Johor Economic Transformation Plan (JETP)

Final Report –Full

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01

Executive Summary.

Executive Summary (1 of 2)

Aspirations

- Johor stands at the cusp of an economic inflection point.
- With a 2030 True North of RM260 billion GDP (up from RM158 billion in 2024), the State is poised to reinforce its position as Malaysia's next engine of growth.
- This vision is anchored on the theme of "Johor Prospers Together".
- At the heart of this journey is the Johor–Singapore Special Economic Zone (JS-SEZ), designed as a high-impact platform to catalyse investment flows, strengthen cross-border linkages, and elevate Johor onto the global stage as a hub of innovation, digitalisation, and sustainability.

Landscape

- Johor today is Malaysia's third-largest economy and one of its fastest-growing, powered by its robust industrial base and strategic geography.
  - **Investment leader**: Since 2021, Johor has secured more than RM240 billion in approved investments, with strong foreign investor confidence (61% FDI share).
  - In Q1 2025 alone, Johor led the nation with RM27 billion approvals, underpinned by data centres, manufacturing, and high-value services.
  - **Strategic assets**: Johor commands Malaysia's second-largest labour force, world-class trade infrastructure (Port of Tanjung Pelepas, Johor Port), fast-growing digital connectivity, and modern industrial parks.
  - **Future-ready enablers**: Expansions in broadband, 5G, airport and port upgrades, as well as rail linkages, position Johor to capture the next wave of advanced industries and digital economy growth.
- Johor's fundamentals are strong, and the State is already laying the foundation for higher-value, innovation-led development.

The Case for Change - Opportunities

- The next chapter for Johor is not about "what is missing," but rather about **unlocking greater value from strengths already in motion**. The JETP outlines clear opportunities:.
  - **From approvals to realisation**: Johor's strong pipeline can translate into accelerated job creation and GDP impact. By raising realisation rates in services and fast-tracking anchor projects, Johor will unlock billions in downstream value.
  - **An AI and digital frontier**: Johor's thriving data centre ecosystem, coupled with proximity to Singapore, presents a once-in-a-generation opportunity to evolve into Southeast Asia's AI, advanced manufacturing, and digital services hub.
  - **Raising productivity and incomes**: By deepening supply-chain integration and nurturing higher-value activities, Johor can lift wages, retain talent, and climb the ladder of global economic complexity.
  - **Future-proofing growth**: Investments in reliable power, treated water, flood resilience, and plug-and-play industrial estates will de-risk growth while giving investors the confidence to scale.
- These opportunities when unlocked, promises benefits to the State of Johor:
  - **Economic**: Higher GDP contribution, sectoral diversification, and job creation.
  - **Technological**: Emergence of Johor as a regional AI and digital hub.
  - **Social & Environmental**: Greater resilience, inclusivity, and sustainability

Source: PASB Analysis

Executive Summary (2 of 2)

Economic Restructuring Approach: Deepening Economic Complexity

- JETP shifts the focus from merely securing investments to accelerating realisation and ensuring they deliver broad-based economic benefits. The programme is built on three pillars:
  a. **Strategic True North** – achieving RM260 billion GDP by 2030;
  b. **Where to Play** – 10 high-potential sectors that can drive competitiveness and economic diversification;
  c. **How to Succeed** – combining efforts to deepen economic complexity and strengthen growth enablers
- Eight priority sectors have been identified, each supported by tailored strategies developed through extensive stakeholder engagements, market analysis, and FGD to capture higher-value segments, integrate into global value chains, and leverage Johor's comparative advantages
- A pipeline of catalytic projects has been identified to accelerate GDP growth, create high-value jobs, and increase the state's export sophistication

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Strengthening Foundations for Growth (Strategic Interventions)

- Four key enablers are essential for sustaining investment momentum and enhancing competitiveness:
  a. **Infrastructure Development** – upgrading industrial parks, transport networks, and utilities to meet investor needs;
  b. **Ease of Doing Business** – streamlining approvals, reducing regulatory bottlenecks, and enhancing investor facilitation;
  c. **Private Investment Catalysts** – enhancing access to capital market and attractive incentives to attract investors;
  d. **Talent and Capacity Building** – expanding skilled workforce pipelines through targeted education, training, and retention strategies
- These interventions will be delivered through a whole-of-government approach, working closely with federal agencies, the private sector, and state-linked companies to ensure timely and impactful execution
- These interventions form the backbone of JETP's transformation agenda — addressing investor pain points, accelerating realisation, and positioning Johor as a globally competitive hub.

Recommendations

- With clear aspirations, strategic interventions, and a disciplined execution, Johor is ready to seize its moment as Malaysia's next economic powerhouse.
- To ensure the delivery of its aspiration to achieve the RM260 billion GDP milestone by 2030, solidifying Johor's role as Malaysia's leading growth engine and recognition as a regional hub for AI, the digital economy, and advanced manufacturing — with resilient and sustainable foundations for long-term prosperity — the JETP recommends that Johor:
  - Fast-track flagship interventions in water, power, digitalisation, and connectivity as investor-critical enablers;
  - Position Johor as Southeast Asia's AI hub by coordinating sustainable data centre growth and building a strong digital talent pipeline;
  - Prioritise resilience and sustainability through accelerated flood mitigation, green energy, and industrial-ready infrastructure;
  - Embed continuous monitoring and governance mechanisms to ensure momentum, accountability, and transparency in delivery.

Source: PASB Analysis

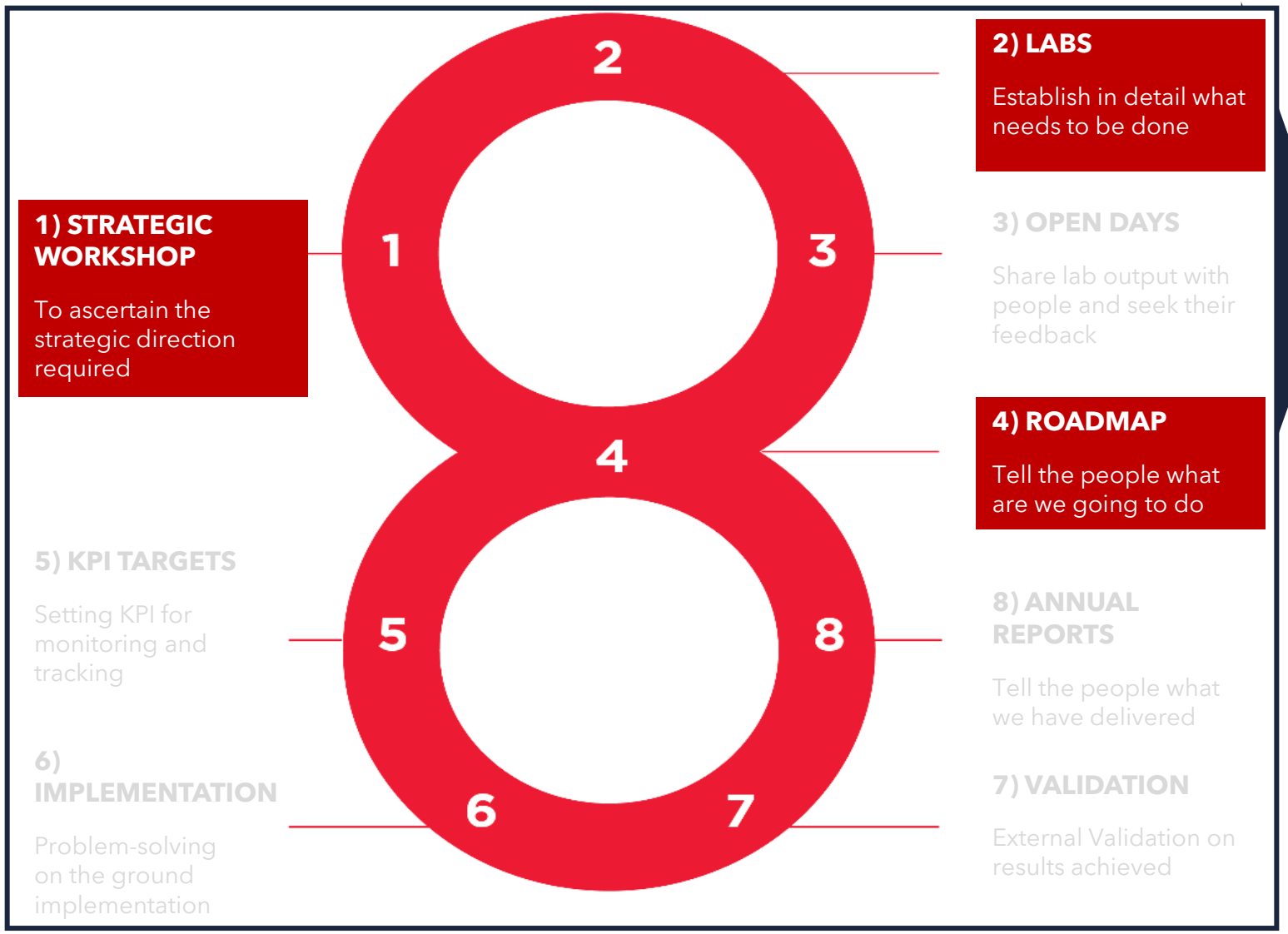
02

Project Overview.

2.1

Project Approach & Timeline.

As part of the comprehensive transformation programme, the Johor State Government is applying PEMANDU Associates' 8-Step BFR Methodology to drive the development of JETP



The current development of JETP will focus on the 3 steps of the BFR methodology:

Step 1 - Strategic Workshop

Step 2 - Labs

Step 4 - Roadmap

Source: PASB

Johor Economic Transformation Programme (JETP)

PEMANDU's role in the development of JETP is divided into three key phases

Project Phase	Description	Key Deliverables
Phase1: Strategic Leadership Engagement	Facilitate high-level discussions with Johor's senior leadership to define the state's strategic direction for economic transformation	• *Baseline assessment* • *True North targets for JETP* • *Prioritised sectors of JETP*
Phase 2: Lab	Conduct multi-stakeholder engagements with public and private sector representatives to identify key investment challenges and develop actionable strategies	• *Lab preparation materials* • *Interim Lab Report*
Phase 3: Post Lab	Consolidate findings from Lab discussions and stakeholder engagements into a final lab report, incorporating feedback from iteration sessions before formal submission	• *Final Lab Report*

The JETP development began in January and concluded with a final lab report consolidating key findings, strategies, and interventions as a guideline for the state government

Jan – Feb '25	Feb – Jun '25	Jun – Aug '25
Phase 1: Strategic Leadership Engagement	**Phase 2: Lab**	**Phase 3: Post Lab**
Baseline Assessment • Assess Johor's economic landscape, strategic plans, and recent developments • Identify key gaps and benchmark Johor's performance against relevant comparisons	**Stakeholder Engagements** • Conduct interviews with key stakeholders to identify catalytic projects across sectors • Identify bottlenecks that hinder investment and project implementation	**Strategic Interventions / Initiatives** • Prioritise key issues that need to be addressed to accelerate investment realization • Develop strategic interventions to resolve implementation barriers
Strategic Leadership Engagement (SLE) • Engage state leadership to align on Johor's transformation direction • Define the True North targets for 2030 and prioritised sectors for JETP	**Focus Group Discussion (FGD)** • Facilitate FGDs with stakeholders in prioritised sectors • Co-develop sector visions and strategies aligned with JETP objectives	**Validation & Co-creation** • Validate the proposed interventions with relevant agencies and stakeholders • Refine and co-create detailed implementation plans for the state government
Output / Deliverables		
Baseline assessment **True North targets & prioritised sectors**	**Lab preparation materials** **Interim lab report**	**Final lab report**

JETP was developed through extensive stakeholder engagements, adopting a co-creation approach to ensure the plan is practical and implementable

Phase1:
Strategic Leadership Engagement

JETP Official Launch

200+ Participants
from various government agencies, local and district offices, state GLCs and private sector industry players

Key Discussion Items:
- Johor baseline assessment
- True North visioning exercise

Strategic Leadership Engagement

70+ State Leaderships
leaders of various government agencies, local and district offices and state GLCs

Key Discussion Items:
- True North targets
- Sectors prioritisation

Phase2:
Lab

Stakeholder Engagements

150+ Stakeholders Engaged
from both private sector and public sector

Key Discussion Items:
- Investment opportunities
- Key issues & challenges

Focus Group Discussion (FGD)

132 Total Participants
from private and public sector, academic and industry experts

Key Discussion Items:
- Sectoral vision
- Sectoral growth strategies

Phase 3:
Post Lab

Initiatives and Implementation Plan Development

40+ Stakeholders
engaged involving private and public sector representatives to ensure alignment in initiative ownership and clear implementation plan

Key Discussion Items:
- Targeted initiatives requiring state government intervention
- Implementation plan

Source: PASB Engagements

The development of JETP is anchored on four key components that form the foundation of its strategic framework, guiding Johor's transformation into an advanced state

Key Guiding Principles in JETP Strategic Framework

Set and define the strategic True North targets that are quantifiable that are aligned with Johor's long-term ambitions

Identify Johor's strategic strengths and high-potential sectors that will generate sustained economic impact

Formulate targeted strategic interventions to attract investments and address key implementation barriers

Establish a comprehensive implementation plan outlining timelines, KPIs, responsibilities, and governance structure for effective delivery

Source: PASB Analysis

2.2

Overview of Johor Economic Transformation Programme (JETP).

Maju Johor 2030 (MJ30) is anchored on 6 key thrusts aimed at driving economic growth and advancing Johor's development by 2030

6 Thrusts of Maju Johor 2030

Thrust 1: Governance

To improve the **governments delivery system** that ensures **transparency**, **efficiency** and **integrity** to the people and prospective investors.

Thrust 2: Economic Development

To position the State of Johor as **Malaysia's economic powerhouse** while remaining **competitive** on a global scale

Thrust 3: Social Security Net

To uphold the principle of **"fair state"** and emphasise **social welfare** towards **vulnerable communities** and those in need of overcoming current socioeconomic challenges

Thrust 4: Facilities & Basic Amenities

To guarantee the availability of **facilities** and **basic amenities** that are **sufficient** and **safe** to meet the needs of the people and catalyse the state's economic growth

Thrust 5: Safety, Cleanliness & Environmental Sustainability

To ensure that the **safety, cleanliness** and **sustainability** of the environment is aligned with the "Sustainable Development Goals"

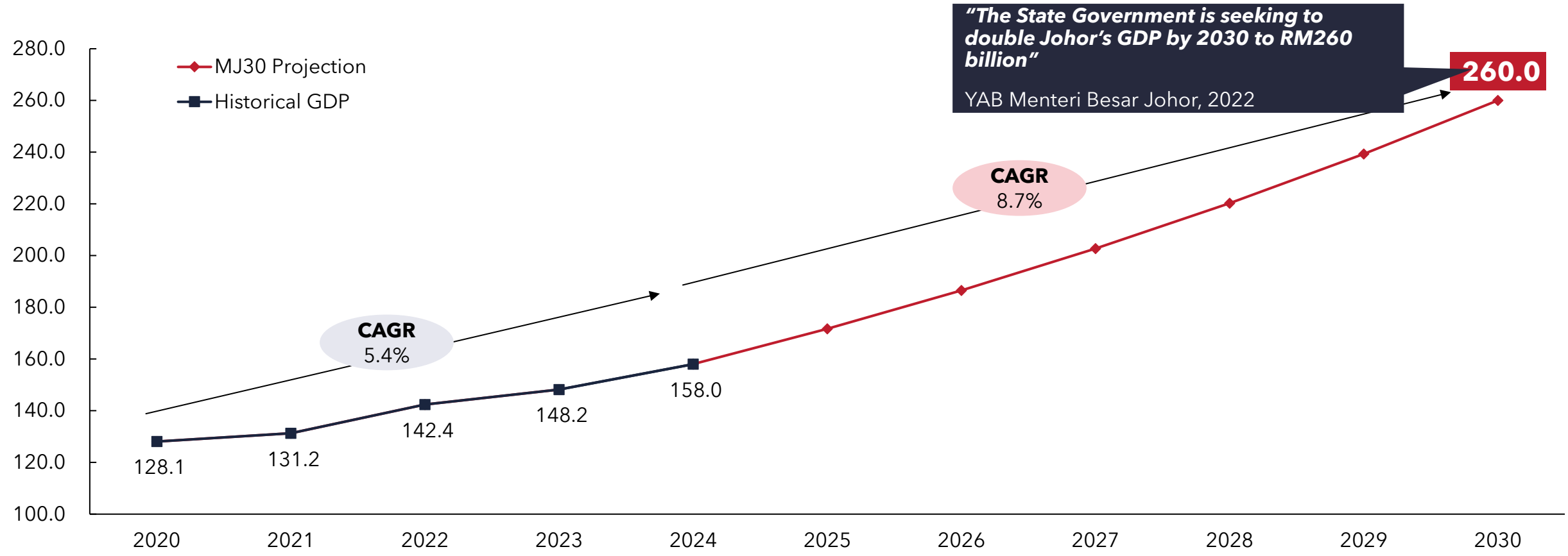
Thrust 6: Johor Youth

To empower the **Johor Youth** as the most prominent group in becoming potential **leaders** and future **economic drivers** that will develop the state

Source: Maju Johor 2030

Under MJ30, the state government aims to double Johor's GDP to RM260 billion by 2030, positioning the state as an advanced, high-income economy with sustainable and inclusive growth

Johor's Historical and Projected GDP (Constant Prices), 2015-2030
RM Billion



Source: DOSM, Maju Johor 2030, PASB Analysis

To support this bold ambition, JETP is developed as an expansion of *Thrust 2* of the MJ30 framework, anchored on 3 core targets – GDP, Private Sector Investments and Employment

6 Main Thrusts under Maju Johor 2030

Source: Maju Johor 2030

Key Objectives

1. **Economic Powerhouse in Malaysia**
   Propelling Johor to become a leading economic hub by fostering an ecosystem that supports both established and emerging industries

2. **Private Sector Investments**
   Attracting high-quality investments from both foreign and domestic sources to spur economic growth through a business-friendly environment, incentives, and infrastructure

3. **New Employment Opportunities**
   Empowering Johor's workforce by equipping individuals with industry-relevant skills and knowledge while creating meaningful job opportunities for the rakyat, ensuring inclusive and sustainable economic growth

The development of JETP is aligned with existing State and National plans to ensure a cohesive and consistent economic narrative for Johor's transformation

State Plans

NON-EXHAUSTIVE

State Documents	Objectives
Maju Johor 2030	• Maju Johor is a 2030 agenda to drive Johor's development through 6 core thrusts: (1) Governance, (2) Economic Growth, (3) Social Security, (4) Infrastructure, (5) Sustainability, and (6) Youth
Johor State Structure Plan (RSN 2030)	• RSN 2030 is based on the provisions of the Town and Country Planning 1976 (Act 172) to spearhead development across the Johor State
Pelan Pembangunan Mampan Johor (PPMJ) 2030	• PPMJ 2030 serves as a guiding document for stakeholders to drive Johor's sustainable and dynamic development in line with the "Negeri Berprestasi Tinggi dan Bangsa Johor Bestari" vision
Johor Green Deal	• Policy framework for green growth in Johor involving 5 key pillars: (1) Energy, (2) Transport & Mobility, (3) Land Use, Nature & water, (4) Low Carbon Cities, (5) Industry
Rancangan Tempatan Daerah (RTDs)	• Local planning document that guides district-level development, translating state policies into detailed land use and infrastructure plans to ensure sustainable and organized growth

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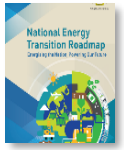
Federal Plans

NON-EXHAUSTIVE

Federal Documents	Objectives
13th Malaysian Plan (2026 – 2030)	• The 13MP aims to achieve high-income nation status and greater social inclusion by 2030 through 4 pillars: boosting economic complexity, enhancing social mobility, reforming public services, and promoting environmental sustainability. It targets 4.5–5.5% GDP growth, GNI per capita of RM77,200 and 40% employee compensation share of GDP by 2030
New Industrial Masterplan (NIMP) 2030	• NIMP 2030 aims to propel the Manufacturing and Services industries. The government hopes to provide strategic direction towards the growth of targeted industries, act as a reference for foreign investors, as well as strengthen the government's role in building up the nation's economy.
 **National Energy Transition Roadmap (NETR)**	• NETR, aims to accelerate Malaysia's energy transition efforts by focusing on shifting from traditional fossil fuels-based economy to a high-value green economy. NETR identified six levers comprising ten flagship catalyst projects.
Comprehensive Development Plan iii (CDPiii) Iskandar Malaysia 2030	• CDPiii serves as a strategic framework aimed at transforming the region into a resilient, inclusive, and sustainable metropolis of international standing. It focuses on four key areas: fostering a High-value Economy, Cultivating a Productive Society, Enhancing Climate Resilience Towards Carbon Neutrality, and Developing an Integrated, Liveable City

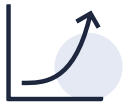
Source: Government of Malaysia; State of Johor; various news articles

JETP adopts the vision of *Johor Prospers Together*, prioritising inclusive economic prosperity, social wellbeing, technological leadership, and environmental stewardship

JETP Vision Statement

"Johor Prospers Together"

Which can be characterised by:



1 Economic Prosperity

- JETP aims to position Johor as one of Malaysia's leading economic powerhouses and a premier destination for high-quality investments

2 Social Wellbeing

- Johor is committed to fostering inclusive growth by ensuring equal opportunities for all communities across the state

3 Technological Leadership

- Johor aims to position itself as a hub for technological advancement by attracting private sector investments in cutting-edge technology while enhancing government delivery through the adoption of advanced digital solutions

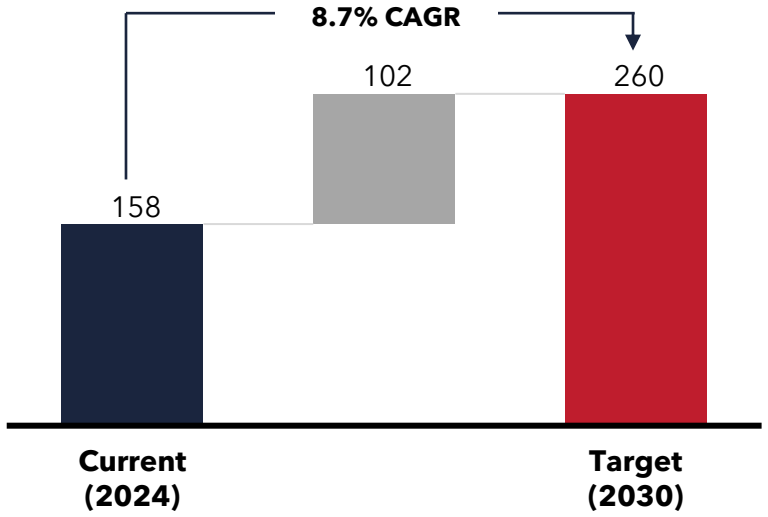
4 Environmental Stewardship

- JETP seeks to position Johor as a leader in sustainability by implementing proactive measures to mitigate and adapt to climate change, ensuring a resilient environment for future generations

Source: Outcome from JETP SLE with YAB Menteri Besar Johor

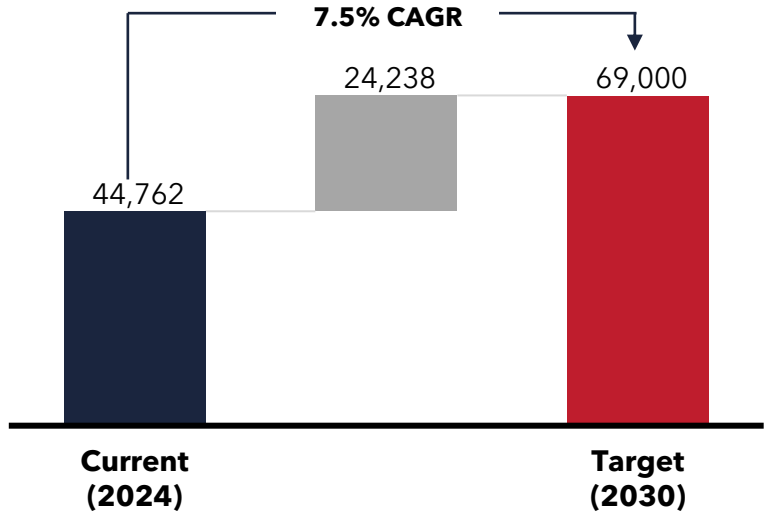
On 21 February during the Strategic Leadership Engagement, 3 key goals have been set for JETP for Johor to achieve by 2030 – in alignment to MJ30

GDP (RM Billion)



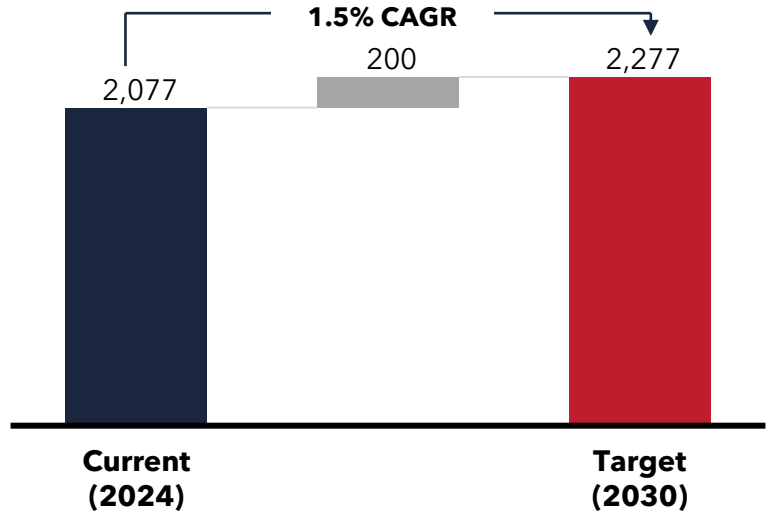
- Realising the next wave of private-sector investments is **projected to lift Johor's GDP to RM260 billion by 2030**, achieving an accelerated 8.7% CAGR and firmly positioning the state on a high-income, innovation-driven growth trajectory

GDP 2030 Per Capita (RM)



- By accelerating and strengthening high-value sectors, **Johor's GDP per capita is projected to rise to over RM69,000 by 2030**, growing at 7.5% CAGR and firmly positioning the state **above the World-Bank high-income benchmark**

New Employment Opportunities ('000)



- The successful realisation of private-sector investments across Johor's prioritised sectors is **projected to create more than 200,000 new, high-quality job opportunities**, expanding employment at a steady 1.5% CAGR and strengthening the state's long-term economic resilience

Source: PASB analysis, Outcome from JETP SLE with YAB Menteri Besar Johor

03

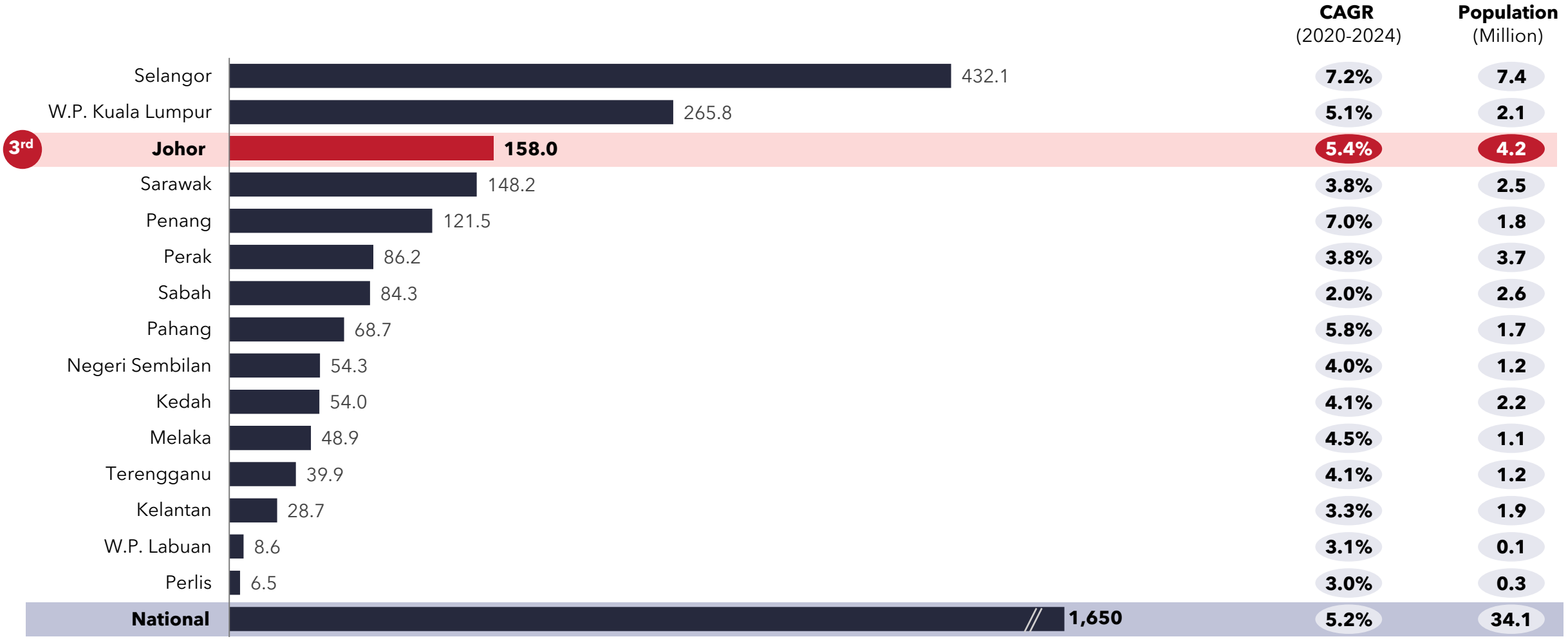
Johor Current State Assessment.

3.1

Johor Economic Landscape.

Johor is Malaysia's 3rd largest economic contributor, with an average growth rate of 5.4% between 2020 and 2024, outpacing the national average of 5.2% in the same period

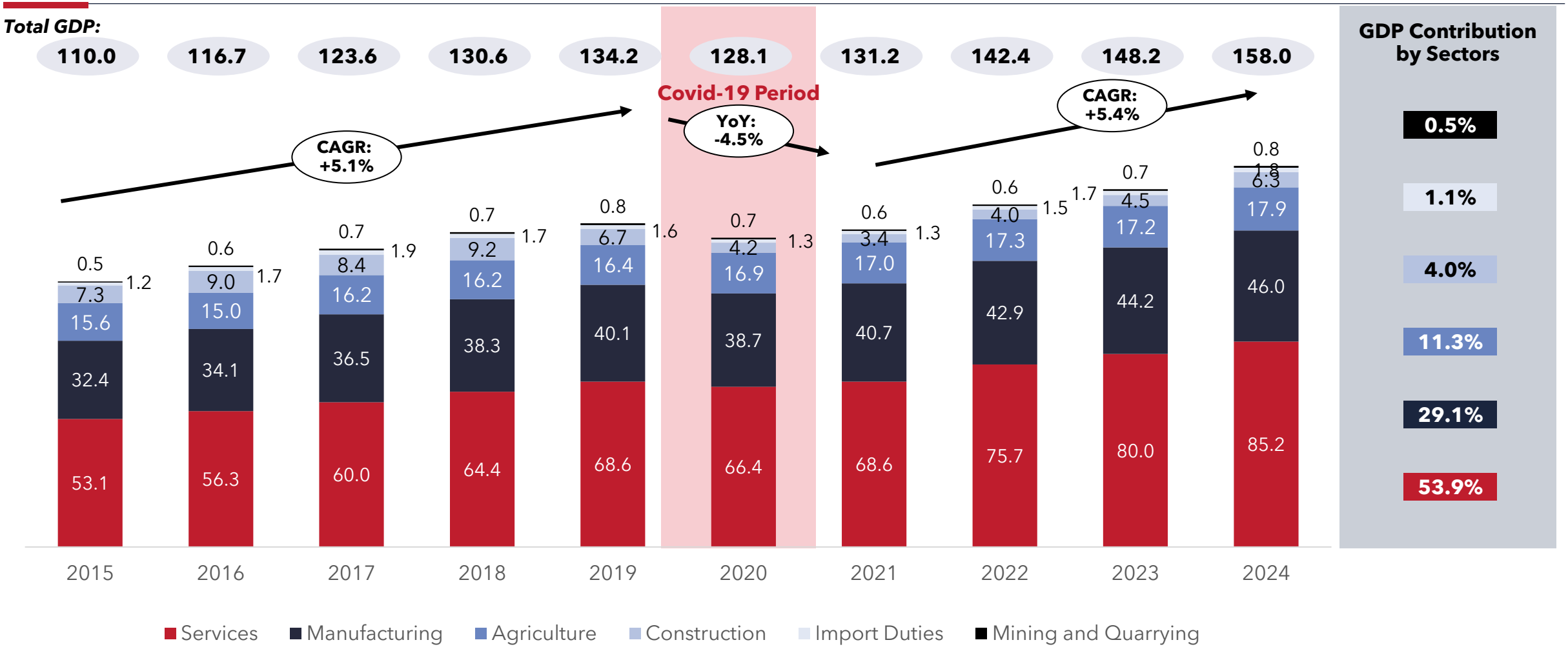
GDP by States (Constant Prices), 2024
RM Billion



Source: DOSM, PASB Analysis

Johor's economy rebounded strongly post-COVID, recording 5.4% growth between 2020 to 2024, driven primarily by the services and manufacturing sectors

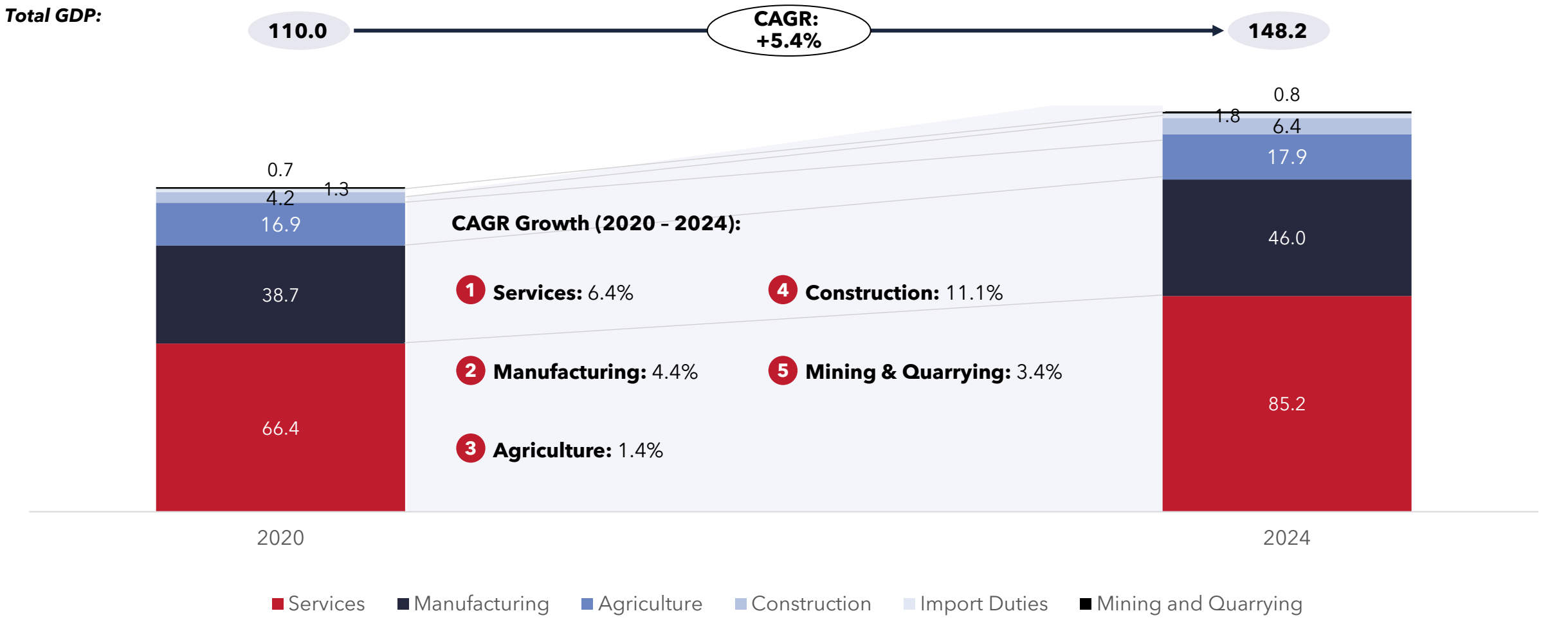
GDP by sectors (Constant Prices), 2015 – 2024
RM Billion



Source: DOSM, PASB Analysis

Between 2020 to 2024, the construction sector recorded the fastest growth in Johor, followed by services, manufacturing, mining & quarrying, and agriculture

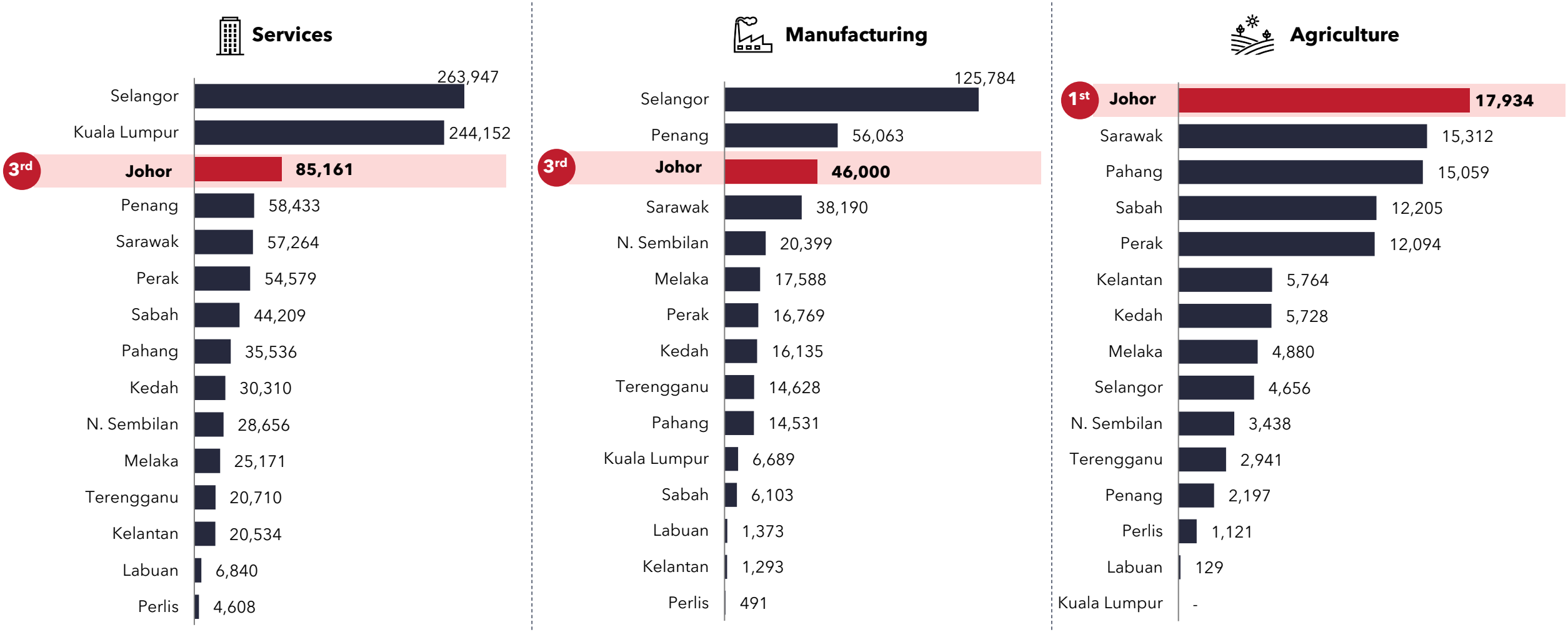
GDP by sectors (Constant 2015 Prices), 2020 – 2024
RM Billion



Source: DOSM, PASB Analysis

Johor's services and manufacturing sectors are the third largest, while its agriculture sector ranks first in Malaysia

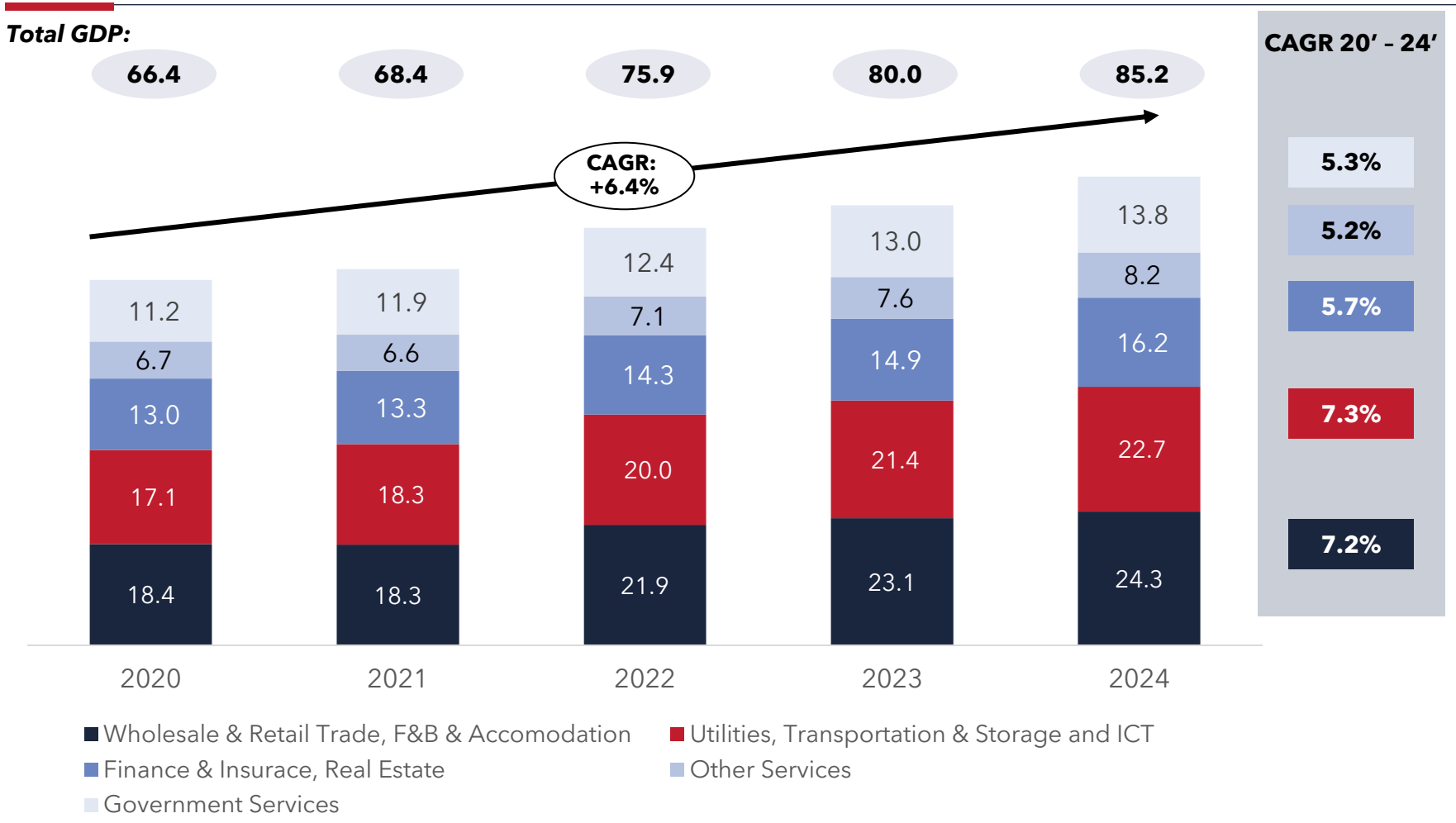
Key Sectoral GDP Comparison by Malaysian States (2024)
RM Million



Source: DOSM

Johor's services sector is contributing over RM85 billion to GDP in 2024, driven primarily by wholesale and retail trade, F&B, and accommodation services

Services Sector in Johor, 2020 – 2024
RM Billion



CAGR 20' – 24'

- 5.3%
- 5.2%
- 5.7%
- 7.3%
- 7.2%

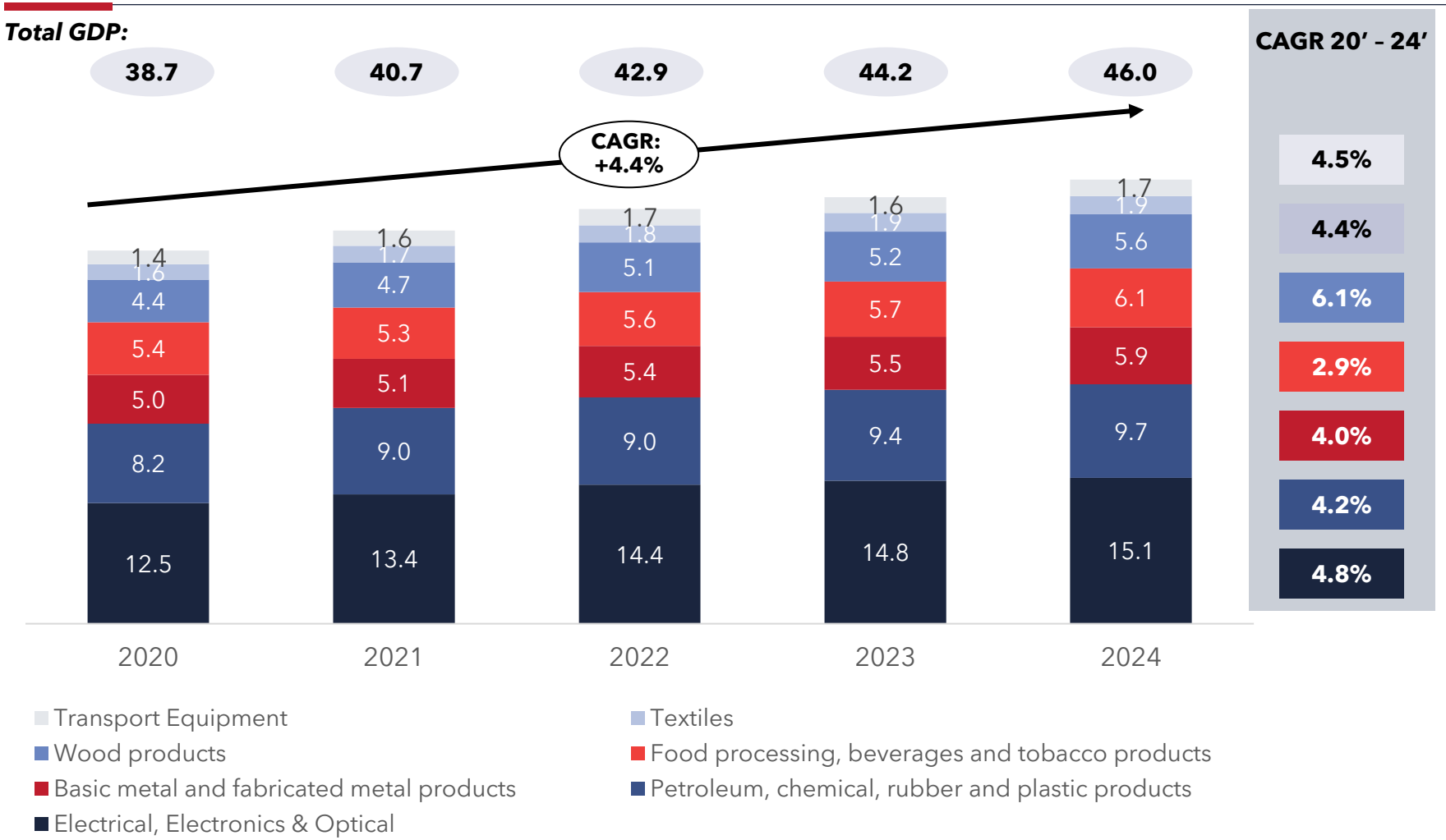
Key Highlights

- Services sector has grown at a CAGR of 6.4% between 2020 to 2024 with a contribution of **RM85.0 billion** to the state's GDP in 2024
- The state is the **3rd largest service economy** in Malaysia, contributing over **8.7% of the national services sector** in 2024
- Tourism-related services such as wholesale and retail trade, food and beverage, and accommodation formed the largest component of Johor's services sector, contributing **RM24.3 billion in 2024**
- That same year, Johor recorded the highest number of visitor arrivals in the country, with over **15 million visitors**
- Between 2020 to 2024, utilities, transportation, storage & ICT sub-sector grew the fastest at 7.3% in tandem with industrial development in the state

Source: DOSM, PASB Analysis

Johor's manufacturing sector recorded over RM46 billion in GDP in 2024, driven primarily by E&E and optical products

Manufacturing Sector in Johor, 2020 – 2024
RM Billion



CAGR 20' – 24'
4.5%
4.4%
6.1%
2.9%
4.0%
4.2%
4.8%

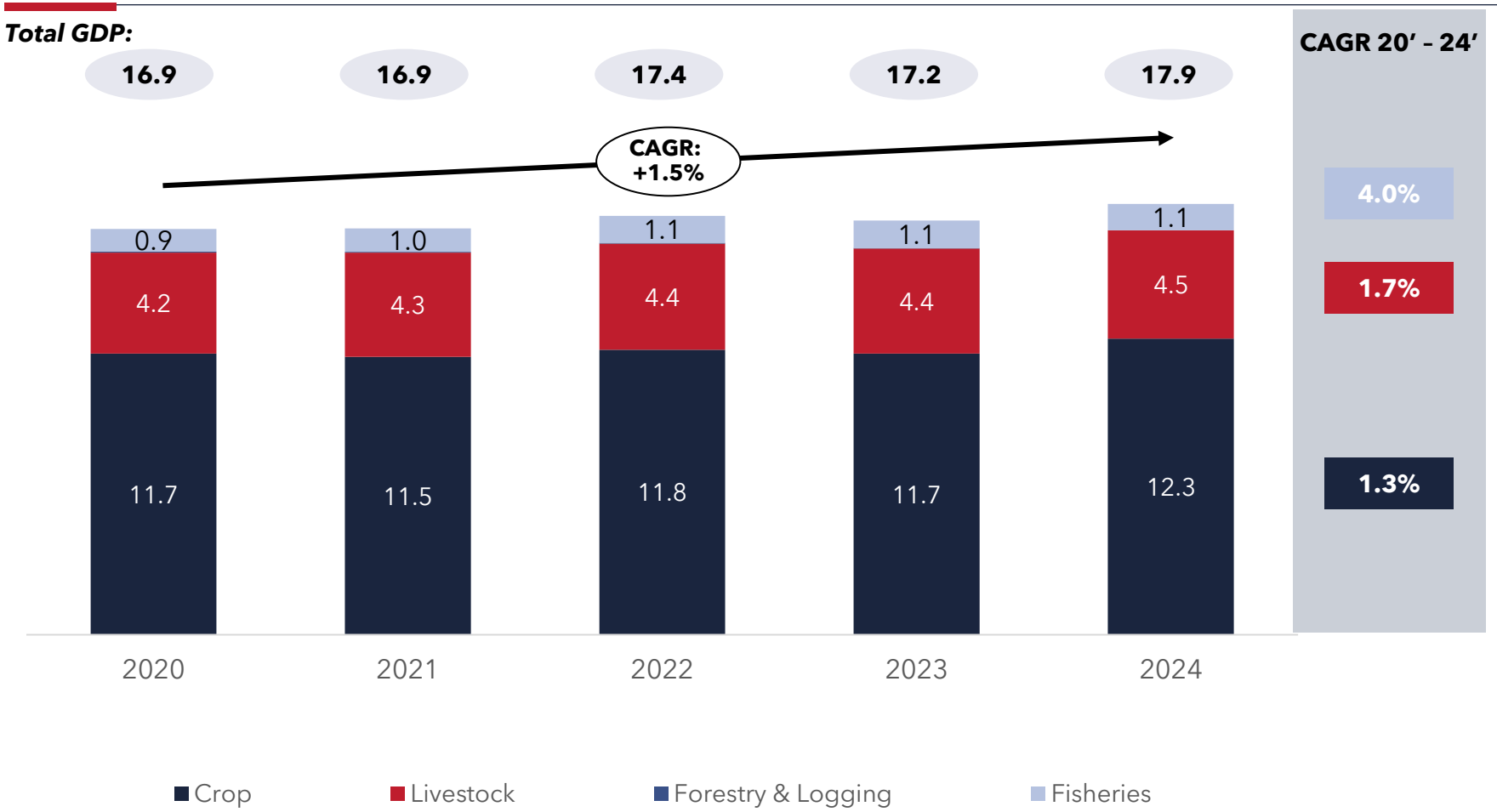
Source: DOSM

Key Highlights

- Johor's manufacturing sector has grown at a **CAGR of 4.4%** with a contribution of **RM46 billion in 2024**
- The manufacturing sector in Johor is the **3rd largest** in the country, contributing over **12% to national manufacturing sector**
- **The electrical, electronics, and optical products sub-sector** was the largest contributor to the state's manufacturing output, accounting for **RM15.1 billion in 2024**
- The wood products sub-sector has been the fastest growing sub-sector between 2020 to 2024 with 6.1% CAGR growth

Johor is the largest GDP contributor to the national agriculture sector with RM17.9 billion in 2024, driven primarily by crop production

Agriculture Sector in Johor, 2020 – 2024
RM Billion



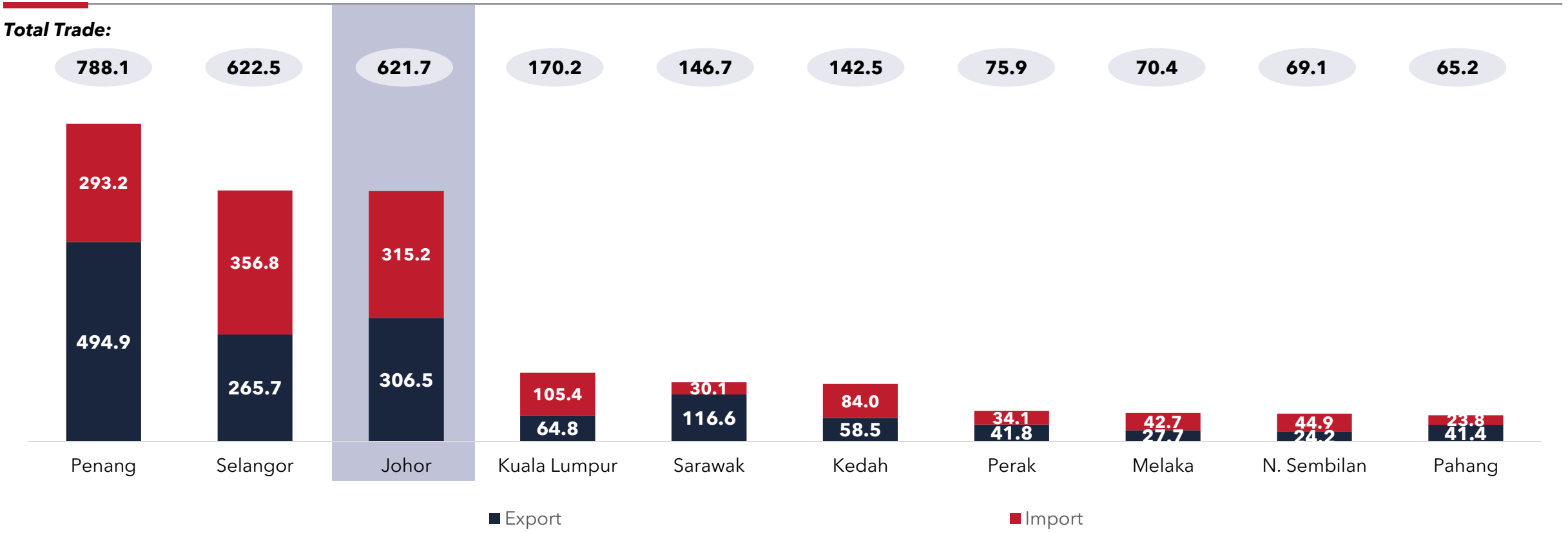
Key Highlights

- The agriculture sector contributed **RM17.9 billion, accounting for 11.3% of Johor's GDP**
- Johor's agricultural output represents **17.3% of Malaysia's total agricultural GDP**, underscoring its pivotal role in the country's agro-economy
- The state is a major producer of **palm oil, rubber, crops like pineapples and durians**, and boasts the country's largest livestock food production park

Source: DOSM
Note: GDP contribution from Forestry & Logging is minimal and not visible in the graph

Johor is also the third largest contributor to national trade, accounting for over 21% of Malaysia's total with RM621.7 billion in trade value in 2024; marginally behind Selangor

Total Trade by States (Top 10 States), 2024
RM Billion

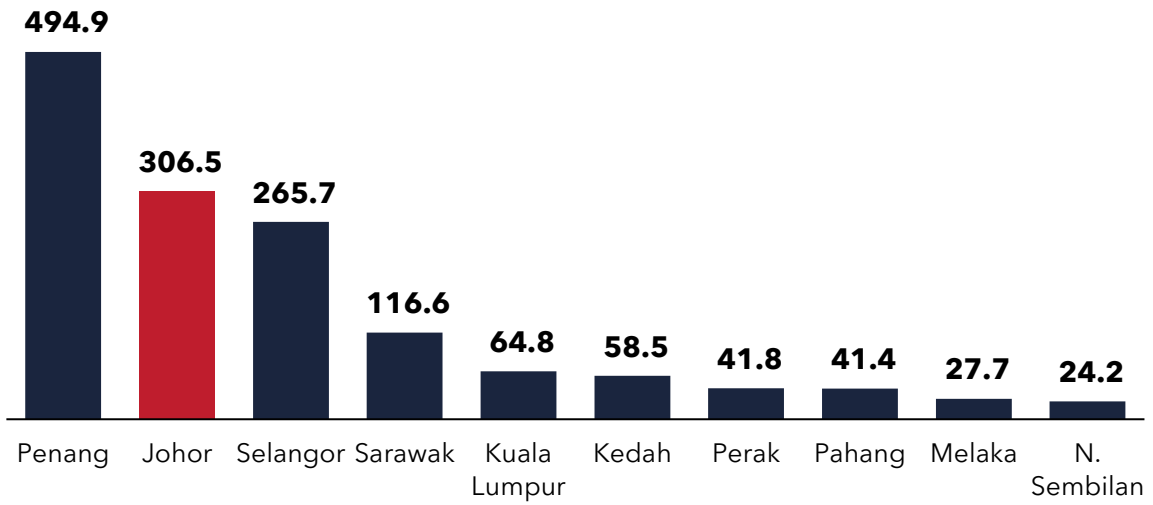


Johor's industrial base plays a critical role in Malaysia's trade activities, supported by its strategic ports and logistics infrastructure that are integral to Southeast Asia's trade network. Key ports like the Port of Tanjung Pelepas (PTP) and Johor Port provide excellent connectivity for both export and import activities

Source: DOSM

As Malaysia's second largest exporter, Johor recorded over RM306 billion in merchandise exports in 2024—trailing Penang but surpassing Selangor

Merchandise Export by States (Top 10 States), 2024
RM Billion



Johor's Main Exports (2024):

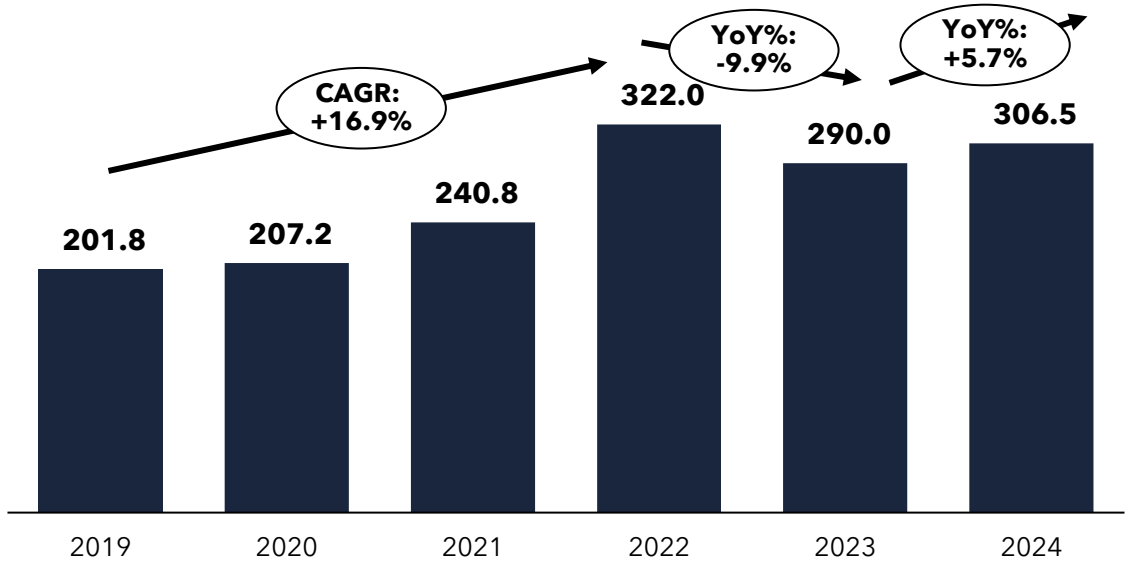
Refined Petroleum Products
- RM80.7 billion
- 26.3% of total exports

Electronic Integrated Circuits
- RM27.5 billion
- 9.0% of total exports

Other E&E Products
- RM30.2 billion
- 9.8% of total exports

Palm Oil
- RM11.7 billion
- 3.8% of total exports

Johor's Total Exports (2019 – 2024)
RM Billion



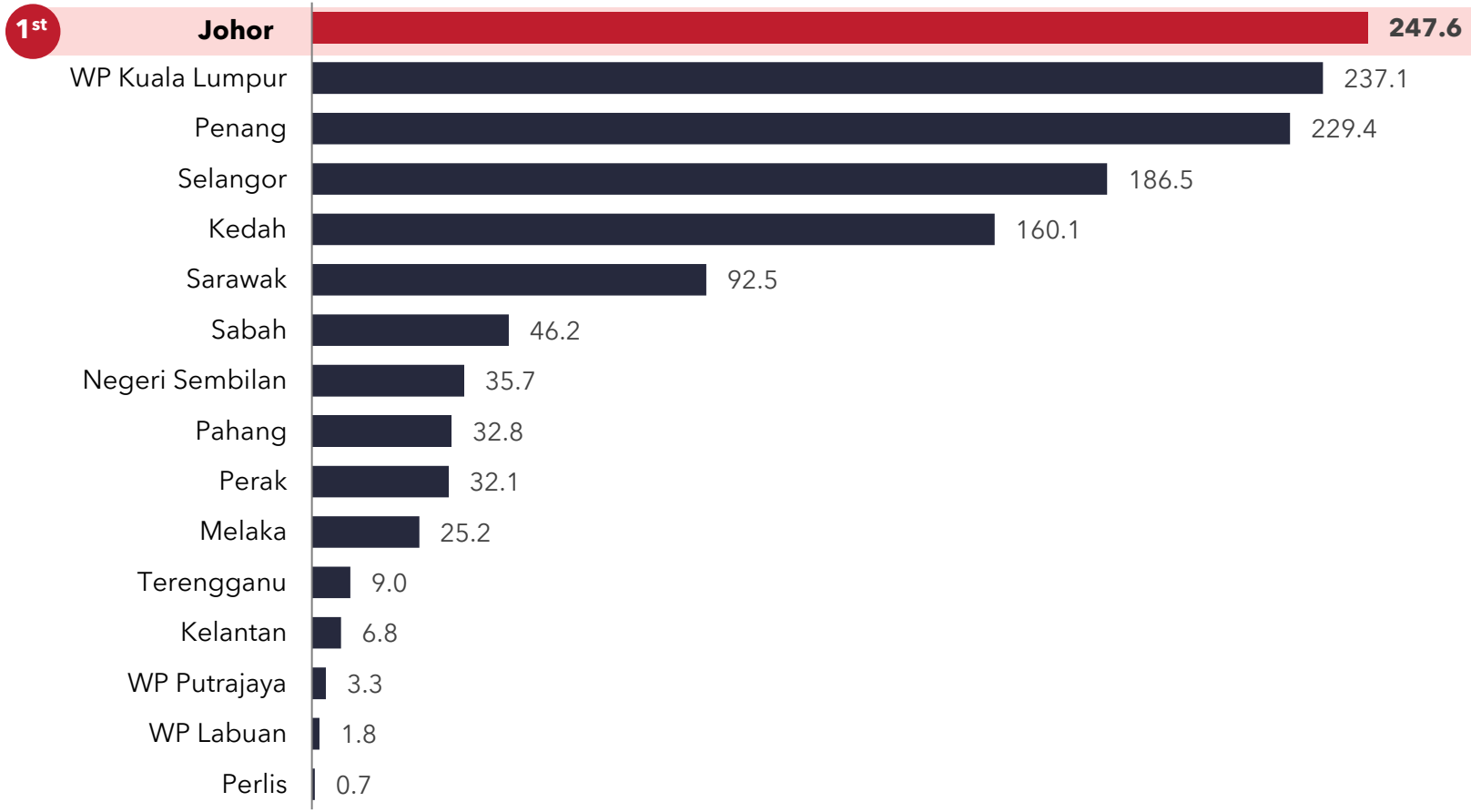
Johor's Main Export Markets (2024):

*Johor's total exports experienced a steady growth from 2019 to 2022, with a **CAGR of 16.9%**, before declining in 2023 due to the **global economic slowdown and commodity price volatility***

Sources: DOSM, PASB Analysis

Between 2021 and Q1 2025, Johor secured over RM247 billion in approved investments, largely driven by FDI

Cumulative Approved Investments from Various Sectors, 2021 – Q12025
RM Billion



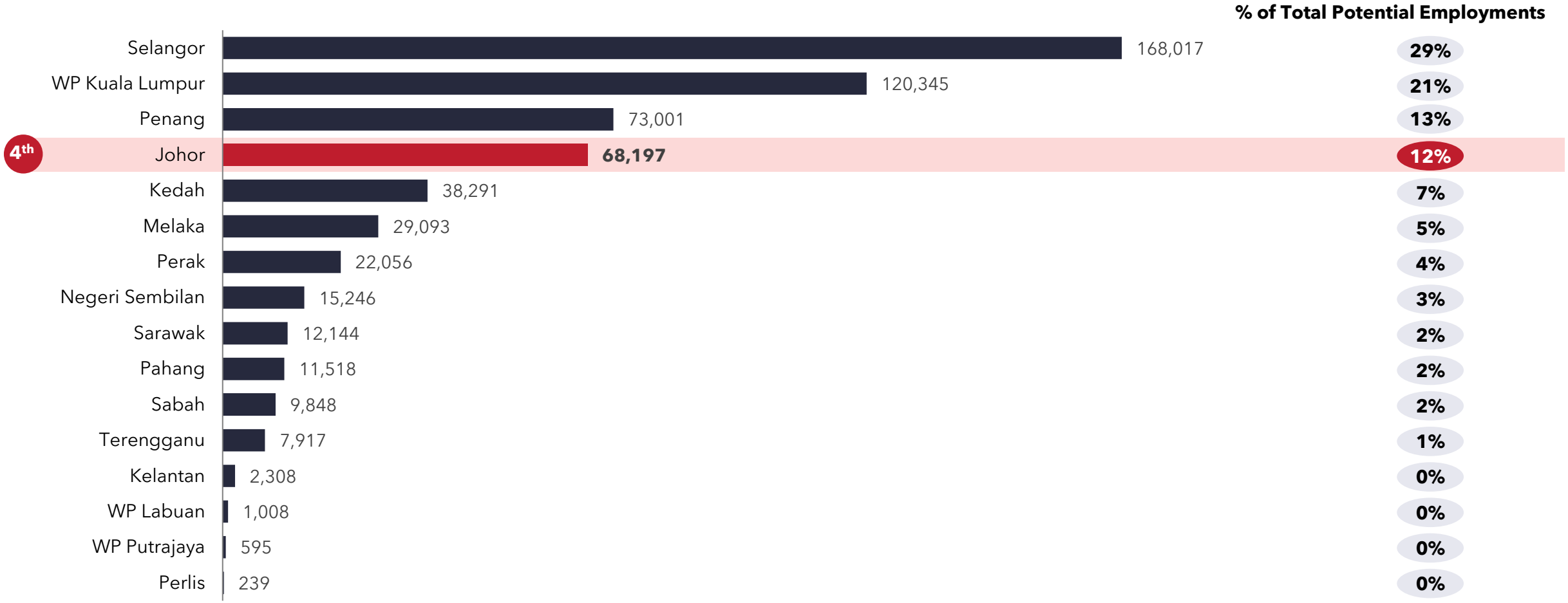
FDI constituted almost 61% of total investment in Johor

	FDI (RM Billion)	DDI (RM Billion)
Johor	150.4	97.2
WP Kuala Lumpur	108.7	128.4
Penang	172.3	57.1
Selangor	82.6	103.9
Kedah	147.2	12.9
Sarawak	34.5	58.0
Sabah	21.3	24.9
Negeri Sembilan	20.0	15.7
Pahang	15.2	17.6
Perak	9.2	22.9
Melaka	16.3	8.9
Terengganu	6.7	2.3
Kelantan	1.3	5.5
WP Putrajaya	0.0	3.3
WP Labuan	1.1	0.7
Perlis	0.0	0.7

Source: MIDA, PASB Analysis

Between 2021 to 2024, Johor created over 68,000 potential employment opportunities from the approved investments, contributing 12% of Malaysia's total

Cumulative Potential Employments from Various Sectors, 2021 – 2024



Note: Potential employment data for Q1 2025 has not yet been released by MIDA

Source: MIDA, PASB Analysis

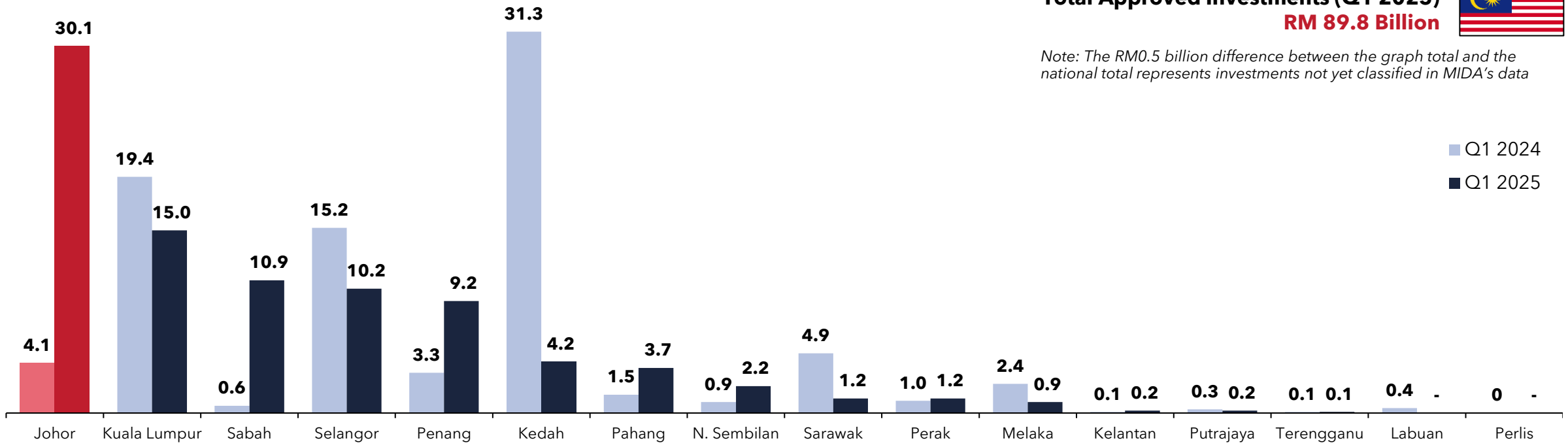
In Q1 2025, Johor led the nation in approved investments, securing over RM30 billion in investment driven primarily by the services sector

Approved Investments by States, Q1 2024 & Q1 2025

RM Billion

Total Approved Investments (Q1 2025)
RM 89.8 Billion

Note: The RM0.5 billion difference between the graph total and the national total represents investments not yet classified in MIDA's data

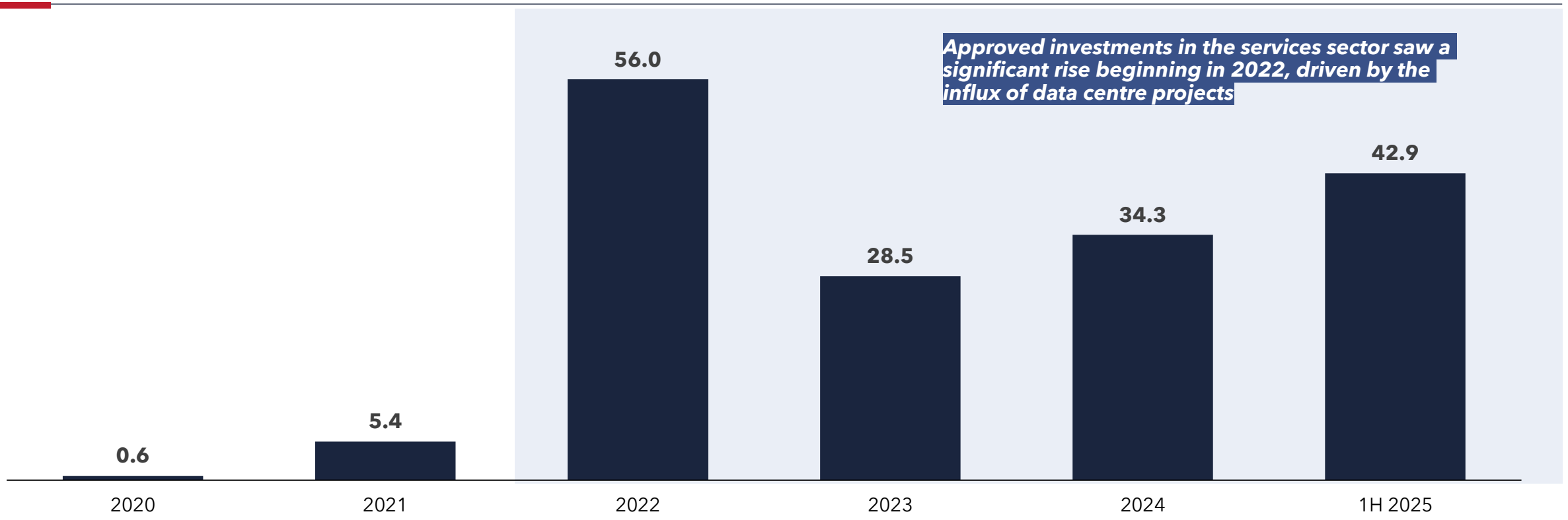


Johor recorded the largest year-on-year surge in approved investments in Q1 2025, rising from RM4.1 billion in Q1 2024 to over RM30 billion, driven mainly by the services sector (RM27.1 billion) and supported by manufacturing (RM3 billion)

Source: MIDA, PASB Analysis

In recent years, Johor has seen a rise in services sector investments, particularly in information and communication, fueled by the growing influx of data centre projects

Johor's Approved Investments in Services Sector, 2020 – 1H2025
RM Billion



The surge in data centre investments since 2022 has significantly boosted Johor's approved investments in the services sector, driving it to record-breaking levels and positioning the state as a key hub for digital infrastructure

Source: MIDA

Johor has been able to benefit from the spillover of data center investments from Singapore, driven by Singapore's moratorium on new developments and Johor's proximity, lower costs, ample land, and ready infrastructure

2019

Singapore enforces a nationwide moratorium on building more data centers on the island due to energy sustainability concerns

In addition to Singapore's moratorium, Johor is at the same time blessed with several competitive advantages…

- *Low Cost of Construction*
- *Cheaper Cost of Utilities*
- *Ample Availability of Land*
- *Investor Friendly Environment*

… which has led Johor to becoming a key hyperscale data centre hub for large technology firms

NON-EXHAUSTIVE

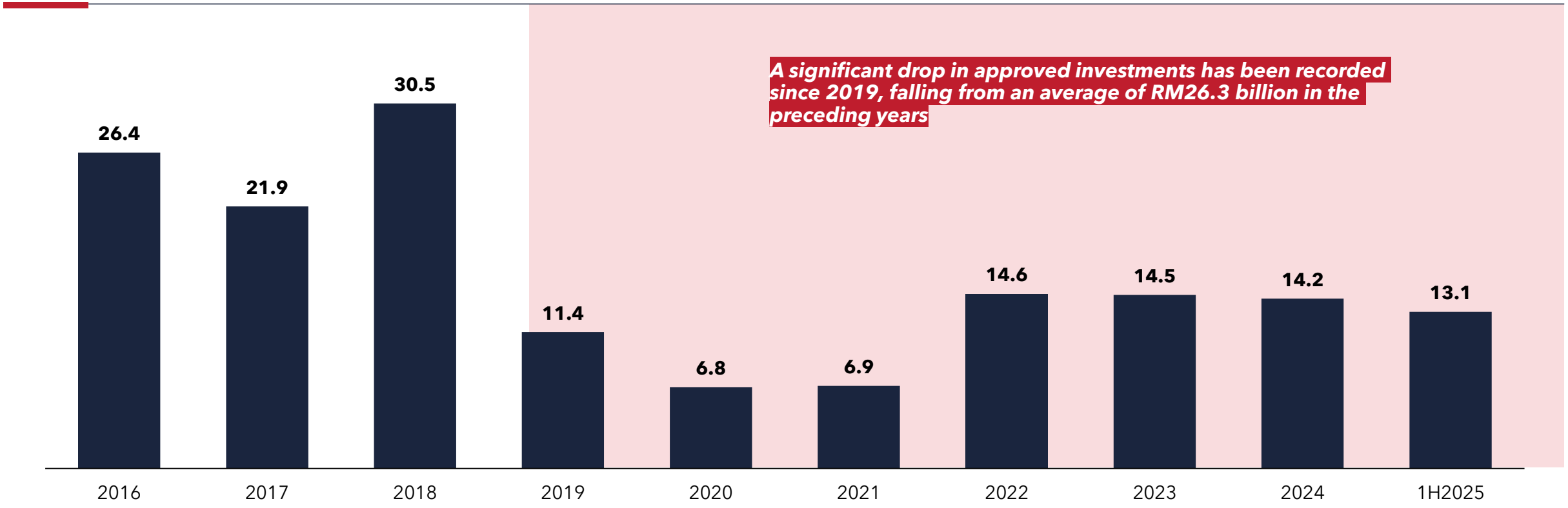
NVIDIA, Microsoft, sea, YTL Power YTL GROUP, STTelemedia Global Data Centres, GDS万国数据, EQUINIX, MN, AIRTRUNK, Princeton DG, yondr

Establishment of data centres in Johor by renowned tech companies indicates the potential that Johor has, to further leverage on its current position and foreign interest to become one of the largest data centre hubs in the region

Source: MIDA, Channel News Asia, The Star Malaysia, Baxtel

Following a period of correction post-COVID, manufacturing investments in Johor show signs of stabilisation

Johor's Approved Investments in Manufacturing Sector, 2016 – 1H2025
RM Billion



Approved investments in the manufacturing sector saw a sharp decline in 2019, primarily driven by a significant drop in investments in the petroleum products, petrochemical, and electrical & electronics sectors

Source: MIDA, BPENJ

Johor continues to build its investment ecosystem within the manufacturing sector, having successfully attracted recent large-scale investments into the state

NON-EXHAUSTIVE

2025: SICK AG (Germany) is investing nearly **RM1 billion** to establish high-tech manufacturing hub for advanced sensor technologies for global automation markets which sets to generate **2,500 jobs**

2025: Gold Peak Technology, a listed company from Hong Kong is investing over **RM670 million** to build nickel-zinc battery manufacturing & R&D centre inside the new JS-SEZ

2024: Masimo Medical Technologies, a leading player in mission-based and technology company opened its first production facility in Pasir Gudang with an investment over **RM100 million**

2024: BMW Group Malaysia announced the **expansion of its regional parts distribution center from 45,000 sqm to 65,000 sqm** located in the Free Industrial Zone, Senai

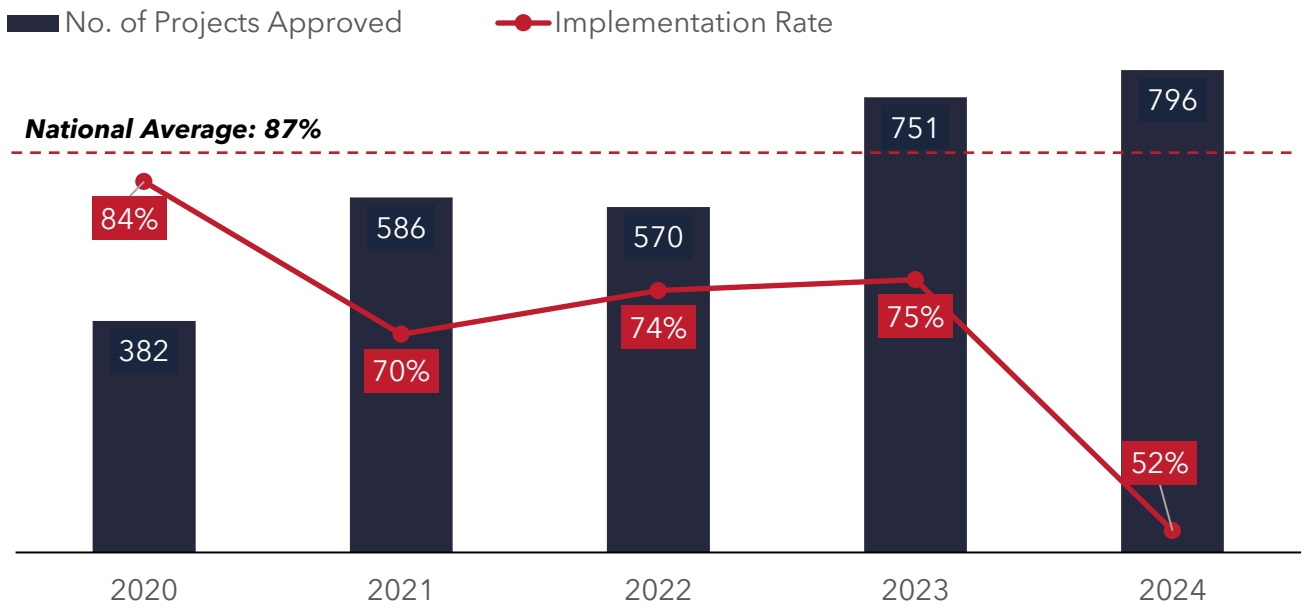
2024: SP Manufacturing, an electronics manufacturing services company founded and headquartered in Singapore, has announced its expansion into Senai

2023: Ferrotec Power Semiconductor recently invested **RM520 million** in its new 60,000 sq ft manufacturing facility in Pasir Gudang

Source: MIDA, Investment Monitor, The Edge

Between 2020 and 2024, Johor recorded an average yearly project implementation rate of 71%, below the national average of 87%, with 929 projects still pending implementation

Johor Implementation Rate of Approved Investments, 2020 – 2024, %



Number of Implemented Projects:

2020	2021	2022	2023	2024	Total
320	410	433	571	422	2,156

Number of Unimplemented Projects:

2020	2021	2022	2023	2024	Total
62	176	137	180	374	929

Key Highlights:

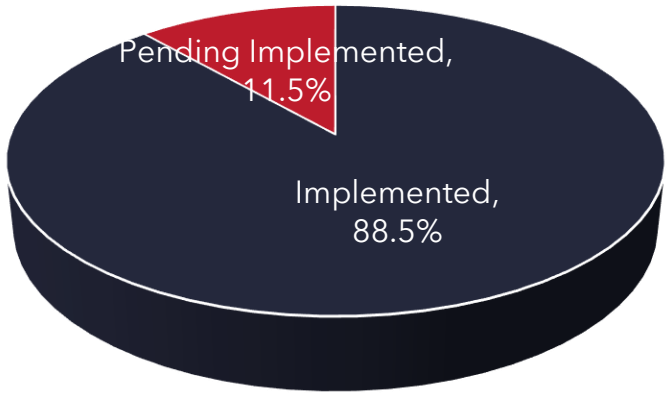
- Over the past 5 years (2020–2024), Johor has maintained a relatively healthy investment realisation rate, averaging at **71% for MIDA approved investment projects**
- Current trends indicate that most approved projects reach a realisation rate of over **70% within a 2-3 year timeframe**. On an annual basis, as of 2024, the realisation rate for project implementation stands at over 50%
- The efficiency of public sector services particularly at the local authority level in areas such as land administration and development approvals plays a critical role in accelerating the realisation of these investments
- Notably, the introduction of the ***Johor Super Lane*** initiative has contributed to faster realisation by reducing red tape and enhancing the efficiency of approval processes for investors.

Note: *Based on the definition received from MIDA, the realisation rate of approved investments indicates the commencement of implementation activities, such as factory construction and machinery installation; however, it does not imply that the full investment value has been fully disbursed*

Source: MIDA, PASB Analysis

A closer look reveals that the manufacturing sector in Johor has a high implementation rate of over 88%, whereas the services sector lags significantly behind at just 60%

Implementation Rate (Manufacturing), 2020 – 2024



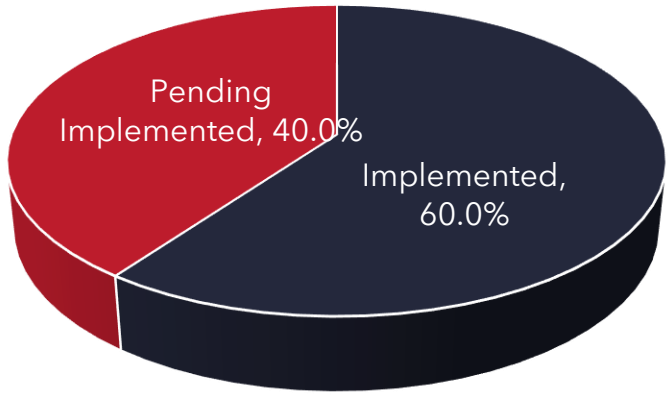
Total Projects:
1,050

Implemented Projects:
929

Pending Implementation:
121

The implementation rate for manufacturing sector projects in Johor has been relatively efficient at over 88% implementation rate for the period of 2020 to 2024. This is a great testament to of the great effort by the state government through initiative such as Johor Fast Lane to accelerate the facilitation of the project implementation in Johor

Implementation Rate (Services), 2020 – 2024



Total Projects:
2,035

Implemented Projects:
1,227

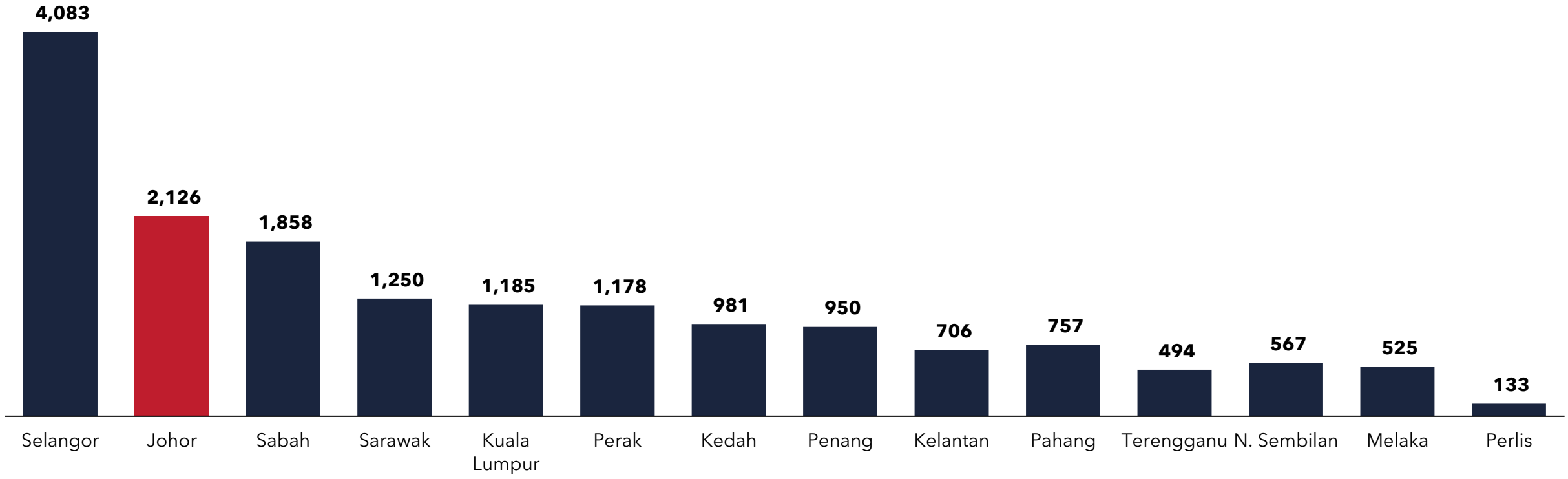
Pending Implementation:
808

The services sector has been the primary driver of Johor's approved investments in recent years, accounting for approximately 69% of the state's total approved investments between 2020 and 2024. However, the sector's implementation rate remains relatively low, with only 60% of approved projects having been realized to date. This slow pace of implementation poses a risk to Johor's ability to fully capture the economic and employment benefits anticipated from these investments

Source: MIDA, PASB Analysis

Johor possesses the second largest labour force in Malaysia, positioning it as a key talent hub - this strategic advantage is further strengthened by the presence of major universities

Total Labor Force by States, 2024
'000

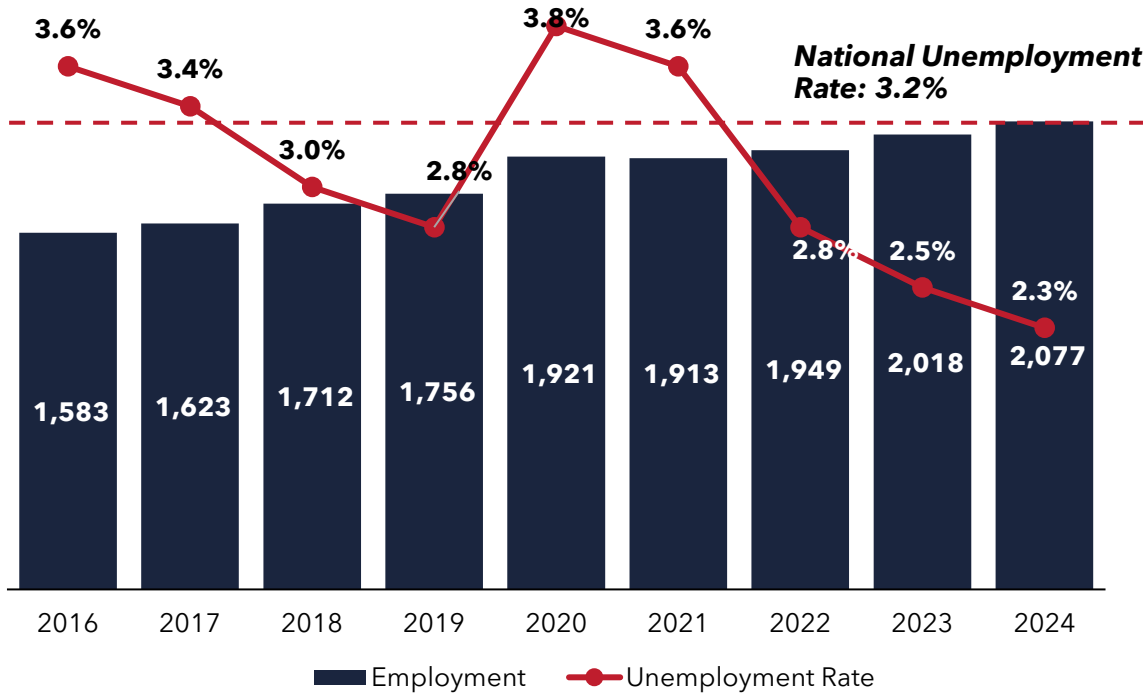


Johor's large labour force gives the state a strategic advantage in attracting investors, offering access to a broad talent pool supported by major local universities such as UTM and UTHM that continue to produce a steady pipeline of skilled graduates in the state

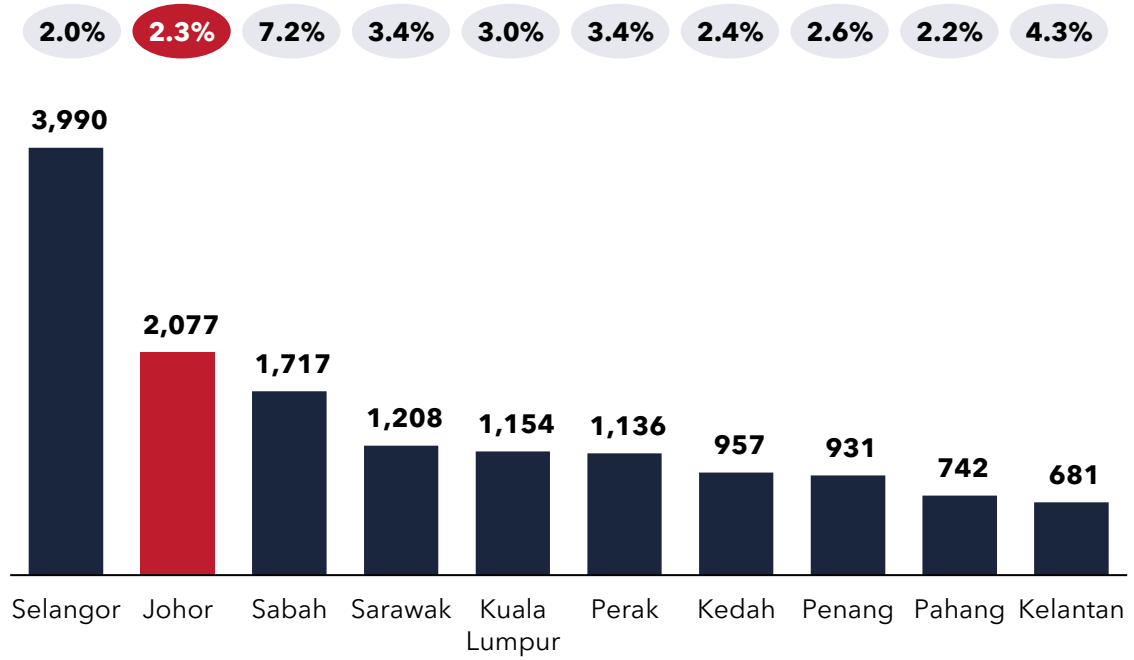
Source: DOSM

Johor's vibrant economic growth has contributed to a steady increase in the employment rate over the past few years, in line its overall economic growth trends

Johor Total Employment and Unemployment Rate, 2016 - 2024
Thousands *('000), %*



Employed Persons and Unemployment Rate by States (Top 10), 2024
'000, %

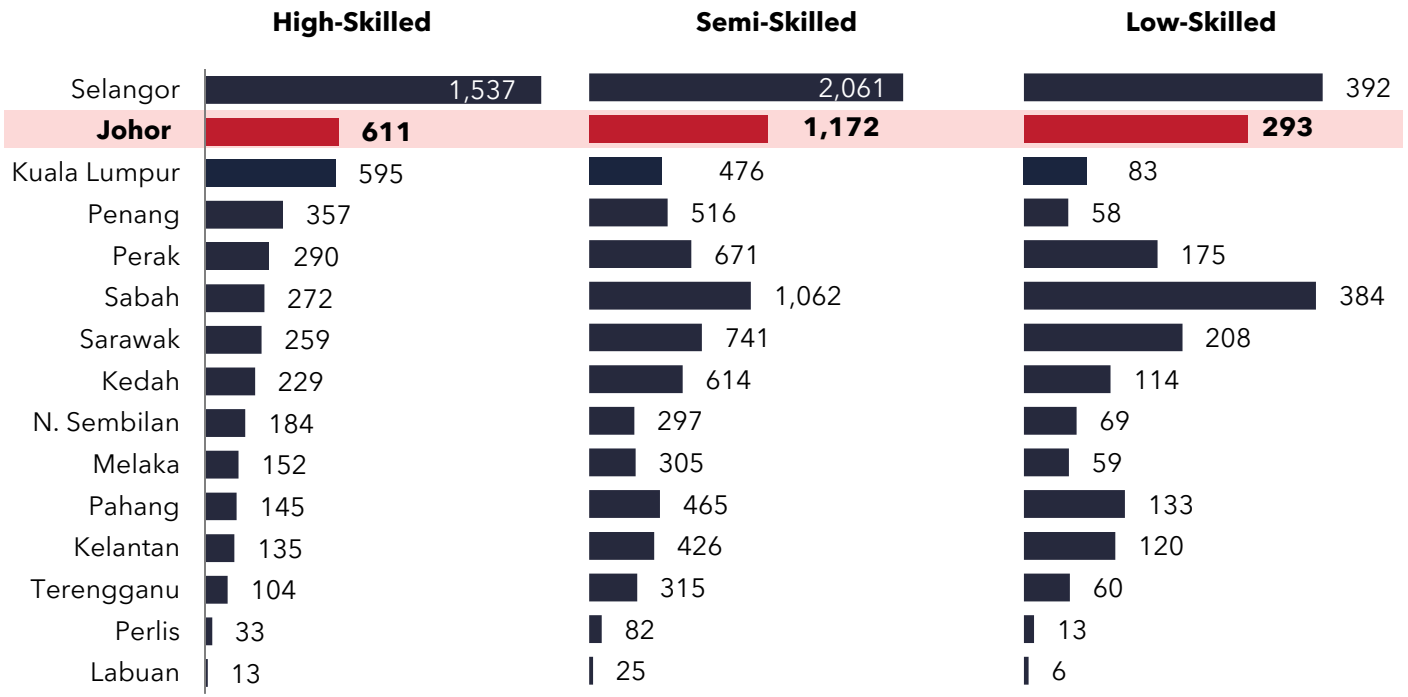


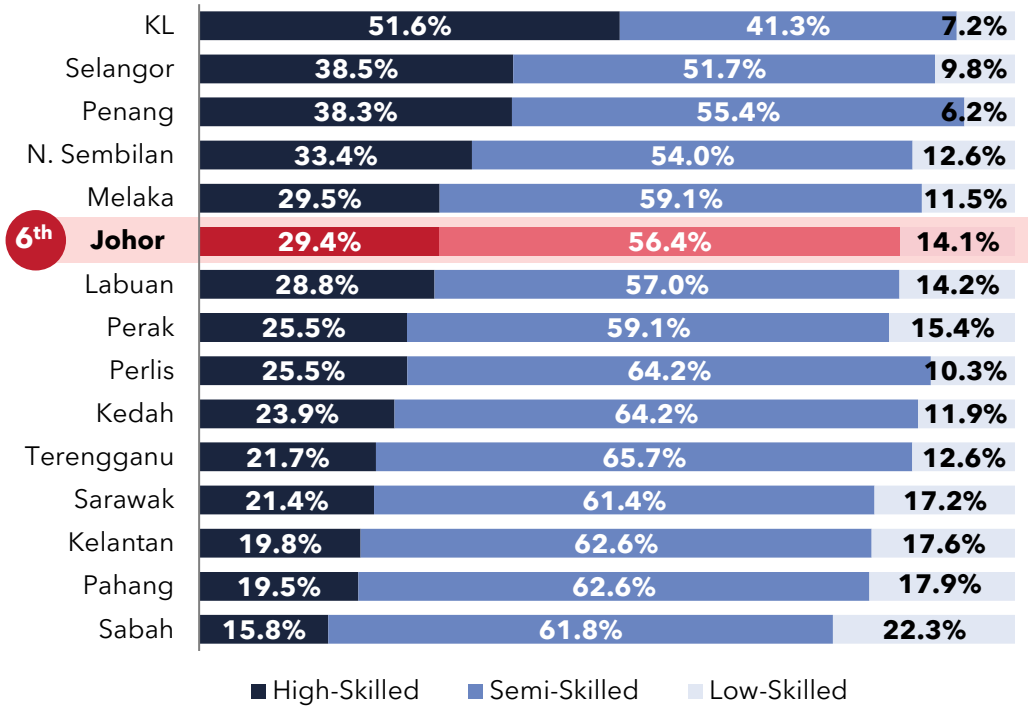
- *Johor's total employment grew at a CAGR of 3.5% from 2016 to 2024, surpassing 2 million mark, with an unemployment rate of 2.3% which is well below the national average of 3.2%*
- *Nationally, Johor ranks 2nd in total employment, aligned with its overall economic growth trends*

Source: DOSM, PASB Analysis

Johor has over 29% of its workforce classified as skilled – which is a comparatively smaller proportion that may limit its transition toward high value-added sectors

Employed Persons by Skills by States, 2024
'000, %



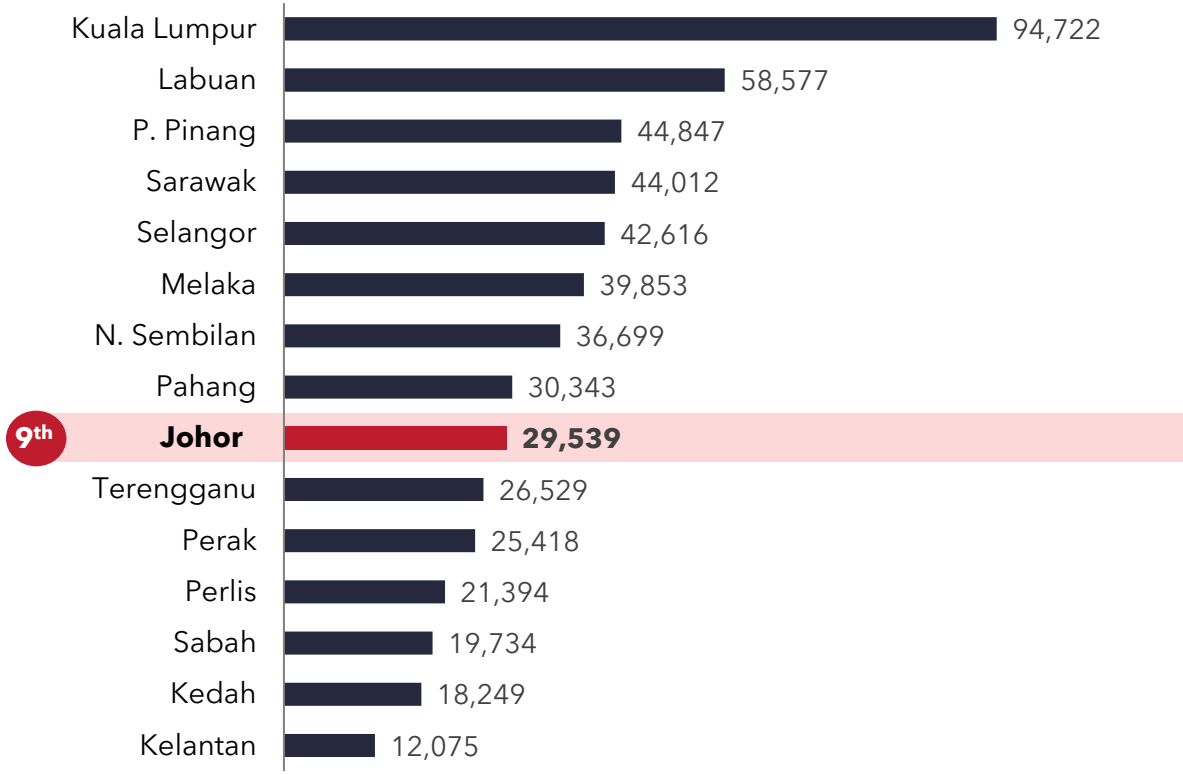


- *Over 56% of Johor's workforce is classified as semi-skilled, which may reflect the state's reliance on labour-intensive and moderately complex economic activities*
- *In contrast, the number of skilled workforce in Selangor and WP Kuala Lumpur combined is over 3.4 times larger than Johor's, indicating that higher value-added jobs, potentially driven by advanced technology and knowledge-based roles are contributing significantly to productivity and GDP growth in these states*

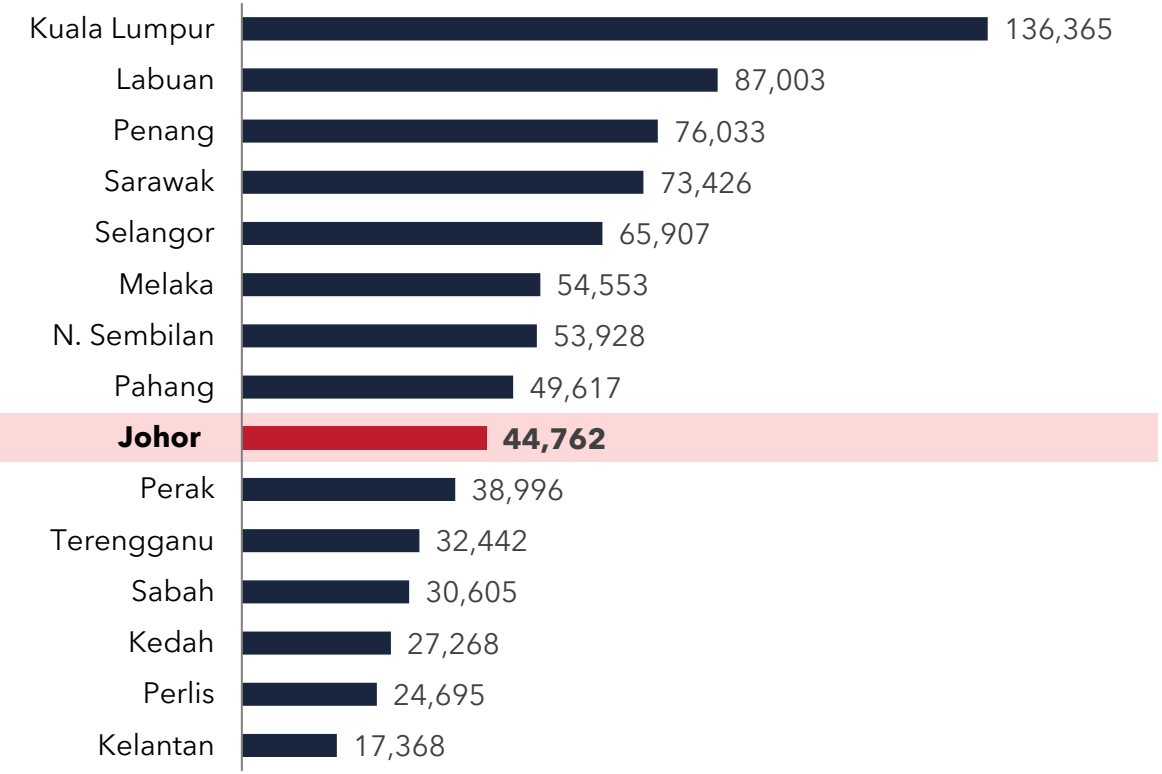
Source: DOSM, PASB Analysis
Note: Data for 2024 is not yet available

Johor currently ranks 9th in the GDP per capita, indicating a potential inequitable distribution of economic growth within the state

GDP Per Capita by States, 2015
RM



GDP Per Capita by States, 2024
RM



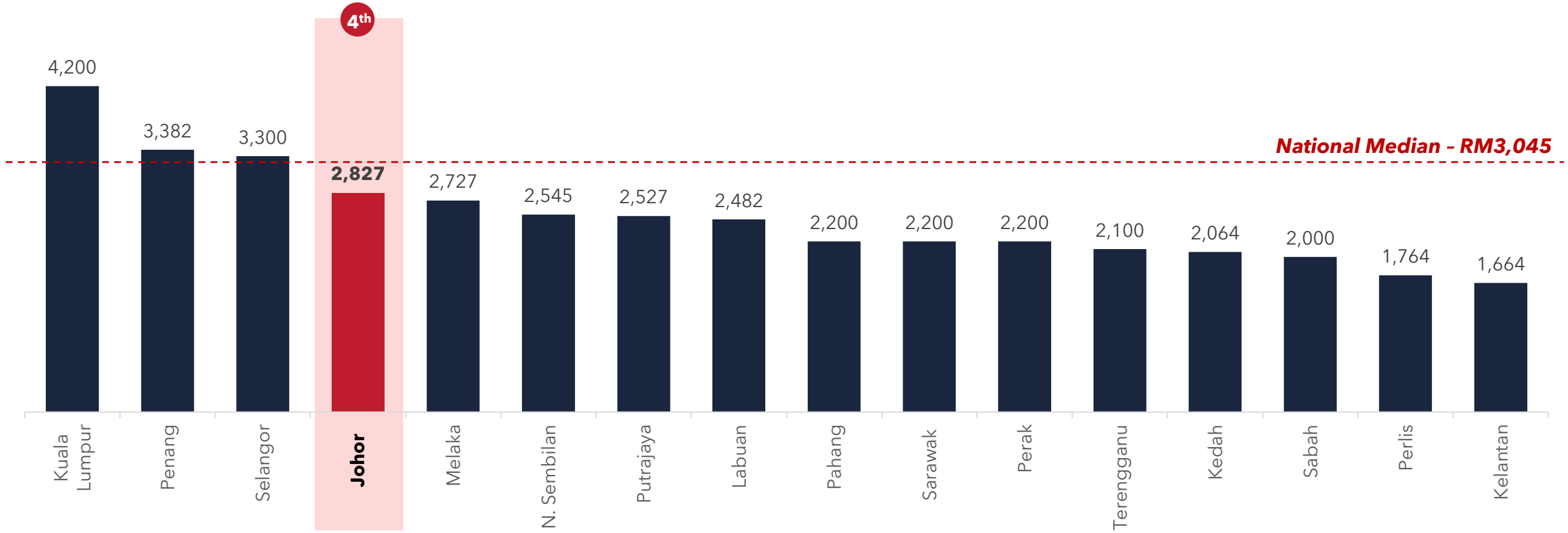
Johor is the 2nd most populous state in Malaysia, with a population of over 4.2 million. The uneven distribution of economic growth across the state has likely been a significant factor contributing to its lower GDP per capita

Source: DOSM

The state ranks 4th in median monthly salary at RM2,827, trailing Kuala Lumpur, Penang, and Selangor, and remains below the national average of RM3,045

Median Monthly Salary, 2024

RM

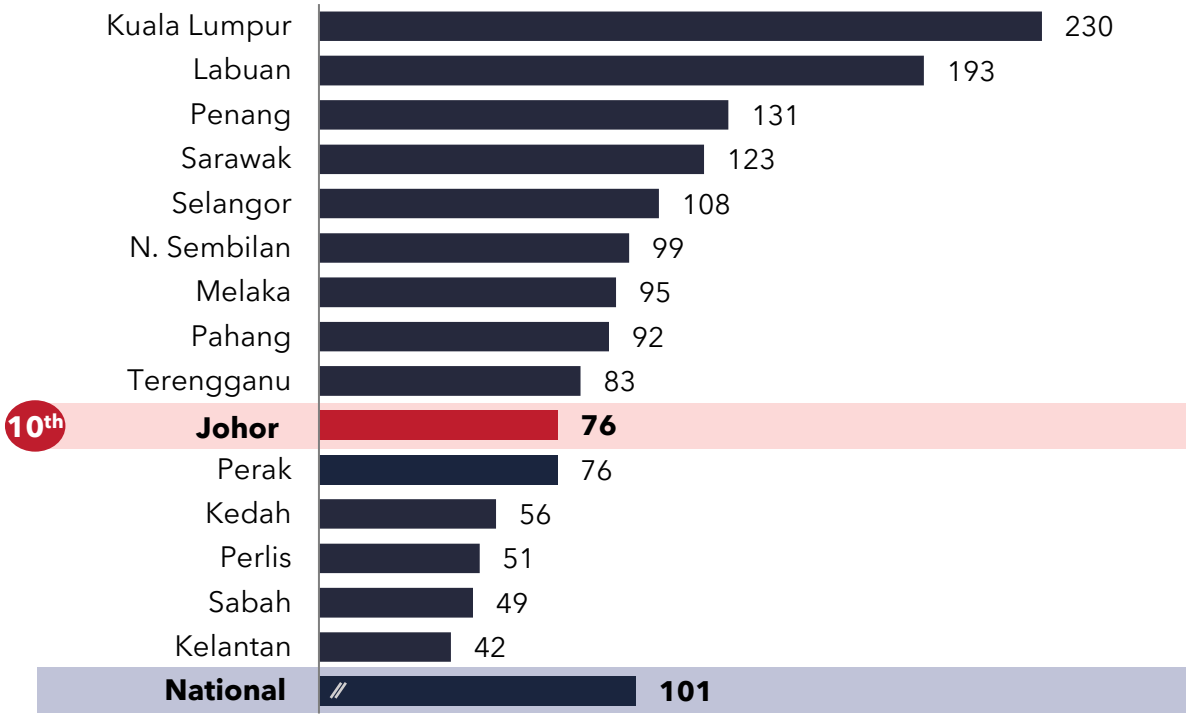


Despite an improvement in in recent years, Johor's median salary remains below the national average and lags behind high-income states like Kuala Lumpur, Penang and Selangor

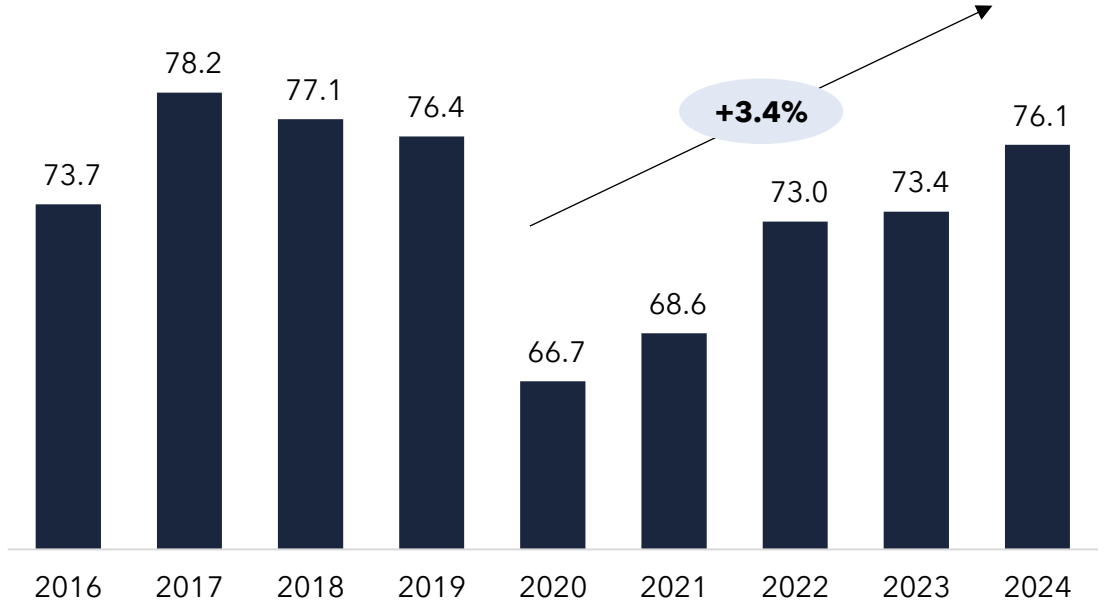
Source: DOSM

Johor's labour productivity remains a key area for improvement, ranking 10th nationally and trailing the national average by 25%

GDP Per Employed Person by States, 2024
RM '000



GDP Per Employed Person by States, 2024
RM '000



*Johor ranks **10th nationally in labour productivity**, with GDP per employed person at RM 76,000. This is 25% below the national average of RM 101,000. The productivity gap highlights **a need for structural shifts towards higher value-added sectors and upskilling of the workforce***

*Johor's productivity peaked in 2017 at RM 78,200, but has since shown a downward trend. Despite some post-pandemic recovery, labour productivity **remains lower than pre-pandemic levels**. This signals **underlying structural challenges and the need for interventions to boost productivity growth***

Source: DOSM

3.2

Johor's Districts Diagnostic Assessment.

As part of the JETP development process, each district in Johor was assessed to identify its sectoral focus and competitive advantages, providing a holistic view of the state's economic landscape

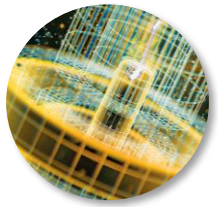
As investments in Johor continue to surge, the risk of uneven district growth looms…

Concentration of income within Johor Bahru which will be deepened by JS-SEZ which risks wider inequality and wealth distribution across the state which has severe implications in living standards and infrastructure development

Economic activity remains highly concentrated in JB, creating single-points-of-failure which creates a long-term risk as an economic chokepoint to the state

Weak inter-district linkages and lagging economic advancementand depth across districts (beyond JB) are limiting synergies between manufacturing and services, reducing complementary spillovers across districts

… therefore, JETP deep-dives into the economic structure of each district with clear objectives…



Identify cross-district synergies and complementary value chains to rebalance the sector mix and build an integrated, investment-ready ecosystem across Johor

Develop district-specific positioning that set sector priorities, sharpen each district's investor value proposition, and guide implementation

… underpinned by rigorous analysis and assessments

1. **Diagnostic Assessment** consisting of economic profiling, asset mapping, competitive analysis and strategic fit with state vision
2. **High-level strategic recommendations** for each district

Analysis were supported based on:

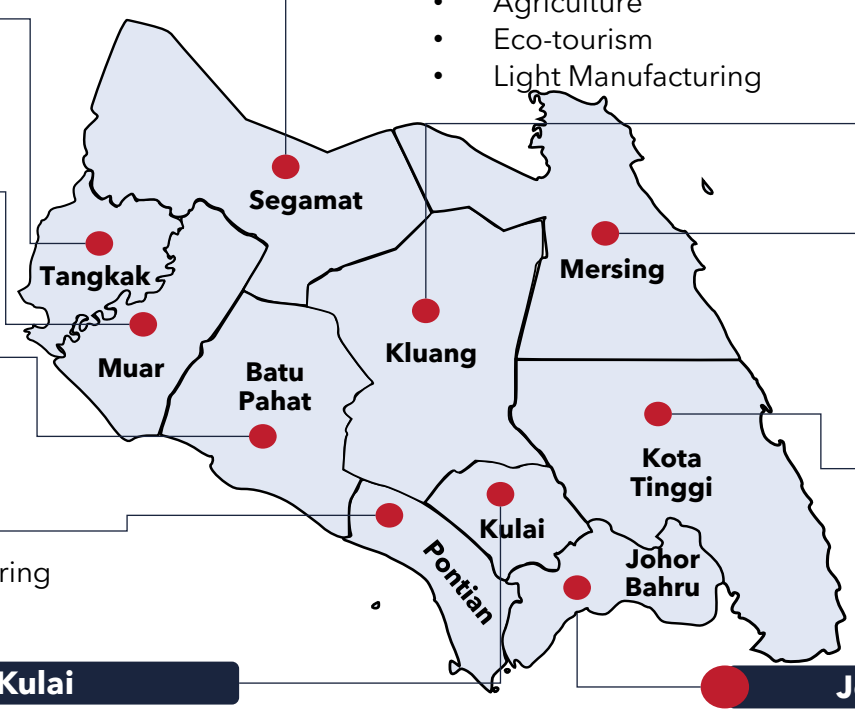
Rancangan Tempatan Daerah (RTD)

Physical District Visits

Landscape Analysis

Each district in Johor possesses unique economic strengths and development potential that the state should strategically leverage

Sectors Concentration in Johor by Districts



Segamat
- Agriculture
- Eco-tourism
- Light Manufacturing

Tangkak
- Agriculture
- Eco-tourism
- Light Manufacturing

Kluang
- Agriculture
- Eco-tourism
- Manufacturing

Muar
- Manufacturing (Furniture)
- Tourism

Mersing
- Tourism
- Agriculture
- Light Manufacturing

Batu Pahat
- Agriculture
- Manufacturing
- Tourism

Kota Tinggi
- Agriculture
- Chemical & Petrochemical
- Tourism

Pontian
- Agriculture
- Energy
- Tourism
- Light Manufacturing

Kulai
- Logistics
- Manufacturing
- Aerospace
- Tourism
- Healthcare
- Energy

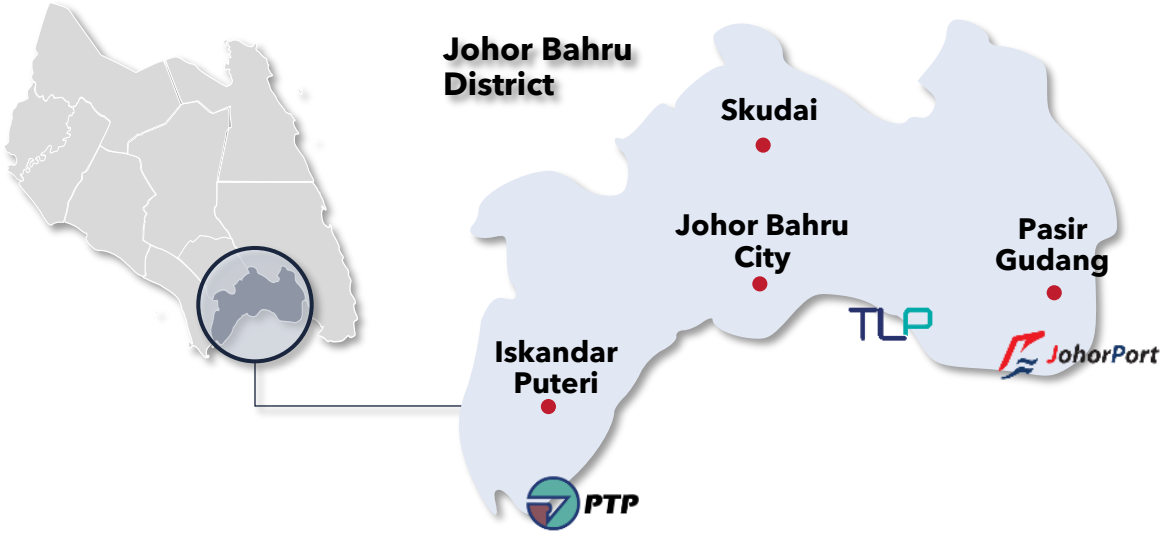
Johor Bahru
- Logistics
- Manufacturing
- Energy
- Healthcare & Pharmaceutical
- Tourism
- Chemical & Petrochemical

Sector concentration is determined by the presence of industries in each district and the thematic sectors identified in their RTDs, which outline key economic activities and translate them into land-use and zoning proposals

Source: Maju Johor 2030, RTDs

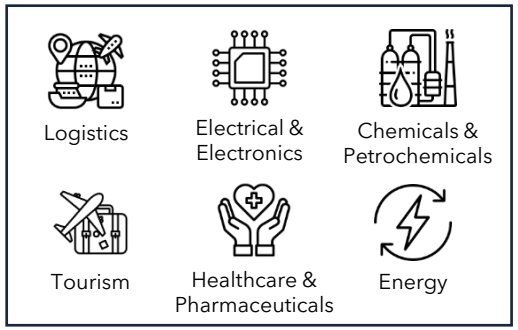
As the state capital, Johor Bahru is Johor's largest economic contributor and most populous district with 70% of its population in the working-age group

Johor Bahru District Snapshot in 2025



- **Population:** 1,758,500
- **Working age population:** 1,234,400 (70%)
- **Unemployment rate:** 2.6%
- **Land Size:** 113,571 hectares

Sectors Concentration:



Key Assets

Cross-Border Trade Relations

- Part of Johor-Singapore Special Economic Zone (SEZ) and home to Forest City Special Financial Zone
- In Q1 2025, Johor recorded RM31 billion worth of approved investments, with Singapore and the United States as the main investors in the manufacturing sector

Access to Ports

- Johor Bahru possesses 3 major shipping ports: Perlabuhan Tanjung Pelepas, Johor Port and Tanjung Langsat Port, with distinct handling capabilities to support both transshipment and local industry

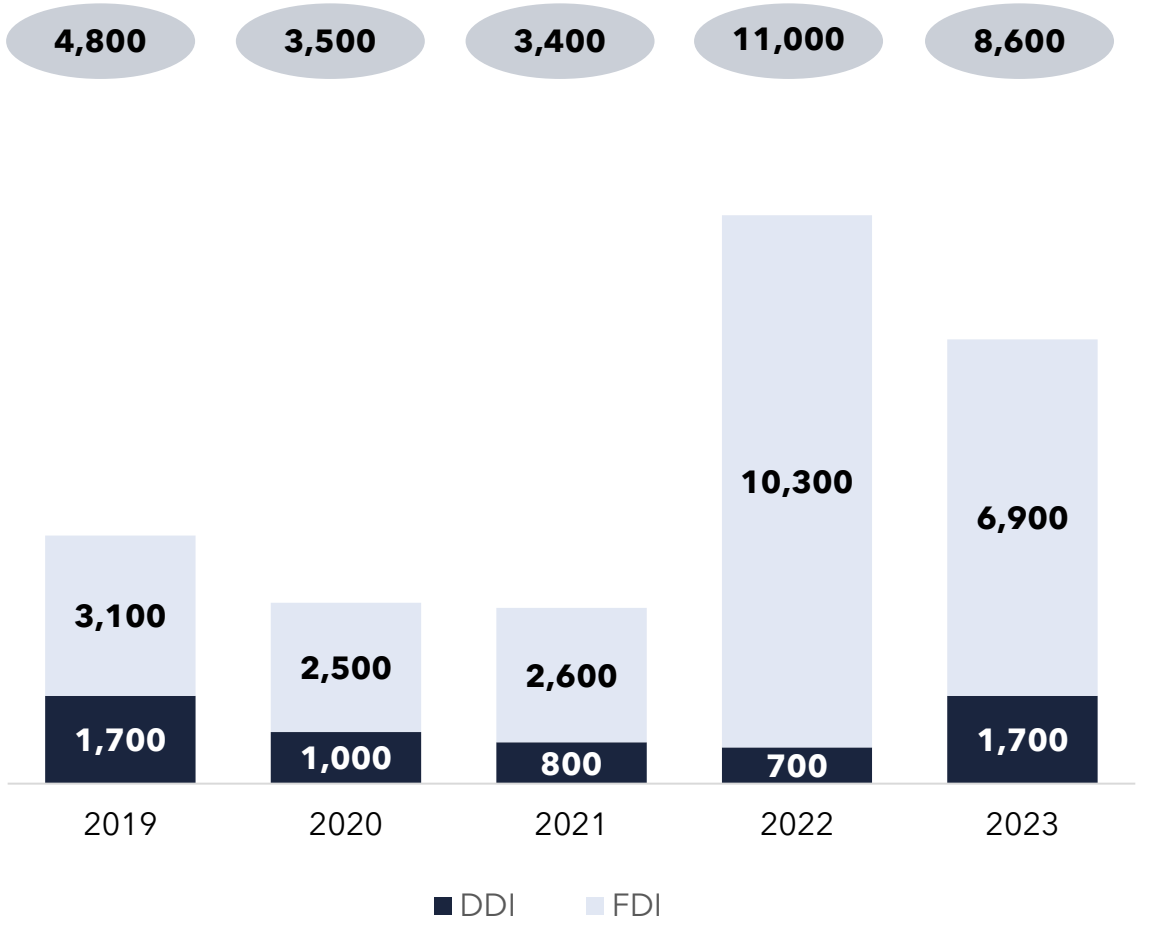
Proximity to Singapore

- Johor-Singapore Link Bridges handle more than 400,000 travelers daily, as some of the busiest land crossings in the world
- No. of travelers expected to increase by 40% in the next 25 years

Source: Rancangan Tempatan Daerah Johor Bahru dan Kulai (2030), PLAN Malaysia Laporan Maklumat Guna Tanah Negeri Tahun 2022, DOSM, Laporan Sosioeokonomi Johor 2023

Johor Bahru brought in RM8.6 billion in manufacturing investments between 2019 to 2023, led by its strengths in petrochemicals and electronics

Johor Bahru Approved Manufacturing Investments, 2019 – 2023
RM Million



District Competitive Advantages

Critical logistics and transshipment hub, offering container handling to Singapore and other trade routes. Significant integrated logistics investments have also been made by leaders such as DHL and Nippon Express

Centre for private healthcare and medical tourism, with numerous hospitals and specialist centres attracting patients from Singapore and Indonesia, amongst other countries. Johor Bahru also hosts pharmaceutical and medical device manufacturing firms serving the Asia-Pacific markets

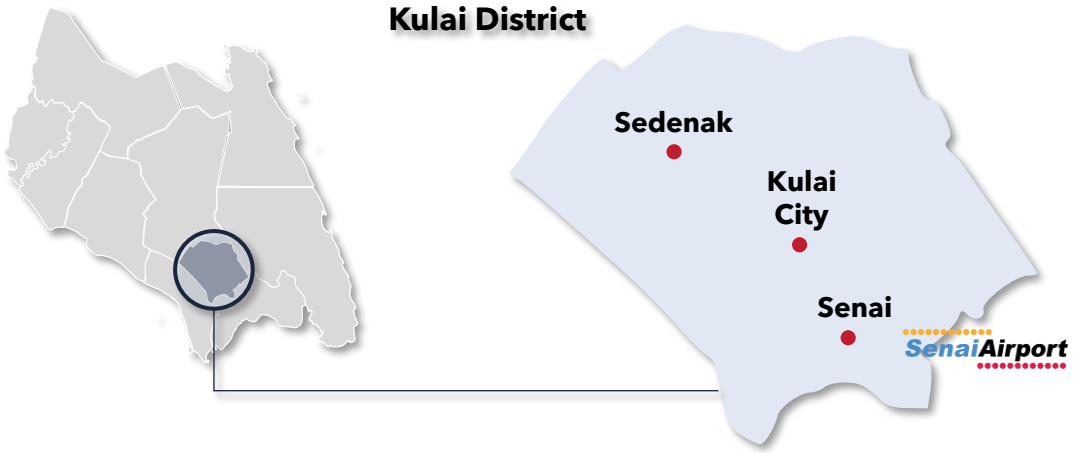
Pasir Gudang supports a mature ecosystem of chemical, petrochemical, energy and electronics industries, particularly in downstream and export-oriented production.

As a gateway to South Malaysia, Johor Bahru is a vibrant destination for Singaporean and international tourists. Anchor attractions include Legoland Malaysia, Johor Premium outlets, and unique cultural & heritage sites.

Source: Rancangan Tempatan Daerah Johor Bahru dan Kulai (2030), PLAN Malaysia Laporan Maklumat Guna Tanah Negeri Tahun 2022, DOSM, Laporan Sosioeokonomi Johor 2023, PASB Analysis

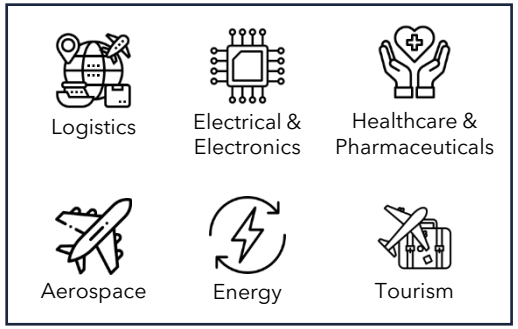
Kulai district is a flagship area of Iskandar Malaysia, boasts an industrial ecosystem supported by robust infrastructure, including Senai Int. Airport and Sedenak Tech Park

Kulai District Snapshot in 2025



- **Population:** 339,600
- **Working age population:** 254,700 (75%)
- **Unemployment rate:** 2.5%
- **Land Size:** 74,700 hectares

Sectors Concentration:



Key Assets

Senai International Airport

- Kulai is home to Johor's international airport with a runway of 3,800 metres. It can handle passenger aircraft such as the Airbus 350, Boeing 777, and up to 5 million passengers per annum
- Senai Airport also has cargo handling capacity of 80,000 MT and handled 14,694 tons of freight in 2019

Senai Airport City and Industrial Park

- Senai Airport City is a 1,100-hectare integrated industrial development providing a plug-and-play model for foreign investors, with direct interchanges to key ports.

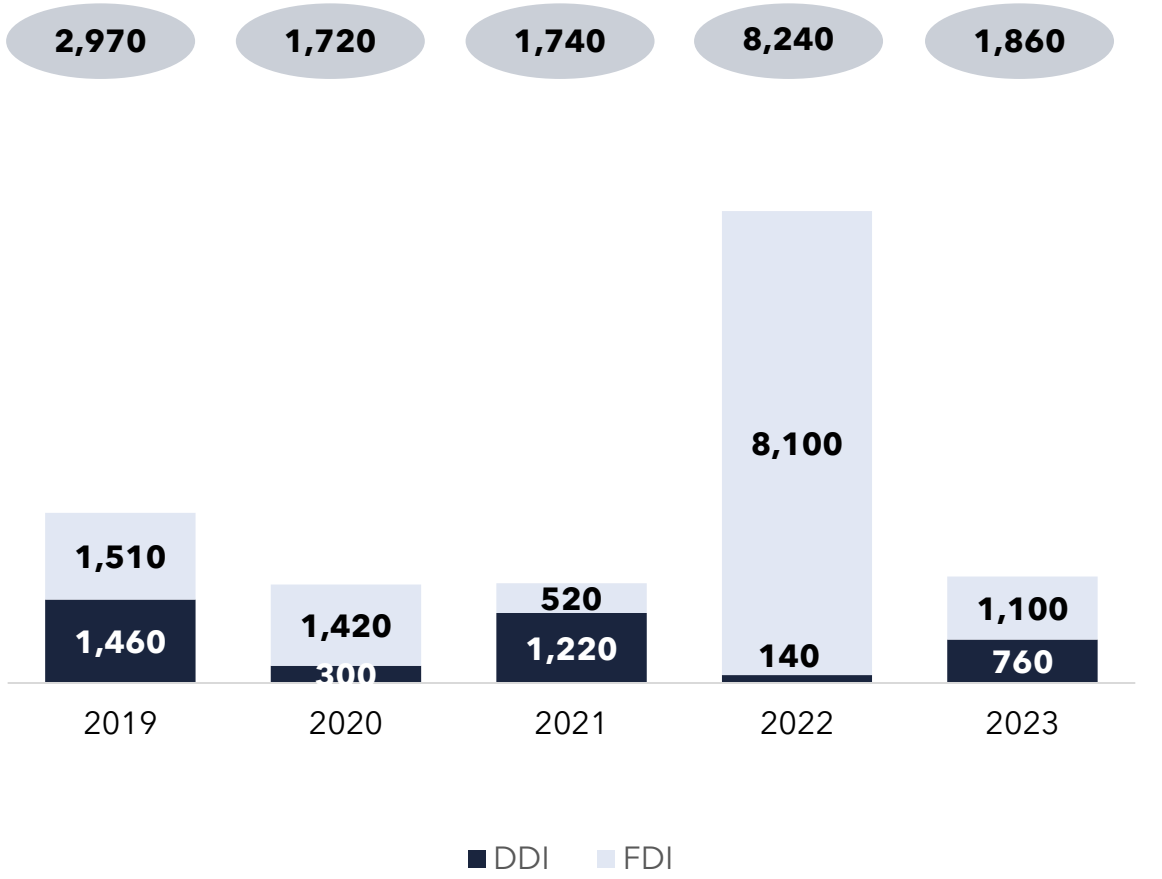
Sedenak Technology Valley

- STV is a 7,290-acre integrated development by Johor Land, designed to attract high-value industry clusters. STV is home to Sedenak Tech Park (STeP), a 745-acre data centre park.

Source: Rancangan Tempatan Daerah Johor Bahru dan Kulai (2030), PLAN Malaysia Laporan Maklumat Guna Tanah Negeri Tahun 2022, DOSM, Laporan Sosioeokonomi Johor 2023

Kulai was Johor's 3rd largest recipient of approved manufacturing investments in 2023, with this number likely to grow following data centre boom

Kulai Approved Manufacturing Investments, 2019 – 2023
RM Million



District Competitive Advantages

Competitive E&E hub due to development of industrial parks and availability of water and utilities. This has led to it being able to attract numerous data centres, as well as advanced E&E manufacturing facilities

Kulai's agriculture sector is dominated by the production of oil palm and rubber, major export commodities. 97% of Kulai's agricultural land is used for oil palm plantations, with 2% for mixed plantations and 0.6% for rubber

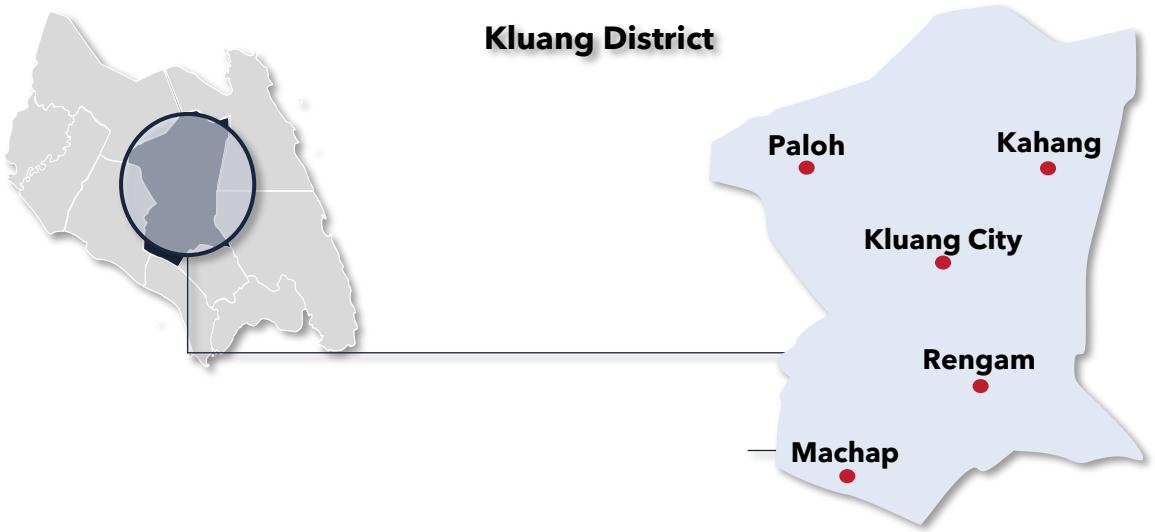
Excellent connectivity facilitating strength in logistics, as Kulai connects Johor with the rest of Malaysia via a strong road and rail network, as well as the state's only airport

Availability of large-scale industrial areas allows Kulai to attract high-value industry clusters, with key focus areas including logistics and warehousing, advanced E&E, medical device manufacturing, renewable energy

Source: MIDA, Laporan Sosioekonomi Johor 2023, PASB Analysis

Kluang is Johor's central logistics hub, offering a diverse industrial base, ample land, and strong rail-road links, while serving as a gateway to key agro-industry and tourism sites

Kluang District Snapshot in 2025



- **Population:** 328,000
- **Working age population:** 228,000 (69.5%)
- **Unemployment rate:** 3.1%
- **Land Size:** 285,170 hectares

Sectors Concentration:

Agriculture | Tourism | Manufacturing (various sectors)

Key Assets

Expansive Industrial Landbank

- Kluang has 13 identified industrial areas supporting extensive production of ceramics and latex. Large tracts of undeveloped land strategically positioned for future industrial development

Connectivity via Rail and Road

- Kluang's connectivity will be boosted by the Gemas–Johor Bahru Electrified Double Track Project, enhancing passenger and freight capacity while cutting travel times across central Johor. The district also enjoys direct access to the PLUS Highway via Ayer Hitam, Machap, and Simpang Renggam interchanges, as well as Federal Route 50, linking Batu Pahat, Kluang, and Mersing

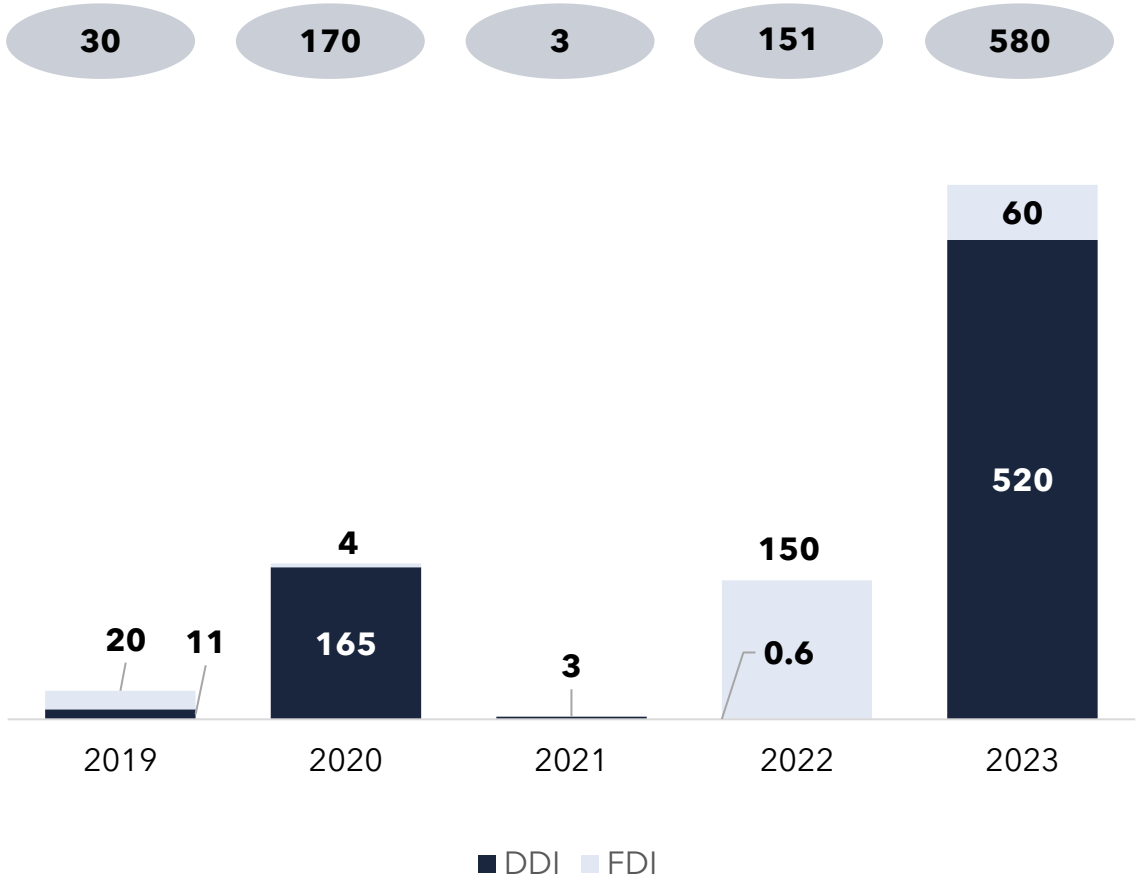
Agro-Industry and Agro-Tourism Strengths

- The district has a diverse modern agriculture base, including Zenxin Organic Park, UK Farm—the country's largest goat and sheep farm—and Kahang Organic Eco-Rice Farm. Kluang also serves as the gateway to Endau-Rompin National Park, supporting tourism and conservation-linked activities

Source: Rancangan Tempatan Daerah Kluang (2030), PLAN Malaysia Laporan Maklumat Guna Tanah Negeri Tahun 2022, DOSM, Laporan Sosioeokonomi Johor 2023

Kluang demonstrates strong investment potential, being the 5th largest recipient of approved manufacturing projects in Johor in 2023

Kluang Approved Manufacturing Investments, 2019 – 2023
RM Million



District Competitive Advantages

Agricultural production contributed to 44% of district GDP and 25% of employment opportunities. 88% of agricultural land is used for oil palm

Kluang is a major producer of ceramic pots and tiles, home to companies such as Malaysian Mosaic, Guocera and Claytan

Kluang possesses numerous tourism attractions, such as local brand Kluang Coffee, Gunung Lambak (25,500 visitors in 2022) and UK Farm Agro Resort (32,400 visitors in 2022)

Source: MIDA, Laporan Sosioekonomi Johor 2023, PASB Analysis

Kota Tinggi anchors Johor's East Coast growth, driven by world-scale energy infrastructure in Pengerang, vibrant Desaru tourism, and strong sea-road links to regional markets

Kota Tinggi District Snapshot in 2025

- **Population:** 299,364
- **Working age population:** 223,811 (74.8%)
- **Unemployment rate:** 2.4% (out of labour force: 30%)
- **Land Size:** 348,643 hectares

Sectors Concentration:

Chemical & Petrochemicals | Agriculture | Tourism

Key Assets

Pengerang Integrated Petroleum Complex (PIPC)

- Pengerang hosts the 20,000-acre Pengerang Integrated Petroleum Complex (PIPC), one of Southeast Asia's largest oil, gas, and petrochemical hubs, equipped with refineries, LNG facilities, and a deepwater terminal

Desaru Coast & Eco-tourism Attractions

- Kota Tinggi is a tourism hub anchored by the Desaru Coast resort area, featuring beaches, luxury hotels, and golf courses. Other key attractions include Kota Tinggi Waterfalls, the 180-acre Desaru Fruit Farm, and Firefly Valley Leisure Park

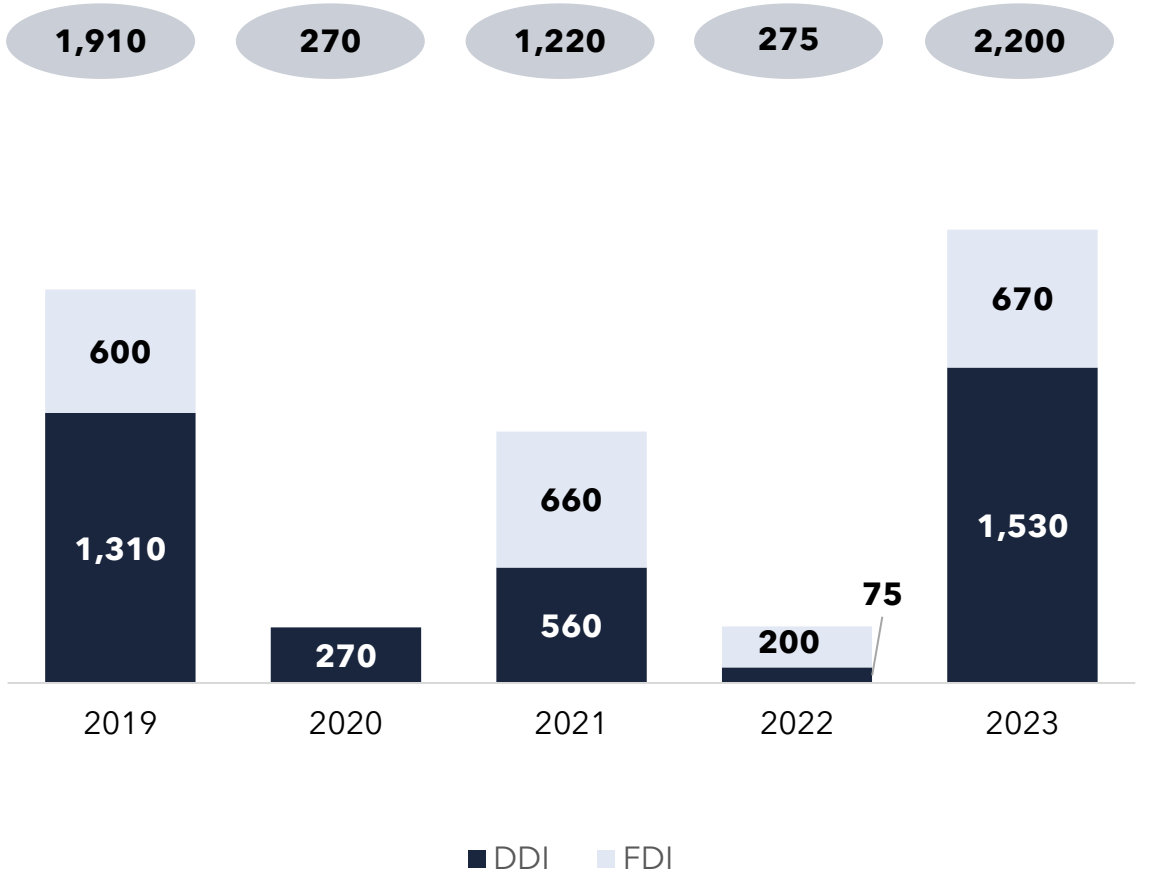
Strong Connectivity

- Tanjung Belungkor Ferry Terminal and Ferry Sebana Cove Terminal operate passenger ferry services to Indonesia and Singapore. By road, Kota Tinggi is accessible via the Senai-Desaru Expressway, North-South Expressway, and express bus services

Source: Rancangan Tempatan Daerah Kota Tinggi (2030), PLAN Malaysia Laporan Maklumat Guna Tanah Negeri Tahun 2022, DOSM, Laporan Sosioeokonomi Johor 2023

Kota Tinggi was Johor's 2nd largest investment destination in 2023, attracting over RM2 billion with its strengths in petrochemicals and tourism

Kota Tinggi Approved Manufacturing Investments, 2019 – 2023
RM Million



District Competitive Advantages

Pengerang's world-scale PIPC provides an integrated base for oil, gas, and petrochemical activities, creating strong supply chain linkages and opportunities for downstream diversification into specialty chemicals, green hydrogen, and renewable energy manufacturing

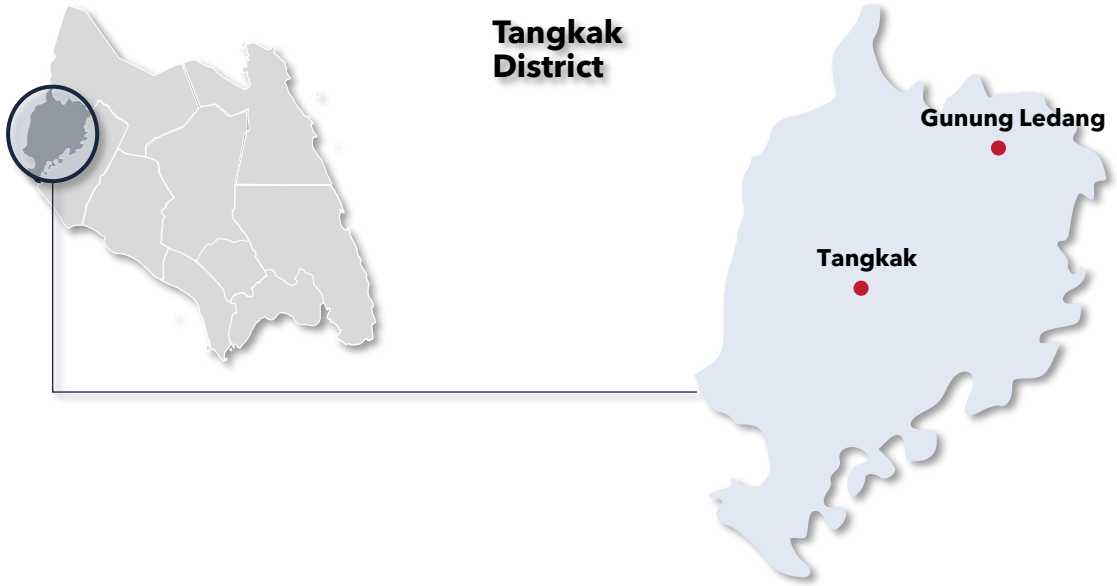
Beyond its established Desaru Coast resorts and natural attractions, Kota Tinggi has the potential to expand into high-yield tourism segments such as eco-resorts, agri-tourism, and regional events, leveraging its scenic coastline, river systems, and cultural sites

The district's inclusion in the JS-SEZ unlocks preferential incentives, streamlined regulatory processes, and greater investor confidence, enabling attraction of high-value sectors such as advanced manufacturing, logistics, and the digital economy

Source: MIDA, Laporan Sosioekonomi Johor 2023

Tangkak has a rich tourism and agriculture landscape, with strategic proximity to Gunung Ledang, Muar River and neighbouring state Melaka

Tangkak District Snapshot in 2025



- **Population:** 163,449
- **Working age population*:** 114,250 (69.9%)
- **Unemployment rate:** 1.9% (out of labour force: 36%)
- **Land Size:** 97,676 hectares

Sectors Concentration:

Tourism | Agriculture | Manufacturing (various sectors)

Key Assets

Availability of Industrial Land

- Local authorities have committed 377 hectares for industrial land by 2030, on top of existing 140 hectares including Tangkak Industrial Area, Bukit Gambir Industrial Area, and Tanjung Agas Industrial Area.

Gunung Ledang National Park

- Home to Gunung Ledang National Park and Forest Reserve, comprising 8,612 hectares of protected land. The mountain attracts between 15,000 to 20,000 visitors each year.

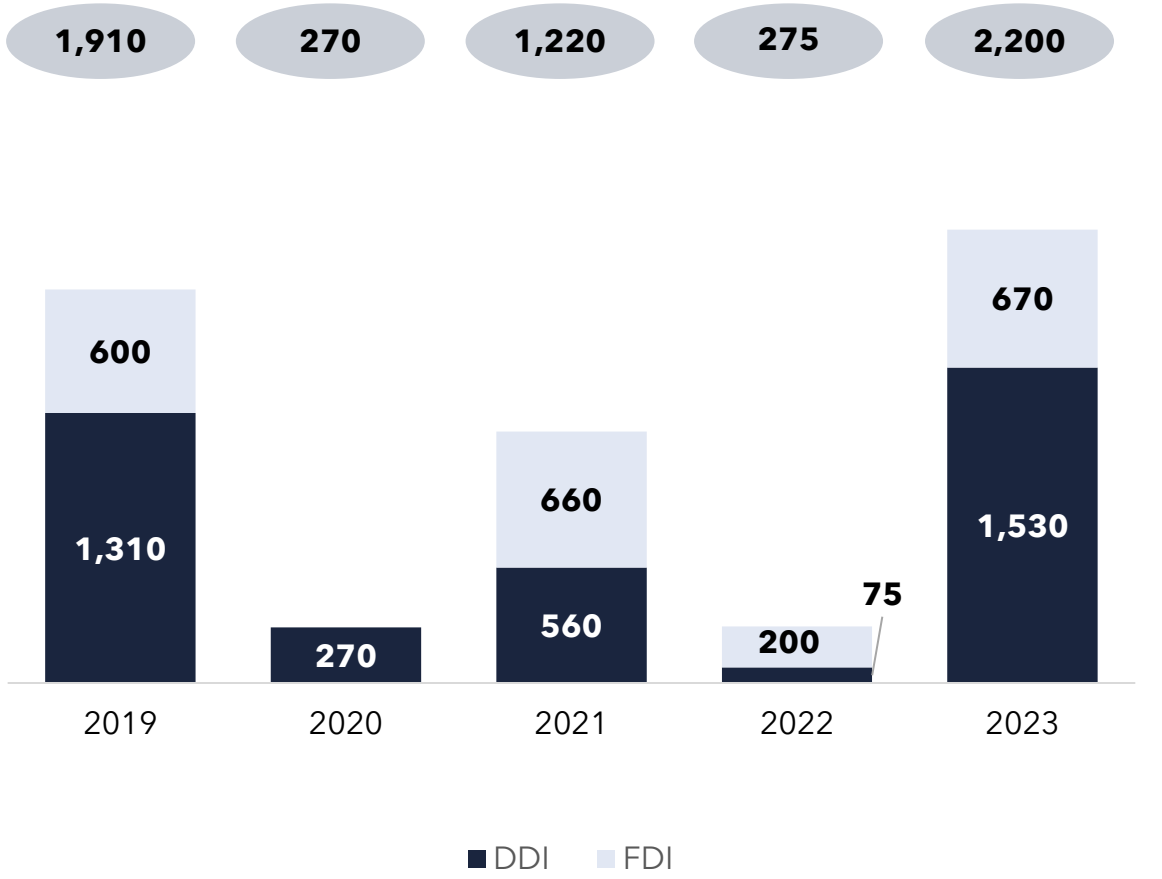
High Connectivity

- Tangkak is positioned next to neighbouring states Melaka and Negeri Sembilan in the proposed Southern Gateway Corridor, serving as an important pitstop along the North-South Expressway.

Source: Rancangan Tempatan Daerah Tangkak (2030), PLAN Malaysia Laporan Maklumat Guna Tanah Negeri Tahun 2022, DOSM, Laporan Sosioeokonomi Johor 2023

Tangkak is well-positioned to develop its advanced E&E and technology-enabled agriculture sector, having attracted RM2 billion in manufacturing investments in 2023

Tangkak Approved Manufacturing Investments, 2019 – 2023
RM Million



District Competitive Advantages

Established ecosystem for high-tech and advanced manufacturing in Johor, having attracted semiconductor leader Micron for assembly and testing of memory chips and key electronics components

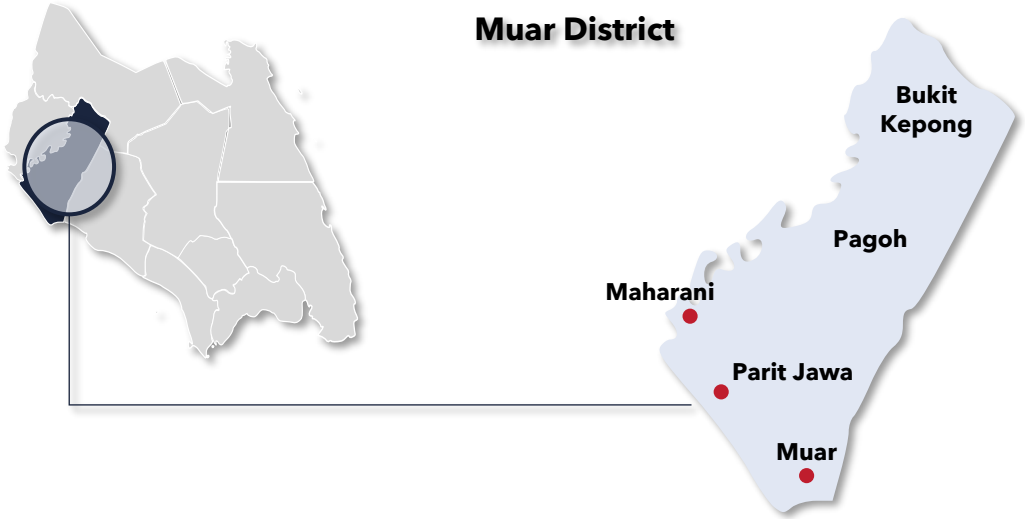
Tangkak is the largest fruit producer and second largest vegetable producer in Johor, with soil fertile for high value crops such as durian, mangosteen, rambutan, and herbs. Sawah Ring-Grisik has been identified for future investments as an agricultural hub

Access to 20 tourism assets, including Gunung Ledang, Muar River, Chondong Durian Island and Sawah Ring for eco- and agro-tourism

Source: MIDA, Laporan Sosioekonomi Johor 2023

Muar is Johor's hub for Talent and Education, responsible for building a strong pipeline of workforce-ready talent

Muar District Snapshot in 2025



- **Population:** 315,000
- **Working age population*:** 223,000 (70%)
- **Unemployment rate:** 1.6% (out of labour force: 33%)
- **Land Size:** 139,258 hectares

Sectors Concentration:

Tourism

Manufacturing (Furniture & Wood Products)

Key Assets

Strategic Coastal and River Access

- Muar River supports an active local aquaculture industry providing for local economy and food security. The river also provides untapped opportunities for logistics and eco-tourism

Maharani Energy Gateway

- 1,295-hectare energy hub and deep-sea port on reclaimed land, complementing existing oil and gas and petroleum and petrochemical industries in Johor

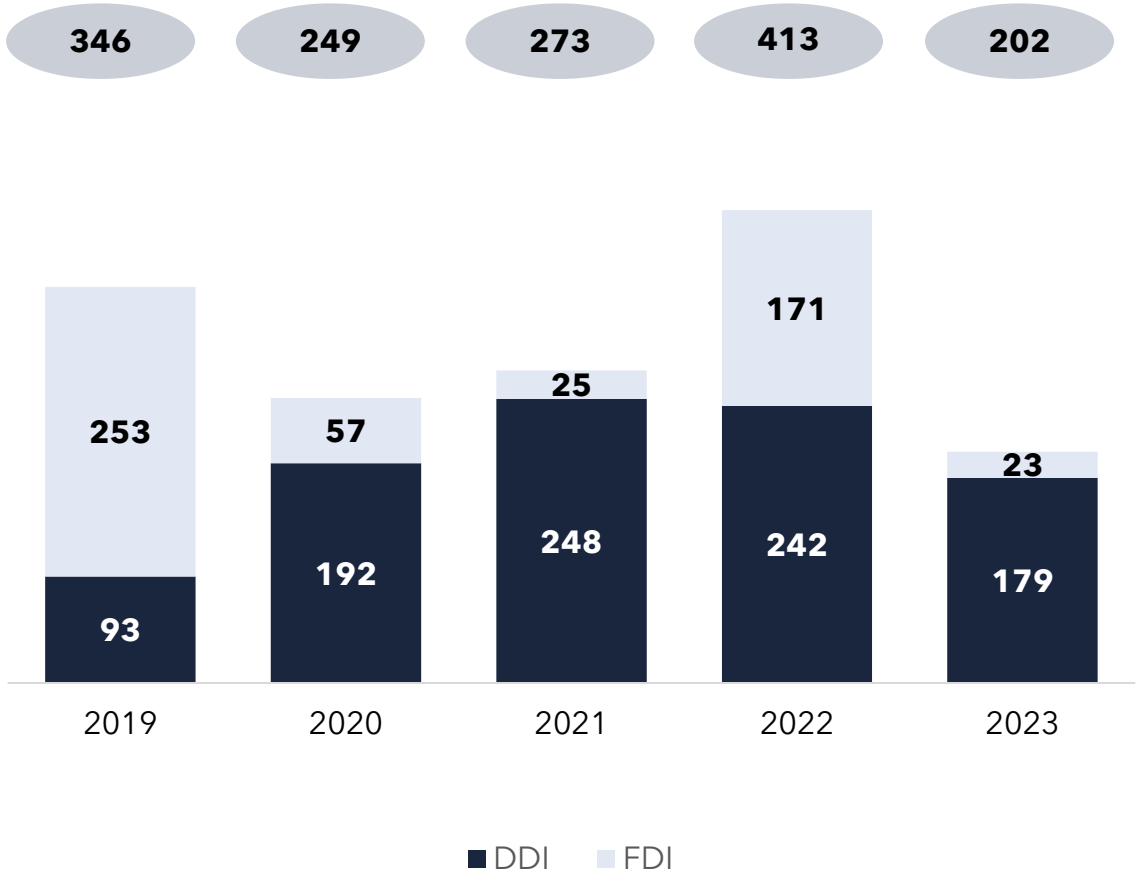
Bandar Universiti Pagoh

- 4,000-hectare integrated university town, including 531-acre Education Hub that houses Universiti Tun Hussein Onn Malaysia, International Islamic University Malaysia, Universiti Teknologi Malaysia and Polytechnic Pagoh

Source: Rancangan Tempatan Daerah Muar (2030), PLAN Malaysia Laporan Maklumat Guna Tanah Negeri Tahun 2022, DOSM, Laporan Sosioeokonomi Johor 2023, MIDA

Muar has unlocked energy-led industrial transformation, driving future growth in renewable energy and logistics investments

Muar Approved Manufacturing Investments, 2019 – 2023
RM Million



District Competitive Advantages

Land bank for transformative renewable energy projects, such as Maharani Energy Gateway, an integrated energy and maritime hub blending traditional energy production with renewable energy advancements

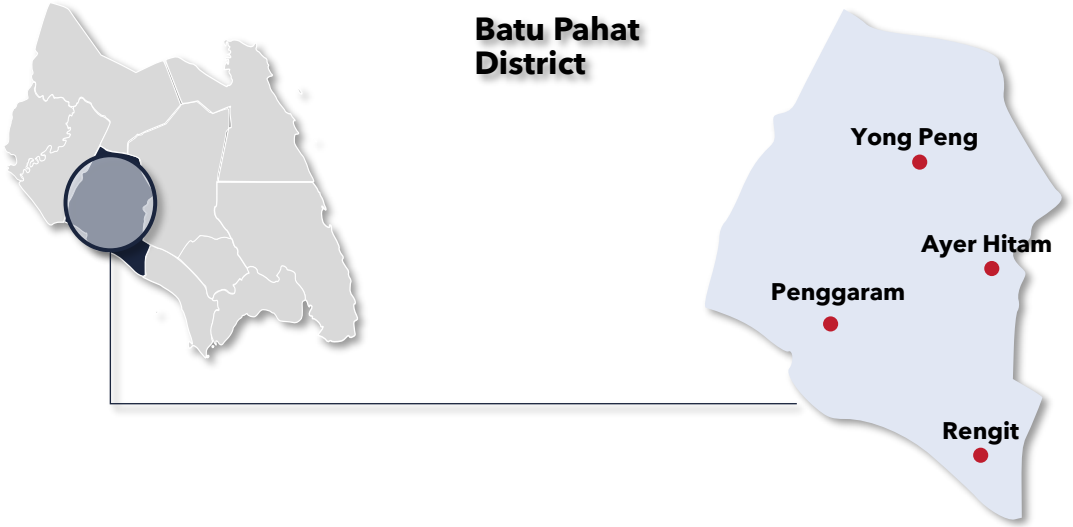
Furniture manufacturing hub of Malaysia, supported by industrial zones and generational expertise in carpentry. Muar is export-oriented, with its wooden and OEM furniture going mainly to the US, Japan and Middle East

Logistics growth to support local sectors and industries, including furniture, as well as new free industrial and commercial zones at Maharani Port

Source: MIDA, Laporan Sosioekonomi Johor 2023

Batu Pahat is one of Johor's largest manufacturing hub, hosting multinational and textile industries, while leveraging its agriculture and education strengths to drive growth

Batu Pahat District Snapshot in 2025



- **Population:** 503,400
- **Working age population*:** 362,400 (72%)
- **Unemployment rate:** 1.3% (out of labour force: 29%)
- **Land Size:** 196,632 hectares

Sectors Concentration:

Tourism | Agriculture | Manufacturing (various sectors)

Key Assets

Diversified Manufacturing Hub

- Batu Pahat is one of Johor's largest manufacturing bases, hosting multinational and local firms like Sharp Roxy, Fujitsu, Hitachi Koki, Panasonic, and Hicom-Yamaha. It is also a key textile hub, with 300+ factories supplying about half of Malaysia's textile exports

Agricultural and Plantation Strength

- Batu Pahat's agriculture spans oil palm, rubber, coconut, and cocoa, and it is Johor's leading producer of tropical fruits such as watermelon, pineapple, banana, papaya, durian, and guava for domestic and export markets

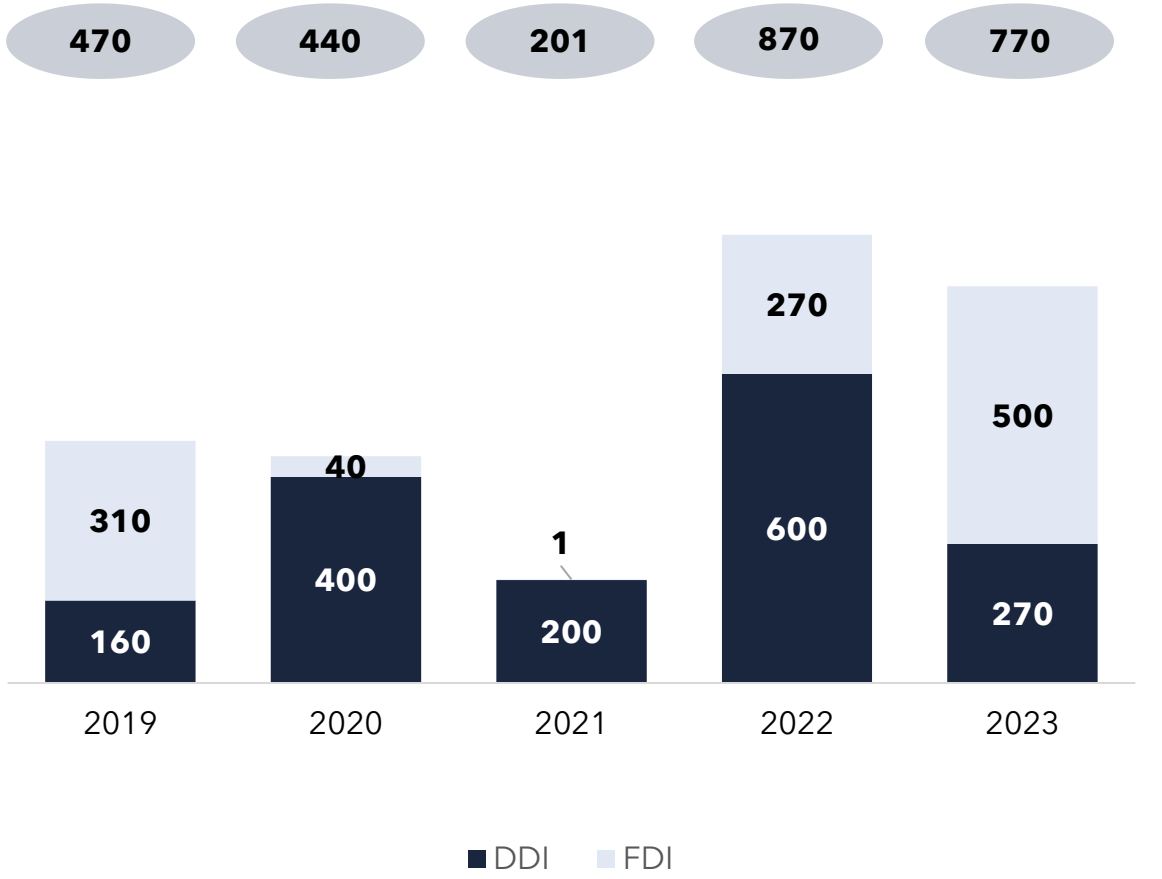
Education and Talent Development

- Universiti Tun Hussein Onn Malaysia (UTHM) in Parit Raja serves as a key higher-education institution, producing graduates in engineering, technology, and technical education, strengthening the district's skilled workforce base

Source: Rancangan Tempatan Daerah Batu Pahat (2030), PLAN Malaysia Laporan Maklumat Guna Tanah Negeri Tahun 2022, DOSM, Laporan Sosioekonomi Johor 2023, MIDA

Batu Pahat's manufacturing sector attracts significant investment from both foreign and domestic investors, with potential for more in tourism and agriculture

Batu Pahat Approved Manufacturing Investments, 2019 – 2023
RM Million



District Competitive Advantages

Manufacturing & processing nucleus of Johor, with a focus on light manufacturing (furniture, electrical and electronics, clothing, and ceramics) in Sri Gading and Parit Raja

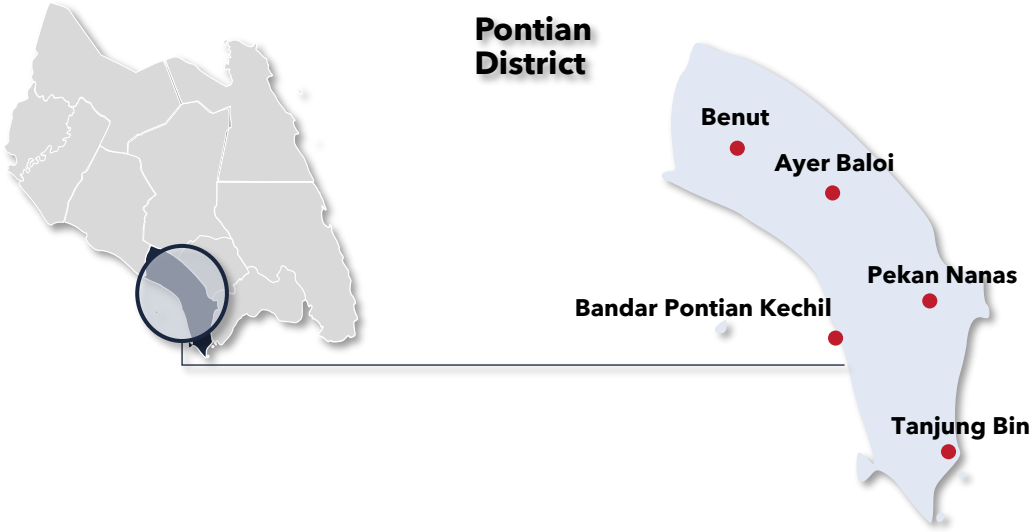
Diverse tourist attractions, ranging 400+ historical and cultural sites, local cuisine and food industry. Batu Pahat has home grown food products and brands that have become iconic on a national and international level, e.g. Hwa Tai, Miaow Miaow, Munchy's

Approximately 61.8% of Batu Pahat's agricultural land is dedicated to fertile, high-yield crops including rubber, coconuts, durians, pineapples, and bananas. While coconut production faces challenges from price volatility and low profitability, there is potential to boost yields and returns through improved technical expertise, efficiency, and technology adoption.

Source: MIDA, Laporan Sosioekonomi Johor 2023

Pontian is an emerging hub for petrochemicals and maritime industry with the on-going development of Tanjung Bin and Pekan Nenas

Pontian District Snapshot in 2025



- **Population:** 175,500
- **Working age population*:** 117,600 (67%)
- **Unemployment rate:** 2.9% (out of labour force: 34%)
- **Land Size:** 93,264 hectares

Sectors Concentration:

- Agriculture
- Energy
- Tourism
- Manufacturing (various sectors)

Key Assets

Tanjung Bin Power Station

- Malakoff's 2,100 MW Tanjung Bin Power Plant has started a biomass co-firing initiative, aiming to integrate up to 15% biomass by 2027. This demonstrates Pontian's potential in renewable energy and greener industrial operations

Tanjung Piai Eco-Tourism

- Tanjung Piai, the southernmost tip of mainland Eurasia and a Ramsar-listed wetland, stands as a premier ecotourism destination. Its coastal mangroves and biodiversity-rich habitat attract nature tourists and conservation-driven visitors

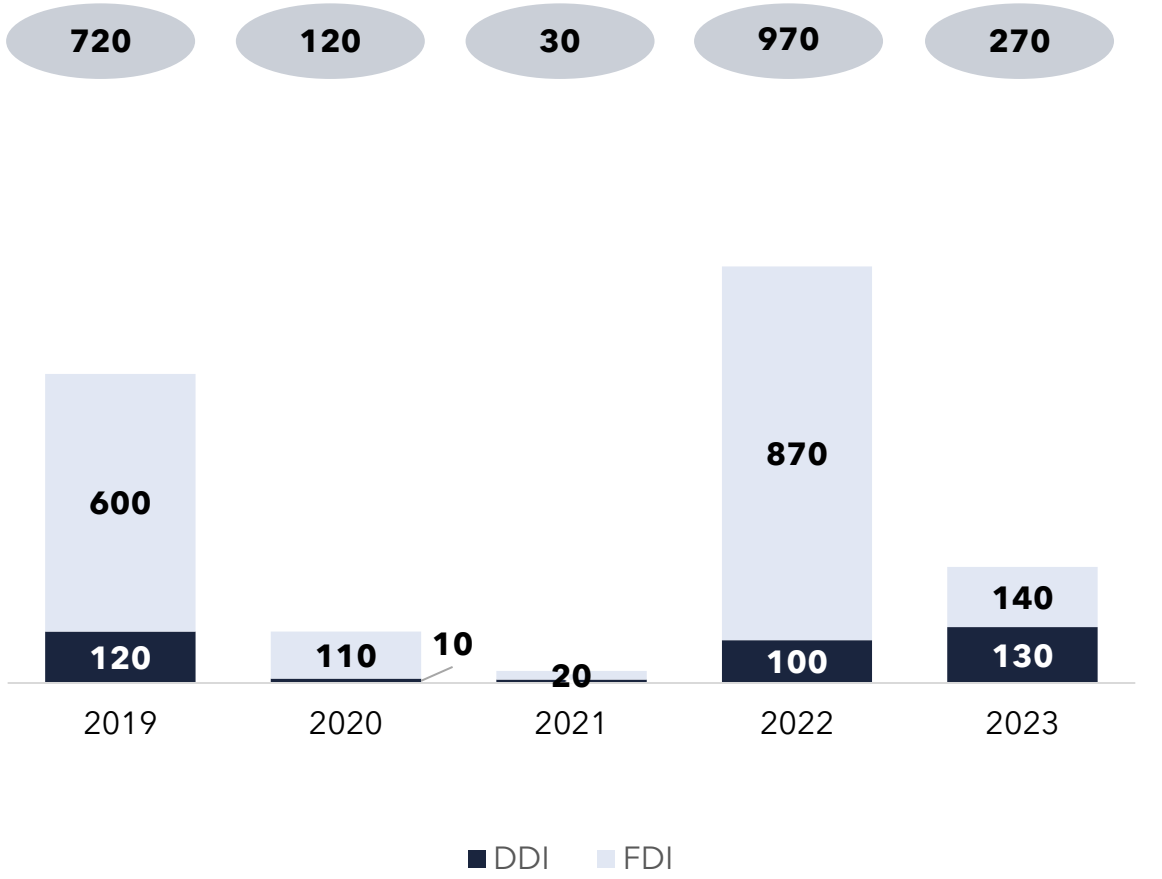
Connectivity to Johor Bahru and Indonesia

- Access to 3 Federal Highways, direct bridge to Johor Bahru and other interstate roads. Pontian also provides passenger ferry services via Kukup International Ferry Terminal to Indonesia

Source: Rancangan Tempatan Daerah Pontian (2030), PLAN Malaysia Laporan Maklumat Guna Tanah Negeri Tahun 2022, DOSM, Laporan Sosioeokonomi Johor 2023, MIDA

Pontian's economy is currently rooted in its access to rich natural resources, and stands ready to absorb new investments towards expansion of its maritime and agricultural sectors

Pontian Approved Manufacturing Investments, 2019 – 2023
RM Million



District Competitive Advantages

Tanjung Bin has been gazetted for a 1,957-hectare petrochemical and maritime industrial cluster, aimed to establish Pontian as a new energy and shipping node in Johor by 2030. This project builds on its strategic coastal location and deep-water accessibility

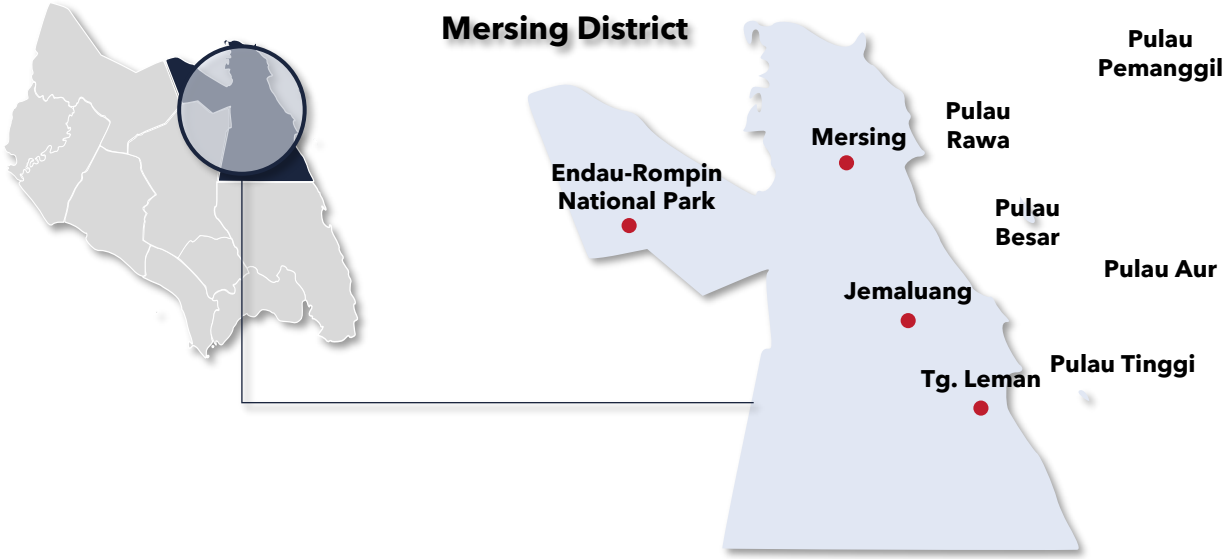
Strong agricultural industry known for its pineapple production, contributing 37,000 tonnes annually. 45% of Pontian's land is rich in peat soil, which renders it suitable for pineapple cultivation. While Pontian grows diverse crops such as coconut, coffee and sugarcane, more can be done to diversify its fruit, vegetable and livestock rearing as 77.5% of current agricultural land is used for oil palm

Pontian's coastal location and prominent pineapple farms create numerous opportunities for tourism. The district contains 2 national parks (Tanjung Piai, Pulau Kukup) with diverse mangrove species, museums, homestays, farms and eco-resorts

Source: MIDA, Laporan Sosioekonomi Johor 2023

Mersing is Johor's gateway to island and rainforest tourism, anchored by marine parks and Endau–Rompin National Park, with emerging strengths in agribusiness industry

Mersing District Snapshot in 2025



- **Population:** 78,195
- **Working age population*:** 53,900 (69%)
- **Unemployment rate:** 2.1% (out of labour force: 40%)
- **Land Size:** 285,659 hectares

Sectors Concentration:

Tourism | Agriculture | Manufacturing (various sectors)

Key Assets

Gateway to Marine Island Tourism

- Mersing is the main departure point to Johor's island destinations such as Pulau Rawa, Pulau Sibu, Pulau Besar, Pulau Aur, Pulau Tinggi, and Pulau Pemanggil within Johor Marine Park, offering pristine beaches, coral reefs, diving, snorkelling, and marine conservation activities for domestic and international visitors

Tourism at Endau–Rompin National Park

- The district is the southern gateway to Endau–Rompin National Park, famed for its biodiversity, waterfalls, trails, and ecotourism, supporting conservation while benefiting the local economy

Agribusiness Processing

- Mersing is developing as a food production hub with projects like Jemaluang Dairy Valley to boost milk output and the Endau–Mersing Fish Processing Park, which offers cold storage and value-added seafood processing to strengthen the fisheries value chain

Source: Rancangan Tempatan Daerah Mersing (2030), PLAN Malaysia Laporan Maklumat Guna Tanah Negeri Tahun 2022, DOSM, Laporan Sosioeokonomi Johor 2023, MIDA

Mersing holds strong growth potential, particularly in tourism and agriculture, offering opportunities to elevate its economy to new heights

Mersing GDP by Sectors, 2019 – 2023
RM Million

Note: Data on approved manufacturing investments in Mersing unavailable

Source: MIDA, Laporan Sosioekonomi Johor 2023, DOSM

District Competitive Advantages

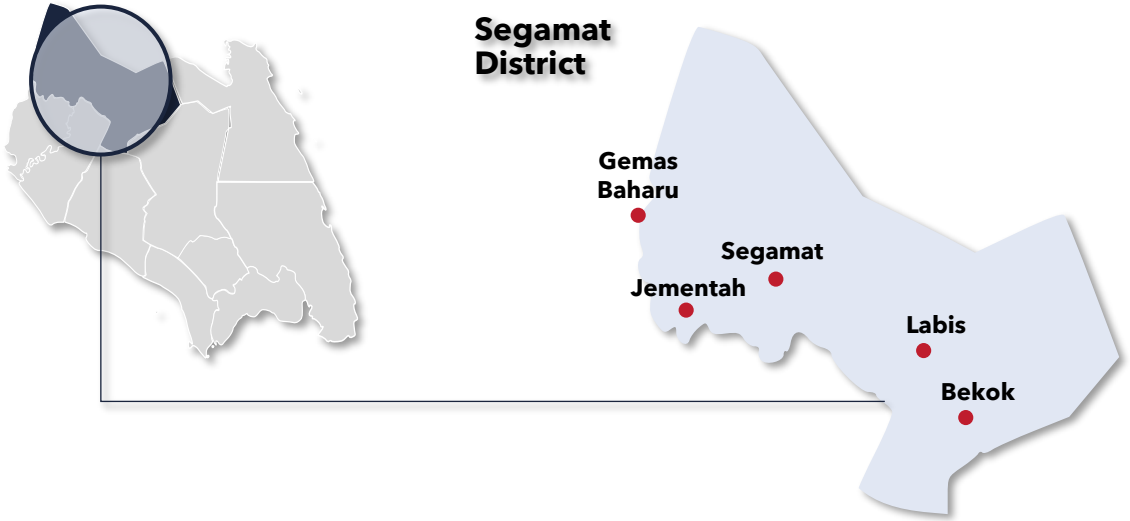
Mersing's position as the gateway to Johor's island destinations offers opportunities to expand premium tourism products such as luxury resorts, liveaboard diving packages, and eco-tourism cruises. Developing higher-spend visitor experiences can increase tourism receipts and extend visitor stays

As the southern gateway to Endau-Rompin National Park, Mersing can capitalise on the growing demand for nature-based tourism, guided expeditions, and conservation-linked research tourism. This can create skilled jobs in eco-guiding, park management, and scientific tourism while supporting biodiversity preservation

The Jemaluang Dairy Valley and Endau-Mersing Fish Processing Park can move the district up the value chain by producing premium dairy products, branded seafood, and processed exports. This can raise agricultural incomes, diversify revenue streams, and tap into niche domestic and export markets

Segamat is well-positioned for economic growth, with a strong agricultural base and emerging energy sector

Segamat District Snapshot in 2025



- **Population:** 197,762
- **Working age population*:** 138,235 (69.9%)
- **Unemployment rate:** 2.7%
- **Land Size:** 286,656 hectares

Sectors Concentration:

Tourism | Agriculture | Manufacturing (various sectors)

Key Assets

Sekijang Food Production Park

- 1 of 5 permanent food production parks in Johor jointly producing over 5,000 tonnes of crop products annually. These parks create long-term food production areas, produce entrepreneurs and encourage private sector investment in food production

Segamat Inland Port

- Dry port offering road and rail links to Port of Tanjung Pelepa and Pasir Gudang Port in Johor, as well as Port Klang, Kuantan Port, and Malacca Port. 50-acres of customs-bonded open land allowing 3 tonnes of cargo per square metre

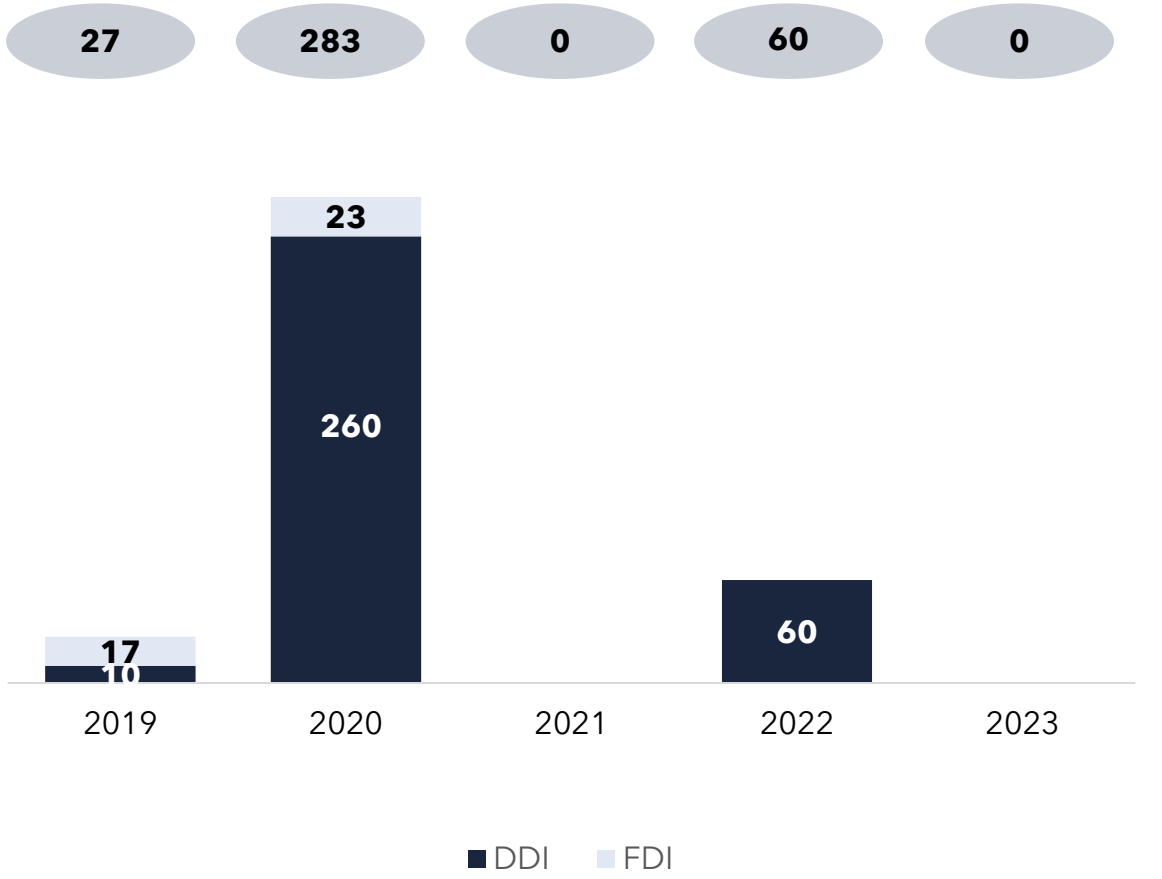
Solar Power Infrastructure

- Segamat is a key player in the country's renewable energy ecosystem as the site of UEM Lestra's 1,700-acre flagship initiative under National Energy Transition Roadmap

Source: Rancangan Tempatan Daerah Segamat (2030), PLAN Malaysia Laporan Maklumat Guna Tanah Negeri Tahun 2022, DOSM, Laporan Sosioeokonomi Johor 2023, MIDA

New investments in Segamat are driving innovation towards synergies between sustainable agriculture and renewable energy

Segamat GDP by Sectors, 2019 – 2023
RM Million



Source: MIDA, Laporan Sosioekonomi Johor 2023

District Competitive Advantages

Key player in ECERDC's agricultural transformation, with strong outcomes – high productivity and job creation for locals – from pilot investments such as IPR-INTAN Chili Fertigation and Agro Mix Farm. Over 50% of Segamat's agricultural land is used for oil palm, followed by rubber (36%)

Large landbank available for development of new industries, such as biomass/biofuel that can integrate the development of Segamat's agricultural and energy sectors

Capable of being a key player in Johor's logistics as the Northern Gateway to the state, with Segamat Inland Port (SIP) serving as a feeder rail link to Port Klang and Port of Tanjung Pelepas, and newly opened ETS Segamat for public transportation. However, SIP's usage was last reported at a low level of 60 TEU per month, due to lack of industrial demand

3.3

District Strategic Recommendations.

All 10 districts were evaluated to determine their strategic roles in Johor's future economic growth, with an emphasis on ensuring they complement one another in its future state

District Future State

Segamat
High-Value Crops and Biomass Processing Region

Kluang
Agro-Processing Hub, Agriculture and Logistics Hub

Mersing
Blue Economy and Eco-Tourism Hub

Tangkak
Strategic Transit Centre and Eco-Tourism Hub

Kota Tinggi
Green Chemistry, Agriculture and Tourism Hub

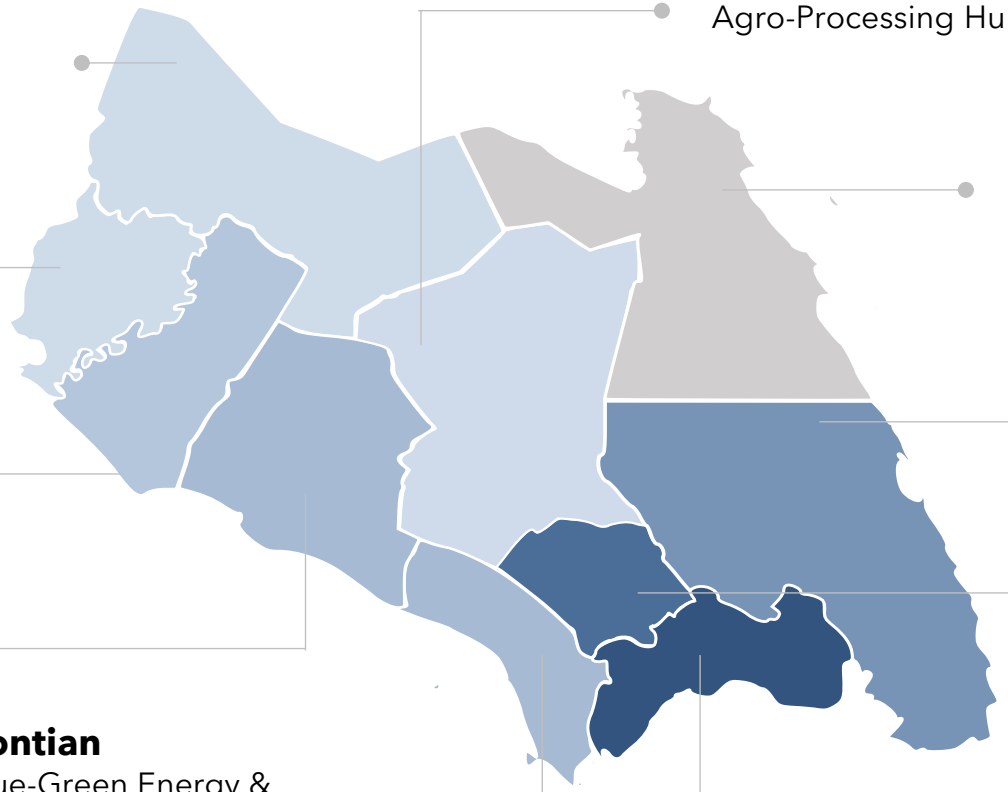
Muar
Industrial Energy Complex, Integrated Tourism & High Value Food Processing Industry Hub

Kulai
AI and High-tech Manufacturing Hubs, Digital Economy, Aerospace and Export-oriented Services

Batu Pahat
High-Value Manufacturing and Processing Industry

Pontian
Blue-Green Energy & Aquaculture Products Hub

Johor Bahru
AI and High-tech Manufacturing Hubs, Digital Economy, Aerospace and Export-oriented Services



Cumulative 5-Year Manufact. Approved Investment (2019-2023, RM'Bil)

<1 | 2 - 4 | 5 - 7 | 8 - 10 | 25 - 35

Source: DOSM.
Note: Data on Approved Manufacturing Investment in the Mersing District was not published

Johor Districts as the Engine: JETP's district strategic recommendations are designed to complement the JS-SEZ, not compete with it, by focusing on local sectoral ecosystems (1/5)

District	Existing Strengths	Key Infrastructure Assets	Strategic Recommendations	Potential Preliminary Initiatives
 Segamat *High-Value Crops and Biomass Processing Region*	• **Plantation led economy** through its Fruit, rubber & palm-oil basket • **Rail & highway access** to KL and JB with upcoming ETS connectivity extension • **Large Landbank** at relatively lower cost relative to southernmost districts • **High rural workforce** availability to support labour intensive sectors	• Sekijang Food Production Park • Segamat Inland Port (SIP) • Solar Power Infrastructure (e.g., UEM Lestra Flagship) • Segamat Railway Station • Segamat Industrial Park	• Establish northern Bio-Agro Industrial Zone for high-value crops, biomass and renewable energy under NETR • Revitalise Segamat Inland Port as a multimodal logistics hub • Strengthen bio-processing investment promotion and agri-innovation R&D partnerships • Develop Agro-Innovation & Skills Centre to upskill local workforce in smart farming and bio-industry	• SIP revitalisation taskforce (ECERDC–KTMB) with rail spur • Segamat Bio-Agro Park PPP for biomass, biofuel and feedstock processing • Smart farming and crop diversification pilot with FELDA and MARDI • Renewable-energy integration plan linking Lestra solar to industrial estates
 Tangkak *Strategic Transit Centre and Eco-Tourism Hub*	• **Access to Tourism Assets** which supports eco and agro-tourism activities • **High Connectivity** through the WCE-NSE interchange • **Availability of Industrial Land** • **Largest fruit producer** and second largest vegetable producer in Johor	• Gunung Ledang National Park • Tangkak Industrial Area • WCE-NSE interchange • Tangkak Water Treatment Plant	• Develop Northern Johor Transit & Logistics Corridor integrating WCE–NSE • Expand Agro-Industrial Cluster for food-tech and machinery SMEs • Transform Gunung Ledang–Muar River Corridor into a flagship eco-agro-tourism destination • Accelerate green and digital SME upgrading aligned with state incentives	• Integrated Transit & Logistics Hub Feasibility Study at WCE–NSE interchange • Agro-industrial estate expansion with shared utilities and SME incubation. • Gunung Ledang eco-tourism redevelopment under Majestic Johor PPP. • District-level green SME and digital adoption grant rollout

Source: Rancangan Tempatan Daerah, PASB Analysis, Laporan Sosioeokonomi Johor 2023

Johor Districts as the Engine: JETP's district strategic recommendations are designed to complement the JS-SEZ, not compete with it, by focusing on local sectoral ecosystems (2/5)

District	Existing Strengths	Key Infrastructure Assets	Strategic Recommendations	Potential Preliminary Initiatives
 Muar *Industrial Energy Complex, Integrated Tourism & High Value Food Processing Industry Hub*	• **Furniture manufacturing hub of Malaysia** with skilled carpentry and technical production capabilities • **Talent and Education hub** with establishment of 4000-hectare integrated university town	• Muar Furniture Park (MFP) • Maharani Energy Gateway Project • Bandar Universiti Pagoh • Sultan Ismail Bridge • Taman Tanjung Emas	• Establish Muar Integrated Food & Tourism Corridor linking food-tech, heritage and riverfront assets • Redevelop Muar Riverfront Zone as a tourism and creative-industry precinct • Strengthen Pagoh Food-Tech & Education Hub for R&D and export innovation • Expand Halal and processed-food export clusters with cold-chain connectivity	• Muar Food Innovation Park for halal and processed-food SMEs. • Riverfront redevelopment blueprint with mixed-use PPP. • Pagoh Food-Tech Talent Partnership (UTHM–MARDI–YPJ). • Heritage & Culinary Circuit activation under Majestic Johor
 Batu Pahat *High-Value Manufacturing and Processing Industry*	• **Major manufacturing hub of Johor** across diverse sectors • **Well developed industrial parks** which houses more than 20 listed companies • **Strategic Location in Straits of Malacca** with 6 existing jetties that handles exports to and from Sumatra	• Sri Gading Industrial Park • Parit Raja Industrial Park • Batu Pahat River • Historical and Cultural Sites • Universiti Tun Hussein Onn Malaysia (UTHM)	• Position Batu Pahat as central high-value manufacturing engine for precision, machinery and green-chemical industries • Attract advanced and green-certified investments aligned with Industry 4.0 • Establish State–District Skills Accelerator for automation and robotics talent	• Advanced Manufacturing Park (AMP) with shared utilities and certification • Industry 4.0 Talent Accelerator via MARA–HRD Corp–JTDC • Logistics enhancement linking Batu Pahat Port with NSE–WCE corridor

Source: Rancangan Tempatan Daerah, PASB Analysis, Laporan Sosioeokonomi Johor 2023

Johor Districts as the Engine: JETP's district strategic recommendations are designed to complement the JS-SEZ, not compete with it, by focusing on local sectoral ecosystems (3/5)

District	Existing Strengths	Key Infrastructure Assets	Strategic Recommendations	Potential Preliminary Initiatives
 Kluang *Agro-Processing Hub, Agriculture and Logistics Hub*	• **Connected via Rail and Road** with interstate and inter-district connections via the PLUS Highway and ETS Kluang • **Diverse Agricultural and Natural Resources** enabling production of variety of crops • **Large workforce**, standing as the 4th largest population in Johor.	• Upcoming Gemas-JB EDTP • Kluang Railway Station • IOI Pamol Kluang Palm Oil Mill & Estates • Gunung Lambak • Sekolah Menengah Sains Johor	• Develop Kluang as Johor's central agro-processing and logistics hub, integrating value-based agriculture with cross-district supply chains • Establish Agro-Industrial & Logistics Corridor linking Simpang Renggam–Machap–Kluang to connect producers for export • Anchor Agro-Tech & Food Processing Cluster for downstream value addition	• Agro-logistics hub feasibility with dry port and cold-chain facilities • Kluang Agro-Tech Park expansion for food processing and packaging SMEs • Smart agriculture and cooperative commercialisation programme under DOA & FAMA • District-level talent and SME upgrading programme
 Mersing *Blue Economy and Eco-Tourism Hub*	• **Gateway to Offshore Islands** (Pulau Rawa, Pulau Tioman, etc.) • Beneficiary of ECERDC initiatives • **Land Bank for Agricultural Development** which makes up almost 15% of the state's total land	• Pristine Islands and Natural Resources • Jemaluang Dairy Valley (JDV) • Endau-Mersing Integrated Fish Processing Park (EM-IFPP) • Mersing Jetty • Tanjung Penyabong Waterfront Complex	• Position Mersing as Johor's blue-economy and eco-tourism anchor, driving sustainable marine, fisheries and island-based growth • Upgrade Mersing as East Coast Gateway, strengthening port, road and air connectivity • Develop Integrated Eco-Tourism Belt along Mersing–Endau coastline under the Majestic Johor framework	• Coastal infrastructure and protection plan (DOF–ECERDC) with port and ferry upgrades • Mersing Blue Economy Hub for aquaculture, cold-chain and marine product innovation • Johor–Federal working group to coordinate LPT4 and coastal route integration

Source: Rancangan Tempatan Daerah, PASB Analysis, Laporan Sosioeokonomi Johor 2023

Johor Districts as the Engine: JETP's district strategic recommendations are designed to complement the JS-SEZ, not compete with it, by focusing on local sectoral ecosystems (4/5)

District	Existing Strengths	Key Infrastructure Assets	Strategic Recommendations	Potential Preliminary Initiatives
 Pontian *Blue-Green Energy & Aquaculture Products Hub*	• **Well Connected via** access to 3 Federal Highways and direct bridge to Johor Bahru • **Emerging hub** for petrochemicals and maritime industry • **Strong agricultural industry** with robust pineapple production of 37,000 tonnes annually • **Availability of fishing and marine resources** in Kukup Laut	• Tanjung Bin Power Station • Skudai-Pontian Highway • Kukup International Ferry Terminal • Pontian and Nenas Industrial Parks • Tanjung Piai National Park	• Position Pontian as Johor's blue-green energy frontier, integrating renewable power, aquaculture, and coastal resource management • Develop Tanjung Piai–Serkat Coastal Zone as a green industrial and aquaculture complex under NETR • Promote integrated aquaculture innovation through R&D partnerships for high-value products	• Blue-Green Industrial Zone feasibility study • Tanjung Piai Renewable Energy & Aquaculture Park PPP development • Coastal resilience and infrastructure enhancement plan • District-led aquaculture upgrading and export certification programme
 Kulai *AI and High-tech Manufacturing Hubs, Digital Economy, Aerospace and Export-oriented Services*	• **Critical transportation hub** to connect Johor with the rest of Malaysia • **Flagship of Iskandar Malaysia**, benefiting from the JS-SEZ • **Aerospace Hub** with Senai International Airport and City • **Competitive E&E hub with** the establishment of Sedenak Technology Valley • **Major Exporter** of Oil Palm and Rubber Production	• Kulai KTM • EDTP • Sedenak Technology Valley • Senai International Airport • Senai Airport City	• Establish Kulai–Senai Corridor as Johor's logistics, aerospace and digital-economy nucleus aligned with JS-SEZ and SFZ • Strengthen Senai Airport and Sedenak Tech Park as twin anchors for air cargo, aerospace manufacturing, and hyperscale data centres • Facilitate high-value FDI in digital infrastructure, supporting data, AI, and cloud service ecosystems	• Develop Aerospace & Digital Skills Hub in partnership with MARA, CAAM and MyDigital for advanced workforce readiness • Expansion of Sedenak Tech Park and YTL Green Data Centre cluster under JS-SEZ • Digital economy sandbox and AI adoption programme for SMEs • Aerospace & Digital Skills Academy linked to JTDC

Source: Rancangan Tempatan Daerah, PASB Analysis, Laporan Sosioeokonomi Johor 2023

Johor Districts as the Engine: JETP's district strategic recommendations are designed to complement the JS-SEZ, not compete with it, by focusing on local sectoral ecosystems (5/5)

District	Existing Strengths	Key Infrastructure Assets	Strategic Recommendations	Potential Preliminary Initiatives
 Johor Bahru *AI and High-tech Manufacturing Hubs, Digital Economy, Aerospace and Export-oriented Services*	• **Part of the JS-SEZ and home to FS-SFZ** • **Access to major shipping ports** across PTP, Johor Port, Tanjung Langsat Port • **Gateway to Singapore** through the Johor-Singapore Link Bridges • **Advanced industrial parks** • **Robust healthcare services**, with thriving medical tourism	• Shipping Ports • Sultan Iskandar CIQ Complex • Johor Singapore-Link Bridges • Upcoming RTS • Upcoming EART • Hyperscale Data Centre Campuses	• Position Johor Bahru as the state's high-tech manufacturing and services powerhouse, driven by JS-SEZ and SFZ integration • Accelerate cross-border digital and logistics infrastructure to strengthen Johor–Singapore economic connectivity • Expand digital economy ecosystem through innovation corridors, fintech, and data-driven service exports	• JS-SEZ operationalisation and digital customs clearance system • Advanced manufacturing and innovation cluster within zones • Johor Innovation Corridor pilot under MyDigital–IRDA partnership • State–Federal coordination for talent mobility and dual-track TVET programmes
 Kota Tinggi *Green Chemistry, Agriculture and Tourism Hub*	• **Part of the JS-SEZ** within dedicated zone • **Established Petrochemical Hub** in Pengerang • **Top Island and beach Tourism destination** in Desaru • **Selected site for KEJORA** agiritech initiatives including Fertigation Park and Pineapple Plantation	• Pengerang Integrated Complex • Pengerang Deepwater Terminals • Tanjung Langsat Port & Oil Terminal • Desaru Coast • Sultan Iskandar Reservoir • Semangar Water Treatment Plant	• Develop Green Chemical and Hydrogen Industry Zone aligned with NETR and national energy transition goals • Establish Desaru–Pengerang Tourism Belt as Johor's premier east coast destination for eco-luxury and marine tourism • Promote sustainable agriculture and aquaculture in inland areas to diversify local livelihoods	• Pengerang Hydrogen & Green Chemical Development Plan (PETRONAS-led) • Agriculture diversification programme with DOA and FAMA for high-value crops • Desaru–Pengerang Tourism Investment Zone (STIZ) expansion under Majestic Johor • Integrated infrastructure plan linking LPT4 corridor to energy and tourism clusters

Source: Rancangan Tempatan Daerah, PASB Analysis, Laporan Sosioeokonomi Johor 2023

04

Driving Johor's Economy Forward.

4.1

Johor Economic Restructuring.

Moving forward, Johor must strategise based on recent rapid global transformation...

Geoeconomic Fragmentation and Protectionism

- The global economy is shifting from multilateralism to fragmentation, marked by rising protectionism, trade restrictions, and geopolitical competition
- US global tariff is shifting trade agreements and trade relations

Climate Change and Sustainability

- Climate change is reshaping global priorities, prompting stronger regulations and market expectations for sustainability and resilience
- Extreme weather events and climate risks are becoming more frequent, affecting supply chains and infrastructure

AI & Technological Advancements

- Technological advancements in AI and automation are transforming productivity and economic structures, creating both opportunities and challenges that require swift policy adaptation

Demographic Shifts and Labour Market Challenges

- Ageing populations in developed markets and youth bulges in others are changing global labour dynamics
- Talent shortages, skill mismatches, and migration are reshaping workforce availability and competitiveness.

Source: World Economic Forum (WEF), INSEAD Knowledge, PASB Analysis

...which can have huge implications to the state if not addressed properly

- Johor must diversify its trade partners and strengthen regional integration through ASEAN frameworks to cushion against global protectionist shocks and ensure market access

- Johor must embed sustainability into its growth model by promoting decarbonisation, developing climate-resilient infrastructure, and aligning with green financing trends

- Johor must leverage these technologies to boost efficiency in manufacturing and services, supported by investments in digital infrastructure and workforce reskilling to meet future industry demands

- Johor must prepare for labour market shifts by tapping into regional talent pools, including ASEAN youth and strengthening TVET and upskilling programmes to ensure a steady pipeline of skilled and semi-skilled workers

To seize these opportunities, Johor needs to structurally address the major gaps in its economy to unlock its next growth chapter

Major Pain Points	Supporting Evidence
Moderate Economic Complexity	• **Low Median Salary** – As of 2024, Johor ranked 4th in median salary at RM2,827, which is slightly below the national average of RM3,045 and significantly lower than Selangor (RM3,300), Penang (RM3,382) and Kuala Lumpur (RM4,200) • **Low GDP Per Capita** – Johor's GDP per capita stands at RM44,762 in 2024, ranking 9th in Malaysia. This remains well below high-income states and is less than 70% of Selangor's level • **Lagging Productivity** – Johor's GDP per worker stands at RM82,701 (9th nationally), which may reflect its reliance on low-value, labour-intensive, and mid-complexity industries
Low Share of Skilled Labour and High Talent Leakage	• **Large Labour Force, Low Share of Skilled Employment** – Despite having the 2nd largest labour force of over 1.9 million nationally, only 26% are employed in high-skilled jobs (8th nationwide) • **High Skill Mismatch** – One-third of Johor's graduates are employed in roles that do not match their qualifications or skill levels, resulting in lower productivity and job satisfaction • **Talent Drain to Singapore** – Johor's median salary is only 5.6 times of Singapore's, prompting outflow of skilled and managerial talent across the border and undermining investor confidence
Stagnant Manufacturing Investment & Delayed Investment Implementation	• **Stagnant Manufacturing Approvals** – Manufacturing investment approvals have plateaued since 2019, despite annual investment approvals exceeding RM40 billion • **Overreliance on Data Centres** – Recent investment growth is concentrated in hyperscale data centres, which are capital-intensive but generate limited jobs and expose Johor to tech-cycle and energy risks • **Delayed Investment Implementation** – Johor's overall investment implementation rate from 2020 to 2024 averaged 72%, compared to the national average of 87%, hindering the state's ability to translate approvals into economic output

Source: DOSM, PASB Analysis

Recently, major efforts have been rolled out to address existing gaps to address the structural issues and unlock full potential of Johor's economy

Pain Points

Moderate Economic Complexity

Stagnant Manufacturing Investment & Delayed Investment Implementation

Low Share of Skilled Labour and High Talent Leakage

Recent Initiatives

Johor-Singapore Special Economic Zone (JS-SEZ)

Official Launch: January 2025

- High-growth economic corridor designed to position Johor as a premier investment, trade, and innovation hub in Southeast Asia
- Targeted incentives packages are offered for businesses operating in the designated flagship areas within the special economic zone

Invest Malaysia Facilitation Centre-Johor (IMFC-J)

Official Launch: February 2025

- Jointly led agency by IRDA, Invest Johor and MIDA as a one-stop agency to facilitate investment implementation within JS-SEZ
- IMFC-J will help minimize administrative obstacles by consolidating services related to investments into a single platform to reduce bureaucracy

Johor Talent Development Council (JTDC)

Official Launch: November 2024

- A one-stop centre for integrated talent solutions in Johor, established to meet the state's evolving workforce needs
- JTDC is chaired by Deputy Prime Minister and co-chaired by Johor Menteri Besar and it involves 7 federal ministries, 8 public universities, and over 100 TVET and private institutions

Source: Maju Johor website

Johor-Singapore Special Economic Zone (JS-SEZ)

The JS-SEZ will provide Johor with a major boost in attracting high value and advanced tech investments in years to come

Key Features and Objectives

NON-EXHAUSTIVE

Agreement signed on January 7th, 2025

Attracting High-Value Investments

- Key sectors such as advanced tech manufacturing, logistics, tourism, and clean energy will benefit from competitive tax incentives and simplified regulatory processes

Economic Integration

- JS-SEZ aims to unlock mutual economic benefits by combining Johor's land and labour advantages with Singapore's financial strength and investment capabilities

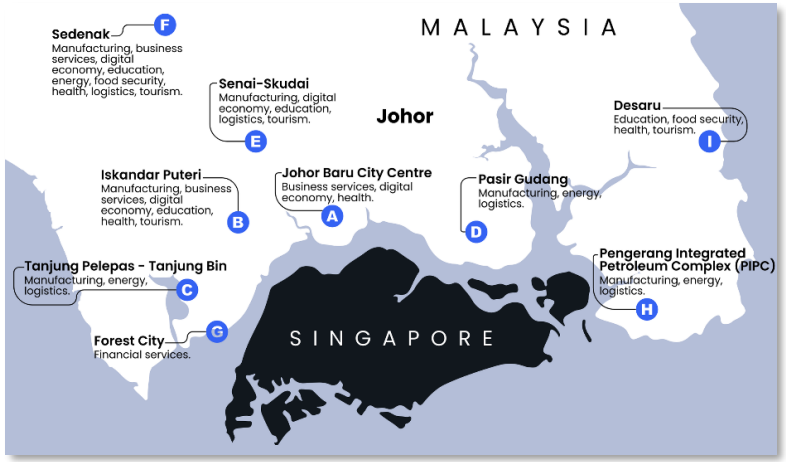
Facilitating Movement of Goods and People

- Enhancing cross-border connectivity by streamlining customs processes, improving transport infrastructure, and introducing passport-free clearance at border checkpoints

Creating Jobs

- Targeting the creation of 20,000 high-skilled jobs over the next 10 years through the implementation of 100 high-impact projects within the JS-SEZ

Flagship Area



9 flagship zones have been identified, with each zone designated its own targeted economic activities across the key sectors

11 Key Targeted Sectors		
Manufacturing	Logistics	Food Security
Energy	Digital Economy	Tourism
Green Economy	Business Services	Financial Services
Education	Health	

Source: Maju Johor website

Invest Malaysia Facilitation Centre-Johor (IMFC-J)

The facilitation and coordination of the end-to-end investment related process is streamlined through the establishment of IMFC-J

Composition of IMFC-J

Invest JOHOR – ADVANCED ECONOMY STATE
ISKANDAR REGIONAL DEVELOPMENT AUTHORITY
MIDA – MALAYSIAN INVESTMENT DEVELOPMENT AUTHORITY

Key Services of IMFC-J

NON-EXHAUSTIVE

Facilitates and coordinates end to end investment related process

- Single Point of Contact for Investment Facilitation
- Incentive Support Package (ISP)
- Investment Advisory Services
- 15% Tax Incentive Scheme for Knowledge Workers
- Expatriate Employment Services
- Land Matters
- Malaysia Automatic Clearance System (MACS)
- Development Matters

Process Flow

NON-EXHAUSTIVE

Step 1: Preliminary Study
Step 2: Application & Approval
Step 3: Project Set Up
Step 4: Construction
Step 5: Commencement

Source: IMFC-J, Maju Johor website

Johor Talent Development Council (JTDC)

JTDC will serve as the one-stop centre for talent solutions in Johor, supporting investors in meeting their workforce needs

Structure & Stakeholders of JTDC

Co-Chairmen
Deputy Prime Minister / MB Johor

JTDC Secretariate
Unit Strategik Modal Insan Johor

Federal Stakeholders	State Stakeholders	Industry Representatives	Educational Institutions
• 7 Key Ministries & MTVET	• State EXCOs • Departments, Agencies and State GLCs	• Industry Associations • Industry Leaders	• Universities in Johor • Technical & Vocational Colleges

Key Objectives of JTDC

One-Stop Expert Labor Center
- Sourcing skilled talent to support investor needs and attract high-quality investments

Aligning Education and Training with Industry Needs
- Restructuring education and training programmes to ensure graduates are equipped with industry-relevant skills

Industry-Education Partnership
- Strengthening collaboration between industry and academia to improve career opportunities

Workforce Data Collection & Analysis
- Leveraging data to ensure Johor's talent development strategies align with the evolving needs of key industries

Flagship Initiative by JTDC

SKILLS4JOHOR

RM20 million programme aimed to upskill the workforce, boost employability for premium wages, reduce skill mismatches, and restructure the training ecosystem to attract greater investment into Johor

Source: JTDC, Maju Johor website

4.2

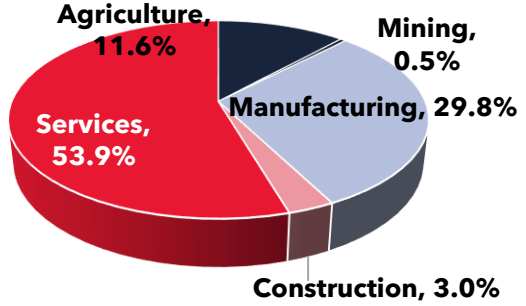
Johor Economic Restructuring Approach.

As the Southern Gateway of Malaysia, Johor is well-positioned with strong fundamentals to seize emerging opportunities and address challenges from a position of strength

Strategic Location as Malaysia's Southern Gateway

- A strategic gateway for trade and investment, located near major shipping lanes in the Malacca Strait
  - Proximity to Singapore positions Johor as a key node for trade, logistics, and cross-border investment, particularly through the Iskandar Malaysia economic corridor

Diverse & Robust Economic Base



- Johor's economy is well-diversified across multiple sectors, minimising concentration risk

World Class Logistics and Transport Infrastructure

3 International Ports
- Pelabuhan Tanjung Pelepas
- Johor Port
- Port Tanjung Langsat

1 International Airport
- Senai International Airport

- Extensive logistics infrastructure with comprehensive highway and railway connectivity

Broad Base Talent Pool and Strong Presence of Higher Education Institutions

Johor Total Labor Force (2023) :

2nd
largest talent pool in Malaysia

30
higher education institutions

- As of 2023, Johor has a labour force of over 2 million, providing investors with access to a broad and diverse talent pool

UTM · UTHM · University of Southampton Malaysia · Newcastle University Medicine Malaysia · University of Reading Malaysia · Sunway College Johor Bahru

Source: DOSM, MIDA, Malaysian Qualifications Agency (MQA)

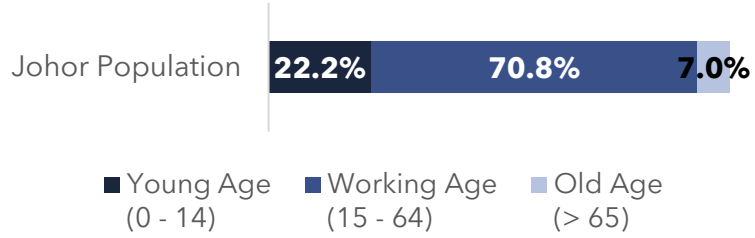
Establishment of New Economic Zones JS-SEZ & SFZ

Johor Singapore Special Economic Zone (JS-SEZ):
- Aims to boost cross-border economic integration with Singapore through seamless investment and talent mobility

Special Financial Zone (SFZ):
- Positioned to become a financial services hub offering competitive incentives to attract global firms and digital finance players

Young & Growing Workforce

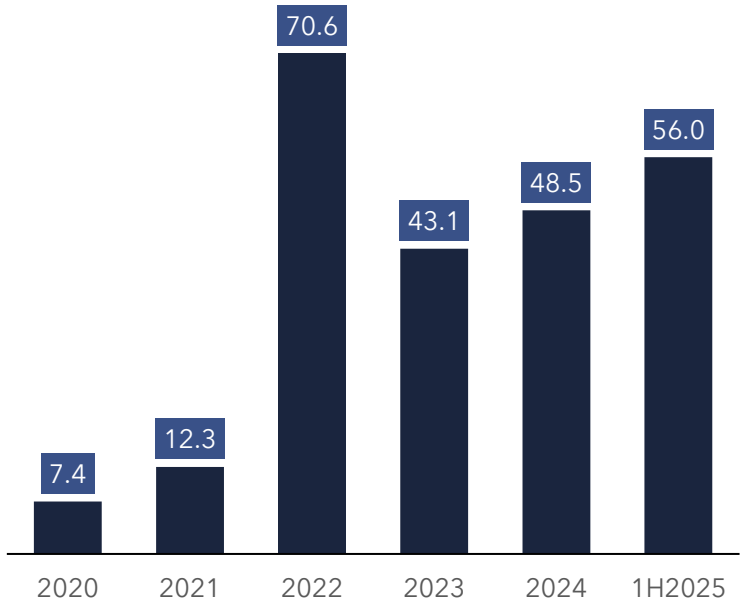
Johor' Population: 4.2 million



- 70.8% of Johor's population falls within the working-age group of 15 to 64 years, representing a substantial talent pool to support the workforce demands of investors

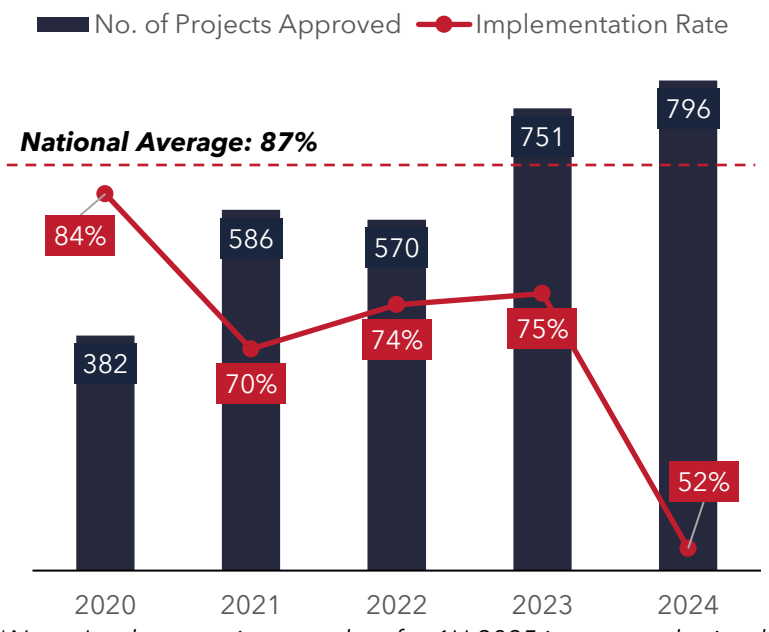
Despite being Malaysia's top investment destination with RM212 billion in approved investments between 2020 – Q1 2025, Johor's implementation rate averages just 72%, below the national average of 87%

Total Approved Investments, 2020 – 1H2025
RM Billion



Total Approved Investment:
RM237.9 billion

Approved Projects Implementation Rate, 2020 – 2024
%



**Note: Implementation rate data for 1H 2025 is not yet obtained*

Implemented Projects:
2,156

Unimplemented Projects:
929

The real challenge is translating approved investments into GDP, jobs, and tangible economic impact through effective implementation

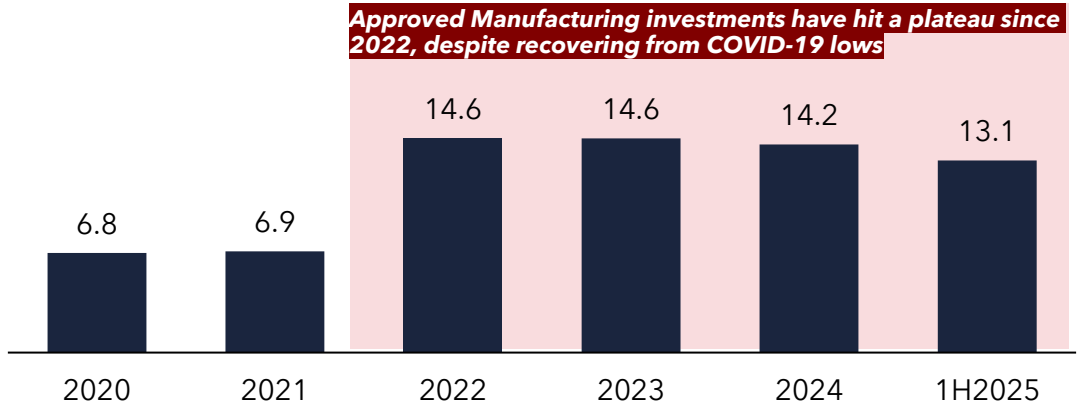
- *As Johor aims to double its GDP to RM260 billion by 2030, the state requires additional RM108 billion in realised private investments*
- *Despite strong investor interest, the state risks missing its target without strategic interventions. Achieving this ambition hinges on turning approvals into real, on-the-ground economic activity*

Source: MIDA, PASB Analysis
Note: Implementation rate data for 1H 2025 is not yet obtained

Additionally, approved investments in Johor in recent years have relied heavily on data centres, while manufacturing has seen a plateau in both investment value and project numbers

Approved Investments (Manufacturing), 2020 – 1H2025
RM Billion

Total Approved Investment: RM60.1 billion



2020 – Q12025:

Potential Employment

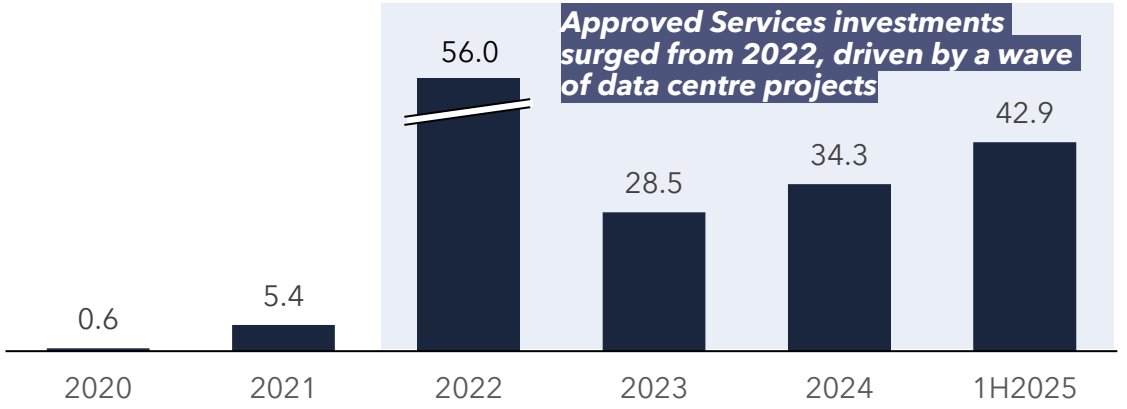
75,866

Number of Projects

1,099

Approved Investments (Services), 2020 – 1H2025
RM Billion

Total Approved Investment: RM151.9 billion



2020 – Q12025:

Potential Employment

9,116

Number of Projects

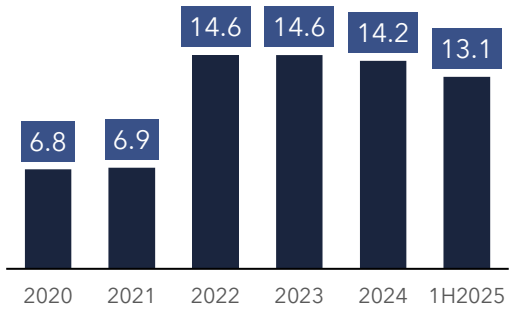
2,225

Johor's growing reliance on data centre investments has driven a surge in services approvals, but these projects generate far fewer jobs compared to traditional manufacturing investments

Source: MIDA, PASB Analysis

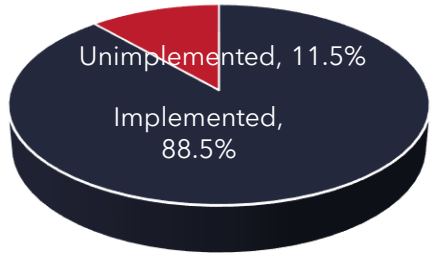
Only 60% of approved projects in the services sector have been implemented with 808 still pending, while the manufacturing sector shows a higher implementation rate of 88% but has seen a plateau in project value and job creation

Manufacturing Investments, 2020 – 1H2025
RM Billion



Total Approved Investment: *RM70.2 billion*

Manufacturing Implement. Rate, 2020 – 2024
%

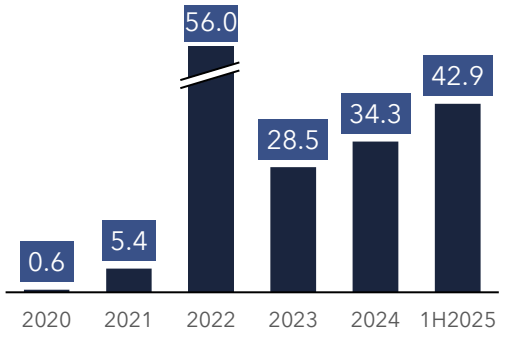


Total Projects: *1,050*

Implemented Projects: *929*

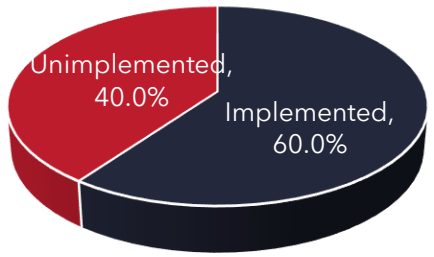
Unimplemented Projects: *121*

Services Investments, 2020 – 1H2025
RM Billion



Total Approved Investment: *RM167.7 billion*

Services Implement. Rate, 2020 – 2024
%



Total Projects: *2,035*

Implemented Projects: *1,227*

Unimplemented Projects: *808*

Key barriers in project implementation

Lengthy and Complex Land Approvals
Convoluted land conversion, amalgamation and titling processes have proven a recurring bottleneck for sites outside established industrial parks

Stringent Environmental Regulations
Stringent environment impact assessment and regulations have resulted in extensive reviews and compliance efforts

Insufficient Utility Infrastructure
Lack of utility readiness and centralisation to meet the increasing demand to support industrial needs resulting in stalled project pipeline (e.g., data centres)

Fragmented Issue-Resolution
Lack of a unified, cross-functional process for diagnosing and fixing problems drives repetitive back-and-forth and project operationalization

As such, these challenges must be addressed to unlock the full potential of Johor's investment pipeline

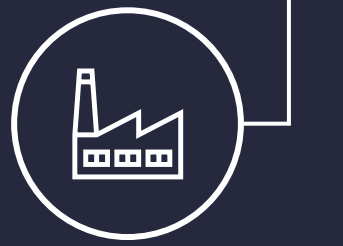
Source: MIDA, PASB Analysis, FGD
Note: Implementation rate data for Q1 2025 is not yet obtained

Recognising these opportunities, JETP pivots Johor's economic strategy from simply securing more investment approvals to ensuring faster and broader realisation of those already approved

JETP Focus:

Accelerating the realisation of approved investments:

Investment Approval



Investment Realisation

Infrastructure Readiness
Ensure availability of industrial land, utilities (power, water, gas), and last-mile infrastructure to support rapid project mobilisation

Investors Friendly Policy
Establish single-window facilitation and streamline approval processes (e.g., EIA, DO, permits) through a coordinated and time-bound mechanism

Incentives & Investment Facilitation
Support drawdown of approved tax incentives and financing, while assisting investors in customs clearance, licensing, and regulatory compliance

Talent & Workforce
Coordinate TVET and university pipeline with investor needs, expedite foreign talent approvals, and build a local supply chain of skilled workers

The development of JETP is anchored on four key components that form the foundation of its strategic framework, guiding Johor's transformation into an advanced state

Key Guiding Principles in JETP Strategic Framework

Set and define the strategic True North targets that are quantifiable that are aligned with Johor's long-term ambitions

Identify Johor's strategic strengths and high-potential sectors that will generate sustained economic impact

Formulate targeted strategic interventions to attract investments and address key implementation barriers

Establish a comprehensive implementation plan outlining timelines, KPIs, responsibilities, and governance structure for effective delivery

JETP Development

Implementation

Source: PASB Analysis

Strategic True North

- *GDP*
- *GPD per Capita*
- *New Employment Opportunities*

Setting clear True North targets is crucial to help the state track its performance and stay aligned with its long-term goals

Key Areas

1 GDP (RM Billion)

- Realising the next wave of private-sector investments is **projected to lift Johor's GDP to RM260 billion by 2030**, achieving an accelerated 8.7% CAGR and firmly positioning the state on a high-income, innovation-driven growth trajectory

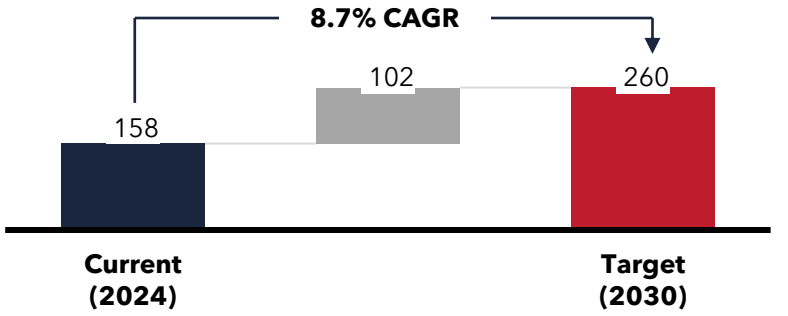
2 GDP Per Capita (RM)

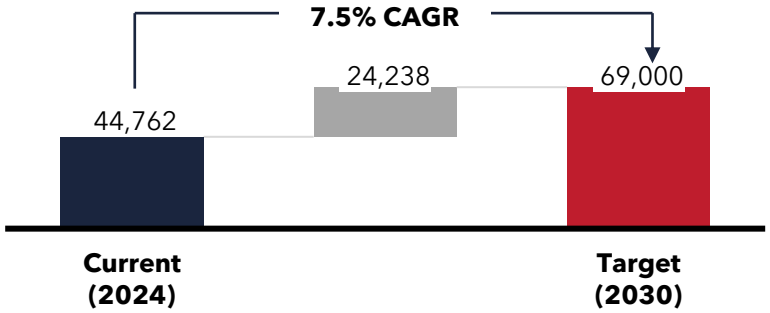
- By accelerating and strengthening high-value sectors, **Johor's GDP per capita is projected to rise to over RM69,000 by 2030**, growing at 7.5% CAGR and firmly positioning the state above the World-Bank high-income benchmark

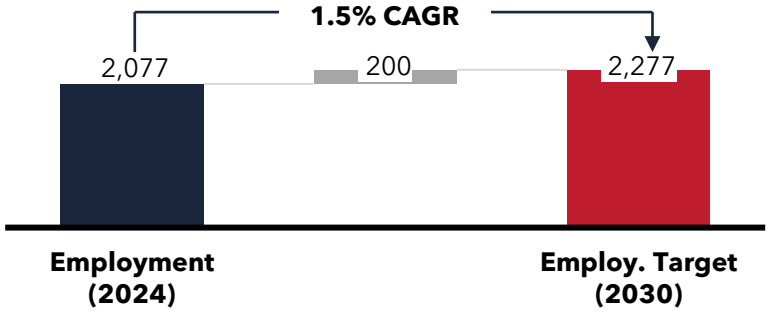
3 New Employment Opportunities ('000)

- The successful realisation of private-sector investments across Johor's prioritised sectors is **projected to create more than 200,000 new, high-quality job opportunities**, expanding employment at a steady 1.5% CAGR and strengthening the state's long-term economic resilience

True North Targets



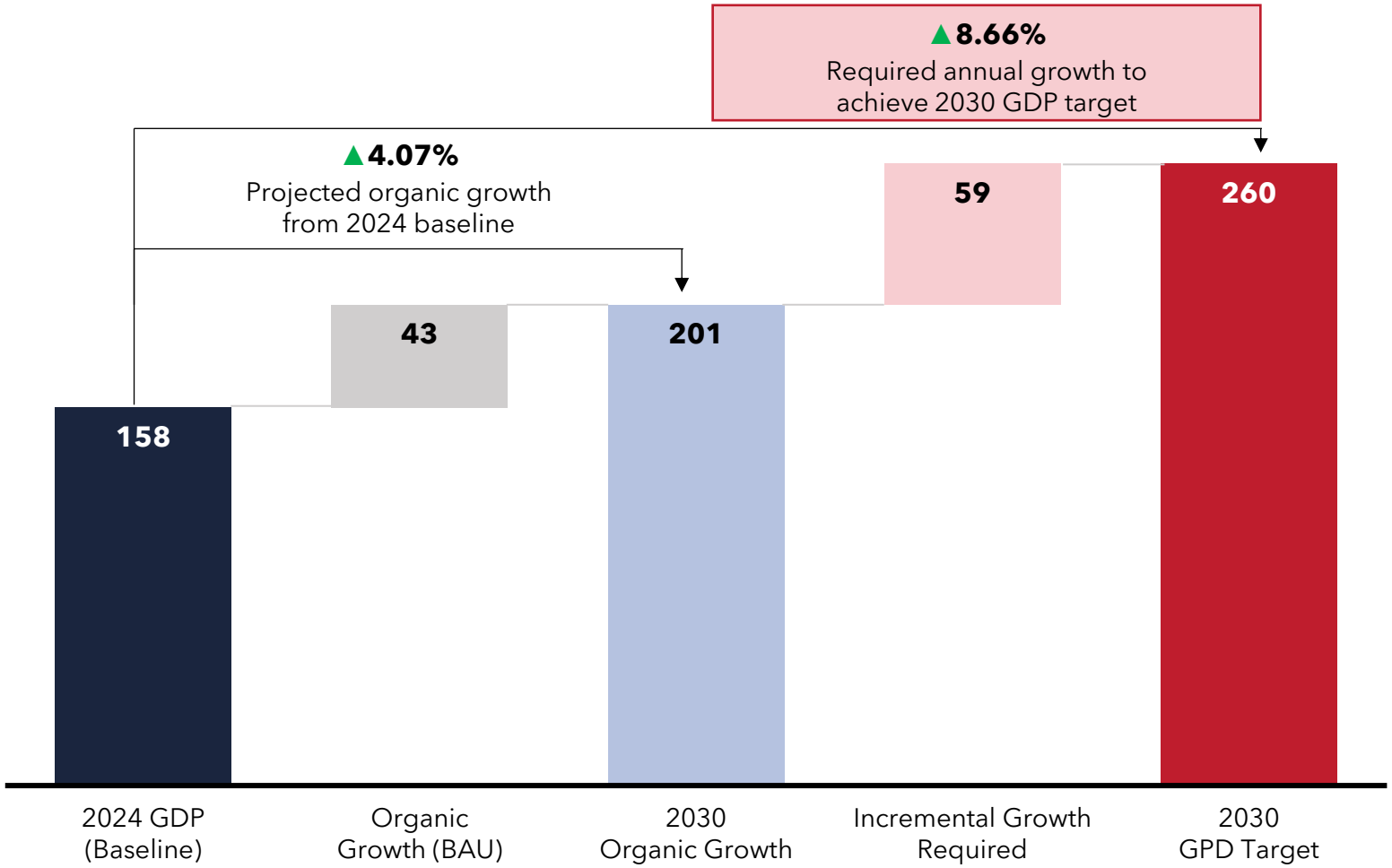




Source: Strategic Leadership Engagement (SLE)

With a GDP target of RM260 billion by 2030, Johor requires an additional RM59 billion uplift beyond organic growth to meet this goal

Johor's GDP Targets by 2030
RM Billion



2030 GDP Organic Growth:

- Between 2016 and 2024, Johor's GDP grew at 1.01 of the national GDP growth rate
- Given that the national GDP is expected to grow at an average rate of 4% annually through 2030, Johor's GDP is projected to grow at an average rate of 4.07% per year. At this rate, Johor's GDP is anticipated to reach RM201 billion by 2030

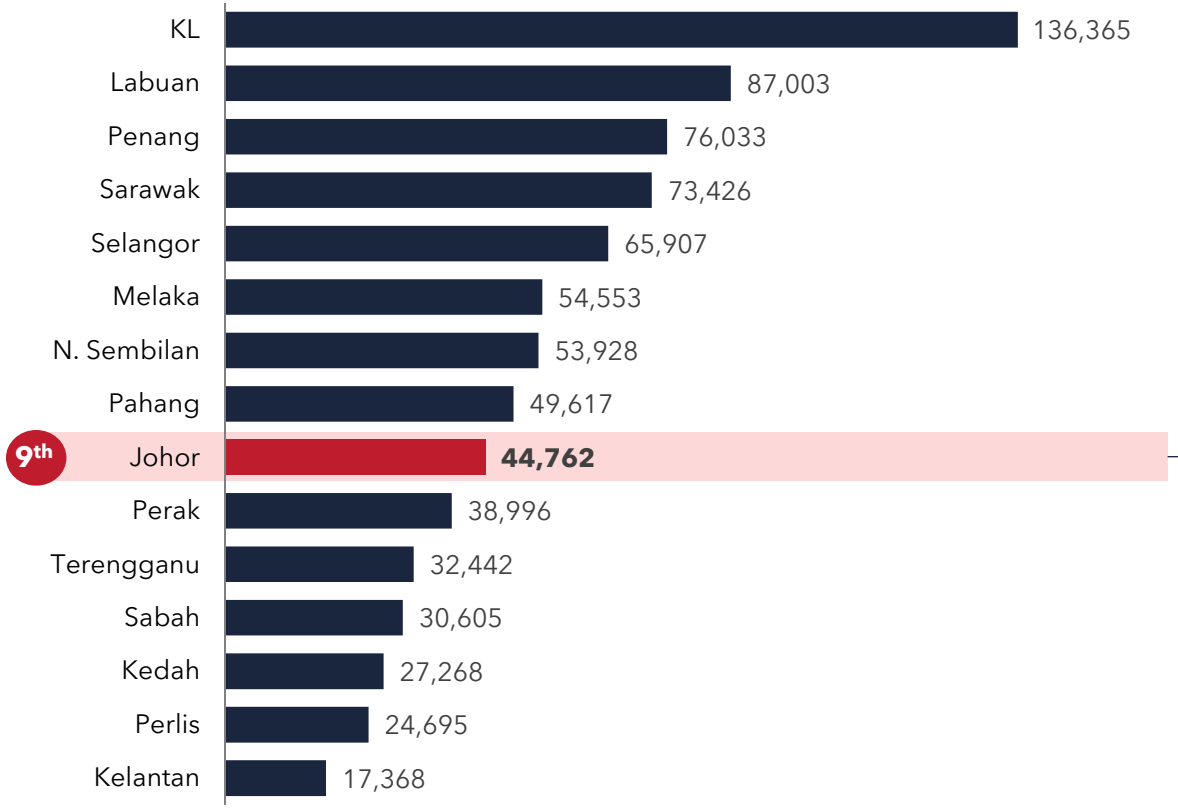
2030 GDP Target:

- To meet Johor's goal of achieving a GDP of RM260 billion by 2030, an additional RM59 billion in economic growth will be required to achieve the goal with an annual growth of 8.66%
- This represents a significant boost beyond the projected organic growth and will require targeted interventions and strategic investments to accelerate Johor's economic development by 2030

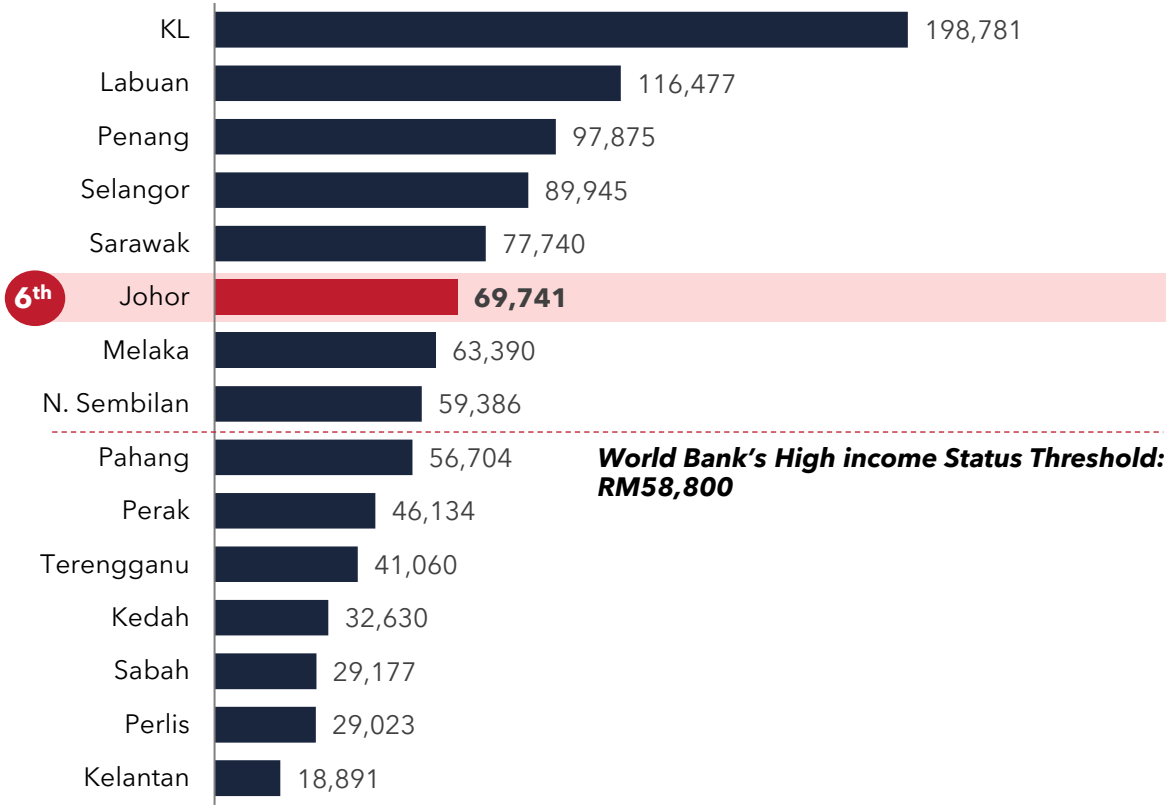
Note: The projected organic growth is based on correlation of Johor's historical growth against national growth between 2016 to 2024

At over RM69,000 GDP per capita, Johor is projected to become a high-income state by 2030, based on the World Bank's current threshold of RM58,747[1]

GDP Per Capita (Current Prices) by States, 2024
(RM '000)



Projection on GDP Per Capita (Current Prices) by States, 2030
(RM '000)

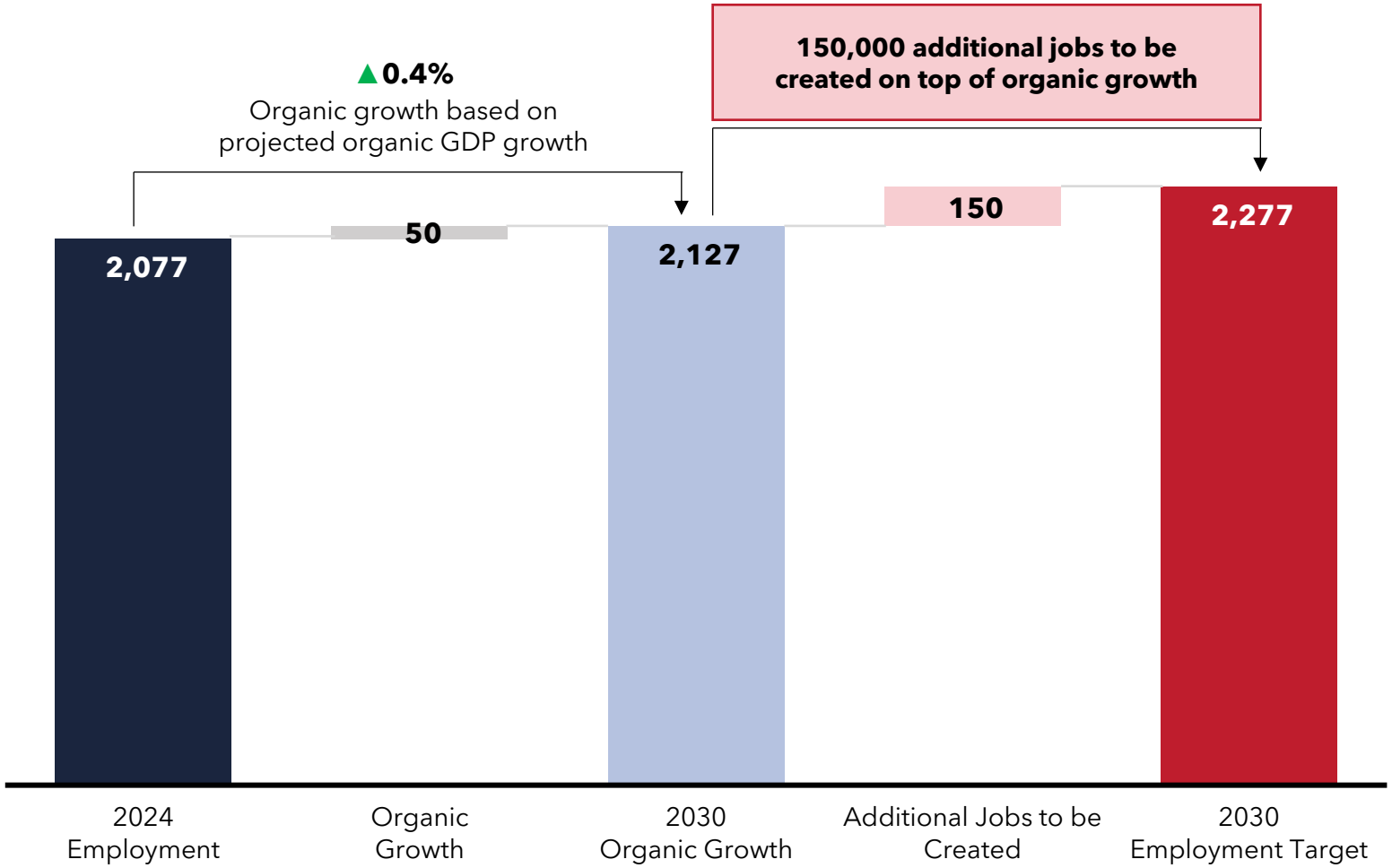


Johor's GDP per capita is projected to grow at a CAGR of 7.5%, improving its national ranking from 9th to 6th by 2030, uplifting the state to surpass World Bank's definition of high-income status

Source: DOSM (2024). A high-income nation is defined by the World Bank as one with a gross national income (GNI) per capita of $13,936 or more in 2024, subject to change on a yearly basis. [1]

At RM260 billion GDP, it is projected that the state will generate an additional 200,000 jobs by 2030, including those from organic growth

Johor's Total Employment Targets by 2030
Number of Employment, Thousands ('000)



2030 Total Employment Organic Growth:

- Between 2021 and 2024, Johor's employment grew at an average annual rate of 2.0%, against a GDP growth of 5.4%, resulting in an employment elasticity of 0.366
- Assuming a projected GDP CAGR of 4.1%, an employment elasticity of 0.366, and a 3% annual increase in labour productivity (based on 2021–2024 trends), Johor's employment is expected to grow at 0.4% annually between 2025 and 2030
- This translates to approximately 50,000 additional jobs from organic economic growth by 2030

2030 Total Employment Target:

- To achieve the RM260 billion GDP target by 2030, Johor must grow at an annual rate of 8.7%. Using similar elasticity of 0.366 and assuming a higher labour productivity gain of 4% per annum (reflecting increased technological adoption), the projected employment growth rate is estimated at 1.5% annually
- This translates to approximately 200,000 additional jobs from 2024 and 150,000 on top of organic economic growth by 2030

Note: The projected organic growth is derived from expected employment growth, based on the correlation between projected GDP growth and historical employment elasticity

Where to Play

- *10 prioritised industries have been identified to propel Johor's economy to greater heights by 2030*

10 priority industries have been identified, aligned with Johor's recent economic initiatives, to drive growth and realise JETP vision

1. Chemical & Petrochemical
2. Healthcare & Pharmaceutical
3. Energy
4. Electrical & Electronics
5. Aerospace
6. Logistics
7. Tourism
8. Agriculture
9. Digital Economy
10. Manufacturing

Why does Johor need to prioritise?

- **Policy Alignment:** Clear priorities enable coordinated policies across areas such as talent and infrastructure
- **Strong Value Proposition:** Focused industries help define Johor's investment pitch, giving investors confidence in consistent government support
- **Leadership Focus:** Prioritisation allows better tracking of sector performance, driving greater economic impact from the state leadership

Source: Strategic Leadership Engagement (SLE)

Johor's economic growth hinges on identifying and prioritising key sectors that will drive the state's development through 2030 and beyond

Key Guiding Principles in Sector Prioritisation

1 Existing Strength in Contribution to Johor's GDP

- Sectors with strong historical and current contributions to Johor's GDP (e.g., manufacturing, services, agriculture)
- High employment-generating sectors with established infrastructure and business ecosystems
- Strong export performance and integration into regional and global value chains

2 Strategic Alignment with Johor's Future Advancement & Vision

- Alignment with Johor's long-term plans (e.g., Maju Johor, JS-SEZ)
- Potential to support national and state-level aspirations in sustainability, digital economy, and innovation
- Capacity to catalyse cross-sectoral spillovers and attract high-value investments

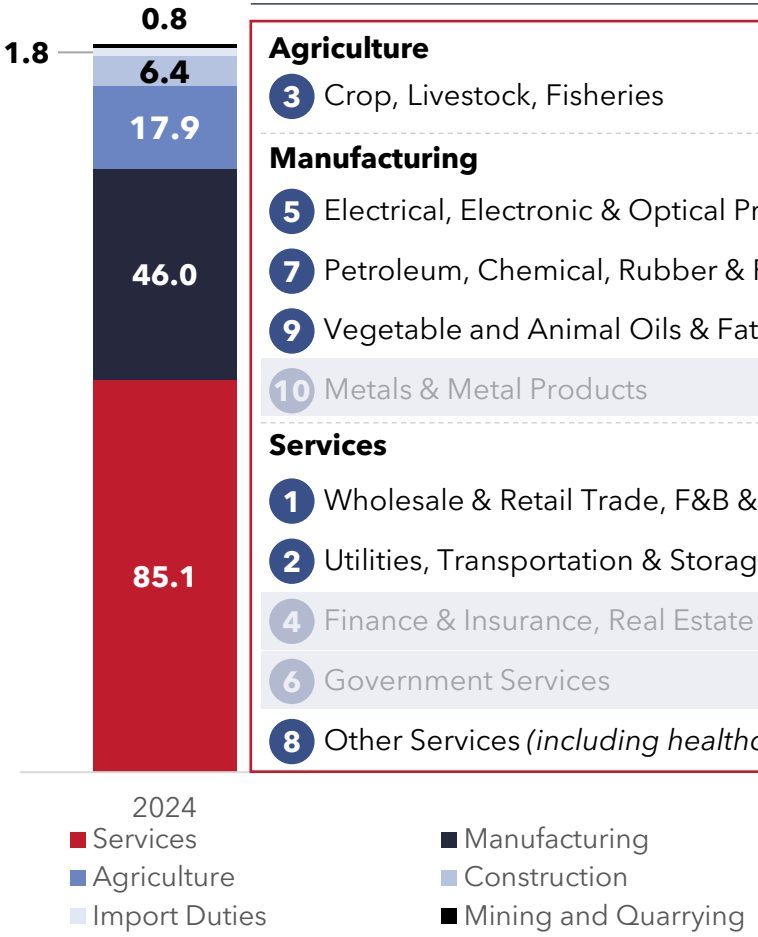
Source: Strategic Leadership Engagement (SLE) Session, PASB Analysis

The 10 prioritised sectors under JETP accounted for over 66% of Johor's GDP in 2024, underscoring their role as the state's key economic drivers

Guiding Principles

1. **Existing Strength in Contribution to Johor's GDP**
2. **Strategic Alignment with Johor's Future Advancement & Vision**

Johor GDP by Sectors, 2024
RM Bil



Top 10 Ranking of GDP Size by Sub-sectors

Agriculture
3 Crop, Livestock, Fisheries

Manufacturing
5 Electrical, Electronic & Optical Products
7 Petroleum, Chemical, Rubber & Plastic Products
9 Vegetable and Animal Oils & Fats, Food Processing, Beverages
10 Metals & Metal Products

Services
1 Wholesale & Retail Trade, F&B & Accommodation *(tourism related)*
2 Utilities, Transportation & Storage and ICT
4 Finance & Insurance, Real Estate
6 Government Services
8 Other Services *(including healthcare)*

Prioritised Sector Mapping

Agriculture	
Electrical & Electronic	
Chemical & Petrochemical	
Agro-processing *(Agriculture)*	
>	Not selected
Tourism	
Energy, Logistics, Aerospace	
	Not selected
	Not selected
Healthcare & Pharmaceutical	

RM104 billion
66% of Johor's GDP in 2024

**excluding Metals & Metal Products, Financial & Insurance, Real Estate and Government Services*

Source: DOSM, PASB Analysis

These 10 prioritised sectors are aligned with Johor's core economic focus as outlined in other key strategy documents, ensuring strategic alignment across the state's development agenda

Guiding Principles

1. Existing Strength in Contribution to Johor's GDP
2. Strategic Alignment with Johor's Future Advancement & Vision

Mapping of Prioritised Sectors with Other Existing State Documents

State Doc. / Plan	Chemical & Petro-chem.	Health-care & Pharma	Energy	Electrical & Electron.	Aero-space	Logistics	Tourism	Agri-culture	Digital Econ.	Green Econ.	Financial & Business Services	Edu-cation
Maju Johor 2030	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗
Johor-Singapore Special Economic Zone (JS-SEZ)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Johor Economic Transformation Programme (JETP)	✓	✓	✓	✓	✓	✓	✓	✓	✓	*Embedded in Energy Sector*	*Enabler*	*Enabler*

JETP Manufacturing & Digital Economy Sectors

Financial & Business Services, Green Economy, Digital Economy and Education are embedded as cross-cutting enablers to support the ambitions of JETP

Source: Maju Johor 2030, IRDA, PASB Analysis

These 10 prioritised sectors encompass various sub-sectors, which will serve as key focus areas for Johor's development moving forward (1/3)

JETP Focused Sectors and Sub-sectors

Chemical & Petrochemical

Johor's Competitive Advantage

The presence of Pengerang Integrated Petroleum Complex (PIPC) in Johor positions the state as a key regional hub for downstream and petrochemical activities, offering strong potential for value-added investments and job creation

Subsectors

- Chemical & Chemical Products
- Petroleum Products
- Plastic Products
- Rubber Products
- Oleochemicals

Healthcare & Pharmaceutical

Johor's Competitive Advantage

Driven by rising healthcare demand from the regional market, anchored by major medical groups and a growing ecosystem, Johor is well-positioned to expand its healthcare and pharmaceutical industry while enhancing service quality

Subsectors

- Healthcare Services
- Medical Devices
- Pharmaceuticals

Energy

Johor's Competitive Advantage

Leveraging its strategic position in energy infrastructure, Johor is well-placed to ensure a reliable and sustainable energy supply to meet the growing demands of its expanding industrial base and key growth sectors

Subsectors

- Renewable Energy Generation
- Energy Storage Systems
- Hydrogen & Alternative Fuels

Electrical & Electronics

Johor's Competitive Advantage

With a strong E&E base and established EMS players, Johor is primed to scale advanced manufacturing to meet increasing global demand for high-tech goods and services

Subsectors

- Electronic Components
- Industrial Electronics
- Consumer Electronics
- Electrical Products

Source: MIDA, PASB Analysis

These 10 prioritised sectors encompass various sub-sectors, which will serve as key focus areas for Johor's development moving forward (2/3)

JETP Focused Sectors and Sub-sectors

Aerospace

Johor's Competitive Advantage

Johor's aerospace sector is poised for growth, supported by the expansion of Senai International Airport and key MRO players, enabling the development of an integrated aerospace ecosystem and stronger regional supply chain connectivity

Subsectors

- Aerospace Manufacturing
- Maintenance, Repair and Overhaul (MRO)

Logistics

Johor's Competitive Advantage

Johor's position as Malaysia's Southern Gateway makes it a key regional hub for trade and supply chains, supported by its transshipment facilities, marine supply base, and strong multimodal connectivity

Subsectors

- Warehousing
- Transportation
- Freight Forwarding
- Distribution
- Supply Chain Management

Tourism

Johor's Competitive Advantage

With a strong tourism foundation, Johor can leverage its rich natural landscapes, cultural heritage, and strategic attractions to expand into high-value tourism segments and position itself as a leading destination for both domestic and international travelers

Subsectors

- Eco-tourism
- Meetings, Incentives, Conferences & Exhibitions (MICE)
- Medical & Wellness Tourism

Agriculture

Johor's Competitive Advantage

As Malaysia's top contributor to agriculture value-added, Johor is well-positioned to capitalise on its natural strengths and scale high-potential segments like the halal industry, solidifying its role as the nation's food basket and a key driver of food security

Subsectors

- Crop Cultivation
- Livestock Farming
- Fisheries
- Food Processing
- Wood Products

Source: MIDA, PASB Analysis

These 10 prioritised sectors encompass various sub-sectors, which will serve as key focus areas for Johor's development moving forward (3/3)

JETP Focused Sectors and Sub-sectors

Digital Economy

Johor's Competitive Advantage

Strategic proximity to Singapore and JS-SEZ, enabling seamless cross-border digital trade and data connectivity. Rapid growth of hyperscale data centres forming Malaysia's largest digital infrastructure cluster.

Subsectors

- Data Centres & Cloud Infrastructure
- Artificial Intelligence & Automation
- Digital Trade & E-Commerce

Manufacturing

Johor's Competitive Advantage

Malaysia's leading industrial and export manufacturing base, anchored by high-value E&E, petrochemical, and machinery clusters. Strategic connectivity via ports, airports, and logistics corridors linking Johor directly to global supply chains.

Subsectors

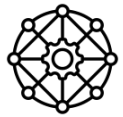
- Electrical & Electronics and Precision Components
- Green & Circular Manufacturing
- Advanced Materials and Industrial Machinery

Source: MIDA, PASB Analysis

How to Succeed

- *Identify sectoral strategies and formulate targeted interventions to attract investments and address key implementation barriers*

JETP is built around two key strategic themes: deepening economic complexity within priority sectors and strengthening foundational enablers

Key Strategy	Description
1  **Deepening Economic Complexity**	*How can Johor climb the global value chain and forge tighter inter-sector linkages?* • Anchor higher-value, R&D-intensive activities in the 10 prioritised industries • Enhance value chain resilience through local suppliers and ecosystems that amplify spill-overs • Nurture innovation, talent and sustainable practices to raise Johor's economic complexity
2 **Strengthening Foundations for Growth**	*What must Johor do to fix or build so complexity can actually materialise?* • Upgrade critical hard & digital infrastructure • Simplify approvals & after-care for superior ease of doing business • Crowd-in capital via private-investment catalysts (incentives, blended finance) • Strengthen talent & capacity building pipelines • Run a delivery-unit "control tower" to drive on-time execution

Source: PASB Analysis

Deepening economic complexity in Johor means moving up the value curve, fortifying supply-chain ecosystems, and accelerating knowledge-driven innovation

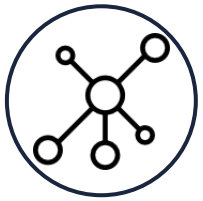
Deepening Economic Complexity

1

Moving Up the Value Curve

- Capture higher-value segments—design, engineering, advanced services—within every priority sector
- Secure anchor investors that commit to local R&D and supplier development
- Embed sustainability & circular-economy principles from the outset

2



Enhancing Supply Chain Resilience

- Build deep local chain supplier ecosystems around anchor MNCs and GLCs
- Create shared cross-sector platforms (testbeds, logistics corridors, data exchanges)
- Leverage joint procurement and co-innovation programmes

3

Accelerating Knowledge & Innovation

- Scale specialised talent pipelines (micro-credentials, dual-track TVET)
- Expand university-industry research partnerships and IP commercialisation
- Foster start-ups via sandboxes, venture co-investment, and green/innovation sukuk

Source: PASB Analysis

In parallel, it is mission-critical for the state government to formulate strategic interventions that effectively support both investment attraction and realisation

Strengthening Foundations for Growth

Infrastructure Development

Physical Infrastructure

- Enhance physical infrastructure across key economic corridors to support industrial growth, positioning Johor as a regional and global trade hub

Digital Infrastructure

- Expand and modernise digital infrastructure to improve investment competitiveness and operational efficiency for businesses in Johor

Ease of Doing Business

Regulatory Process

- Simplify regulatory processes across agencies and reduce bureaucratic delays to make Johor more attractive to investors, entrepreneurs, and multinational corporations

Invest. Promotion & Facilitation

- Strengthen investment promotion strategies and investor services through dedicated support channels to improve investor experience and reduce entry barriers

Private Investment Catalyst

Financial Incentives & Access to Capital Market

- Strengthening financial assistance through targeted incentives and improved capital market access to support investments in emerging technologies and sectors

Sectoral Development

- Develop support mechanisms for prioritised sectors to drive industrial deepening, supply chain integration, and value-added activities

Talent & Capacity Building

Talent Attraction, Development, and Retention

- Attract, nurture, and retain a skilled and adaptable workforce through comprehensive strategies in education, training, and employment to support Johor's advanced industries

Industry-Academia Linkages

- Foster stronger collaboration between industry players and academic institutions to align curriculum with evolving industry needs and produce job-ready talent

With private investments positioned as a catalyst for economic growth, Johor must work closely with the federal government, private sector and state GLCs to effectively accelerate the realisation of investments

Key Role of Federal / State Government and Agencies, GLCs and Private Sector Players

Federal Gov. / Agencies

Competitive Incentives & Policy Clarity

- Offer targeted fiscal and tax incentives, alongside clear long-term policy roadmaps to boost investor confidence

Streamline Federal-Level Approvals

- Ensure efficient and coordinated federal approvals to facilitate smooth project implementation

State Gov. / Agencies

Create an Investment-Ready Environment

- Develop core infrastructure and utilities to unlock investable land and facilitate industrial growth

Accelerate State Level Approvals

- Enhance state processes for land, planning, and utility approvals, and proactively resolve bottlenecks

Private Sector

Lead Investment & Project Delivery

- Take lead in financing and operating investments across the 8 priority sectors, driving capital formation and job creation

Foster Innovation & Supply Chain Development

- Adopt advanced technologies and ESG standards, while developing local Tier 2/3 suppliers to strengthen the domestic value chain

State GLCs

Co-Invest in Strategic & High-Impact Projects

- Provide patient capital or land assets to co-invest in catalytic or pioneering ventures

Address Market Gaps

- Invest in sectors or infrastructure underserved by private capital to address structural gaps in the investment ecosystem

A "whole-of-government, whole-of-market" approach—where Government sets direction, GLCs crowd in capital and capabilities, and the private sector drives execution—will be critical to achieving JETP's 2030 investment and economic goals

4.3

Sectoral Growth Strategies.

Across the 10 prioritised sectors, vision statements and sectoral strategies were co-developed with public and private players which positions Johor to capture high-value added industries

Rationale

Vision Statements

Establishing an ambitious future-state that is application and value based, rooted from the sector's unique proposition, emerging trends and strategic potential within the state

Key Strategies

Balanced mix of short to long term strategies that capitalise on market opportunities, driven by private investment and reinforced through public-private partnerships (PPPs)

Illustration and Description

Strategy 1- Deepening Econ. Complexity | Strategy 2 - Strengthening Found. for Growth

Through the Lab, each of the 8 sector strategies was co-developed with public and private players to not only strengthen individual sectors but also generate cross-district spillovers and drive inclusive growth (2 of 2)

Industries	Vision Statements	Key Strategies
Aerospace	*Positioning Johor to be the Southern Region Gateway for General Aviation and Maintenance, Repair & Overhaul (MRO) Services*	• Establish production hub for next-generation aviation technologies • Develop specialised facility for servicing component-level MRO • Establish an Aerospace Manufacturing Hub to boost aviation trade and industry linkages

Strategy 1- Deepening Econ. Complexity | Strategy 2 - Strengthening Found. for Growth

Through the Lab, each of the 8 sector strategies was co-developed with public and private players to not only strengthen individual sectors but also generate cross-district spillovers and drive inclusive growth (1 of 2)

Industries	Vision Statements	Key Strategies
Chemical & Petrochemical	*Strengthen Johor as an advanced, application-driven integrated chemical hub in ASEAN by fostering a dynamic and innovative chemical ecosystem*	• Advance the chemical and petrochemical hubs towards a ready-state development with enhanced infrastructure solutions • Accelerate industry integration towards high-value specialised chemicals • Pioneer the growth of green chemistry & circular petrochemical economy
Healthcare & Pharmaceutical	*Position Johor as the leading healthcare ecosystem driver in the ASEAN region*	• Strengthen and diversify local manufacturing capabilities and capacity • Expand on local commercialisation and innovation capacity • Establish Johor as the preferred destination for integrated healthcare services
Energy	*Position Johor as a regional energy powerhouse for sustainable, inclusive and innovative energy development, aligned with the national & global energy transition*	• Scale up production of sustainable, low-carbon and renewable power • Develop green hydrogen and ammonia export hubs • Build green innovation and manufacturing hubs • Strengthen the sustainable maritime industry
Electrical & Electronics	*Position Johor as Southeast Asia's E&E hub, driven by high-value manufacturing, advanced tech applications, and a future-ready talent & business ecosystem*	• Addressing the needs of emerging E&E end-use markets • Strengthening intermediary E&E segments (e.g. robotics, data centers) • Driving local supply chain anchoring through corporate-led innovation & investment

Source: Focus Group Discussion (FGD)

50

Source: Focus Group Discussion (FGD), PASB Analysis

Chemical & Petrochemical.

By 2030, Johor could be an advanced, application-driven integrated chemical hub in ASEAN

Sectoral Vision:

Strengthen Johor as an advanced, application-driven integrated chemical hub in ASEAN by fostering a dynamic and innovative chemical ecosystem

Sectoral Strategies:

Strategy 1:

Accelerate industry shift from bulk to high-value specialty chemicals

Strategy 2:

Pioneer the growth of green chemistry & circular petrochemical economy

Strategy 3:

Elevate chemical and petrochemical hubs to ready-state development through enhanced infrastructure

Source: FGD Session with Industry Stakeholders, PASB Analysis

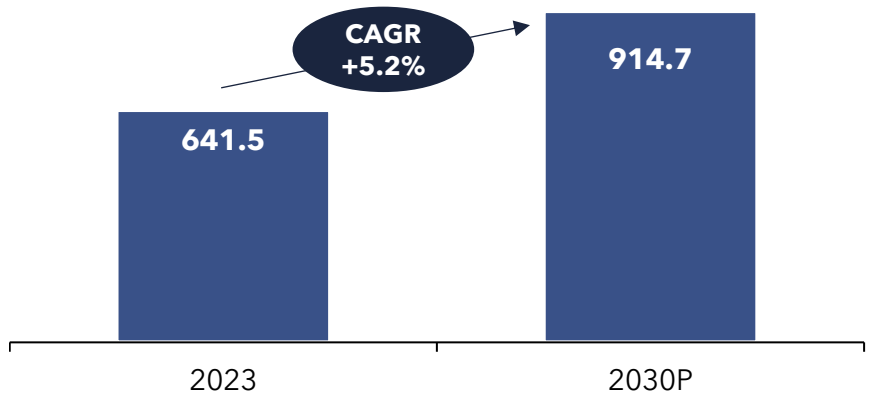
To unlock greater value in the chemical sector, Johor will need to strategise the transition from bulk chemicals to high-value specialty chemicals

Strategy 1:

Accelerate industry shift from bulk to high-value specialty chemicals

Johor to focus on accelerating the shift from bulk to high-value specialty chemicals by leveraging strong regional demand, promoting bio-based and sustainable solutions, and aligning with national policies to attract new investments and high-tech manufacturing.

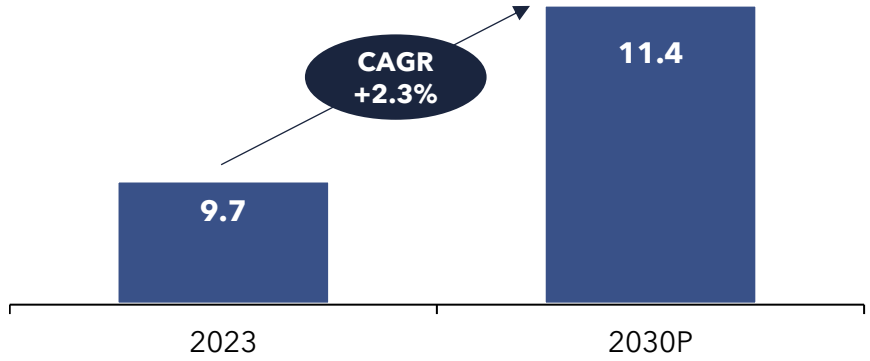
Global Specialty Chemicals Market, 2023 – 2030P
USD Billion



Key Highlights

- **Strong Growth Outlook:** Significant expansion in emerging markets, particularly in the Asia-Pacific region, driving future demand outlook for chemical and petrochemical products
- **Specialty & Sustainability Focus:** Growing focus on developing bio-based and renewable chemical solutions. Industry is accelerating development of biodegradable plastics & eco-friendly formulations to meet regulatory and consumer pressures

Malaysia Chemicals Market Size, 2023-2030P
USD Billion



Key Highlights

- **Positive Domestic Outlook:** Malaysia chemical market is expected to grow to USD11.4 billion by 2030, driving by strong regional demand
- **Supportive Government Policy & Strategic Vision:** Chemical Industry Roadmap 2030 (CIR2030) targets a rise in chemical sector GDP contribution from 3.4% to over 4.5% by 2030, supported by aligned national policies like NIMP2030, NETR, and tax incentives for new manufacturing

Source: Market.US; Grand View Research; Market Research Future, Chemical Industry Roadmap 2030, PASB Analysis

Unlocking value in specialty chemicals will require strengthening downstream activities and fostering close collaboration between the state and private industry to drive sectoral growth

Key Focus	Rationale
1 Incentivise Investment in Downstream Specialty Chemical Manufacturing	• Specialty chemicals such as care chemicals, nutrition chemicals, and electronic chemicals offer higher profit margins, R&D intensity, and stronger resilience against commodity price shocks. Incentivising MNCs and local champions to invest in high-value downstream activities will allow Johor to diversify away from volatile bulk chemical exports and increase value-add per tonne of output • Supports NIMP 2030 aspirations on increasing value-add and competitiveness • Aligns with CIR2030 priorities on specialty and performance chemicals • Positions Johor to compete in advanced sectors like semiconductors, E&E, and pharmaceuticals
2 Establish Chemical Product Innovation Clusters in Strategic Industrial Zones	• Develop dedicated innovation hubs within existing zones (e.g., PIPC, RAPID) or greenfield sites to house specialty chemical players, R&D centres, pilot plants, and downstream manufacturers. These clusters should integrate shared testing facilities, logistics infrastructure, and regulatory facilitation • Enables co-location and supply chain integration across Tier 3–5 segments (see value chain slide) • Attracts global firms through plug-and-play infrastructure and targeted incentives • Supports AP2 (collaborative platform) and AP7 (industry consortia) under NIMP
3 Facilitate Public-Private R&D Collaboration for Specialty & Green Chemicals	• Specialty chemicals are increasingly driven by application-specific performance and sustainability demands. Building strong linkages between manufacturers, universities, and research institutes (e.g., UTM, SIRIM, Malaysian Genome Institute) is critical to fast-track formulation development, testing, and commercialisation • Supports NIMP AP4 (adoption of modernised operations), AP5 (sustainability incentives) • Enables Johor to pioneer in biochemicals, green feedstocks, and customised polymers • Builds capabilities in Tier 4–5 activities including green chemistry and nanomaterials

Source: PASB Analysis

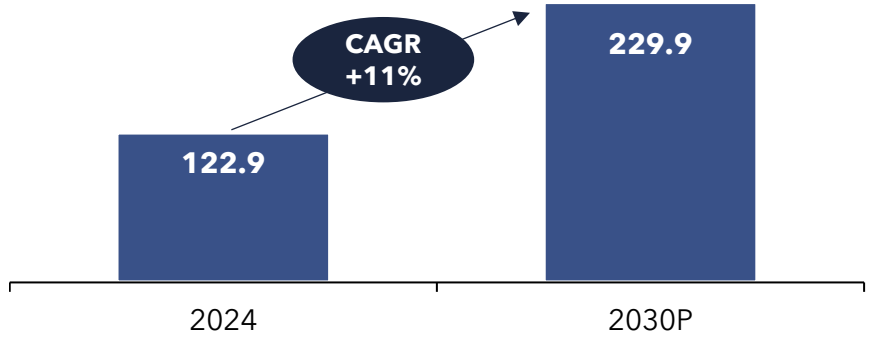
In line with global trends, Johor must accelerate the development of green chemistry and a circular petrochemical economy to tap into rising opportunities in the sustainability space

Strategy 2:

Pioneer the growth of green chemistry & circular petrochemical economy

Johor to drive the development of green chemistry and circular petrochemical economy by promoting sustainable practices, low-emission technologies, and value chain innovation in line with national chemical and petrochemical roadmaps

Global Green Chemicals Market, 2024 – 2030
USD Billion



Malaysia has introduced several key strategies to guide the development of green chemistry & circular petrochemical to promote the development of these sectors

Malaysia NIMP 2030 (Chemical Industry)
Aims to improve sustainability of chemical industry in the country through development of regulatory framework, incentives for operations & innovations and value chain consortia

Malaysia NIMP 2030 (Petrochemical Industry)
Aims to accelerate the transition towards sustainable practices through tighter energy & emission accounting new emerging technologies

Key Highlights

- **Strong Growth Outlook:** The global green chemicals market was valued at approximately USD122.9 billion in 2024 and is projected to reach USD229.9 billion by 2030, a CAGR of about 11%. Asia-Pacific accounted for 35% of global revenue share in 2023 and is expected to exhibit the fastest growth in the region

- **Supportive National Plans:**
  - Advance Sustainable Practices: Align with NIMP 2030 to promote low-emission and energy-efficient operations across the chemical and petrochemical sectors
  - Enable Green Innovation: Foster R&D in bio-based chemicals, recyclable materials, and cleaner production processes
  - Strengthen Regulatory Frameworks: Implement incentives and regulations that encourage adoption of circular economy principles, such as waste-to-resource approaches and carbon tracking
  - Support Value Chain Collaboration: Encourage partnerships between firms and academia to develop green technologies and closed-loop industrial systems

Source: Market.US; Grand View Research; Market Research Future, Chemical Industry Roadmap 2030, Petrochemical Industry Roadmap 2030 PASB Analysis

Unlocking value in specialty chemicals will require strengthening downstream activities and fostering close collaboration between the state and private industry to drive sectoral growth

Key Focus

Rationale

1 Catalyse Bio-based and Low-carbon Chemical Production

- Global demand for green chemicals is growing rapidly, projected to reach USD 229 billion by 2030, driven by stricter environmental regulations and ESG-aligned consumer preferences
- Malaysia's Chemical Industry Roadmap 2030 (CIR2030) and NIMP 2030 prioritise green and specialty chemicals as value-add opportunities
- Johor can build on the PIPC ecosystem to attract green feedstock players (e.g. palm-based oleochemicals) and shift from bulk to higher-margin, environmentally friendly products
- Incentivising bio-based chemicals aligns with NIMP AP5 & AP6, supporting innovation and sustainability through fiscal tools and regulatory reforms

2 Establish a Closed-loop Chemical Waste and By-product Recovery System

- Develop infrastructure, policies, and partnerships to enable chemical producers in Johor to reuse industrial by-products, recover feedstock materials, and recycle waste streams, creating a circular economy loop within the PIPC and beyond
- Circular chemical production reduces resource intensity, lowers emissions, and enhances competitiveness through waste valorisation
- Johor's petrochemical hubs (e.g. RAPID, Pengerang) generate large volumes of industrial waste that can be recycled or repurposed if the right systems exist
- This aligns with NIMP 2030 Action Plans (AP7 & AP8), which call for improved waste infrastructure and sustainability consortia
- Establishing a closed-loop model positions Johor as a regional leader in green petrochemical zones, aligned with global best practices and enabling ESG-compliant exports

Source: PASB Analysis

To accelerate industry growth, Johor must reimagine and enhance its chemical and petrochemical hubs with future-ready infrastructure

Strategy 3:

Elevate chemical and petrochemical hubs to ready-state development through enhanced infrastructure

Johor to focus on addressing critical infrastructure gaps—ranging from shared utilities and digital systems to last-mile logistics and environmental solutions—to enable fully integrated, investment-ready industrial ecosystems

Key Infrastructures & Incentives for Chemical & Petrochemical in Johor

Pengerang Integrated Petroleum Complex (PIPC)
World-class downstream hub housing global players like PETRONAS, Aramco, and Dialog Group. PIPC integrates refining, petrochemicals, and utilities, with port access and potential for specialty & circular chemical investments

Tanjung Langsat Industrial Complex (TLIC)
Dedicated park for high-value, hazardous, and bulk chemical manufacturing. TLIC offers ready infrastructure and opportunities to grow into a hub for advanced materials and circular processing

Johor-Singapore Special Economic Zone (JS-SEZ)
A bilateral economic zone targeting specialty and green chemicals. JS-SEZ offers streamlined cross-border logistics, fiscal incentives, and positions Johor as a launchpad for green industrial clusters and low-carbon manufacturing

Key Factors	Gaps Identified	Opportunities
Utilities & Shared Services	Fragmented or underdeveloped utility networks (e.g., steam, industrial water, waste heat reuse)	Develop centralised utility corridors with circular and resource-efficient infrastructure (e.g., symbiotic eco-industrial parks)
Digital Infrastructure	Limited use of digital twins, IoT, and AI-based control systems	Accelerate adoption of Industry 4.0 tools to enhance predictive maintenance, energy optimisation, and real-time operations visibility
Last Mile Logistics	Bottlenecks in inland port access, poor multimodal integration	Improve connectivity linkages, explore dedicated logistics corridors and bonded zones to reduce turnaround time and cost
Environmental Infrastructure	Inadequate capacity for industrial emissions, effluent, and waste management	Establish regional waste gas recovery and green utility platforms

Sources: PASB Analysis

To elevate its chemical and petrochemical hubs to ready-state development, Johor must enhance utility access, logistics connectivity, and industrial land availability

Key Focus	Rationale
1 Establish Shared Green Utility Infrastructure (Power, Water, Steam, Hydrogen)	• Providing shared utilities, especially green ones (e.g., solar-powered steam generation, recycled water systems), lowers setup costs and improves environmental compliance for chemical park tenants • It accelerates investor readiness by minimising time-to-operations and ensures long-term sustainability in power-intensive operations, aligning with ESG trends and global buyer requirements
2 Develop Smart, Connected Logistics and Storage Zones within Hubs	• Modern petrochemical logistics require real-time monitoring, safety tracking, and automated handling. Integrating smart warehousing, connected pipelines, and multimodal logistics nodes enhances the efficiency of feedstock and product movement • It also decongests coastal ports by offering inland tank farms and strategic linkages, thus making Johor more competitive for downstream investment
3 Designate Pre-Packaged, Pre-Zoned Expansion Parcels with Fast-Track Permitting	• Investors value plug-and-play sites with pre-approved land use, environmental clearance, and infrastructure connections • Fast-tracked parcels reduce administrative burdens and uncertainty, particularly for brownfield expansions or new anchor investors in integrated zones • This model, used in China and Singapore, is proven to accelerate industrial land take-up and reduce idle land risks

Source: PASB Analysis

Johor's chemical & petrochemical sector currently focuses on upstream and midstream activities, particularly refining and base chemical processing, with limited presence in downstream specialty chemicals

Value Chain of the Chemical & Petrochemical Industry

Upstream	Midstream			Downstream
Feedstock	Base Chemicals/ Building Blocks	Intermediates	Polymers	End Consumer
Activities: • Extraction, refining, and purification of raw materials • Primary processing such as distillation or cracking **Examples of Products:** • Crude oil • Natural gas • Naphtha • Palm kernel oil • Biomass • Coal • LPG (Liquefied Petroleum Gas)	**Activities:** • Conversion of feedstocks into base or platform chemicals. • Basic synthesis processes such as steam cracking or reforming **Examples of Products:** • Methanol • Ethylene • Propylene • Benzene • Toluene • Xylenes • Ammonia • Chlorine	**Activities:** • Further processing of base chemicals into more complex compounds. • Often involves catalytic reactions, blending, or chemical transformation. **Examples of Products:** • Acrylic acid • Phenol • Propylene glycol • MTBE • Phthalic anhydride • Butadiene	**Activities:** • Polymerisation or compounding of intermediates. • Granulation and preparation for manufacturing processes. **Examples of Products:** • Polyethylene (PE) • Polypropylene (PP) • Polyvinyl chloride (PVC) • Engineering plastics	**Activities:** • Manufacturing of consumer and industrial goods using polymers and specialty chemicals. • Packaging, coating, compounding, blending with additives, etc. **Examples of Products:** • Paints and coatings • Adhesives • Pharmaceuticals • Agrochemicals • Automotive parts • Electronics

High presence in Johor

More value to be captured

Source: Chemical Industry Roadmap 2030, NIMP 2030 – Chemical Industry, PASB Analysis

Multiple anchor companies are currently present in Johor, covering key activities across the industry supply chain, offering strong potential for the state to further expand and deepen its value chain ecosystem

Existing Companies in Johor

NON-EXHAUSTIVE

Key Activities	Organisations	Description
Integrated Petrochemical Players	PETRONAS, DIALOG, LOTTE CHEMICAL TITAN	Anchor players involved in integrated petrochemical refining and manufacturing across upstream, midstream, and downstream value chains, especially in Pengerang and Pasir Gudang.
Specialty and Downstream Chemical Manufacturers	synthomer, SHOWA DENKO, kaneka	Leading producers of specialty chemicals, polymers, oleochemicals, and high-performance materials for industrial and consumer applications.
Chemical Logistics & Storage	Vopak, DIALOG, JohorPort®, PTP A Member of MMC Group	Operators of tank farms, ISO tank handling, and bulk liquid terminals for chemicals and gas, supporting global trade and safe distribution.
Park & Infrastructure Developers	AME, UEM SUNRISE, JCORP Johor Corporation	Master planners and industrial park developers offering plug-and-play solutions, utilities access, and green infrastructure for chemical industry tenants.

Source: PASB Analysis

To further develop the sector, Johor should aim to attract these companies to establish a world-class chemical and petrochemical hub in the state

Potential Companies to Attract

NON-EXHAUSTIVE

Key Activities	Organisations	Description
Global Integrated Chemical Players	BASF We create chemistry; sabic; INEOS	Multinational conglomerates with strong upstream-to-downstream integration across refining, olefins, polymers, and specialty chemicals; can anchor complex ecosystems and export hubs.
Specialty & Performance Chemical Leaders	EVONIK Leading Beyond Chemistry; SOLVAY; CLARIANT	High-margin chemical producers focused on advanced materials, coatings, additives, and niche markets; can uplift value-added segments and enable diversification.
Green & Bio-based Chemical Innovators	Corbion; geno.; Braskem	Companies leading in bio-based polymers, renewable feedstocks, and biodegradable plastics; critical for developing Johor's green chemistry and circular economy pillars.
Chemical Logistics & Terminal Specialists	Stolt-Nielsen; Vopak; LBC TANK TERMINALS	Specialists in bulk liquid handling, chemical tank storage, and ISO tank services; essential for supporting large-scale exports and safety-compliant logistics.
Research & Technology Anchors	Fraunhofer; AIST; ICIQ	Leading research consortia and institutions for chemical innovation, catalyst design, process intensification, and green chemistry R&D; potential collaborators for local R&D clusters.

Source: PASB Analysis

Healthcare & Pharmaceutical.

By 2030, Johor seeks to double down on integrated healthcare services, while growing capacity for medical device and pharmaceutical manufacturing

Sectoral Vision:

Position Johor as the leading healthcare ecosystem driver in the ASEAN region

Sectoral Strategy:

Strategy 1:

Strengthen and diversify local manufacturing capabilities and capacity

Strategy 2:

Expand on local commercialisation and innovation capacity

Strategy 3:

Establish Johor as the preferred destination for integrated healthcare services

Johor's current healthcare manufacturing presence are limited to low-value goods, and has key opportunities to diversify and strengthen its capabilities to move up the value chain

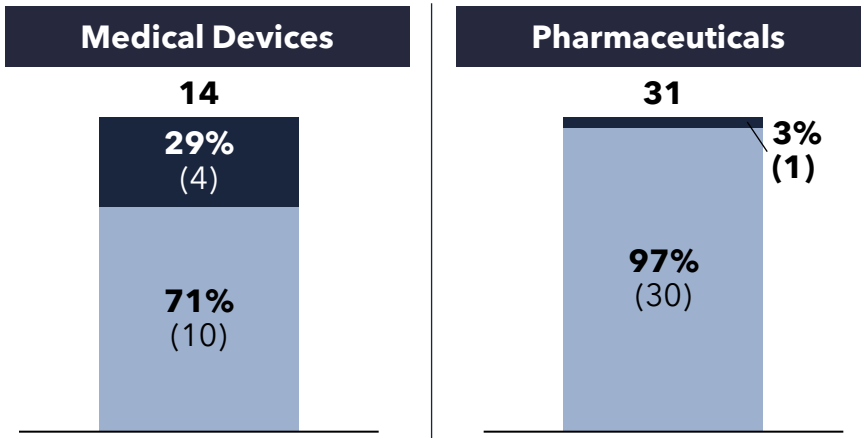
Strategy 1:

Strengthen and diversify local manufacturing capabilities and capacity

Johor to accelerate the shift from low-value to high-value healthcare manufacturing by leveraging its existing industry base, promoting innovation in advanced medical devices and aligning with national priorities to attract new investments and high-tech production

Distribution of Low-value to High-value Healthcare Manufacturers in Johor[1] (2025), number of manufacturers

NON-EXHAUSTIVE



Subsegments

Low Value
- Consumables (e.g. medical tube, catheter, gloves, condoms, contact lenses, face masks, etc.)

High Value
- Diagnostic and monitoring devices
- Therapeutic delivery systems
- Sensory aids

Subsegments
- Traditional Chinese and herbal medicines
- Nutraceuticals
- Health supplements
- Generics
- Biologics

Key Highlights

- Majority of Johor's manufacturing capabilities in medical devices and pharmaceuticals are primarily concentrated in low-value subsegments
  - Medical devices (71%, 10)
    - Medical tube/ Catheter (21%, 3)
    - Rubber gloves (21%, 3)
  - Pharmaceuticals (97%, 30)
    - Traditional Chinese and herbal medicines (87%, 26)
- Johor has a substantial opportunity to leverage its existing manufacturing base to move up the value chain and diversify into production of high-value healthcare manufactured goods (e.g. combination drug-device products, biologics, innovators, niche botanical APIs, etc.)
- With medical devices and pharmaceuticals designated as priority subsectors under the NIMP 2030, Mission 1 – Advance Economic Complexity of the masterplan is ever more relevant for Johor and reiterates the strategic importance of the subsectors to expand into high-value-added activities within the value chain

Note: 1. An analysis conducted over 45 players where ancillary product manufacturers (e.g. plastic moulds and PCB inputs for medical devices) and contract manufacturers are excluded
Source: MDA, NPRA, National Industrial Master Plan (NIMP) 2030, PASB Analysis

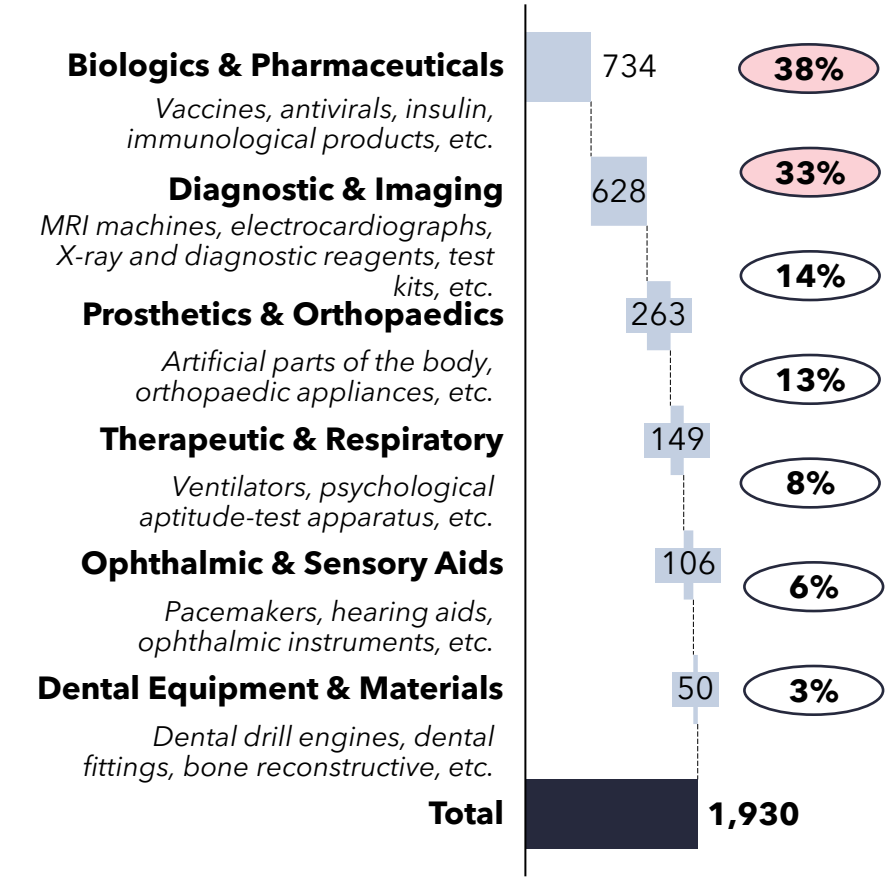
Diversifying Johor's manufacturing capabilities can help to future-proof our broader healthcare system and strengthen Johor's position in other export markets

Strategy 1:

Strengthen and diversify local manufacturing capabilities and capacity

Johor to accelerate the shift from low-value to high-value healthcare manufacturing by leveraging its existing industry base, promoting innovation in advanced medical devices and aligning with national priorities to attract new investments and high-tech production

Value of Imports Across High-value Subsegments of Medical Device & Pharmaceutical Goods (2023), USD mil



Key Highlights

- Majority of Malaysia's high-value healthcare manufactured imports (71%) are based in Biologics & Pharmaceuticals and Diagnostic & Imaging equipment, and this is due to limited local capabilities/ capacity to research, develop, assemble, test such advanced pharmaceuticals and technologies
- Malaysia remains heavily dependent on high-value biologic (e.g. vaccines) and essential medicine imports, which persisted into the COVID-19 pandemic and threatened national healthcare self-sufficiency due to acute shortages from supply chain disruption
- Therefore, there is an urgent need for Malaysia to build local manufacturing capabilities for biologics to safeguard patient access in line with NIMP 2030's carve-out of biologics as an opportunity area
- However, biologics manufacturing demands huge capital outlays and R&D spend, to which Johor has a unique opportunity in mitigating through capitalising on its manufacturing base to accelerate capability building and minimise risks. Moreover, such diversification opens Johor up to greater export markets
- Additionally, Malaysia imports ~88% of medical devices from foreign countries, most of which are high-tech products, to which Johor has an opportunity to support in reducing import dependence

Note: Aggregated selected goods with granular H6 codes across the 1890 and 6300 H4 umbrella codes
Source: The Observatory of Economic Complexity (OEC), National Industrial Master Plan (NIMP) 2030, International Trade Administration, PASB Analysis

In strengthening its manufacturing capabilities, Johor should drive an orchestrated growth in targeted high-value pharmaceutical and medical device subsegments

Key Focus	Rationale
1 Biopharmaceuticals (Biologics, Biosimilars) *(Pharmaceuticals)*	• The ASEAN biopharmaceutical market is projected to grow at a 7.84% CAGR to USD12.3 billion by 2033, driven by rising chronic disease prevalence and other demand factors • Localising production in Johor—a strategically located hub—can boost exports to developed markets (e.g., Singapore, China, Japan) and reduce import-related shortages, strengthening national healthcare self-sufficiency. Johor already hosts Biocon Biologics, which is investing RM1.1 billion to expand its Bio-XCell facility and enhance insulin production
2 Botanical APIs, High-value Nutraceuticals, TCM & Herbal Supplements *(Pharmaceuticals)*	• The ASEAN traditional Chinese and herbal medicine market is projected to grow at an 11.0% CAGR to RM7.2 billion by 2031, driven by rising acceptance and awareness. • Many pharmaceutical manufacturers in Johor are TCM- and herbal-based, with potential to add premium value through stronger evidence-based claims. Johor's tropical biodiversity supports high-demand botanical API production and cost-effective manufacturing via a vertically integrated value chain. Leveraging IBD-UTM's research expertise with strong industry presence can spur local innovation and commercialisation of high-value TCM, herbal, and botanical products
3 Implantable Invasives *(Medical Devices)*	• The ASEAN implantable devices market is projected to grow 8.03% to USD5.4 billion by 2033, creating opportunities in high-tech medical devices such as pacemakers, stents, and insulin pumps • Strengthening domestic production through IJN-UTM and industry collaboration can reduce import dependence and accelerate innovation in cardiovascular and assistive implants
4 Active/ Electronic Medical Devices *(Medical Devices)*	• The ASEAN MedTech market overall is projected to grow at a 6.97% CAGR to USD 18.7 bil by 2029 as a result of increased innovation and patient accessibility/ affordability • Opportunity to bridge IJN-UTM's research experts and industry to foster innovation and commercialisation of high-value active/ electronic medical devices (e.g. modular type motorised wheelchair, transesophageal echocardiogram telerobotic system, etc.)

Note: 1. Traditional Chinese Medicine; 2. Institute of Bioproduct Development; 3. Institut Jantung Negara
Source: IMARC Group, Cognitive Market Research, Statista, IBD-UTM, IJN-UTM, PASB Analysis

Johor's R&D ecosystem, driven mainly by academia and the public sector, has the potential to foster local innovations and research activity to capacity build in a move up the value chain

Strategy 2:

Expand on local innovation and commercialisation capacity

Johor to build on its growing healthcare R&D base by strengthening academic-industry collaboration, expanding clinical trial capacity, and accelerating the commercialisation of homegrown innovations to position the state as a hub for high-impact healthcare solutions

Johor's Academia Healthcare Research Arms

UTM

PHARMACEUTICALS

Institute of Bioproduct Development (IBD-UTM) CoE[1]

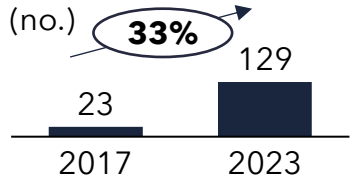
- To be an innovative leader in bioproduct R&D

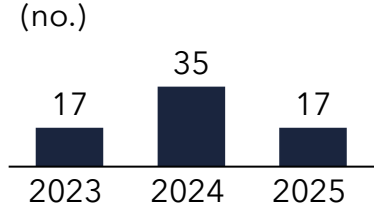
MEDICAL DEVICES

IJN-UTM Cardiovascular Engineering Centre

- To be recognised as a world-class CoE of cardiovascular science and engineerinng

Research Publications





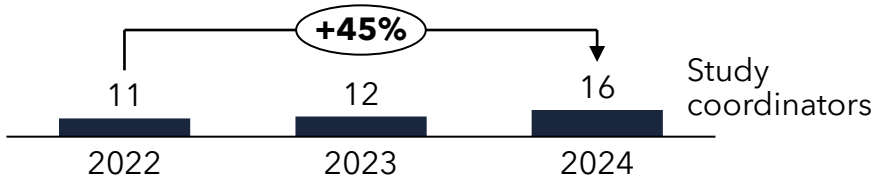
Johor's MOH[2] Driven Sponsored Clinical Research (2022-2024), no. of clinical trial sites, and no. of study coordinators

CRM CLINICAL RESEARCH MALAYSIA

MINISTRY OF HEALTH MALAYSIA

1. **Hospital Sultanah Aminah (HSA)**
2. **Hospital Sultan Ismail (HSI)**

2 **Clinical trial sites**



Key Highlights

- Johor has an emerging healthcare R&D ecosystem that is primarily driven by academia, where it is tracking positive growth in R&D through publications (e.g. IBD-UTM with a 33% YoY increase)
  - IBD-UTM CoE: Development of API – Eurycomanone from Tongkat Ali
  - IJN-UTM Cardiovascular Engineering Centre: Tracheal stent, Ventricular assist device, etc.
- Moreover, the R&D ecosystem is also supported by hospital-attached clinical trial sites, where the increase in study coordinators indicates greater sponsored research traction locally, and an opportunity to capacity build Johor's research base
  - HSA and HSI – Top Therapeutic Areas: Cardiology, Oncology, Haematology, etc.
- The above progress and tailwinds signifies a clear bridge from lab to market for Johor – academic discoveries, increased trial activity, position the state as a future hub for homegrown, high-impact healthcare innovations

Note: 1. Centre of Excellence; 2. Ministry of Health; 3. Contract Research Organisation
Source: IBD-UTM, IJN-UTM, Clinical Research Malaysia

However, Johor's surplus and growing research talent lacks the necessary supporting infrastructure and commercialisation pathways to fully realise and scale local innovations

Strategy 2:

Expand on local innovation and commercialisation capacity

Johor to build on its growing healthcare R&D base by strengthening academic-industry collaboration, expanding clinical trial capacity, and accelerating the commercialisation of homegrown innovations to position the state as a hub for high-impact healthcare solutions

Overview of Johor's R&D Talents

Johor's Surplus R&D Talent Base (2024), no. of PhD and Master graduates out of total

312
Life Science and Health PhD and Master Graduates

vs.

11
Life Science and Health graduate roles offered at UTM

Only fulfils **3.5%** of the entire graduate pool

Johor has a surplus of research talent, but are underutilised due to limited academic and commercial opportunities

- Director at IJN-UTM

Johor's R&D & Commercialisation Infrastructure Limitation

Infrastructure	
Certification centre	✗
Testing centre (BA/BE[1], etc.)	✗
R&D Centres	✓ *(limited)*
Contract Manufacturing (CDMO[3])	✓ *(limited)*

We are on track to be able to commercialise, but lacking certification/ testing infrastructure, CDMO are barriers

- Directors at IJN-UTM and IBD

Singapore as A Successful Academia-Industry R&D Model

Advanced Remanufacturing and Technology Centre
A*STAR ARTC

A*STAR is a PPP consortium that drives academia-to-industry applications and has incubated 140 biotech startups, **raising S$950 mil**

Key Highlights

- Johor has a growing healthcare R&D talent base, but limited academic and commercial opportunities cannot accommodate for the surplus, leaving an unfulfilled gap of 96.5% of graduates without an opportunity for a research role, thereby leading to underemployment and underdevelopment of Johor's healthcare R&D value chain
- Johor hosts 0 of Malaysia's 3 NPRA-accredited BA/BE clinical centres that are presently located in Penang (a thriving healthcare manufacturing hub) and Selangor, together with the lack of certification centres, consequentially blocks local pharmaceutical and medical device prototype testing and the path to commercialisation, where high-impact innovations eventually become obsolete due to long lead times
- In addition, limited R&D facilities and complementary CDMOs (particularly for pharmaceuticals) capable of end-to-end research, prototyping, formulation, sterilisation, packaging, severely hamper innovators' ability to commercialise effectively/ efficiently, stalling development timelines and discouraging investment in medical device and pharmaceutical breakthroughs
- Hence, in line with NIMP 2030, Johor ought to model its R&D ecosystem after Singapore's A*STAR successful development of an academia-to-industry bridge through effective government facilitation and provision of proper R&D infrastructure

Note: 1. Bioassessment/ Bioequivalence; 2. Contract, Development and Manufacturing Organisation
Source: Ministry of Higher Education, UTM, Agency for Science, Technology and Research (A*STAR), NPRA, National Industrial Master Plan (NIMP) 2030, PASB Analysis

Johor can expand on its commercialisation and innovation capacity through growing contract manufacturing, certification and testing as well as R&D facilities

Key Focus	Rationale
1 Contract Manufacturing (CDMO)	• The ASEAN CDMO market is expected to grow from USD10.91 billion in 2021 to USD22.53 billion by 2028 (CAGR 10.9%), driven by broader healthcare demand • Johor's cost advantage in this price-sensitive region positions it well to develop CDMO capabilities for rapid prototyping and commercialisation of innovative pharmaceuticals and medical devices. Strengthening Johor's research ecosystem will further support the shift into high-value, innovation-driven manufacturing
2 Certification & Testing Facilities	• On-site NPRA-accredited labs shorten certification lead times, accelerating commercialisation and market entry for innovative pharmaceuticals and medical devices • Singapore's healthcare testing, inspection, and certification outsourcing market is set to grow from USD60.4 million in 2024 to USD109.4 million by 2030 (CAGR 10.7%), offering Johor spillover opportunities given its proximity and cost advantage. Expanding high-value commercialisation will also raise the export value of Johor's medical goods
3 R&D Centres	• Access to pilot-scale bioreactors and analytical suites and GMP cleanrooms will enable Johor researchers to iterate prototypes rapidly, and in the process catalyse academia-industry partnerships, which can support the retainment of high-skilled talent locally • In-house R&D shifts Johor from contract manufacturing of patented pharmaceuticals/ medical devices to being an originator of new high-value drugs and devices, thereby increasing Johor's export value of medical goods

Source: Fortune Business Insights, Grand View Research, PASB Analysis

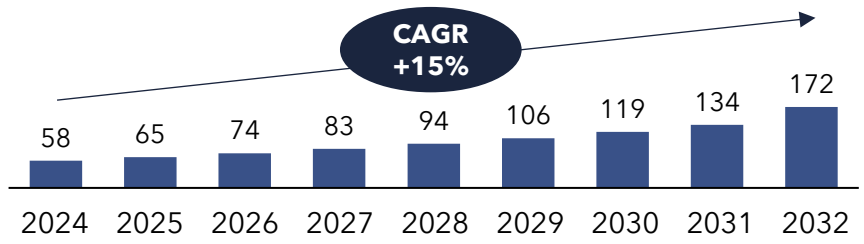
Across ASEAN, rising demand for comprehensive, specialised care is driving increased medical tourism and Malaysia is capturing a sizable spillover of these patients

Strategy 3:

Establish Johor as the preferred destination for integrated healthcare services

Johor to position itself as the preferred ASEAN destination for integrated healthcare by leveraging Malaysia's strong medical tourism brand, enhancing specialised treatment capabilities, and bundling medical care with wellness services to attract high-value international patients

ASEAN Medical & Wellness Tourism Market, 2024 - 2032
USD Billion



Malaysia Healthcare Traveller Contribution by Region & Top Treatments Sought After* (2024), RM mil

Region	Revenue	% Revenue	YoY Growth
Asia Pacific	2,442	89.7%	21%
Europe	135	5.0%	23%
Americas	61	2.2%	27%
Middle East	35	1.3%	5%
Africa	34	1.2%	24%
Others	16	0.6%	-2%

Accidents/ Injuries	ENT[1]	Cardiology
Health Screening	Orthopaedics	Oncology
Gastroenterology	Urology	OBGYN[2]

Key Highlights

- The ASEAN medical and wellness tourism market is expanding rapidly and is projected to grow at a rate of +15% CAGR till 2032. This sizable growth is mainly attributed to:
  - Cost-quality advantage: ASEAN countries offer high-standard of care at a substantially lower cost than developed countries
  - Government support and policies: Pro-medical-tourism initiatives (e.g. free visa) have strengthened regional capacity and visibility
  - Rising health-conscious middle class: Growing disposable incomes fuel demand for comprehensive and specialised treatments
  - Improved connectivity and accreditation: Expansion of internationally accredited hospitals and ease of intra-ASEAN travel enhance patient confidence and accessibility
  - Integrated wellness offerings: Bundled medical and post-treatment wellness services (spas, rehabilitation) drive extended-stay tourism, boosting overall market value
- Moreover, Asia Pacific accounts for majority of Malaysia medical travellers, where highly sought after treatment specialties include cardiology, orthopaedics, oncology, gastroenterology, OBGYN, etc

Note: *Order does not correspond to actual ranking and prevalence of treatments; 1. Ear, Nose Throat; 2. Obstetrics and Gynaecology
Source: Global Market Insights, Malaysia Healthcare Travel Council

Johor, with its strategic location and cost-competitive yet quality treatments, is poised to attract plentiful of medical tourists from Indonesia, Singapore and other Asia Pacific markets

Strategy 3:

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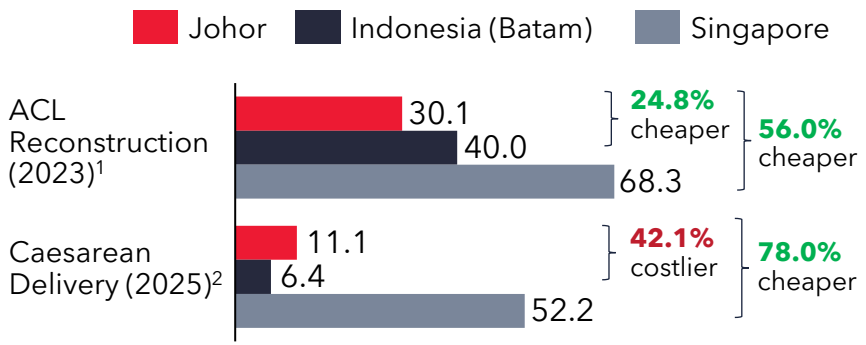
Johor's Strategic Proximity to Key ASEAN Markets
travel time in hours by different transportation

Johor's Cost Advantage in Private Healthcare Treatments,
RM '000



Key Highlights

- Johor possesses proximity advantage to neighbouring markets (e.g. Singapore and Indonesia), enabled via key connectivity infrastructure, thereby presenting the opportunity to greater scale patient access, reduce KL-bound travel for underserved patient markets burden
  - Singapore
    - Air: Senai Airport <> Changi Airport
    - Land: Sultan Iskandar CIQ[3] <> Woodlands Checkpoint
  - Indonesia
    - Ferry: [Batam] Stulang Laut Port <> Port of Batam; Johor Port <-> Harbour Bay Batam
    - Air: [Jakarta] Senai Airport <> Soekarno-Hatta International Airport, [Surabaya] Senai Airport <> Juanda International Airport
- Johor has a significant cost advantage for general and specialised treatments relative to key adjacent markets, where treatments can be anywhere up to 24 – 78% more affordable, driving cross-border patient flows through greater access and affordability, especially so for price-sensitive markets

Note: 1. The 2023 exchange rate applied are as follows (1 USD = 4.60 MYR); 2. The 2025 exchange rates applied are as follows (1 IDR = 0.00026 MYR, 1 SGD = 3.3 MYR); 3. Customs, Immigration and Quarantine Complex. Source: Alvarez & Marsal, Channel News Asia, Hospital websites, Ministry of Health Singapore

With an extensive hospital network and a skilled healthcare workforce, Johor has the untapped potential to cement itself as a premier healthcare destination within ASEAN

Strategy 3:

Establish Johor as the preferred destination for integrated healthcare services

Johor to position itself as the preferred ASEAN destination for integrated healthcare by leveraging Malaysia's strong medical tourism brand, enhancing specialised treatment capabilities, and bundling medical care with wellness services to attract high-value international patients

Johor's Private Hospital Network, 2023

no. of private hospitals and medical centres

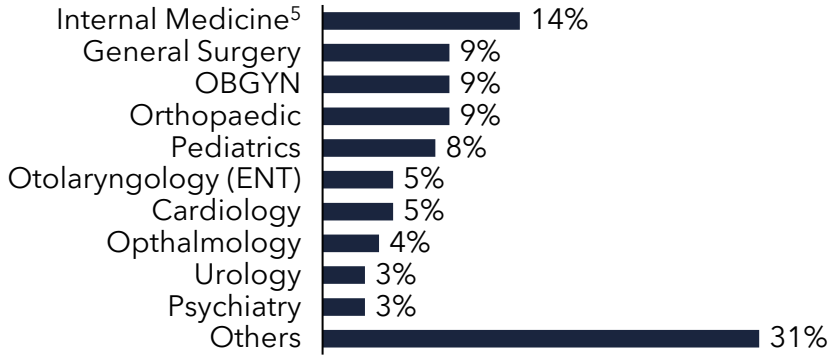
REGENCY SPECIALIST HOSPITAL
Gleneagles Hospital JOHOR
KPJ JOHOR SPECIALIST HOSPITAL
COLUMBIA ASIA
Columbia Asia Hospital - Iskandar Puteri

JCI-accredited[1]: Signifies the hospital meets internationally recognise standards for patient safety and quality of care

29	18	11	1,844
Private Hospitals/ Medical Centres	**Multi Specialty[2]**	**Single Specialty[3]**	**Hospital Beds**

Johor's Top 10 Treatment Disciplines Offered[4],2025

as a % of total private hospital specialists



Key Highlights

- Johor carries a comprehensive hospital network with a total of 29 private hospitals/ medical centres across the state, signifying private healthcare service delivery as a core economic contributor and strength to leverage in growing the state's medical tourism
- Much of Johor's private healthcare presence and medical tourist footprint is concentrated in Johor Bahru (20 private hospitals, 1 JCI-accredited hospital, 79% of the state's private hospital beds)
- 18 of which are multi-specialty (e.g. orthopaedics, ophthalmology, cardiology, etc.). 11 of which are single-specialty (i.e. OBGYN[6])
- Johor has a strong local pool of over 750+ medical specialists across an extensive variety of disciplines, offering high-value treatments
- Amongst the high-value treatment disciplines, OBGYN, Orthopaedics, Cardiology and Ophthalmology comprise of one of the largest proportion of specialists
- Johor's strong hospital network combined with a deep and broad specialist pool has the great potential to enable the delivery of seamless, quality integrated healthcare services

Note: 1. Joint Commission International; 2. Offers multiple treatment specialities under one facility; 3. Offers only one treatment discipline under one facility; 4. Aggregated across 19 searchable Private Hospitals/ Medical Centres; 5. Includes Hematology, Infectious Diseases, etc.; 6. Obstetrics and Gynaecology. Source: Ministry of Health, Joint Commission International, Hospital websites, MHTC

High-value treatment specialties such as cardiovascular, oncology, orthopaedics, obstetrics and gynaecology care should remain Johor's core focus in growing its healthcare services

Key Focus	Rationale
1 Oncology Treatment & Care	• The Asia Pacific oncology market is projected to reach USD157.29 billion by 2033, growing at a 13.5% CAGR from 2025, driven by rising cancer incidence, targeted therapies, immunotherapies, and precision medicine • Johor can position itself as a relative patient-affordability-friendly oncology hub, offering treatments cheaper than neighboring countries while maintaining quality, thus attracting regional medical tourists in partaking in high-value treatments
2 Orthopaedics Treatment & Care	• The Asia Pacific orthopaedic devices market is projected to reach USD19.41 billion by 2033, growing at a 5.5% CAGR from 2025, driven by ageing populations and rising sedentary lifestyles • Johor's strong base of orthopaedic specialists and full-spectrum services from surgery to rehabilitation supports integrated care. High-value surgeries fuel demand for implants and rehab services, creating opportunities to collaborate with Johor's existing rehab experts and medical device manufacturers
3 Fertility & Women's Health	• The Asia Pacific gynaecological devices market is projected to reach USD16.4 billion by 2030 (8.0% CAGR from 2025), while the fertility services market is expected to hit USD20.5 billion (15.5% CAGR from 2021), driven by demographic shifts and evolving health needs • Johor's affordability and strong clinic performance position it as a premier fertility corridor, with spillover benefits in women's wellness, as evidenced by Monash IVF KPJ Johor reported 50% international patients in 2024
3 Cardiovascular Treatment & Care	• The ASEAN cardiovascular disease treatment market is projected to reach USD15.5 billion by 2029, growing at a 7.1% CAGR from 2025, driven by rising disease prevalence • Johor's strong cardiology base and proximity to Singapore enable it to offer high-value, lower-cost interventions such as stent placements and valve replacements. The technology-intensive nature of cardiovascular care presents opportunities for partnerships and innovation with local MedTech players like IJN-UTM

Source: Market Data Forecast, Mordor Intelligence, Allied Market Research, My 1Health, Statista

Johor's medical device manufacturing is currently concentrated in midstream and downstream activities, particularly assembly and sales/distribution, with limited upstream presence in areas such as R&D and component manufacturing

Value Chain of the Healthcare & Pharmaceutical Industry (Medical Devices)

Upstream

Research and Product Development

Activities:
- Concept design, prototyping, testing mechanical/electrical functions, clinical trials, and regulatory approval for market entry

Examples of Products:
- Diagnostic prototypes
- Minimally invasive surgical device prototypes
- Cardiovascular device prototypes (i.e. stents, pacemakers, etc.)

Component Manufacturing

Activities:
- Precision fabrication of device components, PCB assembly, sterile barrier packaging, sourcing materials through GMP-compliant production

Examples of Products:
- Injection-molded casings
- Printed circuit boards (PCBs)
- Catheter components
- Sterile pouches
- Optical lenses
- Sensor modules

Midstream

Manufacturing and Assembly

Activities:
- Fabrication of whole devices, cleanroom assembly, sterilisation, software integration, quality control, and batch validation before release

Examples of Products:
- Insulin pumps
- Pulse oximeters
- Orthopaedic implants
- Contact lenses
- Hearing aids
- Surgical gloves
- Condoms

Downstream

Logistics, Sales, Distribution & Post-sales Services

Activities:
- Cold chain and standard device logistics, wholesaler delivery, coordination with healthcare providers, marketing, after-sales maintenance and support

Examples of Products:
- Consumer medical devices (BP monitors)
- OTC diagnostic kits
- Hospital-use devices (ventilators)
- Wound care kits
- Home-use rehabilitation equipment

More value to be captured

High presence in Johor

Source: NIMP 2030, PASB Analysis

For pharmaceuticals, Johor's is also currently concentrated in midstream and downstream activities, particularly assembly and sales/distribution, with limited upstream presence in areas such as R&D and component manufacturing

Value Chain of the Healthcare & Pharmaceutical Industry (Pharmaceuticals)

Upstream

Research and Product Development

Activities:
- Drug discovery, formulation development, pre-clinical/clinical trials, regulatory approvals, and patent filing for market entry

Examples of Products:
- New drug molecules
- Vaccines
- Biologics prototypes
- Biosimilar candidates
- TCM innovations
- Herbal-based formulations

Component Manufacturing

Activities:
- API production, excipient preparation, and packaging material manufacturing under GMP and quality standards

Examples of Products:
- Active Pharmaceutical Ingredients (APIs)
- Capsule shells
- Blister packs
- Injection vials
- Coating systems
- Medical-grade packaging films

Midstream

Manufacturing, Assembly and Dosage

Activities:
- Drug formulation, sterile production, dosage assembly, quality control, safety testing, and batch validation before release

Examples of Products:
- Tablets
- Capsules
- Injectables
- Nutraceuticals
- Herbal medicines
- Topical formulations
- Specialty dosage forms

Downstream

Logistics, Sales, Distribution & Post-sales Services

Activities:
- Storage, transport, and delivery of medicines and healthcare products to hospitals, clinics, pharmacies, and direct consumers.

Examples of Products:
- Prescription medicines
- Over-the-counter (OTC) drugs
- Vaccines
- Health supplements
- Medical devices for home use
- Personal care health products

More value to be captured

High presence in Johor

Source: NIMP 2030, PASB Analysis

Multiple anchor companies are currently present in Johor, covering key activities across the supply chain, offering strong potential for Johor to expand and deepen its value chain (1/2)

Existing Companies in Johor

Key Activities	Organisations	Description
Biopharmaceuticals (Biologics, Biosimilars) *(Pharmaceuticals)*	Biocon Biologics – Transforming Healthcare. Transforming Lives.	Producers of biologics and biosimilars specialising in insulin, therapeutic proteins, and advanced biologic formulations, with capabilities spanning large-scale manufacturing and export to global healthcare markets
Botanical APIs, High-value Nutraceuticals, TCM & Herbal Supplements *(Pharmaceuticals)*	Wen Ken 永健; ECOLITE; TIGER BALM; BIOFACT LIFE MANUFACTURING GROUP; ALOE forlife;	Manufacturers of traditional Chinese medicines, herbal remedies, nutraceuticals, and plant-based supplements, combining proprietary formulations, halal-certified production, and bio-science innovation to serve wellness and preventive care markets
Implantable Invasives *(Medical Devices)*	Owen Mumford; UTM	Developers and manufacturers of minimally invasive and implantable medical devices, including auto-injectors, safety lancets, pen needles, and blood-sampling systems, supporting both clinical and at-home healthcare applications
Active/ Electronic Medical Devices *(Medical Devices)*	Insulet Corporation; Masimo	Producers of advanced electronic medical technologies such as insulin pumps, patient monitoring systems, and pulse oximetry devices, integrating smart health solutions for chronic disease management and hospital care
Contract Manufacturing (CDMO)	altek MED; Maple Tree GLOBAL; RACER MEDICAL; Hochuen; TEGRA MEDICAL	Specialists in contract manufacturing for the medical device sector, offering precision injection moulding, cleanroom assembly, prototyping, and high- to low-volume production of complex components and consumables to ISO 13485 standards

Source: PASB Analysis

Multiple anchor companies are currently present in Johor, covering key activities across the supply chain, offering strong potential for Johor to expand and deepen its value chain (2/2)

Existing Companies in Johor

Key Activities	Organisations	Description
Cardiovascular, Oncology Treatment & Care	REGENCY SPECIALIST HOSPITAL; KPJ JOHOR SPECIALIST HOSPITAL; Gleneagles Hospital JOHOR	Specialist hospitals delivering advanced cardiovascular and cancer care, offering comprehensive diagnostics, interventional procedures, and rehabilitation, alongside integrated oncology services spanning medical, surgical, and radiation treatments.
Orthopedics Treatment & Care	REGENCY SPECIALIST HOSPITAL; COLUMBIA ASIA Columbia Asia Hospital - Iskandar Puteri; MARIA Hospital	Hospitals specialising in joint replacement, arthroscopy, spine surgery, and orthopaedic trauma care, complemented by outpatient rehabilitation services and minimally invasive surgical capabilities
Fertility & Women's Health	TMC FERTILITY; KEMPAS MEDICAL CENTRE; Gleneagles Hospital JOHOR	Centres of excellence in reproductive health and women's care, offering IVF, IUI, prenatal diagnostics, obstetrics, gynaecology, and minimally invasive surgery, with integrated maternal health and reproductive counselling services

Source: PASB Analysis

To further develop the sector, Johor should aim to attract these companies to establish a world-class healthcare and pharmaceutical hub in the state (1/2)

Potential Companies to Attract

NON-EXHAUSTIVE

Key Activities	Organisations	Description
Biopharmaceuticals (Biologics, Biosimilars) *(Pharmaceuticals)*	Samsung Biologics; Lonza; Celltrion Healthcare	Global biopharma leaders with capabilities in large-scale biologics and biosimilars manufacturing, including monoclonal antibodies, cell-culture scale-up, and fill-finish services, supported by ASEAN regulatory approvals.
Botanical APIs, High-value Nutraceuticals, TCM & Herbal Supplements *(Pharmaceuticals)*	Eu Yan Sang; DSM; Blackmores	Producers of high-purity botanical APIs, nutraceuticals, and traditional Chinese medicines, combining advanced R&D, GMP-certified production, and strong brand presence across Asia-Pacific wellness and preventive healthcare markets.
Implantable Invasives *(Medical Devices)*	Medtronic; Boston Scientific; Abbott	Multinational medical device leaders specialising in cardiovascular and orthopaedic implants, neuromodulation devices, and minimally invasive surgical solutions, with regional R&D hubs and ASEAN manufacturing footprints.
Active/ Electronic Medical Devices *(Medical Devices)*	Philips Healthcare; GE HealthCare; Mindray	Manufacturers of diagnostic imaging, patient monitoring, and connected healthcare technologies, integrating smart systems for chronic disease management, telehealth, and advanced hospital care across APAC markets.
Contract Manufacturing (CDMO)	Catalent; ThermoFisher Scientific; Recipharm	Global pharmaceutical CDMOs providing end-to-end solutions from R&D and GMP production to analytical testing, sterile-fill, and oral-dose manufacturing, with integrated APAC supply chain capabilities.

Source: PASB Analysis

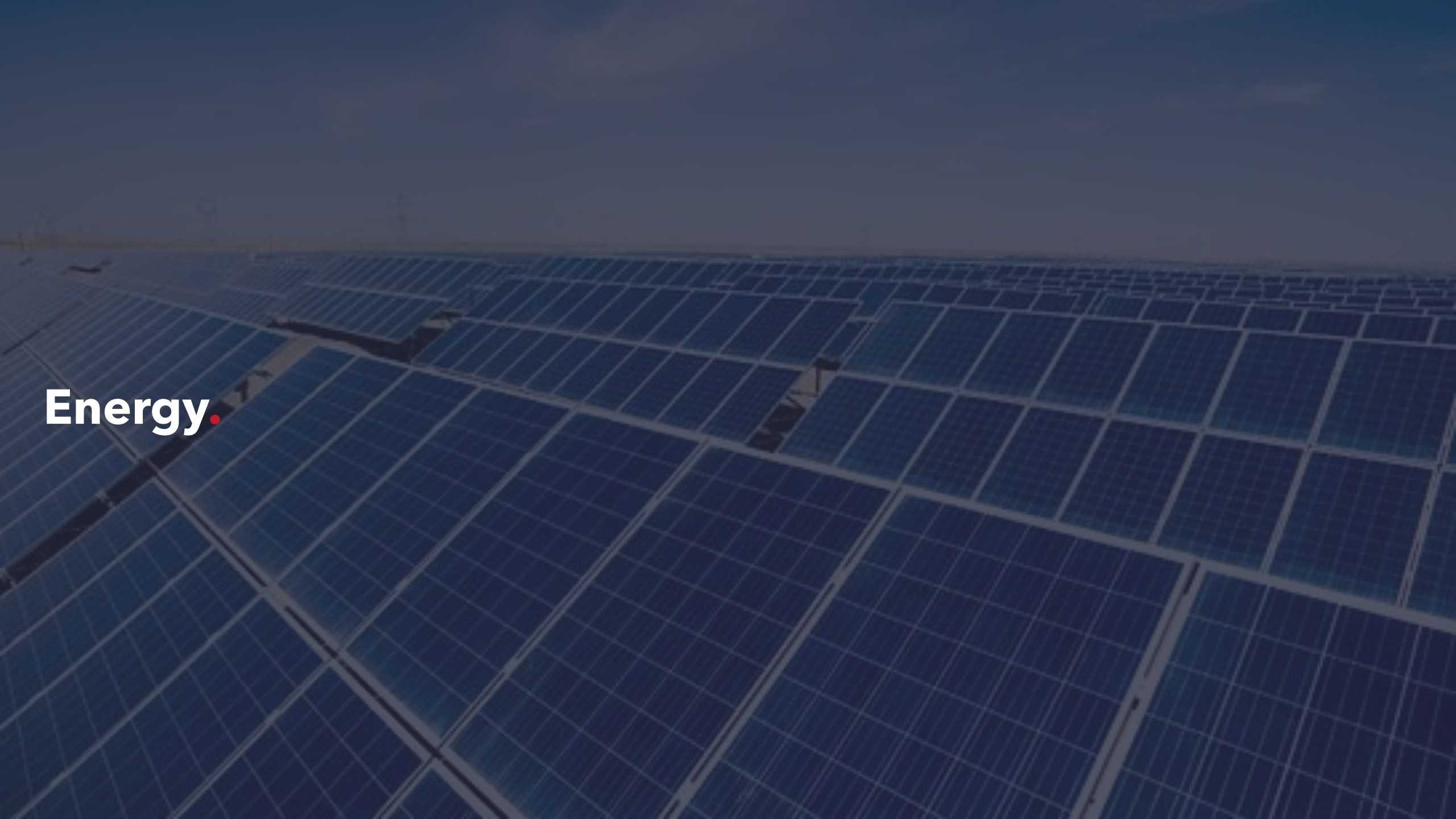
To further develop the sector, Johor should aim to attract these companies to establish a world-class healthcare and pharmaceutical hub in the state (2/2)

Potential Companies to Attract

NON-EXHAUSTIVE

Key Activities	Organisations	Description
Certification & Testing Facilities	Info Kinetics, TÜV SÜD	Accredited organisations offering GLP-compliant pharmacokinetic, bioequivalence, and medical device testing, alongside internationally recognised certification services for regulatory compliance in ASEAN markets.
R&D Centres	Novartis	International research institutes advancing tropical disease therapies, novel small-molecule drugs, and targeted medical innovations, with a focus on diseases prevalent in developing regions.
Cardiovascular, Oncology Treatment & Care	BDMS Bangkok Dusit Medical Services, Apollo Hospitals, GenesisCare, Raffles Medical Group	Private hospital networks offering integrated cancer care, including radiotherapy, chemotherapy, and surgical oncology, anchored by multi-disciplinary cancer centres with regional footprints.
Orthopaedics Treatment & Care	Bumrungrad International Hospital	Centres of excellence in orthopaedic surgery, specialising in joint replacement, spine surgery, and sports injury treatments, supported by advanced rehabilitation facilities.
Fertility & Women's Health	virtus health, SUNfert	Specialist providers in reproductive medicine, IVF, and women's healthcare services, with expertise in minimally invasive surgery, prenatal care, and genetic testing across Asia-Pacific markets.

Source: PASB Analysis


Energy.

Aligned with the global energy transition, Johor aspire to position itself as a regional energy powerhouse for sustainable, inclusive and innovative energy development by 2030

Sectoral Vision:

Position Johor as a regional energy powerhouse; advancing sustainable, inclusive, and innovative energy development, while ensuring cost-competitive growth aligned with national transition goals

Sectoral Strategy:

Strategy 1:

Scale up production of sustainable, low-carbon and renewable power

Strategy 2:

Develop green hydrogen export hubs

Strategy 3:

Build green innovation and manufacturing hubs

Strategy 4:

Strengthen the sustainable maritime industry

Source: FGD Session with Industry Stakeholders, PASB Analysis

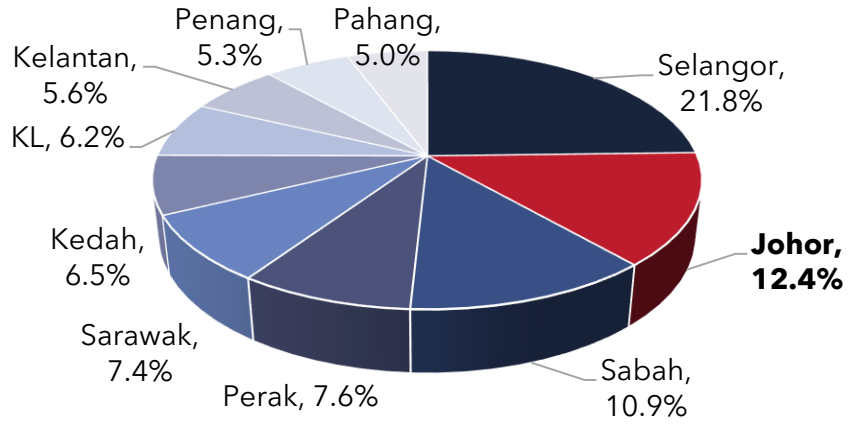
Rising future power demand in Johor calls for the state to scale up sustainable, low-carbon, and renewable energy production to meet industry needs

Strategy 1:

Scale up production of sustainable, low-carbon and renewable power

Johor to prioritise expanding its sustainable, low-carbon, and renewable energy capacity to meet rising power demand—particularly from energy-intensive industries like data centres—while ensuring long-term energy security and resilience

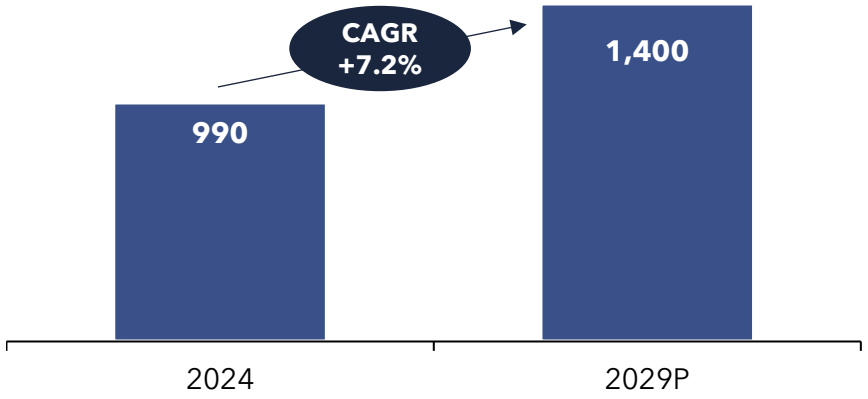
Electricity Consumption by Top 10 States, 2023
%



Key Highlights

- According to estimates, Johor ranks as the 2nd largest consumer of electricity in the country, driven by its growing population and expanding economic activities
- As Johor emerges as a leading regional hub for data centers, concerns are mounting over potential power shortages and the ability to sustain the increasing energy demands of these high-consumption facilities

Data Center Power Requirement, 2024 – 2029P
MW



Key Highlights

- According to estimates by Public Investment Bank, power demand from the data centre industry is projected to rise from 990 MW in 2024 to 1,400 MW by 2029, with Johor expected to bear a significant share of this increase
- This trend underscores the need for Johor to expand its capacity for sustainable, low-carbon, and renewable energy to meet the sector's growing demand in the coming years

Sources: Energy Commission, Public Invest; New Straits Times; PASB Analysis

Scaling up sustainable, low-carbon energy will require Johor to expand solar capacity, explore wind potential, and develop BESS to ensure long-term energy stability

Key Focus	Rationale
1 Expanding Solar Energy Production	• Unlocks Johor's solar energy production potential to strengthen long-term energy security and reduce dependence on fossil fuel imports • By expanding solar energy generation capacity, Johor can position itself as a renewable energy hub that supports green industrialisation, meets investor ESG requirements, and enables cleaner electricity supply for high-growth sectors such as data centres, electronics manufacturing, and agrosolar applications
2 Exploring Potential of Wind Energy	• Diversifies Johor's renewable energy mix while unlocking untapped clean energy sources suited for coastal and offshore wind deployment zones • By exploring wind energy potential, particularly in eastern coastal areas and offshore clusters, Johor can complement its solar footprint, attract green investment in hybrid RE projects, and enhance energy resilience through continuous generation across diurnal and seasonal cycles
3 Develop Battery Energy Storage Systems (BESS) for Grid Stability	• Improves grid reliability, reduces curtailment of solar output, and supports time-shifting of renewable energy use • As Johor scales up intermittent solar and wind generation, investments in BESS will be critical to ensure stable supply, reduce dependence on backup fossil generation, and support future smart grid infrastructure and RE trading platforms

Source: PASB Analysis

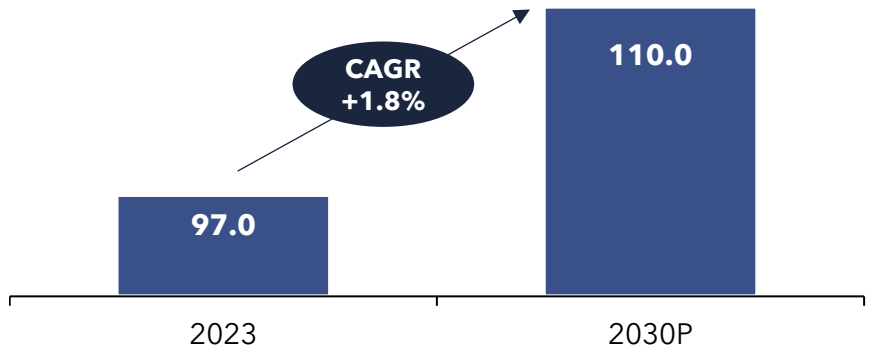
As hydrogen emerges as a key energy transition lever, Johor should focus on developing its hydrogen production capabilities to tap into growing future demand

Strategy 2:

Develop green hydrogen export hubs

Johor to focus on developing green hydrogen export hubs by leveraging its strategic location and infrastructure to scale up production, support domestic use, and align with national decarbonisation targets

Global Hydrogen Demand, 2023 – 2030P
Million tonnes (Mt)



Key Highlights

- According to International Energy Agency, the global hydrogen demand is expected to surge from 97 Mt to 110 Mt by 2030, driven by a rapid 80-fold expansion in new applications and strong policy enforcement. This represents 1.8% CAGR from 2023 to 2030
- Demand growth will be driven by traditional applications like refining and chemicals and new applications such as steel DRI, power generation, shipping and aviation fuels

NETR Key Targets on Hydrogen

NETR Responsible Transition (RT) Pathway		
Sector	**Key Drivers**	**2050 NETR Targets**
Hydrogen	Green hydrogen production (MTPA)	Up to 2.5 MTPA
	Grey hydrogen feedstock phase off (%)	100%
	Hydrogen hubs (#)	3

Key Highlights

- NETR adopts a "Responsible Transition" pathway to achieve net-zero by 2050, balancing decarbonisation with socioeconomic progress while remaining adaptable to emerging technologies, hydrogen being a key pillar
- Johor must position itself to capitalise on the growing global hydrogen market by becoming a hub for hydrogen production for high-value export markets (e.g., Singapore, Japan, South Korea), while scaling up domestic hydrogen use in its decarbonisation efforts

Sources: International Energy Agency Southeast Asia Energy Outlook 2024, NETR, PASB Analysis

Developing hydrogen production capabilities will require Johor to establish dedicated hydrogen zones and secure strategic partnerships with off takers

Key Focus

Rationale

1 Establish Dedicated Green Hydrogen Production Zones in Proximity to Industrial Parks and Ports

- Co-locating hydrogen production facilities with key demand centres (e.g., petrochemicals, shipping, data centres) and port infrastructure (e.g., Pengerang, Tanjung Langsat) minimises transmission losses, reduces logistic costs, and supports decarbonisation of hard-to-abate sectors
- These zones can leverage existing pipelines, water infrastructure, and substation connectivity while providing streamlined permitting and utility access, critical enablers for first-mover hydrogen projects

2 Secure Long-Term Offtake and Export Partnerships with International Buyers

- Export viability depends on predictable demand signals. By targeting offtake MOUs and strategic cooperation with markets such as Singapore, Japan, South Korea, and the EU (under their green import frameworks), Johor can anchor investment confidence for large-scale hydrogen and ammonia infrastructure
- This includes aligning with international certification schemes (e.g., CertifHy, GH2 Green Hydrogen Standard), and building customs-clearance and bunkering protocols at key ports to support future hydrogen-based trade flows

Source: PASB Analysis

To seize the economic opportunities of energy transition, Johor should develop its clean-tech manufacturing capabilities, leveraging its robust industrial and logistics infrastructure

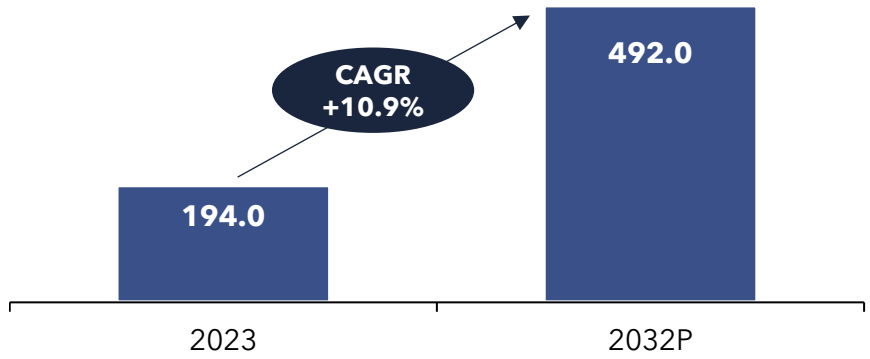
Strategy 3:

Build green innovation and manufacturing hubs

Johor to develop itself as a leading hub for clean tech manufacturing in Malaysia, capitalising on global demand for sustainable technologies and the state's industrial and logistics advantages

Sustainable Manufacturing Market Size, 2023 – 2032P

USD Billion

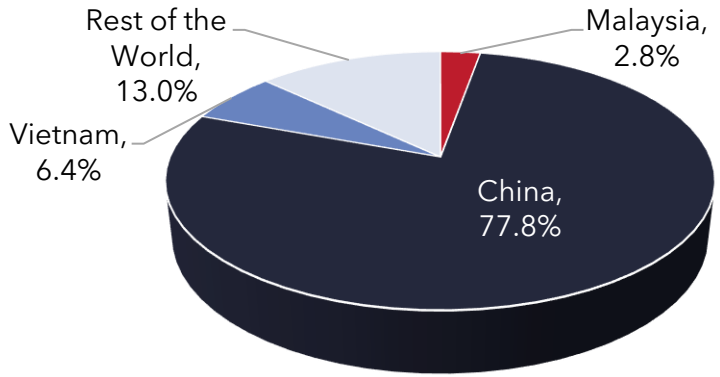


Key Highlights

- In 2023, global clean manufacturing including sustainable factories for solar modules, batteries, and wind components was valued at USD194 billion, projected to reach USD492 billion by 2032, growing at 10.9% CAGR
- China accounts for over two-thirds of global clean-tech investment (~USD 680 billion in 2024) and dominates key value chains such as polysilicon, batteries, electric vehicles, and solar modules

Share of Global Solar Module Manufacturing, 2022

%



Key Highlights

- In 2022, Malaysia was the world's 3rd largest solar module manufacturer, behind China and Vietnam, contributing 2.8% of global output, exporting RM 41.6 billion worth of solar PV products
- To capture this opportunity, Johor should develop its capability in clean-tech manufacturing by capitalising on its robust industrial base and logistics infrastructure and leveraging this foundation to attract solar module and clean-tech component manufacturing aligned with growing global sustainability demand

Sources: Statista, PASB Analysis

Johor can boost green innovation and manufacturing by developing RE equipment clusters and dedicated industrial parks with integrated RE solutions to drive innovation

Key Focus

Rationale

1 Establish Renewable Energy Equipment Manufacturing Clusters

- Promote the development of specialised industrial zones focused on the production of solar PV modules, battery storage systems, inverters, wind turbine components, and hydrogen electrolysers
- Leverage Johor's proximity to ports (e.g., PTP, Johor Port) and its manufacturing talent base to attract global and regional manufacturers seeking to scale clean tech production in Southeast Asia
- Malaysia is already the 3rd largest exporter of PV products globally (RM41.6B in 2022); Johor can capture value-added components in this chain
- Demand for energy storage and hydrogen electrolysers is rising in tandem with RE capacity targets (e.g., 70% RE by 2050 per NETR)
- Manufacturing clusters promote economies of scale, skills development, and backward linkages for local SMEs

2 Develop Clean-Tech Industrial Parks with Green Certification and RE Integration

- Designate selected industrial parks in Johor for transformation into clean-tech parks that are powered by on-site renewables (e.g., rooftop solar, biomass, hydrogen co-firing), incorporate sustainable water and waste management systems, and meet green certification standards such as CASBEE, LEED, or MyCREST. These zones will attract ESG-conscious investors and support green exports
- Global investors increasingly prioritise low-carbon supply chains; green-certified parks enable tenants to meet ESG mandates
- RE-powered zones reduce exposure to volatile grid prices and strengthen Johor's climate-resilient industrial competitiveness
- Complements Johor's green data center investments and can support RE-linked industrial AI, IoT, and automation solutions

Source: PASB Analysis

As Johor aims to strengthen its energy ecosystem, it must accelerate the transition from fossil-based generation toward clean, decentralised, and technology-driven energy systems

Different Tiers of Energy Value Creation

As we move from left to right…

- Johor transitions from fossil-based, centralised energy systems toward sustainable, decentralised, and innovation-led clean energy infrastructure
- Increasing emphasis on decarbonisation, digitalisation, and value-added energy exports (e.g., hydrogen, smart systems)
- Requires enhanced grid readiness, clean energy financing, and future-ready talent
- Johor must position itself as a regional hub for low-carbon energy production, technology localisation, and industrial decarbonisation

Tier 1: Fossil Fuel Extraction and Refining

- Conventional energy supply: coal, natural gas, oil-based power plants
- Includes refining, gas processing, and captive generation for industry
- Capital-intensive and reliable, but high in carbon emissions and vulnerable to future carbon pricing
- Johor is well-established here: RAPID (gas processing, cogeneration), Tanjung Bin (coal), Sultan Iskandar (gas)

Tier 2: Grid-Tied Renewable Energy (RE) Deployment

- Solar PV, small hydro, biomass connected to the national grid
- Clean but still dependent on centralised grid infrastructure and demand-side uptake
- Moderate local value-add (e.g., EPC contractors, O&M)
- Existing early-stage solar projects in Pontian and Pasir Gudang, but capacity remains <100 MW

Tier 3: Distributed & Smart Energy Systems

- Rooftop solar, energy storage systems, microgrids, virtual power plants
- Offers energy resilience for industrial zones and high-load areas
- High local integration value – supports local installers, aggregators, software developers
- Johor has potential to scale this in Senai, Pasir Gudang, Iskandar, and port areas
- Requires grid modernisation and new regulatory models (e.g., peer-to-peer trading, third-party access)

Tier 4: Clean Fuels & Carbon Mitigation Solutions

- Green hydrogen, ammonia, biomass infrastructure, low-carbon fuels
- Supports industrial decarbonisation and cross-border green energy trade
- R&D and infrastructure-intensive, but positions Johor in high-value regional clean fuel markets
- Potential in Pengerang and Langsat for hydrogen bunkering/export
- Aligned with global ESG standards and corporate net-zero commitments

Tier 5: Energy Technology Innovation & Export Ecosystems

- Local manufacturing of clean energy systems: PV modules, electrolysers, batteries, EV infrastructure
- IP creation and localisation of smart grid software, energy analytics, and automation tools
- High-value, export-oriented – often involves collaboration between MNCs, universities, and startups
- Johor can become a manufacturing and innovation base for Southeast Asia's energy transition supply chain
- Aspirational goal: establish Johor as a Clean Energy Tech & Export Hub for ASEAN

Where Johor's energy industry could focus on:

- Transitioning from Tier 2 to Tiers 3–5: From deployment to innovation and value-added export
- Building smart grids, hydrogen hubs, and industrial microgrids
- Establishing RE-linked industrial zones with digital energy infrastructure
- Incentivising R&D localisation and clean tech manufacturing
- Upskilling talent for solar, hydrogen, battery systems, and digital energy technologies

Multiple anchor companies are currently present in Johor, covering key activities across the industry supply chain, offering strong potential for the state to further expand and deepen its value chain ecosystem

Existing Companies in Johor

NON-EXHAUSTIVE

Key Activities	Organisations	Description
Power and Renewable Energy Developers	SOLARVEST, MASDAR, YTL Power YTL GROUP, TNB RENEWABLES, UEM, Ditrolic Energy	Includes leading companies developing grid-tied and distributed solar PV projects in Johor (e.g. Pontian, Pasir Gudang).
Hydrogen and Ammonia	gentari, CityEnergy Good Energy for our City, sojitz	Key players exploring green hydrogen and ammonia development, bunkering, and export opportunities, particularly in Pengerang and Tanjung Langsat. Some are involved in early-stage pilot and R&D efforts aligned to national hydrogen strategies.
Energy Infrastructure and Grid	TENAGA NASIONAL	Responsible for grid stability, interconnection planning, and enabling RE integration. Also includes agencies managing FiT schemes and grid-tied licensing in Johor.
Green Maritime Fuel	JohorPort®, PTP A Member of MMC Group, DIALOG	Companies supporting green marine fuel development, LNG/green bunkering logistics, and port infrastructure upgrades for sustainable maritime energy solutions.

Source: PASB Analysis

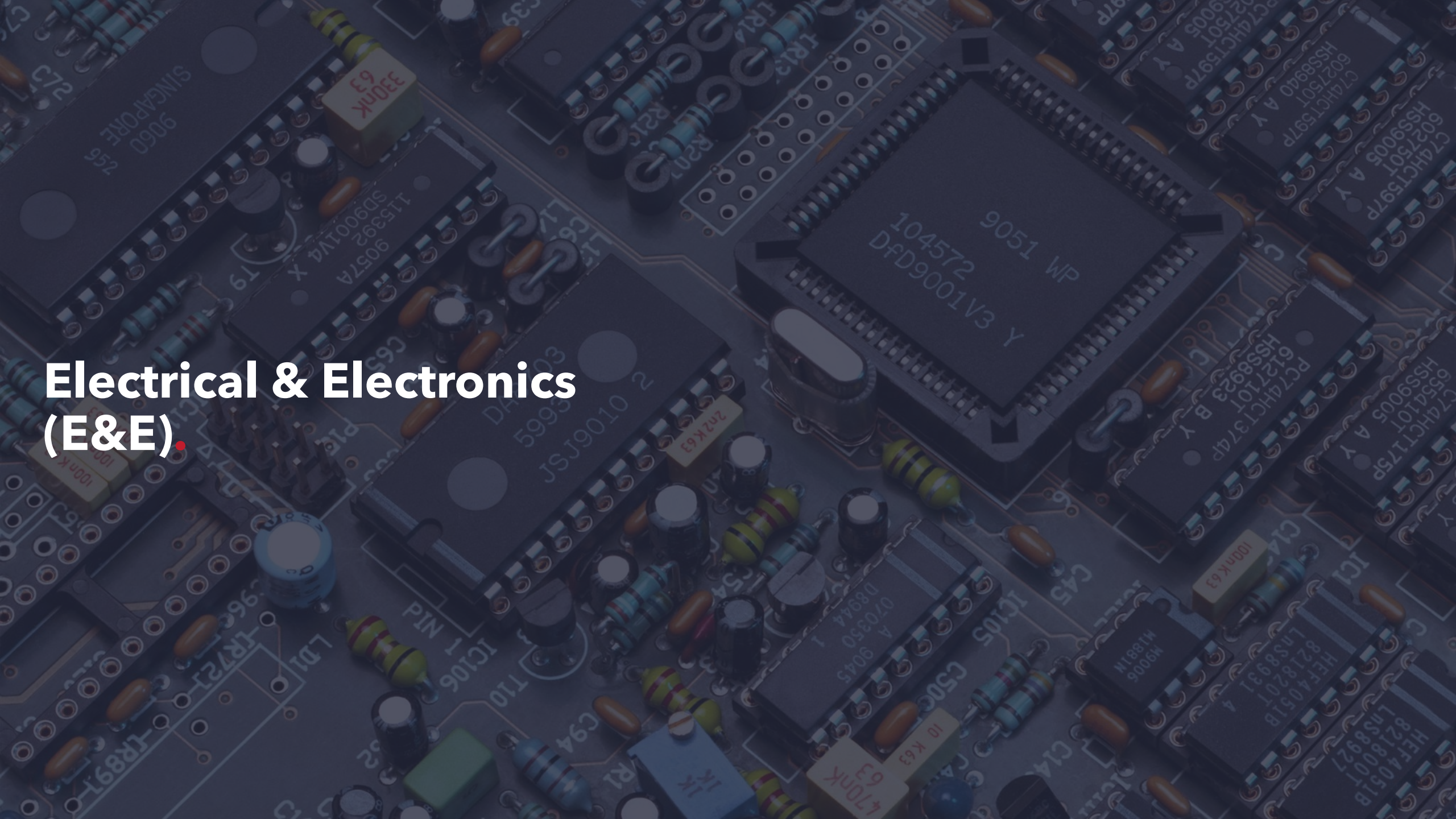
To further develop the sector, Johor should aim to attract these companies to establish a world-class chemical and petrochemical hub in the state

Potential Companies to Attract

NON-EXHAUSTIVE

Key Activities	Organisations	Description
Renewable Power Developers	MASDAR, Envision, equal energie, VENA ENERGY	Leading global renewable IPPs with interest in Southeast Asia; potential partners for scaling solar, wind, and hybrid RE projects.
Green Hydrogen and Ammonia Export Leaders	Air Liquide, Iberdrola, ENGIE, FORTESCUE FUTURE INDUSTRIES	Global players in green hydrogen production and hydrogen/ammonia logistics with large-scale export operations; bring investment in electrolysers, hydrogen carriers, and ammonia terminals.
Sustainable Maritime Fuels & Bunkering	NYK LINE NIPPON YUSEN KAISHA, YARA, E	Active in green marine fuel development, ammonia bunkering vessels, and terminal operations; can help position Johor as a low-carbon maritime hub.
Clean Energy Manufacturing & Tech	LONGi, First Solar, Trinasolar	Manufacturers of solar panels, inverters, battery systems, wind turbines, electrolyser components, and energy control systems. Can anchor clean energy tech parks and supply chains.
Energy Storage & Grid Modernisation	CATL, TESLA ENERGY, Hitachi Energy	Global leaders in energy storage, grid software, and power electronics; critical to build smart grids and ensure renewable integration.

Source: PASB Analysis



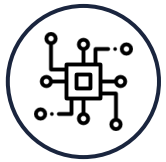
Electrical & Electronics (E&E).

By 2030, Johor aims to position itself as Southeast Asia's E&E hub, driven by high-value manufacturing and advanced tech applications

Sectoral Vision:

Position Johor as Southeast Asia's E&E hub, driven by high-value manufacturing, advanced tech applications, and a future-ready talent & business ecosystem anchored in TVET and local-industry empowerment

Sectoral Strategy:



Strategy 1:

Addressing the needs of emerging E&E end-use markets

Strategy 2:

Strengthening intermediary E&E segments (e.g. robotics, data centers)

Strategy 3:

Empowering local supply chains by strengthening local participation and corporate partnerships

Source: FGD Session with Industry Stakeholders, PASB Analysis

As emerging technologies drive new demand in E&E, Johor must adopt a coordinated strategy to tap into the evolving manufacturing landscape

Strategy 1:

Addressing the needs of emerging E&E end-use markets

Johor to focus on aligning its E&E manufacturing ecosystem with the evolving needs of end-use sectors such as energy, aerospace, and healthcare by targeting high-value components and technologies that enable smart, efficient, and automated systems

E&E is a foundational enabler of digital transformation, driving smarter and more efficient systems through automation, sensing, and advanced electronics across all priority sectors

Emerging technologies in these sectors…

Energy | **Chemical & Petrochemical** | **Aerospace** | **Healthcare & Pharmaceutical**

…will have cascading effects on E&E sector

Electrical & Electronics

NON-EXHAUSTIVE

Sector	E&E Integration Points	Description
Energy	• Smart Grids • Energy Storage Systems	Enables real-time energy monitoring, control systems, and efficient storage solutions critical for renewable energy integration
Chemical & Petrochemical	• Industrial Process Automation • Predictive Maintenance	Advanced sensors and control systems optimise plant efficiency, safety, and predictive fault detection to reduce downtime
Aerospace	• Avionics & Flight Control Systems • Aircraft Health Monitoring Systems	High-reliability electronics power navigation, control, and real-time diagnostics to enhance aircraft performance and safety
Healthcare and Pharmaceuticals	• Monitoring & Medical Devices • Diagnostic & Lab Equipment	E&E drives precision in diagnostics, real-time patient monitoring, and supports advanced pharmaceutical manufacturing systems

Sources: PASB Analysis

As Johor accelerates its shift towards a high-tech and sustainable economy, the growth of E&E is not just complementary, but essential to scaling these strategic sectors

Key Focus	Rationale
1 Energy Sector	• Regional and national energy plans signal a strong demand for E&E technologies to digitalize grids, enable real-time monitoring, and manage renewable integration • Johor's 6.1% energy demand surge, driven by green and digital industries, necessitates advanced E&E systems to modernize grid resilience and control
2 Chemical & Petrochemical Sector	• Regional leaders are accelerating Industry 4.0 adoption in the chemical sector, embedding E&E systems to drive smart manufacturing, energy efficiency, and real-time monitoring • Johor's rapid industrial-driven electricity growth demands urgent deployment of E&E solutions to strengthen grid resilience, efficiency, and sustainability
3 Aerospace Sector	• E&E technologies are critical to aerospace, powering everything from flight control to real-time aircraft health diagnostics through advanced sensors and embedded systems • Electronics integration is the core enabler powering aerospace innovation—from digital cockpits and predictive MRO to electric propulsion and smart systems
4 Aerospace Sector	• Southeast Asia is integrating E&E technologies like into national healthcare strategies to drive smarter, preventive, and connected care systems • Malaysia's home healthcare market is rising steadily at 7.5% CAGR, driven by growing demand for in-home respiratory, dialysis, IV, and diagnostic care solutions

Source: PASB Analysis

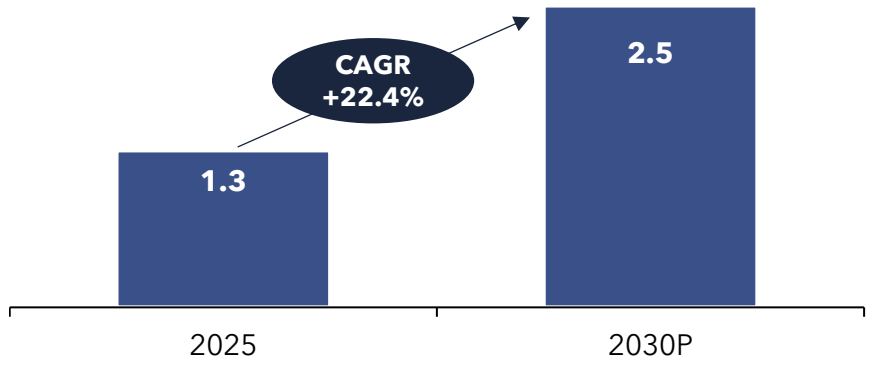
The growing data centre and robotics markets in Malaysia present an opportunity for Johor to strengthen its E&E sector, particularly within the intermediary component segment

Strategy 2:

Strengthening intermediary E&E segments (e.g. robotics, data centers)

Johor to focus on strengthening its intermediary E&E manufacturing segments such as robotics and data centre components that serve the rising automation and digital infrastructure demand

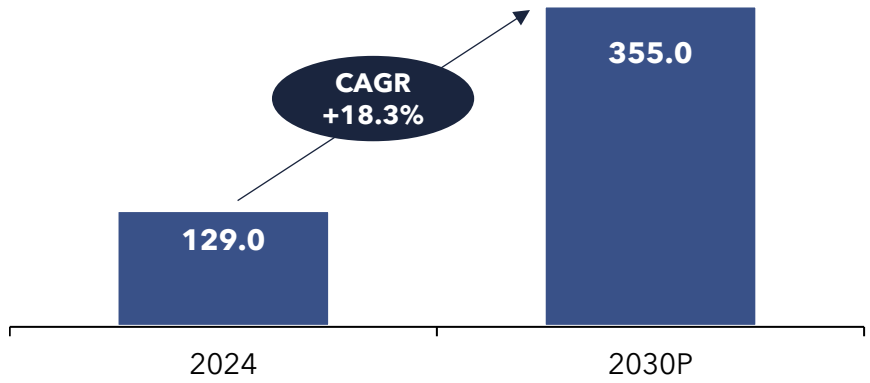
Malaysia Data Center Market, 2025 – 2030P
USD Billion



Key Highlights

- Malaysia's booming data centre market is projected to nearly double by 2030, attracting global tech giants and emerging players seeking to capitalise on the region's digital growth
- In Johor, the market is rapidly expanding with concentrated developments, anchored by major players like Bridge Data Centres and hyperscale campuses surpassing 100 MW, positioning the state as a key regional data centre hub

Malaysia Robotics Market, 2024 – 2030P
USD Million



Key Highlights

- Malaysia's robotics market is projected to grow from USD 129 million in 2024 to USD 355 million by 2030, driven by increasing automation in manufacturing, logistics, and services, aligned with national initiatives such as the National Robotics Roadmap, which targets a 30% automation rate in key industries by 2030
- Demand for intermediary E&E components such as sensors, controllers, and embedded systems will rise in tandem with robotics adoption across sectors

Sources: Research and Markets, Verified Market Research, PASB Analysis

With Johor's growing data centre and robotics sectors, E&E will be critical to supporting intermediary components within the state's expanding digital and automation infrastructure

Key Focus	Rationale
1 Data Centres	• The rapid growth of data centres in Johor presents a strategic opportunity to localise the supply of critical E&E components such as power management systems, high-density server boards, cooling control electronics, and smart sensors • Johor can attract investments in high-performance electronics manufacturing and testing, positioning itself as a regional hub for data centre-grade components while reducing reliance on imports
2 Robotics	• Johor can tap into the robotics value chain by producing key E&E components such as sensors, embedded controllers, and drive systems • The state can promote contract manufacturing and design services for robotics parts used in smart factories, logistics, and healthcare. Strengthening capabilities in automation-related E&E opens doors for Johor to serve not only domestic needs but also regional export markets.

Source: PASB Analysis

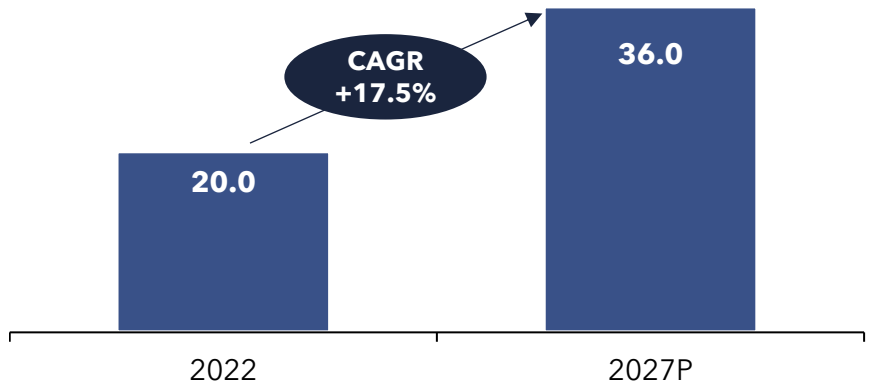
To strengthen its industrial ecosystem, Johor should empower local supply chains by deepening local supplier participation and fostering corporate partnerships

Strategy 3:

Empowering local supply chains by strengthening local participation and corporate partnerships

Johor will strengthen local supplier networks by promoting investment in innovation, advanced packaging, and AI hardware supported by vendor development programmes to position local firms to serve global OEMs

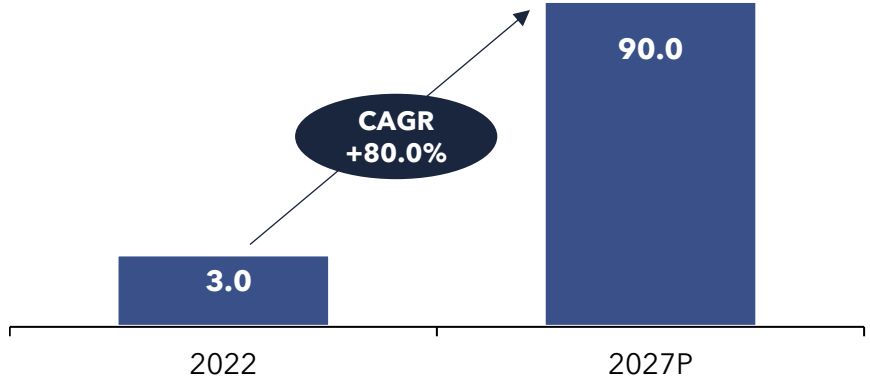
Global Edge-AI Hardware Market, 2022 – 2027
USD Billion



Key Highlights

- Growth fuelled by vision-guided robotics, in-line quality inspection and predictive maintenance across smart-factory roll-outs
- Edge processors allow real-time inference without cloud latency, pushing OEMs to develop local supplier bases for boards, modules and reference designs

Global Chiplet Advanced Packaging Market, 2022 – 2027
USD Billion



Key Highlights

- Hyper-growth of SiP & chiplet architectures is drawing IDMs and OSATs to place minority stakes in Malaysian substrate and power-package
- Vendor-development programmes that pair large buyers with vetted Johor firms shorten qualification cycles, letting corporates lock-in local capacity while capturing generous tax incentives

Sources: MarketsanadMarkets, PASB Analysis

Johor can deepen local supply chain networks by etablishing structured local vendor development programme and initiate a corporate co-investment in local startups

Key Focus

Rationale

1 Structured local vendor development

- Establish a structured vendor development programme to integrate Johor-based suppliers into global advanced technology value chains. Focus on enabling SMEs to supply AI hardware, advanced packaging, and high-precision components to multinational OEMs. Support vendors through qualification, capability upgrading, and alignment with international manufacturing standards
- Developing local vendor capacity reduces reliance on imports and strengthens supply chain resilience against global market disruptions. Corporate-led vendor programmes can accelerate Johor SMEs' entry into high-value technology segments, creating skilled jobs and technology spillovers. Retaining manufacturing spend within Johor ensures economic value stays local, positioning the state as a competitive production base for advanced industries

2 Corporate co-investment in local startups

- Encourage corporates to co-invest in Johor-based technology startups, pairing funding with immediate market access. Target startups in advanced manufacturing, AI hardware, and semiconductor packaging, ensuring they have anchor customers from the outset to accelerate scaling
- Co-investment models provide startups with both capital and secured demand, reducing time to market and improving business sustainability. Corporate equity stakes help retain critical SiP, chiplet, and advanced manufacturing know-how within Johor, safeguarding strategic intellectual property. High-profile corporate participation signals ecosystem maturity, attracting additional venture capital, skilled talent, and global technology partners to Johor's industrial hubs.

Source: PASB Analysis

Johor's E&E sector is centred on midstream activities such as component manufacturing and assembly, test & packaging, and should broaden into R&D, design, and wider component production to capture greater value

Value Chain of the Electrical & Electronics Sector

Upstream

Research and Development (R&D)

Activities:
- Focuses on creating new technologies, improving materials, and developing innovative processes to make better electronic products. This includes building prototypes and testing new ideas before mass production

Examples of Products:
- Prototype chips
- New manufacturing processes and techniques
- Patents and intellectual property

Design

Activities:
- Turns concepts into detailed product designs, including circuit layouts, hardware structures, and embedded software, ensuring they are ready for manufacturing

Examples of Products:
- Semiconductor and microchip designs
- Printed circuit board (PCB) layouts
- Embedded software and firmware
- Ready-to-use electronic modules

Midstream

Manufacture of Components

Activities:
- Produces the essential parts used to build electronic products, from microchips to sensors, using precision manufacturing processes

Examples of Products:
- Semiconductors and integrated circuits
- Capacitors, resistors, and inductors
- Printed circuit boards (rigid and flexible)
- Sensors and LED components

Assembly, Test & Packaging

Activities:
- Assembles components into complete units, runs tests to ensure they work properly, and packages them for delivery to customers or integration into final products

Examples of Products:
- Packaged microchips and modules
- Fully assembled circuit boards (PCBAs)
- Tested and certified sub-systems

Downstream

Marketing, Distribution & Sales

Activities:
- Promotes, sells, and delivers electronic products to customers, while also managing logistics, customer service, and after-sales support

Examples of Products:
- Consumer electronics (smartphones, appliances)
- Automotive electronics (ECUs, sensors)
- Industrial control systems
- Servers, storage systems, and telecom equipment

More value to be captured

High presence in Johor

Source: NIMP 2030, PASB Analysis

Multiple anchor companies are currently present in Johor, covering key activities across the industry supply chain, offering strong potential to further expand and deepen its value chain

Existing Companies in Johor

NON-EXHAUSTIVE

Key Activities	Organisations	Description
Energy Sector	PETRONAS, DIALOG, malakoff A Member of MMC Group	Integrated oil, gas, and power players operating large-scale refinery, storage, and generation facilities, positioning Johor as a regional hub for energy production and petrochemical supply.
Chemical & Petrochemical Sector	LOTTE CHEMICAL TITAN, PRefChem	Producers of essential petrochemicals and polyolefins through integrated refining and cracker complexes, supplying regional industrial and manufacturing value chains.
Healthcare & Pharmaceuticals Sector	Biocon Biologics Transforming Healthcare. Transforming Lives., KPJ HEALTHCARE KPJ JOHOR SPECIALIST HOSPITAL	Leaders in biopharmaceutical manufacturing and specialist healthcare services, supporting advanced treatment and high-volume biologics production for ASEAN markets.
Data Centres	YTL SINCE 1955, yondr, Keppel Data Centres	Developers and operators of hyperscale, green-powered data centre campuses with high-availability colocation services for regional and global clients.
Robotics	ABB, SEM A Caterpillar Brand	Industrial robotics and automation integrators specialising in engineering, assembly, and deployment of advanced robotic systems for manufacturing.
Corporate co-investment & local vendor development	dyson, VENTURE, flex	Corporate venture investors backing advanced manufacturing and technology start-ups to accelerate integration into supply chain.

Source: PASB Analysis

To further develop the sector, Johor should aim to attract these companies to establish a a comprehensive electrical and electronics hub in the state

Potential Companies to Attract

NON-EXHAUSTIVE

Key Activities	Organisations	Description
Energy Sector	TotalEnergies, Ørsted	Global energy leaders expanding LNG, renewables, and offshore wind capacity across Asia, supporting regional energy transition and supply resilience.
Chemical & Petrochemical Sector	DOW, BASF We create chemistry	Producers of specialty chemicals, silicones, and advanced materials, operating large-scale integrated complexes serving diverse industrial markets
Healthcare & Pharmaceuticals Sector	Pfizer, NOVARTIS	Multinational pharmaceutical innovators in mRNA vaccines, sterile injectables, and advanced cell- and gene-therapy manufacturing.
Data Centres	aws, Azure	Hyperscale cloud providers deploying AI-ready, green-powered datacentres with sovereign region capabilities for global enterprises.
Robotics	FANUC	World-leading CNC and industrial robotics manufacturer driving automation adoption in precision manufacturing.
Corporate co-investment & local vendor development	intel capital, SONY, NVIDIA	Semiconductor and electronics technology leaders and emerging technology start-ups to accelerate commercialisation.

Source: PASB Analysis

Aerospace.

By 2030, Johor seeks to position itself as Malaysia's Southern Gateway for General Aviation and MRO, with the high potential expansion of Senai Airport

Sectoral Vision:

Positioning Johor to be the Southern Region Gateway for General Aviation and Maintenance, Repair & Overhaul (MRO) Services

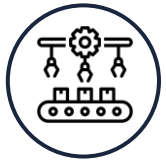
Sectoral Strategy:

Strategy 1:

Establish production hub for next-generation aviation technologies, including electric aircraft, sea planes, and unmanned systems

Strategy 2:

Develop specialised facility for servicing component-level MRO and integrating local SMEs into global supply chains & high value markets



Strategy 3:

Establish a specialised Aerospace Manufacturing Hub to drive aviation trade growth and integrate Johor into regional and global aerospace supply chains

Source: PASB Analysis

Johor has the potential to lead in emerging and niche aviation technologies by leveraging existing aerospace capabilities to attract targeted investment

Strategy 1:

Establish production hub for next-generation aviation technologies, including electric aircraft, sea planes, and unmanned systems

Johor can focus on building a competitive hub for next-generation aviation by leveraging its coastal geography, uncongested airspace, and existing aerospace institutions to attract investment in UAVs, electric aircraft, and seaplanes.

Overview of Johor's Involvement in Aviation Technology

General Aviation

- Delta Aerospace is the first seaplane in Malaysia.
- It's first LA-8 aircraft arrived in Senai Port in March 2022 marked its role in the assembly and technical preparation of niche aviation platforms.

R&D Push in UAV, Drone Technologies and Advanced Air Mobility

- Johor hosts key education and training institutions in such as University Teknologi Malaysia (UTM), Aero Malaysian Engineering Centre and Asia Aeronautical Training Academy that are actively involved in research supporting next gen aviation, materials testing and simulations environment.
- Malaysia's Drone Technology Action Plan 2030 targets RM50.7 billion in GDP contribution from the drone sector, offering Johor an opportunity to position itself as the main UAV testing and low-volume production hub in the country.

Key Opportunities

Position Johor as an entry point for niche production and testing hub for seaplanes, UAVs, electric aircrafts and upcoming aviation technologies.

Next-gen technolgoies like UAVs, light aircraft, and seaplanes typically have smaller size, shorter range, and simpler infrastructure requirements making it a possibility for Johor to be a suitable first-mover state.

Areas Johor can tap into:

✓ Establish a UAV Test Bed that can be accessed through land and coastline in Southern Johor

✓ Setting up a Low-Rate Initial Production (LRIP) Facility for UAV and eVTOL components

Source: Sinar Harian, The Star, PASB Analysis

As Johor advances its position in the global aerospace value chain, expanding capabilities in manufacturing, systems integration, and engineering services will be critical to securing high-value investment

Key Focus	Rationale
1 Aerospace Manufacturing	• Malaysia lacks a dedicated anchor facility for manufacturing next-generation aircraft, creating a strategic opening for Johor to lead in electric aircraft, UAV, seaplane, and AAM production • Johor's proximity to Singapore's aerospace and logistics hub, combined with coastal access, offers strategic advantages for seaplane assembly and UAV export • Establishing prototyping, LRIP, and final assembly capabilities will strengthen Johor's competitiveness in securing long-term OEM and Tier-1 supplier investments
2 Systems Integration	• Limited upstream integration in UAV-related activities restricts Johor's ability to scale; coordinated R&D clusters for flight systems, testing, and certification can address this gap • A cross-border UAV logistics sandbox can leverage Johor's port infrastructure, uncongested airspace, and regulatory flexibility to serve Southeast Asian drone delivery markets • Integration of locally manufactured UAV components with advanced avionics and communication systems can build a full-value chain within the state
3 Engineering & Design Services	• Strengthening collaboration between academia, CAAM, and industry will expand capabilities in prototyping, simulation, and regulatory compliance for next-gen aviation platforms • Public–private investment in AI-based navigation, autonomous systems, and advanced materials design will accelerate Johor's transition from small-scale projects to commercially viable aviation technologies • Leveraging UTM, AATA, and AMEC's talent pipelines will ensure a steady supply of engineers and technicians to support rapid scaling of design and certification services

Source: PASB Analysis

Johor is well-positioned to advance into high-value component MRO, strengthening its role in the Aerospace Value Chain

Strategy 2:

Develop specialised facility for servicing component-level MRO and integrating local SMEs into global supply chains & high value markets

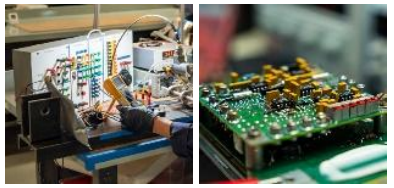
Johor can accelerate the shift into to high-value, specialised component MRO by catering to regional demand and aligning with national aerospace strategies to attract OEM partnerships, global suppliers, and high-tech investment

Component MRO is a high-growth segment. Global aerospace trends are shifting towards specialised, modular servicing, creating opportunities for hubs with strong technical skills, supply chain integration, and regulatory compliance.

Majority MRO players (GKN, ADE) in Malaysia currently focus on base and line maintenance. There is an opportunity for Johor to move up the value chain into niche component servicing

- **Line Maintenance:** Routine checks and minor repairs performed between flights or overnight stops
- **Base Maintenance:** More in-depth inspections modifications, and repairs performed at dedicated hangars; often includes scheduled heavy checks

…… by positioning Johor as an entry point for niche production and testing hub for seaplanes, UAVs, electric aircrafts and upcoming aviation technologies



MRO component servicing refers to the MRO of aircraft components, parts and systems rather than the entire aircraft.

NON-EXHAUSTIVE

Components	Description
Wheel & Brakes	• Regional demand is strong due to common fleet types (A320, B737) • High-turnover item – average overhaul every 250 – 300 landings
Avionics	• Increasing complexity of electronics = growing need for specialist servicing • Does not require hangar space; cleanrooms and benches suffice
Landing Gears	• Requires frequent inspection, repair, and overhaul due to exposure to high stress during take-off and landing cycles

Source: PASB Analysis

As Johor advances its role in the aerospace sector, developing specialised component MRO capabilities will be key to reducing reliance on overseas facilities and capturing high-value market share

Key Focus

1 Maintenance, Repair & Overhaul

Rationale

Specialisation in MRO Component Servicing

- The global MRO component market, valued at over USD 20 billion, is expanding rapidly with Asia's aging and growing aircraft fleet, creating sustained demand for high-turnaround servicing every 6–18 months
- ASEAN's rising fleet of commercial, business, and general aviation aircraft is driving the need for localised component repair capabilities, reducing reliance on overseas facilities in Germany, the US, and France
- Currently, over 80% of Malaysia's MRO activity is concentrated on airframe and engine overhauls, leaving a gap in specialised component-level expertise
- Most domestic MRO services are located in Selangor, while regional component work is often outsourced to Singapore, highlighting the opportunity for Johor to develop its own hub
- Johor's proximity to Singapore's aerospace cluster, combined with access to Senai International Airport and the state's established manufacturing base, positions it as a cost-effective and strategically located alternative for component servicing
- Many local aerospace SMEs remain at Tier-3 or below, limited to machining or subassembly roles due to certification and capacity constraints, positioning Johor to move up the value chain with targeted investment in certified component servicing

Source: PASB Analysis

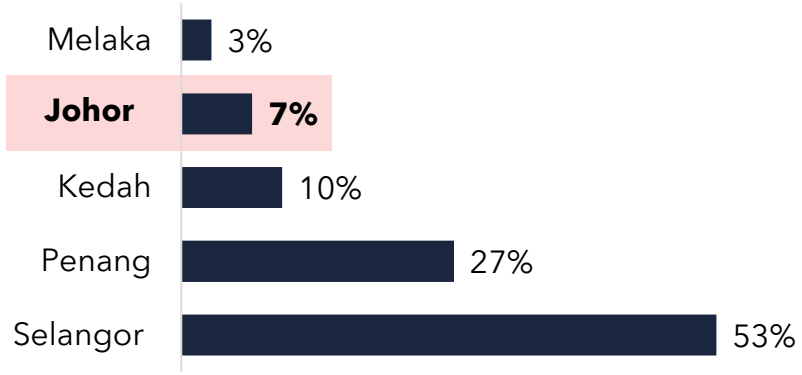
Johor can position itself as a niche aerospace manufacturing hub by specialising in precision component capabilities

Strategy 3:

Establish production hub for next-generation aviation technologies, including electric aircraft, sea planes, and unmanned systems

Johor will focus on developing a niche aerospace manufacturing hub by targeting high-precision, small-lot components such as cabin interiors and composite parts, leveraging its existing E&E manufacturing base aligning with national aerospace strategies to attract OEM and Tier-1 investments.

Aerospace Manufacturing Players by State



Key Highlights

- Malaysia's aerospace manufacturing is heavily concentrated in Selangor (53%) and Penang (27%), driven by OEM and Tier 1 players like Spirit AeroSystems, Safran, Honeywell.
- The bulk of manufacturing in these states focuses on large structural components such as airframes, wings, nacelles produced for major commercial aircraft platforms.
- Despite emerging players, Johor's aerospace manufacturing footprint remains limited, indicating room for targeted growth

Opportunities for Johor

- Establishing Johor as a specialised Aerospace Manufacturing Hub could serve as a high-value platform to boost aviation trade and industry linkages with regional and global aerospace value chain
- There are specific areas where Johor can rapidly build it's niche to attract investment, and plug into global supply chains such as cabin interiors and composite parts
- Facility could provide these capabilities:

Repair & Inspection *Trimming* *Fabrication* *Assembly*

Cabin Interiors (Seats, Panels)

- ❑ Compatible with Johor's existing E&E Manufacturing Base
- ❑ Easy to scale with automation

Composite & Plastic Parts

- ❑ Leverages local plastics for cabin interiors, ducts, brackets
- ❑ Access to growing demand for lightweight components

Source: PASB Analysis

Leveraging Johor's industrial infrastructure, proximity to Singapore, and skilled workforce can position the state as a competitive hub for precision aerospace manufacturing and advanced systems integration

Key Focus

Rationale

1 Aerospace Manufacturing

- Johor has a strong base in electrics and electronics manufacturing and its industrial parks in Senai can be further optimised for aerospace manufacturing and production
- National aerospace manufacturing remains concentrated in Selangor, creating an opportunity for Johor to capture investment and activity in the Southern Corridor
- Singapore is a global aerospace manufacturing hub but relies heavily on imports for mid-tier part, offering Johor a cross-border supply opportunity in precision, small-lot component manufacturing

2 Systems Integration

- Many Malaysian SMEs are not integrated into OEM/Tier 1 supply chains due to lack of certifications (AS9100, NADCAP), consistent QA systems, and long-term contracts
- There is limited participation of Johor-based firms in multi-tier supplier structures, joint ventures, or risk-sharing partnerships. As a result, Malaysia imports most key components or relies on foreign Tier-1s operating in isolation, without deep linkages to domestic ecosystem
- Building structured collaboration platforms between Johor SMEs and foreign Tier-1/Tier-2 firms can enable technology transfer, increase local content, and reduce reliance on imported components.

Source: PASB Analysis

Johor's aerospace industry is currently concentrated in downstream activities, particularly in maintenance and aftercare, with limited upstream presence in aerospace manufacturing which can add higher value to Johor's economy

Value Chain of the Aerospace Industry

Upstream

Design & Development

Activities:
- Encompasses the conceptualisation, design, and development of aerospace products, and related systems.

Examples of Key Activities:
- Aerodynamic and structural design
- Avionics and system architecture development
- Simulation and modeling (e.g., CAD, CAE)

Manufacturing

Activities:
- Involves the production of aerospace parts, components, and systems.

Examples of Key Activities:
- Fabrication of aerostructures (eg: wings)
- Production of engine components
- Manufacturing of avionics and electronic systems

Assembly & Integration

Activities:
- Covers the assembly and integration of various aircraft components and systems into a complete, functional aircraft.

Examples of Key Activities:
- Structural assembly
- Systems integration
- Testing and validation
- Quality assurance

Downstream

Sales & Operations

Activities:
- Focuses commercial aspects of the aerospace industry, including, sales, and operational deployment of aircraft..

Examples of Key Activities:
- Marketing and sales
- Customer support
- Fleet management
- Operational planning
- Leasing and financing

Maintenance & Aftercare

Activities:
- Focuses on the ongoing maintenance, repair, and overhaul (MRO) of aircraft to ensure safety, reliability, and compliance with aviation regulations.

Examples of Key Activities:
- Routine & predictive maintenance
- Repairs and overhauls
- Upgrades and modifications
- Regulatory compliance

More value to be captured

High presence in Johor

Source: Chemical Industry Roadmap 2030, NIMP 2030 – Chemical Industry, PASB Analysis

Multiple anchor companies are currently present in Johor, covering key activities across the industry supply chain, offering strong potential for the state to further expand and deepen its value chain ecosystem

Existing Companies in Johor ✓

NON-EXHAUSTIVE

Key Activities	Organisations	Description
Maintenance, Repair & Overhaul (MRO)	GKN AEROSPACE; ADE ASIA DIGITAL ENGINEERING	GKN Aerospace is a repair and research facility focusing on aero-engine parts such as low-pressure components. Asia Digital Engineering offers a spectrum of aircraft services, including line maintenance, base maintenance, component repair and overhaul.
Aerospace Manufacturing	BARNES AEROSPACE; Celestica; TSA	Barnes Aerospace produces engine components and air frames. Celestica provides electronics manufacturing services, while TSA Industries specialises in high-precision components for sectors such as aviation, oil and gas, and general engineering.
Education & Training	ASIA AERONAUTICAL TRAINING ACADEMY; UTM UNIVERSITI TEKNOLOGI MALAYSIA; aero malaysian engineering centre	Asia Aeronautical Training Academy (AATA) is a Civil Aviation Authority of Malaysia (CAAM)-approved aviation training organisation. Universiti Teknologi Malaysia (UTM) is a leading public research university in Malaysia, with a campus in Skudai, Johor. Aero Malaysian Engineering Centre (AMEC) is an aviation training organisation approved by CAAM.

Source: PASB Analysis

To further develop the sector, Johor should aim to attract these companies to establish a well-established aerospace hub in the state

Potential Companies to Attract

NON-EXHAUSTIVE

Key Activities	Organisations	Description
Maintenance, Repair and Overhail (MRO)	StandardAero, Lufthansa Technik, Revima	Global leaders in full-spectrum MRO services, specialising in high-turnaround component repairs, advanced diagnostics, and lifecycle management for engines, airframes, and critical systems.
Aerospace Manufacturing	DAHER, FACC	Tier-1 and Tier-2 aerospace manufacturers with expertise in advanced materials, aerostructures, and composite component production; can drive investment in precision manufacturing, smart production technologies, and integration into global supply chains.
Systems Integration	BAE SYSTEMS, AIT	Industry leaders in complex aerospace systems engineering, avionics integration, and advanced manufacturing solutions
Engineering & Design Services	Belcan, Quest global	Specialists in end-to-end engineering solutions, including product design, simulation, prototyping, and testing for aerospace components and system
Research & Technology Anchors	aes aerospace engineering solutions, Bretthauer Kunststofftechnik, CoE TTHP Center of Excellence for Technical Training & Human Performance	Global R&D institutions and technology centres focused on aerospace materials, manufacturing processes, and system innovation

Source: PASB Analysis

Logistics.

By 2030, Johor's logistics ecosystem will be the preferred logistics gateway into Asia, strengthened by new capabilities in digitalisation, air and specialised logistics

Sectoral Vision:

Mature Johor's logistics ecosystem into a seamless, integrated, sustainable, agile ecosystem and crystallise its reputation as the preferred logistics gateway into Asia with long-term competitive advantage

Sectoral Strategy:

Strategy 1:

Improve sea logistics landscape via capacity expansion, digitalisation and automation to ensure competitive advantage

Strategy 2:

Build the foundation of Johor's air logistics landscape to capture potential future demand

Strategy 3:

Establish Smart Logistics Complexes (SLC) integrating cutting-edge technologies with real-time goods movement tracking

Strategy 4:

Develop capabilities in storage and transportation of special goods

Source: FGD Session with Industry Stakeholders, PASB Analysis

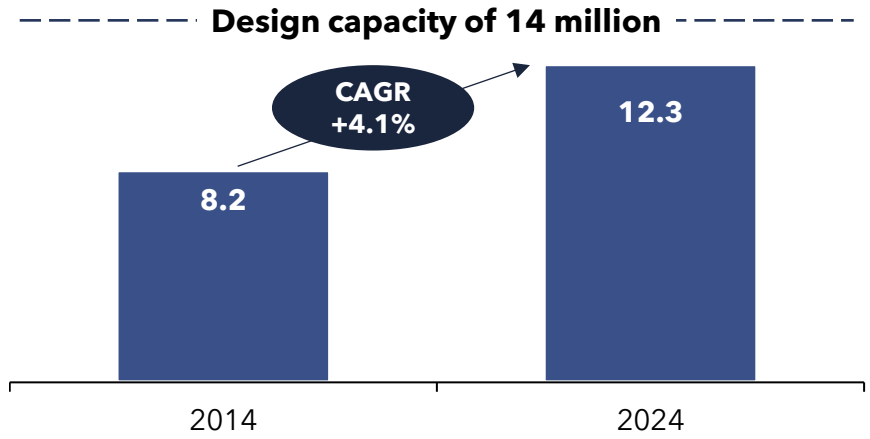
Johor could strengthen its sea logistics competitiveness through capacity expansion, digitalisation and automation

Strategy 1:

Improve sea logistics landscape via capacity expansion, digitalisation and automation to ensure competitive advantage

Johor to focus on accelerating port capacity upgrades, integrating smart port technologies, and streamlining operations to handle rising TEU demand and attract global shipping alliances, positioning PTP as a leading transshipment hub in the region

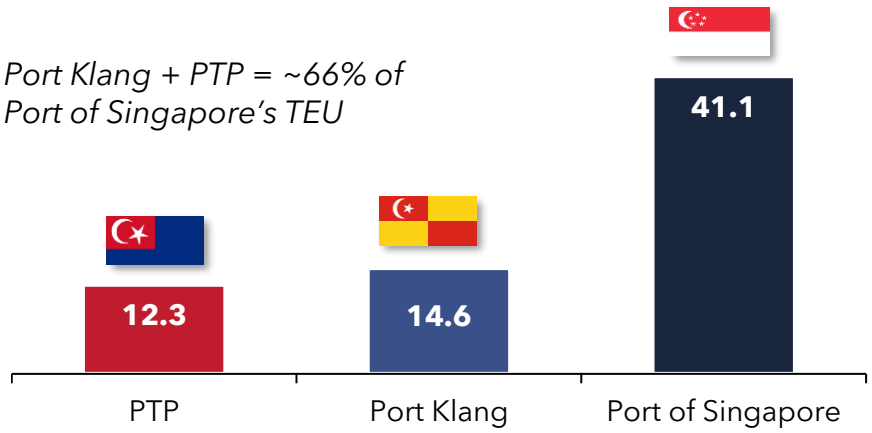
TEUs Handled by PTP, 2014 – 2024
Million



Key Highlights

- PTP recorded steady 4.1% growth p.a., (2014 – 2024) and handled 12.3mil in 2024, which translates to 88% of design capacity
- Expedite capacity expansion, reflecting future TEU growth; Provides long-term capacity assurance to shipping alliances and shipping lines

TEUs Handled by Major Ports, 2024
Million



Key Highlights

- Port of Singapore handles significantly more TEUs due to stronger global recognition, broader connectivity (600 vs. PTP's 300 ports), higher operational efficiency, and strategic partnerships with major shipping alliances
- To uplift TEU demand, PTP could offer shipper-specific incentives with government support, dedicate self-operated terminals, and consolidate container operations to create sticky volume and drive long-term cost efficiency

Sources: Ministry of Transport, PASB Analysis

Enhancing sea logistics capacity in Johor requires improvements to both container ports and inland ports, given their interdependent roles in ensuring end-to-end supply chain efficiency

Key Focus	Rationale
1 Enhance Container Port Capabilities	• Long-term capacity expansion to accommodate Johor's maturing industrial base (i.e., import and export) and growing transshipment volumes, as ports continue to grow and attract global shipping lines and alliances to Johor • Leveraging advanced digital systems and modern port technologies improve productivity and provide real-time tracking, which promotes faster and seamless container handling operations
2 Enhance Inland Port Capabilities	• Promotes inland cargo storage, processing and distribution activities, which could alleviate strain and congestion at neighbouring coastal ports • With the potential establishment of the Pan-Asian Railway Network, inland ports can act as vital nodes that optimise regional rail cargo flows and facilitate multimodal cargo handling capabilities (e.g., between sea and rail), while reducing reliance on road cargo transportation and alleviate congestions on expressways

Source: PASB Analysis

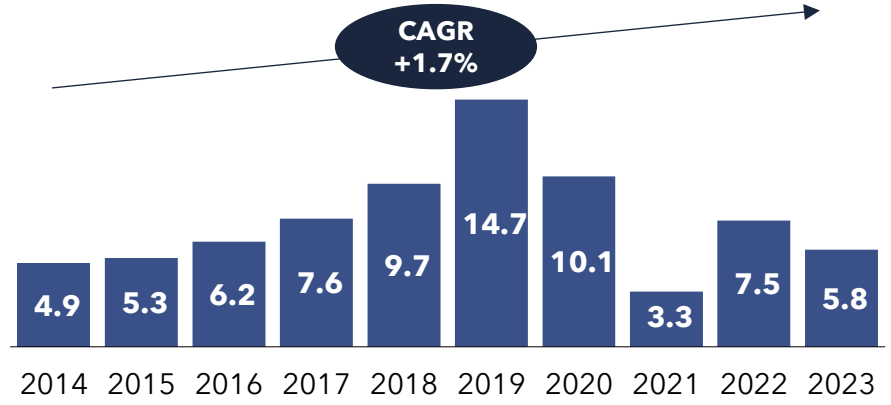
With air logistics demand expected to grow, Johor should expand its infrastructure to stay competitive with neighbouring airports

Strategy 2:

Build the foundation of Johor's air logistics landscape to capture potential future demand

Position Johor as a competitive regional air logistics hub by upgrading infrastructure, enhancing cargo handling capacity, and strengthening cold-chain and specialised logistics services to meet rising future industrial demand

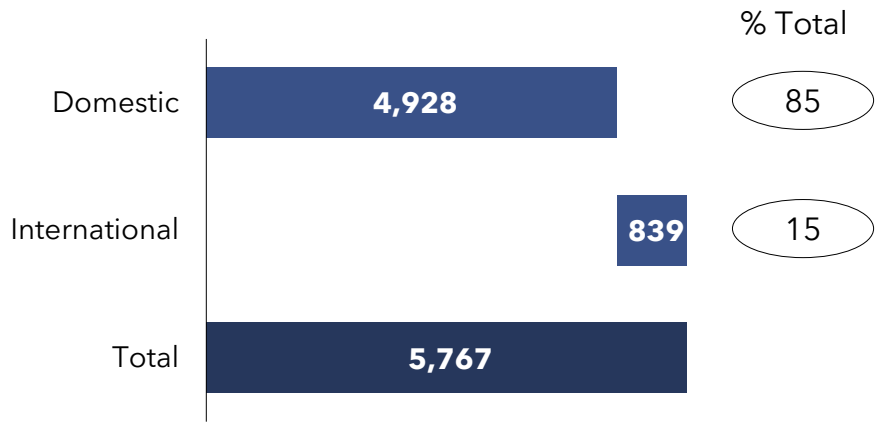
Senai Airport Total Cargo Handled, 2014 – 2023
Tonnes (Thousand)



Key Highlights

- Senai International Airport has a design capacity to handle 80,000 tonnes of cargo per annum
- Handled ~5,800 tonnes of cargo in 2023 (~7% of design capacity), achieved only ~40% of pre-COVID figures
- Cargo handled peaked in 2019 just before COVID-19, ~14,700 tonnes handled (~18% of design capacity)

Senai Airport Cargo Handled, 2023
%



Key Highlights

- Senai International Airport's air cargo is predominantly domestic (85%), with 90% comprising perishables and live seafood, mainly connecting East Malaysia to Johor. Current throughput is largely supported by belly cargo on domestic routes
- Air logistics demand remains limited due to Johor's industrial base favouring sea freight, limited presence of high-value, time-sensitive sectors, stronger competition from larger airports with better infrastructure, and restricted international connectivity

Sources: Ministry of Transport, PASB Analysis

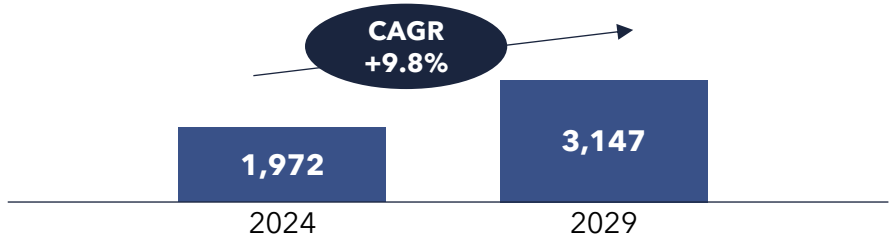
Demand in major industries such as e-commerce, food, and pharmaceuticals is expected to keep growing, driving the need to expand air logistics in Johor

Strategy 2:

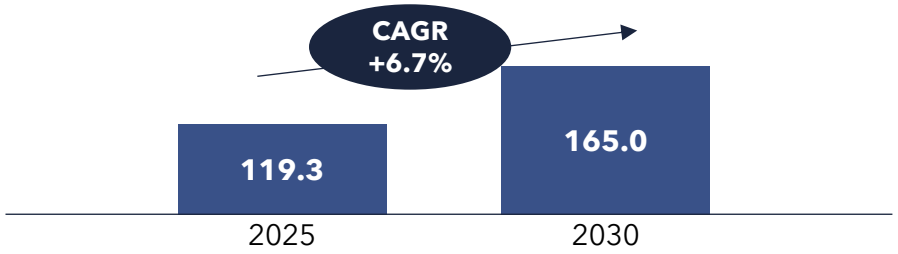
Build the foundation of Johor's air logistics landscape to capture potential future demand

Position Johor as a competitive regional air logistics hub by upgrading infrastructure, enhancing cargo handling capacity, and strengthening cold-chain and specialised logistics services to meet rising future industrial demand

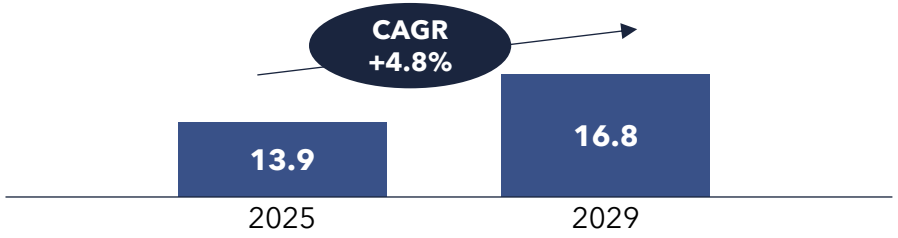
E-commerce Market in Asia, 2024 – 2029
USD Billion



Food Market in Malaysia, 2025 – 2030
USD Billion



Pharmaceuticals Market in SEA, 2025 – 2029
USD Billion



Key Highlights

- The rapid growth of e-commerce, temperature-sensitive food exports, and pharmaceuticals regionally is increasing demand for fast, reliable, and secure air freight services. Johor's strategic location offers an opportunity to become a preferred regional gateway
- Competing airports in neighbouring regions such as Changi Airport are expanding capacity and facilities. Without similar upgrades, Johor risks losing potential cargo traffic to better-equipped hubs
- National and state-level initiatives, including the JS-SEZ, are targeting high-value industries that rely on efficient air logistics. Aligning infrastructure upgrades with these policies can maximise investment attraction
- Strengthening air logistics will not only capture cargo demand but also stimulate the growth of advanced manufacturing, agritech, and biopharma sectors that depend on fast global market access

Sources: Statista, Ministry of Transport, PASB Analysis

Enhancing air logistics capacity in Johor requires improvements to both container ports and inland ports, given their interdependent roles in ensuring end-to-end supply chain efficiency

Key Focus	Rationale
1 Increase Air Cargo Charter Services	• Expanding charter services provides flexible and scalable air freight capacity to meet fluctuating and niche demand that scheduled commercial flights may not cover (i.e., belly load) • Charter services enhance Johor's connectivity to diverse regional and international markets quickly, supporting industries with urgent or customised shipping needs • Facilitating charter operations positions Johor as a responsive logistics hub capable of supporting time-sensitive sectors such as aerospace, electronics, and pharmaceuticals emerging in the Johor-Singapore Special Economic Zone • Boosting charter services could also attract specialised operators and promote the development of relate infrastructure such as private handling facilities and bonded warehouses at Senai International Airport
2 Integration with Specialised Cargo Handling Capabilities	• Developing specialised cargo handling infrastructure (e.g., cold chain for perishables, hazardous goods facilities, and valuable cargo security) ensures Johor can handle a wider variety of high-value and sensitive air freight efficiently • Integration with dedicated handling capabilities attracts high-growth sectors like pharmaceuticals, medical devices, and high-tech manufacturing, which are prioritised in Johor's economic planning
3 Enhance Air Logistics Infrastructure to Cater Future Demand	• With the introduction of the JS-SEZ and growing cross-border trade flows and business activities, Senai Airport should be upgraded to accommodate potential growth is logistics activities for high-growth sectors and capture Singapore spillover demand • Expanding cargo handling capacity at Senai Airport will reduce operational bottlenecks, enabling faster processing of shipments and higher throughput volume without compromising service quality

Source: PASB Analysis

As global supply chains grow increasingly complex, Johor should focus on attracting global distribution investments that leverage advanced smart logistics capabilities

Strategy 3:

Establish Smart Logistics Complexes (SLC) integrating cutting-edge technologies with real-time goods movement tracking

Position Johor as a competitive regional air logistics hub by upgrading infrastructure, expanding cargo handling capacity, and strengthening cold-chain and specialised logistics services to capture the rising demand from high-growth industries

E-commerce Market in Asia, 2024 – 2029
USD Billion

Zara Distribution Centre
Arteixo, Spain

Walmart Distribution Centre
Arizona, USA

Different Maturities of Automation

★☆☆ Basic Automation	★★☆ Semi Automation	★★★ Full Automation
• Warehouse Management System	• Automated Guided Vehicles	• AR/RS • Automated cranes

Large scale global distributions centres tend to be more automated and can achieve "lights-out" operations

Key Highlights

- The rapid growth of e-commerce, just-in-time manufacturing, and temperature-sensitive supply chains is accelerating the need for automated, data-driven logistics hubs across Asia
- Competitive land and operational costs, integrated road–sea–air connectivity, and proximity to Singapore position Johor as an ideal site for regional distribution hubs adopting automation and AI
- Leaders like Zara and Walmart have achieved significant efficiency gains using automated storage/retrieval systems, robotic picking, and AI-based inventory optimization, capabilities that Johor should attract to be based in the state
- Singapore-based distribution centres may relocate or expand backend operations to Johor to benefit from cost efficiencies and cross-border integration, paving the way for full regional distribution migration over time
- Johor can leverage JS-SEZ incentives to fast-track the development of Smart Logistics Complexes (SLCs) and attract leading logistics operators to the state

Sources: SCM Globe, Infios, PASB Analysis

Strengthening Johor's regional logistics position requires attracting global distribution hubs and leading logistics providers to deliver integrated, tech-driven supply chain solutions

Key Focus	Rationale
1 Global / Regional Distribution Hubs	• Attract multinational companies to establish regional and global distribution hubs in Johor, focusing on high-growth industries such as technology, pharmaceuticals and healthcare. These hubs will leverage Johor's competitive cost base, strategic location, and multimodal connectivity to serve Southeast Asia and beyond • Johor's proximity to Singapore offers cross-border integration opportunities and cost advantages that can entice companies to shift or expand regional hub operations in the state. Co-location with manufacturing facilities in Johor enables just-in-time supply chain integration and reduces transportation costs
2 Global Total Logistics Service Providers (3PL & 4PL	• Position Johor as a base for global pure-play logistics providers offering integrated, multimodal services across sea, air, road, and rail. Encourage the establishment of 3PL and 4PL headquarters or regional operations in Johor to manage complex supply chains for high-growth industries • Global logistics players are seeking scalable hubs in Southeast Asia to manage rising volumes from technology, automotive, and electronics manufacturing. 4PL providers can integrate and optimise multiple 3PL operations, delivering cost savings and efficiency gains • Having leading global logistics brands headquartered in Johor can enhance the state's reputation, attract complementary services, and create a competitive ecosystem for advanced logistics. Anchoring these providers in Johor strengthens linkages with ports, airports, and industrial parks, supporting integrated supply chain solutions

Source: PASB Analysis

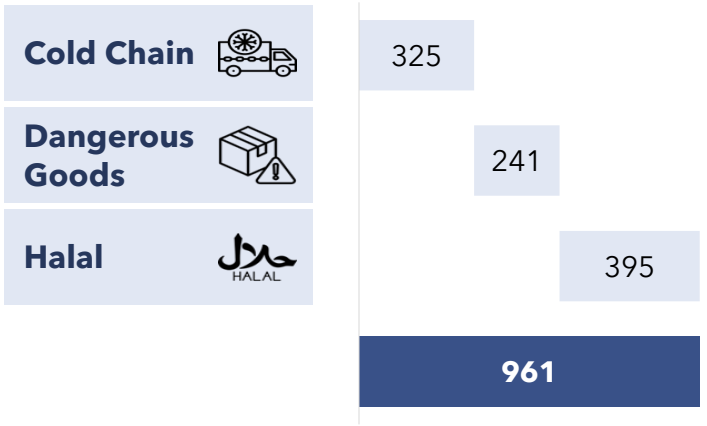
To position itself in high-value logistics, Johor must strengthen capabilities in the handling, storage, and transport of specialised goods

Strategy 4:

Develop capabilities in storage and transportation of special goods

Johor will focus on developing end-to-end capabilities in specialised logistics segments such as cold chain, hazardous materials, and halal-certified handling to capture growing global demand and carve a niche in high-value, compliance-driven supply chains

Global Specialised Handling Market, 2024
USD Billion



Cold Chain	Dangerous Goods	Halal
• Pharmaceuticals • Vaccines • Fresh produce	• Industrial Chemicals • Flammable Gases • Petrochemicals	• Halal Food Products • Nutraceuticals • Processed Meats

Key Highlights

- Global specialised handling market (i.e., cold chain, dangerous goods and halal) estimated at ~USD 961 bil and growing, enhancing capabilities in specialised goods handling can carve a niche for Johor's logistics industry
- **Cold Chain:** Global pharmaceutical and biologics growth is fuelling demand for temperature-controlled logistics. Johor can capitalise on this by investing in GxP-compliant infrastructure, especially with proximity to Singapore's biomedical hub
- **Dangerous Goods:** Chemical and petrochemical industries require strict regulatory handling and storage. Johor's strong industrial base presents an opportunity to lead in secure, certified logistics zones for hazardous materials
- **Halal Products:** With nearly 60% of the global Muslim population projected to be in Asia Pacific by 2030, Johor is strategically positioned to serve halal markets across ASEAN, India, Bangladesh, and the Middle East. Strengthening halal logistics infrastructure supports end-to-end Shariah-compliant supply chains

Sources: PASB Analysis

Developing its capability in transporting specialised goods, Johor can focus on cold chain, dangerous goods, and halal logistics to meet growing demand

Key Focus	Rationale
1 Cold Chain	• Johor's proximity to major FMCG, pharmaceutical, and seafood clusters creates strong demand for reliable temperature-controlled logistics to maintain product quality and safety • The growing preference for fresh, perishable food and temperature-sensitive pharmaceuticals in Malaysia and regional markets drives rapid expansion of the cold chain sector • Investing in advanced cold chain infrastructure positions Johor to capture increasing e-commerce and export opportunities, especially underpinned by government initiatives supporting integrated and sustainable logistics
2 Dangerous Goods	• Handling hazardous materials requires stringent safety, regulatory compliance, and specialised facilities, making focused development essential for attracting industries like chemicals, oil & gas, and pharmaceuticals • Establishing robust dangerous goods logistics capabilities improves Johor's competitiveness as a comprehensive multimodal hub able to serve diverse high-value industrial sectors • This sub-segment supports regional supply chains demanding secure, compliant transport of dangerous goods, which is vital for industrial and infrastructure projects growing in the area
3 Halal Goods	• Malaysia's status as a global Halal hub necessitates specialised logistics that uphold Halal certification standards throughout storage and transportation processes • Halal logistics integration with cold chain services is critical to maintain product integrity, particularly for meat and food products, reinforcing Johor's appeal to Halal food exporters and manufacturers • Strengthened Halal logistics capabilities help Johor capitalise on expanding Muslim consumer markets across Southeast Asia and beyond, supporting export growth and compliance demands

Source: PASB Analysis

With its well-established ecosystem, Johor evidently offers comprehensive logistics services across the value chain, with strong private sector participation

Logistics Services	Description and Service Offerings	Availability in Johor
Port and Terminal Services	Cargo handling, vessel berthing, and temporary storage to ensure smooth import/export flows and intermodal transfers	✓
Freight Forwarding	Coordinating shipments, customs clearance, and documentation across transport modes to streamline cross-border trade compliance	✓
Warehousing and Storage	Providing secure storage, inventory management to optimise stock availability and handling	✓
Transportation Services	Moving goods via road, rail, air, or sea, including last-mile delivery and multimodal logistics to connect global supply chains efficiently	✓
Contract Logistics	End-to-end supply chain outsourcing, integrating warehousing, transport, and technology for seamless client-vendor coordination	✓
Distribution and Fulfilment	Managing order processing, rapid delivery networks, and reverse logistics; Usually to meet e-commerce and retail demands	✓
Specialised Logistics Services	Handling unique cargo needs like temperature-sensitive goods, hazardous materials, or halal-certified products with compliance-driven protocols	✓
Other Services	Value-added services (packaging, quality check) and ancillary services (insurance, trade finance)	✓

Example Companies

NON-EXHAUSTIVE

PTP, JohorPort, SX GROUP, SenaiAirport, TLP Terminal (A JCORP Company), DIALOG, maskargo, MAERSK, DHL Group, teleport, Shopee, DB SCHENKER, TIONG NAM (www.tiongnam.com)

Source: PASB Analysis

As other key industries "move up the value chain" and global supply chains become more complex, Johor's logistics industry must also step up to support their growth

Different Types of Logistics Service Provider

As we move from left to right…

- Company has **lesser control** over their own supply chain and **outsources** logistics services more
- More **advanced technology integration and adoption**
- More catered to **larger enterprises** with increasingly **complex global supply chains**
- Johor logistics industry shall mature and cater to these players as we aim to "move up the value chain" in manufacturing sectors

1PL: First-Party Logistics

- Company **self-manages** goods transportation
- Generally, **no technology integration**
- Typically catered to **small-scale businesses** with minimal supply chain complexity

2PL: Second-Party Logistics

- **Outsourcing of transportation services** to logistics provider (i.e., in some instances, may include also storage services)
- **Minimal** technology integration
- Typically used by **manufacturers or exporters**

3PL: Third-Party Logistics

- 3PL company acts as the "middle-man" between company and customers and provides of **a range of logistics services** (e.g., warehousing, inventory management, order fulfilment, transportation)
- **Moderate** technology integration
- While typically used by **small / medium sized enterprises**, some large enterprises also utilise 3PL services

4PL: Fourth-Party Logistics

- 4PL companies are "strategic partners" and can **coordinate multiple 3PLs** and service providers to optimise the **end-to-end supply chain**
- **High** technology integration
- **Large enterprises** who want strategic oversight and end-to-end supply chain management

5PL: Fifth-Party Logistics

- **5PL optimises the full network integration** (streamlining of multiple supply chains into a "system") by leveraging advanced tech
- **High** technology integration, leveraging **advanced technologies** (e.g., AI, IoT, Big Data)
- **Large global / regional enterprises** and **e-commerce companies** with large-scale global networks

Source: PASB Analysis

Multiple anchor companies are currently present in Johor, covering key activities across the industry supply chain, offering strong potential for the state to further expand and deepen its value chain ecosystem

Existing Companies in Johor

NON-EXHAUSTIVE

Key Activities	Organisations	Description
Port and Terminal Services	PTP, JohorPort, SenaiAirport, TLP Terminal	• Cargo handling, vessel berthing, and temporary storage to ensure smooth import/export flows and intermodal transfers
Freight Forwarding, Warehousing, Distribution, Transportation and Special Goods Handling	maskargo, KTM, teleport, GDEX, ninjavan, TIONG NAM, MAERSK, SX GROUP, YCH, KUEHNE+NAGEL, DHL Group, FedEx, TASCO, Kontena Nasional, J&T Express, Yusen Logistics, UPS, NIPPON EXPRESS, DGP Logistics Sdn Bhd, DB SCHENKER, LESCHACO	• Moving goods via road, rail, air, or sea, including last-mile delivery and multimodal logistics to connect global supply chains efficiently • Providing secure storage, inventory management to optimise stock availability, handling, and distribution • Specialised management, storage, and transportation of temperature-sensitive goods • Ensure goods remain at controlled temperatures throughout supply chain (from production to consumption) • Specialised handling, storage, and transportation of goods that pose significant health, safety, property, environment risks • Management of supply chain activities (e.g., procurement, transportation, storage, and handling) that fully complies with Islamic Shariah law

Note: Most logistics players are total logistics providers that provide a range of services for various cargo types; The bucketing of organisations to respective segments are hence largely based on what the player is commonly known for

Source: PASB Analysis

To further develop the sector, Johor should aim to attract these companies to establish a well integrated logistics hub in the state

Potential Companies to Attract

NON-EXHAUSTIVE

Key Activities	Organisations	Description
Global / Regional Distribution Hubs (e.g., E-commerce, Retail)	Alibaba.com, Rakuten, amazon, Shopee, Lazada, KERRY LOGISTICS	Attracting these hubs involves developing advanced warehousing, customs clearance, last-mile delivery, and fulfilment infrastructure tailored for sector-specific supply chains. Focus should be on seamless multi-channel integration (omnichannel retail), real-time inventory management, and cross-border optimisation to serve both Malaysian and neighbouring markets efficiently
Global Total Logistics Service Providers	CEVA LOGISTICS, DB SCHENKER, SINOTRANS, UPS, KUEHNE+NAGEL	These providers orchestrate the design, integration, and operation of complex supply chains, often managing every stage from inbound transport to final-mile delivery. Activities include deployment of digital supply chain platforms, value-added logistics like postponement and custom packaging, tailor-made multimodal services, and risk management
Specialised Goods (e.g., Cold Chain, Dangerous Goods, Halal)	Lineage, BOLLORÉ LOGISTICS, NX NIPPON EXPRESS, DSV, Yusen Logistics	Development focuses on certified Halal logistics corridors, dedicated dangerous goods storage/handling zones, world-class temperature-controlled warehousing, and compliance-driven processes. Leveraging smart monitoring, regulatory standards, and advanced safety protocols ensures appeal to regulated, high-growth industries

Source: PASB Analysis

Tourism.

By 2030, Johor seeks to be a world-class destination for integrated sustainable tourism, with a focus on high-value activities and a stronger cultural identity

Sectoral Vision:

A welcoming world-class destination for integrated sustainable tourism

Sectoral Strategy:

Strategy 1:

Elevate sustainable eco-tourism through luxury branded accommodation

Strategy 2:

Attract business tourists and seize MICE demand

Strategy 3:

Develop Johor into a premier medical and wellness tourism destination

Strategy 4:

Enhance maturity of urban and retail landscape

Strategy 5:

Strengthen Johorean identity through sports and events

Blessed with abundant natural heritage, Johor is well-positioned to make eco-tourism a key pillar of its tourism offerings

Strategy 1:

Elevate sustainable eco-tourism through luxury branded accommodation

Position Johor as a premier sustainable ecotourism destination by developing high-end accommodations near key natural attractions, combining premium hospitality with strong environmental stewardship

Ecotourism Assets in Johor

NON-EXHAUSTIVE

Key Highlights

- Johor boasts some of Peninsular Malaysia's best ecotourism assets such as Endau-Rompin National Park, the Mersing archipelago, and Desaru's beaches which should be strategically leveraged to attract more international tourists
- With rising demand for nature-based and lesser-known destinations, Johor can capture the growing ecotourism segment by:
  - Develop integrated luxury resorts near ecotourism sites, with proper environmental safeguards
  - Improve connectivity and accessibility to remote nature attractions
  - Unlock Mersing's potential as a world-class ecotourism destination—similar to the Maldives—by attracting high-end resort investments beyond current options like Rawa Island and Batu Batu
  - Roll out targeted international sales and marketing campaigns to promote Mersing and other ecotourism gems in the state

Sources: PASB Analysis

In expanding its eco-tourism offerings, Johor can focus on wellness retreats, glamping resorts, elevated retreats, and beach resorts to enhance the state's appeal

Key Focus	Rationale
1 Elevated Wellness Retreats	• Wellness tourism is a growing global trend, and Johor's pristine rainforests and coastal landscapes offer an ideal setting for premium wellness retreats. With proximity to Singapore and strong air connectivity to other APAC hubs, Johor can attract affluent visitors seeking immersive nature-based healing, spa therapies, yoga retreats, and holistic wellness experiences • Leveraging assets such as Gunung Ledang and Endau-Rompin, retreats can combine natural beauty with curated wellness programs, appealing to both international and domestic high-end markets
2 Luxury Glamping Resorts Eco-resorts	• Johor's untouched beach, island, and forest locations particularly in Mersing, Pulau Rawa, and Pulau Tengah are ideal for premium glamping and eco-resorts • These developments can cater to both weekenders from Singapore and long-haul eco-travelers, offering a blend of luxury comforts with sustainable practices such as solar energy, rainwater harvesting, and minimal land disturbance. Beyond tourism revenue, such projects can generate jobs and foster entrepreneurship in surrounding rural communities
3 Rainforest Canopy and Elevated Retreats	• Rainforest canopy retreats in areas like Endau-Rompin or Gunung Lambak can offer unique, elevated accommodations with panoramic views, providing guests with a distinctive "above-the-trees" experience • Designed with minimal ecological footprint, these retreats allow visitors to enjoy biodiversity and bird-watching while preserving ground-level habitats. Such high-value experiences appeal to niche, premium markets seeking exclusive, nature-immersive stays that cannot be replicated in urban settings
4 Luxury Beach Resorts	• Johor's idyllic beaches and island clusters, such as the Mersing archipelago and Desaru Coast, present strong potential for high-end beach resorts targeting affluent regional travelers • With integrated offerings—luxury villas, private beaches, marine-based activities, and eco-conscious operations, Johor can position itself as a premium alternative to destinations like the Maldives or Phuket. These resorts can tap into a steady flow of visitors from Singapore and beyond, supported by targeted international marketing and enhanced sea/air connectivity

Source: PASB Analysis

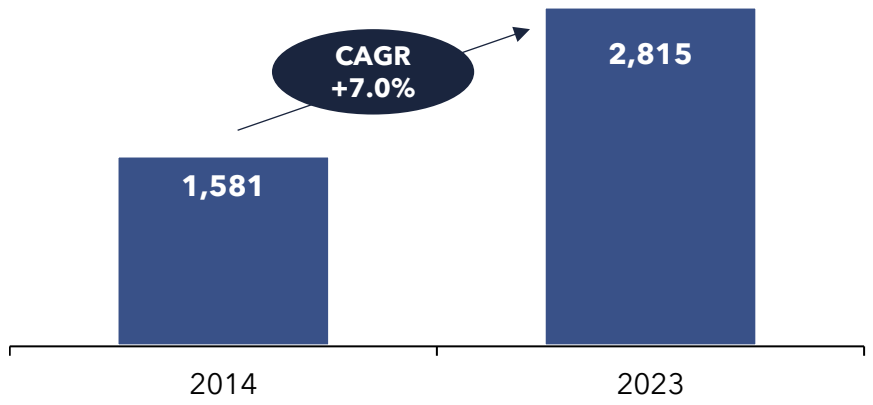
As one of Malaysia's largest state economies, Johor should leverage its strategic location and infrastructure to capture the growing demand for high-value MICE tourism

Strategy 2:

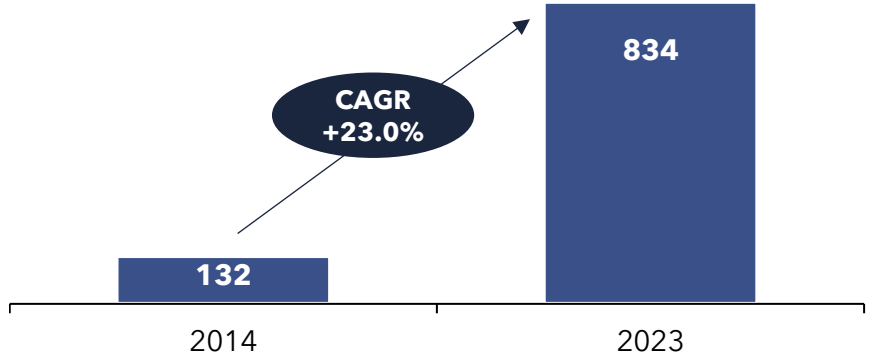
Attract business tourists and seize MICE demand

Position Johor as a competitive MICE hub by upgrading conference infrastructure, boosting international promotion, and tapping Singapore's spillover to attract high-spending business travelers, large-scale events, and "bleisure" tourism

Malaysia Est. Economic Impact (EEI) from Business Events
RM Million



Malaysia Estimated Total Delegates, 2014 – 2023
Thousands



Key Highlights

- Malaysia has achieved an EEI of RM2.8bil in 2023 (8% above 2019 figures) with a CAGR of 7%
- This is driven by:
  - Significant government and private sector investment in MICE infrastructure
  - Stronger strategic marketing and international positioning (e.g., proactive participation in international MICE trade shows)
- Johor could consider upgrading MICE infrastructure and ramp up targeted promotion and marketing for MICE tourism:
  - Global MICE industry expected to double over the next decade and Asia-Pacific as a fast-growing market
  - Capitalise Singapore's MICE spillover demand
  - "Bleisure" tourists segment to grow going forward and tend to spend at least twice the amount of leisure tourists, has greater willingness to pay

Sources: MyCEB, PASB Analysis

Expanding Johor's MICE capabilities requires a holistic approach that captures opportunities across all MICE segments

Key Focus	Rationale
1 **Meetings**	• Johor's upgraded convention centres and resort facilities provide cost-effective, accessible locations for corporate meetings, especially appealing to companies from nearby Singapore, Kuala Lumpur, and ASEAN countries. This segment helps build steady demand for hotel and service providers year-round and supports Johor's emerging position as a regional business destination
2 **Incentives**	• Johor's attractive luxury beach resorts (e.g., Desaru Coast), ecotourism offerings, and cultural heritage sites create compelling incentive travel experiences. Proximity to Singapore and improving connectivity (highways, ferry, and Senai Airport) make Johor an accessible, affordable alternative for incentive groups seeking leisure and recreation combined with business activities
3 **Conferences**	• Johor's strategic location near Singapore and Malaysia's industrial zones supports hosting regional conferences, especially for sectors like manufacturing, education, and technology. The state's growing infrastructure—hotel rooms, convention centres, and transport links—positions it as a competitive alternative for mid-sized conferences, relieving congestion from Kuala Lumpur and complementing national MICE growth
4 **Exhibitions**	• While Johor's current exhibition infrastructure is developing, there is strong potential given its industrial base and burgeoning economic zones to host sector-specific trade fairs (e.g., manufacturing, halal products, logistics). This segment facilitates business-to-business linkages, investment promotion, and drives substantial visitor spending across accommodation, F&B, and local tourism activities, contributing to the broader economic ecosystem

Source: PASB Analysis

Leveraging its strategic location and extensive network of private hospitals, Johor can position itself as a premier medical and wellness tourism destination

Strategy 3:

Develop Johor into a premier medical and wellness tourism destination

Leverage Johor's strategic location, advanced healthcare capabilities, and competitive treatment costs to attract international patients from Singapore, Indonesia, and the wider region

Quick Facts on Medical Tourism, 2023

Malaysia

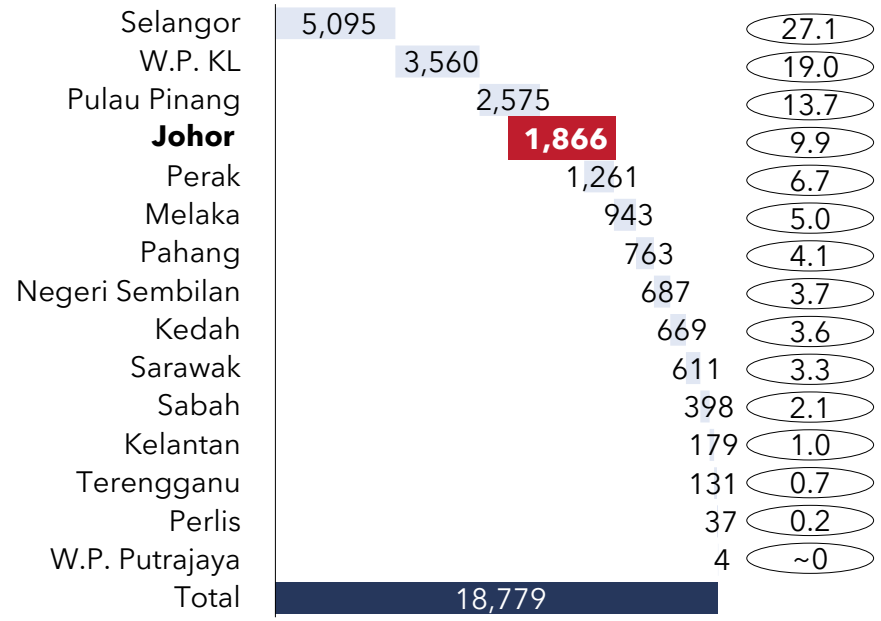
RM1.7bil
Malaysia Medical Tourism Revenue

1.1mil
Malaysia Medical Tourists

Johor

RM143mil
Johor Medical Tourism Revenue

Beds in Private Hospitals in Malaysia by State, 2023



Key Highlights

- In 2023, 1.1 million individuals travelled to Malaysia for healthcare, generating RM1.7 billion. Medical tourism revenue grew faster than tourist numbers (9% vs. 2% CAGR), indicating higher average spend per patient
- Malaysia's success as a medical tourism hub is driven by:
  - Advanced medical standards and technology
  - Cost-effectiveness (3–4 times cheaper than other developing countries)
  - Strategic location and cultural compatibility
  - Integration of treatment with tourism experiences
- Johor contributed RM143 million (~8% of Malaysia's medical tourism revenue) in 2023
- Despite having the 4th highest number of private hospital beds, its 95% occupancy rate signals high demand but growth constraints due to limited capacity—addressable through new private hospital investments
- Johor's strengths include proximity to Indonesia and Singapore (ferry connectivity) and affordability compared to neighbouring countries

Sources: Statista, PASB Analysis

Johor can target multiple segments of medical tourism to build a competitive edge and establish itself as the region's premier medical and wellness destination

Key Focus	Rationale
1 Advanced Elective Surgery	• Johor's leading private hospitals have invested in cutting-edge facilities and medical expertise. These high-demand elective procedures are often less expensive than in neighbouring Singapore or Australia, attracting international patients seeking affordable, quality care. Elective surgeries are a primary driver of inbound medical travel throughout Southeast Asia, offering strong revenue and branding opportunities for Johor
2 Cosmetic and Aesthetic Medicine	• Malaysia is recognised as a regional leader for safe, high-standard cosmetic treatments at competitive prices. Johor's proximity to Singapore and Indonesia, coupled with its growing portfolio of accredited clinics, positions it to serve affluent clients seeking privacy, luxury, and post-treatment recuperation in resort-like environments
3 Fertility and Reproductive Health (IVF Centres)	• With rising fertility tourism from China, Singapore, and Indonesia, Johor's specialised centres offer high success rates and regulatory flexibility compared to many origin countries. Fertility treatment demand is steadily increasing, and Johor's lower costs, English-speaking practitioners, and location near Singapore make it a compelling option
4 Wellness, Health Screening & Preventive Medicine	• Johor's hospitals offer world-class health screening using modern diagnostic technology, often at a fraction of Singaporean prices. Combining wellness, relaxation, and hospitality (hotels, resorts) appeals to health-conscious expatriates and regional travellers who seek integrated medical-wellness "retreat" experiences

Source: PASB Analysis

As one of Malaysia's most vibrant cities, Greater Johor Bahru is well-positioned to promote urban tourism by leveraging its thriving retail landscape

Strategy 4:

Enhance maturity of urban and retail landscape

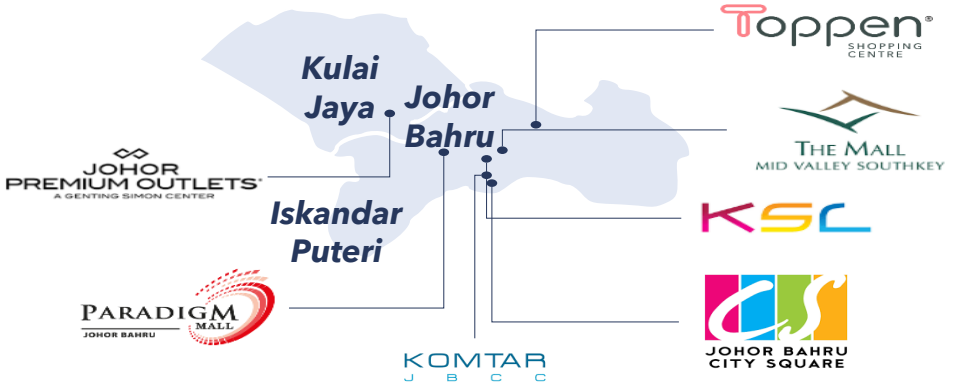
Elevate Greater Johor Bahru's status as a dynamic metropolis by enhancing urban infrastructure, expanding premium retail spaces, and creating iconic shopping districts that attract global brands and boost tourism spend

Asia-Pacific Best Cities by Ranking, 2025

Johor Bahru

29th	6th	2nd
best city in Asia Pacific	best city in ASEAN	best city in Malaysia

Major Retail Attractions in Greater Johor Bahru



Key Highlights

- Johor Bahru ranks 29th among Asia-Pacific cities and 5th in ASEAN, behind only Singapore, Bangkok, Kuala Lumpur, Jakarta, and Hanoi
- Johor Baru's strong industrial and retail sectors, bolstered by the Iskandar Malaysia Project, are transforming the region into a global metropolis, while attractions such as Johor Premium Outlets and Legoland Malaysia Resort continue to drive tourism
- While Johor Bahru has a relatively desirable ranking, there is still an opportunity for improvement and consider continuous urban rejuvenation
- While Johor has healthy and diverse retail landscape, state currently does not have dedicated shopping district offering a consolidated, luxury retail experience; Johor can learn from:
  - Singapore: Orchard Road
  - Hong Kong: Causeway Bay
  - Kuala Lumpur: Bukit Bintang
- A vibrant shopping district boosts footfall, enhances global recognition, and can position Johor Bahru as a dynamic metropolis

Sources: Resonance Consultancy, PASB Analysis

Johor can elevate Greater Johor Bahru by driving strategic developments that attract tourists and enhance the city's liveability

Key Focus	Rationale
1 Urban Residential and Mixed-Use Development	• Such developments meet rising demand from Malaysia-Singapore commuters, local residents, and foreign investors, creating vibrant urban precincts that support sustainable growth and reduce traffic congestion through transit integration • By blending residential living with retail, wellness, and education hubs, Johor enhances urban vibrancy, attracts talent, and increases the city's appeal as a regional economic gateway, complementing the Johor-Singapore Special Economic Zone (JS-SEZ) initiative
2 Retail and Lifestyle Hub Enhancement	• Diversified retail experiences addressing evolving consumer preferences—such as experiential retail, food and beverage clusters, and niche lifestyle offerings—help Johor retain spending locally and boost tourism-related economic activity • Strengthened retail and lifestyle hubs contribute to longer visitor dwell times, higher retail revenues, and improved quality of life, thus reinforcing Johor's competitive urban position within the Iskandar Malaysia region
3 Strategic Landmarks	• Strategic landmark developments elevate Johor's cityscape, improve place-making, and create visually distinctive urban experiences that differentiate the state as a destination for business, tourism, and lifestyle • These focal points bolster civic pride and attract international and regional visitors, supporting broader economic objectives such as MICE tourism and retail spending, while fostering sustainable urban development with integrated green and public spaces

Source: PASB Analysis

Enhancing tourism in Johor goes beyond infrastructure and luxury resorts but it requires creating compelling reasons for tourists to visit the state

Strategy 5:

Strengthen Johorean identity through sports and events

Position Johor as a premier sports and events destination with a year-round calendar of high-profile tournaments, festivals, and cultural showcases, leveraging its unique identity, world-class venues, and strategic location to attract international visitors and boost tourism spending

Major Sporting and Live Events in Johor

NON-EXHAUSTIVE

Football Events
Events like Malaysia Super League, AFC Champions League Elite, Malaysia Cup and Malaysia FA cup attracts tens of thousands of spectators

Ironman
Major international triathlon event held annually in Desaru Coast, attracting over 1,000 athletes globally

Johor International Boxing Championship
A high-profile boxing event featuring elite fighters from Asian countries, sanctioned by the WBC and the Malaysia Professional Boxing Federation

Ombak Festival
Luxurious weekend getaway filled with music, arts, culture, family-friendly activities and culinary experiences

Key Highlights

- Johor organises many events and festivals, prioritising international events can solidify its image and identity as a vibrant global destination
- Importance of events and festivals for Johor's tourism industry:
  - Sustainable and consistent tourist arrivals: Well-planned events calendar throughout the year ensures healthy and sustained tourist inflows
  - Economic impact: Tourist spending on accommodation, F&B, transportation, shopping can benefit MSMEs and beyond
  - Branding and perception: Events help position destinations as vibrant, culturally rich, and attractive, differentiating them from competitors
- Global examples, such as Brazil's Rio de Janeiro Carnival—dubbed "the greatest party on planet earth" and projected to generate R$5.7 billion (~RM4.3 billion) for Rio's economy in 2025—illustrate the scale of economic and branding impact Johor could aim to replicate

Sources: The Rio Times, PASB Analysis

Johor should curate high-profile events that draw local and international visitors, boosting tourism spending and strengthening its competitiveness among regional destinations

Key Focus	Rationale
1 Sports Events	• Johor is developing world-class sports infrastructure, such as the Sultan Ibrahim Stadium, and hosting diverse events to position itself as a regional sports tourism hub. High-profile and participatory events boost tourist arrivals, hotel occupancy, and local businesses while promoting healthy lifestyles • Leveraging these events supports "Visit Johor Year" and regional MICE growth, encouraging longer stays and higher spending. Expanding event scale and variety can further enhance international visibility, diversify visitors, and strengthen partnerships with sports organisations
2 Music Festivals	• Music festivals attract diverse demographics, especially younger travellers, increasing off-peak visitation and generating substantial economic impact across hospitality, F&B, and retail sectors • Johor's proximity to Singapore and accessibility via major transport links create a strategic advantage for regional festival organisers seeking new vibrant locations
3 Cultural Events	• Cultural events deepen visitor connection, support community pride, and diversify the tourism offering beyond natural and leisure attractions • Growing interest in authentic cultural experiences among regional tourists and expatriates calls for expanded, professionally curated cultural events
4 Gastronomy / Culinary Experiences	• Positioning Johor as a culinary destination encourages repeat visits and cross-promotion with other tourism subsegments like cultural and wellness tourism • Greater investment in food festivals and high-quality culinary marketing can tap into rising demand among domestic and international travellers for authentic, experiential dining

Source: PASB Analysis

Tourist journey roadmap reveals potential focus areas along each touchpoint[1]

	Tourism Promotion and Marketing	Entry / Exit Points and Transportation	Accommodation	Urban Tourism	Tourism Niches / Sub-segments
Description	**Activities:** • Targeted tourism promotion and marketing via offline and online channels **Focus areas:** • Improve websites and develop high-quality content • Increase social media presence via influencer collaboration • Utilise SEO to improve Johor's visibility	**Activities:** • Immigration and customs clearance • Public transportation • E-hailing **Focus areas:** • Land: Improve border crossing productivity via digitalisation, capacity expansion, new causeways, RTS; Improve public transportation services • Air: Improved air connectivity • Sea: International cruise ships berth in major Johor seaports	**Activities:** • Accommodation and hospitality services • Recreational facilities • Wellness and spa **Focus areas:** • Premium / Luxury accommodations with strong international presence	**Activities:** • Landmark tourism • Cultural and historical experiences • Retail experiences • F&B **Focus areas:** • Rejuvenate city with prominent landmarks and high walkability • Transform retail and F&B landscape – Premium / luxury malls – Large-scale duty-free complexes – Gastronomic hubs	**Activities:** • Immersive experiences • Corporate meetings and events • Medical treatments and packages • Events and festivals **Focus areas:** • Ecotourism / Cultural tourism • MICE tourism • Medical and wellness tourism • Sports tourism • Events
Stakeholders	TOURISM JOHOR MINISTRY OF TOURISM, ARTS & CULTURE MALAYSIA	MMC SenaiAirport PAJ prasarana	Hilton HOTELS & RESORTS Amari RENAISSANCE HOTELS thistle KSL HOLDINGS BERHAD SUNWAY HOTELS & RESORTS	JCORP Johor Corporation WCT JOHOR PREMIUM OUTLETS IGB BERHAD JOHOR BAHRU CITY SQUARE KOMTAR JBCC IKANO	ISKANDAR INVESTMENT DESARU COAST MALAYSIA THE WESTIN DESARU COAST RESORT ANANTARA DESARU COAST RESORT & VILLAS JOHOR NATIONAL PARKS EduCity Iskandar Malaysia Hard Rock HOTEL DESARU COAST One&Only DESARU COAST Malaysia SUNWAY KPJ

Note: [1]Non-exhaustive
Source: PASB Analysis

Multiple anchor companies are currently present in Johor, covering key activities across the industry supply chain, offering potential to expand and deepen its value chain ecosystem

Existing Companies in Johor

NON-EXHAUSTIVE

Key Activities	Organisations	Description
Transportation	Causeway Link, PAJ, Grab, prasarana, SenaiAirport	Key private sector players involved in providing air, land, rail, and logistics transport services that connect Johor locally and internationally, facilitating efficient movement of tourists
Accommodation	Hilton Hotels & Resorts, thistle, Sunway Hotels & Resorts, Amari, KSL Holdings Berhad, Renaissance Hotels	Includes hotels, resorts, and serviced apartments catering to a range of guest preferences from budget to luxury
Retail	WCT, IGB Berhad, Johor Premium Outlets, Ikano, Komtar JBCC, Johor Bahru City Square	Comprises shopping malls, premium outlets, lifestyle centres, and local markets offering diverse retail, dining, and entertainment experiences that attract both local consumers and regional visitors, boosting Johor's urban vibrancy
MICE Tourism	Persada Johor, Berjaya Waterfront Johor Bahru, Tourism Johor, Invest Johor	Covers meeting, incentive travel, conferences, and exhibitions facilitated by convention centres, hotels, and event organisers
Medical and Wellness Tourism	KPJ Healthcare, Columbia Asia, Gleneagles Hospitals	Comprises private hospitals, specialised clinics, wellness retreats, and spas delivering healthcare and wellness services
Sports Tourism and Events	Tourism Johor	Includes hosting of competitive sports events, recreational activities, sports training camps, and related events

Source: PASB Analysis

To further develop the sector, Johor should aim to attract these companies to establish a world-class tourism hub in the state

Potential Companies to Attract

NON-EXHAUSTIVE

Key Activities	Organisations	Description
Luxury Accommodation	Four Seasons, St Regis, Shangri-La Hotels and Resorts, Hilton, Āman, Marriott Hotels · Resorts · Suites	Development and operation of high-end hotels, resorts, and serviced residences offering premium hospitality services, exceptional comfort, and exclusive experiences targeting affluent travellers and business tourists
Healthcare and Wellness Services Providers	Sunway, Prince Court Medical Centre, Thomson Medical	Providers of internationally accredited medical, wellness, and rehabilitative services including private hospitals, specialised clinics, and integrated wellness centres catering to medical tourists and health-conscious visitors
Luxury / Upscale Retail Experiences	CapitaLand, IOI Group, Sime Darby, Genting	Development and management of premium shopping malls and lifestyle retail precincts that offer high-quality brands, dining, entertainment, and experiential retail targeted at tourists, expatriates, and affluent locals

Source: PASB Analysis

Agriculture.

By 2030, Johor seeks to position itself as Malaysia's hub for food security for key crops and livestock, accelerating adoption of agri-tech for productivity and high-value activities

Sectoral Vision:

Positioning Johor as Malaysia's hub for food security and premium agri-exports through sustainable and advanced agritech

Sectoral Strategy:

Strategy 1:

Leveraging advanced agritech and robotics across R&D, plantation, and distribution by both large and small industry players

Strategy 2:

Boosting the production of premium agro based specialties through expanded high-value downstream activities and innovative plantation techniques

Strategy 3:

Accelerating sustainable farming and circular economy practices through waste-to-value innovation and low-carbon agri-energy solutions

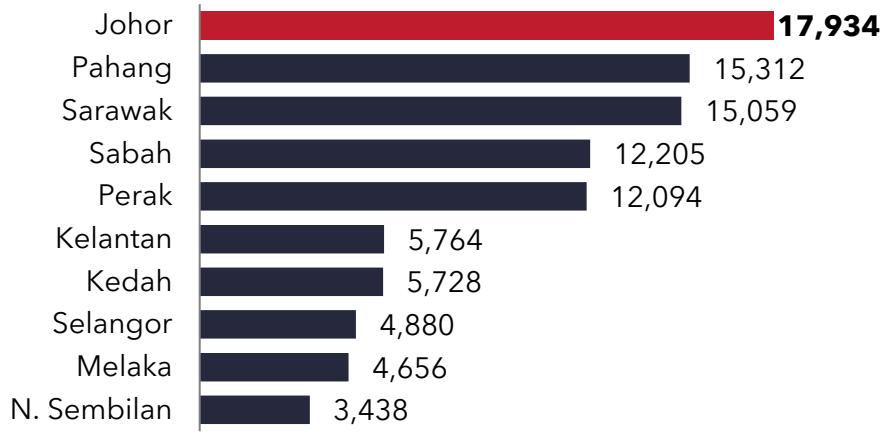
As the largest contributor to Malaysia's agricultural GDP, Johor should enhance productivity by adopting advanced agritech and robotics to achieve greater efficiency and higher yields

Strategy 1:

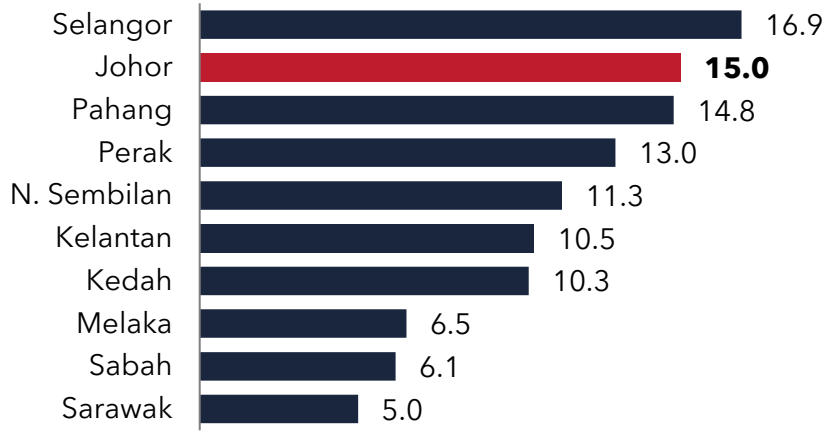
Leveraging advanced agritech and robotics across R&D, plantation, and distribution by both large and small industry players

Johor's strong agricultural base provides a solid platform to accelerate agritech and robotics adoption. Leveraging automation, IoT monitoring, AI-driven crop analytics, and precision farming can boost productivity, reduce labour reliance, and improve product quality

Agriculture Sector GDP by States (Top 10), 2024
RM Million



Fruits, Vegetables & Cash Crops Productivity by States
(Production per hectare) Mt / Ha



Key Highlights

- Johor recorded the highest agriculture GDP in Malaysia in 2024 at RM17.93 billion, representing 17.3% of the total national agricultural GDP
- However, in terms of productivity, measured by the output of fruits, vegetables, and cash crops per plantation area, Johor ranked second at 15.0 Mt/Ha, closely trailing Selangor's 16.9 Mt/Ha
- Johor's diverse crop portfolio, including pineapples, oil palm, vegetables, and aquaculture provides strong testbeds for agritech and robotics applications
- The presence of leading R&D institutions such as UTM, along with initiatives by FarmByte supports innovation in automation, IoT-enabled farming, and AI-driven crop analytics
- Leveraging advanced agritech can enhance productivity, reduce labour dependency, improve quality consistency, and strengthen Johor's competitiveness in domestic and export markets

Sources: DOSM, PASB Analysis

With its strong agricultural foundation, Johor is well-positioned to serve as a testbed for advanced technologies, such as AI, to boost productivity

Key Focus	Rationale
1 Autonomous Field-Service Hubs	• Regional hubs equipped with fleets of drones, autonomous tractors, and robotic harvesters could be booked "on demand" by surrounding farmers. Operated in partnership with large plantations, technology providers, and cooperatives, these hubs would provide precision spraying, planting, and harvesting services, while collecting real-time data to drive continuous improvement • This approach enables smallholders to access advanced machinery without high upfront costs, boosts yields by while reducing fertiliser and pesticide use, spreads capital investments across multiple farms for greater cost efficiency, and channels sensor and imaging data into R&D to improve seed varieties, nutrient plans, and pest management
2 AI-Driven Crop Health & Yield Analytics	• Deploy drones, ground sensors, and satellite imaging integrated with AI to monitor crop health, detect pests and diseases early, and forecast yields • The system would be accessible through cooperatives or subscription services, enabling early intervention to reduce crop losses and minimise pesticide use. Accurate yield forecasts would also improve harvest planning and market matching
3 All-in-One Smallholder Tech Platform	• A digital platform linking smallholders to shared machinery, buyers, agronomists, and financing. It aggregates produce volumes, schedules equipment use, and offers AI-driven agronomic advice • By pooling volumes, smallholders can meet minimum lot sizes for higher-value markets and diversify beyond oil palm. AI analytics assess creditworthiness to unlock micro-loans for inputs, replanting, and mechanisation. End-to-end traceability builds buyer trust and supports premium export pricing, while promoting crop diversification and resilience to market shifts

Source: PASB Analysis

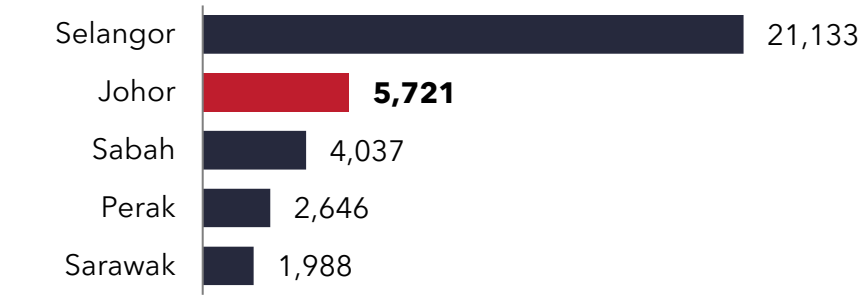
Additionally, Johor should also boost premium agro production by advancing high value-added downstream activities to capture greater market value

Strategy 2:

Boosting the production of premium agro based specialties through high-value downstream activities and innovative plantation techniques

Johor to accelerate the development of high-value agro-based specialties by leveraging its strong downstream hubs and innovative plantation techniques to capture more value per unit of output and strengthen its position as a leading regional agro-export hub

Agro-Processing GDP by States (Top 5), 2023
RM Million



Where Johor already has an edge

Palm Oil Downstream Hub
IOI Oleo Pasir Gudang is the world's largest single-location vertically integrated palm oil refinery and oleochemical complexes

Jemaluang Dairy Valley (JDV)
A 275-hectare integrated dairy cluster targeting an annual output of ≈ 5.4 million litres of fresh milk, aiming to boost national supply by ≈ 10%

FarmByte × Archisen Smart Indoor Vertical Farm
A 52,000 sq ft climate-controlled facility producing ~306 ton of vegetables annually via zero-pesticide hydroponics

Key Highlights

- Johor, despite being the largest contributor to national agricultural GDP, ranked second in agro-processing GDP in 2023 at RM5.72 billion, far behind Selangor's RM21.1 billion
- With its strong agricultural base, Johor can leverage this foundation to expand premium agro-based products and capture greater value through deeper downstream activities
- The state hosts IOI Oleo Pasir Gudang, the world's largest single-location palm oil refinery and oleochemical complex; Jemaluang Dairy Valley, set to produce 5.4 million litres of fresh milk annually and boost Malaysia's dairy self-sufficiency by ~10%; and the FarmByte × Archisen Smart Indoor Vertical Farm, producing ~306 tonnes of premium, pesticide-free vegetables annually
- Johor's established downstream infrastructure and innovative farming techniques position it well to scale premium agro-based products for higher-value export markets

Sources: DOSM, PASB Analysis

Leveraging its agricultural strengths, Johor can focus on strategic, high-potential products and boost premium production through value-added downstream activities

Key Focus	Rationale
1 Premium Pineapple & Tropical Fruit Processing Hub	• Develop an integrated processing hub to handle fresh MD2 pineapples and other tropical fruits for export, alongside facilities for bromelain extraction, juice concentrate production, and pineapple-leaf fibre (PALF) processing for textiles and biocomposites • Leverages Johor's ~66–68% share of Malaysia's pineapple cultivation and high-yield MD2/MS16 varieties. Bromelain and PALF offer margins 3–5× higher than raw fruit exports
2 Oleochemical & Specialty Fats Expansion (Palm Oil)	• Move beyond basic refined oils to higher-value derivatives such as esters, surfactants, green solvents, and RSPO-segregated specialty fats for food, personal care, and industrial use • Builds on IOI Oleo Pasir Gudang's position as the world's largest single-location oleochemical complex. Higher-value products offer greater price stability and demand resilience than bulk crude palm oil
3 Dairy & Specialty Milk Product Development	• Expand Jemaluang Dairy Valley's capacity into downstream processing for cheese, yoghurt, UHT milk, and functional dairy products (e.g., high-protein, lactose-free) • Increases value capture from raw milk, which currently accounts for a small share of retail dairy prices. Supports Malaysia's dairy self-sufficiency while developing exportable premium dairy lines
4 Controlled-Environment & High-Value Crop Clusters	• Establish more greenhouse and vertical farming clusters for premium herbs, leafy greens, berries, and exotic vegetables, equipped with climate control, LED lighting, and automated fertigation • Enables year-round, pesticide-free production with yields up to 10–15× conventional acreage. Supports import substitution (reducing reliance on air-freighted produce) and rapid supply to Singapore within 4 hours

Source: PASB Analysis

Johor should accelerate sustainable farming practices to improve the marketability of its agricultural products while capturing additional value through circular economy initiatives

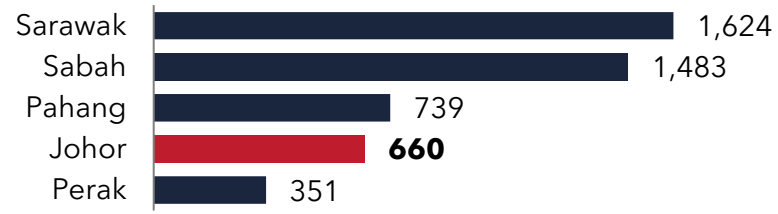
Strategy 3:

Accelerating sustainable farming and circular economy practices through waste-to-value innovation and low-carbon agri-energy solutions

Johor to drive sustainable farming and circular economy practices by converting agricultural residues into high-value products and low-carbon energy, while expanding certified sustainable farms to strengthen export competitiveness.

Johor Circular Economy Potentials

Palm Oil Planted Areas by States (Top 5), Hectares '000:



JPG Biomethane Gas Plant
Located in Sedenak, JPG biomethane gas plant converts palm-oil-mill effluent (POME) into biomethane, also known as renewable natural gas. The gas plant is expected to to produce a capacity of up to 676,000 MMBtu and generate a gross profit margin of 40% to 50% per year

Sustainable Farming Practices in Johor

MyGap Certified Farm in Johor
Johor now has 1,924 certified farms, up 24% in 2023. This gives Johor the strongest base of third-party-audited "safe and sustainable" crop producers for premium and export supply chains

Key Highlights

- Johor is Malaysia's fourth-largest oil palm state, with 660,000 hectares planted, offering substantial potential for biomass and POME-to-energy initiatives
- The JPG biomethane gas plant in Sedenak showcases how abundant oil palm residues can be transformed into renewable energy, creating tangible value for industry players
- Looking ahead, Johor can expand biogas, biofertiliser, biochar, and biomass pellet production to cut emissions, enhance resource efficiency, and unlock new commercial opportunities across the agricultural value chain

Key Highlights

- Johor has 1,924 MyGAP-certified farms as of 2023, up 24% year-on-year, giving it Malaysia's strongest base of audited "safe and sustainable" crop producers
- Certification growth positions Johor as a leader in sustainable agriculture for both domestic and export supply chains.

Sources: State Agricultural Department, JPG, PASB Analysis

Johor can unlock greater value from the circular economy by establishing dedicated hubs and advancing sustainable farming through recognised certifications

Key Focus	Rationale
1 Circular Bio-Economy Hubs	• Develop integrated hubs around major palm oil, dairy, and aquaculture clusters to convert agricultural residues into high-value products such as biogas, biomethane, biofertilisers, and compost. Facilities will co-locate with mills and farms to minimise logistics costs and maximise feedstock utilisation • Build on the existing success of the JPG biomethane gas plant in Sedenak and scale similar initiatives across Johor to capture more value from the state's abundant agricultural residues. Co-location with palm oil mills, dairy farms, and aquaculture sites reduces feedstock transport costs and improves processing efficiency
2 Full EUDR & ESG Compliance for Palm-Oil Exports	• Fast-track compliance for Johor's palm oil producers with the EU Deforestation Regulation (EUDR) and sustainability certifications (RSPO, ISCC). Deploy geolocation traceability systems and collective certification schemes to protect market access and secure premiums • EU imports >RM4 billion of Malaysian palm oil; EUDR cut-off dates post-2025 could impose penalties of up to 4% turnover for non-compliance. Only 16% of Malaysia's planted area is RSPO-certified—scaling Johor's share rapidly is the quickest way to retain EU market access
3 Mass-Scale Farm Certifications	• Expand Johor's network of MyGAP-certified farms and promote adoption of other sustainability standards for fruits, vegetables, aquaculture, and livestock. Provide financial incentives, aggregated audits, and technical support to accelerate uptake among smallholders • Johor has 1,924 certified farms (2023), up 24% YoY—momentum that can be scaled to cover >10% of cropland by 2026. Certification unlocks export premiums and access to finance; banks already offer better lending rates for certified growers

Source: PASB Analysis

Johor's agriculture sector is comprehensive covering all aspects of the value chain needs stronger focus on high-value midstream and downstream activities to capture greater economic returns

Value Chain of Agriculture Sector

Upstream	Midstream	Downstream
Production & Farming	**Processing & Value Addition**	**Distribution & Market Access**
Palm Oil: • **Land Preparation & Crop Management:** Select high-yield seedlings, optimize layouts, and apply fertilization and pest control • **Harvesting & Collection:** Use mechanized tools for efficient FFB harvesting and reduced labour dependency **Fruits & Vegetables:** • **Orchard Preparation & Management:** Condition soil, plant suitable tree varieties, and regulate water usage with smart irrigation • **Harvesting & Sorting:** Use AI-driven disease detection, pick fruits at peak ripeness, and sort them for quality and post-harvest handling	**Palm Oil:** • **FFB Processing & Oil Extraction:** Move harvested fresh fruit bunches to mills for sterilization, stripping, and crude palm oil (CPO) extraction • **Refining & Packaging:** Process CPO into derivatives like oleochemicals and biodiesel, then pack products for distribution **Fruits & Vegetables:** • **Sorting & Storage:** Classify produce by size and ripeness, then use cold chain logistics to maintain freshness • **Processing & Value Addition:** Extract juices, dry fruits, and prepare jams or canned products for retail • **Packaging:** Pack fruits & vegetables using biodegradable smart packaging to maintain freshness and reduce waste	**Palm Oil:** • **Distribution & Retail:** Transport crude and refined palm oil to wholesalers, refineries, and global markets • **Industrial Supply & Manufacturing:** Provide palm oil derivatives for food, cosmetics, and biofuel industries **Fruits & Vegetables:** • **Wholesale & Export:** Supply fresh fruits to supermarkets, wet markets, and global markets with blockchain traceability for authenticity • **E-Commerce & Direct Sales:** Offer fresh fruit delivery through online platforms and direct-to-consumer channels.

High presence in Johor

More value to be captured

Source: PASB Analysis

Multiple anchor companies are currently present in Johor, covering key activities across the industry supply chain, offering potential to expand and deepen its value chain ecosystem

Existing Companies in Johor

NON-EXHAUSTIVE

Key Activities	Organisations	Description
Autonomous Field-Service Hubs	KULIM	Integrated plantation operator deploying mechanised and precision agriculture solutions to optimise large-scale crop management and harvesting efficiency.
All-in-One Smallholder Tech Platform	farmbyte	Digital agriculture platform supporting Johor farmers with end-to-end solutions including market access, agronomy support, and supply chain integration.
Vertical-Farming Clusters	farmbyte	Technology-driven urban farming operations using controlled-environment agriculture to produce high-quality vegetables for Johor's domestic and regional markets.
Specialty Ingredient Processing Hubs	BERHAD GUANCHONG	Malaysia's largest cocoa grinder operating advanced processing facilities in Johor to supply high-grade cocoa ingredients for global confectionery brands.
Mass-Scale Farm Certifications	JOHOR PLANTATIONS; IOI GROUP	Leading palm oil producers based in Johor.
Palm Oil Exports & Circular Bio-Economy Hubs	PROTENGA Insect-based Nutrition	Insect-based protein producer in Johor converting agricultural waste and palm by-products into fertilise.

Source: PASB Analysis

To further develop the sector, Johor should aim to attract these companies to establish a well integrated agricultural hub in the state

Potential Companies to Attract

NON-EXHAUSTIVE

Key Activities	Organisations	Description
Autonomous Field-Service Hubs	FarmWise	Agri-tech innovators deploying autonomous machinery and AI-powered robotics to optimise field operations, reduce labour dependency, and improve crop yields.
All-in-One Smallholder Tech Platform	DeHaat Seeds to Market; TaniHub group	Integrated digital platforms providing smallholder farmers with end-to-end services, including market access, financing, agronomy advisory, and supply chain integration.
Vertical-Farming Clusters	AEROFARMS Agriculture, Elevated.	Leaders in controlled-environment agriculture using advanced hydroponics and aeroponics to enable high-density, pesticide-free crop production year-round.
Specialty Ingredient Processing Hubs	Givaudan Health Solutions Hub	Producers and processors of high-value natural ingredients and flavour compounds, supplying global food and beverage.
Mass-Scale Farm Certifications	Nestle; Unilever	Global FMCG brands and food producers driving large-scale certification programmes.
Palm Oil Exports & Circular Bio-Economy Hubs	INNOVAFEED; LanzaTech	Companies leveraging bio-technology to convert agricultural waste and palm oil by-products into high-value biofuels, proteins, and sustainable materials.

Source: PASB Analysis

05

Project Analysis & Impact Assessment.

5.1

Project Analysis.

Investment Pipeline Projects Sources.

The success of JETP hinges on the realisation of private sector investment projects, for which the study examined identified investments from three primary sources

Project Compilation Sources

1 State & Federal Documents

State and federal documents relevant to Johor's economic development

Example:

- ***State Documents:*** *MJ 2030, Johor Green Deal, PPMJ 2030, JS-SEZ, SFZ, Comprehensive Development Plan iii Iskandar Malaysia 2022-2030*
- ***Federal Documents:*** *NIMP 2030, NETR, NTP 2030, Digital Economy Blueprint*

2 State & Federal Agencies / GLCs

State & Federal Agencies / GLCs in Johor that would have list of private sector driven projects

Example:

- *Invest Johor*
- *MIDA Johor*
- *ECERD*
- *IRDA*
- *JCorp*
- *PDT*
- *KPRJ*

3 Selected Industry Players

Selected industry players with potential investment plans in Johor through desktop research

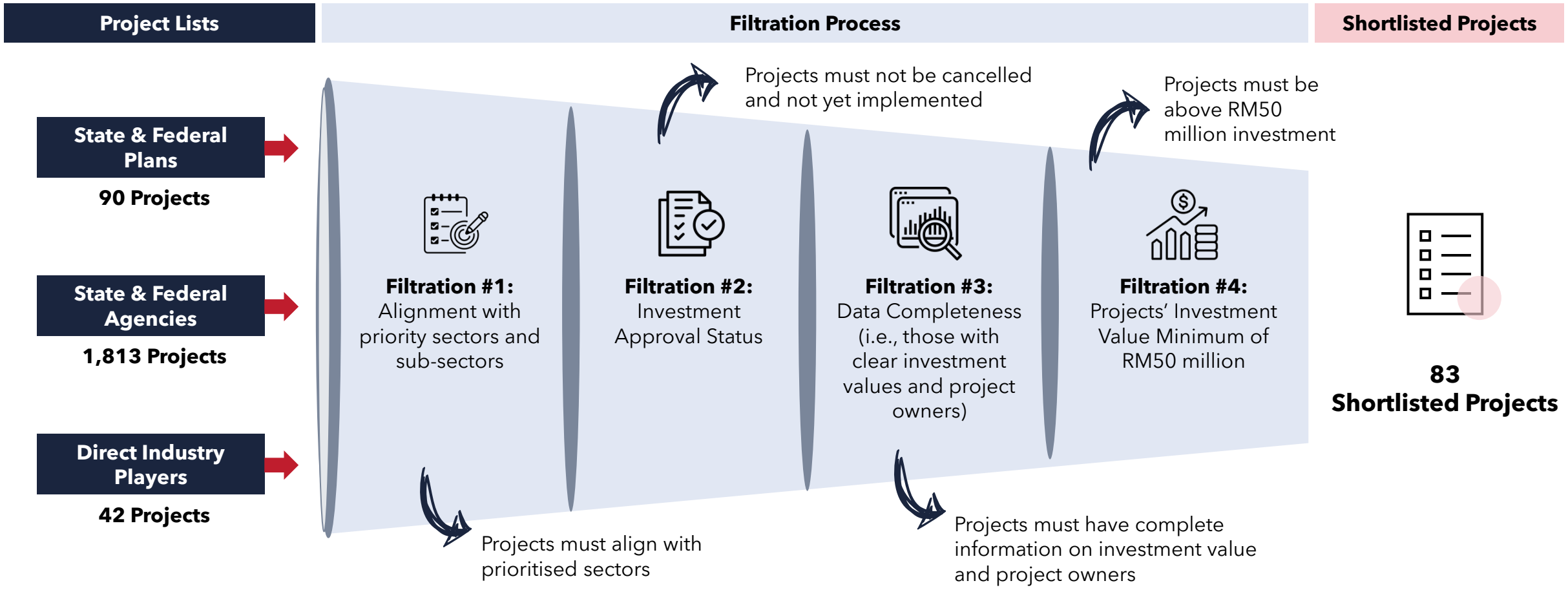
Example:

- *Petronas*
- *Cape EMS Berhad*
- *BMW*
- *Ranhil Utilities*

Source: Various state and federal documents, MIDA, IRDA, Invest Johor, ECERDC, various state's GLCs, selected industry players

The lab and extensive engagement with various stakeholders, has identified a pipeline of 83 high-impact investment projects for the purpose of impact simulation

Project Filtration Process



1,945 projects in total from these sources	**1,282 projects** satisfy this criteria	**868 projects** satisfy this criteria	**118 projects** satisfy this criteria	**83 projects** satisfy this criteria	**83 shortlisted projects** in total

Source: Various state and federal documents, MIDA, IRDA, Invest Johor, ECERDC, various state's GLCs, selected industry players

The 83 identified investment projects have an earmarked total investment value of RM167.4 billion

Total Investment Value

RM 167.4 billion

Total Investment Value of Identified Investment Projects

Number of Projects

83

Total Number of Identified Investment Projects

>

Chemical & Petrochemical
RM17.5 billion

13 Projects

Healthcare & Pharma.
RM7.3 billion

18 Projects

Energy
RM28.2 billion

9 Projects

E&E and Data Centers
RM95.8 billion

27 Projects

Aerospace
RM3.0 billion

1 Project

Logistics
RM3.4 billion

4 Projects

Tourism
RM11.3 billion

7 Projects

Agriculture
RM0.9 billion

4 Projects

Source: Various state and federal documents, MIDA, IRDA, Invest Johor, ECERDC, various state's GLCs, selected industry players

Project List – Lab Engagements.

Disclaimer Notes

The investment projects listed were identified through Lab Engagements under JETP, based on direct consultations with the respective Project Owners.

These projects represent part of the potential investment opportunities across eight sectors in Johor, but do not constitute the full extent of the State's recognised or emerging investment pipeline.

The project lists presented are non-exhaustive. Insights provided are limited to the scope of initiative charters contained within this report, and are shared in strict observance of the confidentiality obligations of all stakeholders.

PEMANDU makes no representation as to the reliability or accuracy of the information provided, which is assumed to be accurate and reliable as at the point of obtainment from the respective Project Owners.

List of Projects: Chemical & Petrochemical

Sector:
Chemical & Petrochemical

Total Investment Value:
RM8.1 billion

Total Number of Projects:
5

Note:
Projects were identified through JETP Lab engagements with respective Project Owners and do not represent Johor's full investment pipeline. Information is assumed accurate at point of obtainment; PEMANDU bears no responsibility for its reliability or accuracy. Subject to stakeholder confidentiality obligations.

No	Project Name	Project Owner	Location
1	Sustainable Aviation Fuel (SAF) and Biofuel Refinery	Petroliam Nasional Berhad (Petronas)	Pengerang
2	Green Energy & Sustainable Aviation Fuel	Gryffin Partners	Pengerang
3	Recycling of Plastic Waste into Circular Pyrolysis Oil	Kytari Sdn Bhd	Pengerang
4	Dialog Asia Project (Tango & Camelia)	Dialog Asia	Pengerang
5	Bitumen Production	Cascadian Asphalt Industries Sdn Bhd	Tanjung Langsat

Source: Various state and federal documents, Lab engagements

List of Projects: Healthcare & Pharmaceutical

Sector:
Healthcare & Pharmaceutical

Total Investment Value:
RM4.0 billion

Total Number of Projects:
9

Note:
Projects were identified through JETP Lab engagements with respective Project Owners and do not represent Johor's full investment pipeline. Information is assumed accurate at point of obtainment; PEMANDU bears no responsibility for its reliability or accuracy. Subject to stakeholder confidentiality obligations.

No	Project Name	Project Owner	Location
1	Thomson Iskandariah Hospital	TMC Life Sciences Bhd	Johor Bahru
2	Hospital Sultanah Aminah 2, Johor Bahru	Kementerian Kesihatan Malaysia	Johor Bahru
3	Maria Hospital 2 at Permas Jaya	Maria Hospital	Permas Jaya
4	Expansion of KPJ Hospitals (KPJ Dato' Onn, KPJ Johor Specialist Hospital, KPJ Kluang, KPJ Pasir Gudang)	Kumpulan Perubatan Johor (KPJ)	Various Locations
5	Expansion of Columbia Asia Hospital Iskandar Puteri	Columbia Asia	Iskandar Puteri
6	Expansion of Kempas Medical Centre	Kempas Medical Centre	Johor Bahru
7	Pulai Springs Hospital	Pulai Group	Pulai
8	Austin Heights Specialist Hospital	Austin Heights Sdn Bhd	Johor Bahru
9	South Island Nursing Home, Ulu Tiram and Kempas	South Island Healthcare Sdn. Bhd.	Ulu Tiram

Source: Various state and federal documents, Lab engagements

List of Projects: Energy

Sector:
Energy

Total Investment Value:
RM28.2 billion

Total Number of Projects:
9

Note:
Projects were identified through JETP Lab engagements with respective Project Owners and do not represent Johor's full investment pipeline. Information is assumed accurate at point of obtainment; PEMANDU bears no responsibility for its reliability or accuracy. Subject to stakeholder confidentiality obligations.

No	Project Name	Project Owner	Location
1	Combined Cycle Gas Turbine with Green Hydrogen and Green Ammonia Plant	Maharani Energy Gateway Sdn Bhd / China Energy International Group Sdn Bhd	Muar
2	KPRJ x Sembcorp Floating Solar Project	KPRJ Environment	Linggiu Reservoir
3	Renewable Energy Zone	Ditrolic Energy	Pengerang / Mersing
4	UEM Lestra x Hexa Renewables Solar Project	UEM Lestra Hexa Renewables JV	Segamat
5	Masdar Renewables Large Scale Solar Farm	Masdar Renewable Energy	Johor Bahru
6	Rare Earth Oxide Production in Johor	Fujian Golden Dragon Rate-Earth Co. Ltd.	Johor Bahru
7	Equalenergie Solar Farm	Equalenergie Sdn. Bhd.	Segamat
8	Renewable Energy Industrial Park in Gerbang Nusajaya, Johor	UEM Sunrise	Iskandar Puteri
9	Envision Energy Wind Farm Project	Envision Energy	Kota Tinggi

Source: Various state and federal documents, Lab engagements

List of Projects: Electrical & Electronics

Sector:
Electrical & Electronics

Total Investment Value:
RM0.2 billion

Total Number of Projects:
2

Note:
Projects were identified through JETP Lab engagements with respective Project Owners and do not represent Johor's full investment pipeline. Information is assumed accurate at point of obtainment; PEMANDU bears no responsibility for its reliability or accuracy. Subject to stakeholder confidentiality obligations.

No	Project Name	Project Owner	Location
1	Plastic Injection Moulds	Flextronics Shah Alam Sdn Bhd	Tanjung Pelepas
2	Portable Commercial Studio LED	BPW Industrial Sdn Bhd	Ulu Tiram

Source: Various state and federal documents, Lab engagements

List of Projects: Electrical & Electronics (Data Centers)

Sector:
Electrical & Electronics (DC)

Total Investment Value:
RM4.0 billion

Total Number of Projects:
5

Note:
Projects were identified through JETP Lab engagements with respective Project Owners and do not represent Johor's full investment pipeline. Information is assumed accurate at point of obtainment; PEMANDU bears no responsibility for its reliability or accuracy. Subject to stakeholder confidentiality obligations.

No	Project Name	Project Owner	Location
1	Equinix Data Center - PTD 7444 (JH` & JH2)	Equinix	Kulai
2	Nanda Digital - PTD 227197	Nanda Digital	Gelang Patah
3	Tropicana Data Center	Tropicana Firstwide	Pulai
4	Data Center Prefabrication	EPG	Johor Bahru
5	Ibrahim Technopolis (IBTEC)	JLand Group	Sedenak

Source: Various state and federal documents, Lab engagements

List of Projects: Aerospace

Sector:
Aerospace

Total Investment Value:
RM3.0 billion

Total Number of Project:
1

Note:
Projects were identified through JETP Lab engagements with respective Project Owners and do not represent Johor's full investment pipeline. Information is assumed accurate at point of obtainment; PEMANDU bears no responsibility for its reliability or accuracy. Subject to stakeholder confidentiality obligations.

No	Project Name	Project Owner	Location
1	Senai Airport Expansion (Aerospace Hub)	Senai Airport Terminal Services	Senai

Source: Various state and federal documents, Lab engagements

List of Projects: Logistics

Sector:
Logistics

Total Investment Value:
RM3.4 billion

Total Number of Projects:
4

Note:
Projects were identified through JETP Lab engagements with respective Project Owners and do not represent Johor's full investment pipeline. Information is assumed accurate at point of obtainment; PEMANDU bears no responsibility for its reliability or accuracy. Subject to stakeholder confidentiality obligations.

No	Project Name	Project Owner	Location
1	Tiong Nam Logistics Hub	Tiong Nam	Sedenak
2	Phase 3 Free Zone Infrastructure (148 acres) and Access Road	Pelabuhan Tanjung Pelepas (PTP)	Tanjung Pelepas
3	Seraya 2	DIALOG Terminals Langsat (3) Sdn Bhd	Pasir Gudang
4	DHL Supply Chain Malaysia (Phase 2 and Phase 3)	DHL	Johor Bahru

Source: Various state and federal documents, Lab engagements

List of Projects: Tourism

Sector:
Tourism

Total Investment Value:
RM11.3 billion

Total Number of Projects:
7

Note:
Projects were identified through JETP Lab engagements with respective Project Owners and do not represent Johor's full investment pipeline. Information is assumed accurate at point of obtainment; PEMANDU bears no responsibility for its reliability or accuracy. Subject to stakeholder confidentiality obligations.

No	Project Name	Project Owner	Location
1	Arena Larkin	JCorp	Larkin
2	Desaru Coast Expansion	DRH	Desaru
3	Medini International Convention City (MICC)	IIB	Iskandar Puteri
4	Overall Rejuvenation of Johor's Tourism Ecosystem and Promotion	Public Funds	Various Locations
5	Sunway Puteri Hills (F&B Hub)	Sunway Group	Iskandar Puteri
6	Banjaran Mangrove Resort	Sunway Group	Johor Bahru
7	Sunway Circuit	Sunway Group	Johor Bahru

Source: Various state and federal documents, Lab engagements

List of Projects: Agriculture

Sector:
Agriculture

Total Investment Value:
RM0.9 billion

Total Number of Projects:
4

Note:
Projects were identified through JETP Lab engagements with respective Project Owners and do not represent Johor's full investment pipeline. Information is assumed accurate at point of obtainment; PEMANDU bears no responsibility for its reliability or accuracy. Subject to stakeholder confidentiality obligations.

No	Project Name	Project Owner	Location
1	Integrated Sustainable Palm Oil Complex (ISPOC)	Johor Plantations Group	Kota Tinggi
2	Circular Biomass	IOI Palm Wood Sdn. Bhd.	Segamat
3	Integrated Coconut Processing	IOI Coconut Mill Sdn. Bhd.	Segamat
4	Crop Protection Products	Lianhetech Malaysia Sdn Bhd	Tanjung Langsat

Source: Various state and federal documents, Lab engagements

Project List – MIDA Johor.

Disclaimer Notes

The following projects list was obtained directly from MIDA Johor. To PEMANDU's understanding, this represents only a small subset of the entire portfolio of approved investments currently managed and monitored by MIDA, which, based on publicly available information, exceeds 3,000 investment projects. The list is non-exhaustive and reflects only the top 10 approved investments by value as at 1Q2025.

PEMANDU was provided with limited details comprising the names of investments, project owners, and aggregated values by segment. PEMANDU acknowledges that MIDA and other Investment Promotion Agencies (IPAs) remain bound by confidentiality obligations with respect to prospective investors.

PEMANDU bears no responsibility for the reliability or accuracy of the information presented, which is assumed to be accurate as at the point of obtainment from MIDA Johor.

List of Projects: Chemical & Petrochemical

Sector:
Chemical & Petrochemical

Total Investment Value:
RM9.4 billion

Total Number of Projects:
8

No	Project Name	Project Owner
1	Polyvinyl-Chloride (PVC), Vinyl-Chloride Monomer (VCM)	Tosoh Corporation
2	Nitrile Butadiene Latex (NBL)	LG Petronas Chemicals Malaysia
3	Medium Chain Triglycerides	Apical Oils & Fats Sdn Bhd
4	Hydro-Treated Vegetable Oil Sustainable Aviation Fuel (SAF)	ECO Environmental Investments Limited
5	Nitrogen, Oxygen & Argon	Air Products Malaysia Sdn Bhd
6	Octyl Salicylate & OS	Cosmos Personal Care (Malaysia) Sdn Bhd
7	Dry Release Film Coatings	Colorcon Malaysia Sdn Bhd
8	Refined Sludge Palm Oil	Apical Oils & Fats Sdn Bhd

Note:
List obtained from MIDA Johor, representing only the top 10 approved investments by value as at 1Q2025. Does not reflect the full pipeline (>3,000 projects). Information provided is limited and assumed accurate at point of obtainment; PEMANDU bears no responsibility for its reliability or accuracy.

Source: Various state and federal documents, MIDA, IRDA, Invest Johor, ECERDC, various state's GLCs, selected industry players

List of Projects: Healthcare & Pharmaceutical

Sector:
Healthcare & Pharmaceutical

Total Investment Value:
RM3.3 billion

Total Number of Projects:
9

Note:
List obtained from MIDA Johor, representing only the top 10 approved investments by value as at 1Q2025. Does not reflect the full pipeline (>3,000 projects). Information provided is limited and assumed accurate at point of obtainment; PEMANDU bears no responsibility for its reliability or accuracy.

No	Project Name	Project Owner
1	Precision Parts for Medical Devices	Unisteel Technology (M) Sdn Bhd
2	Consumable Catridge and Sterile Liquid Transfer Devices	Titanium Systems Sdn Bhd
3	Pulse Oximetry Adhesive Sensor & Pulse Oximeter	Masimo Medical Technologies Sdn Bhd
4	Anesthesia Mask, Bacterial/Viral Filter and Pre-Filled Syringe	Xinmed Sdn Bhd
5	Precision Parts for Medical Devices	Unisteel Technology (M) Sdn Bhd
6	Ureterorenoscope and Cystoscope	Innovex Medical (Malaysia) Sdn Bhd
7	DNA Test Kit	Intretech (Malaysia) Sdn Bhd
8	Multilayer Laminate for IVD DNA Sensor Cartridge	Hochen Medical Sdn Bhd
9	Blood Glucose Monitoring Device and Single Use Surgical Endoscope	Altek Medical Sdn Bhd

Source: Various state and federal documents, MIDA, IRDA, Invest Johor, ECERDC, various state's GLCs, selected industry players

List of Projects: Electrical & Electronics

Sector:
Electrical & Electronics

Total Investment Value:
RM5.5 billion

Total Number of Projects:
10

Note:
List obtained from MIDA Johor, representing only the top 10 approved investments by value as at 1Q2025. Does not reflect the full pipeline (>3,000 projects). Information provided is limited and assumed accurate at point of obtainment; PEMANDU bears no responsibility for its reliability or accuracy.

No	Project Name	Project Owner
1	Server	Super Micro Computer Malaysia Sdn Bhd
2	Power Distribution Board, Server Mainboard	Compuware Technology Sdn Bhd
3	Aluminium Substrates	WD Media (Malaysia) Sdn Bhd
4	AMB & Active Metal Brazed &, DCB & Direct Copper Bonding	Ferrotec Power Semiconductor Sdn Bhd
5	Vacuum Cleaner, Energy Efficiency Fan	Alton Intelligent Technology Sdn Bhd
6	Server Chasis	Ablecom Technology Sdn Bhd
7	Printed circuit board (PCB)	Wiwynn Technology Service Malaysia Sdn Bhd
8	Red Dot Sight, Reflex Sight	Poe Manufacturing Sdn Bhd
9	Server Chassis and Computer Peripheral Components	Ablecom Technology Sdn Bhd
10	Computer Entertainment System and Semifinished for Computer Entertainment System Sets	Sharp Manufacturing Corporation (M) Sdn Bhd

Source: Various state and federal documents, MIDA, IRDA, Invest Johor, ECERDC, various state's GLCs, selected industry players

List of Projects: Electrical & Electronics (Data Center)

Sector:
Electrical & Electronics

Total Investment Value:
RM86.1 billion

Total Number of Projects:
10

Note:
List obtained from MIDA Johor, representing only the top 10 approved investments by value as at 1Q2025. Does not reflect the full pipeline (>3,000 projects). Information provided is limited and assumed accurate at point of obtainment; PEMANDU bears no responsibility for its reliability or accuracy.

No	Project Name	Project Owner
1	ByteDance Data Center	ByteDance Systen Sdn Bhd
2	Hyperscale Data Center	GDS IDC Services III (Malaysia) Sdn Bhd
3	Data Center Cloud Services	Seainfra (Malaysia) Sdn Bhd
4	Infrastructure for Hosting, Data Processing and Related Activities	YTL AI Cloud Sdn Bhd
5	YTL Data Centre	YTL DC South Sdn Bhd
6	Hyperscale Data Centre	GDS IDC Services II (Malaysia) Sdn Bhd
7	Infrastructure for Hosting, Data Processing and Related Activities	Yu Ao Sdn Bhd
8	Data Center	STT GDC Malaysia 2 Sdn Bhd
9	Data centre	Bridge Data Centres Malaysia III Sdn Bhd
10	Hyperscale Data Centre	GDS IDC Services (Malaysia) Sdn Bhd

Source: Various state and federal documents, MIDA, IRDA, Invest Johor, ECERDC, various state's GLCs, selected industry players

5.2

Impact Assessment.

An impact simulation was undertaken to assess the potential contribution of prioritised investment projects to the state's economy by 2030

Why simulation is necessary?

To Quantify Economic Impact
Estimate the potential GDP contribution and employment opportunities arising from the prioritised projects identified

To Guide Policy and Strategy
Provide evidence-based insights to support decision-making, resource allocation, and prioritisation of state interventions

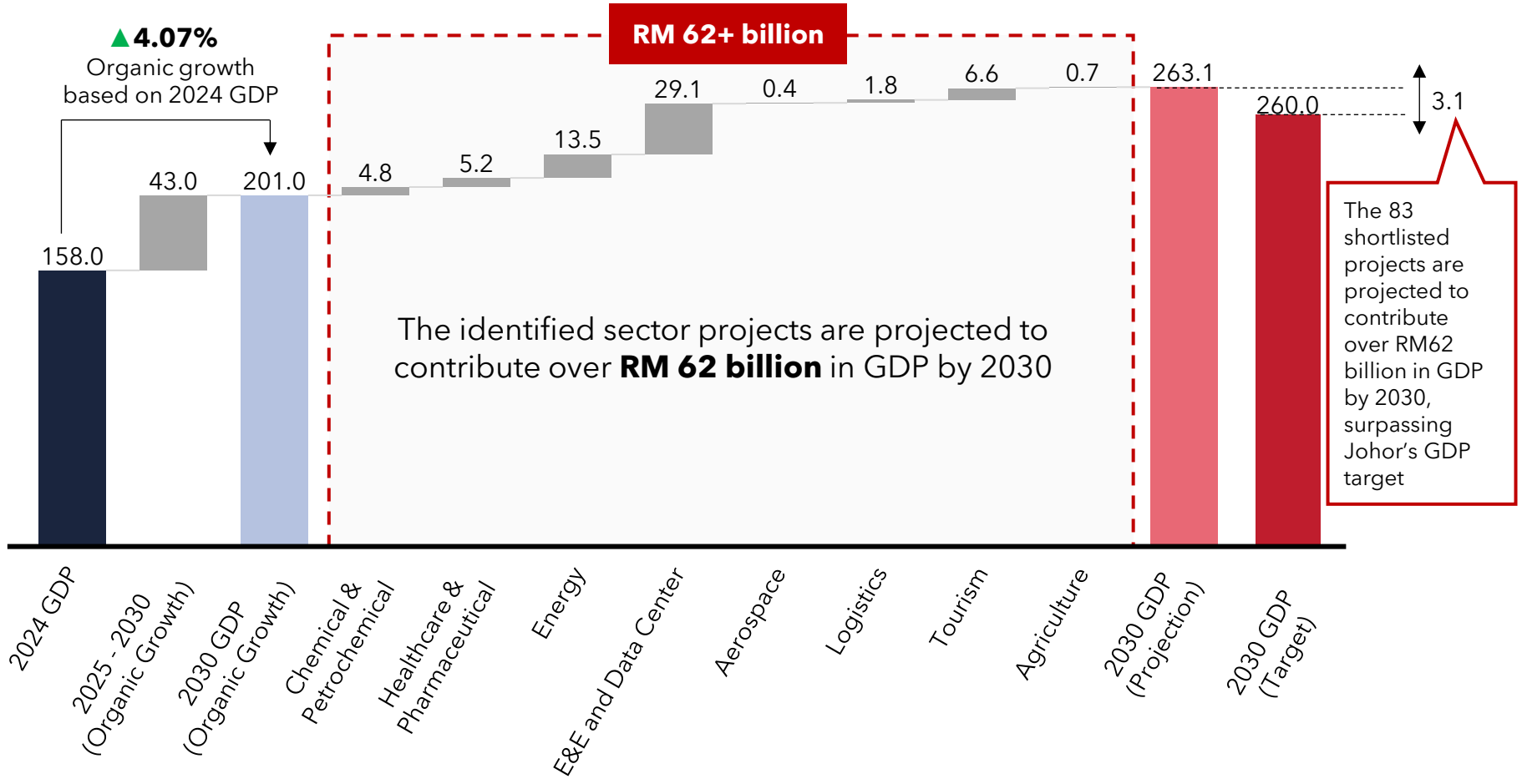
To Close The Investment Gap
Bridge the gap between approved investments and their actual implementation, ensuring projects translate into tangible economic outcomes

The findings provide a clear picture of the growth potential, enabling Johor to chart a stronger path towards its 2030 economic aspirations

GDP.

The shortlisted projects are projected to generate over RM62 billion in GDP by 2030, raising Johor's total projected GDP to RM263 billion

GDP Growth Projection (RM'bil), 2025 – 2030
RM Billion



Sector Projects GDP Contribution:

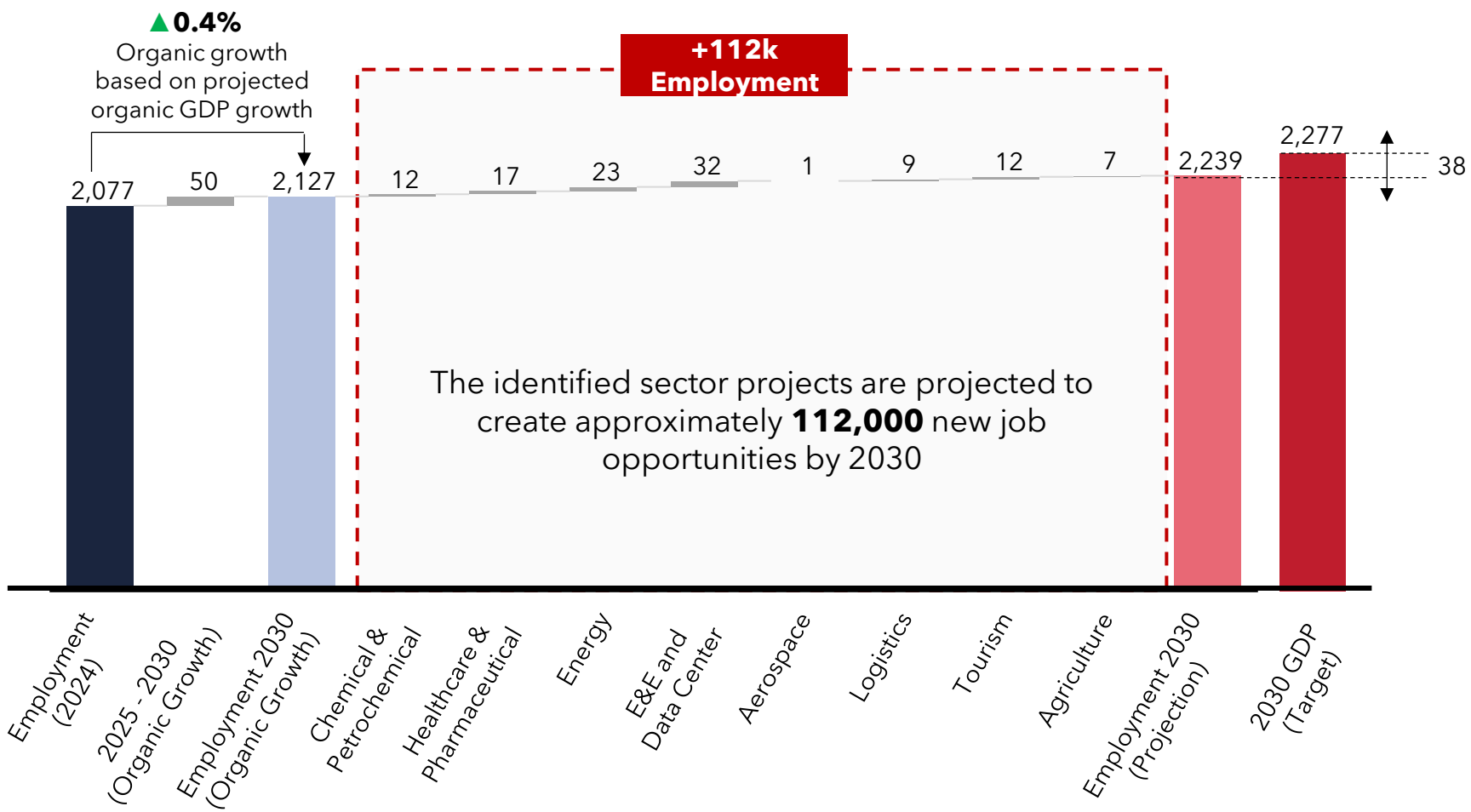
- The JETP sector projects are key to Johor's goal of reaching a RM260 billion GDP by 2030
- The current 83 shortlisted projects contribute over RM62 billion to Johor's economy by 2030
- Data center and energy are the primary contributors, highlighting their critical role in Johor's economic growth

Source: DOSM, PASB Analysis

Employment Opportunities.

The shortlisted projects are simulated to contribute approximately 112,000 new employment opportunities to Johoreans by 2030

Total Employment Projection, 2025 – 2030
('000)



Sector Projects Employment Contribution:

- The identified sector projects are projected to contribute approximately 112,000 new job opportunities for Johoreans by 2030, aligning with Johor's economic growth trajectory
- Key sectors such as E&E and Data Centers and Energy are major drivers of employment generation, with the largest projected contributions to job creation
- The total employment growth, factoring in both the shortlisted projects and organic growth, is expected to result in over 162,000 job opportunities by 2030

Source: DOSM, PASB Analysis

06

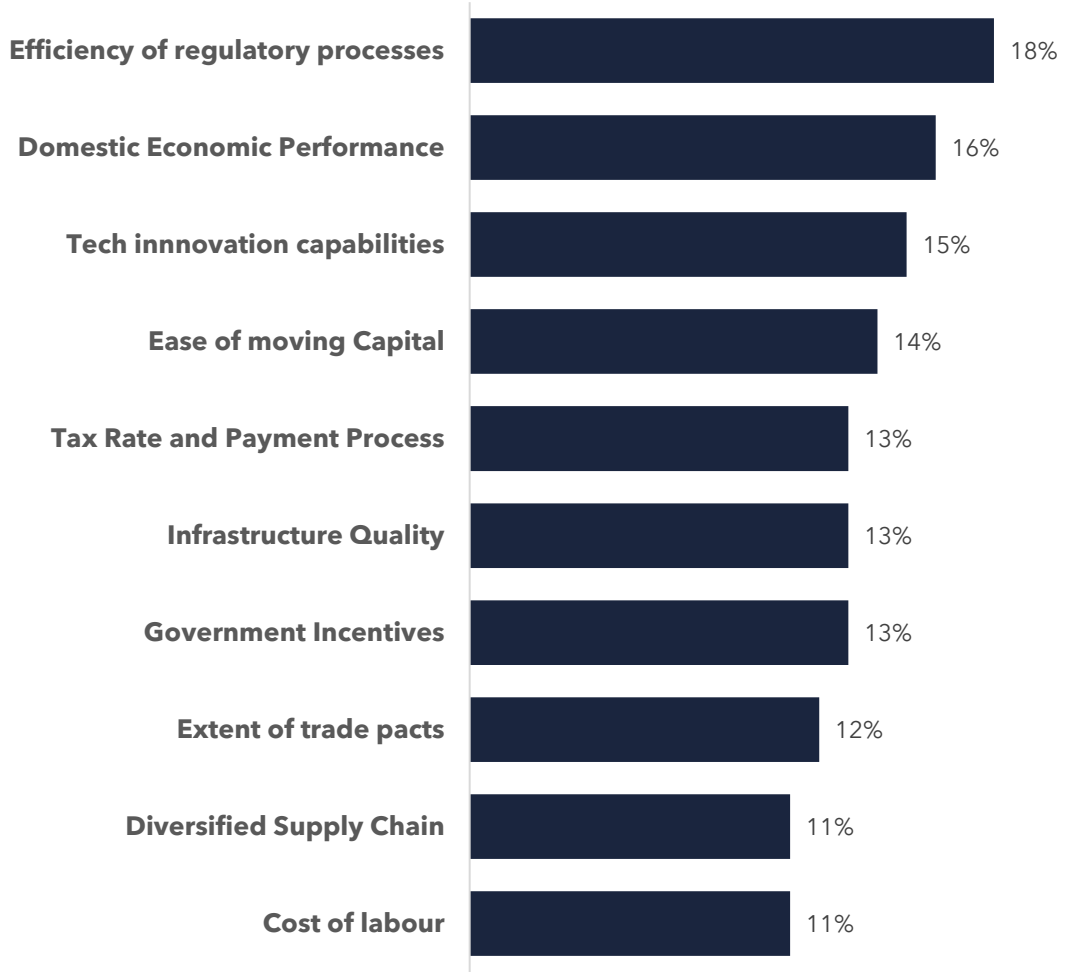
Strategic Interventions.

6.1

Strategic Interventions Overview.

When assessing new investment destinations, multinational companies prioritise factors such as regulatory stability, operational costs, and workforce availability

Top 10 most Important factors when considering a geographic location for FDI among foreign investors



Source: Kearney Foreign Direct Investment Confidence Index 2025

Key Highlights:

- Efficiency of regulatory processes remains the most important factor considering they directly accelerate time-to-market and ensure consistent, reliable business operations
- Investors with global presence are prioritising markets with strong domestic economic performance to leverage on domestic and regional growth which would reflect higher demand amidst ongoing macro-economic volatility
- Technological and innovation capabilities, ease of moving capital, talent, tax and investment incentives within the host country have stood out as key unique propositions that significantly entices attraction of FDI
- Additionally, quality of infrastructure and availability of land remains a priority to ensure accessibility and reliability of conducting business operations

Impact Towards Johor:

- On a macro-level, Johor remains primed to attract and realise FDI given its strong domestic economic performance catalysed by JS-SEZ
- More importantly, Johor has taken proactive strides in offering more efficient regulatory process, government incentives along with development of infrastructure assets- elements that will distinguish the state as an investment destination.

Based on the JETP survey findings among investors who are considering investing in Johor, several key focus areas were identified which require further intervention from the state

Top 8 Investment Decision Factors among investors in / considering Johor

1. **Road Connectivity**
   Seamless movement of goods and personnel, reducing logistics costs and delivery times
2. **Geographical Resilience**
   Minimises operational disruptions , loss of assets and supply chain shock arising from natural disasters
3. **Basic Utilities**
   Cost-effective and reliable access to power, water, and waste management to support effective operations
4. **Government Incentives**
   Lowers barrier to entry, upfront and ongoing expenses through tax breaks, grants, and subsidies
5. **Regulatory Approvals**
   Accelerates time-to-market and reduces bureaucratic uncertainty by streamlining permits, licenses, and compliance requirements
6. **Digital Infrastructure**
   Provides high-speed, secure connectivity essential for Industry 4.0 technologies
7. **Skilled Workforce**
   Supplies the talent pool needed for productivity, innovation, and rapid scaling of operations
8. **Land Matters**
   Simplifies site development through clear land-use zoning, affordable acquisition, and title security allowing for plug-and-play

JETP Investor Survey was conducted on 17 April 2025

Recommended Focus Area based on survey insights

Connectivity and Utilities
- Access to renewable energy
- Reliability of basic utilities for industrial needs
- Traffic congestions

Land Matters
- Clarity of land titling
- Land-use classification

Labour and Workforce
- Talent Retention
- Sufficiency of foreign labour
- Wage Gaps and Mismatch

Investment Incentives
- Sufficiency of financing and grants
- Investment approval efficiency
- Complementary Sectoral ecosystems

Regulatory Compliance
- Permits and Licensing Permit
- Rigidity of Environmental Policies

Source: JETP Investor Survey, PASB Analysis

Additionally, extensive engagements with both private and public sector agencies have surfaced several key roadblocks that continue to impede their investment potential in Johor

NON-EXHAUSTIVE

Infrastructure

> "There are ongoing concerns regarding the stability of electricity supply and the adequacy of treated water for industrial use
>
> ***E&E Industry Players***

> "The construction of access road to PTP Zone 3 is really crucial to support and expedite the expansion of PTP
>
> ***Port Tanjung Pelepas***

Ease of Doing Business

> "Lack of flexibility in land use regulations for agrosolar applications has made it difficult for agricultural operators to adopt solar-powered solutions
>
> ***Agriculture Industry Players***

> "The current cost structure under the CRESS scheme presents a barrier to scaling renewable energy projects
>
> ***Renewable Energy Players***

Incentives & Investment Facilitation

> "High land costs in PIPC remain a significant deterrent for potential investors considering setting up operations in the area
>
> ***Chemical Industry Players***

> "Mersing has untapped tourism potential and should be considered for inclusion in a designated Special Tourism Investment Zone
>
> ***Tourism Industry Players***

Talent & Workforce

> "Retention of nursing talent is a major challenge, with many opting for employment in Singapore due to better pay which has impacted our ability to meet local demand
>
> ***Healthcare Industry Player, IRDA***

> "The aerospace sector requires a more consistent and industry-aligned talent pipeline to meet future workforce needs
>
> ***Aerospace Industry SME***

To address the key issues identified, the state government must adopt a whole-of-government approach, ensuring close coordination among ministries and agencies to effectively support the end-to-end investor journey

Source: FGD session and project engagements with private sector players

JETP's strategic interventions are designed to accelerate the conversion of approved investments to be effectively realised for sustainable, long-term economic growth

JETP Strategic Intervention Framework

1 **Definition and Objective**

A curated portfolio of high-impact enabling projects designed to resolve roadblocks, accelerate approvals, and unlock infrastructure and talent supply which will ensure high realisation of secured investments

2 **What does it encompass?**

A blend of ongoing, planned, and "breaking-new-ground" initiatives spanning federal programmes, state-level projects and policy reforms

3 **How was it Developed?**

Proposed initiatives stems from a two-prong approach: (1) Top-down visioning through repeated syndication with the state leadership and (2) Bottoms-up diagnostics via Labs and Stakeholder engagements that co-created initiatives from the roadblocks and opportunities identified

4 **How to Implement?**

Each initiative is rooted with a detailed implementation plan consisting of action steps, project milestones and Key Performance Indicators

The strategic interventions under JETP go beyond resolving investor roadblocks, focusing also on promoting emerging economic opportunities to unlock future growth

1 Common On-Ground Roadblocks

Systemic cross-cutting roadblocks faced by investors across every stage of the investment journey which deters fresh capital or slows down realisation of investments into productive assets

2 New Emerging Opportunities with Multiplier Potential

Harnessing on key economic and sectoral trends that leverages on Johor's positioning and propositions which delivers broad, economy-wide spill-overs that can be accelerated and maximised through strategic intervention by the state

Therefore, the proposed strategic interventions targets both dimensions to extract and unlock the highest economic value to the state

Source: PASB Analysis

In parallel, it is mission-critical for the state government to formulate strategic interventions that effectively support both investment attraction and realisation

Strengthening Foundations for Growth

Infrastructure Development

Physical Infrastructure

- Enhance physical infrastructure across key economic corridors to support industrial growth, positioning Johor as a regional and global trade hub

Digital Infrastructure

- Expand and modernise digital infrastructure to improve investment competitiveness and operational efficiency for businesses in Johor

Ease of Doing Business

Regulatory Process

- Simplify regulatory processes across agencies and reduce bureaucratic delays to make Johor more attractive to investors, entrepreneurs, and multinational corporations

Invest. Promotion & Facilitation

- Strengthen investment promotion strategies and investor services through dedicated support channels to improve investor experience and reduce entry barriers

Private Investment Catalyst

Financial Incentives & Access to Capital Market

- Strengthening financial assistance through targeted incentives and improved capital market access to support investments in emerging technologies and sectors

Sectoral Development

- Develop support mechanisms for prioritised sectors to drive industrial deepening, supply chain integration, and value-added activities

Talent & Capacity Building

Talent Attraction, Development, and Retention

- Attract, nurture, and retain a skilled and adaptable workforce through comprehensive strategies in education, training, and employment to support Johor's advanced industries

Industry-Academia Linkages

- Foster stronger collaboration between industry players and academic institutions to align curriculum with evolving industry needs and produce job-ready talent

Therefore, for the state to effectively action on the strategic intervention initiatives, it requires a collaborative effort through a "whole-of-government" approach

4 Critical Strategic Intervention Categories were identified ...

1

Infrastructure Development

Enhancing physical and digital infrastructure to support growing economic activities

2

Ease of Doing Business

Simplifying regulatory processes and improving Investment Promotion & Facilitation

3

Private Investment Catalyst

Increasing access to financial incentives and capital while accelerating sectoral development strategies

4

Talent & Capacity Building

Attracting, Developing and Retaining high quality talents while fostering industry-academia linkages

... which anchors on a "Whole-of-Government" approach

Federal Government & Agencies

Offering competitive incentives and clarity in policies with efficient and streamlined Federal-Level Approvals

State Government and Agencies

Creating an Investment-Ready Environment with Accelerated State Level Approvals

State GLCs

Co-Investing in Strategic & High-Impact Projects while strategically addressing untapped opportunities

Private Sector

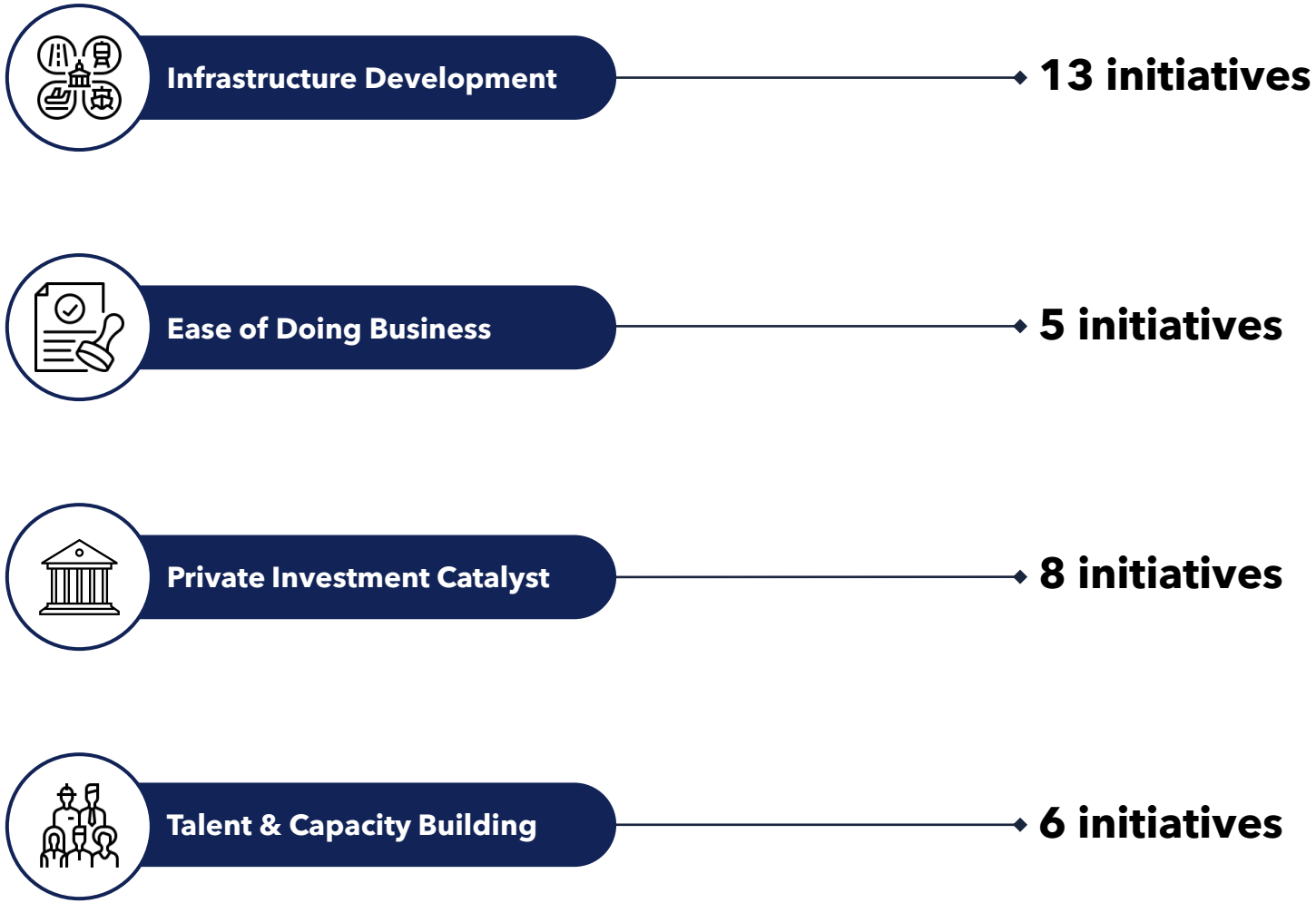
Leading Investment & Project Delivery while Fostering Innovation & Supply Chain Development locally

Source: PASB Analysis

Cumulatively, 32 initiatives have been co-created with the relevant stakeholders

32 Intervention Initiatives:

- 32 initiatives have been identified based on key challenges and opportunities raised by private sector stakeholders and relevant public sector agencies
- The initiatives have been filtered and prioritised to guide the state in prioritising the most critical strategic interventions to drive realisation of investments



Source: Co-Creation with Federal ministries, State Agencies and GLCs, PASB Analysis

JETP Strategic Intervention Initiatives (1/5)

Infrastructure Development

11 Key Roadblocks

13 Initiatives

	Key Roadblocks / Opportunities	Key Initiatives
1	Lack of Treated Water Supply for Industry Use	1. Advancement Towards Treated Water Self-sufficiency - (1) Sungai Sembrong Water Transfer (2) Semangar 3 Water Treatment Plant (4) ORS Sungai Johor (5) Ulu Sedili Dam Scheme (6) ORS, Barrage Development at Sungai Pontian Besar & Kayu Ara Pasong Plant (7) RSTP and WRP Pasir Gudang (8) Off-River Storage Sungai Sedili Besar
2	High & Frequent Risk of Flooding	2. Mitigation of Flood Risks by Establishing Johor as a Sponge City
3	Opportunities for Enhancing Customs Clearance Efficiency	3. Digitalisation of Customs Clearance
4	Suboptimal Traffic Conditions in Port of Tanjung Pelepas (PTP) Vicinity	4. Construction of PTP Free Zone 3 Access Road
5	Suboptimal Rail Conditions and Frequency of Inter-Terminal Transfer (ITT) Services	5. Enhancement of Rail Logistics Infrastructure and Inter-Terminal Transfers (ITT)
6	Lack of International Connectivity into Mersing	6. Enhancement of Mersing's International Connectivity
7	Opportunity to enhance port operations	7. Introduction of Elevated Autonomous Rapid Transit (EART) Services
8	Lack of Transport Infrastructure Within Greater JB Area	8. Revitalisation of Segamat In-Land Port
9	Lack of Rail Connectivity and Frequent Rail Services Across Johor	9. Leveraging Gemas-JB EDTP1 Infrastructure for Commuter Services in Johor

Source: Co-Creation with Federal ministries, State Agencies and GLCs, PASB Analysis

JETP Strategic Intervention Initiatives (2/5)

Infrastructure Development

11 Key Roadblocks

13 Initiatives

Key Roadblocks / Opportunities	Key Initiatives
10 Poor Connectivity Along Johor's East Coast Region	10. Development of Lebuhraya Pantai Timur 4 (LPT4) 11. Construction of East Coast Rail Link 2 (ECRL2) 12. Development of the West Coast Expressway Southern Link
11 Opportunity to Drive Green Growth and Unlock Cross-sectoral Economic Synergies through Transitioning Industrial Clusters	13. Development of Johor Transition Industrial Clusters (JTIC)

Source: Co-Creation with Federal ministries, State Agencies and GLCs, PASB Analysis

JETP Strategic Intervention Initiatives (3/5)

Ease of Doing Business

5 Key Roadblocks

5 Initiatives

Key Roadblocks / Opportunities	Key Initiatives
1 Outdated Land Classification Frameworks Constrain Sectoral Investment and Land Use Optimisation in Johor	1. Introduction of Special Land Use Permit Classifications Reform
2 Structural Policy and Incentive Barriers to Renewable Energy Scale-Up in Malaysia	2. Formation of Johor Renewable-Energy Market Reform Group
3 Enhancing Johor's State Capacity for AI Development and Cross-Sectoral Innovation	3. Activating Johor's AI Engine through Johor Artificial Intelligence Office (JAIO)
4 Absence of Standardised Benchmarks to Assess and Upgrade Industrial Parks and Associated Professionals: Issue Charter	4. Johor Industrial Park STAR Ratings
5 Lack Of Unified Framework To Pilot Innovative Technologies	5. Johor Regulatory Sandbox

Source: Co-Creation with Federal ministries, State Agencies and GLCs, PASB Analysis

JETP Strategic Intervention Initiatives (4/5)

Private Investment Catalyst

8 Key Roadblocks

8 Initiatives

	Key Roadblocks / Opportunities	Key Initiatives
1	Escalating Industrial-Land Costs in Johor's Strategic Zones	1. Developing a Strategic Industrial Land Consolidation & Release Programme (SILCRP)
2	Absence of Special Tourism Investment Zone (STIZ) and duty-free zone status in Mersing	2. Establishing Mersing as part of Special Tourism Investment Zone (STIZ) and Free Commercial Zone (FCZ)
3	Limited mandate to oversee tourism industry development	3. Expansion of Tourism Johor's Mandate to Drive Targeted Tourism Industry Growth
4	Absence of Centralised Coordination for Aerospace Industry Development	4. Launching a Johor Aerospace Council & Secretariat
5	High Capital Barrier for Advanced Back-End Semiconductor Manufacturing	5. Introduce Tiered Land Premium Discount for Strategic OSAT Fabs
6	Access to Agritech Is Costly and High-Risk	6. Launch Johor Agritech Accelerator Program
7	Flood Risks on Agriculture Activities	7. Piloting Johor Agriculture Resilience Insurance Scheme (JARIS) for Smallholders
8	Absence of a Financial Hub in Johor	8. Enhancing Forest City Special Financial Zone (FC-SFZ)

Source: Co-Creation with Federal ministries, State Agencies and GLCs, PASB Analysis

JETP Strategic Intervention Initiatives (4/4)

Talent & Capacity Building

4 Key Roadblocks

6 Initiatives

Key Roadblocks / Opportunities	Key Initiatives
1 Attract: Critical Shortage of High-skilled Professionals	1. Establishing Public-Private Training Pathways for New Nurses
2 Retain: Outmigration of Service Sector Workers	2. JS-SEZ Productivity-Linked Wage Policy
3 Develop: Underutilisation of Johor's Graduates	3. Implementing Johor's Integrated TVET Programme 4. Johor Accelerator for Digital Excellence
4 Innovate: Lack of Strategic Innovation to Drive Economic Transformation	5. Establishing Johor's Innovation Corridor 6. Leadership Development Programme for Civil Service Officers

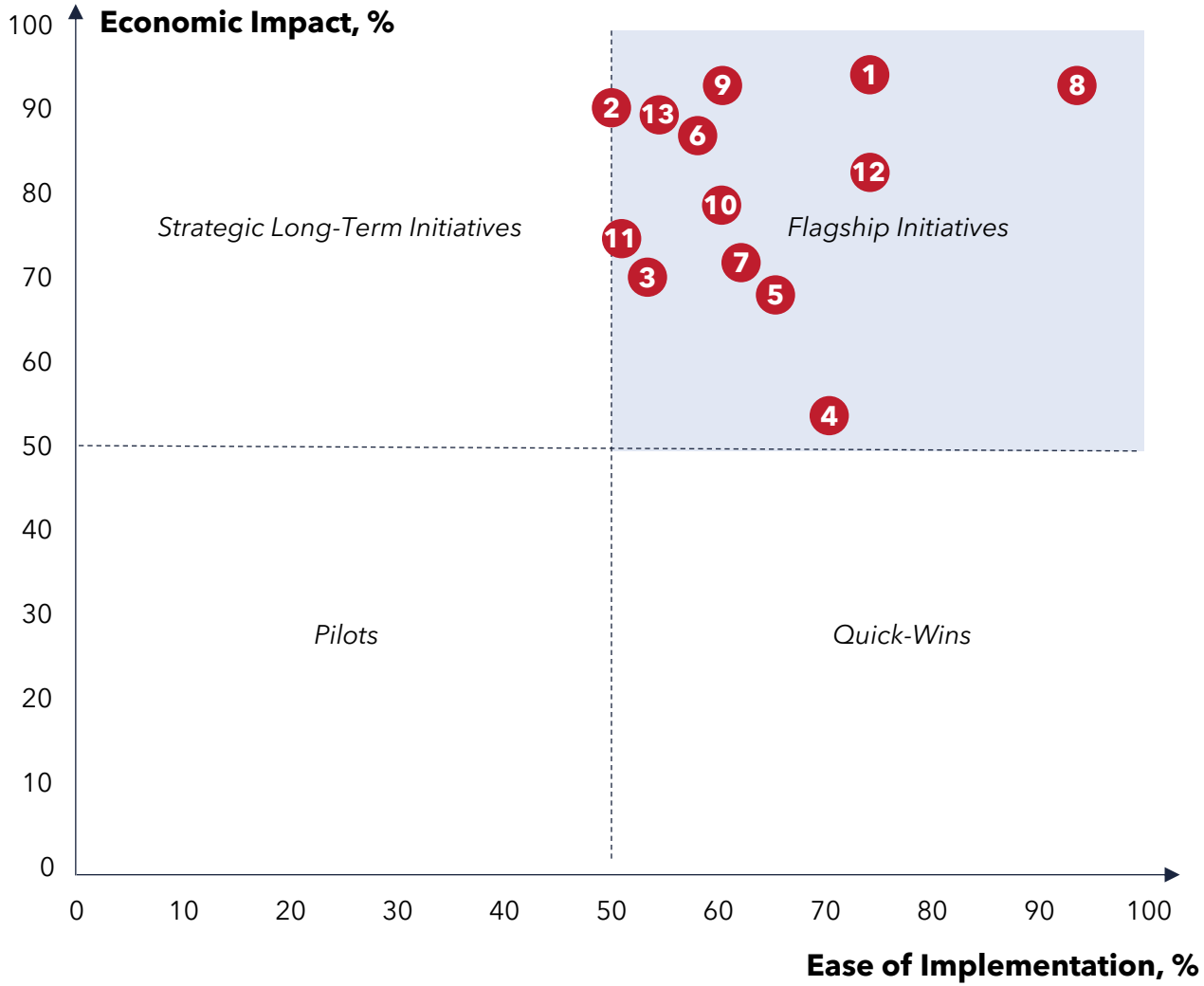
Source: Co-Creation with Federal ministries, State Agencies and GLCs, PASB Analysis

In order to determine key flagship initiatives, a prioritisation matrix was applied to shortlist the highest impact projects

Prioritisation Matrix

- Matrix anchors on the overall economic impact to the state based on its ability to address systemic roadblocks or unlocking new opportunities
- The matrix also considers the ease of implementation of initiatives based on identified budget, timeline, commitment from implementing party

JETP Strategic Intervention Prioritisation Matrix



JETP Flagship Strategic Intervention Initiatives

1. Advancement Towards Treated Water Self-sufficiency
2. Digitalisation of Customs Clearance Processes
3. Johor Transition Industrial Cluster
4. Elevated Autonomous Rapid Transport (EART)
5. Lebuhraya Pantai Timur (LPT) 4
6. Enhancing Mersing's International Connectivity
7. Revitalisation of Segamat In-land Port
8. Johor Regulatory Sandbox
9. Developing a Strategic Industrial Land Consolidation & Release Programme (SILCRP)
10. Establishing Mersing as a Special Tourism Investment Zone (STIZ) and Free Commercial Zone (FCZ)
11. Operationalising JS-SEZ Productivity Linked Waged Policy
12. Implementing Johor's Integrated TVET Programme
13. Establishing Johor's Innovation Corridor

Source: PASB Analysis

Out of the 32 initiatives, 13 flagship initiatives were shortlisted to be further prioritised and accelerated (1/2)

13 Flagship Initiatives:

Flagship Initiatives were selected based on their overall economic impact and ease of implementation respectively

	Key Flagship Initiatives	Implementing Party
1	Advancement Towards Treated Water Self-sufficiency	1. BAKAJ, Ranhill SAJ, Johor Special Water (JSW), PDT, etc.
2	Digitalisation of Customs Clearance Processes	2. Jabatan Kastam Diraja Malaysia (JKDM)
3	Johor Transition Industrial Cluster	3. MyDigital, Johor State Government
4	Elevated Autonomous Rapid Transport (EART)	4. Ministry of Transport (MOT), Jabatan Kerja Raya (JKR) Johor
5	Lebuhraya Pantai Timur (LPT) 4	
6	Enhancement of Mersing's International Connectivity	5. Ministry of Transport (MOT), ECERDC
7	Revitalisation of Segamat In-land Port	6. Ministry of Transport (MOT), Majlis Perbandaran Segamat
8	Johor Regulatory Sandbox	7. Johor State Investment, Trade and Consumer Affairs Committee, IRDA
9	Developing a Strategic Industrial Land Consolidation & Release Programme (SILCRP)	8. JCORP

Resolving Roadblocks

Emerging Opportunities

Source: Co-Creation through engagement with Stakeholders, PASB Analysis
Note: Numbers assigned to flagship initiatives serve only as identifiers and does not indicate priority

Out of the 32 initiatives, 13 flagship initiatives were shortlisted to be further prioritised and accelerated (2/2)

13 Flagship Initiatives:

Flagship Initiatives were selected based on their overall economic impact and ease of implementation respectively

Key Flagship Initiatives	Implementing Party
10 Establishing Mersing as a Special Tourism Investment Zone (STIZ) and Free Commercial Zone (FCZ)	9. MOTAC, Tourism Johor
11 Operationalising JS-SEZ Productivity Linked Waged Policy	11. Johor State Human Resources Committee, JTDC
12 Implementing Johor's Integrated TVET Programme	12. Jskills, JTDC
13 Establishing the Johor Innovation Corridor	13. IRDA, Johor State Investment, Trade and Consumer Affairs Committee, JTDC

Resolving Roadblocks

Emerging Opportunities

Source: Co-Creation through engagement with Stakeholders, PASB Analysis
Note: Numbers assigned to flagship initiatives serve only as identifiers and does not indicate priority

6.2

Category Deep-Dive.

Infrastructure Development.

Infrastructure projects are the critical foundational elements for unlocking long-term socioeconomic growth which spans physical and digital infrastructure

Scope of JETP Infrastructure Development Chapter: Defining Infrastructure Projects

What Infrastructure Projects Are

- Infrastructure projects are **enabling initiatives** focused on development, enhancement, and maintenance of essential foundational systems and facilities that support the functioning and growth of communities and economies
- These projects may include transportation, utilities, digital communication systems

Physical Infrastructure

Physical infrastructure refers to **tangible** assets that are critical for the movement of people, goods, and services, and are foundational for industrial development

Digital or Infrastructure

Digital infrastructure encompasses the technologies and systems that enable digital connectivity, communication, and data exchange, which are crucial to support modern industries, such as, the **digital economy**

Infrastructure projects can catalyse economic growth, create jobs, improve quality of life, and could promote social inclusion

Source: PASB Analysis

Within JETP, infrastructure development is further defined and granularised into sub-categories, allowing for targeted analysis and recommendations

Category	Sub-Category	Definition	Selected Examples
Physical Infrastructure	Power	• Includes the facilities and systems for **producing, transmitting, and distributing power** necessary for industrial, commercial, and residential use	• Power plants, electrical grids, and renewable energy installations
	Water	• Systems that provide **treated water** for domestic and non-domestic usage, **wastewater** and **flood** management	• Water treatment plants, pipelines, dams, aqueducts, drainage systems, desalination plants, flood barriers, etc.
	Connectivity	• Logistics and transportation infrastructure comprises the physical networks and facilities enabling the **movement and storage of goods and people** • It is essential for efficient supply chains, trade, and tourism	• Railways, ports, airports
	Industrial Estates	• Designated zones equipped with facilities to **support business activities** (e.g., manufacturing, warehousing, etc.) • Some industrial estates are equipped with **basic infrastructure** (e.g., utilities, logistics, etc.) to facilitate business activities	• Composite industrial estates, special purpose industrial estates, light / medium / heavy industrial estates
Digital Infrastructure	Digital Connectivity	• Infrastructures enabling accessibility to **digital networks and services**	• Network cabling (e.g., fibre optics), broadband, wireless networking equipment (e.g., 5G)
	Data Exchange	• Platforms and protocols that enable **data transmission and interaction**	• Mobile networks, satellite system
	Data Storage	• Systems that **store, process, and manage data flows**	• Data centres, cloud computing

Source: PASB Analysis

Infrastructure projects promote an economic multiplier effect and enables investment attraction, job creation, and enhances connectivity and productivity

Infrastructure Projects' Economic Multiplier Effect

20%
Socioeconomic Rate of Return[1]

$1
Worth of Infrastructure Investment

Which Means...

$0.20
Increase in Gross Domestic Product (GDP)

How Infrastructure Projects Drive Economic Growth

Investment Attraction
Robust infrastructure attracts foreign direct investment (FDI), supports industrial growth, and fosters innovation by providing a reliable foundation for businesses and technology

Productivity Enhancement
Infrastructure reduces production and transaction costs, improves efficiency, and enhances connectivity, enabling businesses to operate more competitively and economies to grow sustainably

Job Creation
Infrastructure projects generate employment during construction and through improved economic activities afterward, helping reduce poverty and raise living standards

Connectivity Improvement
Infrastructure development enhances physical and digital connectivity by reducing travel times, lowering transportation costs, and expanding access to communication networks

Note: [1]Rate of Return is a measure of profitability or efficiency of investment (i.e., net profit divided by initial investment cost)
Source: McKinsey Global Institute

Malaysia ranks 23rd in IMD's World Competitiveness Index, supported by economic strength, but with infrastructure identified as a key improvement area

IMD World Competitiveness Ranking (2025) Across 69 Countries

2021	2022	2023	2024	2025
25th	32nd	27th	34th	**23rd**

- 2025 marks Malaysia's best performance in five years, ranking 23rd in the IMD World Competitiveness Index
- Across the different categories, infrastructure development remain an area of improvement for the nation with an overall score of 53.5 – the lowest across all categories

IMD World Competitiveness Further Breakdown (2021 – 2025), Ranking

Further Details: Examples of Measurements Used (Non-exhaustive)

Infrastructure (Score: 53.5)

2021	2022	2023	2024	2025
32nd	37th	35th	35th	35th

Roads, railroads, air transportation, energy infrastructure, mobile broadband subscribers, internet users, R&D expenditure, health infrastructure, education public expenditure

Detailed Breakdown (2025):

- Basic Infrastructure: 13th
- Technological Infrastructure: 25th
- Scientific Infrastructure: 35th
- Health and Environment: 50th
- Education: 44th

Focus

Economic Performance (Score: 74.1)

2021	2022	2023	2024	2025
15th	12nd	7th	8th	4th

Gross Domestic Product (GDP), Real GDP growth, GDP per capita, trade balance, direct investment flows, employment, consumer price inflation

Government Efficiency (Score: 60.4)

2021	2022	2023	2024	2025
30th	38th	29th	33rd	25th

Government budget surplus / deficit, total tax revenues, real short-term interest rate, legal and regulatory framework, tariff barriers, transparency

Business Efficiency (Score: 55.4)

2021	2022	2023	2024	2025
24th	38th	32nd	40th	32nd

Overall productivity (PPP), workforce productivity, working hours, labour force, access to financial services

Source: IMD

Similarly, Johor's rapid economic growth can be attributed to its robust infrastructure development efforts...

Overview of Johor's Infrastructure and Selected Performance Metrics

Power

Quick Facts	Notable Infrastructure
5 Powerplants **5,415MW** Installed Capacity[1]	• Tanjung Bin Power • Tanjung Bin Energy • Southern Power Generation • Pengerang Power • TNB Pasir Gudang

Water

Quick Facts: STP[1]	Quick Facts: WTP[2]	Quick Facts: Dam	Notable Infrastructure
1,092 Sewage Treatment Plants **5.5Mil** Population Equivalence **3,740km** Sewer Pipe Length	**47** Water Treatment Plants **2,375MLD** Design Capacity **24,188km** Pipe Length	**17** Dams **2,118MLD** Capacity	• Johor Bahru Central Sewage Treatment Plant • Sg Johor Water Treatment Plant • Sultan Iskandar Water Treatment Plant • Linggiu Dam

Connectivity and Transportation

Quick Facts: Air	Quick Facts: Sea	Quick Facts: Land	Notable Infrastructure
1 International Airport **3Mil** Passengers Handled **5,800 FWT** Cargo Handled	**4** Major Seaports[2] **12.3Mil** TEUS	**25,336km** Length of Road Infrastructure **11** Major Railway Stations **4** Major KTMB Cargo Hubs	• Airport: Senai International Airport • Seaport: Port of Tanjung Pelepas • Roads: Eastern Dispersal Link (EDL), Federal Route 3, 1st and 2nd link • Rail cargo hubs: Segamat, Kempas Baru

Industrial Estates

Quick Facts	Notable Infrastructure
28 Industrial Estates	• Sedenak Technology Park • Senai Airport City • Pengerang Integrated Petroleum Complex (PIPC)

Digital Infrastructure

Quick Facts		Notable Infrastructure
84% 5G Coverage	**11** Data Centres[3]	• DayOne: Nusajaya Tech Park • Keppel DC Johor • Bridge Kidex Sedenak

Note: [1]Sewage Treatment Plant, [2]Water Treatment Plant, [3]Operational

...however, further infrastructure enhancements will be required to take Johor's economic growth to greater heights

Why Infrastructure Enhancement Is Required

GDP Growth Ambitions

- To meet the Maju Johor 2030 vision, Johor must grow GDP from RM158 billion to RM260 billion by 2030
- This requires improvements in transport, utilities, and digital infrastructure

Surging Investment Volume

- Johor attracted RM30.1 billion in investments in Q1 2025, with more coming in the pipeline
- Infrastructure upgrades are essential to support growth in manufacturing, data centers, and logistics

Supporting High-Value Sectors

- Rapid expansion in logistics, data centers, and advanced manufacturing demands reliable power, water, broadband, and road connectivity
- Infrastructure upgrades enable "future-ready" industrial facilities

Traffic Congestion and Productivity

- Johor faces severe traffic congestion, increasing operational costs and lowering productivity
- Investing in roads, public transit and smart mobility solutions is critical

Special Economic Zone Integration

- Success of JS-SEZ and Forest City SFZ relies on seamless infrastructure integration (ports, energy, digital, transport)
- Upgraded infrastructure supports faster customs clearance, logistics, and talent mobility

Source: PASB Analysis

Deep-dive: Power

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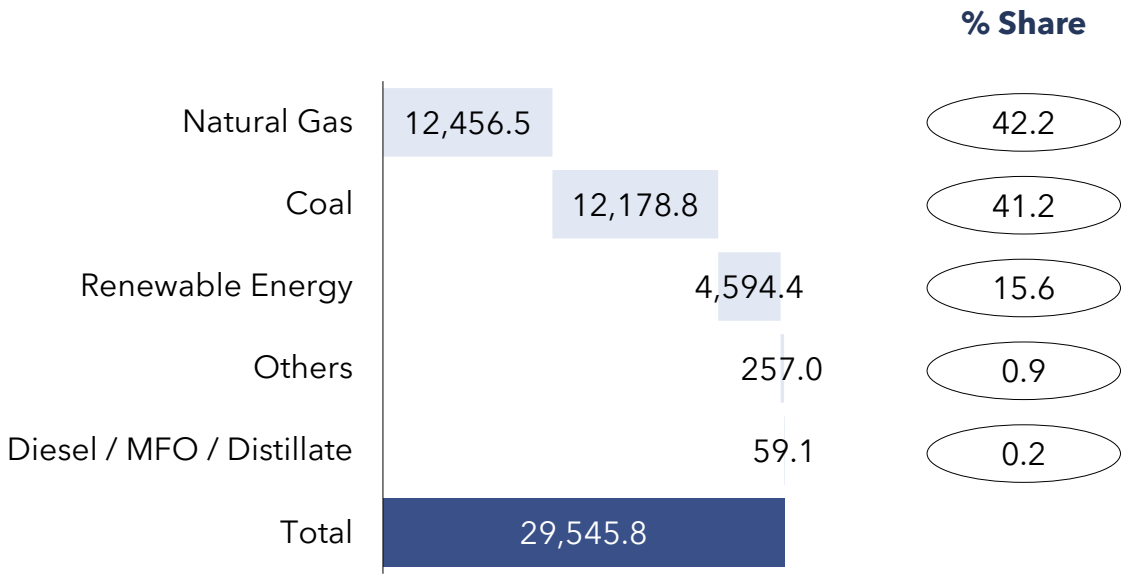
Source: PASB Analysis

Peninsular Malaysia has ~29GW of total installed capacity, where 80% is represented by natural gas and coal, ~16% represented by renewable sources

Peninsular Malaysia Installed Capacity (Total) by Source (2021)

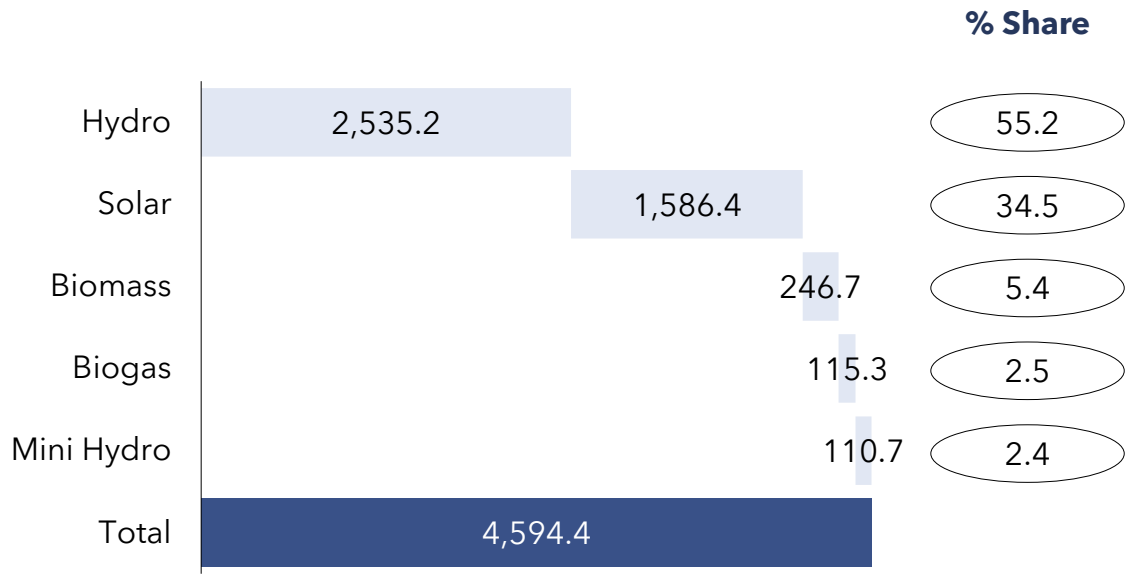
Megawatts



- Peninsular Malaysia has a **total installed capacity of 29GW**
- **Natural gas and coal** represent **over 80% of Peninsular Malaysia's total installed capacity**
- **Renewable energy** represents **~16% of Peninsular Malaysia's installed capacity**

Peninsular Malaysia Installed Capacity (Renewable Energy) by Source (2021)

Megawatts

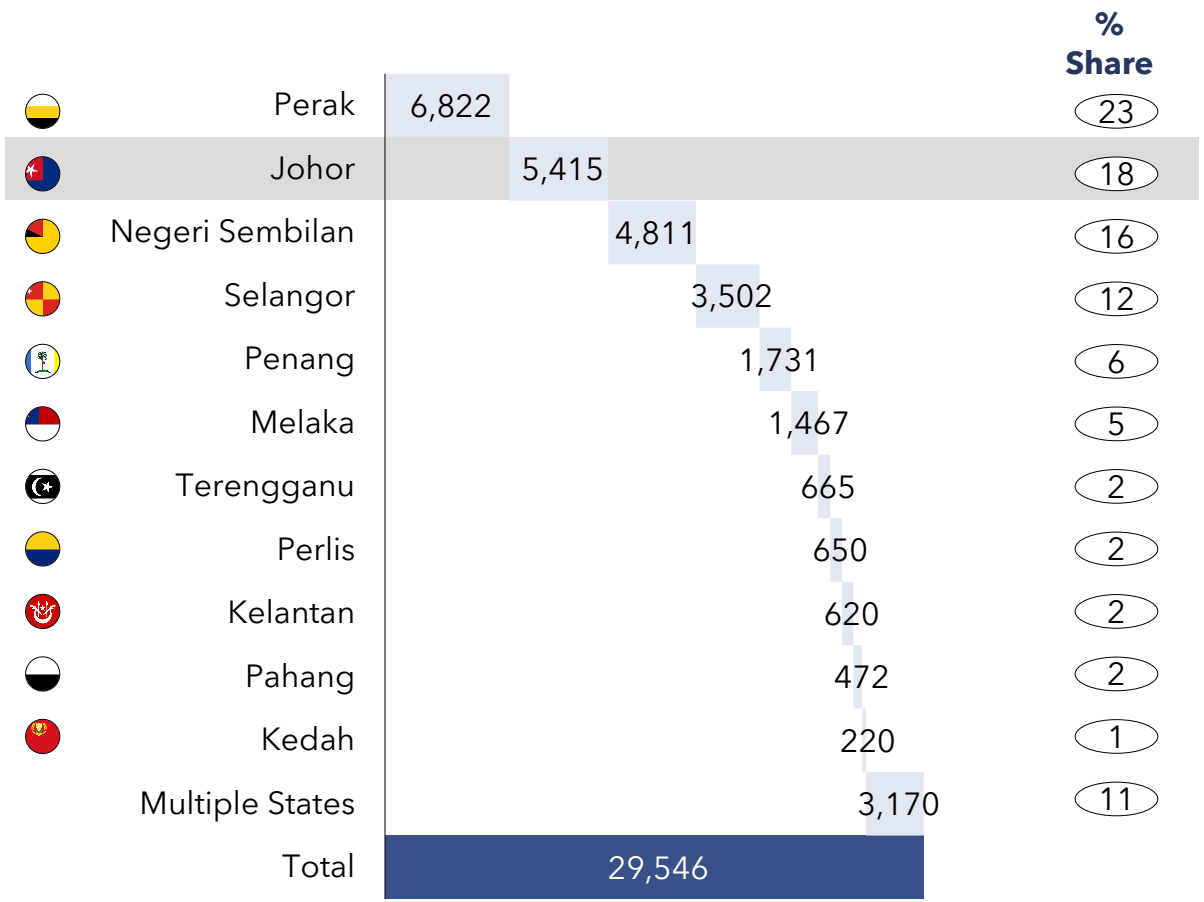


- Diving deeper into renewables, **hydro and solar** were the **largest contributors**, representing over **80% of renewable installed capacity**

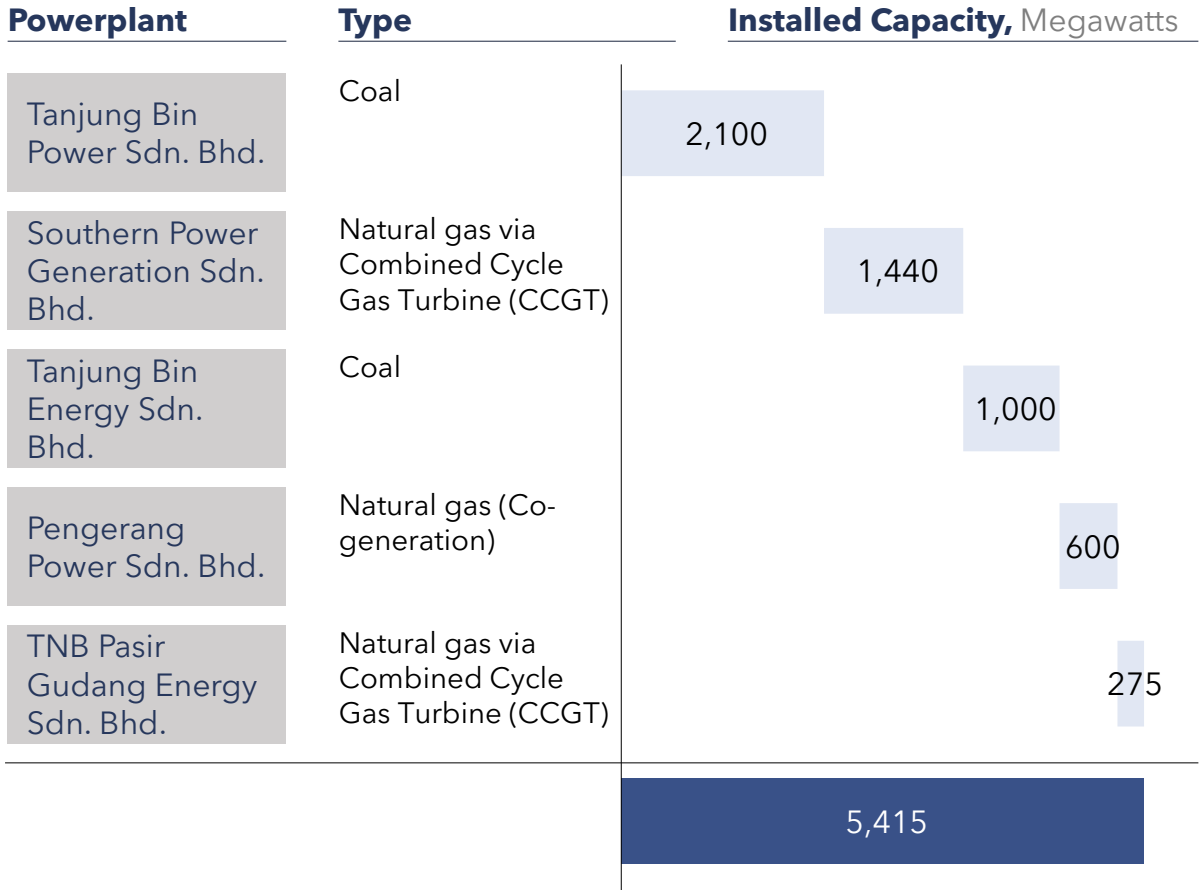
Source: Suruhanjaya Tenaga

Johor has ~18% of Peninsular Malaysia's installed capacity, positioning it as the 2nd highest in the Peninsula, mainly attributed to Tanjung Bin and Southern Power Generation plants

Peninsular Malaysia Installed Capacity (Total) by State (2021), Megawatts



Johor's Installed Capacity (Total) by Powerplant (2021)

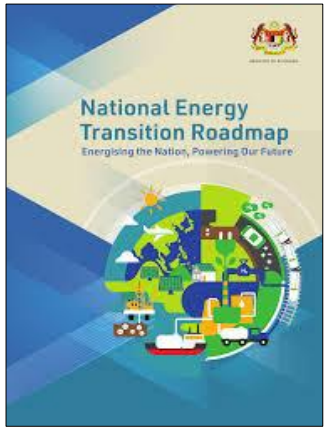


Since powerplants located across Peninsular Malaysia are connected to the National Grid, where electricity flows dynamically based on supply and demand, Johor is a significant contributor and ensures that the Peninsula's energy demands are met

Note: Data as of 2021, there may be significant development since then
Source: PASB Analysis, Suruhanjaya Tenaga

The National Energy Transition Roadmap (NETR) was developed to guide Malaysia towards its net-zero ambitions, which it strives to achieve by 2050...

NETR Quick Summary



- Roadmap is vital for steering Malaysia's shift from traditional fossil fuels to high-value green economy
- 10 flagship catalyst projects identified, potentially attracting over RM25bil investments, 23,000 jobs
- Malaysia aims to achieve:
  - **Net-zero** greenhouse emissions (GHG) by **2050**
  - **Reduce economy-wide carbon intensity by 45% by 2030**, based on 2005 levels

National Energy Transition Roadmap (NETR) Strategy

Ambition	**Long-term energy transition ambition**: To establish low-carbon pathway, energy mix and emission target reduction					
Energy Transition Levers	**Optimise**	**Shift to Renewables**				**Abate**
	Energy Efficiency	Renewable Energy	Hydrogen	Bioenergy	Green Mobility	Carbon Capture, Utilisation and Storage (CCUS)
Flagship Projects	• Efficient Switch	• Renewable Energy Zone (RE Zone) • Energy Storage • Energy Secure	• Green Hydrogen • Hydrogen for Power	• Biomass Demand Creation	• Future Mobility • Future Fuel	• CCS for Industry
Enablers	• Financing and investments • Human capital and capabilities • Policy and regulation • Technology and infrastructure • Governance					

Source: PASB Analysis

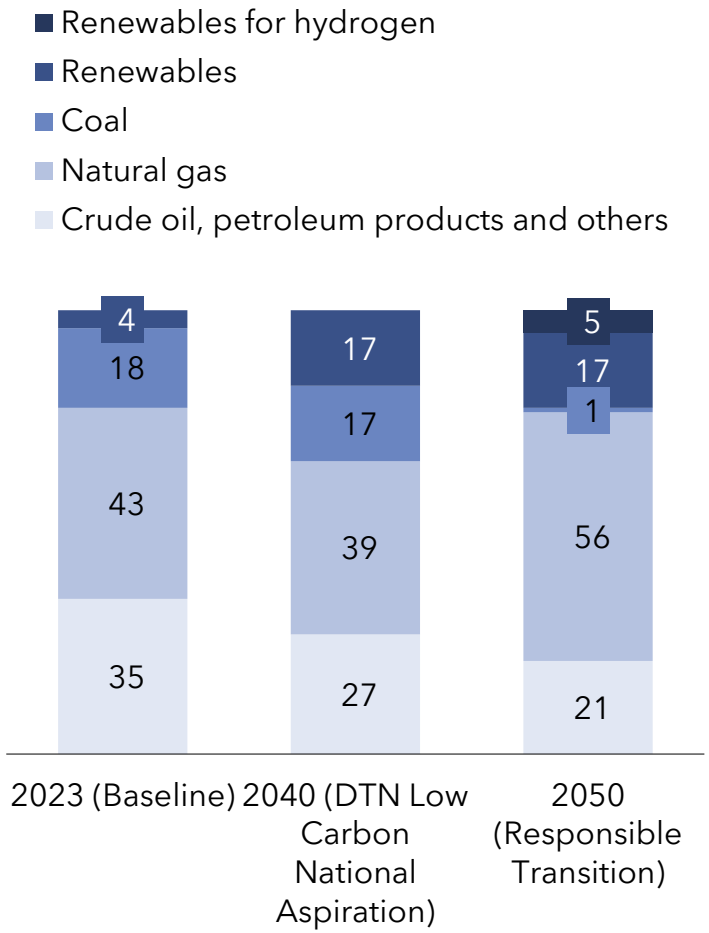
...and is grounded by specific targets to guide realisation

NETR Selected Drivers and Targets by 2050 (An Extension of 2040 DTN Targets)

Lever	Driver	2040 DTN[1]	2050 NETR[2]
Energy Efficiency	Industry, comm. energy savings (%)	11%	23%
Re-newable Energy	Coal share installed capacity (%)	19%	0%
	RE share installed capacity (%)	41%	70%
Hydrogen	Green hydrogen production (Mtpa)	N/A	Up to 2.5Mtpa
	Hydrogen hubs (#)	N/A	3
Bioenergy	Biofuel capacity (bil litres)	N/A	3.5
	Bioenergy power generation (GW)	N/A	1.4
Green Mobility	Hydrogen penetration (Heavy) (%)	N/A	5%
	SAF blending mandate by 2050 (%)	N/A	47%
CCUS	CCUS clusters (#)	N/A	3-6
	CO_2 storage capacity (Mtpa)	N/A	40-80

How This Translates into Malaysia's Total Primary Energy Supply (TPES)

Malaysia's Projected Total Primary Energy Supply by Energy Source, Percentage Share



Takeaways

- While crude oil and petroleum products diminishes (35% in 2023 to 21% in 2050), it remains significant in TPES
- Natural gas TPES share grows (43% in 2023 to 56% in 2050), crystallising its position as a key "transition fuel"
- Coal diminishes in Malaysia's total primary energy supply, from 18% in 2023 to only 1% in 2050
- Renewables will ultimately grow (4% in 2023 to 17% in 2050) to facilitate reduction in GHG emission

Note: [1]National Energy Policy's Low Carbon Nation Aspiration, [2]NETR's Responsible Transition

Johor State Government aims to realise Sultan Ibrahim Solar Photovoltaic Park, 860MW Hybrid Solar Power Plant, LSS projects for energy security and to facilitate energy transition

State Government Ongoing Efforts to Ensure Energy Security

NON-EXHAUSTIVE

Sultan Ibrahim Solar PV Park in Pengerang

- 450MW ground-mounted solar photovoltaic (PV) park located in Pengerang, envisioned to be Southeast Asia's largest solar energy storage system
- Constructed expected to commence in 2025, commercial operation targeted by 2026
- Project costs RM1.4bil

860MW Hybrid Solar Power Plant in Segamat

- 1,700 acres, combining solar PV with energy storage to enhance reliability
- Hybrid nature of plants increases consistency of power output, addressing intermittency issues in solar energy
- Part of Johor's broader renewable energy strategy to enhance energy security

Johor Green Deal Aims to Attract Large-Scale Solar (LSS) Projects into Johor

- Under recommendation E4: "Attract investments in solar PV technology to grow Large-Scale Solar ("LSS") energy projects in Johor"

Source: PASB Analysis, various news articles

Deep-dive: Water

Category	Sub-Category	Definition	Selected Examples
Physical Infrastructure	Power	• Includes the facilities and systems for **producing, transmitting, and distributing power** necessary for industrial, commercial, and residential use	• Power plants, electrical grids, and renewable energy installations
	Water	• Systems that provide **treated water** for domestic and non-domestic usage, **wastewater** and **flood** management	• Water treatment plants, pipelines, dams, aqueducts, drainage systems, desalination plants, flood barriers, etc.
	Connectivity	• Logistics and transportation infrastructure comprises the physical networks and facilities enabling the **movement and storage of goods and people** • It is essential for efficient supply chains, trade, and tourism	• Railways, ports, airports
	Industrial Estates	• Designated zones equipped with facilities to **support business activities** (e.g., manufacturing, warehousing, etc.) • Some industrial estates are equipped with **basic infrastructure** (e.g., utilities, logistics, etc.) to facilitate business activities	• Composite industrial estates, special purpose industrial estates, light / medium / heavy industrial estates
Digital Infrastructure	Digital Connectivity	• Infrastructures enabling accessibility to **digital networks and services**	• Network cabling (e.g., fibre optics), broadband, wireless networking equipment (e.g., 5G)
	Data Exchange	• Platforms and protocols that enable **data transmission and interaction**	• Mobile networks, satellite system
	Data Storage	• Systems that **store, process, and manage data flows**	• Data centres, cloud computing

Source: PASB Analysis

Despite being one of Malaysia's increasingly water-demanding states, Johor has built a relatively resilient water infrastructure system that is able to deliver adequate water supply

Key Findings

1 **Johor is one of the top water-intensive states in Malaysia**

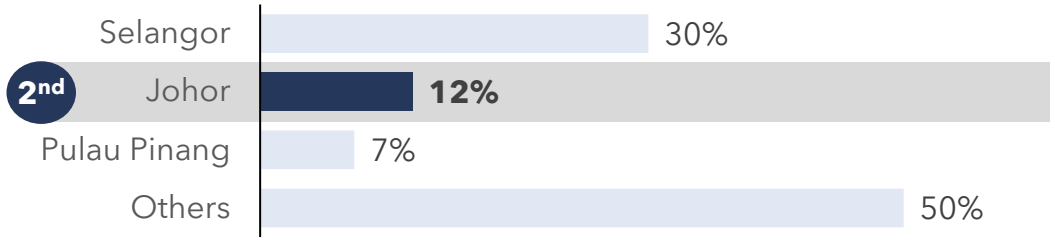
2 **Johor has the lowest proportion of water leakage (NRW[2]) across all states**

3 **Johor has committed to ensuring sufficient water reserves in recent years**

Macro Data

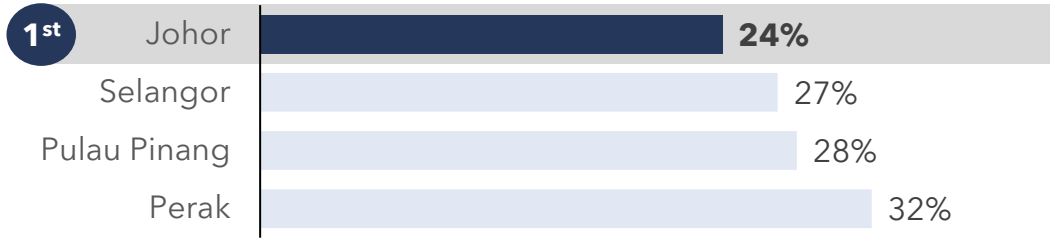
Water Consumption by State (2022)

% of national water consumption



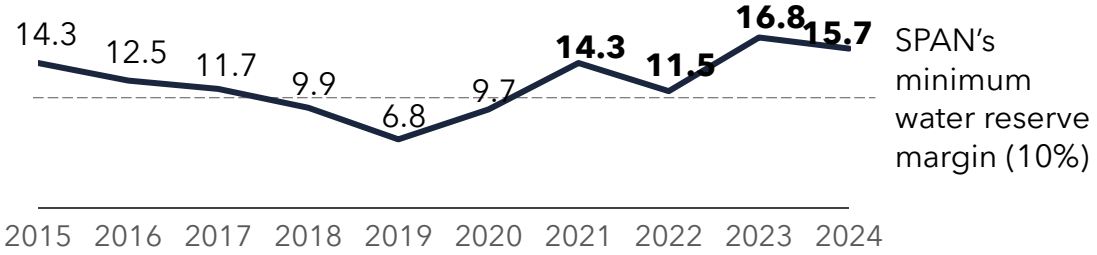
Non-Revenue Water by State (2024)

% of respective state's water demand (SIV – System Input Volume)



Johor Water Reserve Margins[3] (2015-2024)

% of total water production/ distribution capacity



Insights

- Johor consumes 1403 MLD[1], and **ranks 2nd in terms of national water consumption** as of 2022
- Water consumption in the state has **expanded rapidly by ~3% annually since 2003-2022**, in attribution to population and industrial growth

- Johor tracked an improvement of over 13% NRW reduction since 2005 (37%), and **now ranks 1st in terms of the least NRW** in 2024
- Ranhill's (Johor's sole water operator) together with the government (PAAB) has **ongoing commitments to reduce NRW to 5%** by 2025

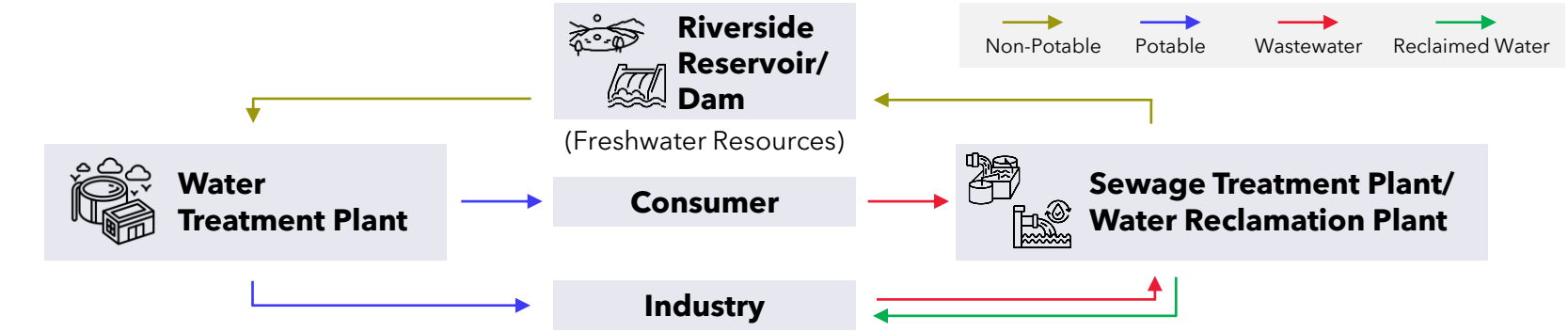
- Johor has been able to maintain healthy water reserves as it was prompted to strengthen its water capacity following:
  - **Drought-induced water supply shortages** between 2018-2020
  - **Clustered industrialisation push** and **increasing data centre interests**

Note: 1. Million litres per day; 2. Non-revenue water is water that has been produced and is "lost" before it reaches the customer; 3. Extra distributable capacity after meeting current demand
Source: DOSM, SPAN, i3 Investor

Johor's continued ability to meet rising water demand is underpinned by an integrated treated water ecosystem, backed by well-planned infrastructure and capacity upgrades

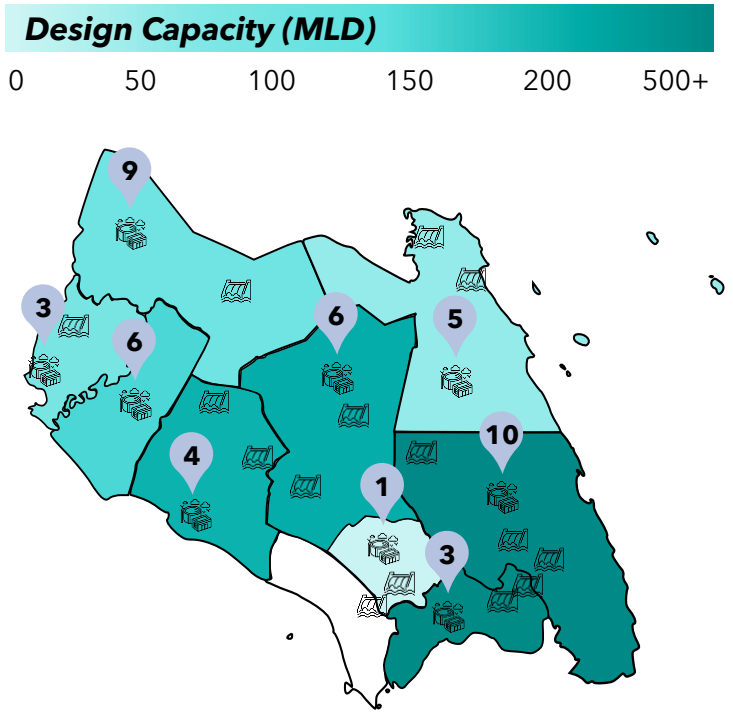
Value Chain	Owners	Types of Water Infrastructure	Johor Current State Capacity (2024)		
Water Storage/ Supply	Federal/ State	**Riverside Reservoir/ Dams** • Stores and regulates raw water from rivers for consistent supply to treatment facilities	**17** dams	**2,118 MLD** in yield	
Water Treatment	Ranhill	**Water Treatment Plants (WTPs/ LRAs)** • Purifies raw water to meet potable standards for household, commercial, and industrial use	**47** plants*	**2,375 MLD** in design capacity	**24,188 km** in pipe length
	Indah Water/ Johor Special Water	**Sewage Treatment Plants (STPs)** • Removes pollutants from wastewater to ensure safe discharge into the environment	**1092** plants	**5.5 mil** in PE[1]	**3,740 km** in sewer pipes
		Water Reclamation Plants (WRPs) • Treats used water to quality suited for industrial, non-potable reuse, reducing freshwater demand	**N/A**	**N/A**	**N/A**

Water Lifecycle



Location of Water Infrastructure

Location of mapped WTPs are aggregated and hence not accurate to its true in-district location



Riverside Reservoir	-
Dam	17
Water Treatment Plant	47
Sewage Treatment Plant	1,092
Water Reclamation Plant	-

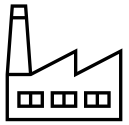
Note: *Excludes Singapore's Public Utilities Board (PUB) operated water treatment plant, 1. Population equivalence
Source: SPAN, Ranhill SAJ, PDT

Additionally, beyond the challenges of water supply, recurrent flooding in the nation has led to lasting direct and indirect economic implications, posing significant financial risks to businesses and the broader economy

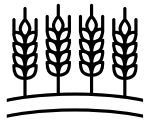
Non-exhaustive

Direct Impacts (Physical and Immediate Losses)

Infrastructure & Property Damage
Public infrastructure, utilities and energy infrastructure, residential property losses, personal assets (vehicles, valuable belongings, etc) which includes construction and repair costs



Business Asset Losses
Damages to facilities, equipment and inventory especially towards the manufacturing and industrial sector

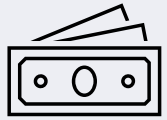


Agriculture & Food Supply Chain Losses
Farmlands, Crop and livestock losses which have long term repercussions due to extended turnaround time required

Indirect Impact (Ripple Effects)

Economic Productivity Losses
GDP Contraction from lower output, diversion of tourism and declines in consumer spending

Supply Chain Disruption
Delays and production losses due to hindered delivery, transportation network and manufacturing



Increased operational cost
Additional expenses for repair and higher cost of raw materials especially if sourced within affected regions along with insurance premiums

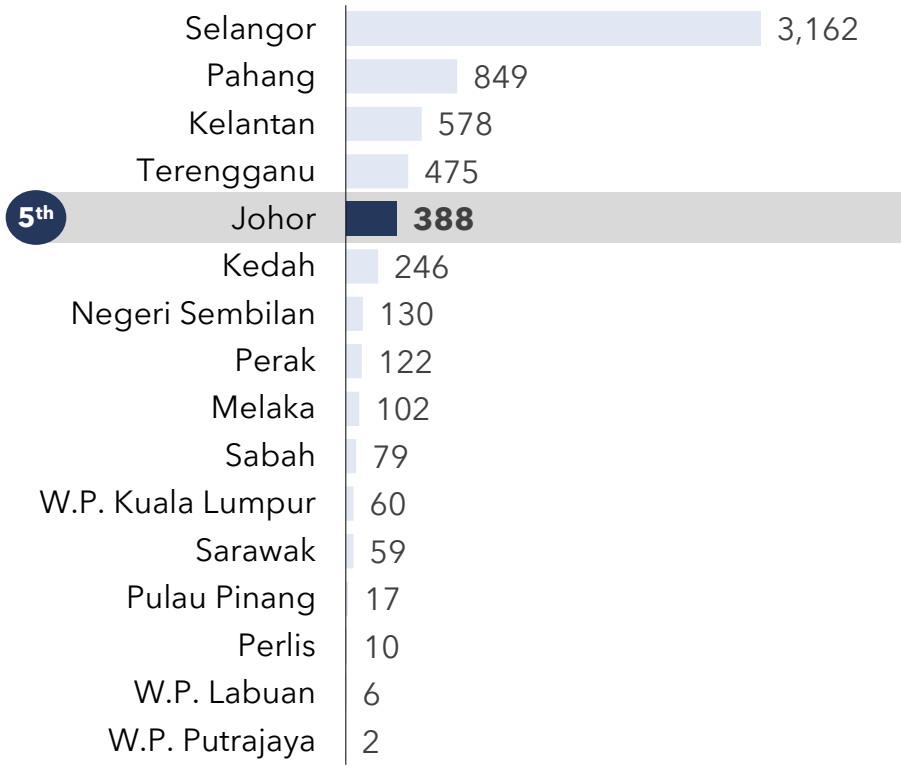
Investment Deterrent
Risk towards long-term investments, particularly in capital-intensive and high-value industries such as technology, manufacturing, and logistics

Source: PASB Analysis

Johor remains one of the most flood-prone states and is increasingly so due to rapid urbanisation, with public and household assets bearing the greatest damage cumulatively

Cumulative Flood Losses Across States (2021-2024)

RM Million



Across states, **Johor ranks 5th in cumulative flood losses** over the past 4 years in which **2023 alone contributed RM275 million** due to a combination of heavy rainfalls, high tides, clogged drainage systems, and is anticipated to worsen with growing urbanisation and flood risks

Total Direct Flood Losses in Johor by Category (2022-2024[1])

as a % of total flood losses

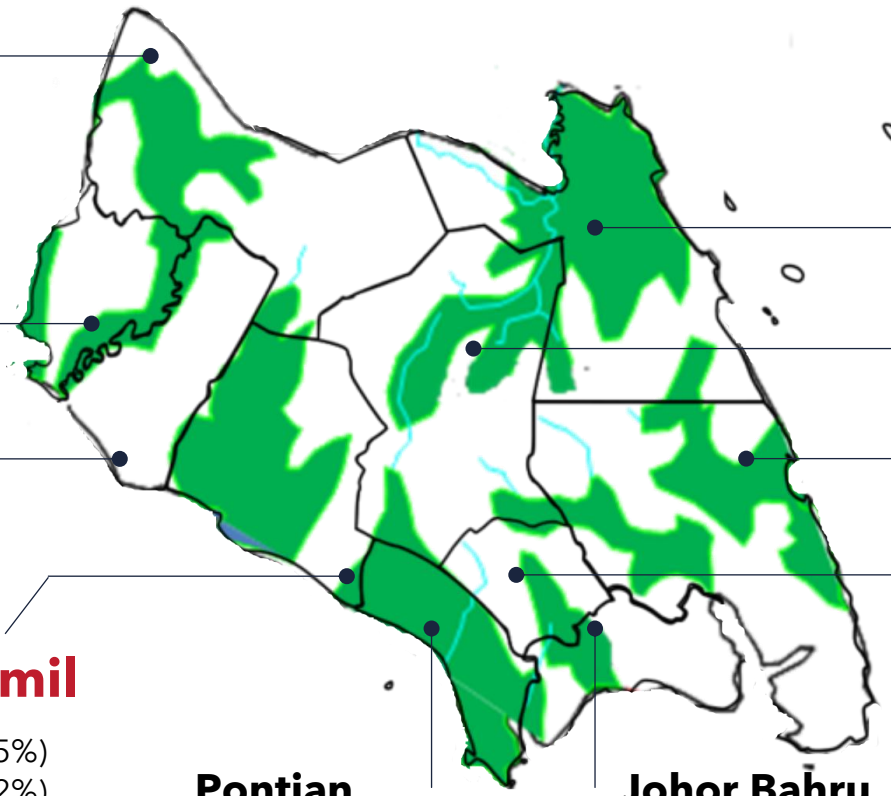
Category	Amount (RM Million)	Percentage of Total Losses (%)
Public Infrastructure	152	39
Living Quarters	144	37
Business Premises	33	9
Agriculture	28	7
Vehicles	18	5
Manufacturing	10	3

Similar to other states, **living quarters and public infrastructure makes up majority of Johor's total flood losses (77%)** due to their relatively higher vulnerability to flood damange, while **agriculture and manufacturing-related flood-losses comprised 10% of the total**

Source: DOSM; PASB Analysis
Note: 1. 2021 data excluded due to missing agriculture data. 2. Top 15 GDP districts based on 2020 DOSM data

Across Johor, all districts remain exposed to flood risks however Muar, Batu Pahat and Segamat remain the most affected districts based on direct flood losses from 2022-2024

Cumulative Flood Losses Across Districts in Johor (2022-2024)



Segamat
RM 56.7 mil
- RM 19.9 mil (35%)
- RM 1.5 mil (3%)
- RM 25.9 mil (46%)
- RM 9.5 mil (17%)

Tangkak
RM 2.8 mil
- RM 2.3 mil (80%)
- RM 0.2 mil (7%)
- RM 0.4 mil (13%)
- N/A

Muar
RM 104.8 mil
- RM 7.1 mil (84%)
- RM 1.1 mil (13%)
- RM 0.2 mil (3%)
- RM 0.0 mil (0%)

Batu Pahat
RM 105.1 mil
- RM 89.5 mil (85%)
- RM 12.4 mil (12%)
- RM 3.3 mil (3%)
- N/A

Pontian
RM 0.7 mil
- RM 0.6 mil (84%)
- RM 0.0 mil (4%)
- RM 0.1 mil (12%)
- N/A

Johor Bahru
RM 6.8 mil
- RM 5.4 mil (80%)
- RM 0.3 mil (5%)
- RM 0.3 mil (4%)
- RM 0.8 mil (12%)

Kulai
RM 0.7 mil
- RM 0.7 mil (82%)
- RM 0.1 mil (7%)
- RM 0.1 mil (12%)
- N/A

Mersing
RM 4.4 mil
- RM 3.4 mil (78%)
- RM 0.5 mil (12%)
- RM 0.4 mil (10%)
- N/A

Kluang
RM 5.1 mil
- RM 4.7 mil (77%)
- RM 0.8 mil (13%)
- RM 0.6 mil (10%)
- N/A

Kota Tinggi
RM 13.4 mil
- RM 10.3 mil (77%)
- RM 1.1 mil (8%)
- RM 2.0 mil (15%)
- N/A

Flood Prone Areas
Major Rivers

Source: DOSM; PASB Analysis; JPS
Note: Agriculture data not captured and measured at an administrative district level. "N/A" = Not affected by flood

The Johor State Government has developed multifaceted public infrastructure and governance efforts to ensure adequate water supply and flood protection across all districts

Ongoing State Government Efforts for Treated Water

PUBLIC INFRASTRUCTURE

1. **Kahang Water Treatment Plant**
   - At a cost of RM 140 mil and located in Kluang, it will help supply 40 MLD to approximately 86,000 people

2. **Semangar Water Treatment Plant (Package Plant)**
   - Equips the Semangar WTP with an additional 50 MLD capacity at a cost of RM 70 mil, supplying Johor Bahru and Kulai

3. **Old Water Pipelines Replacement**
   - Since 2022, the state government has committed to replacing 6,000 km of old underground pipes in the next 5-10 years

GOVERNANCE & STRATEGIC MEASURES

1. **Johor State Water Board**
   - Johor has tabled to upgrade its water regulatory body – BAKAJ[1] to the state's water board, granting it stronger enforcement powers and enhanced surveillance

2. **Johor State Data Centre Development Coordination Committee (JPPDNJ)**
   - JPPDNJ in line with the JSDCDPG[2], conducts thorough sustainability vetting of data centre applications

3. **Johor Special Water**
   - A wholly-owned subsidiary of PDT established to drive strategic statewater initiatives for future industrial use

Ongoing State Government Efforts for Flood

PUBLIC INFRASTRUCTURE

1. **River Mitigation Projects**
   - 8 high priority flood mitigation projects are being implemented in Johor across Segamat, Kota Tinggi, Batu Pahat, Muar, Tangkak, Johor Bahru

2. **Flood Control Infrastructure Upgrading**
   - Upgrades are planned for mechanical and electrical flood control infrastructures as well as the Bekok Dam

3. **Seri Menanti Breakwater Reclamation Project**
   - Reclamation behind the breakwater to bolster coastal resilience along the Seri Menanti coast to reduce tidal-surge flooding in low-lying Muar districts

GOVERNANCE & STRATEGIC MEASURES

1. **Special Task Force for Flood Hotspots**
   - Introduction of a broader special task force to address flood hot spots across the state and develop a holistic mitigation strategy which involves the drainage and irrigation department, district offices, and local councils
   - Reassess developments along Sungai Skudai and Sungai Tebrau, which had historically suffered from inadequate federal funding for deepening and cleaning efforts

Source: PDT, Various news sources
Note: 1. Badan Kawalselia Air Johor; 2. Johor State Data Centre Development Planning Guidelines

Deep-dive: Connectivity

Category	Sub-Category	Definition	Selected Examples
Physical Infrastructure	Power	• Includes the facilities and systems for **producing, transmitting, and distributing power** necessary for industrial, commercial, and residential use	• Power plants, electrical grids, and renewable energy installations
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	Data Exchange	• Platforms and protocols that enable **data transmission and interaction**	• Mobile networks, satellite system
	Data Storage	• Systems that **store, process, and manage data flows**	• Data centres, cloud computing

Source: PASB Analysis

Located in Kulai, Senai International Airport is Johor's only international airport; It serves as a key aviation gateway for the southern region of Peninsular Malaysia

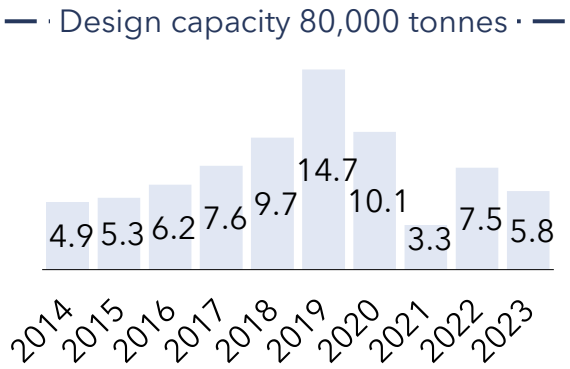
Overview of Airports in Johor

Legend

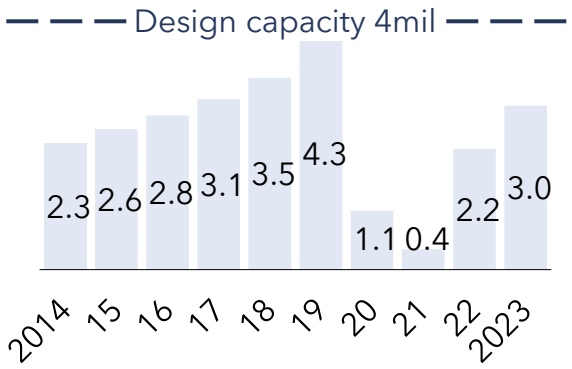
A Senai International Airport

Snapshot of Selected Statistics

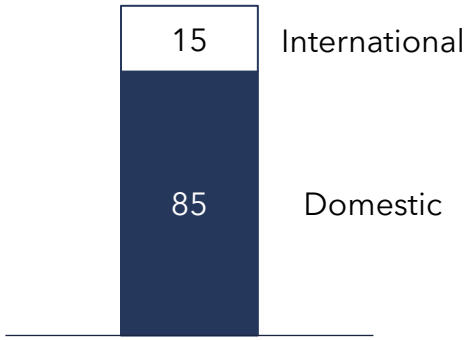
Cargo Handled (2014 – 2023), Tonnes (Thousand)



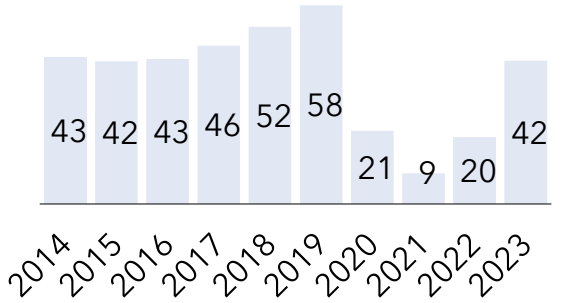
Total Passengers Handled (2014 – 2023)[1], Number of Passengers



Average Cargo Handled (Int. VS Dom.) (2023), Percentage of Total



 # Commercial Aircraft Movements (2014 – 2023), Thousand



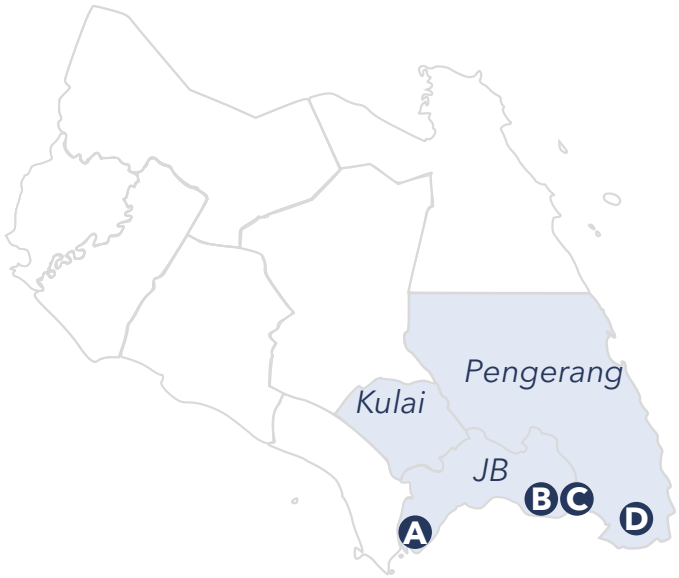
Further Details

- **5.8mil** cargo handled in 2023, translates to **~7%** of design capacity
- **85%** of cargo handed in 2023 is **domestic**
- **3mil** passengers handled in 2023, translates to **~75%** of design capacity
- Passengers handled in **2019 surpassed** design capacity
- ~**42k** commercial aircraft movements in 2023

Source: SATSSB, MOT

While for seaports, Johor has Port of Tanjung Pelepas, Johor Port Berhad, Tanjung Langsat Port and Pengerang Deepwater Terminals

Overview of Seaports in Johor

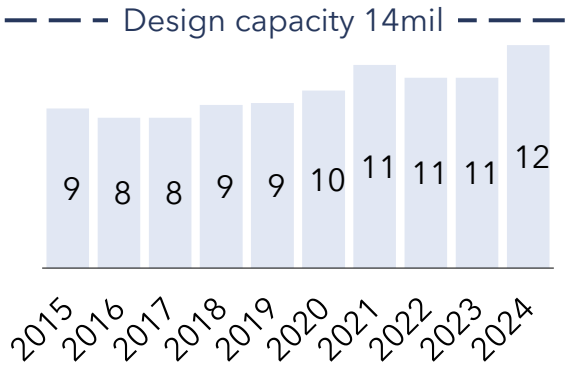


Legend

- Ⓐ Port of Tanjung Pelepas (PTP)
- Ⓑ Johor Port Berhad (JPB)
- Ⓒ Tanjung Langsat Port (TLP)
- Ⓓ Pengerang Deepwater Terminals

Snapshot of Selected Statistics

TEUs Handled by PTP (2015 – 2024), Million



Cargo Throughput by Type Handled by JPB (2019 – 2023)

	2019	'21	'22	'23	2024
Liquid Bulk Mn FWT	14	13	14	14	12
Dry Bulk Mn FWT	3.9	3.7	3.6	4.0	4.2
Break Bulk Mn FWT	0.7	0.6	0.7	0.6	0.5
Container Mn TEU	1.0	1.0	0.9	0.9	0.9

Liquid Storage Capacity in Tanjung Langsat Port, Cubic Metres

DTL1	476,000
DTL3	205,777
DTL2	171,000
Musim Mastika	70,200
Langsat Bitumen	70,000
Langsat Bulkers	47,400
Norman Process…	43,000
Menajaya	20,300
Total	1,103,677

Pengerang Terminal Storage Capabilities by Product

1.7mil cbm
Crude and clean petroleum products

1.3mil cbm
Crude, refined products, petrochemicals, LPG

400,000 cbm
LNG

430,000 cbm
Middle Distillates

Further Details

- PTP handled **12.3mil TEUs** in 2024, translates to ~88% of design capacity
- In 2023, JPB handled:
  - **12mil** FWT of liquid bulk cargo (80% of design capacity)
  - **4.2mil** FWT of dry bulk cargo (53% of design capacity)
  - **0.5mil** FWT of break bulk cargo (24% of design capacity)
  - **~0.9mil** TEUs (65% of design capacity)
- TLP has oil storage capacity of up to **1.1mil cubic metres**

Source: PTP, JPB, TLP, Pengerang Deepwater Terminals

Johor has 11 ferry terminals and have collectively received 1.2mil foreign tourist arrivals in 2023

Selected Ferry Terminals in Johor

Legend

- A Kukup Ferry Terminal
- B PTP Ferry Terminal
- C Puteri Harbour Ferry Terminal
- D Stulang Laut
- E Pasir Gudang Ferry Terminal

Snapshot of Selected Statistics

Foreign Tourist Arrivals by Ferry Terminal, 2023

Thousand

		% Share
Stulang Laut	330.9	28.6
Pelabuhan Tanjung Pelepas	201.6	17.4
Pasir Gudang	172.8	14.9
Puteri Harbour	164.9	14.2
Kukup	118.2	10.2
Muar	113.3	9.8
Minyak Beku	21.9	1.9
Tanjung Pengelih	18.4	1.6
Desaru Coast Ferry Terminal	16.9	1.5
Tanjung Belungkor	-	0.0
Sebana Cove	-	0.0
Total	1,158.9	

Further Details

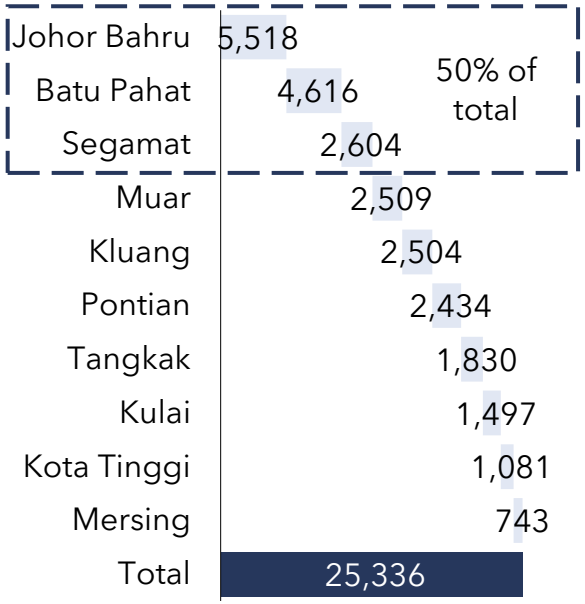
- Johor has around 11 ferry terminals and has collectively recorded **~1.2mil** foreign tourist arrivals in 2023
- Most foreign tourist arrivals were via Stulang Laut, PTP, Pasir Gudang, Puteri Harbour, and Kukup, which collectively represents **85.3%** of total foreign tourist arrivals

Source: Data Asas Johor

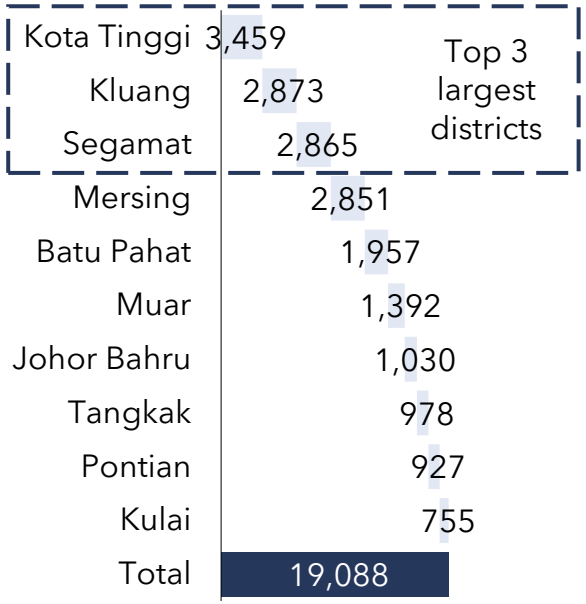
Johor has 25,336km of road infrastructure where Johor Bahru, Batu Pahat and Segamat represents 50% of total; Johor Bahru has significantly higher road density as expected

Snapshot of Selected Statistics

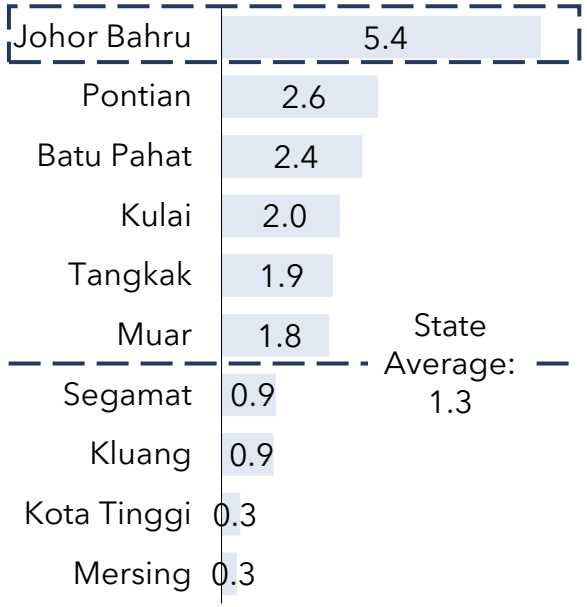
Road Length by District (2023)
Kilometres



Area by District (2023)
Square Kilometres



Road Length per Area by District[1] (2023), km per 1km²



Examples of Major Roads and Expressways (Non-exhaustive)

- Eastern Dispersal Link (EDL)
- Federal Route 3 (Johor Bahru – Kota Tinggi)
- Lebuhraya Sultan Iskandar (Johor Bahru – Iskandar Puteri)
- Lebuhraya Pasir Gudang
- Lebuhraya Skudai
- Causeways: Johor-Singapore Causeway and Second Link

Further Details

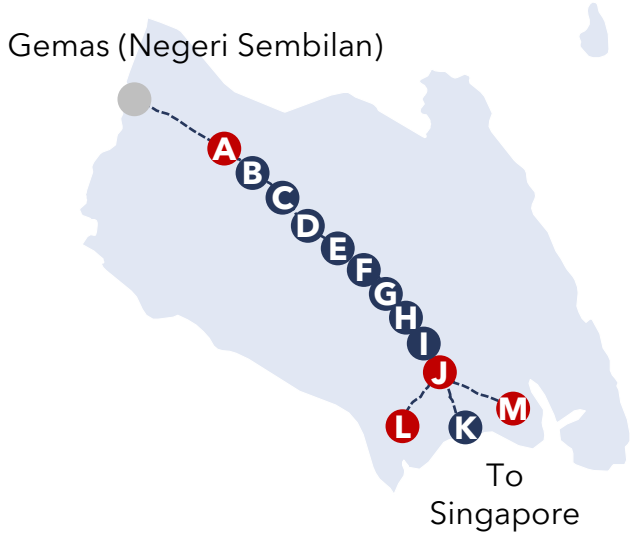
- Top 3 districts with the **longest** road length, represents **50% of total**:
  - Johor Bahru (5,518km)
  - Batu Pahat (4,616km)
  - Segamat (2,604km)
- Top 3 **largest districts** based on land area:
  - Kota Tinggi (3,459km²)
  - Kluang (2,873km²)
  - Segamat (2,865km²)
- Top 3 districts with the **longest road length per area**:
  - Johor Bahru (5.4km per 1km²)
  - Pontian (2.6km per 1km²)
  - Batu Pahat (2.4km per 1km²)
- Zooming in on districts below state average road length per area of 1.3km per 1km², these are **also the largest in the state**

Note: [1]Each chart has been independently sorted from largest to smallest, road length per area by district was calculated using respective district data (e.g., JB road length per JB area)
Source: DOSM

In terms of rail infrastructure, Johor is connected via 11 stations, currently served by KTM Intercity Services and has 4 cargo hubs built to supplement its logistics industry

KTMB Stations and Cargo Hubs in Johor

ILLUSTRATIVE



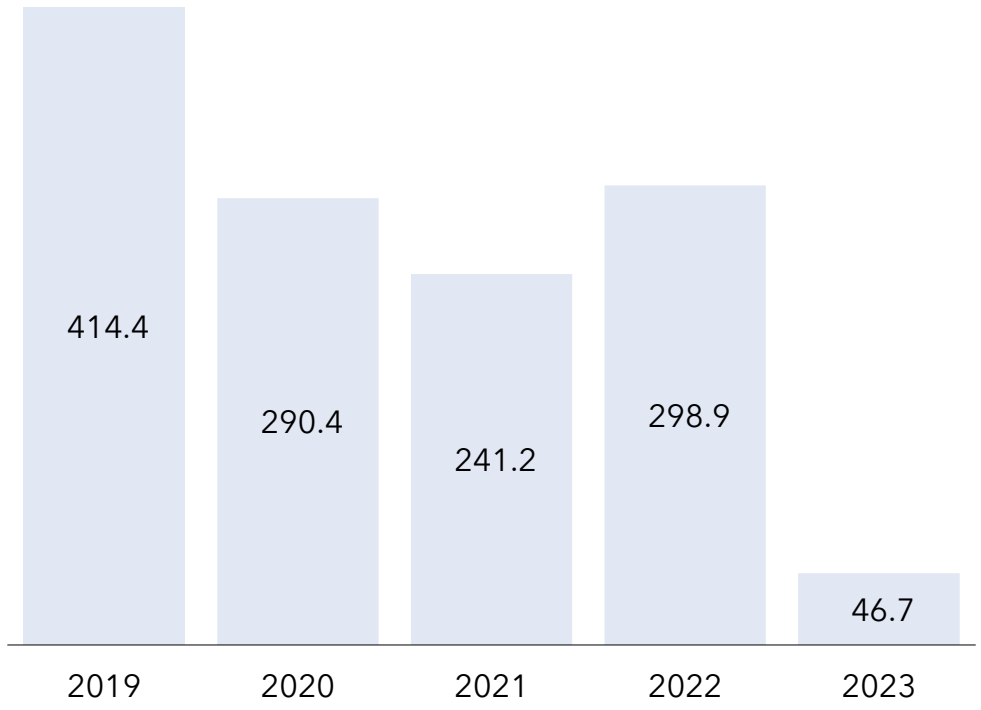
Legend Cargo Hub, Station

- A Segamat (*)
- B Labis
- C Bekok
- D Paloh
- E Chamek
- F Kluang
- G Rengam
- H Layang[2]
- I Kulai
- J Kempas Baru (*)
- K JB Sentral
- L Port Tg Pelepas
- M Johor Port Bhd

Snapshot of Selected Statistics

Rail Cargo Throughput in Johor

Metric Tonne (Thousand)



Further Details

- Based on KTMB's data, Johor has **11 train stations**, served by KTM Intercity services (selected stops only)
- Johor has **4 KTMB Cargo Hubs**:
  - Segamat and Kempas Baru also serve as conventional train stations
  - Port of Tanjung Pelepas and Johor Port Berhad both have dedicated rail cargo hubs; These are connected via Inter-Terminal Services (ITT), operated by KTMB-MMC Cargo Sdn Bhd
  - Collectively, **46.7k metric tonnes** of cargo was handled via rail in 2023

Note: (*) Also serves as a conventional train station
Source: MOT, KTMB

State Government of Johor has also announced various connectivity improvement projects, for example, the RTS, Gemas-JB EDTP, EART, and border crossing enhancement programme

State Government Ongoing Efforts to Enhance Connectivity

NON-EXHAUSTIVE

Rapid Transit System (RTS) Ontrack to be Completed

- RTS expected to operationalise January 2027
- Carries up to 10,000 passengers per hour per direction
- First RTS Link train unveiled 30 June 2025

Gemas-JB Electrified Double Track Project (EDTP)

- Reduces rail travel time from 7 hours to 3.5 hours
- Expected to commence operations in August 2025
- Key part of Malaysia's rail modernisation, enhancing rail connectivity in Peninsular Malaysia

Elevated Autonomous Rapid Transit (EART)

- Project expected to initiate Q3 2025
- Improves connectivity at Skudai, Tebrau, Iskandar Puteri
- EART to be integrated with RTS to promote seamless connectivity
- Part of Johor's broader strategy to improve public transportation

Customs Checkpoint Enhancements to Address Congestion and Improve Efficiency

- Implementation of QR Code System for car lanes to speed up vehicle processing
- Reorganisation of immigration department staff shifts to increase efficiency at passport counters
- Pedestrian walkway from Jln Lingkaran Dalam to BSI
- RM58.07mil allocated for BSI and KSAB to facilitate cross-border flow

Note: Non-exhaustive, there are also other road enhancement programmes not captured here
Source: PASB Analysis, various news articles

Deep-dive: Industrial estates

Category	Sub-Category	Definition	Selected Examples
Physical Infrastructure	Power	• Includes the facilities and systems for **producing, transmitting, and distributing power** necessary for industrial, commercial, and residential use	• Power plants, electrical grids, and renewable energy installations
	Water	• Systems that provide **treated water** for domestic and non-domestic usage, **wastewater** and **flood** management	• Water treatment plants, pipelines, dams, aqueducts, drainage systems, desalination plants, flood barriers, etc.
	Connectivity	• Logistics and transportation infrastructure comprises the physical networks and facilities enabling the **movement and storage of goods and people** • It is essential for efficient supply chains, trade, and tourism	• Railways, ports, airports
	Industrial Estates	• Designated zones equipped with facilities to **support business activities** (e.g., manufacturing, warehousing, etc.) • Some industrial estates are equipped with **basic infrastructure** (e.g., utilities, logistics, etc.) to facilitate business activities	• Composite industrial estates, special purpose industrial estates, light / medium / heavy industrial estates
Digital Infrastructure	Digital Connectivity	• Infrastructures enabling accessibility to **digital networks and services**	• Network cabling (e.g., fibre optics), broadband, wireless networking equipment (e.g., 5G)
	Data Exchange	• Platforms and protocols that enable **data transmission and interaction**	• Mobile networks, satellite system
	Data Storage	• Systems that **store, process, and manage data flows**	• Data centres, cloud computing

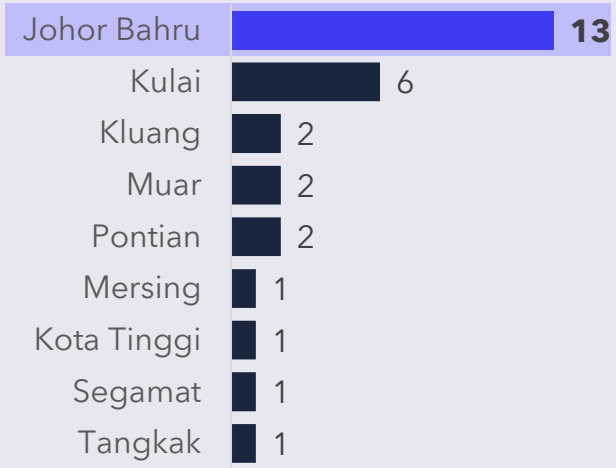
Source: PASB Analysis

As one of the largest states by land area in Peninsular Malaysia, Johor offers a substantial allocation of dedicated industrial land to support its growing economic sectors

Johor Industrial Estate Key Facts

Total industrial estates

29



Almost half (44.8%) of Johor's industrial estates are located in its capital Johor Bahru, which is in **strategic proximity to Singapore** and key **connectivity infrastructure** touchpoints

Note: Data extracted from MIDA MYSite as of 2025
Source: MIDA

Selected Examples: Industrial Estates Located in Johor

NON-EXHAUSTIVE

A Muar Furniture Park (986 acres)
- Developed to spur transformation of state furniture industry

B Pagoh Special Economic Zone (PSEZ) (Sime Darby Industrial Park) (Phase 1 is 850 acres)
- Designed to transform Pagoh into a sustainable and modern township
- To create industrial area based on the Pagoh Education Hub

C Sedenak Technology Park (745 acres)
- Formerly known as Kulai Iskandar Data Exchange
- Dedicated for data centre, cloud computing and support services

D Tanjung Bin Industrial Park (2,255 acres)
- With ready basic infrastructure (i.e., power supply, water supply, centralised effluent treatment system
- Targets logistics, agrifood, etc.

E Senai Airport City (2,718 acres)
- Target industries (e.g., E&E, green technology, FMCG, logistics)
- Contains i-Park (195 acres) which merges industrial activities, business operations, healthy and lifestyle in a fully integrated hub

F Pengerang Integrated Petroleum Complex (PIPC) consists of:
- Pengerang Industrial Park (1,192 acres)
- Pengerang Maritime (1,672 acres)
- Teluk Ramunia Yard (170 acres)
- Pengerang Eco-Industrial Park (68 acres)

Much of Johor's industrial parks are anticipated to reach full occupancy in view of growing investor demand, but lacking "plug-and-play" options could hinder investor interest

Johor's Industrial Estate Occupancy Rate

Parks[1]	Location	Land (Acres)	Occupancy Rate (%)
Easy Vista Sdn Bhd	Johor Bahru	224	100%
Sejota Sdn Bhd	Tangkak	3	100%
I-Park @ Indahpura	Kulai	230	100%
I-Park @ Senai Airport City	Kulai	195	100%
Eco Business Park I	Johor Bahru	611	79%
I-Tech Valley	Johor Bahru	170	78%
Muar Furniture Park	Muar	643	72%
Frontier Park	Johor Bahru	136	65%
Sedenak Tech Park	Kulai	780	53%
Pengerang Integrated Petroleum Complex	Kota Tinggi	22,904	27%
Bandar Universiti Pagoh Industrial Park	Muar	850	23%
Pekan Nenas	Pontian	1,206	4%
Average			**67%**

Johor's industrial estates currently average a **moderately high 67% occupancy rate**, with 4 out of 29 estates already in full occupancy, indicating a **potential gap in future supply of industrial estates**, on the back of **continued industrial growth** and foreign investor **demand amplified by the JS-SEZ rollout**

Johor's Industrial Estate "Plug-and-Play" Readiness

% of Estates by Readiness & Utility Availability[2]	Readiness	Utilities				
		Electricity	Water	Waste	Connectivity	Gas
Complete-Ready Provision of end-to-end utility infrastructure and services, allowing direct plug-and-play	**14% of parks are complete-ready** (4)	100% of complete-readiness estates provide end-to-end utility infrastructure and services				
Partial-Ready Provision of a subset of core utilities which requires further installation works	**41% of parks are partial-ready** (12)	**83%** (10)	**83%** (10)	**83%** (10)	**75%** (9)	**8%** (1)
Civil-Ready All site earthworks are complete but no installed utility infrastructure	**45% of park are civil-ready** (13)	0% of civil-ready estates provide end-to-end utility infrastructure and services				

Only 14% of industrial estates are complete-ready and enables immediate investor plug-and-play, which could **discourage investor interest due to probable high capital expenditures** associated with utility installation/ connection, thereby signifying a **critical gap in plug-and-play parks to facilitate deployment of growing investments**

Note: 1. Excludes estates without occupancy rate data (n = 16); 2. Estates labelled with N/A data for any of the utilities assumed to not supply the corresponding utility / Source: MIDA

With the JS-SEZ rollout and ASEAN chairmanship, Johor is eyeing the opportunity to establish a regional industrial hub designed to attract investments from neighbouring RCEP[1] countries

Johor ASEAN Industrial Park

"This is about **positioning the JS-SEZ as Southeast Asia's preferred destination for RCEP-related investment** and creating **quality jobs** for the region"

- YAB MB Onn Hafiz Ghazi

With the development of an ASEAN industrial park, Johor can expect to reap the benefits from **greater regional economic integration and ASEAN linkages:**

- **Technology/ expertise transfer**
- **Harmonisation of industrial standards** and practices
- **Supply chain efficiency**/ resilience
- Enhanced **trade relations** and local exports
- Increased **foreign direct investments**
- Greater **high-quality job creation**

Key Facts

Located within the **JS-SEZ**, in strategic proximity to Singapore

Targeted Sectors

	Examples:
Advanced Manufacturing	• *Semiconductors* • *Aerospace*
Green Technology	• *Renewable Energy Tech* • *Energy Storage Tech*
Digital Economy	• *Software & Cloud* • *FinTech*

Key Features:

Incentives offered **include tax breaks, simplified talent mobility, eased fund repatriation**

First rolled out with a **pilot program**, followed by **performance-based expansion in phases**

PPP-driven infrastructure and service development

Note: 1. Regional Comprehensive Economic Partnership
Source: Various news sources

Deep-dive: Digital Infrastructure

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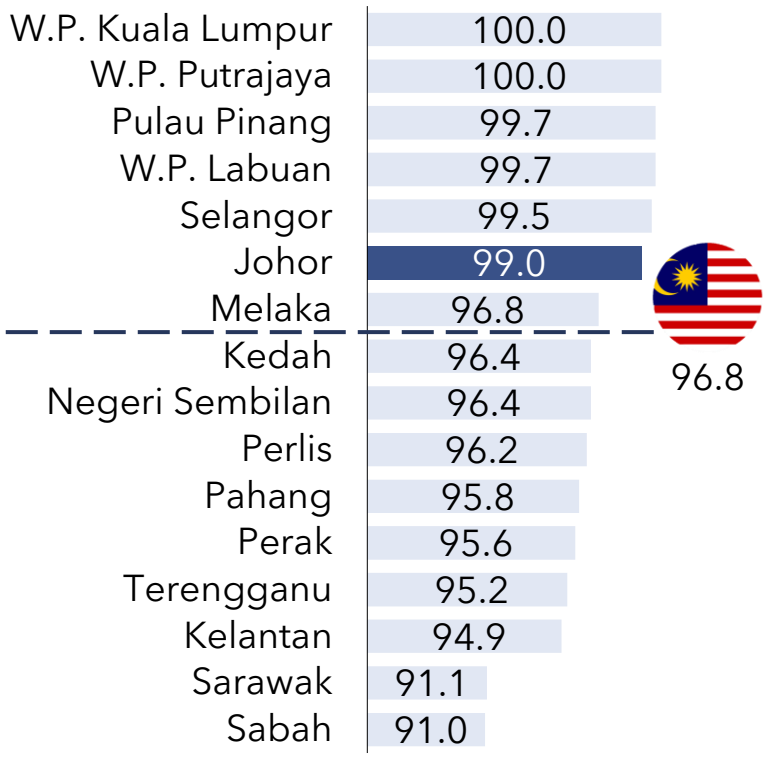
	Data Storage	• Systems that **store, process, and manage data flows**	• Data centres, cloud computing

Source: PASB Analysis

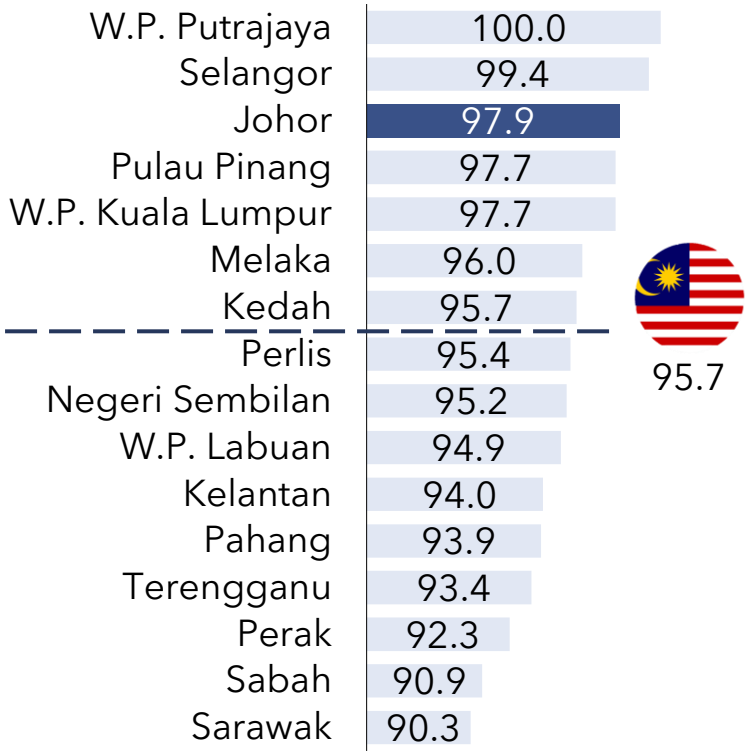
99% of households in Johor have access to the internet, higher than the national average of ~97%; Fundamental internet infrastructure is accessible by almost all Johorean households

Percentage of Households with Internet Access by State, Type of Service (2024), Percentage

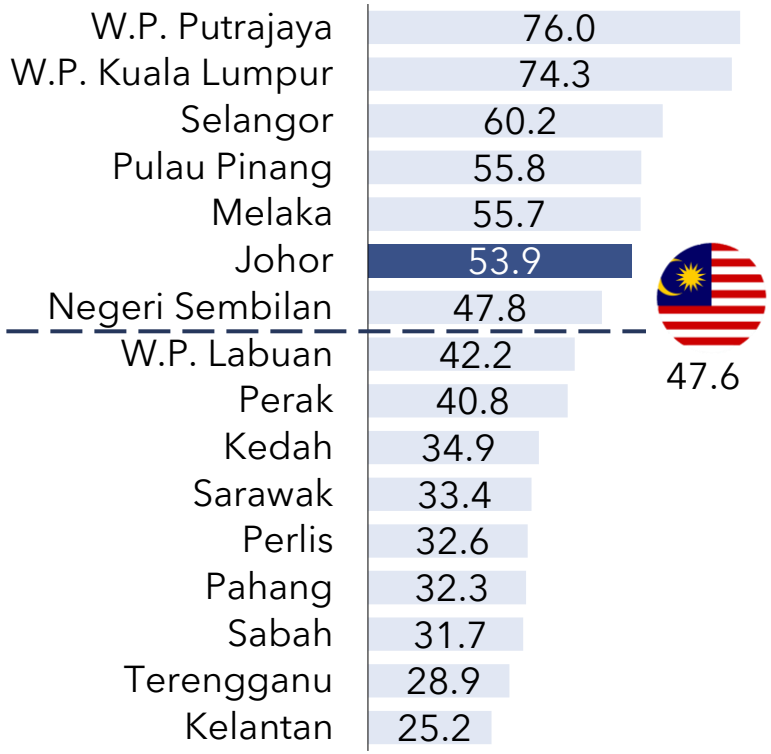
Internet[1]



Mobile Broadband



Fixed Broadband

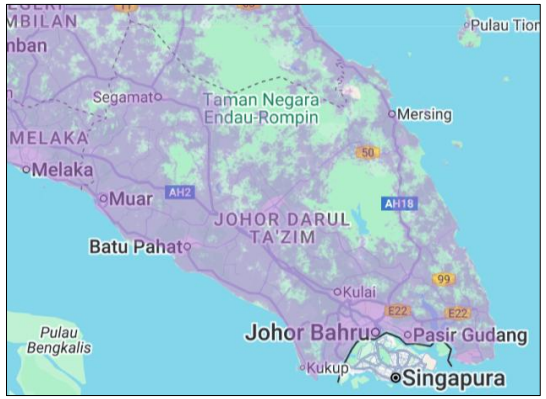


Fixed broadband penetration is generally lower due to more extensive infrastructure requirements (e.g., fibre optic cables or copper lines) which could be time-consuming to install; Mobile broadband leverages wireless networks (e.g., 4G / 5G) which could be deployed faster, with greater accessibility, convenience and potentially lower cost

Note: [1]Refers to households with both mobile and fixed broadband
Source: DOSM

Johor's 5G coverage stands at 84%, slightly above the national 5G coverage at 82.4%; It has one of the most mature 5G capabilities required to catapult the growth of its digital economy

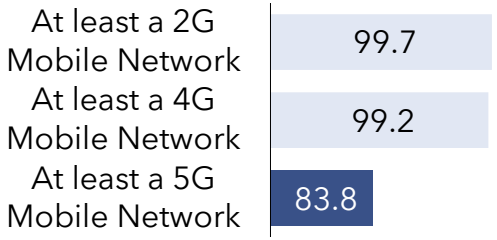
2G, 4G, 5G Coverage Area in Johor



5G Coverage Area in Johor

Snapshot of Selected Statistics

Johor Population Covered by Mobile Network (2023), Percentage



4G and 5G Overall Coverage (2025)

Percentage

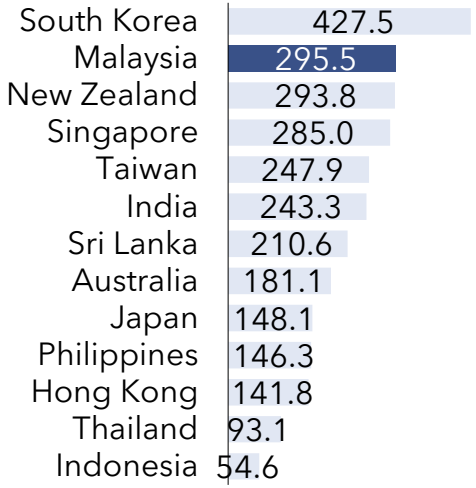
99.9%
Johor 4G Coverage

84%
Johor 5G Coverage

82.4%
Malaysia 5G Coverage

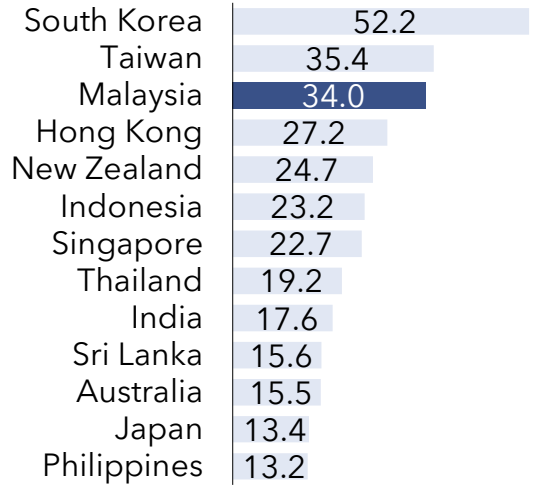
5G Download Speed Experience

Mbps



5G Upload Speed Experience

Mbps



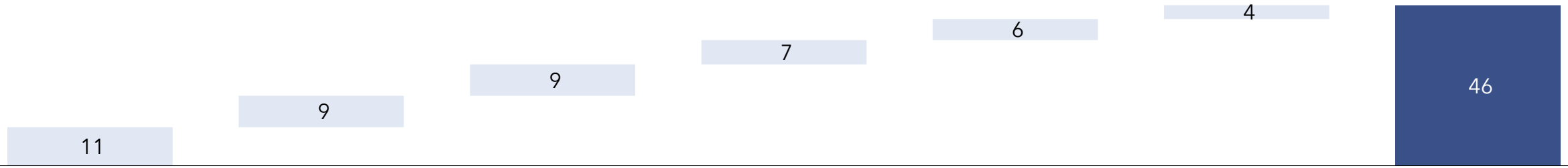
Further Details

- **Over 80%** of Johor population is covered by 5G mobile network
- In terms of coverage, Johor has **almost 100% 4G coverage**; And approximately **50% 5G coverage**
- 5G broadband infrastructure is one of the **key success factors** to the **digital economy**, specifically, its **ultra-fast, reliable, low-latency connectivity** is required to enable AI, IoT, blockchain, digital platforms, data centres, etc.
- In fact, Malaysia has one of the **fastest 5G networks** in the region (2nd for download, 3rd for upload)

Source: JENDELA, Digital Nasional Berhad, Opensignal

Johor currently has around 46 data centres with varying implementation statuses, which could form a foundational pillar for the state's digital economy

Overview of Data Centres in Johor by Status



Operational

- Bridge Kidex Sedenak MY06-01
- BrightRay: Johor MY-01
- CSF: Johor CX3
- DayOne: Nusajaya Tech Park
- EC33 Johor
- Equinix Johor JH1
- Keppel DC Johor 1
- Microsoft Johor
- Open DC JB1
- Open DC JB2
- VADS Iskandar Puteri Core Data Centre (IPDC)

Planned

- AirTrunk: Johor JHB2
- BrightRay: MY-03
- CURRENC: Johor
- ESR-Logos: Johor
- GDC SDN: Johor
- Princeton PDG: JH2
- Stack: JHB01B
- YTL: Johor 3
- YTL: Johor 6

Land Bank

- Bridge: Plentong
- Digital Halo: Johor
- Digital Hyperspace: Johor
- Edgnex: Johor
- Equalbase: Johor
- Microsoft: Kulai
- Microsoft: Mukim Pulai
- Microsoft: Nusa Cemerlang
- ZData: Johor

Construction

- Bridge: Johor MY07
- BrightRay: MY-02
- DayOne: Kempas Tech Park
- Equinix: JH2
- Stack: Johor JHB01
- STT Johor Campus
- YTL: Johor 2

Construction (Planned)

- EdgeConneX: Johor
- Epoch Digital: Johor
- K2: Johor JHR1
- NTT: Gelang Patah
- Nxera: Johor
- Yondr: Johor

Operational (Planned)

- AirTrunk Johor Bahru JHB1
- Bridge MY06-02
- Princeton PDG JH1
- YTL Johor

Data centres possess high-capacity data processing capabilities, enabling real-time analytics, AI and big data applications; This then creates an essential digital environment for cloud computing, hosting digital platforms, FinTech – All part of the digital economy

Source: Baxtel

The Johor State Government is proactively positioning itself as a regional digital hub through strategic partnerships and structured regulatory measures

State Government Ongoing Efforts to Sustainably Develop Digital Infrastructure

NON-EXHAUSTIVE

Strategic Collaboration Between Johor State Government and Malaysian Communications and Multimedia Commission (MCMC)

- **RM300mil** allocated over 2 years to strengthen digital infrastructure, internet network coverage, digital literacy
- **4G to 5G enhancement** in 1,169 industrial areas, increasing 5G coverage in Johor

Establishment of Data Centre Guidelines and JPPDNJ for Coordinated, Sustainable Growth of Data Centres in Johor

- **Data centre guidelines** to be developed, which strives to **coordinate and monitor** data centre development uniformly across local authorities and agencies
- Formation of **Johor State Data Centre Development Coordination Committee (JPPDNJ),** which emphasises **sustainable** practices by focusing on renewable technologies and efficient use of power and water, while continuing investment-friendly policies with aspirations to become a **regional digital hub**

Source: PASB Analysis, various news articles

Further investments in infrastructure will be crucial to establish a conducive, reliable and facilitative business environment for businesses

Bucket	Physical Infrastructure				Digital Infrastructure
How These Infrastructures Help Attract and Realise Investments	**Power** • Ensures reliable and affordable energy supply, reduces **operational risks and minimises downtime** • Clean / Renewable energy aligns with global sustainability goals, appealing to **ESG-focused investors**	**Water** • Reliable and affordable treated water supply and efficient wastewater management are essential for industrial processes, **reducing downtime and reducing health risks** • Proper flood management protects investments from **climate risks**	**Connectivity** • Efficient logistics and customs clearance **reduce supply chain costs, lead times, and promotes supply chain resilience** • Modern, well-connected roads, ports, and airports facilitate seamless movement of goods and people, critical for **export-oriented industries and tourism** • Reduce **congestion**, which reduces productivity and hikes operational costs	**Industrial Estates** • Industrial parks foster **clustering effects**, encouraging innovation, supply chain efficiencies, and workforce development, which further attract investment • "Plug and play" industrial estates with ready utilities, roads, and digital connectivity **reduce time-to-market** for investors, lowering setup costs and operational risks	**Digital Connectivity** • Robust digital infrastructure is critical for reliable **internet connectivity and communication** • Investment in 5G is crucial to support the **digital economy / IR4.0** (i.e., IoT, blockchain, AI, etc.), which tends to require a stable high-speed network with low latency • Governments investing in digital infrastructure also enhance **public services and smart city initiatives**, improving quality of life and making regions more attractive for **talent and investment**
Key Takeaways	**The lack of basic infrastructure would inevitably "repel" investors; Investors hence expect comprehensive, reliable, facilitative basic infrastructure that would not lead to hikes in operational costs, risks and impede market entry**				

Source: PASB Analysis

As such, it is imperative for Johor to develop a resilient, sustainable, and seamlessly integrated infrastructure ecosystem to drive accelerated economic growth (1/3)

Ideal Future State

Vision

"Johor equipped with a resilient, sustainable, and seamlessly connected infrastructure ecosystem that empowers economic growth, enhances quality of life, and positions the state as a leading regional hub for investment and innovation"

Resilient Infrastructures With Long-term Competitive Advantages	Develop robust and adaptable infrastructure systems that withstand environmental, economic, and social challenges, ensuring long-term sustainability and uninterrupted support for Johor's expanding economy
Seamlessly Connected Ecosystem	Create an integrated network of transport, utilities, and digital infrastructure that enables efficient mobility, accessibility, and communication within Johor and across regional borders, fueling productivity and collaboration
Economic and Innovation Hub	Foster world-class infrastructure that attracts investment, accelerates innovation, and nurtures emerging industries, positioning Johor as a competitive destination for business and technological advancement

Source: PASB Analysis

Key Strategies

1

Ensure Sustainable, Reliable, and Adequate Power Supply for Growing Industrial Base

- Reliable power supply with minimal outages to accommodate growing industrial base
- Integration of diverse sustainable energy sources, accommodating needs of sustainability-focused investors
- Regional smart grids with efficient routing and energy management

2

Advance Towards Treated Water Self-Sufficiency and Flood Loss Minimisation

- Extensive reservoir system for peak demand coverage and drought resilience
- Modern, efficient water treatment system leveraging advanced multi-stage processes, optimising resource usage
- Integrated, wastewater and sewage systems, utilising advanced treatment solutions (i.e., water reclamation plant)
- Comprehensive flood management with effective flood protection infrastructure, flood forecasting and early warning systems for disaster risk management

As such, it is imperative for Johor to develop a resilient, sustainable, and seamlessly integrated infrastructure ecosystem to drive accelerated economic growth (2/3)

Ideal Future State

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Source: PASB Analysis

Key Strategies

3 Develop Modern, Integrated, Seamless, and Green Connectivity Networks

- Establish new roads and expressways to realise economic synergies
- Decongest urban areas with greener public transportation solutions
- Develop regional and intrastate rail connectivity, facilitating goods and people movement
- Enhance international connectivity into Johor
- Leverage digital solutions, eliminate physical documentations to streamline customs clearance processes

4 Develop Smart and Sustainable Transition Industrial Clusters and Industrial Parks

- Promote industrial symbiosis and develop the circular economy, catapulting GDP growth while reducing environmental impact and wastages

As such, it is imperative for Johor to develop a resilient, sustainable, and seamlessly integrated infrastructure ecosystem to drive accelerated economic growth (3/3)

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Source: PASB Analysis

Key Strategies

5

Future-Ready Digital Connectivity Powering Industrial Transformation

- Expand 5G broadband coverage to enable digital economy growth (AI, IoT, digital platforms)
- Support sustainable development and facilitate influx of data centres benefitting the local digital economy

Collaboration with federal government is needed for power infrastructure modernisation and energy mix diversification to accommodate growing industrial base demands

1

Ensure Sustainable, Reliable, and Adequate Power Supply for Growing Industrial Base

Description

- **Establishment of a resilient energy system** engineered for minimal disruption, ensuring continuous power supply, accommodating the needs of energy-intensive industries, as Johor's industrial base transforms and matures
- **Integration of a mix of energy sources** (e.g., solar) to diversify supply and accommodate the needs of sustainability-centric investors, unlocking green economy opportunities; Furthermore, enhancement of the national grid is essential to facilitate the integration of renewable energy sources effectively
- **Development of regional smart grids** leveraging IoT, automation, and real-time energy management to optimise distribution and reduces losses; Moreover, modernisation of grids and integration into regional grids can facilitate energy trading, which could help achieve long-term regional energy security, while facilitating regional energy transition

Strategic Impact

- **Improves Investor Confidence**: Demonstrates proactive infrastructure planning, addressing concerns over power reliability, which is a frequent dealbreaker for major FDI and anchor tenants
- **Stimulates Investment**: Reliable and sustainable electricity infrastructure is a critical prerequisite for attracting local and foreign investment in manufacturing, logistics, and advanced industries
- **Enhances Competitiveness**: Lowers risk of operational downtime, boosts productivity, and positions Johor as a preferred hub for high-value industrial projects
- **Accelerates Green Transition**: Supports industries in achieving their carbon targets, benefiting ESG-focused investors and complying with international procurement standards

Case Study

- **Germany's Energiepark Lausitz:** Integrated energy park combining solar, wind, battery storage, and smart grid tech to supply uninterrupted green electricity for the region's growing industrial base. This has resulted in increased regional investment, job creation, and robust support for major industrial tenants' green energy needs
- **Vietnam's Renewable Energy Expansion:** Vietnam has rapidly increased renewable capacity, supported by investments in transmission upgrades and grid reinforcement to handle the new loads. This supports the country's growing industrial and residential demand while enabling renewable integration on a regional scale

Source: PASB Analysis

Advancing water self-sufficiency and minimising flood risks via robust infrastructure planning safeguards state's continued productivity and key assets while affirming investor confidence

2

Advance Towards Treated Water Self-Sufficiency and Flood Loss Minimisation

Description

- **Development of additional reservoirs, catchment systems and water transfer programs** to accommodate expansion in raw water feedstock required for newly planned and constructed water treatment plants, which will also help to buffer dry periods where water levels may reduce to potentially critical levels
- **Construction of more high-capacity water treatment plants and advanced treated water solutions** (i.e. water reclamation – wastewater recycling) to complement increase in raw water supply and match the projected rise in demand for treated water due to growing industrial and household needs
- **Roll out of integrated flood mitigation infrastructure and efforts**, both physical and digital (e.g. barrage, prediction systems, etc.) to safeguard businesses and communities from flood losses

Strategic Impact

- **Supports Investment Attraction:** Modern water and flood infrastructure attracts capital through demonstration of reliable supply of water, and minimisation of destructive flood risks, helps facilitate investor confidence and investments
- **Enhances Economic Growth & Job Creation:** The positive knock-on effects (i.e. water security, low flood risks) resulting from water supply and flood projects will contribute towards continued and enhanced GDP growth and job creation
- **Minimises Productivity & Economic Losses:** Reliable water and flood mitigation efforts will help minimise business disruptions and asset losses
- **Increases Climate Resilience:** Diversified water buffers and integrated flood measures help the state to adapt to droughts and extreme rainfall, safeguarding communities and assets

Case Study

- **Singapore's NEWater Programme:** The NEWater water reclamation process is possible and a result of decades of R&D, where 4 NEWater plants are now meeting 40% of Singapore's water demand (55% by 2060), serving both industrial (i.e. wafer fabrication) and household needs. It has helped Singapore secure its water self-sufficiency, attract investment, and elevate Singapore's global water leadership
- **Netherland's Delta Works:** A series of flood mitigation infrastructures built to protect against saltwater flooding and safeguard freshwater supply for approximately 4 million people. The prominent Oosterscheldekering dam has helped to reduce flood frequency from once every 10 years to once every 10,000 years, whilst also ensuring business continuity and productivity (i.e. key economic infrastructures such as the Port of Rotterdam that is the largest port in Europe)

Source: Singapore Public Utilities Board, FI Group, Institution of Civil Engineers, The Architectural Review

Integrated, sustainable connectivity solutions must be introduced to enhance regional connectivity, reduce urban congestion, facilitating seamless people and goods movement

3

Develop Modern, Integrated, Seamless, and Green Connectivity Networks

Description

- **Establishment of new roads and expressways** to unlock economic synergies by enhancing the movement of goods and people across Johor and beyond
- **Implementation of greener, efficient public transportation** solutions, which integrates with existing infrastructure, to reduce urban traffic congestion and pollution
- **Enhancement of regional and intrastate rail connectivity**, facilitating seamless goods and people management in a cost-effective manner
- **Leveraging a single, integrated digital platform for customs clearance**, eliminating physical documentation to streamline cross-border trade and reduce administrative bottlenecks

Strategic Impact

- **Accelerates Investment Attraction**: Enhanced connectivity improves logistics efficiency, market access, and lowers the cost of doing business, which thereby attracts high-value industrial players
- **Boosts Industrial Competitiveness**: Reduces lead times for raw materials and finished goods, enabling Johor's industrial base to respond rapidly to market demands and supply chain disruptions
- **Enhances Economic Growth**: Improved transport networks stimulate regional economic integration, increase job creation, and raise productivity through better labor mobility and market access
- **Strengthens Investor Confidence**: Demonstrates commitment to world-class infrastructure and seamless integration, fostering an investor-friendly environment essential for long-term projects
- **Supports Sustainable Development**: Greener transport options and digitisation reduce carbon footprints and administrative inefficiencies, aligning infrastructure development with ESG goals

Case Study

- **Germany's Extensive Rail Network:** System combines regional, national, and cross-border services seamlessly with advanced scheduling and infrastructure upgrades. Moreover, regional rail development integrates with freight logistics and urban transit improving overall multimodal connectivity. Network transformed regional economies by reducing travel times between key cities, fostering business collaboration, and facilitating rapid goods movement
- **Hong Kong's MTR (Mass Transit Railway)**: A world-renowned transit-oriented development (TOD) model integrating heavy rail with dense commercial and residential districts, generating high ridership and vibrant urban growth. Strategic integration of rail, retail, and property development drives sustainable urban density and financial viability of the transit system. Reduced car dependency, increased public transport use, and reduced urban congestion

Source: PASB Analysis

Fostering industrial clusters' transition towards circular economy practices and shared resource efficiency can unlock Johor's cross-sectoral synergies and propel green growth

4

Develop Smart and Sustainable Transition Industrial Clusters and Industrial Parks

Description

- **Deployment of shared clean-energy infrastructure** (i.e. on-site solar, biomass, microgrids) and electrify heat processes to enable greater share of green energy sources and optimised energy use
- **Production of high-value hydrogen for energy and new green products** via leveraging electricity and heat generated from existing clean-energy infrastructure
- **Optimisation of resource flows via cross-entity exchange of waste, water and energy** to embed circularity at scale, enabled through digitalisation
- **Establishment of common carbon infrastructure** for low-carbon feedstocks and storage to be used as industrial and manufacturing processes
- **Establishment of eco-industrial parks** with "plug-and-play" shared utilities, byproduct exchange networks and integrated circular economy practices where co-locating industries can unlock cross-cutting resource efficiencies and synergies

Strategic Impact

- **Decarbonisation at scale:** Embedding shared energy and carbon infrastructure for major players can drive deep emissions cuts by aggregating demand and lowering unit abatement costs
- **Resource-use Efficiency:** Industrial symbiosis and circular-park operations minimise virgin material inputs, waste disposal and water consumption, cutting costs and environmental footprint
- **Increased Industrial Productivity & Boosts GDP:** Shared utilities and digital energy management optimise uptime, boosts throughput across co-located industrial clusters which uplifts productivity gains and economic growth
- **Enhances Investment Attraction:** Proven resilience and sustainability credentials can draw green financing, anchor tenants and foster robust public–private partnerships
- **Innovation & Job Creation:** IR4.0 platforms, renewable-energy deployment and circular-economy projects stimulate R&D, workforce upskilling and high-value employment

Case Study

- **Denmark's Kalundborg Symbiosis:** Kalundborg Symbiosis is a partnership between 9 public and private companies in Kalundborg, Denmark. They are the world's first industrial symbiosis hub with a circular approach to production, where co-locating companies collaborate in the exchange of material, water, and energy streams. Over the past 60 years, each company has been able to reap bottom-line savings of €24 million, abate 635,000 tons of CO_2, etc.
- **China's Tianjin Economic-Technological Development Area (TEDA):** The TEDA cluster developed and operates a circular economy and waste-free digital platform enabling cluster members to visualize and facilitate industrial symbiotic relationships to increase resilience, reduce landfill waste, taxes and related costs. Since launching the platform, the TEDA cluster has enabled 150+ industrial symbiosis relationships, reduced landfill waste by 0.98m tons, cut CO_2 emissions by 170,000 tons

Note: 1. Carbon Capture, Utilisation, and Storage
Source: European Union, World Economic Forum

High-speed, low latency internet connectivity and data centres will be required for advanced manufacturing and to accelerate Johor's digital economy growth

5

Future-Ready Digital Connectivity Powering Industrial Transformation

Description

- **Deployment of extensive 5G networks** to enable the digital economy growth, supporting advanced industrial applications such as artificial intelligence (AI), Internet of Things (IoT), and digital platforms, which rely on high-speed, low-latency connectivity; 5G networks is required by smart factories that require real-time data exchange, robotics coordination, autonomous operations
- **Development of energy-efficient data centers** powered by renewable energy, designed to meet the growing demands of the digital economy while minimising environmental impact and develop local digital economy

Strategic Impact

- **Attracts High-Value Investment:** Robust 5G infrastructure and digital ecosystems attract multinational technology firms, data center operators, and innovation-driven industries
- **Accelerates Industrial Competitiveness:** Enhances operational efficiencies through automation and real-time data analytics, reducing downtime and production costs while enabling faster decision-making in manufacturing, logistics
- **Boosts Economic Growth and Job Creation:** Enables new digital economy sectors to flourish, expanding high-skilled employment opportunities and diversifying Johor's industrial base
- **Enhances Investor Confidence:** Demonstrates a forward-looking infrastructure commitment essential for investors focusing on Industry 4.0 readiness and ESG criteria
- **Enables Sustainable Industrialisation:** Supports green technology adoption and reduces the digital sector's environmental footprint, aligning growth with sustainable development goals

Case Study

- **Loudoun County Hyperscale Data Centres:** The surge in data center investments led to a 170% increase in tax revenue between 2021 and 2023, reaching $582 million annually, funding critical public services (e.g. education, infrastructure, healthcare). Data centers have a multiplier effect on employment where each direct job in the industry supports an estimated 7.4 ancillary jobs, amplifying economic benefits beyond the immediate facility. The concentration of data centers has enhanced local digital infrastructure and connectivity, attracting tech firms and enabling expansion of the digital economy in the region

Source: PASB Analysis

Ease of Doing Business.

The World Bank definition of Ease of Doing Business defines the concept of "Ease of Doing Business" can assist in understanding the many dimensions from which Ease of Doing Business can be assessed and quantified

World Bank Ease of Doing Business Index

- The Ease of Doing Business index ranks economies from 1 to 190, with first place being the best.
- A high ranking (a low numerical rank) indicates that the regulatory environment is conducive to business operation.
- The index averages the country's percentile rankings on 10 topics covered in the World Bank's Doing Business project.
- The ranking on each topic is the simple average of the percentile rankings on its component indicators.

World Bank EoDB Evaluation Criteria

Starting a business	**Getting credit**	**Enforcing contracts**
Dealing with construction permits	**Protecting minority investors**	**Resolving insolvency**
Getting electricity	**Paying taxes**	
Registering property	**Trading across borders**	

Source: World Bank Ease of Doing Business Index

The application of World Bank's Ease of Doing Business definition in JETP refers to the overall conduciveness of a country's regulatory, administrative, and institutional environment for starting, operating, and expanding a business

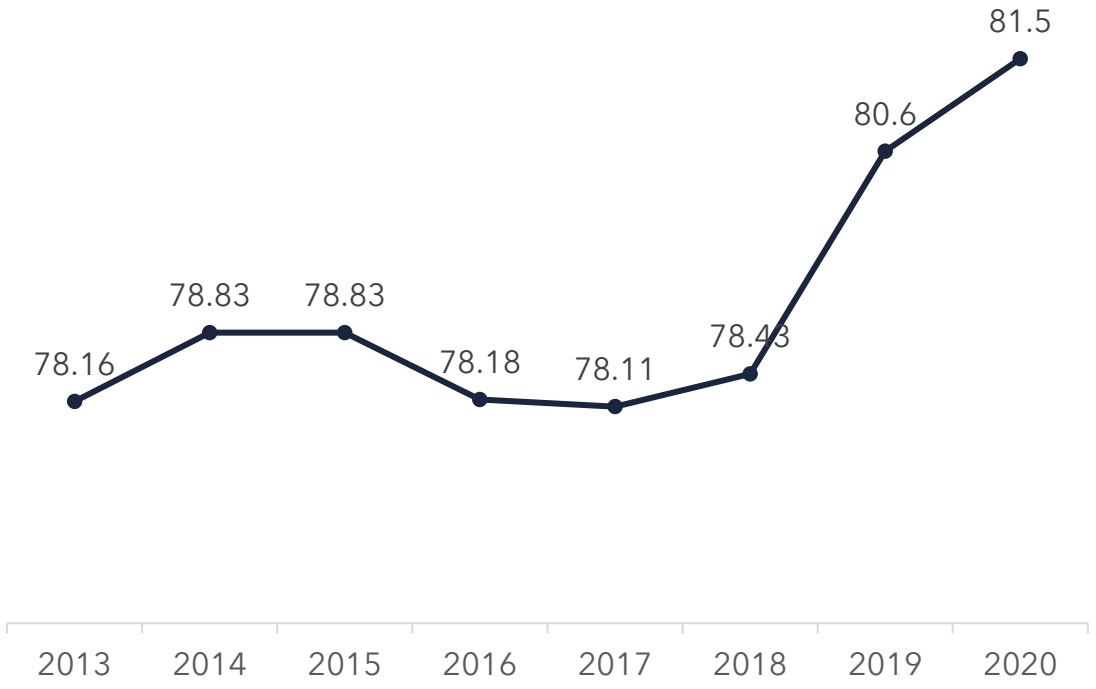
Ease of Doing Business

1. **Regulatory Simplicity and Efficiency:** The extent to which business-related regulations (such as those for starting a business, obtaining permits, paying taxes, and trading across borders) are clear, streamlined, and efficiently administered.
2. **Transparency and Predictability:** The presence of transparent rules, predictable enforcement, and accessible information for businesses. A transparent environment reduces uncertainty and the risk of arbitrary decision-making by authorities.
3. **Access to Essential Services and Infrastructure:** The availability and quality of public services (e.g., electricity, water, digital infrastructure) and the ease with which businesses can access them.
4. **Legal and Institutional Support:** The effectiveness of legal institutions in protecting property rights, enforcing contracts, resolving disputes, and supporting insolvency processes. Strong legal frameworks and institutions foster trust and reduce transaction costs.
5. **Market Functioning and Competition:** The degree to which markets are open, competitive, and free from unnecessary barriers or monopolistic practices. A conducive business environment encourages innovation and fair competition.
6. **Inclusivity and Sustainability:** Consideration of how the business environment supports not only firms but also workers, consumers, and the environment. Modern frameworks include digital adoption, environmental sustainability, and gender equality as integral components

Source: PASB Analysis

Malaysia has consistently ranked among the top 25 economies globally for ease of doing business between 2013 – 2020, peaking at 6th in 2014 and maintaining a strong position in the top 20 for most years

World Bank Ease of Doing Business Score Malaysia 2013 - 2020
Distance To Frontier (DTF) Score*



World Bank Ease of Doing Business Ranking Malaysia 2013 - 2020
Ranking

Year	Ranking	DTF Score
2013	12	78.16
2014	6	78.83
2015	18	78.83
2016	18	78.18
2017	23	78.11
2018	24	78.43
2019	15	80.60
2020	12	81.50

The EoDB Index was discontinued in 2021, while the first edition of the B-READY Report was released in 2024. Malaysia was not included in the 2024 edition of the B-READY Report but will be included in the 2025 edition.

Source: World Bank; PASB Analysis
*Note: The EoDB score (Distance to Frontier, DTF) measures how close an economy is to the best performance observed on each indicator across all economies since 2005. A score of 100 represents the global best practice.

Between 2013 to 2020, legal infrastructure underpinned Malaysia's attractiveness as a business destination while weaknesses in tax and business compliance limited the country's ability to climb higher in the global rankings, despite overall strong performance

World Bank Ease of Doing Business Indicators Malaysia 2013 - 2020
Ranking (1 – 189/190)

Indicators	2013	2020
Starting a Business	54	126
Construction Permits	96	2
Getting Electricity	59	4
Registering Property	59	33
Getting Credit	1	37
Protecting Minority Investors	4	2
Paying Taxes	15	80
Trading Across Borders	11	48
Enforcing Contracts	33	35
Resolving Insolvency	49	40

Persistent Strengths

- **Protecting Minority Investors:** Ranked 2nd–4th throughout the period. Strong legal protections, transparency, and corporate governance reforms.
- **Construction Permit:** From 96th in 2013 to 2nd globally by 2019–2020. Streamlined procedures, reduced inspections, and digitalisation of approval processes.
- **Getting Electricity:** From 59th in 2013 to 4th globally by 2019–2020. Simplified connection processes, reduced costs, and improved reliability.

Persistent Areas of Improvement

- **Starting A Business:** Despite some improvement in 2014–2016 (as high as 13th), Malaysia's ranking plummeted to 122nd in 2019 and 126th in 2020. High number of procedures (8.5 in 2020), long processing times (17.5 days), and complex requirements compared to global best practices.
- **Paying Taxes:** From 15th in 2013–2014 to 80th by 2019–2020. High compliance time (174 hours/year in 2020), complex tax structure, and frequent changes in tax policy.
- **Trading Across Borders:** From 5th–11th in 2013–2015 to 48th by 2019–2020. Increased documentation requirements, customs delays, and less competitive logistics compared to regional peers

Source: World Bank; PASB Analysis

Across the World Bank's EODB indicators, both federal and state government possess specific responsibilities and jurisdiction (1/2)

EODB Indicator	Description	Federal Government Role	Johor State Government Role
Starting a Business	Measures procedures, time, cost, and capital required to start a business.	Sets national company law and registration requirements via Companies Commission of Malaysia (CCM); issues business licenses and oversees compliance.	Facilitates local business registration, provides support services, ensures compliance with state/local regulations.
Dealing with Construction Permits	Assesses procedures, time, and cost to obtain construction permits.	Sets national standards and guidelines for construction; may regulate safety and environmental standards.	Local authorities (city/district councils) issue permits, enforce building codes, zoning, and local planning.
Getting Electricity	Measures procedures, time, and cost to obtain a permanent electricity connection.	Regulates the energy sector via the Energy Commission; sets national standards for supply and safety; oversees Tenaga Nasional Berhad (TNB).	Coordinates with utility providers to ensure local infrastructure supports efficient connections; may facilitate approvals.
Registering Property	Assesses procedures, time, and cost to transfer property titles.	Sets legal framework for property rights and registration; maintains national land registration system.	Manages land records, processes local property transactions, ensures compliance with state land laws.
Getting Credit	Evaluates legal rights for borrowers/lenders and credit information systems.	Regulates financial institutions and credit markets via Bank Negara Malaysia; oversees credit bureaus and legal rights.	May support local credit schemes or facilitate access to state-backed financing; fosters local economic environment.

Source: World Bank; PASB Analysis

Across the World Bank's EODB indicators, both federal and state government possess specific responsibilities and jurisdiction (2/2)

EODB Indicator	Description	Federal Government Role	Johor State Government Role
Protecting Minority Investors	Measures protection for minority shareholders against misuse of assets.	Enforces corporate governance and investor protection laws via Securities Commission Malaysia; sets national standards.	Promotes good governance among local companies; may encourage best practices but has limited regulatory authority.
Paying Taxes	Assesses number of taxes, time to file, and total tax rate.	Sets and administers national tax policy via Inland Revenue Board; collects federal taxes (income, corporate, GST/SST).	May offer state/local tax incentives or rebates; collects state-level taxes (e.g., land tax, quit rent).
Trading Across Borders	Measures time and cost to export/import goods.	Sets customs, trade, and border policies via Ministry of International Trade and Industry; manages customs clearance.	Facilitates local infrastructure at ports/border crossings (e.g., Johor-Singapore border); supports logistics improvements.
Enforcing Contracts	Evaluates time and cost to resolve commercial disputes in court.	Provides national legal framework and judiciary; sets rules for contract enforcement and court procedures.	State-level courts handle local cases; ensures efficient case management and local judicial processes.
Resolving Insolvency	Assesses time, cost, and outcome of insolvency proceedings.	Regulates insolvency law and proceedings via Department of Insolvency Malaysia; sets national standards.	Provides local support services for businesses in distress; may facilitate restructuring or liquidation at the state level.

Source: World Bank; PASB Analysis

Johor also does not have a single definition of EoDB but it can be inferred via the state governments actions and policies that it takes seriously the need to simplify regulations, reduce delays, improve transparency while providing end-to-end investment facilitation

JCORP Johor Corporation

IMFC-J

Invest JOHOR ADVANCED ECONOMY STATE

ISKANDAR MALAYSIA

Policy and Practice

- Johor's approach is reflected in its **development policies, economic planning**, and **business facilitation** initiatives.
- Based on learnings from other thriving economies, Johor has established the **importance in establishing a seamless investment journey** for investors, especially FDIs, which reflects improved ease of doing business
- The state's focus on transforming regions like Pengerang into major industrial hubs, and its efforts to **streamline business processes**, all point to an implicit understanding of the concept as **reducing barriers and improving the business climate**.

Johor's implicit definition centers on creating a business-friendly environment by making government processes more efficient, transparent, and responsive to the needs of investors and entrepreneurs

Source: OECD; IMF; World Bank, Doing Business 2020; 12th Malaysia Plan, MADANI Economic Framework; National Policy on the Development and Implementation of Regulations (Malaysia); "Achieving A System Of Competitive Cities in Malaysia" – World Bank

YAB MB Dato' Onn Hafiz Ghazi has made clear commitments to improving the Ease of Doing Business in Johor as part of a broader strategy to cut red tape, attract investment, and position Johor as a leading business destination in the region

Johor State Commitment to Ease of Doing Business

Yang Amat Berhormat Dato' Onn Hafiz Ghazi
Chief Minister of Johor

On The Establishment of IMFC-J
"The establishment of this centre is a manifestation of the state government's commitment to facilitate and expedite the process for investors to set up businesses in Johor. We want to ensure that investors can obtain all necessary approvals and licenses under one roof, without unnecessary delays."

Opening of IMFC-J office
18 February 2025

On The Establishment of Johor Super Lane
"Johor is committed to cutting red tape and facilitating investments through these programs. The Johor Super Lane is a manifestation of improvements to the Kulai Fast Lane initiative, which has set a benchmark for other regions."

Johor Budget 2025 Tabling
21 November 2024

On The Establishment of JS-SEZ
"We must operationalise the JS-SEZ as soon as possible to future-proof our economies. The SEZ's diverse industries and resilient workforce are key to its success, and we are implementing policies to attract investors and complement the economic strengths of Singapore and Malaysia's Klang Valley."

JS-SEZ Business & Investment Forum
21 April 2025

On The Establishment of Johor Regulatory Sandbox
"We are proposing a regulatory sandbox in Johor to allow for a supervised and flexible environment for testing new technologies and policies, especially in sectors currently constrained by regulation."

JS-SEZ Business & Investment Forum
21 April 2025

Source: Various News Sources

At the State level, Johor has initiated and launched various mechanisms to streamline and accelerate investment approvals

NON-EXHAUSTIVE

Kulai Fast Lane

- Established as a pioneering initiative in the Kulai district of Johor to streamline and expedite the approval process for investment projects, particularly foreign direct investment (FDI).
- After launch in 2022, the Kulai Municipal Council had targeted RM141million in revenue in 2022, but collected RM163million. In 2023, it achieved RM192mil, well above the RM145mil target.
- Johor received RM72billion in investments for 2023 and from that amount, RM50.4bil or 70% went into Kulai. KFL had recorded RM56.4bil in investments to date.

Johor Fast Lane

- A state-level initiative designed to further streamline business and investment processes across Johor.
- It builds on the Kulai Fast Lane's principles, aiming to cut through bureaucratic hurdles and make Johor a more attractive destination for both domestic and foreign investors.
- The Fast Lane is part of Johor's broader economic development strategy, focusing on enhancing the ease of doing business and supporting the state's industrialisation goals.
- The Johor Fast Lane initiative had reduced approval waiting time of potential investors from 24 to 12 months.

Johor Super Lane

- An advanced evolution of the Fast Lane concept, launched as part of the Johor-Singapore Special Economic Zone (JS-SEZ) initiative.
- Its primary goal is to further accelerate and simplify governance and business processes, making Johor a premier investment destination in Southeast Asia.
- The Super Lane is designed to provide even faster approvals, greater transparency, and a more seamless experience for investors, leveraging digital platforms and inter-agency coordination.

Source: Stakeholder Engagement; The Vibes; The Star; The Edge; PASB Analysis

Introduction of the Kulai Fast Lane (KFL) has become the gold standard to all PBT in offering fast and efficient service delivery system to process investment development applications

E-LICENSE WEB
KFL
KULAI FAST LANE

Key Objective
In 2022, as part of the Kulai industrial booster plan, the Kulai Municipal Council had introduced the KFL in efforts of attracting investments by streamlining and accelerating investment approvals which would shorten the time required for documentation application which includes Planning Permission, obtaining Certificate of Completion Compliance (CCC) and license approval for operations

Key Features and Benefits of KSL

Preliminary Technical Coordination
Project Briefing by applications with facilitation sessions

Simultaneous Approval
Simultaneous approval of planning permission, infrastructure plan and building plan

Early Construction Work Commencement
Allowing early commencement construction work through accelerated approval

Advance License Application
Advance Operating License Application after reaching 80% construction stage

Early Machine Installation
Allowing machinery installation during construction stage

Timely and Cost Effective
Across Plan Approval, Construction, CCC, Operating License and Operation

Investment Site Criteria Eligibility under KSL

1. **Within Planned Industry Area**
(approved with Planning Permission and Earthwork, road & drainage infrastructure)
2. **Industrial Land Titling**
Land title for industry or any approval for industry development purposes
3. **Available for construction**
Site is available and feasible for construction
4. **Equipped with infrastructure and utilities**
Across basic infrastructure and utilities provided within the site
5. **EIA Approved**
EIA report approved by DOE
6. **TIA and RSA approved**

Outcome of KSL as of 2024

38
investments facilitated

RM52 bil
worth of investments

171%
Y-o-Y amount of investments in Kulai

7000
Jobs Created

Key MNC Investors:
wiwynn, Mercedes-Benz, Princeton Digital Group, yondr, Supermicro, Bridge Data Centres

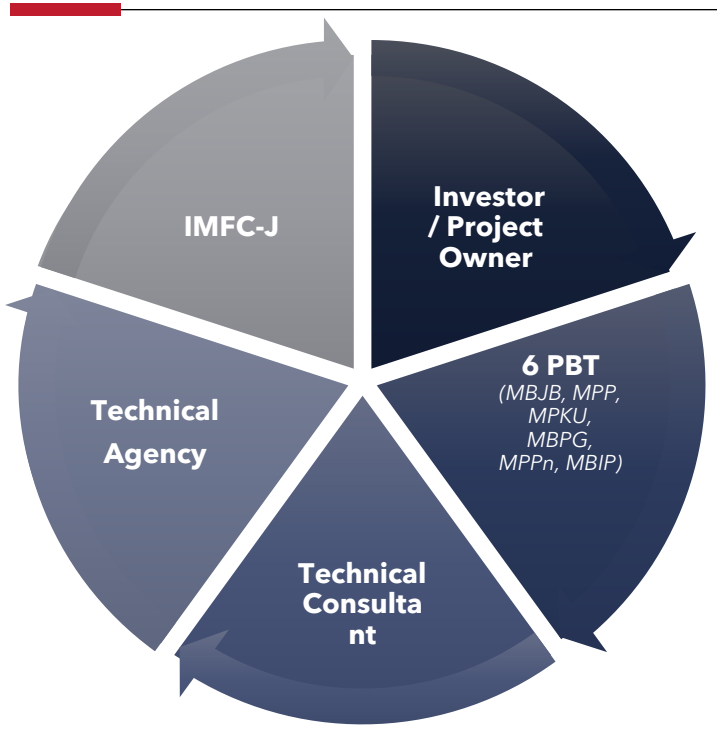
Source: Kulai Municipal Council, Various News Sources; PASB Analysis

In addition, the Johor state government aims to introduce the Johor Super Lane (JSL) moving forward to further accelerate the implementation and realisation of investments in JS-SEZ …

Key Objective

Johor Super Lane (JSL), which will be operated by IMFC-J aims to coordinate and standardise the approval development process in a fast and efficient manner across local councils and technical agencies in the JS-SEZ which would enable development approvals in record turnaround time, compared to previously achieved with KSL and JFL.

Stakeholders involved in facilitating JSL



Key features of JSL

1. **Joint submission** of development plan with KMP/ PJ / PB / PL / PLJ plan
2. Early license approval upon **50% of construction completion**
3. License for early machine installation before issuance of CCC
4. CCC technical Facilitate services to be coordinated **2 months before project completion**

Key targets across milestones in JSL

1. Reduce land development from **37 months to 13 months**
2. Issuance of operational license **within 1 hour after CCC is approved**
3. TIA and EIA approval **within 14 days** after submission of development plan to respective technical agency
4. Land matters (SBKS) and titling approval within **53 days of application**

Source: Kulai Municipal Council, Various News Sources; PASB Analysis

… which will enable JSL to accelerate and expedite its development approval processes with a record turnaround time compared to previous initiatives

Project timeline comparison across platforms (days)

Process Milestone	OSC 3 Plus	KFL / JFL	JSL
Data Collection	30	7	7
Project Brief	-	14	7
Technical Consideration	57	29	18
Commence of work notice	1	1	1
Interim Review	14	14	14
Final Review	30	30	14
CCC Deposit	1	1	1
Issuance of Operating license	1	1	1 hr
Total	**1**	**97**	**62**

JSL will become the fastest and most efficient development approval process with a 62 days turnaround across key milestones

Potential time saved across main land project development types

1. **For Projects with ongoing or previously approved layout plan / land for development**
   from **24** **Months** *to* **14** **Months**

2. **For Projects without prior layout planning and SBKS**
   from **37** **Months** *to* **13** **Months**

Source: Kulai Municipal Council, Various News Sources; PASB Analysis

Furthermore, Johor has also spearheaded key initiatives revolving investment facilitation to ensure investors are well guided throughout the investment journey

NON-EXHAUSTIVE

IMFC-J (Invest Malaysia Facilitation Centre Johor)

- A **one-stop facilitation center** led by IRDA established to streamline and expedite investment processes within the Johor-Singapore Special Economic Zone (JS-SEZ).
- IMFC-J brings together over 30 federal, state, and local government agencies, as well as private sector partners, under one roof to handle all investor needs.
- Its primary goal is to reduce bureaucratic hurdles, coordinate between multiple government agencies, and provide comprehensive support to investors from pre-investment to post-investment stages.
- By centralising processes, IMFC-J aims to cut approval times and improve transparency for investors in the JS-SEZ.
- Services include investment advisory, regulatory guidance, permit and license facilitation, and aftercare for existing investors.

UOB-Invest Johor "Green Lane"

- A collaborative initiative between United Overseas Bank (UOB) and Invest Johor, specifically designed to fast-track investment approvals and support for companies—especially those in green and high-value sectors—entering the Johor-Singapore SEZ.
- **Fast-Track Regulatory Approvals:** Provides a streamlined, expedited pathway for regulatory approvals, reducing bureaucratic delays for qualifying investors.
- **Pre-Qualification by UOB:** UOB conducts pre-qualification assessments for its clients based on Invest Johor's criteria, ensuring only eligible projects benefit from the Green Lane.
- **Fast Lane Account Opening:** UOB offers a dedicated, rapid account opening service for Singapore-based companies expanding into Johor.
- **Dedicated Support Desks:** UOB has set up JS-SEZ desks in both Johor and Singapore to provide market entry advisory, financial solutions, and cross-border banking support.

Source: Stakeholder Engagement; The Vibes; The Edge; IMFC-J Website; UOB Website; PASB Analysis

Moreover, to make JS-SEZ the most competitive and compelling investment destination in the region, Johor has proposed a Regulatory Sandbox to offer temporary regulatory exemptions to enable testing of innovative technologies, policies and business models.

Johor Regulatory Sandbox

Concept & Purpose

- A state-led initiative designed to **foster innovation and investment** by providing a controlled environment where companies can test new products, services, or business models with relaxed regulatory constraints.
- The sandbox is particularly relevant in the context of the Johor-Singapore Special Economic Zone (JS-SEZ), where regulatory harmonisation and business facilitation are critical.

Structure and Implementation

1. **Controlled Testing Environment:** Companies are allowed to operate under a set of relaxed or modified regulations for a limited period and scope, under close supervision by relevant authorities.
2. **Multi-Agency Coordination:** The sandbox involves collaboration between federal, state, and local agencies, including Invest Johor, the Iskandar Regional Development Authority (IRDA), and sector-specific regulators.
3. **Integration with JS-SEZ:** The sandbox is a core component of the JS-SEZ's strategy to harmonise regulations with Singapore and address cross-border business challenges.
4. **One-Stop Facilitation:** The sandbox is supported by the Invest Malaysia Facilitation Centre Johor (IMFC-J), which acts as a single window for regulatory guidance, permit facilitation, and aftercare services.
5. **Sectoral Focus:** While open to various sectors, there is a particular emphasis on fintech, logistics, and green technology, reflecting Johor's economic priorities.

Source: Stakeholder Engagement; New Straits Times; PASB Analysis

Moving forward, Johor should strive to lead with transparent, innovation-enabling policies that support cross-border business and fosters investor confidence (1/4)

Ideal Future State

Vision

"Johor as the benchmark and pioneer for efficient, transparent, and innovation-ready regulatory governance, enabling seamless business operations through progressive policies and cross-border alignment"

Dynamic, Innovation-Ready Regulations	Johor leads in piloting, updating, and localising regulations that enable next-gen business models (e.g. fintech, agri-biotech, smart logistics), supported by a flexible regulatory sandbox environment.
Real-Time Transparency & Accountability	End-to-end digital systems that allow real-time tracking of investment applications, licensing status, and agency actions – viewable by investors, ministries, and the public.
Borderless Business Mobility	Businesses, goods and capital move fluidly across Johor and Singapore under reciprocal agreements, supported by interoperable platforms and mutual recognition of certifications.

Key Strategies

1. **Accelerating First-Mover Policy Frameworks**

   Position Johor as a launchpad for high-value emerging sectors (e.g., RE, AI, FinTech) through agile, future- ready, pro-innovation policies such as sandboxes, pilot programs, and ESG-aligned risk management.

2. **Mobilising Investor-Centric Operating Models**

   Offering value-added support and investor care across the investment journey to streamline business entry, operations, and growth amidst the rapidly evolving economic landscape

3. **Institutionalising Pro-Investment Governance Structures**

   Establishing cross-sectoral working groups, creating specialised agencies (e.g., for AI or Renewable Energy), and empowering semi-autonomous platforms to lead reforms, subject matter expert engagement and industry recommendations

Source: PASB Analysis

Moving forward, Johor should strive to lead with transparent, innovation-enabling policies that support cross-border business and foster investor confidence (2/4)

1 Accelerating First-Mover Policy Frameworks

Description

- **Johor as a testbed** for agile, innovation-enabling policy environments to attract high-growth sectors like renewable energy (RE), artificial intelligence (AI), and financial technology (FinTech).
- **Embedment of enabling regulatory tools** such as regulatory sandboxes, pilot licenses, and temporary exemptions into state policy, Johor can offer responsive frameworks that accommodate rapidly evolving technologies.

Strategic Impact

- **Boosts Investment Appeal for Emerging Sectors**: First-mover frameworks directly reduce policy ambiguity and accelerate regulatory clearance for emerging industries with accelerated potential for commercialisation
- **Accelerates Tech Adoption**: Encourages the piloting of frontier technologies by lowering regulatory entry barriers for startups and innovative enterprises
- **Differentiates Johor as a Policy Innovator**: Builds Johor's brand as a forward-thinking jurisdiction willing to co-develop rules alongside industry
- **Strengthens Cross-Border Collaboration**: Creates an enabling foundation for joint ventures, particularly within the JS-SEZ framework with Singapore-based firms
- **Drives Inclusive Growth**: Opens pathways for local entrepreneurs and SMEs to participate in high-value sectors

Case Study

- **Japan Regulatory Sandbox for Mobility and Healthcare:** Japan's regulatory sandbox, established under the Act on Special Measures for Productivity Improvement (2018), is overseen by the Cabinet Office and designed to allow real-world testing of innovative technologies and business models with temporary regulatory exemptions. The framework is sector-agnostic but has seen notable success in mobility, healthcare, and fintech.
- **Singapore MAS Regulatory Sandbox and Smart Logistics:** Singapore's sandbox enabled the piloting of blockchain-based trade finance platforms, such as the collaboration between DBS Bank, Standard Chartered, and Infocomm Media Development Authority (IMDA). These pilots digitied and streamlined trade documentation and customs processes, reducing transaction times from days to hours and improving transparency & security in cross-border logistics.

Source: PASB Analysis

Moving forward, Johor should strive to lead with transparent, innovation-enabling policies that support cross-border business and foster investor confidence (3/4)

2 Mobilising Investor-Centric Operating Models

Description

- **Shifts from transactional to strategic** by transforming Johor's investment model from a fragmented, process-driven approach to a unified, investor-first ecosystem
- **Integrates cross-agency "deal teams"** to coordinate across government agencies to offer packaged solutions—including permits, land, and infrastructure access
- **Delivers speed and transparency** by focusing on de-risking and accelerating investment through proactive, value-added support at every stage
- **Treats investors as partners** by positioning them as long-term collaborators, not mere applicants

Strategic Impact

- **Reduces approval fragmentation**: Streamlines multi-agency interactions for faster turnaround times
- **Improves timeline reliability**: Ensures consistency and clarity in investment delivery which is key to de-risking capital-heavy projects
- **Enhances Johor's competitiveness**: Builds a trusted, responsive environment for high-impact and cross-border investments.

Case Study

- **Invest India's Project Monitoring Group (PMG):** PMG serves as an inter-ministerial platform that fast-tracks large investments by resolving regulatory and infrastructural bottlenecks. Its digital tracking and accountability mechanisms reduce delays and provide clarity to investors, making India more attractive to infrastructure and energy players.
- **Singapore's Economic Development Board (EDB) Investment Facilitation Model:** The EDB deploys dedicated sector-specific teams to provide tailored investor support—from policy navigation to workforce solutions. This proactive, concierge-style facilitation has earned Singapore a reputation for low friction and high responsiveness in industrial investment.

Source: PASB Analysis

Moving forward, Johor should strive to lead with transparent, innovation-enabling policies that support cross-border business and foster investor confidence (4/4)

3 Institutionalising Pro-Investment Governance Structures

Description

- **Embeds long-term coordination** by integrating pro-investment structures into Johor's governance framework for sustained reform delivery
- **Establishes cross-sectoral platforms** such as working groups and specialised agencies (e.g., for AI, renewable energy, or FinTech) to lead thematic investment reform
- **Empowers semi-autonomous entities** to drive reforms, facilitate stakeholder engagement, and monitor investor experience independently
- **Ensures continuity and alignment** by creating responsive institutional architecture that supports policy coherence and investor facilitation.

Strategic Impact

- **Builds Long-Term Investor Confidence:** Clear and stable governance frameworks reassure investors of continuity and reduced uncertainties
- **Signals Johor's Commitment to Pro-Business Reform**: Demonstrates institutional dedication beyond ad hoc initiatives or political cycles
- **Improves Investor-Government Responsiveness**: Dedicated platforms enable faster issue resolution, ensuring investor concerns are addressed in real time
- **Enables Agile and Adaptive Policymaking**: Institutional mechanisms allow the state to respond rapidly to emerging sector needs and global investment trends
- **Elevates Johor's Institutional Reputation**: Positions the state as a reliable and reform-oriented jurisdiction

Case Study

- **South Korea's Presidential Council on National Competitiveness:** This cross-ministerial platform, chaired by the President, was critical in resolving inter-agency disputes and driving reforms that boosted South Korea's business environment rankings.
- **European Union High-Level Expert Groups (HLEGs) on Emerging Technologies:** Government-led, cross-sectoral working groups with multi-stakeholder panels to guide policy, stakeholder engagement, and regulatory innovation for emerging industries such as AI, Green Finance, Hydrogen Strategy, and Industrial Data. The HLEG has accelerated regulatory readiness for complex emerging sectors and boosted industry confidence.

Source: PASB Analysis

Private Investment Catalyst.

JETP's Private Investment Catalyst Strategy aims to unlock high-impact private capital through targeted financial incentives, capital access, and sector-specific development

Overview of JETP Private Investment Catalyst (PIC)

Private Investment Catalyst (PIC)

Financial Incentives & Capital Market Access

- Financial mechanisms to enhance the viability of projects and reduce investment risks in high-growth sectors, thereby attracting greater private sector participation
- This includes tailored fiscal incentives such as grants, tax rebates, land-premium discounts, risk-sharing schemes and other mechanisms to improves access to debt and equity markets.

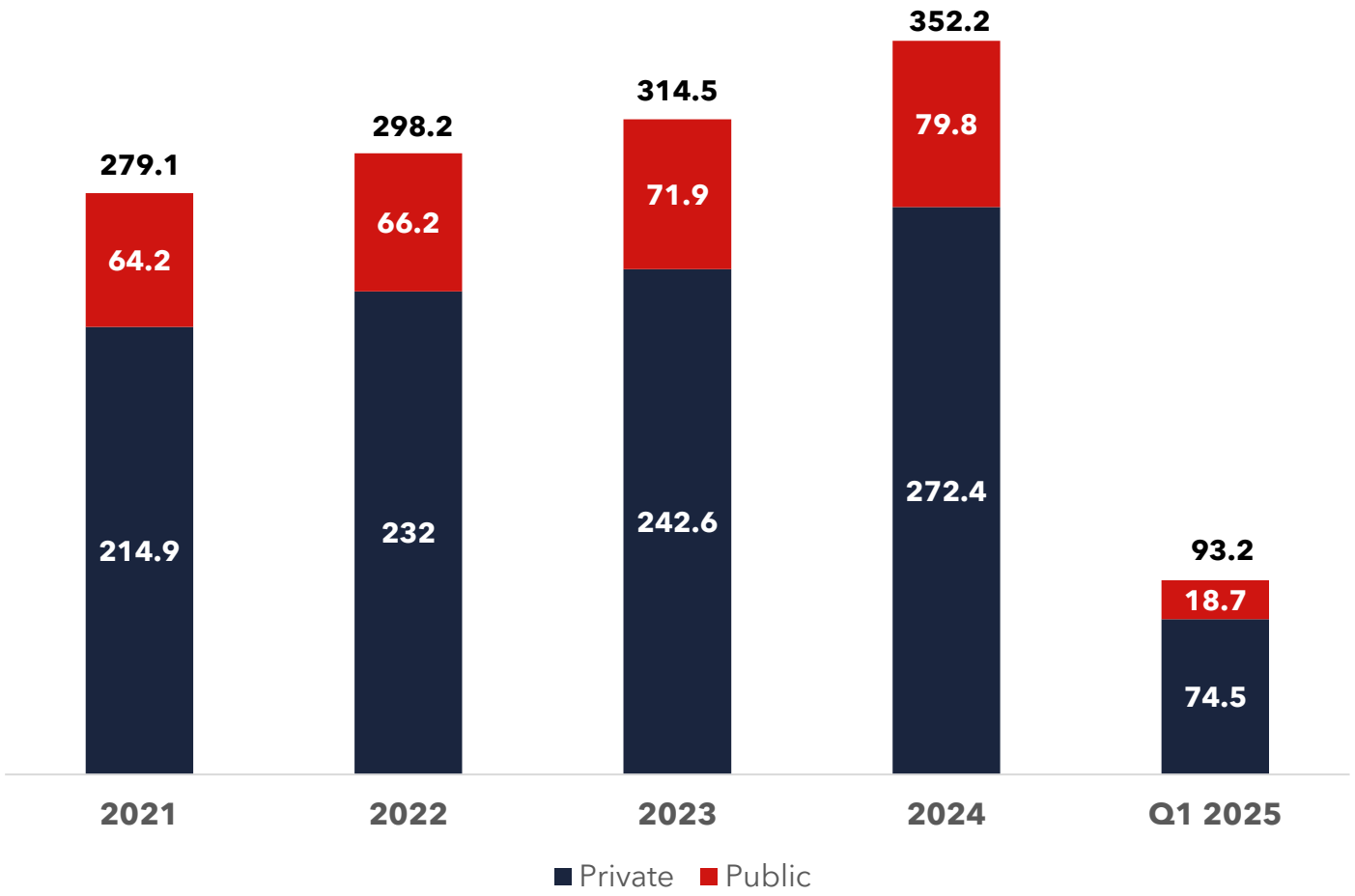
Sectoral Development

- Focuses on strengthening sector ecosystems to drive sector growth and positioning Johor as a preferred investment hub for private investments.
- This includes sector masterplans, special investment zones, industrial development frameworks and other structures to support targeted economic sectors.

Source: PASB Analysis

Private investments made up an average of 78% of national GFCF[1] over the past five years, with a clear upward trend peaking at 79.9% in Q1 2025

Malaysia's gross fixed capital formation (GFCF), 2021-Q1 2025
RM billion



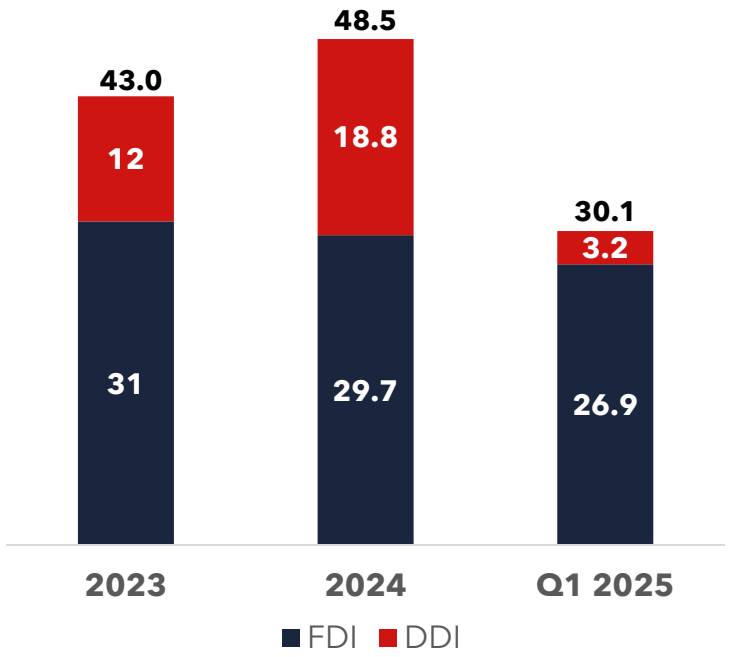
Key Highlights:

- Malaysia's GFCF is **mainly driven by the private sector** which is critical to ensuring sustained **productivity growth** which translates to economic resilience and attractiveness as an investment destination
- Malaysia's real GFCF rocketed +**12% in 2024** to ~RM 352 bn—the sharpest jump since 2012
- Corporates now finance **four-fifths** of all investment (80 % in Q1 2025)
- And crucially, nearly **two-thirds** of that private money targets service-sector assets—digital, logistics, finance—highlighting where national competitiveness is really being built

Note: [1]Gross Fixed Capital Formation
Source: DOSM, PASB Analysis

Johor saw a record RM30 bn in Q1 2025 approvals–driven 90% by foreign investors–anchored in services, which now make up 70% of total investments

Johor's Approved Investments, 2023-Q1 2025
RM bn



Top 3 Largest Investors by Country, Q1 2025
RM bn

Singapore - **RM 28.3bn**

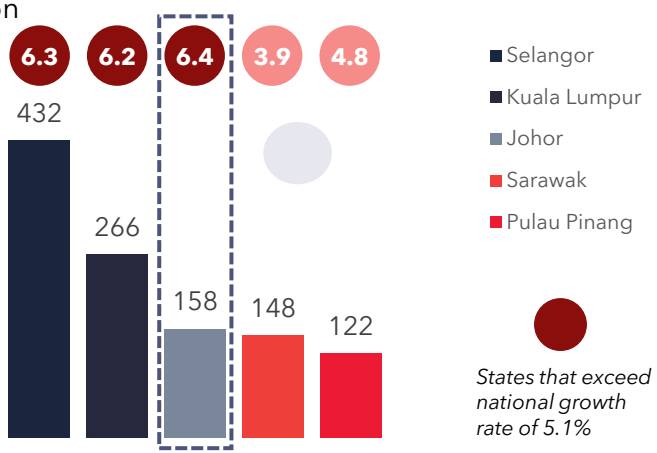
USA
RM 9.9bn

China
RM 7.9bn

Investment Mix by Sectors

Services Manufacturing

Top 5 GDP Contribution & %Growth by States, 2024
RM bn



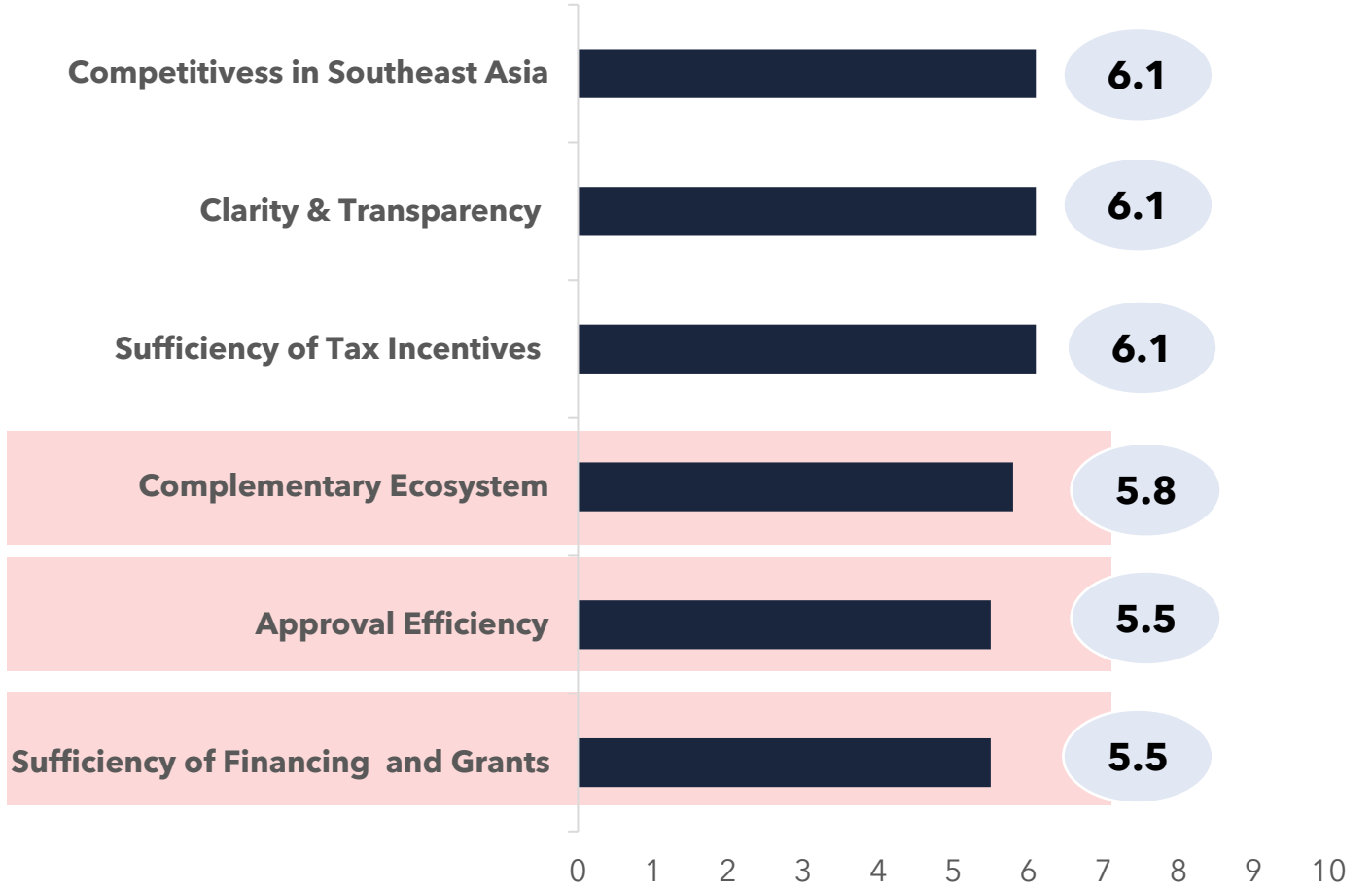
- Johor achieved an astounding RM 30 billion in approved investments in just Q1 2025, seven-times last year's first quarter
- Foreign investment dominates – ~90% of that surge came from Singapore, US and China
- Services now account for 70% of all capital committed, perfectly matching Johor's pivot to data-centre, logistics and finance plays, while GDP raced ahead at a nation-leading 6.4%

Source: MIDA, Bernama, The Sun, PASB Analysis

Investor feedback indicates Johor's incentives are competitive, but lasting success hinges on a robust, complementary sectoral ecosystem across investment and sectoral development

Status of Investment Incentives in Johor (Ranked out of 10)

Scoring Matrix - 0: Very Poor 5: Adequate 10: Excellent



Key Highlights:

- Johor's competitive investment packages including incentives and tax exemptions have **positioned it strongly** within Southeast Asia.
- While incentives remain a key draw for investors, a **robust, well-functioning ecosystem** is equally critical to ensure sustained reinvestment, long-term value creation, and industry confidence.
- By addressing these structural needs, Johor can evolve from being **incentive-dependent to ecosystem-driven** ensuring long-term investor confidence, industry growth, and shared value for the state.

Source: JETP Investor Survey, Eden Strategy Institute, The Edge Malaysia, American Malaysian Chamber of Commerce (AMCHAM), PASB Analysis

The Johor-Singapore SEZ which offers fast-track approvals and generous incentives have significantly propelled Johor as a preferred investment destination in the region

Johor-Singapore Special Economic Zone (JS-SEZ)

Strategic Vision

To build the ultimate cross-border growth engine for **advanced manufacturing & knowledge services** by marrying Singapore's capital andtalent with Johor's land and cost advantage

Why Was It Established?

"We can both be more competitive, enhance our value proposition, and jointly attract more investments to our shores." – Singapore PM Lawrence Wong (joint press conf.)

Incentive Package

- 5% flat CIT, up to 15 yrs
- 15% flat PIT for knowledge workers, for 10 years
- 100 % ITA on qualifying capex (high-impact sectors)
- 40% stamp duty exemption on commercial property transfers

How does it work?

IMFC-J one-stop centre – licenses, land & incentives in ≤ 30 days (vs 90 days before)

7 flagship zones clustered around checkpoints, Senai Airport & Port of Tanjung Pelepas

Forward targets

100

High-Value Projects within 10 years

20,000

High Skilled Jobs to be created

Source: UOB Group, WSJ, The Edge, UNCTAD, BDO, PASB Analysis

Forest City's Special Financial Zone is positioning as Malaysia's offshore finance and fintech hub, with tax perks and duty-free status drawing interest from financial firms and family office interest

Forest City Special Financial Zone

Strategic Vision

To position Forest City as **Malaysia's next-generation offshore finance & fintech gateway**, complementing the JS-SEZ and drawing cross-border capital, family offices and high-growth digital firms

Why Was It Established?

"The SFZ lowers the cost of doing business and extends Iskandar incentives to pull in foreign investment."– PM Anwar (25 Aug 2023)

Incentive Package

- 5% CIT for fintech, GBS, foreign PSPs, ≤ 15 yrs
- 0% on investment income, ≤ 20 yrs (≥ RM 30 m AUM) for Single Family Office
- 15% flat PIT for "knowledge workers", Full customs & SST exemption on Pulau 1 imports

How does it work?

Duty-free island status (Pulau 1) **+ Free Commercial Zone** regulations

One-stop desk co-run by MoF & Securities Commission for licence + visa issuance (FO scheme portal live Q1 2025)

MM2H-lite visa: 10-yr stay, FD requirement cut to RM 150k (>50 yrs).

Forward targets

19

family-office applicants; 2 approvals

11

companies exploring fintech / GBS setups

Note: [1]As of April 2025
Source: Baker McKenzie, UNCTAD, EY, PwC, KPMG, SCMP, PASB Analysis

Senai Airport Free Zone and Senai Airport City was established to catalyse the development of wide-ranging aerospace services and manufacturing within the sector

Senai Airport Free Zone (SAFZ) / Senai Airport City

Strategic Vision

"To be the southern regional hub for commercial and business aviation." – Senai International Airport mission statement

Why Was It Established?

- Provide an air-cargo & MRO platform south of KLIA
- Anchor Malaysia's Aerospace Blueprint 2030 and support cross-border e-commerce growth - CEO Gan Seng Keong interview

Cluster Composition

Aerospace / MRO

ADE

SapuraTechnics

Global logistics operators

UPS

DHL

How does it work?

Tenants sign a long-term land lease with **Senai Airport City Sdn Bhd** (MMC Group)

Developer and Customs jointly operate **a one-stop FIZ desk**; typical licence turnaround "about a month"

Results to-date (2025)[1]

8 RM bn of committed investments

160 investors showing interest

Forward targets

28k Jobs to be created, with emphasis on Johoreans

350 Acres to be launched as part of Phase 3

Note: [1]As of June 2025
Source: Senai Airport, Bernama, DHL, CAAM, PASB Analysis

In addition, IRDA, Invest Johor, and IMFC-J form a layered investment ecosystem—statewide promotion, corridor planning, and SEZ fast-track delivery

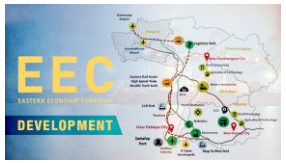
Agency	Reporting line / Governance	Geographic scope	Core mandate & services
IRDA (Iskandar Regional Development Authority)	Federal statutory body under IRDA Act 2007; Board ("Members of Authority") co-chaired by the Prime Minister and Johor Menteri Besar	Iskandar Malaysia: 2,300 km² across 5 local authorities (MBJB, MBIP, MBPG, MPKu, MPPn)	• Plan and facilitate sustainable development in Iskandar Malaysia • Provide investor consultation and coordinate multi-level governmental approvals
IMFC-J (Invest Malaysia Facilitation Centre – Johor)	Jointly operated by MIDA (Federal), IRDA & Invest Johor; overseen by the JS-SEZ Ministerial Committee (MoE MY & MTI SG)	One-stop centre for the Johor-Singapore SEZ (flagship sites in Iskandar & Pengerang)	• Accelerate investments through one-stop Johor–Singapore SEZ facilitation centre • Process applications, fast-track approvals, and support investors continually
Invest Johor	State agency under Johor Executive Council (EXCO for Investment, Trade & Consumer Affairs – YB Lee Ting Han)	Entire State of Johor (all 10 districts)	• Promote and facilitate strategic investments into Johor state • Offer investors guidance, market insights, and regulatory support

How they complement one another:

- **Layered governance**. IRDA answers to a federal–state board; Invest Johor is state-executive; IMFC-J is a mixed federal-state desk embedded in the JS-SEZ
- Together, they create a clear funnel for investors: **Statewide attraction** (Invest Johor) → **Corridor-level planning** (IRDA) → **SEZ fast-track execution** (IMFC-J)

Source: IRDA, IMFC-J, Invest Johor, PASB Analysis

Furthermore, regional peers are aggressively competing with long tax holidays, capital subsidies, and fast-track visas—each targeting high-value sectors like AI, EVs, data centres, and advanced manufacturing

Countries	Headline Tax Break	Non-Tax Sweeteners	Target / Priority Sectors
Vietnam – Draft Hi-Tech Incentive Decree	**0% CIT 5 yrs** → 10 % for next 15 yrs (AI & semiconductors)	• Up to **50% subsidy on initial capex** (≥ VNĐ 3 trn) • "Red-Carpet Task-Force": 48-hr license promise	AI chips, logic & advanced packaging, green-energy electronics
 **Thailand** – Eastern Economic Corridor	**CIT holiday up to 15 yrs**	• **Flat 17% PIT** for foreign talent • EEC LTR Visa (10-yr, airport fast-track)	Robotics, EV/EV-battery, smart-electronics, biotech
INDONESIA SEZ NATIONAL COUNCIL FOR SPECIAL ECONOMIC ZONE **Indonesia** – Special Economic Zones	**100% CIT holiday 10-30 yrs** (≥ IDR 10 bn)	• **VAT & import-duty exemption**; accelerated depreciation; 95-yr land-use rights; 10-yr work-visa	Renewable energy export (Batam), data-centres, petro-chem/EV value chain
Singapore – PC / DEI & GIP refresh	**5%–10% tax rate up to 40 yrs** (Pioneer Certificate & DEI)	• **PR-by-investment (GIP)** with S$ 10m threshold – fast PR for founders/investors	Global HQ, advanced mfg., fintech, life-sciences
Philippines – CREATE / SIPP rules	**4-7 yr ITH → 5% SCIT / enhanced deductions** up to 27 yrs	• Duty-free import of capital equip; VAT-zero rating on local buys; "CREATE MORE" bill adds R&D 200% super-deduction draft	Tier III: AI, data-centres, cyber-security; export fabs

Source: Vietnam News, AustChamThailand, ASEAN Briefing, PwC, EDB, KPMG

Moving forward, Johor will need to sustainably position itself as ASEAN's Southern Corridor by unlocking an integrated investment ecosystem anchored on targeted incentives and capital access (1/3)

Ideal Future State

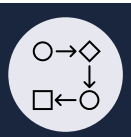
Vision

"Johor as the investment-magnet of ASEAN's Southern Corridor that the is strengthened by a complementary well-integrated investment ecosystem"

Rooted on Strategic Win-Win-Win Incentives	First-to-market incentives that benefit and creates mutual value particularly in priority key sectors for investors, local industry players and the state.
Established Southern Capital Gateway	A targeted capital mobilisation strategy to unlock private investment in high-impact and underserved sectors through blended financial instruments
Performance Based Reinvestment Destination	Preferred reinvestment destination in priority sectors through institutional mandates, sectoral development efforts and public-private strategies by anchor firms through sector-specific interventions and partnerships.

Key Strategies

1



Adaptive Incentive Portfolio

A dynamic menu of fiscal rewards (tax, grants, land rebates) that flexes with sector priorities that are aligned to national focus areas

2

Catalytic Capital Access

A state-led financing stack that blends public anchor funds and private capital to support green-field and high value sectors

Moving forward, Johor will need to sustainably position itself as ASEAN's Southern Corridor by unlocking an integrated investment ecosystem anchored on targeted incentives and capital access (2/3)

1

Adaptive Incentive Portfolio

Description

- **Dynamic and Targeted Incentives** that adjusts fiscal levers such as corporate income tax (CIT), personal income tax (PIT), investment tax allowances (ITA), and land grants based on evolving sector priorities that are of high growth potential
- **Designed to maintain competitiveness** without overextending public finances, leveraging tax benchmarking and rapid feedback loops.
- **Avoids incentive fatigue** by shifting from static, long-term packages to a live incentive dashboard that is reviewed and renewed by a central incentive council.
- **Anchored around the JS- SEZ fiscal framework**, offering competitive incentives to anchor strategic investor.

Strategic Impact

- **Boosts Investment Appeal**: Offers investors a clear, predictable, and responsive incentive environment, enhancing Johor's competitiveness across ASEAN.
- **Increases Agility & Responsiveness:** Fast-tracked recalibration of incentive terms ensures Johor adapts to global trends, e.g. AI, EVs, and decarbonisation investments.
- **Avoids Fiscal Overreach**: Structured trade-offs and caps on incentive intensity prevent runaway tax leakage while offering high-value deals to strategic investors.
- **Drives Cluster Development:** Sector-specific carveouts (e.g. for semiconductors, green tech) catalyse concentration of high-value activities within economic zones.
- **Reduces Time-to-Market**: Streamlined approvals and periodic automatic renewals allow investors to scale with reduced bureaucratic friction.

Case Study

Vietnam's special AI/semiconductor package

- Vietnam has introduced a special incentive package in draft form targeted at semiconductor and AI firms, offering a CIT exemption for the first 5 years, followed by reduced rates, and 150% R&D expense deduction.
- The policy is part of a broader strategy to elevate Vietnam's positioning in the global high-tech supply chain.
- Early investor interest has spiked, particularly from South Korean and Japanese electronics firms, showing the power of targeted fiscal tools to drive sector-specific FDI.

[1] A Convergence Finance study found that, on average, blended finance funds have leveraged $4 of commercial capital for every dollar of concessional capital
Source: UNCTAD, Reuters, Business Times, Convergence Finance, Baker McKenzie, PASB Analysis

Moving forward, Johor will need to sustainably position itself as ASEAN's Southern Corridor by unlocking an integrated investment ecosystem anchored on targeted incentives and capital access (3/3)

2

Catalytic Capital Access

Description

- **Establishment of blended finance framework** to mobilise large-scale private investment that are high-risk, capital-intensive, or commercially non-bankable in early stages.
- **Leverages a layered capital stack** comprising public anchor funds, sovereign wealth fund (SWF) contributions, and commercial bank loans to derisk investment profiles and attract private capital.
- **Enables crowding-in of institutional investors** by providing catalytic capital in the form of subordinated equity, credit guarantees, or concessional debt.
- **Priority financing targets** include advanced industrial parks, renewable energy zones, and AI-enabling infrastructure which are often underfunded by traditional banking channels.

Strategic Impact

- **Closes Investment Gaps**: Directly addresses market failure where private capital is absent due to high perceived risk, particularly in early-stage or untested sectors.
- **Reduces Cost of Capital**: By blending concessional and commercial capital, project sponsors benefit from more favourable interest rates and longer tenors.
- **Accelerates Project Delivery**: Enables financing readiness for catalytic projects, shortening time-to-finance and reducing opportunity loss from delayed implementation.
- **Stregthens Johor's Investment Reputation:** Positions Johor as a regional innovator in investment facilitation, aligning with global blended finance best practices.
- **Multiplies Fiscal Efficiency**: Delivers strong leverage targeting a 1:4 ratio, meaning RM1 of public or concessional input unlocks RM4 in private capital.

Case Study

Indonesia's Danantara Fund

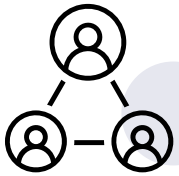
- Danantara was launched in February 2025 with an initial capitalisation of US $20 billion, drawn from government and SOE resources.
- The fund aims to invest in strategic sectors such as AI infrastructure, renewable energy, natural resources processing, and food infrastructure.
- It is funded through government allocations and SOE dividends with long term ambitions to significantly expand its total asset base.
- Early-stage financing partnerships and credit lines are being explored to fund strategic infrastructure.

[1] A Convergence Finance study found that, on average, blended finance funds have leveraged $4 of commercial capital for every dollar of concessional capital
Source: UNCTAD, Reuters, Business Times, Convergence Finance, Baker McKenzie, PASB Analysis

Talent and Capacity Building.

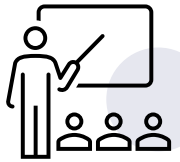
JETP's Talent & Capacity Building is a critical enabler, ensuring investments are backed by a robust talent pipeline

Overview of JETP Talent and Capacity Building



Workforce Supply & Development

- Focuses on enhancing the availability of local talents across the private and public sector that are fit for purpose to participate and support in the economic growth within Johor
- Additionally, capacity building is further considered with the objective of nurturing and training locally skilled talents across key industries



Industry-Academia Linkages

- Enforces collaboration among industry and academia to deepen research and design capabilities
- Such linkages aims to enable upwards mobility to high value industries by creating a unique value proposition for Johor in overall capabilities

Source: PASB Analysis

Within the next 10 years, the recently launched JS-SEZ is slated to create a cumulative 20,000 highly skilled jobs in line towards a value-based economy

Landmark Johor-Singapore SEZ pact signed: 100 projects, 20,000 jobs, investments across 11 sectors

07 Jan 2025 • 6 min read

Johor aims for 100k high-income jobs in JS-SEZ Initiative

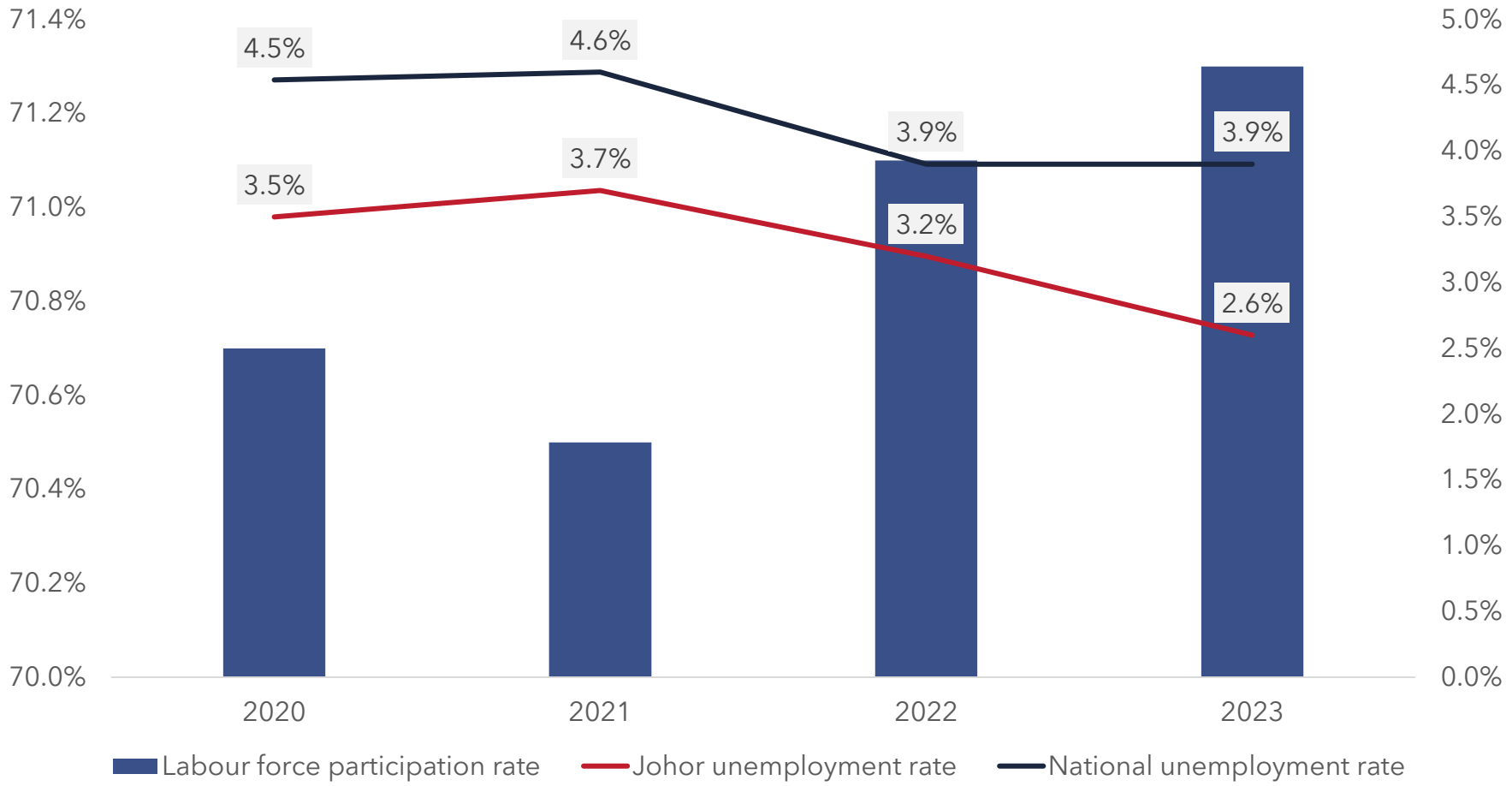
By Mary Victoria Dass - October 6, 2024 @ 5:56pm

Both Malaysian and Singaporean governments have set ambitious targets for the creation of skilled jobs in JS-SEZ. The Johor State Government has been proactive in its engagement of employers to negotiate higher salaries and improve coordination and alignment of educational institutions to industry requirements.

Source: Various News Sources

Increasing labour force participation, coupled with a declining unemployment rate, signals dynamic economic growth and jobs creation from new investments into Johor

Labour Force Participation and Unemployment Rate in Johor
(2020-2023)

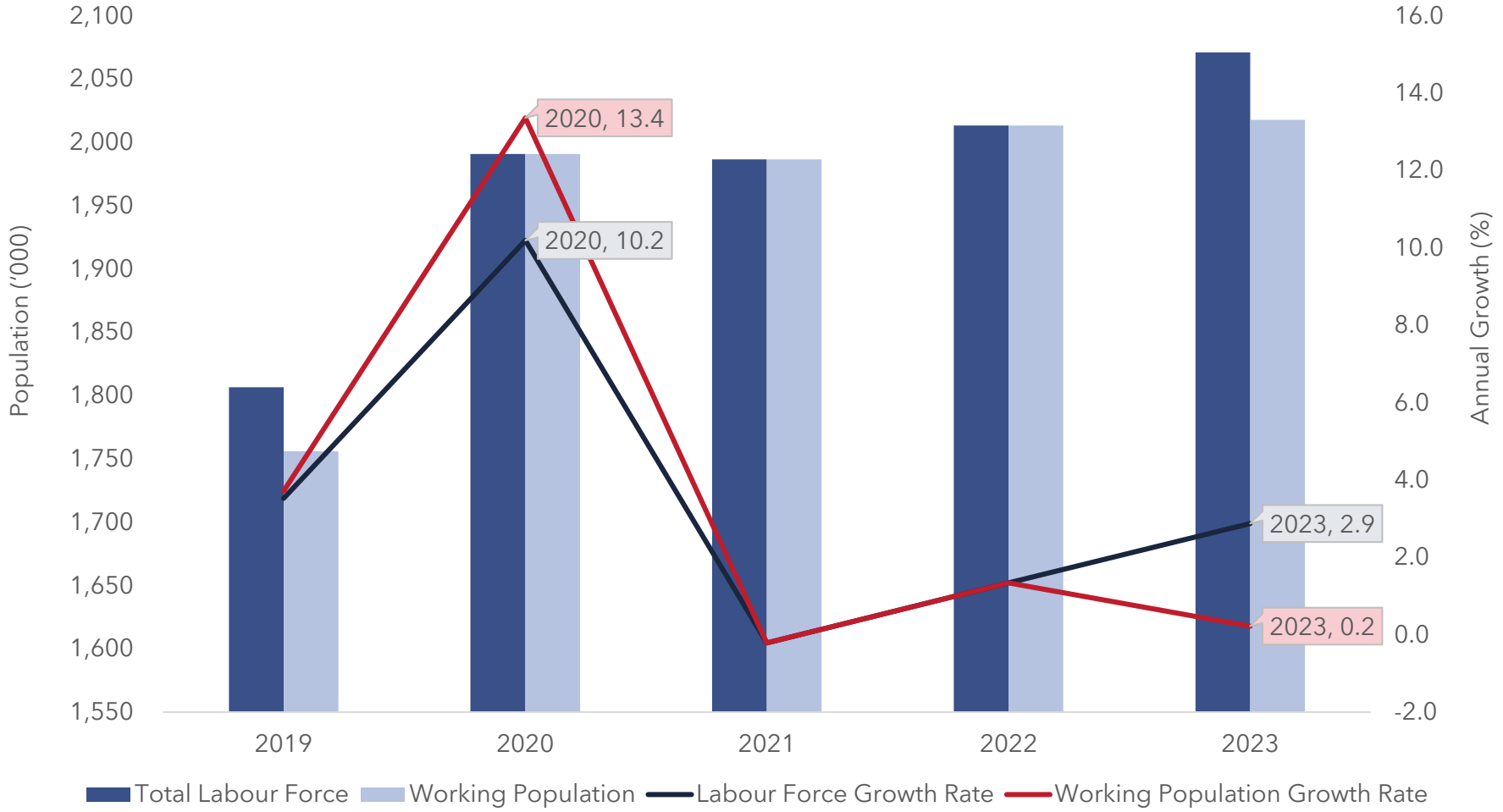


- **Johor's unemployment rate has consistently stayed below the national rate** owing to the state's favourable investment climate. This trend will likely gain momentum with the establishment of the JS-SEZ.
- Increasing labour force participation following 2021 signals post-pandemic economic recovery. **With a large youth population, Johor's will have a large working age population to support its labour force** participation in the years to come.

Source: Labour Force Survey Report, DOSM (2024)

Johor's labour market has been getting tighter, with working age population growth lagging behind the workforce

Total Labour Force and Working Age Population in Johor
(2019-2023, %)

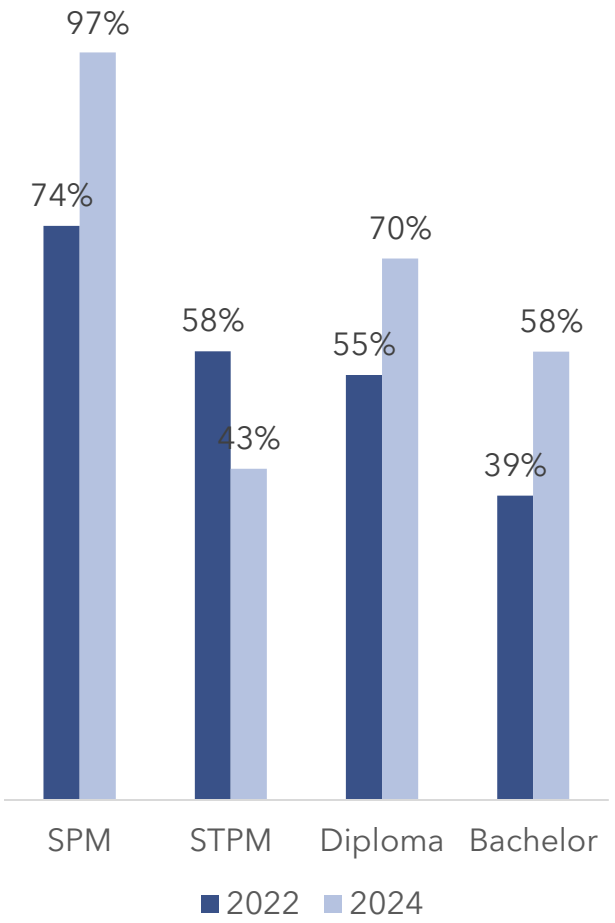


- While Johor's total labour force is steadily growing to outpace working age population growth. This has seen a corresponding increase in labour force participation and decrease in unemployment, suggesting that the labour market will continue to tighten.
- Working age population growth peaked during the pandemic, drastically dropping from 13.4% in 2020 to 0.2% in 2023. Potential drop due to outmigration post-pandemic.

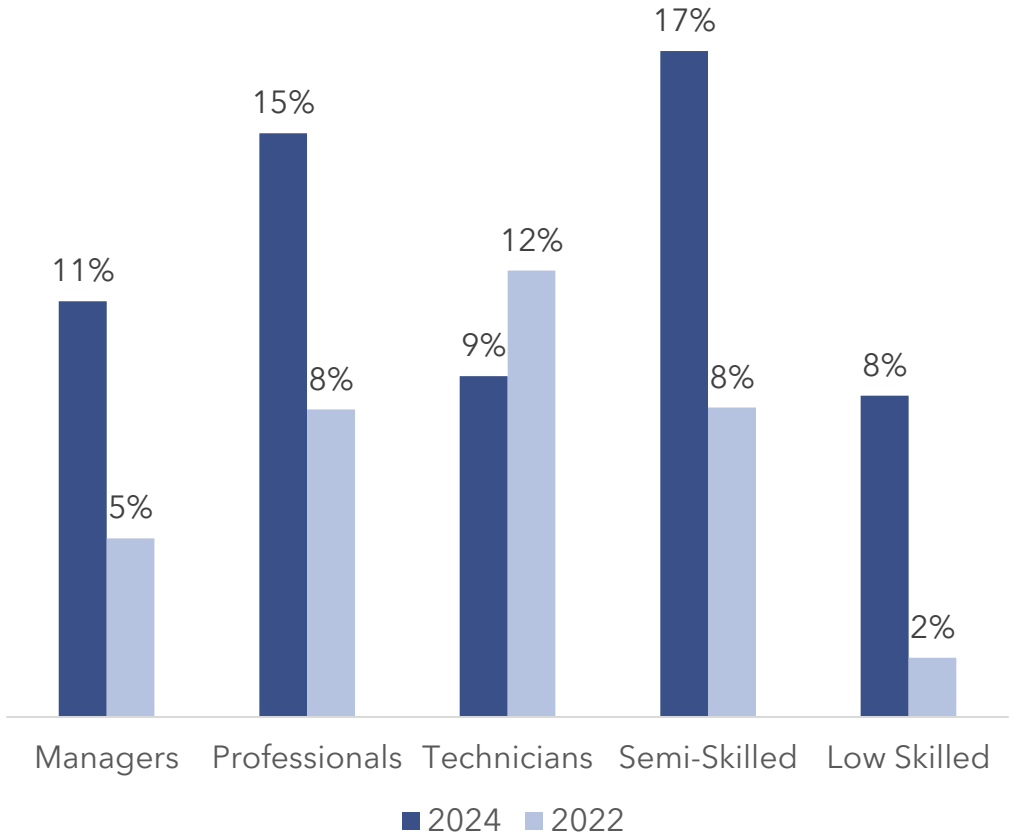
Source: Labour Force Survey Report, DOSM (2024)

High placement rates for SPM holders and vacancy fill rates for semi-skilled workers suggest stronger demand for lower skilled workers in Johor

Placement Rate by Education Level
(2022-2024)



Vacancy Fill Rate by Occupation/Skill Level
(2022-2024)

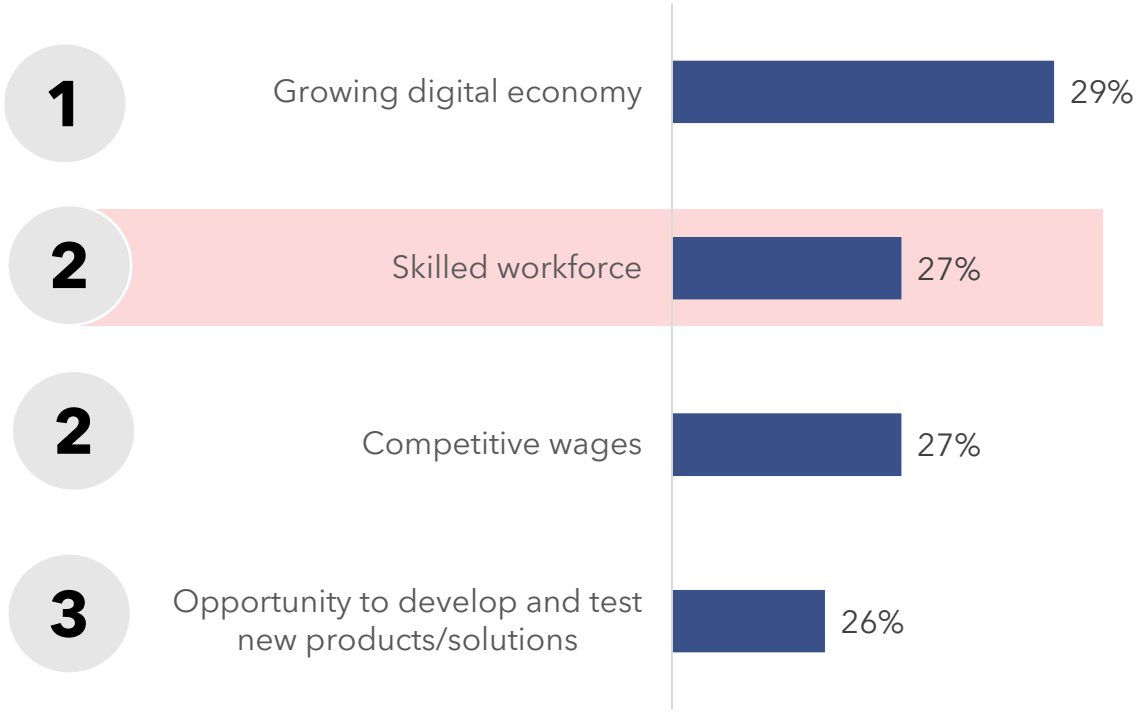


- Job seekers with SPM qualifications on MyFutureJobs saw significantly higher placement rates (97%) than those with higher levels of qualifications, such as STPM (43%), Diploma (70%) and Bachelor (58%).
- Out of 148,000+ vacancies listed on MyFutureJobs, in 2024, 19,000 (13%) were filled. Most filled positions were in semi-skilled jobs (47%) followed by skilled jobs (43%).
- While this correlation might be affected by other factors such as access to a greater range of job seeking platforms for higher qualified students, this data suggests strong demand for lower skilled workers.

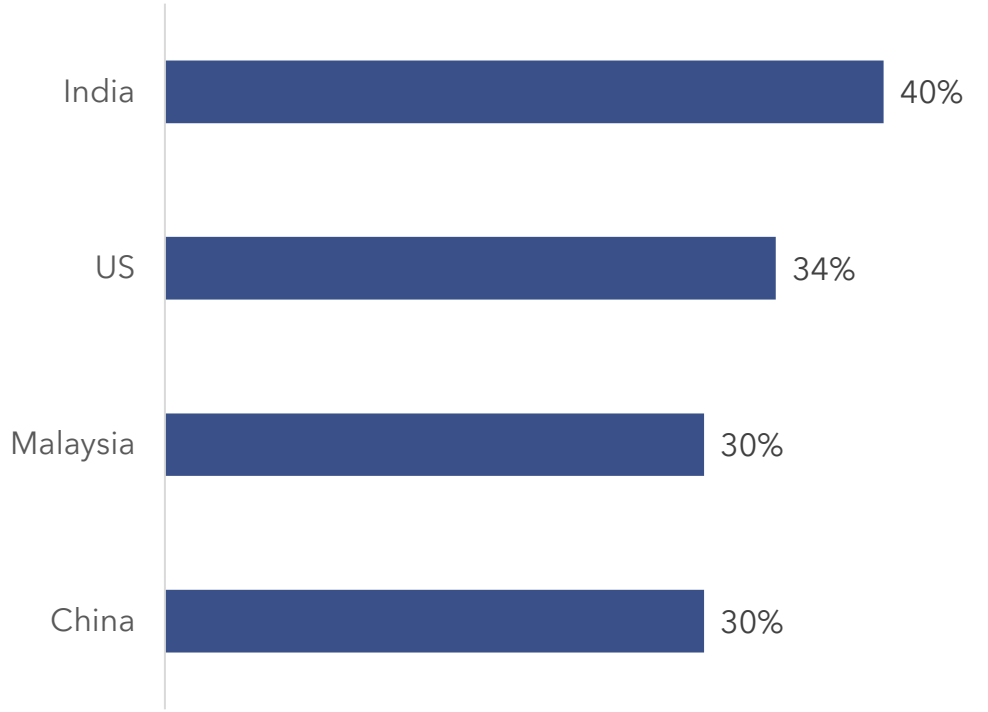
Source: Labour Force Survey Report, DOSM (2024)

However, multinational companies continue to identify a lack of skilled labour as their top priority in business expansion and largest challenge in Malaysia

Key Factors for Business Expansion in Southeast Asia
(2022)



Companies Reporting Challenges Hiring Skilled Labour in Malaysia
(2022)



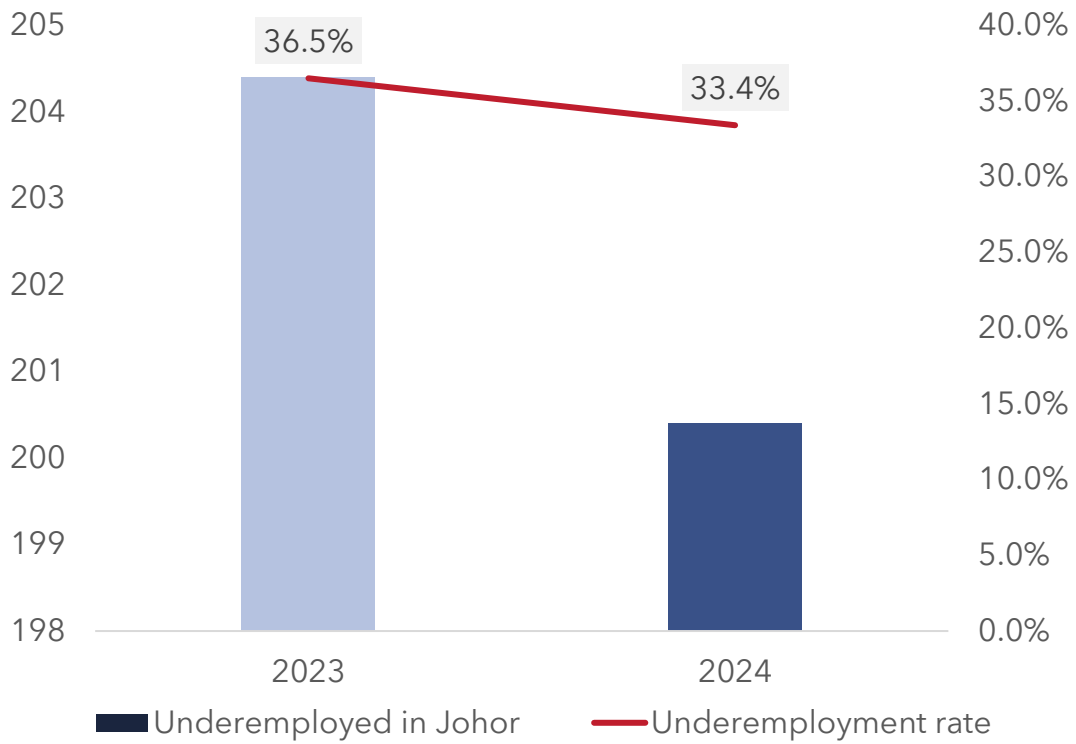
Skilled workforce was selected a top pull factor for ASEAN competitors such as Vietnam (30%) and Indonesia (29%) – while this did not feature as highly for Malaysia (<25%).

Conversely, **both local and international companies have identified a lack of skilled labour in Malaysia as the largest challenge** for their operations here.

Source: HSBC Navigator: SEA in Focus Report (2022)

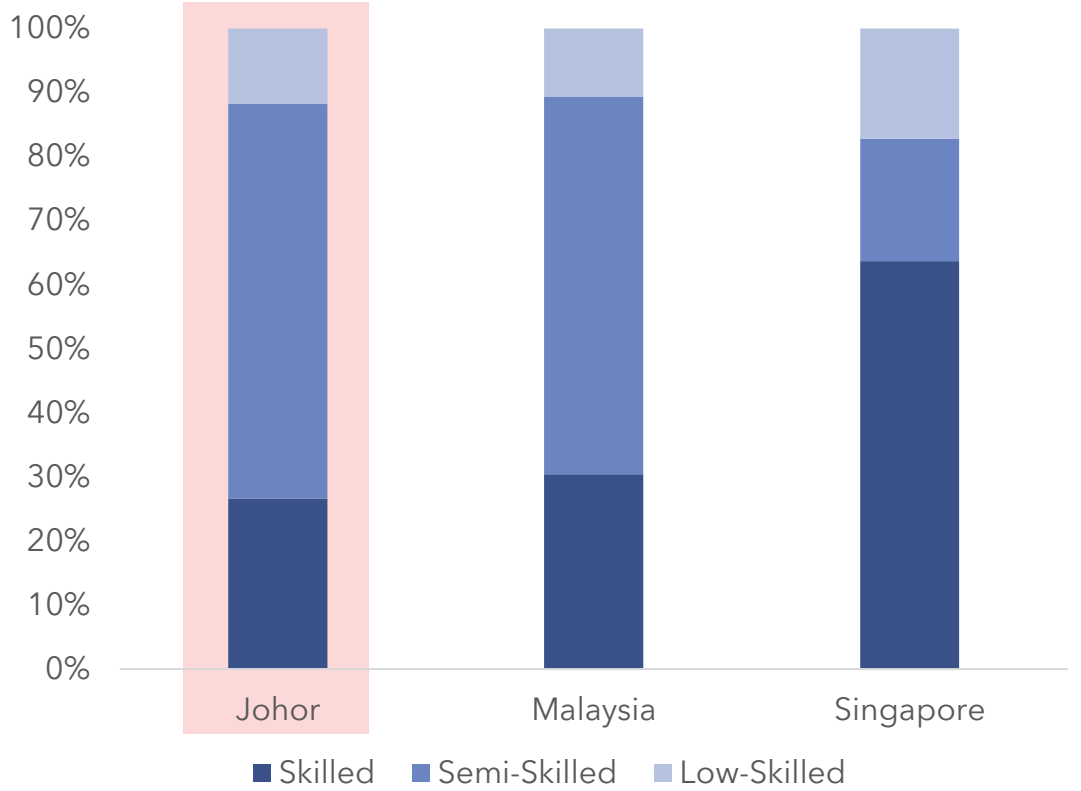
Johor faces a two-headed challenge of an overdependence on semi-skilled labour and skill-related underemployment of existing graduates

Skill-Related Underemployment in Johor
(2023-2024, '000)



A third of Johor's graduates are employed in jobs below their qualifications or skill level. Underemployment is a key indicator of economic inefficiency, leading to **lower productivity, salary, and job satisfaction**.

Breakdown of Labour Force by Skill Level
(2023)

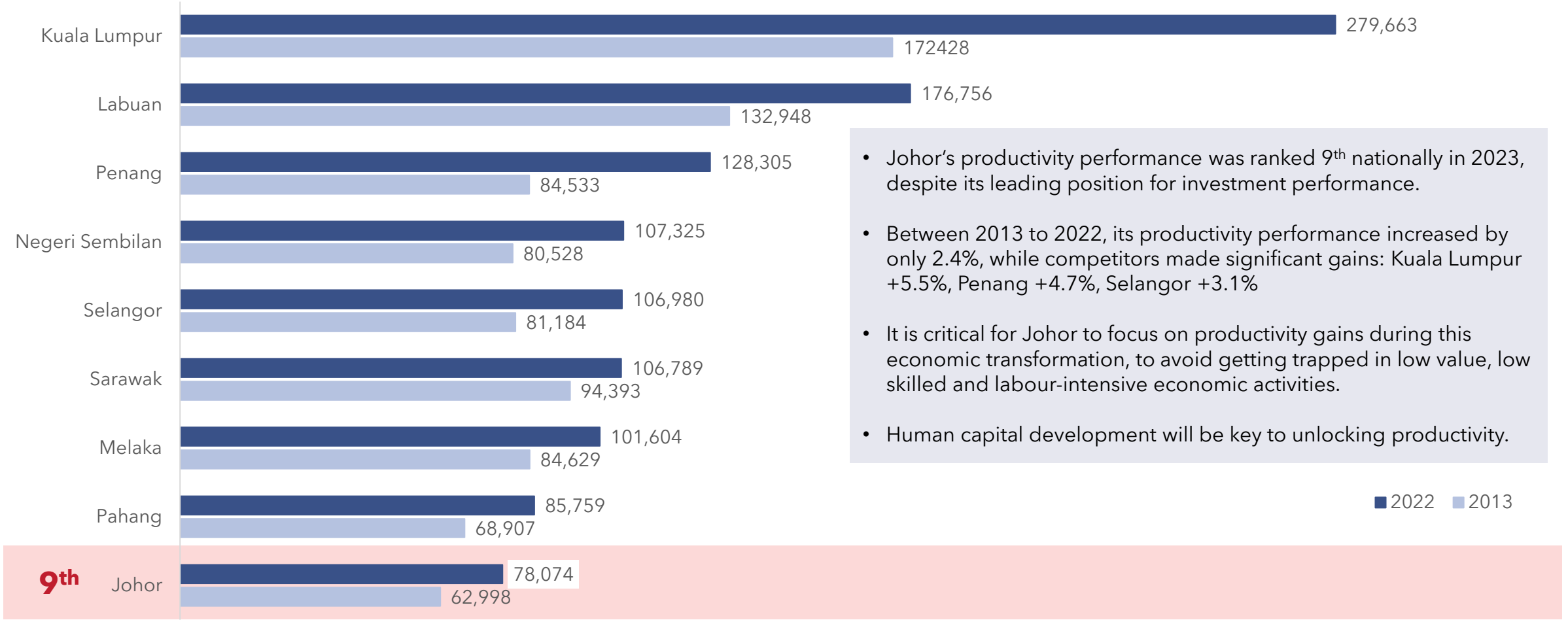


Only 26.6% of employed persons in Johor are classified as skilled workers, with the majority semi-skilled (61.6%). This is lower than the national average (30.4%) and Singapore (62.6%).

Source: Labour Force Survey Report, DOSM (2024), Laporan Sosioekonomi Johor (2024). Underemployment is defined as those with tertiary education working in the semi-skilled and low-skilled categories.

Human capital development is a key factor to develop and attract high value, greenfield investments and shift Johor towards a knowledge-based economy

Productivity Performance by State
(2013 and 2022, RM)



- Johor's productivity performance was ranked 9th nationally in 2023, despite its leading position for investment performance.
- Between 2013 to 2022, its productivity performance increased by only 2.4%, while competitors made significant gains: Kuala Lumpur +5.5%, Penang +4.7%, Selangor +3.1%
- It is critical for Johor to focus on productivity gains during this economic transformation, to avoid getting trapped in low value, low skilled and labour-intensive economic activities.
- Human capital development will be key to unlocking productivity.

Source: Labour Force Survey Report, DOSM (2024)

Johor possesses a well-developed tertiary education system, home to some of Malaysia's leading universities, as well as 130+ institutes for technical and vocational education

Johor is home to 3 leading public universities and 8 private universities, with degree specialisations in engineering, science, technology and medicine.

UTM Universiti Teknologi Malaysia
UTHM Universiti Tun Hussein Onn Malaysia
Universiti Teknologi MARA
TARUMT Tunku Abdul Rahman University of Management and Technology
MDIS Malaysia
University of Reading Malaysia
University of Southampton Malaysia
Newcastle University Medicine Malaysia
Raffles University
KPJ healthcare college Johor Bahru
Netherlands Maritime University College
DKU041(J) JPT/BPP(D)1000-701/619(15)

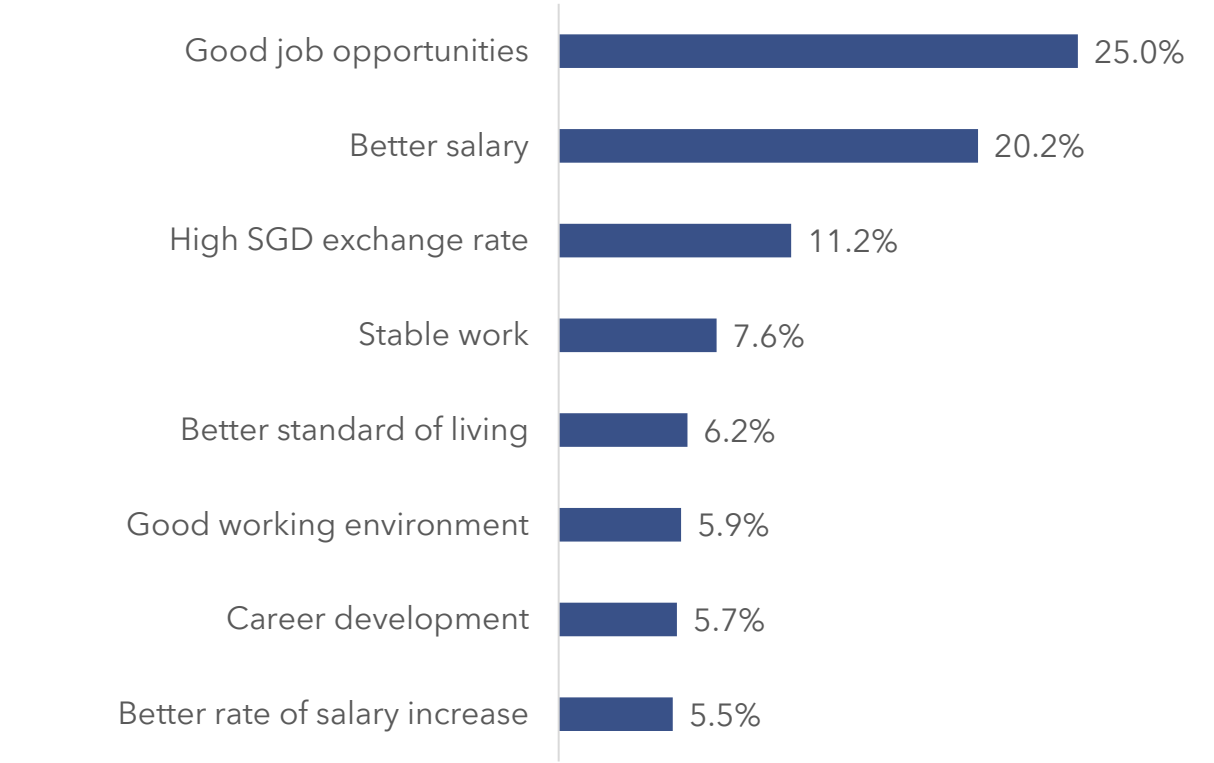
Johor also hosts 131 registered TVET providers as of 2023, including polytechnics, colleges and other institutions. 78 of these are public (federal-owned), 2 state-owned, and 51 privately owned.

ILPPG Since 1981 Institut Latihan Perindustrian Pasir Gudang
ilcm Johor Bahru
KYPJ Kolej Yayasan Pelajaran Johor
ILP Mersing
JSkills Johor Skills Development Centre
ADTEC Batu Pahat Jabatan Tenaga Manusia
Kolej Vokasional Kementerian Pendidikan Malaysia
Kolej Komuniti Malaysia
ILP Tangkak
Jabatan Pertanian Johor Pusat Pertanian Ayer Hitam
Politeknik Malaysia Ibrahim Sultan

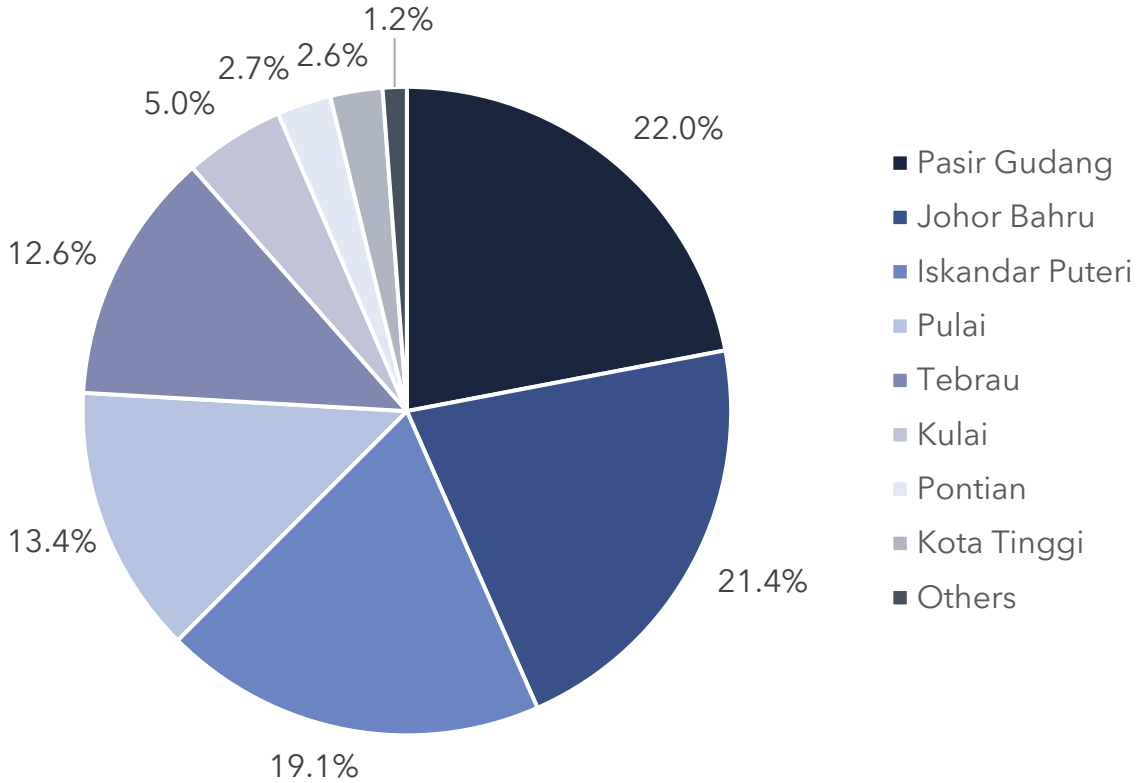
Source: Malaysian Qualifications Agency (2025), ISEAS Yusof Ishak Institute (2025)

Despite a large pipeline, strategic factors such as better job opportunities, higher salaries and geographic proximity lures talent to seek employment Singapore

Pull Factors for Malaysians Working in Singapore
(2022)



Residential Addresses of Johoreans Working in Singapore
(2022)



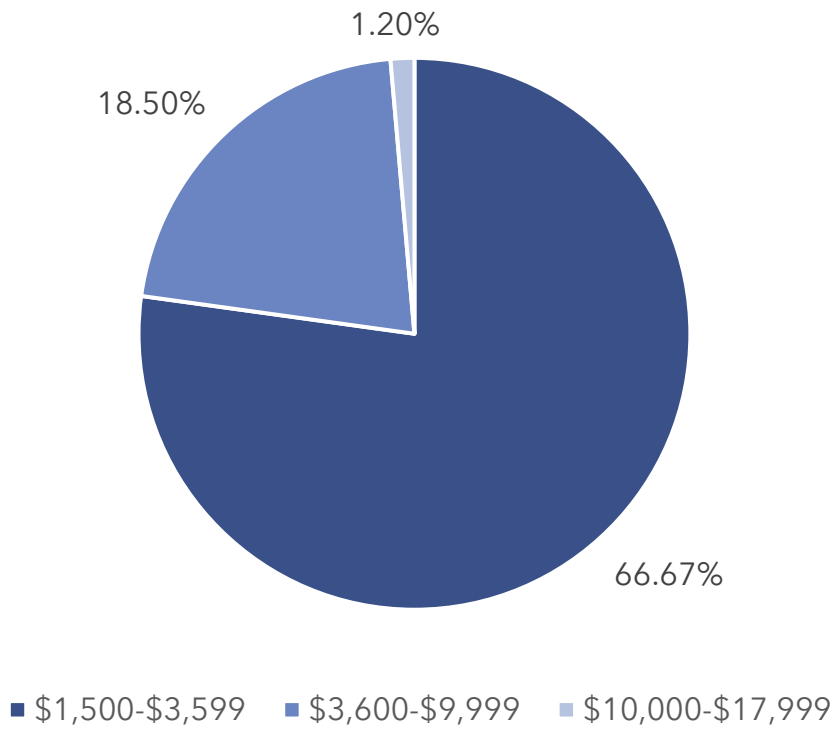
Around 400,000 Malaysians work in Singapore, making it the top destination for Malaysians working and living abroad. **Better job opportunities and salaries are key pull factors** for those working in Singapore.

A 2022 PERKESO survey of Malaysians working in Singapore found that 38.3% of respondents were born in Johor. Most lived in areas with strategic proximity to the border, such as Pasir Gudang, Johor Bahru and Iskandar Puteri.

Source: Laporan Kajian Perlindungan Keselamatan Sosial Rakyat Malaysia Bekerja di Luar Negara: Singapura, PERKESO (2022)

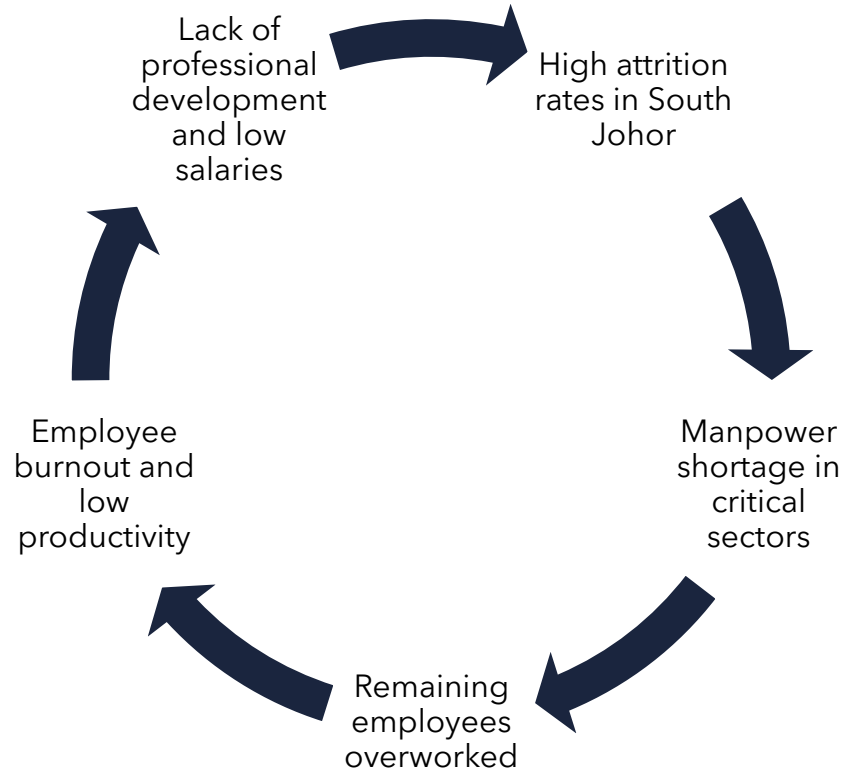
The ongoing talent drain locks Johor into a vicious cycle of manpower shortages, poor working conditions and lower productivity outcomes

Salary Breakdown of Malaysians Living and Working in Singapore (2022)
SGD



2 in 3 Malaysians living and working in Singapore earn between SGD1,500 to SGD3,599, gaining short term financial freedom while risking longer-term security

Vicious Cycle of Talent Drain
Illustration



Malaysians working in Singapore are not protected under PERKESO's Employment Insurance System. Trading longer-term social security for short-term financial freedom was brought to light during the COVID-19 pandemic and is a key concern for PERKESO.

Source: Kajian Perlindungan Keselamatan Sosial Rakyat Malaysia Bekerja di Luar Negara: Singapura (DOSM, 2024), PASB Analysis

At the Federal level, TalentCorp has spearheaded key initiatives to both entice high-skilled Malaysian talent working abroad to return home and retain top foreign talent in Malaysia

Returning Expert Programme (REP)

- 15% flat tax on chargeable employment income for 5 continuous years
- Eligibility for PR status for foreign spouses and children
- Excise duty exemption for 1 locally manufactured vehicle
- Tax exemption for all personal effects brought into Malaysia

As of Dec 2024, TalentCorp has approved 7,241 applications out of 11,402 applications (63.5%), with only **4,730 individuals returning (65.3%). Of these, only 17% are from Singapore.**

Malaysia@Heart (MyHeart)

- Networking hub for Malaysian talents overseas
- Employment and education facilitation for transitioning home
- Information source for Malaysian policy and political developments

As of Nov 2024, MyHeart has a network of Malaysians from 60 countries and 40 associations

Residence Pass-Talent (RP-T)

- Permit to live and work in Malaysia for up to 10 years
- Independent visa without need for employer sponsorship
- Eligibility for dependent visa for foreign spouses and children, including employment for spouse

As of Dec 2023, TalentCorp approved 11,600 applications, with **experts working primarily in ICT, Business Services, Oil, Gas & Energy, Education and Financial Services**

Source: TalentCorp (2024)

Efforts by state government include establishment of the Johor Talent Development Council, as well as the announcement of the RM4,000 minimum wage in the JS-SEZ

Formation of Johor Talent Development Council

- In Nov 2024, the Johor Talent Development Council (JTDC) was established to coordinate the state's workforce development efforts, and strengthen collaboration with industry to meet the needs of JS-SEZ.
- This was supported with a RM20 million allocation channelled through HRD Corp, and a target to create 10,000 high-income jobs in 2025.

Key JTDC efforts as of July 2025

Upskilling & Training

- Launch of Data Centre Technician Programme to train 200 individuals under partnership between JTDC and Lead Future Holding
- Pro-Mahir Programme for the upskilling of 510 existing workers through TVET courses

Industry Coordination & Collaboration

- Appointment of Industry Advisory Board, comprising sector leaders from both international companies and top local firms, to guide the design and review of skills and education curriculum in Johor – particularly for TVET schools
- Signed Note of Understanding with Sun Bus Tech for RM4,000 starting salary for skilled workers, alongside tuition support and onsite training
- Data Centre Academy supported by Microsoft and the Environmental Professional In-Training Institute, Singapore (in process of establishment)

- The RM4,000 minimum wage is a groundbreaking effort to strengthen the pull for workers in Johor and the JS-SEZ
- However, without a proper mechanism and facilitation process, companies remain unsure about the financial sustainability of this recommendation, and hesitant to commit.

Source: Malaysian Employers Federation (2025)

Under the advices of His Royal Highness Tunku Ismail, the State Government is piloting the Sekolah Rintis Bangsa Johor (SRBJ) Initiative to transform education from the primary level, setting students up early for success

Overview of SRBJ Initiative

Key Facts

- **2,352 students and 212 teachers across primary and secondary levels** from 4 participating schools in Pasir Gudang and Johor Bahru
- **3 year pilot phase** with expansion planned
- **RM30 mil allocation** (RM6.2 mil from State Gov't, RM24 mil from corporate partners)

Focus Areas	*Description*	*Ongoing Efforts*
Global Standards, Locally-Rooted	Dual-curriculum model where students will sit for Primary School Leaving Examination (PSLE) and International General Certificate of Secondary Education (IGCSE) alongside Sijil Pelajaran Malaysia (SPM).	• English proficiency and higher standards of assessment to be introduced. • Target set for 100% of students to progress to higher education.
STEM and Digital Readiness	Minimum completion of 112 hours annually in STEM subjects, double the 64-hour national requirement. Technology in computer and science labs will also be upgraded..	• Recognition as Apple Distinguished Schools • 2,496 iPads donated through strategic collaboration with Raja Zarith Sofiah Foundation, Apple Education and QSR Brands
High Quality Teaching	Teachers to undergo professional development in pedagogy, STEM instruction, and innovative strategies such as the Singaporean 'lesson study' model.	• 212 educators trained at Singapore's National Institute of Education (NIE) on pedagogical innovation, STEM subjects and Common European Framework of Reference for Languages (CEFR) standards.
Continuity and Progression	For continuity, the primary schools will act as feeders to their respective secondary schools, ensuring smooth progression for students.	• Students from SMK Seri Kota Puteri 2 will progress into SK Seri Kota Puteri in Pasir Gudang, likewise for SMK Tasek Utara to SK Tasek Utara in Johor Baru.

Source: New Straits Times, The Star (2025)

On the other end of the pipeline, the Johor State Government places particular effort in cultivating its next generation of leaders, through a strong Civil Service (JCS) and Institut Dato Onn (IDO)

Overview of Talent Development System for Johor Civil Service

Akademi Perkhidmatan Tadbir Negeri Johor

Established in 2020, the JCS Academy has implemented more than 100 competency enhancement programs including postgraduate programs for management and professional groups in addition to providing training in strategic collaboration with local and international higher education institutions since 2022.

Leadership Development Programmes

Since 2017, Permodalan Darul Ta'zim (PDT) has supported 16 individuals from JCS middle and senior management through executive education courses at the Harvard Kennedy School and Asian Institute of Management in Manila. PDT has also allocated RM650,000 for Pena Jauhar, JCS Transformation Plan and JCS Academy.

Institut Dato Onn

Formerly known as Institut Kepimpinan dan Latihan Semangat Dato' Onn (IKLAS), IDO was established in 2000 to nurture leaders in the fields of politics, economics and community building. Today, IDO conducts provides a range of upskilling opportunities for early stage JCS Officers, as well as placements for Johorean youth to gain exposure into public service.

Source: Media Digital Johor, Permodalan Darul Ta'zim, Institut Dato Onn

Moving Forward, to strengthen ongoing efforts and achieve full realisation of investment opportunities, Johor requires a comprehensive, accelerated talent strategy tackling pipeline, training and higher education

Ideal Future State

"Johor as a dynamic, global hub for talent and innovation"

Seamless Talent Pipeline	Workforce-ready graduates educated by an integrated tertiary education system prioritising hands-on learning, innovative problem-solving and strategic leadership
Dynamic Skills Ecosystem	Continuous professional development and upskilling to meet changing economic needs, coupled with efficient immigration and visa policies for top global talent
Higher Education Hub	A nationally recognised centre of learning and research for emerging and critical sectors, supported by strong industry partnerships and market links

Key Strategies

1. **Attract** Johor's brightest talent into critical occupations, creating a pipeline of skilled local talents to pull in new investors and establish Johor as Malaysia's education hub.
2. **Retain** high-performing talent by establishing Johor as a desirable place for career growth, uplifting critical occupations with improved compensation packages and productivity gains.
3. **Develop** an industry-ready workforce, embedding employers into process of curriculum design, training and matching across universities and TVET institutions.
4. **Innovate** frontier industries across public and private sectors, creating "gravity wells" for top talents to drive strategic transformation at a world-class level.

Attract Johor's brightest talent into critical occupations, creating a pipeline of skilled local talents to pull in new investors and establish Johor as Malaysia's higher education hub

1

Attract

Description

- **Address gaps in critical skilled occupations in Johor**, as reported by both professionals, employers and investors
- **Exploit Johor's unique geographical advantage and SEZ with Singapore**, an existing global talent hub to extend knowledge transfer and overall capacity
- The private sector is often seen as a natural progression from the public, resulting in competition for local talent.

Strategic Impact

- Position Johor as an education hub, leveraging regional expertise to develop emerging and critical sectors
- Creates a dynamic talent pool available to local employers, strengthening Johor's brand as a vibrant talent destination
- JETP seeks to encourage public-private collaboration in critical occupations where shortages are faced, such as hospitality and nursing.

Case Study

Monash Partners Academic Health Science Centre (Australia)

- A government-designated Academic Health Science Centre linking public & private hospitals with Monash University and research institutes to integrate education, research and clinical services. This supports shared training and professional development across both sectors.

Source: PASB Analysis, Working Session with JTDC Council

Retain high-performing talent by establishing Johor as a desirable place for career growth, uplifting critical occupations with improved compensation packages and productivity gains

2

Retain

Description

- **Positioning Johor as the go-to destination for professional development** as a compelling retention factor which resonates with the younger local workforce
- **Support the education and training of students in critical occupations**, as well as the development of a clear pathway for their career progression and professional development, to ensure graduates see value in staying.
- **Linking career progression based on meritocracy** via strong performance, to avoid complacency

Strategic Impact

- Establish a specific mechanism to support Johor-based businesses to retain Malaysian talent and achieve the JS-SEZ minimum wage.
- Build long-term sustainability and phasing out of government subsidies by improving productivity through incentivised training.

Case Study

Singapore: Progressive Wage Model (PWM)

- This model was initiated in 2014 as Singapore's sector-specific alternative to a blanket minimum wage, targeting lower-wage occupations (cleaning, security, landscaping, lift maintenance, retail, food services, waste management, administrators, drivers).
- Singapore's PWM features a wage ladder, tying entry-level roles to training and skill progression to result in stepwise wage increases. The PWM also requires employers to register training and upgrade competency to increase wages.
- Compliance is mandatory – failure to comply impacts licensing and access to foreign labour.
- Benefited more than 155,000 workers across 8 sectors. Analysis from the past decade has demonstrated the PWM has effectively increased incomes, reduced wage inequality, and incentivised upskilling

Source: PASB Analysis, Working Session with JTDC Council

Develop an industry-ready workforce, embedding employers into process of curriculum design, training and matching across universities and TVET institutions

3

Develop

Description

- **Shifting TVET curriculum and training system from being supply-driven by education providers, to demand-driven by industries –** building a pipeline of highly employable graduates for both MNCs and SMEs in Johor.
- Encourage interest and pursuance of STEM education amongst graduating Form 5 students from Sekolah Rintis Bangsa Johor, **equipping them with foundational digital, technology, problem-solving and innovation skills.**

Strategic Impact

- Ability to train, upskill and place graduates in high-demand and high-growth industries such as E&E, Aerospace and Tourism, to support investment realisation and tackle key investor concerns regarding a lack of a skilled workforce.
- Equipping 670 SRBJ students over 5 years with self-driven digital and technology skillsets to expose them to STEM career pathways and build a generation of digital natives and leaders.

Case Study

Penang Skills Development Centre (Malaysia)

- Founded in 1989 as Malaysia's first tripartite TVET institution (public–private–academic). Established by Penang State Government, Universiti Sains Malaysia (USM), and industry leaders (e.g., Intel, HP, Motorola), PSDC is ocated in the Bayan Lepas Free Industrial Zone, serving the state's electronics and manufacturing ecosystem. It is supported by federal and state incentives (e.g. 200% tax deduction on training expenses).
- In the past 30 years, PSDC has trained 257,000+ participants through over 13,000 programmes, ranging from precision machining, industrial automation to German dual-vocational diplomas. It has a near-100% employability rate for graduates due to strong partnerships with employers.

Source: PASB Analysis, Working Session with JTDC Council

Innovate frontier industries across public and private sectors, creating “gravity wells” for top talents to drive strategic transformation at a world-class level

4

Innovate

Description

- **Boosting Johor’s R&D capabilities** by integrating available ingredients of Johor’s economic success to drive innovation, including its STEM academic engine (research universities), upcoming Smart City infrastructure (IBTEC), JS-SEZ (regulatory ease)
- **Focus on creating access to capital for research and start-ups**, building a vibrant VC ecosystem with Johor’s first state-level VC fund

Strategic Impact

- Capture value from major local investments, in particular data centres, by building out its technology ecosystem
- Attract new foreign direct investments from global leaders in frontier industries by demonstrating Johor’s capabilities as an R&D hub
- Bolster the growth of high-value manufacturing sectors by creating an ongoing pipeline of inno
- Foster the development of innovation-centric policy by ensuring State leaders are fluent in the language of global policy

Case Study

Zhejiang Province as China’s AI Hub (China)

- In 2025, Hangzhou launched a CNY 100 billion AI development plan (2025), supporting large language models, proof-of-concept centers, and subsidies (e.g., 60% compute vouchers) to attract global AI talent and accelerate industrial applications. This was in addition to existing efforts to create an outstanding innovation system, home to rising AI firms (e.g. DeepSeek) and established tech leaders (e.g. Alibaba).
- The Hangzhou authorities adopted a low-red tape, high-support approach, encouraging rapid scaling of startups and positioning Hangzhou, and its capital Zhejiang, as China’s AI innovation hub.

Source: PASB Analysis, Working Session with JTDC Council

6.3

Enabling Initiatives.

Infrastructure Development.

Disclaimer Notes

The enabling initiatives listed were identified through Lab Engagements under JETP, based on direct consultations with the respective stakeholders.

These initiatives represent part of the proposed enablers to support Johor's economic transformation, but do not constitute the full extent of the State's recognised or emerging enabling measures.

The initiative lists presented are non-exhaustive. Information provided, including indicative budgets, are as furnished by the respective stakeholders and are shared in strict observance of the confidentiality obligations of all parties.

PEMANDU makes no representation as to the reliability or accuracy of the information provided, which is assumed to be accurate and reliable at the point of obtainment from the respective stakeholders.

Lack of Treated Water Supply for Industry Use

Problem Statement

- Johor currently is dependant on Singapore in supplementing its treated water supply, and **imports an average of 16 million gallons (mgd) of treated water daily**, well **above the 5 mgd** stipulated in the 1962 Water Agreement, while cost-effective (**RM0.50 vs. RM1.80 per cubic metre** in self-treating locally), this reliance poses risks to Johor's **water security** and **industrial resilience** considering the following demand pressures:
    - Despite Johor currently having adequate water reserves, increasing industrialisation, urbanisation and population growth, coupled with the projected rise in the water-intensive data center sector in the coming years is bound to put **massive strain on Johor's current treated water supply capacity**, which will require urgent action from the state government to plug the present gap; E.g. To date, **17 data centers** have been approved in Johor which will require a combined **59.06 million liters per day** in its operations, and accounts for a staggering **2.7%** of the state's total capacity
    - **Water supply disruptions** are a common and significant occurrence in Johor due to outdated pumps, with the most recent event happening in May 2025 at Sungai Johor Water Treatment Plant, that led to a shortfall of **318 million liters per day**, impacting **approximately 300,000 people** in Johor Bahru and Iskandar Malaysia

Impact / Implication

- Persistent water supply shortages will **disrupt the operations** of high-value manufacturing and process industries (e.g. E&E, chemicals, food processing, data centers, etc.) and deter further investments in Johor
- Water allocation to water-intensive sectors like data centres may crowd out traditional sectors such as manufacturing and agriculture key to Johor, leading to **imbalanced development**
- Industries facing water rationing may incur **higher operational costs** due to the need for alternative water sources, **reducing competitiveness**

Parties Involved

- BPEN-J
- PDT
- Ranhill SAJ
- Kementerian Peralihan Tenaga dan Transformasi Air (PETRA)
- Badan Kawalselia Air Negeri Johor (BAKAJ)
- Pengurusan Aset Air Berhad (PAAB)
- Jabatan Perkhidmatan Pembetungan (JPP)

Source: The Star, Batam News Asia, The Straits Times

Johor targets to cut its treated water dependency on Singapore and achieve full water self-sufficiency by 2030

Johor-Singapore 1962 Water Agreement

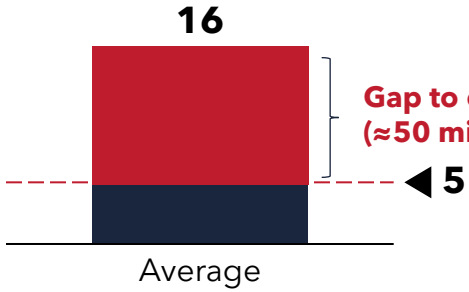
The Water Agreement between Johor and Singapore stipulates that:

- Singapore is allowed to import **250 MGD[1] at RM 0.03 every 1,000 gallons**
- Johor has the right to buy back a daily supply of treated water from Singapore, **up to a maximum of 2% (5 MGD) of the raw water supplied**, at **RM 0.50 for every 1,000 gallons** (heavily discounted rate – well below Singapore's own internal cost of treatment and distribution)

Despite the existing agreement, **Singapore has continued to supply additional potable water based on goodwill** at Johor's request

Johor's Imported Water from Singapore (2025)

MGD



Maximum MGD Singapore is obliged to sell to Johor under the Water Agreement

- Johor currently imports an average of 16 MGD daily from Singapore, which **well exceeds the 2% maximum, highlighting dependency on water, which is a critical resource**

This is due to the **inherent cost-effectiveness** in importing treated water from Singapore, where Singapore's PUB[2] operates large centralised water treatment facilities and employs cutting-edge technologies that enables **substantial economies of scale**

Import: RM 0.50 per 1,000 gallons

Treat locally: ≈RM 8.18* per 1,000 gallons

≈RM 7.68 saved per 1,000 gallons imported, which amounts to:

≈RM122.9k saved on the 16 MGD imported daily

- However, the **continued reliance** on Singapore for treated water puts Johor at risk of **supply disruptions, price volatility and diplomatic leverage** that could undermine **its long-term water security and sovereignty**

Johor's Self-sufficiency Goals

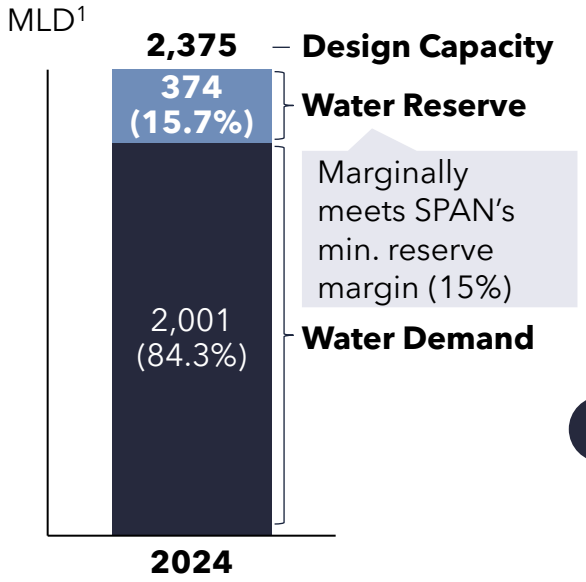
*Underlining the risk in dependency and the state's ambition to **end the reliance on Singapore for treated water**, the state has targeted…*

To achieve water self-sufficiency as a state by 2030

Note: 1. Million gallons per day, 2. Public Utilities Board. *Conversions in volume assume gallons are denominated in imperial gallons
Sources: New Straits Times, Ministry of Foreign Affairs Singapore

Although Johor currently has adequate water reserves, influx of data centres, population and industrialisation growth could easily detract stable water supply and self-sufficiency goals

Johor Current State of Water Capacity

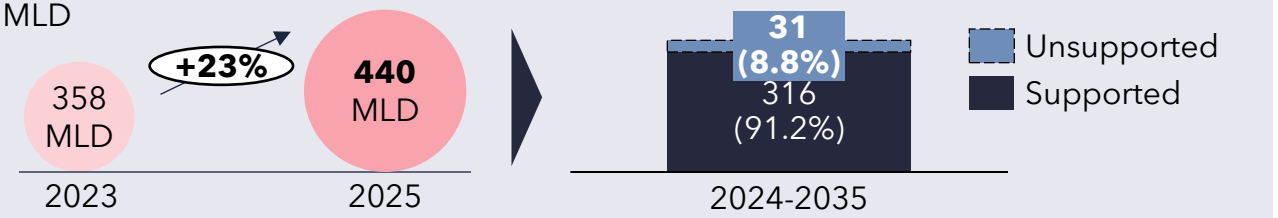


Marginally meets SPAN's min. reserve margin (15%)

While Johor currently meets the water demand for industrial and household consumption, **emerging factors amplifying water demand** could easily push Johor below the reserve margin threshold, **threatening water supply and its goal to attaining self-sufficiency by 2030**

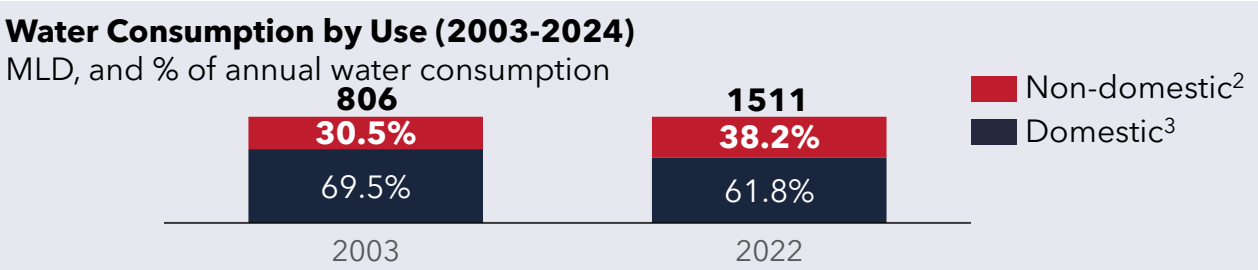
Factors Increasing Water Demand in Johor

Expanding Influx of Data Centres



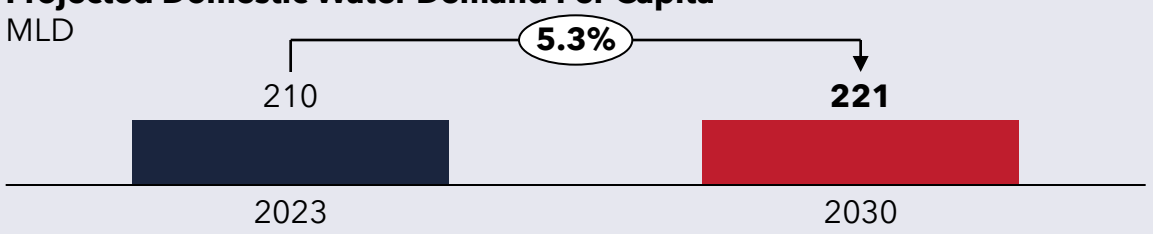
Data centre growth and investor interest **have driven a +23% rise in projected water demand** in just 2 years creating a **supply shortfall equal** to 8.8% of approved data-centre water supply allocations

Increasing Industrialisation



Growth in **non-domestic water consumption (148%) has outpaced domestic water consumption (61%)** in recent years as a result of an **expansion in water-intensive industries** (e.g. E&E manufacturing, agriculture, etc.)

Growing Population and Urbanisation



Being the second-most populous state, Johor's **growing population and urbanisation** is forecasted to **increase the domestic water consumption** per capita by +5.3% to 221 MLD by 2030

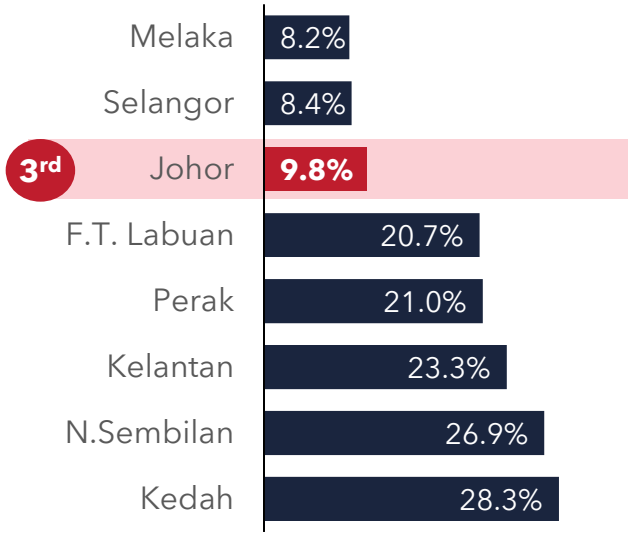
Note: 1. Million litres per day; 2. Data centre; 3. Water used for commercial, industrial and agricultural purposes; 4. Water used for household purposes
Source: SPAN, The Edge, The Star, DOSM, PASB Analysis

Additionally, outdated pumps and poorly-maintained water pipelines that lead to frequent water supply disruptions could further compromise the stability in supply of water

Johor Current State of Water Pipelines

Water Pipelines Aged >7 Years (2024)

% no. of metres out of total no. of metres



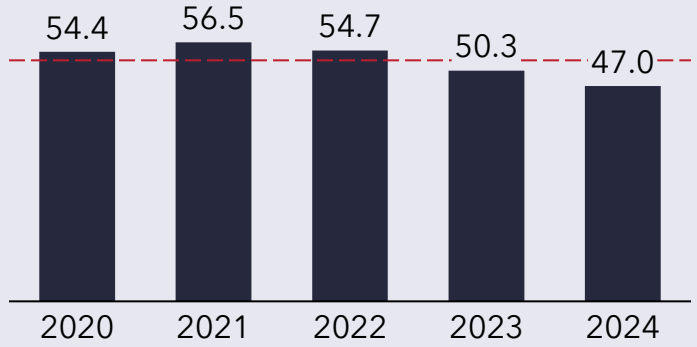
Most of Johor's current water pipelines are **relatively new and expected to be reliable**. However, **frequent water disruptions** call into question the supposed resiliency of Johor's water supply infrastructure, and signals a need for **better upgrades and failsafe systems in water distribution/ management systems**

Johor Current State of Water Supply Stability

Large Persisting Share of Pipe Breakage/ Leakage Issues

Pipe Burst/ Breakage/ Leakage Complaints (2020-2024)

% of complaints to total complaints

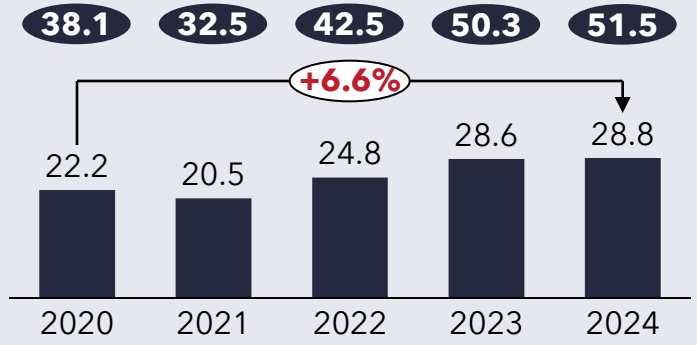


On average, 52.6% of all complaints are related to pipeline damages

Growing Proportion of Water Supply Interruptions

Water Supply Interruption Complaints (2020-2024)

no. of complaints ('000), and % of complaints to total complaints

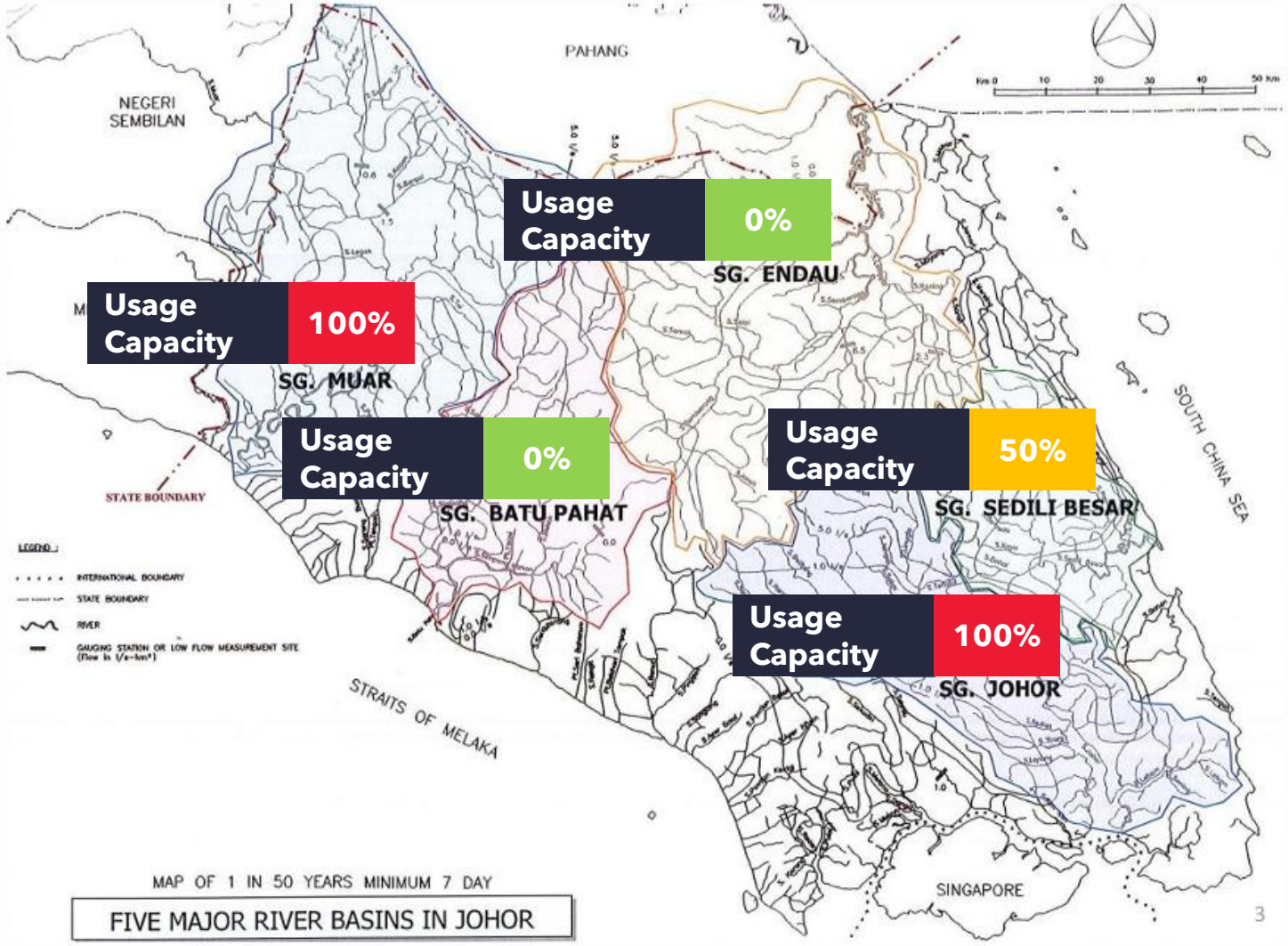


Water interruption complaints increased in **share (+6.6%)** and in **absolute** terms **(+35.2%)**

*Water infrastructure failures over the years have repeatedly **disrupted business operations** and **adversely affected quality of life** for Johoreans…*

Source: SPAN, New Straits Times, The Star, Sinar Daily, PASB Analysis

Moreover, with 2 of Johor's 5 major basins at a 100% drawdown, the most productive areas of the state (Johor Bahru, Kulai), is anticipated to face acute water-security risks that require long-term mitigatory plans such as inter-basin transfers and demand-management strategies



Source: PDT

Advancement Towards Treated Water Self-sufficiency (1/2)

The rapid rise in data centre investments and continuous population in Johor is anticipated to escalate local water demand and would require additions in the current treated water supply/ capacity in order to satisfy both growing industrial and consumer demand

Initiative Highlights:

Concept Description

Expand raw water and treated water capacity by developing several riverside water reservoirs along Sungai Pontian Besar, Sungai Johor and Sungai Sedili Besar in addition to construction of treatment plants at Kayu Ara Pasong, Semangar and Pasir Gudang

Visualisation of the initiative

- Water treatment plant
- Riverbank reservoir
- Sewage treatment plant & Water reclamation plant

1 Off-river Storage (ORS), Barrage Development at Sungai Pontian Besar & Kayu Ara Pasong Water Treatment Plant

- ORS and Barrage: 260 MLD[1] capacity; RM 455.12 mil in cost
- WTP[2]: 90 MLD; RM 420 mil in cost
- Total cost: RM875.12 mil
- Implementation: TAPS and Barrage (2027 – 2030), WTP (2030-)

2 Off-river Storage (ORS) at Sungai Johor

- ORS: 200 MLD capacity
- Total cost (after VA[3]): RM 605 mil
- Implementation: 2026 – 2029

WTP is a dependency project

3 Water Treatment Plant & Water Distribution System at Semangar 3, Kota Tinggi

- WTP: 200 MLD capacity
- Total cost: RM1 billion *[Indicative – To be revised]*
- Implementation: 2026 – 2028

Contribute towards Johor's target to achieve zero-dependency on imported treated water from Singapore and to become self-sufficient by 2030 amidst growing population and industrial needs

Implementing Agency
- BAKAJ, PDT, Ranhill SAJ, PETRA

Monitoring Agency
- BPEN-J

Associated Sectors :
- Cross-Cutting

Stakeholders Involved:
- BPEN-J
- BAKAJ
- Pengurusan Aset Air
- Berhad (PAAB)
- Jabatan Perkhidmatan Pembetungan (JPP)

Budget Required (Preliminary)*:

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total	**RM 7.7 bil**	**RM 156 mil**

Implementation Timeframe:
- Start Date: January 2026
- End Date: December 2031

Note: [1]Megalitres/ day; [2]Water Treatment Plant; [3]Value Assessment workshop; *Project budget assumed to be disbursed and allocated the same year the project begins construction
Source: PDT, BAKAJ

Advancement Towards Treated Water Self-sufficiency (2/2)

The rapid rise in data centre investments and continuous population in Johor is anticipated to escalate local water demand and would require additions in the current treated water supply/ capacity in order to satisfy both growing industrial and consumer demand

Implementing Agency
- BAKAJ, PDT, Ranhill SAJ, PETRA

Monitoring Agency
- BPEN-J

Associated Sectors :
- Cross-Cutting

Stakeholders Involved:
- BPEN-J
- BAKAJ
- Pengurusan Aset Air
- Berhad (PAAB)
- Jabatan Perkhidmatan Pembetungan (JPP)

Initiative Highlights:

Concept Description

Expand raw water and treated water capacity by developing several riverside water reservoirs along Sungai Pontian Besar, Sungai Johor and Sungai Sedili Besar in addition to construction of treatment plants at Kayu Ara Pasong, Semangar and Pasir Gudang

Visualisation of the initiative

- Water treatment plant
- Riverbank reservoir
- Sewage treatment plant & Water reclamation plant

4 Regional Sewage Treatment Plant (RSTP) & Water Reclamation Plant (WRP) at Pasir Gudang
- RSTP[1]: 250,000 population equivalent; RM 635.27 mil in cost
- WRP: 40 MLD capacity; RM 155.89 in cost
- Total cost: RM 791.16 mil
- Implementation: 2026 – 2031

5 Off-river Storage (ORS), Barrage Development at Sungai Sedili Besar
- ORS and Barrage: 600 MLD capacity
- Total cost: RM572.4 mil
- Implementation: 2026 – 2030

6 Sungai Sembrong Water Transfer and Ulu Sedili Dam Scheme
- Dam and WTP: 2,000 MLD capacity
- Total cost: RM4.05 bil
- Proposed to replace Sedili Besar, Sungai Johor, Pontian Besar TAPS

Budget Required (Preliminary)*:

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total	**RM 7.7 bil**	**RM 156 mil**

Implementation Timeframe:
- Start Date: January 2026
- End Date: December 2031

Contribute towards Johor's target to achieve zero-dependency on imported treated water from Singapore and to become self-sufficient by 2030 amidst growing population and industrial needs

Note: [1]Regional Sewage Treatment Plant; *Project budget assumed to be disbursed and allocated the same year the project begins construction

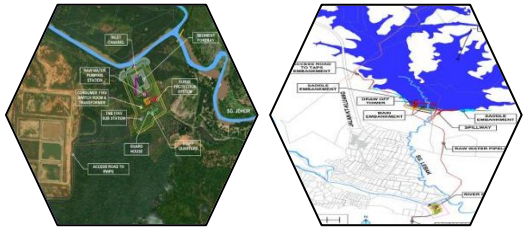
Source: PDT

Proposed water self-sufficiency projects worth RM7.9bil at a glance (1/2)

(Partially) Approved under RMK
Proposed

	1 Off-river Storage (ORS), Barrage Development at Sungai Pontian Besar & Kayu Ara WTP	2 Off-river Storage (ORS) at Sungai Johor	3 Water Treatment Plant & Water Distribution System at Semangar 3, Kota Tinggi
Project		*Dependency* ←	
Context	• Pontian's **current supply capacity of 90 MLD still remains under 2035's target capacity** of 195 MLD amidst growing demand annually (2.03%)	• The Iskandar Malaysia region is experiencing rapid development due to the rollout of JS-SEZ and expansion of data centres, where **current water capacity cannot match future demand**	• Johor Bahru and Kota Tinggi is expected to face water shortages given the **projected annual increase in demand** (3.5% = 35 MLD) and **current lacking supply** (1,075 MLD)

Key Facts	• **RM 875.12 million** in total costs (i.e. construction of TAPS, Barrage, WTP)
	• **TAPS and Barrage: 260 MLD;**
	• **WTP: 90 MLD (meets treated water demand through 2060)**
	• Implementation: TAPS and Barrage (2027 – 2030), WTP (2030-)
	• WTP sources raw water supply from Sungai Pontian Besar
	  – **TAPS Sungai Pontian Besar is a requirement** and approved under RMK-12
	• Executed via **Joint Venture** between **PDT – Asia Baru Construction**
	• Key project components:
	  – Reservoir
	  – Barrage (100 m)
	  – TNB substation
		• **RM 605 million** in total costs after VA workshop which identified an additional RM 197.62 million beyond the approved budget of RM 407.4 million
		• **TAPS: 200 MLD**
		• Implementation: 2026 – 2029
		• Approved under RMK-12
		• Key project components:
		  – Reservoir
		  – Reservoir Capacity: 26 MCM
		  – Catchment Area: 43 km^2
		  – Dam Height: 27 m
		  – Dam Length 700 m (Main), 310 m (Saddle)
			• **RM 1 billion** in total costs (i.e. land, consultation, construction) *[Indicative – To be revised]*
			• **200 MLD capacity (meets treated water demand in both districts until 2039)**
			• Implementation: **2024 – 2026**
			• WTP sources raw water supply from Sungai Johor
			  – **TAPS Sungai Johor project is a requirement** and approved under RMK-12
			• Executed via **Joint Venture** between **PDT – Asia Baru Construction**
			• Key project components:
			  – Raw-water Intake and Pumping Station (430 MLD)
			  – Semangar 3 Water Treatment Plant Pipeline Network (49 km)
			  – 2 Balancing Reservoirs

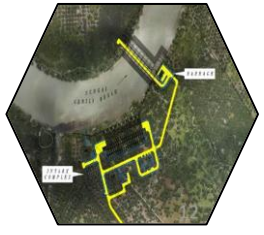
Illustration			

Proposed water self-sufficiency projects worth RM7.9bil at a glance (2/2)

(Partially) Approved under RMK
Proposed

Project	4 Regional Sewage Treatment Plant (RSTP) & Water Reclamation Plant (WRP) at Pasir Gudang	5 Off-river Storage (ORS), Barrage Development at Sungai Sedili Besar	6 Sungai Sembrong Water Transfer and Ulu Sedili Dam Scheme
Context	• The RSTP and WRP proposal for MBPG has been **approved under RMK-12** and remains the council's priority to deliver a more **systematic, modern sewage-collection system**	• To **support the rapid and holistic development in areas surrounding PIPC**, additional raw water supply has to be secured amidst growing water supply concerns	• With the rapid JS-SEZ and data centre development, current water treatment capacity in Johor Bahru, Kulai, Pontian and Kota Tinggi is **will not be able to match projected demand**

Key Facts	• **RM 791 million** in total costs (i.e. construction of RSTP, WRP)
	• **RSTP: 250,000 PE (28 sewage treatment plants rationalised);**
	  – Federal funding
	• **WRP: 40 MLD (Johor's first WRP)**
	  – Private funding (YTL – PDT)
	• Implementation: Estimated 4 – 5 years
	• Implemented by PDT in partnership with **Yeoh Tiong Lay Sdn Bhd (YTL Construction)**
	• Key project components:
	  – RSTP (250,000 PE with 6 pumping stations, sewerage pipelines, etc.)
	  – WRP (40 MLD with distribution pipelines)
		• **RM 572.4 million** in total costs
		• **TAPS: 600 MLD**
		• Implementation: 2027 – 2030
		• Approved under RMK-12
		• Key project components:
		  – Reservoir
		  – Reservoir Capacity: 43 MCM
		  – Barrage
		  – Length (107 m)
			• **RM 4.05 billion** in total costs
			• **2,000 MLD capacity (meets treated water demand up to 2068)**
			  – Option 1: Water transfer from Sg. Sembrong to Linggiu Dam with new WTP (1,200 MLD) + New Ulu Sedili Dam with new WTP (800 MLD)
			  – Option 2 (If SG does not agree to Linggiu Dam water transfer): Full water transfer to new Ulu Sedili Dam with new WTP (2,000 MLD)
			• Implementation:
			• 3 TAPS (Sedili Besar, Sugai Johor, Pontian Besar) under consideration only ensures water security up to 2030 and is **32% costlier** than current proposal
			• To be funded by **Federal or through PFI**, where approved budget for the 3 TAPS (i.e. Sedili Besar, Sungai Johor, Pontian Besar) is recommended to be reallocated to fund the proposed project

Illustration			

High and Frequent Risk of Flooding

Problem Statement

- Johor has been experiencing an **increase incidence of flooding** over the past years, where 2015-2022 experienced a **+32.3% increase** in flood incident on the back of escalating flood risk factors
    - **Increasing population** and the **rapid urbanisation** that comes along has led to the rise in development of impervious/ non-absorbent structures (e.g. roads, sidewalks, buildings, etc.), consequently **increasing the volume of stormwater runoff and risk of flooding**
    - **Inadequate and clogged drainages** around urban city centres have become high flood-prone areas due to the increased frequency of overwhelming rainfalls in recent years, which has resulted in a corresponding increase in flood hotspots and consequentially flood risks
    - **Average volume of rainfall has increased over the years** as with global warming/ climate change, potentially overwhelming the existing inadequate water management systems and increases flood risks
    - **Persistent deforestation** also increases flood risks due to the lack of soil infiltration to mitigate and reduce surface runoff during heavy downpours
- Such frequent and severe flooding damages physical infrastructure central to the continued operational sustainability of productive sectors (e.g. manufacturing, tourism retail, agriculture, etc.), which leads to loss of economic output and deters potential investors. This is evident with Johor's central and most productive district where amongst the top 15 performing districts by GDP in Malaysia, **Johor Bahru ranks 2nd in the highest in flood losses cumulatively (2022-2024)**

Impact / Implication

- **Business disruption and revenue losses** will result from frequent and severe flooding damages to core public and business infrastructure
- **Shrunk investor confidence** as investors view repeated flood losses as systemic risk, particularly in sectors like manufacturing, logistics, agro-processing, and warehousing
- Such flood risks will pose **serious threats to agricultural output** and **Johor's food security ambitions**, as flooding destroys standing crops, damages irrigation systems, and disrupts supply line, etc.

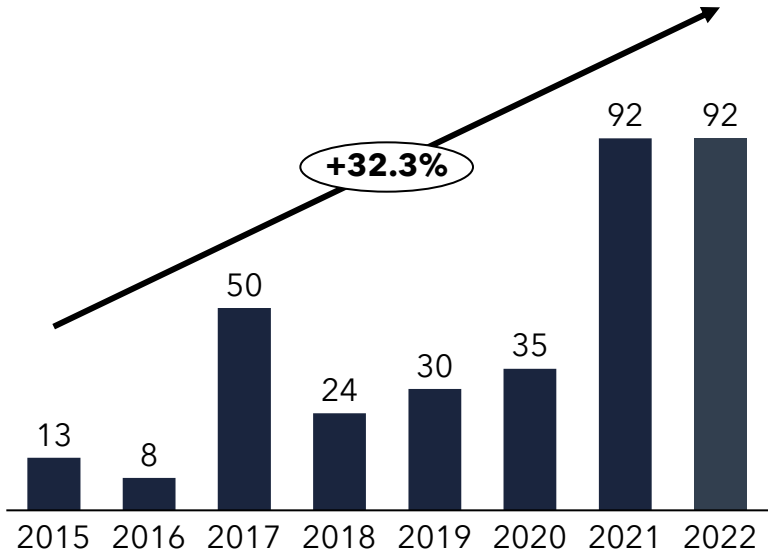
Parties Involved

- PETRA
- JPS
- Local Councils
- PLANMalaysia
- IRDA

Source: DOSM, The Straits Times

Flood risks in Johor are bound to escalate in the coming decade due to a multitude of compounding factors such as urbanisation, lacking drainages, climate change, deforestation

Johor Number of Flood Incidents (2015-2022)



Johor's **flood incidence has increased by an alarming +32.3%** since 2015 and is anticipated to worsen with a **culmination of compounding flood risk factors** such as urbanisation, inadequate drainage capacity, climate change, continued deforestation and etc., signalling the **urgent need for increased and improved state-wide flood mitigation/ control measures** to minimise losses to the economy and people

Factors Increasing Flood Risks in Johor

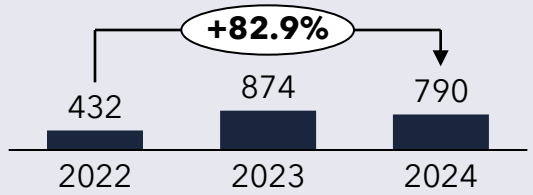
1 Rapid Urbanisation

Population by Stratum (2010-2020)
as a % of total population

Share of urban population has risen by +5% YoY[1], where increasing urbanisation is **increasing stormwater runoff due to impervious developments**, directly increasing flood risks

2 Inadequate & Undermaintained Drainage Capacity

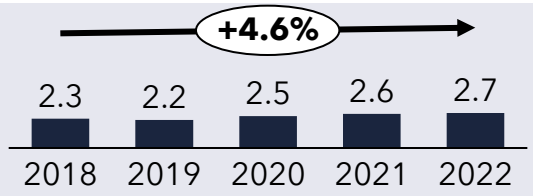
Flood Hotspots (2022-2024)
number of locations



Lacking or aging drainage networks become prone hotspots for flooding if met with extraordinary rainfall, where the last 2 years have seen **flood hotspots increase by +82.9%**

3 Climate Change

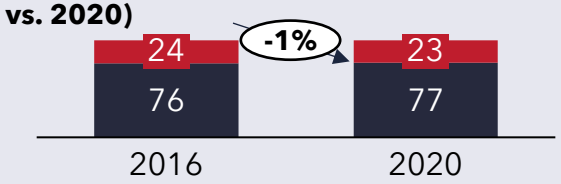
Average Yearly Rainfall[2] (2018-2022)
total in '000 millimetres (mm)



Climate change and global warming have been **driving frequent and intense downpours at a +4.6% YoY**, which is overwhelming existing water management systems and increasing flood risks

4 Deforestation

Forest & Non-Forested Areas (2016 vs. 2020)
as a % of state area

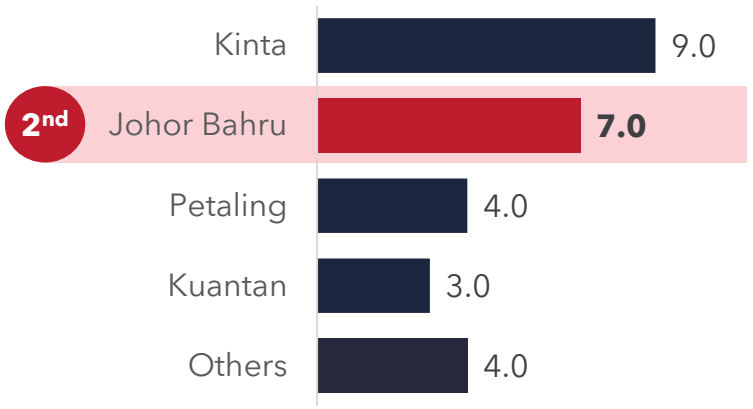


The loss of tree cover YoY by -1% reduces soil infiltration and boosts surface runoff, sedimentation which directly contributes to heightened flood risks

Note: 1. Year over year. 2. Averaged across 4 localities (Batu Pahat, Kluang, Mersing, Senai) in Johor
Source: DOSM, JPS, Various news sources

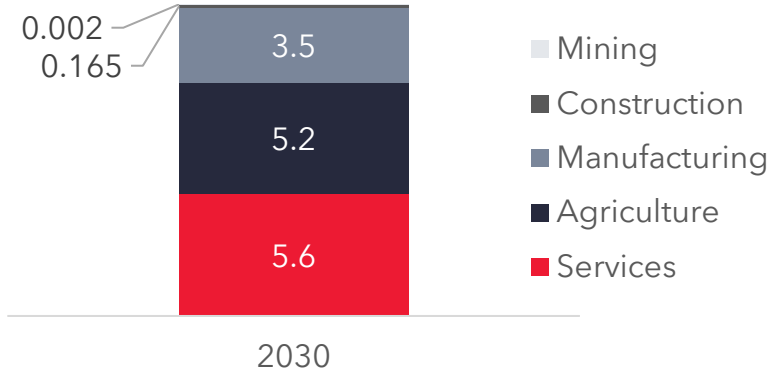
Increased flood risks, especially in key investment areas such as Johor Bahru, could jeopardise Johor's continued economic growth, potentially marking flood losses amounting up to RM14.4 billion, which is 5.5% of projected GDP by 2030

Cumulative Flood Losses Across Top 15 Districts by GDP[2] (2022-2024)
RM Million

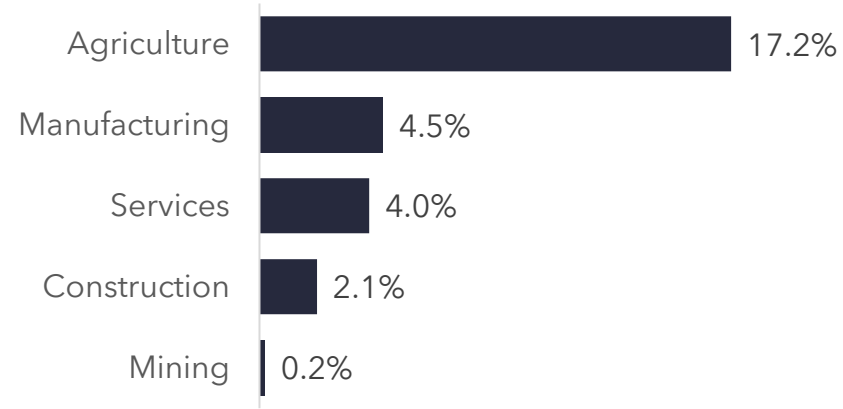


- Compared to other top-performing districts by GDP in Malaysia, **Johor Bahru recorded the 2nd highest flood loss of RM6.81 mil** across a cumulative period from 2022 to 2024
- Accumulating and growing flood risks over the years has rendered Johor Bahru to be highly vulnerable to flood damages which could pose a **significant threat to business continuity and a severe deterrent for the state's primary investment hub** due to loss of business/ investor confidence

Johor Forecasted Weighted Sectoral GDP Losses (2030)
RM Billion



Johor Forecasted Sectoral GDP Losses (2030)
as a % of weighted sectoral output loss



- GDP loss from flooding **is forecasted to amount to RM14.7 billion which represents 5.5% of total state GDP**
- **Services would be the most severely impacted sector** with losses in tourism, logistics and connectivity disruptions
- **Agriculture would be the 2nd most impacted sector** considering Johor's vast presence and contribution of agriculture
- **Manufacturing would be the 3rd most impacted sector** due to Johor's growing industrialisation and manufacturing hubs

- **Agriculture is forecasted to experience the highest flood losses as a percentage of its sectoral output** due to long-term crop, produce and farmland destruction
- **Manufacturing would observe the second highest sectoral output loss** due to supply-chain disruptions, factory shutdowns and etc.
- **Services would be the 3rd most affected** with retail, hospitality and F&B hit hardest by tourism diversion along with infrastructure destruction
- **Construction and mining remains the least impacted** due to lower reliance on fixed infrastructure

Source: DOSM, World Bank and Bank Negara Malaysia, Managing Flood Risks: Leveraging Finance for Business Resilience in Malaysia; PASB Analysis. Note: Forecast is based on projected GDP 2030 target of RM260 billion which applies certain sector contribution based on historical data (2015-2023); Forecast applies BNM's approach of 1-in-20-year flood

Mitigation of Flood Risks by Establishing Johor as A Sponge City

Johor is highly vulnerable to flood risks and is one of the Top 5 states with the highest direct flood losses across the last 3 years, resulting in severe damages to public infrastructure and core productive sectors, overall jeopardising business continuity and investor confidence

Initiative Highlights:

Concept Description	Implementation of flood mitigation infrastructure upgrades and construction around major rivers/ dams in Johor and enhancement flood modelling/ hazard mapping for real-time flood forecasting and warning systems

Visualisation of the initiative

Physical Infrastructure

River & Coastal Conservation & Protection

- River widening/ deepening, diversion channels, dredging
- Seawalls, breakwaters, beach nourishment

Drainage, Dam & Flood Control Systems

- Stormwater culverts, monsoon drains
- Embankment reinforcement
- Sluice/ tidal control gates, pumps

Digital Infrastructure

Flood Modelling and Flood Hazard Mapping for Real-time Flood Forecasting

- Daily flood hazard forecasting based on weather patterns, etc. to provide early flood detection

Digitise Drainage and Flood System Information for Early Flood Warning

- Real-time dashboard for disaster information that provides timely updates on flood evacuation

Advanced Technologies for Flood Monitoring & Detection

- Drones, satellite imagery, and AI to enhance early flood detection

Johor aims to become a regional model for integrated flood mitigation – deploying resilient and robust physical infrastructure, smart technologies, community engagement to ensure safety, and climate resilience, all while safeguarding the business continuity of its economic sectors

Implementing Agency
- PETRA, IRDA

Monitoring Agency
- BPEN-J

Associated Sectors :
- Cross-Cutting

Stakeholders Involved:
- PETRA
- JPS
- Local Councils
- PLANMalaysia
- IRDA

Budget Required (Preliminary)*:

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total	**RM 4 bil**	**TBD**

Implementation Timeframe:
- Start Date: January 2026
- End Date: January 2030

Note: *Extrapolated and tabulated budgetary costs from PETRA's document on flood mitigation project opportunities for RMK-13

Proposed flood mitigation infrastructure projects at a glance

NON-EXHAUSTIVE

Flood Mitigation Infrastructure Projects

Physical Infrastructure

River Conservation & Protection

- **Channel Restoration:** Dredging, de-siltation and bank re-profiling to restore design conveyance capacity
- **Riparian Buffering:** Planting native vegetation and installing bio-engineering (geotextile-rock revetments) to stabilise banks and filter runoff

Coastal Conservation & Protection

- **Shoreline Stabilisation:** Installing breakwaters, submerged reefs or geotextile sand containers to dissipate wave energy
- **Mangrove Restoration:** Replanting and hydrodynamic re-profiling to enhance natural coastal defenses

Dam Maintenance & Upgrade

- **Hydromechanical Refurbishment:** Overhauling gates, valves; replacing or retrofitting control systems **Spillway Capacity Enhancement:** Widening/ adding auxiliary spillways to accommodate updated flood-frequency projections

Drainage & Flood Control Systems Upgrade

- **Integrated Urban Drainage:** Creating retention-infiltration pockets, permeable pavements and bio-retention swales to reduce peak runoff
- **Culvert & Sluicegate Renewal:** Upsizing or retrofitting road-crossing culverts and tide-proofing flap valves to prevent back-flow

Digital Infrastructure

Flood Modelling & Flood Hazard Mapping

- **Multi-Hazard Simulations:** Running hydraulic models for riverine, coastal surge, combined scenarios
- **Urban Micro-Catchment Analysis:** High-resolution modelling of storm-water networks to identify local pinch-points and overland flow paths

Digital Drainage & Flood Systems Information

- **GIS-Based Asset Registry:** Building a centralised spatial database of flood defenses
- **Real-Time Dashboards:** Integrating sensor feeds, rainfall forecasts and model results into an interoperable platform (e.g., cloud GIS)
- **Mobile Field Apps:** Equipping JPS with tablet-based inspection and maintenance reporting tools
- **Early-Warning Systems:** Linked sirens, SMS alerts and web-APIs to disseminate timely warnings to communities and agencies

Advanced Flood Monitoring & Detection Technology

- **Smart Sensor Networks:** Deploying ultrasonic/pressure sensors in channels and radar-rain gauges across catchments for live monitoring.
- **Remote-Sensing & UAV Surveys:** Using satellite SAR and drone LiDAR to detect surface-water extent and terrain changes

Opportunity to Drive Green Growth and Unlock Cross-sectoral Economic Synergies through Transitioning Industrial Clusters

Problem Statement

- Johor currently has **3 major and developing industrial clusters** i.e. 1) Iskandar Malaysia Development Region (IMDR), 2) IBTEC & Sedenak Tech Park, and 3) Pengerang Intergrated Petroleum Complex (PIPC)
- The introduction of MYCentre4IR in partnership with WEF[1] under MyDigital and their **mandate in driving energy transition and digital transformation** within key industrial clusters in Malaysia, highlights an opportunity for Johor's growing yet majority traditional industrial base to transition towards decarbonisation and digitalisation through adoption of WEF's "Transitioning Industrial Clusters Model", which will help drive (non-exhaustive):
  - **Unlocking of cross-sector economies of scale, economic productivity and cost efficiencies** through shared infrastructure and resource/ demand optimisation
  - **Accelerated innovation** through shared technology platforms and collaborative infrastructure (i.e. testing facilities, cleanrooms, ecosystem forums, etc.)
  - **Attraction of foreign investments** by positioning Johor as a purpose-built, low-carbon industrial hub with ready-made shared infrastructure
  - **Advancement in carbon-emission and circular economy goals** under the state's sustainability policy framework for green growth – Johor Green Deal

Impact / Implication

- **Erosion of competitiveness and potential loss of foreign direct investments** (FDI) and delayed industrial growth as investors seek well-integrated, circular economy clusters in competing neighbouring states/ countries; Johor risks being pigeonholed as a low-value, resource-intensive manufacturing base than a high-tech green hub
- **Foregone improvements in business productivity** and upside from new cross-sectoral economic synergies
- Continued BAU reliance on carbon-intensive and outdated processes will perpetuate high emissions, **undermine Johor's and broader national climate commitments**

Parties Involved

- Johor State Government
- Malaysian Investment Development Authority
- BPEN-J
- PDT
- IRDA
- MyDigital (MYCentre4IR)
- Cluster Players (e.g. PIPC – PETRONAS, Dialog, etc.)

Source: MIDA
Note: 1. World Economic Forum

Transitioning Industrial Clusters (TIC) is an initiative by WEF[1] that drives collaboration, shared action across industrial ecosystems to foster economic growth, jobs and decarbonisation

WEF Transition Industrial Clusters

Description of Industrial Clusters

Geographic areas where **co-located companies and public institutions**, representing either a single or multiple industries, provide

- Opportunities for **scale;**
- **Sharing of risk/resources;**
- **Aggregation** and **optimisation of demand**

A **holistic and collective approach** is required to **optimise emissions solutions** and create an **integrated energy system** that **maximises outcomes** across economic, social and environmental aspects

Target Outcomes

Increased GDP Growth

Increased High-value and High-skilled Jobs Creation

Decarbonised Supply Chains

Transitioning Industrial Clusters

Geared towards **high-tech and industry 4.0 sectors,** where companies big and small **co-locate and share advanced resources.** These TICs would **integrate cutting-edge technologies** (i.e. AI, robotics, IoT, automation) to help **reduce costs, boost productivity** and **cut emissions**

Main Pillars

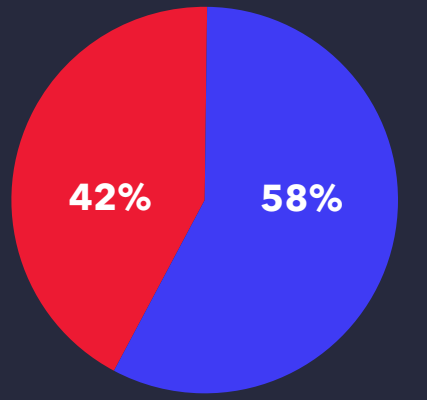
Governance	Bring together co-located companies and public institutions at an industrial cluster level through the development of a **cohesive governance structure**
Finance	Illustrate the **business case and financial benefits of a cluster model** in reducing costs to integrate, scale, and use decarbonisation technologies
Infrastructure	Identify the **challenges** and the **potential solutions** to accelerate the scale up of resilient **digital and physical infrastructure to support the energy transition**
Digitalisation	Identify **synergies** and improve **industrial clusters impact** by leveraging **data collaboration, digital tools** and **common target definitions**
Nature	Secure commitments from ports and share strategies that **benefit people and nature** in port-anchored industrial clusters

Note: 1. World Economic Forum
Source: MyDigital

Globally, there has been a growing shared drive of developed and developing countries alike embarking on TIC[1] initiatives, realising huge strides in their respective decarbonisation journeys whilst boosting economic growth and job creation

TIC[1] Global Lens & Impact

There are currently **33 Industrial Clusters** from **16 Countries**



832 Mt CO_2
Abated emissions represented

$492 billion
GDP contribution represented

4.3 million
Direct/ Indirect jobs represented

**Impact key performance indicators represent CO2 e emissions, jobs and GDP/ economic data reported by a limited number of signatory clusters*

1. Greater St. Louis and Illinois Regional Clean H2 Hub
2. H2Houston Hub
3. Louisiana Future Energy Cluster
4. National Capital Hydrogen Center
5. Ohio Clean Hydrogen Hub Alliance
6. Cartagena Industrial Cluster
7. Port of Açu Low Carbon Hub
8. Andalusian Green Hydrogen Valley
9. Canary Islands Industrial Cluster
10. Net-Zero Basque Industrial Super Cluster
11. HyNet North West
12. Solent Cluster
13. Zero Carbon Humber
14. Tranzero Initiative
15. Brightlands Circular Space
16. Port of Rotterdam
17. Port of Antwerp-Bruges
18. DKarbonation
19. Saraburi Sandbox
20. Ordos-Envision Net Zero Industrial Park
21. Sanjiang New Area Industrial Park
22. Tianjin Economic-Technological Development Area
23. Kawasaki Carbon Neutral Industrial Complex
24. Jababeka Net-Zero Industrial Cluster
25. Indo-Pacific Net-zero Battery-Materials Consortium
26. Hunter Region
27. Western Trade Coast (Kwinana Industries Council)
28. Gopalpur Industrial Park
29. Kakinada Cluster
30. Kerala Green Hydrogen Valley
31. Mumbai Green Hydrogen Cluster
32. Mundra Cluster
33. Jubail Industrial City

Note: 1. Transition Industrial Clusters
Source: MyDigital

Ergo, there is a major opportunity for Johor to further state/ national green agenda and boost growth through TIC amidst growing industrialisation and global shift towards sustainability

Johor's Industrial Estates Current State of Sustainability

Proportion of industrial estates with zero sustainability feature incorporation

Proportion of eco-industrial parks

- **Eco-industrial estates**
  - Integrated developments which contains sustainable utility infrastructure (e.g. shared renewable energy and waste systems)
- **Estates with green modules**
  - Facilities equipped with modular infrastructure (e.g. solar PV solution)

Less than half (43%) of Johor's current industrial estates incorporate sustainability elements into their operations, highlighting the **lack of maturity in sustainable developments** and ultimately, **lack of integration of estates into a broader synergised industrial ecosystem**

National Drive Towards Energy Transition – MyDigital Centre4IR

Malaysia Centre for the Fourth Industrial Revolution (MyDIGITAL)

15 May 2023 – Establishment of Malaysia's "Centre4IR" by MyDigital in partnership with WEF to drive **energy transition** and **digital transformation** with TIC as a flagship initiative

Energy Transition Focus Areas

Green Industry Revolution
- Driving energy transition across industrial clusters via sustainable practices, adoption of IR4.0 tech

Energy Efficiency
- Promote energy efficiency measures and system optimisation techniques

Scaling Energy Value Chain
- Facilitate development of resilient and future-ready energy systems across entire value chain

State Green Development Agenda – Johor Green Deal

JOHOR GREEN DEAL

15 Nov 2023 – Launch of "Johor Green Deal" in tandem with JSC[1] which will serve as **primary reference and policy for the state's green development agenda**

Pillars

Energy | **Transport & Mobility** | **Land Use, Nature & Water** | **Low Carbon Cities** | **Industry**

Goal: Encouraging better environmental performance and decarbonising Johor's Industries

Focus Areas: Sustainable Practices, Industry Decarbonisation

Alignment in state and national commitment to foster green growth and advance energy transition goals signals a significant opportunity for Johor to decarbonise and synergise its growing industrial base through accelerated integration of TIC practices, and potentially position Johor as a green economy leader/ catalyst for industrial cluster transitions within ASEAN

Note: 1. Johor Sustainability Centre
Source: World Economic Forum, PDT

Development of Johor Transition Industrial Clusters (JTIC)

Opportunity to transition Johor's growing industrial base through collective integration of circular economy practices and digitalisation to enable industrial symbiosis that can support the unlocking of cross-sectoral economic synergies and green growth through decarbonisation

Implementing Agency
- State Government / MyDigital

Monitoring Agency
- BPEN-J

Associated Sectors :
- Cross-cutting

Stakeholders Involved:
- Malaysian Investment Development Authority
- BPEN-J
- PDT
- IRDA
- MyDigital

Initiative Highlights:

Concept Description

Development of a state-led Special Purpose Vehicle (SPV) to partner with MyDigital's MYCentre4IR in driving circular economy integration and industrial symbiosis of clusters through shared infrastructure development and digitalisation through IR4.0

Visualisation of the initiative

Johor's Major Industrial Clusters

1. **IBTEC & STeP** • AI & Digital Cluster
2. **IMDR** • Biopharma, Life Science & Manufacturing Cluster
3. **PIPC** • Energy, Petrochemicals Cluster

Anchor Opportunity Areas (non-exhaustive)

Clean Energy & Shared Energy Infrastructure
- Developing diverse renewable energy sources and expanding shared energy systems (e.g. storage, etc.)

Common Carbon Infrastructure
- Building of shared carbon pipelines to aggregate, transport, use and store carbon

Enablement of Hydrogen & New Green Products
- Securing of long-term supply of renewable energy power for hydrogen and other derivative products

Circular Economy
- Maximising the use of raw materials and minimising waste disposal costs through digital infrastructure
  - Industrial Symbiosis Database
  - Waste Exchange & Bidding Information Platform

Transforms current industrial clusters into a sustainable integrated ecosystem, enabling unlocking of cross-sectoral operational synergies, creation of higher-value goods and jobs, thereby positioning Johor as an economic and investment frontier in TIC[1] and clean energy hub within ASEAN

Budget Required (Preliminary)*:

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: January 2026
- End Date: January 2028

Note: 1. Transition Industrial Clusters; *Utilised Singapore's Biopolis and other neighbouring industrial parks e.g. Bio-Xcell as ballpark budget estimations with a 40/60 PPP split
Source: MyDigital

Johor Transition Industrial Cluster (JTIC) could be established via a Special Purpose Vehicle

PRELIMINARY

Johor Transition Industrial Clusters Special Purpose Vehicle (JTIC SPV)

Mandate

Serve as the **state government-led regional agency** to **spearhead Transition Industrial Clusters (TIC) efforts and goals** across **IBTEC-STeP, IMDR and PIPC** through catalysing circular-economy integration and industrial symbiosis

Objectives & Roles

1. **Mobilise and leverage capital –** Pool Johor seed equity, GLC anchor investments and private co-investor funds via PPPs to underwrite shared infrastructure projects across clean energy, carbon, hydrogen and symbiosis hubs (e.g. energy microgrids, carbon pipelines, hydrogen pilots, etc.)
2. **Deploy IR4.0 technology and digital platforms –** Procure, integrate, run and maintain AI/ IoT/ database systems and real-time dashboards that aggregates/ democratises information on all waste/byproducts and raw material information of enterprises within the clusters, thereby enabling the monitoring of material/ energy flows and matching of potential symbiotic relationships between enterprises which will help promote standardised transactions on waste between industrial symbiotic enterprises
3. **Convenor and governance steward –** Lead cross-cluster roundtables, secure Statements of Ambition with IBTEC-STeP, IMDR and PIPC cluster conveners/ partner organisations, align on cluster-wide transition KPIs, jointly develop and operationalise the TIC playbook (i.e. governance structure, funding mechanisms, asset/infrastructure pipeline, implementation plan, etc.) with WEF and cluster conveners/ partners
4. **Incubate innovation and R&D ecosystem on top of matching talent development –** Establish shared research labs, maker-spaces, testing facilities, and dedicated programmes in AI, smart manufacturing, sustainable materials and green products, whilst building a robust industry-aligned talent pipeline through joint curriculum/ certification development, to accelerate Johor's shift to a green and digital industrial base

SPV Financing Mechanics

Capital Stack

- **Seed equity** (Johor State Treasury)
- **Anchor-investor equity** (GLCs e.g. JLG for IBTEC-STeP, Petronas for PIPC)
- **Private co-investor equity** (Cluster conveners/ partners)
- **Debt financing** (Development banks)

PPP Model

- **Implementation:** SPV issues project-specific SPVs or concession agreements for each anchor opportunity area/ project
- **Revenue streams for cost recovery:** User fees, Service fees, Lang-leasing
- **Risk allocation:** Demand risk for service lines (e.g. energy for shared grids, hydrogen, feedstock, captured carbon, etc.) will be shared via guaranteed off-take agreements

Opportunities for Enhancing Customs Clearance Efficiency

Problem Statement

- **Lack of a unified digital "single source of truth" platform** for customs processes leads to fragmented information, inconsistent documentation requirements, and delays in clearance, hindering seamless trade and border operations.
- **Manual documentation** and **non-automated inspection procedures** for certain goods cause prolonged clearance times and operational inefficiencies, increasing costs for traders and contributing to congestion at key checkpoints like Johor-Singapore CIQ complexes
- **Limited real-time visibility** into customs approval status and pending action items (such as duties and tax payments) results in poor communication between stakeholders, causing unnecessary delays and reducing predictability in supply chains
- **Regulatory misalignment** between Malaysia and Singapore, coupled with a complex and non-streamlined customs compliance framework, creates duplication of processes, confusion among traders, and impedes cross-border trade efficiency

Impact / Implication

- Inefficient customs processes lead to **longer clearance times**, causing shipment delays and increased inventory holding costs. This reduces the competitiveness of exporters and importers, as delays can disrupt supply chains and increase overall trade costs
- Without real-time visibility and streamlined processes, businesses face **uncertainty** regarding shipment status and approval requirements, leading to poor planning, increased risk of non-compliance, and reduced trust in customs authorities
- Failure to modernise customs through digital platforms, automated inspections, and regulatory harmonisation **diminishes a country's attractiveness** as a trade and investment hub; This can result in lost foreign direct investment and reduced integration into regional economic initiatives

Parties Involved

- Jabatan Kastam Diraja Malaysia
- Ministry of Finance
- BPEN-J

World Bank's Logistics Performance Index (LPI), scores the logistics performance of a country based on 6 key dimensions

What World Bank's LPI is About

THE WORLD BANK
Logistics Performance Index

- LPI is an interactive benchmarking tool to **help countries assess and improve trade logistics performance**
- **Measures efficiency and quality of logistics services** that enable goods movement across borders and within countries
- It relies on an **online survey** of logistics professionals from multinational **freight forwarders** and the main express **carriers**

LPI Derived Based on 6 Key Dimensions

Related to **Policy**

The efficiency of **customs** and border management clearance

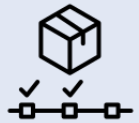
The quality of trade- and transport-related **infrastructure**

The competence and quality of logistics **services**

Related to Service Delivery **Performance**

Frequency of shipments reaching consignees within **scheduled / expected delivery time**

The ease of arranging **competitively priced** international shipments

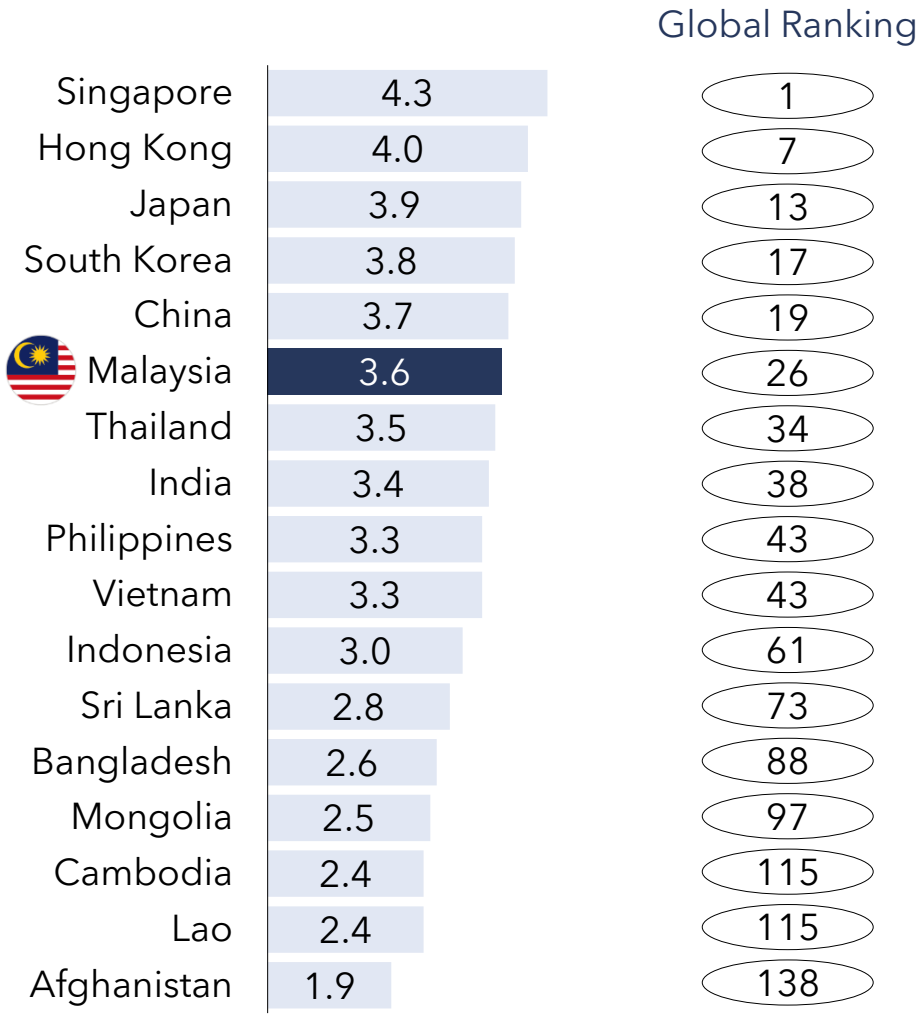


The ability to **track and trace** consignments

Source: World Bank

Malaysia is amongst the top 30 countries in the world and one of the best in Asia for logistics, however, customs clearance remains as an area of improvement

Logistics Performance Index amongst Countries in Asia (2023)



Source: World Bank

Malaysia VS Selected Asian Countries Within Top 10 Global Ranking (2023)

	Malaysia	Singapore	Hong Kong
Customs Score	3.3	4.2	3.8
Infrastructure Score	3.6	4.6	4.0
International Shipment Score	3.7	4.0	4.0
Logistics Competence and Quality Score	3.7	4.4	4.0
Timeliness Score	3.7	4.3	4.1
Tracking and Tracing Score	3.7	4.4	4.2

Digitalisation of Customs Clearance Processes

Customs clearance is currently highly manual and relies heavily on physical documents, which hinders efficiency and productivity; Moreover, the lack of digital documentation, integrated processes, and a real-time status tracker can lead to more reworks, longer approval time, and shipping delays

Initiative Highlights:

Concept Description	Collaborate with federal customs department to digitise customs clearance documentations and integrated digital platforms and streamline customs clearance processes for more seamless cross-border goods flow

Visualisation of the initiative

Optimisation Opportunities

Goods Declaration	Payment of Duties & Taxes	Permit & License Mgmt.	Cargo Inspection	Coordination & Comms.
Fully paperless, end-to-end digital submission of all customs declaration documents via integrated platforms	Fully integrated e-payment system with instant reconciliation and automated receipt issuance	Fully integrated e-permit system for real-time approvals and automatic permit validation	Automated cargo inspection for selected low-risk goods, targeted physical inspections for high-risk goods	Centralised digital communication platform with real-time status updates, notifications, and tracking

Moreover, green lane facilities could provide shippers an even more seamless customs clearance experience, expediting cross-border goods flow

Streamlining and digitalising customs clearance in Johor and Malaysia will dramatically speed up trade, enhance transparency, boost economic growth, and strengthen regional competitiveness

Implementing Agency
- Jabatan Kastam Diraja Malaysia

Monitoring Agency
- BPEN-J

Associated Sectors :
- Logistics[1]

Stakeholders Involved:
- Ministry of Finance

Budget Required (Preliminary)*:

FY	Public	Private
2025	Budget details to be finalised during implementation of the initiative	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: January 2026
- End Date: November 2028

Note: [1]This also applies to the logistical requirements of other sectors (e.g., pharmaceutical, etc.); *Utilised cost figures from World Bank's Philippines customs-modernisation program as a benchmark

Expediting digital transformation, improving processing and coordination can significantly enhance customs clearance processes, facilitating seamless trade movements

Bucket	**Current State:** Possible Explanations for Customs Score	**Potential Opportunities to Improve Customs**
Digitalisation	• May lack a **well-integrated National Single Window (NSW)** • Despite digitalisation efforts, **physical documentation** still required, especially outside major ports (e.g., Port Klang), which could lead to rework, increasing clearance time	• Establish integrated digital customs with streamlined clearance processes via **NSW** • **Expedite digital transformation** (i.e., AI-driven cargo inspections / scanning for low-risk goods)
Internal Coordination	• Coordination among other government agencies (OGA) may be **ambiguous, manual and complex** for certain shipments • For example, restricted / controlled goods typically require complex documentation, multiple permits and manual submissions to various agencies for approval	• **Streamline** government agency **requirements / inspections** to harmonise clearance processes[1] • Government agencies (e.g., Malaysian Quarantine and Inspection Services Department) to adopt **interoperable systems** that could be integrated with NSW for seamless data sharing
Processing	• While Pre-Arrival Processing (PAP) and Authorised Economic Operator (AEO) exist, there is currently a **lack of green lanes** for goods movement	• Introduce **green lanes,** reducing time-consuming customs checks for pre-approved shipments (e.g., non-prohibited) • Establish **fast track** (i.e., priority / expedited processing) for compliant shippers / traders
G2G Trade Facilitation Efforts	• **Dual customs clearance** for cargo shipments between Johor and Singapore	• Establish **joint customs** between Johor and Singapore to simplify processes and reduce clearance time

Note: [1]Malaysian Border Control and Protection Agency (MBCA) established to streamline overlapping government agency requirements and inspections / Source: JETP Focus Group Discussions, World Bank, Royal Malaysian Customs Department, PASB Analysis

In alignment with some of the identified opportunities, the Royal Malaysian Customs Department (JKDM) has announced various initiatives to enhance customs clearance

Royal Malaysia Customs Department's (JKDM) Recent Efforts to Improve Customs Clearance

Inception of **Malaysian Customs Import Export Document System (MyCIEDS)**[1]

- Digital platform to better manage **import / export support documents**
- Intermediary between **customs officers and companies,** aiming to enhance documentation productivity
- Leverages advanced Document Management System (DMS) and **integrates with existing Customs Information System (SMK)**
- **Initial roll out in Port Klang** has improved transparency by minimising direct interactions between customs officers and forwarding agents

Establishment of **Malaysia Border Control Agency (MBCA)**

- MBCA will be the **sole agency** in overseeing border security matters (Formerly known as Single Border Agency)
- Consolidate border control functions previously handled by over **20 government agencies**, which has led to confusion, duplication and delays
- Over 5000 JKDM officers are expected to join MBCA

Aspiration towards **AI Scanning Machine Adoption**

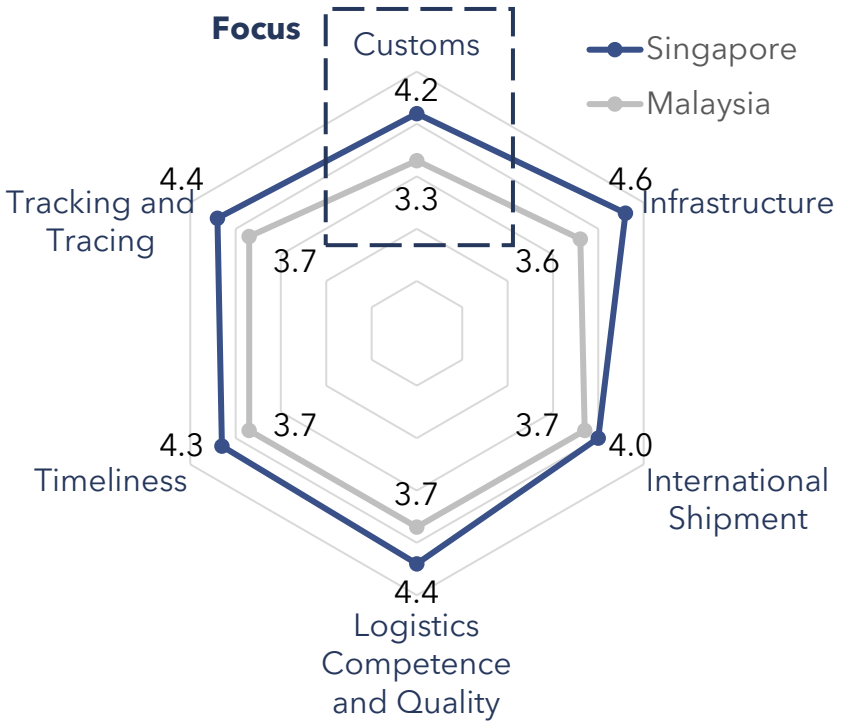
- JKDM expressed budget allocation for **AI scanners, body-worn cameras** for Budget 2025
- Initial adoption of 40 AI baggage scanners implemented in airports

Continuous engagement and collaboration between state and federal governments is needed to facilitate and expedite implementation of these customs enhancement initiatives in Johor

Note: [1]Dated May 2025
Source: Malaymail, The Star, BusinessToday Malaysia

Case example: What Malaysia could learn from Singapore on customs clearance enhancement

Recap: LPI Comparison Between Malaysia and Singapore



- **Singapore has the highest score for customs** amongst the countries studied based on the LPI
- It is 0.9 points above Malaysia's customs score; Malaysia could **selectively implement Singapore's customs improvement measures** to facilitate trade flows
- One of the key success factors to Singapore's customs scores could be attributed to **TradeNet implementation**

Key Learnings and Takeaways: Leveraging TradeNet to Enhance Customs Clearance Processes

SINGAPORE CUSTOMS
Ensuring Revenue. Enabling Trade.

TRADENET®

Summary of TradeNet

- Operationalised in 1989, 100% of trade declarations processed via TradeNet, it is Singapore's **National Single Window for trade declaration**
- Single electronic platform where traders, freight forwarders, and logistics providers **submit all import, export, and transshipment declarations to multiple government agencies simultaneously**
- **Integrates the processing of permits, licenses, and fees**, enabling Singapore Customs and other Competent Authorities (CAs) to monitor goods movement and enforce regulatory requirements efficiently
- Significantly **reduces cost and time** for documentation preparation, submission, and processing

Features of TradeNet

- **Single electronic declaration** replacing multiple paper forms
- **Automated forwarding** to relevant agencies for approval / rejection
- **Electronic payment** and deduction of fees and taxes

Impact of TradeNet

Processing Time	2-7 days	1 min.
# Documents	3-35	1 e-doc
Fees, SGD	10-20	3.30

Source: World Bank, Singapore Customs, Crimson Logic, PASB Analysis

Suboptimal Traffic Conditions in Port of Tanjung Pelepas (PTP) Vicinity

Problem Statement

- There is currently **severe traffic congestion** on Tanjung Pelepas highway and junctions leading to the port; The congestion has been validated via a Traffic Impact Assessment conducted in 2022; JKR Johor agrees with the outcome of the Traffic Impact Assessment
- One of the contributing factors to the traffic congestion is due to the **opening of the Sg. Pulai bridge**, which has added **extra traffic** to the Tanjung Pelepas highway

Impact / Implication

- Severe congestion on Tanjung Pelepas Highway and port junctions leads to **increased transit times** for cargo trucks, reducing overall logistics efficiency and port throughput; **Delays in cargo movement** can increase **operational costs** for logistics operators and port users, affecting competitiveness
- Congestion on key logistics corridors causes unpredictable delivery times, **undermining supply chain reliability** and **customer satisfaction**

Parties Involved

- Relevant City Councils
- Johor Bahru Land Office
- Johor Land & Mines Office
- Department of Environment (DOE)
- Department of Irrigation & Drainage (DID)
- Public Works Department (PWD)
- Jabatan Kerja Raya (JKR)

Note: [1]MIDA Johor

PTP access road must be constructed to alleviate congestion, which has been validated by the authorities; Free Zone 3 development may be hindered without a new access road

Rationale: Why Access Road into PTP is Needed

Initial Traffic Impact Assessment in 2022 Highlights Severe Congestion into PTP

- Level of Service (LOS) at **main road into PTP** has been graded as **E**
- Whereas **main junction** has been graded as **F**
- **JKR Johor has concurred** with assessment outcome

Operationalisation of Sg. Pulai Bridge in 2023 has Aggravated Congestion

- This was **not taken into consideration** in the initial Traffic Impact Assessment (TIA) conducted in 2022
- The LOS for previously mentioned areas has thus **worsened**

JKR Johor Will Hence Not Support Free Zone 3 Development Plan Submission, Given Current Traffic Situation

- Access and regulatory requirements are **not met**
- Moreover, congestion may **"repel" potential Free Zone 3 investors**

Source: PTP, PASB Analysis

Construction of PTP Free Zone 3 Access Road

PTP is planning to expand its Free Zone industrial area with its 3rd-phase development (to be privately funded by PTP). However, due to the high traffic volume on the existing road to the port, a new road connecting to this new development needs to be constructed

Initiative Highlights:

Concept Description	Collaborate with Ministry of Transport to secure funding for the construction of a new access road with direct connection to Free Zone 3 located at the Port of Tanjung Pelepas to attract local and international investors

Visualisation of the initiative

Illustration

Details

- Access road is 1.5km long, 4-lane dual-carriageway
- 37 acres of land reserved for access road
- Access road can unlock economic potential of Free Zone 3's development:
  - Free Zone 3 fully funded by PTP
  - Involves construction of infrastructure (i.e., platform backfilling, road, drainage and utilities)
  - Completed in stages from 2028 to 2030
- Cost: RM190mil (RM83mil for land acquisition; RM107mil for road construction)
- Timeline: 2.5 years for land acquisition, 2 years for construction

PTP's Free Zone 3 industrial area is expected to create over 1,800 new white and blue collar once the area is leased to domestic and international investors. The construction of the infrastructure by PTP and subsequent warehouses and factory construction will provide a positive impact on the surrounding area for the next 25 years.

Implementing Agency
- Jabatan Kerja Raya

Monitoring Agency
- BPEN-J

Associated Sectors :
- Logistics

Stakeholders Involved:
- Johor Port Authority
- MBIP[1]
- Pejabat Daerah Johor Bahru
- Pejabat Tanah dan Galian Johor
- Jabatan Pengairan dan Saliran

Budget Required (Preliminary):

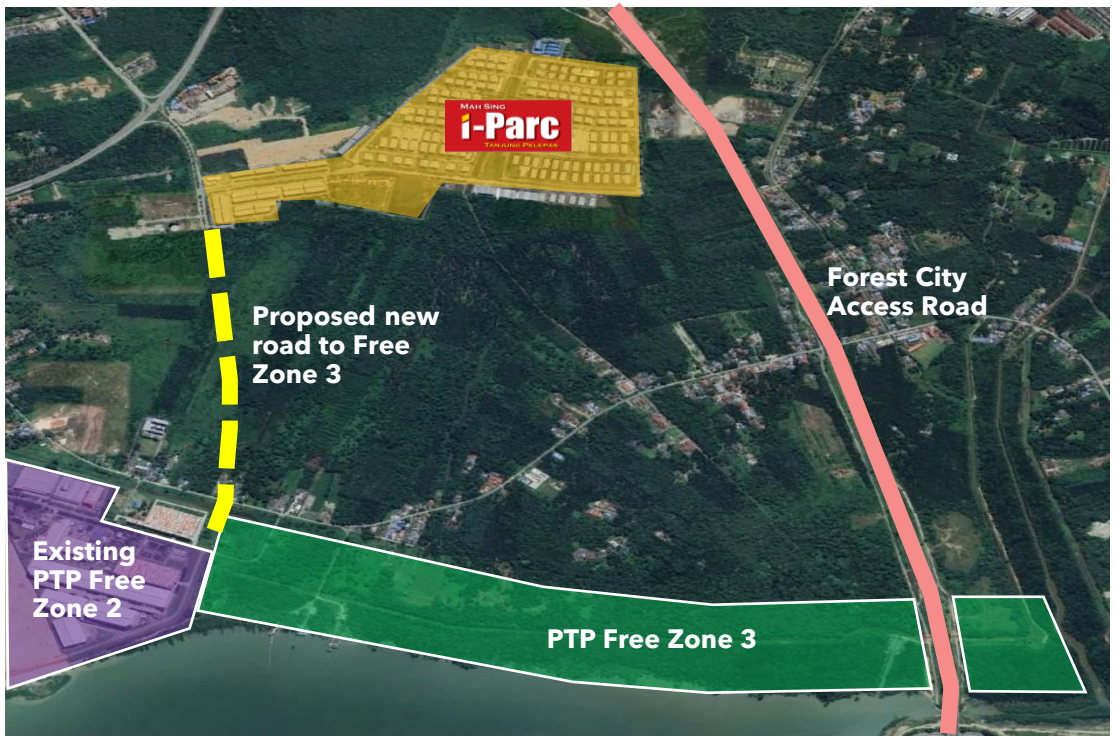
FY	Public	Private
2025	0.0	0.0
2026	16.6	0.0
2027	37.9	0.0
2028	32.5	0.0
2029	75.3	0.0
2030	22.5	0.0
2031 onwards	5.2	0.0
Total	**190.0**	**-**

Implementation Timeframe:
- Start Date: Q1 2026
- End Date: Q1 2030 *(Defect Liability Period, Q1 2031)*

Note: [1]Majlis Bandaraya Iskandar Puteri

While PTP Free Zone 3 will spur economic growth, the development of a state access road is required to make it a more attractive investment

Where the Access Road Will Be



Details

1.5km
Length of Access Road

4
Number of Lanes (Dual Carriageway)

37
Acres of Land Reserved for Access Road

RM190mil
Total Cost of Access Road

How Access Road Makes FZ3 More Attractive to Investors

- Makes PTP Free Zone 3 more accessible
- Alleviates congestion within PTP vicinity

Suboptimal Rail Conditions and Frequency of Inter-Terminal Transfer (ITT) Services

Problem Statement

- Sections of Peninsular Malaysia and Johor's rail network suffer from **outdated / under maintained facilities and tracks**, leading to occasional service disruptions and operational inefficiencies, including the suspension of freight lines in Johor due to poor track conditions (i.e., between Kempas Baru and Johor Port)
- From MMC Group's website, ITT services currently have a service frequency of 2-5 times per week, subject to rail cargo demand; However, based on Focus Group Discussions (FGD) conducted as part of the JETP exercise, private sector logistics players have recommended to **improve Inter-Terminal Transfer (ITT) services between ports**, specifically, in terms of service frequency, predictability and reliability; With suboptimal ITT services, this could lead to slower goods movement and cause overcapacity / congestions at ports / container yards
- Given suboptimal rail conditions, the potential growth of Malaysian logistics industry may be limited since there is growing popularity and preference for rail logistics amongst shippers; Rail logistics can be faster than sea freight, while being cheaper than air freight, positioning it as a **unique middle ground offering**

Impact / Implication

- Poor rail track conditions and infrequent ITT services **reduce the reliability and attractiveness of rail** as a mode for cargo transfer between terminals
- This limitation forces **greater reliance on road transport**, increasing road traffic, causing **congestion**

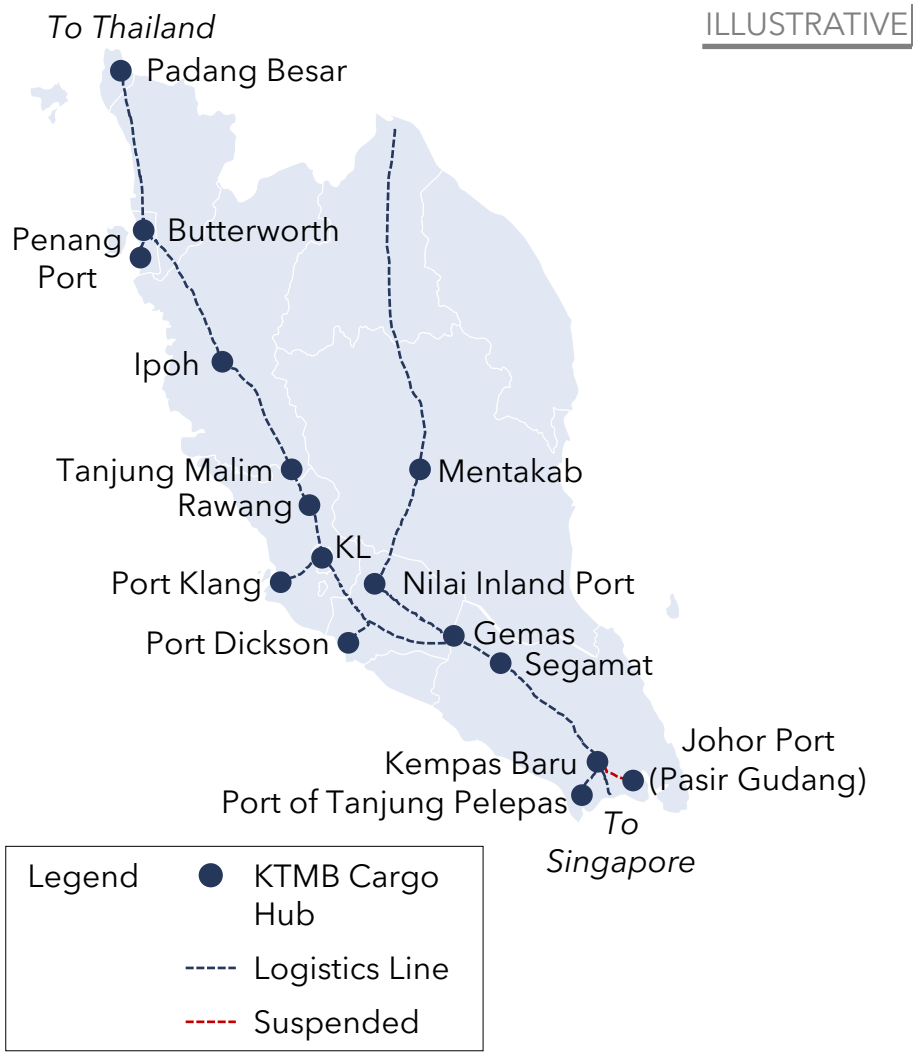
Parties Involved

- Port of Tanjung Pelepas
- Johor Port Berhad
- KTMB
- KTMB – MMC Cargo Sdn Bhd
- Railways Assets Corporation (RAC)
- Jabatan Kerja Raya (JKR)

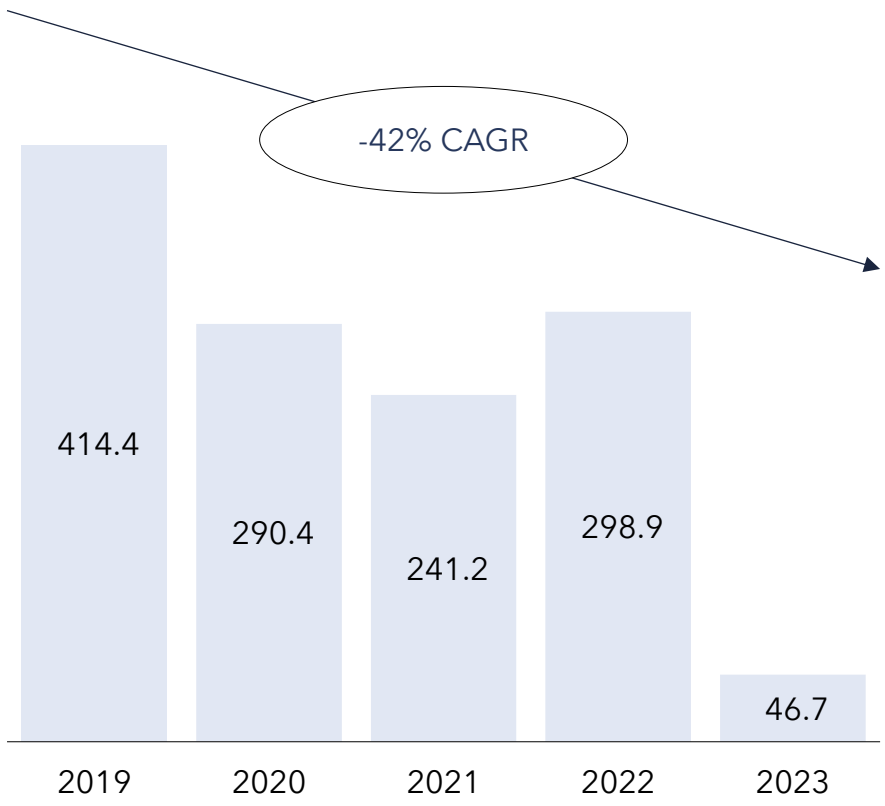
Note: [1]MIDA Johor

While major ports across Peninsular Malaysia are well connected via logistics rail lines, Johor has seen rapidly declining rail cargo throughput, possibly due to poor track conditions

KTMB Cargo Network Across Peninsular Malaysia



Rail Cargo Throughput in Johor, Metric Tonne (Thousand)



Further Details

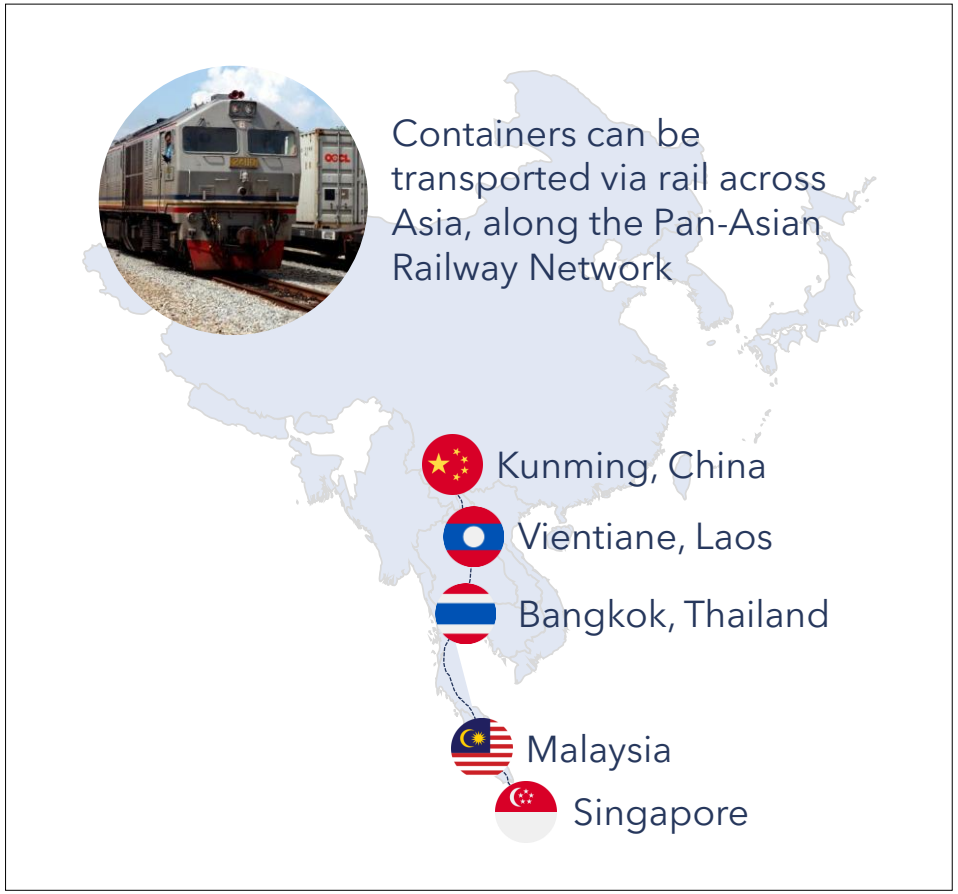
Rail cargo throughput declined possibly due to:

- **Poor track conditions** which may have forced trains to travel at lower speeds due to derailment risks
- Shippers thus **shifted towards truck logistics solutions**, despite congestions
- As an example, **suspension of the crucial cargo-only rail line between Kempas Baru and Johor Port (40km long)** by the Land Public Transport Agency (APAD) in 2024 due to **poor track conditions**, reinforcing the hypothesis
- **Infrequent** and **unpredictable** ITT services (i.e., currently 2-5 services per week, subject to market demand)

Source: The Star, KTMB, MoT, PASB Analysis

Malaysia's rail infrastructure has high integrability into the Pan-Asian Railway Network, which fosters regional rail freight growth; Rail freight's growth driven by its unique proposition

Illustration of Potential Pan-Asian Railway Network



Further Details

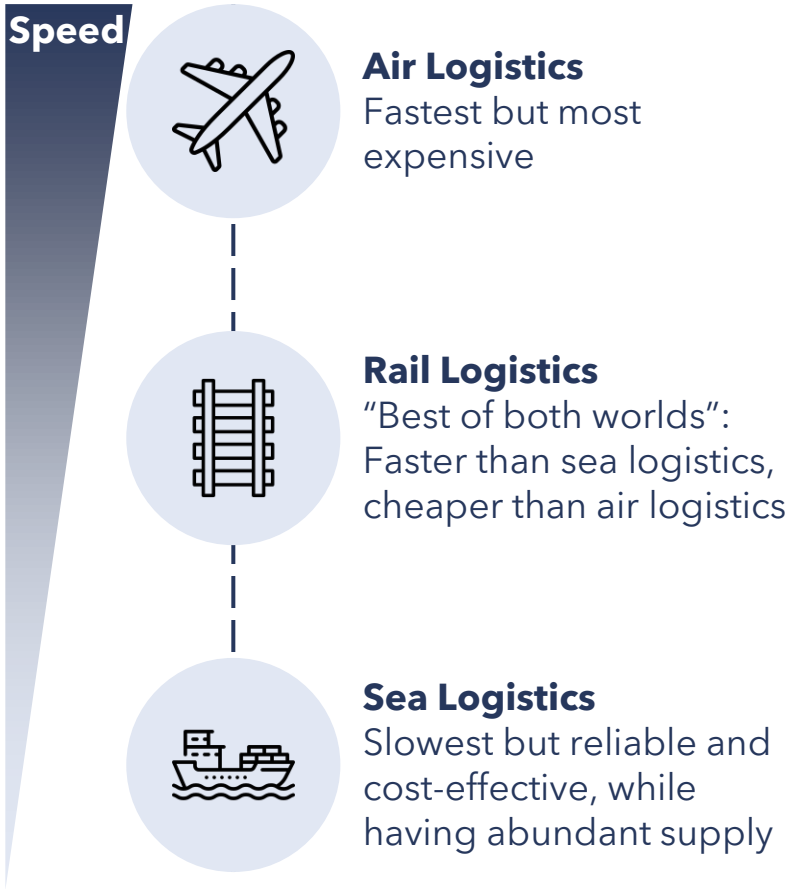
Pan-Asian Railway Network

- Pan-Asian Railway Network could link **Singapore, Malaysia, Thailand, Laos and China**
- Malaysia's rail infrastructure plays a **significant role** to connect Kunming and Singapore; It is hence crucial for intergovernmental collaboration to collectively enhance overall rail infrastructure

ASEAN Express Freight Services

- In 2024, ASEAN Express connecting Malaysia, Thailand, Laos and China was launched
- Connects Selangor to Chongqing in **8 – 9 days**

Growing Popularity Due to Rail Logistics' Unique Positioning: Middle Ground Solution



Source: The Straits Times, PASB Analysis

Enhancement of Rail Logistics Infrastructure and Inter-Terminal Transfers (ITT)

While major ports across Peninsular Malaysia are well connected via logistics rail lines, Johor has seen rapidly declining rail cargo throughput, possibly due to poor track conditions and infrequent Inter-Terminal Transfer Services

Initiative Highlights:

Concept Description	Collaborate with the Ministry of Transportation to co-develop maintenance programme for rail logistics infrastructure in Johor; Increase frequency of Inter-Terminal Transfer services

Visualisation of the initiative

Peninsular Malaysia Rail Infrastructure

What Inter-Terminal Transfer is

- Rail-based movement of shipping containers between port terminals
- Service provided by KTMB MMC Cargo Sdn Bhd (Collaboration between KTMB and MMC ports)
- Handles both laden and empty containers

Takeaway

- While Peninsular Malaysia's rail logistics is well-connected, there is opportunity to:
  - Improve maintenance and upkeeping of rail logistics lines
  - Increase frequency of Inter-Terminal Transfer (ITT) services to facilitate movement of cargo / containers between crucial cargo nodes

Strengthens Johor's overall logistics ecosystem, enhances its position to become a mature multi-modal logistics hub, playing a crucial role in regional and global supply chains

Implementing Agency
- Ministry of Transport (Johor)

Monitoring Agency
- BPEN-J

Associated Sectors :
- Logistics

Stakeholders Involved:
- KTMB
- KTMB – MMC Cargo Sdn Bhd
- Railway Assets Corporation

Budget Required (Preliminary)*:

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: January 2026
- End Date: April 2028

Note: Preliminary, subject to further discussion / engagements with relevant stakeholders; *Benchmarked against similar rail upgrade projects implemented locally within Malaysia, and assuming a 70/30 PPP split

Lack of International Connectivity into Mersing

Problem Statement

- **Mersing lacks direct international transport links** such as international ferry routes, air connections, or efficient cross-border transport, limiting tourist access from overseas markets
- Limited connectivity **restricts the flow of international tourists**, affecting the growth potential of tourism-related businesses including island resorts, diving operators, and cultural attractions
- Insufficient infrastructure and connectivity **hinder Mersing's tourism potential** to fully capitalise on its status as a growing ecotourism and island gateway destination in Johor
- The absence of seamless international connectivity **reduces Mersing's competitiveness** compared to other Malaysian tourism hubs with better access, such as Langkawi or Penang

Impact / Implication

- Tourism growth in Mersing will remain constrained, **limiting job creation and economic benefits** for local communities reliant on tourism and related sectors
- Mersing risks **missing out on its potential recognition and benefits as a global tourism destination**
- Local tourism operators, including dive centers and island resorts, face **challenges attracting international visitors**, impacting revenue and investment opportunities
- The overall **development of Mersing as a premier ecotourism and island gateway destination will be slowed**, affecting Johor's broader tourism goals

Parties Involved

- Ministry of Transport
- Tourism Johor

Note: [1]MIDA Johor

Mersing can be an appealing tourism site to foreigners; However, it currently has no direct international connectivity, land transportation may currently be the most accessible option

Current State Assessment: Mersing Connectivity and Accessibility by Transportation Mode

NON-EXHAUSTIVE

	Air	Land	Sea
Getting to Mersing Town	• Tourists could first fly into **Senai International Airport**, then drive or take a coach to Mersing • Senai International Airport however largely handles **domestic flights**	• Car: Via **Federal Route 3** from JB (2 hours) • Coach: **Standard coach** services (e.g., Transnasional, MARA Liner) • Rail: **No direct rail services** between JB and Mersing for now	• Mersing jetty is a **domestic** terminal with connectivity to neighbouring islands • **No international connectivity**
Getting to the Islands	• **Not available** for now (e.g., between Mersing and islands, between country of origin and islands)	• **May not be technically feasible** between Mersing and islands	• **Limited, infrequent** ferry / speedboat services • Services are typically **booked via resort**

The lack of international connectivity and general accessibility limits Mersing and its surrounding islands' potential as a global tourism destination

Source: PASB Analysis

Enhancement of Mersing's International Connectivity

While Mersing currently has a ferry terminal and airstrip, there is currently no international connectivity into and out of Mersing and its surrounding islands, limiting its tourism potential

Initiative Highlights:

Concept Description	Improve Mersing's international connectivity via the introduction of integrated multimodal connectivity hubs or redevelopment of Mersing airstrip

Visualisation of the initiative

Map

Legend

- A Mersing Airstrip
- B Mersing Ferry Terminal

Options

Option A: Redevelopment of Mersing airstrip

Option B: Transform Mersing ferry terminal into a multimodal terminal

Details

- Enhancement of Mersing Airstrip into a **full-fledged commercial airport** with international connectivity
- Connectivity and services to be improved:
  - Between new Mersing Airport and ferry terminal
  - Between ferry terminal and islands

- Multimodal terminal consists **seaplane and ferry / speedboat operations**
- Jetties to connect waterway with terminal
- Seaplanes could provide:
  - International connectivity w/o a full-fledged airport
  - Exclusive connections between Mersing and islands
  - Highly exclusive connections to islands from origin
- Existing ferry / speedboat services could be positioned as a cost-effective option

With improved international connectivity into Mersing and its neighbouring islands, this could lead to a significant influx of foreign tourists to its most idyllic islands, elevating and transforming Johor's tourism industry

Implementing Agency
- Ministry of Transport (MOT), ECERDC

Monitoring Agency
- BPEN-J

Associated Sectors :
- Cross-Cutting

Stakeholders Involved:
- Ministry of Transport

Budget Required (Preliminary)*:

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: January 2026
- End Date: October 2029

Note: *Provides budget estimates for Options A and B, based on online benchmarks for airport builds and ferry-terminal upgrades, and assumes a 40/60 PPP split

Maldives was once doubted as a tourism destination; However, it is one of the world's top luxury destinations today…

Maldives' Transformation Timeline

1970s: "Underdog"
- Unknown internationally
- Mainly a fishing village
- Kurumba[1] opened in 1972
- UNDP concluded tourism would not succeed due to lack of infrastructure

1980s: "Innovation"
- Introduction of "One Island, One Resort" (OROI) policy, ensures exclusivity and high-quality experiences
- Rapid infrastructure development

1990s: "Expansion"
- Growth in foreign investments and resorts
- Enhancement of global reputation as pristine, exclusive tourism destination

2000s: "Luxury"
- Redefined luxury tourism with world-class brands entering the market
- Maldives crystallised as high-end travel destination, attracting celebrities globally

Present: "Sustainability"
- Maintain long-term status as the top luxury destination
- More emphasis on marine conservation and local empowerment

Illustration

Kurumba Resort Maldives in the 1970s

Maldives is now a modern, luxury tourism destination

Overall development and transformation of its capital, Malé

Note: [1]First modern resort in the Maldives
Source: CNN, PASB Analysis

...one of its key success factors is attributed to rapid infrastructure development targeted to enhance connectivity

Key Success Factors

Focus

Tourism Master Plans and Zoning

- Introduction of "One Island, One Resort" policy to ensure exclusivity and environmental protection
- Regulations introduced to limit built-up areas on resorts, building designs must consider environmental protection
- Guidelines to control quality of hospitality workforce and facilities
- Plots for tourism development were leased from government on fixed-term contracts under competitive bidding process in 2006

Development of Maldives International Airport

- Government prioritised the upgrading of the main international airport near Malé
- Early resort development was initially concentrated near the airport for accessibility
- Creation of wide network of charter air services to catapult tourist inflows; Coupled with attractive travel promotions, this attracted foreign private investments

Sea Transport Mechanisation and Modernisation

- Nationwide, government-led effort to upgrade vessels with diesel engines
- Improved airport transfers, enhanced connectivity between resort islands
- Introduction of speedboat and seaplane services

Mersing could also follow Maldives' footsteps and address its international connectivity challenges, which could unlock its tourism potential

,Source: PASB Analysis

While Mersing airstrip could be developed into a full-fledged international airport, introduction of seaplane services can be the "gamechanger" to Mersing's tourism landscape

Getting to Mersing archipelago (via sea)

Current State

- **Upstream (Getting to Mersing):**
  - **Air:** Mostly domestic flights into Senai International Airport
  - **Sea:** Mersing jetty is a domestic terminal, no international connectivity
  - **Land (Car):** Via Federal Route 3 from JB (2 hours)
  - **Land (Coach):** Standard coaches (e.g., Transnasional, MARA Liner)
  - **Land (Rail):** No direct rail services between JB and Mersing
- **Downstream (Mersing to islands):**
  - Limited, infrequent services
  - Services typically booked via resort

Opportunities

- **Upstream (Getting to Mersing):**
  - **Air:** Increase international chartered flights
  - **Sea:** Upgrade Mersing jetty and establish international connectivity
  - **Land (Car)**: Upgrade existing road infrastructure
  - **Land (Coach):** Introduce direct luxury coach services
  - **Land (Rail):** Express rail services between JB and Mersing
- **Downstream (Mersing to islands):**
  - Introduce regular ferry / speedboat services to key islands

Getting to Mersing archipelago (via air)

- Currently **not available**

- Introduce **seaplane services** departing from:
  - Singapore (e.g., Seletar or Changi)
  - Senai International Airport
  - Kuala Lumpur (e.g., KLIA or Subang)

Focus

Selected Seaplane Case Examples

Maldives

- Seaplane operations connect Velana International Airport to over 170 resorts located around Maldives
- Flight duration could range from 10 to 90 minutes

Pulau Perhentian, Malaysia

- Celebrated first private seaplane services in mid-2024
- Reduces travel time from 45 minutes (by boat) to 10 – 15 minutes (by seaplane)

Source: PASB Analysis

Opportunities to Improve Inland Cargo Processing Facilities

Problem Statement

- Integration of the **Pan-Asian Railway Network** is expected to increase regional rail cargo traffic through Johor; Inland ports can be crucial cargo nodes to optimise regional rail cargo flows, which could make regional supply chain more resilient
- Current processing **infrastructure** and cargo handling **capabilities** at Segamat Inland Port **may not be optimal** to cope with potential surge in regional rail demand
- Moreover, neighbouring seaports can occasionally be **congested**; Congestion could be alleviated with a supplementary inland processing facility which can optimise container handling operations at these major seaports
- Without the development or enhancement of inland cargo nodes, it may cause potential **logistical hiccups** with anticipated surge in regional rail cargo throughput, negatively impacting supply chain efficiency, resilience and regional trade competitiveness

Impact / Implication

- Enhanced capacity and efficiency at Segamat Inland Port will stimulate trade and industrial activity in the region, generating **jobs and investment opportunities**
- Optimisation of rail cargo flows through a dedicated inland hub **reduces pressure** on coastal seaports improving turnaround times and port productivity
- Improved multimodal connectivity with seamless integration of rail and road transport, advanced cargo handling technologies, and value-added logistics services increases the **reliability and flexibility of regional supply chains**
- Developing Segamat Inland Port as a key node in this network enhances Malaysia's role in the transnational logistics corridor, boosting **regional trade competitiveness**

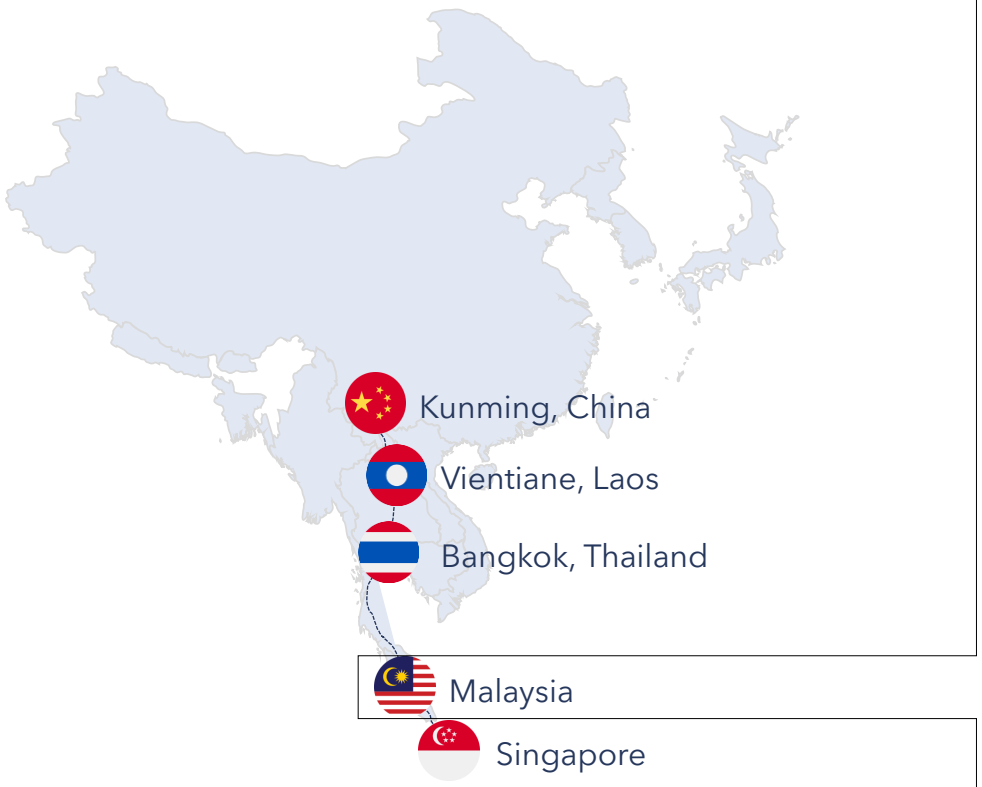
Parties Involved

- Ministry of Transport
- Keretapi Tanah Melayu Berhad
- Relevant port authorities
- Johor State Government
- Majlis Perbandaran Segamat
- BPEN-J

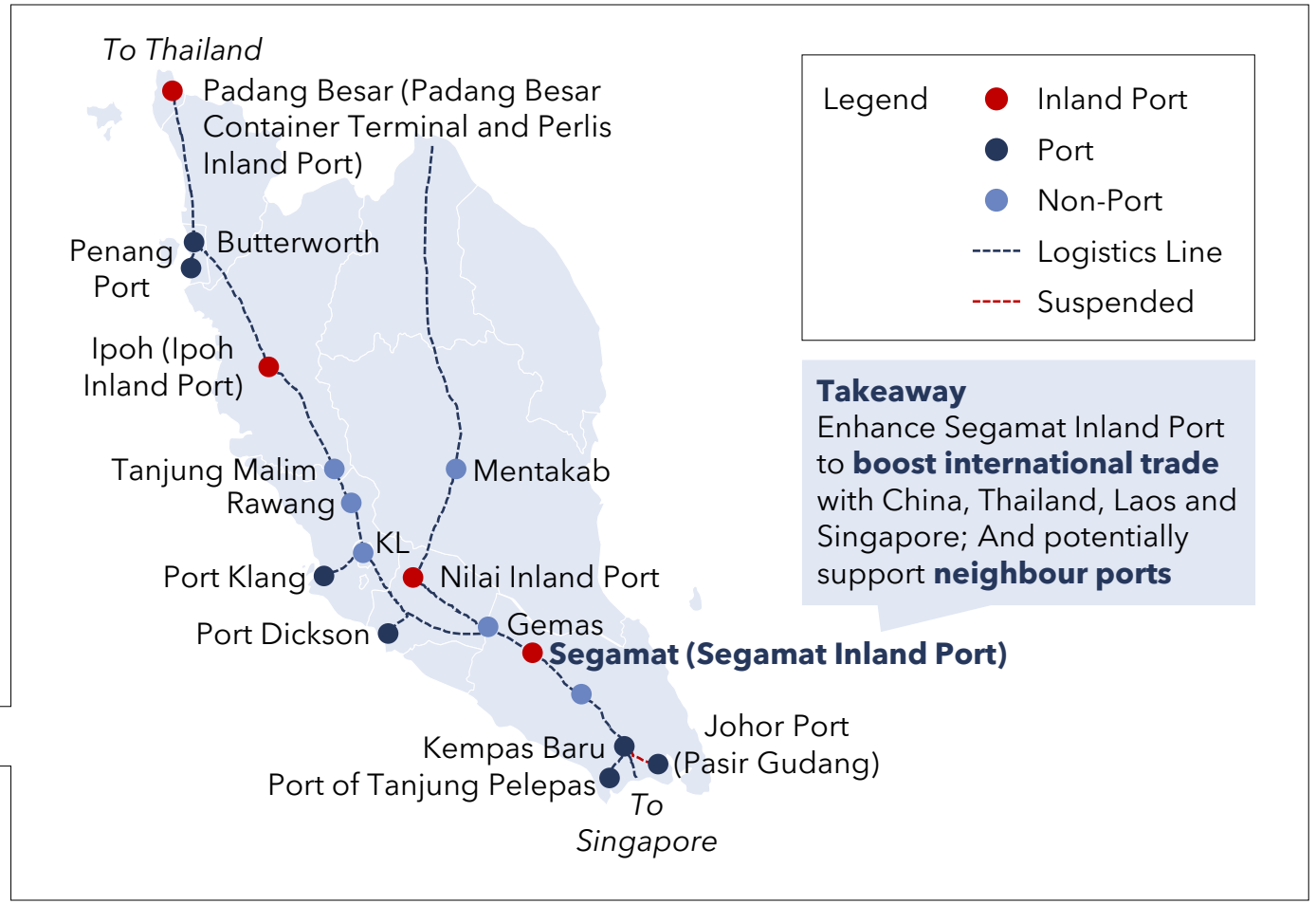
Source: PASB Analysis

Malaysian inland ports are well-connected to major seaports and can be crucial nodes within the Pan-Asian Railway Network; Nodes play key role to optimise international rail cargo flows

Illustration of Potential Pan-Asian Railway Network



KTMB Cargo Network Across Peninsular Malaysia



Takeaway
Enhance Segamat Inland Port to **boost international trade** with China, Thailand, Laos and Singapore; And potentially support **neighbour ports**

There will be 5 inland ports located in Peninsular Malaysia that could act as crucial nodes within the Pan-Asian Railway Network; Rail cargo flows could be optimised by decongesting seaports via inland processing, facilitating storage and distribution activities

Source: PASB Analysis

Revitalisation of Segamat Inland Port

With the potential Pan-Asian Railway Network integration and rising trade volumes and logistics demands, there is a strong need to enhance existing multimodal inland processing facilities to optimise regional rail cargo flows and decongest major coastal ports

Initiative Highlights:

Concept Description	Collaborate with Ministry of Transport to develop and enhance the Segamat Inland Port into a modern, multimodal logistics hub that integrates rail and road connectivity, advanced cargo handling, and value-added services to support regional trade

Visualisation of the initiative

Inland Ports in Malaysia

Segamat (Segamat Inland Port)

Details

- Inland ports are **crucial multimodal processing nodes**, usually connected to rail infrastructures, which could help optimise cargo flows
- **Key success factors** include:
  - Rail infrastructure improvements (between Segamat Inland Port and main rail cargo line)
  - Improved road access into Segamat Inland Port
  - Bonded, non-bonded warehouses and container storage
  - Integrated port systems for real-time tracking and coordination`

Development of Segamat Inland Port could boost regional economic growth, decongest major neighbouring seaports, and ultimately strengthen supply chain resilience

Implementing Agency
- Ministry of Transport

Monitoring Agency
- BPEN-J

Associated Sectors :
- Cross-cutting

Stakeholders Involved: Segamat
- Johor Port Authority
- Port Klang Authority
- Majlis Perbandaran

Budget Required (Preliminary)*:

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: January 2026
- End Date: September 2028

Note: *Ballpark figure estimated through an extrapolation of costs required for each infrastructural component, where extrapolation is based on comparative international/ local benchmarks

Inland ports are ports located away from coastlines and are typically intermodal; Some are built to facilitate inland cargo processing to alleviate congestion at neighbouring terminals

Definition of Inland Port

- Inland ports are large-scale ports located **away from coastlines**
- Most common types are **dry ports** and **inland waterway ports** (i.e., connected to river, lake)
- Acts as a key **intermodal hub**, facilitating cargo transfer between different modes of transportation
- Provides customs clearance, storage, consolidation, distribution logistics service; Allows goods to be **processed inland**, as opposed to causing **congestion** at traditional seaports

Case Examples and Key Success Factors

Port of Duisburg
Duisburg, Germany

- **One of the world's largest** inland ports, handles over 4mil TEUs
- **Inland river port** situated at confluence of the Rhine and Ruhr rivers
- **Trimodal** logistics hub, offers multimodal transfers between water, rail, road, with advance container terminals
- Key endpoint for **China-Europe** rail freight corridor

Perlis Inland Port
Perlis, Malaysia

- **Dry port** (inland container terminal) designed to complement Padang Besar Container Terminal, located near Malaysia-Thailand border, which can be **congested**
- **Doubles** Padang Besar Container Terminal capacity to 300k TEUs per annum (Phase 1 to be completed Q3 2025, full capacity of 1mil TEUs in later phases)
- Crucial node for integration into **Pan-Asian Railway Network**

Segamat Inland Port could thus be enhanced in alignment with successful inland ports globally: 1.) Ensure adequate container handling capacity to support neighbouring ports, 2.) Improved integration to rail infrastructure, 3.) Port road access upgrades, 4.) Integrated cargo handling digital platforms

Source: PASB Analysis

Lack of Transport Infrastructure Within Greater JB Area and Rapid Urbanisation Leading to Chronic Congestion

Problem Statement

- Johor Bahru and its surrounding areas are experiencing **chronic traffic congestion**, limiting regional **connectivity** and economic growth
- **Existing transport infrastructure is insufficient** to support the rapidly growing urban population and increasing mobility demands
- There is a strong need for sustainable, low-carbon transportation solutions to support Johor's commitment to **environmental goals**
- Alternative modes of public transportation, such as, the **light rail transit (LRT) is costlier** and takes **longer to construct**

Impact / Implication

- Significant improvements to urban mobility via rapid, reliable, and integrated transit option operating on elevated viaducts, **reducing road traffic congestion** and **travel times**
- It supports Johor's **low-carbon agenda** by offering an **environmentally friendly** alternative to private vehicles, lowering **carbon emissions**
- Enhances regional connectivity and **complements the upcoming RTS Link** between Johor Bahru and Singapore, boosting tourism and economic growth
- Improves the **quality of life** for residents by enabling seamless, efficient public transport solutions aligned with Johor's urban development

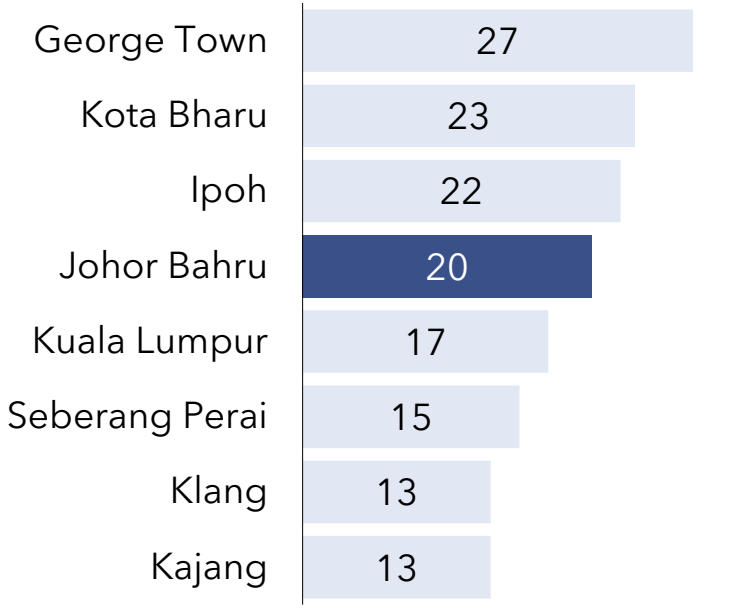
Parties Involved

- Ministry of Transport
- Johor State Government
- Unit Kerjasama Awam Swasta (UKAS)
- Local Authorities
- Pejabat Tanah dan Galian (PTG)

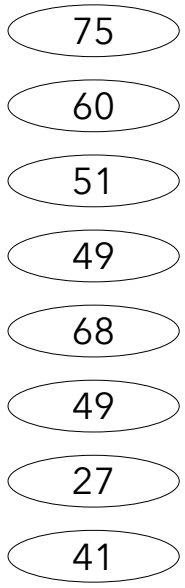
Rapid urbanisation has contributed to congestion in Johor Bahru; This is further aggravated by high new car registrations and influx of both local and Singaporean vehicles into the city

Tomtom Traffic Index (2024): A Deep-dive into Malaysian Cities

Average Travel Time Per 10km by City, Minute

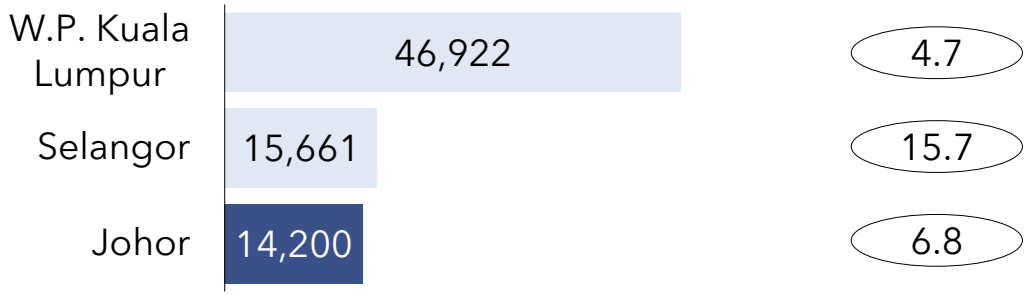


Time in Rush Hour Per Year, Hour



Top 3 States with Highest Car Registration (2024)[1]

Number of Cars



Average Traffic Going into Johor Bahru City

Number of Vehicles per Hour

7,433
Local Vehicles

3,744
Singaporean Vehicles

Johor is the 4th most congested city in Malaysia and is amongst the top 3 states with the highest new car registrations

Note: [1]Excluded Rakan Niaga Portal dataset
Source: Malaymail, Tomtom, MOT, PASB Analysis

Reliable public transportation services is required to ease congestion; Feasibility of various public transportation systems were assessed and EART was concluded to be the most feasible

Consequences if Congestion Left Unaddressed

Decline in Quality of Life and Wellbeing
Daily gridlocks leads to stress and frustration, lowering life satisfaction

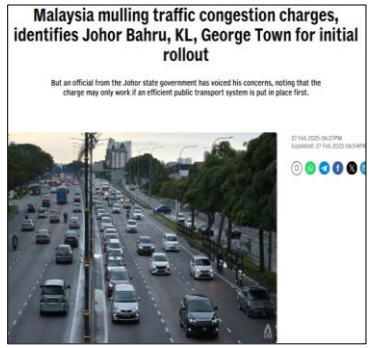
Negative Impact on Tourism and Supply Chains
Congestion discourages tourists and disrupts supply chains

Environmental Deterioration
Reliance on private vehicles leads to higher CO_2 emissions

Potential Investor Determent for Key Projects
Such as JS-SEZ and SFZ; Moreover, RTS may aggravate traffic conditions

Initiatives in the Pipeline to Address Congestion

Johor identifies 77 congestion hotspots in Greater JB, plans to tackle issue with RTS, rail corridors and RM1.28b road projects, says state exco


Malaysia mulling traffic congestion charges, identifies Johor Bahru, KL, George Town for initial rollout

But an official from the Johor state government has voiced his concerns, noting that the charge may only work if an efficient public transport system is put in place first.

- **77 congestion hotspots** identified, **RM1.3bil allocated** for road infrastructure enhancement
- Road widening and enhancement programmes expected to be completed by **2026 / 2027**, for example:
  - Gelang Patah (J4)
  - Phase 2B Pasir Gudang Highway
  - Bandar Seri Alam / Taman Rinting to Pasir Gudang
  - Elevated intersection for EDL-JBCC-Stulang Laut
  - Senai-Desaru Expressway enhancement
- Moreover, **traffic congestion charges** have been studied, which could reduce **20% of traffic**, but is currently not feasible

While there are ongoing road infrastructure enhancement programmes to accommodate vehicle influx, there needs to be a reliable public transportation system to remove vehicles on the road; Since EART is cost-effective and has a shorter construction timeframe, it is likely the best possible option for Johor Bahru now

Source: Channel News Asia

Introduction of Elevated Autonomous Rapid Transit (EART) Services

A new high-capacity, rapid transit system is required to alleviate chronic traffic congestion and improve regional connectivity in Johor Bahru and its surrounding areas; Moreover, the state is also committed to support sustainable growth through low-carbon and more cost-effective transportation solutions

Initiative Highlights:

Concept Description	A public transportation initiative to develop an autonomous, trackless transit system operating on elevated viaducts and roads, aimed at enhancing urban mobility, easing traffic congestion, and complementing the upcoming Rapid Transit System (RTS) Link

Visualisation of the initiative

EART Quick Facts

- **Trackless, rubber-wheeled** vehicles that could be operated **autonomously** on dedicated guideways
- Unique as it possesses **speed and capacity of train** with **flexibility of buses**

Key Project Features

- Improves connectivity in **Skudai, Tebrau and Iskandar Puteri region**
- Total length of **47.6km**
  - Iskandar Puteri Line (14.8km)
  - Skudai Line (18.8km)
  - Tebrau Line (14km)
- **32 stations** planned

Significantly improves urban mobility and regional connectivity through faster, more reliable and integrated public transportation, reducing traffic congestion and travel times, while lowering carbon emissions; Supports Johor's tourism industry, boosts economic growth and improves quality of life

Implementing Agency
- Ministry of Transport (MOT), ECERDC

Monitoring Agency
- BPEN-J

Associated Sectors :
- Cross-cutting

Stakeholders Involved:
- Johor State Government
- Unit Kerjasama Awam Swasta (UKAS)
- Local Authorities
- Pejabat Tanah dan Galian (PTG)

Budget Required (Preliminary):

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: Q3 2025 (Target)
- End Date: January 2027

EART will complement other public transportation infrastructures and transform Greater Johor's urban connectivity

Overview of EART Connectivity

Details

3
Number of Connected Corridors (e.g., Skudai, Tebrau, Iskandar Puteri)

32
Stations Planned

47.6km
Track Length

Integrated at Bukit Chagar Interchange, linking RTS riders to EART, significantly improving urban connectivity

Latest Status

- RFP process for the EART system implementation initiated by the Public-Private Partnership Unit (UKAS)
- Targeted to begin construction in Q3 2025, with proposals and evaluations ongoing
- Final alignment and route proposal for the EART system is expected to be officially announced by August 2025, subject to RFP evaluation results

Note: Project information as of July 2025
Source: IQI Global

Lack of Rail Connectivity and Frequent Rail Services Across Johor

Problem Statement

- The **existing Gemas-Johor Bahru rail infrastructure is outdated and unelectrified:**
  - Results in **slow travel times** for long haul train services (i.e., intercity), in relation to other road transport options
  - Absence of electric power system could **hinder modern electric commuter train services**; These higher frequency commuter services are crucial in connecting people across Johor
- Heavy reliance on road travel contributes to **congestion and higher emissions**, impacting economic and social development in the region

Impact / Implication

- Electrification and double tracking will **reduce rail travel time by up to 50%**, making rail a competitive and attractive mode of transport between Johor and Kuala Lumpur
- This modernisation is expected to **ease road congestion**, **lower carbon emissions**, and promote environmentally sustainable mobility options in southern Malaysia
- Improved rail connectivity will **stimulate economic growth and tourism development** by facilitating faster movement of people and goods
- The project supports Malaysia's broader commitment to upgrading transportation infrastructure and enhancing **regional integration within the national rail network and beyond** (i.e., Pan-Asian Railway Network)

Parties Involved

- Ministry of Transport
- Railway Asset Corporation (RAC)
- Keretapi Tanah Melayu Berhad (KTMB)
- YTL Construction Sdn Bhd
- SIPP Rail Sdn Bhd

Source: PASB Analysis

Existing Gemas-JB rail infrastructure needs to be enhanced due to outdated power infrastructure, poor track conditions and an overreliance on road transportation

Why Gemas-JB Rail Infrastructure Needed Enhancement

Absence of Electric Traction Infrastructure

- Existing rail infrastructure could only accommodate diesel locomotives, which are **outdated**, **slow**, produces significant **emissions**, and can have **reliability** issues
- Lack of electric traction infrastructure can hinder usage of more reliable, cost-effective electric trains, which could also be used for **high frequency commuter services**

Suboptimal Track Conditions

- Single track infrastructure leads to **lower service frequencies**
- Poor track conditions can be **hazardous**, affecting service **reliability** while also **limiting train operational speeds**

Overreliance on Road Transportation

- The southern corridor between Gemas and Johor Bahru is **heavily dependent on road-based vehicles**—including public buses, trucks, and private cars—resulting in **frequent congestion** on major highways such as the North-South Expressway, especially in Johor

Modernisation of outdated rail infrastructure can enable faster intercity services and frequent rail services, improving people and goods movement productivity, spurring long-term socioeconomic growth

Source: PASB Analysis

Leveraging Gemas-JB EDTP[1] Infrastructure for Commuter Services in Johor

Gemas-Johor Bahru rail electrification project addresses the urgent need to modernise Malaysia's southern rail network by significantly reducing travel time, improving connectivity, and providing a faster, more reliable, and environmentally friendly alternative to road travel

Initiative Highlights:

Concept Description	A transformative infrastructure project that modernises southern Malaysia's rail network by providing faster, more comfortable, and environmentally sustainable train travel, significantly enhancing connectivity between Johor and Kuala Lumpur, and within Johor

Visualisation of the initiative

ETS Rolling Stock

Modern rolling stock features 312 seats, onboard WiFi, USB charging, luggage space

Gemas-JB ETS Quick Facts

192km
Total Length of Electrified Gemas-JB Rail

140km/h
ETS Top Operating Speed

22
Number of Trips Daily

Map of Gemas-JB Line

Leveraging on Gemas-JB Electrified Double Track Project (EDTP) infrastructure, frequent electric commuter services connecting Paloh to JB Sentral could be introduced; This enhances connectivity across Johor, establishes synergies with Rapid Transit System (RTS), and reduces congestion

This project will revolutionise travel in southern Malaysia by drastically reducing journey times (i.e., cuts intercity rail travel time by up to 50%), easing road congestion, and stimulating economic and tourism growth through improved rail connectivity (i.e., between states and across Johor)

Implementing Agency
- Ministry of Transport

Monitoring Agency
- BPEN-J

Associated Sectors :
- Cross-cutting

Stakeholders Involved:
- Railway Asset Corporation (RAC)
- Keretapi Tanah Melayu Berhad (KTMB)
- YTL Construction Sdn Bhd
- SIPP Rail Sdn Bhd

Budget Required (Preliminary):

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: January 2018
- End Date: Q3 2025 *(2026/2027 for Commuter)*

Note: [1]Electrified Double Track Project

Electrification and track upgrades between Gemas and JB creates a unique value proposition for rail transportation, realising connectivity synergies and unlocking socioeconomic growth

Quick Comparison Between Pre-electrification VS Post-electrification

	Before	After
Travel Duration[1]	**7 hours,** with an average speed of ~27km/h; Between KL and JB	**3.5 – 4 hours**, with an average speed of ~55km/h; Between KL and JB
Track	192km **single-track**	192km **double-track**, which can accommodate **more services**
Overall Rail System	**Diesel**	**Electric**
Integration with Electrified Commuter Services	**Not possible** without electrification; Frequent diesel commuter services may be less cost-effective in the long-run	Existing electrified track infrastructure leveraged to introduce **commuter services between Paloh – JB Sentral**

Key Takeaways

- Gemas-JB Electrified Double Track Project (EDTP) ETS services, cut travel duration by **40 – 50%**, has a **unique and attractive value proposition**, relative to other modes of transport:
  - Relative to air: Rail is more **cost-effective**, moreover, air transportation's end-to-end travel duration may largely be similar to rail
  - Relative to coach services: Rail can be faster and more reliable, since it is **not susceptible to traffic / congestion risks**

- With this infrastructure (i.e., double-track and electrification), regular **commuter services between Paloh and JB Sentral** can be introduced, improving **connectivity**, realising **RTS synergies**, and **reducing congestion**

Note: [1]Simple average taken, includes stops along the way
Source: PASB Analysis

Poor Connectivity Along Johor's East Coast Region

Problem Statement

- The east coast region of Johor, including towns such as Mersing and Kota Tinggi, suffers from **limited road and absence of rail infrastructure**, relying on congested routes like Federal Route 3 for road transport
  - **Limited road infrastructure**:
    - There is currently a lack of alternative roads, which forces motorists to utilise the already congested Federal Route 3 (i.e., near Greater JB area)
    - Moreover, there have been reports and news articles proposing targeted programmes for road condition enhancement, which may suggest that Federal Route 3 conditions are suboptimal for comfort and safety
    - One of the phases for the LPT4 proposes a 3rd link between Johor and Singapore; With 3rd link operationalisation, this could alleviate congestion at existing borders and improve accessibility into Kota Tinggi and Mersing, driving growth of foreign tourists along Johor's east coast
  - **Absence of rail infrastructure**:
    - No rail connectivity between JB and east coast towns (e.g., Mersing, Kota Tinggi), which can impede growth of tourism, logistics, manufacturing
    - Limited car ownership in Singapore can constrain the accessibility of Johor's east coast towns for Singaporeans and other foreign tourists

Impact / Implication

- Alleviates congestion on the North South Expressway (PLUS), especially between Johor Bahru and northern regions, improving **traffic flow, safety**
- Attracts industrial and commercial **investments**, facilitating job creation, and boosting local economies in west coast districts (Muar, Batu Pahat, Pontian)
- Improved connectivity will also enhance **logistics and freight efficiency** through **traffic dispersal**, benefiting ports and industrial zones across Selangor, Melaka, and Johor

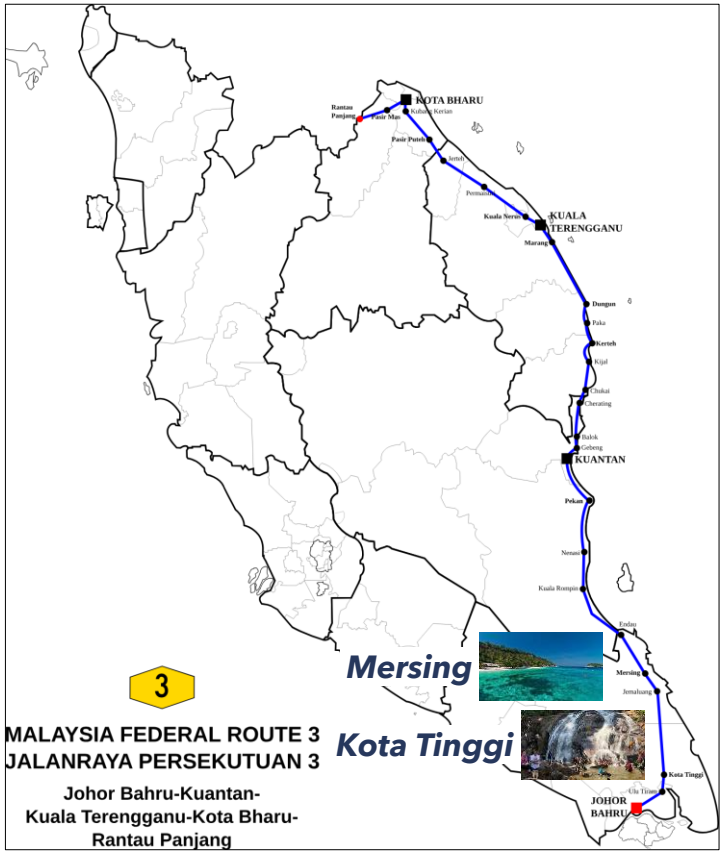
Parties Involved

- Kementerian Kerja Raya
- Relevant State Governments
- Relevant Local Councils
- Pejabat Tanah dan Galian
- Ministry of Transport
- Ministry of Finance
- Ministry of Economy
- Ministry of Transport (China)
- Relevant State Governments

Source: PASB Analysis

Johor towns along the east coast are mainly connected via Federal Route 3, which can be congested; Lack of alternative connections limit accessibility and economic development

Federal Route 3 (FR3) Quick Facts and Selected Johor Towns



739km
Length of Federal Route 3

4
States Connected via Federal Route 3

- Connects **Rantau Panjang to Johor Bahru** in Johor
- Passes through Kelantan, Terengganu, Pahang, Johor
- **One of the 3** main north-south federal highways in Peninsular Malaysia, alongside Federal Routes 1 and 5, which are all **backbone for east coast connectivity**
- In relation to Johor, it includes Johor Bahru – Kota Tinggi Highway / **Tebrau Highway** and Jalan Kota Tinggi

Related Comments and Articles on FR3 Congestion

*"From my observation, there are just **too many cars and road works along FT03 Federal Road** (Mersing-Kota Tinggi-Johor Baru)This led some motorists to use alternative routes, including around the Austin Heights area, which also caused such areas to be affected by congestion"*

*"I have been experiencing daily congestion, especially along **Jalan Tebrau** and Skudai Highway*

Upgrade Works Required to Improve Road Conditions - *"Additionally, for three roads, namely FT1, FT3, and FT5, the government has allocated another RM100mil to complete these three projects"*

For example, coastal towns with high tourism potential (e.g., Mersing and Kota Tinggi) currently only have road connectivity via Federal Route 3; Since Singaporeans and other foreign tourists may not have access to cars, the lack of rail connectivity can hinder tourism growth potential

Source: Ministry of Works, various news articles, PASB Analysis

Development of Lebuhraya Pantai Timur 4 (LPT4)

Current road connectivity between Kuantan, Mersing, Kota Tinggi and Johor Bahru relies solely on LPT2 and Federal Route 3 (FR3), leading to frequent congestion, limited accessibility and constrained economic development on the east coast

Initiative Highlights:

Concept Description	Phase 4 extension of the existing LPT 1 and LPT 2 (East Coast Highway) at a road length of 123 km – linking Kuantan, Mersing and Kota Tinggi to Pasir Gudang, Johor Bahru

Visualisation of the initiative

Illustration of LPT4 Route Map

Phases

Phase 1 (Mersing – Ulu Tiram, Johor)
- 123km, costs RM4.94bil

Phase 2 (Malaysia – Singapore 3rd Link)
- 10km, costs RM4.01bil

Phase 3 (Kuantan – Rompin, Pahang)
- 170 km, costs RM5.57bil

Project Scope

- Construct a new 123 km highway alignment parallel to FR3, connecting Mersing-Kota Tinggi-JB
- Build 4 interchanges at Mersing, Jemaluang, Kota Tinggi and Ulu Tiram (SDE)
- Install 4 toll plazas
- Undertake land acquisition and utility relocation
- Execute geotechnical and road ancillary works
- Conduct feasibility studies

Enhances safety and accessibility for key towns in Mersing, Kota Tinggi, etc. via traffic dispersal, thereby unlocking East Coast Economic Region's (ECER) economic potential by a simulated GDP contribution of RM3.2 billion through bolstering tourism and manufacturing linkages

Implementing Agency
- Ministry of Transport (MOT), JKR Johor

Monitoring Agency
- BPEN-J

Associated Sectors :
- Cross-Cutting

Stakeholders Involved:
- Relevant State Governments
- Relevant Local Councils
- Pejabat Tanah dan Galian

Budget Required (Preliminary):

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total	**RM14.52 bil**	**-**

Implementation Timeframe[1]:
- Start Date: January 2026
- End Date: January 2033

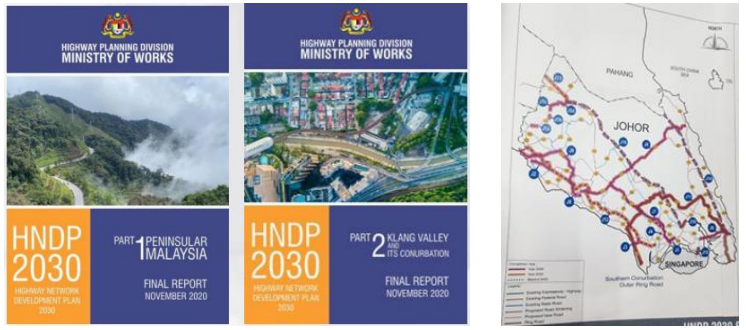
Note: [1]Preliminary

LPT4 was identified as a key infrastructure project in various Masterplans, it has however fallen short on implementation, potentially due to competing priorities and high CAPEX

Suggestion to Implement LPT4 Highlighted in ECER Masterplan 2.0

- ECER Masterplan 2.0 (2018 – 2025) aims to expedite socioeconomic transformation in East Coast Economic Region (ECER)
- **LPT4 was identified as a key infrastructure project** in ECER Masterplan 2.0, designed to extend existing East Coast Expressway further south, linking Mersing and Kota Tinggi to rest of East Coast and Johor

LPT4 Suggestion Exhibited in Highway Network Development Plan (HNDP)



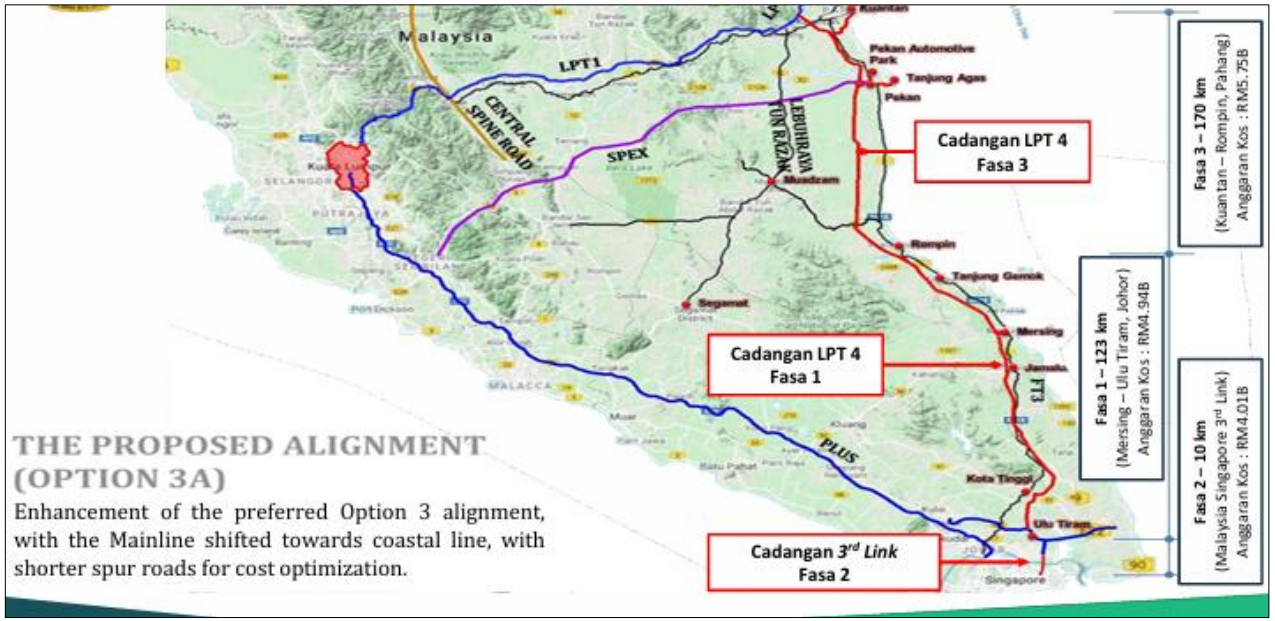
- Highway Network Development Plan (HNDP) is a national Masterplan for road infrastructure developed by the Ministry of Works
- LPT4 was specifically mentioned under **"Project Road and Implementation Programme Plan for State of Negeri Sembilan"**

While LPT4 has yet to be implemented, it has been suggested and referenced in various Masterplans, which could indicate that this project has a strong case and feasibility; Moreover, existing plans and designs could be leveraged, potentially shortening implementation timeline

Source: ECER Masterplan 2.0, HNDP, PASB Analysis

LPT4 Phase 1 could halve travel duration between Senai Airport and Mersing while Phase 2 optimises border crossing flows, facilitating people movement and tourism growth

LPT4 Overview: 3 Key Phases



Phase 1	Mersing – Ulu Tiram	RM4.94Bil	123km
Phase 2	Malaysia – Singapore Third Link	RM4.01Bil	10km
Phase 3	Kuantan – Rompin (Pahang)	RM5.75Bil	170km

Further Details

LPT4 Reduces Travel Duration Between Senai Airport and Mersing

Legend

- A Senai Airport
- B Mersing

- Distance between Senai International Airport and Mersing is approximately 139km, translates to a travel duration of 2 hours
- LPT4 could **cut travel duration by up to 50%,** which translates to an optimised **travel duration of 1 hour**
- Mersing, which has been identified as a catalytic node for Johor's tourism industry, must be **enabled by seamless connectivity** to thrive

LPT4's Third Link Could Optimise Border Crossing Flows

450,000

People Crossing Malaysia-Singapore Checkpoints Daily[1]

Note: [1]Before pandemic
Source: Ministry of Works, PASB Analysis

Construction of East Coast Rail Link 2 (ECRL2)

Absence of a continuous 310 km rail link between Kuantan and Johor Bahru forces reliance on road transport to complete the last-mile of goods transport, causing capacity constraints, higher logistics costs and limited passenger and goods mobility to key logistical and people touchpoints in Johor

Initiative Highlights:

Concept Description

ECRL 2 is a 310 km rail link and an extension of the current ECRL major railway infrastructure project that will connect Kuantan to Johor Bahru which further complements the entire ECRL network as part of China's Belt and Road Initiative

Visualisation of the initiative

Illustration of ECRL 2 Route Map

Key Project Features

- An **extension of ECRL 1**, where ECRL 2 aims to service a **310km railway network** between Kuantan and Johor Bahru
- ECRL 2 include **passenger trains, cargo trains, and various wagons** such as container flat-bed, open-top, and box car
- ECRL 2 will support the **transport of people and diverse goods** including bulk commodities, liquid goods, agriculture products, marine produce and other manufactured goods
- The route for ECRL 2 will **connect key ports and major stations**, serving both passenger and freight transport needs

Drives long-term strategic growth in Johor by boosting manufacturing, exports, logistics, and attraction/ enhancement of high-value industries as well as talent mobility to support the state's economic development, potentially contributing a simulated GDP contribution of RM22.5 billion

Implementing Agency
- Ministry of Transport

Monitoring Agency
- BPEN-J

Associated Sectors :
- Cross-cutting

Stakeholders Involved:
- Ministry of Finance
- Ministry of Economy
- Ministry of Transport (China)
- Relevant State Governments

Budget Required (Preliminary):

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: Estimated start date 2026
- End Date: Estimated completion in 2040

East Coast Rail Link project is designed to enhance connectivity between key cities and towns along Malaysia's East Coast, promoting equitable socioeconomic growth across the region

Overview of ECRL Project

01

Crucial infrastructure project to **improve freight and passenger rail connectivity** under ECER Masterplan

02

Boost economic growth by stimulating commercial activities, investments, job creation, tourism, and regional development

03

Construction began in August 2017, with **China Communications Construction Company (CCCC)** as the main contractor

04

Current construction progress has already surpassed 80%, as of mid-2025; ECRL1 expected to be operational in **January 2027**

Other Details

Quick Facts

160km/h
Passenger Train

25,000V
Power System (Fully Electrified System)

80km/h
Freight Train

1.435m
Track Width (Standard Gauge)

Cargo Carrying Capabilities

Bulk Commodity
- Coal
- Cement
- Iron Ore
- Steel
- Bauxite
- Silica

Liquid Goods
- Chemicals
- Petroleum Products

Marine Produce
- Fisheries

Manufactured Goods
- Inland Containers
- Automotive
- Petchem
- Specialised Goods

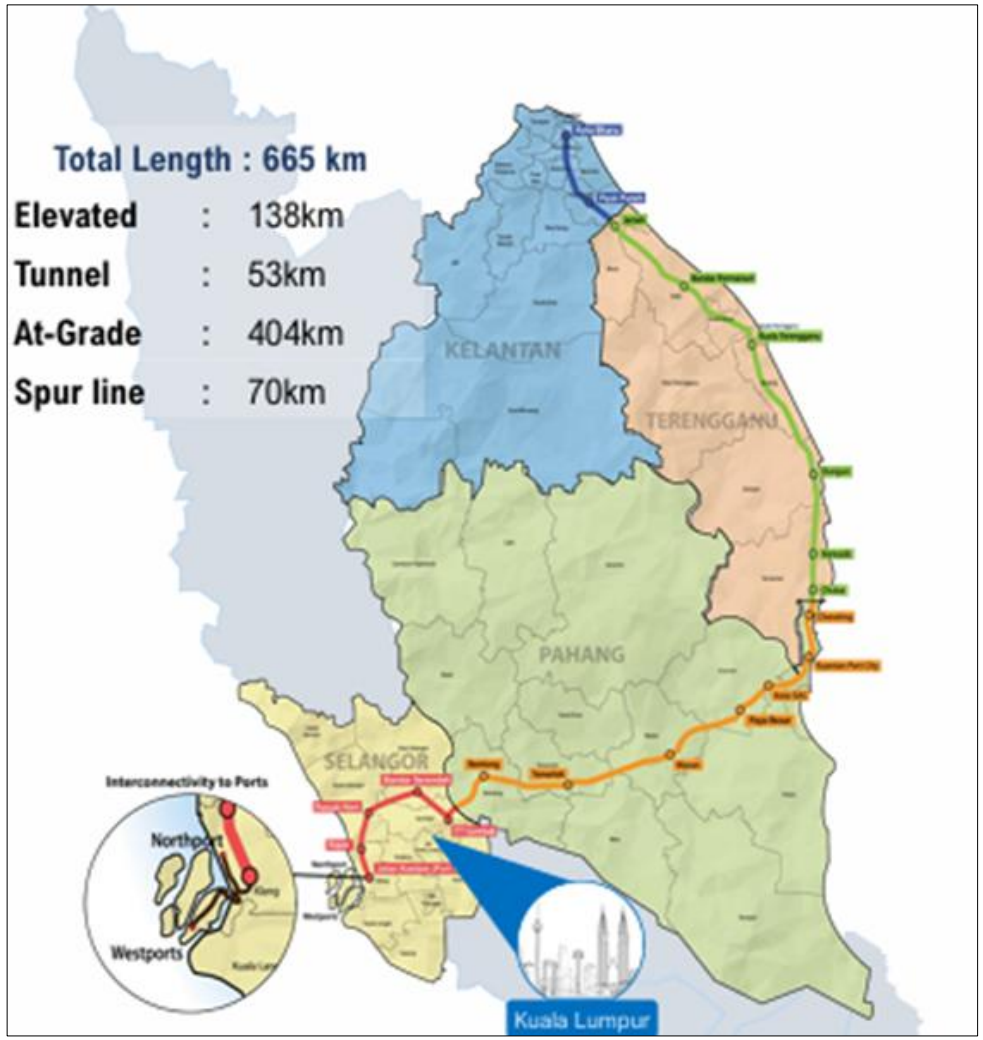
Agriculture
- Palm Oil
- Palm Biomass
- Rubber
- Fertilisers

Source: Malaysia Rail Link, PASB Analysis

The current ECRL line has a total length of 665km with 20 stations across 4 states in Peninsular Malaysia

Legend
Interchange
Cargo

Illustration of Existing ECRL



Further Details: Stations

State	# Stations	Station Name	
Kelantan	2	Kota Bharu	*Tok Bali Spurline (Future)*
		Pasir Puteh	
Terengganu	6	Jerteh	
		Bandar Permaisuri	
		Kuala Terengganu	
		Dungun	*Kerteh Spurline*
		Kemasik	*Kemaman Spurline*
		Chukai	
Pahang	7	Cherating	*KPC[1] Spurline*
		Kuantan Port City	
		Kota SAS	
		Paya Besar	
		Maran	
		Temerloh[2]	
		Bentong	
Selangor	5	Terminal Bersepadu Gombak (TBG)[3]	
		Bandar Serendah[4]	
		Puncak Alam	
		Kapar	
		Jalan Kastam (Port Klang)[5]	

Note: [1]Kuantan Port City, 2Connects to KTMB East Coast Line (Jungle Line), [3]Connects to existing LRT Line, [4]Connects to KTMB North-South Line, [5]Connects to KTMB North-South Line, Northport and Westport; Source: Malaysia Rail Link

ECRL2 will be an extension to existing ECRL1, which enhances connectivity along the Southeast Coast, which could realise synergies and unlock regional economic opportunities

Potential ECRL2 Connectivity

ECRL2 Rationale and Potential Synergies

Location	Examples of Economic Activities
Kuantan	• Logistics (e.g., Kuantan Port) • Petrochemical, manufacturing (e.g., Gebeng Industrial Area) • Tourism
Pekan	• Automotive manufacturing and assembly (i.e., Pekan Automotive Park) • Agriculture and fisheries (e.g., oil palm, livestock)
Kuala Rompin	• Manufacturing • Agriculture and aquaculture (e.g., pineapple, dairy, fisheries) • Tourism (e.g., Endau-Rompin, Tioman Island)
Mersing	• Tourism • Agriculture and fisheries
Kota Tinggi	• Tourism (e.g., Desaru, waterfalls) • Agriculture • Petrochemical
Pasir Gudang	• Logistics (e.g., PTP, JPB, TLP) • Heavy industries (e.g., petrochemicals, shipbuilding, manufacturing)

Rationale

- Addresses long-standing **geographical isolation** and reduces **reliance on road transport**
- **Improves accessibility** for local and international tourists to scenic coastal, ecotourism hotspots
- ECRL2 could provide more **cost-effective, high-capacity, and faster** logistics solutions
- ECRL2 could realise potential **synergies**, unlocking regional economic potential

Examples of Potential Synergies

- Industrial and **port linkages** (e.g., Kuantan Port and Johor ports)
- New **agriculture and agro-based** supply chains, markets
- Regional **tourism** ecosystem, cross-leveraging tourist flows
- More resilient **manufacturing** supply chains

Source: Malaysia Rail Link, PASB Analysis

Lack of Direct Connectivity Along Southwestern Coast

Problem Statement

- There is currently **no direct road connectivity** between Selangor and Johor along the **southwestern corridor**, forcing motorists to utilise the congested North-South Expressway (PLUS) to access districts in Johor
- The lack of direct connectivity along the southwestern coast can **prolong travel times** should motorists utilise existing coastal roads (i.e., non-expressways), and this also leads to inefficient logistics flow along this critical, developing economic corridor
- The **underserved coastal districts** of Muar, Batu Pahat, and Pontian may suffer from **the lack of infrastructure development efforts** required to spur economic growth and industrial development

Impact / Implication

- The WCE Southern Link will **enhance regional connectivity**, providing a direct route from Banting, Selangor to Gelang Patah, Johor, over approximately 310 km
- It will **alleviate congestion** on the North-South Expressway (PLUS), especially along the **southern stretch**
- The project will **catalyse economic development** by attracting industrial and commercial investments, facilitating job creation, and boosting local economies in west coast districts (Muar, Batu Pahat, Pontian)
- Improved connectivity will also **enhance logistics and freight efficiency** through traffic dispersal, benefiting ports and industrial zones

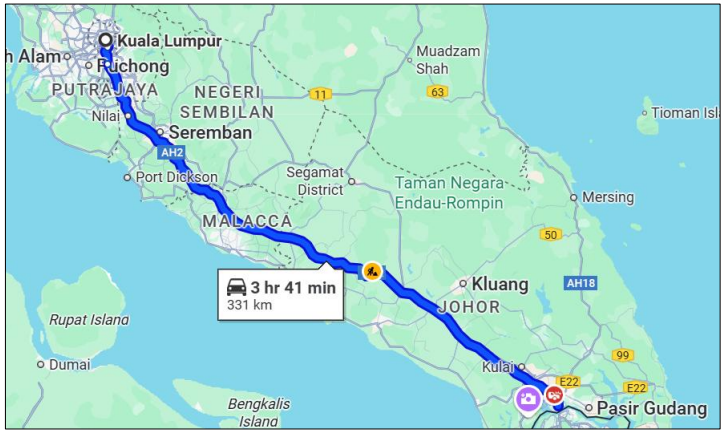
Parties Involved

- West Coast Expressway Sdn Bhd
- Kementerian Kerja Raya (KKR)
- State Government of Selangor
- State Government of Johor
- State Government of Negeri Sembilan
- State Government of Melaka
- Pejabat Tanah dan Galian (PTG)

Source: PASB Analysis

Without efficient alternative routes, motorists rely on the congested North-South Expressway to reach Johor; Moreover, leveraging existing coastal roads can impede economic synergies

Details on KL-JB Route via North-South Expressway (PLUS)



331km
Distance Between KL and JB via PLUS

3hr 41mins
Time Taken to Travel Between KL and JB via PLUS

Examples of Johor Coastal Towns and Economic Activities

Muar
- Furniture manufacturing
- Agriculture
- Fisheries

Batu Pahat
- Textiles
- Agriculture
- Timber
- Electronics

Pontian
- Agriculture
- Ecotourism
- Food processing

Key Takeaways

- According to Google, **best route** to Johor from KL is via **North-South Expressway**, which takes around **3 – 4 hours**
- During festive seasons however, high traffic flows can cause **severe congestion**, which significantly increases travel duration
- While there are alternative routes along the southwestern coast, such as, **Federal Route 5**, this could take up to **6 – 8 hours,** which is **inefficient** for both people and goods movement
- There are currently no expressways along the southwestern coast of Johor, which could **limit development in coastal towns** (e.g., Muar, Batu Pahat, Pontian), which can **impede economic synergies**

Source: Google Maps

Development of the West Coast Expressway Southern Link

No direct road connectivity between Selangor and Johor along the southwestern corridor, which requires motorists to detour via the North-South Expressway (PLUS) in order to access districts in West of Johor

Initiative Highlights:

Concept Description

WCE Southern Link is a proposed extension of the existing West Coast Expressway (WCE) connecting Banting, Selangor to Gelang Patah, Johor Bahru at a road length of 310 km

Visualisation of the initiative

Illustration of WCE (Southern Link) Route Map

- The WCE Southern Link will complete the highway network in the West Coast corridor, directly linking **Selangor, Negeri Sembilan, Melaka, and Johor Bahru**

Key Facts

- **Key status:** Consultant appointment for 7-month feasibility study in progress by procurement board as of 19th March 2025

Scope of Feasibility Study (non-exhaustive)

- Traffic Analysis
- Land-use Assessment
- Economic Evaluation
- Socio-Economic Study
- Environmental Impact Screening

Key Impacts (non-exhaustive)

Alleviate congestion on NSE, diverting inter-state traffic away and improve travel times

Enhance regional connectivity by linking major population centres and port with industrial hubs

Enhances regional connectivity and catalyses economic development (i.e. increased industrial/ commercial developments and job creation) for underserved west cost districts (i.e. Muar, Batu Pahat, Pontian) and facilitate logistics and freight efficiency all via traffic dispersal

Implementing Agency
- West Coast Expressway Sdn Bhd

Monitoring Agency
- BPEN-J

Associated Sectors :
- Cross-Cutting

Stakeholders Involved:
- Kementerian Kerja Raya
- Relevant State Governments
- Relevant Local Councils
- Pejabat Tanah dan Galian

Budget Required:

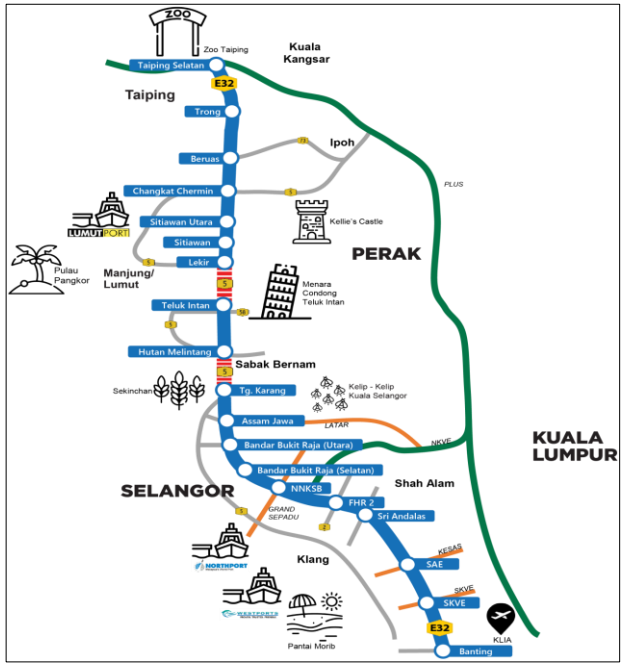
FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe[1]:
- Start Date: September 2025
- End Date: March 2031

Note: [1]Preliminary

West Coast Expressway (WCE) is designed to enhance connectivity along Malaysia's west coast, serving as a strategic alternative route to optimise traffic flow and alleviate congestion

Overview of West Coast Expressway (WCE)



- WCE aims to **reduce travel time to key coastal towns** along the west coast
- Expressway **integrates** with major highways (e.g., PLUS, SKVE, NKVE, KESAS, LATAR)
- Currently connects between **Banting and Taiping Selatan**

Proposed Extension: WCE (Southern Link)

WCE to support Johor's economic growth – Exco

25 Oct 2024

The proposed extension of the West Coast Expressway (WCE) from Banting, Selangor, to Gelang Patah, Johor, is set to drive economic growth in Johor, especially in the Free Commercial Zone (FCZ).

Johor's State Investment, Trade, Consumer Affairs, and Human Resources Committee chairman, Lee Ting Han, noted that the Johor-Singapore Special Economic Zone (JS-SEZ) and Forest City Special Financial Zone (Forest City SFZ) are among the economic initiatives that will benefit directly from the project.

"The positive impact of this project includes increased investment and trade activities in industrial and commercial areas along the WCE route.

- WCE (Southern) connects **Banting and Gelang Patah**
- The southern segment serves as a **crucial corridor for traffic dispersal from the congested Klang Valley**, offering an **alternative** route for people and goods movement along the west coast

Source: West Coast Expressway, freemalaysiatoday, MIDA

WCE Southern could be the strategic catalytic road infrastructure required to enhance Johor's competitiveness and ensure balanced regional development

Benefits of WCE (Southern) to Johor

Economic Growth Catalyst

- Expected to drive significant economic growth in the JS-SEZ and Forest City SFZ
- It will stimulate investment and trade activities in industrial and commercial zones along the route, expanding Johor's economic base

Improved Port Connectivity

- Enhanced direct access between Port of Tanjung Pelepas and Port Klang
- Enables supply chain efficiency and resilience
- Strengthens Johor's position as a regional logistics hub

Alleviating Traffic Congestion

- Vital alternative route to heavily congested North-South Expressway, especially JB-KL stretch
- Improves travel times and optimises traffic flows

Regional Development and Infrastructure Upgrades

- Improves accessibility for towns like Batu Pahat, Pontian and Gelang Patah
- Spurs local development, creating new economic opportunities in these developing areas

Tourism and Community Benefits

- Supports tourism growth via connectivity enhancement to coastal towns and rural areas
- Provides better access to local communities, facilitating balanced regional development and improving quality of life

Source: MIDA, PASB Analysis

Ease of Doing Business.

Disclaimer Notes

The enabling initiatives listed were identified through Lab Engagements under JETP, based on direct consultations with the respective stakeholders.

These initiatives represent part of the proposed enablers to support Johor's economic transformation, but do not constitute the full extent of the State's recognised or emerging enabling measures.

The initiative lists presented are non-exhaustive. Information provided, including indicative budgets, are as furnished by the respective stakeholders and are shared in strict observance of the confidentiality obligations of all parties.

PEMANDU makes no representation as to the reliability or accuracy of the information provided, which is assumed to be accurate and reliable at the point of obtainment from the respective stakeholders.

Lack Of Unified Framework To Pilot Innovative Technologies

Problem Statement

- Johor lacks a coordinated, structured framework for piloting innovative business models, technologies, or services that do not yet fit existing regulatory classifications (e.g., AI, fintech, green hydrogen, advanced mobility). Current regulatory and permitting processes are lengthy, rigid, and fragmented, involving multiple agencies without clear guidelines for exemptions or experimental use.
- This regulatory friction deters innovation-led investments, especially in emerging sectors like renewable energy, agritech, advanced manufacturing, and health tech.
- Johor is losing competitiveness to other regional and international jurisdictions (e.g., Singapore, Japan, UK) that offer regulatory sandboxes or testbed environments with temporary waivers.
- The absence of a sandbox also delays policy learning and regulatory reform, as authorities lack real-world data from controlled innovation pilots.
- Startups, multinationals, and investors are increasingly demanding clear, time-bound pathways to pilot and scale new models with regulatory flexibility.

Impact / Implication

- **Operational:** Regulators struggle to interpret legacy rules when assessing novel use cases. Lack of a sandbox mechanism slows cross-agency coordination and impedes time-sensitive market launches.
- **Strategic:** Johor risks falling behind national innovation goals (e.g., under the NETR, NIMP 2030) and losing its first-mover advantage in regional innovation ecosystems. The state's ease of doing business perception declines, particularly among digital economy investors.
- **Economic & Social:** Missed investment opportunities in high-growth sectors like AI, renewable energy, and biotech. Lost chances to create future-proof jobs, support local innovation ecosystems, and attract top talent. Reduced international visibility as a destination for innovation testbeds.

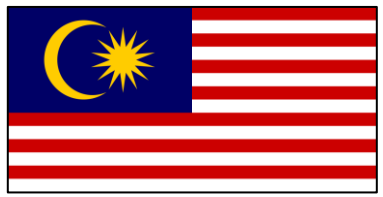
Parties Involved

- BPEN-J
- MDEC (Malaysia Digital Economy Corporation)
- MITI
- Sector Regulators (e.g., Energy Commission, Bank Negara, MCMC, Ministry of Transport, Ministry of Agriculture)
- Johor State EXCO (Innovation, Economy, Investment)
- Startups, industry players, R&D institutions

Source: PASB Analysis

Malaysia's regulatory complexity, in contrast to Singapore's efficiency, has cost Johor valuable economic opportunities

Average Time Taken For Regulatory Approval For Innovative Projects

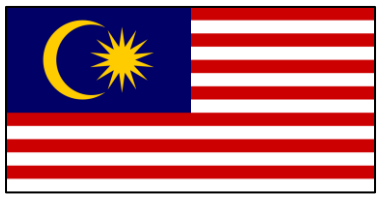


12 – 24 months

VS

3 – 6 months

Share of Total Digital Investments in ASEAN 2022



3%

VS

67%

- **Malaysia lags behind Singapore in digital investment attractiveness:** Malaysia captured only a small fraction of ASEAN's total digital investments compared to Singapore, indicating lower investor confidence or ecosystem readiness.
- **Singapore's AI and digital economy is projected to be more impactful:** By 2025, Singapore's digital economy is expected to contribute a significantly higher share to its GDP than Malaysia's, showing stronger integration and prioritisation.
- **Malaysia risks falling behind in regional competitiveness:** The wide gap in both investment inflows and economic contribution highlights the urgency for Malaysia to strengthen its digital and AI development strategies.

Source: Malaysia Digital Economy Blueprint (MyDIGITAL), 2021; Google, Temasek, Bain & Company, e-Conomy SEA 2022, World Bank Doing Business Report 2020; Singapore MAS Regulatory Sandbox; Malaysia Productivity Corporation

The MyDigital Sandbox was designed and managed at the federal level, with its main objectives and activities aligned to national digital transformation priorities, rather than those at the Johor-state level

- **Narrow Sectoral Focus:** The MyDigital Sandbox primarily targets specific sectors such as fintech, healthtech, and agritech. While these are important, they do not cover the full spectrum of industries present in various states. Sectors that are critical to Johor's economy—such as advanced manufacturing, logistics, or blue economy—may not be prioritised or supported.

- **Emphasis on Large, National Projects:** The sandbox tends to support larger, more established digital projects that can demonstrate national impact. This focus can exclude smaller, localised innovations or pilot projects that are more relevant to state-level economies.

- **Unclear Collaboration Pathways:** While the blueprint suggests that collaboration with state governments is encouraged, the mechanisms for such collaboration are not clearly defined. This leads to inconsistencies in implementation and support at the state level.

- **One-Size-Fits-All Approach:** The focus on national-level metrics and outcomes can lead to a one-size-fits-all approach, limiting the sandbox's adaptability to local conditions and specific state-level challenges.

Source: Malaysia Digital Economy Blueprint 2021; PASB Analysis

Johor Regulatory Sandbox

Johor lacks a coordinated, flexible, and transparent mechanism to pilot and test innovative business models, products, or technologies that do not fit into existing regulatory frameworks. This deters investors and innovators in sectors like renewable energy, fintech, mobility, agritech, and AI from launching projects in Johor due to lengthy, rigid, or unclear permitting processes.

Initiative Highlights:

Concept Description

Introduce a Johor Regulatory Sandbox, a structured framework allowing time-limited, controlled testing of innovative projects under temporary exemptions or modified regulatory conditions. The sandbox will serve as a live testing environment that informs long-term policy and regulatory reform across sectors.

Visualisation of the initiative

Clear Design Principles

- **Single Point of Contact:** Create a Johor Sandbox Secretariat to streamline submissions and cross-agency coordination
- **Multi-sector Eligibility:** Open to projects across digital economy, energy, AI/IoT, advanced agriculture, health tech, etc
- **Structured Demonstration Period:** 6–12 month pilot window under predefined monitoring and reporting requirements
- **Data-Driven Policy Reform:** Insights from pilots will support evidence-based updates to state policies and regulation

Process Flow

Prior consultation and drafting of proposal

↓

Submission to the Sandbox Management Unit

↓

Evaluation by sector regulators and competent authorities

↓

Conditional approval for demonstration by JRS Steering Committee

↓

Reporting, evaluation, and regulatory reform recommendation

Entry Criteria

- Proposal must be novel and face regulatory friction.
- Demonstration must be safe, time-bound, and not conflict with national law.
- Applicant must commit to transparent data sharing and results monitoring.

Potential Locations

IBTEC

Forest City

Enables Johor to become a national pioneer in regulatory innovation, unlocking investment and fast-tracking high-impact solutions across sectors. The sandbox reduces market entry barriers, and ensures Johor's regulatory environment evolves in tandem with technological progress

Implementing Agency
- IRDA

Monitoring Agency
Johor Investment and Trade Committee

Associated Sectors :
- Fintech, Agriculture, Logistics, Energy, etc

Stakeholders Involved:
- Sector Regulators (e.g. Ministry of Transport, Ministry of Agriculture, etc)
- MITI
- MDEC

Budget Required:

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: 2026
- End Date: 2030

At the JS-SEZ Joint Business and Investment Forum on 20th April 2025, Chief Minister YAB Dato' Onn Hafiz Ghazi announced the formation of a working committee with the Ministry of Investment, Trade and Industry (MITI) to develop the Johor Regulatory Sandbox

Johor Regulatory Sandbox - Definition and Purpose

- The **Johor Regulatory Sandbox** is a state-led initiative designed to provide a controlled, flexible environment where businesses can test new products, services, or business models with temporary regulatory relaxations.
- The sandbox is particularly relevant for emerging sectors such as fintech, smart logistics, green technology, and artificial intelligence, and is closely linked to the ambitions of the Johor-Singapore Special Economic Zone (JS-SEZ).

Key Objectives

- **Foster Innovation:** Enable companies to experiment with next-generation solutions without being immediately subject to the full spectrum of regulations.
- **Accelerate Investment:** Streamline and expedite regulatory approvals for high-impact projects, reducing time-to-market and admin burdens.
- **Regulatory Learning:** Allow regulators to observe real-world impacts of new technologies and models, informing future policy/regulatory adjustments.

What is the necessary operating model?

- **Controlled Testing Environment:** Companies are allowed to operate under a set of relaxed or modified regulations for a limited period and scope, under close supervision by relevant authorities.
- **Multi-Agency Coordination:** The sandbox involves collaboration between federal, state, and local agencies, including Invest Johor, the Iskandar Regional Development Authority (IRDA), and sector-specific regulators.
- **Integration with JS-SEZ:** The sandbox is a core component of the JS-SEZ's strategy to harmonise regulations with Singapore and address cross-border business challenges.

Preliminary Design Principles

- **Single Point of Contact:** Create a Johor Sandbox Secretariat within BPENJ to streamline submissions and cross-agency coordination.
- **Multi-sector Eligibility:** Open to projects across digital economy, energy, AI/IoT, advanced agriculture, health tech, etc.
- **Structured Demonstration Period:** 6–12 month pilot window under predefined monitoring and reporting requirements.
- **Data-Driven Policy Reform:** Insights from pilots will support evidence-based updates to state policies and regulation.

Source: PASB Analysis, Japan Cabinet Secretariat Website, Gemini Group

Johor can look at comparable models from across the world to extract lessons and guidance on modelling the Johor Regulatory Sandbox (1/2)

United Kingdom - Financial Conduct Authority (FCA) Regulatory Sandbox

Description

- The FCA Regulatory Sandbox, launched in 2016, is a pioneering initiative under the UK's Project Innovate. It allows businesses to test innovative financial products, services, or business models in a controlled environment with real consumers, under the oversight of the regulator. The sandbox is designed to reduce the time and cost of getting innovative ideas to market, while ensuring consumer protection and market integrity.

Example

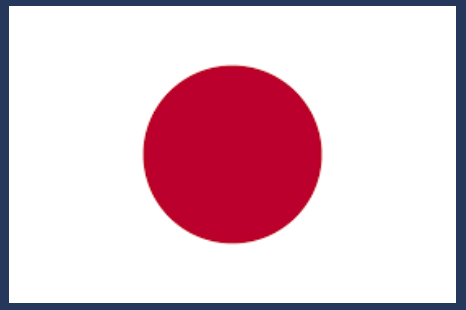
- Over 700 applications received since inception, with more than 150 firms accepted.
- 90% of firms completing testing continued to market, and many reported faster time-to-market and easier access to funding.
- Plum (AI-powered savings app) and Bud (open banking platform) both participated in the sandbox and subsequently secured significant investment and commercial partnerships.
- Onfido (digital identity verification) used the sandbox to validate its technology, leading to global expansion.

Key Features

- **Controlled Testing Environment:** Firms can test with real customers under regulatory oversight and with safeguards in place.
- **Regulatory Relief:** Tailored waivers or modifications to certain rules, where appropriate, to facilitate innovation.
- **Cohort Structure:** Regular application windows and structured support for each batch of participants.
- **Outcome-Focused:** Emphasis on consumer benefit, market integrity, and learning for both regulator and industry.
- **Transparency:** Public reporting on each cohort's results and learnings, fostering ecosystem-wide knowledge sharing.
- **Scalability:** The model has inspired similar sandboxes in over 50 jurisdictions worldwide.

Source: Financial Conduct Authority, CNBC, Global Regulation Tomorrow, ScaleUp Institute

Johor can look at comparable models from across the world to extract lessons and guidance on modelling the Johor Regulatory Sandbox (2/2)



Japan - Japan Regulatory Sandbox (JRS)

Description

- Japan's Regulatory Sandbox Scheme was launched in June 2018 as part of the government's broader "Society 5.0" and regulatory reform agenda. The sandbox is designed to promote innovation by allowing companies (both domestic and foreign) to conduct demonstration projects and experiments involving new technologies, business models, or services that may not fit within existing legal or regulatory frameworks.
- The scheme is cross-sectoral—covering not only fintech, but also mobility, healthcare, energy, IoT, AI, and more. It is administered by the Cabinet Secretariat, with coordination from relevant ministries and agencies. The sandbox provides a safe environment for time-limited, real-world testing, with regulatory exemptions or flexibility on a case-by-case basis.

Example

- As of 2023, over 30 projects approved/tested under the sandbox, spanning fintech, mobility, healthcare, energy, etc.
- **Mobility and Autonomous Vehicles:** SoftBank and SB Drive conducted public road tests of autonomous buses in Gunma Prefecture under the sandbox, with regulatory waivers for road traffic laws.
- **Healthcare Data Sharing:** A consortium led by MICIN Inc. piloted a cross-institutional medical data sharing platform, testing privacy and data protection protocols under sandbox conditions.
- **Energy and IOT:** ENEOS and partners tested blockchain-based peer-to-peer electricity trading, using the sandbox to temporarily relax rules on electricity retailing and settlement.

Key Features

- **Cross-Sectoral Scope:** Open to all industries, not limited to finance or a single sector.
- **Centralised Administration:** Managed by the Cabinet Secretariat, with a "one-stop" application process and coordination with relevant ministries.
- **Regulatory Flexibility:** Temporary exemptions or waivers from existing laws/regulations are granted for the duration of the experiment.

Source: Japan Cabinet Secretariat, World Bank

For Johor, a multi-tiered governance structure is recommended, and should be designed to ensure strategic oversight, operational efficiency, sectoral expertise, and stakeholder engagement

Johor Regulatory Sandbox - Governance Structure and Terms of Reference

Level	Composition / Parties Involved	Terms of Reference (Preliminary)	Key Roles
1 **JRS Steering Committee**	• Johor State Government (Chief Minister's Office, EXCO Investment, BPEN-J, IRDA, IMFC-J, etc) • Federal reps (MITI, MIDA, BNM) • Singaporean observer (for JS-SEZ alignment) • Senior legal & regulatory advisors	• Set strategic direction and policy for the sandbox • Approve sectoral focus and eligibility criteria • Approve major admissions & exits • Ensure alignment with JS-SEZ and national innovation goals	• Strategic oversight • Policy approval • Inter-agency coordination • Crisis management
2 **Sandbox Management Unit (SMU)**	• IRDA • Representatives from key state agencies (e.g. Land, Local Government, Digital Economy) • Secretariat staff • BPEN-J	• Day-to-day admin of the sandbox • Manage application process and initial screening • Coordinate with sectoral boards and technical groups • Monitor ongoing tests and ensure reporting	• Ops management • Application processing • Monitoring & reporting
3 **Sectoral Advisory Boards**	• Industry experts (e.g., agri-biotech, RE, AI, logistics) • Academia (IHLs, research institutes) • Relevant regulators (e.g., EC, JPNJ) • Private sector reps • BPEN-J, IRDA, SMU	• Advise on sector-specific eligibility and test design • Evaluate technical & market feasibility • Recommend sectoral best practices and safeguards • Advise on exit/transition protocols	• Technical evaluation • Sectoral guidance • Risk assessment
4 **Technical Working Groups**	• Regulatory specialists • IT/data security experts • Legal advisors • Private sector reps • BPEN-J, IRDA, SMU	• Design and review test protocols • Assess data governance, cybersecurity, and legal compliance • Advise on technical standards and interoperability • Conduct post-test evaluation	• Protocol design • Compliance review • Post-test analysis
5 **External Stakeholder Panel**	• Industry associations • Investor groups • Consumer advocates • Civil society • SG business reps (for cross-border issues)	• Provide feedback on sandbox operations and transparency • Advise on public communication and stakeholder engagement • Highlight emerging risks or opportunities	• Stakeholder engagement • Transparency • Public trust

Source: PASB Analysis

At each stage of the governance structure, clearly defined roles and responsibilities is necessary to ensure the success of the Johor Regulatory Sandbox

Johor Regulatory Sandbox - Roles and Responsibilities	
1 **JRS Steering Committee**	• **Strategic Leadership:** Sets the overall vision, approves major policy changes, and ensures the sandbox aligns with Johor's and Malaysia's economic and innovation strategies. • **Regulatory Coordination:** Ensures harmonisation with federal and (where relevant) Singaporean regulations, especially for cross-border pilots. • **Risk Oversight:** Reviews risk management frameworks and crisis response plans. • **Final Approvals:** Makes decisions on high-impact admissions, extensions, or terminations of sandbox projects.
2 **Sandbox Management Unit (SMU)**	• **Operational Hub:** Acts as the single point of contact for applicants and participants. • **Process Management:** Handles application intake, initial eligibility screening, and coordination with sectoral boards. • **Monitoring & Reporting:** Tracks progress of sandbox projects, ensures compliance with agreed protocols, and compiles regular performance and risk reports for the Steering Committee. • **Liaison:** Facilitates communication between participants, regulators, and advisory boards.
3 **Sectoral Advisory Boards**	• **Expert Evaluation:** Provide deep technical and market expertise for sector-specific applications (e.g., agri-biotech, RE, AI, logistics). • **Test Design:** Advise on the design of controlled testing environments, KPIs, and consumer safeguards. • **Exit/Transition:** Recommend criteria and protocols for successful graduation or early termination of sandbox projects.
4 **Technical Working Groups**	• **Protocol Development:** Draft and review technical, legal, and data governance protocols for each sandbox project. • **Compliance Checks:** Ensure all tests meet minimum standards for safety, data protection, and consumer rights. • **Post-Test Review:** Conduct evaluations and lessons-learned sessions after each sandbox project.
5 **External Stakeholder Panel**	• **Feedback Loop:** Collects and channels feedback from industry, investors, and the public. • **Transparency:** Advises on public communication, reporting, and stakeholder engagement strategies. • **Emerging Issues:** Flags new risks, opportunities, or public concerns to the SMU and Steering Committee.

Source: PASB Analysis

Absence of Standardised Benchmarks to Assess and Upgrade Industrial Parks and Associated Professionals: Issue Charter

Problem Statement

- Johor lacks a standardised framework to assess and benchmark the quality and readiness of its industrial parks across key criteria such as infrastructure, sustainability, and livability.
- Inconsistent park development and unclear quality signals make it difficult for the state to attract targeted, high-value investments aligned with Johor's economic priorities (e.g., semiconductors, green economy).
- Investors often lack transparent, location-based data when selecting industrial sites, limiting Johor's ability to compete with other states and regional hubs.
- Without structured benchmarks, underperforming parks are not held accountable, while high-performing ones receive limited visibility or incentive to upgrade further.
- Project execution delays and subpar infrastructure outcomes are often caused by underperforming consultants or architects, yet there is no current rating mechanism to track their performance or incentivise quality delivery.

Impact / Implication

- Poor management and operational standards across industrial parks resulting in loss of investments, investor dissatisfaction, manufacturing and services interruptions
- Johor risk falling behind in upholding ESG standards across its industrial parks which are critical for high value sectors
- Frequent delays and substandard outcomes in industrial park development are attributed to insufficient regulatory oversight and lack of clear accountability mechanisms

Parties Involved

- BPENJ
- Invest Johor
- IMFC-J
- MITI
- MIDA
- SIRIM, Local Authorities (e.g., PBTs)
- Park Developers
- Federation of Malaysian Manufacturers (FMM)
- Digital platform providers (MYSite Portal)
- ESG advisors

Source: PASB Analysis

As a general matter, when deliberating on site selection, investors prioritise industrial parks with strong ESG standards, logistics access, smart infrastructure, and streamlined regulations that enable fast, sustainable, and low-risk operational setup

Key Factors Investors Consider in Industrial Park Site Selection

ESG Compliance and Sustainability Standards

- Investors seek locations aligned with international ESG benchmarks (carbon reduction, circularity, social compliance).
- Green-certified parks with renewable energy access and clear emissions strategies are preferred.

Supply Chain Resilience and Connectivity

- Proximity to seaports, airports, rail, and highways is vital.
- Parks that offer multimodal logistics options and reduce dependency on a single supplier route are prioritised.

Infrastructure Readiness and Utilities Reliability

- Ready-to-use plots, stable electricity (including renewable options), water access, internet connectivity, and waste treatment are baseline expectations.

Ease of Entry and Investment Incentives

- Investors evaluate the availability of tax holidays, investment allowances, import/export facilitation, and one-stop centers for approvals.
- Industrial parks within Special Economic Zones (SEZs) or Free Zones are highly favored.

Digital and Smart Infrastructure

- Integration of IoT, digital permitting systems, energy monitoring, and industrial automation enablers is a growing differentiator.
- Smart park management systems improve efficiency and compliance reporting.

Quality of Life and Worker Welfare

- For higher-tier operations (e.g. HQs, tech), factors like housing, healthcare access, public transport, and safety for workers matter.
- Some MNCs require third-party audits of worker living standards.

Source: "New study reveals how ESG is a growing factor in global trade & supply chain resilience" – Thomson Reuters (9th December 2024); "ESG Strategies and Sustainable Performance in Multinational Enterprises" – Chen, Li, Chuang (2025); American Bar Association; "The case for world-class industrial parks in Malaysia" – MIDA (24th September 2024)

Research indicates that Johor's industrial parks suffer from inconsistent assessment systems, limiting benchmarking, environmental monitoring, and policy alignment needed to improve built environment efficiency and sustainability

Identified Challenges in Johor Industrial Parks	
1 Fragmented and inconsistent assessment practices	• Industrial parks employ radar-chart assessments and built-environment evaluation systems, but these tools are not standardised across all parks and often lack consistent application.
2 Environmental Impact Assessments (EIAs) are project-specific, not benchmarking tools	• EIAs are conducted only to gauge individual project impacts and prescribe mitigation measures, rather than serving as comparative or performance benchmarking across multiple parks.
3 Lack of unified indicator application	• Assessment indicators for quality, social, environmental and economic aspects vary due to data availability and selective adaptation during tool customisation.
4 Limited benchmarking capacity due to inconsistent application of tools	• Tools are not uniformly applied, parks cannot be compared or ranked, undermining the ability to assess overall built environment efficiency.
5 Environmental load (such as carbon and pollution) measurement gaps	• Missing data on key variables (e.g. detailed decarbonisation strategies), resulting in environmental impact measurements being weak or inconsistent across zones

There is a clear need for a robust accountability mechanism, such as through a STAR Rating System, to addresses Johor's current gaps in assessment, accountability, and ESG benchmarking–enabling park competitiveness, investor confidence, and sustained performance improvement

Source: "Application of Comprehensive Assessment System for Built Environment Efficiency (CASBEE) at City Level in Johor Bahru" – Hakim, Hoh, Chau, Chin (2019); PASB Analysis

Johor Industrial Park STAR Ratings

Johor faces increasing pressure to differentiate its industrial parks and rising investor expectations for quality infrastructure, ESG compliance, and supply chain resilience. A lack of transparent benchmarking makes it difficult to signal high-quality sites and incentivise upgrades among underperforming parks and service providers.

Initiative Highlights:

Concept Description

Introduce a Johor Industrial Park STAR Rating System, adapted from MITI's national framework, to evaluate and rank the quality, competitiveness, and livability of industrial parks in Johor across four dimensions: Planning and Management, Infrastructure and Business Competitiveness, Environmental Sustainability, Social Responsibility

Visualisation of the initiative

Design Pillars

- Clear metrics aligned to national STAR Rating Framework (SIRIM–MITI)
- Focus on Industry 4.0 and ESG readiness
- Include independent performance ratings of infrastructure consultants and architects based on past park projects
- Third-party assessments (e.g., SIRIM) in partnership with state agencies
- Scorecards for both parks and key professional service providers
- Annual re-assessment and performance publication

Process Flow

Pre-screening by Invest Johor

↓

Site assessments conducted by MIDA + SIRIM with local councils

↓

Provisional scores reviewed in state technical working committee

↓

Final star rating awarded and published on MYSite-Johor Portal

Entry Criteria

- **Park Type:** Must be recognised as a gazetted or actively managed industrial park by PBT or state.
- **Baseline Submissions:** Masterplan, infrastructure, utility, ESG data
- **Consultant/Architect Requirement:** Firms involved must submit execution records and agree to independent performance audit

The STAR Ratings will establish Johor as a model state for transparent, high-quality industrial park development. It will drive targeted upgrades to underperforming parks and equip investors with reliable benchmarks and visibility

Implementing Agency
- MIDA

Monitoring Agency
- SIRIM

Associated Sectors :
- Logistics, Energy, Manufacturing, E&E, etc

Stakeholders Involved:
- MIDA, MITI, SIRIM
- Local Authorities (e.g. Majlis Bandaraya, PBTs)
- Park developers & operators
- Federation of Malaysian Manufacturers (FMM)

Budget Required:

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: Q1 2026
- End Date: Q4 2027

Source: PASB Analysis

The Industrial Park STAR Rating System in Malaysia is a strategic initiative spearheaded by the Ministry of Investment, Trade and Industry (MITI), in collaboration with the Malaysian Investment Development Authority (MIDA) and SIRIM

Industrial Park STAR Rating System

Key Policy Drivers

- **Resilient Supply Chains:** The system is part of Malaysia's ambition to build resilient supply chains, especially in strategic sectors like semiconductors.
- **Investment Attraction:** By providing transparent, standardised assessments, the system aims to help investors make informed decisions and encourage high-value investments.
- **National Digitalisation:** The ratings are integrated into the MYSite Selection Portal, a digital platform that combines geospatial analytics with industrial data for site selection

Structure and Evaluation Method

Parameter	Description
Planning and Management	Assesses organisational, legal, and administrative aspects, including park governance, maintenance, and legal status.
Infrastructure & Business Competitiveness	Evaluates the quality and availability of physical infrastructure (roads, utilities, digital connectivity), as well as facilities that support business operations and competitiveness.
Environmental Sustainability	Measures adherence to sustainable practices, such as energy efficiency, waste management, and green certifications.
Social Responsibility	Assesses contributions to local communities, worker welfare, and engagement with stakeholders.

Evaluation Process

- Parks are assessed through a combination of self-reporting, on-site inspections, and third-party audits (SIRIM).
- Data is collected on infrastructure, management practices, ESG initiatives, and community engagement.
- The results are compiled into a comprehensive scorecard for each park.

Key Features

- **Transparency:** Ratings and detailed assessments are made **publicly available**. The ratings are published on the MYSite Selection Portal, providing real-time, transparent information to investors and stakeholders.
- **Annual Reassessment:** Parks are **re-evaluated annually** to ensure standards are maintained and to encourage continuous improvement.
- **Performance Publication: Results are published** to incentivise parks to improve and to inform investor decisions. Each parameter is scored based on a set of detailed criteria and weightages. The cumulative score determines the park's star rating, typically on a **1- to 5-star scale**.

Source: PASB Analysis

Strong accountability in industrial parks via performance benchmarking, transparent reporting, stakeholder oversight, aligned incentives, and peer learning are crucial to industrial parks are driven to continuously improve to meet investor needs

The Need For Robust Accountability Mechanisms For Industrial Parks

1 Technical assistance and peer-learning networks	• Research indicates that parks with access to knowledge exchange (e.g., UNIDO's EIP assessments) see better uptake of eco-industrial practices through accountability frameworks reinforced by external support.
2 Transparent monitoring and reporting	• Regular data collection and transparent disclosure on environmental, energy, social, and economic indicators support accountability and allow comparisons between parks.
3 Benchmark-driven regulation	• Consistent benchmarking (e.g. CASBEE, EIP Framework) with clear, measurable sustainability targets enables performance tracking and motivates continuous operational improvement.
4 Alignment with International Trade & Investment Standards	• Parks with credible accountability frameworks are better positioned to attract global investors and tenants seeking compliance with frameworks like EU CBAM, OECD Guidelines, or GRI standards.
5 Foundation for Tiered Rating and Recognition Systems	• Accountability data allows for the creation of STAR ratings, performance tiers, or league tables, encouraging competition and motivating underperforming parks to improve over time.

In summary, a robust accountability mechanism is necessary to ensure that industrial parks continuously strive towards improvement and meeting the needs of investors that are seeking industrial parks with strong ESG standards, logistics access, skilled talent, smart infrastructure, and streamlined regulations that enable fast, sustainable, and low-risk operational setup

Source: "Application of Comprehensive Assessment System for Built Environment Efficiency (CASBEE) at City Level in Johor Bahru" – Hakim, Hoh, Chau, Chin (2019); "Benchmarking of energy and utility infrastructures in industrial parks" – Festel, Wurmseher (2014); "Eco-Industrial Advancement Guide – European Union, EU4Environment; OECD

Johor can emulate comparable models from across the world to extract lessons and guidance on modelling the Johor Industrial Park STAR Ratings (1/2)

India - Industrial Park Rating System (IPRS)

Description

- The Industrial Park Rating System (IPRS) was introduced by India's Department for Promotion of Industry and Internal Trade (DPIIT) to establish a standardized, performance-based evaluation of industrial parks and special economic zones (SEZs) across India.
- The IPRS assesses parks on over 100 parameters grouped under four major pillars: Internal Infrastructure, External Connectivity, Business Support Services, and Environmental & Safety Standards. The initiative is part of a broader agenda to improve the ease of doing business, support India's Make in India programme, and attract both domestic and foreign investments in manufacturing.

Example

- In its initial implementation (2018–2020), the IPRS evaluated over 449 industrial parks across India. The process included independent field assessments, state government engagement, and validation with park operators.
- The results revealed significant gaps in internal road conditions, plug-and-play factory availability, waste management, and environmental infrastructure in several parks. However, states like Gujarat and Tamil Nadu emerged as top performers, with high-rated parks offering robust logistics, CETPs, power reliability, and access to skilled labor.
- Following the release of the ratings, approximately 60% of parks initiated targeted infrastructure improvements to address identified weaknesses. Several parks moved up the rating tiers in subsequent assessments.

Key Features

- **Internal Infrastructure:** Evaluates roads, power and water supply, sewage systems, telecom access, and solid waste management.
- **External Infrastructure**: Assesses proximity to highways, ports, rail lines, and airports for trade and logistics.
- **Business Support Services:** Includes availability of logistics providers, testing labs, single-window clearances, CETPs, and plug-and-play facilities.

Source: Asian Development Bank, Invest India

Johor can emulate comparable models from across the world to extract lessons and guidance on modelling the Johor Industrial Park STAR Ratings (2/2)

China – Eco-Industrial Park (EIP) Standards

Description

- The Eco-Industrial Park (EIP) Standards framework provides a structured approach for evaluating and certifying industrial parks that meet stringent sustainability, circular economy, and low-carbon development criteria. The standards assess performance across resource efficiency, energy and water management, emissions control, waste recycling, and industrial symbiosis.
- It supports China's broader goals under its Five-Year Plans, carbon peaking and neutrality pledges, and Made in China 2025 strategy, positioning EIPs as showcases of sustainable industrialization. Parks that meet the standards receive national EIP designation and preferential policy support, financing access, and recognition.

Example

- As of 2023, China had certified over 50 national-level EIPs and hundreds of provincial-level eco-industrial parks.
- One notable case is the Tianjin Economic-Technological Development Area (TEDA), which achieved EIP status through extensive resource sharing among co-located firms, including steam recovery, chemical feedstock reuse, shared water treatment, and waste-to-energy systems. These measures contributed to a 20% reduction in carbon intensity and improved industrial competitiveness.
- Another leading example is Suzhou Industrial Park, which implemented advanced waste recycling systems, circular material flows across tenants, and digitized environmental monitoring to meet national EIP indicators.

Key Features

- **Circular Economy Integration:** Promotes energy cascading, by-product reuse, and shared utility systems.
- **Performance-Based Evaluation:** Uses KPIs for energy consumption per unit of output, waste recycling rates, carbon emissions, and pollution control.
- **Digital Environmental Monitoring:** Encourages deployment of real-time monitoring platforms for water, air, and waste metrics to ensure compliance and transparency.

Source: Review of the development of China's Eco-industrial Park standard system – Huang (2019), World Bank

The following represents an illustration of a potentially formulation of the Johor Industrial Park STAR Ratings Scorecard and the potential evaluation methodology for Johor

Johor Industrial Park STAR Ratings Scorecard (Illustrative)		
Category	**Metrics (Sample)**	**Weight (%)**
Planning & Management	Legal status, governance, maintenance, tenant satisfaction	**20**
Infrastructure & Competitiveness	Road quality, utilities, digital connectivity, logistics access	**25**
Environmental Sustainability	Renewable energy, waste management, green certifications	**20**
Social Responsibility	Worker welfare, community engagement, safety, inclusivity	**15**
Industry 4.0 Readiness	IoT infrastructure, automation, data analytics, smart utilities	**10**
ESG Readiness	ESG policy, reporting, compliance, third-party ESG audits	**10**

Potential Evaluation Methodology for Johor	
Data Collection	• Parks submit detailed documentation on infrastructure, management, ESG initiatives, and digital readiness. • Service providers (consultants, architects) submit portfolios and references from past projects.
On-Site & Digital Audits	• SIRIM and state agencies conduct on-site inspections and digital infrastructure audits. • ESG and Industry 4.0 readiness are assessed using standardised checklists (e.g., presence of smart meters, renewable energy, digital twin systems).
Scoring & Weightage	• Each parameter is scored with clear weightages (e.g., 30% infrastructure, 25% ESG, 20% management, 15% social, 10% digital/Industry 4.0). • Service providers are rated on delivery, innovation, and compliance history.
Third-Party Verification	• All results are verified by SIRIM and, where relevant, international partners for credibility.
Publication & Feedback	• Results are published on a Johor Industrial Park Portal, with downloadable scorecards and annual performance trends. • Parks and service providers receive feedback and recommendations for improvement.

Source: PASB Analysis

Outdated Land Classification Frameworks Constrain Sectoral Investment and Land Use Optimisation in Johor

Problem Statement

- Johor's existing land classification and permitting system is rooted in legacy regulations that do not align with evolving industry models in sectors such as renewable energy (e.g., agrosolar), logistics, and technology-based industrial developments.
- There is no unified, cross-sectoral framework for managing dual-use, hybrid, or emerging land applications (e.g., solar on agricultural land, digital parks within residential-industrial peripheries, or logistics hubs in mixed-use zones).
- Case-by-case approvals dominate current practice, leading to unpredictable processing times, conflicting interpretations, and inconsistent criteria applied by Pejabat Tanah & Galian (PTG) across districts.
- Sector-specific constraints have intensified in recent years due to surging investor interest in energy transition (e.g., agrosolar post-2021), supply chain localisation (e.g., integrated logistics parks), and industrial transformation (e.g., green data centers).
- The lack of updated land use guidelines undermines Johor's strategic ambitions under frameworks like the Johor-Singapore SEZ, NETR, and NIMP2030, which require land use flexibility and zoning clarity.
- Other states, such as Selangor and Kedah, have started piloting special permit models or flexible zoning mechanisms to accommodate new sectoral needs.

Impact / Implication

- **Operational**: Land-dependent projects across multiple sectors (e.g., agrosolar, logistics, digital infrastructure) experience costly delays due to permit ambiguity and lack of codified land use pathways. Developers face legal uncertainty, site selection bottlenecks, and renewal risks (e.g., SPs in agrosolar reviewed yearly with no long-term land security).
- **Strategic**: Johor risks being bypassed for high-value private sector investments that depend on land-use flexibility, particularly in green infrastructure, logistics, and next-gen industrial models.
- **Economic & Social**: Opportunity losses in job creation, rural income diversification, and land productivity (e.g., agrosolar) due to underutilised land and stalled private capital flows.

Parties Involved

- Pejabat Tanah & Galian Johor (PTG Johor)
- BPENJ
- Department of Agriculture (JPNJ)
- Johor EXCO Energy and Agriculture
- Johor EXCOs for Investment, Energy, Agriculture, and Infrastructure
- PLANMalaysia@Johor
- Local Authorities and Industrial Park Developers
- MOT

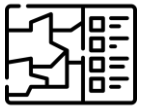
Source: PASB Analysis

In Malaysia, the overarching legal framework for land matters are governed by the National Land Code, however, the exercise of powers related to land are state-controlled, with states empowered to govern zoning, conversions, and issue special permits

Key Details of the Malaysian National Land Code

Land Is a State Matter under the Federal Constitution

- Land matters, including land tenure, land use, zoning, and disposal, fall under state jurisdiction.
- Each State Authority controls land within its borders, including decisions on conversion, classification, and development.
- The Federal Government cannot directly legislate on land use unless it intersects with federal matters (e.g. infrastructure, defense, etc.).



Land Use and Zoning Are Governed by State Authorities

- Under the NLC, land is categorised by category of land use i.e. agriculture, building, industry.
- Landowners must apply for conversion (Section 124 NLC) if they want to change the land use (e.g. from agricultural to industrial).
- Local Authorities and State Planning Committees handle development planning and zoning, often based on the Town and Country Planning Act 1976 (Act 172), which supports spatial planning.

Federal Role Is Limited to Coordination and Guidance

- The Federal Department of Town and Country Planning (PLANMalaysia) plays an advisory role.
- However, implementation and enforcement remain with the states, including, local plans, zoning approvals, development control
- Any change in land use or subdivision requires: State Authority consent; Payment of conversion premium; Fulfilment of imposed conditions (e.g. time for development, infrastructure provision)

The Power Of States To Issue "Special Permits"

- The National Land Code (NLC) 1965 does not explicitly use the term "special permit" for land use.
- However, it grants wide discretionary powers to the State Authority to regulate and allow for non-conforming or temporary uses of land, including the issuance of permits or approvals outside the ordinary category of use, under certain provisions.
- It is under this framework, within the bounds of Section 124, that states issue Special Permits

Source: National Land Code (NLC); PASB Analysis

Zooming into Johor, solar farm developments face legal ambiguity, inconsistent approvals, and land-use conflicts, highlighting the need for standardised, transparent, and harmonised land administration policies

Key Insights - Challenges and Practises in the Land Administration of Solar Farming Development in Johor, Malaysia

Challenges and Practises in the Land Administration of Solar Farming Development in Johor, Malaysia

Azmi ROHANI, Mohd Shahrizan SAHID, Suhailizan SULIMAN, Amirul Haffiz ARIFF and Muhammad Ammar Akmal SENAN, Malaysia

Key words: solar farming, land development approval, land use management, sustainable development goals (SDGs)

SUMMARY

Approaching the year 2030, Malaysia government is committed in promoting energy efficiency and renewable energy to achieve the Sustainable Development Goal, Goal 7: Affordable and Clean Energy. Globalisation and population growth have caused the natural resources to deplete faster than the earth regeneration capacity. Therefore, in order to ensure a sustainable development, renewable energy resources appear as one of the most effective long-term potential solutions. As a result of the development in technology intelligence (TI), the Johor State Government has encouraged the public and private sectors to commercialize the solar farming. This is made viable through the supports received from legal provision and facilitated by procedural implementation. At present, there is no standardized legal framework for solar farming development in Malaysia. This article describes the legal practices, challenges, and approaches for solar farming development in Johor. The findings will serve as a foundation to standardize the solar farming development approval in Johor in accordance to sustainable land use management.

Challenges and Practises in the Land Administration of Solar Farming Development in Johor, Malaysia (10331)
Azmi Rohani, Mohd Shahrizan Sahid, Suhailizan Suliman, Amirul Haffiz Ariff and Muhammad Ammar Akmal Senan (Malaysia)

FIG Working Week 2020
Smart surveyors for land and water management
Amsterdam, the Netherlands, 10–14 May 2020

1	**Absence of Standardised Legal Framework**	• Johor lacks uniform guidelines on solar farm development approvals, leading to inconsistent practices across the state
2	**Reliance on Special Permits**	• In the absence of conversion approvals, authorities commonly issue Special Permits (e.g. Form 19C under Johor Land Rules) to enable solar use on agricultural land
3	**Inconsistencies Among States**	• States vary: Kedah allows solar farms via 25-year temporary permits; Selangor sometimes alters express conditions; Negeri Sembilan/Melaka permit without changing land status
4	**Financial and Procedural Uncertainty**	• Special permit fees (e.g. RM 80/100 m² annually with annual renewal) and manual memorial processes create uncertainty and administrative burden
5	**Competing Agri-Solar Land Use Pressures**	• Ground-mounted PV farms compete with agriculture, creating ecological and occupancy conflicts unless integrated with practices like agrivoltaics
6	**Need for Harmonised State Guidelines Among States**	• Johor Circulars (e.g. Circular No. 1/2003 + PTG 3/2006) reflect early regulatory codification; but there is still a push to develop standardised approval frameworks aligning land policy and planning controls

Source: "Achieving a System of Competitive Cities in Malaysia" – World Bank; "Challenges and Practises in the Land Administration of Solar Farming Development in Johor, Malaysia" – Rohani, Sahid, Suliman, Ariff, Senan (2020)

Johor's Circular No. 3/2006 specifically restricts mixed development by disallowing dual-use land, forcing costly conversions and causing delays due to unclear, outdated land classification rules

Current Special Permit Regime For Agrosolar

In Johor, the Land Administrator has issued a special circular i.e. Circular No. 3/2006, to permit the issuance of Special Permit which is read together with the Circular No. 1/2003 of Department of General Director of Lands and Mines (JKPTG), Special Permit Issuance of Temporary Agricultural Land for the Mean Other Than Agriculture and Its Practice in Johor

Circular No. 3/2006

- This circular is the basis for states to formulate a special permit issuance policy to be implemented at their respective state level.

No.	Matter	Land/ Building	Form of Approval
1	Tower/ matter management telecommunication transmitter	Government Land	Temporary Occupancy License
		Land (Agriculture / Unconditional)	Temporary Special Permit
		On Building	Permit Under Uniform Building By-Laws 1984
2	Management of matters relating to the use of agricultural land for non-agricultural purposes	Land (Agricultural)	Temporary Special Permit

Key Insight

- **Restrictive Interpretation of Land Use Categories**: Rigid separation between agriculture and non-agricultural activity makes it impossible to legally conduct agrosolar projects—which by nature integrate both.
- **No Provision for Dual-Use or Mixed-Use Models:** The circular does not provide a mechanism for permitting dual-use land, such as planting crops underneath or between solar panels (i.e. agrivoltaics). As a result, landowners must apply for full conversion to "building" or "industrial" category, triggering high premiums and more stringent planning approvals.
- **Administrative Uncertainty and Delays**: Since agrosolar projects do not fit neatly into "agriculture" or "industry", applicants often face delays, inconsistent treatment between districts, or rejection due to the circular's lack of clarity on permissible hybrid uses.

Source: "Achieving a System of Competitive Cities in Malaysia" – World Bank; "Challenges and Practises in the Land Administration of Solar Farming Development in Johor, Malaysia" – Rohani, Sahid, Suliman, Ariff, Senan (2020)

Kemayan City reveals how Johor's fragmented permitting processes and unclear land classification can paralyse development, deter investment and leave strategic projects abandoned for decades

Case Study – Kemayan City, Johor Bahru

Initiated in 1993, Kemayan City was planned as Johor Bahru's largest integrated commercial development—a 4.8-hectare brownfield site at Tampoi, about 12 km from the city center. It was intended to offer 64,800 m² of retail space, hotel, office blocks, and mixed-use facilities, at an estimated cost of RM 400 million.

Project Abandonment & Classification

- Construction stalled in 1997–1998, largely due to the Asian Financial Crisis, and the project was fully abandoned by 1998.
- The buildings, not in use for over 10 years, became categorised as Category D "incomplete and abandoned more than 10 years" brownfield sites by the Town & Country Planning Department. As of the early 2010s, the site remained derelict and structurally decaying.

Administrative & Permit Issues

- Despite acquisition by new developer (Blackstone Group Eight Sdn Bhd) in 2010, no redevelopment took place.
- Lack of a clear, standardised pathway for rezoning or formal land-use conversion created regulatory paralysis.
- Authorities attempted internal renovations under planning permission, changing express conditions, however, major redevelopment remained stalled.

Governance & Policy Implications

- Researchers linking Kemayan City's failure attribute it to governance fragmentation.
- The absence of a clear, harmonised rezoning or permitting mechanism across districts hindered revitalisation of brownfield sites.
- This case serves as a cautionary example of how permitting ambiguity, permit renewal uncertainty, and lack of coordinated state-level guidelines can paralyse major urban projects.

Source: "Challenges and Practises in the Land Administration of Solar Farming Development in Johor, Malaysia" – Rohani, Sahid, Suliman, Ariff, Senan (2020); "Unlocking Johor's Industrial Potential: A Strategic Outlook on the Johor-Singapore Special Economic Zone (JS-SEZ)" – AREA Market Intelligence (24th March 2025)

Introduction of Special Land Use Permit Classifications Reform

Johor's land classification system has not kept pace with evolving investment models across sectors such as renewable energy, logistics, and digital infrastructure. Rigid land use categories limit co-use opportunities, deter strategic investments, and result in delayed or inconsistent permitting.

Initiative Highlights:

Concept Description

Introduce a cross-sectoral land classification reform initiative to modernise Johor's Special Permit system. The initiative will establish new sub-categories and permitting pathways for emerging land uses, such as agrosolar, integrated logistics hubs & smart-industrial estates

Visualisation of the initiative

Multi-Sector Zoning Categories

- Introduce new land subcategories for hybrid or emerging land uses:
- "Renewable Agriculture" (e.g., agrosolar, floating solar aquaculture).
- Sustainable Commerce Hubs that integrate low-impact commercial activity with renewable infrastructure, light warehousing, or shared-use facilities
- "Smart Industrial Zones" (e.g., data centers with co-located warehousing or residential buffers).

Modernised Special Permit Framework

- Standardise application criteria, documentation, and timelines across all land use offices (PTG) in Johor.
- Define baseline development guidelines and economic justifications required for dual- or multi-use permits.
- Establish clear thresholds for co-activity (e.g., % of land that must retain primary activity such as agriculture or logistics).

Sector-Specific Operational Guidance

- **For Agrosolar:** Panel height, crop compatibility, shading thresholds, and safety buffers.
- **For Logistics:** Allowance for staging zones, warehousing density, and vehicle access in mixed commercial areas.
- **For Industry 4.0 Zones:** Requirements for broadband infra, utilities, buffer zones, and ESG compliance features.

Empowers Johor to align land use policy with economic transformation ambitions, enabling efficient land utilisation, faster project permitting, and attraction of strategic investment into clean energy, logistics, and next-gen industries

Implementing Agency
- PTG Johor

Monitoring Agency
- BPENJ

Associated Sectors :
- Energy; Agriculture; Logistics; Industrial Dev.

Stakeholders Involved:
- BPEN-J
- Department of Agriculture (JPNJ)
- Johor EXCO Investment
- District and local authorities

Budget Required:

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: Q1 2026
- End Date: Q2 2027

International best practices highlight the need for flexible, innovation-friendly, and sector-specific zoning to enable sustainable development, renewable integration, and digital infrastructure in emerging economic zones

International Best Practice For the Development of Agrosolar	
1 **Standardised and Flexible Zoning**	• International Zoning Code (IZC) and mixed-use zoning enable the integration of multiple land uses, residential, commercial, industrial, and infrastructure, within the same area. • Promotes vibrant, adaptive, and sustainable communities, especially important for evolving economic needs. • Helps reduce rigid land-use boundaries, which often inhibit innovation and cross-sector investment.
2 **Special Permit Models for Innovation**	• Special permits are globally adopted to allow regulatory flexibility for projects that do not fit neatly into traditional zoning categories. • This includes emerging industries like agrosolar, data centers, and clean-tech clusters. • Encourages experimentation and adaptive land use without forcing premature or costly zoning changes.
3 **Sector-Specific Guidance**	• UNIDO and other international bodies recommend tailored zoning standards for industrial parks, aligned with: Renewable energy integration (e.g. solar grid readiness, land for agrosolar); Logistics optimisation (e.g. access roads, truck terminal density); and Digital infrastructure needs (e.g. fiber optic corridors, smart metering zones) • Promotes climate-smart development and enhances zone competitiveness.

International best practices call for zoning systems that are flexible, innovation-enabling, and sector-sensitive—allowing for mixed-use models, special permits for novel uses, and custom infrastructure guidance to unlock sustainable industrial growth

Source: International Guidelines For Industrial Parks – UNIDO; International Zoning Code

Introducing new land subcategories for hybrid uses enables flexible, policy-aligned development that integrates agriculture, commerce, and industry with sustainability, digital readiness, and efficient land utilisation

Proposed New Land Subcategories for Hybrid or Emerging Uses

Renewable Agriculture

- **Definition:** Agricultural land that simultaneously supports renewable energy generation and active agricultural production.
- **Examples:** Agrosolar; Floating solar on aquaculture; agroforestry with wind turbines
- **Policy Recommendation:** Include in Circular under a special permit category with clearly defined dual-use thresholds (e.g., min. 50% land remains agriculturally productive).

Sustainable Commerce Hubs

- **Definition:** Commercial or logistics-enabled zones that integrate low-impact commercial activity with renewable infrastructure, light warehousing, or shared-use facilities.
- **Examples:** Mixed-use retail–storage clusters with integrated cold chains; Fulfilment centers co-located with SME digital storefronts
- **Policy Recommendation:** Recognise as a distinct commercial subcategory within zoning laws or circulars, with flexibility for infrastructure co-location and performance-linked incentives (e.g., emissions, energy use, access).

Smart Industrial Zones

- **Definition:** Industrial zones that integrate digital infrastructure, automation-ready facilities, and co-location of non-industrial functions (e.g. worker housing, green buffers).
- **Examples**: Smart factories next to dormitories or green transit nodes; Warehousing plus vocational training centers
- **Policy Recommendation:** Allow through a hybrid “Smart Industrial–Mixed” zoning designation with clear infrastructure and environmental integration guidelines.

These reforms would assist Johor to attract sustainable investments, support economic diversification, and align land use with national energy, digital, and industrial policy goals through flexible zoning

Source: International Guidelines For Industrial Parks – UNIDO; International Zoning Code

Structural Policy and Incentive Barriers to Renewable Energy Scale-Up in Malaysia

Problem Statement

- Malaysia lacks a cohesive and responsive policy framework to accelerate renewable energy (RE) adoption across technologies and user segments.
- Fragmented incentives, legacy tariff structures, and inconsistent policy signals have constrained both utility-scale and behind-the-meter RE growth.
- High system charges and absence of technology-specific support undermine commercial viability. For instance, under the CRESS framework, developers face punitive fixed charges (e.g., RM0.45/kWh SAC, RM12/kWp standby) without corresponding incentives or Feed-in-Tariff (FiT) options for technologies like wind and hybrid RE.
- Corporate buyers and RE developers struggle to access clear mechanisms for offsite PPAs, peer-to-peer trading, or performance-linked incentives.
- Regulatory frameworks are slow to adapt to new models such as energy storage, virtual power plants, and grid interactivity, impeding innovation and competitiveness.
- The problem spans multiple ministries and regulators (e.g., EC, SEDA, TNB, PETRA, MITI), each with overlapping mandates but limited coordination.
- With rising demand for clean energy, especially from industrial and export-facing sectors, structural reform is urgent to support Malaysia's NETR and NIMP targets.

Impact / Implication

- **Operational:** Current RE frameworks discourage uptake due to high upfront and recurring costs, limited access to net-metering or corporate PPA mechanisms, and lack of policy certainty.
- **Market & Investment:** Malaysia loses ground to ASEAN peers offering investor-friendly RE terms, undermining its competitiveness as an RE manufacturing or green export hub.
- **Decarbonisation:** Industrial sectors cannot meet emissions targets cost-effectively, slowing implementation of NETR and hindering ESG-aligned industrial park development.
- **System Efficiency:** Grid capacity is underutilised, and clean energy assets operate below optimal load due to regulatory and tariff bottlenecks.

Parties Involved

- Jawatankuasa Pelaburan, Perdagangan, Hal Ehwal Pengguna dan Sumber Manusia (Investment EXCO)
- BPEN-J
- PETRA
- Energy Commission (ST)
- SEDA
- MITI
- TNB

Source: PASB Analysis

Malaysia's renewable energy growth is hindered by high system charges, limited incentives, low adoption rates, and weaker competitiveness compared to ASEAN peers, affecting investment attractiveness and efficiency

Challenges With Current Renewable Energy Market - Malaysia

1 Tariff Structures and System Charges Undermine Commercial Viability

High System Charges and Lack of Technology-Specific Support

- Malaysia's legacy tariff structures and system charges (e.g., Standby Charges, System Access Charges) are cited as punitive for RE developers, especially under frameworks like CRESS.
- For example, developers face punitive fixed charges (e.g., RM0.45/kWh SAC, RM12/kWp standby) without corresponding incentives or Feed-in-Tariff (FiT) options for technologies like wind and hybrid RE.
- While Malaysia introduced the FiT in 2011, it is now limited in scope and does not cover all RE technologies, particularly wind and hybrid systems.
- Malaysia reduced its green electricity tariff premium rates by up to 80% as of July 2025, and the average overall electricity tariff cost by up to 19% compared to the previous regulatory period.
- However, these reductions have not been matched by expanded or targeted incentives for new RE technologies.

2 Malaysia's RE Adoption Lags Behind ASEAN Peers

Low RE Share and Efficiency

- As of 2022, Malaysia has generated approximately 2% of its electricity from renewable sources, which is significantly below its initial target of achieving 20% renewable energy in its energy mix and behind regional peers.
- Malaysia ranked among the lowest in renewable energy consumption efficiency in ASEAN (2017–2021), while Brunei, the Philippines, and Singapore were noted for higher efficiency.

Market and Investment Competitiveness

- Malaysia loses ground to ASEAN peers offering investor-friendly RE terms, undermining its competitiveness as an RE manufacturing or green export hub

Source: Science Direct; Research Gate; "Evaluating renewable energy consumption efficiency in the association of southeast Asian nations utilizing the data envelopment analysis with the undesirable output model" – Nguyen, Wang, Chung (April 2025); Review of the policies and development programs for renewable energy in Malaysia: Progress, achievements and challenges" – Azreen Junaida, Nurul Akidah & Ors (March 2024);

Malaysia's renewable energy expansion is also constrained by grid limitations, inaccessible procurement pathways, and outdated regulations that have not kept pace with emerging technologies like ESS and VPPs

Challenges With Current Renewable Energy Market - Malaysia	
3 **Barriers to Corporate RE Procurement and Market Access**	**Limited Access to Offsite PPAs and Peer-to-Peer Trading** • Corporate buyers and RE developers face significant regulatory and procedural barriers to accessing offsite Power Purchase Agreements (PPAs), peer-to-peer trading, and performance-linked incentives. • The high initial costs associated with renewable energy projects are a major deterrent for corporations. Although there are incentives like the Green Investment Tax Allowance (GITA), accessing these can be cumbersome due to bureaucratic hurdles. **Grid Capacity and Infrastructure Limitations** • Malaysia's existing power grid infrastructure is not fully equipped to handle large-scale renewable energy integration. This includes limitations in transmission lines, transformers, and substations, which are necessary to support the increased supply and demand associated with renewable energy.
4 **Regulatory Frameworks Slow to Adapt to Emerging Technologies**	**Energy Storage, Virtual Power Plants, and Grid Interactivity** • Malaysia's regulatory framework is still evolving to accommodate new models such as energy storage systems (ESS), virtual power plants (VPPs), and distributed energy resources. • There is an ongoing discussion about the need for regulatory changes in Malaysia's energy sector. The government has identified key agendas such as amending the Electricity Supply Act 1990 and reforming the electricity tariff structure, which could potentially influence the integration of new technologies like energy storage and VPPs. • The benefits of energy storage systems in power systems are well recognised, and there is a research gap associated with integrating ESS with solar power in Malaysia. This suggests that while the potential is acknowledged, regulatory frameworks may still be evolving to fully support these technologies.

Source: Electricity Commission (EC); "Benefits of energy storage systems and its potential applications in Malaysia: A review" – Tee, Gan, Sardi (March 2024)

To zoom in on a particular potential area of reform; there have been longstanding complaints from the Renewable Energy industry that the Corporate Renewable Energy Supply Scheme is not structured in a RE-production friendly manner

Malaysia: CRESS Charges and Tariff Regime 2025			
Charge Type	**Value (MYR)**	**USD Equivalent**	**Notes**
System Access Charge (SAC)	0.45 MYR/kWh (non-firm, e.g., solar/wind)0.25 MYR/kWh (with battery storage)	$0.106/kWh (non-firm)$0.059/kWh (with storage)	Fixed for 3 years, capped at 15% variation per IBR period [[research report]]
Wheeling Charge	Same as SAC	Same as SAC	No separate wheeling charge; SAC is the wheeling fee
Standby Charge	Not explicitly stated	N/A	Not detailed in public CRESS documents [[research report]]
Other Fees	Grid connection, application, and metering fees (variable)	N/A	Typically minor compared to SAC
Tariff Support	No FiT for wind/hybrid; NEM for solar (net metering)	N/A	CRESS is main mechanism for corporate RE; FiT limited to small solar/biogas

Source: IEA; Olade

Malaysia's high SAC has been reported to be a significant barrier to RE investment, especially for wind, hybrid, and storage projects, opening up an opportunity for Johor to pilot a reformed, market-friendly SAC and tariff structure under its Regulatory Sandbox

Country	Grid Access Charge	Wheeling Charge	Standby Charge	Tariff Support (FiT/Auction)	RE Investment Growth
Malaysia	$0.106 (non-firm) $0.059 (with storage)	Same as SAC	Not explicit	NEM (solar), no FiT for wind/hybrid	Moderate
Vietnam	$0–$0.004	$0–$0.004	N/A	$0.053–$0.075 (solar, 2025)	Very high
Thailand	$0.0036–$0.0077	$0.0036–$0.0077	N/A	$0.067–$0.087 (solar, 2023)	High
Singapore	$0.031–$0.047	$0.031–$0.047	N/A	Market-based	Niche
Indonesia	$0–$0.0092	$0–$0.0092	N/A	$0.088–$0.163 (solar, 2017)	High
Germany	$0.012–$0.023	$0.012–$0.023	N/A	$0.093–$0.151 (legacy FiT)	High
India	$0–$0.0023	$0–$0.0023	N/A	$0.028–$0.034 (auction)	Very high
Australia	$0.007–$0.020	$0.007–$0.020	N/A	$0.039–$0.130 (FiT/market)	High

Key Highlights

- **Malaysia's** SAC for non-firm RE ($0.106/kWh) is the highest among all compared countries. Even with storage ($0.059/kWh), it is still above most benchmarks.
- **Vietnam, India, and Indonesia** have either waived or set minimal grid access charges for RE, directly correlating with their rapid RE investment and deployment. Tariff support (FiT/auctions) in these countries is also more attractive and technology-specific, further boosting investment.
- **Thailand's** grid access charges are extremely low ($0.0036–$0.0077/kWh), and its FiT regime remains competitive.
- **Singapore's** grid charges are low and uniform, but its RE market is niche due to land constraints.
- **Germany and Australia** have modest grid charges and strong policy support, driving high RE penetration.

Source: IEA; Olade

As such, there are several potential reasons to explain the high charges under the Malaysian system, and it may include infrastructure upgrades and grid system transitions

What Are The Potential Reasons For Malaysia's Expensive Charges Under The CRESS Regime?	
1 **Cost Recovery for Grid Modernisation and Legacy Infrastructure**	• Malaysia's grid is undergoing major upgrades to accommodate renewables, with TNB investing RM22 billion (USD 4.7 billion) in grid modernisation between 2022 and 2024, and a further RM10.3 billion planned for 2025–2027. • The SAC is designed to recover these substantial infrastructure costs, especially as the grid transitions from centralised fossil generation to more variable, distributed renewables. • In contrast, benchmark countries often have more mature, amortised grid infrastructure or have socialised these costs across all users, not just RE developers.
2 **Utility Revenue Protection and Market Structure**	• TNB, as a vertically integrated utility, faces revenue shortfalls as more customers shift to direct RE procurement. The SAC is partly a mechanism to protect utility revenues and ensure cost recovery as the market liberalises. • In other countries, regulatory reforms have decoupled utility revenues from volumetric sales or have introduced competitive market structures that reduce the need for high access charges.
3 **Risk Allocation and Grid Stability Concerns**	• The higher SAC for non-firm (intermittent) renewables reflects the perceived cost and risk of integrating variable energy sources into a grid historically dominated by fossil fuels. • Malaysia's regulatory approach places the burden of variability and grid balancing on RE developers, rather than spreading it across the system or incentivising storage/grid flexibility. • Some benchmark countries have more advanced grid management, market mechanisms, or policy support (e.g., capacity markets, ancillary services) that reduce the need for high access charges.
4 **Policy and Regulatory Choices**	• Malaysia's regulatory environment is still evolving and tends to be conservative in allocating costs and risks, especially as the market transitions to more open access and corporate PPAs. • Benchmark countries have made deliberate policy choices to lower or waive grid charges for renewables to accelerate adoption and meet climate targets.

High grid access charges are recognised globally as a barrier to renewable energy adoption, elongating payback periods and reducing financial viability. Malaysia's approach is seen as a legacy of utility cost recovery and risk aversion, rather than a market design optimised for rapid RE scale-up

Source: Fulcrum; US International Trade Administration; The Edge; Olade, IEA; PASB Analysis

Formation of Johor RE Market Reform Group

Johor's clean energy transition is constrained by national-level policy misalignments, non-competitive pricing structures, and fragmented incentive mechanisms for renewable energy. CRESS provisions on system access charges and lack of support for emerging technologies are symptomatic of wider challenges across Malaysia's RE regulatory landscape.

Implementing Agency
- EXCO Investment

Monitoring Agency
- BPEN-J

Associated Sectors :
- Energy

Stakeholders Involved:
- BPEN-J
- PETRA
- Energy Commission (ST)
- SEDA

Initiative Highlights:

Concept Description

A structured state-industry platform to systematically engage with national authorities on renewable energy policy gaps. The platform will address issues such as pricing structures, incentive design, market access, and enabling frameworks for emerging RE technologies.

Visualisation of the initiative

Mandate & Objectives

- A formal state-level coordination platform for industry input on RE market policy, pricing, & incentive design.
- Identify policy bottlenecks and regulatory cost burdens across key policies (e.g., CRESS, NEM, FiT, CGPP).
- Propose Johor-specific changes to support adoption of advanced RE technologies (e.g., wind, hybrid solar)
- Support Johor's contribution to national policy consultations led by EC, SEDA, PETRA, and MITI.

Key Workstreams

- **Competitiveness Audit:** Assess Johor's RE demand, industrial needs, and cost barriers across various market models (self-consumption, peer-to-peer, export-to-grid).
- **Policy Benchmarking:** Analyse incentive schemes, tariff structures, and permitting frameworks from other benchmark countries
- **Technology Enablement:** Design support frameworks for underrepresented tech (e.g., wind, floating solar, battery storage, virtual PPAs).
- **Market Dialogue & Advocacy:** Conduct recurring industry roundtables, policy feedback sessions, and multi-stakeholder engagements to ensure alignment with national RE reforms.

Budget Required:

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

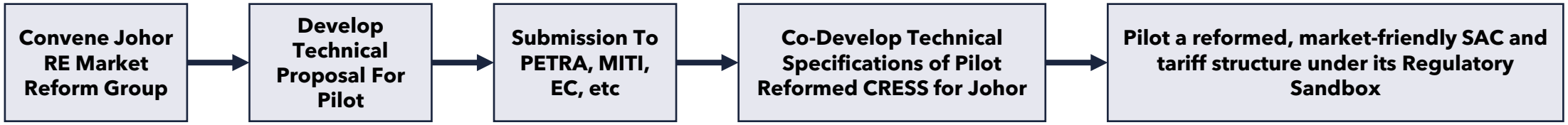
Empowers Johor to influence national RE policy reforms and pricing structures through evidence-based recommendations and industry-grounded feedback. Supports a more diversified, investable RE landscape that accelerates industrial decarbonisation and green economy development in Johor.

Implementation Timeframe:
- Start Date: Q1 2026
- End Date: Q2 2027

Source: PASB Analysis

An example of the reform proposals that can be generated from the "Johor RE Market Reform Group" would be to formulate Johor's proposal to pilot a reformed, market-friendly SAC and tariff structure under its Regulatory Sandbox (1/2)

Example: Reformed Market-Friendly CRESS Regime Pilot For Johor



Key Description of Activities

Convene Johor RE Market Reform Group

Purpose

- Establish a formal platform to coordinate energy policy dialogue between state actors (e.g. BPEN-J) and national regulators (e.g. PETRA, MITI, EC).

Activities

- Assemble stakeholders from public sector (EXCO Investment, BPEN-J), industry (solar developers, logistics firms), and regulators.
- Confirm scope of the group: focus on SAC reforms, technology enablement, tariff redesign, and market mechanisms.

Develop Technical Proposal For Pilot

Purpose

- Craft a comprehensive and technically sound proposal justifying the pilot reform.

Activities

- Conduct a competitiveness audit on Johor's SAC and system charges (e.g. current RM12/kW/month SAC under CRESS).
- Identify and document pain points (e.g. cost burdens, access limitations for RE developers).
- Benchmark against market-friendly RE tariff regimes in countries like Vietnam, India, or Germany.
- Propose tariff design options (e.g. differentiated SAC by RE tech type, time-of-use pricing).

Submit to PETRA, MITI, EC, etc

Purpose

- Obtain support and alignment with national authorities.

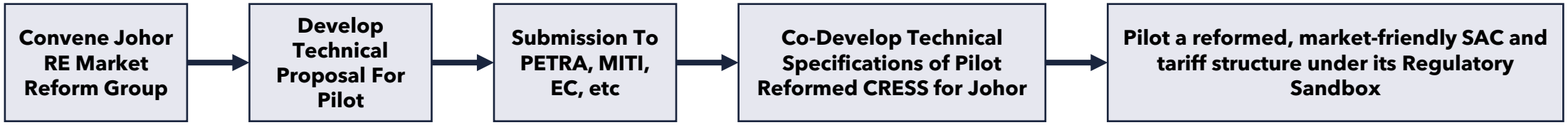
Activities

- Present the technical proposal and its rationale to key ministries and agencies.
- Address potential regulatory conflicts or overlaps with national CRESS provisions.
- Propose co-ownership of the pilot design, ensuring alignment with Malaysia's broader energy transition goals under NETR.

Source: PASB Analysis

An example of the reform proposals that can be generated from the "Johor RE Market Reform Group" would be to formulate Johor's proposal to pilot a reformed, market-friendly SAC and tariff structure under its Regulatory Sandbox (2/2)

Example: Reformed Market-Friendly CRESS Regime Pilot For Johor



Key Description of Activities

Co-develop Technical Specifications of the Pilot Reformed CRESS for Johor

Purpose

- Design the technical and regulatory framework for the pilot.

Activities

- Define the specific RE technologies and user groups eligible for the pilot (e.g. floating solar, battery-integrated systems).Set out the revised SAC rates, tariff calculation formulas, cost-recovery mechanisms, and performance evaluation metrics.
- Develop regulatory safeguards for consumer protection, investor risk, and grid reliability.

Pilot a Reformed, Market-Friendly SAC and Tariff Structure under Johor's Regulatory Sandbox

Purpose

- Purpose: Implement the pilot in a controlled, monitored, and adaptable environment.

Activities

- Launch the pilot via the proposed Johor Regulatory Sandbox (linked to the JAIO initiative).Monitor uptake and impact on RE deployment, investor interest, and cost savings.
- Collect data for evaluation, with mechanisms for iterative refinement.
- Report findings to inform permanent regulatory change at national or state level.

Source: PASB Analysis

Enhancing Johor's State Capacity for AI Development and Cross-Sectoral Innovation

Problem Statement

- Johor lacks a dedicated state-level AI office to drive policy foresight, cross-sector innovation, and coordination of AI-related initiatives aligned to state development priorities.
- This gap limits Johor's ability to anticipate and respond to emerging global AI trends, regulatory developments, and disruptive technologies shaping future industries.
- Reliance on federal agencies and fragmented project-level efforts leaves Johor reactive, rather than proactive, in shaping an AI-powered innovation economy.
- As AI becomes a critical growth enabler, the absence of a coordinated Johor-based AI body leads to: Misalignment with evolving global and national AI policy framework
- Delayed response to governance issues in AI ethics, safety, and regulation. Weak investor confidence due to lack of clear state-level AI innovation ecosystem

Impact / Implication

- Johor risks losing AI-related investments and pilot opportunities to better-prepared regional hubs such as Singapore and Bangkok.
- Local industries may face difficulty attracting high-value AI talent, funding, or anchor projects, particularly in sectors like smart manufacturing, healthcare, logistics, and agriculture.
- Fragmented AI policy landscape impedes scaling of responsible, secure, and inclusive AI use cases within Johor.
- Without strong state-level AI leadership, Johor could become a bottleneck for shaping ethical, competitive, and future-ready AI development aligned with national ambitions.
- Johor may also miss opportunities to leverage federal support from NAIO and ecosystem enablers (e.g. GAIV, Microsoft cloud region, AIForMYFuture) tailored to local use cases.

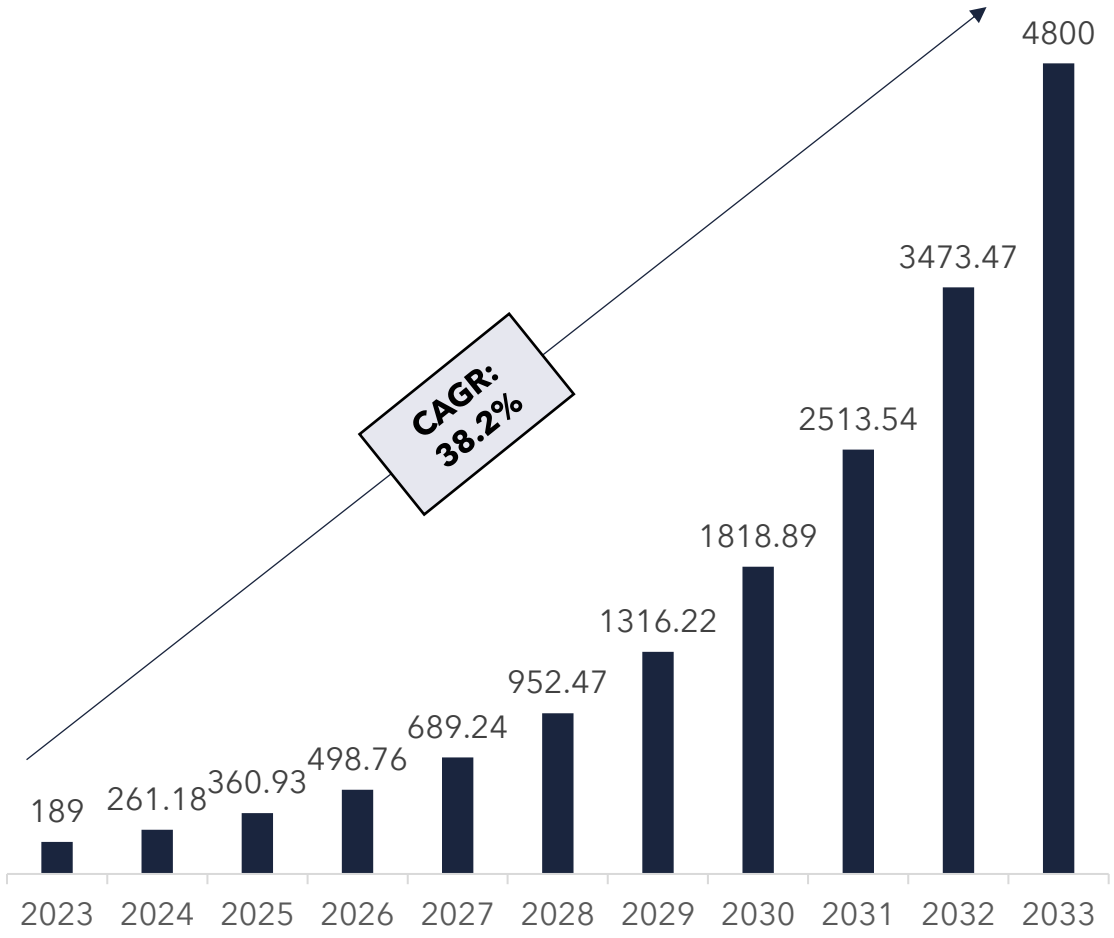
Parties Involved

- BPEN-J
- Johor EXCO (Investment and Digital Economy)
- National AI Office (NAIO)
- UTM, UTHM, IDO and other Johor-based IHLs
- Iskandar Malaysia Innovation Hub
- Johor-based digital/tech associations (e.g., J-Biotech, MyDigital Johor)
- Ministry of Digital Malaysia

Source: PASB Analysis

The AI market is projected to go from USD 189 billion in 2023 to USD 4.8 trillion by 2033 with substantial CAGR of 38.2%; the market value increasing 25-fold in just a decade

Projection Global AI Market Value (USD Billion) 2023 - 2033



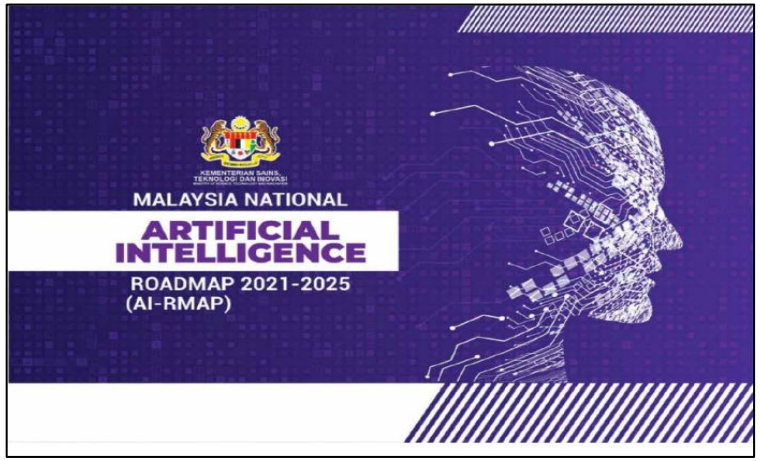
Key Insights

1 Share of Global Frontier Tech Market	• Rising from 7% to 29% and emerging as the sector's dominant force.
2 Patents & Research	• In 2022, just 100 companies, mainly in the United States and China, accounted for 40% of global AI research and development (R&D). • Combined, the two countries hold 60% of all AI patents and produce a third of global AI publications.
3 Impact on Jobs	• AI is already reshaping industries – from content creation and product design to automated coding and customer service. • Globally, it could affect 40% of jobs, with up to one third in advanced economies at risk of automation. But those same economies are better placed to benefit: 27% of their jobs could be enhanced by AI, boosting productivity and complementing human skills.

Source: UNCTAD (7th April 2025)

In anticipation of this monumental growth in global AI, Malaysia published the AI Roadmap 2021–2025, identifying AI as a critical enabler for smart manufacturing, healthcare, agriculture, logistics, amongst many other sectors

Malaysia National Artificial Intelligence Roadmap 2021 - 2025



Strategies and Action Plans

- Malaysia National Artificial Intelligence Roadmap 2021-2025 (AI-RMAP) outlines a comprehensive plan for developing and implementing AI technologies in Malaysia.
- The roadmap serves as a guide for Malaysia's journey towards becoming a global leader in AI, with a focus on ensuring that the benefits of AI are shared across all sectors of society.

Strategic Objectives

Establishing AI Governance	**Advancing AI R&D**	**Escalating Digital Infrastructure to Enable AI**	**Fostering AI Talents R&D**	**Kick-Starting a National AI Innovation Ecosystem**

Identified Strategic Sectors

Smart Manufacturing	**Healthcare**	**Agriculture**	**Logistics**

Malaysia's National Artificial Intelligence Roadmap (2021–2025) identified AI as a strategic enabler for smart manufacturing, healthcare, agriculture, and logistics, all key sectors in Johor

Source: MOSTI; Malaysia National Artificial Intelligence Roadmap 2021 – 2025; PASB Analysis

AI is also recognised as a foundational 4IR technology, essential for transforming key sectors, such as manufacturing, healthcare, agriculture, logistics, to drive Malaysia's ambition toward innovation-led development

Malaysia – National Fourth Industrial Revolution (4IR) Policy

Strategic Role of AI as Defined in the Policy	
Core Enabler of 4IR Economic Transformation	• AI is classified among the six foundational technologies of the 4IR, alongside IoT, robotics, advanced analytics, additive manufacturing, and cloud computing. • The policy emphasises AI integration to streamline physical, digital, and biological systems across industries.
Productivity and Growth Catalyst	• AI is targeted to boost national productivity by 30% by 2025 and increase the value of digitalised manufacturing, aligning with Industry4WRD goals. • The policy supports Malaysia's roadmap to position AI as a high-impact driver of Smart Manufacturing and innovation ecosystem maturity.
Inclusive, Ethical, and Competency-Focused Governance	• The policy underscores ethical AI development, accountability, and capacity-building, reinforcing Malaysia's ambition to become an "AI innovator." • Initiatives like "AI untuk Rakyat" promote digital literacy and ensure citizen-level AI understanding across demographic segments.

Source: Ministry of Economy, Access Partnership; InvestKL

Johor's absence of a dedicated state-level AI office limits its ability to align with national AI strategies, attract pilot investments, and coordinate inclusive, cross-sectoral innovation critical to future competitiveness

National Artificial Intelligence Office (NAIO)

KEMENTERIAN SAINS, TEKNOLOGI DAN INOVASI
MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION

NAIO

Background

- **Overview:** The National Artificial Intelligence Office (NAIO) in Malaysia is a federal-level coordinating body established under the Ministry of Science, Technology and Innovation (MOSTI) to lead and implement the country's national AI agenda.
- **Cabinet Approval:** On 28 August 2024, Malaysia's Cabinet officially approved the creation of the National AI Office (NAIO)
- **Formal Launch:** NAIO was launched by the Prime Minister on 12 December 2024, under MyDIGITAL Corporation, to serve as Malaysia's central AI policy and coordination hub

Mandate & Governance Structure of NAIO

- **Operational Placement**: Incorporated under MyDIGITAL Corporation, NAIO functions under the Ministry of Digital and serves as Malaysia's upstream AI authority
- **Government Mechanisms**: Establishment of seven expert Working Groups, including AI Policy, Ethics, Security, and Sectoral adoption task forces, comprising government, industry, academia, and civil society representatives

Core Responsibilities

Developing the National AI Action Plan 2026-2030	Developing an AI Regulatory Framework, AI Code of Ethics, and Public Sector AI Adaptation Guidelines	Driving cross-sectoral AI adoption in areas like healthcare, agriculture, logistics, and education

Johor's Institutional Gap

- **Lack of State Anchor:** Johor lacks a subnational equivalent to NAIO, resulting in no central AI coordination at state level.
- **Fragmented Efforts:** AI-related initiatives are dispersed across multiple federal and district agencies, leading to duplication, inconsistent implementation, and delayed responses to investor and ecosystem needs.
- **Policy and Investment Misalignment:** Without a dedicated AI office, Johor may miss opportunities linked to NAIO's national schemes (e.g. AIForMYFuture, GIGA cloud investments, or AI-ready industrial plans), eroding its innovation readiness GovInsider+11Source+11Global Practice Guides+11.

Implications for Business and Investment Climate

- **Investor Uncertainty:** Companies looking to pilot AI innovations—such as in agri-AI, logistics drones, or digital manufacturing—face unclear local regulatory environments, discouraging commitment
- **Limited Institutional Support for SMEs:** SMEs and local tech firms lack exposure to national skilling, grants, policy incubation, and cross-sector pilots driven by NAIO
- **Strategic Disadvantage:** Neighboring countries (i.e. Singapore), regions or states may attract AI-driven industrial projects due to stronger internal coordination and faster execution frameworks.

Source: MOSTI; PASB Analysis

Activating Johor's AI Engine through Johor Artificial Intelligence Office (JAIO)

Johor currently lacks a dedicated mechanism to translate national AI policy into state-level application, to rapidly pilot and scale AI solutions, and to coordinate across districts and sectors. This gap limits Johor's ability to deploy AI for real-world impact and to feed insights back into national policy

Implementing Agency
- IDO

Monitoring Agency
- BPENJ

Associated Sectors :
- Cross-Cutting

Stakeholders Involved:
- NAIO
- MDEC, MyDigital
- Johor-based chambers & associations (e.g., J-Biotech, MICCI, FMM)

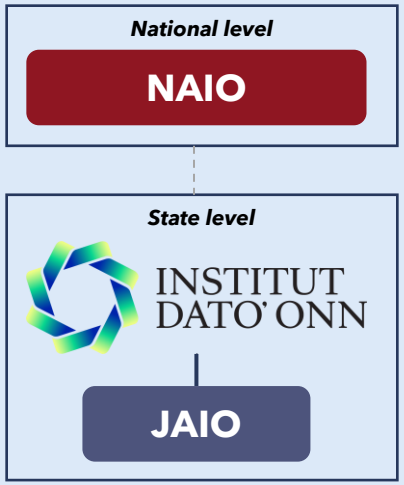
Initiative Highlights:

Concept Description

The JAIO housed within IDO, will serve as Johor's AI "middle bridge". Upstream linkage: Aligns with NAIO on federal policy, standards, and ethics. Downstream execution: Works under IDO to champion, pilot, and scale AI solutions across Johor's districts, SMEs, GLCs, and public agencies

Initiative Highlights:`

Org Structure



Key Activities & Outcomes

District & Sector Pilots

- Run "One District, One AI" use-case sprints tailored to each district
- Cluster similar districts for shared, scalable pilots (e.g., flood management, agri-tech drones, aviation MRO)
- Coordinate with NAIO for joint lab initiatives like Rakan Tani

Talent & Capability

- Launch "AI for All" upskilling (HRDF-funded) programs for state civil servants
- Expand the "One Employee, One AI" prototype across state agencies
- Host JAIO bootcamps, ethics labs, and hackathons with partners

1. Develop Johor-specific AI policy briefs and regulatory watchlists
2. Monitor national/global AI ethics, standards, and governance frameworks
3. Advise Johor EXCO and state agencies on emerging AI trends and investment opportunities

Establishing JAIO could position Johor as an AI powerhouse strengthening its ability to respond to technological shifts, attract high-value investments, and foster cross-sectoral innovation. This could unlock economic opportunities and build investor confidence for Johor.

Budget Required:

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: Q1 2026
- End Date: Q4 2030

Source: PASB Analysis

A multi-tiered governance structure is recommended, and should be designed to ensure strategic oversight, operational efficiency, sectoral expertise, and stakeholder engagement

Johor Artificial Intelligence Office (JAIO)- Governance Structure and Terms of Reference			
Level	**Composition / Parties Involved**	**Terms of Reference (Preliminary)**	**Key Roles**
1 **JAIO Steering Committee**	• Johor EXCO (Investment & Digital Economy), BPEN-J, IDO, NAIO, MyDIGITAL, MDEC, key ministries (e.g., MOSTI, MITI), Chambers (FMM, MICCI), GLCs	• Approve state AI priorities; • Align with NAIO and federal agenda; • Endorse ethics code and talent strategy; • Review performance milestones	• Strategic governance, • State-federal alignment, • Performance oversight,
2 **JAIO Secretariat (IDO-led)**	• IDO (lead), BPEN-J (secretariat), NAIO liaison officer, seconded technical staff from MDEC, J-Biotech, UTM/UTHM	• Coordinate JAIO initiatives, • Pilots and talent programs; • Interface with districts; • Compile policy recommendations and run AI watchlist; • Serve as knowledge hub	• Execution leadership, • Coordination, • Knowledge synthesis, • Policy feedback loop
3 **AI Sectoral Coordination Boards**	• Sectoral reps from healthcare, smart manufacturing, logistics, agriculture; industry anchors, GLCs, IHLs; SME clusters	• Define use-case clusters; • Advise on pilot scope and criteria; • Coordinate cross-agency implementation; • Identify investment blockers	• Use-case design, • Multi-sector coordination, • Thematic ecosystem building
4 **Technical Advisory Panels**	• AI/data scientists, cybersecurity experts, AI ethics specialists, regulatory lawyers, innovation and tech advisors, NAIO ethics/policy group	• Design and vet test protocols; • Assess ethical and legal frameworks; • Review data access and risk; • Recommend safeguards for high-risk AI use	• Risk governance, • Test assurance, • Safety by design
5 **Stakeholder Engagement Council**	• Digital associations (e.g., PIKOM, MyStartup), investor groups, public policy NGOs, civil society, youth representatives, chambers, media/communications experts	• Provide inclusive feedback loop; • Ensure transparency and communication; • Build public trust in state AI deployment; • Promote citizen-centric use cases	• Public accountability, • Transparency, • Trust-building

Source: PASB Analysis

Private Investment Catalyst.

Disclaimer Notes

The enabling initiatives listed were identified through Lab Engagements under JETP, based on direct consultations with the respective stakeholders.

These initiatives represent part of the proposed enablers to support Johor's economic transformation, but do not constitute the full extent of the State's recognised or emerging enabling measures.

The initiative lists presented are non-exhaustive. Information provided, including indicative budgets, are as furnished by the respective stakeholders and are shared in strict observance of the confidentiality obligations of all parties.

PEMANDU makes no representation as to the reliability or accuracy of the information provided, which is assumed to be accurate and reliable at the point of obtainment from the respective stakeholders.

Escalating Industrial-Land Costs in Johor's Strategic Zones

Problem Statement

- Asking prices for industrial land in core zones such as **Pengerang, Pasir Gudang and Iskandar Puteri now hover at RM 60–70 psf**, more than 7× the price in 2012
- In Iskandar Puteri, **land values doubled from RM 65 psf in 2015 to RM 130 psf in 2024**, while Pasir Gudang rose from RM 25 to RM 62 psf over the same period
- Fragmented ownership means **< 50 % of gazetted PIPC land is effectively in use**, preventing large anchor tenants from securing contiguous 50 ha blocks
- Lack of a transparent, data-driven release mechanism (cf. Singapore GLS) fuels speculation, erodes investor certainty and inflates infrastructure costs.

Impact / Implication

- **Under-utilised Assets**: Tens of thousands of hectares sit idle, muting spill-overs to SMEs, housing and logistics
- **Lost Scale Economies**: High entry costs push tenants onto sub-scale lots, diluting cluster productivity and green-infrastructure payback
- **Governance Gap**: Without coordinated price guidance, Johor struggles to benchmark incentives, taxing future SEZ competitiveness

Parties Involved

- JLand
- EPF
- Khazanah
- JPPH
- PTG Johor
- Local Councils
- TNB
- SAJ

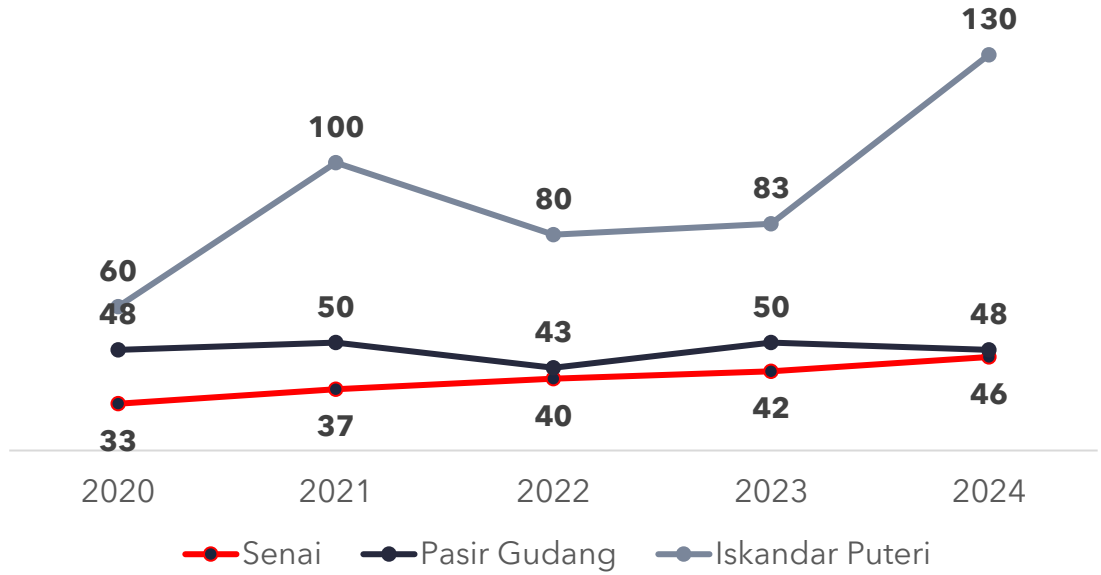
Source: Property Guru, The Edge, MIDA

Industrial land prices in Johor are rising across key zones, with Iskandar Puteri surging and Senai showing strong uplift potential

Johor Property Market Coverage

- "According to CBRE | WTW data, property prices across sectors ranging from **residential to industrial and commercial have risen over the years**. This trend is evident in industrial zones such as Senai, Iskandar Puteri and Pasir Gudang.
- There has been strong interest in land acquisitions for industrial and **data centre development**, fuelled by robust demand from regional tech players and neighbouring countries."

Average Industrial Land Transaction Price in Johor
(2020-2024)



- The gap between **Iskandar Puteri and other zones has significantly widened**, highlighting divergent growth trajectories and potential for value uplift in emerging zones like Senai
- **JS-SEZ is forecasted to further accelerate the widening of land prices** with steep appreciation within the dedicated zones which could further hinder investors which require large land parcels for heavy manufacturing

Source: The Edge, CBRE WTW, PASB Analysis

Strategic Industrial Land Consolidation & Release Programme (SILCRP)

Speculative land prices in Johor's priority industrial zones stall billions in downstream FDI. Unlike Singapore's data-driven land-release model, Johor lacks a transparent, patient-capital-backed mechanism to consolidate, service and recycle land at scale

Initiative Highlights:

Concept Description	Establish a patient-capital SPV under JCorp that bulk-buys, services and re-prices ≥50 ha parcels via a transparent ceiling-price model to unlock strategic land parcels

Initiative Highlights:

Objective:

- **Stabilise Industrial Land Supply**: Deliver ready-to-use 50 ha+ blocks at certified prices
- **Self-Sustaining Funding Engine**: Recycle resale uplifts into subsequent land clusters

Function:

Capitalise SPV
Secure patient equity anchors (EPF/Khazanah) and JCorp approvals

Parcel Servicing & GIS
Fast-track roads, utilities and green covenants; publish mapped plots online

Bulk Acquisition
Purchase contiguous ≥50 ha parcels at JPPH rates; vest to JLand

Release & Recycle
Lease/sell plug-and-play lots at ceiling price; funnel uplifts back into Fund.

By assembling ready-to-build parcels at predictable and reasonable rates, this will reactivate under-used industrial land, eliminate speculative barriers, catalyse new anchor investments and accelerate job creation–driving Johor toward its cluster-focused growth and investment targets

Implementing Agency
- JCorp

Monitoring Agency
- BPEN-J

Associated Sectors :
- Cross-Cutting

Stakeholders Involved:
- EPF
- Khazanah
- JPPH
- PTG Johor
- Local Councils
- JLand
- TNB
- SAJ

Budget Required:

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: Q1 2026
- End Date: Q4 2030

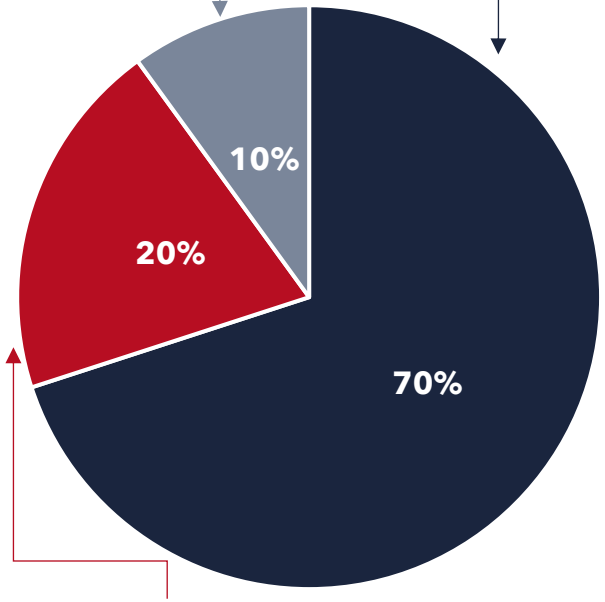
A blended capital stack with flexible landowner payback options enables large-scale land acquisition while balancing liquidity, risk, and upside potential

SPV Fund Structure (Capital Stack)

State In-Kind Sponsors

JCORP Johor Corporation

State-owned enterprise that provide land-sourcing guarantees, fast-track approvals, and in-kind capital contributions. Their regulatory facilitation ensures seamless, on-schedule project delivery



Patient Equity Anchors

KWSP EPF

KHAZANAH NASIONAL

Long-horizon institutional investors that absorb early-cycle risk and signal stability. Their deep-pocket backing underwrites bulk land acquisitions and builds market confidence

Bridge Financing Partners

BPMB Malaysia Development Bank

Mezzanine debt or quasi-equity providers that fill funding gaps between equity close and cash flows. They accelerate parcel servicing and GIS roll-out without diluting anchor sponsors

Source: PASB Analysis

Potential Landowner Payback Options

1 **Outright sale uplift**	• **Operating Model**: Sale of industrial land parcel to sector anchor investor at a premium upon successful transformation and development of infrastructure. Alternatively, a Master-Purchaser cost pass-through could be explored. • **Strategic Impact:** Immediate or phased cash realisation to recycle into new strategic sites or infrastructure
2 **Long-Term Lease**	• **Operating Model**: SPV retains land title and grants 20/30/60-year industrial leases via open bidding at a ceiling upfront land premium nominal based on annual ground rent indexed to CPI and infrastructure development cost • **Strategic Impact:** Long-term ownership and predictable annuity-style cash yields while incentivising long term sector cluster growth
3 **Anchored JV Land-for-Equity Swap**	• **Operating Model**: SPV contributes serviced land into a JV with a pre-qualified sector anchor; state takes an equity stake and structures downstream returns via profit-share and/or throughput royalty • **Strategic Impact:** Lowers cash barrier for anchors, preserves policy control, and recovers value over time as the park scales.

A coordinated ecosystem of finance, regulatory, and utility partners ensures credible funding, streamlined approvals, and infrastructure readiness for each parcel

Finance Partners

1. KWSP (EPF) & Khazanah

- Absorb early-cycle risk; signal fund credibility

2. Bank Pembangunan Malaysia

- Provides flexible, long-tenor debt to bridge equity gaps

3. JCorp (State GLC)

- Guarantees land sourcing and fast-tracks permits

Regulatory & Governance Bodies

1. Jabatan Penilaian & Perkhidmatan Harta (JPPH)

- Certifies ceiling price; underpins transparent pricing

2. PTG Johor

- Vests parcels; files green-governance covenants

3. Local Councils

Fast-track clearances; ensure local stakeholder alignment

Utilities & Connectivity Partners

Tenaga Nasional Berhad (TNB)

- Delivers bulk power roll-out with SLA-backed reliability

Syarikat Air Johor (SAJ)

- Ensures water provision with environmental safeguards

TM (Telekom Malaysia)

- Provides high-speed network infrastructure to each parcel

Source: PASB Analysis

A structured 6-step land value cycle drives parcel readiness, investor uptake, and recurring income—while recycling uplift into future acquisitions

1 Bulk Acquisition

- SPV buys contiguous ≥50 ha parcels at the certified JPPH ceiling price (e.g. RM 55 psf)
- SPV (EPF/KWSP/Khazanah + BPMB) & JLand for title vesting

2 Parcel Servicing & Green Compliance

- Fast-track delivery of roads, drainage, power (TNB) & water (SAJ) to parcel boundaries; register green-covenant safeguards
- JCorp & Local Councils lead permits; TNB/SAJ execute works; PTG Johor file covenants

3 GIS Publication & Demand Signal

- Publish detailed parcel maps, service-level guarantees and ceiling price on the GIS portal; launch targeted investor outreach
- JCorp to run and manage portal; MIDA/MoF share demand forecasts

4 Investor Offtake

- Investors lease or purchase plug-and-play lots at the published ceiling price via the portal
- SAF Fund Manager coordinates contracts; Legal teams finalise lease/sale

5 Interim Warehousing Income

- Unsubscribed parcels are leased short-term to SMEs for modular warehousing (e.g. 1–3 yr tenures) to generate 5–8 % IRR
- SAF Fund Manager sources lessees; Local Councils assist SME matchmaking

6 Full Release & Value-Share (Uplift-Recycling)

- Resale at market price (e.g. RM 65 psf) triggers value-share: 20% of uplift paid to equity-opt-in landowners, 80% recycled into next 50 ha cluster acquisition
- SAF Fund Manager disburses proceeds; BPENJ audits recycling; JCorp sources next parcels

Source: PASB Analysis

Absence of Special Tourism Investment Zone (STIZ) Status in Mersing

Problem Statement

- The National Tourism Policy 2020–2030 introduced by MOTAC outlines the creation of Special Tourism Investment Zones (STIZs) to promote high-value, sustainable, and innovative tourism investments across Malaysia
- Johor has yet to designate any STIZ, putting it at a disadvantage compared to other states which have been included in the pilot program such as Langkawi, Port Dickson, Tuaran-Kota Belud and Putrajaya-Sepang which have received targeted incentives and national attention
- Despite being the gateway to 13 marine park islands and the main jetty to Tioman, Mersing remains underdeveloped as a tourism hub
- Developers face the full weight of land premiums, taxes, and prolonged approval processes, making tourism projects less financially viable and deterring long-term investments
- Tourist arrivals to Mersing remain very low, with only ~21,000 visitors in 2018, and just 5,000–11,000 visitors annually between 2019 and 2022, a stark contrast to Langkawi's multi-million visitor counts

Impact / Implication

Investor Hesitation:

- Absence of STIZ means Mersing lacks access to fiscal incentives, such as tax exemptions, capital allowances and infrastructure development
- These missing enablers create a high entry barrier for private developers, delaying or stalling tourism related projects in the district.

Improving Socio-economic Gaps:

- Mersing records Johor's highest district poverty rate at 12.1% in 2022, significantly above other districts In Johor averaging at 5 to 6%
- Without catalytic tourism development, income opportunities remain limited for local SMEs, fisheries cooperatives, and transport operators.

Parties Involved

- Ministry of Tourism, Arts & Culture (MOTAC) Johor
- Bahagian Perancang Ekonomic Negeri Johor (BPENJ)
- Tourism Johor

Source: Tourism Johor, Langkawi Development Authority, DOSM

Mersing has the natural assets, but needs catalytic infrastructure such as STIZ to realise Mersing's tourism potential

Special Tourism Investment Zone (STIZ) Overview in Malaysia

Definition

- STIZ is a key initiative under the National Tourism Policy 2020–2030.
- STIZ are designated by MOTAC to promote sustainable, high-value tourism by offering fiscal incentives (tax breaks, capital allowances), fast-tracked approvals, and federal infrastructure funding.

STIZ in Malaysia

Pilot STIZ Project Areas:

- Port Dickson
- Tuaran-Kota Belud
- Putrajaya – Sepang
- Langkawi

Resulting Impact:

Duty-free tourism growth, increased airport and retail infrastructure

Heritage restoration, hotel investment boost, better road access

Mersing's Eco-Tourism Strengths & Foundation for High Tourism Growth

Mersing, Johor

Mersing district in Johor is an important southern gateway for ecotourism, as well as coastal and island tourism in the ECER. The tourism sector is developed based on the 'Rainforest to Reef' (R2R) concept, focusing not only on its rainforest and island assets but also the integrated urban and coastal tourism assets in Mersing.

While environmental and branding efforts have positioned Mersing as an emerging eco-tourism destination, **the district lacks the enabling economic and tourism infrastructure** to attract and facilitate private investment at scale.

Marine conservation efforts like Cintai Kepulauan Mersing demonstrate local commitment and ecological value. Without a vehicle like a Special Tourism Investment Zone, Mersing risks remaining a conservation and visitation interest points.

But without STIZ, **these isolated efforts remain fragmented,** underfunded, and disconnected from the national tourism growth strategy

Under the 13th Malaysia Plan (13MP), Johor has been identified as a focus state for STIZ development. As states like Sarawak and Melaka accelerate STIZ-linked tourism infrastructure and investment, Mersing with its gateway islands, national parks must not be left behind. Recognising Mersing as a STIZ will be a strategic enabler to connect Mersing to national tourism momentum and global visitor flows.

Source: New Strait Times, MOTAC, Malaysia Kini

Establishing Mersing as part of Special Tourism Investment Zone (STIZ)

Mersing has a strong potential to become a leading tourism destination in Malaysia, leveraging its unique natural resources and strategic location. By developing coastal resorts, island tourism, and ecotourism options, Mersing can attract both domestic and international visitors into the district

Initiative Highlights:

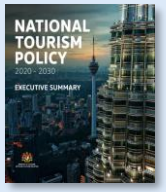
Concept Description	Collaborate with the federal government to designate Mersing as part of a Special Tourism Investment Zone (STIZ) to accelerate tourism development in the district

Initiative Highlights:

Mersing

Located on the east coast of Johor, Mersing is a hidden gem poised to become a major tourism destination. Major attractions include:

- Pristine Islands & Beaches
- Beautiful Coral & Marine Life
- Endau Rompin National Park



Special Tourism Investment Zone (STIZ)

MOTAC's National Tourism Policy 2020–2030 introduced the STIZ initiative to attract high-value, sustainable tourism investments through public-private partnerships. Designating Mersing as a STIZ location would unlock its potential by leveraging key incentives to be offered under STIZ programme:

- **Tax Incentives:** Reduction in corporate income tax for investors
- **Preferential Rate Loans:** Preferential rate loans for development projects
- **Infrastructure Development:** Investments in roads, utilities and other infrastructures

Creation of employment opportunities in Mersing District which would uplift the socioeconomic status of the people in Mersing

Implementing Agency
- MOTAC, Tourism Johor

Monitoring Agency
- BPEN-J

Associated Sectors :
- Tourism

Stakeholders Involved:
- MOTAC Johor
- Invest Johor

Budget Required:

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: Q1 2026
- End Date: Q4 2029

Source: Tourism Johor, National Tourism Policy 2020 – 2030, MOTAC

Establishing Mersing as a STIZ is a key step to accelerate investments, fast-track infrastructure, and transform the district into a sustainable tourism destination

What Mersing could benefit from under STIZ designation:

Benefits	Description	Impact	Example
Tax Incentives	• Reduction or exemption of corporate income tax for qualifying tourism developments under STIZ policy	• Attracts private sector interest and lowers investment barriers, especially for large-scale eco-resorts and hospitality ventures	• Langkawi Tourism Development Authority (LADA) leveraged tax incentives to attract high-end resorts like The Datai and Four Seasons, catalysing luxury eco-tourism growth
Financing Support	• Access to low-interest or preferential rate loans for tourism capital expenditure (eg: eco-lodges, cultural centres)	• Enables participation by SMEs and local investors, promoting inclusive tourism models creating employment opportunities for local communities	• Terengganu tourism microfinancing enabled homestay operators to expand services, improving income and creating jobs in rural areas
Public Infrastructure Enablement	• Prioritised allocation of federal-state funding for roads, utilities, jetties, and digital infrastructure within STIZ zones	• Improves accessibility, enhances tourist experience and supports dispersal to secondary destinations while managing visitor pressure on ecological assets in Johor	• Desaru Coast benefited from coordinated infrastructure investment (roads, water, broadband), positioning it as a regional resort destination
Streamlined Approvals	• "Single-window" facilitation model for tourism-related investments; reduces overlap between federal and state licensing	• Accelerates investment timelines, improves investor confidence, and enhances Mersing's competitiveness	• Malaysia Investment Development Authority (MIDA) adopted a fast-track approval mechanism for strategic sectors, improving project delivery timeframes by up to 50%

Source: Tourism Johor, MIDA, PASB Analysis

Absence of Duty-Free Zone Status for Mersing

Problem Statement

- Johor currently has only one small urban duty-free zone located in Stulang Laut Free Commercial Zone, Johor Bahru which is detached from its key beach and island tourism assets
- Prominent coastal destinations such as Mersing and its surrounding islands (Rawa, Sibu, Tinggi) remain outside the duty-free zone, placing them at a disadvantage compared to established duty-free islands like Langkawi, Tioman, and nearby Batam/Bintan
- To unlock the full potential of its coastal tourism economy, the Johor State Government should pursue duty-free zone status for high-potential tourism destinations
- While approval of duty-free zones rests with the Royal Malaysian Customs Department and the Ministry of Finance, Johor has yet to table a comprehensive, site-specific proposal to the Federal Government
- In the absence of duty-free incentives, Johor faces challenges in attracting high-spending tourists—particularly from Singapore—and in positioning itself as a competitive, retail-driven resort destination

Impact / Implication

Lost Tourism Receipts & Jobs:

- Langkawi's duty-free model drew 3.92 million visitors and RM 1.7 billion in tourism revenue in 2019; Johor forgoes similar high-value spend and the associated hospitality/retail employment

Under-performance of Mersing:

- Mersing attracted just over 11,000 visitors in 2022, more than 200 times fewer than Langkawi's 2.5 million, reflecting a substantial gap in tourism demand

Shorter Stays & Lower Per-capita Spend:

- Tourists treat Mersing mainly as a transit point to Tioman/Singapore rather than a retail-experience destination

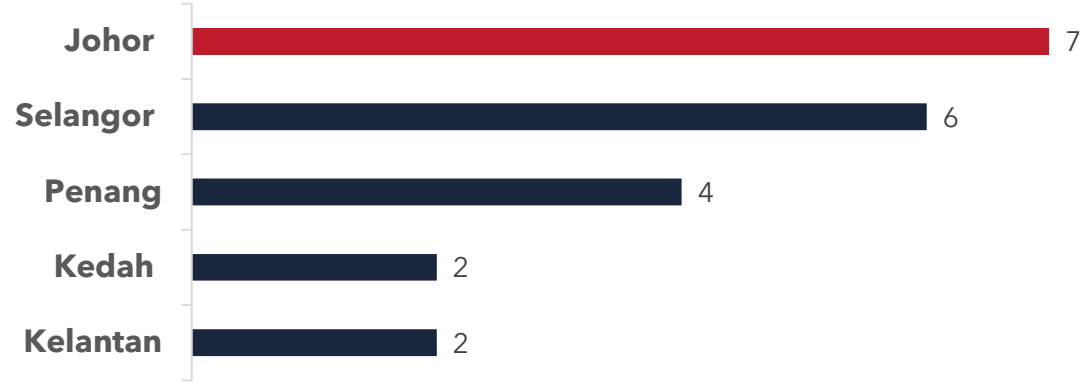
Parties Involved

- Ministry of Finance (MOF)
- Royal Malaysian Custom Department
- Ministry of Tourism, Arts & Culture (MOTAC) Johor
- Bahagian Perancang Ekonomic Negeri Johor (BPENJ)
- Tourism Johor

Source: Tourism Johor, Langkawi Development Authority, DOSM

Although Mersing plays a growing role in Johor's tourism landscape, the absence of a duty-free commercial zone may limit its ability to retain tourist spending and support local economic growth

Top 4 States in Malaysia with highest Free Commercial Zones



- Johor ranks as the top state in Malaysia with the highest number of Free Commercial Zones (FCZs) with 7 designated areas, outperforming major states like Selangor and Pinang
- Despite this, FCZs in Johor are largely concentrated in southern and western industrial or urban corridors (e.g., near ports and Iskandar region), with limited presence in tourism-centric districts

How the Lack of a Duty-Free Zone Constrains Mersing's Tourism Potential

Despite being a key entry point to Johor's 13 marine park islands, Mersing receives little spillover benefit from visitor traffic due to its lack of commercial incentives like duty-free retail or tourism-linked facilities.

Tourists largely pass through Mersing without stopping resulting in:

- Low per-capita tourist spend
- Minimal local commercial activity
- Underdeveloped retail/F&B ecosystem

Local enterprises have few incentives or platforms to tap into tourist flows, leading to missed opportunities for income generation and job creation.

This suggests an opportunity to extend FCZ coverage to underserved tourism gateways like Mersing, ensuring more balanced regional development aligned with Johor's wider economic goals

Source, DHL, PASB Analysis

Establishing Mersing as a Free Commercial Zone (FCZ)

Designating Mersing as a free commercial zone (FCZ) would catalyse tourism development in the district by capitalising on its strategic location as the gateway to the Mersing Archipelago and its unique natural assets, including pristine beaches, islands, and rich marine biodiversity

Implementing Agency
- MOTAC, Tourism Johor

Monitoring Agency
- BPEN-J

Associated Sectors :
- Tourism

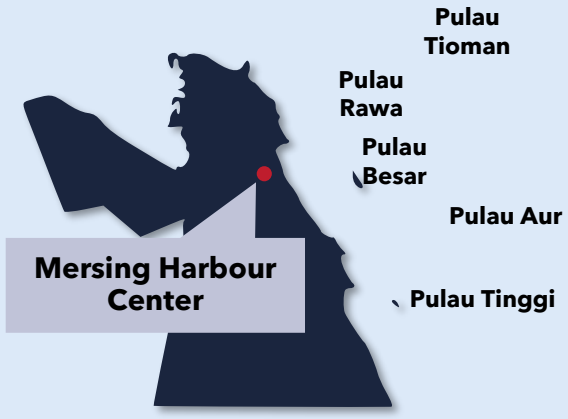
Stakeholders Involved:
- Ministry of Finance (MOF)
- Jabatan Kastam Diraja Malaysia
- MOTAC Johor

Initiative Highlights:

Concept Description	Collaborate with the federal government to designate Mersing as a Free Commercial Zone (FCZ) to accelerate tourism development in the district

Initiative Highlights:

Proposed Location of FCZ:



Designating Mersing Harbour Centre and key islands in Mersing as Free Commercial Zone (FCZ) presents a strategic and economically viable move to accelerate tourism growth in the district:

- **Policy Alignment:** The FCZ can be incorporated into Mersing's STIZ application, offering dual federal recognition and added investment appeal
- **Market Potential:** Langkawi drew 2.5 million visitors in 2022, compared to only 11,000 for Mersing. Lifting duty barriers could unlock significant tourism demand into the district
- **Economic Impact:** Customs exemptions apply only to specific goods, while SST, service tax, quit rent, and local levies remain intact. Langkawi's model shows that every RM1 in duty foregone can generate over RM10 in broader taxable economic activity

Budget Required:

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

The designation of Mersing as a Free Commercial Zone is expected to stimulate tourism growth, enhance local employment prospects, and drive socio-economic upliftment by reducing poverty levels in the district

Implementation Timeframe:
- Start Date: Q1 2026
- End Date: Q2 2027

Source: Tourism Johor, Langkawi Development Authority, Bernama, PASB Analysis

As tourism branding gains traction in Mersing, introducing a Free Commercial Zone has the potential to strengthen its economic viability as a destination

Free Commercial Zone:
Designated area to perform commercial activities that include trading (excluding retail trade), breaking bulk, grading, repacking, relabeling and transit

Objective:
- To stimulate visitor spending, tourism receipts, and commercial vibrancy in Mersing through duty-free privileges
- To provide fiscal incentives that enhance Mersing's appeal as a tourism stop, not just a transit point

Anticipated Impact:
- **Increase in Tourist Spending** due to duty-free price advantage
- **Boost number of visitors** particularly from Singapore-based short-haul tourists and yachting segment
- **Generate job opportunities** within retail, F&B, ferry/marina services

Proposed Location for FCZ in Mersing

Primary Zone:
- Mersing Ferry Terminal Precinct and Town Core (commercial/retail spine)
- Covers waterfront retail area, jetty terminals, and adjacent commercial blocks

Optional Expansion (Phase 2):
- Marina area and selected island-based resorts (eg: Pulau Rawa, Pulau Besar)
- Enables marine-based duty-free access (similar to Tioman's model)

What a Mersing FCZ Could Look Like

Designated Duty-Free Zone at Mersing Harbour, anchored by boutique retail and a marine tourism services

Inter-island Connectivity Infrastructure, including upgraded ferry terminals supporting seamless movement across the island

Eco-aligned Zoning Regulations, ensuring incentives is channeled into low-impact, high-value tourism models

Single-Window Investor Facilitation, streamlining customs exemptions, licensing, and investment approvals under one roof

Source: PASB Analysis

Case Study Example: What Mersing could learn from Langkawi on Free Commercial Zone

Overview of Langkawi Free Commercial Zone

- Langkawi was designated as a duty-free island in 1987, and this policy has markedly boosted its tourism growth.
- Annual visitor arrivals jumped immediately after the FCZ designation Throughout the 1990s and 2000s, Langkawi's tourism expanded steadily, crossing the 1 million mark in the early 1990s and reaching over 3.6 million by the mid-2010s.
- This growth culminated in a record 3.92 million tourist arrivals in 2019

Impact of Duty-Free Retail on Tourist Spending

Langkawi's duty-free status significantly increases per-visitor spending, especially on chocolate, perfume, and souvenirs.

Malaysian tourists spend ~RM412/day in Langkawi, 2–3x higher than in non-FCZ destinations.

In 2023, Langkawi earned RM4.4 billion in tourism revenue from 2.82 million visitors – ~RM1,560 per visitor on average.

How Mersing can recoup investments by learning from Langkawi

Duty Free Business Licensing

- Operators of duty-free shops must be licensed and pay fees
- For example, a duty-free shop license costs about RM1,200 for a two-year term. These licensing fees (issued via Royal Malaysian Customs) provide some revenue and also regulate the number and compliance of duty-free retailers

Port and Marina Usage Fees

- Cruise ships and ferries are charged berthing and passenger handling fees
- Fees help fund maintenance, operations, and return concession-based revenue to the government

Customs Duties on Existing Goods

- Tax exemptions apply only within Langkawi where customs duties are charged on goods brought back to the mainland exceeding allowed quotas
- For example, exceeding alcohol or tobacco allowances triggers standard import duties. This helps prevent abuse while still allowing regulated duty-free shopping

Tourism Taxes and Local Levies

- Foreign tourists pay RM10/night Tourism Tax, collected by hotels and remitted to Customs
- Langkawi also applies a local promotion fee (RM1–RM9 per night based on hotel rating)
- These taxes fund infrastructure, services, and tourism marketing, ensuring indirect public returns

Source: Tourism Johor, Royal Malaysia Customs Department, DHL , Tourism Malaysia, Langkawi Development Authority

Limited mandate to oversee tourism industry development

Problem Statement

- Tourism Johor's current mandate is confined to marketing, publicity, and event-based promotions. It may lack the clear mandate over key strategic functions such as tourism masterplan development, investment promotion, infrastructure monitoring, and establishing a tourism data framework
- Meanwhile, Invest Johor, the state's principal investment promotion agency focuses primarily on the manufacturing and logistics sectors. Without a dedicated tourism investment unit, potential investors may face challenges in accessing sector-specific support, insights, and facilitation services
- Additionally, Johor has yet to operationalise the National Tourism Policy 2020–2030's vision for Special Tourism Investment Zones (STIZs), nor has it published a state-level tourism development roadmap. This lack of strategic planning could hamper coordinated development, site prioritisation, and long-term industry growth
- Tourism-related approvals, licensing, and oversight are dispersed across MOTAC-Johor, local councils, and sector regulators. This fragmentation increases bureaucratic hurdles, lengthens investment timelines, and drives up compliance costs due to the absence of a clear lead agency

Impact / Implication

Disjointed Tourism Investment Ecosystem

- Fragmentation leads to inconsistent investor experience, weakened coordination, and missed opportunities for catalytic tourism developments across Johor

Lack of Strategic Direction

- Without a unified tourism strategy or lead agency, Johor struggles to prioritise anchor projects, attract targeted investment, and develop high-impact tourism clusters

Reduced Investor Confidence

- Unclear facilitation structures and multiple regulatory touchpoints deter serious investors, particularly for capital-intensive tourism developments (e.g. resorts, marinas, eco-tourism hubs)

Parties Involved

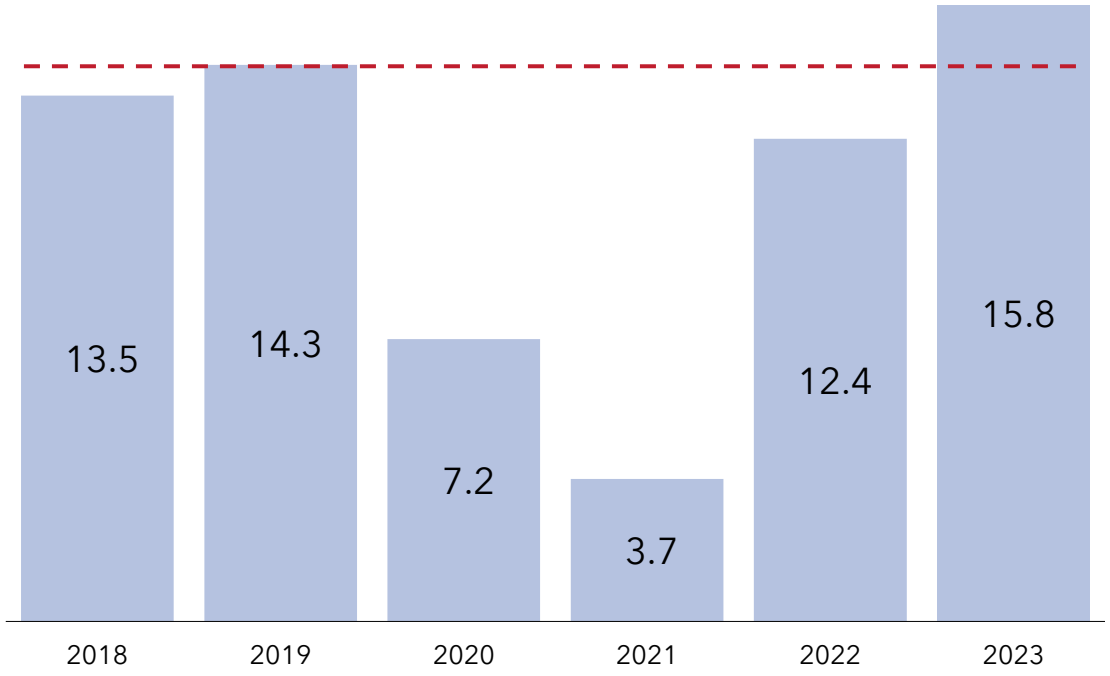
- Ministry of Tourism, Arts & Culture (MOTAC) Johor
- Bahagian Perancang Ekonomi Negeri Johor (BPEN-J)
- Tourism Johor
- Invest Johor

Source: Invest Johor, Tourism Johor

Johor recorded its highest domestic and foreign visitor volumes in five years in 2023, signaling a full post-pandemic recovery in tourism demand

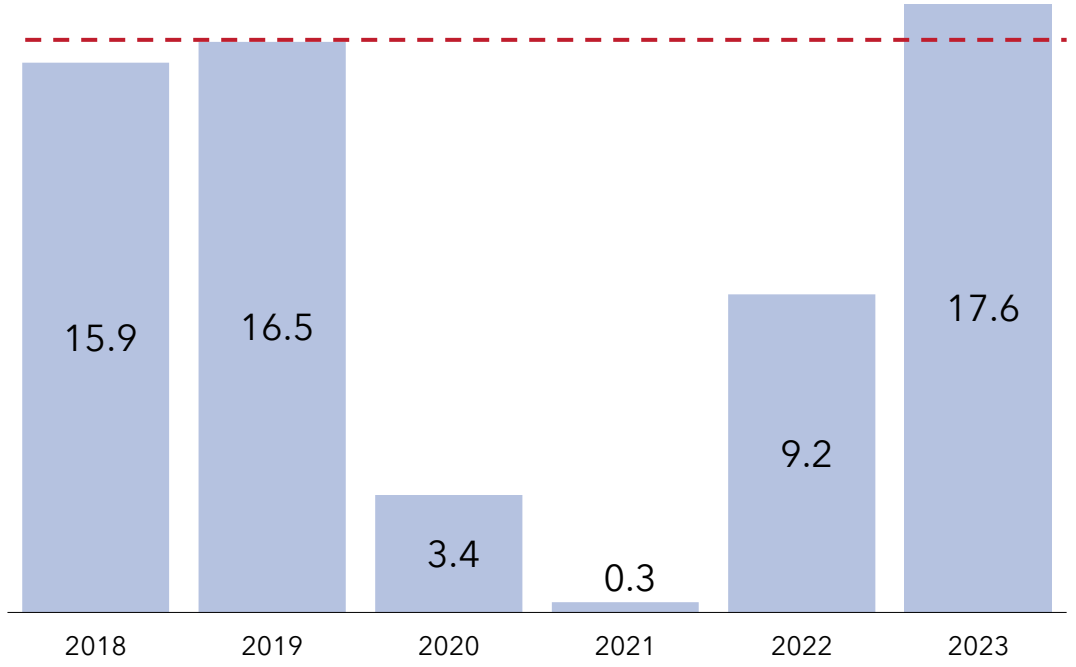
Total Number of Domestic Visitors in Johor (2018 – 2023)
Domestic Visitors (Million)

Pre- Covid: 14.3 Million



Total Number of Foreign Arrivals in Johor (2018 – 2023)
Foreign Arrivals (Million)

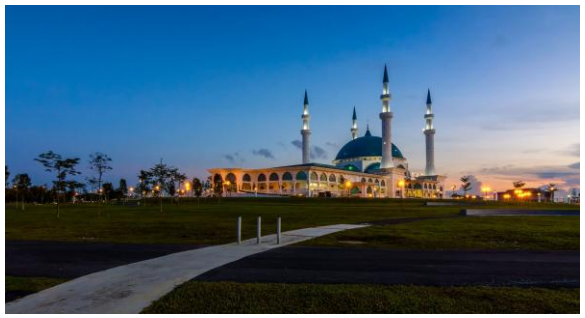
Pre- Covid: 16.5 Million



Tourism in Johor has bounced back to pre-COVID levels – domestic arrivals hit 15.8M in 2023, exceeding 2019 levels, and foreign arrivals reached 17.6M, up from 16.5M in 2019

Source: BPEN Data Asas Johor (2018 – 2023)

To convert short-term recovery into long-term prosperity, Johor must empower Tourism Johor with the strategic tools and mandate to drive holistic tourism development



TOURISM JOHOR

Tourism Johor's currently focused primarily on:

- Marketing and promotion, with limited role in infrastructure or policy coordination.
- Lacks authority and resources for masterplan development, cross-district alignment, or major investment facilitation.

If Tourism Johor's mandate remains limited:

- **Fragmented Development**: Lack of coordinated infrastructure plans may result in congestion at hotspots, neglect of emerging districts, and inconsistent tourist experiences.
- **Missed Investment Opportunities**: Without a central body to spearhead tourism investment promotion, Johor may lose out to better-prepared destinations.
- **Policy Blind Spots**: Absence of a robust data system means decisions will be reactive, not informed by trends, gaps, or high-impact areas.
- **Limited Long-Term Vision**: No single roadmap guides Johor's tourism development, which can lead to short-termism and ad-hoc initiatives.

Source: PASB Analysis

Expansion of Tourism Johor's Mandate to Drive Targeted Tourism Industry Growth

Johor's tourism industry is mainly driven by Tourism Johor, which does mostly tourism marketing, branding and promotion[1]; Johor may thus lack a dedicated, well-mandated tourism body to oversee overall industry development and long-term planning needed to drive sustained growth

Initiative Highlights:

Concept Description	Expanding Tourism Johor's mandate to include masterplan development, investment promotion, coordination of tourism infrastructure development, and data framework development to strategically drive and monitor Johor's tourism growth.

Initiative Highlights:

Proposed Mandates

Expansion of Tourism Johor's mandate:

- **Johor's Tourism Masterplan Development:** A comprehensive, long-term strategy document / roadmap to guide Johor's overall tourism development plan via a consultative and collaborative approach involving private players, public agencies and tourism subject matter experts
- **Tourism Investment Promotion:** Spearheading investment attraction efforts to ensure a comprehensive and strategic development of Johor's tourism sector
- **Infrastructure Coordination:** Overseeing the planning, coordination, and implementation of tourism infrastructure projects across districts to ensure timely delivery and alignment with development priorities
- **Data-Driven Development Framework:** Establishing a robust tourism data system to enhance investment planning, inform policy decisions, and strengthen stakeholder engagement through accurate data collection and analysis

Expansion of Tourism Johor's mandate can provide clarity in the strategic alignment and coordination of tourism development projects across districts and increase efficiency and transparency in tourism infrastructure implementation

Implementing Agency
- Tourism Johor

Monitoring Agency
- BPEN-J

Associated Sectors :
- Tourism

Stakeholders Involved:
- Invest Johor
- MOTAC Johor

Budget Required:

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: Q1 2026
- End Date: Q3 2027

Note: [1]Also does some infrastructure development project monitoring and coordination

Expansion of Tourism Johor's Mandate across a holistic scope to be the leading one-stop centre for tourism matters within the state

Structure:

Lead Agency:
Tourism Johor

State Level

Working Group

Objective

Develop a comprehensive tourism masterplan aligned with national and federal strategies.

Increasing tourism-related investment, jobs, and contribution to Johor's economy

Strengthening Johor's competitiveness in the national and international tourism landscape

Aim:

Position **Tourism Johor** as the state-level delivery agency for strategic tourism planning, guiding sector growth and delivery moving beyond marketing to lead master planning, investment promotion, infrastructure coordination, and data-driven development.

Intended Impact:

Stronger Industry Ecosystem
Clearer alignment between infrastructure, investment, and tourism development for Johor

Increased Investments
More targeted and higher-quality investments attracted through structured engagement

Greater Project Delivery Transparency
Infrastructure coordination reduces overlaps, improves alignment with state priorities, and enables monitoring of delivery outcomes

Enhanced Decision-Making
Data-driven insights allow Johor to adjust strategies dynamically based on market trends and visitor data

Function Area:

Tourism Masterplan Development

Lead long-term strategic planning aligning with federal strategies (e.g. National Tourism Policy, VM2026) and embedding global best practices in infrastructure design, sustainability, and inclusive visitor experience delivery.

Tourism Infrastructure Coordination

Oversee cross-agency and inter-district coordination for the planning and delivery of tourism infrastructure – ensuring accessible, high-quality, and integrated development that enhances seamless visitor journeys and equitable access.

Tourism Data Platform & Framework

Build and manage a comprehensive tourism data platform to track visitor flows, spending, infrastructure gaps, and environmental indicators enabling performance monitoring, dynamic strategy adjustments, and outcome-based policymaking.

Source: PASB Analysis

Absence of Sectoral Centralised Platform for Aerospace Industry Development in Johor

Problem Statement

- Johor's aerospace industry is still in its infancy even as Senai Airport prepares for a multi-phase expansion to host new MRO facilities, freighter services and international carriers
- Without a dedicated coordination office—akin to Selangor's Aerospace Industry Coordination Office (S-DAICO), which has consolidated investor outreach, streamlined permits, overseen skills development pipelines and driven global roadshows—Johor is left juggling enquiries across Invest Johor, the airport authority, port operators and various state agencies
- This fragmentation means every land allocation, talent-training partnership and promotional campaign must be managed separately, slowing down project launches just as the state's airport capacity and regional profile are poised for dramatic growth
- Given Johor's nascent position, establishing a single aerospace desk now is critical to capture momentum, avoid the growing pains experienced by emerging hubs like Penang and Kedah, and ensure the state fully leverages its upcoming infrastructure

Impact / Implication

- Prospective aerospace firms confront a maze of touchpoints—Invest Johor, Senai Airport, and various state departments—leading to confusion, duplicated briefings and perceptions that Johor is less business-friendly than states with unified desks like Selangor
- The absence of a central office hampers the rapid rollout of targeted training programs and industry partnerships, stalling the growth of a local talent pool needed for MRO, avionics and component manufacturing
- As Senai Airport's capacity and connectivity expand, Johor risks watching key anchor investors and trade missions favour more coordinated peers (e.g., Selangor Darul Ehsan Aerospace Industry Coordination Office (S-DAICO) or Kedah's Aerospace Committee), limiting its ability to position itself as regional aerospace hub.

Parties Involved

- IRDA
- Invest Johor
- Bahagian Perancang Ekonomic Negeri Johor (BPENJ)
- Senai Airport Terminal Services
- Malaysia Investment Development Authority (MIDA)
- Ministry of International Trade & Industry (MITI)
- National Aerospace Industry Coordinating Office (NAICO)
- Selangor Darul Ehsan Aerospace Industry Coordination Office (S-DAICO)
- Academic and training institutions
- Industry players and SMEs

Source: PASB Analysis

Johor's emerging aerospace presence presents a strategic opportunity to anchor southern Malaysia's role in the national aerospace ecosystem

Overview of aerospace presence in Johor

Key Activities in Johor Bahru and Kulai:

- International Airport
- Maintenance, Repair & Overhaul (MRO)
- Aerospace Manufacturing
- Education & Training Institutions

Johor's aerospace ecosystem is entering a critical growth phase, catalyzed by strategic investments, regional connectivity, and its proximity to Singapore.

With high-value aviation activities taking root in **Kulai and Johor Bahru**, there is now a pressing need for a **dedicated Aerospace Council and Secretariat** to coordinate efforts, drive investor confidence, and position Johor as a **southern aerospace gateway complementing Selangor's established dominance**.

Johor's Strategic Positioning

Emerging Key Player

- Johor is emerging as a key player in Malaysia's aerospace sector, driven by anchor investments from GKN Aerospace and Asia Digital Engineering.

Southern Advantage

- Senai International Airport, the only international airport in southern Peninsular Malaysia, strengthens Johor's role as a southern gateway for cross-border aerospace operations.

Industrial Foundation

- Johor's maturing industrial base, and the Senai Airport Industrial Zone provides critical infrastructure to support high-value aerospace services such as MRO and manufacturing.

Source: Free Malaysia Today, Maju Johor

Launching a Johor Aerospace Council & Secretariat

Johor lacks a formalised platform to align, coordinate, and support the aerospace development efforts across the state. While existing efforts exist across various agencies, these remain distributed, with no centralised body serving as a consistent point of contact for investors, industry players, or stakeholders.

Initiative Highlights:

Concept Description

Establish a Johor Aerospace Council & Secretariat to serve as a strategic platform for sectoral alignment, direction and inter-agency coordination on aerospace sector development in Johor. The Council's core function is to shape and guide Johor's aerospace ambitions, with the Secretariat providing day-to-day support and coordination.

Initiative Highlights:

Background Context

- This initiative proposes the creation of Johor Aerospace Council under the leadership of the Johor State Government to provide vision, direction and the overall development plan for the aerospace industry.
- The Secretariat will support the Council directly, providing operational coordination, stakeholder engagement, and administrative support.
- A dedicated Council and supporting Secretariat would provide a central platform to enhance coherence, alignment, and stakeholder engagement across Johor's aerospace ecosystem.

Proposed Structure

Johor Aerospace Council

↓

Johor Aerospace Secretariat

- **Provide Strategic Direction:** Guide Johor's aerospace positioning, including Master Plan oversight, long-term value chain development, and alignment with the National Aerospace Blueprint 2030.
- **Convene Cross-Sector Stakeholders:** Bring together federal and state bodies, academia, industry leaders, and regulatory authorities to ensure coherence across policies, training and regulatory frameworks.
- **Position Johor Globally:** Champion Johor as an aerospace hub and in the through national and international engagement.

The establishment of a Johor Aerospace Council and Secretariat will strengthen strategic alignment and coordination of aerospace development initiatives across Johor, enhancing efficiency and coherence in stakeholder engagement and infrastructure implementation.

Implementing Agency
- IRDA

Monitoring Agency
- BPEN-J

Associated Sectors :
- Aerospace

Stakeholders Involved:
- IMFC-J
- BPENJ
- MIDA

Budget Required (Preliminary):

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: Q1 2026
- End Date: Q2 2027

Launching a Johor Aerospace Council & Secretariat : Initiative Details

Reference Case: Selangor's Aerospace Model (S-DAICO)

Selangor Darul Ehsan Aerospace Industry Coordination Office (S-DAICO)

Function: State-level aerospace office responsible for coordination, execution, management and monitoring of the Selangor Aerospace Growth, Development and Promotion

Structure:

- Positioned under Invest Selangor
- 'Secretariat' to the Selangor Aerospace Council chaired by The Chief Minister of Selangor

Outcome:

- Developed the country's first state-level Aerospace Action Plan
- Over 60% of national aerospace firms (≈230) coordinated via S-DAICO

Scope

- One-stop aerospace facilitation centre
- Supports SMEs, major aerospace sub-sectors

Source: Invest Selangor

Opportunity for Johor

Establish state-level leadership to drive long-term aerospace ecosystem development through a Johor Aerospace Council (providing strategic direction) and Secretariat (providing operational coordination and support).

	Council	Secretariat
Focus Area:	Strategic Direction, Oversight, Policy Alignment	Operational Coordination, Stakeholder Engagement, Data Management
Role:	▪ Set vision and priorities for Johor's aerospace ambitions ▪ Provide high-level oversight and guidance ▪ Champion Johor's positioning as an aerospace hub ▪ Align with state and federal strategies	▪ Facilitate communication and alignment across state agencies and with federal stakeholders (MIDA, IMFC-J) ▪ Provide a "single point of contact" for investors to navigate state-level processes
Intended Outcome:	▪ Johor Aerospace Master Plan endorsed as state's long-term aerospace strategy ▪ Stronger positioning of Johor within Malaysia's aerospace ecosystem	▪ Implementation Action Plans developed and coordinated across agencies ▪ Annual Aerospace Progress Reports produced to track delivery against Master Plan

High Capital Barrier for Advanced Back-End Semiconductor Manufacturing

Problem Statement

1. **Historical Context (2010–2020)**
   - Malaysia has long been a global hub for outsourced semiconductor assembly and testing (OSAT), accounting for 13 % of worldwide OSAT services by 2023
   - Yet most high-end packaging activity remains concentrated in Penang and Klang Valley, leaving Johor with minimal advanced back-end capacity.
2. **Recent Developments (2021–2025)**
   - The global OSAT market was valued at USD 39.92 billion in 2023 and is forecast to reach USD 67.92 billion by 2030 (CAGR 7.9 %)
   - Meanwhile, Johor's share of Malaysia's OSAT output is under 5 %, as few local players can handle multi-die, 2.5D/3D, and chiplet packaging.
3. **Bottleneck**: Without targeted upgrades in facility capabilities, talent development, and anchor-tenant partnerships, global semiconductor firms continue to bypass Johor for advanced back-end services, undermining JS-SEZ's aim of a full-chain ecosystem

Impact / Implication

- **Market Opportunity Lost**: Johor captures < 5 % of Malaysia's OSAT output (versus the national 13 %), translating to roughly USD 2.0 billion in current annual revenue instead of a potential USD 5.2 billion
- **Foregone Growth**: The global OSAT market is projected to grow to USD 71.21 billion by 2030 (CAGR 8.62 % from 2025)—Johor's under-investment means it risks missing out on a USD 8–12 billion share opportunity over the next decade
- **Ecosystem Spill-Over**: Advanced packaging drives high-value spill-overs—equipment suppliers, materials producers, and R&D centres. Johor's lack of in-state capacity caps its E&E export potential at USD 4 billion, versus a USD 7 billion projection under a fully realized JS-SEZ strategy

Parties Involved

- Bahagian Perancang Ekonomi Negeri Johor
- Malaysian Investment Development Authority
- Malaysian Digital Economy Corporation
- Global OSAT Players
- Industry Associations
- Academic Institutions

Source: DIGITIMES Asia, Grand View Research, Mordor Intelligence

Advanced-packaging demands billion-dollar investments, with global OSAT market growth reinforcing its strategic importance despite post-COVID normalization

Big-Ticket Advanced-Packaging Investments (2021-2025)

Intel invested ~US $7b in new advanced-packaging plant, Penang. (2021)

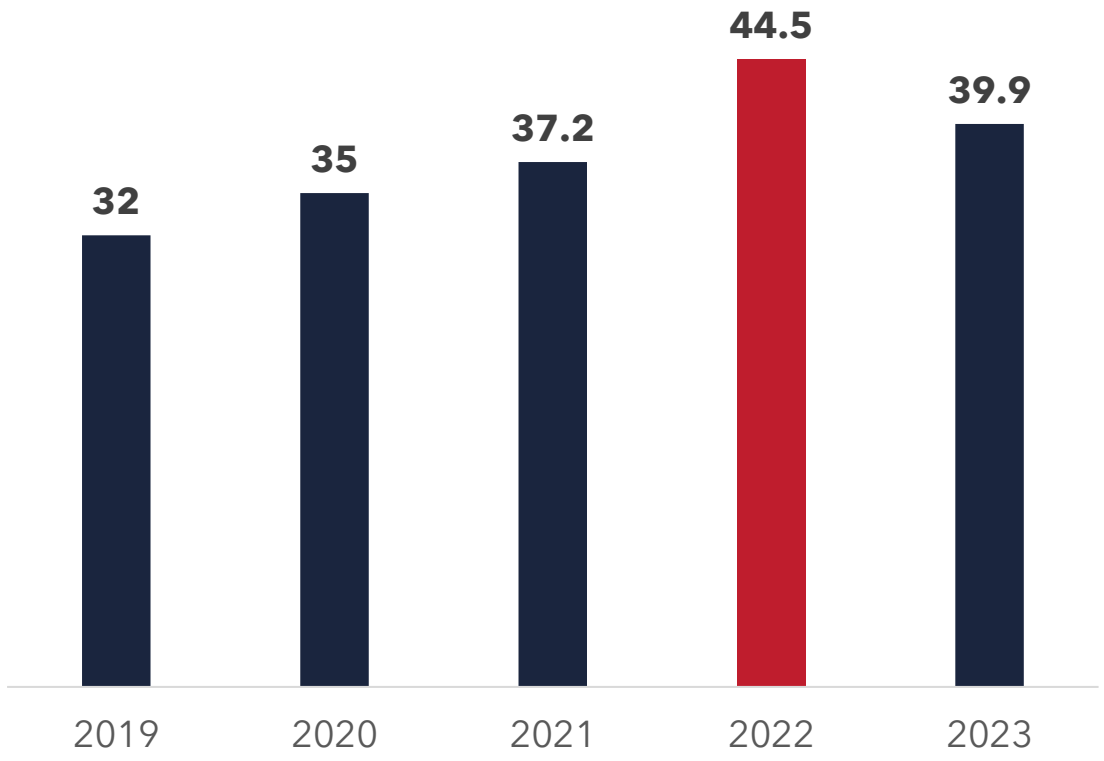
China commits US $4.1b to new fan-out WLP lines across Jiangsu & Guangdong. (2024)

TSMC approves NT$1.5tn (~US $45b) expansion for 2 nm & advanced-packaging hub, Kaohsiung. (2025)

Advanced-packaging hubs demand exceptionally high capital investment – with global players committing between US$4–45 billion per site

Global OSAT Market Size (2019-2023)

USD bil



The 2022 spike reflects post-COVID capacity rush; values normalise in 2023 but trend line is firmly upward

Source: Grand View Research, The Edge, TSMC, PASB Analysis

Introduce Tiered Land Premium Discount for Strategic OSAT Fabs

Johor's advanced back-end semiconductor ambitions are hampered by speculative land costs, deterring multi-die, 3D and chiplet-packaging investments. A structured rebate scheme will incentivise global advanced OSAT companies to invest in Johor

Initiative Highlights:

Concept Description	Introduce a graduated land-premium rebate within Johor's land-use framework–30 % for basic packaging, 50 % for advanced OSAT, and 80 % for multi-die/R&D anchor fabs–to cut entry costs and catalyze cluster growth

Initiative Highlights

Rebate Tier Structure

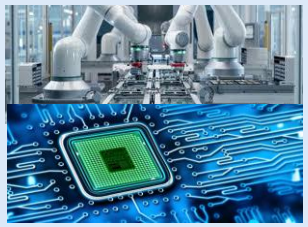
- Basic OSAT: 30 % rebate on land premium for standard packaging lines (single-die, wire-bond) (cap 500)
- Advanced OSAT: 50 % rebate for multi-die, 2.5D/3D packaging facilities
- R&D & Anchor Fabs: 80 % rebate plus equity incentives for fabs with on-site R&D centers or anchor-tenant commitments

Premium Discount Applicability

- Embed rebate tiers in PTG Johor's land-use circular under "Semiconductor Strategic Zone"
- Limit to parcels within designated JS-SEZ or industrial E&E park clusters
- Apply rebates to state land premiums or premium top-ups for private land converted to industrial use

Eligibility & Technical Requirements

- Investment Scale: Minimum capex of USD 50 million (Basic), USD 100 million (Advanced), USD 200 million (R&D/Anchor)
- R&D Linkage: Advanced and Anchor tiers require local academia partnerships or dedicated in-house R&D labs



Application & Approval Workflow

- Digital One-Stop Portal: Integrate rebate applications into IMFC-J's SFT-60 platform

By standardising and fast-tracking tiered land-premium rebates, Johor will unlock advanced packaging investments, deepen its OSAT ecosystem, and cement its position as Malaysia's leading back-end semiconductor hub

Implementing Agency
- Pejabat Tanah & Galian Johor

Monitoring Agency
- BPEN-J

Associated Sectors :
- Electrical & Electronics

Stakeholders Involved:
- IMFC-J
- MIDA
- MITI

Budget Required (Preliminary):

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: Q1 2026
- End Date: Q4 2030

Source: Mordor Intelligence, PASB Analysis

Vietnam, Taiwan, and Arizona link land incentives to capex/R&D – backing Johor's milestone-based rebate as fast, fair, and fiscally neutral

- Vietnam exempts land rent up to 15 yrs for high-tech chip plants (2024)
- High-tech-zone decree grants full rent holidays + CIT 10%
- CAPEX: US$ 4b + new OSAT pipeline

- Taiwan science parks give 50% land-rent discount first 5 yrs (2016)
- Parks lease—not sell—land; phased rent ramps cut entry cost
- CAPEX: US$ 9b TSMC 3DFabric Kaohsiung

- Arizona offers up to 71% property-tax relief in semiconductor zones (2023)
- Foreign trade & R&D zones slash real-property levies
- CAPEX: US$ 40b + TSMC Phoenix campus

All three locations tie land-cost relief to capex & R&D commitments– exactly what Johor's tiered rebate aims to secure

Proposed "Tiered Land-Premium Rebate" Mechanism

1	**Investor Qualification**	• Min capex: US $50 m (Basic) / 100 m (Advanced) / 200 m (R&D) • Must locate inside JS-SEZ or approved E&E park
2	**One-Stop e-Portal Application**	• PTG workflow embedded in IMFC-J SFT-60 platform • 30-day statutory turnaround; digital stamping & fee notice
3	**Rebate Issuance**	• Land-premium invoice auto-applies 30 %, 50 % or 80 % discount • MOF top-ups cover private-land conversions if applicable
4	**Milestone Triggers & Claw-back**	• Disbursement tied to site earth-works (40 %) + tool move-in (60 %) • Non-compliance (<80 % capex spend or <300 jobs) → prorated claw-back
5	**Recycle & Benchmark**	• Annual review resets cap tiers vs. Penang, Vietnam, Arizona benchmarks • Data dashboard published by BPENJ for transparency

Digital approvals + milestone-linked claw-backs keep the scheme fast, fair and fiscally neutral

Source: GTJA, Invest Taiwan, SEMI, PASB Analysis

Access to Agritech Is Costly and High-Risk

Problem Statement

1. **Historical Context**: In 2015, the federal Agri-Smart Scheme earmarked RM 50 million in matching grants for farm-level agritech (e.g., soil sensors, automated drip systems, drones). Johor received RM 8 million, yet by 2018 uptake languished at 1.2 % of smallholders (MARDI 2019)
2. **Current Reality**: As of December 2023, only 1 650 of 47 000 registered Johor smallholders (3.5 %) have installed any precision-agriculture technology—less than half the 8.5 % national average reported by MARii (2023). The state's RM 4 million 2023 grant pool was 80 % undersubscribed (DOA Johor 2023)
3. **Drivers**:
    - **High Up-Front CAPEX**: A mid-range automated irrigation system costs RM 25 000–50 000, versus an annual smallholder income of RM 30 000 (SME Corp 2022)
    - **Perceived Operational Risk**: 72 % of farmers cite lack of technical support and maintenance concerns, per a Johor Farmers' Association survey (2022)
    - **Fragmented Access to Finance**: Only 12 % of agritech-loan applications—averaging RM 40 000—received bank approval in 2023 (Agrobank)
4. **Consequences**: Low agritech adoption has perpetuated high manual labor costs (45 % of total operating expenses versus 30 % nationally) and constrained yield: Johor rice farms average 6.8 t/ha compared to 8.5 t/ha on precision-irrigated plots (MARDI 2022)

Impact / Implication

- **Economic**: Manual labour still accounts for **45%** of Johor farm operating costs versus **30%** in Malaysia overall, eroding profit margins by up to **RM 5 000/ha** annually (SME Corp Malaysia, 2022)
- **Productivity**: Johor's average paddy yield is **6.8 t/ha**, yet precision-irrigated farms elsewhere achieve 8.5 t/ha—a potential **25% gain** (MARDI 2022)
- **Strategic**: Without broader agritech uptake, Johor risks missing its **2030** target of becoming Malaysia's leading agri-innovation hub under the National Agro-Food Policy (NAP 2021–2030), hampering future investment

Parties Involved

- Department of Agriculture Johor (DOA Johor)
- Johor State Economic Planning Unit (BPEN)
- Malaysia Automotive, Robotics & IoT Institute (MARii)
- Malaysian Agricultural Research & Development Institute (MARDI)
- Ministry of Agriculture & Food Security (MAFS)
- Johor Farmers' Association

Source: MARDIN, Dept of Agriculture, SME Corp, Johor Farmers Association, Agrobank, MARii

Smart-farming adoption remains low as agribusinesses lag in digital readiness – highlighting the need to de-risk adoption, not just pilot new tech

Evidence of the Adoption Gap

Agriculture 2.0: Digital tech set to transform Malaysia's economic landscape, says World Bank

"Digital tech set to transform Malaysia's farms, but uptake still 'well below 10 % of smallholders'." (Malay Mail summary of World Bank Farming the Future report, 14 Oct 2024)

How Malaysia is stitching together a vibrant agritech tapestry

"Malaysia's agritech tapestry: pilot farms cut operating cost 30%." (GovInsider interview with MDEC, 2021)

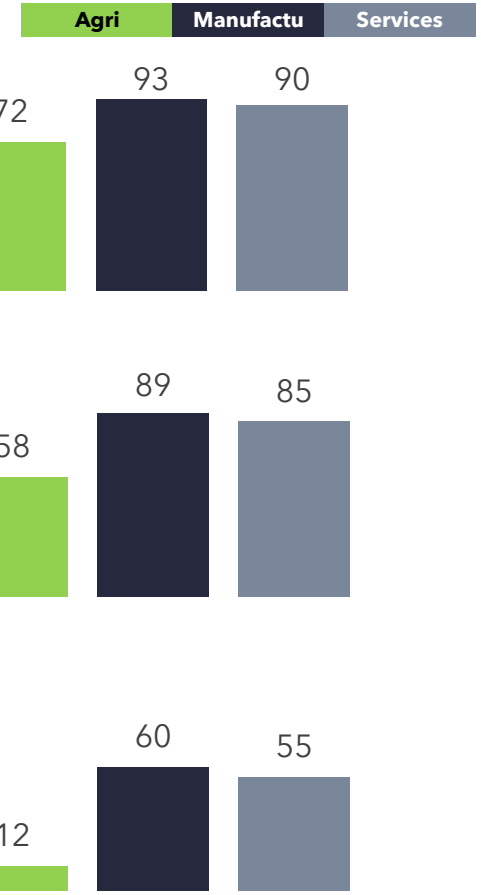
INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Exploring the Challenges of Adopting Smart Farming in The Agriculture Sector Among Smallholders in Malaysia

Academic review (UiTM, 2024): 'High capex & technical risk remain top barriers for Johor smallholders adopting smart-farming'

Despite proven benefits like 30% cost savings, smart-farming adoption among Malaysian smallholders remains low due to high capex and technical barriers

Digitalisation gaps within agribusinesses



Only 7 in 10 agribusinesses even go online, and barely 1 in 8 has a web presence—clear proof that Johor's agritech push must focus on lowering capex and de-risking adoption, not just piloting new gadgets

Source: Malay Mail, GovInsider, ResearchGate, World Bank, PASB Analysis

Launch Johor Agritech Accelerator Program

Johor's agriculture sector contributes nearly 30 % of Malaysia's agro-GDP but relies on manual practices that cap yields and margins. To meet the state's Maju Johor 2030 plan of becoming Malaysia's food basket, Johor farmers need end-to-end agritech support–making equipment affordable, financing accessible and skills widespread

Initiative Highlights:

Concept Description	Launch an integrated agritech support package–combining matching grants, credit guarantees, land-premium rebates and fast-track permits–to make sensors, drones and automation affordable and low-risk for Johor farmers

Visualisation of the initiative

Scope & Criteria

- Registered Johor smallholders
- Farms ≥ 2 ha with DOA/MARii-certified capex plans
- Q4 2025–Q4 2027 rollout across 10 selected demo hubs

Capability Pillars	Key Outcomes
Funding & Grants	• Calculating capex eligibility • Crafting winning grant and loan proposals
Precision Technologies	• Selecting and deploying sensors, drones, IoT • Optimizing farm layouts for yield
Data & Analytics	• Using farm-management software • Interpreting soil, weather & yield data
Bio & Input Innovation	• Integrating biopesticides • Applying seed-treatment and biotech solutions

Impact: JAAP will halve smallholder agritech capex, drive statewide Agritech adoption, boost average yields by 20-30% and cut manual labor costs by up to 15 %–advancing Maju Johor's 2030 food basket ambition

Implementing Agency
- Jcorp/FarmByte

Monitoring Agency
- BPEN-J

Associated Sectors :
- Agriculture

Stakeholders Involved:
- Jabatan Pertanian Johor
- MARii
- MARDI
- MDEC

Budget Required (Preliminary):

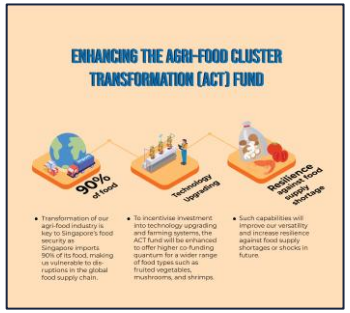
FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Note: To be further determined by FarmByte

Implementation Timeframe:
- Start Date: Q1 2026
- End Date: Q4 2030

Source: PASB Analysis

JAAP localises global best practices by blending financing, know-how, and incentives to scale smart farming in Johor



- **Singapore** – Agri-Food Cluster Transformation (ACT) Fund
- Co-funds up to 70% of farm-automation capex (max S$ 6m)

- **New Zealand** – Sustainable Food & Fibre Futures (SFF Futures)
- Grants cover 40–60% of agritech R&D and pilot costs (NZ$ 530m committed)

- **Indonesia** – TaniFund Crowdlending Platform
- Retail investors finance ≤ US$ 50k tech loans for smallholders since 2015

Each programme lowers capex risk and pairs funding with know-how—exactly what JAAP will localise

Proposed JAAP Delivery Mechanism

1	**Eligibility & On-Boarding**	• Registered Johor smallholders, ≥ 2 ha, DOA / MARii-certified capex plan
2	**Digital One-Stop Portal**	• Single form routes to grants, credit-guarantees and land-rebates
3	**Financing Toolkit**	• 50% matching grant (cap RM 50k) + MARii loan-guarantee up to RM 200k • Optional land-premium rebate for demo hubs
4	**Capability Accelerator Hubs**	• Four tracks: Funding, Precision Tech, Data & Analytics, Bio-Input • On-farm clinics + MARii/FarmByte mobile teams
5	**Milestone-Linked Payout & M&E**	• 40% grant at purchase order; 60% after verified deployment & yield-data upload • BPENJ dashboard tracks adoption vs 20% target by 2030

JAAP streamlines financing, training, and incentives to boost smart-farming adoption among Johor smallholders

Source: AGRI-FOOD CLUSTER TRANSFORMATION (ACT) FUND, MPI NZ, PASB Analysis

Flood Risks on Agriculture Activities

Problem Statement

- Johor is Malaysia's largest agriculture contributor, contributing RM17.2 billion or 11.6 % to the state's GDP in 2023. Nationally, Johor's agriculture output represents 17.1% of Malaysia' total agriculture GDP, underscoring its pivotal role in the country's agriculture economy
- However, Johor's agricultural productivity is increasingly threatened by recurring monsoon-season floods
- These floods inundate low-lying croplands and livestock areas, resulting in severe damage to harvests, livestock, and farm infrastructure
- In 2023, Johor suffered total flood loss of over RM275 million, with over RM25 million in damages directly affecting agriculture
- This recurring problem threatens rural livelihoods as well as big agriculture companies and jeopardizes the state's vision to become the national food basket, ensuring food security ambitions

Impact / Implication

Significant Flood-Related Losses:

- In 2023, Johor recorded over RM25 million in agricultural losses due to floods. Farmers face increased financial strain from recovery, rehabilitation, and infrastructure rebuilding
- Flood events disrupt the food supply chain and reduce overall agricultural productivity. The extensive damage to crops, livestock, irrigation systems, and farm facilities hampers long-term sustainability

Erosion of Investor Confidence:

- Repeated flood incidents diminish investor confidence in agriculture-related ventures, especially in high-risk zones
- Perceived risks deter private sector participation in modernising and expanding agricultural operations.

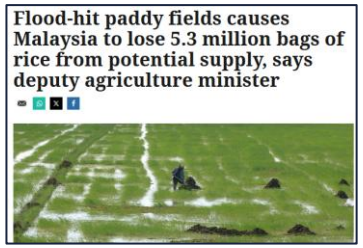
Parties Involved

- Jabatan Pertanian Johor
- Jabatan Pengairan dan Saliran Johor (JPS)
- Bahagian Perancang Ekonomic Negeri Johor (BPENJ)

Source: DOSM,

As Johor remains highly vulnerable to flood risk which would pose significant repercussions towards the agricultural sector, a multi-crop insurance scheme will prove critical to safeguard smallholders

What Other Countries Have Done



Agrobank "Padi Crop Takaful" Scheme (2023) – pays up to RM 3 000 per season for flood-damaged paddy; rolled out in Kedah & Kelantan.

Disaster Relief Facility & six-month moratorium – loan rescheduling for farmers in flooded rice belts.

Outcome so far – <10 % of Johor farmers accessed these paddy schemes (Kelantan & Kedah dominate claims)

Agrobank's paddy-focused schemes benefit northern states, with <10% of Johor farmers accessing available support

Why Johor Needs Its Own Multi-Crop Solution

Crop mix is different

- Johor's top farm revenue comes from oil-palm blocks, vegetables and livestock, not paddy; current takaful excludes those commodities

Higher loss values per hectare

- Horticulture & livestock losses average > RM 13,000/ha vs RM 1,800/ha paddy aid; payouts must match diversified, higher-value operations

Faster, data-driven payout

- Parametric triggers (river-gauge + radar rainfall) can settle claims within days, critical for high-working-capital vegetable & poultry farms

Johor needs a multi-crop insurance scheme to match its crop mix, higher losses, and faster payout needs

Source: Malay Mail, AgroBank, Business Today, PASB Analysis

Piloting Johor Agriculture Resilience Insurance Scheme (JARIS) for Smallholders

Johor is the largest contributor to Malaysia's agriculture GDP, driven primarily by crops and livestock. However, recurring monsoon floods increasingly threaten agricultural productivity, underscoring the need to protect farmers and safeguard their livelihoods through insurance protection scheme

Initiative Highlights:

Concept Description	Piloting fiscal support for subsidised crop insurance scheme in Johor for smallholders through a structured, premium-subsidised agriculture insurance programme

Initiative Highlights:

Background Context

- In 2023, agriculture contributed RM17.2 billion of GDP or 11.6% to the state GDP. In the same year, DOSM reported that Johor suffered flood losses of over RM25 million in agriculture industry. Without formal insurance, climate shocks cost Johor tens of millions annually, undercutting the very sector that anchors rural livelihoods and food security

Proposed Concept

As a concept, JARIS will be established as a public-private, takaful-compliant crop and livestock insurance pool with the following features:

- **Flood Loss Coverage:** Provides protection against flood-related damages, a key risk in Johor's agricultural sector
- **Affordable Premiums:** Farmer contributions will be capped at low rates (i.e. 2% for staple crops, 3% for industrial crops, and 5% for horticulture and livestock), with the remaining premium subsidised equally by the State Government
- **Digital Enablement:** Leverages a digital platform for MyKad-based e-registration, GIS parcel mapping, drone/remote sensing for loss assessments, and mobile wallet payouts within 30 days

Introducing JARIS would help reduce the government's reliance on contingency budgets for ad hoc disaster relief while providing a structured social protection mechanism for poor and vulnerable farmers against flood-related losses

Implementing Agency
- Exco Pertanian

Monitoring Agency
- BPEN-J

Associated Sectors :
- Agriculture

Stakeholders Involved:
- AgroBank
- BNM
- MARDI

Budget Required (Preliminary):

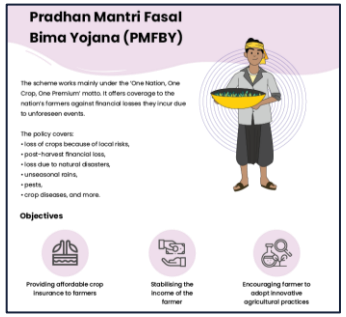
FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: Q1 2026
- End Date: Q4 2030

Source: ASEAN Guideline on Agricultural Insurance Implementation, PASB Analysis

JARIS mirrors global best practices: low premiums, fast payouts, and tailored coverage for smallholders

- **Philippines** – PCIC Parametric Insurance (launched 2025)
- Satellite + rain-index triggers; payouts within 14 days



- **India –** PMFBY Scheme (since 2016)
- Farmer premium capped at 2 %–5 %; > 29 crore growers enrolled

- **Thailand** – Rice Insurance Plan (2024 budget THB 1.57 b)
- Government pays ≈ 60 % of premium; farmers pay balance

All three schemes succeed when premiums stay ≤5 % and payouts are fast–yet each is crop-specific

Proposed JARIS Delivery Mechanism

1	**Eligibility & Enrolment**	• Smallholders registered with DOA Johor; any crop or livestock • e-KYC via MyKad & GIS parcel pin.
2	**Parametric Cover**	• Dual triggers: river-gauge flood height or 120 mm/24h rainfall • Sum-insured RM 3,000/acre (crops) & RM 5,000/head (livestock).
3	**Premium Subsidy & Re-insurance**	• State covers 50 % of actuarial premium; BPENJ retains first RM 20m losses, reinsurers excess.
4	**Digital Claims in 72h**	• Flood map + drone imagery auto-validate; DuitNow to farmer e-wallet
5	**Dashboard & Adjust**	• BPENJ publishes loss ratio vs. avoided relief spend; recalibrates triggers yearly

JARIS ensures fast, data-driven flood payouts to smallholders via automated maps and e-wallet transfers

Source: BusinessWorld Online, Jus Scriptum, Global Trade Alert, PASB Analysis

Absence of a financial hub in Johor

Problem Statement

- Johor lacks a robust financial ecosystem which hinders the state's ability to climb the financial services ladder as Singapore remains the preferred destination
- Insufficient financial-services support as the absence of accessible funding mechanisms and complementary banking, fintech, and capital markets infrastructure undermines the JS-SEZ's appeal for capital-intensive investors
- Despite Forest City's strategic location and massive investment, Forest City has under-delivered on its economic promise and potential resulting in underutilisation and high vacancy within the area

Impact / Implication

- Missed foreign direct investment (FDI) inflows as Singapore remains the undisputed and default financial hub
- Reduced synergies with the JS-SEZ and broader Iskandar corridor as investors lacks accessibility to financial services and access to capital in Johor
- Continued under-utilisation of Forest City which erodes investor and public confidence
- Stagnation of local job creation and skills development within the financial sector

Parties Involved

- Ministry of Finance
- MIDA
- BPENJ
- State Investment and Trade EXCO
- IMFC-J

Source: PASB Analysis

Johor risks missing out on high-value financial investments and the infrastructure needed to rival Singapore's offerings, undermining the JS-SEZ's potential

Johor is on track and will continue to attract high value investments across the coming years…

- Johor is on-track to attract up to RM100 billion in investments by the end of 2025
- The launch of JS-SEZ has propelled Johor in becoming Malaysia's top investment destination for the first quarter in 2025
- Moving forward, as the state aims to attract high value industries which may include capital intensive sectors, there is a growing demand for seamless and accessible financial services

… however, there remains a lack of financial services in Johor…

- Predominance of retail-oriented branch networks in Johor's with no national or regional headquarters to drive strategic corporate-finance initiatives
- Limited scope of transactional services as local banks only provide basic cash management, trade-finance letters of credit and conventional business loans, but lack platforms for syndicated lending, project-finance structuring or complex treasury products common in Kuala Lumpur and Singapore

… resulting in missed opportunities as investors look to Singapore for such services

- Singapore host over 150 banks and deposit-taking institutions, plus 45 representative offices of foreign banks
- Singapore's unmatched assets under management stands at a staggering S$6 trillion, as recorded in 2024
- Diverse range of financial services are offered:
  - Debt & Equity Capital-Markets Issuance
  - Fintech & Digital-Payments Infrastructure
  - Corporate & Structured Financing
  - Cash-Management & Treasury Services
  - Trade Finance & Supply-Chain Solutions

Source: PASB Analysis

Enhancing Forest City-Special Financial Zone (FC-SFZ)

Despite robust JS-SEZ–driven investment inflows, Johor still lacks a dedicated financial hub and the full suite of services that investors and capital-intensive businesses require—risking diversion of capital to Singapore and other regional centers

Initiative Highlights:

Concept Description	Establishing Forest City as Malaysia's first Special Financial Zone for high-value financial activity, underpinned by a comprehensive incentive package such as tax holidays, expatriate support and more

Visualisation of the initiative

FC-SFZ
The SFZ applies to Pulau Satu within Forest City, granting a duty-free status and bespoke fiscal incentives designed to attract capital-intensive and high-value financial players

Main Incentive Packages

Corporate Tax Concessions: A 0–5 % corporate tax rate for qualifying entities, compared to Malaysia's standard 24 % rate

Personal Income Tax Relief: A flat 15 % rate for knowledge-based workers

Duty-Free Status: Exemption from import/export duties on capital equipment and goods entering Pulau Satu.

Single Family Office Scheme which offers 0 % tax rate on eligible investment income of the Single-Family Office Vehicle (SFOV)

FC-SFZ could potentially attract high value financial anchor institution and investments while complementing the JS-SEZ ecosystem

Implementing Agency
- State Investment and Trade EXCO

Monitoring Agency
- BPEN-J

Associated Sectors :
- Cross-cutting

Stakeholders Involved:
- Ministry of Finance
- MIDA
- BPENJ
- IMFC-J

Budget Required:

FY	Public	Private
2025	*Budget details to be finalised during implementation of the initiative*	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: January 2026
- End Date: September 2028

While the FC-SFZ has attracted significant interest from financial investors, particularly single-family offices, the state must address additional complementary factors to enhance its proposition

NON-EXHAUSTIVE

Official Launch of FC-SFZ

- In September 2024, the FC-SFZ was officially launched in efforts to promote and attract vigorous development and capabilities in the financial industry within the state
- FC-SFZ through the support of the federal government aims to be a financial hub that promotes innovation across finance and banking services
- The FC-SFZ will introduce advanced financial formats and financial infrastructure in Johor that cooperates with Singapore as a "Dual-Core engine"

To further draw anchor financial institutions into FC-SFZ, several complementing factors should be considered:

Regulatory Flexibility	Potential embedment of the regulatory sandbox in partnership with Bank Negara's efforts to spur innovation-friendly framework and as a test-bed that evolves with global financial standards
Strategic Brand Positioning	Establishing a compelling narrative around Forest City's Singapore adjacency, cost arbitrage and "sandbox" credentials to differentiate the SFZ internationally
Targeted Promotion & Market Access	Leveraging trade missions, roadshows and investor visits to directly showcase SFZ's value proposition to decision-makers in global banks, family offices and sovereign-wealth funds
Public-Private Partnerships	Structuring of co-development agreements with multilateral development banks and leading financial groups to share risk, amplify credibility and mobilise blended capital that serves JS-SEZ and Johor

Source: PASB Analysis

Talent and Capacity Building.

Disclaimer Notes

The enabling initiatives listed were identified through Lab Engagements under JETP, based on direct consultations with the respective stakeholders.

These initiatives represent part of the proposed enablers to support Johor's economic transformation, but do not constitute the full extent of the State's recognised or emerging enabling measures.

The initiative lists presented are non-exhaustive. Information provided, including indicative budgets, are as furnished by the respective stakeholders and are shared in strict observance of the confidentiality obligations of all parties.

PEMANDU makes no representation as to the reliability or accuracy of the information provided, which is assumed to be accurate and reliable at the point of obtainment from the respective stakeholders.

Issue Charter – Critical shortage of high-skilled professionals

Problem Statement

- **JETP has identified investments that could create over 174,000 jobs in Johor by 2030, across our 8 priority sectors.**
- **However, it faces an acute shortage of high-skilled professionals, particularly in the Healthcare, Pharmaceuticals, and E&E sectors.**
- **Nursing is an increasingly unpopular profession due to a combination of poor working conditions, slow career progression and low salaries.** The number of nurses working in Johor has only grown by 1.4% over the past 5 years compared to state's population growth at 1.9%, resulting in a 1:373 Nurse to Population Ratio. Given growth of the industry, a 2022 survey by the Association of Private Hospitals Malaysia (APHM) indicated that an additional 9,224 nurses were needed between 2023 and 2025.
- While the number of specialists in Malaysia is growing at a 4.1% CAGR, there remains a **large gap between our current Specialist to Population Ratio and that of OECD countries.**
- **E&E has the highest vacancy rate out of all manufacturing sub-sectors**, at 5.2% of 649,000 roles vacant, or 33,749 vacancies. According to industry leaders, 15% of our engineers have left to work in Singapore, Australia, the United States and the United Kingdom, and 72% of E&E firms remained focused on recruitment to cope with talent shortages and high turnover rates, particularly for engineers.

Impact / Implication

- **Inability to realise investments worth over RM51 billion** identified by JETP.
- **Operational delays:** The Private Healthcare Facilities and Services Act (PHFSA) 1998 uses the number of nurses as a limiting factor for development: Private hospitals are prohibited from opening beds unless there are sufficient nurses to staff them.
- While there is no such regulation for manufacturing, the Aerospace and E&E sectors remain limited by a lack of expertise with available local talents, **disincentivising new MNCs and large players from entering the state**. This has a ripple effect on innovation and R&D within the state. SMEs will also face challenges, as they lack both the technical expertise as well as the programme expertise of running staff training programmes.

Parties Involved

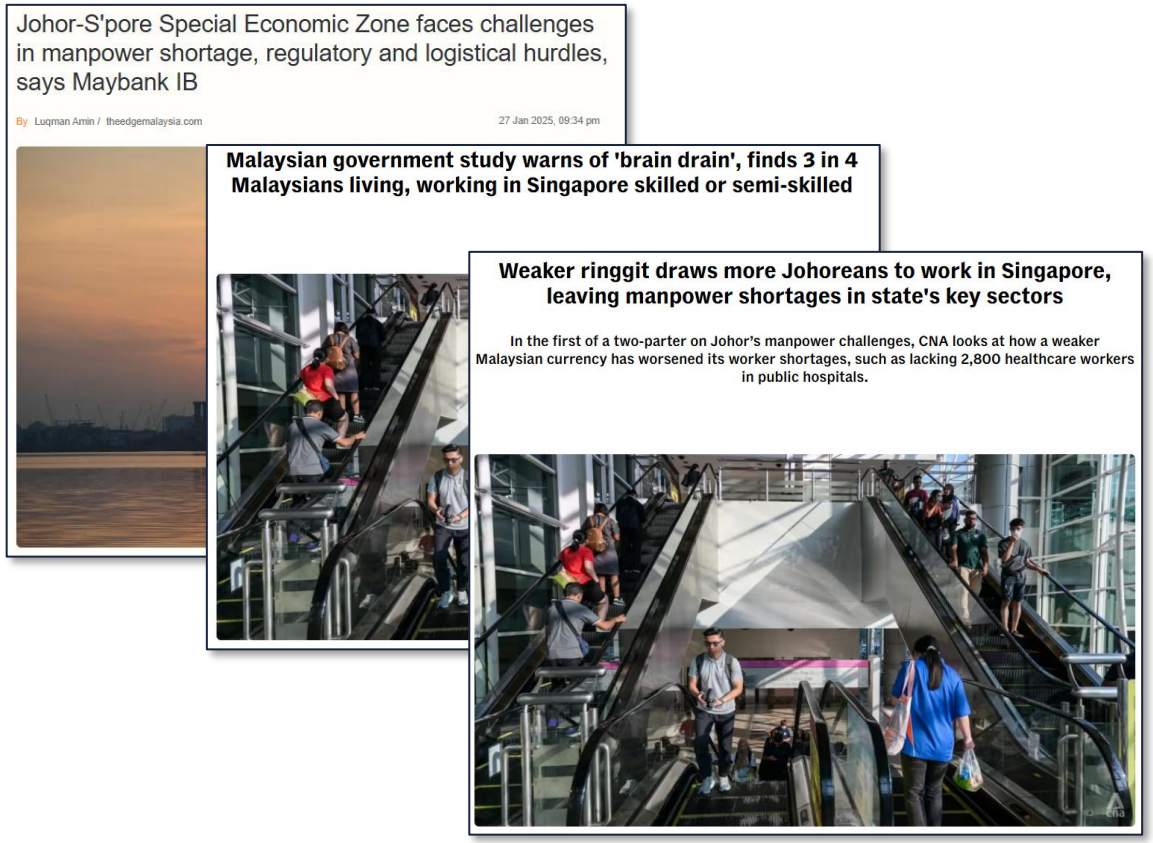
Talent Development
- JTDC
- Johor Skills
- MOHR
- TalentCorp
- Malaysia Productivity Corporation

Foreign Talent
- Department of Immigration

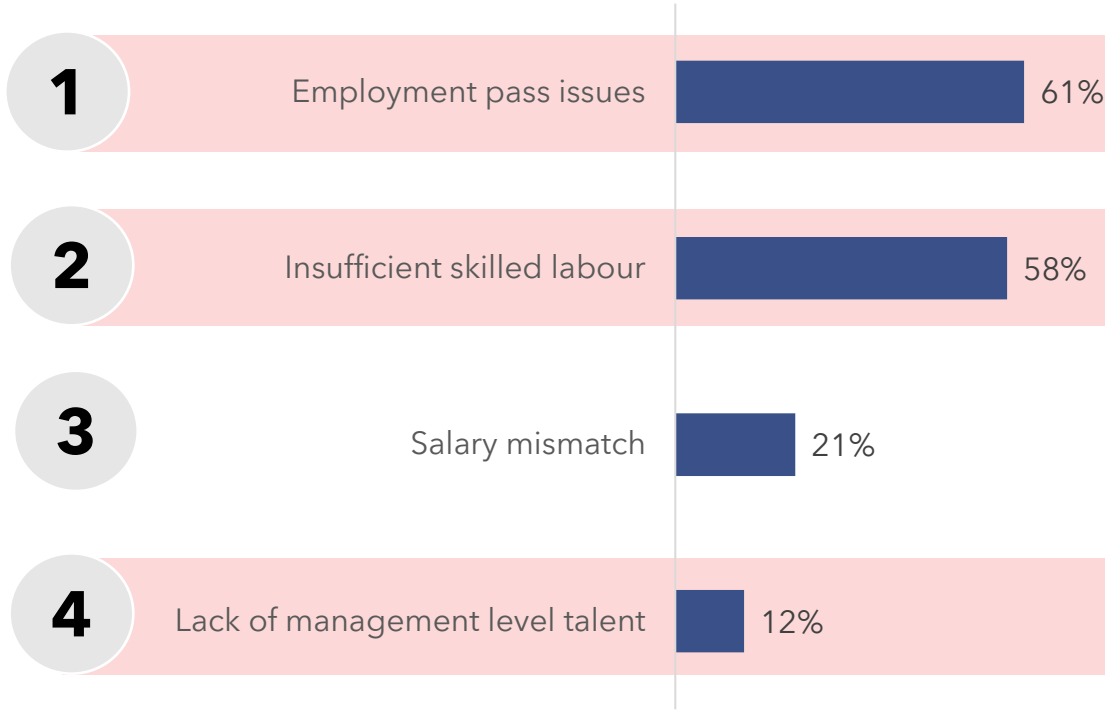
Healthcare-Specific
- Jabatan Kesihatan Negeri Johor
- IRDA
- National Specialist Registry (NSR)
- Kementerian Kesihatan Malaysia
- KPJ Healthcare University

Source: Bank Negara Malaysia, Malaysia Semiconductor Industry Association, FMM

Johor faces an acute shortage of technical and skilled talent, with 60% of Singaporean businesses with operations in Johor citing this as their biggest challenge



Factors Contributing to Manpower Crunch in Johor
(2022)



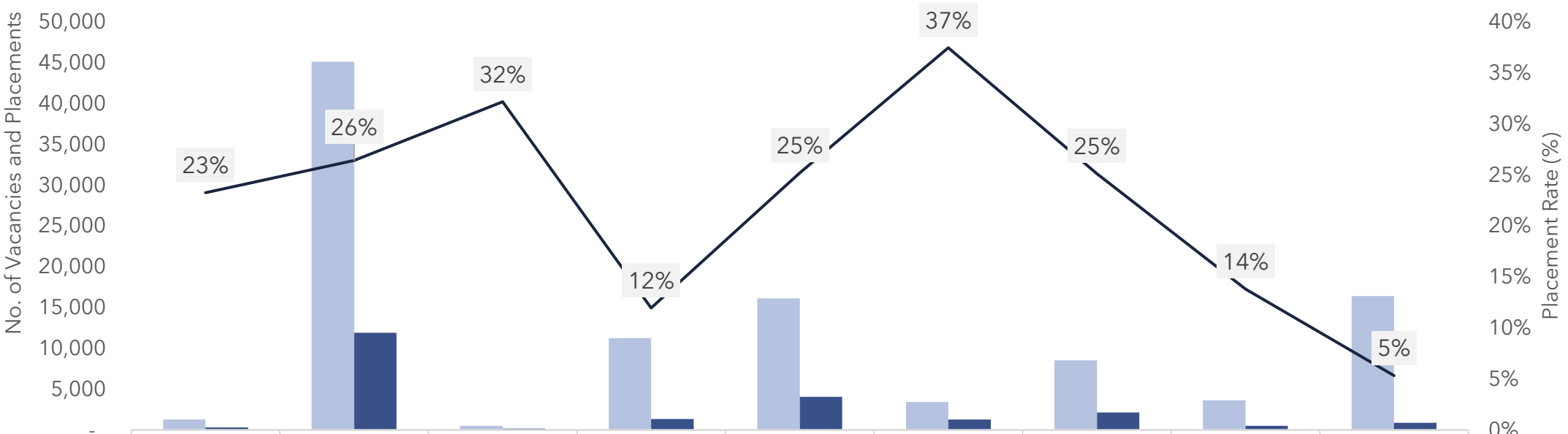
Between 300,000 to 400,000 Malaysians, mainly from or living in Johor, commute across the border to Singapore daily for work and education.

Meanwhile, in Johor, **3 out of 4 top manpower challenges identified by Singaporean companies were related to insufficient skilled labour,** including challenges obtaining work visas to bring in foreign talent.

Source: JS-SEZ SBWG Report, Singapore Business Federation (2024), The Edge (2025), Channel News Asia (2024)

Industry players consulted through JETP reported manpower shortages specifically in the Manufacturing (E&E, Aerospace) and Healthcare sectors

Comparison of Vacancies and Placements through MyFutureJobs by Industry
(2024)

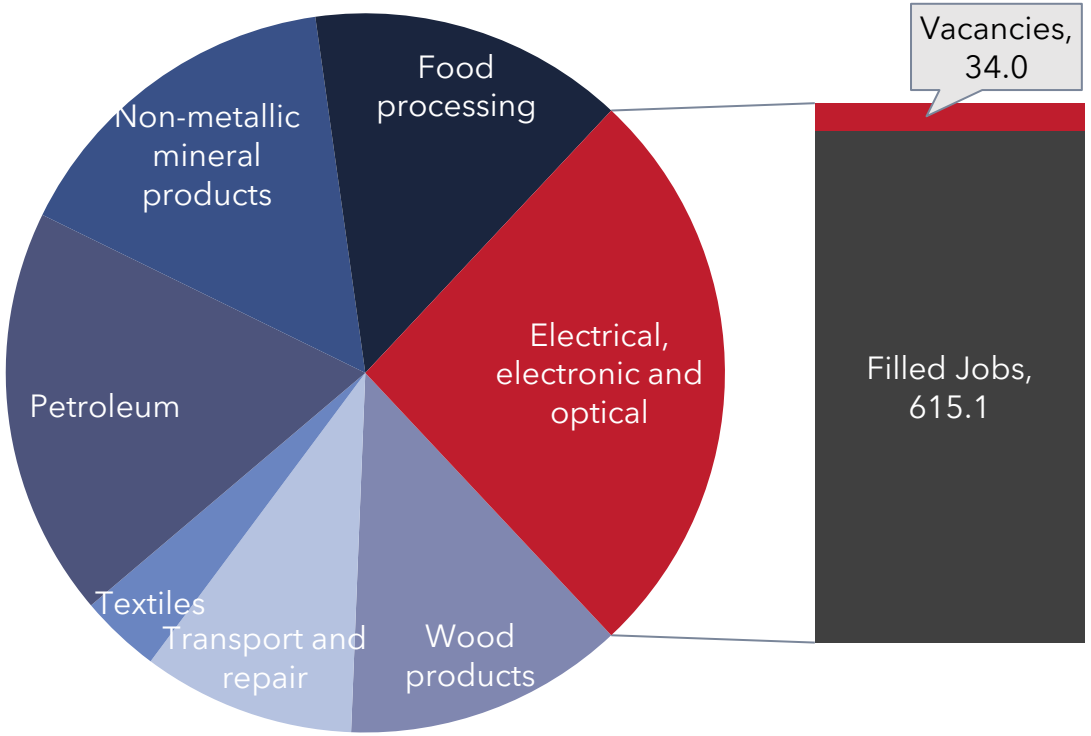


	Agriculture, Forestry & Fishing	Manufacturing	Electricity, Gas, Steam	Construction	Wholesale and Retail	Transportation	Accommodation & F&B	ICT	Human Health & Social Work
MyFutureJobs Vacancies	1,294	45,141	500	11,268	16144	3433	8541	3644	16410
Successful Placements	301	11929	161	1,349	4070	1287	2146	504	875
Placement Rate	23%	26%	32%	12%	25%	37%	25%	14%	5%

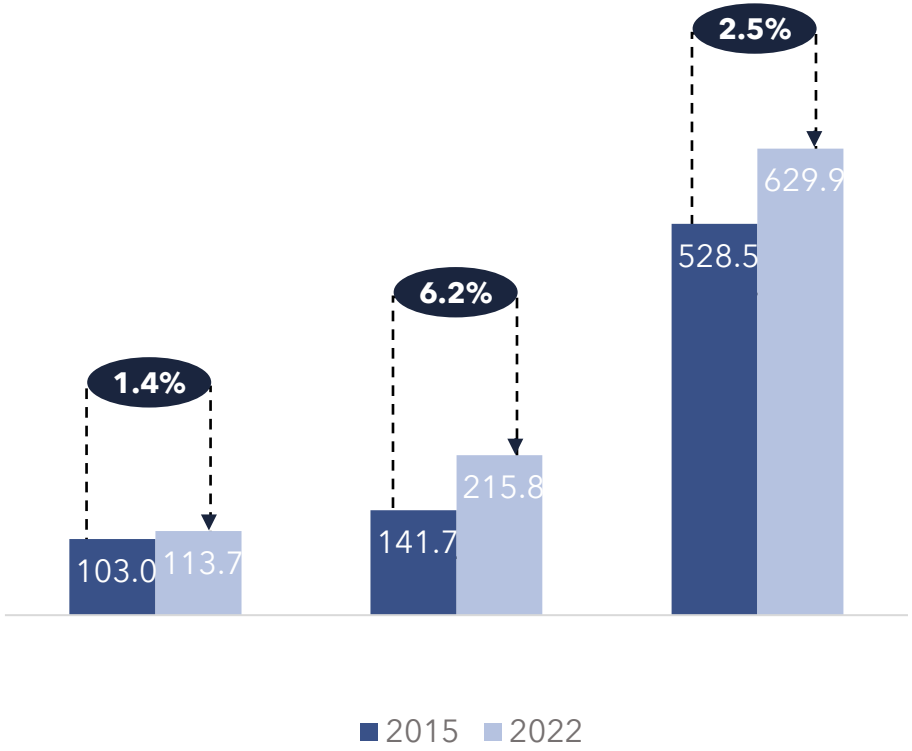
While Manufacturing jobs made up 1/3 of the 148,000 jobs listed on MyFutureJobs platform in 2024, the sector had a low placement rate of 26%. Health and social work had the lowest placement rate at 5% - while this could be because the sector relies on different methods of recruitment, healthcare stakeholders engaged through JETP discussions reported major challenges with recruitment and retention of critical healthcare occupations.

The E&E sector has the highest vacancy rate among all Manufacturing sub-sectors, with 34,000 available vacancies in Q1 of 2025

Manufacturing Jobs by Economic Sub-Sector in Malaysia (Q1 2025)
'000



Number of persons engaged by E&E by State (2015 and 2022)
'000



E&E jobs make up 26.0% of the Manufacturing sector. In Q1 2025 however, **E&E vacancies contributed to 30.6% of all vacancies in the Manufacturing sector and 17.5% of total vacancies in Malaysia.**

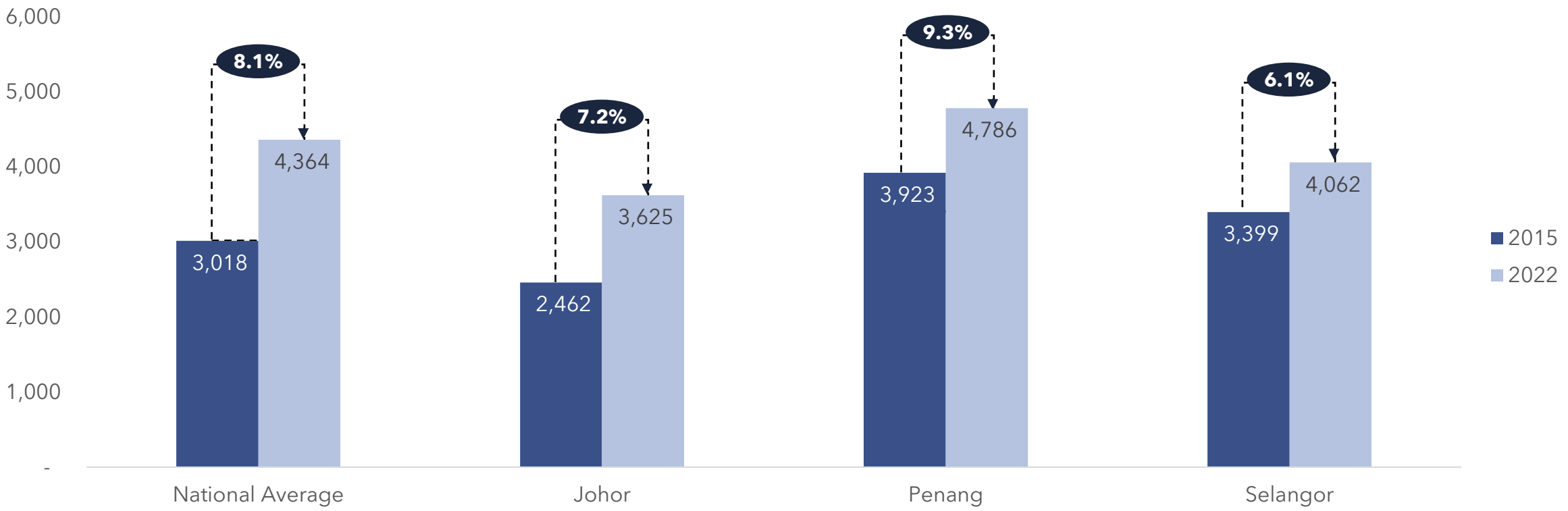
In Johor, the number of E&E workers increased by an annual growth rate of 1.4%, compared to 6.2% in Penang and 2.5% nationwide.

Source: Employment and Salaries & Wages Statistics (DOSM, 2023), Labour Market Review (DOSM, 2025)

The average monthly salary of an E&E worker in Penang is 32% more than in Johor, creating strong competition for skilled talent in the country

Average Monthly Salaries and Wages of E&E Workers by State (2022)

RM

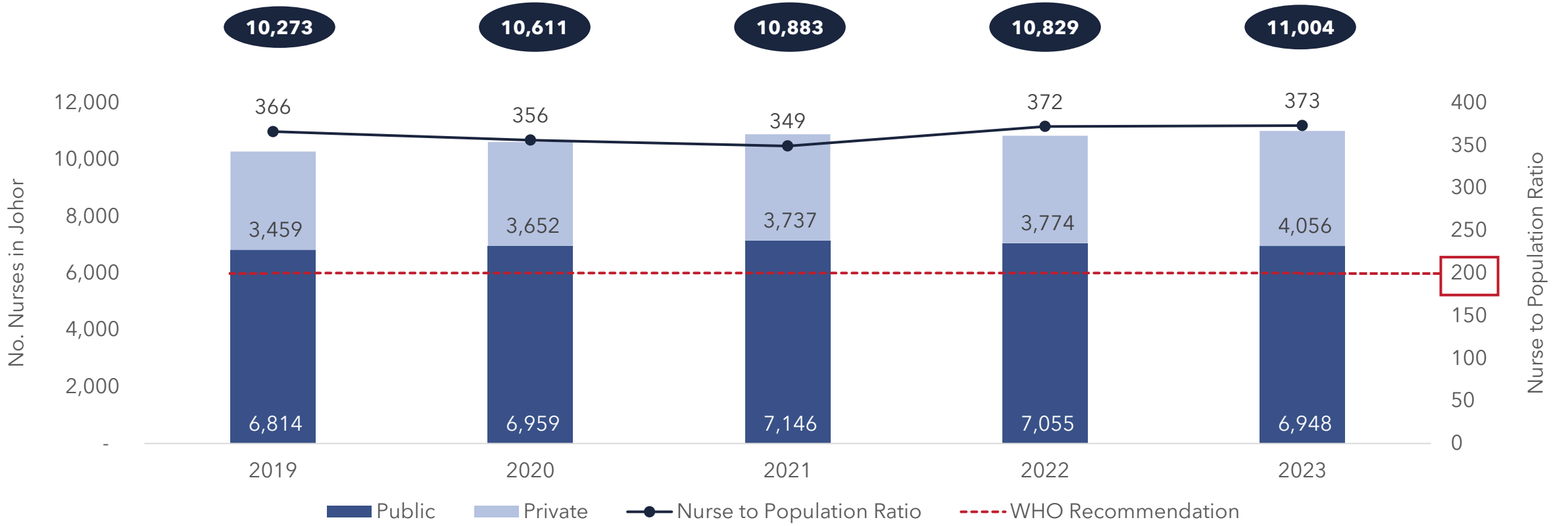


Despite a 7.2% annual growth rate of average salaries since 2015, Johor companies are still playing catch up to counterparts in key competitor states such as **Penang, which offers 32% more on average**. E&E players engaged during JETP's research suggested that the manpower shortage was even larger in Johor, given the strong pull factor of higher wages in other Malaysian states and Singapore.

Source: Salaries and Wages Survey Report (DOSM, 2023)

In the Healthcare sub-sector, Johor faces an acute shortage of nurses, with its 1:373 Nurse to Population Ratio almost half the WHO recommendation of 1:200

Nurses Working in Johor by Employment Type (2019-2023)

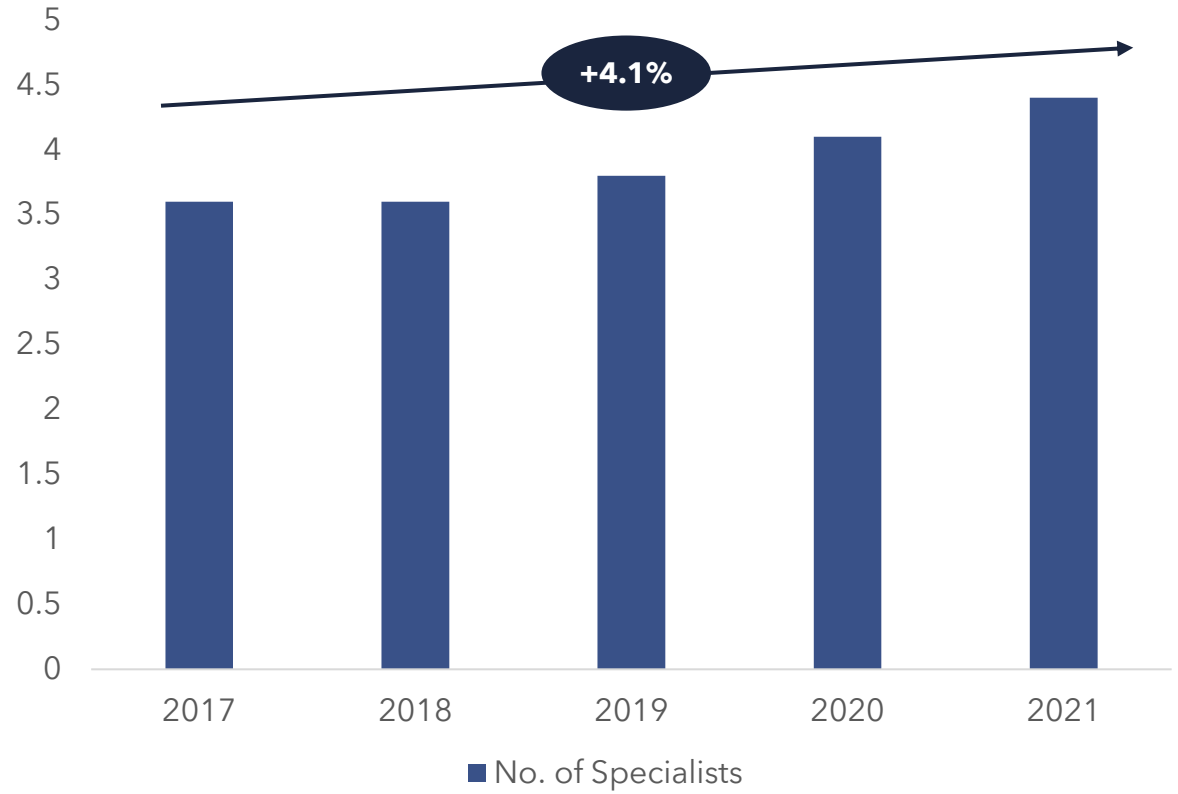


The number of nurses working in Johor has only grown by 1.4% over the past 5 years, and has been outpaced by the state's population growth at 1.9%.
Johor requires targeted efforts to increase its nursing workforce, accounting for increasing demand from private healthcare and medical tourism.

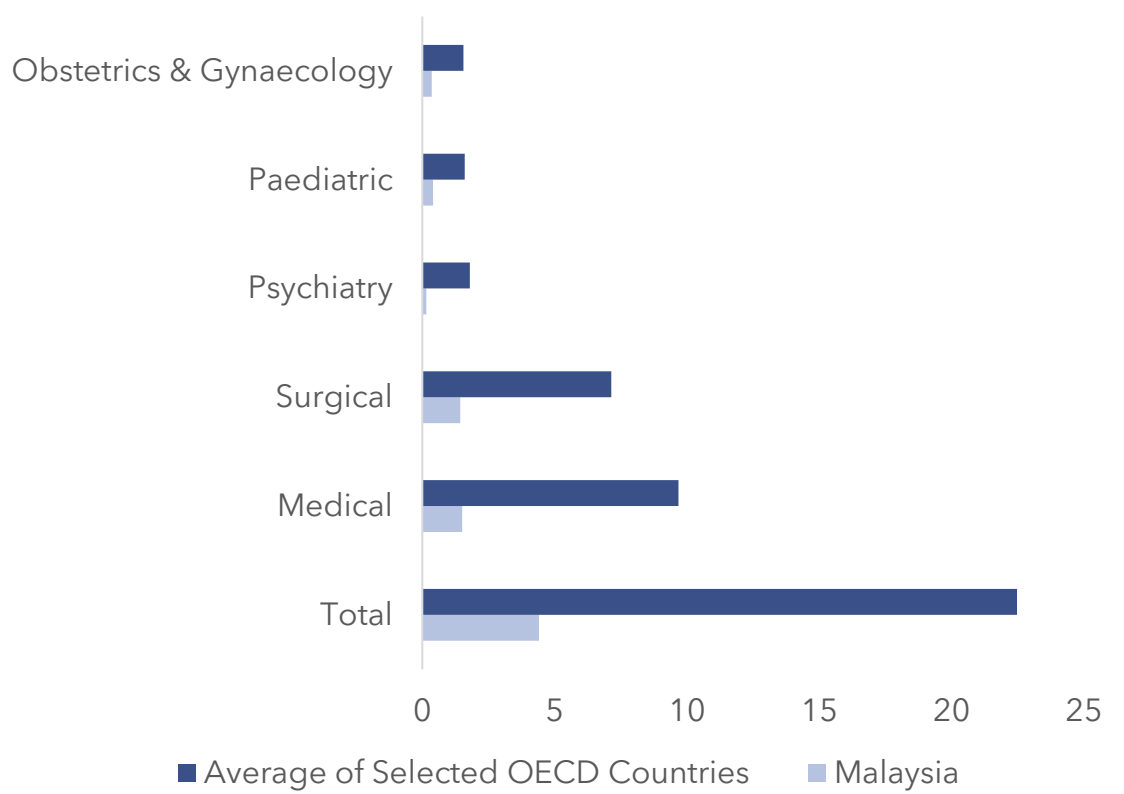
Source: Health Indicators (Ministry of Health, 2020-2024)

While the number of specialists in Malaysia is growing at a 4.1% annually, there remains a large gap between our current Specialist to Population Ratio and that of OECD countries

No. of Specialists in Malaysia (2017-2021)
Per 1,000 Population



No. of Specialists in Malaysia vs Selected OECD Countries (2021)
Per 1,000 Population



Johor can play an important role in training and attracting top specialist talent, both domestic and international, in order to improve health outcomes for its people, and accelerate its development status to a high income state by 2030.

Source: Health Indicators (Ministry of Health, 2022), Human Resources for Health Country Profile 2019-2021 (Ministry of Health, 2

While recent efforts to reduce expert visa processing times for foreign talent report impressive outcomes, the JS-SEZ presents a unique opportunity to change our approach to talent attraction

	Key Features	Limitations	Key Initiatives
Employer-Centric	• **Traditional model where companies are responsible for the end-to-end recruitment process of their employees.** • Employers are responsible to manage recruitment, visa sponsorship, facilitating immigration process, relocation support and onboarding.	• Heavy reliance on employer initiatives and HR capacity. SMEs struggle to do this without the capacity and experience with foreign recruitment more typical of MNCs. • Limited flexibility for employees.	• Single-window processing service has reduced visa processing time from 6-12 months to 8-15 working days
Cross-Border Talent Leveraging	• **Exploiting Johor's unique geographical advantage and SEZ with Singapore, an existing global talent hub.** • Flexible visa and dual-licensing arrangements for Singapore-based professionals to commute and practice across borders, without full relocation or traditional visa commitments.	• Complex regulatory harmonization required, making it ideal for JS-SEZ Regulatory Sandbox. • Requires strong collaboration between Malaysian and Singaporean professional bodies.	• JS-SEZ Dual-Licensing for Medical Specialists (see Initiative 1), which can be expanded to other professions upon review.
Employer-Independent	• **Open working visa directed at individual talents who independently relocate to seek career opportunities**, attracted to Johor's quality of life, affordability, and thriving economy. • This model creates a dynamic talent pool available to local employers immediately, strengthening Johor's brand as a vibrant talent destination.	• Management of immigration policy and compliance required on both state and federal-level. • Talent not incentivised to migrate if local opportunities are not attractive or competitive enough.	• JS-SEZ ASEAN Talent Fast Lane (see Initiative 2), which will be focused on attracting top professional talent to JS-SEZ where talent crunch is most critical.

Source: PASB Analysis

Public-Private Partnership for Johor Nursing Programme

The nursing shortage is felt acutely across both public and private hospitals in Johor. Johor State Government can leverage the maturity of its private healthcare players to increase training capacity and develop an attractive co-training system, reducing competition within local hospitals.

Initiative Highlights:

Concept Description	Co-training and compensation pathway both new and experienced nurses under improved working conditions, creating opportunities for specialisation and career progression within the state.

Visualisation of the initiative

Compensation

- State government subsidises 40% of tuition fees for new nurses who commit to working in Johor-based healthcare facilities for a minimum of 5 years
- Participating private hospitals co-fund the remaining costs and provide monthly allowances during training, supported by HRDC incentives

Resource Pooling

- Sharing resources across nursing schools, public and private hospitals, such as clinical lecturers, simulation labs and training equipment
- Supplement existing government training centres for core modules with private specialties, e.g. aged care, ICU, diagnostics

Career Progression

- Establish clear framework for career progression based on performance outcomes, not length of service, e.g.
  - New nurse: RM3,000
  - Ward manager: RM5,000
  - Specialist nurse or matron: RM7,000
- Develop partnerships with leading universities in Singapore / globally to allow nurses to receive world-class training and qualifications without relocating

Impact: Increasing number of nurses in Johor by 15% within 5 years, improving public-private workforce balance, retention of local nursing workforce and injection of expertise from returning nurses.

Implementing Agency
Jabatan Kesihatan Negeri Johor

Monitoring Agency
- BPEN-J

Associated Sectors:
- Healthcare & Pharmaceuticals

Stakeholders Involved:
- KPJ Healthcare University
- KKM

Budget Required:

FY	Public	Private
2025	Budget details to be finalised during implementation of the initiative	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: Jan 2026
- End Date: Dec 2030

The shortage of nurses is felt acutely in both public and private hospitals in Johor, with the State Government taking urgent action including utilisation of volunteers

MALAYSIA

‘Alarming’ nurse crisis: Johor, MOH agree on urgent staffing for hospital upgrades

Johor Menteri Besar Datuk Onn Hafiz Ghazi said these key matters were discussed during a meeting between the state delegation and Health Minister Datuk Seri Dr Dzulkefly Ahmad in Putrajaya yesterday. — Bernama file pic

Nursing is an increasingly unpopular profession due to a combination of poor working conditions, slow career progression and low salaries. A 2022 survey by the Association of Private Hospitals Malaysia (APHM) indicated that an additional 9,224 nurses were needed between 2023 and 2025.

Southern Johor has seen rising private investments in medical industries, with **JETP identifying RM7.3 billion worth of high value Healthcare & Pharmaceutical investments**. Johor’s private healthcare sector is led by strong home-grown players such as KPJ Group, as well as new entrants from Singapore and the rest of Malaysia. Nurses will continue to be in high-demand across both public and private sectors.

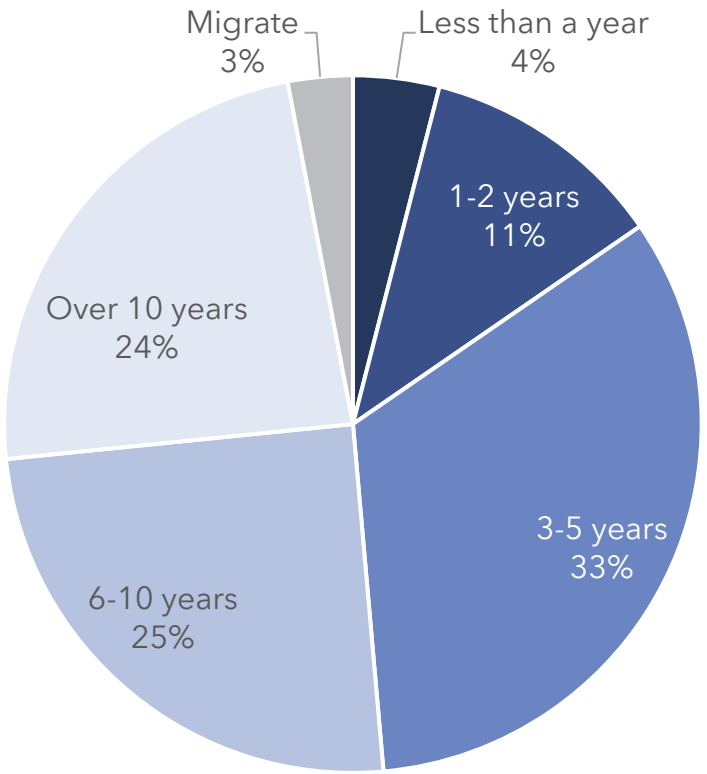
Private hospitals compete with public hospitals for nursing staff and often win, owing to their ability to offer higher salaries. However, they are not exempt from the manpower crunch, as even **private investors report operational delays due to a shortage of nurses**. The Private Healthcare Facilities and Services Act (PHFSA) 1998 prohibits private hospitals from opening beds unless there are sufficient nurses to staff them.

The opportunity is ripe for the State Government of Johor to facilitate a cohesive public-private partnership to uplift the nursing profession, as a longer-term intervention to address the future of the nursing profession. Failure to do so will risk the realisation of RM7.3 billion in incoming medical investments, and more importantly, continue to strain the provision of quality health services across the board.

Source: Various News Sources, Association of Private Hospitals Malaysia (APHM) , PAS Analysis

4 in 10 Malaysians working in Singapore intend to return within the next 5 years, with an additional 2 planning to return within 10 years

Duration of Time Planned to Work in Singapore
Out of Total Respondents that Will Continue to Work in Singapore



Profiles of Nurses
Two-Pronged Approach to Recruitment

New nursing students and early career nurses

Pull factors:

- Clear progression pathways
- Competitive compensation
- Ability to contribute to society

Mid-career to senior nurses returning from Singapore / overseas

Pull factors:

- Work-life balance
- Proximity to family
- Access to public services (e.g. education, social protection) as a Malaysian looking to start a family

Most respondents intend on returning to Malaysia within the next decade, with only 3% of respondents actually intending on permanently migrating to Singapore.

Strategic intervention is required to re-establish nursing as an attractive, sustainable profession in the eyes of Johorean youth, while leveraging the expertise of nurses returning from abroad. Understanding the pull factors for different groups of nurses is critical to this.

Kajian Perlindungan Keselamatan Sosial Rakyat Malaysia Bekerja di Luar Negara: Singapura (PERKESO, 2024)

Issue Charter – Outmigration of Service Sector Workers

Problem Statement

- **JETP has identified investments that could create over 125,000 jobs in Johor's service sector by 2030, concentrated in Tourism and Healthcare.**
- **Tourism is projected to create the highest number of jobs at over 116,000**, yet leading private sector players have consistently identified recruitment as a challenge, owing to inability to compete with currency arbitrage with neighbouring Singapore, as well as countries further away such as Australia and the Middle East.
- In healthcare, a private sector nurse in Malaysia earns a monthly salary of around RM2,000-RM5,000, while a new graduate nurse can earn around RM8,000 in Singapore and RM10,000 in the Middle East, after conversion to MYR.
- **The daily outmigration of between 300,000 to 400,000 Malaysians, most of whom live in Johor, poses a significant challenge for companies seeking to recruit service sector workers here**. Amongst Malaysians who choose to also live in Singapore, 2 in 3 earn between SGD1,500 to SGD3,599, indicating that they are not moving for better job opportunities, but rather, better pay.
- **Existing tax incentives for companies are not targeted towards raising local wages**, leading many companies to move towards hiring foreign talent from countries such as Indonesia, to fill the workforce gaps at lower salaries. The **JS-SEZ minimum salary + fixed tax rate only applies to knowledge workers**, and will not be effective as tax rates in Singapore for a comparative salary bracket are still lower than 15%.

Impact / Implication

- **Social protection for these workers has become an increasing concern for the Malaysian Ministry of Human Resources**, as foreigners in Singapore do not need to contribute to the Central Provident Fund (CPF), risking longer-term security for their short-term financial freedom.
- This has **heavy consequences on Johor State**, as it will have to undertake this protection should they choose to return home to retire (most Malaysians working in Singapore tend to stay for at least 2-6 years, and **almost 40% have the intention to return** after).

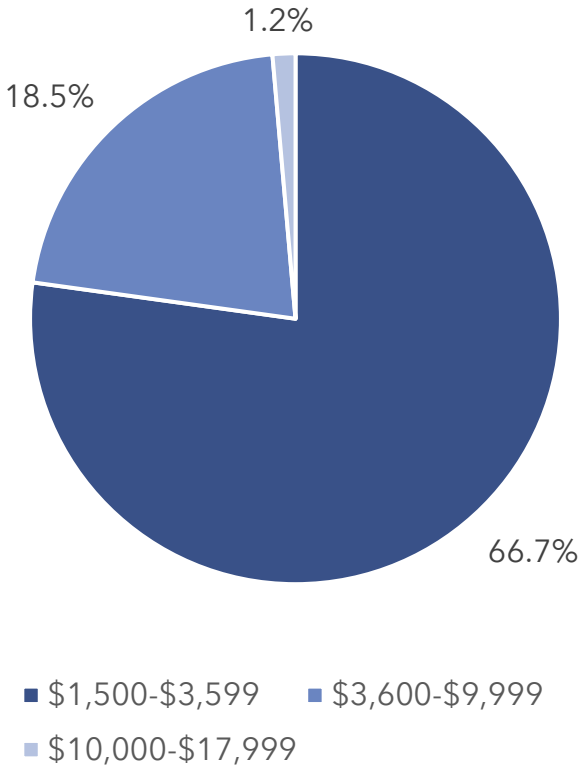
Parties Involved

- Ministry of Economy
- PERKESO
- Ministry of Health
- Ministry of Tourism, Arts and Culture

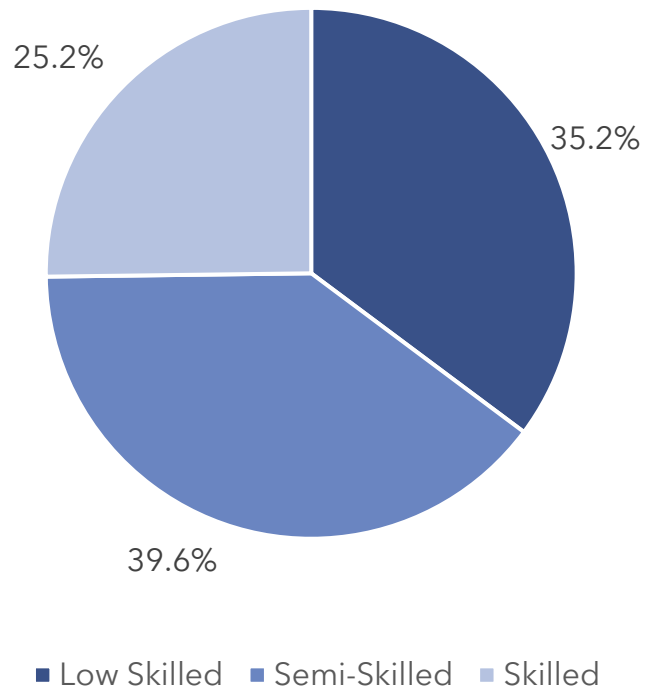
Source: DOSM, MOHR, PASB Research & Focus Group Discussions

400,000 Malaysians commute to work in Singapore daily, with almost 4 in 10 working semi-skilled jobs in manufacturing and services

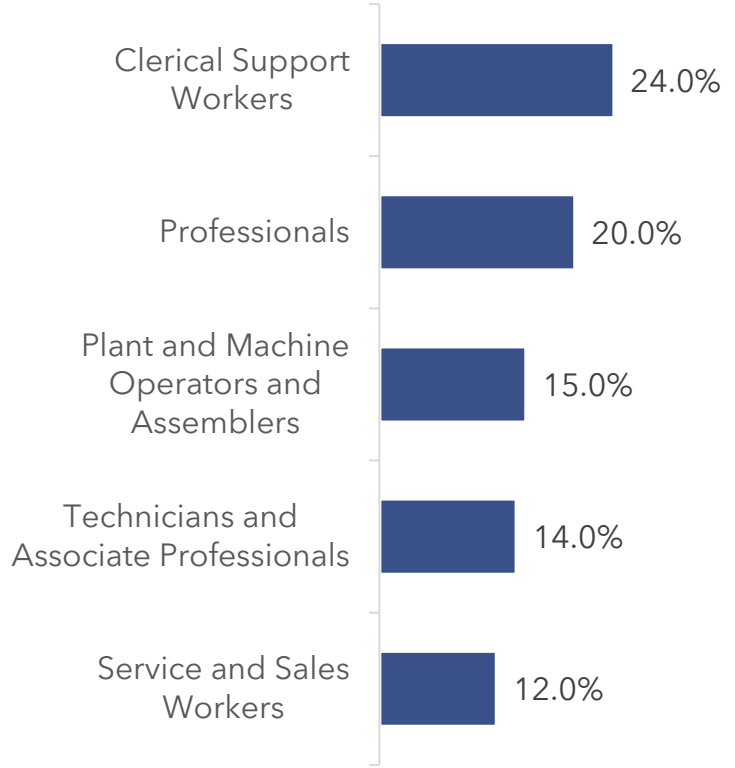
Malaysians Working in Singapore by Salary
SGD



Malaysians Working in Singapore by Skill Level
SGD



Malaysians Working in Singapore by Occupation

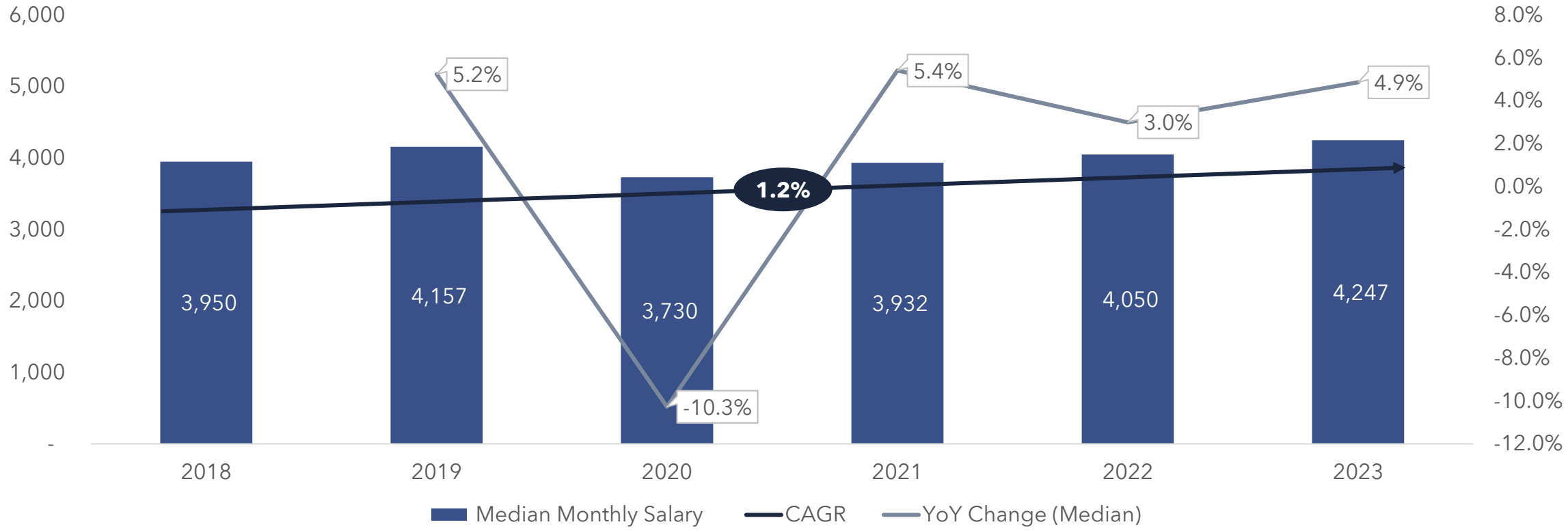


In a 2022 PERKESO survey of 3,121 Malaysians working in Singapore, **67% were classified as "lower wage earners"** according to benchmarks by Singapore's Ministry of Manpower, with **40% employed as semi-skilled labour**. This suggests that **Malaysians working in Singapore are driven by high salaries (after conversion to MYR), as opposed to career growth opportunities.**

Source: Singapore Ministry of Manpower (2025), Kajian Perlindungan Keselamatan Sosial Rakyat Malaysia Bekerja di Luar Negara: Singapura (PERKESO, 2024)

Graduate salaries in Johor grew at just 1.2% annually over the past 6 years, reflecting a slow recovery from COVID-19 impacts

Median Monthly Salary for Graduates in Johor, 2018-2023
(RM)

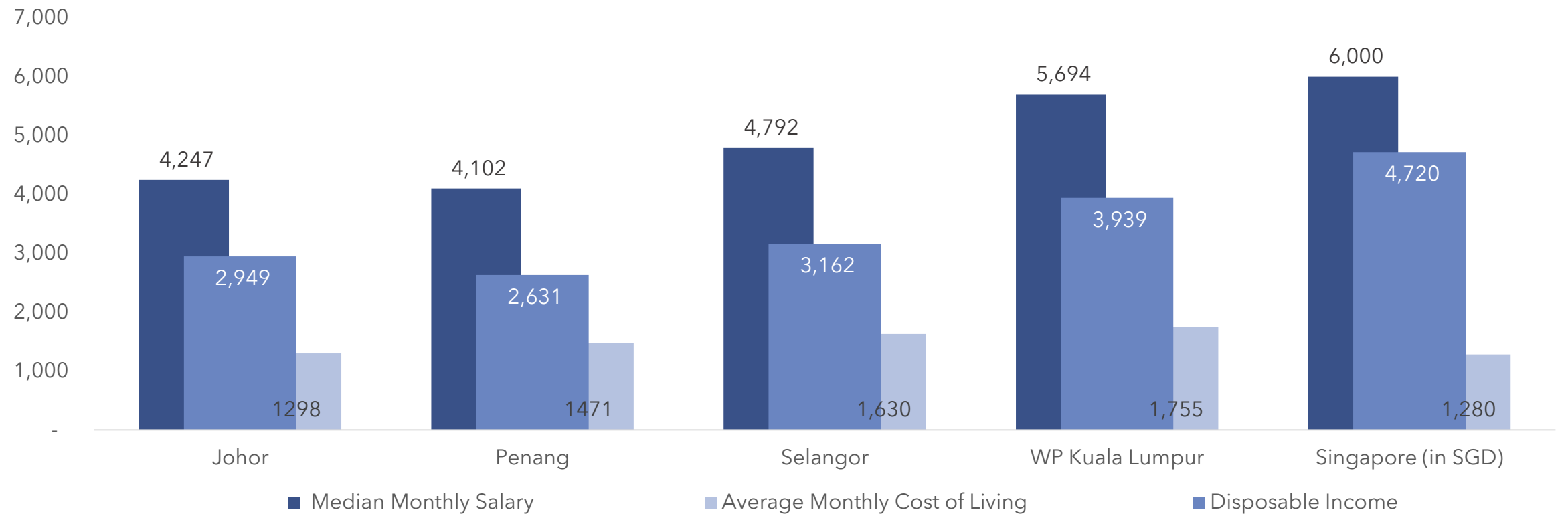


Low graduate salaries remain a key challenge to attract and retain graduates in Johor, which has no shortage of actual graduates from its large number of top universities and colleges. Numerous industry partners have reported concerns that they are unable to recruit top graduates from Johor's universities due to competitive compensation offered by employers in Klang Valley, Penang and Singapore.

Source: Graduates Statistics (DOSM, 2023), Cost of Living Survey (DOSM, 2024)

Employment in the Klang Valley offers graduates significantly higher disposable income than in Johor, making them more attractive places for young people seeking financial stability

Comparison between Median Monthly Graduate Salary and Cost of Living in 2023
(RM)

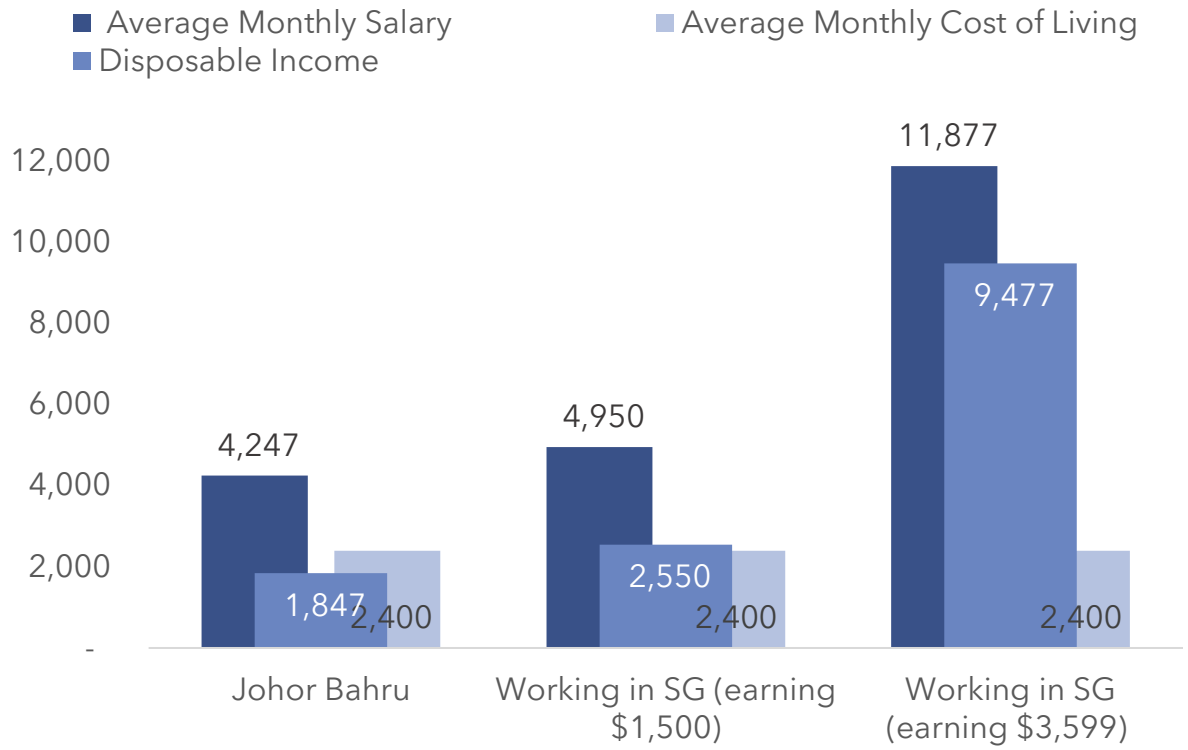


Johor's average cost of living is 20%-26% lower than that of Selangor and KL's. Despite this, Klang Valley offers significantly higher graduate salaries, resulting in more disposable income. This difference is further diminished in Johor Bahru, where cost of living is only RM400 lower than in Kuala Lumpur. Higher disposable income makes cities more attractive for young professionals seeking financial stability and opportunities to save or invest.

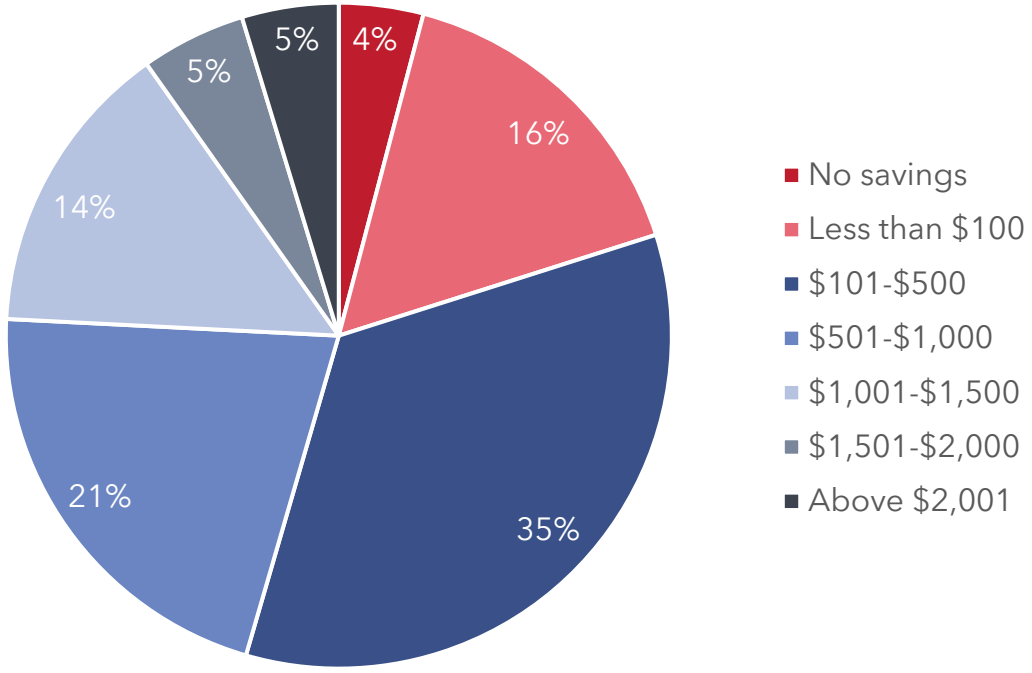
Source: Graduates Statistics (DOSM, 2023), Cost of Living Survey (DOSM, 2024), 2023 Joint Autonomous Universities Graduate Employment Survey (Ministry of Education Singapore, 2023)

Johor Bahru has a significantly higher cost of living than the rest of the state (RM2,400 vs RM1,298), made manageable by disposable income from Malaysians working in Singapore

Estimated Disposable Income for Malaysians Working in Singapore
(RM)



Reported Monthly Savings of Malaysians Working in Singapore
(SGD)



The majority (67%) of surveyed **Malaysians commuting daily to Singapore for work are able to retain between RM2,550 to RM9,500 in disposable income per month.** This both inflates and allows workers to manage the higher cost of living in JB (RM2,400), relative to the state average (RM1,298).

A lack of social security has been highlighted by Malaysian authorities as a major concern, given that **20% of surveyed Malaysians working in Singapore save less than SGD100 per month.**

Source: Kajian Perlindungan Keselamatan Sosial Rakyat Malaysia Bekerja di Luar Negara: Singapura (PERKESO, 2024), EPF Expenditure Guide (2024). Conversion rate for SGD to MYR used was x3.30.

Service-sector industry associations have reported a talent crunch since 2022, with attrition and shortages reaching crisis-levels in 2025

Statements from Industry Leaders

"The **high cost of living in Malaysia, especially in Johor Bahru**, has caused locals to look for higher-paying jobs not only across the border, but also in other countries such as Hong Kong."

Johor Baru Chinese Chamber of Commerce and Industry
Low Kueck Shin, President

"Hotels and other **service-based businesses need to rethink their compensation and career development plans**. If wages continue to lag, it's only natural that workers will seek out higher-paying opportunities elsewhere, especially in Singapore."

Malaysian Tourist Guides Council
Jimmy Leong, President

"Johorean school-leavers join **local hotels in entry-level roles paying RM1,200** to RM1,500 per month. **They come, they learn, and they leave** as soon as higher-paying jobs are within reach, especially in Singapore."

Malaysian Association of Hotels (Johor Chapter)
Ivan Teo, President

"**Patients in private hospitals wait up to 6-8 hours for ward admission**, with congestion in the emergency room or emergency and trauma department of private hospitals. The Private Healthcare Facilities and Services Act (PHFSA) 1998 prohibits private hospitals from opening up beds unless there are sufficient nurses to staff these beds."

Association of Private Hospitals Malaysia
Dr Kuljit Singh, President

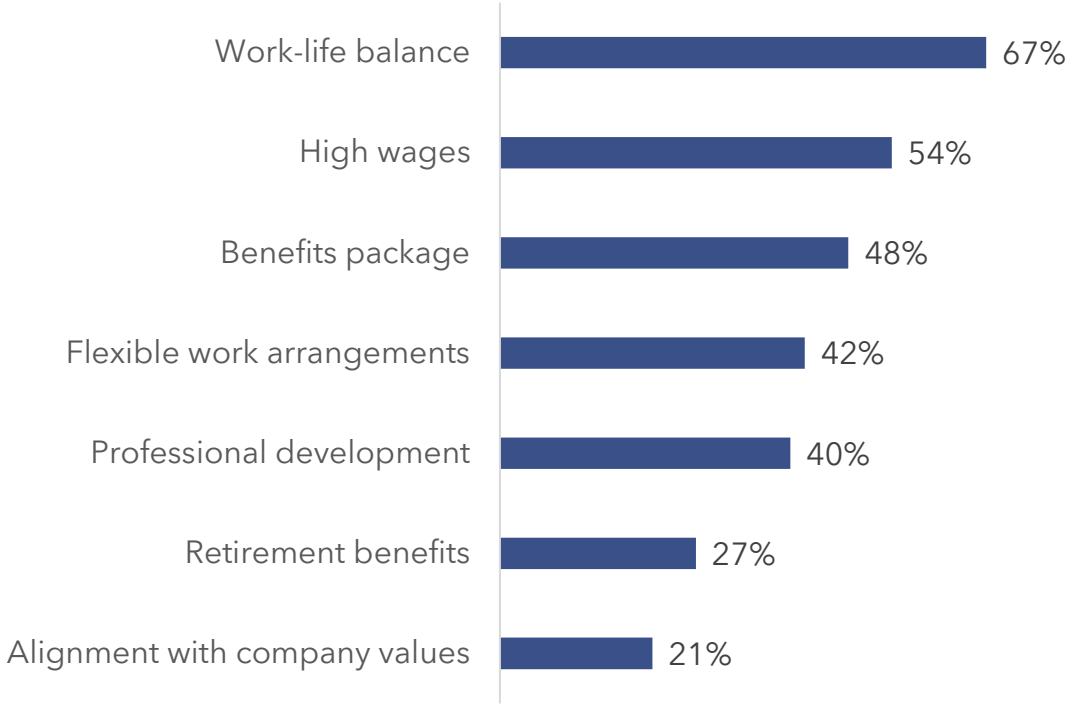
"The lure of the Singapore dollar is strong – even hair salons are facing a shortage of hairdressers. **20 member companies reported that about 50% of their employees had left due to higher salaries** after converting to Malaysian ringgit. Some of the affected sectors are manufacturing, logistics, services and accounting."

SME Association of South Johor
Tan Siew Keng, President

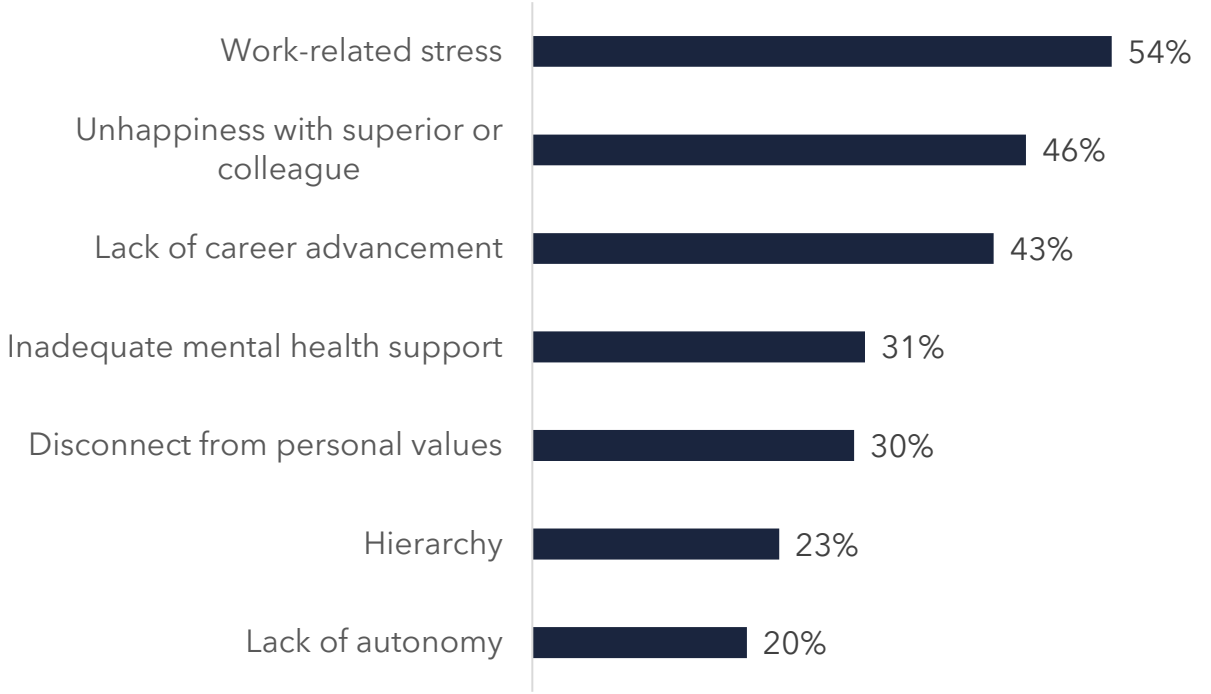
Source:The New Straits Times (2025), Galen Centre for Health and Social Policy (2025)

Importance must also be given to work-life balance as the top retention factor for 67% of Malaysian Gen Z workers, with 54% willing to leave a job because of work-related stress

Key Reasons Malaysian Gen Z Workers Remain in a Job
(%)



Key Reasons Malaysian Gen Z Workers Quit a Job
(%)



While high wages are a clear pull factor, it is challenging for Johor-based companies to compete with Singaporean firms purely based on salaries. According to the President of South Johor's SME Association, "Staff who feel that they are being taken care of by their bosses will choose to stay. Furthermore, commuting to and from Singapore daily is stressful and takes away quality time with their family."

A combination of factors such as good work-life balance, an attractive benefits package, flexible working arrangements, and clear professional development opportunities is required to attract and retain workers in Johor.

Source: Gen Z: Money Mind Survey (Channel News Asia, 2025)

Johor-based companies must attract and retain employees through a more holistic approach to overall compensation and benefits, while also addressing stagnant wages

	Key Features	Limitations	Key Initiatives
Growth of Wages and Salaries	• **Incentivise and support employers to increase wages for and upskill semi-skilled workers (60%).** • The JS-SEZ 15% personal income tax only applies to knowledge workers and appeals to those from other countries, but not to those working in Singapore – as they likely already enjoy lower effective tax rates.	• Cannot compete with Singapore companies due to currency exchange. • Heavy burden on employers, and heavy reliance on government funding.	• Productivity-Linked Wage Policy (see Initiative 3) to encourage wage growth via productivity gains. • 15% flat rate tax on personal income for knowledge workers employed in JS-SEZ.
Quality of Job Opportunities	• **Today's graduates seek jobs that are both high impact and high value.** • Johor is on the cusp of its economic S-curve; this is an exciting period for graduates to engage in meaningful, innovative work for the future of industry, state and nation.	• While Johor's graduates are underemployed, employers continue to report a lack of skilled labour. The mismatch between talent supply and demand is deeply complex, and more data is urgently required to inform policy solutions.	• Influx of new, high-quality investments in JS-SEZ has seen the creation of 33,000 high skilled jobs in Johor. • JTDC is developing a talent matching platform with Revo Global.

Source: PASB Analysis

JS-SEZ Productivity-Linked Wage Policy

Businesses must be incentivised to hire and uplift wages of Malaysian employees, but such wage increments must also be justified by an increase in productivity and skills. The service sector within JS-SEZ is an ideal pilot for the next phase of the Progressive Wage Policy (PWP).

Initiative Highlights:

Concept Description

Dual-pronged policy targeted at increasing wages for low-earning workers in critical service sector occupations, while increasing productivity gains for long-term sustainability.

Visualisation of the initiative

Targeted Wage Increments for Low-Earning Workers

Open to employers in JS-SEZ only; PWP to be applied in tandem with JS-SEZ minimum wage, to support the latter's take-up by employers.

Applies to Malaysian full-time employees in designated occupations within 2 sectors only: **TBD**

Hospitality Workers: Guest Relations, F&B, Sales & Marketing, Spa Therapist

Healthcare Workers: Nurses, Pharmacists, Lab Technician, Dental Assistants, Medical Officers

Outcomes-Based Funding for Productivity

Companies required to specify training requirements and key performance indicators for a minimum of 1-year, to ensure workers under this scheme are upskilled to achieve higher productivity / new skills that can sustain their increased wages in the long-term.

Additional grant funding available from JTDC and HRDC (application required) to support productivity-linked improvements, such as:

- Digitalisation / Technology Adoption
- Accreditation / Certifications

Impact: Supporting Johor-based businesses to retain Malaysian talent and achieve the JS-SEZ minimum wage, while improving productivity through incentivized training

Implementing Agency

- Johor State HR Committee, JTDC

Monitoring Agency

- BPEN-J

Associated Sectors :

- Healthcare & Pharmaceutical, Tourism

Stakeholders Involved:

- Ministry of Economy
- Ministry of Human Resources
- Malaysia Productivity Corporation
- PERKESO

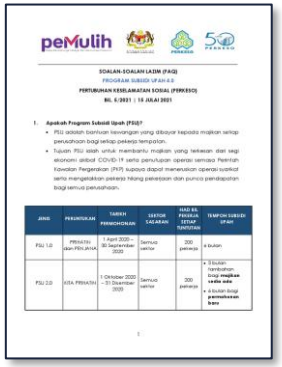
Budget Required:

FY	Public	Private
2025	Budget details to be finalised during implementation of the initiative	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:

- Start Date: Feb 2026
- End Date: Nov 2027

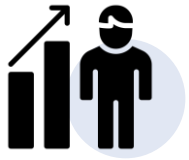
Various wage-related initiatives have been considered and implemented at a national level



Initiative	**Minimum Wage** (Dasar Gaji Minimum)	**Wage Subsidy Programme** (Program Subsidi Upah)	**Productivity-Linked Wage Scheme** (Sistem Upah Yang Dikaitkan Dengan Produktiviti)	**Progressive Wage Policy** (Dasar Gaji Progresif)
Description	Minimum wage of RM1,700 per month for all employers nationwide, covering foreign and contract workers, with non-compliance a legal offence.	Financial assistance program paid to employers for all local employees earning RM4,000 or less, to support post-COVID economic recovery.	Guidelines for employers to link fixed salary components with variable components determined by productivity/performance.	Co-funding of salary increments up to RM300/month for 6 months, limited to a wage ceiling of RM5,000 (until end-2027).
Voluntary	✗	✓	✓	✓
Incentive-Based	✗	✓	✗	✓
Productivity-Linked	✗	✗	✓	✓

Source: Department of Industrial Relations Malaysia, PERKESO, Ministry of Human Resources

Key Success Factors for the implementation of JS-SEZ Productivity-Linked Wage Policy, based on learnings from Federal efforts



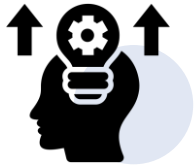
Clear Definitions and Scope for Effective Outcomes

Action

- **JS-SEZ PWP must study and clearly define the parameters of its application**, with particular regard to the following elements:
  - *Selected Occupations within Target Sectors*
  - *Skill Requirements*
  - *Training Requirements*
  - *Wage Ladders*

Rationale

- This will ensure that the policy has targeted and clear parameters for application. The pilot federal application of PWP was said to have been overly ambitious, covering the large manufacturing, agriculture and construction sectors. In Singapore, a similar policy only covered service sector occupations with "4-5 job rungs and corresponding wage progression."



Industry-Aligned Skill Development to Raise Capability and Measurable Productivity

Action

- **JS-SEZ PWP must map skill requirements to available skill development training modules and providers,** with a robust mechanism to verify and monitor learning outcomes. Close collaboration with HRD Corp and tertiary institutions in Johor will be critical to achieve this.

Rationale

- An effective PWP will ensure that training and skills development are aligned to the needs to industry – effectively delivered to improve worker capabilities.
- Skill development requirements were developed in greater detail in Singapore's, whereas Malaysia's PWP pilot only "generally prescribed that employers must provide formal training programmes for their workers."

Long-Term Sustainability and Eventual Phasing Out of Public Involvement

Action

- **JS-SEZ PWP must distribute responsibility both employee and employer, with a clear timeline for phasing out public funding.** Employees are tasked to upskill via new certifications, while employers must be encouraged to support improved performance with adoption of technology and digitalisation of operations.

Rationale

- Use of public funding for employers must be designed as a transitory mechanism to support JS-SEZ in providing competitive salaries, e.g. RM4,000 minimum wage. Effective productivity gains will be experienced through increased output and profitability, justifying financial viability of increased wages. Employers must be willing to finance this in the long-term.

Source: Lee Hwok Aun, Yusof Ishak Institute (ISEAS, 2024), Penang Institute

Issue Charter – Underutilisation of Johor's Graduates

Problem Statement

- **58% of Singaporean employers have identified insufficient skilled labour as a cause of the manpower crunch in Johor**, while managerial and unskilled workers were significant less common challenges.
- While short-term measures can be put in place to recruit foreign talent to fill this gap, it will be **necessary to build Johor's own talent pipeline – leveraging its youthful and rapidly growing population as a key advantage.**
- Singapore and Malaysia have agreed to enhance cooperation in technical and vocational education and training (TVET) initiatives to meet industry demands, such as MOUs between Singapore Polytechnic and the Federation of Malaysian Manufacturers, Singapore's ITE Education Services (ITEES) and JSDC, and a Cooperation Note on Talent Development between Republic Polytechnic and JTDC.
- **However, Johor cannot rely on Singaporean TVET education alone** – long-term, it will require its own strong TVET system to grow and attract the country's top talent to support the development of world-class industries and a high-income state. **In the short to medium term, there is an existing group of graduates in Johor who are currently underutilized**, and can be matched to the right opportunities, retrained or upskilled within 1-3 years.
- JETP's approach will tackle both alignment of curriculum to existing industry needs, as well as training & upskilling opportunities to ensure all of Johor's graduates are able to meet their highest potential.

Impact / Implication

- 33.3% of graduates in Johor are working in jobs that are not proportional to their qualifications.
- Between 20% and 60% of graduates from vocational colleges in Johor are working outside of their fields due to mismatched jobs.

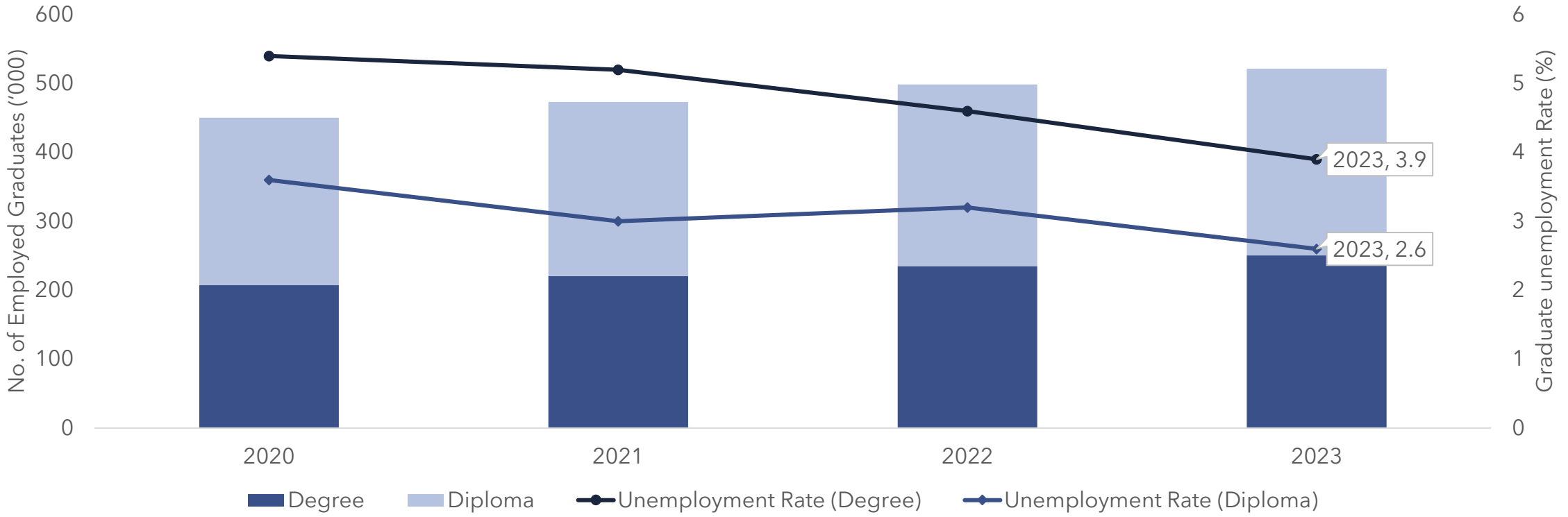
Parties Involved

- JTDC
- Government-Industry TVET Coordination Body
- Anchor Industry Players

Source: JS-SEZ Progress Report (Maybank, 2025), Singapore Business Federation Survey (2024), Speech by YB MB Dato Onn Haafiz Ghazi (2024)

The unemployment rate for degree graduates is on a steady decline to 3.9% in 2023, although still significantly higher than 2.6% for diploma graduates

No. of Employed Graduates and Unemployment Rate for Degree and Diploma Holders in Johor
('000, %)

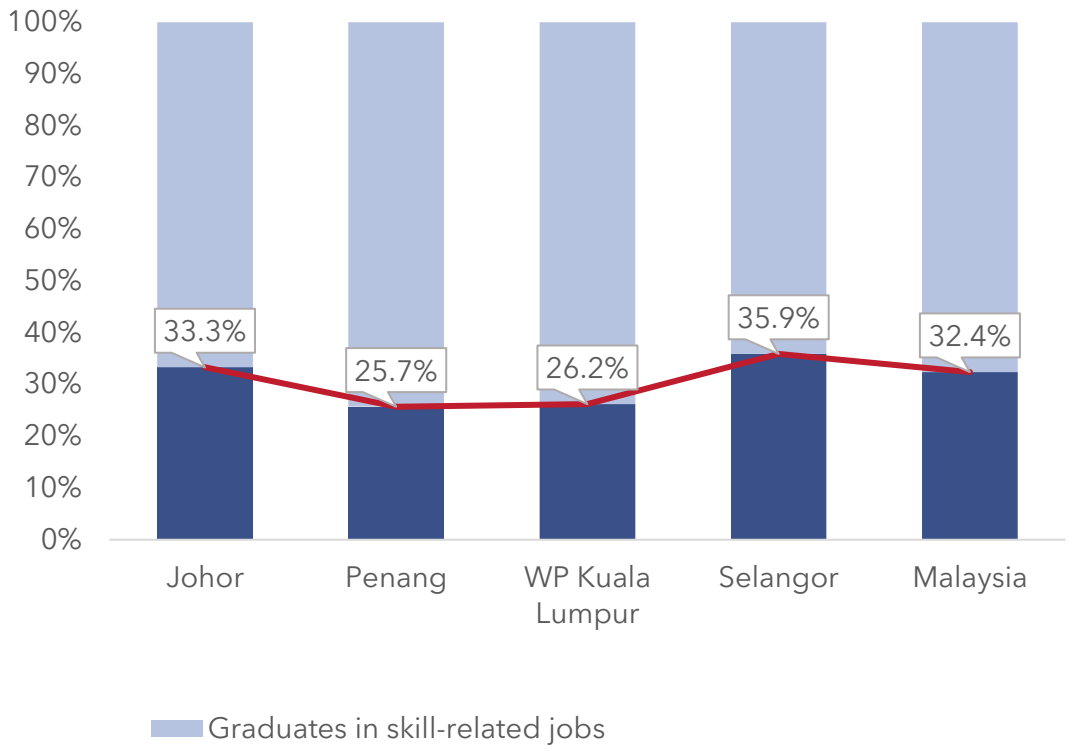


Degree holders face higher unemployment rates than diploma holders – suggesting **diploma holders are perhaps more employable, and/or have a greater willingness than degree holders to switch into jobs below their qualification level.**

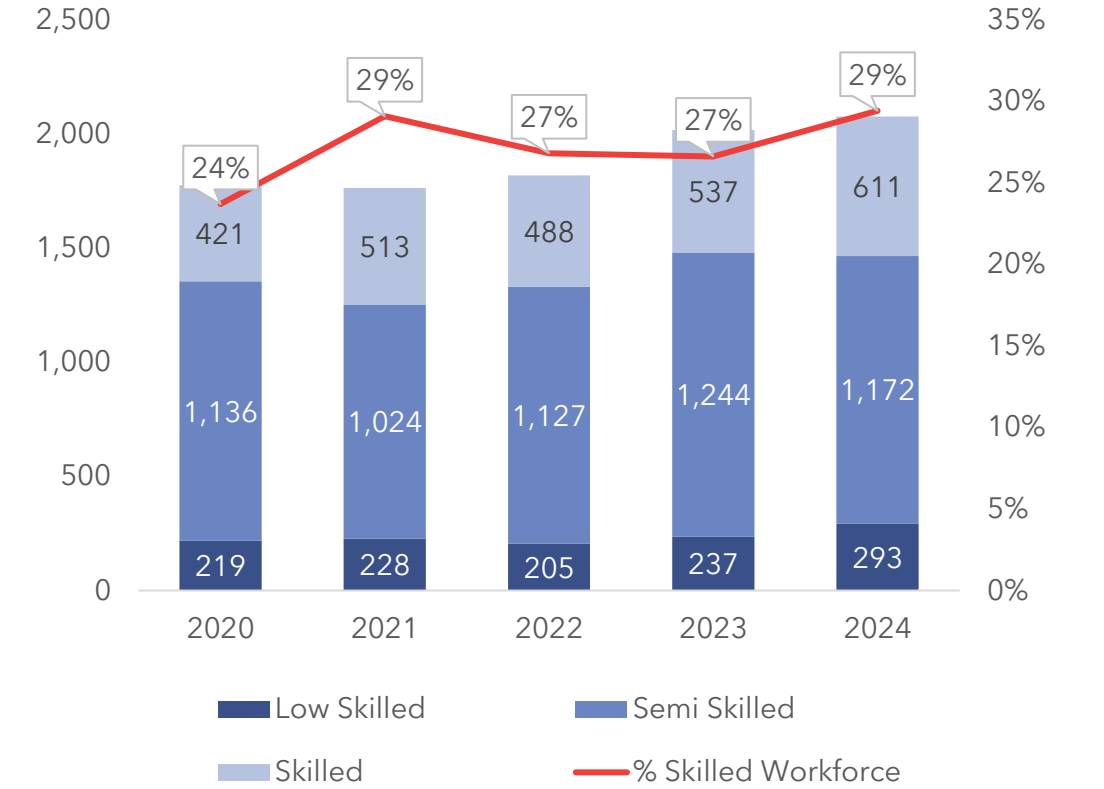
Source: Graduates Statistics (2023, DOSM)

However, 1/3 of Johor's graduates are not finding jobs commensurate to their skill level, with more than half of Johor's workforce employed in semi-skilled occupations

Skill-Related Underemployment in Malaysia
(2023)



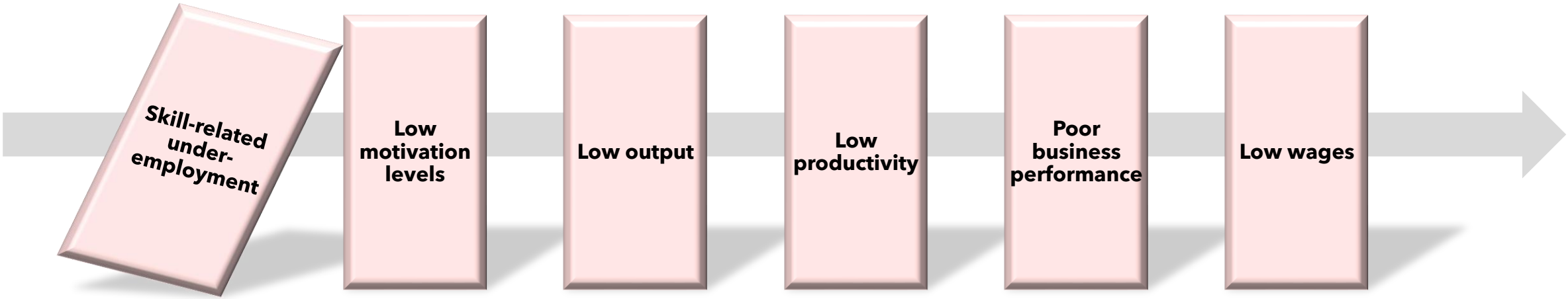
Employed Persons by Occupation Skill Level in Johor, 2020-2024
('000, %)



High underemployment rates (33%) and proportion of employed persons working in semi-skilled occupations (56.4%) suggests that many graduates are taking on semi-skilled work. This situation is described as a "skills trap", taking place because workers are either overqualified, or do not have skills that are "acknowledged or utilized effectively by employers".

Source: Graduates Statistics (DOSM, 2020-2024), Malaysia Productivity Report (Malaysia Productivity Corporation, 2024)

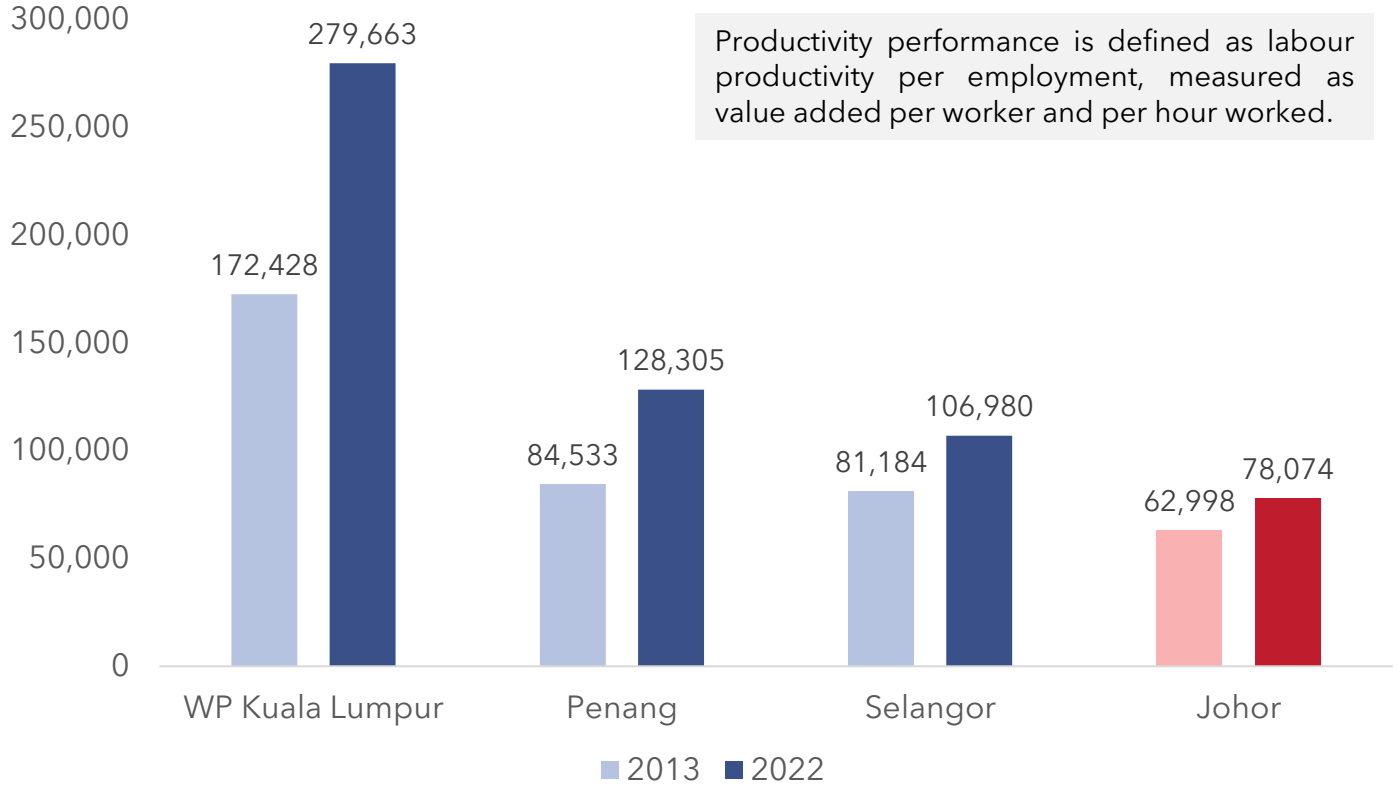
Johor's workforce faces a "skills trap" in the persistent mismatch between workers' skills and those demanded by employers



Over time, underemployment can lead to persistent career stagnation, lower earnings potential, and lower productivity levels. This is a critical challenge that must be addressed to unlock economic growth.

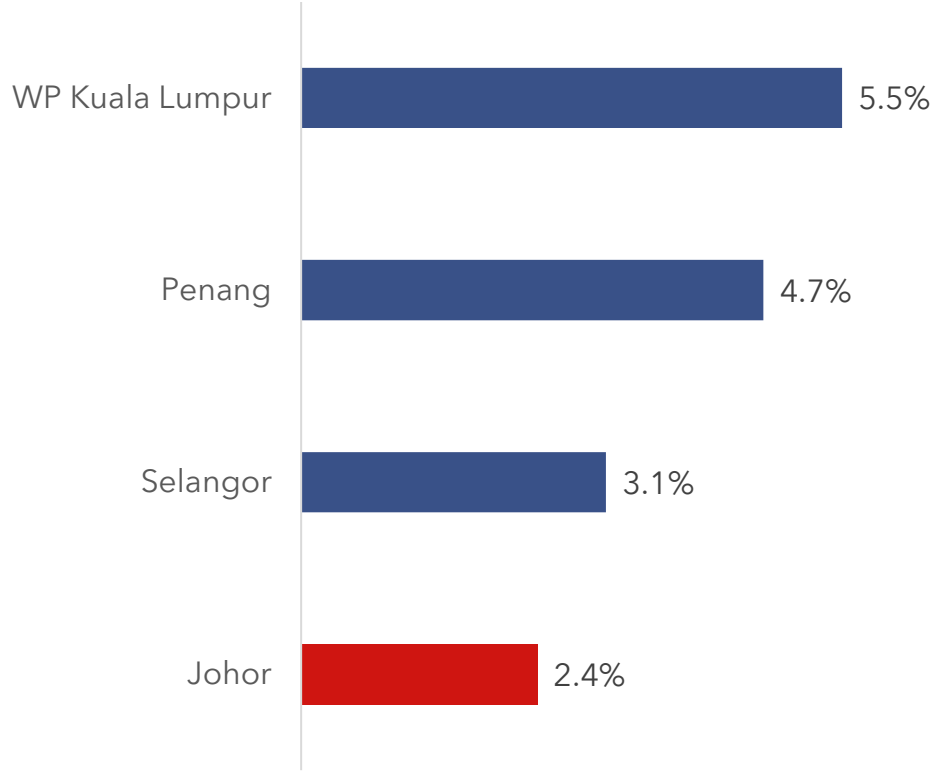
An overreliance on semi- and low skilled labour has locked Johor's economy into a state of economic inefficiency, with productivity performance only improving 2.4% since 2013

Productivity Performance by State
(2013 and 2022, RM)



Productivity performance is defined as labour productivity per employment, measured as value added per worker and per hour worked.

Growth in Productivity Performance by State
(2013 and 2022, %)

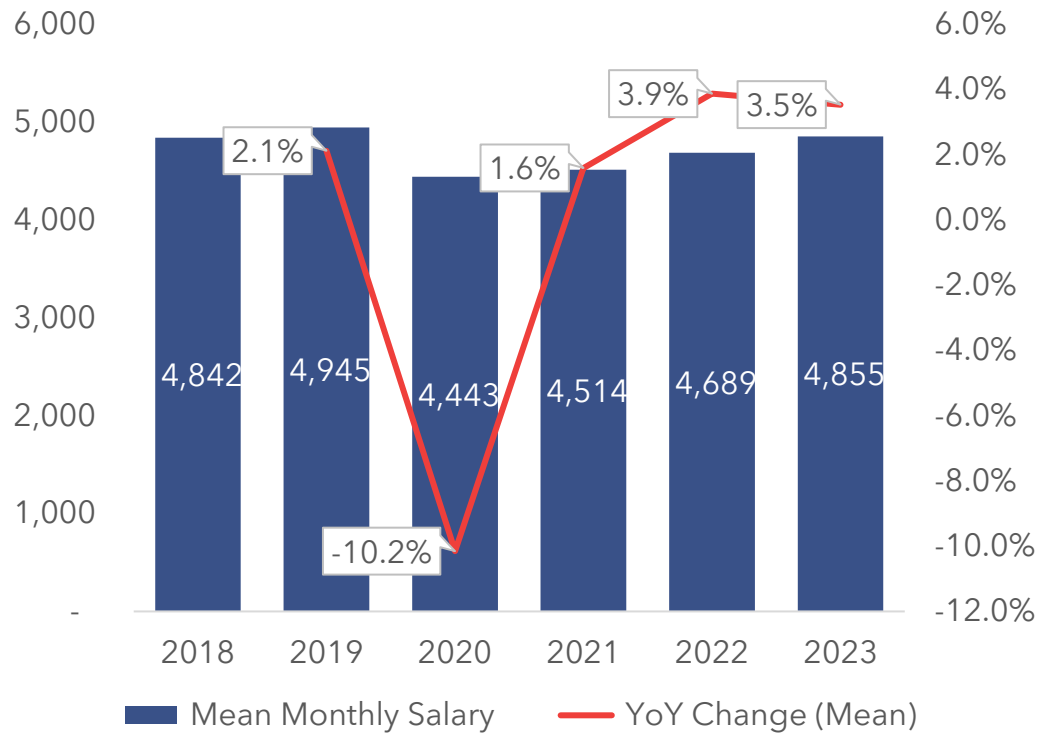


Johor's productivity performance lags behind key competitors', with a growth of only 2.4% in the decade between 2013 to 2022. JETP seeks to drastically change this by introducing new strategies to target high value investments, requiring Johor's workforce to be well-equipped with the necessary skillsets to realise these investments.

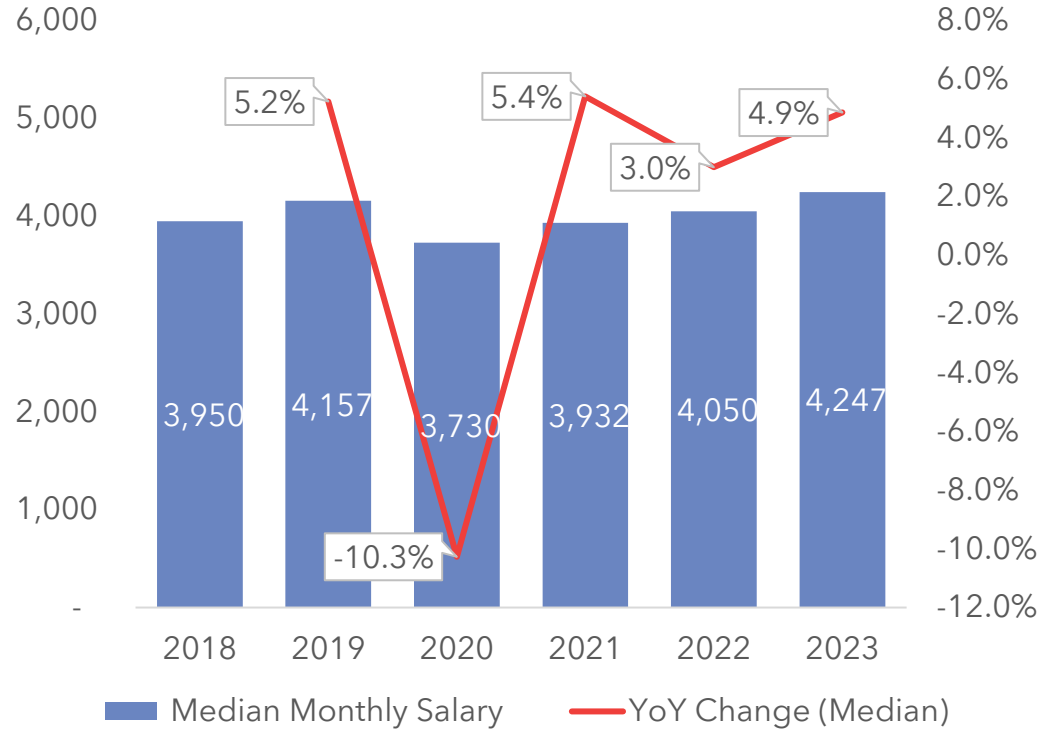
Source: Malaysia Productivity Report (Malaysia Productivity Corporation, 2024)

Low productivity performance has led to stagnating salaries, which saw 10% decrease following the COVID-19 pandemic

Mean Monthly Salary in Johor, 2020-2024
(RM)



Median Monthly Salary in Johor, 2020-2024
(RM)



The median monthly salary for a graduate in 2023 was only RM300 more than in 2018. Offering competitive salaries pose a particular challenge for Johor-based companies, given that Singapore's median monthly salary is 7 times higher. Johor will need to compete in other ways to retain talent, such as providing meaningful professional development and career opportunities.

Source: Graduates Statistics (DOSM, 2020-2023)

Key factors affecting skill-related underemployment include a supply-driven education system, lack of recognition for TVET pathways, and the existing concentration of opportunities in low value sectors

Supply-Driven Education System

- Education is supply-driven, based on predefined curricula rather than specific needs of industries.
- The discrepancy between skills taught in educational institutions and those required in workplace renders education institutions unable to keep up, especially with fast-changing industries such as technology and advanced manufacturing.

Lack of Recognition for TVET

- Absence of a unified TVET system with clear quality assurance, standardised certifications, and reliable data on student outcomes weakens employer confidence in TVET graduates' actual competencies.
- Public perception also views TVET as inferior to university education, reducing student enrolment and industry acceptance.

Low-Value Economic Activities

- A majority of employment opportunities in Johor's labour market currently exist at the semi-skilled level, resulting in limited opportunities for skilled workers to utilise their full potential.

Source: PASB Analysis

JETP's talent development approach seeks to prepare our graduates for an ever-changing future of work, support mid-career transitions into high value industries, and build economic resilience through future-proof skillsets

	Key Features	Limitations	Key Initiatives
Industry-Aligned Vocational Education	• **Developing a coordinated TVET system, with training and curriculum co-designed and co-delivered by industry players.** • Strong focus on hands-on training and early industry exposure in technical fields, building a strong pipeline for the manufacturing and services sectors.	• Risk of industry fatigue if companies are burdened with too many engagement demands. • JTDC to play a heavy role in coordination, requiring a strong mandate and working team.	 • Industry Working Groups (IWGs) established by JTDC, which can lead pilots with major TVET providers (see Initiative 4). • Enhancement of digital skills and leadership of Johor's future generation through Sekolah Rintis Bangsa Johor.
Career Transitions into High Value Industries	• **Providing upskilling / reskilling funds, work-study pathways and research backing** for adults transitioning into sectors like aerospace or advanced manufacturing. • Supporting upwards career mobility to reduce current overreliance on lower-skilled and lower-value sectors.	• Sustainable funding mechanism must be identified to reduce burden on state funds. • Critical to have strong partnerships with employers to support funding and absorption of retrained individuals.	
Entrepreneurial Resilience for Self-Employed	• **Building entrepreneurial and digital skillsets to ensure Johor's workforce is prepared for an ever-changing workforce.** • Creates economic resilience where both traditional and self-employment is vulnerable in the face of AI and technological revolutions.	• Employment success requires continuous mentorship and market access, in addition to being dependent on broader market conditions.	

Source: PASB Analysis

Implementing Johor's Integrated TVET Programme

Shifting TVET curriculum and training system from being supply-driven by education providers, to demand-driven by industries – building a pipeline of highly employable graduates for both MNCs and SMEs in Johor.

Initiative Highlights:

Concept Description

A win-win, cooperative system between MNCs and SMEs for TVET internships and apprenticeships, where students split time between advanced training modules provided by MNCs and on-the-job training hosted by SMEs.

Visualisation of the initiative

1 Implementing Institutions

Pilot to be implemented at Johor Skills (manufacturing) and KYPJ (hospitality), and expand to approved schools and new sectors upon success

2 Leading MNCs

E&E: Microsoft, micron, ST

Aerospace: GKN

Hospitality: Hilton, Hard Rock Hotel

- JTDC Industry Working Groups to provide strategic guidance on curriculum & certifications
- Expert trainers from established country offices to train-the-trainer or deliver required sessions
- Provision of cutting-edge equipment
- Mentorship and networking opportunities

3 Local SMEs

- Host students for hands-on training, internships, mentorship and networking

4 Conversion to Employment

Graduates of this dual scheme will be exposed to both MNCs and SMEs, with opportunities to apply for apprenticeships and full-time jobs at both

Impact: Ability to train, upskill and place graduates in high-demand and high-growth industries such as E&E, Aerospace and Tourism

Implementing Agency
JSkills, KYPJ (pilot), JTDC

Monitoring Agency
- JTDC

Associated Sectors :
- E&E, Aerospace, Tourism

Stakeholders Involved:
- JTDC
- Government-Industry TVET Coordination Body
- Anchor Industry Players

Budget Required (RM Mil):

FY	Public	Private
2025	Budget details to be finalised during implementation of the initiative	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: April 2026
- End Date: December 2028

Source: Developed in consultation with JTDC

Key Success Factors for the implementation of Johor's Integrated TVET Programme, based on best practices i.e. Penang Skills Development Centre

Targeted Approach Leveraging JS-SEZ Anchor Companies Creating High Quality Jobs

Action

- **Engage and partner with incoming anchor companies for Integrated TVET Programme,** focused on those able to create high quality (high skilled and high paying) jobs.

Rationale

- JTDC foresees major challenges in aligning multiple MNCs on a single curriculum. The success of PSDC can be attributed largely to unique model which required new investors (during the early stages of Penang's semiconductor industry) to commit to investing in local training programmes.
- The Integrated TVET Programme can focus on new, incoming anchor investors of JS-SEZ, for which a similar training criteria can be added, as opposed to trying to unify existing players that do not provide high quality jobs and have varied operations/training systems.

Focus on Practical Training to Equip Students with Holistic Skillset

Action

- **Implement a 30:70 training ratio**, with 70% of time spent on-the-job training.
- **Curriculum should also include transferable credentials** in communication and use of digital tools, to allow for both upward and horizontal mobility.

Rationale

- Emphasis must be given on raising the quality of trainers in TVET institutions. This can be done through close partnership with anchor MNCs in organising train-the-trainer sessions, leveraging on global expertise.
- On-the-job training provides students with the opportunity to gain not only specialised technical skills, but also practice highly valued soft skills, such as communication and use of digital skills.

Creation of Clear and Direct Pathways to Employment

Action

- **Proactive engagement of employers by JTDC**, to maintain an updated database of available jobs and talent matching.
- Sign MOUs with anchor companies to guarantee placement for a certain number or percentage of the cohort.

Rationale

- A key feature of TVET education is its ability to create employable graduates. However, this must be made visible to students to build confidence in the TVET system. Information on job opportunities must be open and easily accessible, with the application process clearly spelled out to prevent information paralysis.
- SMEs must be integrated into the talent marketplace through proactive engagement from JTDC, to build a shared pipeline of talent for all companies.

Source: Developed in consultation with JTDC

Johor Accelerator for Digital Excellence (JADE)

With the launch of 42 Iskandar Puteri, Johor has a leading bootcamp-style, peer-to-peer digital school. Its programmes are fully sponsored and supported by Khazanah's Dana Impak. However, 42IP has yet to achieve mainstream visibility and interest with youth in Johor.

Implementing Agency
Digital Economy Working Group (JTDC)

Monitoring Agency
BPEN-J

Associated Sectors :
- Cross-cutting

Stakeholders Involved:
- MDEC
- JTDC & Digital Economy Working Group
- 42 Iskandar Puteri

Initiative Highlights:

Concept Description

Encourage interest and pursuance of STEM education amongst graduating Form 5 students from Sekolah Rintis Bangsa Johor, equipping them with foundational digital, technology, problem-solving and innovation skills.

Visualisation of the initiative

Introductory Programme

- 4-month co-curricular programme delivered by 42 instructors at SRBJ campuses
- Open to all Form 4 and Form 5 students
- Course content:
  - Data Collection & Analysis
  - Coding, Tech & Ethics
  - Design Thinking & Innovation

Foundational Bootcamp

- 26 day bootcamp for interested students, 7-10 hours per day
- No programming knowledge required
- Course content:
  - Basics of C Programming
  - Basics of Shell
  - Communication, Adaptability and Problem-Solving Skills

Internships

Direct pathways with partnering employers to gain industry experience

Specialisation

Advanced programmes available with 42: algo & AI, security, dev-ops, etc.

Budget Required:

FY	Public	Private
2025	Budget details to be finalised during implementation of the initiative	
2026		
2027		
2028		
2029		
2030		
Total		

Impact: Equipping 670 SRBJ students over 5 years with self-driven digital and technology skillsets to expose them to STEM career pathways and build a generation of digital natives and leaders

Implementation Timeframe:
- Start Date: Jan 2026
- End Date: Dec 2030

MDEC currently offers a range of programmes to support digital upskilling across the country, with room for a targeted programme to accelerate industry-driven training in Johor

Existing Initiatives	Description	Complementary Scope	Owner
SKILLS4JOHOR	Full reimbursement of Johor's workforce to meet the demands of key sectors in JS-SEZ, targeting employers, trainees and HRD Corp-registered training providers. Training maximum 3 months.	Open to all HRD Corp courses, not restricted to digital skills. However, we can leverage this funding to support the JADE initiative.	HRD Corp Unit SMI Johor JTDC
MD Workforce Place & Train	Providing salary and training incentives to eligible employers in digital tech industry to support hiring and upskilling of unemployed Malaysians.	Only open to unemployed Malaysians; focused on employer activity. JADE can complement this by identifying employers and project tracks.	MDEC
Digital Industrial Skills Framework	Comprehensive guide that establishes framework for skills and competencies required in digital industry, to shape skills training.	Guiding framework for project tracks and live projects.	HRD Corp MDEC PIKOM
Digital Experts Network	Connecting experts to review MDEC's digital tech curricula, aligning training to industry needs.	Providing network of mentors and employers.	MDEC
Partnership with Revo-Global	Strategic partnership to provide integrated tech platform connecting job seekers, employers, training providers, and educational institutions.	Tech platform to build pipeline of students and carry out talent marketplace.	JTDC
E-Usahawan	Programme implemented through external and online learning exercises to train individuals, students and micro-entrepreneurs in digital entrepreneurship to generate income, carry out product marketing and increase sales.	Targeted towards digital entrepreneurship, not workforce training. Potential collaboration on live projects.	MDEC

Source: MDEC Website

Issue Charter – Lack of Strategic Innovation

Problem Statement

- **Current R&D intensity is too low to move Johor up the value chain.** Malaysia's gross expenditure on R&D (GERD) was 1.01% of GDP in 2022, well below the government's target (2.5% by 2025; 3.5% by 2030) and far behind innovation leaders. MOSTI estimates RM85.7 billion of additional R&D investment is needed this decade to reach those targets. Johor—despite being Malaysia's #3 economy by value added (RM148.2b in 2023)—relies heavily on manufacturing and services growth without a matching lift in research intensity and firm-level innovation.
- **Innovation outputs and talent depth lag regional competitors.** Malaysia ranks 33rd on the Global Innovation Index 2024, signalling room to improve commercialization outputs relative to inputs. The country has roughly ~700 researchers per million people, far below R&D-intensive economies, constraining advanced technology development, local IP and deep-tech entrepreneurship that Johor needs to anchor higher-value clusters.
- **Johor's growth surge is concentrated in trade and data-center FDI, with weak spillovers.** Johor delivered 29% of Malaysia's total trade in 2023 (≈RM753 billion) and attracted RM43 billion in approved investments in 2023, while emerging as a regional data-center hub. But experts warn DCs are power- and water-intensive and create relatively few high-skill jobs unless paired with local R&D, upskilling and supplier development—risking shallow linkages.

Impact / Implication

- Stagnant productivity & wages to continue.
- Falling into the "Assembly hub" trap with GERD stuck near ~1% of GDP and low business R&D. Johor risks remaining an assembly base for JS-SEZ and foreign companies.
- Inability to capture value from incoming megaprojects: Data-center-led FDI can strain energy/water systems and deliver limited multipliers if not coupled with innovation programs, resulting in fewer quality jobs for Johoreans and weaker fiscal returns.
- Erosion of competitiveness in comparison to regional peers.

Parties Involved

- JCORP
- IRDA
- UTM & UTHM
- State GLCs
- BPEN
- JCS Academy
- IDO

Source: MOSTI Press Release (17 Oct 2024), DOSM Statistics on GDP by state (2024), WIPO (2024), The Star (2024), MIDA (2024), AP News (2025)

Johor is the largest data centre market in Malaysia and a rising regional leader, expected to host 60% of Malaysia's total data centre capacity by 2030

Snapshots from News Media

Current State
Johor is Malaysia's top performing state in terms of investment attraction

- Cross-border capital drives investment surge in Johor-Singapore Special Economic Zone
- 'Game changer': How the RTS could transform Johor-Singapore connectivity and drive new growth for Malaysia
- OCBC pledges over RM11bil financing to support Johor-Singapore SEZ
- Johor Records Highest Investments In Malaysia Of RM30.1 Bln In 1Q 2025

Future State
Concerns over the sustainability over record high investments, given concentration in data centres

- Data centre investments should not be purely property play, says Maybank
- More quality investments, please
- Will Johor-Singapore SEZ make it this time?

Key Success Factors

After Singapore's moratorium on data centre developments in 2019, **Johor has managed to attract as many as 40 new data centre investments**, establishing itself as a rising data centre hub.

The Johor **State Government has been proactive in its efforts** to court MNCs via JS-SEZ, bringing in key players such as Nvidia, AirTrunk, GDS International, Princeton Digital Group, as well as local player YTL Power International.

Johor is also a likely **beneficiary of the US-China trade war**, which encourages both Western and Chinese diversification across ASEAN.

Establishment of Johor-Singapore Special Economic Zone: when positioned with, and not against, Southeast Asia's most developed economy and research leader, Johor gains unbeatable competitive advantage

Industry leaders highlight how a lack of R&D opportunities and resourcing in the state lead to a lack of innovation and brain drain, with strong competition from Singapore and Selangor

Statements from Industry Leaders

"**For Johor, the challenge lies not in replication but in innovation**. Johor's success will hinge on its ability to create not just industries, but also dynamic ecosystems where innovation is born, nurtured and scaled."

Johor Corporation (JCorp)
Datuk Syed Mohamed Syed Ibrahim, President and Chief Executive

"Johor has a surplus of research talent, but with limited teaching posts and private sector opportunities within the state, **our postgraduates have to seek opportunities elsewhere**."

Institut Jantung Negara – Universiti Teknologi Malaysia
Director

"Currently, the country faces challenges in data centre design and construction due to a **lack of domestic capacity, forcing companies to rely on imports**. As data centres drive up utility consumption, the increased demand could serve as a catalyst for scaling up renewable energy projects."

Institute for Democracy and Economic Affairs
Doris Liew, Economist

Future Threats

Singapore continues to lead charge for innovation Southeast Asia - in 2022, they relaxed their 2019 ban on data centres, and in 2024 released a Green Data Centre Roadmap outlining plans to drive R&D for clean and efficient energy.

Selangor is a rising contender in the race to develop AI infrastructure, given its existing mature manufacturing sector, extensive 5G network coverage, and RM52 billion in data centre investments in 2025.

Balancing public welfare with economic gains: 250,000 Johoreans experienced water shortages in 2019, with hour-long power outages in Dec 2023. Similarly, Singapore's initial moratorium on data centres was largely due to environmental concerns.

By following status quo, Johor risks falling into the resource trap, becoming a landowner for resource-intensive activities that drain Johor's natural resources – data centres, oil palm plantations, etc. **Strong R&D capabilities will enable the state to attract high value investments that complement existing economic strengths** in Agriculture, Digital Infrastructure, Logistics, and Healthcare.

Source: PASB Interviews, Business Times (2025)

In China, Zhejiang Province powers the nation with its strong economic growth and homegrown entrepreneurial successes, including Alibaba Group, Geely and DeepSeek

Case Study: Development of Zhejiang Province as China's Technology Innovation Hub

Research Ecosystem

- Zhejiang is home to 10 public research universities and 900,000 full-time students.
- Its research infrastructure includes 4 science technology parks, 14 major laboratories, and 7 national research centres.
- Dual-focus on both production and commercialisation of academic research.

Integrated Supply Chain

- New policy target in 2025 aims to form partnerships between 1,000 large enterprises and 50,000 individual businesses, supporting large enterprises to develop local supply chains.
- "Hangzhou's well-developed upstream and downstream industrial chains have created favourable conditions for the emergence of tech startups."[1]

Information Infrastructure

- Hangzhou's Smart City model as a foundation for data-driven industries, with established fast networks, high reliability and expanded digital government services.
- Upstream: Alibaba Cloud providing computing power for AI startups.
- Downstream: Internet companies provided diverse scenarios for AI testing and application.

Supportive Policy Environment

- Zhejiang local government pioneered a business-oriented culture in the early days of its development.
- Local officials adopted the following motto: "We won't bother you if you don't need us – but if you do, we'll be there."
- New policy target set in 2025 aims to reduce onsite inspections related to market regulation by 20%.

Forward-thinking, business-oriented policies are required from the Johor State Government to establish Johor as the nation's innovation nucleus – akin to the 2003 Digital Zhejiang Initiative set by then-Province Secretary Xi Jinping.

Source: East Asian Institute of National University of Singapore [1] (2025), Lianhe Zaobao (2025), Study in Zhejiang

Zhejiang's NHU Company attributes its success to "industry-university cooperation", allowing it to acquire technological innovation capabilities necessary for business growth

Case Study: Growth stages of NHU Company as the world's 3rd largest manufacturer of vitamins through industry-university collaboration

- **Founded in 1988, recycling waste alcohol, a simple and low-tech activity**
- Product valued at RMB1000 per tonne, while market leaders' were valued at RMB1000 per kg
- Desire to shift to high-tech, high value-added products with strong market potential to compete in both Chinese and international markets

1 1988-1994	**Hired Zhejiang University (ZJU) graduates to develop high value-added product**, improving production processes and gaining market share. 3 years of joint research produced a Vitamin E product that now accounts for 70% of domestic market share.	*Hired 2 PhDs from ZJU to solve technical problems relating to one product, which expanded into the development of an entire product series*	**Innovation-oriented product strategy**
2 1995-2006	**Established long term strategic partnerships with ZJU researchers** to share risk of product development. These researchers looked at product R&D, enterprise process improvements, technology acquisition and technical risk assessments.	*Basic consultancy fee + performance fee to incentivise researchers. 30 professors hired as senior technical advisors*	**High-quality research innovation team of 400+**
3 2007-2012	**Expansion to training and recruitment of high-quality personnel:** 6 month placements to give university students industry exposure; university experts hired to guide research collaboration; young hires sponsored to enrol in further education.	*50% of post-doctoral researchers absorbed into company after graduation as project managers and engineers*	**Learning-oriented culture**
4 2012-Present	**Established NHU-ZJU Joint Research Centre as formal vehicle for collaboration** after internal research institute could no longer meet resource demands. This was able to secure both provincial and national support, as well as serve other companies.	*Patented 60 inventions, with development of 15 new products and implementation of 14 national projects*	**Growth of pharma industry in Zhejiang**

- **World's 3rd largest manufacturer of vitamins, competing with BASF and Roche**
- State-level enterprise technical centre
- National post-doctoral research station and critical reaction lab
- Joint research centre with 100+ units of large-scale precision equipment

Source: Journal of Organisational Change Management (2018)

Digital transformation is taking place rapidly in Malaysia, and Johor needs to leverage its momentum to position itself as a leader of the digital innovation economy

MDEC Join Forces With Zhejiang University To Advance AI, Smart Cities And Digital Transformation

By **Adrian Phung** - April 23, 2025

- Letter of Intent signed by MDEC and Zhejiang University to collaborate on digital transformation, AI ecosystem and smart cities based on the 'Zhejiang Model'
- Particular interest in fostering collaboration among government, universities, the private sector as well as empowering digital talent.

UTM Hosts Zhejiang University: Advancing AI Together

July 19, 2025 Collaboration & Networking

- Recent strategic discussions involved long-term partnerships for collaborative research, co-supervision of postgraduate students, and academic exchanges
- Interest to establish Joint AI Laboratory
- Pursuing MoU to formalise collaboration and launch pilot programmes

Source: MDEC Press Release (2025), Universiti Teknologi Malaysia (2025)

Johor also lacks federal-level commitment to driving R&D, which exists in other states: see research agencies under MITI and MOSTI in Penang and Kuala Lumpur

CREST
COLLABORATIVE RESEARCH IN ENGINEERING, SCIENCE & TECHNOLOGY

- Agency under Ministry of International Trade and Industry (MITI) as of 2023
- Launched in 2012 to develop E&E focused Research, Development and Commercialisation ecosystem
- Industry-led with triple helix representation in Government, Industry and Academia

Bayan Lepas, Penang

MIMOS

- Agency under Ministry of Science, Technology and Innovation (MOSTI)
- Premier innovation centre in semiconductors, microelectronics and ICT
- Filed more than 2,000 patents since inception in 1985

Bukit Jalil, Kuala Lumpur

Opportunity Zone

- Microelectronics & Nanotechnology - Shamsuddin Research Centre (UTHM)
- PROTOM-i Research Group (UTM)
- Industry-academia partnerships to push the boundaries of data centre efficiency and use of green energy. Recent efforts in Singapore include (i) a 500kW testbed to pilot innovative cooling technologies, (ii) SGD30 mil fund for green computing and software solutions, and (iii) SGD100 mil for low-carbon energy technologies.

Johor

With established federal E&E research agencies in Penang and Kuala Lumpur, **Johor must identify a unique yet complementary approach to finding its place within the research ecosystem, such as focusing on its new strength as a data centre hub.** Although UTM is one of the country's leading research universities, more can be done to drive innovation frontiers for emerging data centre technologies.

Source: PASB Analysis

Establishing the Johor Innovation Corridor

To capture value from major local investments, attract new investments and bolster growth of high-value manufacturing sectors, Johor needs to elevate its R&D capabilities. The State Government can do this by integrating its STEM academic engine, upcoming Smart City infrastructure, and JS-SEZ.

Initiative Highlights:

Concept Description	Innovation Corridor anchored by state-backed VC Fund, supported by the development of strong industry-academia relationships and real-world testbed in Ibrahim Technopolis.

Visualisation of the initiative

IBTEC Living Labs	Industry-Academia Partnerships	Johor Venture Capital Fund
• 7,290 acre smart-technology and circular township in Sedenak, equipped with infrastructure such as smart utilities, clean energy and digital connectivity to enable unrestricted innovation. • Supported by JS-SEZ regulatory sandbox.	• Leverage industry expertise by appointing business leaders as professors in key universities (UTM, UTHM). • Ensure science-driven business innovation by by appointing researchers as Chief Science Officers in GLCs (JCORP subsidiaries).	• Establish a state-backed VC Fund supported by both State Government and State GLCs, co-investing with private VCs. • Provide early access to IP for contributing GLCs, with transparent IP-sharing rules. • Focus on industrial deep-tech for Johor customers.

Impact: Position the state as a leader in sustainable industralisation and high-tech manufacturing, built upon IBTEC infrastructure and strong research leadership.

Implementing Agency
IRDA

Monitoring Agency
- BPEN-J

Associated Sectors :
- Healthcare & Pharmaceuticals, E&E, Agriculture, Logistics

Stakeholders Involved:
- JCORP
- IRDA
- UTM & UTHM
- State GLCs

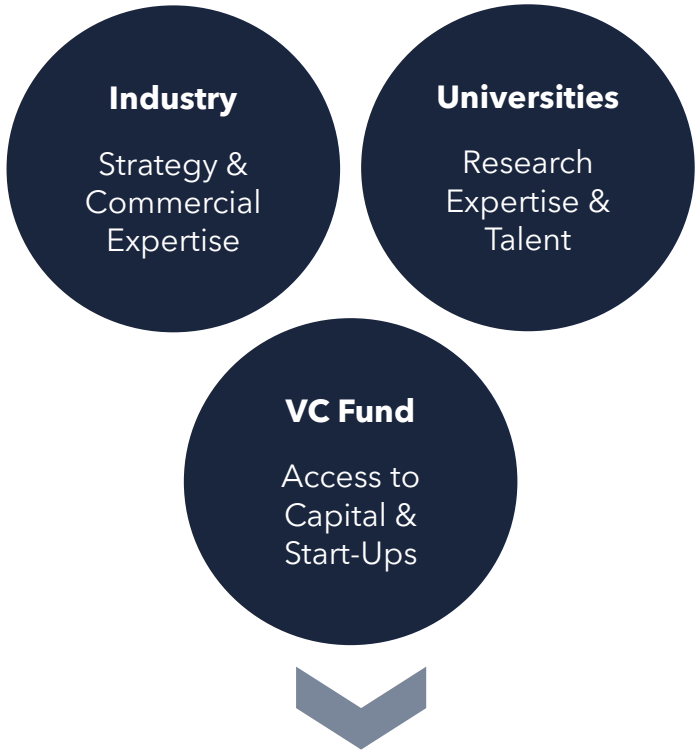
Budget Required:

FY	Public	Private
2025	Budget details to be finalised during implementation of the initiative	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: Jan 2026
- End Date: Dec 2030

A VC fund for Johor could combine key ingredients for success, funding research in high growth areas, supported by technology-enabled infrastructure

Components of Innovation Ecosystem



Building Commercial Pipeline in High-Growth Areas

Agri-Tech
Advanced E&E
Smart Logistics
Life Sciences & MedTech
Digital Infrastructure

Key Success Factors

Talent and Entrepreneurial Ecosystem Support: Strong linkage with tertiary institutions for talent pipeline. Complementary programs such as TVET, accelerators, mentorship networks build the human capital base, equipping startups and founders with the skills to scale and attract additional investment.

Policy and Regulatory Enablers: Alignment with JS-SEZ incentives (e.g., tax breaks, regulatory fast-tracks and sandbox) creates an enabling environment that makes Johor attractive for founders and investors alike.

Cross-Border Partnerships: Collaboration with Singaporean, ASEAN, and global VCs enhances market access, provides international expertise, and facilitates regional scaling of Johor-based startups.

Anchor Investments and Early Success Stories: Securing high-profile, successful early investments establishes proof of concept, attracts media and investor attention, and builds momentum for the fund's reputation.

Effective Public–Private Co-Investment Model: Leveraging state seed capital to crowd-in private VCs, corporates, and sovereign funds increases fund size, diversifies risk, and builds credibility with the global investor community.

Clear KPIs and Impact Tracking: Regular monitoring of key outcomes (i.e. capital raised, startups funded, IP commercialised, and jobs created) provides evidence of progress and reassures both public and private stakeholders.

Leadership Development Programme for Civil Service Officers

Johor Civil Service is embarking on a journey to attract and develop the best and brightest talent in the state. To establish Johor's role as a regional powerhouse for economic development, its future will need to be guided by leaders with exposure to top-level policymaking and global developments.

Initiative Highlights:

Concept Description	Develop a robust professional development programme for JCS Officers, including accelerated career pathways, global policy exposure and world-class leadership education.

Visualisation of the initiative

Scholarship Programme	Fast-Track for Top Performers	Secondments	Executive Leadership
Pre-service (0 yrs) • Scholarships awarded to top graduates of Sekolah Bangsa Perintis Johor for degrees in public policy, economics and management • Internship within State Govt during school holidays • Post-study placement guarantee into JCS (DG41)	DG41-DG44 (2-6 yrs) • Annual performance evaluation and nomination of high performing and potential officers • Accelerated promotion pathway from DG41 to DG44 • Direct mentorship from senior JCS officers	DG44-DG48 (6-12 yrs) • Secondments of 6-12 months to GLCs and int'l development orgs • Project-based assignments on topics such as technology adoption, economic development, social policy, etc. • Reintegration into policy department	DG48-JUSA (12+ yrs) • Short-term executive education programmes in strategy, public administration, negotiations, leadership, etc. • Host ASEAN Policy Lab for regional leaders

Impact: Strategically position the Johor Civil Service as an attractive, competitive and high-performing employer to develop the state's next generation of leaders.

Implementing Agency
- Permodalan Darul Ta'zim

Associated Sectors :
- Cross-Cutting

Stakeholders Involved:
- BPEN
- JCS
- IDO

Budget Required:

FY	Public	Private
2025	Budget details to be finalised during implementation of the initiative	
2026		
2027		
2028		
2029		
2030		
Total		

Implementation Timeframe:
- Start Date: Further input required
- End Date: Further input required

Building a future-ready Johor Civil Service will require expanding horizons, while remaining rooted in its strong legacy of leadership

Key Success Factors

Clear Competency and Assessment Framework: A structured leadership competency model, co-created with state leadership and HR, ensures officers are trained in the skills most critical to Johor's governance and service delivery priorities. Regular 360° assessments, leadership simulations, and progress reviews will provide officers with actionable feedback and ensure accountability in the development process.

Sustained Culture of Support and Learning: Pairing senior civil service leaders and private-sector executives as mentors ensures real-world guidance, career development support, and cross-sector insights. Officers must be supported by a network of peers and alumni, to foster continuous peer learning and collaboration, creating a culture of learning.

Rotational Assignments & Exposure: Structured secondments across GLCs, international development organisations or even private-sector partners allow officers to gain broad perspectives and strengthen problem-solving capacity. Exposure to a broader range of policy challenges and solutions creates a holistic development journey that equips officers with both theory and practice.

Integration with Career Pathways: Officers must see be able to link leadership development with promotion opportunities and succession planning, to make the initiative meaningful and motivate officers to invest in their development.

Strong Political & Administrative Sponsorship: Visible support from the Chief Minister, State Secretary, and senior leadership reinforces legitimacy and signals the importance of the programme within the JCS.

6.4

Detailed Implementation Plan and Key Performance Indicators.

Infrastructure Development.

Disclaimer Notes

The detailed implementation plan and Key Performance Indicators (KPIs) outlined in this report were developed for the purpose of the study, drawing largely—but not entirely—from inputs and advice provided by the respective stakeholders.

For initiatives or components where direct stakeholder input was not available due to various limitations, PEMANDU has taken the liberty to draft the milestones, action plans, and KPIs based on known best practices and reference processes available at the time of writing of this study. These milestones, action plans, and KPIs are therefore indicative and intended to provide direction, but do not constitute a finalised monitoring and evaluation framework.

PEMANDU recommends that, upon commencement of implementation, these components be revisited, validated, and finalised by the relevant authorities and stakeholders to ensure accuracy, ownership, and alignment before being formally adopted for monitoring and evaluation.

Off-river Storage (ORS), Barrage Development at Sungai Pontian Besar & Kayu Ara Pasong Water Treatment Plant: Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
1	Assessment – TAPS & Barrage	PETRA / BBA	Expected to complete by 2029	
2	Project Implementation – TAPS & Barrage	Contractor	Expected to complete by 2029	
3	Assessment – Kayu Ara Pasong WTP	Contractor	Completion year for the project is dependent on completion of TAPS & Barrage	
4	Project Implementation – Kayu Ara Pasong WTP	Contractor		
			Jan 2026	**Dec 2029**

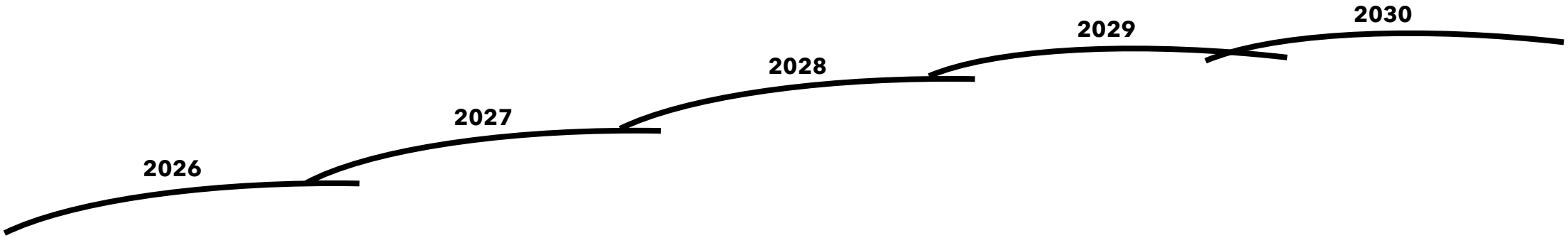
Off-river Storage (ORS), Barrage Development at Sungai Pontian Besar & Kayu Ara Pasong Water Treatment Plant: Implementation Plan (1/2)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Assessment – TAPS & Barrage**		**Expected to complete by 2029**	
1.1	Appointment for engineering consultant, surveyor & town planner	PETRA / BBA	TBD	TBD
1.2	Soil investigation	PETRA / BBA	TBD	TBD
1.3	Detail Environment Impact Assessment (DEIA)	PETRA / BBA	TBD	TBD
1.4	Land acquisition	PETRA / BBA	TBD	TBD
2	**Project Implementation – TAPS & Barrage**		**Expected to complete by 2029**	
2.1	Preliminary works	Contractor	TBD	TBD
2.2	Construction of barrage	Contractor	TBD	TBD
2.3	Construction of structure for TAPS, monitoring room, quarters, guard house, and access road	Contractor	TBD	TBD
2.4	Mechanical, electrical, SCADA system and installation of water quality censor	Contractor	TBD	TBD
2.5	Land works for retention pond TAPS	Contractor	TBD	TBD
2.6	Construction of TNB Sub-Station	Contractor	TBD	TBD
3	**Assessment – Kayu Ara Pasong WTP**		**Completion year for the project is dependent on completion of TAPS & Barrage**	
3.1	Design & planning stage	Contractor	~2030	TBD
3.2	(To be further detailed out)	Contractor		

Off-river Storage (ORS), Barrage Development at Sungai Pontian Besar & Kayu Ara Pasong Water Treatment Plant: Implementation Plan (2/2)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
4	**Project Implementation – Kayu Ara Pasong WTP**		**Completion year for the project is dependent on completion of TAPS & Barrage**	
4.1	(To be further detailed out)	Contractor	TBD	TBD

Off-river Storage (ORS), Barrage Development at Sungai Pontian Besar & Kayu Ara Pasong Water Treatment Plant: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• State's raw water capacity: ≥2,378 MLD	• *Not within stipulated timeframe*
Achieved Milestones	• TAPS & Barrage Assessment – Appointment for engineering consultant, surveyor & town planner – Soil investigation – Detail Environment Impact Assessment (DEIA) – Land acquisition	• TAPS & Barrage Construction – Preliminary works – Construction of barrage – Construction of structure for TAPS, monitoring room, quarters, guard house, and access road – Mechanical, electrical, SCADA system and installation of water quality censor – Land works for retention pond TAPS – Construction of TNB Sub-Station	• TAPS & Barrage Project Construction Completion	• *(Anticipated) Design & planning stage for Kayu Ara Pasong WTP Assessment*	

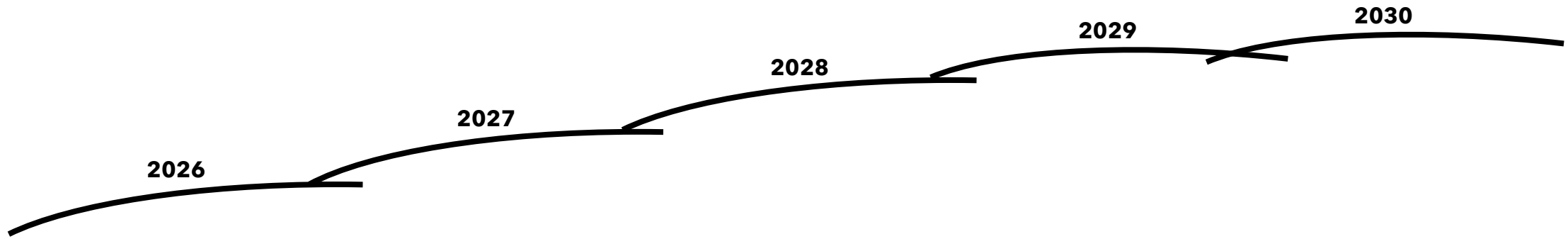
Off-river Storage (ORS), Barrage Development at Sungai Pontian Besar & Kayu Ara Pasong Water Treatment Plant: KPI Dictionary

KPI	Raw Water Capacity
Description	The maximum volume of raw water supply that all combined water storage infrastructure in the Johor state is engineered to contain, expressed in million litres per day (MLD)
Method Of Measurement	Sum of design capacity data on all water storage infrastructure (i.e. off-river storage, dams, etc.) in the state
Achievement Trend	N/A
Justification	Raw water capacity is a critical KPI because it measures the volume of raw water actually available from natural sources – rivers, reservoirs, dams against which treatment and distribution capacity must be planned and operated
Target (Year 2029)	Johor's current raw water capacity (2,118 MLD as of 2024 – accounting for dams only) plus the increase in capacity from construction of Off-river Storage at Sungai Pontian Besar (+260 MLD) Target: ≥2,378 MLD
Supporting Document	N/A
Frequency Of Data Reported	Annual consolidation and review by BAKAJ/ PDT

Off-river Storage (ORS) at Sungai Johor: Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
1	Construction Tender Award & Procurement	PETRA	Jan 2026	Mar 2026
2	TAPS Construction & Completion	EPCC / Contractor / Tender winner	Mar 2026	Feb 2029
			Jan 2026	**Feb 2029**

Off-river Storage (ORS) at Sungai Johor: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• State's raw water capacity: ≥2,318 MLD	• *Not within stipulated timeframe*
Achieved Milestones	• Construction Tender Award & Procurement	• TAPS Construction	• *Not available*	• TAPS Construction Completion	• *Not within stipulated timeframe*

Off-river Storage (ORS) at Sungai Johor: KPI Dictionary

KPI	Raw Water Capacity
Description	The maximum volume of raw water supply that all combined water storage infrastructure in the Johor state is engineered to contain, expressed in million litres per day (MLD)
Method Of Measurement	Sum of design capacity data on all water storage infrastructure (i.e. off-river storage, dams, etc.) in the state
Achievement Trend	N/A
Justification	Raw water capacity is a critical KPI because it measures the volume of raw water actually available from natural sources – rivers, reservoirs, dams against which treatment and distribution capacity must be planned and operated
Target (Year 2029)	Johor's current raw water capacity (2,118 MLD as of 2024 – accounting for dams only) plus the increase in capacity from construction of Off-river Storage at Sungai Johor (+200 MLD) Target: ≥2,318 MLD
Supporting Document	N/A
Frequency Of Data Reported	Annual consolidation and review by BAKAJ/ PDT

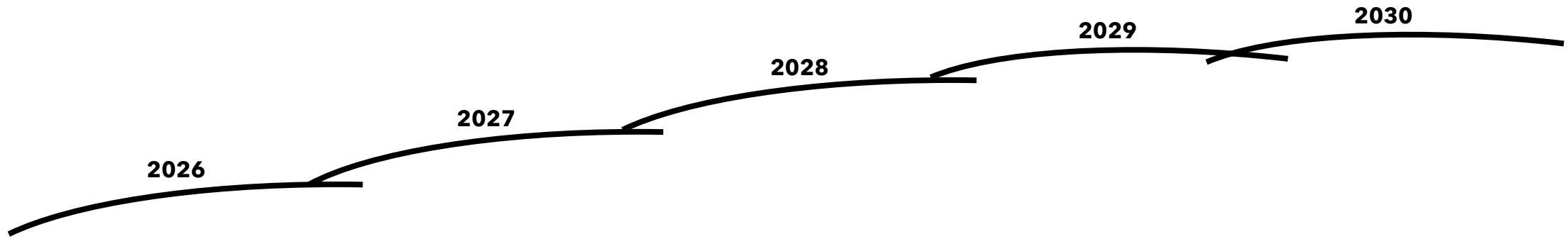
Water Treatment Plant & Water Distribution System at Semangar 3, Kota Tinggi: Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
1	Assessment	PDT – ABC	Expected 9 months for completion	
2	Project Implementation	PDT – ABC	Expected 3 years for completion	
			Jan 2026	**Dec 2029**

Water Treatment Plant & Water Distribution System at Semangar 3, Kota Tinggi: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Assessment**		**Expected 9 months for completion**	
1.1	Site survey, soil investigation, land acquisition, etc.	PDT – ABC	1st month – 6th month	
1.2	Engineering design	PDT - ABC	1st month – 9th month	
2	**Project Implementation**		**Expected 3 years for completion**	
2.1	Construction of Semangar 3 WTP	PDT - ABC	4th month – 36th month	
2.2	Construction of Semangar 3 Intake & RWPS (IRWPS)	PDT – ABC	4th month – 36th month	
2.3	Construction of Balancing Resevoir (BR) – 20 Ml Bukit Kulai BR & 20 Ml Bukit 75A/75B BR	PDT – ABC	13th month – 32nd month	
2.4	Pipelaying works (a) 15km of 1800mm dia. Pipe (ORS to WTP) (b) 1km of 1800mm dia. Pipe (IRWPS to WTP) (c) 23km of 1400mm dia. Pipe (WTP to Bkt Kulai BR) (d) 10km of 1800mm dia. Pipe (WTP to Bkt 75A/75B BR)	PDT – ABC	7th month – 34th month	
2.5	Interconnection of existing pipeworks	PDT – ABC	34th month – 35th month	
2.6	Testing and commissioning	PDT - ABC	35th month – 36th month	

Water Treatment Plant & Water Distribution System at Semangar 3, Kota Tinggi: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• State's water treatment plant design capacity: ≥2,505 MLD	• *Not available*	• *Not available*
Achieved Milestones	• Site survey, soil investigation, land acquisition, etc. • Engineering design	• *Not available*	• Semangar 3 WTP Construction Completion • Semangar 3 Intake & RWPS (IRWPS) Construction Completion • Balancing Resevoir (BR) Construction Completion • Pipelaying works • Interconnection of existing pipeworks • Testing and commissioning	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*

Water Treatment Plant & Water Distribution System at Semangar 3, Kota Tinggi: KPI Dictionary

KPI	Water Treatment Plant (WTP) Design Capacity
Description	The maximum treated water supply that all combined water treatment plants in the Johor state is engineered to deliver, expressed in million litres per day (MLD)
Method Of Measurement	Sum of design capacity data on all water treatment plants in the state
Achievement Trend	Johor has tracked a positive growth in its WTP design capacity, measuring a 20% increase in overall state design capacity over the last decade between 2015-2024
Justification	WTP design capacity is a critical KPI because it benchmarks the maximum treatment throughput a plant can reliably deliver, ensuring adequate supply during peak or emergency conditions and helps demonstrate compliance in line with SPAN's standards. Monitoring current utilisation and projected water demand against this design capacity also helps to inform timely expansion planning to ensure continuous and sufficient streams of water supply
Target (Year 2028)	Johor's current WTP design capacity (2,375 MLD as of 2024) plus the increase in capacity from construction of Semangar 3 Water Treatment Plant (+130 MLD) Target: ≥2,505 MLD
Supporting Document	Water and Sewerage Factboook by by Suruanjaya Perkhidmatan Air Negara (SPAN)
Frequency Of Data Reported	Annual consolidation and publication in the Water and Sewerage Factboook by SPAN

Regional Sewage Treatment Plant & (RSTP) Water Reclamation Plant (WRP) at Pasir Gudang: Milestone

No	Milestones	Responsibility	Planned start date	Planned end date
1	Tender Process	PETRA / JPP	Expected 1 year for completion	
2	Project Implementation	EPCC / Contractor / Tender winner	Expected 5 years for completion	
			Jan 2026	**Dec 2031**

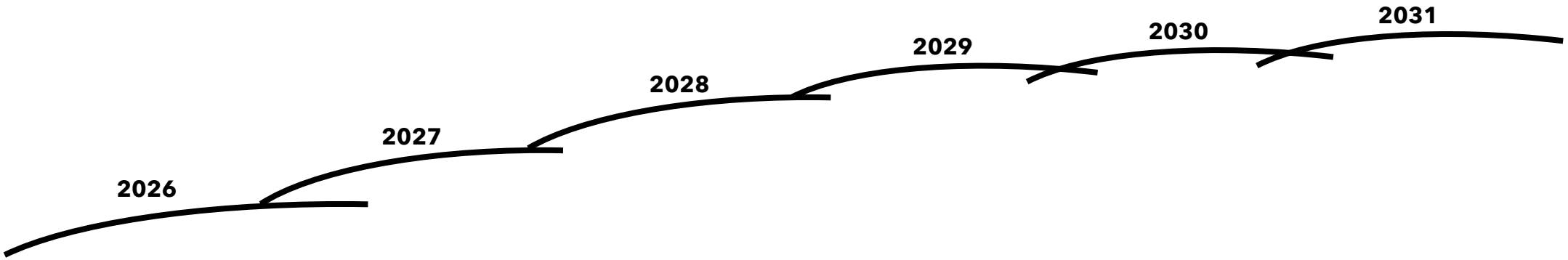
Regional Sewage Treatment Plant & (RSTP) Water Reclamation Plant (WRP) at Pasir Gudang: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Tender Process**		**Expected 1 year for completion (by 2026)**	
1.1	Preparation of VA Report	PETRA / JPP	TBD	TBD
1.2	Appeal for Notice of Changes (NOC)	PETRA / JPP	TBD	TBD
1.3	Preparation of Need Statement Document	PETRA / JPP	TBD	TBD
1.4	Value Engineering (VE)	PETRA / JPP	TBD	TBD
1.5	Procurement process	PETRA / JPP	TBD	TBD
2	**Project Implementation**		**Expected 5 years for completion (by 2031)**	
2.1	Preliminary Works	EPCC / Contractor / Tender winner	TBD	TBD
2.2	Engineering, Soil Investigation & Design	EPCC / Contractor / Tender winner	TBD	TBD
2.3	Built and operate Temporary Treatment Facilities	EPCC / Contractor / Tender winner	TBD	TBD
2.4	Upgrading & refurbishment of WWTP / NPS / SPBKI	EPCC / Contractor / Tender winner	TBD	TBD
2.5	Piping network for sewerage	EPCC / Contractor / Tender winner	TBD	TBD
2.6	Rationalization	EPCC / Contractor / Tender winner	TBD	TBD
2.7	Desludging Facilities	EPCC / Contractor / Tender winner	TBD	TBD
2.8	Construction of WRP	EPCC / Contractor / Tender winner	TBD	TBD
2.9	Traffic management works, road pavement & refurbishment	EPCC / Contractor / Tender winner	TBD	TBD

Regional Sewage Treatment Plant & (RSTP) Water Reclamation Plant (WRP) at Pasir Gudang: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
2.10	Testing & Commissioning	EPCC / Contractor / Tender winner	TBD	TBD
2.11	Engineering consulting services	EPCC / Contractor / Tender winner	TBD	TBD
2.12	Others	EPCC / Contractor / Tender winner	TBD	TBD

Regional Sewage Treatment Plant & (RSTP) Water Reclamation Plant (WRP) at Pasir Gudang: KPI



	2026	2027	2028	2029	2030	2031
Initiative KPIs	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• State's regional sewage treatment plant Population Equivalence: ≥879,746 PE • State's water treatment plant design capacity: ≥2,565 MLD	
Achieved Milestones	• Tender Process – Preparation of VA Report – Appeal for Notice of Changes (NOC) – Preparation of Need Statement Document – Value Engineering (VE) – Procurement Process	• Project Implementation – Preliminary Works – Engineering, Soil Investigation & Design – Built and operate Temporary Treatment Facilities – Upgrading & refurbishment of WWTP / NPS / SPBKI – Piping network for sewerage – Rationalization – Desludging Facilities	– Construction of WRP – Traffic management works, road pavement & refurbishment – Testing & Commissioning – Engineering consulting services – Others		• RSTP and WRP Construction Completion	

Regional Sewage Treatment Plant & (RSTP) Water Reclamation Plant (WRP) at Pasir Gudang: KPI Dictionary

KPI	Population Equivalence
Description	The total biochemical-load–equivalent population (PE) that all combined regional sewage treatment plants can serve under design load conditions
Method Of Measurement	Sum of population equivalence data on all regional sewage treatment plants in the state
Achievement Trend	
Justification	Validates that the RSTP can reliably handle the anticipated organic load from the equivalent urban population, safeguarding effluent quality and avoiding bypass
Target (Year 2031)	Johor's current regional sewage treatment plant population equivalence (629,746 PE as of 2024) plus the increase in capacity from construction of Regional Sewage Treatment Plant & Water Reclamation Plant at Pasir Gudang (+250,000 PE) Target: ≥879,746 PE
Supporting Document	Water and Sewerage Factboook by by Suruanjaya Perkhidmatan Air Negara (SPAN)
Frequency Of Data Reported	Annual consolidation and publication in the Water and Sewerage Factbook by SPAN

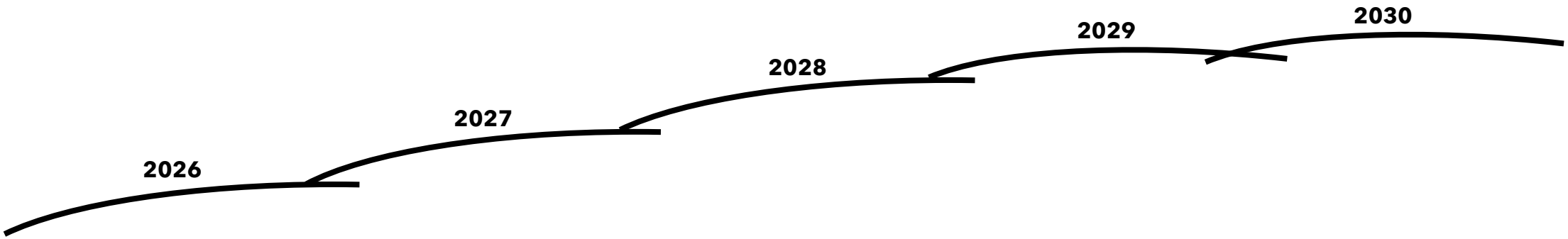
Regional Sewage Treatment Plant & (RSTP) Water Reclamation Plant (WRP) at Pasir Gudang: KPI Dictionary

KPI	Water Treatment Plant (WTP) Design Capacity
Description	The maximum water supply that all combined water treatment plants is engineered to deliver, expressed in million litres per day (MLD)
Method Of Measurement	Sum of design capacity data on all water treatment plants in the state
Achievement Trend	Johor has tracked a positive growth in its WTP design capacity, measuring a 20% increase in overall state design capacity over the last decade between 2015-2024
Justification	WTP design capacity is a critical KPI because it benchmarks the maximum treatment throughput a plant can reliably deliver, ensuring adequate supply during peak or emergency conditions and helps demonstrate compliance in line with SPAN's standards. Monitoring current utilisation and projected water demand against this design capacity also helps to inform timely expansion planning to ensure continuous and sufficient streams of water supply
Target (Year 2031)	Johor's current WTP design capacity (2,375 MLD as of 2024) plus the increase in capacity from construction of Regional Sewage Treatment Plant & Water Reclamation Plant at Pasir Gudang (+190 MLD) Target: ≥2,565 MLD
Supporting Document	Water and Sewerage Factbook by by Suruhanjaya Perkhidmatan Air Negara (SPAN)
Frequency Of Data Reported	Annual consolidation and publication in the Water and Sewerage Factbook by SPAN

Off-river Storage (ORS), Barrage Development at Sungai Sedili Besar: Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
1	Detailed Design	PETRA / Contractor	Jan 2026	Sep 2026
2	Land Acquisition	PETRA, Local Council	Jun 2026	Nov 2026
3	Planning Approval	PETRA, Local Council	Nov 2026	Feb 2027
4	Construction Tender Award & Procurement	PETRA	Feb 2027	Jul 2027
5	Tender Award Document Preparation	PETRA	Aug 2027	Oct 2027
6	TAPS Construction & Completion	EPCC / Contractor / Tender winner	Nov 2027	Oct 2027
			Jan 2026	**Oct 2027**

Off-river Storage (ORS), Barrage Development at Sungai Sedili Besar: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• State's raw water capacity: ≥2,718 MLD
Achieved Milestones	• Detailed Design • Land Acquisition	• Planning Approval • Construction Tender Award & Procurement • Tender Award Document Preparation • TAPS Construction	• *Not available*	• *Not available*	• TAPS Construction Completion

Off-river Storage (ORS), Barrage Development at Sungai Sedili Besar: KPI Dictionary

KPI	Raw Water Capacity
Description	The maximum volume of raw water supply that all combined water storage infrastructure in the Johor state is engineered to contain, expressed in million litres per day (MLD)
Method Of Measurement	Sum of design capacity data on all water storage infrastructure (i.e. off-river storage, dams, etc.) in the state
Achievement Trend	N/A
Justification	Raw water capacity is a critical KPI because it measures the volume of raw water actually available from natural sources – rivers, reservoirs, dams against which treatment and distribution capacity must be planned and operated
Target (Year 2030)	Johor's current raw water capacity (2,118 MLD as of 2024 – accounting for dams only) plus the increase in capacity from construction of Off-river Storage at Sungai Pontian Besar (+600 MLD) Target: ≥2,718 MLD
Supporting Document	N/A
Frequency Of Data Reported	Annual consolidation and review by BAKAJ/ PDT

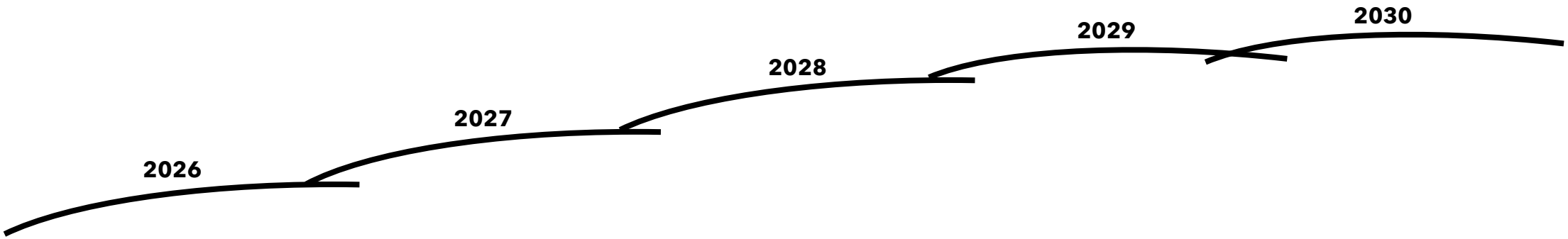
Sungai Sembrong Water Transfer and Ulu Sedili Dam Scheme: Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
1	Project Proposal	PETRA, YTL, RSAJ, PUB, PDT, BPENJ	Expected 3 – 5 years for completion *(assumptions apply maximum estimate of 5 years)*	
2	Project Implementation	PDT - RSAJ		
			Jan 2026	**Dec 2030**

Sungai Sembrong Water Transfer and Ulu Sedili Dam Scheme: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Project Proposal**		**Expected 3 – 5 years for completion**	
1.1	Approval from Fed. Gov. for source of funding (Skim Ulu Sedili)	PETRA, YTL, RSAJ	TBD	TBD
1.2	Approval from PUB (Linggiu Dam) – Option 1	YTL, RSAJ, PUB	TBD	TBD
1.3	Finalization of JVCo. for PFI (Sembrong Water Transfer)	YTL, RSAJ, PDT	TBD	TBD
1.4	Approval from State Gov.	YTL, RSAJ, PDT, BPENJ	TBD	TBD
2	**Project Implementation**			
2.1	To be detailed out	PDT - RSAJ		

Sungai Sembrong Water Transfer and Ulu Sedili Dam Scheme: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• State's water treatment plant design capacity: ≥4,375 MLD
Achieved Milestones	• Approval from Fed. Gov. for source of funding (Skim Ulu Sedili) • Approval from PUB (Linggiu Dam) – Option 1 • Finalization of JVCo. for PFI (Sembrong Water Transfer) • Approval from State Gov.	• *Not available*	• *Not available*	• Project Implementation Completion	

Sungai Sembrong Water Transfer and Ulu Sedili Dam Scheme: KPI Dictionary

KPI	Water Treatment Plant (WTP) Design Capacity
Description	The maximum treated water supply that all combined water treatment plants is engineered to deliver, expressed in million litres per day (MLD)
Method Of Measurement	Sum of design capacity data on all water treatment plants in the state
Achievement Trend	Johor has tracked a positive growth in its WTP design capacity, measuring a 20% increase in overall state design capacity over the last decade between 2015-2024
Justification	WTP design capacity is a critical KPI because it benchmarks the maximum treatment throughput a plant can reliably deliver, ensuring adequate supply during peak or emergency conditions and helps demonstrate compliance in line with SPAN's standards. Monitoring current utilisation and projected water demand against this design capacity also helps to inform timely expansion planning to ensure continuous and sufficient streams of water supply
Target (Year 2030)	Johor's current WTP design capacity (2,375 MLD as of 2024) plus the increase in capacity from construction of Sembrong Water Treatment Plant (+2,000 MLD) Target: ≥4,375 MLD
Supporting Document	Water and Sewerage Factboook by by Suruanjaya Perkhidmatan Air Negara (SPAN)
Frequency Of Data Reported	Annual consolidation and publication in the Water and Sewerage Factboook by SPAN

Mitigation of Flood Risks by Leveraging Physical & Digital Infrastructure: Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
5-Year Physical Infrastructure Action Plan		**PETRA, JPS**	**Jan 2026**	**Oct 2030**
1	Assessment & Strategy Development	PETRA, JPS	Jan 2026	Jun 2026
2	Master Plan & Approvals	PETRA, JPS	July 2026	Apr 2029
3	Implementation of Upgrades	PETRA, JPS	May 2029	May 2030
4	New-Build Construction & Implementation	PETRA, JPS	May 2029	May 2030
5	Commissioning & Handover	PETRA, JPS	May 2030	Oct 2030
Digital Infrastructure Action Plan		**PETRA, JPS, ICT Johor**	**Jan 2026**	**Jan 2029 and beyond**
1	Digital Strategy & Design	PETRA, JPS, ICT Johor	Jan 2026	Mar 2026
2	Procurement & Partner Engagement	PETRA, JPS, ICT Johor	Apr 2026	Aug 2026

Mitigation of Flood Risks by Leveraging Physical & Digital Infrastructure: Milestones

No	Milestones	Responsibility	Planned start date (~01/01/2026)	Planned end date (~01/01/2030)
Digital Infrastructure Action Plan		**PETRA, JPS, ICT Johor**	**Jan 2026**	**Jan 2029 and beyond**
3	Deployment & Integration	PETRA, JPS, ICT Johor	Sep 2026	Dec 2027
4	Testing & Handover	PETRA, JPS, ICT Johor	Jan 2028	Dec 2028
5	Operations & Continuous Improvement	PETRA, JPS, ICT Johor	Jan 2029	Jan 2029 and beyond
			Jan 2026	**Jan 2030 and beyond**

Note: 1. Centre for Environmental Sustainability and Water Security

Mitigation of Flood Risks by Leveraging Physical & Digital Infrastructure: Implementation Plan – 5-Year Physical Infrastructure Action Plan (1/4)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Assessment & Strategy**	**PETRA, JPS, BPEN-J, PDT, Local Councils, UTM IPASA[1]**	**Jan 2026**	**Jun 2026**
1.1	Map high-risk flood zones against historical loss data & asset condition (embankments, sluices, pumps)	PETRA, JPS, BPEN-J, PDT, Local Councils	Jan 2026	Feb 2026
1.2	Conduct internal assessment and hydrological modelling to prioritise upgrade needs for existing flood control assets as well as key dredging & embankment sites	PETRA, JPS, UTM IPASA	Feb 2026	Apr 2026
1.3	Define scope for upgrades vs. new works (i.e. cost/benefit analysis)	PETRA, JPS	May 2026	Jun 2026
2	**Master Plan & Approvals**	**PETRA, JPS, BPEN-J, PDT, Local Councils**	**Jul 2027**	**Apr 2029**
2.1	Draft master plan: dredging channels, reinforce embankments, buffer zones, flood and drainage asset upgrades	PETRA, JPS, Local Councils	Jul 2027	Oct 2027
2.2	Secure permits for upgrades, dredging, embankments & new civil-works components	PETRA, JPS, Local Councils	Nov 2028	Apr 2029
2.3	Finalise civil-works budget & procurement approach	PETRA, JPS, BPEN-J, PDT	Nov 2028	Apr 2029
3	**Implementation of Upgrades**	**PETRA, JPS**	**May 2029**	**May 2030**
3.1	Reinforce existing embankments and sluice foundations	PETRA, JPS	May 2029	May 2030
3.2	Modernise barrage gates, pumps and control systems	PETRA, JPS	May 2029	May 2030

Note: 1. Centre for Environmental Sustainability and Water Security

Mitigation of Flood Risks by Leveraging Physical & Digital Infrastructure: Implementation Plan – 5-Year Physical Infrastructure Action Plan (2/4)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
4	**New-Build Construction & Implementation**	**PETRA**	**May 2029**	**May 2030**
4.1	Execute river widening & diversion channel earthworks	PETRA	May 2029	May 2030
4.2	Plant and maintain nature-based wetland buffers	PETRA	May 2029	May 2030
5	**Commissioning & Handover**	**PETRA, JPS**	**May 2030**	**Oct 2030**
5.1	Dry-run test mechanical systems (i.e. upgraded gates, pumps)	PETRA, JPS	May 2030	Jun 2030
5.2	Wet commissioning under simulated flood flows	PETRA, JPS	Jul 2030	Aug 2030
5.3	Formal handover & regulatory sign-off	PETRA, JPS	Sep 2030	Oct 2030

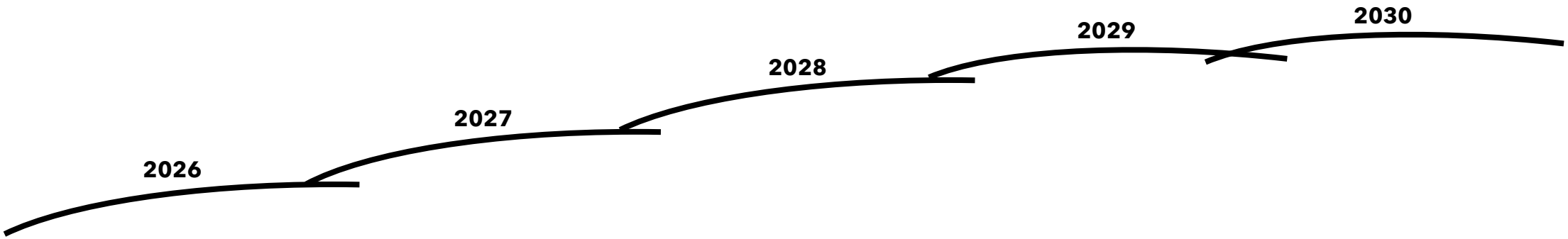
Mitigation of Flood Risks by Leveraging Physical & Digital Infrastructure: Implementation Plan – Digital Infrastructure Action Plan (3/4)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Digital Strategy & Design**	**PETRA, ICT Johor, Systems Integrator Consultant**	**Jan 2026**	**Mar 2026**
1.1	Audit existing flood-monitoring systems & data flows	PETRA, ICT Johor, Systems Integrator Consultant	Jan 2026	Jan 2026
1.2	Map out advanced technology application and use cases	PETRA, ICT Johor, Systems Integrator Consultant	Feb 2026	Feb 2026
1.3	Draft digital-platform architecture & integration approach	PETRA, ICT Johor, Systems Integrator Consultant	Mar 2026	Mar 2026
2	**Procurement & Partner Engagement**	**PETRA, ICT Johor, Systems Integrator Consultant, Telecom Companies, IoT Vendors, Software Vendors/ Developers**	**Apr 2026**	**Aug 2026**
2.1	Partner and procure technology providers, AI modelling development expertise	PETRA, ICT Johor, Systems Integrator Consultant, Telecom Companies, IoT Vendors, Software Vendors/ Developers	Apr 2026	Aug 2026
3	**Deployment & Integration**	**PETRA, ICT Johor, Systems Integrator Consultant, Telecom Companies, IoT Vendors, Software Vendors/ Developers**	**Sep 2026**	**Dec 2027**
3.1	Deploy advanced technology and required digital connectivity at priority flood locations	PETRA, ICT Johor, Telecom Companies, IoT Vendors	Sep 2026	Feb 2027

Mitigation of Flood Risks by Leveraging Physical & Digital Infrastructure: Implementation Plan – Digital Infrastructure Action Plan (4/4)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
3.2	Integrate sensor feeds into centralised cross-agency cloud database which is linked to a dashboard for internal manual monitoring and early warning purposes for externals	PETRA, ICT Johor, Systems Integrator Consultant, IoT Vendors, Software Vendors/ Developers	Mar 2027	May 2027
3.3	Train and implement autonomous AI-driven flood hazard mapping model for anomaly detection & alerting	PETRA, ICT Johor, Software Vendors/ Developers	Jun 2027	Dec 2027
4	**Testing & Handover**	**PETRA, ICT Johor, Systems Integrator Consultant, Telecom Companies, IoT Vendors, Software Vendors/ Developers**	**Jan 2028**	**Dec 2028**
4.1	Conduct dry-run digital tests without live data	Vendors	Jan 2028	Feb 2028
4.2	End-to-end wet testing with live sensor data & automated alerts	Vendors	Mar 2028	Sep 2028
4.3	Formal system acceptance & training for monitoring staff	Vendors	Oct 2028	Dec 2028
5	**Operations & Continuous Improvement**	**PETRA, ICT Johor**	**Jan 2029**	**Jan 2029 and beyond**
5.1	Real-time monitoring of flood metrics & system health	PETRA, ICT Johor	Jan 2029	Jan 2029 and beyond
5.2	Quarterly reviews & model retraining to reduce false alerts	PETRA, ICT Johor	Jan 2029	Jan 2029 and beyond
5.3	Publish annual digital performance report & update analytics parameters	PETRA, ICT Johor	Jan 2029	Jan 2029 and beyond

Mitigation of Flood Risks by Leveraging Physical & Digital Infrastructure: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• Percentage of Hectares Safeguarded in Flood-Prone Areas: 70% • Flood Losses: ≤RM 10 million • Frequency of Flood Occurrences: ≤50 incidents
Achieved Milestones	• **5-Year Physical Infrastructure Action Plan** – Assessment & Strategy Development • **Digital Infrastructure Action Plan** – Digital Strategy & Design – Procurement & Partner Engagement	• **Digital Infrastructure Action Plan** – Deployment & Integration	• **Digital Infrastructure Action Plan** – Testing & Handover	• **5-Year Physical Infrastructure Action Plan** – Master Plan & Approvals • **Digital Infrastructure Action Plan** – Operations & Continuous Improvement	• **5-Year Physical Infrastructure Action Plan** – Implementation of Upgrades – New-Build Construction & Implementation – Commissioning & Handover

Mitigation of Flood Risks by Leveraging Physical & Digital Infrastructure: KPI Dictionary

KPI	Percentage of Hectares Safeguarded in Flood-Prone Areas
Description	Proportion of designated flood-risk land covered under flood preventive/ mitigatory infrastructure (e.g. embankments, channels, buffers).
Method Of Measurement	Coverage area of flood preventative/ mitigatory infrastructure over Total flood-prone area, in hectares and measured through GIS analysis
Achievement Trend	N/A
Justification	By expressing protected land as a percentage of total flood-prone area, this KPI transparently tracks both the scale and pace of mitigation efforts. It shows how incremental investments in embankments, dredging and green buffers translate into real-world risk reduction across the landscape. Stakeholders can see whether the programme is accelerating coverage fast enough to meet resilience goals, identify geographic gaps, and prioritise future works to ensure that all vulnerable communities and assets are safeguarded as efficiently as possible
Target (Year 2030)	Target: 70% of flood-prone areas safeguarded
Supporting Document	Internal assessment of current coverage area flood preventive/ mitigatory infrastructure by PETRA
Frequency Of Data Reported	Annual

Mitigation of Flood Risks by Leveraging Physical & Digital Infrastructure: KPI Dictionary

KPI	Flood Losses
Description	Total direct economic damages (RM) incurred per flood event
Method Of Measurement	Aggregated post-flood loss assessments
Achievement Trend	There has been a stark reduction and improvement in the value in flood losses comparing between 2024 and 2023, where in 2023, major floods led to a record loss of RM 275 million in household and productive assets (e.g. living quarters, vehicles, business premises, agriculture, infrastructure, etc.) in comparison to the RM 59 million in 2024. Johor is likely to continue this positive downward trend on flood losses as it seeks to minimise yearly flood losses by implementing effective long-term flood preventative/ mitigation measures
Justification	Quantifies fiscal impact of floods, directly reflecting the effectiveness of physical mitigation investments and guiding prioritization of high-loss zones
Target (Year 2030)	Target: ≤RM 10 million
Supporting Document	Flood Impact Report by DOSM
Frequency Of Data Reported	Annual

Mitigation of Flood Risks by Leveraging Physical & Digital Infrastructure: KPI Dictionary

KPI	Frequency of Flood Occurrences
Description	Number of flood incidents reported annually
Method Of Measurement	Sum of flood incidents occurring throughout the districts of Johor in a single year
Achievement Trend	There has been a drastic increase in number of flood incidents over the years, where flooding frequency expanded from 13 incidents in 2015 to 92 incidents in 2022 (+32.3% increase). However, the frequency has stagnated over the recent years (2022 and 2021: 92 flood incidents), signaling the state's effectiveness in curbing the growth in flood incidents with its commitment towards flood mitigation efforts. However, if the state does not sustain its investment in robust, high-quality flood-mitigation infrastructure to counter escalating flood risks, it is likely to see both the frequency and severity of flood events increase
Justification	Quantifies frequency of flood incidents, directly reflecting the effectiveness of physical flood protection infrastructure in mitigating flood risks and preventing the occurrence of damaging floods
Target (Year 2030)	Target: ≤50 incidents
Supporting Document	Flood Data by JPS provided via DOSM
Frequency Of Data Reported	Annual

Development of Johor Transition Industrial Clusters (JTIC): Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
1	SPV Formation & Governance Setup	Johor State Government, BPEN-J, PDT, IRDA, MyDigital, Anchor Cluster Players	Jan 2026	Jun 2026
2	Cluster Convening & Stakeholder Engagement	JTIC SPV, MYDigital, WEF[1], (Onboarded) Cluster Conveners & Players,	Jul 2026	Jun 2027
3	Strategy Development & Playbook Co-Creation	JTIC SPV, MYDigital, WEF, IRDA, BPEN-J, PDT, MIDA, Onboarded Cluster Conveners & Players, EPCC	Jan 2027	Dec 2027
4	Operationalisation & Monitoring	JTIC SPV, MYDigital, WEF, IRDA, BPEN-J, PDT, Onboarded Cluster Conveners & Players, EPCC, ICT Johor, Digital Platform Vendor	Jan 2028	Jan 2028 and beyond (Continuous)
			Jan 2026	**Jan 2028 and beyond**

Note: 1. World Economic Forum

Development of Johor Transition Industrial Clusters (JTIC): Implementation Plan (1/3)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**JTIC SPV Formation & Governance Setup**	**Johor State Government, BPEN-J, PDT, IRDA, MyDigital, Anchor Cluster Players**	**Jan 2026**	**Jun 2026**
1.1	Draft JTIC SPV charter and governance model	Johor State Government, BPEN-J, PDT, IRDA, MyDigital	Jan 2026	Feb 2026
1.2	Incorporate JTIC SPV and appoint board (e.g. anchor cluster players – JCorp for IBTEC & STeP, Petronas for PIPC)	Johor State Government, BPEN-J, PDT, IRDA, MyDigital, Anchor Cluster Players	Mar 2026	Apr 2026
1.3	Establish PPP framework and close term-sheet commitments with anchor GLCs	Johor State Government, BPEN-J, PDT, IRDA, MyDigital, Anchor Cluster Players	May 2026	Jun 2026
2	**Cluster Convening & Stakeholder Engagement**	**JTIC SPV, MYDigital, WEF[1], (Onboarded) Cluster Conveners & Players,**	**Jul 2026**	**Jul 2027**
2.1	Host engagement forums and convene vision-alignment, target-setting workshops with IBTEC & STeP, IMDR, PIPC players	JTIC SPV, MYDigital, WEF, Cluster Conveners & Players,	Jul 2026	Oct 2026
2.2	Sign Statements of Ambition and MoUs with private-sector players interested in contributing to JTIC as a cluster partner	JTIC SPV, MYDigital, WEF, Cluster Conveners & Players,	Oct 2026	Dec 2026
2.3	Map existing assets, supply-chain linkages and circular-economy gaps within the current industrial clusters	JTIC SPV, MYDigital, Onboarded Cluster Conveners & Players	Oct 2026	Jun 2027

Note: 1. World Economic Forum

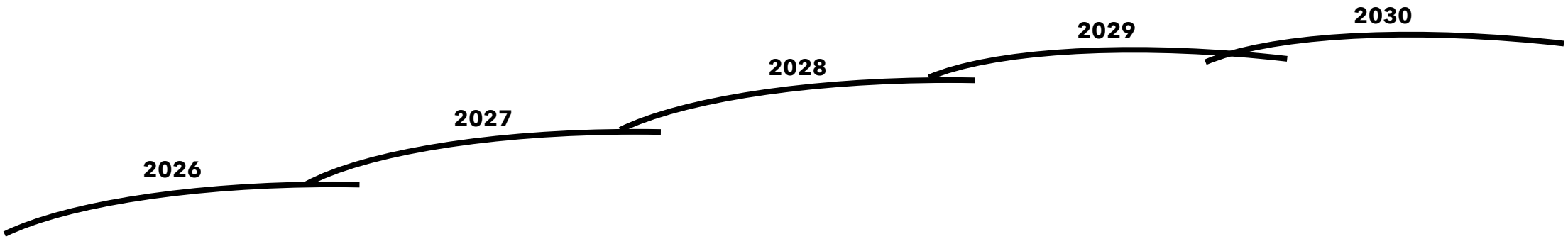
Development of Johor Transition Industrial Clusters (JTIC): Implementation Plan (2/3)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
3	**Strategy Development & Playbook Co-Creation**	**JTIC SPV, MYDigital, WEF, IRDA, BPEN-J, PDT, MIDA, Onboarded Cluster Conveners & Players, EPCC**	**Jan 2027**	**Dec 2027**
3.1	Co-create JTIC playbook (i.e. defining anchor areas, KPIs, IR4.0 roadmaps and circular-economy frameworks)	JTIC SPV, MYDigital, WEF, IRDA, BPEN-J, PDT, Onboarded Cluster Conveners & Players	Jan 2027	Jun 2027
3.2	Develop financing/ incentives toolkit (i.e. tax breaks, innovation and infrastructure funds, facilitation, etc.)	JTIC SPV, MYDigital, IRDA, MIDA, Onboarded Cluster Conveners & Players	Jan 2027	Jun 2027
3.3	Finalise shared-infrastructure design briefs, implementation owner, operating model for clean energy, carbon, hydrogen and symbiosis hubs	JTIC SPV, MYDigital, IRDA, Onboarded Cluster Conveners & Players, EPCC	Jul 2027	Dec 2027
4	**Operationalisation & Monitoring**	**JTIC SPV, MYDigital, WEF, IRDA, BPEN-J, PDT, Onboarded Cluster Conveners & Players, EPCC, ICT Johor, Digital Platform Vendor**	**Jan 2028**	**Jan 2028 and beyond**
4.1	Roll out and commission shared-energy, carbon-capture and symbiosis hubs across clusters	JTIC SPV, Onboarded Cluster Conveners & Players, EPCC	Jan 2028	Jan 2028 and beyond
4.2	Deploy AI/ IoT platform for real-time resource-efficiency monitoring and enablement of circular-economy industrial symbiosis (i.e. digital matching/ exhange of raw materials/ byproducts/ waste through big data and information platforms)	JTIC SPV, Onboarded Cluster Conveners & Players, ICT Johor, Digital Platform Vendor	Jan 2028	Jan 2028 and beyond

Development of Johor Transition Industrial Clusters (JTIC): Implementation Plan (3/3)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
4	**Operationalisation & Monitoring**	**JTIC SPV, MYDigital, WEF, IRDA, BPEN-J, PDT, Onboarded Cluster Conveners & Players, EPCC, ICT Johor, Digital Platform Vendor**	**Jan 2028**	**Jan 2028 and beyond**
4.3	Launch labs, maker-spaces and grant programs; onboard R&D partners for green and digital innovation	JTIC SPV, Onboarded Cluster Conveners & Players, EPCC	Jan 2028	Jan 2028 and beyond
4.4	Continuously monitor JTIC KPIs (e.g. resource-recovery rates, emission impact, digital adoption, FDI inflows, etc.) and convene biannual (first-year)/ annual reviews	JTIC SPV, MYDigital, WEF, IRDA, BPEN-J, PDT, Onboarded Cluster Conveners & Players	Jan 2028	Jan 2028 and beyond
4.5	Iterate on playbook and roadmap based on yearly performance data, stakeholder feedback and emerging best practices	JTIC SPV, MYDigital, WEF, IRDA, BPEN-J, PDT, Onboarded Cluster Conveners & Players	Jan 2029	Jan 2028 and beyond (annually)

Development of Johor Transition Industrial Clusters (JTIC): KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• *Not within stipulated timeframe*	• Cluster Partnership Uptake: Minimum of 9 cluster partners	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*
Achieved Milestones	• SPV Formation & Governance Setup	• Cluster Convening & Stakeholder Engagement • Strategy Development & Playbook Co-Creation	• Operationalisation & Monitoring (Ongoing)	• Operationalisation & Monitoring (Ongoing)	• Operationalisation & Monitoring (Ongoing)

Development of Johor Transition Industrial Clusters (JTIC): KPI Dictionary

KPI	Cluster Partnership Uptake
Description	Number of cluster partners formally committed to JTIC via signed Statement of Ambitions/ MoUs
Method Of Measurement	Count of executed Statement of Ambitions/ MoUs in SPV's partnership register
Achievement Trend	N/A
Justification	Demonstrates and tracks stakeholder buy-in for JTIC, ensures access to existing cluster assets and network, and validates the SPV's convening power
Target (Year 2027)	WEF recommends that a minimum of 3 private players from various sectors is required to convene and represent a single cluster. Hence, target is set with at least 9 or more cluster partners given the 3 major industrial clusters in Johor (IBTEC & STeP, IMDR, PIPC) Target: Total of 9 cluster partners
Supporting Document	JTIC Performance Report
Frequency Of Data Reported	Annually

Digitalisation of Customs Clearance Processes: Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
1	Feasibility assessment at all checkpoints in Johor	Jabatan Kastam Diraja Malaysia	Jan 2026	Apr 2026
2	Appointment of technical consultant	Jabatan Kastam Diraja Malaysia	Apr 2026	Jun 2026
3	Requirements gathering and analysis	Vendor	Jun 2026	Sep 2026
4	Systems design and development of process streamlining plan	Vendor	Sep 2026	Feb 2027
5	Pilot programme and testing	Vendor	Feb 2027	Aug 2027
6	Obtain regulatory approvals	Jabatan Kastam Diraja Malaysia	Aug 2027	Nov 2027
7	Full rollout and integration	Vendor	Nov 2027	Nov 2028
			Jan 2026	**Nov 2028**

Digitalisation of Customs Clearance Processes: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Feasibility assessment at all checkpoints in Johor**	**Jabatan Kastam Diraja Malaysia**	**Jan 2026**	**Apr 2026**
1.1	Current state analysis and process mapping	Jabatan Kastam Diraja Malaysia	Jan 2026	Feb 2026
1.2	Identification of digitalisation opportunities	Jabatan Kastam Diraja Malaysia	Feb 2026	Mar 2026
1.3	Review of existing IT infrastructure and integration	Jabatan Kastam Diraja Malaysia	Mar 2026	Mar 2026
1.4	Preparation and submission of feasibility report	Jabatan Kastam Diraja Malaysia	Mar 2026	Apr 2026
2	**Appointment of technical consultant**	**Jabatan Kastam Diraja Malaysia**	**Apr 2026**	**Jun 2026**
2.1	Development and issuance of Request for Proposal (RFP)	Jabatan Kastam Diraja Malaysia	Apr 2026	Apr 2026
2.2	Evaluation of bids	Jabatan Kastam Diraja Malaysia	Apr 2026	May 2026
2.3	Contract negotiation and finalisation	Jabatan Kastam Diraja Malaysia	May 2026	Jun 2026

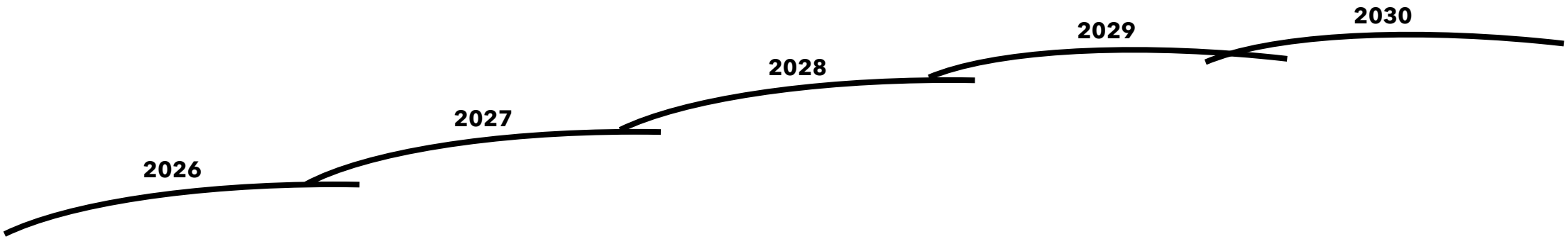
Digitalisation of Customs Clearance Processes: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
3	**Requirements gathering and analysis**	**Vendor**	**Jun 2026**	**Sep 2026**
3.1	Stakeholder workshops and interviews	Vendor	Jun 2026	Jun 2026
3.2	Mapping “as-is” processes and defining “to-be” workflows	Vendor	Jul 2026	Jul 2026
3.3	Documentation of functional and technical requirements	Vendor	Aug 2026	Sep 2026
4	**Systems design and development of process streamlining plan**	**Vendor**	**Sep 2026**	**Feb 2027**
4.1	System architecture design and technology selection	Vendor	Sep 2026	Sep 2026
4.2	Module and interface detailed design	Vendor	Oct 2026	Oct 2026
4.3	Data migration and security planning	Vendor	Nov 2026	Nov 2026
4.4	Development of process workflows and user roles	Vendor	Dec 2026	Feb 2027
5	**Pilot programme and testing**	**Vendor**	**Feb 2027**	**Aug 2027**
5.1	Agile development of system modules	Vendor	Feb 2027	Apr 2027
5.2	Internal testing (unit, integration, system)	Vendor	May 2027	Jun 2027
5.3	Pilot deployment and user acceptance testing (UAT)	Vendor	Jul 2027	Aug 2027

Digitalisation of Customs Clearance Processes: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
6	**Obtain regulatory approvals**	**Jabatan Kastam Diraja Malaysia**	**Aug 2027**	**Nov 2027**
6.1	Compliance audit and documentation preparation	Jabatan Kastam Diraja Malaysia	Aug 2027	Aug 2027
6.2	Submission and liaison with regulatory bodies	Jabatan Kastam Diraja Malaysia	Sep 2027	Sep 2027
6.3	Addressing feedback and securing final approvals	Jabatan Kastam Diraja Malaysia	Oct 2027	Nov 2027
7	**Full rollout and integration**	**Vendor**	**Nov 2027**	**Nov 2028**
7.1	Phased deployment across Johor checkpoints	Vendor	Nov 2027	Feb 2028
7.2	Integration with external systems and stakeholders	Vendor	Mar 2028	Aug 2028
7.3	Post-implementation review and continuous improvement	Vendor	Sep 2028	Nov 2028

Digitalisation of Customs Clearance Processes: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• Reduce average shipment clearance time per shipment: 48 hours	• Reduce average shipment clearance time per shipment: 36 hours	• Reduce average shipment clearance time per shipment: 24 hours
Achieved Milestones	• Complete feasibility assessment at all checkpoints in Johor • Complete appointment of technical consultant • Complete requirements gathering and analysis	• Complete systems design and development of process streamlining plan • Complete pilot programme and testing • Regulatory approvals obtained	• Full rollout and integration	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*

Digitalisation of Customs Clearance Processes: KPI Dictionary

KPI	Reduce average shipment clearance time
Description	Measures the average time taken from arrival of shipment to completion of customs clearance
Method Of Measurement	Measured based on JKDM's existing shipment tracking systems
Achievement Trend	Historical data consolidated by JKDM could be used to establish baseline data; Consult vendor on potential average clearance time reduction attributed to systems integration and process streamlining to derive / refine KPI targets
Justification	Average clearance time reflects cargo flow productivity at Johorean borders; For example, high average clearance time can cause congestion at checkpoints during peak periods
Target (Year 2030)	Reduce average shipment clearance time to 24 hours or less
Supporting Document	Logistics provider quarterly survey (Proposed)
Frequency Of Data Reported	Monthly

Construction of PTP Free Zone 3 Access Road: Milestone

No	Milestones	Responsibility	Planned start date	Planned end date
1	Planning (i.e., land identification, acquisition, road design, appointment of road contractor)	Jabatan Kerja Raya, Majlis Bandaraya Iskandar Puteri, Pejabat Daerah Johor Bahru, Pejabat Tanah dan Galian Johor, Jabatan Pengairan dan Saliran	Jan 2026	Oct 2028
2	Construction of access road (i.e., site clearing, earthworks, drainage, bridge and junction upgrading	Contractor	Oct 2028	Apr 2030
3	Operationalisation of access road	Jabatan Kerja Raya	Apr 2030	Apr 2030
			Jan 2026	**Apr 2030**

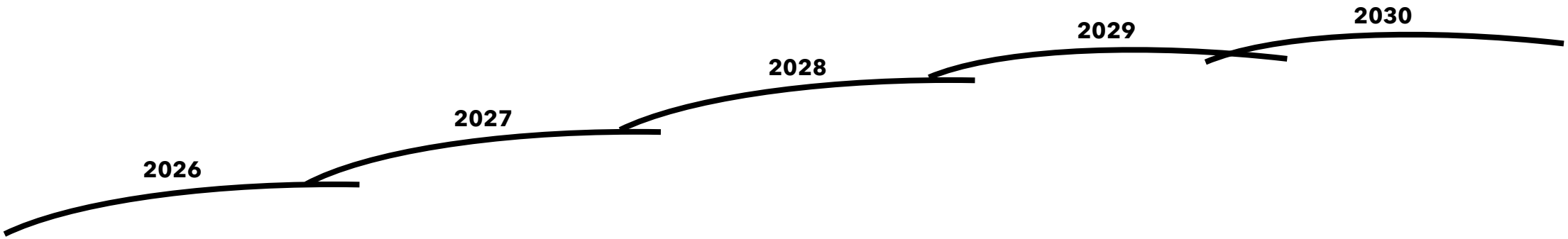
Construction of PTP Free Zone 3 Access Road: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Planning**	**Jabatan Kerja Raya, Majlis Bandaraya Iskandar Puteri, Pejabat Daerah Johor Bahru, Pejabat Tanah dan Galian Johor, Jabatan Pengairan dan Saliran**	**Jan 2026**	**Oct 2028**
1.1	Land identification	Jabatan Kerja Raya, Majlis Bandaraya Iskandar Puteri, Pejabat Daerah Johor Bahru, Pejabat Tanah dan Galian Johor, Jabatan Pengairan dan Saliran	Jan 2026	Mar 2026
1.2	Land acquisition	Jabatan Kerja Raya, Majlis Bandaraya Iskandar Puteri, Pejabat Daerah Johor Bahru, Pejabat Tanah dan Galian Johor, Jabatan Pengairan dan Saliran	Apr 2026	Sep 2027
1.3	Road design (preliminary & detailed)	Jabatan Kerja Raya, Majlis Bandaraya Iskandar Puteri, Pejabat Daerah Johor Bahru, Pejabat Tanah dan Galian Johor, Jabatan Pengairan dan Saliran	Oct 2027	May 2028

Construction of PTP Free Zone 3 Access Road: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1.4	Appointment of road contractor	Jabatan Kerja Raya, Majlis Bandaraya Iskandar Puteri, Pejabat Daerah Johor Bahru, Pejabat Tanah dan Galian Johor, Jabatan Pengairan dan Saliran	Jun 2028	Oct 2028
2	**Construction of access road**	**Contractor**	**Oct 2028**	**Apr 2030**
2.1	Site clearing & preparation	Contractor	Oct 2028	Dec 2028
2.2	Earthworks	Contractor	Jan 2029	Jun 2029
2.3	Drainage installation	Contractor	Jul 2029	Dec 2029
2.4	Bridge and junction upgrading	Contractor	Jan 2030	Apr 2030
3	**Operationalisation of access road**	**Jabatan Kerja Raya**	**Apr 2030**	**Apr 2030**
3.1	Official opening	Jabatan Kerja Raya	Apr 2030	Apr 2030

Digitalisation of Customs Clearance Processes: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• Level of Service (Part of Traffic Impact Assessment): A (free flow)
Achieved Milestones	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• Complete land identification, acquisition, road design, appointment of road contractor	• *Not available*	• Operationalisation of access road

Digitalisation of Customs Clearance Processes: KPI Dictionary

KPI	Level of Service (LOS) (Part of Traffic Impact Assessment)
Description	Qualitative measurement of traffic flow quality, rated from A (free flow) to F (overcapacity / congested)
Method Of Measurement	Conduct biannual Traffic Impact Assessments, measuring Level of Service (LoS) and other relevant metrics
Achievement Trend	To compare outcome of Traffic Impact Assessment pre-construction of access road VS post-construction of access road
Justification	Traffic Impact Assessment and its relevant measurements are commonly used to study congestion
Target (Year 2030)	Level of Service: A (free flow)
Supporting Document	*Not required*
Frequency Of Data Reported	Biannual

Enhancement of Rail Logistics Infrastructure and Inter-Terminal Transfers (ITT): Milestones

No	Milestones and Key Activities	Responsibility	Planned start date	Planned end date
1	Technical assessment for rail upgrading works	MOT, RAC	Jan 2026	Jan 2027
2	Obtain approval from relevant ministries	MOT, APAD	Jan 2027	Apr 2027
3	Rail maintenance work	RAC	Apr 2027	Apr 2028
4	Develop case for ITT frequency enhancement	PTP, JPB, Shipping Lines	Jan 2026	Feb 2026
5	Syndication with KTMB-MMC Sdn Bhd to enhance frequency of ITT services	PTP, JPB, Shipping Lines	Feb 2026	Mar 2026
			Jan 2026	**Apr 2028**

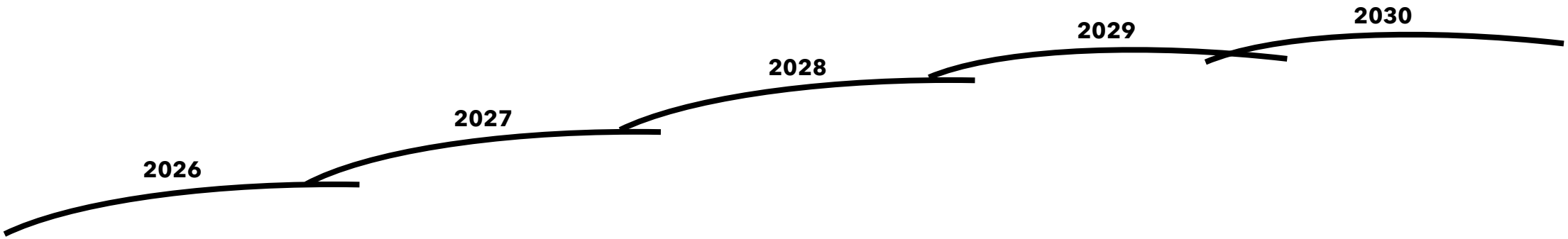
Enhancement of Rail Logistics Infrastructure and Inter-Terminal Transfers (ITT): Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Technical assessment for rail upgrading works**	**MOT, RAC**	**Jan 2026**	**Jan 2027**
1.1	Conduct detailed condition survey of rail infrastructure	MOT, RAC	Jan 2026	Mar 2026
1.2	Identify required upgrades and capacity enhancements	MOT, RAC	Apr 2026	Jun 2026
1.3	Assess technology and equipment needs	MOT, RAC	Jul 2026	Sep 2026
1.4	Prepare and submit technical assessment report	MOT, RAC	Oct 2026	Jan 2027
2	**Obtain approval from relevant ministries**	**MOT, APAD**	**Jan 2027**	**Apr 2027**
2.1	Prepare submission documents including impact analysis	MOT, APAD	Jan 2027	Jan 2027
2.2	Engage ministries for consultations and clarifications	MOT, APAD	Jan 2027	Feb 2027
2.3	Address feedback and revise proposals	MOT, APAD	Feb 2027	Mar 2027
2.4	Secure formal approvals	MOT, APAD	Mar 2027	Apr 2027

Enhancement of Rail Logistics Infrastructure and Inter-Terminal Transfers (ITT): Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
3	**Rail maintenance work**	**RAC**	**Apr 2027**	**Apr 2028**
3.1	Mobilise maintenance teams and equipment	RAC	Apr 2027	Apr 2027
3.2	Execute track repairs, replacements, and upgrades	RAC	May 2027	Dec 2027
3.3	Conduct safety and quality assurance inspections	RAC	Oct 2027	Mar 2028
3.4	Monitor and report progress	RAC	Apr 2027	Apr 2028
4	**Develop case for ITT frequency enhancement**	**PTP, JPB and Shipping Lines**	**Jan 2026**	**Feb 2026**
4.1	Analyse current ITT service frequency and bottlenecks	PTP, JPB and Shipping Lines	Jan 2026	Jan 2026
4.2	Model potential frequency improvements and benefits	PTP, JPB and Shipping Lines	Jan 2026	Jan 2026
4.3	Draft business case and cost-benefit analysis	PTP, JPB and Shipping Lines	Jan 2026	Feb 2026
5	**Syndication with KTMB-MMC Sdn Bhd to enhance frequency of ITT services**	**PTP, JPB and Shipping Lines**	**Feb 2026**	**Mar 2026**
5.1	Initiate discussions and partnership framework	PTP, JPB and Shipping Lines	Feb 2026	Feb 2026
5.2	Negotiate service level agreements and operational plans	PTP, JPB and Shipping Lines	Feb 2026	Feb 2026
5.3	Finalise syndication agreement	PTP, JPB and Shipping Lines	Feb 2026	Mar 2026

Enhancement of Rail Logistics Infrastructure and Inter-Terminal Transfers (ITT): KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• Rail cargo throughput: 300 metric tonne per annum	• Rail cargo throughput: 400 metric tonne per annum	• Rail cargo throughput: 500 metric tonne per annum
Achieved Milestones	• Frequency of Interterminal Transfer Services increased	• Complete technical assessment for rail maintenance and upgrading works • Regulatory approvals for rail maintenance and upgrading works obtained	• Rail maintenance and upgrading works completed	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*

Enhancement of Rail Logistics Infrastructure and Inter-Terminal Transfers (ITT): KPI Dictionary

KPI	Rail cargo throughput
Description	Cargo volume transported via rail in Johor per annum
Method Of Measurement	Leverage KTMB's existing cargo tracking tool
Achievement Trend	From historical data, the highest rail cargo throughput recorded in Johor was 414.4 metric tonnes in 2019; However, only 46.7 metric tonnes was transported via rail in 2023, possibly due to declining track conditions; KPI targets were developed to turnaround this declining trend via enhancement of track conditions, which could be further refined for calibration
Justification	Improvement in track quality and service frequency would ideally provide rail cargo throughput uplift
Target (Year 2030)	500,000 metric tonnes of cargo transported via rail per annum
Supporting Document	*Not required*
Frequency Of Data Reported	Monthly

Enhancement of Mersing's International Connectivity: Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
1	Feasibility study and evaluation of options	Ministry of Transport, Johor State Government, Department of Environment, Local Municipalities	Jan 2026	May 2026
2	Detailed design and planning	Ministry of Transport, Malaysia Airports, Johor Port Authority, Civil Aviation Authority Malaysia	Jun 2026	Oct 2026
3	Obtain permits and regulatory approvals	Ministry of Transport	Nov 2026	Feb 2027
4	Tendering and contractor selection	Ministry of Transport	Feb 2027	Oct 2027
5	Procurement, construction and testing	Contractor	Oct 2027	Oct 2029
			Jan 2026	**Oct 2029**

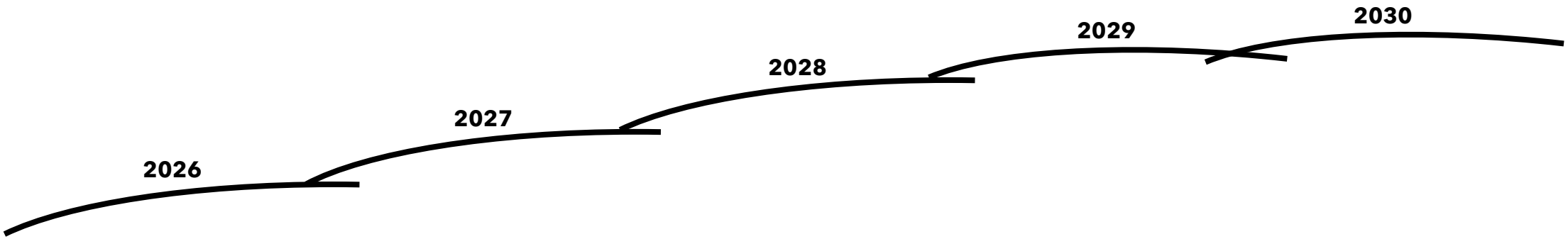
Enhancement of Mersing's International Connectivity: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Feasibility study and evaluation of options**	**Ministry of Transport, Johor State Government, Department of Environment, Local Municipalities**	**Jan 2026**	**May 2026**
1.1	Technical and commercial feasibility for both options	Ministry of Transport, Johor State Government	Jan 2026	Feb 2026
1.2	Environmental and social impact assessments	Department of Environment, Local Municipalities	Mar 2026	Apr 2026
1.3	Stakeholder engagement and decision-making on preferred option	Ministry of Transport, Johor State Government	Apr 2026	May 2026
2	**Detailed design and planning**	**Ministry of Transport, Malaysia Airports, Johor Port Authority, Civil Aviation Authority Malaysia**	**Jun 2026**	**Oct 2026**
2.1	Design and planning of airport redevelopment (If option A chosen)	Malaysia Airports, Ministry of Transport	Jun 2026	Oct 2026
2.2	Design and planning of multimodal terminal (If option B chosen)	Johor Port Authority, Civil Aviation Authority Malaysia, Ministry of Transport	Jun 2026	Oct 2026

Enhancement of Mersing's International Connectivity: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
3	**Obtain approval from relevant ministries**	**Ministry of Transport**	**Nov 2026**	**Feb 2027**
3.1	Prepare submission documents including impact analysis	Ministry of Transport	Nov 2026	Nov 2026
3.2	Engage ministries for consultations and clarifications	Ministry of Transport	Nov 2026	Dec 2026
3.3	Address feedback and revise proposals	Ministry of Transport	Dec 2026	Jan 2027
3.4	Secure formal approvals	Ministry of Transport	Jan 2027	Feb 2027
4	**Tendering and contractor selection**	**Ministry of Transport**	**Feb 2027**	**Oct 2027**
4.1	Develop tender documents	Ministry of Transport	Feb 2027	Mar 2027
4.2	Issue tenders and manager bidder queries	Ministry of Transport	Apr 2027	May 2027
4.3	Evaluate bids and conduct contractor interviews	Ministry of Transport	Jun 2027	Aug 2027
4.4	Finalise contract negotiations and award contract	Ministry of Transport	Sep 2027	Oct 2027
5	**Procurement, construction and testing**	**Contractor**	**Oct 2027**	**Oct 2029**
5.1	Procurement, construction and testing of Mersing Airport (Option A)	**Contractor**	Oct 2027	Oct 2029
5.2	Procurement, construction and testing of multimodal terminal (Option B)	**Contractor**	Oct 2027	Oct 2029

Enhancement of Mersing's International Connectivity: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Passenger throughput: 100k per annum[1]*	• *Passenger throughput: 100k per annum[1]*
Achieved Milestones	• Feasibility study completed • Detailed design and planning completed	• Permits and regulatory approvals obtained • Tendering process and selection of contractor completed • Construction process initiated	• *Not available*	• Construction and testing completed	• *Not within stipulated timeframe*

Note: [1]Does not apply for option B as seaplanes have lower capacity

Enhancement of Mersing's International Connectivity: KPI Dictionary

KPI	Passenger throughput
Description	This KPI measures the number of passengers who enter Mersing via new Mersing airport or multimodal terminal. It reflects the infrastructure project's ability to attract both domestic and international visitors, thereby enhancing Mersing's global connectivity and boosting local tourism and economic growth
Method Of Measurement	Count the total number of tourists arriving at Mersing annually. Data can be further segmented based on (Non-exhaustive): • Local vs international tourists • Age • Country of origin
Achievement Trend	Historical data has been recorded, which could be used as this KPI's baseline; When the infrastructure (either airport expansion or multimodal terminal) has been developed, this KPI could be refined further
Justification	Tracking this KPI is critical because the primary objective of this infrastructure project is to enhance international connectivity and stimulate tourism. This KPI directly links infrastructure investment to tangible economic and social benefits, helping stakeholders evaluate project effectiveness and inform future development strategies
Target (Year 2030)	100k passengers per annum[1]
Supporting Document	Accommodation data for verification and validation purposes
Frequency Of Data Reported	Quarterly

Note: [1]Does not apply for option B as seaplanes have lower capacity

Enhancement of Segamat Inland Port: Milestones

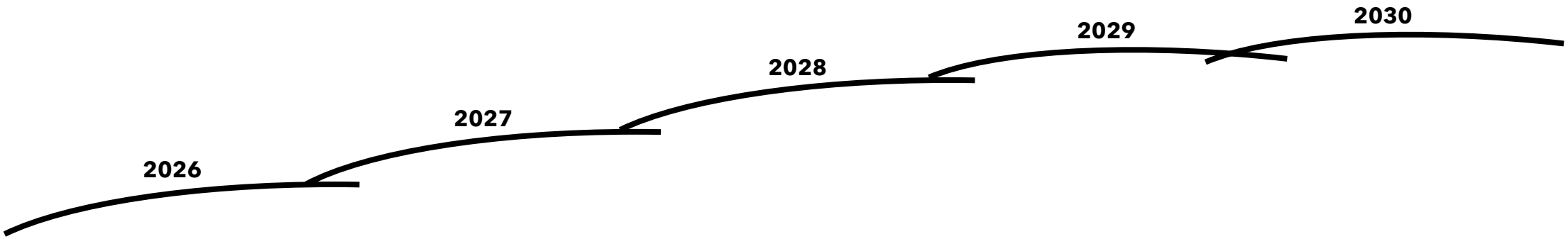
No	Milestones	Responsibility	Planned start date	Planned end date
1	Feasibility study	Ministry of Transport, Johor State Government, Relevant Port Authorities, Majlis Perbandaran Segamat	Jan 2026	Mar 2026
2	Design and planning	Ministry of Transport, Johor State Government, Relevant Port Authorities, Majlis Perbandaran Segamat, Contractor	Apr 2026	Sep 2026
3	Construction and infrastructure upgrades	Contractor	Oct 2026	Mar 2028
4	Testing, commissioning and operationalisation	Contractor	Apr 2028	Sep 2028
			Jan 2026	**Sep 2028**

Enhancement of Segamat Inland Port: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	Feasibility study	Ministry of Transport, Johor State Government, Relevant Port Authorities, Majlis Perbandaran Segamat	Jan 2026	Mar 2026
2	Design and planning	Ministry of Transport, Johor State Government, Relevant Port Authorities, Majlis Perbandaran Segamat, Contractor	Apr 2026	Sep 2026
3	Construction and infrastructure upgrades	Contractor	Oct 2026	Mar 2028
4	Testing, commissioning and operationalisation	Contractor	Apr 2028	Sep 2028

Implementation plan is to be developed upon receiving the appropriate mandate, with the objective of tracking and monitoring relevant ongoing projects in alignment with the overall action plan and timeline that has been set –both of which currently fall under the purview of the Federal Government

Enhancement of Segamat Inland Port: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• TEUs per annum: 50k	• TEUs per annum: 52.5k
Achieved Milestones	• Feasibility study completed • Design and planning completed • Initiate inland port enhancement	• *Not available*	• Inland port enhancement completed • Initiate Segamat Inland Port operations	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*

Enhancement of Segamat Inland Port : KPI Dictionary

KPI	TEUs handled per annum
Description	Measures the total number of Twenty-Foot Equivalent Units (TEUs) processed through the Segamat Inland Port annually. This KPI reflects the port's capacity, operational efficiency, and contribution to regional and international trade. An increase in TEUs handled indicates successful port enhancement, improved connectivity, and growing logistical demand
Method Of Measurement	• Data Collection: Count all full and empty TEU containers processed (inbound and outbound) at the port, according to standard customs and cargo documentation • Verification: Cross-check port operations system logs, customs clearance records, and operator shipping manifests to ensure accuracy • Calculation: Aggregate the total TEUs handled within the calendar year as recorded by the port's terminal operating system
Achievement Trend	• Baseline: Establish pre-enhancement TEU volumes for at least 1–2 years prior to project implementation • Ongoing Tracking: Plot annual TEU figures, highlighting increases following major infrastructure, connectivity, or service upgrades • Benchmarking: Compare yearly trends against similar inland and coastal ports in Malaysia or the region • Target: Set incremental growth targets (e.g., 3 – 5% year-on-year increase post-upgrade), influenced by trade forecasts, port capacity, and regional economic activity
Justification	• TEUs handled per annum directly demonstrates the port's utilization and its ability to attract, process, and facilitate trade efficiently • Higher TEU throughput signals economic growth, enhanced logistics capacity, and successful decongestion of coastal seaports • Tracking TEUs helps justify further investments, policy or operational improvements, and guides resource allocation for future expansions • Comparable with standard port KPIs used by Ministry of Transport and international logistics bodies, ensuring relevance and transparency
Target (Year 2030)	~53k TEUs per annum
Supporting Document	Customs cargo clearance data and port terminal operating system reports
Frequency Of Data Reported	Monthly: Preliminary tracking for operational review and short-term trend analysis Quarterly: Management reporting and performance review Annually: Official reporting, benchmarking, and public disclosure; used for target assessment and strategic planning

Introduction of Elevated Autonomous Rapid Transit (EART) Services: Milestones

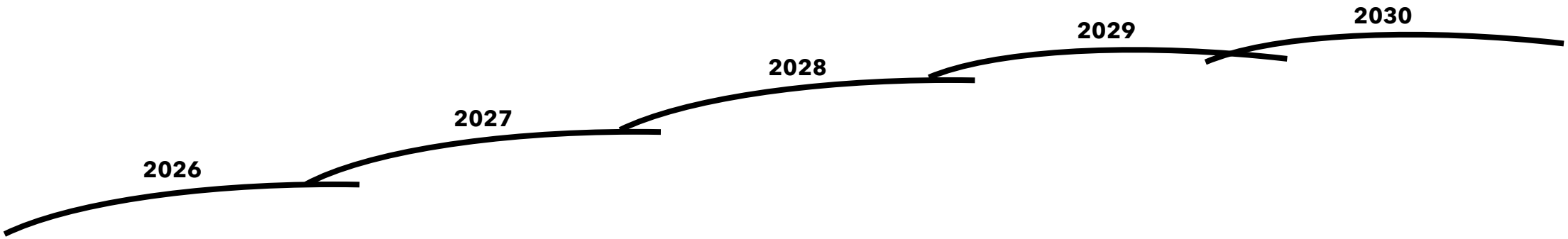
No	Milestones	Responsibility	Planned start date	Planned end date
1	Finalisation of feasibility study	Ministry of Transport	Aug 2025	Aug 2025
2	Request for Proposal (RFP) and vendor selection	Ministry of Transport	Aug 2025	Dec 2025
3	Construction of infrastructure and procurement of Autonomous Rapid Transit (ART)	Vendor, Ministry of Transport	Jan 2026	Dec 2026
			Jan 2026	**Dec 2026**

Introduction of Elevated Autonomous Rapid Transit (EART) Services: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	Finalisation of feasibility study	Ministry of Transport	Aug 2025	Aug 2025
2	Request for Proposal (RFP) and vendor selection	Ministry of Transport	Aug 2025	Dec 2025
3	Construction of infrastructure and procurement of Autonomous Rapid Transit (ART)	Vendor, Ministry of Transport	Jan 2026	Dec 2026
4	Finalisation of feasibility study	Ministry of Transport	Aug 2025	Aug 2025

Implementation plan is to be developed upon receiving the appropriate mandate, with the objective of tracking and monitoring relevant projects in alignment with the overall action plan and timeline that has been set –both of which currently fall under the purview of the Federal Government

Introduction of Elevated Autonomous Rapid Transit (EART) Services: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• *Not within stipulated timeframe*	• EART Ridership per annum: 30mil	• EART Ridership per annum: 33mil	• EART Ridership per annum: 36mil	• EART Ridership per annum: 40mil
Achieved Milestones	• Systems testing, safety certification and technology integration completed	• Operationalisation of Elevated Autonomous Rapid Transit (EART)	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*

Introduction of Elevated Autonomous Rapid Transit (EART) Services: KPI Dictionary

KPI	Elevated Autonomous Rapid Transit (EART) ridership per annum
Description	• Measures the total annual number of passenger boardings on the Elevated Autonomous Rapid Transit (EART) network in Johor Bahru and surrounding corridors • Reflects public adoption, utilisation levels, and the effectiveness of the EART system in meeting mobility needs
Method Of Measurement	• Collected via automated fare collection systems capturing ticket validations at all stations and onboard vehicles • Supplemented by periodic manual passenger counts and surveys to validate and analyse ridership patterns • Data aggregation and quality assurance conducted by the operating agency and reported to regulatory bodies
Achievement Trend	• Post-launch, ridership should be tracked monthly and quarterly to identify growth trends, peak demand periods, and the impact of service changes or expansions • Helps understand passenger behavior, station usage distribution, and integration effectiveness with feeder transport modes • Enables monitoring of progress toward long-term targets aligned with regional population and economic growth
Justification	• Ridership is a direct indicator of system success, public acceptance, and return on infrastructure investment • Helps assess the EART's role in reducing road traffic congestion and emissions, supporting Johor's sustainable transport goals • Provides essential feedback for service planning, capacity adjustments, and marketing strategies to maximise impact • Aligns with best practices in urban transit performance monitoring for regional transport authorities
Target (Year 2030)	40mil passengers per year
Supporting Document	*Not required*
Frequency Of Data Reported	Weekly reporting for internal operations monitoring; Quarterly reports to regulators and key stakeholders for performance assessment and strategic review

Leveraging Gemas-JB EDTP[1] Infrastructure for Commuter Services in Johor: Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
1	Operationalisation of Gemas-JB Electrified Double Track Project (From Gemas to Kluang)[2]	Ministry of Transport	Aug 2025	Aug 2025
2	Operationalisation of Gemas-JB Electrified Double Track Project (From Gemas to Kluang)[2]	Ministry of Transport	Dec 2025	Dec 2025
3	Acquisition of new electric train sets for commuter services	Ministry of Transport, Railway Asset Corporation	Jan 2026	Jan 2027
4	Testing of new electric train sets	Ministry of Transport, Railway Asset Corporation	Jan 2027	Jan 2028
5	Operationalisation of commuter services (southern stretch)	KTMB	Jan 2028	Jan 2028
			Jan 2026	**Jan 2028**

Note: [1]Electrified Double Track Project, [2]Not included in overall timeline estimations

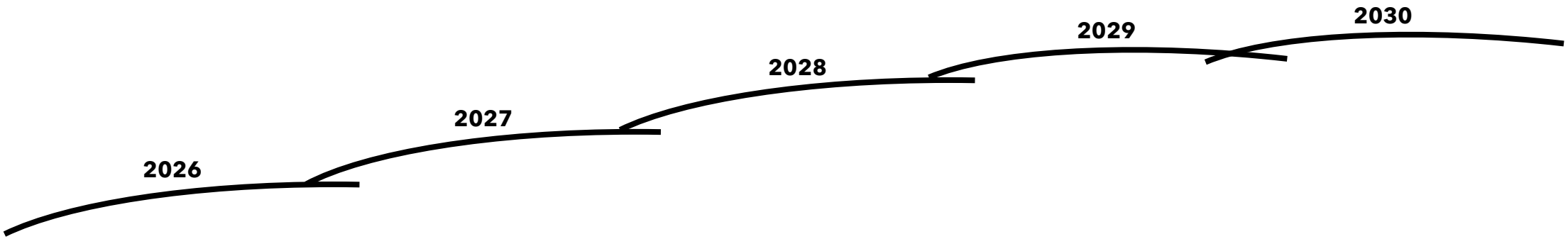
Leveraging Gemas-JB EDTP[1] Infrastructure for Commuter Services in Johor : Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	Operationalisation of Gemas-JB Electrified Double Track Project (From Gemas to Kluang)[2]	Ministry of Transport	Aug 2025	Aug 2025
2	Operationalisation of Gemas-JB Electrified Double Track Project (From Gemas to Kluang)[2]	Ministry of Transport	Dec 2025	Dec 2025
3	Acquisition of new electric train sets for commuter services	Ministry of Transport, Railway Asset Corporation	Jan 2026	Jan 2027
4	Testing of new electric train sets	Ministry of Transport, Railway Asset Corporation	Jan 2027	Jan 2028

Implementation plan is to be developed upon receiving the appropriate mandate, with the objective of tracking and monitoring relevant ongoing projects in alignment with the overall action plan and timeline that has been set –both of which currently fall under the purview of the Federal Government

Note: [1]Electrified Double Track Project, [2]Not included in overall timeline estimations

Leveraging Gemas-JB EDTP[1] Infrastructure for Commuter Services in Johor: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• Commuter (Southern) ridership per year: 500k	• Commuter (Southern) ridership per year: 550k
Achieved Milestones	• *Not within stipulated timeframe*	• Acquisition of new electric train sets required for commuter services completed	• Testing of new electric train sets completed • Operationalisation of commuter services (southern stretch)	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*

Note: [1]Electrified Double Track Project

Leveraging Gemas-JB EDTP[1] Infrastructure for Commuter Services in Johor: KPI Dictionary

KPI	Commuter (Southern) ridership per year
Description	Tracks the total number of passenger boardings annually on the Paloh–JB Sentral commuter rail service
Method Of Measurement	• Aggregated from automated fare collection systems (ticketing data) and validated by periodic passenger counts and surveys • Data collected daily at all stations along the Paloh–JB corridor
Achievement Trend	Since there is no historical data for this specific service in the southern corridor, ridership data to be consolidated and anlaysed to establish baseline KPI. KPI to be refined further based on trends and ridership behaviour
Justification	• Ridership data directly quantifies service adoption and demonstrates public value of the commuter rail investment • Provides actionable insights to improve service delivery, optimise schedules, and identify needs for capacity expansion or marketing outreach • Data could be used to measure the level of utilisation and demand for commuter rail alongside changes in travel behavior over time
Target (Year 2029)	500k
Supporting Document	*Not required*
Frequency Of Data Reported	Weekly reporting for internal operations monitoring; Quarterly reports to regulators and key stakeholders for performance assessment and strategic review

Development of Lebuhraya Pantai Timur 4 (LPT4): Milestones

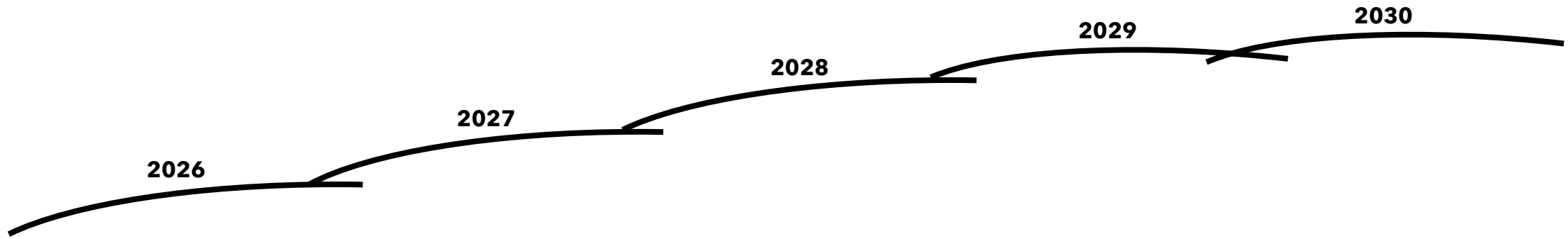
No	Milestones	Responsibility	Planned start date	Planned end date
1	Feasibility study	Kementerian Kerja Raya, Consultants	Jan 2026	Jan 2027
2	Land acquisition and statutory	Relevant State Governments, Relevant Local Councils, Pejabat Tanah dan Galian	Jan 2027	Jan 2029
3	Construction and monitoring	Vendor	Jan 2029	Jan 2033
			Jan 2026	**Jan 2033**

Development of Lebuhraya Pantai Timur 4 (LPT4): Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	Feasibility study	Kementerian Kerja Raya, Consultants	Jan 2026	Jan 2027
2	Land acquisition and statutory	Relevant State Governments, Relevant Local Councils, Pejabat Tanah dan Galian	Jan 2027	Jan 2029
3	Construction and monitoring	Vendor	Jan 2029	Jan 2033
4	Feasibility study	Kementerian Kerja Raya, Consultants	Jan 2026	Jan 2027

Implementation plan is to be developed upon receiving the appropriate mandate, with the objective of tracking and monitoring relevant ongoing projects in alignment with the overall action plan and timeline that has been set –both of which currently fall under the purview of the Federal Government

Development of Lebuhraya Pantai Timur 4 (LPT4): KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• Level of Service (Part of Traffic Impact Assessment): A (free flow)	• Level of Service (Part of Traffic Impact Assessment): A (free flow)
Achieved Milestones	• Project planning and feasibility study completed	• Tendering and contract selection completed • Road engineering design and planning completed	• *Not available*	• Construction and upgrading works completed	• *Not within stipulated timeframe*

Construction of East Coast Rail Link 2 (ECRL2): Milestones

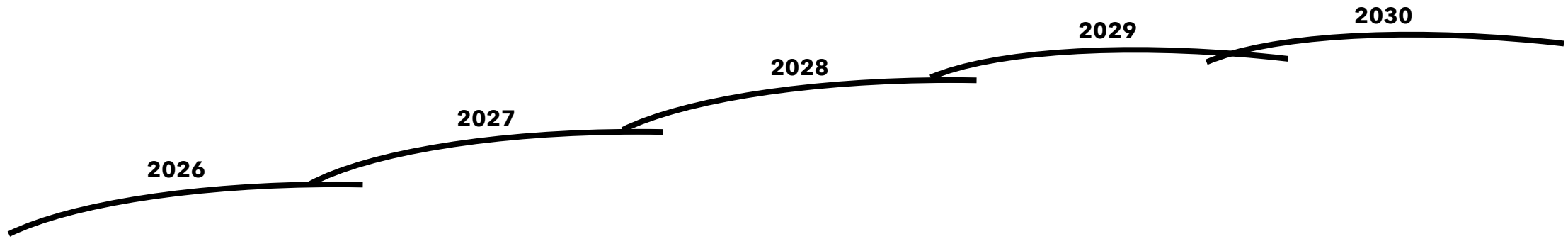
No	Milestones	Responsibility	Planned start date	Planned end date
1	Feasibility study	Malaysia Rail Link Sdn Bhd, Ministry of Transport	Jan 2026	Jan 2027
2	Land acquisition and statutory	Pejabat Tanah dan Galian (PTG), Relevant state governments and local authorities	Jan 2027	Jan 2029
3	Construction and monitoring	Vendor: China Communications Constructions Company (CCCCM)	Jan 2029	Jan 2037
			Jan 2026	**Jan 2037**

Construction of East Coast Rail Link 2 (ECRL2): Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	Feasibility study	Malaysia Rail Link Sdn Bhd, Ministry of Transport	Jan 2026	Jan 2027
2	Land acquisition and statutory	Pejabat Tanah dan Galian (PTG), Relevant state governments and local authorities	Jan 2027	Jan 2029
3	Construction and monitoring	Vendor: China Communications Constructions Company (CCCCM)	Jan 2029	Jan 2037
4	Feasibility study	Malaysia Rail Link Sdn Bhd, Ministry of Transport	Jan 2026	Jan 2027

Implementation plan is to be developed upon receiving the appropriate mandate, with the objective of tracking and monitoring relevant ongoing projects in alignment with the overall action plan and timeline that has been set –both of which currently fall under the purview of the Federal Government

Construction of East Coast Rail Link 2 (ECRL2): KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*
Achieved Milestones	• *Not within stipulated timeframe*	• Feasibility study completed	• *Not available*	• Land acquisition completed and approvals obtained • Initiate construction	• *Not available*

Note: Operationalisation of ECRL2 may be beyond stipulated timeframe (i.e., beyond 2030)

Development of the West Coast Expressway Southern Link: Milestones

No	Milestones and Key Activities	Responsibility	Planned start date	Planned end date
1	Feasibility study and preliminary planning	Kementerian Kerja Raya	Sep 2025	Mar 2026
2	Land acquisition and statutory approvals	Pejabat Tanah dan Galian (PTG), Relevant state governments and local authorities	Mar 2026	Mar 2027
3	Construction and monitoring	West Coast Expressway Sdn Bhd (WCE), Vendor	Mar 2027	Mar 2031
			Sep 2025	**Mar 2031**

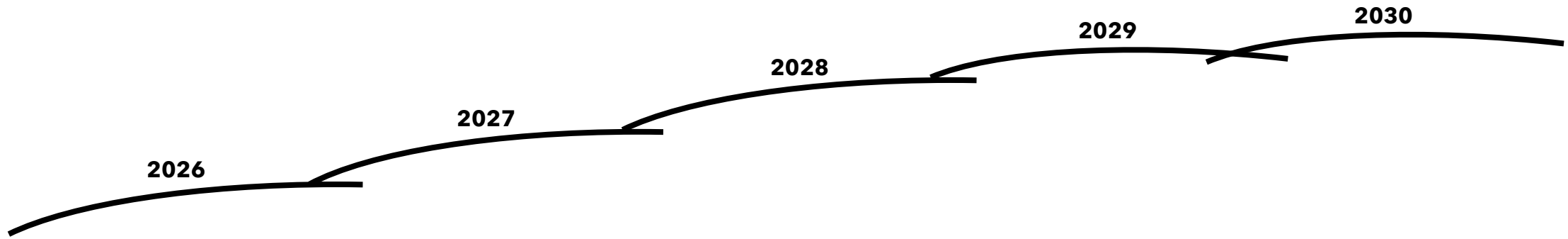
Note: To be further developed once milestones have been solidified and validated by stakeholders

Construction of East Coast Rail Link 2 (ECRL2): Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	Feasibility study and preliminary planning	Kementerian Kerja Raya	Sep 2025	Mar 2026
2	Land acquisition and statutory approvals	Pejabat Tanah dan Galian (PTG), Relevant state governments and local authorities	Mar 2026	Mar 2027
3	Construction and monitoring	West Coast Expressway Sdn Bhd (WCE), Vendor	Mar 2027	Mar 2031
4	Feasibility study and preliminary planning	Kementerian Kerja Raya	Sep 2025	Mar 2026

Implementation plan is to be developed upon receiving the appropriate mandate, with the objective of tracking and monitoring relevant ongoing projects in alignment with the overall action plan and timeline that has been set –both of which currently fall under the purview of the Federal Government

Development of the West Coast Expressway Southern Link: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*	• *Not within stipulated timeframe*
Achieved Milestones	• Feasibility study and preliminary planning	• Land acquisition completed and statutory approvals obtained • Initiate construction	• *Not available*	• *Not available*	• *Not available*

Note: Operationalisation of WCE (Southern) may be beyond stipulated timeframe (i.e., beyond 2030)

Ease of Doing Business.

Disclaimer Notes

The detailed implementation plan and Key Performance Indicators (KPIs) outlined in this report were developed for the purpose of the study, drawing largely—but not entirely—from inputs and advice provided by the respective stakeholders.

For initiatives or components where direct stakeholder input was not available due to various limitations, PEMANDU has taken the liberty to draft the milestones, action plans, and KPIs based on known best practices and reference processes available at the time of writing of this study. These milestones, action plans, and KPIs are therefore indicative and intended to provide direction, but do not constitute a finalised monitoring and evaluation framework.

PEMANDU recommends that, upon commencement of implementation, these components be revisited, validated, and finalised by the relevant authorities and stakeholders to ensure accuracy, ownership, and alignment before being formally adopted for monitoring and evaluation.

Johor Regulatory Sandbox: Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
1	Stakeholder Engagement and Validation	BPEN-J / EXCO Investment and Trade Committee	Sep 2025	Dec 2025
2	Establish Sandbox Secretariat	KSN, SUK Johor, EXCO Investment and Trade Committee, BPENJ, MDEC	Jan 2026	Mar 2026
3	Draft Regulatory Sandbox Framework	EXCO Investment and Trade Committee, BPENJ, MITI, Sector Regulators	Apr 2026	Jun 2026
4	Stakeholder Consultations	BPENJ, Sector Regulators	Jul 2026	Sep 2026
5	Launch Sandbox Application Portal	BPENJ, MDEC	Oct 2026	Dec 2026
6	Open Call for Sandbox Applications	BPENJ	Oct 2026	Dec 2026
7	Evaluation and Approval of Projects	Sector Regulators, BPENJ	Feb 2027	Mar 2027
8	Pilot Demonstration Phase (Batch 1)	Participating Agencies, Sector Regulators	Apr 2027	Mar 2028
9	Monitoring and Mid-Term Review	BPENJ, Sector Regulators	Apr 2028	Jun 2028
10	Pilot Demonstration Phase (Batch 2)	Participating Agencies, Sector Regulators	Jul 2028	Jun 2029
11	Final Review and Policy Recommendations	BPENJ, MITI, Sector Regulators	Jul 2029	Jan 2030
			Jan 2026	**Jan 2030**

Johor Regulatory Sandbox: Implementation Plan (1/6)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Stakeholder Engagement and Validation**	**BPENJ, Sector Regulators, MITI, MDEC**	**Sep 2025**	**Dec 2025**
1.1	Stakeholder engagement to validate implementation plans	BPENJ, Sector Regulators, MITI, MDEC	Sep 2025	Dec 2025
2	**Establish Sandbox Secretariat**	**SUK Johor, BPENJ, MDEC**	**Jan 2026**	**Mar 2026**
2.1	Identify host agency and confirm operating model	SUK Johor, BPENJ, MDEC	Jan 2026	Jan 2026
2.2	Appoint dedicated Secretariat team	SUK Johor, BPENJ	Jan 2026	Feb 2026
2.3	Secure interim office space, equipment, and IT systems	BPENJ	Feb 2026	Mar 2026
2.4	Define Secretariat's TOR	BPENJ	Feb 2026	Mar 2026
2.5	Establish document repository and workflow system	BPENJ	Mar 2026	Mar 2026
2.6	Develop branding and communications toolkit	MDEC	Mar 2026	Mar 2026
3	**Draft Regulatory Sandbox Framework**	**BPENJ, MITI, Sector Regulators**	**Apr 2026**	**Jun 2026**
3.1	Benchmark international sandbox models	BPENJ, MITI	Apr 2026	Apr 2026
3.2	Define regulatory scope	BPENJ, Sector Regulators	Apr 2026	May 2026
3.3	Draft structure and governance model	BPENJ	May 2026	May 2026
3.4	Develop inter-agency MOU	BPENJ, Sector Regulators	May 2026	Jun 2026
3.5	Define ethical and safety parameters	BPENJ	Jun 2026	Jun 2026
3.6	Secure in-principle approval from EXCO	BPENJ	Jun 2026	Jun 2026

Johor Regulatory Sandbox: Implementation Plan (2/6)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
4	**Stakeholder Consultations**	**BPENJ, Sector Regulators**	**Jul 2026**	**Sep 2026**
4.1	Identify and invite stakeholders	BPENJ	Jul 2026	Jul 2026
4.2	Prepare and disseminate consultation paper	BPENJ	Jul 2026	Jul 2026
4.3	Conduct townhalls and focus groups	BPENJ, Sector Regulators	Jul 2026	Aug 2026
4.4	Collect feedback through surveys and papers	BPENJ	Sep 2026	Sep 2026
4.5	Preparation and finalisation of Draft Framework report	BPENJ	Sep 2026	Sep 2026
5	**Launch Sandbox Application Model**	**BPENJ, MDEC, Sector Regulators**	**Oct 2026**	**Dec 2026**
5.1	Confirm final requirements and design specifications for portal	BPENJ, MDEC	Oct 2026	Oct 2026
5.2	Appoint development vendor / internal IT team	BPENJ	Oct 2026	Oct 2026
5.3	Develop and test Sandbox Application Portal (backend and frontend)	BPENJ, MDEC	Oct 2026	Nov 2026
5.4	Conduct User Acceptance Testing (UAT) with select agencies	BPENJ, Sector Regulators	Dec 2026	Dec 2026
5.5	Refine portal based on UAT feedback and conduct bug fixes	BPENJ, MDEC	Dec 2026	Dec 2026
5.6	Private Launch of portal with applicant support tools	BPENJ	Dec 2026	Dec 2026

Johor Regulatory Sandbox: Implementation Plan (3/6)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
6	**Open Call for Sandbox Applications**	**BPENJ, MDEC**	**Jan 2027**	**Jan 2027**
6.1	Finalise sandbox eligibility criteria and selection guidelines	BPENJ	Jan 2027	Jan 2027
6.2	Draft and approve Open Call announcement content	BPENJ	Jan 2027	Jan 2027
6.3	Coordinate dissemination via official platforms, social media, and stakeholder networks	BPENJ	Jan 2027	Jan 2027
6.4	Conduct briefing session/webinar for potential applicants	BPENJ	Jan 2027	Jan 2027
6.5	Public launch online application portal and activate helpdesk	BPENJ, MDEC	Jan 2027	Jan 2027
6.6	Application intake and applicant support	BPENJ	Jan 2027	Jan 2027
6.7	Close application window and archive submissions	BPENJ	Jan 2027	Jan 2027

Johor Regulatory Sandbox: Implementation Plan (4/6)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
7	**Evaluation and Approval of Projects**	**SUK Johor, BPENJ, Sector Regulators, MITI**	**Feb 2027**	**Mar 2027**
7.1	Assign evaluation leads for each sector (e.g., AI, energy, fintech)	BPENJ, Sector Regulators	Feb 2027	Feb 2027
7.2	Develop evaluation rubrics and criteria (impact, feasibility, risk, etc.)	BPENJ, Sector Regulators	Feb 2027	Feb 2027
7.3	Conduct technical and regulatory due diligence on received applications	Sector Regulators	Feb 2027	Feb 2027
7.4	Organise applicant presentation and Q&A sessions	BPENJ	Feb 2027	Feb 2027
7.5	Perform regulatory impact assessments and risk review	Sector Regulators, MITI (if needed)	Feb 2027	Feb 2027
7.6	Convene evaluation committee to evaluate proposals	BPENJ, Sector Regulators	Mar 2027	Mar 2027
7.7	Finalise list of approved projects and define sandbox conditions	SUK Johor, BPENJ, Sector Regulators	Mar 2027	Mar 2027
7.8	Draft and issue conditional approval letters to selected applicants	BPENJ	Mar 2027	Mar 2027
7.9	Conduct onboarding sessions with approved applicants	BPENJ, Sector Regulators	Mar 2027	Mar 2027
7.10	Submit evaluation report and recommendations to EXCO and MITI	BPENJ	Mar 2027	Mar 2027

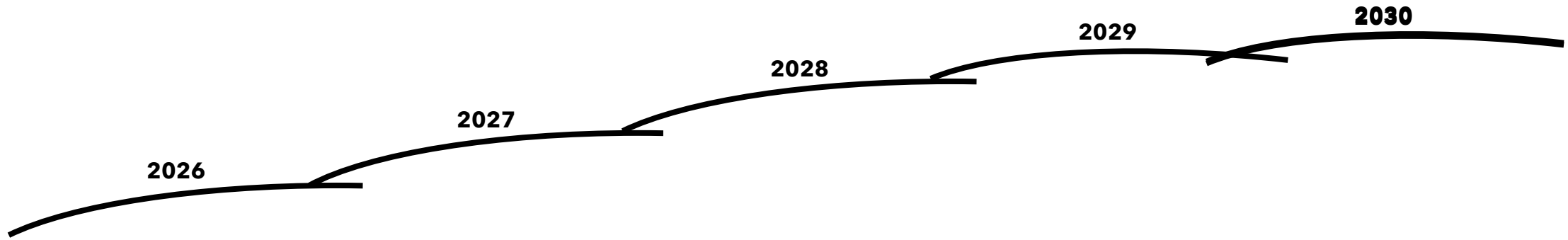
Johor Regulatory Sandbox: Implementation Plan (5/6)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
8	**Pilot Demonstration Phase (Batch 1)**	**BPENJ, Sector Regulators, Private Companies, Project Case Officers**	**Apr 2027**	**Mar 2028**
8.1	Select approved pilot projects and confirm sandbox agreements with participants	BPENJ, Sector Regulators	Apr 2027	Apr 2027
8.2	Deploy necessary regulatory exemptions and sandbox compliance letters	Sector Regulators, Legal Units	Apr 2027	Apr 2027
8.3	Initiate implementation of pilots at designated sites (e.g., Forest City, IBTEC)	Participating Companies, BPENJ	Apr 2027	Jun 2027
8.4	Conduct scheduled monthly check-ins and gather progress updates	BPENJ, Project Case Officers	Jul 2027	Feb 2028
8.5	Prepare preliminary impact report and identify technical or regulatory issues encountered	BPENJ, Sector Regulators, External Reviewers	Mar 2028	Mar 2028
9	**Monitoring and Mid-Term Review**	**BPENJ, Project Case Officers, MITI, MDEC**	**Apr 2028**	**Jun 2028**
9.1	Issue formal request for monitoring reports from all Batch 1 pilot participants	BPENJ, Project Case Officers	Apr 2028	Apr 2028
9.2	Consolidate and analyse performance data against KPIs and sandbox conditions	BPENJ, Sector Regulators	Apr 2028	Apr 2028
9.3	Conduct interviews with project proponents to gather qualitative feedback	BPENJ, External Reviewers	Apr 2028	May 2028
9.4	Identify cross-cutting challenges and opportunities	BPENJ, Legal, Regulators	May 2028	May 2028
9.5	Draft and finalise Mid-Term Review report	BPENJ, MITI, Regulators, MDEC	May 2028	Jun 2028

Johor Regulatory Sandbox: Implementation Plan (6/6)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
10	**Pilot Demonstration Phase (Batch 2)**	**SUK Johor, BPENJ, Sector Regulators, Legal, Participating Agencies, Technical Working Group**	**Jul 2028**	**Jun 2029**
10.1	Implement revisions to sandbox framework	BPENJ, Sector Regulators, Legal	Jul 2028	Jul 2028
10.2	Announce second call for sandbox applications and facilitate selection of new Batch 2 projects	BPENJ, MDEC, Sector Regulators	Jul 2028	Aug 2028
10.3	Prepare project onboarding kits and briefings for new sandbox participants	BPENJ, Sector Regulators	Aug 2028	Aug 2028
10.4	Launch pilot implementation for Batch 2 projects with regulatory exemptions and real-time tracking in place	Participating Agencies, Sector Regulators	Aug 2028	Jun 2028
10.5	Conduct quarterly review and troubleshooting sessions	SUK Johor, BPENJ, Regulators, Technical Working Group	Oct 2028	Jun 2029
11	**Final Review and Policy Recommendations**	**BPENJ, MITI, State Legal Advisor**	**Jul 2029**	**Dec 2029**
11.1	Conduct comprehensive evaluation of Batch 1 and Batch 2 projects	BPENJ, Sector Regulators	Jul 2029	Aug 2029
11.2	Host external validation workshops and roundtables	BPENJ, MITI, MDEC	Aug 2029	Aug 2029
11.3	Draft final policy reform package and recommendations	BPENJ, MITI, Legal	Sep 2029	Oct 2029
11.4	Submit final review report and policy package to Johor EXCO and federal ministries for endorsement	BPENJ, MITI, State Legal Advisor	Oct 2029	Nov 2029
11.5	Launch public communication campaign to share key outcomes and future direction of the sandbox programme	BPENJ, Media Partners	Nov 2029	Dec 2029

Johor Regulatory Sandbox: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• NA	• NA	• NA	• Cumulative total of 10 sandbox projects completed and at least 5 policy or procedural reforms implemented	• Cumulative total of 10 sandbox projects completed and at least 5 policy or procedural reforms implemented
Achieved Milestones	• Completion of Stakeholder Consultations (Milestone 4) • Draft Framework Report (4.5) • Confirm portal specs (5.1) • Appoint IT team (5.2) • Develop/test portal (5.3) • Conduct UAT (5.4) • Refine portal + bug fixes (5.5) • Private launch (5.6)	• All Open Call steps completed (6.1 to 6.7) • Assign eval. leads (7.1) • Complete reviews + approvals (7.2–7.10) • Pilot agreements signed (8.1) • Compliance letters issued (8.2) • Pilots implemented (8.3) • Monthly check-ins started (8.4)	• Issue monitoring requests (9.1) • KPI performance review (9.2) • Interviews + insights (9.3–9.5) • Framework revised (10.1) • 2nd Open Call completed (10.2) • Batch 2 onboarded (10.3) • Pilots launched (10.4)	• Evaluation completed (11.1) • Validation workshops held (11.2) • Final reform draft completed (11.3) • Submit to EXCO and ministries (11.4) • Public communication launched (11.5)	• NA

Johor Regulatory Sandbox: KPI Dictionary

KPI	**Cumulative total of 10 sandbox projects completed and at least 5 policy or procedural reforms implemented**
Description	Measures the outcomes of the Johor Regulatory Sandbox by tracking: (i) the number of sandbox pilot projects that have been formally completed, tested, and reported, and (ii) the number of substantive policy or procedural reforms adopted as a result of sandbox learnings.
Method Of Measurement	- **Sandbox Projects Completed**: Cumulative count of sandbox projects endorsed by the sandbox secretariat, executed with participating agencies, and formally closed with evaluation reports and public documentation. - **Reforms Implemented**: Count of distinct state-level or agency-level policy, guideline, or SOP changes adopted and documented in official records (e.g. EXCO minutes, departmental circulars) that arose directly from sandbox project learnings.
Achievement Trend	- 2028: Total of 6 sandbox projects completed and 3 reforms implemented - 2029: Cumulative 10 sandbox projects completed and at least 5 reforms adopted, meeting target
Justification	Tracks both experimentation and systemic change, ensuring the sandbox yields tangible results that improve Johor's regulatory agility and investment climate. Encourages iterative learning and institutional responsiveness to new technology, business models, and inter-agency challenges.
Target (Year 2030)	**By end-2029:** • At least **10 sandbox projects** completed with formal project closure and documented learnings • At least **5 policy/procedural reforms** implemented by participating agencies based on sandbox insights
Supporting Document	- Johor Regulatory Sandbox Project Tracker - Annual Sandbox Summary Report - EXCO circulars, PTJ procedural updates, inter-agency SOP documents
Frequency Of Data Reported	- Bi-annual updates to sandbox secretariat dashboard (via BPEN-J and PTG) - Annual progress report published (2026–2028) - Final 2028 summary report to include all completed projects and adopted reforms

Johor Industrial Park STAR Ratings: Milestone

No	Milestones	Responsibility	Planned start date	Planned end date
1	Stakeholder Engagement and Validation	BPENJ, SIRIM, MIDA	Jan 2026	Jan 2026
2	Finalise Rating Framework and Assessment Metrics	BPENJ, SIRIM, MIDA	Feb 2026	Mar 2026
3	Stakeholder Consultation and Pilot Site Identification	BPENJ, Local Authorities, Park Developers	Mar 2026	Jun 2026
4	Conduct Pilot Assessment and Collect Baseline Data	SIRIM, MIDA, Local Authorities	Jul 2026	Dec 2026
5	Review Pilot Results and Refine Scoring Criteria	BPENJ, MITI, MIDA	Jan 2027	Mar 2027
6	Full Rollout of STAR Ratings and Public Disclosure	BPENJ, MYSite Platform Team, FMM	Mar 2027	Jun 2027
7	Capacity Building and Annual Reassessment Framework	BPENJ, MIDA, SIRIM	Jul 2027	Dec 2027
			Jan 2026	**Dec 2027**

Johor Industrial Park STAR Ratings: Implementation Plan (1/3)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Stakeholder Engagement and Validation**	**BPENJ, MIDA, MITI, SIRIM**	**Jan 2026**	**Jan 2026**
1.1	Stakeholder engagement to validate implementation plans	BPENJ, MIDA, MITI, SIRIM	Jan 2026	Jan 2026
2	**Finalise Rating Framework and Assessment Metrics**	**BPENJ, MIDA, MITI, SIRIM**	**Feb 2026**	**Mar 2026**
2.1	Review national STAR framework and adapt for Johor	BPENJ, SIRIM, MIDA, MITI	Feb 2026	Feb 2026
2.2	Draft Johor-specific rating metrics	BPENJ, SIRIM, MIDA, MITI	Feb 2026	Feb 2026
2.3	Internal workshop with technical agencies	BPENJ, SIRIM, MIDA, MITI	Feb 2026	Feb 2026
2.4	Public consultation with industry and park stakeholders	BPENJ, SIRIM, MIDA, MITI	Feb 2026	Mar 2026
2.5	Finalise and publish framework	BPENJ, SIRIM, MIDA, MITI	Mar 2026	Mar 2026
3	**Stakeholder Consultation and Pilot Site Identification**	**BPENJ, Local Authorities, Park Developers, MIDA, MITI**	**Mar 2026**	**Jun 2026**
3.1	Develop consultation roadmap	BPENJ	Mar 2026	Mar 2026
3.2	Conduct stakeholder townhalls across Johor	BPENJ, Local Authorities, Park Developers	Mar 2026	Mar 2026
3.3	Identify longlist of potential pilot industrial parks	BPENJ, Local Authorities, Park Developers	Mar 2026	Apr 2026
3.4	Verify readiness and data availability with local authorities	BPENJ, Local Authorities, Park Developers	Apr 2026	May 2026
3.5	Select 3-5 pilot parks for initial rollout	BPENJ, MITI, MIDA	May 2026	Jun 026

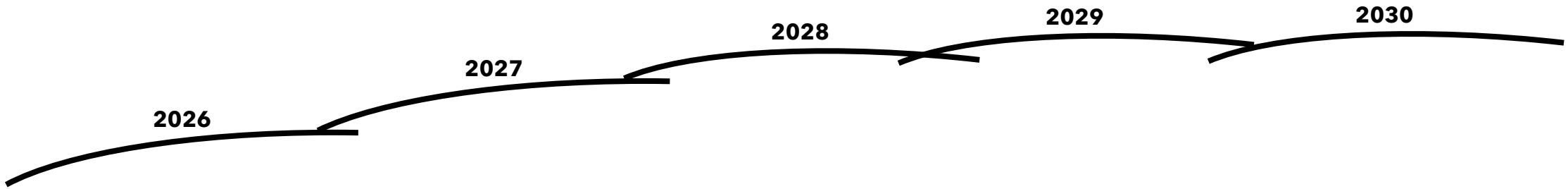
Industrial Park STAR Ratings: Implementation Plan (2/3)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
4	**Conduct Pilot Assessment and Collect Baseline Data**	**SIRIM, MIDA, Local Authorities**	**Jul 2026**	**Dec 2026**
4.1	Develop site assessment tools and protocols	SIRIM, MIDA, Local Authorities	Jul 2026	Jul 2026
4.2	Conduct on-site assessments of selected parks	SIRIM, MIDA, Local Authorities	Jul 2026	Aug 2026
4.3	Collect infrastructure, ESG, livability, and tenancy data	SIRIM, MIDA, Local Authorities	Aug 2026	Aug 2026
4.4	Process and analyse collected data	SIRIM, MIDA, Local Authorities	Sep 2026	Oct 2026
4.5	Prepare pilot assessment report	SIRIM, MIDA, Local Authorities	Oct 2026	Dec 2026
5	**Review Pilot Results and Refine Scoring Criteria**	**BPENJ, SIRIM, MITI, MIDA**	**Jan 2027**	**Mar 2027**
5.1	Conduct internal review workshop on pilot findings	BPENJ	Jan 2027	Jan 2027
5.2	Identify weaknesses in existing scoring model	BPENJ	Jan 2027	Jan 2027
5.3	Consult MITI and SIRIM on refinements	BPENJ, SIRIM, MITI, MIDA	Jan 2027	Feb 2027
5.4	Update rating framework accordingly	BPENJ	Feb 2027	Feb 2027
5.5	Approve final model for rollout	BPENJ, MITI, MIDA	Feb 2027	Mar 2027

Industrial Park STAR Ratings: Implementation Plan (3/3)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
6	**Full Rollout of STAR Ratings and Public Disclosure**	**BPENJ, MYSite Platform Team, FMM**	**Mar 2027**	**Jun 2027**
6.1	Prepare public communication plan	BPENJ, MYSite Platform Team, FMM	Mar 2027	Mar 2027
6.2	Configure and integrate STAR rating data on MYSite platform	BPENJ, MYSite Platform Team, FMM	Mar 2027	Apr 2027
6.3	Upload park-specific STAR rating pages	BPENJ, MYSite Platform Team, FMM	Apr 2027	May 2027
6.4	Conduct launch event and outreach	BPENJ, MYSite Platform Team, FMM	May 2027	May 2027
6.5	Release press, investor, and agency briefings	BPENJ, MYSite Platform Team, FMM	May 2027	Jun 2027
7	**Capacity Building and Annual Reassessment Framework**	**BPENJ, MIDA, SIRIM**	**Jul 2027**	**Dec 2027**
7.1	Develop reassessment SOPs	BPENJ, MIDA, SIRIM	Jul 2027	Jul 2027
7.2	Train assessors and local authorities	BPENJ, MIDA, SIRIM	Jul 2027	Jul 2027
7.3	Schedule annual reassessment cycle	BPENJ, MIDA, SIRIM	Aug 2027	Sep 2027
7.4	Create park improvement toolkits and guidelines	BPENJ, MIDA, SIRIM	Sep 2027	Oct 2027
7.5	Final stakeholder roundtable on sustainability	BPENJ, MIDA, SIRIM	Nov 2027	Dec 2027

Johor Industrial Park STAR Ratings: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• At least 3 park developers formally commit to rating improvement plans (corrective actions) • At least 5 industrial parks assessed and given provisional STAR Ratings	• STAR Rating platform publicly launched and accessed by >500 unique visitors within 3 months	• Cumulative total of 15 industrial parks rated and published in Johor STAR system	• Cumulative total of 15 industrial parks rated and published in Johor STAR system	• Cumulative total of 15 industrial parks rated and published in Johor STAR system
Achieved Milestones	• Pilot parks selected (3.5) • On-site assessments completed (4.2) • Baseline data collected and analysed (4.3–4.4) • Pilot report prepared (4.5) • Final rollout model approved (5.5)	• STAR platform launched (6.1–6.4) • Ratings publicised (6.5) • SOPs for reassessment developed (7.1) • Training completed (7.2)	• Reassessment cycle launched (7.3) • Improvement toolkits published (7.4) • Roundtable on sustainability held (7.5)	• NA	• NA

Johor Industrial Park STAR Ratings: KPI Dictionary

KPI	**Minimum 20 stakeholders across 4 sectors (logistics, energy, manufacturing, ESG) engaged with signed validation records**
Description	Measures the breadth and depth of stakeholder engagement across priority sectors to validate the STAR Ratings framework and gain sectoral buy-in for successful implementation.
Method Of Measurement	Count of individual stakeholder organisations (e.g. companies, industry groups, government bodies) from the logistics, energy, manufacturing, and ESG advisory sectors that have: (i) Participated in engagement sessions or workshops, and (ii) Signed validation records confirming endorsement or input to the STAR Ratings framework.
Achievement Trend	- Minimum 5 stakeholders per sector engaged - Validation signatures collected and filed for each participant - Sectoral spread confirmed by BPEN-J and MIDA
Justification	Validates that the STAR Ratings framework reflects the real-world needs of key industrial sectors in Johor. Secures cross-sectoral ownership and encourages future participation in assessments, ratings, and corrective actions.
Target (Year 2030)	Minimum 20 stakeholders engaged across 4 sectors (≥5 per sector) with signed validation records confirming participation and endorsement of the framework.
Supporting Document	Stakeholder Engagement Report 2025, Signed Validation Log (endorsed by BPEN-J & MIDA), Workshop Participation Records
Frequency Of Data Reported	One-off reporting for 2025 milestone, included in the STAR Ratings Framework Submission Package (Dec 2025)

Johor Industrial Park STAR Ratings: KPI Dictionary

KPI	**At least 3 park developers formally commit to rating improvement plans (corrective actions)**
Description	Measures the number of park developers that have formally agreed to implement improvement measures based on their STAR Rating results, such as infrastructure upgrades, ESG retrofits, or tenant facilities enhancement.
Method Of Measurement	Cumulative count of park developers that: (i) Received provisional STAR Rating results; (ii) Submitted formal written commitment or MoU to undertake corrective actions; and (iii) Submitted a high-level improvement action plan accepted by MIDA or SIRIM.
Achievement Trend	- Provisional STAR Ratings issued to pilot parks by Q2 2026 - Improvement planning workshops conducted with park developers - Written commitments received from at least 3 developers by end 2026
Justification	Demonstrates that the STAR Ratings system is not just a diagnostic tool, but also a catalyst for real infrastructure and service-level improvements. Signals buy-in from private sector for continuous quality upgrading.
Target (Year 2030)	Minimum of 3 park developers submit formal corrective action commitments in response to STAR Rating results.
Supporting Document	STAR Rating Improvement Plans, Commitment Letters / MoUs signed by developers, BPEN-J/MIDA workshop reports
Frequency Of Data Reported	One-off reporting in STAR Ratings Pilot Evaluation Report (Q4 2026) with developer commitment annexes

Johor Industrial Park STAR Ratings: KPI Dictionary

KPI	**Number of Industrial Parks Assessed and Given Provisional STAR Ratings**
Description	Measures the number of industrial parks in Johor that have undergone initial on-site assessment and have received a provisional STAR Rating based on Johor's framework, prior to full-scale rollout.
Method Of Measurement	Count of distinct industrial parks that have completed baseline assessments by MIDA and SIRIM, using validated scorecards and SOPs, and received a documented provisional rating report reviewed by BPEN-J.
Achievement Trend	• Pilot park selection completed by early 2026 • Minimum 5 pilot parks assessed by mid-2026 • Ratings verified and endorsed by technical review committee by Q4 2026
Justification	Provides early validation of the STAR Ratings framework, allows fine-tuning of scoring mechanisms, and signals readiness for wider rollout. Builds confidence among park developers and investors.
Target (Year 2030)	At least **5 industrial parks** in Johor assessed and granted **provisional STAR Ratings** by Q4 2026.
Supporting Document	Baseline Pilot Assessment Reports, Industrial Park Rating Scorecards, Technical Review Committee Endorsement Memos
Frequency Of Data Reported	Single milestone report in 2026; summary to be published in the Final Pilot Report and incorporated into the STAR Rating Platform by early 2027

Johor Industrial Park STAR Ratings: KPI Dictionary

KPI	**STAR Rating platform publicly launched and accessed by >500 unique visitors within 3 months**
Description	Measures the public reach and visibility of the Johor Industrial Park STAR Rating platform within the first 3 months of launch, indicating stakeholder interest and accessibility.
Method Of Measurement	Cumulative count of unique IP-based visitors to the official STAR Rating digital platform (e.g. MYSite) within 90 days of launch, using verified analytics tools (e.g. Google Analytics, internal site metrics).
Achievement Trend	- Platform design and pre-launch testing completed by mid-2027 - Official launch and public access enabled by Q3 2027 - Visitor count monitored continuously for 90 days post-launch - Reporting dashboard updated with performance metrics
Justification	Demonstrates public awareness, transparency, and digital engagement with the rating system. Acts as a validation of outreach efforts and enhances credibility of the initiative among investors, planners, and developers.
Target (Year 2030)	**At least 500 unique visitors recorded within 3 months** of STAR platform launch, measured from official go-live date.
Supporting Document	Platform Visitor Analytics Report, STAR Launch Communications Plan, Web Analytics Summary (e.g. MYSite dashboard)
Frequency Of Data Reported	One-time report compiled 90 days post-launch and published via dashboard or presented in annual implementation report.

Johor Industrial Park STAR Ratings: KPI Dictionary

KPI	**Cumulative Number of Industrial Parks Rated and Published in Johor STAR System**
Description	Measures the cumulative number of industrial parks in Johor that have received a verified STAR Rating and had their scores publicly published through the Johor STAR platform.
Method Of Measurement	Tally of industrial parks that: (i) completed the full STAR Ratings assessment process, (ii) received a validated score based on standardised metrics, and (iii) were publicly disclosed on the Johor STAR platform (e.g. MySite or BPENJ dashboard).
Achievement Trend	• First batch of 5 parks assessed and rated by end-2026 • Additional 5 parks rated and published by end-2027 • Final 5 parks rated and published by end-2028, reaching a cumulative total of 15
Justification	Tracks the initiative's actual coverage and impact across Johor's industrial ecosystem. Promotes transparency and encourages peer benchmarking and corrective improvements among park operators.
Target (Year 2030)	A cumulative total of at least **15 industrial parks** rated and published on the Johor STAR system by 2028.
Supporting Document	- STAR Ratings Dashboard - Rating Rollout Progress Report - Verified Scorecard Archive (MIDA/SIRIM)
Frequency Of Data Reported	Updated annually from 2027–2028 with cumulative totals verified by BPENJ and published via MySite and related platforms

Introduction of Special Land Use Permit Classifications Reform: Milestone

No	Milestones	Responsibility	Planned start date	Planned end date
1	Stakeholder Engagement and Cross-Sector Validation (RE, logistics, industrial park developers, PTG, PLANMalaysia)	PTJ / PTG Johor	Jan 2026	Jan 2026
2	Establish Inter-Agency Task Force and confirm governance structure (BPEN-J, PLANMalaysia@Johor, JPNJ, developers)	PTJ / PTG Johor	Jan 2026	Jan 2026
3	Baseline Policy and Legal Review of SP Circulars, zoning designations, and existing Special Permit practices across PTG districts	PTJ / PTG Johor	Jan 2026	Feb 2026
4	Benchmark Land Use Models from Selangor, Kedah, Sarawak, Singapore and international cases (RE, logistics, mixed-use industrial)	PLANMalaysia@Johor	Feb 2026	Mar 2026
5	Draft Use-Case Typologies and Criteria for new SP categories (e.g. agrosolar, integrated logistics, green industrial zones)	PTJ / JPNJ / PLANMalaysia@Johor	Mar 2026	May 2026
6	Spatial Mapping and Demand Identification: Map strategic areas where reform is needed based on investor demand, planning mismatch, or transformation priority (e.g., logistics hubs near ports, agri zones)	BPEN-J	May 2026	Jul 2026
7	Draft and Propose Policy Amendments or new SP land use subcategories across sectors	PTJ / PTG Johor	Jul 2026	Sep 2026
8	Conduct Technical Consultations with sector specialists (e.g., logistics investors, solar developers, RECs, industrial planners)	PTJ / BPEN-J	Sep 2026	Dec 2026
9	Develop Inter-Agency SOPs and SP Approval Guidelines (checklist, timeline, documentation)	PTJ / PTG Johor	Dec 2026	Feb 2027
10	Establish Single-Window SP Tracking System to improve application visibility, user guidance and permit status across sectors	PTJ / PTG Johor	Feb 2027	Apr 2027
11	Finalise and Gazette Updated SP Guidelines and Land Use Subcategories in Johor planning system	PTJ / PLANMalaysia@Johor	Apr 2027	Jun 2027
			Jan 2026	**Jun 2027**

Introduction of Special Land Use Permit Classifications Reform: Implementation Plan (1/5)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Stakeholder Engagement and Cross-Sector Validation**	**PTJ / PTG Johor**	**Jan 2026**	**Jan 2026**
1.1	Stakeholder engagement to validate implementation plans	PTJ / PTG Johor	Jan 2026	Jan 2026
2	**Establish Inter-Agency Task Force and confirm governance structure (BPEN-J, PLANMalaysia@Johor, JPNJ, developers)**	**PTG Johor, BPENJ, PLANMalaysia@Johor**	**Jan 2026**	**Jan 2026**
2.1	Nominate focal reps from each agency and developer clusters	PTG Johor	Jan 2026	Jan 2026
2.2	Draft TOR and governance roles	BPENJ	Jan 2026	Jan 2026
2.3	Validate TOR with agencies	PLANMalaysia@Johor	Jan 2026	Jan 2026
2.4	Hold inception and coordination meeting	PTG Johor	Jan 2026	Jan 2026
2.5	Issue formal directive and launch task force	PTG Johor	Jan 2026	Jan 2026
3	**Baseline Policy and Legal Review of SP Circulars, zoning designations, and existing Special Permit practices across PTG districts**	**PTG Johor, BPENJ**	**Jan 2026**	**Feb 2026**
3.1	Compile relevant SP Circulars and decisions from each PTG	PTG Johor, BPENJ	Jan 2026	Jan 2026
3.2	Compare interpretations and note variations	PTG Johor, BPENJ	Jan 2026	Jan 2026
3.3	Consult with State Legal Advisor to clarify interpretation	PTG Johor, BPENJ	Jan 2026	Feb 2026
3.4	Document baseline regulatory barriers and inconsistencies	PTG Johor, BPENJ	Feb 2026	Feb 2026
3.5	Summarise legal gaps and prepare baseline report	PTG Johor, BPENJ	Feb 2026	Feb 2026

Introduction of Special Land Use Permit Classifications Reform : Implementation Plan (2/5)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
4	**Benchmark Land Use Models from Selangor, Kedah, Sarawak, Singapore and international cases (RE, logistics, mixed-use industrial)**	**PLANMalaysia@Johor**	**Feb 2026**	**Mar 2026**
4.1	Identify comparable benchmark states and international cases	PLANMalaysia@Johor	Feb 2026	Mar 2026
4.2	Collect zoning regulation documents and case studies	PLANMalaysia@Johor	Mar 2026	Mar 2026
4.3	Conduct structured review against Johor's current SP regime	PLANMalaysia@Johor	Mar 2026	Mar 2026
4.4	Document best practices for RE, logistics and dual-use zones	PLANMalaysia@Johor	Mar 2026	Mar 2026
4.5	Submit benchmarking report with recommendations	PLANMalaysia@Johor	Mar 2026	Mar 2026
5	**Draft Use-Case Typologies and Criteria for new SP categories (e.g. agrosolar, integrated logistics, green industrial zones)**	**PTG Johor, JPNJ / PLANMalaysia@Johor**	**Mar 2026**	**May 2026**
5.1	Map common and emerging land use cases in Johor	PTG Johor	Mar 2026	Mar 2026
5.2	Define classification parameters and sector-specific conditions	JPNJ / PLANMalaysia@Johor	Mar 2026	Apr 2026
5.3	Draft preliminary guidelines for each subcategory	JPNJ / PLANMalaysia@Johor	Apr 2026	Apr 2026
5.4	Review typologies with technical agencies	PTG Johor	Apr 2026	Apr 2026
5.5	Finalise draft SP category framework	PTG Johor	Apr 2026	May 2026

Introduction of Special Land Use Permit Classifications Reform : Implementation Plan (3/5)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
6	**Spatial Mapping and Demand Identification: Map strategic areas where reform is needed based on investor demand, planning mismatch, or transformation priority (e.g., logistics hubs near ports, agri zones)**	**BPEN-J**	**May 2026**	**Jul 2026**
6.1	Engage developers and agencies for demand input	BPEN-J	May 2026	May 2026
6.2	Identify potential high-priority reform zones	BPEN-J	May 2026	May 2026
6.3	Overlay zoning constraints with infrastructure maps	BPEN-J	Jun 2026	Jun 2026
6.4	Tag reform categories by demand potential	BPEN-J	Jun 2026	Jun 2026
6.5	Publish draft spatial zoning reform map	BPEN-J	Jul 2026	Jul 2026
7	**Draft and Propose Policy Amendments or new SP land use subcategories across sectors**	**PTG Johor**	**Jul 2026**	**Sep 2026**
7.1	Draft proposed amendments for SP circular	PTG Johor	Jul 2026	Aug 2026
7.2	Align proposals with state and national legal teams	PTG Johor	Aug 2026	Aug 2026
7.3	Conduct legal risk review with advisors	PTG Johor	Aug 2026	Sep 2026
7.4	Prepare gazettement documents and policy notes	PTG Johor	Aug 2026	Sep 2026
7.5	Submit proposed amendments for state legal vetting	PTG Johor	Sep 2026	Sep 2026

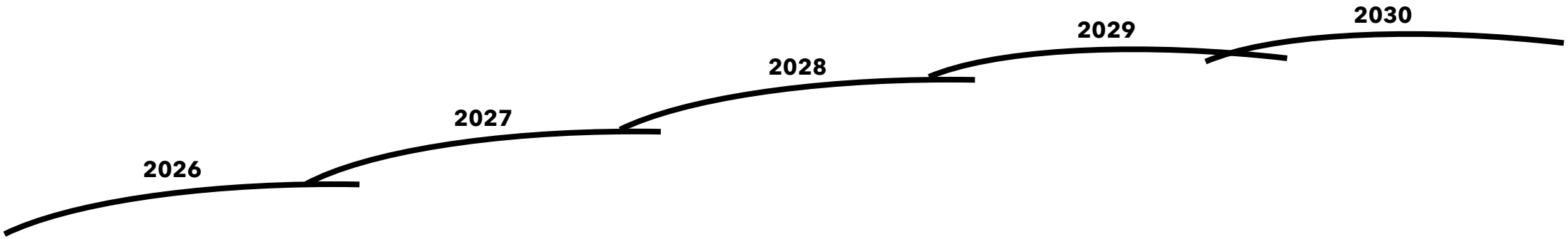
Introduction of Special Land Use Permit Classifications Reform : Implementation Plan (4/5)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
8	**Conduct Technical Consultations with sector specialists (e.g., logistics investors, solar developers, RECs, industrial planners)**	**PTG Johor, JPNJ, Land Use Planning Dept, PETRA, ST**	**Sep 2026**	**Dec 2026**
8.1	Draft checklist of technical and regulatory criteria	PTG Johor	Sep 2026	Oct 2026
8.2	Conduct SOP drafting session across agencies	PTG Johor, JPNJ, Land Use Planning Dept	Oct 2026	Oct 2026
8.3	Seek validation from legal and governance review committee	PTG Legal Affairs	Oct 2026	Oct 2026
8.4	Refine and align checklist and SOPs with federal formats	PTG Johor, PETRA, ST	Oct 2026	Nov 2026
8.5	Approve SOP for operational use	PTG Johor	Dec 2026	Dec 2026
9	**Develop Inter-Agency SOPs and SP Approval Guidelines (checklist, timeline, documentation)**	**PTJ / PTG Johor**	**Dec 2026**	**Feb 2027**
9.1	Convene inter-agency coordination meeting to align on SOP structure	PTJ / PTG Johor	**Dec 2026**	**Dec 2026**
9.2	Develop draft SOP document including SP application flow and timelines	PTJ / PTG Johor	**Dec 2026**	Jan 2027
9.3	Solicit feedback from technical and legal units	PTJ / PTG Johor	Jan 2027	Jan 2027
9.4	Refine SOPs based on feedback and conduct simulation walkthrough	PTJ / PTG Johor	Jan 2027	Feb 2027
9.5	Finalise and issue endorsed SOP guideline for implementation	PTJ / PTG Johor	Feb 2027	Feb 2027

Introduction of Special Land Use Permit Classifications Reform : Implementation Plan (5/5)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
10	**Establish Single-Window SP Tracking System to improve application visibility, user guidance and permit status across sectors**	**PTJ / PTG Johor**	**Feb 2027**	**Apr 2027**
10.1	Conduct needs assessment and user requirement workshops	PTJ / PTG Johor	Feb 2027	Feb 2027
10.2	Develop system architecture and define UI/UX flow	PTJ / PTG Johor	Feb 2027	Mar 2027
10.3	Appoint system vendor and begin platform development	PTJ / PTG Johor	Mar 2027	Mar 2027
10.4	Pilot test with selected agencies and incorporate refinements	PTJ / PTG Johor	Mar 2027	Apr 2027
10.5	Launch platform and provide agency onboarding and user training	PTJ / PTG Johor	Apr 2027	Apr 2027
11	**Finalise and Gazette Updated SP Guidelines and Land Use Subcategories in Johor planning system**	**PLANMalaysia@Johor**	**Apr 2027**	**Jun 2027**
11.1	Draft gazettement documentation in coordination with PLANMalaysia@Johor	PLANMalaysia@Johor	Apr 2027	Apr 2027
11.2	Undertake legal vetting and incorporate adjustments	PLANMalaysia@Johor	Apr 2027	May 2027
11.3	Secure endorsement from EXCO and state legal advisor	PLANMalaysia@Johor	May 2027	May 2027
11.4	Submit gazettement documents to Federal and publish	PLANMalaysia@Johor	May 2027	Jun 2027
11.5	Update digital and official land use systems to reflect changes	PLANMalaysia@Johor	Jun 2027	Jun 2027

Introduction of Special Land Use Permit Classifications Reform: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• Complete stakeholder engagement with at least 3 sectoral groups (RE, logistics, industrial parks) • Submit full legal review and summary report of SP Circular 3/2006 for all 10 districts	• Hold technical consultation with minimum 20 private sector players • Map and publish 5 pilot zones with high investment potential across sectors	• Develop and deploy functioning digital tracking system with UAT completed	• NA	• NA
Achieved Milestones	• Stakeholder engagement validated (1.1) • Inter-agency task force established (2.5) • SP Circular baseline review completed (3.5) • Benchmarking study finalised (4.5)	• Draft use-case typologies and permit criteria completed (5.5) • Pilot zones identified and mapped (6.5) • Draft legal text completed and validated (7.5) • Stakeholder consultations conducted (8.5)	• Digital SP portal user tested and finalised (9.4) • Establish Single-Window SP Tracking System to improve application visibility, user guidance and permit status across sectors (10) • Finalise and Gazette Updated SP Guidelines and Land Use Subcategories in Johor planning system (11)	• NA	• NA

Introduction of Special Land Use Permit Classifications Reform: KPI Dictionary

KPI	**Complete stakeholder engagement with at least 3 sectoral groups (RE, logistics, industrial parks)**
Description	Measures whether at least 3 distinct sectoral stakeholder groups have been engaged as part of the initial validation of the land use reform initiative.
Method Of Measurement	Cumulative count of agrosolar applications that have: (i) Submitted a complete SP application via the single-window system; (ii) Received formal approval by the PTG/EXCO based on compliance with agrosolar criteria; (iii) Completed initial project site activation (e.g., installation works, agri-use deployment) as verified by relevant authorities.
Achievement Trend	- Stakeholder validation completed by Q3 2025 - Broader engagement with sub-sector representatives in 2026 - Ongoing feedback loop incorporated into implementation materials
Justification	Ensures multi-sector alignment and early buy-in to avoid regulatory misalignment and delays during operationalisation.
Target (Year 2030)	**At least 3 sectoral stakeholder groups fully engaged and validated in formal consultation reports by Q3 2025.**
Supporting Document	Stakeholder Engagement Report, Meeting Minutes, Validation Forms
Frequency Of Data Reported	One-time report by end of Q3 2025

Introduction of Special Land Use Permit Classifications Reform: KPI Dictionary

KPI	**Submit full legal review and summary report of SP Circular 3/2006 for all 10 districts**
Description	Measures completion of the comprehensive legal review of Special Permit (SP) regulations and their interpretations across Johor's districts.
Method Of Measurement	Submission of a consolidated legal summary report covering SP Circular 3/2006 interpretations, ambiguities, and implementation variations across all 10 PTG districts.
Achievement Trend	- Legal analysis conducted across all districts by Q3 2025 - Common gaps and conflicts identified - Used to inform revised SP framework design
Justification	Provides the legal foundation to modernise the SP classification framework and ensure statewide consistency in interpretation.
Target (Year 2030)	**Full legal review report submitted by end of Q3 2025, validated by PTG Johor legal advisors.**
Supporting Document	SP Circular Legal Review Report, PTG District Legal Memos
Frequency Of Data Reported	One-time submission by end of Q3 2025

Introduction of Special Land Use Permit Classifications Reform: KPI Dictionary

KPI	**Hold technical consultation with minimum 20 private sector players**
Description	Tracks breadth of technical engagement with private developers and sector specialists to inform guidelines for new land use SP classifications.
Method Of Measurement	Attendance and engagement log with at least 20 unique private sector stakeholders including RE investors, logistics firms, and industrial planners.
Achievement Trend	- Consultation roundtables conducted by Q2 2026 - Input incorporated into SOPs and guidelines - Industry readiness improves with early co-creation
Justification	Ensures technical feasibility and investor-aligned permitting processes to accelerate uptake across sectors.
Target (Year 2030)	**Minimum of 20 private sector stakeholders formally engaged by Q2 2026.**
Supporting Document	Consultation Attendance Logs, Summary Notes, Technical Feedback Reports
Frequency Of Data Reported	Report submitted post-consultation round in Q2 2026

Introduction of Special Land Use Permit Classifications Reform: KPI Dictionary

KPI	**Map and publish 5 pilot zones with high investment potential across sectors**
Description	Assesses successful identification of strategic areas for targeted land use classification reform based on infrastructure, demand, and sectoral growth potential.
Method Of Measurement	Public release of digital maps and profiles of at least 5 pilot zones tagged to RE, logistics, or industry transformation use-cases.
Achievement Trend	• Desktop mapping and zoning validation by Q1 2026 • Public release on MySite digital system by Q2 2026 • Used to guide early permit prioritisation
Justification	Demonstrates spatial readiness and showcases investable opportunities, increasing clarity for investors and agencies.
Target (Year 2030)	**5 pilot zones fully mapped, validated, and published online by Q2 2026.**
Supporting Document	Zoning Maps, Demand Profile Reports, MySite Pilot Zone Webpages
Frequency Of Data Reported	Updated and published once by Q2 2026

Introduction of Special Land Use Permit Classifications Reform: KPI Dictionary

KPI	**Develop and deploy functioning digital tracking system with UAT completed**
Description	Tracks delivery and readiness of the digital platform to manage SP application flow, approvals, and permit tracking across sectors.
Method Of Measurement	Completion of full UAT and pilot deployment of system; operational readiness confirmed by user validation and SOP documentation.
Achievement Trend	- System developed by Q3 2026 - UAT completed with pilot districts by Q4 2026 - Statewide rollout enabled by 2027
Justification	Enables transparency, efficiency, and user-friendly experience in permit issuance, critical for investor confidence and process automation.
Target (Year 2030)	**Digital tracking system UAT completed and deployed in 3 pilot districts by Q4 2026.**
Supporting Document	System UAT Report, User Guide, SOP Documents, Live Portal Screenshots
Frequency Of Data Reported	UAT completion report and operational verification by end Q4 2026

Formation of Johor RE Market Reform Group: Milestone

No	Milestones	Responsibility	Planned start date	Planned end date
1	Stakeholder Engagement and Validation	PTG Johor, BPENJ	Jan 2026	Jan 2026
2	Convene inter-agency meeting to endorse formation of Johor RE Market Reform Group (JRMRG) and define governance structure	Johor EXCO Investment	Jan 2026	Jan 2026
3	Appoint secretariat and nominate agency/industry representatives for core and technical working groups	Johor EXCO Investment	Jan 2026	Feb 2026
4	Develop TOR for JRMRG including meeting cadence, escalation protocol, and scope of work	Johor EXCO Investment	Feb 2026	Mar 2026
5	Conduct baseline mapping of RE cost structure in Johor's industrial zones (e.g. SAC, standby, FiT access)	Johor EXCO Investment	Mar 2026	Apr 2026
6	Organise state-level consultation workshops with RE developers and corporate buyers on cost and incentive barriers	Johor EXCO Investment, BPEN-J, RE Industry Associations	Apr 2026	Jun 2026
7	Benchmark successful RE pricing frameworks in peer countries and states	Johor EXCO Investment	Jun 2026	Aug 2026
8	Draft Johor-specific policy recommendations for differentiated tariffs and incentive eligibility	Johor EXCO Investment, BPEN-J	Aug 2026	Oct 2026
9	Submit reform memorandum to national agencies (e.g. ST, SEDA) and initiate periodic joint dialogues	Johor EXCO Investment, BPEN-J	Oct 2026	Nov 2026
10	Establish digital platform for continuous stakeholder feedback and policy alignment tracking	Johor EXCO Investment, BPEN-J, IT Vendor	Nov 2026	Jan 2027
11	Publish public report summarising reform proposals and expected impact on RE investment attractiveness	Johor EXCO Investment, BPEN-J	Jan 2027	Mar 2027
			Jan 2026	**Mar 2027**

Formation of Johor RE Market Reform Group: Implementation Plan (1/5)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Stakeholder Engagement and Validation**	**PTG Johor, BPENJ**	**Jan 2026**	**Jan 2026**
1.1	Stakeholder engagement to validate implementation plans	PTG Johor, BPENJ	Jan 2026	Jan 2026
2	**Convene inter-agency meeting to endorse formation of Johor RE Market Reform Group**	**Johor EXCO Investment, BPEN-J**	**Jan 2026**	**Jan 2026**
2.1	Draft agenda, background note & briefing materials	Johor EXCO Investment, BPEN-J	Jan 2026	Jan 2026
2.2	Identify and confirm participation of relevant state and federal agencies (e.g. SEDA, ST)	Johor EXCO Investment	Jan 2026	Jan 2026
2.3	Convene inter-agency coordination meeting to present rationale and proposed structure	Johor EXCO Investment (Chair), BPEN-J, MITI rep (invited)	Jan 2026	Jan 2026
2.4	Collect formal agency feedback and suggested amendments to proposed structure	Johor EXCO Investment	Jan 2026	Jan 2026
2.5	Finalise endorsed governance structure	Johor EXCO Investment, BPEN-J	Jan 2026	Jan 2026
3	**Appoint secretariat and nominate agency/industry representatives for core and technical working groups**	**Johor EXCO Investment, BPENJ**	**Jan 2026**	**Feb 2026**
3.1	Develop nomination criteria and eligibility matrix	Johor EXCO Investment	Jan 2026	Feb 2026
3.2	Circulate nomination requests to key agencies and associations	Johor EXCO Investment	Feb 2026	Feb 2026
3.3	Receive and review nominations	BPEN-J	Feb 2026	Feb 2026
3.4	Confirm appointees and issue formal appointment letters	Johor EXCO Investment	Feb 2026	Feb 2026
3.5	Hold onboarding session for working group members	BPEN-J	Feb 2026	Feb 2026

Formation of Johor RE Market Reform Group: Implementation Plan (2/5)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
4	**Develop TOR for JRMRG including meeting cadence, escalation protocol, and scope of work**	**Johor EXCO Investment**	**Feb 2026**	**Mar 2026**
4.1	Draft preliminary TOR structure and scope	Johor EXCO Investment	Feb 2026	Mar 2026
4.2	Consult appointed core and technical working groups	BPEN-J	Mar 2026	Mar 2026
4.3	Incorporate feedback and revise TOR	Johor EXCO Investment	Mar 2026	Mar 2026
4.4	Legal and policy vetting of TOR	BPEN-J Legal Unit	Mar 2026	Mar 2026
4.5	Finalise and adopt TOR via inaugural meeting	Johor EXCO Investment	Mar 2026	Mar 2026
5	**Conduct baseline mapping of RE cost structure in Johors industrial zones**	**BPENJ, Johor EXCO Investment**	**Mar 2026**	**Apr 2026**
5.1	Design data collection s for SAC, standby, FiT	BPEN-J	Mar 2026	Mar 2026
5.2	Engage local utilities and RE players to obtain cost data	Johor EXCO Investment	Mar 2026	Mar 2026
5.3	Compile and validate data for internal review	BPEN-J	Mar 2026	Apr 2026

Formation of Johor RE Market Reform Group: Implementation Plan (3/5)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
6	**Organise state-level consultation workshops with RE developers and corporate buyers**	**BPENJ, Johor EXCO Investment**	**Apr 2026**	**Jun 2026**
6.1	Design workshop structure and outreach plan	BPEN-J	Apr 2026	Apr 2026
6.2	Invite participants from RE developers and corporate buyers	Johor EXCO Investment	May 2026	May 2026
6.3	Conduct first consultation workshop	BPEN-J	Jun 2026	Jun 2026
6.4	Compile insights and revise format for second round	BPEN-J	Jun 2026	Jun 2026
6.5	Conduct second round and publish consolidated insights	Johor EXCO Investment	Jun 2026	Jun 2026
7	**Benchmark successful RE pricing frameworks in peer countries and states**	**BPENJ, Johor EXCO Investment**	**Jun 2026**	**Aug 2026**
7.1	Select benchmarking countries and data sources	BPEN-J	Jun 2026	Jun 2026
7.2	Review international pricing models	BPEN-J	Jun 2026	Jun 2026
7.3	Analyse incentives and tariff strategies	Johor EXCO Investment	Jun 2026	Jul 2026
7.4	Draft benchmarking summary report	Johor EXCO Investment	Jul 2026	Jul 2026
7.5	Validate with industry experts and finalise	BPEN-J	Jul 2026	Aug 2026

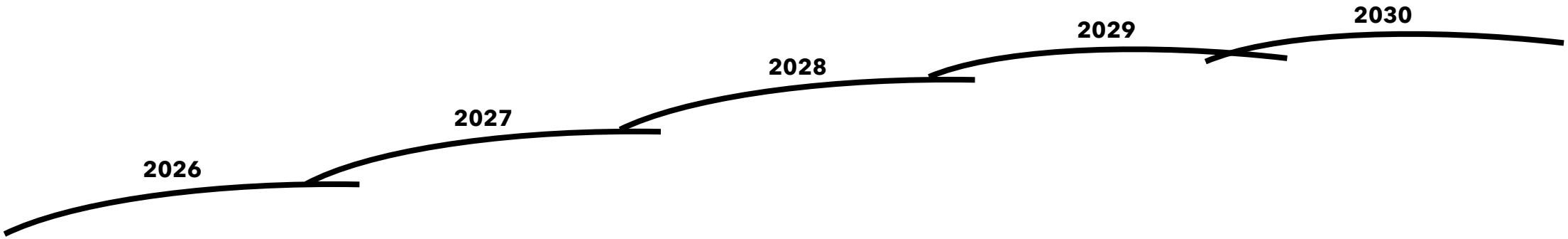
Formation of Johor RE Market Reform Group: Implementation Plan (4/5)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
8	**Draft Johor-specific policy recommendations**	**BPENJ, Johor EXCO Investment**	**Aug 2026**	**Oct 2026**
8.1	Draft initial policy options based on prior outputs	BPEN-J	Aug 2026	Aug 2026
8.2	Evaluate fiscal implications and investor feedback	Johor EXCO Investment	Aug 2026	Aug 2026
8.3	Develop detailed recommendations and justifications	BPEN-J	Sep 2026	Sep 2026
8.4	Hold review session with industry associations	Johor EXCO Investment	Sep 2026	Oct 2026
8.5	Finalise draft policy paper	BPEN-J	Oct 2026	Oct 2026
9	**Submit reform memorandum to national agencies and initiate joint dialogues**	**BPENJ, Johor EXCO Investment**	**Oct 2026**	**Nov 2026**
9.1	Draft reform memorandum and internal review	BPEN-J	Oct 2026	Oct 2026
9.2	Secure EXCO endorsement	Johor EXCO Investment	Oct 2026	Oct 2026
9.3	Submit to SEDA, ST, PETRA, MITI	BPEN-J	Oct 2026	Oct 2026
9.4	Request formal dialogue sessions with national agencies	Johor EXCO Investment	Nov 2026	Nov 2026
9.5	Hold first joint dialogue and agree on next steps	BPEN-J	Nov 2026	Nov 2026

Formation of Johor RE Market Reform Group: Implementation Plan (5/5)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
10	**Establish digital platform for continuous stakeholder feedback**	**BPENJ, Johor EXCO Investment, IT vendor**	**Nov 2026**	**Jan 2027**
10.1	Draft platform requirements and features	BPEN-J	Nov 2026	Dec 2027
10.2	Procure or assign IT vendor for platform build	Johor EXCO Investment	Dec 2027	Dec 2027
10.3	Develop platform and conduct testing	IT Vendor	Dec 2027	Dec 2027
10.4	Onboard stakeholders and provide access	Johor EXCO Investment	Dec 2027	Dec 2027
10.5	Launch platform and monitor usage	BPEN-J	Dec 2027	Jan 2027
11	**Publish public report summarising reform proposals**	**BPENJ, Johor EXCO Investment**	**Jan 2027**	**Mar 2027**
11.1	Draft summary report based on full initiative	Johor EXCO Investment	Jan 2027	Jan 2027
11.2	Design layout and visuals	BPEN-J	Jan 2027	Jan 2027
11.3	Conduct internal review	BPEN-J	Jan 2027	Feb 2027
11.4	Obtain final EXCO approval	Johor EXCO Investment	Feb 2027	Mar 2027
11.5	Publish digitally and distribute	BPEN-J	Mar 2027	Mar 2027

Formation of Johor RE Market Reform Group: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• Baseline cost data collected from minimum 20 RE project developers and buyers (covering SAC, standby, and LCOE) by Q4 2025. • 1 stakeholder consultation round conducted with participation from at least 30 stakeholders (industry, regulators, utilities).	• Second consultation round completed, with 50% new stakeholder participants from previous round. • 1 public RE market reform report published and disseminated to state and federal agencies.	• Second Publication of RE market reform report and disseminated to state and federal agencies.	• NA	• NA
Achieved Milestones	• Stakeholder engagement and validation • Inter-agency endorsement of JRMRG • Appointment of secretariat & working group • Finalised TOR • Completed RE cost mapping • First consultation round held	• Benchmarking pricing frameworks • Finalised Johor-specific policy recommendations • Submitted memorandum to national agencies • Launched stakeholder digital platform • Published final reform report	• NA	• NA	• NA

Formation of Johor RE Market Reform Group: KPI Dictionary

KPI	**Baseline cost data collected from minimum 20 RE project developers and buyers (covering SAC, standby, and LCOE)**
Description	Measures the successful collection of cost-related data from a diverse group of RE stakeholders in Johor to map current pricing burdens, focusing on system access charges (SAC), standby charges, and levelised cost of energy (LCOE).
Method Of Measurement	Verified data submissions from at least 20 independent RE stakeholders (developers, buyers, aggregators) logged into the project database with standardised input forms. At least 3 technology types (e.g. solar, wind, BTM hybrid) must be represented.
Achievement Trend	- Survey framework developed by Q2 2025 - Outreach and onboarding of respondents completed by Q3 2025 - Validation and publication of dataset by Q4 2025
Justification	Provides a data-driven foundation for identifying pricing distortions in Johor's RE market and framing credible reform recommendations with national agencies.
Target (Year 2030)	At least 20 unique stakeholder data submissions validated and stored in project repository by Q4 2025..
Supporting Document	RE Cost Survey Dataset, Stakeholder Submission Log, Data Validation Protocol
Frequency Of Data Reported	Once (Q4 2025), with results summarised in the 2025 Annual Reform Report.

Formation of Johor RE Market Reform Group: KPI Dictionary

KPI	**One stakeholder consultation round conducted with participation from at least 30 stakeholders (industry, regulators, utilities)**
Description	Tracks the completion and inclusiveness of the first round of stakeholder engagements held to identify challenges and inputs relevant to RE reform in Johor.
Method Of Measurement	Attendance list and post-session feedback collected from participants. Minimum representation must include stakeholders from each of the following: RE developers, buyers, utilities, regulators, state agencies, and investors.
Achievement Trend	- Outreach plan developed by Q2 2025 - First round consultation conducted in Q3 2025 - Post-event report submitted by Q4 2025
Justification	Establishes a foundational dialogue channel with relevant ecosystem actors, validating state-level ownership and the need for cost and policy reforms.
Target (Year 2030)	Minimum of 30 attendees representing a cross-section of at least 5 stakeholder groups.
Supporting Document	Attendance Log, Session Agenda, Stakeholder Feedback Summary, Consultation Outcome Report
Frequency Of Data Reported	Once (Q3–Q4 2025), summarised in Annual Reform Group Report.

Formation of Johor RE Market Reform Group: KPI Dictionary

KPI	**Second Consultation round completed, with 50% new stakeholder participants from previous round**
Description	Assesses whether outreach efforts were broadened and deeper industry engagement achieved in the second consultation cycle.
Method Of Measurement	Compare participant list of second round with first round to identify new stakeholders. Minimum 50% of attendees must be new (i.e., did not attend first round), with at least 3 new categories of organisations included.
Achievement Trend	- Stakeholder gap analysis conducted in Q1 2026 - Second consultation planned and held by Q2–Q3 2026 - Participation report published by Q4 2026
Justification	Ensures growing stakeholder buy-in and prevents closed-loop policymaking. Expands the legitimacy and representativeness of reform proposals.
Target (Year 2030)	50% or more of second consultation participants must be first-time attendees.
Supporting Document	Updated Attendance Records, Cross-Comparison Matrix, Session Report, Stakeholder Feedback
Frequency Of Data Reported	Once (Q3–Q4 2026), included in Reform Group's annual report and feedback summary.

Formation of Johor RE Market Reform Group: KPI Dictionary

KPI	**Public RE market reform report published and disseminated to state and federal agencies.**
Description	Measures the successful delivery and distribution of a consolidated RE reform report summarising findings, recommendations, and stakeholder inputs to federal and state-level authorities.
Method Of Measurement	Public release of the final report through digital channels and verified email delivery to at least 5 relevant agencies. Report must include baseline findings, benchmarking results, and policy proposals.
Achievement Trend	- Report drafted and validated by Q3 2026 - Official publication and multi-agency distribution by Q4 2026
Justification	Solidifies Johor's policy voice in the national RE dialogue and provides reference material for federal agencies, investors, and developers.
Target (Year 2030)	1 RE market reform report finalised and disseminated to at least 5 government recipients.
Supporting Document	Final Report PDF, Distribution Log, Publication Announcement, Agency Acknowledgements
Frequency Of Data Reported	One-time milestone reported in Q4 2026 and reflected in Reform Group communication outputs.

Activating Johor's AI Engine through Johor Artificial Intelligence Office (JAIO) : Milestone

No	Milestones	Responsibility	Planned start date	Planned end date
1	Stakeholder Engagement and Validation	JAIO, IDO, BPEN-J, NAIO	Jan 2026	Jan 2026
2	Establish JAIO Governance Structure and Secretariat	JAIO, IDO, BPEN-J	Feb 2026	Mar 2026
3	Develop Johor AI Policy Briefs, Foresight Watchlist, and Regulatory Framework	JAIO, IDO, BPEN-J, NAIO, Relevant Sectoral Bodies Or Agencies	Apr 2026	Sep 2026
4	Launch Initial Sectoral Use Case Pilots (e.g. Logistics, Agriculture)	JAIO, IDO, BPEN-J, Selected Pilot Partner	Oct 2026	Mar 2027
5	Implement AI Talent & Capability Programmes with Key Partners	JAIO, IDO, BPEN-J	Apr 2027	Sep 2027
6	Establish AI Governance Dashboard and Stakeholder Forum	JAIO, IDO, BPEN-J	Oct 2027	Mar 2028
7	Publish First Johor AI Readiness Report & Innovation Outlook	JAIO, NAIO	Apr 2028	Jun 2028
8	Expand Use Cases and Integrate Policy Recommendations into State Planning	JAIO, IDO, BPEN-J Relevant Sectoral Agencies or Bodies	Jul 2028	Jun 2029
9	Conduct Independent Review and Chart JAIO Continuation Plan	JAIO, IDO, BPEN-J	Jul 2029	Dec 2029
10	Finalise JAIO Institutionalisation and Cross-Sector Integration	JAIO, IDO, BPEN-J, Johor EXCO	Jan 2030	Dec 2030
			Jan 2026	**Dec 2030**

Activating Johor's AI Engine through Johor Artificial Intelligence Office (JAIO) : Implementation Plan (1/5)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Stakeholder Engagement and Validation**	**JAIO, IDO, BPEN-J, NAIO**	**Jan 2026**	**Jan 2026**
1.1	Stakeholder engagement to validate implementation plans	JAIO, IDO, BPEN-J, NAIO	Jan 2026	Jan 2026
2	**Establish JAIO Governance Structure and Secretariat**	**JAIO, IDO, BPEN-J**	**Feb 2026**	**Mar 2026**
2.1	Draft JAIO organisational structure and governance terms	JAIO, IDO, BPEN-J	Feb 2026	Feb 2026
2.2	Formally appoint Secretariat and define TOR	JAIO, IDO, BPEN-J	Feb 2026	Mar 2026
2.3	Recruit initial team members	JAIO, IDO, BPEN-J	Mar 2026	Mar 2026
3	**Develop Johor AI Policy Briefs, Foresight Watchlist, and Regulatory Framework**	**JAIO, IDO, BPEN-J, NAIO**	**Apr 2026**	**Sep 2026**
3.1	Conduct regulatory scan of AI policies and frameworks	JAIO, IDO, BPEN-J, NAIO	Apr 2026	May 2026
3.2	Draft policy briefs and foresight watchlist	JAIO, IDO, BPEN-J, NAIO	May 2026	Jul 2026
3.3	Review with state agencies for alignment	JAIO, IDO, BPEN-J, NAIO, Relevant Sectoral Bodies Or Agencies	Jul 2026	Sep 2026

Activating Johor's AI Engine through Johor Artificial Intelligence Office (JAIO) : Implementation Plan (2/5)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
4	**Launch Initial Sectoral Use Case Pilots (e.g. Logistics, Agriculture)**	**JAIO, IDO, BPEN-J**	**Oct 2026**	**Mar 2027**
4.1	Identify pilot sectors and form working groups	JAIO, IDO, BPEN-J	Oct 2026	Nov 2026
4.2	Co-design pilot scope with industry partners	Selected Pilot Partner	Nov 2026	Jan 2027
4.3	Execute pilot implementation and monitoring	JAIO, IDO, BPEN-J	Jan 2027	Mar 2027
5	**Implement AI Talent & Capability Programmes with Key Partners**	**JAIO, IDO, BPEN-J**	**Apr 2027**	**Sep 2027**
5.1	Coordinate with partners to design training modules	JAIO, IDO, BPEN-J	Apr 2027	May 2027
5.2	Launch training programmes and AI bootcamps	JAIO, IDO, BPEN-J	May 2027	Jul 2027
5.3	Evaluate learning outcomes and refine curriculum	JAIO, IDO, BPEN-J	Jul 2027	Sep 2027

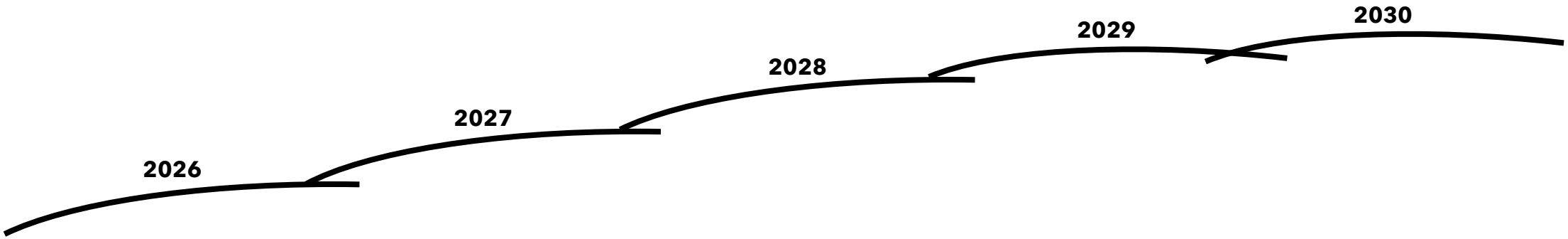
Activating Johor's AI Engine through Johor Artificial Intelligence Office (JAIO) : Implementation Plan (3/5)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
6	**Establish AI Governance Dashboard and Stakeholder Forum**	**JAIO, IDO, BPEN-J**	**Oct 2027**	**Mar 2028**
6.1	Design dashboard architecture and KPIs	JAIO, IDO, BPEN-J	Oct 2027	Nov 2027
6.2	Develop platform for real-time stakeholder input	JAIO, IDO, BPEN-J	Nov 2027	Jan 2028
6.3	Conduct trial use with selected agencies	JAIO, IDO, BPEN-J	Jan 2028	Mar 2028
7	**Publish First Johor AI Readiness Report & Innovation Outlook**	**JAIO, IDO, BPEN-J**	**Apr 2028**	**Jun 2028**
7.1	Compile use case performance and feedback	JAIO, IDO, BPEN-J	Apr 2028	Apr 2028
7.2	Draft readiness report and innovation outlook	JAIO, IDO, BPEN-J	May 2028	May 2028
7.3	Publish report and disseminate through forum	JAIO, IDO, BPEN-J	Jun 2028	Jun 2028

Activating Johor's AI Engine through Johor Artificial Intelligence Office (JAIO) : Implementation Plan (4/5)

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
8	**Expand Use Cases and Integrate Policy Recommendations into State Planning**	**JAIO, IDO, BPEN-J**	**Jul 2028**	**Jul 2029**
8.1	Identify new sectoral use cases with industry	JAIO, IDO, BPEN-J	Jul 2028	Oct 2028
8.2	Refine and integrate policy briefs into state plans	JAIO, IDO, BPEN-J	Oct 2028	Feb 2029
8.3	Align proposals with sector blueprints	Relevant sector agencies and bodies	Feb 2029	Jul 2029
9	**Conduct Independent Review and Chart JAIO Continuation Plan**	**IDO, BPEN-J**	**Jul 2029**	**Dec 2029**
9.1	Commission third-party review on JAIO performance	IDO, BPEN-J	Jul 2029	Aug 2029
9.2	Conduct consultations to assess continuation options	IDO, BPEN-J	Aug 2029	Oct 2029
9.3	Draft continuation and scaling roadmap	IDO, BPEN-J	Oct 2029	Dec 2029
10	**Finalise JAIO Institutionalisation and Cross-Sector Integration**	**Johor EXCO, BPEN-J, JAIO, IDO**	**Jan 2030**	**Dec 2030**
10.1	Convene institutionalisation planning group	JAIO	Jan 2030	May 2030
10.2	Draft and endorse final integration framework	Johor EXCO	May 2030	Aug 2030
10.3	Embed JAIO roles into state digital and industrial strategies	Johor EXCO, BPEN-J, JAIO, IDO	Aug 2030	Dec 2030

Activating Johor's AI Engine through Johor Artificial Intelligence Office (JAIO): KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• JAIO Secretariat established • AI Policy briefs & foresight watchlist drafted • Sectoral pilot use cases launched • Pilot working groups formed	• AI bootcamps and training programmes launched • Governance dashboard architecture completed • Stakeholder dashboard pilot activated	• Johor AI Readiness Report published • Innovation Outlook disseminated • New AI use cases proposed to state agencies	• Independent third-party review of JAIO completed • JAIO continuation roadmap drafted and validated	• JAIO roles embedded in state strategy • Cross-sector institutionalisation finalised • Integration framework endorsed
Achieved Milestones	• Stakeholder engagement validated • Secretariat staffed and operational • Regulatory scan completed • 3 sectoral pilots scoped	• AI talent programmes executed with partners (PETRONAS LC, Microsoft, etc) • Stakeholder dashboard launched and piloted	• AI policy recommendations integrated into 3 sector blueprints • Innovation report presented in forum	• Roadmap for 2031–2035 developed • Policy options from review incorporated into draft state proposals	• JAIO institutionalised with endorsed EXCO mandate • Digital & industrial strategies updated with JAIO provisions

Activating Johor's AI Engine through Johor Artificial Intelligence Office (JAIO): KPI Dictionary

KPI	**Number of Key Milestones Achieved in Establishing and Operationalising the Johor Artificial Intelligence Office (JAIO)**
Description	Measures JAIO's progress from formation to integration into state policy and innovation ecosystems, based on completion of defined functional, structural, and engagement milestones.
Method Of Measurement	Cumulative count of completed milestones across JAIO's lifecycle: (i) Secretariat establishment, (ii) AI policy briefs and foresight watchlist developed, (iii) use case pilots launched, (iv) talent programmes executed, (v) dashboard and governance activated, (vi) state integration formalised.
Achievement Trend	• Secretariat and pilots launched by Q4 2026 • Governance dashboard piloted by Q3 2027 • AI Readiness Report & Innovation Outlook published by Q2 2028 • Continuation roadmap validated by Q4 2029 • Institutionalisation endorsed by Q4 2030
Justification	Demonstrates the effectiveness and sustainability of JAIO as a policy innovation office and regulatory catalyst. Captures progress on use cases, talent development, policy coordination, and long-term integration.
Target (Year 2030)	**All strategic milestones achieved, including full institutionalisation of JAIO with embedded policy, talent, and foresight functions.**
Supporting Document	Cabinet/executive endorsements, Secretariat TOR, policy briefs, pilot reports, training logs, stakeholder forum minutes, readiness & innovation reports, EXCO integration memos
Frequency Of Data Reported	Biannual updates to BPEN-J, with milestone audits aligned to implementation phases. Final assessment and milestone closure by Q4 2030.

Private Investment Catalyst.

Disclaimer Notes

The detailed implementation plan and Key Performance Indicators (KPIs) outlined in this report were developed for the purpose of the study, drawing largely—but not entirely—from inputs and advice provided by the respective stakeholders.

For initiatives or components where direct stakeholder input was not available due to various limitations, PEMANDU has taken the liberty to draft the milestones, action plans, and KPIs based on known best practices and reference processes available at the time of writing of this study. These milestones, action plans, and KPIs are therefore indicative and intended to provide direction, but do not constitute a finalised monitoring and evaluation framework.

PEMANDU recommends that, upon commencement of implementation, these components be revisited, validated, and finalised by the relevant authorities and stakeholders to ensure accuracy, ownership, and alignment before being formally adopted for monitoring and evaluation.

Strategic Industrial Land Consolidation & Release Programme: Milestones

No	Milestones and Key Activities	Responsibility	Planned start date	Planned end date
1	Establish SAF governance & steering committee	JCorp	Jan 2026	Mar 2026
2	Seed Strategic Acquisition Fund (SAF) with federal & state capital	JCorp / MoF	Mar 2026	Jun 2026
3	Map & shortlist under-used parcels (≥ 50 ha) and owners	PTG Johor	Jun 2026	Jul 2026
4	Conduct valuation & due-diligence on shortlisted parcels	JCorp	Jul 2026	Sep 2026
5	Negotiate acquisition & vesting terms with landowners	JCorp / Landowners	Oct 2026	Dec 2026
6	Finalise acquisitions, vest titles in JPDC and embed green covenants	JCorp / PTG Johor	Dec 2026	Mar 2027
7	Define fixed lease/sale schedules & value-recycle mechanism	JCorp / SAF Steering Committee	Apr 2027	Jul 2027
8	Service & Release “Plug-and-Play” Parcels	JCorp	Jul 2027	Oct 2027
9	Deliver key infrastructure upgrades (jetty, roads) and illustrative utilities	JCorp / TNB & SAJ	Oct 2027	May 2028
10	Build & launch GIS portal with parcel data, price caps & SFT-60 workflow	JCorp	May 2028	Nov 2028
11	Plug-and-play parcel release, ongoing monitoring & value-sharing	JCorp / SAF Fund Manager / Landowners	Nov 2028	Dec 2030
			Jan 2026	**Dec 2030**

Strategic Industrial Land Consolidation & Release Programme: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Establish SAF governance & steering committee**	**JCorp**	**Jan 2026**	**Mar 2026**
1.1	Draft TOR, governance framework and membership criteria	JCorp	Jan 2026	Jan 2026
1.2	Convene inaugural steering-committee kickoff meeting	JCorp	Feb 2026	Mar 2026
1.3	Finalise and approve governance charter	JCorp	Feb 2026	Mar 2026
2	**Seed Strategic Acquisition Fund (SAF)**	**JCorp / MoF**	**Mar 2026**	**Jun 2026**
2.1	Develop fund structure, capital call and subscription documents	JCorp / MoF	Mar 2026	Apr 2026
2.2	Secure federal and state commitment letters and capital injections	JCorp / MoF	May 2026	Jun 2026
3	**Map & shortlist under-used parcels (≥ 50 ha)**	**PTG Johor**	**Jun 2026**	**Jul 2026**
3.1	Compile GIS data and land-owner registry for PIPC parcels	PTG Johor	Jun 2026	Jun 2026
3.2	Validate parcel sizes, usage status and ownership with land registry	PTG Johor	Jul 2026	Jul 2026

Strategic Industrial Land Consolidation & Release Programme: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
4	**Conduct valuation & due-diligence on shortlisted parcels**	**JCorp**	**Jul 2026**	**Sep 2026**
4.1	Draft incorporation docs & shareholder agreements	JCorp	Jul 2026	Jul 2026
4.2	Conduct technical, environmental and title due-diligence	Valuation Consultant	Aug 2026	Sep 2026
5	**Negotiate acquisition & vesting terms**	**JCorp / Landowners**	**Oct 2026**	**Dec 2026**
5.1	Prepare negotiation brief and value benchmarks	JCorp	Oct 2026	Oct 2026
5.2	Hold negotiation sessions with landowners and advisors	JCorp / Landowners	Nov 2026	Dec 2026
6	**Finalise acquisitions, vest titles & embed covenants**	**JCorp**	**Dec 2026**	**Mar 2027**
6.1	Draft and execute sale/lease agreements	JCorp	Dec 2026	Jan 2027
6.2	Register parcel vesting in JPDC name and file green-covenant instruments	JCorp	Feb 2027	Mar 2027

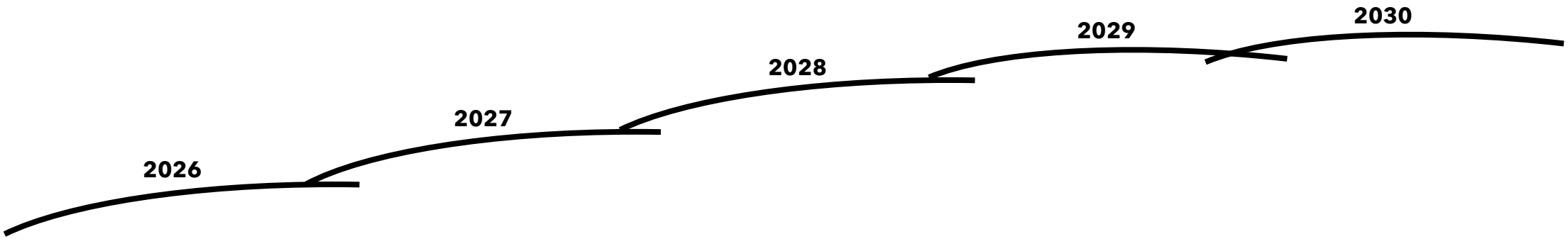
Strategic Industrial Land Consolidation & Release Programme: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
7	**Define fixed lease/sale schedules & value-recycle mechanism**	**JCorp / SAF Steering Committee**	**Apr 2027**	**Jul 2027**
7.1	Model lease/sale pricing curves and recycling thresholds	PTG Johor / JPDC	Apr 2027	May 2026
7.2	Approve recycling mechanism and schedule in steering committee	PTG Johor	Jun 2027	Jul 2027
8	**Service & Release "Plug-and-Play" Parcels**	**JCorp / PETRONAS**	**Jul 2027**	**Oct 2027**
8.1	Install internal roads, drainage, power & fibre within the consolidated 50-ha pilot block	JCorp / PETRONAS	Jul 2027	Aug 2027
8.2	Upload parcel map and capped exit price to the GIS portal	JCorp / PETRONAS	Sep 2027	Oct 2027
9	**Deliver key infrastructure & utilities upgrades**	**JCorp / TNB & SAJ**	**Oct 2027**	**May 2028**
9.1	Commission feasibility studies for jetty, roads and utilities	JCorp / TNB & SAJ	Oct 2027	Nov 2027
9.2	Complete design and contractor tender process	JCorp	Nov 2027	Dec 2027
9.3	Oversee construction of jetty and utility backbone	JCorp / TNB & SAJ	Dec 2027	May 2028

Strategic Industrial Land Consolidation & Release Programme: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
10	**Build & launch GIS portal with parcel data & SFT-60 workflow**	**JCorp**	**May 2028**	**Nov 2028**
10.1	Define data schema, user requirements and approval workflow	JCorp	May 2028	Jun 2028
10.2	Develop & test portal interface and approval integration	JCorp	Jul 2028	Jul 2028
10.3	Launch portal, train users and publish parcel data & workflow guides	JCorp	Aug 2028	Nov 2028
11	**Plug-and-play release, ongoing monitoring & value-sharing**	**JCorp / SAF Fund Manager**	**Nov 2028**	**Dec 2030**
11.1	Release first batch of parcels via portal and facilitate investor onboarding	JCorp / SAF Fund Manager	Nov 2028	Feb 2029
11.2	Monitor uptake, collect value-uplift proceeds and distribute to landowners/SAF	JCorp / SAF Fund Manager	Feb 2029	Dec 2030
11.3	Publish biannual performance report and adjust schedules based on market feedback	JCorp	Feb 2029	Dec 2030

Strategic Industrial Land Consolidation & Release Programme: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• No. of parcels consolidated: 2 • Total area consolidated: 100 ha • Infra upgrades complete: 0% • Avg. SFT-60 approval time: N/A	• No. of parcels consolidated: 5 • Total area consolidated: 250 ha • Infra upgrades complete: 50% • Avg. SFT-60 approval time: 60 days	• No. of parcels consolidated: 5 • Total area consolidated: 250 ha • Infra upgrades complete: 100% • Avg. SFT-60 approval time: 45 days	• No. of parcels consolidated: 5 • Total area consolidated: 250 ha • Infra upgrades complete: 100% • Avg. SFT-60 approval time: 30 days	• No. of parcels consolidated: 5 • Total area consolidated: 250 ha • Infra upgrades complete: 100% • Avg. SFT-60 approval time: 30 days
Achieved Milestones	• SAF governance charter approved • SAF capital fully seeded	• All target acquisitions completed	• Jetty, roads & utilities upgrades delivered • GIS portal launched	• First batch of plug-and-play parcels released • Investor onboarding via portal	• Ongoing parcel release & value-sharing • Biannual performance reporting ongoing

Strategic Industrial Land Consolidation & Release Programme: KPI Dictionary

KPI	No. of parcels consolidated
Description	Count of individual land parcels ≥ 50 ha successfully acquired and vested under IRDA's ownership.
Method Of Measurement	Tally of vested titles in IRDA registry.
Achievement Trend	Steady annual increase from 2 (2026) to 5 (2027 onward)
Justification	Direct indicator of scale-up in land consolidation to unlock large-plot investments.
Target (Year 2030)	5 parcels
Supporting Document	Title deeds; IRDA land registry
Frequency Of Data Reported	Annual

Strategic Industrial Land Consolidation & Release Programme: KPI Dictionary

KPI	Total area consolidated (hectares)
Description	Sum area (in ha) of all parcels consolidated.
Method Of Measurement	GIS measurement of parcel boundaries; IRDA GIS portal logs.
Achievement Trend	Climbs to 250 ha by 2027 and held constant thereafter
Justification	Reflects total land mass made available for downstream investors.
Target (Year 2030)	250 ha
Supporting Document	GIS portal export; land due-diligence report
Frequency Of Data Reported	Annual

Strategic Industrial Land Consolidation & Release Programme: KPI Dictionary

KPI	Feedstock MoUs signed
Description	Number of signed memoranda of understanding for “over-the-fence” feedstock supply with PETRONAS.
Method Of Measurement	Count of valid, executed MoU documents.
Achievement Trend	From zero (2026) to 5 by 2029–2030
Justification	Ensures feedstock proximity, lowering logistics costs and improving project bankability.
Target (Year 2030)	5 MoUs
Supporting Document	Signed MoU PDFs; IRDA legal archive
Frequency Of Data Reported	Annual

Strategic Industrial Land Consolidation & Release Programme: KPI Dictionary

KPI	Infrastructure upgrades completion (%)
Description	Percentage completion of critical infrastructure works (jetty, roads, utilities) against scope.
Method Of Measurement	Engineering progress reports vs. baseline scope-of-work; contractor certifications.
Achievement Trend	Rises from 0 % to 100 % by end-2028
Justification	Tracks delivery of physical enablers required for plug-and-play readiness.
Target (Year 2030)	100 %
Supporting Document	Progress reports; TNB/SAJ acceptance certificates
Frequency Of Data Reported	Semi-annual

Strategic Industrial Land Consolidation & Release Programme: KPI Dictionary

KPI	Avg. SFT-60 approval time (days)
Description	Mean duration from submission to issuance of SFT-60 parcel-release approvals by IRDA.
Method Of Measurement	Portal workflow timestamps (submission → sign-off).
Achievement Trend	Decreases from 60 days (2027) to 30 days (2029 onward)
Justification	Measures efficiency gains in land-release process, enhancing investor experience.
Target (Year 2030)	≤ 30 days
Supporting Document	GIS portal logs; approval certificates
Frequency Of Data Reported	Quarterly

Establishing Mersing as part of Special Tourism Investment Zone (STIZ): Milestones

No	Milestones and Key Activities	Responsibility	Planned start date	Planned end date
1	Form STIZ Steering Committee (Johor Tourism Exco, MOTAC Johor liaison, BPENJ, Invest Johor) and approve governance charter	Johor Tourism Exco	Jan 2026	Jan 2026
2	Draft initial STIZ proposal document: include Mersing's tourism assets inventory, target zones, and incentive summary	BPENJ	Feb 2026	Mar 2026
3	Compile baseline tourism data (visitor counts, infrastructure gaps, poverty indicators) and finalize socioeconomic impact section	Tourism Johor	Mar 2026	Apr 2026
4	Convene federal-state engagement sessions: present draft proposal to MOTAC Johor, MOF, and Customs; gather feedback	MOTAC Johor	May 2026	Jul 2026
5	Incorporate stakeholder feedback and secure state-level endorsement (BPENJ sign-off)	BPENJ	Jul 2026	Aug 2026
6	Finalize and submit complete STIZ application to Ministry of Finance and Royal Malaysian Customs	MOTAC Johor	Aug 2026	Sep 2026
7	Track federal approval process; address any MOF/Customs queries or requests for additional documentation	Ministry of Finance	Sep 2026	Oct 2026
8	Receive formal STIZ designation; publish official Gazette notice and map with defined STIZ boundaries	Ministry of Finance	Oct 2026	Nov 2026
9	Develop detailed STIZ incentive framework: finalize tax-incentive rates, preferential-loan guidelines, and infrastructure support packages (roads, utilities, etc.)	BPENJ	Nov 2026	Jan 2026
10	Integrate STIZ information into Tourism Johor's portal (GIS boundary, incentive summary, application guidelines)	Tourism Johor	Jan 2027	Apr 2027
11	Launch domestic and international investor roadshows (briefings, site visits, promotional materials)	Johor Tourism Exco	Apr 2027	Jun 2027
12	Monitor initial investor engagement: track inquiries, applications, site-booking metrics, and publish quarterly progress report	Johor Tourism Exco	Jul 2027	Dec 2029
			Jan 2026	**Dec 2029**

Establishing Mersing as part of Special Tourism Investment Zone (STIZ): Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Form STIZ Steering Committee and develop governance charter**	**Johor Tourism Exco**	**Jan 2026**	**Jan 2026**
1.1	Identify and nominate members to form the Steering Committee and establishment of Working Group	Johor Tourism Exco	Jan 2026	Jan2026
1.2	Draft Terms of Reference and governance roles for the committee	Johor Tourism Exco	Jan 2026	Jan 2026
1.3	Schedule and conduct inaugural meeting to validate scope and workstreams	Johor Tourism Exco	Jan 2026	Jan 2026
2	**Draft initial STIZ proposal document**	**BPENJ**	**Feb 2026**	**Mar 2026**
2.1	Develop inventory of tourism assets (natural, cultural, investment-ready sites)	BPENJ & Working Group	Feb 2026	Mar 2026
2.2	Define STIZ objectives, investment target sectors, and geographical scope	BPENJ & Working Group	Feb 2026	Mar 2026
2.3	Compile all elements into a structured proposal draft (incl. annexes and maps)	BPENJ & Working Group	Mar 2026	Mar 2026
3	**Compile baseline tourism and socioeconomic data**	**Tourism Johor**	**Mar 2026**	**Apr 2026**
3.1	Collect tourism baseline data: visitor numbers, lodging capacity, site footfall	Tourism Johor	Mar 2026	Apr 2026
3.2	Map existing infrastructure (roads, water, utilities) and access constraints	Tourism Johor	Mar 2026	Apr 2026

Establishing Mersing as part of Special Tourism Investment Zone (STIZ): Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
3.3	Gather socioeconomic indicators (e.g. poverty rate, employment sectors)	Tourism Johor	Mar 2026	Apr 2026
3.4	Conduct impact assessment to identify STIZ potential on local communities	Tourism Johor	Mar 2026	Apr 2026
4	**Present draft STIZ proposal for state-level review and secure state-level endorsement**	**Johor Tourism Exco**	**May 2026**	**Jul 2026**
4.1	Submit draft STIZ proposal for internal circulation and technical vetting	Johor Tourism Exco	May 2026	May 2026
4.2	Organize inter-agency working session (BPENJ, Invest Johor, Tourism Johor, land/state planning units) to review proposal content	Johor Tourism Exco	May 2026	Jun 2026
4.3	Validate proposal components against state strategic plans (e.g., Rancangan Struktur Negeri Johor, Invest Johor promotion priorities)	Johor Tourism Exco	May 2026	Jun 2026
4.4	Address initial queries or gaps identified by state stakeholders	Johor Tourism Exco	Jun 2026	Jul 2026
4.5	Obtain internal clearance to proceed with federal consultation and engagement	Johor Tourism Exco	Jun 2026	Jul 2026

Establishing Mersing as part of Special Tourism Investment Zone (STIZ): Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
5	**Convene federal-state engagement sessions**	**MOTAC Johor**	**Jul 2026**	**Aug 2026**
5.1	Coordinate meeting with MOTAC, MOF, and Customs at federal level	Working Group	Jul 2026	Aug 2026
5.2	Prepare STIZ proposal briefing deck and supporting materials	Working Group	Jul 2026	Aug 2026
5.3	Present draft STIZ to federal stakeholders for initial review	Working Group	Jul 2026	Aug 2026
5.4	Capture feedback and agree on areas requiring refinement or clarification	Working Group	Aug 2026	Aug 2026
6	**Finalise and submit complete STIZ application to MOF and Royal Customs**	**MOTAC Johor**	**Aug 2026**	**Sep 2026**
6.1	Review and revise proposal based on federal feedback	MOTAC Johor & Working Group	Aug 2026	Sep 2026
6.2	Conduct working sessions with BPENJ to ensure alignment with state plans	MOTAC Johor & Working Group	Aug 2026	Sep 2026
6.3	Secure BPENJ sign-off and formal letter of endorsement	MOTAC Johor & Working Group	Aug 2026	Sep 2026
6.4	Compile all required documentation (proposal, maps, legal references, BPENJ letter)	MOTAC Johor & Working Group	Sep 2026	Sep 2026
6.5	Submit official STIZ application to Ministry of Finance and Customs	MOTAC Johor & Working Group	Sep 2026	Sep 2026

Establishing Mersing as part of Special Tourism Investment Zone (STIZ): Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
7	**Facilitate and track federal-level review of STIZ application**	**Ministry of Finance**	**Sep 2026**	**Oct 2026**
7.1	Appoint focal team to coordinate with MOF and Royal Customs during the review process	Working Group	Sep 2026	Oct 2026
7.2	Monitor and respond to federal agencies' queries or requests for clarification	Working Group	Sep 2026	Oct 2026
8	**Secure official designation and gazettement of STIZ boundaries**	**Ministry of Finance**	**Oct 2026**	**Nov 2026**
8.1	Respond to follow-up queries or clarification requests from federal agencies	Working Group	Oct 2026	Nov 2026
8.2	Receive formal approval and designation letter	Working Group	Oct 2026	Nov 2026
9	**Roll out STIZ investment incentives and infrastructure support**	**BPENJ**	**Nov 2026**	**Jan 2027**
9.1	Develop detailed STIZ incentive framework	Working Group	Nov 2026	Nov 2026
9.2	Define eligibility criteria and guidelines for application process for incentives	Working Group	Nov 2026	Nov 2026
9.3	Finalize tax-incentive rates and infrastructure support packages (roads, utilities, etc)	Working Group	Dec 2026	Dec 2026
9.4	Coordinate with state public works departments on infrastructure readiness plans	Working Group	Dec 2026	Jan 2027

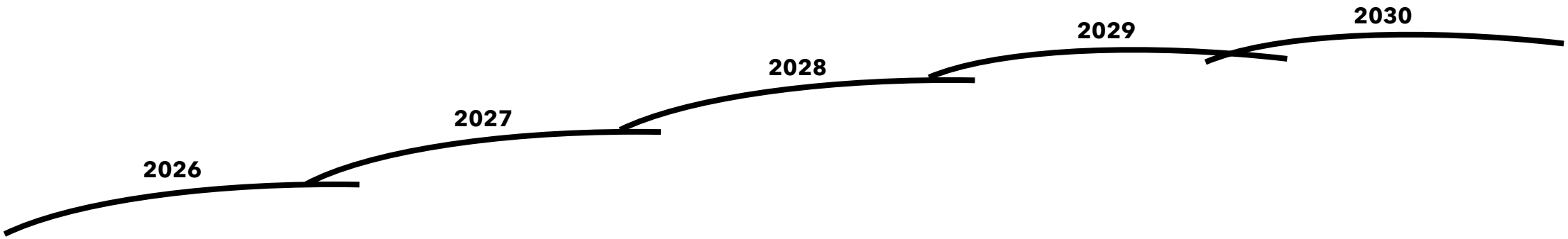
Establishing Mersing as part of Special Tourism Investment Zone (STIZ): Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
10	**Launch STIZ Investor & Outreach Campaigns**	**Tourism Johor**	**Jan 2027**	**Apr 2027**
10.1	Integrate STIZ information into Tourism Johor's portal	Working Group	Jan 2027	Jan 2027
10.2	Identify key domestic and international investor targets	Working Group	Jan 2027	Jan 2027
10.3	Launch domestic and international investor roadshows (briefings, site visits, promotional materials)	Working Group	Feb 2027	Apr 2027
11	**Operationalise STIZ monitoring and evaluation (M&E) system**	**Johor Tourism Exco**	**Apr 2027**	**Jun 2027**
11.1	Launch live dashboard for internal and selected external access	Working Group	Apr 2027	Apr 2027
11.2	Monitor and track campaign results, expressions of interest, applications and investor queries	Working Group	Apr 2027	Jun 2027
11.3	Review reporting data (progress, challenges and bottlenecks)	Working Group	Apr 2027	Jun 2027
11.4	Develop and publish quarterly progress reports	Working Group	Jun 2027	Jun 2027

Establishing Mersing as part of Special Tourism Investment Zone (STIZ): Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
12	**Track Mersing STIZ outcomes and institutionalise learnings to inform future cluster development**	**Johor Tourism Exco**	**Jul 2027**	**Dec 2029**
12.1	Monitor core outcome metrics from Mersing STIZ (e.g. investor applications, project approvals)	Johor Tourism Exco	Jul 2027	Dec 2029
12.2	Conduct annual reviews of Mersing STIZ implementation	Johor Tourism Exco	Jul 2027	Dec 2029
12.3	Share findings with Johor State Unit for future consideration in future developments plans	Johor Tourism Exco	Jul 2027	Dec 2029
12.4	Produce internal evaluation reports with recommendations for policy, process, and facilitation improvements	Johor Tourism Exco	Jul 2027	Dec 2029
12.5	Maintain a watchlist of potential future clusters (Desaru, Endau-Rompin) for re-evaluation post-2030	Johor Tourism Exco	Jul 2027	Dec 2029

Establishing Mersing as part of Special Tourism Investment Zone (STIZ): KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• No of STIZ Investors application received: 10 • No of incentive applications approved: **N/A** • Cumulative private investment committed (RM mil) : **N/A** • % of incentive budget utilised: **N/A**	• No of STIZ Investors application received: **20** • No of incentive applications approved: **10** • Cumulative private investment committed (RM mil) : **N/A** • % of incentive budget utilised: **N/A**	• No of STIZ Investors application received: **30** • No of incentive applications approved: **15** • Cumulative private investment committed (RM mil) : **50** • % of incentive budget utilised: **25%**	• No of STIZ Investors application received: **40** • No of incentive applications approved **30** • Cumulative private investment committed (RM mil) : **150** • % of incentive budget utilised: **35%**	• No of STIZ Investors application received: **50** • No of incentive applications approved: **45** • Cumulative private investment committed (RM mil) : **250** • % of incentive budget utilised: **50%**
Achieved Milestones	• STIZ officially gazetted • Incentive framework finalised • Infrastructure readiness plans initiated	• Investor applications processed • Initial infrastructure packages rolled out • Investor roadshows conducted (local + regional)	• Mid-term STIZ review completed • Dashboard and M&E system fully operational • Revisions made to incentive facilitation SOPs	• Pipeline of 15+ projects facilitated • Incentive and infra SOPs streamlined • Quarterly reporting standardized	• Impact report on STIZ published • Replication-readiness toolkit developed • Framework institutionalised under Johor Tourism Exco

Establishing Mersing as part of Special Tourism Investment Zone (STIZ): KPI Dictionary

KPI	No of STIZ Investors application received
Description	Tracks total number of investor applications received for STIZ designation, indicating the level of market interest and responsiveness to the zone offering.
Method Of Measurement	Count of formal STIZ applications submitted to Johor Tourism Exco and/or Invest Johor based on application log.
Achievement Trend	N/A
Justification	Provides visibility on interest generated by the STIZ scheme, helps benchmark outreach effectiveness and investor appetite.
Target (Year 2029)	N/A
Supporting Document	STIZ investor registry maintained by Johor Tourism Exco and Invest Johor
Frequency Of Data Reported	Quarterly with annual consolidation

Establishing Mersing as part of Special Tourism Investment Zone (STIZ): KPI Dictionary

KPI	Number of Incentive Applications Approved
Description	Tracks number of investor applications approved for incentives under STIZ, reflecting successful facilitation and policy attractiveness.
Method Of Measurement	Review of approved applications against STIZ incentive criteria, validated through inter-agency evaluation and tracking system.
Achievement Trend	N/A
Justification	Demonstrates how effectively investor interest is being converted into active projects, flagging potential gaps in facilitation or policy.
Target (Year 2029)	N/A
Supporting Document	Approval records from incentive evaluation committee
Frequency Of Data Reported	Quarterly with annual consolidation

Establishing Mersing as part of Special Tourism Investment Zone (STIZ): KPI Dictionary

KPI	Cumulative private investment committed (RM mil)
Description	Total value of private investments formally committed by approved STIZ investors, demonstrating capital inflow into the tourism zone.
Method Of Measurement	Aggregation of declared investment values from signed investor agreements and validated business plans submitted by investors.
Achievement Trend	N/A
Justification	Indicates confidence in the zone's viability, directly impacting employment creation, infrastructure co-investment and economic uplift.
Target (Year 2029)	N/A
Supporting Document	Investor agreement documentation and audited investment declarations
Frequency Of Data Reported	Quarterly with annual consolidation

Establishing Mersing as part of Special Tourism Investment Zone (STIZ): KPI Dictionary

KPI	% of incentive budget utilised
Description	Percentage of allocated STIZ incentive budget utilised by approved projects, indicating the efficiency of budget deployment.
Method Of Measurement	Finance reports on STIZ incentive allocation vs disbursement, reviewed quarterly by implementing and monitoring agencies.
Achievement Trend	N/A
Justification	Ensures transparency and accountability in public fund use, and provides early warning signals on underperformance or inefficiencies.
Target (Year 2029)	N/A
Supporting Document	Quarterly financial statements on STIZ incentive fund utilisation
Frequency Of Data Reported	Quarterly with annual consolidation

Establishing Mersing as a Free Commercial Zone (FCZ): Milestones

No	Milestones and Key Activities	Responsibility	Planned start date	Planned end date
1	Initiative kick-off & stakeholder alignment	Johor Tourism Exco	Jan 2026	Feb 2026
2	Draft FCZ proposal: map Mersing's harbour + key islands, inventory tourism assets	BPENJ	Feb 2026	Mar 2026
3	Compile baseline metrics and quantify economic impact	Tourism Johor	Apr 2026	Jun 2026
4	Present draft FCZ proposal for state-level review and secure state-level endorsement	BPENJ, Johor Tourism Exco	Jun 2026	Aug 2026
5	Convene federal-state engagement sessions	MOTAC Johor	Aug 2026	Sep 2026
6	Finalise and submit complete FCZ application to MOF and Customs	MOTAC Johor	Sep 2026	Nov 2026
7	Facilitate and track federal-level review of STIZ application	Ministry of Finance	Nov 2026	Dec 2026
8	Secure official designation and gazettement of FCZ boundaries	Royal Malaysian Customs	Jan 2027	Jan 2027
9	Develop detailed FCZ incentive framework	BPENJ	Jan 2027	Mar 2027
10	Integrate FCZ content into Tourism Johor's investor portal	Tourism Johor	Mar 2027	Apr 2027
11	Prepare and conduct investor roadshows/site briefings	Johor Tourism Exco	Apr 2027	Jul 2027
12	Monitor initial FCZ uptake and publish first quarterly report	Johor Tourism Exco	Jul 2027	Nov 2027
			Jan 2026	**Nov 2027**

Establishing Mersing as a Free Commercial Zone (FCZ) : Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Initiative kick-off & stakeholder alignment**	**Johor Tourism Exco**	**Jan 2026**	**Feb 2026**
1.1	Initial project brief with lead agencies and stakeholders	Johor Tourism Exco	Jan 2026	Feb 2026
1.2	Establishment of FCZ Steering Committee and working group with clear governance structure	Johor Tourism Exco	Jan 2026	Feb 2026
1.3	Define terms of reference, scope, rational and FCZ objectives	Johor Tourism Exco	Jan 2026	Feb 2026
2	**Draft FCZ proposal: map Mersing's harbour + key islands, inventory tourism assets**	**BPENJ**	**Feb 2026**	**Mar 2026**
2.1	Develop draft proposal document structure, set timelines and responsibilities	Working Group	Feb 2026	Feb 2026
2.2	Prepare and document commercial and tourism asset inventory, sites, facilities and land availability	Working Group	Feb 2026	Mar 2026
2.3	Define intended investor segments and expected outcome	Working Group	Feb 2026	Mar 2026
3	**Compile baseline metrics and quantify economic impact**	**Tourism Johor**	**Apr 2026**	**Jun 2026**
3.1	Gather baseline data for commercial and tourism activity (visitor arrivals, port activity, infrastructure gaps)	Working Group	Apr 2026	Jun 2026
3.2	Collect data on poverty and employment	Working Group	Apr 2026	Jun 2026
3.3	Conduct FCZ economic potential assessment	Working Group	Apr 2026	Jun 2026
3.4	Benchmark with other tourism-linked commercial zones (domestic or ASEAN)	Working Group	Apr 2026	Jun 2026

Establishing Mersing as a Free Commercial Zone (FCZ) : Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
4	**Present draft FCZ proposal for state-level review and secure state-level endorsement**	**BPENJ, Johor Tourism Exco**	**Jun 2026**	**Aug 2026**
4.1	Submit draft FCZ proposal for internal circulation and technical vetting	Working Group	Jun 2026	Jun 2026
4.2	Organize inter-agency working session (BPENJ, Invest Johor, Tourism Johor, land/state planning units) to review proposal content	Working Group	Jun 2026	Jul 2026
4.3	Validate proposal components against state strategic plans	Working Group	Jul 2026	Aug 2026
4.4	Address initial queries or gaps identified by state stakeholders	Working Group	Jul 2026	Aug 2026
4.5	Obtain internal clearance to proceed with federal consultation and engagement	Working Group	Jul 2026	Aug 2026
5	**Convene federal-state engagement sessions**	**MOTAC Johor**	**Aug 2026**	**Sep 2026**
5.1	Coordinate meeting with MOTAC, MOF, and Customs at federal level	Working Group	Aug 2026	Aug 2026
5.2	Prepare FCZ proposal briefing deck and supporting materials	Working Group	Aug 2026	Aug 2026
5.3	Present draft FCZ to federal stakeholders for initial review	Working Group	Sep 2026	Sep 2026
5.4	Capture feedback and agree on areas requiring refinement or clarification	Working Group	Sep 2026	Sep 2026

Establishing Mersing as a Free Commercial Zone (FCZ) : Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
6	**Finalise and submit complete FCZ application to MOF and Customs**	**MOTAC Johor**	**Sep 2026**	**Nov 2026**
6.1	Review and revise proposal based on federal feedback	MOTAC Johor & Working Group	Sep 2026	Sep 2026
6.2	Conduct working sessions with BPENJ to ensure alignment with state plans	MOTAC Johor & Working Group	Sep 2026	Oct 2026
6.3	Secure BPENJ sign-off and formal letter of endorsement	MOTAC Johor & Working Group	Nov 2026	Nov 2026
6.4	Compile all required documentation (proposal, maps, legal references, BPENJ letter)	MOTAC Johor & Working Group	Nov 2026	Nov 2026
6.5	Submit official FCZ application to Ministry of Finance and Customs	MOTAC Johor & Working Group	Nov 2026	Nov 2026
7	**Facilitate and track federal-level review of STIZ application**	**Ministry of Finance**	**Nov 2026**	**Dec 2026**
7.1	Appoint focal team to coordinate with MOF and Royal Customs during the review process	Working Group	Nov 2026	Nov 2026
7.2	Monitor and respond to federal agencies' queries or requests for clarification	Working Group	Oct 2026	Dec 2026
8	**Secure official designation and gazettement of FCZ boundaries**	**Royal Malaysian Customs**	**Jan 2027**	**Jan 2027**
8.1	Respond to follow-up queries or clarification requests from federal agencies	Working Group	Jan 2027	Jan 2027
8.2	Receive formal approval and designation letter	Working Group	Jan 2027	Jan 2027

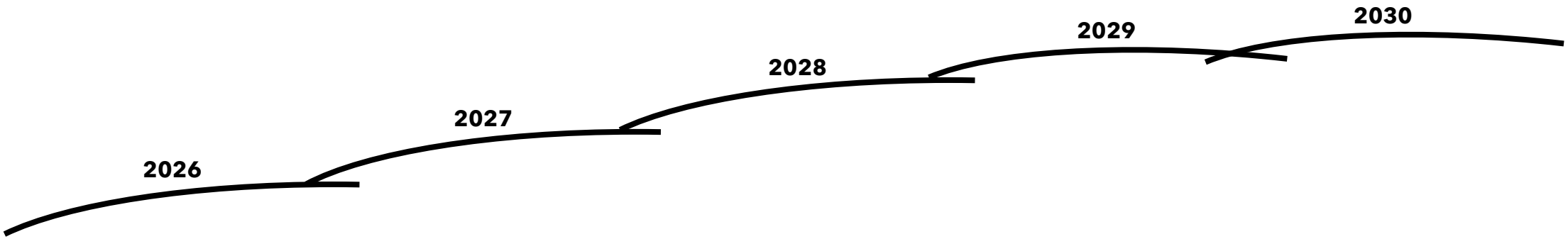
Establishing Mersing as a Free Commercial Zone (FCZ) : Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
9	**Develop detailed FCZ Incentive Framework**	**BPENJ**	**Jan 2027**	**Mar 2027**
9.1	Outline customs-exempt list, service tax guidelines and infrastructure support packages	Working Group	Jan 2027	Jan 2027
9.2	Define state-provided infrastructure upgrades	Working Group	Jan 2027	Jan 2027
9.3	Draft operational guidelines and workflow for customs processing under FCZ	Working Group	Feb 2027	Mar 2027
9.4	Draft investor guidebook that includes incentives, eligibility, application steps, timeline	Working Group	Feb 2027	Mar 2027
9.5	Engage with relevant stakeholders to review, validate proposed framework and to ensure alignment	Working Group	Feb 2027	Mar 2027
9.6	Incorporate feedback into final FCZ Framework	Working Group	Feb 2027	Mar 2027
10	**Integrate FCZ content into Tourism Johor's investor portal**	**Tourism Johor**	**Mar 2027**	**Apr 2027**
10.1	Develop web content (GIS boundaries, incentive details, application guides)	Working Group	Mar 2027	Apr 2027
10.2	Review and conduct testing of portal, usability and responsiveness	Working Group	Mar 2027	Apr 2027
10.3	Engage with Tourism Johor to get their sign off	Tourism Johor	Mar 2027	Apr 2027
10.4	Launch FCZ portal publicly	Working Group	Mar 2027	Apr 2027

Establishing Mersing as a Free Commercial Zone (FCZ) : Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
11	**Prepare and conduct investor roadshows/site briefings**	**Johor Tourism Exco**	**Apr 2027**	**Jul 2027**
11.1	Develop investor promotion materials – brouchers, pitch decks	Working Group	Apr 2027	May 2027
11.2	Identify and invite target investors	Working Group	Jun 2027	Jul 2027
11,3	Organise and schedule roadshows and site visits to Mersing	Working Group	Jun 2027	Jul 2027
12	**Monitor initial FCZ uptake and publish first quarterly report**	**Johor Tourism Exco**	**Jul 2027**	**Nov 2027**
12. 1	Define KPIs: investor inquiries, site bookings, application submissions	Working Group	Jul 2027	Jul 2027
12.2	Set up FCZ uptake monitoring system	Working Group	Jul 2027	Jul 2027
12.3	Track and report progress by compiling data from relevant stakeholders (EG: Invest Johor, local councils, working group)	Working Group	Jul 2027	Nov 2027
12.4	Draft and compile report for internal review	Working Group	Jul 2027	Nov 2027
12.5	Publish quarterly report for Steering Committee and state leadership	Working Group	Jul 2027	Nov 2027

Establishing Mersing as a Free Commercial Zone (FCZ) : KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• No. of FCZ investor inquiries received: **10** • No. of FCZ applications submitted: **3** • No. of customs exemptions claims approved: **N/A** • Cumulative private investment committed (RM mil): **N/A**	• No. of FCZ investor inquiries received: **25** • No. of FCZ applications submitted: **8** • No. of customs exemptions claims approved: **2** • Cumulative private investment committed (RM mil): **30**	• No. of FCZ investor inquiries received: **35** • No. of FCZ applications submitted: **15** • No. of customs exemptions claims approved: **10** • Cumulative private investment committed (RM mil): **80**	• No. of FCZ investor inquiries received: **45** • No. of FCZ applications submitted: **20** • No. of customs exemptions claims approved: **18** • Cumulative private investment committed (RM mil): **150**	• No. of FCZ investor inquiries received: **50** • No. of FCZ applications submitted: **25** • No. of customs exemptions claims approved: **25** • Cumulative private investment committed (RM mil): **250**
Achieved Milestones	• FCZ officially gazette and legally designated • Incentive framework published • Infrastructure readiness plans initiated • Customs alignment SOPs developed	• FCZ applications reviewed and processed • Initial customs exemptions granted and trialed • Investor roadshows conducted (domestic+ regional)	• Mid-term FCZ review completed • M&E dashboard launched and tracking live data • Revisions made to investor servicing SOPs	• Pipeline of 15+ active projects • Investment facilitation time-to-approval reduced by 30% • Quarterly reporting standardised	• FCZ impact report published

Establishing Mersing as a Free Commercial Zone (FCZ): KPI Dictionary

KPI	No. of FCZ investor inquiries received
Description	Tracks the total number of investor inquiries received through official FCZ channels including roadshows, portals, and direct engagement. Serves as an indicator of awareness and early interest in the FCZ offering.
Method Of Measurement	Collected via CRM system logs, roadshow registration forms, digital inquiry portals, and agency contact points.
Achievement Trend	N/A
Justification	Inquiries are a leading indicator of investor pipeline health and market interest. They help monitor effectiveness of promotion efforts.
Target (Year 2029)	N/A
Supporting Document	CRM logs, roadshow records, portal analytics
Frequency Of Data Reported	Quarterly via CRM dashboard; annual summary to Steering Committee

Establishing Mersing as a Free Commercial Zone (FCZ): KPI Dictionary

KPI	No. of FCZ applications submitted
Description	Measures the total number of formal applications submitted by investors to participate in the FCZ, including for land, incentives, or operations.
Method Of Measurement	Tracked through FCZ application registry maintained by the implementing agency and Invest Johor, with submission timestamps.
Achievement Trend	N/A
Justification	Submitted applications mark actual investor engagement with FCZ processes and readiness to commit. It reflects system usability and investor confidence.
Target (Year 2029)	N/A
Supporting Document	FCZ application registry, submission forms
Frequency Of Data Reported	Quarterly submission log review by Invest Johor; annual update to BPENJ

Establishing Mersing as a Free Commercial Zone (FCZ): KPI Dictionary

KPI	No. of customs exemptions request processed
Description	Captures the number of customs exemption claims approved under the FCZ incentive framework, reflecting the operational uptake of duty-related incentives.
Method Of Measurement	Based on approvals logged by Royal Malaysian Customs, in coordination with BPENJ and Tourism Johor facilitation units.
Achievement Trend	N/A
Justification	Customs exemptions are core to FCZ's value proposition. Their approval indicates operationalisation of incentive framework
Target (Year 2029)	N/A
Supporting Document	Customs exemption database, approval records
Frequency Of Data Reported	Quarterly customs reports; validated by FCZ facilitation working group

Establishing Mersing as a Free Commercial Zone (FCZ): KPI Dictionary

KPI	Cumulative private investment interest (RM mil)
Description	Total value (RM million) of private sector investments formally committed through signed agreements or incentive approvals under the FCZ.
Method Of Measurement	Calculated from signed investor documents (e.g. LOIs, MOUs, incentive award letters) validated by Invest Johor and BPENJ.
Achievement Trend	N/A
Justification	Represents financial value committed by private sector, tied directly to FCZ impact on local development, job creation, and tourism growth.
Target (Year 2029)	N/A
Supporting Document	Signed MOUs, incentive award letters, investment summary reports
Frequency Of Data Reported	Quarterly reporting through investor tracking sheet; consolidated annually

Expansion of Tourism Johor's Mandate to Drive Targeted Tourism Industry Growth: Milestones

No	Milestones and Key Activities	Responsibility	Planned start date	Planned end date
1	Convene Masterplan Steering Committee	Tourism Johor	Jan 2026	Jan 2026
2	Collect baseline tourism data for Johor	Tourism Johor	Feb 2026	Mar 2026
3	Perform benchmarking of peer-state tourism masterplans (Selangor, Penang, Kedah)	BPENJ	Mar 2026	May 2026
4	Conduct stakeholder consultations and FGDs	MOTAC Johor	May 2026	Jul 2026
5	Draft Johor Tourism Masterplan Framework	Tourism Johor	Jul 2026	Sep 2026
6	Develop infrastructure coordination guidelines	Tourism Johor	Sep 2026	Nov 2026
7	Specify data-driven framework requirements	BPENJ	Nov 2026	Dec 2026
8	Circulate draft masterplan for review	Tourism Johor	Dec 2026	Jan 2027
9	Finalise masterplan document	Tourism Johor	Jan 2027	Jan 2027
10	Secure formal state endorsement (BPENJ sign-off)	BPENJ	Feb 2027	Mar 2027
11	Publish approved masterplan publicly	Tourism Johor	Mar 2027	Apr 2027
12	Build and deploy data-driven platform	BPENJ	Apr 2027	May 2027
13	Coordinate initial infrastructure project pipeline under masterplan	Tourism Johor	May 2027	Jul 2027
14	Launch first quarterly monitoring report	Tourism Johor	Jul 2027	Aug 2027
			Jan 2026	**Aug 2027**

Expansion of Tourism Johor's Mandate to Drive Targeted Tourism Industry Growth: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Convene Masterplan Steering Committee**	**Tourism Johor**	**Jan 2026**	**Jan 2026**
1.1	Identify and nominate relevant stakeholders (Tourism Johor, BPENJ, local councils, MOTAC)	Tourism Johor	Jan 2026	Jan 2026
1.2	Draft terms of reference and governance structure for the Steering Committee	Tourism Johor	Jan 2026	Jan 2026
1.3	Schedule and conduct inaugural committee meeting to confirm scope and working arrangements	Tourism Johor	Jan 2026	Jan 2026
1.4	Assign focal points and designate working groups under the committee	Tourism Johor	Jan 2026	Jan 2026
2	**Collect baseline tourism data for Johor**	Tourism Johor	**Feb 2026**	**Mar 2026**
2.1	Develop data collection categories (visitor statistics, accommodation capacity)	Tourism Johor	Feb 2026	Feb 2026
2.2	Liaise with respective agencies for existing data	Tourism Johor	Feb 2026	Feb 2026
2.3	Clean, validate and compile datasets into a central database	Tourism Johor	Mar 2026	Mar 2026
2.4	Identify and document baseline trends and gaps	Tourism Johor	Mar 2026	Mar 2026

Expansion of Tourism Johor's Mandate to Drive Targeted Tourism Industry Growth: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
3	**Perform benchmarking of peer-state tourism masterplans (Selangor, Penang, Kedah)**	**BPENJ**	**Mar 2026**	**May 2026**
3.1	Source and review published tourism masterplans of peer states	BPENJ	Mar 2026	Mar 2026
3.2	Prepare benchmarking report summarising lessons and practices relevant for Johor	BPENJ	Apr 2026	Apr 2026
3.3	Share insights with internal stakeholders for directional alignment	BPENJ	May 2026	May 2026
4	**Conduct stakeholder consultations and FGDs**	**MOTAC Johor**	**May 2026**	**Jul 2026**
4.1	Prepare stakeholder engagement plan and FGD guides	MOTAC Johor	May 2026	May 2026
4.2	Schedule and hold focus group sessions across districts and stakeholder categories	MOTAC Johor	Jun 2026	Jun 2026
4.3	Synthesize findings into a stakeholder insight report	MOTAC Johor	Jul 2026	Jul 2026
5	**Draft Johor Tourism Masterplan Framework**	**Tourism Johor**	**Jul 2026**	**Sep 2026**
5.1	Facilitate internal workshops to draft vision, objectives, and guiding principles	Tourism Johor	Jul 2026	Jul 2026
5.2	Develop strategic pillars based on benchmarking, data, and consultation insights	Tourism Johor	Jul 2026	Aug 2026

Expansion of Tourism Johor's Mandate to Drive Targeted Tourism Industry Growth: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
5.3	Prepare initial masterplan framework draft	Tourism Johor	Aug 2026	Aug 2026
5.4	Circulate draft internally for review	Tourism Johor	Aug 2026	Sep 2026
5.5	Synthesize feedback and make amendments from all input gathered	Tourism Johor	Sep 2026	Sep 2026
6	**Develop infrastructure coordination guidelines**	**Tourism Johor**	**Sep 2026**	**Nov 2026**
6.1	Map existing tourism infrastructure planning and approval processes	Tourism Johor	Sep 2026	Sep 2026
6.2	Identify bottlenecks and propose streamlined coordination mechanisms	Tourism Johor	Sep 2026	Oct 2026
6.3	Draft guideline document detailing roles, approval flows, and criteria for prioritisation)	Tourism Johor	Oct 2026	Nov 2026
7	**Specify data-driven framework requirements**	**BPENJ**	**Nov 2026**	**Dec 2026**
7.1	Define data collection needs aligned with strategic pillars and KPIs	BPENJ	Nov 2026	Nov 2026
7.2	Develop draft list of indicators and tourism metrics (e.g. daily arrivals, length of stay, room nights)	BPENJ	Nov 2026	Dec 2026
7.3	Draft data governance policy (e.g. ownership, access rights, update frequency)	BPENJ	Nov 2026	Dec 2026

Expansion of Tourism Johor's Mandate to Drive Targeted Tourism Industry Growth: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
8	**Circulate draft masterplan for review**	**Tourism Johor**	**Dec 2026**	**Jan 2027**
8.1	Send formal requests for feedback to stakeholders with a clear deadline	Tourism Johor	Dec 2026	Dec 2026
8.2	Review feedback with internal team and Steering Committee	Tourism Johor	Jan 2027	Jan 2027
9	**Finalise masterplan document**	**Tourism Johor**	**Jan 2027**	**Jan 2027**
9.1	Incorporate feedback and update all sections for formal submission	Tourism Johor	Jan 2027	Jan 2027
9.2	Conduct internal walkthrough to ensure alignment and sign-off readiness	Tourism Johor	Jan 2027	Jan 2027
10	**Secure formal state endorsement (BPENJ sign-off)**	**BPENJ**	**Feb 2027**	**Mar 2027**
10.1	Submit finalized document with cover memo to BPENJ	BPENJ	Feb 2027	Feb 2027
10.2	Schedule presentation session with BPENJ for endorsement briefing	BPENJ	Feb 2027	Feb 2027
10.3	Address any final comments or requests from BPENJ	BPENJ	Mar 2027	Mar 2027
10.4	Obtain official sign-off or letter of endorsement	BPENJ	Mar 2027	Mar 2027

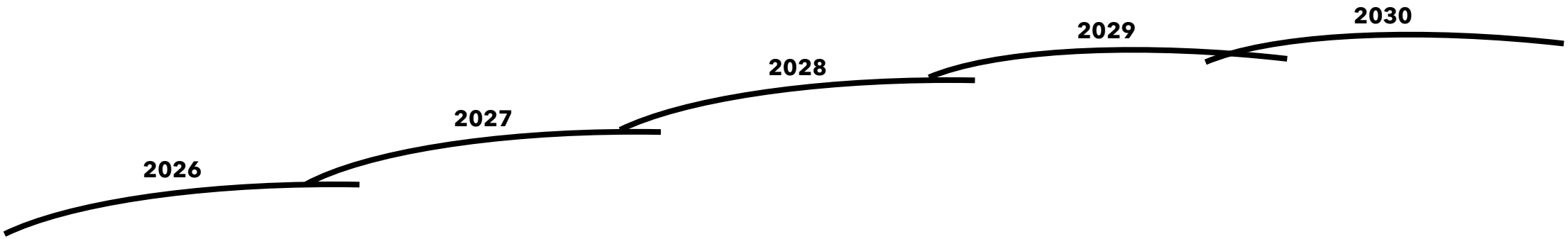
Expansion of Tourism Johor's Mandate to Drive Targeted Tourism Industry Growth: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
11	**Publish approved masterplan publicly**	**Tourism Johor**	**Mar 2027**	**Apr 2027**
11.1	Develop dissemination and outreach strategy (target audience, communication channels)	Tourism Johor	Mar 2027	Mar 2027
11.2	Plan and execute public launch event (venue, media, agenda)	Tourism Johor	Mar 2027	Apr 2027
11.3	Upload masterplan and related materials to Invest Johor & Tourism Johor website	Tourism Johor, Tourism Exco, Invest Johor	Apr 2027	Apr 2027
11.4	Distribute copies to agencies, councils, and private sector stakeholders	Tourism Johor	Apr 2027	Apr 2027
12	**Build and deploy data-driven platform**	**BPENJ**	**Apr 2027**	**May 2027**
12.1	Develop platform backend and user interface	BPENJ	Apr 2027	Apr 2027
12.2	Configure dashboard to track selected KPIs in real time	BPENJ	Apr 2027	May 2027
12.3	Conduct UAT (user acceptance testing) and training for relevant users	BPENJ	May 2027	May 2027
13	**Coordinate initial infrastructure project pipeline under masterplan**	**Tourism Johor**	**May 2027**	**Jul 2027**
13.1	Identify top 3–5 priority infrastructure projects from masterplan	Tourism Johor	May 2027	Jun 2027
13.2	Assign lead agencies and define roles/responsibilities for implementation	Tourism Johor	Jun 2027	Jul 2027

Expansion of Tourism Johor's Mandate to Drive Targeted Tourism Industry Growth: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
14	**Launch first quarterly monitoring report**	**Tourism Johor**	**Jul 2027**	**Aug 2027**
14.1	Collect KPI data from relevant stakeholders and retrieve data from digital platform	Tourism Johor	Jul 2027	Jul 2027
14.2	Analyse KPI Data and progress	Tourism Johor	Jul 2027	Jul 2027
14.3	Draft findings, trends, and implementation status in a quarterly report	Tourism Johor	Jul 2027	Aug 2027
14.4	Validate data and insights with internal team and partner	Tourism Johor	Aug 2027	Aug 2027
14.5	Publish report and share with Steering Committee and stakeholders	Tourism Johor	Aug 2027	Aug 2027

Expansion of Tourism Johor's Mandate to Drive Targeted Tourism Industry Growth: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• No. of Tourism Investment leads engaged: **N/A** • No. of tourism infrastructure projects tracked across district: **5** • % of tourism development projects aligned to masterplan priorities: **N/A**	• No. of Tourism Investment leads engaged: **10** • No. of tourism infrastructure projects tracked across district: **10** • % of tourism development projects aligned to masterplan priorities: **N/A**	• No. of Tourism Investment leads engaged: **20** • No. of tourism infrastructure projects tracked across district: **15** • % of tourism development projects aligned to masterplan priorities: **25%**	• No. of Tourism Investment leads engaged: **35** • No. of tourism infrastructure projects tracked across district: **20** • % of tourism development projects aligned to masterplan priorities: **35%**	• No. of Tourism Investment leads engaged: **40** • No. of tourism infrastructure projects tracked across district: **25** • % of tourism development projects aligned to masterplan priorities: **50%**
Achieved Milestones	• Masterplan Steering Committee formed • Final masterplan drafted, endorsed by BPENJ & launched publicly • Quarterly progress report published	• 3 tourism infrastructure projects move to implementation stage • Dashboard integrated with Invest Johor portal • Data reporting compliance among local councils to 60% • Quarterly reports published	• Infrastructure coordination manual updated with lessons learned • At least 6 districts reporting data regularly	• Strategic decision-making increasingly driven by tourism data • Comprehensive review of infrastructure delivery tracked via dashboard	• Full coverage of all local councils in data system • Annual increase in infrastructure completion rate by 15% • 5-year impact report published (2026–2030)

Expansion of Tourism Johor's Mandate to Drive Targeted Tourism Industry Growth: KPI Dictionary

KPI	No. of Tourism Investment leads engaged
Description	Tracks the total number of prospective tourism investment leads actively engaged through outreach, roadshows, or inquiries facilitated.
Method Of Measurement	Cumulative count of documented investment engagements or roadshow leads logged by Working Group.
Achievement Trend	N/A
Justification	Demonstrates proactive investment promotion efforts and tracks potential pipeline development for tourism investment.
Target (Year 2029)	N/A
Supporting Document	Lead engagement registry; Roadshow reports; CRM databases
Frequency Of Data Reported	Quarterly with annual consolidation

Expansion of Tourism Johor's Mandate to Drive Targeted Tourism Industry Growth: KPI Dictionary

KPI	No. of tourism infrastructure projects tracked across district
Description	Captures the number of infrastructure projects (public or private) under monitoring or coordination by Tourism Johor across Johor districts.
Method Of Measurement	Count of active tourism infrastructure projects listed in the state tourism infrastructure tracker.
Achievement Trend	N/A
Justification	Allows for effective oversight and cross-district coordination, aiding resource planning and implementation tracking.
Target (Year 2029)	N/A
Supporting Document	Tourism Infrastructure Tracker; Project progress dashboards
Frequency Of Data Reported	Bi-annually with updates from district and agency submissions

Expansion of Tourism Johor's Mandate to Drive Targeted Tourism Industry Growth: KPI Dictionary

KPI	% of tourism development projects aligned to masterplan priorities
Description	Percentage of ongoing or new tourism projects that align with strategies and geographic priorities identified in the Johor Tourism Masterplan.
Method Of Measurement	Calculated by dividing the number of aligned projects by the total number of projects monitored under the tourism development pipeline.
Achievement Trend	N/A
Justification	Ensures consistency with strategic direction and optimises public-private resource allocation.
Target (Year 2029)	N/A
Supporting Document	Masterplan-alignment matrix; Project registry; Strategy alignment report
Frequency Of Data Reported	Annually with masterplan review cycle

Launching a Johor Aerospace Council & Secretariat – Milestone

No	Milestones and Key Activities	Responsibility	Planned start date	Planned end date
1	Establish Interim Aerospace Coordination Steering Committee to oversee setup of Council & Secretariat	Investment Exco	Jan 2026	Jan 2026
2	Define mission, scope, and governance structure for Johor Aerospace Council & Secretariat	Investment Exco	Feb 2026	Mar 2026
3	Draft and formalise legal, administrative, and reporting frameworks for Council & Secretariat	Investment Exco Johor & BPENJ	Mar 2026	Apr 2026
4	Recruit core Secretariat team (Director, Liaison, Regulatory Lead, R&D Coordinator, Admin Support)	Investment Exco	Apr 2026	May 2026
5	Map Johor aerospace ecosystem (firms, training institutes, anchor investors, regulators)	Investment Exco	May 2026	Jul 2026
6	Conduct stakeholder consultations & industry engagement sessions	Investment Exco	Jul 2026	Aug 2026
7	Develop Johor Aerospace Masterplan (Vision, Objectives, Strategic Priorities) (Council-led)	Investment Exco Johor & BPENJ	Aug 2026	Oct 2026
8	Endorse and adopt Johor Aerospace Masterplan (State & stakeholder buy-in)	Investment Exco Johor, BPENJ & NAICO	Oct 2026	Nov 2026
9	Establish Aerospace Masterplan Implementation & Tracking System	Investment Exco	Nov 2026	Dec 2026
10	Launch Johor Aerospace Industry Engagement Program (forums, sector-specific roundtables)	Investment Exco	Dec 2026	Feb 2027
11	Facilitate Aerospace Cluster Development Initiatives (targeted growth areas: MRO, UAV, composites)	Investment Exco	Feb 2027	Apr 2027
12	Publish Annual Johor Aerospace Progress Report (track Master Plan delivery, inform Council strategy)	Investment Exco	Apr 2027	Apr 2027
13	Secretariat Performance Review & Next-Phase Strategic Planning	Investment Exco Johor & BPENJ	Apr 2027	May 2027
			Jan 2026	**May 2027**

Launching a Johor Aerospace Council & Secretariat : Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Establish Aerospace Steering Committee**	**Investment Exco Johor**	**Jan 2026**	**Jan 2026**
1.1	Identify and nominate relevant stakeholders	Investment Exco Johor	Jan 2026	Jan 2026
1.2	Draft terms of reference and governance structure for the Steering Committee	Investment Exco Johor	Jan 2026	Jan 2026
1.3	Schedule and conduct inaugural committee meeting to confirm scope and working arrangements	Investment Exco Johor	Jan 2026	Jan 2026
1.4	Assign focal points and designate working groups under the committee	Investment Exco Johor	Jan 2026	Jan 2026
2	**Define mission, scope, and governance structure for Johor Aerospace Council & Secretariat**	**Investment Exco Johor**	**Feb 2026**	**Mar 2026**
2.1	Draft governance framework (roles, responsibilities, decision-making)	Steering Committee	Feb 2026	Feb 2026
2.2	Seek stakeholder feedback on governance draft	Steering Committee	Feb 2026	Mar 2026
2.3	Finalise governance framework	Investment Exco Johor	Mar 2026	Mar 2026
3	**Draft and formalise legal, administrative, and reporting frameworks for Council & Secretariat**	**Investment Exco Johor & BPENJ**	**Mar 2026**	**Mar 2026**
3.1	Identify applicable legal and compliance requirements	Steering Committee	Mar 2026	Mar 2026
3.2	Prepare administrative guidelines and reporting templates	Steering Committee	Mar 2026	Mar 2026

Launching a Johor Aerospace Council & Secretariat : Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
3.3	Review and approve frameworks with stakeholders	Investment Exco Johor & BPENJ	Mar 2026	Mar 2026
4	**Recruit core Secretariat team (Director, Liaison, Regulatory Lead, R&D Coordinator, Admin Support)**	**Investment Exco Johor**	**Mar 2026**	**Apr 2026**
4.1	Develop job descriptions and selection criteria	Steering Committee	May 2026	May 2026
4.2	Advertise, shortlist, and interview candidates	Steering Committee	May 2026	Apr 2026
4.3	Appoint Secretariat staff and onboard them	Steering Committee	Apr 2026	Apr 2026
5	**Map Johor aerospace ecosystem (firms, training institutes, anchor investors, regulators)**	**Investment Exco Johor**	**May 2026**	**Jul 2026**
5.1	Identify sectors, firms, institutions, and regulators	Steering Committee	May 2026	Jun 2026
5.2	Collect and compile data	Steering Committee	May 2026	Jun 2026
5.3	Produce ecosystem mapping report for Johor	Steering Committee	Jul 2026	Jul 2026
6	**Conduct stakeholder consultations & industry engagement sessions**	**Investment Exco Johor**	**Jul 2026**	**Aug 2026**
6.1	Prepare engagement plan and consultation materials	Steering Committee	Jul 2026	Jul 2026
6.2	Hold sub sector-specific workshops and focus groups	Steering Committee	Jul 2026	Aug 2026
6.3	Summarise insights to inform Master Plan drafting	Steering Committee	Aug 2026	Aug 2026

Launching a Johor Aerospace Council & Secretariat : Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
7	**Develop Johor Aerospace Masterplan (Vision, Objectives, Strategic Priorities)**	**Investment Exco Johor & BPENJ**	**Aug 2026**	**Oct 2026**
7.1	Facilitate internal workshops to draft vision, objectives, and guiding principles	Steering Committee	Aug 2026	Aug 2026
7.2	Develop strategic pillars based on benchmarking, data, and consultation insights	Steering Committee	Aug 2026	Aug 2026
7.3	Prepare initial masterplan framework draft	Steering Committee	August 2026	Sep 2026
7.4	Circulate draft internally for review	Steering Committee	Sep 2026	Oct 2026
7.5	Synthesize feedback and make amendments from all input gathered	Steering Committee	Oct 2026	Oct 2026
8	**Endorse and adopt Johor Aerospace Masterplan (State & stakeholder buy-in)**	**Investment Exco Johor, BPENJ & NAICO**	**Oct 2026**	**Nov 2026**
8.1	Present final Masterplan to State Government for approval	Steering Committee	Oct 2026	Oct 2026
8.2	Secure endorsements from key stakeholders	Steering Committee	Oct 2026	Nov 2026
8.3	Publish approved masterplan publicly	Steering Committee	Nov 2026	Nov 2026

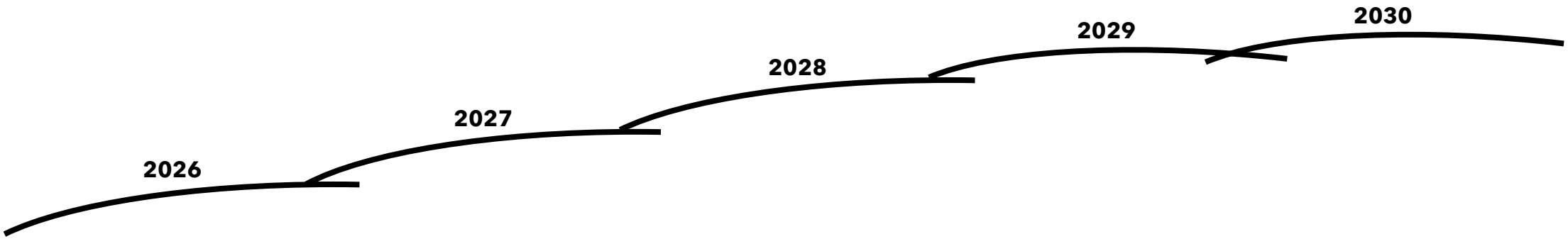
Launching a Johor Aerospace Council & Secretariat : Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
9	**Establish Aerospace Master Plan Implementation & Tracking System**	**Investment Exco Johor**	**November 2026**	**December 2026**
9.1	Define KPI metrics and data collection processes	Steering Committee	November 2026	December 2026
9.2	Build digital dashboard based on process set	Steering Committee	November 2026	December 2026
9.3	Test and improve dashboard based on feedback gathered from internal team	Steering Committee	November 2026	December 2026
9.4	Train Secretariat team to manage and update system	Steering Committee	November 2026	December 2026
10	**Launch Johor Aerospace Industry Engagement Program (forums, sector-specific roundtables)**	**Investment Exco Johor**	**Dec 2026**	**Feb 2027**
10.1	Identify priority platforms and events	Steering Committee	Dec 2026	Dec 2026
10.2	Plan biannual industry roundtables and sector dialogues	Steering Committee	Dec 2026	Jan 2027
10.3	Prepare participation plan and promotional materials	Steering Committee	Jan 2027	Jan 2027
10.4	Host first industry engagement forum	Steering Committee	Feb 2027	Feb 2027
10.5	Document outcomes and integrate into policy updates	Steering Committee	Feb 2027	Feb 2027

Launching a Johor Aerospace Council & Secretariat : Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
11	**Facilitate Aerospace Cluster Development Initiatives**	**Investment Exco Johor**	**Feb 2027**	**Apr 2027**
11.1	Identify priority clusters (MRO, UAV, composites)	Steering Committee	Feb 2027	Feb 2027
11.2	Form working groups with academia and industry	Steering Committee	Feb 2027	Feb 2027
11.3	Launch targeted cluster initiatives	Steering Committee	Mar 2027	Apr 2027
12	**Publish Annual Johor Aerospace Progress Report**	**Investment Exco Johor**	**Apr 2027**	**Apr 2027**
12.1	Compile data from Master Plan tracking system	Steering Committee	Apr 2027	Apr 2027
12.2	Prepare draft progress report	Steering Committee	Apr 2027	Apr 2027
12.3	Internal review of report with relevant key stakeholders	Steering Committee	Apr 2027	Apr 2027
12.4	Publish report and present to external stakeholders	Steering Committee	Apr 2027	Apr 2027
13	**Secretariat Performance Review & Next-Phase Strategic Planning**	**Investment Exco Johor & BPEN J**	**May 2027**	**May 2027**
13.1	Secretariat Performance Review & Next-Phase Strategic Planning	Investment Exco Johor & BPEN J	May 2027	May 2027
13.2	Consult stakeholders on future priorities	Steering Committee	May 2027	May 2027
13.3	Prepare next 3-year action plan	Investment Exco Johor & BPEN J	May 2027	May 2027

Launching a Johor Aerospace Council & Secretariat : Implementation Plan



	2026	2027	2028	2029	2030
Initiative KPIs	• No. of Aerospace Investment leads engaged: **10** • No. of aerospace projects tracked: **5** • % of initiatives aligned to Johor Aerospace Master Plan: **N/A** • No. of Engagements Convened to Support Aerospace Development: **N/A**	• No. of Aerospace Investment leads engaged: **20** • No. of aerospace projects tracked: **10** • % of initiatives aligned to Johor Aerospace Master Plan: **25%** • No. of Engagements Convened to Support Aerospace Development: **6**	• No. of Aerospace Investment leads engaged: **30** • No. of aerospace projects tracked: **15** • % of initiatives aligned to Johor Aerospace Master Plan: **35%** • No. of Engagements Convened to Support Aerospace Development: **10**	• No. of Aerospace Investment leads engaged: **40** • No. of aerospace projects tracked: **20** • % of initiatives aligned to Johor Aerospace Master Plan: **45%** • No. of Engagements Convened to Support Aerospace Development: **14**	• No. of Aerospace Investment leads engaged: **50** • No. of aerospace projects tracked: **25** • % of initiatives aligned to Johor Aerospace Master Plan: **60%** • No. of Engagements Convened to Support Aerospace Development: **20**
Achieved Milestones	• Aerospace ecosystem mapped & database established • Quarterly stakeholder engagement reports published	• Aerospace Council& Secretariat fully operational • Core investor engagement programs activated	• Initial cross-sector R&D partnerships launched • 4 districts participating in ecosystem tracking • Monitoring and tracking of initiative progress	• Active monitoring of infrastructure and projects • Data dashboards driving decisions	• Annual reporting adopted as standard practice • 5-year summary impact report published (2026-2030)

Launching a Johor Aerospace Council & Secretariat: KPI Dictionary

KPI	No. of Aerospace Investment Leads Engaged
Description	Tracks the number of unique, verified aerospace-related investment leads actively engaged through Secretariat initiatives. Engagement includes formal inquiries, consultations, discussions, and facilitated introductions with relevant agencies.
Method Of Measurement	Secretariat to maintain records of investor engagements through CRM tools, tracking engagement status, type of inquiry, and follow-up actions.
Achievement Trend	Initial efforts will focus on generating leads through outreach, events, and targeted promotions. Increased engagements expected as awareness grows.
Justification	Measures the Secretariat's effectiveness in positioning Johor as an attractive aerospace hub and actively facilitating new investment pipelines into the sector.
Target (Year 2029)	40
Supporting Document	Secretariat CRM database, investor reports, engagement tracking sheets
Frequency Of Data Reported	Quarterly reporting with cumulative annual updates

Launching a Johor Aerospace Council & Secretariat: KPI Dictionary

KPI	No. of Aerospace Infrastructure / Ecosystem Projects Tracked
Description	Tracks the number of aerospace-related infrastructure, R&D, training, and ecosystem development projects being monitored by the Secretariat across Johor. Includes both public and private sector initiatives.
Method Of Measurement	Secretariat maintains a centralised database of active and planned projects, updated regularly in collaboration with agencies and stakeholders.
Achievement Trend	Initial mapping underway; number expected to grow as Secretariat engagement deepens and project tracking becomes standardised across agencies.
Justification	Ensures visibility over the ecosystem's growth, helps identify bottlenecks, facilitates alignment of efforts, and supports effective progress reporting to stakeholders.
Target (Year 2029)	20
Supporting Document	Secretariat project tracking database, reports from agencies (BPENJ, IMFC-J, MIDA)
Frequency Of Data Reported	Quarterly reporting, with updates aligned to Secretariat's stakeholder engagements

Launching a Johor Aerospace Council & Secretariat: KPI Dictionary

KPI	% of Initiatives Aligned to Johor Aerospace Master Plan
Description	Measures the proportion of tracked projects and initiatives that align with the objectives and priorities outlined in the Johor Aerospace Master Plan and/or National Aerospace Blueprint 2030.
Method Of Measurement	Secretariat conducts periodic reviews of projects against master plan objectives, with alignment validated through internal assessments and stakeholder feedback.
Achievement Trend	
Justification	Supports alignment of Johor's efforts with strategic national and state ambitions, ensuring focus on high-impact, relevant projects.
Target (Year 2029)	45%
Supporting Document	Secretariat internal reports, project alignment assessments, Council meeting minutes
Frequency Of Data Reported	Annual reporting aligned with Council reviews

Launching a Johor Aerospace Council & Secretariat: KPI Dictionary

KPI	No. of Engagements Convened to Support Aerospace Development
Description	Tracks the number of formal engagements (working groups, roundtables, coordination meetings) convened by the Secretariat to facilitate cross-agency and cross-stakeholder alignment on aerospace initiatives.
Method Of Measurement	Secretariat records all engagements held, with details on purpose, participants, and outcomes captured in meeting logs.
Achievement Trend	Initial coordination platforms being established. Volume expected to increase steadily as the Secretariat strengthens its facilitation role.
Justification	Reflects Secretariat's role in improving coordination, fostering collaboration, and ensuring alignment between government, industry, and academia.
Target (Year 2029)	14
Supporting Document	Secretariat meeting records, reports to Council, stakeholder feedback reports
Frequency Of Data Reported	Quarterly reporting with annual consolidation

Introduce Tiered Land Premium Discount for Strategic OSAT Fabs: Milestone

No	Milestones and Key Activities	Responsibility	Planned start date	Planned end date
1	Establish policy working group (PTG, IMFC-J, MIDA, MITI, MDEC, BPEN-J)	PTG Johor	Jan 2026	Jan 2026
2	Define rebate-tier framework & eligibility criteria (Basic / Advanced / R&D & Anchor)	IMFC-J / PTG Johor	Jan 2026	Feb 2026
3	Conduct stakeholder consultations & incorporate feedback	PTG Johor / MIDA / MITI	Feb 2026	Apr 2026
4	Draft amendments to PTG land-use circular embedding tiered rebate scheme	PTG Johor	Apr 2026	Jun 2026
5	Complete legal & regulatory review and secure state-level approval	PTG Johor	Jun 2026	Aug 2026
6	Publish updated land-use circular and issue implementation guidelines	PTG Johor	Aug 2026	Sep 2026
7	Integrate rebate-application workflow into IMFC-J's SFT-60 digital portal	IMFC-J / PTG Johor	Sep 2026	Dec 2026
8	Launch pilot rebate program in designated JS-SEZ clusters	IMFC-J / PTG Johor	Dec 2026	Mar 2027
9	Monitor pilot uptake, collect data & refine rebate tiers	PTG Johor / BPEN-J	Mar 2027	Jun 2027
10	Full roll-out of tiered rebate scheme across all eligible OSAT parks	PTG Johor	Jun 2027	Sep 2027
11	Conduct outreach & investor education (webinars, roadshows, guidelines)	PTG Johor / MIDA	Sep 2027	Dec 2027
12	Ongoing monitoring, reporting & periodic scheme adjustment based on market feedback	BPEN-J / PTG Johor	Dec 2027	Dec 2030
			Jan 2026	**Dec 2030**

Introduce Tiered Land Premium Discount for Strategic OSAT Fabs : Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Establish policy working group**	**PTG Johor**	**Jan 2026**	**Jan 2026**
1.1	Identify and invite representatives from PTG Johor, IMFC-J, MIDA, MITI, MDEC, BPEN-J	PTG Johor	Jan 2026	Jan 2026
1.2	Draft terms of reference and schedule inaugural meetings	PTG Johor	Jan 2026	Jan 2026
2	**Define rebate-tier framework & eligibility**	**IMFC-J / PTG Johor**	**Jan 2026**	**Feb 2026**
2.1	Research global OSAT rebate benchmarks and investment thresholds	IMFC-J / PTG Johor	Jan 2026	Feb 2026
2.2	Draft tier definitions (capex minima, R&D linkage requirements)	IMFC-J	Jan 2026	Feb 2026
3	**Conduct stakeholder consultations & incorporate feedback**	**PTG Johor / MIDA**	**Feb 2026**	**Apr 2026**
3.1	Hold roundtable workshops with OSAT players, investors, and academia	PTG Johor / MIDA	Feb 2026	Feb 2026
3.2	Collect written feedback and adjust tier criteria	PTG Johor	Mar 2026	Apr 2026
3.3	Publish summary of consultation outcomes	PTG Johor	Mar 2026	Apr 2026

Introduce Tiered Land Premium Discount for Strategic OSAT Fabs : Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
4	**Draft amendments to land-use circular**	**PTG Johor**	**Apr 2026**	**Jun 2026**
4.1	Prepare legal draft of circular embedding tiered rebate scheme	PTG Johor	Apr 2026	Jun 2026
4.2	Review draft with MITI and State Legal Counsel	PTG Johor	Apr 2026	Jun 2026
5	**Complete legal & regulatory review and secure approval**	**PTG Johor**	**Jun 2026**	**Aug 2026**
5.1	Circulate final draft to State EXCO and MOF	PTG Johor	Jun 2026	Jul 2026
5.2	Obtain formal sign-off from State EXCO	PTG Johor	Aug 2026	Aug 2026
6	**Publish updated circular and guidelines**	**PTG Johor**	**Aug 2026**	**Sep 2026**
6.1	Design and issue public notification of new rebate tiers	PTG Johor	Aug 2026	Aug 2026
6.2	Publish detailed application guidelines on PTG website	PTG Johor	Sep 2026	Sep 2026

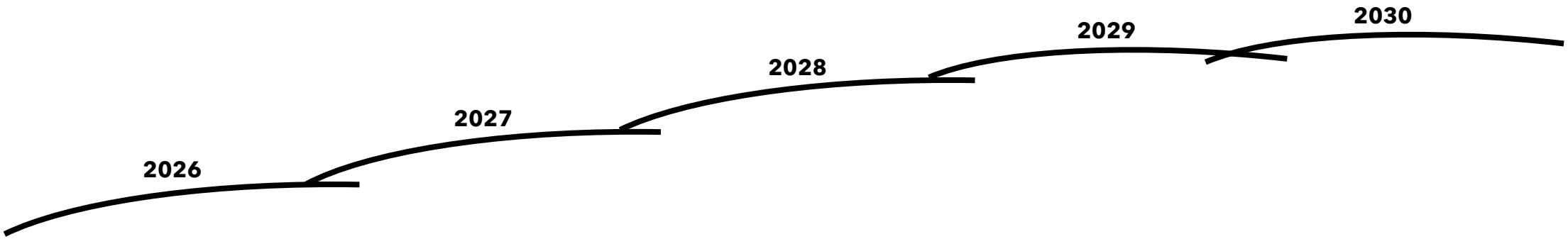
Introduce Tiered Land Premium Discount for Strategic OSAT Fabs : Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
7	**Integrate rebate-application into SFT-60 portal**	**IMFC-J / PTG Johor**	**Sep 2026**	**Dec 2026**
7.1	Map rebate-tier fields into SFT-60 data schema	IMFC-J	Sep 2026	Oct 2026
7.2	Develop and test application modules	IMFC-J	Oct 2026	Nov 2026
7.3	Deploy integration and train portal administrators	IMFC-J / PTG Johor	Nov 2026	Dec 2026
8	**Launch pilot rebate program**	**IMFC-J / PTG Johor**	**Dec 2026**	**Mar 2027**
8.1	Issue invitations to eligible OSAT fabs in JS-SEZ	IMFC-J / PTG Johor	Dec 2026	Jan 2027
8.2	Process first tranche of rebate applications	IMFC-J	Feb 2027	Mar 2027
9	**Monitor pilot uptake & refine tiers**	**PTG Johor / BPEN-J**	**Mar 2027**	**Jun 2027**
9.1	Collect quarterly uptake data and user feedback	PTG Johor / BPEN-J	Mar 2027	Apr 2027
9.2	Analyze pilot performance and recommend tier adjustments	PTG Johor	May 2027	Jun 2027

Introduce Tiered Land Premium Discount for Strategic OSAT Fabs : Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
10	**Full roll-out of tiered rebate scheme**	**PTG Johor**	**Jun 2027**	**Sep 2027**
10.1	Publish roll-out roadmap and open applications statewide	PTG Johor	Jun 2027	Jul 2027
10.2	Process and approve applications under full scheme	PTG Johor	Aug 2027	Sep 2027
11	**Conduct outreach & investor education**	**PTG Johor / MIDA**	**Sep 2027**	**Dec 2027**
11.1	Develop webinar series and investor roadshow materials	PTG Johor / MIDA	Sep 2027	Oct 2027
11.2	Host regional roadshows and virtual briefings	PTG Johor / MIDA	Nov 2027	Dec 2027
12	**Ongoing monitoring, reporting & adjustments**	**BPEN-J / PTG Johor**	**Dec 2027**	**Dec 2030**
12.1	Produce semi-annual uptake and impact reports	BPEN-J / PTG Johor	Dec 2027	Dec 2030
12.2	Convene annual scheme review and refine tiers	PTG Johor	Dec 2027	Dec 2030

Introduce Tiered Land Premium Discount for Strategic OSAT Fabs: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• No. of rebate applications received: 10 • Avg. approval time: 45 days • Uptake rate (approved/apps): 80 % • Total discount value granted (RM m): 5	• No. of rebate applications received: 30 • Avg. approval time: 30 days • Uptake rate (approved/apps): 85 % • Total discount value granted (RM m): 15	• No. of rebate applications received: 50 • Avg. approval time: 20 days • Uptake rate (approved/apps): 90 % • Total discount value granted (RM m): 25	• No. of rebate applications received: 70 • Avg. approval time: 15 days • Uptake rate (approved/apps): 90 % • Total discount value granted (RM m): 35	• No. of rebate applications received: 90 • Avg. approval time: 15 days • Uptake rate (approved/apps): 90 % • Total discount value granted (RM m): 45
Achieved Milestones	• Policy working group formed • Rebate-tier framework defined	• Circular amendments approved • SFT-60 integration completed	• Pilot rebate program launched • Pilot data collected & tiers refined	• Full scheme roll-out completed • Investor outreach completed	• Scheme operating at steady state • Ongoing monitoring & reporting in place

Introduce Tiered Land Premium Discount for Strategic OSAT Fabs: KPI Dictionary

KPI	No. of rebate applications received
Description	Total count of OSAT fab applications submitted for land-premium rebate
Method Of Measurement	Tally of applications logged in SFT-60 portal
Achievement Trend	Steady growth from 10 (2026) to 90 (2030)
Justification	Indicates investor interest and uptake of the incentive scheme
Target (Year 2029)	90 applications
Supporting Document	Portal application logs
Frequency Of Data Reported	Quarterly

Introduce Tiered Land Premium Discount for Strategic OSAT Fabs: KPI Dictionary

KPI	Avg. approval time (days)
Description	Mean duration from receipt of application to formal rebate decision
Method Of Measurement	Timestamp difference in SFT-60 workflow logs
Achievement Trend	Decreases from 45 days (2026) to 15 days (2029 onward)
Justification	Reflects efficiency and responsiveness of the approval process
Target (Year 2029)	≤ 15 days
Supporting Document	SFT-60 workflow audit reports
Frequency Of Data Reported	Quarterly

Introduce Tiered Land Premium Discount for Strategic OSAT Fabs: KPI Dictionary

KPI	Uptake rate (approved/apps)
Description	Percentage of submitted applications that receive approval
Method Of Measurement	(No. approved ÷ No. submitted) × 100
Achievement Trend	Improves from 80 % (2026) to 90 % (2028 onward)
Justification	Measures scheme attractiveness and alignment of criteria to industry needs
Target (Year 2029)	≥ 90 %
Supporting Document	Approval registers; acceptance letters
Frequency Of Data Reported	Quarterly

Introduce Tiered Land Premium Discount for Strategic OSAT Fabs: KPI Dictionary

KPI	Total discount value granted (RM m)
Description	Sum value of land-premium rebates awarded to approved applicants
Method Of Measurement	Aggregated rebate amounts recorded in financial ledgers
Achievement Trend	Increases from RM 5 m (2026) to RM 45 m (2030)
Justification	Demonstrates financial scale of incentive deployment and budget utilization
Target (Year 2029)	RM 45 m
Supporting Document	Finance disbursement records
Frequency Of Data Reported	Semi-annual

Johor Agritech Accelerator Program: Milestone

No	Milestones and Key Activities	Responsibility	Planned start date	Planned end date
1	Establish JAAP steering committee & governance framework	JCorp / FarmByte / Jabatan Pertanian Johor	Jan 2026	Jan 2026
2	Define eligibility criteria, demo-hub methodology & secure funding	JAAP Steering Committee / MARii / MOF / MDEC	Jan 2026	Feb 2026
3	Identify & contract 10 demo-hub smallholders	Jabatan Pertanian Johor / MARDI	Feb 2026	Apr 2026
4	Develop agritech package: grants, capex plans & rebate structure	MARii / FarmByte	May 2026	Jul 2026
5	Build digital one-stop portal for applications & data collection	JCorp/FarmByte	Jul 2026	Oct 2026
6	Launch pilot call & select cohort of 10 farms	JAAP Secretariat / MARDI	Nov 2026	Dec 2026
7	Deploy sensors, drones, IoT & bio-input solutions at pilot farms	FarmByte / MARDI	Jan 2027	Mar 2027
8	Conduct training on precision ag, data analytics & bio-input use	JCorp / MARii / MARDI / MDEC	Apr 2027	Jul 2027
9	Monitor pilot performance & collect yield/cost-savings data	BPEN-J / JAAP	Aug 2027	Nov 2027
10	Mid-term evaluation & refine package based on pilot learnings	JAAP Steering Committee / MARii	Dec 2027	Mar 2028
11	Phase 1 scale & statewide rollout with ongoing monitoring	JAAP Steering Committee / BPEN-J	Apr 2028	Dec 2030
			Jan 2026	**Dec 2030**

Johor Agritech Accelerator Program: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Establish JAAP steering committee & governance framework**	**JCorp / FarmByte / Jabatan Pertanian Johor**	**Jan 2026**	**Jan 2026**
1.1	Draft TOR, governance structure & member invitations	JCorp / FarmByte / Jabatan Pertanian Johor	Jan 2026	Jan 2026
1.2	Convene inaugural steering committee meeting	JCorp	Jan 2026	Jan 2026
2	**Define eligibility criteria, demo-hub methodology & secure funding**	**JAAP Steering Committee / MARii / MOF / MDEC**	**Jan 2026**	**Feb 2026**
2.1	Research global agritech accelerator benchmarks	MARii / MDEC	Jan 2026	Feb 2026
2.2	Draft eligibility criteria & demo-hub selection process	JAAP Steering Committee	Jan 2026	Feb 2026
2.3	Secure commitments: funding envelope & credit-guarantee with MOF	MOF / JAAP Steering Committee	Jan 2026	Feb 2026
3	**Identify & contract 10 demo-hub smallholders**	**Jabatan Pertanian Johor / MARDI**	**Feb 2026**	**Apr 2026**
3.1	Compile list of potential smallholders and regions	Jabatan Pertanian Johor	Feb 2026	Feb 2026
3.2	Issue RFQ and evaluate proposals	MARDI	Mar 2026	Mar 2026
3.3	Finalize contracts & onboard selected smallholders	Jabatan Pertanian Johor / MARDI	Apr 2026	Apr 2026

Johor Agritech Accelerator Program: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
4	**Develop agritech package: grants, capex plans & rebate structure**	**MARii / FarmByte**	**May 2026**	**Jul 2026**
4.1	Draft grant guidelines & rebate terms	MARii	May 2026	Jun 2026
4.2	Define capex subsidy limits & approval workflow	FarmByte	Jun 2026	Jul 2026
5	**Build digital one-stop portal**	**JCorp/FarmByte**	**Jul 2026**	**Oct 2026**
5.1	Define portal requirements & data fields	JCorp/FarmByte	Jul 2026	Jul 2026
5.2	Develop, test & deploy portal	JCorp/FarmByte	Aug 2026	Oct 2026
5.3	Train staff & publish user guides	JCorp/FarmByte	Oct 2026	Oct 2026
6	**Launch pilot call & select cohort of 10 farms**	**JAAP Secretariat / MARDI**	**Nov 2026**	**Dec 2026**
6.1	Issue application call & publicise via MDEC channels	JAAP Secretariat / MDEC	Nov 2026	Nov 2026
6.2	Evaluate applications & announce selected farms	JAAP Secretariat / MARDI	Dec 2026	Dec 2026

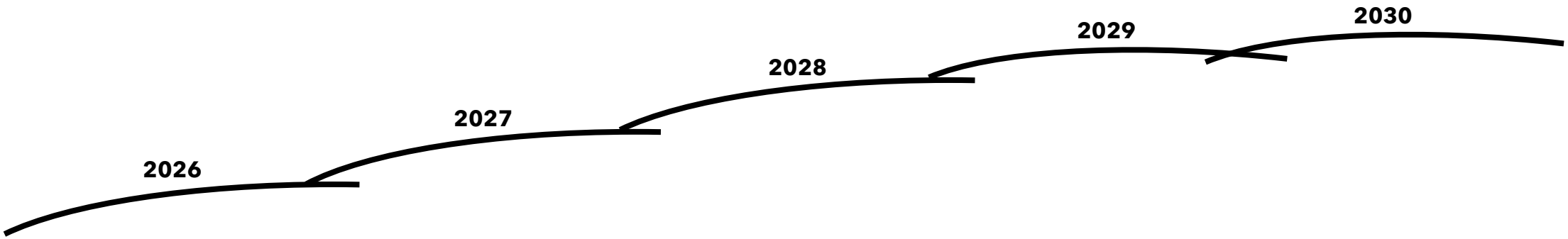
Johor Agritech Accelerator Program: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
7	**Develop agritech package: grants, capex plans & rebate structure**	**FarmByte / MARDI**	**Jan 2027**	**Mar 2027**
7.1	Procure equipment & engage service providers	FarmByte	Jan 2027	Jan 2027
7.2	Install and validate technology at demo farms	FarmByte / MARDI	Feb 2027	Mar 2027
8	**Conduct training & capacity building**	**JCorp / MARii / MARDI / MDEC**	**Apr 2027**	**Jul 2027**
8.1	Develop curriculum & training materials	MARii / MDEC	Apr 2027	May 2027
8.2	Deliver on-site and virtual training sessions	JCorp / MARii / MDEC / MARDI	Jun 2027	Jul 2027
9	**Monitor pilot performance & collect data**	**BPEN-J / JAAP**	**Aug 2027**	**Nov 2027**
9.1	Set up data collection protocols & KPIs	JAAP	Aug 2027	Aug 2027
9.2	Collect yield, cost and impact data quarterly	BPEN-J / JAAP	Sep 2027	Nov 2027

Johor Agritech Accelerator Program: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
10	**Mid-term evaluation & refine package**	**JAAP Steering Committee / MARii**	**Dec 2027**	**Mar 2028**
10.1	Analyze pilot data & stakeholder feedback	JAAP Steering Committee / MARii	Dec 2027	Feb 2028
10.2	Update agritech package guidelines & portal features	MARii / FarmByte	Feb 2028	Mar 2028
11	**Phase 1 scale & statewide rollout with ongoing monitoring**	**JAAP Steering Committee / BPEN-J**	**Apr 2028**	**Dec 2030**
11.1	Onboard additional cohort of 30 farms & deploy solutions	Jabatan Pertanian Johor / JAAP Steering Committee	Apr 2028	Dec 2028
11.2	Continue data monitoring & publish biannual impact reports	JAAP Steering Committee / BPEN-J	Jan 2029	Dec 2030

Johor Agritech Accelerator Program: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• No. of demo-hub farms onboarded: 10 • Sensor deployment rate: 100 % • Avg. yield improvement: N/A • Cost savings per farm (RM): N/A	• No. of pilot farms equipped: 10 • Data collection compliance: 90 % • Avg. yield improvement: 10% • Avg. cost savings: RM 1,000/farm	• No. of farms in Phase 1 scale: 30 • Data collection compliance: 95 % • Avg. yield improvement: 12% • Avg. cost savings: RM 1,200/farm	• Cumulative farms covered: 40 • Data collection compliance: 95 % • Avg. yield improvement: 15% • Avg. cost savings: RM 1,200/farm	• Cumulative farms covered: 50 • Data collection compliance: 100 % • Avg. yield improvement: 20% • Avg. cost savings: RM 1,200/farm
Achieved Milestones	• Portal launched & applications open • Demo-hub contracts signed	• Pilot farms onboarded & tech deployed • Training delivered to pilot cohort	• Mid-term evaluation completed • Agritech package refined	• Phase 1 scale started • Cohort onboarding completed	• Ongoing statewide rollout & monitoring • Biannual impact reports ongoing

Johor Agritech Accelerator Program: KPI Dictionary

KPI	No. of farms onboarded
Description	Count of smallholder farms contracted as demo-hubs or in scaled cohorts
Method Of Measurement	Contracts signed and portal registration logs
Achievement Trend	10 (2026) → 50 (2030 onward)
Justification	Measures program reach and adoption among target farmers
Target (Year 2030)	50 farms
Supporting Document	Contract records; portal database
Frequency Of Data Reported	Annual

Johor Agritech Accelerator Program: KPI Dictionary

KPI	Sensor deployment rate (%)
Description	Percentage of onboarded farms equipped with sensors and IoT devices
Method Of Measurement	Deployment checklists vs. total cohort size
Achievement Trend	100 % (2026) maintained
Justification	Ensures technology uptake critical for data-driven agri solutions
Target (Year 2030)	100 %
Supporting Document	Installation reports; service logs
Frequency Of Data Reported	Annual

Johor Agritech Accelerator Program: KPI Dictionary

KPI	Data collection compliance (%)
Description	Proportion of expected data submissions received on schedule
Method Of Measurement	Portal logs of data uploads vs. scheduled submissions
Achievement Trend	90 % (2027) → 95 % (2028 onward)
Justification	Reflects effectiveness of monitoring protocols and training efficacy
Target (Year 2030)	≥ 95 %
Supporting Document	Portal data logs; compliance dashboards
Frequency Of Data Reported	Quarterly

Johor Agritech Accelerator Program: KPI Dictionary

KPI	Avg. yield improvement (%)
Description	Mean percentage increase in crop yield among participating farms compared to baseline
Method Of Measurement	Aggregated yield data vs. baseline measurements
Achievement Trend	N/A → 12 % (2028)
Justification	Demonstrates agronomic impact of precision-agtech interventions
Target (Year 2030)	≥ 12 %
Supporting Document	Yield reports; agronomic studies
Frequency Of Data Reported	Annual

Johor Agritech Accelerator Program: KPI Dictionary

KPI	Avg. cost savings per farm (RM)
Description	Average reduction in input and operational costs per farm, measured in Malaysian Ringgit
Method Of Measurement	Financial surveys and farm-level cost reports
Achievement Trend	RM 1,000 (2027) → RM 1,200 (2028 onward)
Justification	Indicates economic benefits and ROI for participating smallholders
Target (Year 2030)	RM 1,200
Supporting Document	Financial survey data; program reports
Frequency Of Data Reported	Annual

Piloting Johor Agriculture Resilience Insurance Scheme (JARIS) for Smallholders: Milestone

No	Milestones and Key Activities	Responsibility	Planned start date	Planned end date
1	Establish JARIS steering committee & governance framework	Exco Pertanian / BPEN-J	Jan 2026	Feb 2026
2	Define scheme parameters & premium-subsidy structure	Exco Pertanian / BNM	Feb 2026	May 2026
3	Engage financial & technical partners; draft MoUs	Exco Pertanian / AgroBank / MARDI	May 2026	Aug 2026
4	Develop digital enrollment & GIS-mapping platform	Exco Pertanian / BPEN-J / MARDI	Aug 2026	Dec 2026
5	Design risk-assessment protocols & claims workflows	Exco Pertanian / MARDI	Dec 2026	Feb 2027
6	Register & onboard pilot smallholders (target cohort)	Jabatan Pertanian Johor / Exco Pertanian	Feb 2027	May 2027
7	Pilot implementation: premium collection & coverage activation	AgroBank / Exco Pertanian / BPEN-J	May 2027	Aug 2027
8	Conduct flood-loss assessments & mobile payouts	MARDI / Exco Pertanian	Aug 2027	Nov 2027
9	Farmer training & awareness campaign on scheme benefits	Exco Pertanian / MARDI	Nov 2027	Jan 2028
10	Mid-term evaluation & refine scheme design	JARIS Steering Committee / BNM	Jan 2028	Apr 2028
11	Scale pilot for 500 smallholders & ongoing monitoring (2028–2030)	JARIS Steering Committee / BPEN-J	Apr 2028	Dec 2030
			Jan 2026	**Dec 2030**

Piloting Johor Agriculture Resilience Insurance Scheme (JARIS) for Smallholders: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Establish JARIS steering committee & governance framework**	**Exco Pertanian / BPEN-J**	**Jan 2026**	**Feb 2026**
1.1	Draft terms of reference and governance charter	Exco Pertanian / BPEN-J	Jan 2026	Feb 2026
1.2	Invite and onboard committee members (BNM, AgroBank, MARDI)	Exco Pertanian	Jan 2026	Feb 2026
2	**Define scheme parameters & premium-subsidy structure**	**Exco Pertanian / BNM**	**Feb 2026**	**May 2026**
2.1	Model premium rates for staple, industrial, horticulture and livestock crops	Exco Pertanian / BNM	Feb 2026	May 2026
2.2	Set subsidy co-pay levels and draft subsidy disbursement rules	Exco Pertanian	Feb 2026	May 2026
3	**Engage financial & technical partners; draft MoUs**	**Exco Pertanian / AgroBank / MARDI**	**May 2026**	**Aug 2026**
3.1	Hold MoU negotiation workshops with AgroBank, BNM and MARDI	Exco Pertanian	May 2026	Jun 2026
3.2	Finalize and sign partnership agreements	AgroBank / BNM / MARDI	Jul 2026	Aug 2026

Piloting Johor Agriculture Resilience Insurance Scheme (JARIS) for Smallholders: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
4	**Develop digital enrollment & GIS-mapping platform**	**Exco Pertanian / BPEN-J / MARDI**	**Aug 2026**	**Dec 2026**
4.1	Define user requirements and technical architecture	Exco Pertanian / BPEN-J	Aug 2026	Sep 2026
4.2	Build, test and deploy registration portal with MyKad integration	Exco Pertanian / MARDI	Oct 2026	Dec 2026
5	**Design risk-assessment protocols & claims workflows**	**Exco Pertanian / MARDI**	**Dec 2026**	**Feb 2027**
5.1	Draft flood-loss assessment criteria and claim triggers	MARDI	Dec 2026	Jan 2027
5.2	Set up mobile payout process and partner with wallet providers	Exco Pertanian / BPEN-J	Jan 2027	Feb 2027
6	**Register & onboard pilot smallholders (target cohort)**	**Jabatan Pertanian Johor / Exco Pertanian**	**Feb 2027**	**May 2027**
6.1	Publicise pilot enrollment and eligibility via Jabatan Pertanian channels	Jabatan Pertanian Johor	Feb 2027	Mar 2027
6.2	Process applications and issue policy documents	MARDI / AgroBank	Apr 2027	May 2027

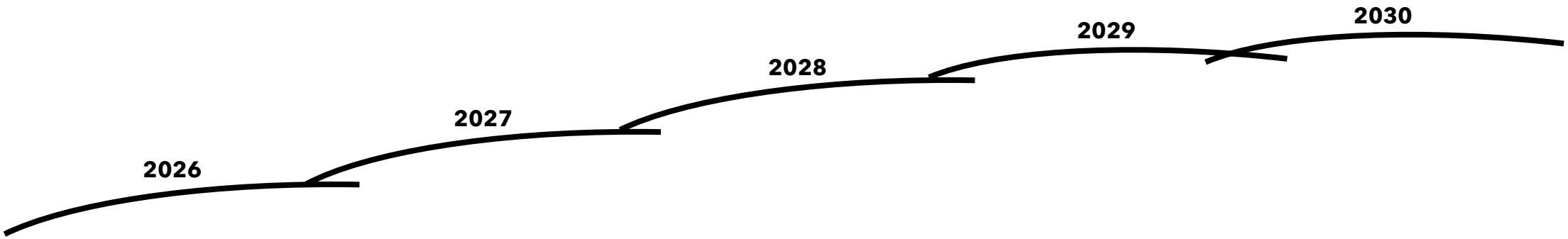
Piloting Johor Agriculture Resilience Insurance Scheme (JARIS) for Smallholders: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
7	**Pilot implementation: premium collection & coverage activation**	**AgroBank / Exco Pertanian / BPEN-J**	**May 2027**	**Aug 2027**
7.1	Collect farmer premiums through AgroBank branches and digital channels	AgroBank	May 2027	Jul 2027
7.2	Activate coverage and send policy confirmations	Exco Pertanian / BPEN-J	Jul 2027	Aug 2027
8	**Conduct flood-loss assessments & mobile payouts**	**MARDI / Exco Pertanian**	**Aug 2027**	**Nov 2027**
8.1	Deploy MARDI/Felcra drone teams to inspect affected parcels	MARDI	Aug 2027	Sep 2027
8.2	Validate claims and execute payouts to farmers' mobile wallets	Exco Pertanian / BPEN-J	Oct 2027	Nov 2027
9	**Farmer training & awareness campaign**	**Exco Pertanian / MARDI**	**Nov 2027**	**Jan 2028**
9.1	Develop training materials and awareness toolkits	MARDI	Nov 2027	Dec 2027
9.2	Conduct in-field workshops and distribute materials	Exco Pertanian	Dec 2027	Jan 2028

Piloting Johor Agriculture Resilience Insurance Scheme (JARIS) for Smallholders: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
10	**Mid-term evaluation & refine package**	**JARIS Steering Committee / BNM**	**Jan 2028**	**Apr 2028**
10.1	Analyze pilot claims data, subsidy rates and farmer feedback	JARIS Steering Committee / BNM	Jan 2028	Feb 2028
10.2	Update scheme parameters, platform features and partner roles	Exco Pertanian / MARDI	Mar 2028	Apr 2028
11	**Scale pilot for 500 smallholders & ongoing monitoring**	**JARIS Steering Committee / BPEN-J**	**Apr 2028**	**Dec 2030**
11.1	Launch expanded enrollment round for additional smallholders	Jabatan Pertanian Johor / Exco Pertanian	Apr 2028	Dec 2028
11.2	Monitor enrollment, claims frequency and financial sustainability monthly	JARIS Steering Committee / BPEN-J	Dec 2028	Dec 2030

Piloting Johor Agriculture Resilience Insurance Scheme (JARIS) for Smallholders: KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• Pilot smallholders onboarded: 100 • Premium subsidy disbursed (RM m): 0.6 • Claims processed: 0 • Avg. payout time (days): N/A	• Pilot smallholders onboarded: 100 • Premium subsidy disbursed (RM m): 0.6 • Claims processed: 25 • Avg. payout time (days): 20	• Cumulative smallholders covered: 150 • Premium subsidy disbursed (RM m): 1.0 • Claims processed: 50 • Avg. payout time (days): 20	• Cumulative smallholders covered: 150 • Premium subsidy disbursed (RM m): 1.0 • Claims processed: 50 • Avg. payout time (days): 15	• Cumulative smallholders covered: 200 • Premium subsidy disbursed (RM m): 1.0 • Claims processed: 75 • Avg. payout time (days): 15
Achieved Milestones	• Steering committee formed • Scheme parameters defined	• Pilot rollout commenced • Digital platform live	• Mid-term evaluation completed • First claims assessed & paid	• Expanded enrollment launched • 450 smallholders covered	• Ongoing monitoring & reporting in place • Biannual impact reports ongoing

Piloting Johor Agriculture Resilience Insurance Scheme (JARIS) for Smallholders: KPI Dictionary

KPI	Pilot smallholders onboarded
Description	Number of smallholder farmers enrolled in the JARIS scheme
Method Of Measurement	Enrollment logs in digital platform
Achievement Trend	0 → 200 (pilot) → 500 (scale)
Justification	Tracks scheme uptake and social protection reach
Target (Year 2030)	700 farmers
Supporting Document	Platform enrollment records
Frequency Of Data Reported	Annual

Piloting Johor Agriculture Resilience Insurance Scheme (JARIS) for Smallholders: KPI Dictionary

KPI	Premium subsidy disbursed (RM million)
Description	Total value of premium subsidies paid by the state government
Method Of Measurement	Financial disbursement records
Achievement Trend	RM 1.2 m/year during pilot; RM 3.0 m/year at scale
Justification	Reflects fiscal support level and budget utilization
Target (Year 2030)	RM 4.2 m
Supporting Document	Treasury disbursement vouchers
Frequency Of Data Reported	Annual

Piloting Johor Agriculture Resilience Insurance Scheme (JARIS) for Smallholders: KPI Dictionary

KPI	Claims processed
Description	Number of insurance claims submitted and processed
Method Of Measurement	Claims management system logs
Achievement Trend	0 (2026) → 200 (2028 onward)
Justification	Measures scheme responsiveness and risk protection effectiveness
Target (Year 2030)	200 claims
Supporting Document	Claims database export
Frequency Of Data Reported	Semi-annual

Piloting Johor Agriculture Resilience Insurance Scheme (JARIS) for Smallholders: KPI Dictionary

KPI	Avg. payout time (days)
Description	Average duration from claim submission to payout transfer
Method Of Measurement	Timestamp difference in claims system
Achievement Trend	N/A → 15 days by 2028
Justification	Indicates efficiency of the claims process and digital payout mechanism
Target (Year 2030)	≤ 15 days
Supporting Document	System workflow logs
Frequency Of Data Reported	Quarterly

Enhancing Forest City-Special Financial Zone (FC-SFZ): Milestones

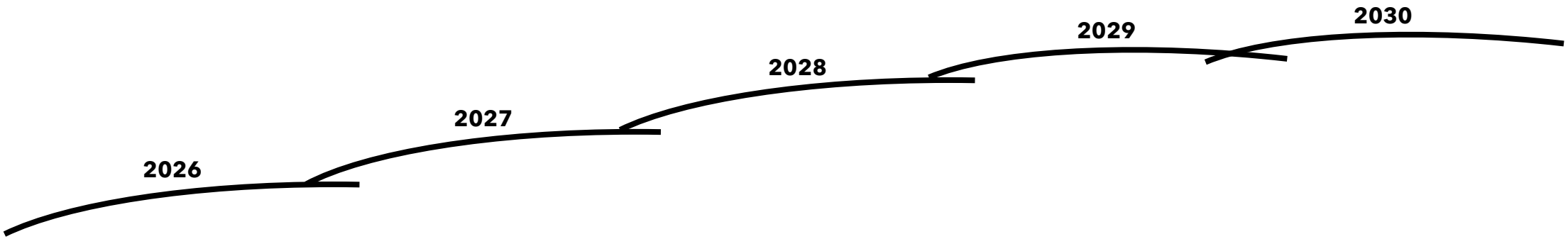
No	Milestones and Key Activities	Responsibility	Planned start date	Planned end date
1	Form FC-SFZ Anchor-Investor Steering Committee (State Investment Office, SFZ Management Office, MIDA, Bank Negara liaison) and approve governance charter	State Investment and Trade EXCO	Jan 2026	Feb 2026
2	Conduct strategic review of existing incentives and identify enhancement areas (tax, customs, FX, talent)	State Investment and Trade EXCO	Feb 2026	May 2026
3	Convene "FC-SFZ Forum" with prospective and incumbent financial institutions to gather feedback and co-create next-phase enhancements	State Investment and Trade EXCO	May 2026	Oct 2026
			Jan 2026	**Oct 2026**

Milestones and implementation plan outlined above to be refined and expanded following a comprehensive strategic review and in-depth analysis of the Forest City SFZ's current performance, stakeholder needs, and comparative benchmarks in the following phase

Enhancing Forest City-Special Financial Zone (FC-SFZ): Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Form FC-SFZ Anchor-Investor Steering Committee**	**State Investment and Trade EXCO**	**Jan 2026**	**Feb 2026**
1.1	Identify and appoint committee members	State Investment and Trade EXCO	Jan 2026	Jan 2026
1.2	Draft Terms of Reference and governance roles for the committee	State Investment and Trade EXCO	Jan 2026	Feb 2026
1.3	Convene inaugural meeting to validate scope, workstreams and decision-rights	State Investment and Trade EXCO	Jan 2026	Feb 2026
2	**Strategic review of existing incentives and gap identification**	**State Investment and Trade EXCO**	**Feb 2026**	**May 2026**
2.1	Inventory review of incentives, policies and roadblocks	State Investment and Trade EXCO	Feb 2026	Feb 2026
2.2	Benchmarking exercise against Singapore, KL and peer jurisdictions	State Investment and Trade EXCO	Apr 2026	May 2026
2.3	Prioritisation of enhancement areas and validation with key stakeholders (including industry players)	State Investment and Trade EXCO	Apr 2026	May 2026
3	**Hosting of "FC-SFZ Forum"**	**Bank Negara Malysia, State Investment and Trade EXCO**	**May 2026**	**Oct 2026**
3.1	Host forum: progress presentations, round-tables and co-creation workshops	Bank Negara Malysia, State Investment and Trade EXCO	May 2026	Jun 2026
3.2	Capture insights, develop action plans and publish post-forum summary	Bank Negara Malysia, State Investment and Trade EXCO	Jul 2026	Oct 2026

Enhancing Forest City-Special Financial Zone (FC-SFZ): KPI



	2026	2027	2028	2029	2030
Initiative KPIs	• 1st FC-SFZ Forum: ≥ 50 participants	• NA	• NA	• NA	• NA
Achieved Milestones	• Steering Committee formed and governance charter approved • Strategic review completed (incentive gap analysis) • Development of FC-SFZ Masterplan	• Execution of action plan	• NA	• NA	• NA

Enhancing Forest City-Special Financial Zone (FC-SFZ): KPI Dictionary

KPI	1st FC-SFZ Forum: ≥ 50 participants
Description	Number of participants who attended the FC-SFZ Forum
Method Of Measurement	Number of participants / attendees
Achievement Trend	N/A
Justification	Ensures a credible, diverse cohort of banks, asset managers, fintechs and family offices—demonstrating market confidence, generating robust feedback and catalyzing network effects among anchor investors
Target (Year 2030)	≥ 250 participants
Supporting Document	NA
Frequency Of Data Reported	NA

Talent and Capacity Building.

Disclaimer Notes

The detailed implementation plan and Key Performance Indicators (KPIs) outlined in this report were developed for the purpose of the study, drawing largely—but not entirely—from inputs and advice provided by the respective stakeholders.

For initiatives or components where direct stakeholder input was not available due to various limitations, PEMANDU has taken the liberty to draft the milestones, action plans, and KPIs based on known best practices and reference processes available at the time of writing of this study. These milestones, action plans, and KPIs are therefore indicative and intended to provide direction, but do not constitute a finalised monitoring and evaluation framework.

PEMANDU recommends that, upon commencement of implementation, these components be revisited, validated, and finalised by the relevant authorities and stakeholders to ensure accuracy, ownership, and alignment before being formally adopted for monitoring and evaluation.

Public-Private Partnership for Johor Nursing Programme: Key Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
1	Programme kick-off with coordinating taskforce	JKN Johor	Sep 2025	Sep 2025
2	Establish consortium of participating hospitals and universities	Taskforce	Sep 2025	Oct 2025
3	Develop shared curriculum and mapping of shared resources	Taskforce	Oct 2025	Nov 2025
4	Develop framework for tuition subsidy and funding	Taskforce	Nov 2025	Jan 2026
5	Obtain accreditation with academic partners	Taskforce	Nov 2025	Feb 2026
6	Design career progression framework	Taskforce	Feb 2026	Feb 2026
7	Student recruitment and outreach	JTDC	Feb 2026	Mar 2026
8	Teacher training and course preparation	Taskforce	Feb 2026	Mar 2026
9	Continuous monitoring, evaluation and reporting	JKN Johor	Apr 2026	Oct 2026
			Sep 2025	**Oct 2026**

Public-Private Partnership for Johor Nursing Programme: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Programme kick-off with coordinating taskforce**	**JKN Johor**	**Sep 2025**	**Sep 2025**
1.1	Stakeholder workshop with KKM hospitals, private hospitals and nursing schools / universities, and government agencies	JKN Johor	Sep 2025	Sep 2025
1.2	Leverage Nursing Shortage taskforce and governance structure for programme	JKN Johor	Sep 2025	Sep 2025
2	**Establish consortium of participating hospitals and universities**	**Taskforce**	**Sep 2025**	**Oct 2025**
2.1	Identify key institutions and hospitals to join consortium	IRDA, JKN Johor	Sep 2025	Sep 2025
2.2	Sign MOUs for resource-sharing between consortium	Taskforce	Oct 2025	Oct 2025
3	**Develop shared curriculum and mapping of shared resources**	**Taskforce**	**Oct 2025**	**Nov 2025**
3.1	Conduct inventory audit of labs, equipment and clinical educators	Taskforce	Oct 2025	Oct 2025
3.2	Review existing curricula and develop joint curriculum	Taskforce	Nov 2025	Nov 2025
3.3	Develop schedule for public-private rotation blocks, simulation labs and shared modules	Taskforce	Nov 2025	Nov 2025

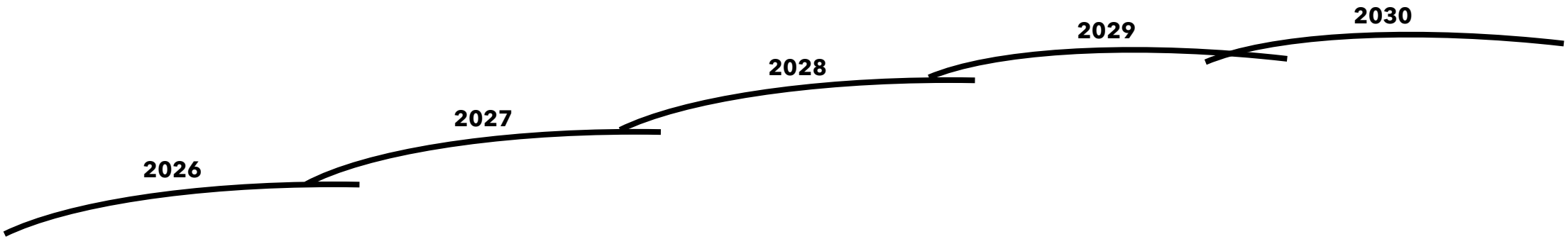
Public-Private Partnership for Johor Nursing Programme: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
4	**Develop framework for tuition subsidy and funding**	**Taskforce**	**Nov 2025**	**Jan 2026**
4.1	Define eligibility and terms of 5-year service bond	Taskforce	Nov 2025	Nov 2025
4.2	Meeting with HRD Corp to align and integrate existing incentive schemes	Taskforce	Nov 2025	Nov 2025
4.3	Establish co-funding share between hospital partners	Taskforce	Jan 2026	Jan 2026
5	**Obtain accreditation with academic partners**	**Taskforce**	**Nov 2025**	**Feb 2026**
5.1	Shortlist university partners (both local and global) for engagement	Taskforce	Nov 2025	Nov 2025
5.2	Share curriculum for review and accreditation	Taskforce	Jan 2026	Jan 2026
5.3	Explore accreditation for microcredentials	Taskforce	Feb 2026	Feb 2026
6	**Design career progression framework**	**Taskforce**	**Feb 2026**	**Feb 2026**
6.1	Design performance-linked promotion pathways	Taskforce	Feb 2026	Feb 2026
6.2	Benchmarking analysis of job titles and salary ladders against market in Johor and Singapore	Taskforce	Feb 2026	Feb 2026
6.3	Draft career pathway for participating students	Taskforce	Feb 2026	Feb 2026

Public-Private Partnership for Johor Nursing Programme: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
7	**Student recruitment and outreach**	**JTDC**	**Feb 2026**	**Mar 2026**
7.1	Identify participating schools for outreach, such as Sekolah Perintis Bangsa Johor and TVET institutions	JTDC	Feb 2026	Feb 2026
7.2	Develop career awareness campaign for nurses (social media and roadshows)	JTDC	Feb 2026	Feb 2026
7.3	Organise roadshow and info sessions across 4 regions (North, South, East and West)	JTDC	Mar 2026	Mar 2026
8	**Teacher training and course preparation**	**Taskforce**	**Feb 2026**	**Mar 2026**
8.1	Organise workshop for faculty across all participating hospitals to align on training methods and curriculum	Taskforce	Feb 2026	Mar 2026
9	**Continuous monitoring, evaluation and reporting**	**JKN Johor**	**Apr 2026**	**Oct 2026**
9.1	Design digital reporting dashboard to track student, employment and retention outcomes	Taskforce	Apr 2026	Apr 2026
9.2	Monthly progress reviews with taskforce	JKN Johor	Apr 2026	Oct 2026

Public-Private Partnership for Johor Nursing Programme: KPIs



	2026	2027	2028	2029	2030
Initiative KPIs	• No. of new nurses enrolled: 200 • No. of returning nurses from abroad: 50 • Average nurse to patient ratio: 1 to 9 • Nurse retention rate: 70%	• No. of new nurses enrolled: 200 • No. of returning nurses from abroad: 100 • Average nurse to patient ratio: 1 to 8 • Nurse retention rate: 75%	• No. of new nurses enrolled: 200 • No. of returning nurses from abroad: 150 • Average nurse to patient ratio: 1 to 7 • Nurse retention rate: 80%	• No. of new nurses enrolled: 200 • No. of returning nurses from abroad: 150 • Average nurse to patient ratio: 1 to 6 • Nurse retention rate: 85%	• No. of new nurses enrolled: 200 • No. of returning nurses from abroad: 150 • Average nurse to patient ratio: 1 to 5 • Nurse retention rate: 85%
Achieved Milestones	• Launch of programme outreach and student intake • Monitoring and reporting	• Continued programme operations • Monitoring and reporting	• Continued programme operations • Monitoring and reporting	• Continued programme operations • Monitoring and reporting	• Continued programme operations • Monitoring and reporting

Public-Private Partnership for Johor Nursing Programme: KPI Dictionary

KPI	No. of new nurses enrolled
Description	Total number of students enrolled in the co-training nursing programme each year.
Method Of Measurement	Verified enrolment records collected from partner institutions.
Achievement Trend	Information on number of new nurses in Johor is currently unavailable, but historical trends on total number of nurses in Johor show increases of 200-300 nurses annually.
Justification	The number of new nurses enrolled in this programme in Johor indicates effectiveness of public campaigns and student outreach, as well hypothesis on pull factors.
Target (Year 2030)	200
Supporting Document	Enrolment records, Ministry of Health Indicators Report
Frequency Of Data Reported	Annually

Public-Private Partnership for Johor Nursing Programme: KPI Dictionary

KPI	No. of returning nurses from abroad
Description	Number of private hospitals participating in consortium
Method Of Measurement	Employer reporting based on candidate self survey during job applications
Achievement Trend	No available data on number of nurses currently working abroad. Continued measurement will generate new insights about the success of the programme.
Justification	Malaysia has thousands of trained nurses working abroad; tapping into this talent pool can fill gaps faster than new training. High retention from candidates returning abroad supports a high-quality, more experienced talent base, as well as validate the hypothesis on pull factors for this group of nurses.
Target (Year 2029)	150
Supporting Document	Annual report from employers
Frequency Of Data Reported	Annually

Public-Private Partnership for Johor Nursing Programme: KPI Dictionary

KPI	Average nurse to patient ratio
Description	Number of private hospitals participating in consortium
Method Of Measurement	Collected via hospital reporting on: Total number of patients admitted to a ward/unit per day or per shift (Numerator) and Number of active-duty nurses assigned to that ward/unit on the same shift (Denominator), averaged across all hospitals.
Achievement Trend	Current data suggests that the nurse to patient ratio in public hospitals is 1:14; this ratio is likely lower in private hospitals, with actual data unavailable. Both ratios are higher than the WHO recommended ratio of 1:4.
Justification	High nurse-to-patient ratios are correlated with increased medical errors, burnout, and lower quality of care. Moving to a 1:5 ratio ensures safe workloads and better health outcomes, especially in critical sectors like aged care and diagnostics.
Target (Year 2029)	Reduce to 1:5 over the next 5 years to align with WHO and OECD recommendations.
Supporting Document	Shift allocation plans and audit summaries submitted by hospitals to JKN Johor
Frequency Of Data Reported	Quarterly

Public-Private Partnership for Johor Nursing Programme: KPI Dictionary

KPI	Nurse retention rate
Description	% of programme graduates who remain employed in Johor-based hospitals or clinics (public/private) for at least 5 years
Method Of Measurement	Cross-check via employment contracts, SOCSO/EPF contributions, and tracking of bonded service agreements
Achievement Trend	2,141 nurses have left the Malaysian public health sector between 2020 and 2024, comprising 1,754 permanent staff and 387 contract staff. There is no available breakdown for Johor at the state level.
Justification	This indicator links directly to the programme's key objective to grow and sustain the size of the nursing workforce in Johor.
Target (Year 2029)	85%
Supporting Document	Annual staffing reports by hospitals
Frequency Of Data Reported	Annually, tracked for 5 years post-graduation by JKN Johor and JTDC

Dual Licensing for Singapore-Registered Specialists: Key Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
1	Formation of dedicated taskforce for cross-border specialist doctors	IRDA	Oct 2025	Oct 2025
2	Establish consortium of partner hospitals	IRDA	Oct 2025	Nov 2025
3	Identify areas of specialisation in critical need of talent	Taskforce	Nov 2025	Dec 2025
4	Legal review of dual practicing terms	Taskforce	Dec 2025	Feb 2026
5	Interview and application process for pilot candidates	Hospitals	Feb 2026	Mar 2026
6	Supporting logistics for part-time operations in JS-SEZ	Hospitals	Apr 2026	May 2026
7	Implement automatic NSR registration	NSR	May 2026	Jul 2026
8	Pilot phase implementation	IRDA	Jul 2026	Sep 2026
9	Review of pilot phase	Taskforce	Oct 2026	Oct 2026
10	Full launch of application intake	IRDA	Nov 2026	Nov 2027
11	Monitoring and reporting	IRDA	Nov 2026	Nov 2027
			Oct 2025	Nov 2027

Dual Licensing for Singapore-Registered Specialists: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Formation of dedicated taskforce**	**IRDA**	**Oct 2025**	**Oct 2025**
1.1	Conduct project kickoff meeting with MOH, NSR, IRDA and BPEN	IRDA	Oct 2025	Oct 2025
1.2	Form working taskforce and define TOR, project timeline, and key responsibilities	IRDA	Oct 2025	Oct 2025
2	**Establish consortium of partner hospitals**	**IRDA**	**Oct 2025**	**Nov 2025**
2.1	Shortlist JS-SEZ hospitals for pilot participation	IRDA	Oct 2025	Oct 2025
2.2	Host roundtable to discuss part-time licensing terms, responsibilities and needs/workforce gaps	IRDA	Nov 2025	Nov 2025
2.3	Sign MOUs with hospital consortium	IRDA	Nov 2025	Nov 2025
3	**Identify areas of specialisation in critical need of talent**	**Taskforce**	**Nov 2025**	**Dec 2025**
3.1	Conduct skills gap analysis using data from private hospitals	Taskforce	Nov 2025	Nov 2025
3.2	Publish prioritised list of specialisations covered under Dual License	Taskforce	Dec 2025	Dec 2025

Dual Licensing for Singapore-Registered Specialists: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
4	**Legal review of dual practicing terms**	**Taskforce**	**Dec 2025**	**Feb 2026**
4.1	Draft legal contract templates with dual practice terms	Taskforce	Dec 2025	Jan 2026
4.2	Obtain vetting from NSR, Department of Immigration and Ministry of Health	Taskforce	Jan 2026	Jan 2026
4.3	Obtain legal vetting and consortium sign-off	Taskforce	Jan 2026	Feb 2026
4.4	Distribute offer templates to pilot hospitals	Taskforce	Feb 2026	Feb 2026
5	**Interview and application process for pilot candidates**	**Hospitals**	**Feb 2026**	**Mar 2026**
5.1	Request nominations from consortium, Singapore Medical Council and Ministry of Health	Hospitals	Feb 2026	Feb 2026
5.2	Shortlist candidates based on specialisation match	Hospitals	Feb 2026	Feb 2026
5.3	Send interview invites and information package	Hospitals	Feb 2026	Feb 2026
5.4	Candidates to submit applications	Hospitals	Mar 2026	Mar 2026
5.5	Review credentials and verify Singapore registration	Hospitals	Mar 2026	Mar 2026
5.6	Conduct interviews with shortlisted candidates	Hospitals	Mar 2026	Mar 2026
5.7	Issue conditional employment offers	Hospitals	Mar 2026	Mar 2026

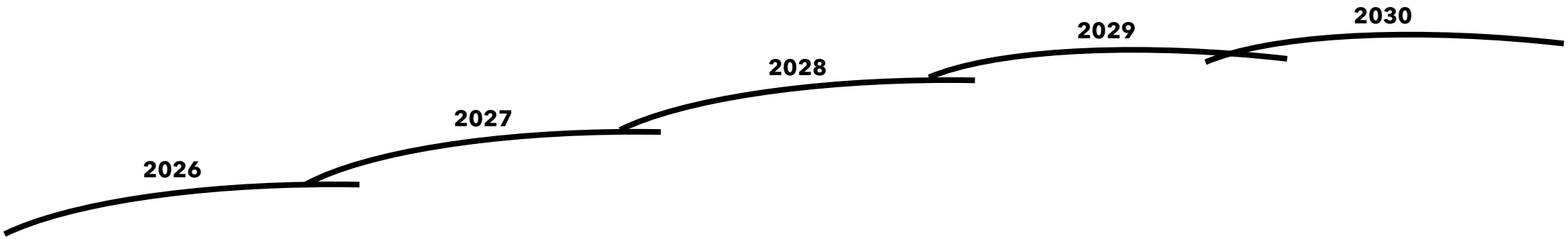
Dual Licensing for Singapore-Registered Specialists: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
6	**Supporting logistics for part-time operations in JS-SEZ**	**Hospitals**	**Apr 2026**	**May 2026**
6.1	Identify clinic/office space allocation for approved specialists	Hospitals	Apr 2026	May 2026
6.2	Prepare clinic/offices with required equipment	Hospitals	Apr 2026	May 2026
6.3	Apply for necessary premise license	Hospitals	May 2026	May 2026
7	**Implement automatic NSR registration**	**NSR**	**May 2026**	**Jul 2026**
7.1	Develop protocol for cross-checking with Singapore Medical Council	NSR	May 2026	May 2026
7.2	Pilot digital submission and approval workflow	NSR	May 2026	May 2026
7.3	Develop license scheme guidelines	NSR	Jun 2026	Jun 2026
7.4	Obtain approval for regulatory compliance by both NSR and SMC	NSR	Jul 2026	Jul 2026
8	**Pilot phase implementation**	**IRDA**	**Jul 2026**	**Sep 2026**
8.1	Issue dual-license to pilot participants	IRDA	Jul 2026	Jul 2026
8.2	Ongoing support and problem-solving for participants	IRDA	Jul 2026	Sep 2026

Dual Licensing for Singapore-Registered Specialists: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
9	**Review of pilot phase**	**Taskforce**	**Oct 2026**	**Oct 2026**
9.1	Workshop session with consortium and pilot participants to collect and consolidate feedback	Taskforce	Oct 2026	Oct 2026
9.2	Review of dual-license guidelines	Taskforce	Oct 2026	Oct 2026
10	**Full launch of application intake**	**IRDA**	**Nov 2026**	**Nov 2027**
10.1	Publish license scheme and policy notification on MOH and NSR portals	IRDA	Nov 2026	Nov 2026
10.2	Hold press briefing with media and hospital CEOs	IRDA	Nov 2026	Nov 2026
10.3	Open license intake portal for Singaporean specialists	IRDA	Nov 2026	Nov 2026
11	**Monitoring and reporting**	**IRDA**	**Nov 2026**	**Nov 2027**
11.1	Track KPIs for service delivery, license uptake and knowledge sharing	IRDA	Nov 2026	Nov 2026
11.2	Develop data dashboard for performance tracking	IRDA	Nov 2026	Nov 2026
11.3	Publish biannual report with policy insights and feedback	IRDA	May 2027	Nov 2027

Dual Licensing for Singapore-Registered Specialists: KPIs



	2026	2027	2028	2029	2030
Initiative KPIs	• No. of partner hospitals signed: 5 • Time to process NSR registration: 15 working days • No. of dual licenses issued: 10 • % of licensed specialists practicing onsite: 90% • Average clinical hours per specialist: 12 hours • Participant satisfaction score: 4.0/5	• No. of partner hospitals signed: 10 • Time to process NSR registration: 15 working days • No. of dual licenses issued: 30 • % of licensed specialists practicing onsite: 90% • Average clinical hours per specialist: 12 hours • Participant satisfaction score: 4.2/5	• No. of partner hospitals signed: 15 • Time to process NSR registration: 15 working days • No. of dual licenses issued: 40 • % of licensed specialists practicing onsite: 90% • Average clinical hours per specialist: 12 hours • Participant satisfaction score: 4.5/5	• No. of partner hospitals signed: 15 • Time to process NSR registration: 15 working days • No. of dual licenses issued: 40 • % of licensed specialists practicing onsite: 90% • Average clinical hours per specialist: 12 hours • Participant satisfaction score: 4.5/5	• No. of partner hospitals signed: 15 • Time to process NSR registration: 15 working days • No. of dual licenses issued: 40 • % of licensed specialists practicing onsite: 90% • Average clinical hours per specialist: 12 hours • Participant satisfaction score: 4.5/5
Achieved Milestones	• Implement automatic NSR registration • Pilot phase implementation	• Full launch of application intake • Monitoring and reporting	• Full launch of application intake • Monitoring and reporting	• Full launch of application intake • Monitoring and reporting	• Full launch of application intake • Monitoring and reporting

Dual Licensing for Singapore-Registered Specialists: KPI Dictionary

KPI	No. of partner hospitals signed
Description	Number of private hospitals participating in consortium
Method Of Measurement	Number of MOUs
Achievement Trend	N/A
Justification	The number of participating partner hospitals demonstrates private sector appetite for this initiative, as well as an accurate representation of the needs across the private healthcare sector for areas of specialisation. This can inform future policy and programmes to train Malaysian specialists.
Target (Year 2029)	15
Supporting Document	MOUs
Frequency Of Data Reported	Annually

Dual Licensing for Singapore-Registered Specialists: KPI Dictionary

KPI	No. of candidates interviewed
Description	No. of eligible Singapore-registered specialists shortlisted for interview for dual license
Method Of Measurement	No. of candidates interviewed
Achievement Trend	N/A
Justification	Tracking this indicator will illustrate interest and availability of talent from Singapore, to justify this cross-border licensing structure. A larger number of candidates and a competitive interview process strengthens both the programme's reputation and Johor's position as an upcoming medical hub for high quality services.
Target (Year 2025)	25
Supporting Document	N/A
Frequency Of Data Reported	6 months

Dual Licensing for Singapore-Registered Specialists: KPI Dictionary

KPI	Time to process NSR registration
Description	Average duration of a Singapore-registered doctor to obtain a dual practice license from Malaysia's NSR
Method Of Measurement	Calculation of average number of days from submission of application to receipt of application outcome
Achievement Trend	N/A
Justification	This indicator underscores the initiative's core purpose: delivering a streamlined and efficient pathway to practice in Johor, filling in urgent gaps in the local workforce. Delays must be monitored and addressed to avoid undermining its purpose. A healthy indicator positions Johor as an agile talent destination with ease of doing business and workforce planning.
Target (Year 2029)	15 days
Supporting Document	Submission timeline from application portal
Frequency Of Data Reported	6 months

Dual Licensing for Singapore-Registered Specialists: KPI Dictionary

KPI	No. of dual licenses issued
Description	Number of dual licenses issued by the NSR for Singapore-registered doctors to practice within the JS-SEZ
Method Of Measurement	Number of dual licenses issued by the NSR
Achievement Trend	N/A
Justification	The number of issued licenses is the clearest indicator of this initiative's operational readiness. Issued licenses support broader SEZ branding and boost investor confidence that Johor is exploring innovative, proactive ways to address talent shortages, and improve the quality of its hospital investments.
Target (Year 2029)	40
Supporting Document	List of licenses issued by NSR
Frequency Of Data Reported	6 months

Dual Licensing for Singapore-Registered Specialists: KPI Dictionary

KPI	% of licensed specialists practicing onsite
Description	The percentage of licensed specialists practicing onsite in Johor within 2 months of receiving a license, out of the total number of specialists issued a dual practicing license
Method Of Measurement	Mandatory survey issued to participating hospitals and licensed specialists
Achievement Trend	N/A
Justification	Tracking this indicator will ensure that issued licenses are being used as intended – a low uptake suggests that specialists might be facing administrative issues, hospital/facility delays, or poor onboarding that can be duly addressed by the taskforce. Licensed specialists will benefit Johor's medical ecosystem by integrating into hospital operations, providing opportunities for medical interns and local upskilling, and most importantly, benefiting patients in need of additional specialist capacity in critical areas.
Target (Year 2029)	90%
Supporting Document	Self-reporting survey issued to participating hospitals and licensed specialists under this scheme
Frequency Of Data Reported	Within 2 months of receiving license

Dual Licensing for Singapore-Registered Specialists: KPI Dictionary

KPI	Average clinical hours per specialist
Description	Reported average number of hours spent in active clinical, surgery or consultation-related activities in Johor
Method Of Measurement	Mandatory survey issued to all licensed specialists
Achievement Trend	N/A
Justification	The dual license must translate into substantive time spent in clinics, surgeries or patient consultations, avoiding token affiliation with participating hospitals. This allows for meaningful and material contribution to patient service time in identified high-need areas, justifying the public and regulatory effort and cost. This data is also valuable to participating hospitals, to estimate patient throughput and resource allocation of nurses, diagnostic services, etc.
Target (Year 2029)	12 hours
Supporting Document	Self-reporting survey issued to licensed specialists under this scheme
Frequency Of Data Reported	6 months

Dual Licensing for Singapore-Registered Specialists: KPI Dictionary

KPI	Participant satisfaction score
Description	Rating out of 5 by participating private hospitals and specialists (1 – Very Dissatisfied; 5 – Very Satisfied), including breakdown by category
Method Of Measurement	Mandatory survey issued to all participating hospitals and licensed specialists
Achievement Trend	N/A
Justification	This indicator can be further broken down into two categories: employer satisfaction, and employee satisfaction. Satisfaction surveys will offer qualitative insights into friction points that can inform future policy iterations, such as processing delays, performance gaps, policy clarity. Positive feedback from anchor hospitals builds momentum to encourage other hospitals to participate in the scheme, and other specialists to find value in working in Johor.
Target (Year 2029)	4.5/5
Supporting Document	Self-reporting survey issued to participating hospitals and licensed specialists under this scheme
Frequency Of Data Reported	6 months

JS-SEZ Productivity-Linked Wage Policy: Key Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
1	Policy kick-off and establishment of multi-agency steering committee	BPEN-J	Feb 2026	Feb 2026
2	Analysis of sector-specific needs to determine productivity gap and target worker profiles	BPEN-J	Mar 2026	Apr 2026
3	Develop wage-productivity guidelines	BPEN-J	Apr 2026	May 2026
4	Design funding and subsidy mechanism in consultation with Ministry of Finance	BPEN-J	May 2026	Jun 2026
5	Integrate training and skills development requirements and offerings	JTDC	Jun 2026	Jul 2026
6	Conduct stakeholder engagement and awareness campaign	IRDA	Jul 2026	Aug 2026
7	Establish monitoring, reporting and evaluation framework	BPEN-J	Aug 2026	Sep 2026
8	Select and onboard pilot companies in JS-SEZ	IRDA	Sep 2026	Sep 2026
9	Launch of pilot phase implementation in JS-SEZ	BPEN-J	Oct 2026	Mar 2027
10	Interim review of pilot phase at 6-month mark	BPEN-J	Apr 2027	Apr 2027
11	Comprehensive assessment of pilot impact upon conclusion	BPEN-J	Sep 2027	Nov 2027
			Feb 2026	**Nov 2027**

JS-SEZ Productivity-Linked Wage Policy: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Policy kick-off and establishment of multi-agency steering committee**	**BPEN-J**	**Feb 2026**	**Feb 2026**
1.1	Conduct initial stakeholder consultations (State Govt., MOHR, employers in tourism and healthcare)	BPEN-J	Feb 2026	Feb 2026
1.2	Establish a multi-agency steering committee with clear governance structure and terms of reference	BPEN-J	Feb 2026	Feb 2026
1.3	Define timeline, scope and objectives of programme	Steering Committee	Feb 2026	Feb 2026
2	**Analysis of sector-specific needs to determine productivity gap and target worker profiles**	**BPEN-J**	**Mar 2026**	**Apr 2026**
2.1	Conduct productivity gap analysis in tourism and healthcare sectors specific to Johor	BPEN-J	Mar 2026	Mar 2026
2.2	Benchmark wages against market rates in Johor and key competitor markets	BPEN-J	Mar 2026	Mar 2026
2.3	Identify target worker profiles for pilot phase	BPEN-J	Apr 2026	Apr 2026
2.4	Review and confirm list of eligible occupations	Steering Committee	Apr 2026	Apr 2026
3	**Develop wage-productivity guidelines**	**BPEN-J**	**Apr 2026**	**May 2026**
3.1	Draft initial productivity-linked wage guidelines and incentive structure	BPEN-J	Apr 2026	Apr 2026

JS-SEZ Productivity-Linked Wage Policy: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
3	**Develop wage-productivity guidelines (cont.)**	**BPEN-J**	**Apr 2026**	**May 2026**
3.2	Validate guidelines through workshop with JS-SEZ employer and employee groups in target sectors	BPEN-J	Apr 2026	Apr 2026
3.3	Validate guidelines with Malaysia Productivity Corporation and federal agencies	BPEN-J	May 2026	May 2026
3.4	Validate guidelines with JS-SEZ Singaporean counterparts	BPEN-J	May 2026	May 2026
4	**Design funding and subsidy mechanism with MOF**	**BPEN-J**	**May 2026**	**Jun 2026**
4.1	Develop co-funding and subsidy models (state/private sector split)	BPEN-J	May 2026	May 2026
4.2	Determine eligibility criteria and application processes	BPEN-J	May 2026	Jun 2026
4.3	Establish funding administration guidelines	BPEN-J	Jun 2026	Jun 2026
5	**Integrate training and skills development requirements and offerings**	**JTDC**	**Jun 2026**	**Jul 2026**
5.1	Map and integrate training courses with PWP wage progression requirements	JTDC	Jun 2026	Jun 2026
5.2	Engage HRD Corp to identify existing and/or new relevant microcredentials and pathways	JTDC	Jul 2026	Jul 2026
5.3	Establish partnerships with local TVET and higher education institutions to deliver training	JTDC	Jul 2026	Jul 2026

JS-SEZ Productivity-Linked Wage Policy: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
6	**Conduct stakeholder engagement and awareness campaign**	**IRDA**	**Jul 2026**	**Aug 2026**
6.1	Design and launch PWP public awareness campaign	IRDA	Jul 2026	Jul 2026
6.2	Host information session for JS-SEZ employers	IRDA	Jul 2026	Jul 2026
6.3	Create digital platform and FAQ resource for employers and employees	IRDA	Aug 2026	Aug 2026
6.4	Establish contact point to facilitate employer queries and implementation	IRDA	Aug 2026	Aug 2026
7	**Establish monitoring, reporting and evaluation framework**	**BPEN-J**	**Aug 2026**	**Sep 2026**
7.1	Distribute productivity tracking tools	BPEN-J	Aug 2026	Aug 2026
7.2	Establish dashboards for productivity and wages	BPEN-J	Aug 2026	Sep 2026
8	**Select and onboard pilot companies in JS-SEZ**	**IRDA**	**Sep 2026**	**Sep 2026**
8.1	Open nomination of pilot companies, prioritising anchor firms in the sector	IRDA	Sep 2026	Sep 2026
8.2	Evaluate and select pilot companies to ensure representation across size and district	IRDA	Sep 2026	Sep 2026
8.3	Conduct onboarding workshop for pilot companies	IRDA	Sep 2026	Sep 2026

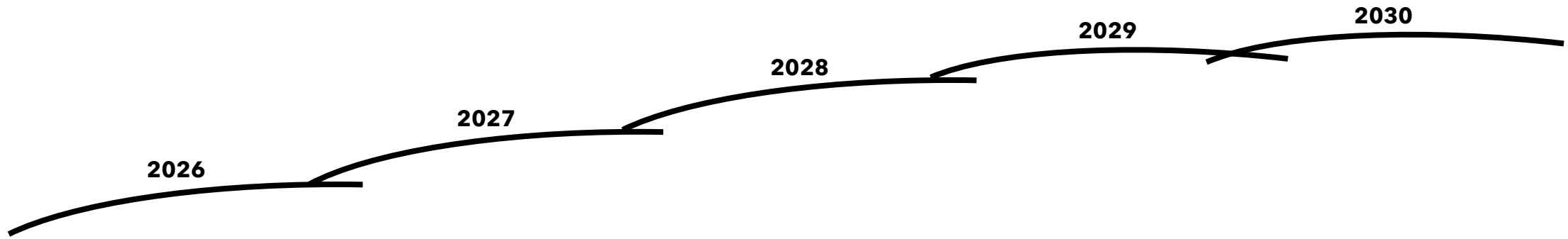
JS-SEZ Productivity-Linked Wage Policy: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
9	**Launch of pilot phase implementation in JS-SEZ**	**BPEN-J**	**Oct 2026**	**Mar 2027**
9.1	Organise formal launch event with key stsakeholders across government, representatives from employers and employees, and media	BPEN-J	Oct 2026	Oct 2026
9.2	Distribute first tranche of subsidy payments	BPEN-J	Oct 2026	Oct 2026
9.3	Pilot phase operations	BPEN-J	Oct 2026	Mar 2027
10	**Interim review of pilot phase at 6-month mark**	**BPEN-J**	**Apr 2027**	**Apr 2027**
10.1	Conduct interim performance review at 6 months from start of implementation	BPEN-J	Apr 2027	Apr 2027
10.2	Review productivity training uptake	BPEN-J	Apr 2027	Apr 2027
10.3	Review wage-productivity linkages	BPEN-J	Apr 2027	Apr 2027
10.4	Update interim guidelines	BPEN-J	Apr 2027	Apr 2027

JS-SEZ Productivity-Linked Wage Policy: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
11	**Comprehensive assessment of pilot impact upon conclusion**	BPEN-J	Sep 2027	Nov 2027
11.1	Conduct full review of pilot outcomes on wage growth, productivity and retention	BPEN-J	Sep 2027	Sep 2027
11.2	Publish report on pilot outcomes	BPEN-J	Oct 2027	Oct 2027
11.3	Presentation to State Government and Ministry of Finance to discuss potential for broader implementation	BPEN-J	Oct 2027	Oct 2027
11.4	Develop detailed scale-up for implementation roadmap	BPEN-J	Nov 2027	Nov 2027
11.5	Secure long-term federal and state budget commitments	BPEN-J	Nov 2027	Nov 2027

JS-SEZ Productivity-Linked Wage Policy: KPIs



	2026	2027	2028	2029	2030
Initiative KPIs	• No. of participating companies: 100	• No. of participating companies: 100 • Wage growth rate for employees: 15% • Productivity growth per worker: 10% • Retention rate in participating companies: 85% • Training completion rate: 90%	*TBD based on pilot phase results:* • No. of participating companies: 150 • Wage growth rate for employees: 15% • Productivity growth per worker: 10% • Retention rate in participating companies: 85% • Training completion rate: 90%	*TBD based on pilot phase results:* • No. of participating companies: 200 • Wage growth rate for employees: 15% • Productivity growth per worker: 10% • Retention rate in participating companies: 85% • Training completion rate: 90%	*TBD based on pilot phase results:* • No. of participating companies: 250 • Wage growth rate for employees: 15% • Productivity growth per worker: 10% • Retention rate in participating companies: 85% • Training completion rate: 90%
Achieved Milestones	• Selection and onboarding of pilot companies in JS-SEZ	• Launch of pilot phase implementation in JS-SEZ • Pilot phase conclusion and evaluation	*TBD based on pilot phase results*	*TBD based on pilot phase results*	*TBD based on pilot phase results*

JS-SEZ Productivity-Linked Wage Policy: KPI Dictionary

KPI	No. of participating companies
Description	Number of eligible firms participating in the JS-SEZ PWP pilot.
Method Of Measurement	Count of registered and active firms in JS-SEZ PWP, verified by MOUs signed with JTDC and/or grant applications
Achievement Trend	Over 1,000 SMEs expressed interest during the rollout phase of PWP at a national level.
Justification	The number of participating companies signals employer confidence in the wage-productivity model and the need for such an intervention. High participation also improves data validity and encourages peer adoption.
Target (Year 2030)	250 (targeting 100 during pilot phase, with subsequent years subject to success and review of long-term sustainability)
Supporting Document	MOUs, application records, industry engagement logs from stakeholder engagement phase
Frequency Of Data Reported	Quarterly updates to monitoring dashboard

JS-SEZ Productivity-Linked Wage Policy: KPI Dictionary

KPI	Wage growth rate for employees
Description	% increase in monthly wages for workers earning below RM2,500 at baseline
Method Of Measurement	Compare baseline monthly wages of target workers (e.g., earning <RM2,500) with wages 6–12 months after joining the JS-SEZ PWP.
Achievement Trend	Johor State has a historical wage growth of less than 2% for graduates from 2018 to 2023. The national PWP pilot (from MyFutureJobs and PSMB data) shows average wage growth of 11%–13% among upskilled workers.
Justification	This is the core policy objective that directly captures the policy's intended outcome: increasing real wages for low-income workers. It also allows comparison against sector- and occupation- wide trends within both state and national levels, to isolate policy impact.
Target (Year 2030)	15%
Supporting Document	Payroll records prior and post intervention
Frequency Of Data Reported	Quarterly by participating companies, with an annual spot audit

JS-SEZ Productivity-Linked Wage Policy: KPI Dictionary

KPI	Productivity growth per worker
Description	Increase in measurable output per worker (e.g. revenue per employee, patients served per nurse, occupancy rate per hospitality staff).
Method Of Measurement	Sector- and occupation-specific output metrics, based on initial analysis
Achievement Trend	While previous federal PWP pilot findings lack this granularity, the 12th Malaysia Plan targets 2–3% annual productivity growth.
Justification	This metric validates wage increases by monitoring the relationship between wage growth to sustainable productivity improvements. This metric strengthens the case for subsidy tapering or scale-up that can be aligned with Johor's broader economic needs and trends.
Target (Year 2030)	8–10% through better training and job redesign
Supporting Document	Monthly operational performance reports, labour productivity dashboards, annual firm-level revenue
Frequency Of Data Reported	Biannually by employers, consolidated by BPEN

JS-SEZ Productivity-Linked Wage Policy: KPI Dictionary

KPI	Retention rate in participating companies
Description	% of employees retained for at least 12 months after wage adjustment
Method Of Measurement	% of employees retained in the same job or within sector 12 months after receiving wage adjustments under JS-SEZ PWP
Achievement Trend	Nationally, turnover rates in hospitality exceed 30%. Retention rates of 85% would reflect strong impact of wage-productivity linkage.
Justification	This indicator tracks improved job satisfaction and workplace stability, while also reducing recruitment costs and churn. These would be key concerns in target sectors such as healthcare and hospitality.
Target (Year 2030)	85%
Supporting Document	HR employment records from participating companies
Frequency Of Data Reported	Annually by employers, validated by SOCSO/EPF records

JS-SEZ Productivity-Linked Wage Policy: KPI Dictionary

KPI	Training completion rate
Description	% of participating workers who complete upskilling or performance-enhancing training tied to wage adjustments
Method Of Measurement	% of enrolled workers who complete training modules (HRD Corp, microcredentials, in-house) tied to wage increments
Achievement Trend	The national PWP pilot showed >80% completion. However, this target will be increased due to a smaller participating group and more active employer involvement within JS-SEZ application.
Justification	This indicator reinforces the core premise that productivity gains must be embedded via skills development, not only financial incentives. Tracking this KPI also supports the use of HRD Corp and other funding mechanisms, to ensure alignment with ongoing and available resources at federal level.
Target (Year 2030)	90% training completion rate within the pilot duration
Supporting Document	Training attendance records and programme evaluation forms
Frequency Of Data Reported	Quarterly reporting by training providers, verified by HRD Corp

Implementing Johor's Dual-Track TVET Programme: Key Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
1	Project kick-off and establishment of steering committee	JTDC	Jan 2026	Jan 2026
2	Establish partnership with anchor companies, JSkills and Kolej Yayasan Pelajaran Johor for pilot cohorts	JTDC	Jan 2026	Feb 2026
3	Development of curriculum and training modules	JSkills & KYPJ	Feb 2026	Apr 2026
4	Train-the-trainer programme	JSkills & KYPJ	Apr 2026	May 2026
5	Preparation of facility and equipment	JSkills & KYPJ	May 2026	May 2026
6	Preparation for practical experience component	JSkills & KYPJ	Jun 2026	Jun 2026
7	Pilot implementation of integrated TVET programme	JSkills & KYPJ	Jul 2026	Jun 2027
8	Student assessment and certification	JSkills & KYPJ	Jun 2027	Jun 2027
9	Post-programme placements for students	JTDC	Jul 2027	Oct 2027
10	Pilot phase conclusion and evaluation	JTDC	Oct 2027	Nov 2027
			Jan 2026	**Nov 2027**

Implementing Johor's Integrated TVET Programme: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Project kick-off and establishment of steering committee**	**JTDC**	**Jan 2026**	**Jan 2026**
1.1	Establish governance, reporting structure and key outcomes for programme	JTDC	Jan 2026	Jan 2026
2	**Establish partnership with anchor companies, JSkills and Kolej Yayasan Pelajaran Johor for pilot cohorts**	**JTDC**	**Jan 2026**	**Feb 2026**
2.1	Discussion with Invest Johor and IRDA to identify potential anchor companies	JTDC	Jan 2026	Jan 2026
2.2	Review and negotiations with anchor companies	JTDC	Jan 2026	Jan 2026
2.3	Signing of MOUs with companies and TVET schools	JTDC	Feb 2026	Feb 2026
2.4	Define Terms of Reference for partnerships	JTDC	Feb 2026	Feb 2026
2.5	Distribute performance monitoring and reporting tools	JTDC	Feb 2026	Feb 2026
3	**Development of curriculum and training modules**	**JSkills & KYPJ**	**Feb 2026**	**Apr 2026**
3.1	Convene anchor companies and TVET schools	JTDC	Feb 2026	Feb 2026
3.2	Identify and document industry-specific skill needs and training gaps based on existing curricula from partner institutions	JSkills & KYPJ	Mar 2026	Mar 2026
3.3	Align curricula with existing international accreditation	JSkills & KYPJ	Mar 2026	Apr 2026

Implementing Johor's Integrated TVET Programme: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
3	**Development of curriculum and training modules (cont.)**	**JSkills & KYPJ**	**Feb 2026**	**Apr 2026**
3.4	Finalise curriculum documentation and updated training modules	JSkills & KYPJ	Apr 2026	Apr 2026
3.5	Recruit trainers from MNCs	JSkills & KYPJ	Apr 2026	Apr 2026
4	**Train-the-trainer programme**	**JSkills & KYPJ**	**Apr 2026**	**May 2026**
4.1	Conduct training sessions for lecturers from partner institutions by expert Industry Working Group trainers	JSkills & KYPJ	Apr 2026	May 2026
5	**Preparation of facility and equipment**	**JSkills & KYPJ**	**May 2026**	**May 2026**
5.1	Seek equipment provision or donation from Industry Working Group members	JSkills & KYPJ	May 2026	May 2026
5.2	Identify locations and set-up of Industry Labs	JSkills & KYPJ	May 2026	May 2026
5.3	Install and test industry-standard equipment provided by industry partners	JSkills & KYPJ	May 2026	May 2026
6	**Preparation for practical experience component**	**JSkills & KYPJ**	**Jun 2026**	**Jun 2026**
6.1	Confirmation of placement partners (MNCs and SMEs)	JTDC	Jun 2026	Jun 2026
6.2	Selection and alignment of curriculum requirements to placement scope	JTDC	Jun 2026	Jun 2026
6.3	Approval of placement programme by Industry Working Groups	Industry Working Groups	Jun 2026	Jun 2026

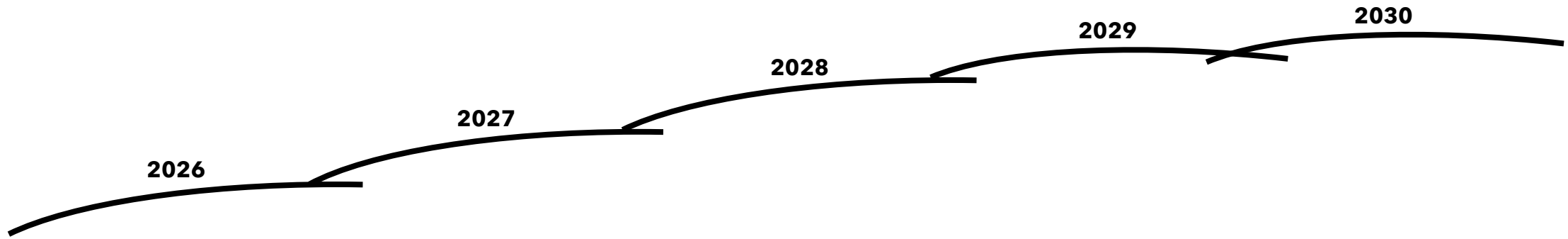
Implementing Johor's Integrated TVET Programme: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
7	**Pilot implementation of integrated TVET programme**	**JSkills & KYPJ**	**Jul 2026**	**Jun 2027**
7.1	Student enrolment and onboarding	JSkills & KYPJ	Jul 2026	Jul 2026
7.2	Weekly split between classroom modules and on-the-job training	JSkills & KYPJ	Sep 2026	Jul 2027
7.3	Monthly monitoring visits and feedback sessions with students and employers	JSkills & KYPJ	Sep 2026	Jul 2027
8	**Student Assessment and Certification**	**JSkills & KYPJ**	**Jun 2027**	**Jun 2027**
8.1	Final practical and theoretical assessments	JSkills & KYPJ	Jun 2027	Jun 2027
8.2	Partner institutions to issue formal certifications	JSkills & KYPJ	Jun 2027	Jun 2027
9	**Post-Programme Placements for Students**	**JTDC**	**May 2027**	**Oct 2027**
9.1	Collate placement opportunities with partnering employers	JTDC	May 2027	May 2027
9.2	Interview preparation for students	JTDC	Jun 2027	Jun 2027
9.3	Tracking and reporting on employment outcomes	JTDC	Jul 2027	Oct 2027

Implementing Johor's Integrated TVET Programme: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
10	**Conclusion and Evaluation of Pilot Phase**	**JTDC**	**Oct 2027**	**Nov 2027**
10.1	Conduct survey and feedback sessions for programme evaluation (with students, trainers and employers)	JSkills & KYPJ	Oct 2027	Oct 2027
10.2	Organise evaluation workshop with Industry Working Groups	JTDC	Nov 2027	Nov 2027
10.3	Review and update curricula based on programme outcomes	JSkills & KYPJ	Nov 2027	Nov 2027

Implementing Johor's Integrated TVET Programme: KPIs



	2026	2027	2028	2029	2030
Initiative KPIs	• No. of enrolled students: 150 • No. of industry partners: 20	• No. of enrolled students: 300 • Programme completion rate: 85% • No. of industry partners: 30 • Student employment rate: 90% • Employer satisfaction rate: 80%	• No. of enrolled students: 450 • Programme completion rate: 87% • No. of industry partners: 45 • Student employment rate: 95% • Employer satisfaction rate: 85%	• No. of enrolled students: 600 • Programme completion rate: 90% • No. of industry partners: 60 • Student employment rate: 100% • Employer satisfaction rate: 85% • % of students progressing into advanced roles: 10%	• No. of enrolled students: 750 • Programme completion rate: 92% • No. of industry partners: 80 • Student employment rate: 100% • Employer satisfaction rate: 85% • % of students progressing into advanced roles: 20%
Achieved Milestones	• Partnerships with anchor companies and TVET institutions • Pilot implementation of integrated training	• Post-programme placements for students • Pilot phase conclusion and evaluation	• Programme expansion	• Programme expansion	• Programme expansion

Implementing Johor's Integrated TVET Programme: KPI Dictionary

KPI	No. of enrolled students
Description	Total number of students formally accepted and enrolled in the Integrated TVET programme at partner institutions.
Method Of Measurement	Data from programme enrolment records provided by JSkills and Kolej Yayasan Pelajaran Johor.
Achievement Trend	Reference available data from the Ministry of Higher Education on TVET enrolment in Johor, as well as enrolment records from partner institutions. TVET enrolment in Malaysia is growing, with over 230,000 enrolments recorded in 2022 across public and private institutions.
Justification	Tracks scale and uptake of programme. This is a primary indicator of programme outreach, interest and accessibility.
Target (Year 2030)	750 (limit based on 42IP's capacity)
Supporting Document	Annual intake report from schools
Frequency Of Data Reported	Biannually, at start and end of academic year

Implementing Johor's Integrated TVET Programme: KPI Dictionary

KPI	No. of industry partners
Description	Total number of companies actively contributing to the programme, from anchor companies, placement hosting and employers.
Method Of Measurement	Signed MOUs or partnership agreements with programme implementers. Count to be maintained in a formal registry.
Achievement Trend	According to HRD Corp, over 5,000 employers have participated in various upskilling schemes. CCPs in Singapore have similarly seen strong employer uptake in priority sectors.
Justification	Demonstrates strength of industry-academia collaboration, which is critical for relevance and absorption into the labour market.
Target (Year 2030)	80 companies
Supporting Document	Signed partnership agreements, JTDC Industry Working Group member list, job database
Frequency Of Data Reported	Biannually, pre- and post-placement cycle

Implementing Johor's Integrated TVET Programme: KPI Dictionary

KPI	Programme completion rate
Description	% of enrolled students who successfully complete all mandatory training modules (academic and industry-based) and internships.
Method Of Measurement	Number of students with completion certificates issued by both TVET institutions and participating industry partners, divided by total enrolled.
Achievement Trend	Historical data should be made available from partner institutions. Similar programmes in Germany and Singapore average 85% to 90% completion.
Justification	This indicator measures student engagement, programme relevance, and administrative efficiency. A high rate suggests strong alignment between recruitment, curriculum and quality of training.
Target (Year 2030)	92%
Supporting Document	Attendance and graduation records from partner institutions
Frequency Of Data Reported	Annually, post-assessment

Implementing Johor's Integrated TVET Programme: KPI Dictionary

KPI	Student employment rate
Description	% of programme graduates employed full-time in a related field within 6 months of completion.
Method Of Measurement	Employment tracking through graduate self-reported surveys.
Achievement Trend	Historical data may be provided by partner institutions.
Justification	This indicator measures the direct economic benefit and success of curriculum-to-workforce alignment. High employment rate indicates ROI on training investments to create a skilled workforce for Johor.
Target (Year 2030)	100%
Supporting Document	Self-reported surveys issued to graduates 6 months post-graduation
Frequency Of Data Reported	Annually, 6 months post-graduation

Johor Accelerator for Digital Excellence (JADE): Key Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
1	Project kick-off and convening of Digital Economy Working Group	MDEC	Jan 2026	Jan 2026
2	Secure 2-year programme budget under HRD Corp Place-and-Train	Digital Economy IWG	Jan 2026	Feb 2026
3	Finalise curriculum, content and teaching materials	42IP	Feb 2026	Feb 2026
4	Sign MOU with Sekolah Rintis Bangsa Johor	Digital Economy IWG	Feb 2026	Feb 2026
5	Establish corporate partners for internship placements	Digital Economy IWG	Mar 2026	May 2026
6	Trainer recruitment and onboarding	42IP	Mar 2026	Mar 2026
7	Launch programme (pilot intake)	Digital Economy IWG	Apr 2026	Aug 2026
8	Transition of students into Piscine bootcamp	42IP	Dec 2026	Dec 2026
9	Placement of students with corporate partners	JTDC	Dec 2026	Mar 2027
10	Review of programme outcomes	Digital Economy IWG	Mar 2027	Mar 2027
11	Continuation of programme upon successful review	Digital Economy IWG	Apr 2027	Dec 2030
12	Continuous monitoring and evaluation of programme outcomes	JTDC	Apr 2027	Dec 2030
			Jan 2026	**Dec 2030**

Johor Accelerator for Digital Excellence (JADE): Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Project kick-off and convening of Digital Economy Working Group**	**MDEC**	**Jan 2026**	**Jan 2026**
1.1	Establish governance, reporting structure and key outcomes for programme	MDEC	Jan 2026	Jan 2026
2	**Secure 2-year programme budget under HRD Corp Place-and-Train**	**Digital Economy IWG**	**Jan 2026**	**Feb 2026**
2.1	Finalise budget with 42IP and SRBJ	Digital Economy IWG	Jan 2026	Jan 2026
2.2	Determine payment schedule with 42IP	HRDC	Jan 2026	Jan 2026
2.3	Disbursal of first payment to 42IP for trainer recruitment	HRDC	Feb 2026	Feb 2026
2.4	Disbursal of subsequent payments to 42IP	HRDC	TBD	TBD
3	**Finalise curriculum, content and teaching materials**	**Digital Economy IWG**	**Feb 2026**	**Feb 2026**
3.1	Review of 42IP curriculum and content by IWG	Digital Economy IWG	Feb 2026	Feb 2026
3.2	Finalise training materials and classroom equipment needed	42IP & SRBJ	Feb 2026	Feb 2026
4	**Sign MOU with Sekolah Rintis Bangsa Johor**	**Digital Economy IWG**	**Feb 2026**	**Feb 2026**

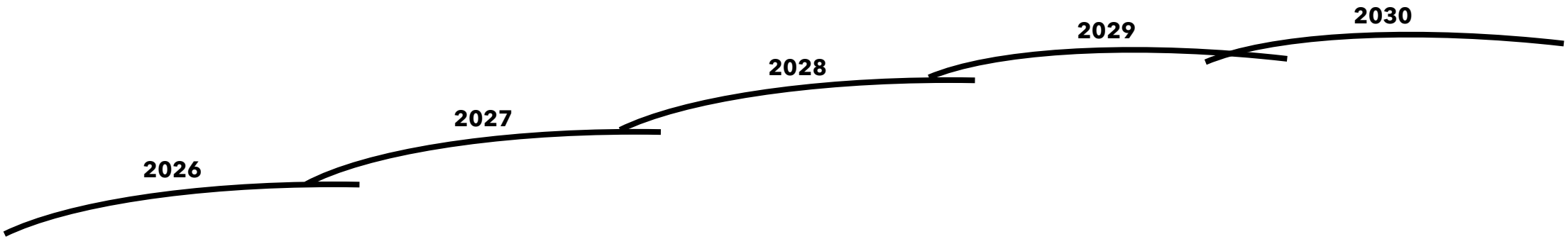
Johor Accelerator for Digital Excellence (JADE): Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
5	**Establish corporate partners for internship placements**	**DE Working Group**	**Mar 2026**	**May 2026**
5.1	Identify key employers in Johor Bahru for placements	DE Working Group	Mar 2026	Mar 2026
5.2	Map student skill levels and appropriate scope of work	42IP	Mar 2026	Apr 2026
5.3	Finalisation of placement opportunities	DE Working Group	May 2026	May 2026
6	**Trainer recruitment and onboarding**	**42IP**	**Mar 2026**	**Mar 2026**
6.1	Recruitment of trainers for introductory course	42IP	Mar 2026	Mar 2026
6.2	Onboarding of trainers including child protection safeguards	42IP	Mar 2026	Mar 2026
7	**Launch programme (pilot intake)**	**42IP**	**Apr 2026**	**Aug 2026**
7.1	Module 1: Introduction & Aspirations	42IP	Apr 2026	Apr 2026
7.2	Module 2: Data in Real Life	42IP	May 2026	May 2026
7.3	Module 3: Introduction to Digital Skills	42IP	Jul 2026	Jul 2026
7.4	Module 4: Future Tech & Ethics	42IP	Jul 2026	Jul 2026
7.5	Module 5: Design Thinking & Innovation	42IP	Aug 2026	Aug 2026
7.6	Module 6: Peer Showcase & Reflection	42IP	Aug 2026	Aug 2026

Johor Accelerator for Digital Excellence (JADE): Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
8	**Transition of students into Piscine bootcamp**	**42IP**	**Dec 2026**	**Dec 2026**
8.1	Student registration of interest for Piscine bootcamp	42IP	Dec 2026	Dec 2026
8.2	Qualification of interested students through logic test	42IP	Dec 2026	Dec 2026
8.3	Finalisation of accepted students	42IP	Dec 2026	Dec 2026
9	**Placement of students with corporate partners**	**JTDC**	**Dec 2026**	**Mar 2027**
9.1	Student registration of interest for placement and employer	Digital Economy IWG	Dec 2026	Dec 2026
9.2	Release of available placements on JTDC platform	JTDC	Jan 2027	Mar 2026
9.3	Matching of list and finalisation of placements	JTDC	Jan 2027	Jan 2027
9.4	Placement of students with corporate partners	JTDC	Jan 2027	Mar 2027
10	**Review of programme outcomes**	**Digital Economy IWG**	**Mar 2027**	**Mar 2027**
10.1	Distribute end of programme survey to students and employers	Digital Economy IWG	Mar 2027	Mar 2027
10.2	Data collection and synthesis	Digital Economy IWG	Mar 2027	Mar 2027
10.3	Data analysis and final recommendation to JTDC	Digital Economy IWG	Mar 2027	Mar 2027

Johor Accelerator for Digital Excellence (JADE): KPIs



	2026	2027	2028	2029	2030
Initiative KPIs	• No. of enrolled participants: 100 • No. of participating companies: 20	• No. of enrolled participants: 120 • No. of participating companies: 40 • Programme completion rate: 85% • Employer satisfaction rate: 85%	• No. of enrolled participants: 150 • No. of participating companies: 50 • Programme completion rate: 90% • Employer satisfaction rate: 90%	• No. of enrolled participants: 150 • No. of participating companies: 50 • Programme completion rate: 90% • Employer satisfaction rate: 90%	• No. of enrolled participants: 150 • No. of participating companies: 50 • Programme completion rate: 90% • Employer satisfaction rate: 90%
Achieved Milestones	• Launch programme (pilot intake)	• Launch programme (pilot intake) • Evaluate programme outcomes and develop state digitalisation roadmap	• Expand programme and corporate partnerships	• Continuous monitoring and review to meet developments in field	• Continuous monitoring and review to meet developments in field

Johor Accelerator for Digital Excellence (JADE): KPI Dictionary

KPI	No. of enrolled participants
Description	Total number of Form 4 and 5 students enrolled in the programme across different phases (i.e. introductory, bootcamp and internship)
Method Of Measurement	Data from programme enrolment records, disaggregated by year group, school and pathway (i.e. introductory, bootcamp and internship)
Achievement Trend	Historical data in similar programmes in other states might be available, while future trends will provide insights as more data is collected
Justification	Tracks scale and uptake of programme. As the introductory phase will be made mandatory in schools, growth in bootcamp enrolment is a better indicator for student interest, accessibility, and operational readiness of 42IP. Strong internship uptake will also signify effectiveness in programme of generating student interest in gaining industry exposure.
Target (Year 2030)	150 (limit based on 42IP's capacity)
Supporting Document	Annual intake report from schools
Frequency Of Data Reported	Annually, post-enrolment cycle

Johor Accelerator for Digital Excellence (JADE): KPI Dictionary

KPI	No. of participating companies
Description	Total number of corporate partners offering internship positions through JTDC, open to graduates of JADE programme.
Method Of Measurement	Data from upcoming JTDC jobs platform
Achievement Trend	Historical data in similar programmes run by MDEC and 42 in other states might be available, while future trends will provide insights as more data is collected
Justification	Tracks effectiveness of programme in (i) promoting interest in tech-related jobs, (ii) employability of provided skillsets and modules, as well as (iii) corporate interest and buy-in to support industry exposure of youth.
Target (Year 2030)	50 companies
Supporting Document	Annual partnerships report from JTDC jobs platform
Frequency Of Data Reported	Annually, pre-placement cycle

Johor Accelerator for Digital Excellence (JADE): KPI Dictionary

KPI	Programme completion rate
Description	Proportion of enrolled students who successfully complete their respective pathways (introductory, bootcamp and internships)
Method Of Measurement	Cross-pathway tracking of completion status, with defined criteria for each track (e.g., graduation, bootcamp completion, placement completion).
Achievement Trend	N/A in first year, but collection of data will allow for insights to be generated from second year onwards.
Justification	Indicates student retention and engagement. Low completion may signal gaps in onboarding, programme design, or support systems.
Target (Year 2030)	90% across all pathways
Supporting Document	Completion status reports from programme administrators
Frequency Of Data Reported	Annually, end of programme cycle

Johor Accelerator for Digital Excellence (JADE): KPI Dictionary

KPI	Employer satisfaction rate
Description	Proportion of participating corporate partners who satisfaction of their interns recruited as a result of their participation in the programme
Method Of Measurement	Post-placement reflection survey; responses are coded based on a rubric capturing demonstrated application and motivation of students
Achievement Trend	Historical data will be unavailable, but future trends will provide insights as more data is collected
Justification	Ensures the programme is enabling the creation of a digitally fluent, high skilled workforce
Target (Year 2030)	90%
Supporting Document	Employer survey forms
Frequency Of Data Reported	Annually, via end of placement feedback cycle

Establishing the Johor Innovation Corridor: Key Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
1	Establish Steering Committee & Governance Structure	IRDA	Jan 2026	Feb 2026
2	Develop Corridor Blueprint & IP Framework	IRDA	Feb 2026	Jun 2026
3	Grow Industry–Academia Partnerships	IRDA	Jun 2026	Sep 2026
4	Design & Integration of IBTEC Living Labs	JLAND	Jul 2026	Dec 2026
5	Establish Johor Venture Capital Fund	IRDA	Jul 2026	Dec 2026
6	Scale Fund & Introduce Global Partnerships	IRDA	Jan 2027	Dec 2027
7	Monitoring, Evaluation & Expansion	IRDA	Jan 2027	Dec 2030
			Jan 2026	**Dec 2030**

Establishing the Johor Innovation Corridor: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Establish Steering Committee & Governance Structure**	**IRDA**	**Jan 2026**	**Feb 2026**
1.1	Appoint and convene Johor Innovation Corridor Steering Committee	IRDA	Jan 2026	Jan 2026
1.2	Define governance, reporting structures, and KPIs	IRDA	Jan 2026	Jan 2026
1.3	Engage state and federal agencies for alignment (MOSTI, MITI, JCorp)	IRDA	Feb 2026	Feb 2026
2	**Develop Corridor Blueprint & IP Framework**	**IRDA**	**Feb 2026**	**Jun 2026**
2.1	Draft master blueprint integrating IBTEC, VC Fund, and partnerships	IRDA	Feb 2026	Apr 2026
2.2	Establish IP-sharing and commercialisation rules for GLC–academia collaboration	IRDA	Apr 2026	Apr 2026
2.3	Secure approval from Johor State Government	IRDA	Jun 2026	Jun 2026
3	**Grow Industry–Academia Partnerships**	**IRDA**	**Jun 2026**	**Sep 2026**
3.1	Formalise partnerships between GLCs and leading research institutions	IRDA	Jun 2026	Jun 2026
3.2	Appoint first cohort of “Professors of Practice” (business leaders)	IRDA	Jul 2026	Jul 2026
3.3	Identify researchers for placement as Chief Science Officers in GLCs	IRDA	Sep 2026	Sep 2026

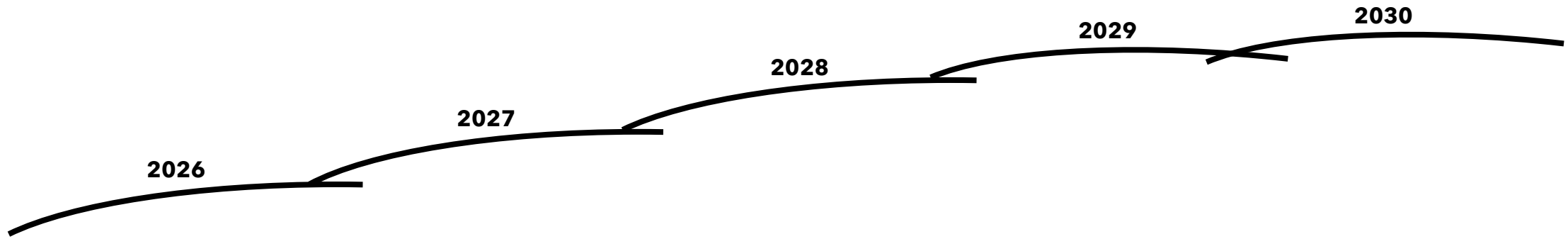
Establishing the Johor Innovation Corridor: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
4	**Design and Integration of IBTEC Living Labs**	**JLAND**	**Jul 2026**	**Dec 2026**
4.1	Secure allocated space for research in Sedenak Tech Park for anchor investors	JLAND	Jul 2026	Oct 2026
4.2	Launch partnerships with utilities (TNB, Telekom) and clean-tech providers	JLAND	Oct 2026	Dec 2026
5	**Establish Johor Venture Capital Fund**	**IRDA**	**Jul 2026**	**Dec 2026**
5.1	Determine fund structure, governance and operating model	IRDA	Jul 2026	Jul 2026
5.2	Define investment thesis	IRDA	Aug 2026	Aug 2026
5.3	Secure state + GLC seed commitments	IRDA	Aug 2026	Sep 2026
5.4	Explore private VC and federal GLC interest	IRDA	Sep 2026	Sep 2026
5.5	Finalize transparent IP-sharing mechanism with GLCs	IRDA	Oct 2026	Oct 2026
5.6	Sign co-investment agreements with private venture funds	IRDA	Oct 2026	Oct 2026
5.7	Issue open call for high potential collaborative R&D proposals in JETP target sectors	IRDA	Oct 2026	Nov 2026
5.8	Review and select R&D proposals for initial funding	IRDA	Nov 2026	Dec 2026

Establishing the Johor Innovation Corridor: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
6	**Scale Fund & Introduce Global Partnerships**	**IRDA**	**Jan 2027**	**Dec 2027**
6.1	Investment promotion and facilitation for MNCs and unicorns to establish in IBTEC	IRDA	Jan 2027	Dec 2027
6.2	Host annual Johor–Singapore Innovation Expo	IRDA	Jan 2027	Dec 2027
6.3	Expand venture fund reach via partnerships with ASEAN/global investors.	IRDA	Jan 2027	Dec 2027
7	**Monitoring, Evaluation & Expansion**	**IRDA**	**Jan 2027**	**Dec 2030**
7.1	Publish annual performance reports (jobs created, IP generated, FDI attracted)	IRDA	Annual	Annual
7.2	Conduct benchmarking analysis against other innovation hubs	IRDA	Annual	Annual
7.3	Plan for next phase expansion of Corridor	IRDA	Jan 2029	Dec 2030

Establishing the Johor Innovation Corridor: KPIs



	2026	2027	2028	2029	2030
Initiative KPIs	• No. of Collaborative R&D Projects: 20 • Funding Raised: RM1 billion	• No. of Innovation-Driven Enterprises Established in IBTEC: 10 • No. of Collaborative R&D Projects: 30 • Funding Deployed: RM200 million • No. of Patents & Commercialised IP: 10 • No. of High Skilled Jobs Created: 100	• No. of Innovation-Driven Enterprises Established in IBTEC: 20 • No. of Collaborative R&D Projects: 40 • Funding Deployed: RM250 million • No. of Patents & Commercialised IP: 15 • No. of High Skilled Jobs Created: 200	• No. of Innovation-Driven Enterprises Established in IBTEC: 30 • No. of Collaborative R&D Projects: 50 • Funding Deployed: RM250 million • No. of Patents & Commercialised IP: 18 • No. of High Skilled Jobs Created: 300	• No. of Innovation-Driven Enterprises Established in IBTEC: 50 • No. of Collaborative R&D Projects: 60 • Funding Deployed: RM300 million • No. of Patents & Commercialised IP: 20 • No. of High Skilled Jobs Created: 500
Achieved Milestones	• Fast-track and secondment pathways launched • First intake launched • Monitoring, reporting and biannual outcome tracking	• Review of first cohort and the entire programme • Recruitment of second cohort • Annual impact assessment conducted to refine programme components • Alumni tracking initiated • Monitoring, reporting and biannual outcome tracking	• Full launch of programme • Annual impact assessment conducted to refine programme components • Monitoring, reporting and biannual outcome tracking	• Full launch of programme • Annual impact assessment conducted to refine programme components • Monitoring, reporting and biannual outcome tracking	• Review of five-year cycle of programme • Monitoring, reporting and biannual outcome tracking

Establishing the Johor Innovation Corridor: KPI Dictionary

KPI	No. of Collaborative R&D Projects
Description	Number of joint research projects between universities (UTM, UTHM, etc.) and industries/GLCs
Method Of Measurement	Count of approved project records under MOSTI/IRDA
Achievement Trend	No publicly available data.
Justification	This indicator is a direct measure of success in materialising greater partnership between academia and industry, supported by less tangible efforts such as appointments of Chief Science Officers, curriculum alignment, etc.
Target (Year 2030)	60
Supporting Document	MOSTI project records, signed MOUs, research contracts
Frequency Of Data Reported	Quarterly

Establishing the Johor Innovation Corridor: KPI Dictionary

KPI	Capital Raised / Capital Invested
Description	Amount of capital raised through Johor Venture Capital Fund and co-investments with private VCs and subsequently mobilised. This will be done through multiple rounds with opportunity for re-investments in existing portfolio companies on an annual basis.
Method Of Measurement	Annual fund reporting by Johor Innovation Fund
Achievement Trend	Total committed VC funds in Malaysia as of 31 December 2024 were RM 6.70 billion, according to the Securities Commission of Malaysia. There is no available breakdown on the state level.
Justification	The total amount of capital is an important indicator of market confidence, signaling credibility to investors, both local and global. Capital is the primary input for the Johor Innovation Fund, and tracking capital deployed is necessary to understand enterprise creation and scaling. This indicator also allows Johor to benchmark its performance.
Target (Year 2030)	RM1 billion raised and invested
Supporting Document	Annual report from Johor Innovation Fund, Securities Commission Malaysia VC/PE Annual Report
Frequency Of Data Reported	Annually

Source: Securities Commission Malaysia (2024)

Establishing the Johor Innovation Corridor: KPI Dictionary

KPI	No. of Innovation-Driven Enterprises Established in IBTEC
Description	Track the number of start-ups, scale-ups, and anchor firms located in the IBTEC Living Labs that are engaged in smart-tech, circular economy, or industrial deep-tech activities
Method Of Measurement	Registration data from JLAND & Companies Commission of Malaysia (SSM)
Achievement Trend	Johor is on track to attract over RM100 billion in investments by the end of 2025. Enhancing its R&D capabilities will allow attraction of higher quality investments, creation of skilled jobs, and greater economic complexity.
Justification	This indicator is a primary measure of success of positioning Johor as a testbed for innovation-led growth, as opposed to a landlord for data centres or traditional manufacturing.
Target (Year 2030)	50
Supporting Document	MIDA Johor Investment Reports, IRDA Annual Reports
Frequency Of Data Reported	Annually

Establishing the Johor Innovation Corridor: KPI Dictionary

KPI	No. of Patents & Commercialised IP
Description	Number of patents filed and successfully commercialised under the Innovation Corridor ecosystem
Method Of Measurement	Data from MyIPO and universities' IP offices (e.g. UTM's ICC)
Achievement Trend	No publicly available data.
Justification	This indicator reflects the quality of innovation, not just activity levels in Johor Innovation Corridor, ensuring that R&D is market-driven.
Target (Year 2030)	20
Supporting Document	MyIPO Annual Report, Universities' Annual Report
Frequency Of Data Reported	Annually

Establishing the Johor Innovation Corridor: KPI Dictionary

KPI	No. of High Skilled Jobs Created
Description	Number of knowledge-based jobs created in the Johor Innovation Corridor (e.g., engineers, data scientists, researchers)
Method Of Measurement	Employer reporting validated against high-skilled wage classifications by DOSM.
Achievement Trend	Johor's current proportion of high-skilled jobs is 26.6%, below the national average of 30.8%.
Justification	This indicator captures the Corridor's impact on human capital development in the state.
Target (Year 2030)	500 jobs
Supporting Document	Employer reports collected by IRDA
Frequency Of Data Reported	Quarterly

Professional Development Programme for Civil Service Officers: Key Milestones

No	Milestones	Responsibility	Planned start date	Planned end date
1	Project kick-off and stakeholder alignment	JCS Academy	Jan 2026	Feb 2026
2	Secure MOU with PDT	JCS Academy	Feb 2026	Mar 2026
3	Design scholarship programme for Sekolah Bangsa Johor graduates	JCS Academy	Apr 2026	May 2026
4	Develop fast-track pathway for early career officers	JCS Academy	May 2026	Jun 2026
5	Develop secondment programme for mid-career officers	JCS Academy	Jun 2026	Aug 2026
6	Establish executive leadership pathway for high potential leaders	JCS Academy	Aug 2026	Sep 2026
7	Develop monitoring, evaluation and reporting framework	JCS Academy	Sep 2026	Sep 2026
8	Create internal communications strategy	JCS Academy	Oct 2026	Oct 2026
9	Launch of first intake	JCS Academy	Nov 2026	Dec 2026
10	Continuous implementation, monitoring, evaluation and learning	JCS Academy	Jan 2027	Dec 2030
			Jan 2026	**Dec 2030**

Professional Development Programme for Civil Service Officers: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
1	**Project kick-off and stakeholder alignment**	**JCS Academy**	**Jan 2026**	**Feb 2026**
1.1	Establish steering committee	JCS Academy	Jan 2026	Jan 2026
1.2	Kick-off meeting for project scope, objectives and responsibilities	JCS Academy	Jan 2026	Jan 2026
1.3	Establish working group for pre-service, early career, mid-career and leadership stage reforms	JCS Academy	Feb 2026	Feb 2026
2	**Secure MOU with Permodalan Darul Ta'zim on collaboration with Tabung Pendidikan**	**JCS Academy**	**Feb 2026**	**Mar 2026**
2.1	Presentation of proposal to PDT leadership	JCS Academy	Feb 2026	Feb 2026
2.2	Drafting of agreement for MOU and financial arrangements	JCS Academy	Mar 2026	Mar 2026
2.3	Final approval from PDT and signing of funding agreement	JCS Academy	Mar 2026	Mar 2026
3	**Design scholarship programme for Sekolah Bangsa Johor graduates**	**JCS Academy**	**Apr 2026**	**May 2026**
3.1	Define criteria, scholarship requirements and selection processes	JCS Academy	Apr 2026	Apr 2026
3.2	Assign administrative and support systems to manage scholarships	JCS Academy	Apr 2026	Apr 2026
3.3	Finalise documentation and agreement with PDT / other GLC funders	JCS Academy	May 2026	May 2026

Professional Development Programme for Civil Service Officers: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
4	**Develop fast-track pathway for early career officers**	**JCS Academy**	**May 2026**	**Jun 2026**
4.1	Develop fast-track selection guidelines	JCS Academy	May 2026	May 2026
4.2	Structure accelerated promotion criteria and governance structure	JCS Academy	May 2026	May 2026
4.3	Hold stakeholder validation workshop with JCS representatives to finalise	JCS Academy	Jun 2026	Jun 2026
5	**Develop secondment programme for mid-career officers**	**JCS Academy**	**Jun 2026**	**Aug 2026**
5.1	Engagement of shortlisted partner organisations (e.g. GLCs, World Bank, Asian Development Bank, etc.)	JCS Academy	Jun 2026	Jun 2026
5.2	Develop secondment procedures, selection critera and employment contracts	JCS Academy	Jun 2026	Jun 2026
5.3	Finalise documentation	JCS Academy	Aug 2026	Aug 2026
6	**Establish executive leadership pathway for high potential leaders**	**JCS Academy**	**Aug 2026**	**Sep 2026**
6.1	Engage shortlisted universities (e.g. Harvard Kennedy School, Lee Kuan Yew School, Oxford Said Business School etc.)	JCS Academy	Aug 2026	Aug 2026
6.1	Develop selection criteria, budget and scheduling	JCS Academy	Sep 2026	Sep 2026
6.2	Finalise formal partnership arrangements	JCS Academy	Sep 2026	Sep 2026

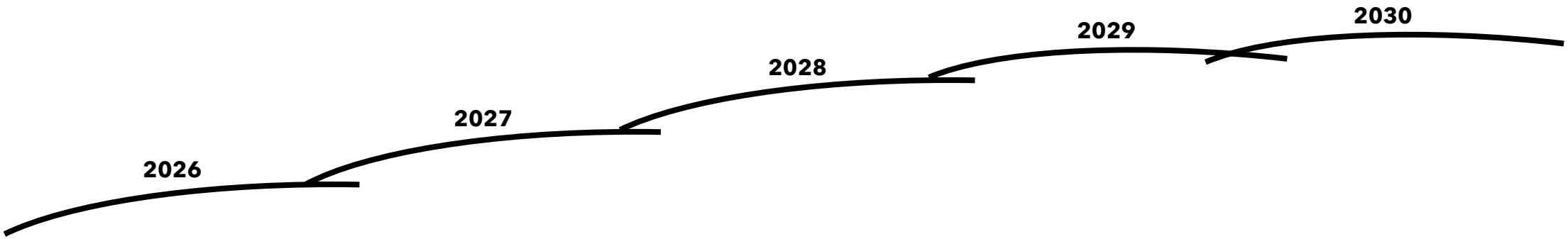
Professional Development Programme for Civil Service Officers: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
7	**Develop monitoring, evaluation and reporting framework**	**JCS Academy**	**Sep 2026**	**Sep 2026**
7.1	Establish clear KPIs, data collection mechanisms and monitoring agencies	JCS Academy	Sep 2026	Sep 2026
7.2	Distribute monitoring and evaluation tools and templates	JCS Academy	Sep 2026	Sep 2026
8	**Create internal communications strategy**	**JCS Academy**	**Oct 2026**	**Oct 2026**
8.1	Develop communication strategy	JCS Academy	Oct 2026	Oct 2026
8.2	Develop onboarding materials for early career recruits	JCS Academy	Oct 2026	Oct 2026
8.3	Appoint PIC to manage questions and internal oversight	JCS Academy	Oct 2026	Oct 2026
9	**Launch of first intake**	**JCS Academy**	**Nov 2026**	**Dec 2026**
9.1	Organise launch event with stakeholders, partners and media	JCS Academy	Nov 2026	Nov 2026
9.2	Open applications for scholarships	JCS Academy	Nov 2026	Nov 2026
9.3	Selection and onboarding of first cohort across all pathways	JCS Academy	Dec 2026	Dec 2026

Professional Development Programme for Civil Service Officers: Implementation Plan

No	Milestones and Key Activities	Responsible Party	Planned Start	Planned End
10	**Continuous implementation, monitoring, evaluation and learning**	**JCS Academy**	**Jan 2027**	**Dec 2030**
10.1	Scholarship award ceremony	JCS Academy	Annual	Annual
10.2	Fast-track, secondment and executive training intakes	JCS Academy	Annual	Annual
10.3	Mid-year review and programme adjustments	JCS Academy	Annual	Annual

Professional Development Programme for Civil Service Officers: KPIs



	2026	2027	2028	2029	2030
Initiative KPIs	• No. of officers enrolled across all pathways: **30** • No of scholarships awarded to SBJ top graduates: **15** • Participation completion rate across all pathways: **>70%** • % of participants reporting professional growth due to programme: **N/A** • No. of officers transitioned to strategic leadership positions: **N/A**	• No. of officers enrolled across all pathways: **50** • No of scholarships awarded to SBJ top graduates: **20** • Participation completion rate across all pathways: **>75%** • % of participants reporting professional growth due to programme: **N/A** • No. of officers transitioned to strategic leadership positions: **N/A**	• No. of officers enrolled across all pathways: **75** • No of scholarships awarded to SBJ top graduates: **25** • Participation completion rate across all pathways: **>80%** • % of participants reporting professional growth due to programme: **80%** • No. of officers transitioned to strategic leadership positions: **N/A**	• No. of officers enrolled across all pathways: **100** • No of scholarships awarded to SBJ top graduates: **35** • Participation completion rate across all pathways: **>80%** • % of participants reporting professional growth due to programme: **90%** • No. of officers transitioned to strategic leadership positions: **5**	• No. of officers enrolled across all pathways: **120** • No of scholarships awarded to SBJ top graduates: **40** • Participation completion rate across all pathways: **>80%** • % of participants reporting professional growth due to programme: **100%** • No. of officers transitioned to strategic leadership positions: **10**
Achieved Milestones	• Fast-track and secondment pathways launched • First intake launched • Monitoring, reporting and biannual outcome tracking	• Review of first cohort and the entire programme • Recruitment of second cohort • Annual impact assessment conducted to refine programme components • Alumni tracking initiated • Monitoring, reporting and biannual outcome tracking	• Full launch of programme • Annual impact assessment conducted to refine programme components • Monitoring, reporting and biannual outcome tracking	• Full launch of programme • Annual impact assessment conducted to refine programme components • Monitoring, reporting and biannual outcome tracking	• Review of five-year cycle of programme • Monitoring, reporting and biannual outcome tracking

Professional Development Programme for Civil Service Officers: KPI Dictionary

KPI	No. of officers enrolled across all pathways
Description	Total number of officers newly enrolled in the scholarship, fast-track, secondment, and executive leadership pathways for each cohort every year.
Method Of Measurement	Data from programme enrolment records, disaggregated by pathway and cohort year.
Achievement Trend	Historical data in similar programme in Johor or nationally might be available, but future trends will provide insights as more data is collected
Justification	Tracks scale and uptake of the professional development programme. Growth in enrolment reflects interest, accessibility, and operational readiness across the various tracks.
Target (Year 2029)	
Supporting Document	Annual intake reports, pathway enrolment dashboards
Frequency Of Data Reported	Annually, post-enrolment cycle

Professional Development Programme for Civil Service Officers: KPI Dictionary

KPI	No of scholarships awarded to SBJ top graduates
Description	Number of SBJ (Sekolah Bangsa Johor) graduates awarded scholarships to pursue degrees in public policy, economics, or management.
Method Of Measurement	Collated data from scholarship award records, verified through PDT and administering institutions.
Achievement Trend	Historical data in similar programme in Johor or nationally might be available, but future trends will provide insights as more data is collected
Justification	This KPI tracks the state's effort in building a pre-service talent pipeline and strengthening local representation in the civil service from SBJ graduates.
Target (Year 2029)	
Supporting Document	Scholarship award recipient letters of confirmation, application and selection committee records
Frequency Of Data Reported	Annually, following scholarship offer and acceptance cycles

Professional Development Programme for Civil Service Officers: KPI Dictionary

KPI	Participation completion rate across all pathways
Description	Proportion of enrolled participants who successfully complete their respective pathways (scholarship, fast-track, secondment, executive leadership) as defined by programme criteria.
Method Of Measurement	Cross-pathway tracking of completion status, with defined criteria for each track (e.g., graduation, secondment reintegration, executive training attendance).
Achievement Trend	Historical data in similar programme in Johor or nationally might be available, but future trends will provide insights as more data is collected
Justification	Indicates participant retention, programme structure coherence, and delivery effectiveness. Low completion may signal gaps in onboarding, design, or support systems.
Target (Year 2029)	
Supporting Document	Completion status reports from programme administrators
Frequency Of Data Reported	Annually, end of programme cycle (Q4)

Professional Development Programme for Civil Service Officers: KPI Dictionary

KPI	% of participants reporting professional growth due to programme
Description	Proportion of participants who report a change in mindset, leadership ability, or professional capacity as a result of their participation in the programme.
Method Of Measurement	Post-programme reflection survey; responses are coded based on a rubric capturing demonstrated learning and application.
Achievement Trend	Historical data in similar programme in Johor or nationally might be available, but future trends will provide insights as more data is collected
Justification	Captures the depth and application of learning post-programme completion, that satisfaction scores might not be able to capture. Supports adaptive curriculum and ensures the programme is enabling real development.
Target (Year 2029)	
Supporting Document	Participant reflection forms
Frequency Of Data Reported	Annually, via post-programme feedback cycle (3–6 months post-completion)

KPI Dictionary

KPI	No. of officers transitioned to strategic leadership positions
Description	Number of officers who, having participated in the programme, have been promoted to DG48 or JUSA-level roles within the Johor Civil Service.
Method Of Measurement	Tracked via HRIS or JCS promotion records, cross-referenced with programme alumni database.
Achievement Trend	Historical data in similar programme in Johor or nationally might be available, but future trends will provide insights as more data is collected
Justification	Long-term impact indicator reflecting whether the programme contributes to leadership pipeline development. Reinforces the strategic positioning of JCS talent.
Target (Year 2029)	
Supporting Document	Programme alumni database and M&E mechanism
Frequency Of Data Reported	Annually, reviewed during end-year strategic workforce review

Professional Development Programme for Civil Service Officers: KPI Dictionary

KPI	Employer satisfaction rate
Description	Average satisfaction score provided by employer partners regarding the job readiness, skill competency, and attitude of graduates hosted or hired.
Method Of Measurement	Standardised survey administered to employers upon completion of placement, incorporating a Net Promoter Score (NPS).
Achievement Trend	Historical data is unlikely to be available. Data collected will be able to generate new insights on quality of education provided.
Justification	This indicator forms a critical part of a feedback loop to inform curriculum refinement and training methods. A high employment rate indicates the value of the Integrated TVET Programme to employers and suggests likelihood of long-term partnership, building confidence in other employers to participate.
Target (Year 2030)	85%
Supporting Document	Employer survey results
Frequency Of Data Reported	Annually, post-placement completion

Professional Development Programme for Civil Service Officers: KPI Dictionary

KPI	% of students progressing into advanced roles
Description	Proportion of programme graduates who, within 2–3 years, transition into supervisory, technical specialist, or upskilled roles within their respective industries.
Method Of Measurement	A standardized career progression survey issued to alumni on an annual basis. Define "advanced role" by position title, monthly salary (e.g. RM5,000+), and/or function change (e.g. from generalist to specialist)
Achievement Trend	9 in 10 of Singapore's Place-and-Train career conversion programme remained employed 24 months post-programme, and about 60% earned more than their last drawn salary within that period. Similar data must be built for Johor's TVET graduates.
Justification	It will be important to measure not just short-term employment outcomes, but long-term career progression and mobility of TVET graduates. This validates whether the Integrated TVET system is able to support the creation of a skilled workforce to meet shortages, a core objective of the programme.
Target (Year 2030)	20%
Supporting Document	Self-reported surveys issued to graduates
Frequency Of Data Reported	Annually

07

DMS Monitoring Framework.

Key Engagements Recap: As at 25 August 2025

- Following the final presentation of the Johor Economic Transformation Programme (JETP) Study to YAB Menteri Besar (YAB MB) on 28 July 2025, and subsequent discussions with YBhg. Dato' Sri Idris Jala (DSIJ) on 13 August 2025, YAB MB has requested the continued support of PEMANDU Associates in assisting the Johor State Government with the monitoring of the State's critical initiatives.

- On 13 August 2025, YAB Menteri Besar further guided that the scope of monitoring support should also cover initiatives under other programmes, in particular:
  - Monitoring of initiatives under the **Johor State Annual Budget (*Belanjawan Negeri*)**.
  - Monitoring of high-impact projects approved at the Federal level under the **12th and 13th Malaysia Plans (*RMK*)**.
  - Monitoring of initiatives addressing outstanding issues raised during the ***Mesyuarat Tindakan DUN* (MTD)** Meetings in each district.
  - Monitoring of initiatives under the **Johor Economic Transformation Programme (JETP)**.

- YBhg DSIJ, on behalf of PEMANDU Associates, has agreed to extend support to Johor State Government.

- On 25 August 2025, PEMANDU presented the initial proposal at the *Pembentangan Kertas Cadangan Sistem Pemantauan Petunjuk Prestasi Utama* meeting, chaired by Tuan Hj Ahmad Nazir, *Timbalan Setiausaha Kerajaan Johor,* with relevant team members. The meeting concluded with the way forward for PEMANDU to **revise and present the proposal, focusing primarily on the DMS Dashboard System as the key component**

Source: PASB Recap Notes

The State intends to deliver its prioritised mission-critical initiatives in a business-unusual manner, driven by the DMS Dashboard System and strengthened by the DMS Methodology Advisory Team

DMS Dashboard System Development and Operationalisation

Develop an intelligent, executive-centric dashboard powered by Power BI, designed to be modular, data-driven, and fully scalable for the Johor State Government's sustained use beyond PEMANDU's support

Supporting to build Johor's capability to maximise the DMS Dashboard

DMS Methodology Advisory Team

Deploy technical advisors to guide the Johor State Government through capability development by sharing best practices on cadence reporting, meetings, structured problem-solving, and escalation processes, ensuring sustained monitoring and effective use of the DMS Dashboard System

Source: PASB Analysis; Key Engagements related to Implementation Support

The DMS Dashboard system will serve as the single source of truth and the critical delivery platform for monitoring the implementation of 1,325+ initiatives

Johor State Government's Commitment

- Position Johor as a **developed, high-income state by 2030**
- Ensure **balanced growth** across economy, infrastructure, and social well-being
- **Drive transformation** through pillars of governance, inclusivity, sustainability, and youth empowerment
- Mobilise **targeted investments and institutional support** such as IMFC-J
- **Deliver bold initiatives** like the Johor-Singapore SEZ to create jobs and establish Johor as a leading economic hub

Johor State Government's Critical Initiatives

Rancangan Malaysia Ke-12 (RMK12)

Rancangan Malaysia Ke-13 (RMK13)

Belanjawan Johor

Mesyuarat Tindakan Dun (MTD)

Johor Economic Transformation Programme (JETP)

Projects

1,325+ initiatives identified (excluding *RMK*13*)

*RMK13 initiatives are expected to be announced in October 2025.

The DMS methodology–Do it relentlessly, Monitor it constantly, Solve problems recursively–forms the backbone of the system development process

This is where DELIVERY takes place

D Do it relentlessly

M Monitor it constantly

S Solve problem recursively

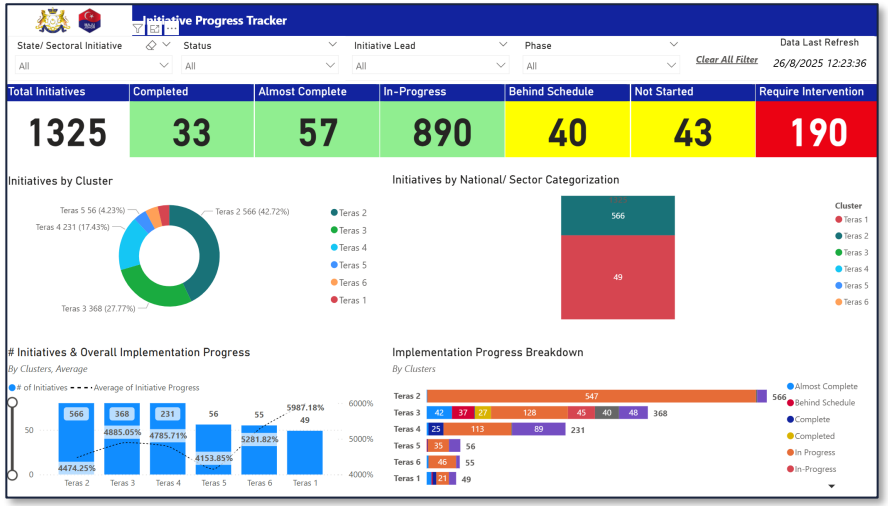
Source: PASB Analysis; Key Engagements related to Implementation Support

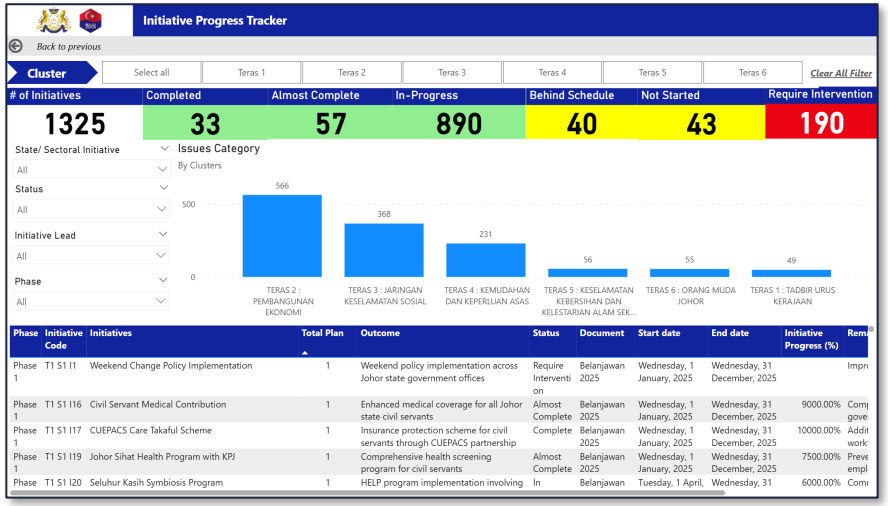
7.1

DMS Dashboard System.

The DMS Dashboards will be designed to cater to two main user groups, leaders and decision makers, as well as project managers and implementers

PRELIMINARY





Executive Friendly

For leaders and decision makers

- To achieve real and tangible outcomes, tracking and monitoring of results will need to be supplemented with **problem solving and decision making**.
- An executive friendly dashboard will allow leadership to view what is **important and critical** to make informed decisions.
- The executive friendly dashboard needs to be tailored to allow decision makers to understand and decipher information easily – adopting **design cues that help them digest information quickly and accurately**.

Detailed and Data Driven

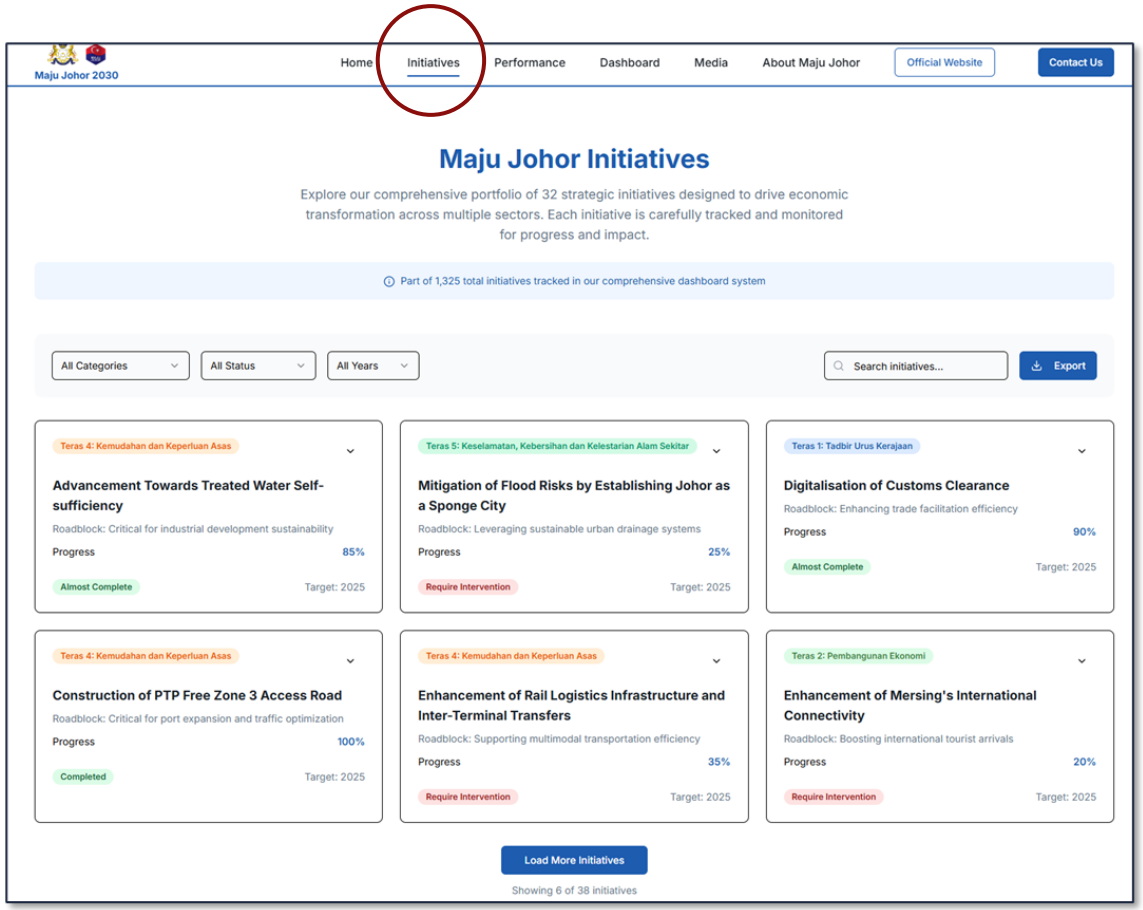
For project managers and implementers

- Driving performance requires project managers and implementers to track key indicators and outcomes – ***the devil is in the details***.
- To **solve problems recursively**, project managers and implementers must immerse themselves in the issues at hand, coordinate stakeholders, and prescribe solutions that are **fact based, and data driven**
- A detailed dashboard will also allow for **early intervention** based on forecasts. This will allow for proactive decision making and strengthen programme delivery

Source: PASB Recommendations

Only critical initiatives under the coverage are monitored and displayed by category, making it easy to track progress and reference across different sectors

2 **Click on the "Initiatives" tab to view Maju Johor Initiatives**



Initiatives

- Each initiative is tagged with a traffic-light colour to provide instant visibility of its status – completed, almost completed, or at risk

Complete

Almost complete

Requires intervention

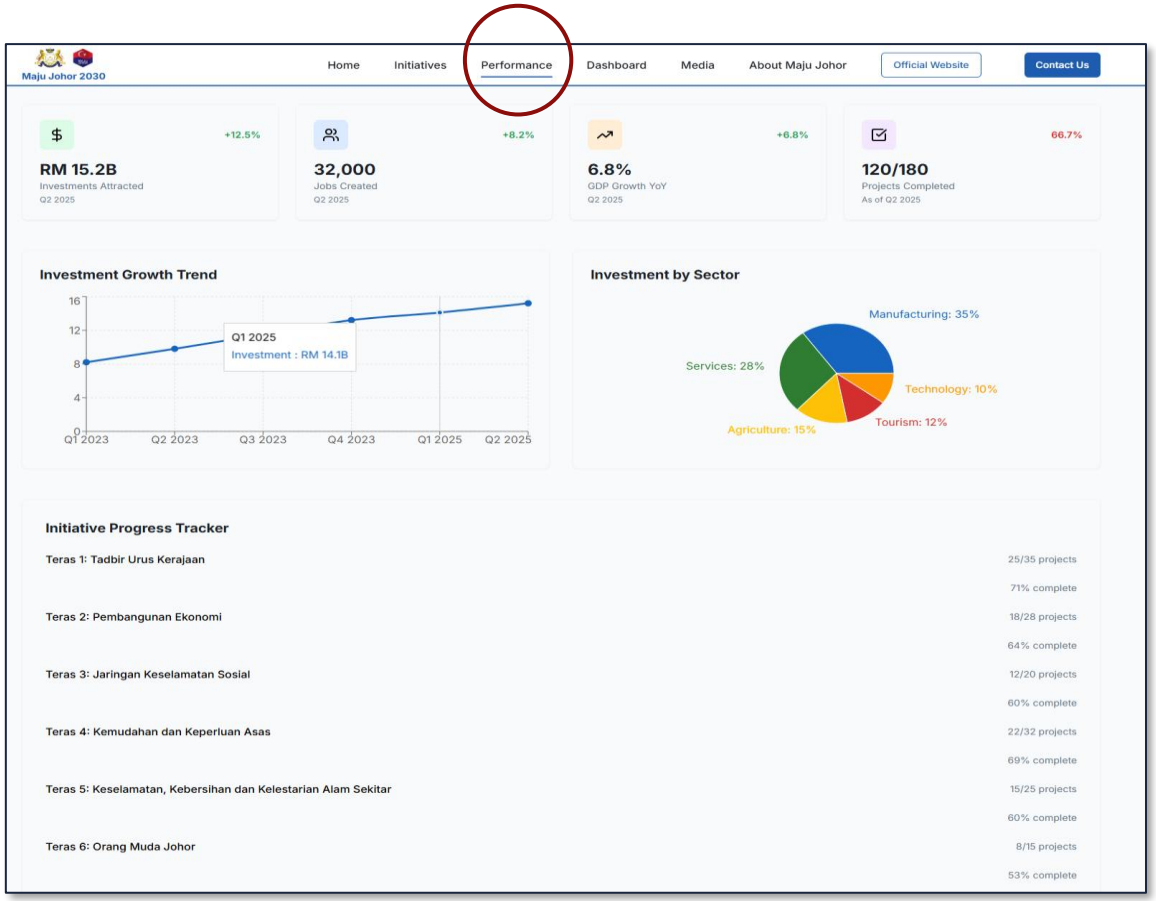
- Provide filtering (by category, status, year).
- Use expandable cards for each initiative (dummy progress % bar).

  Example:
  - *Category*: Infrastructure Development
  - *Roadblock*: Lack of Treated Water Supply for Industry Use
  - *Initiative*: Advancement Towards Treated Water Self-sufficiency
  - *Status*: In Progress (65%)

Source: PASB Recommendations

Tracking Johor's performance by showcasing achievements, measuring progress, and demonstrating impact across all critical initiatives under Maju Johor's coverage

3 **Click on the "Performance" tab to view key achievements across all Maju Johor initiatives and focus areas**



Performance & Achievements

Quarterly and yearly dummy metrics:

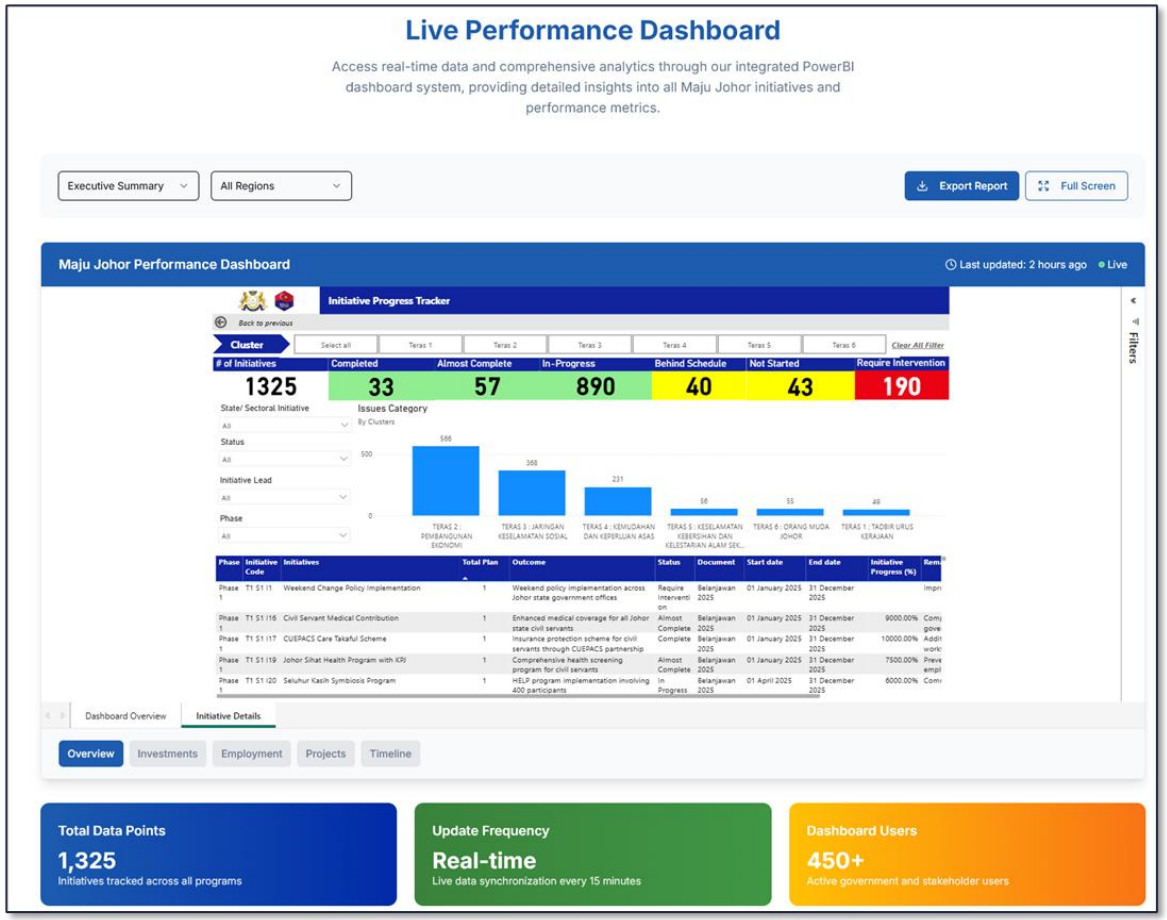
- Investments attracted: RM 15.2B (Q2 2024)
- Jobs created: 32,000 (Q2 2024)
- GDP growth: 6.8% YoY
- Projects completed: 120 out of 180 initiatives

Use bar charts, line graphs, and progress trackers.

Source: PASB Recommendations

Providing real-time access to Johor's critical initiatives' performance data, ensuring transparency and accountability for all stakeholders

4 **Click on the "Dashboard" tab to a consolidated view of all the initiatives**



Dashboard (PowerBI Embed)

- Provide section to embed live PowerBI dashboards using iframe

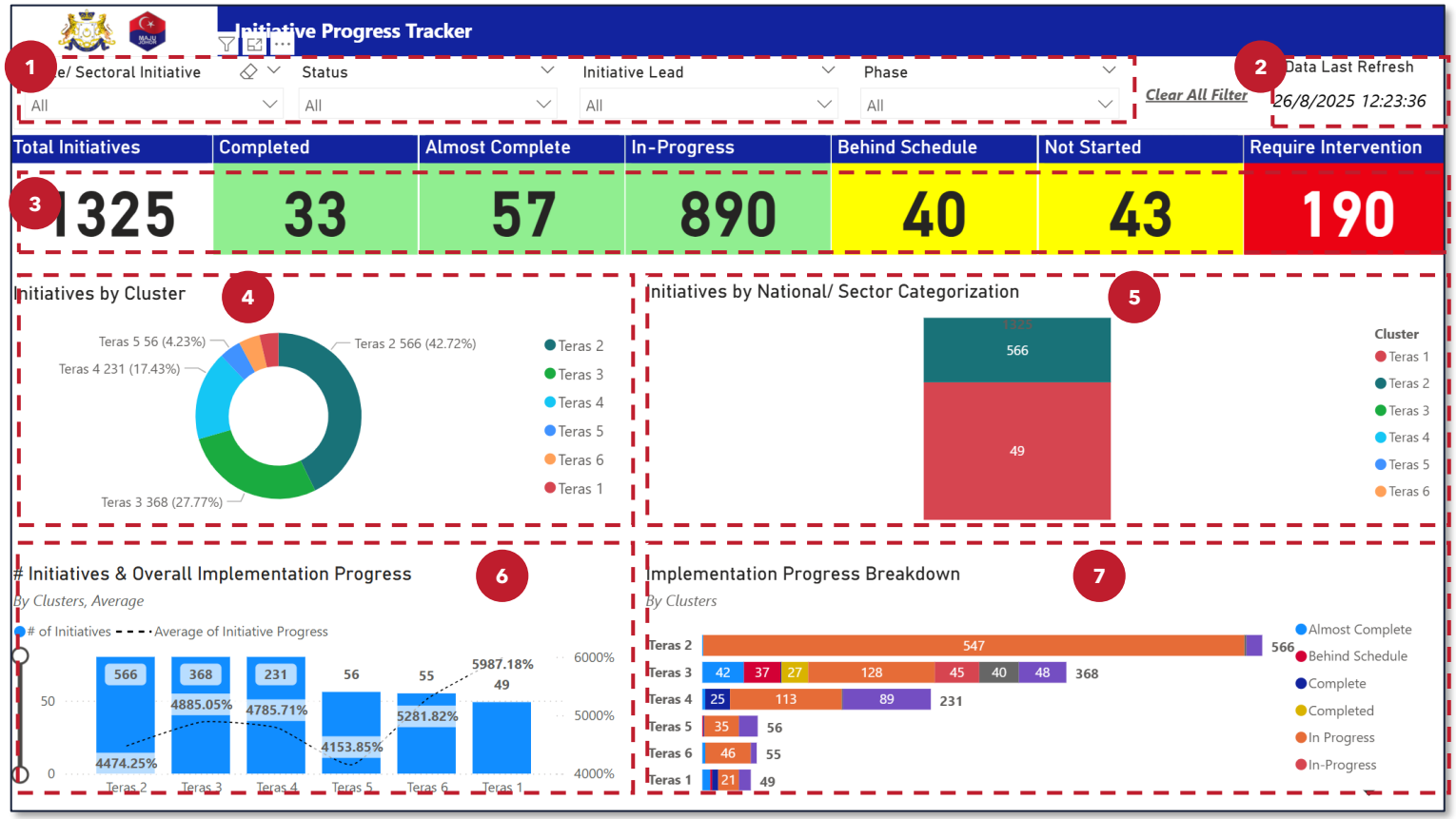
Source: PASB Recommendations

7 imperative data point for an effective dashboard

PRELIMINARY

Target Audience: Management *(Minister, KSU, JDT PMO)*

Mock Dashboard



Dashboard Highlight/ Features

1 Slicer to allow selection of **key focus areas** (*state/ sectorial initiatives/ distinct/ initiative lead/ phase*)

2 Accurate representation of **last data refresh date**

3 A high-level **overview of all strategic initiatives**, with a focused **highlight on those requiring intervention**

4 Detailed **breakdown of total initiatives by cluster**, providing insights into each cluster's share within the overall initiatives

5 Comprehensive categorization of all initiatives by sector and cluster

6 High-level **summary of overall initiative implementation average progress** by clusters

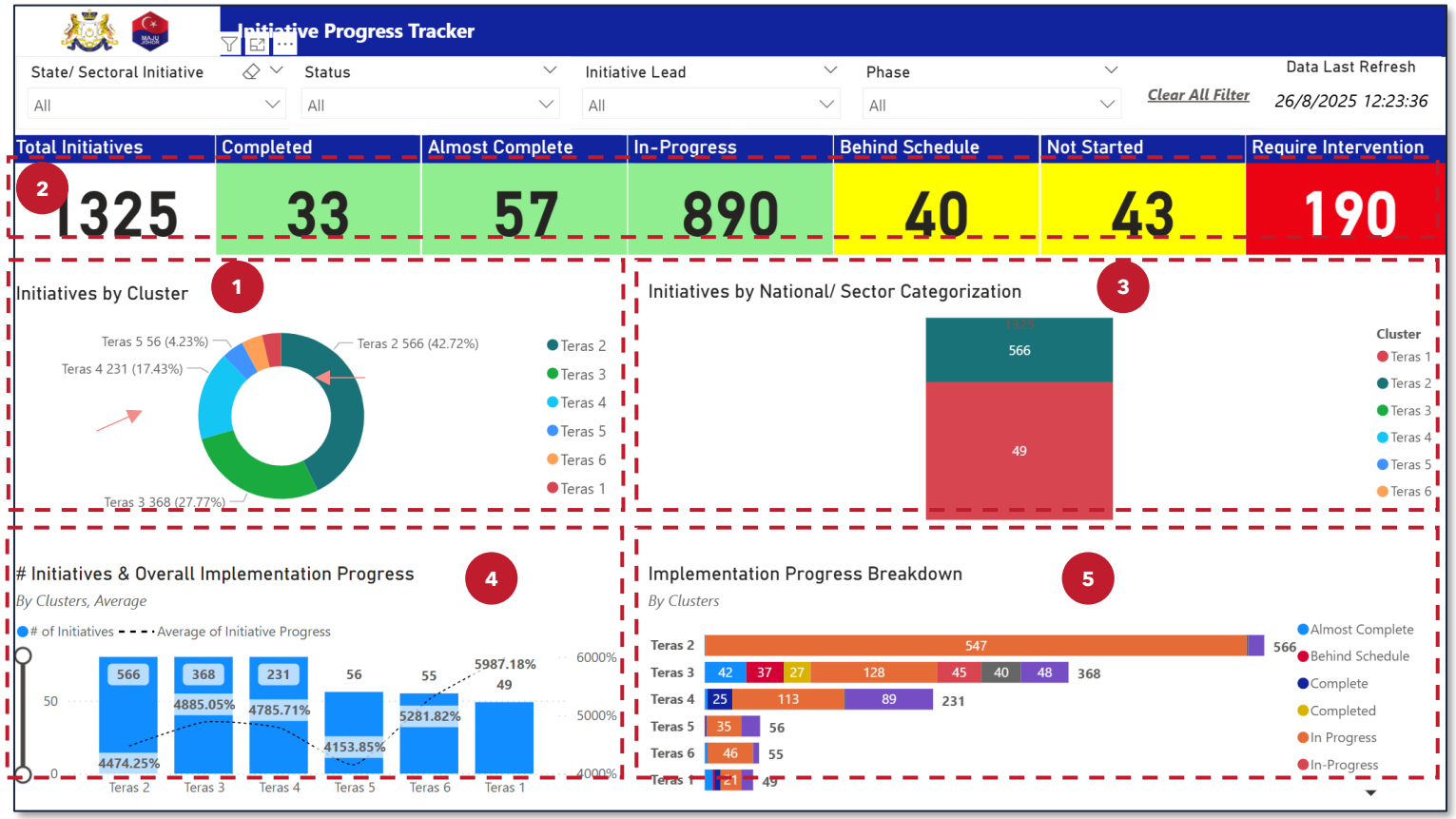
7 Strategic overview **of implementation progress status**, segmented by clusters.

Source: PASB Recommendations

Users can move beyond the high-level summary by engaging in an interactive review of the data, with the ability to click on specific data points for customized insights

Target Audience: Management *(Minister, KSU, JDT PMO)*

Mock Dashboard



Dashboard Highlight/ Features

1 Selection of data *(I.e., Talent & Infrastructure)* can be performed via a single click, ensuing an **interactive dashboard**

2 The **dashboard intuitively reflects relevant information** of the selected data (e.g., Talent and *Infrastructure* cluster)

3 **Reflection of appropriate segmented data** based on previously selected focus area *(I.e.,* Talent and *Infrastructure)*

- *Initiatives by State/ Sector Categorization*
- *Number of initiatives & overall implementation progress*

5

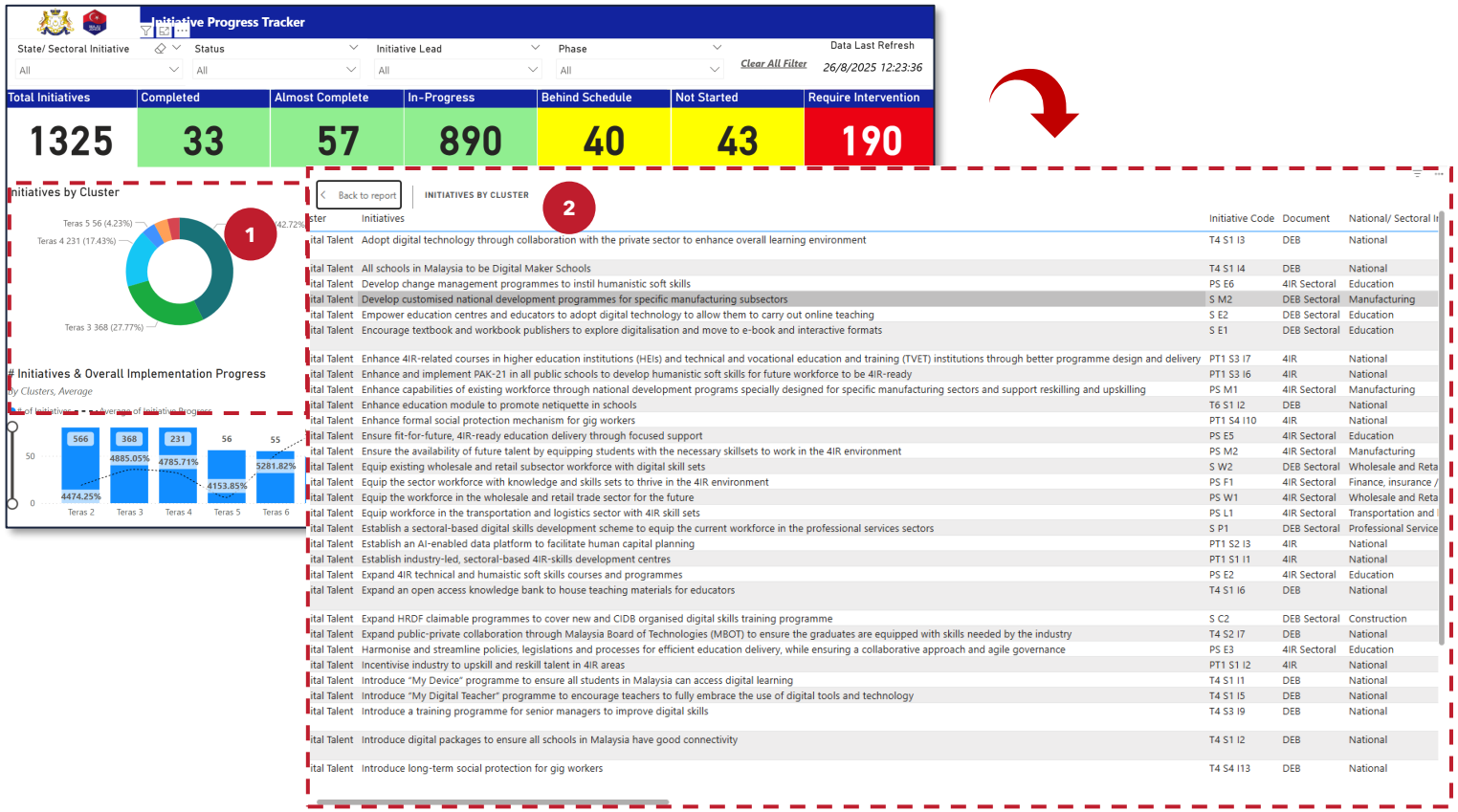
- *Implementation progress breakdown by cluster*

Source: PASB Recommendations

The report incorporates a detailed table view of the selected data, allowing users to examine information at a granular level, enhancing transparency in reporting and facilitating comprehensive data analysis

Target Audience: Management *(Minister, KSU, JDT PMO)/ Implementers*

Mock Dashboard



Dashboard Highlight/ Features

1 Visualization of data points in a table format - Enables a **granular review of data** while enhancing **transparency and auditability**

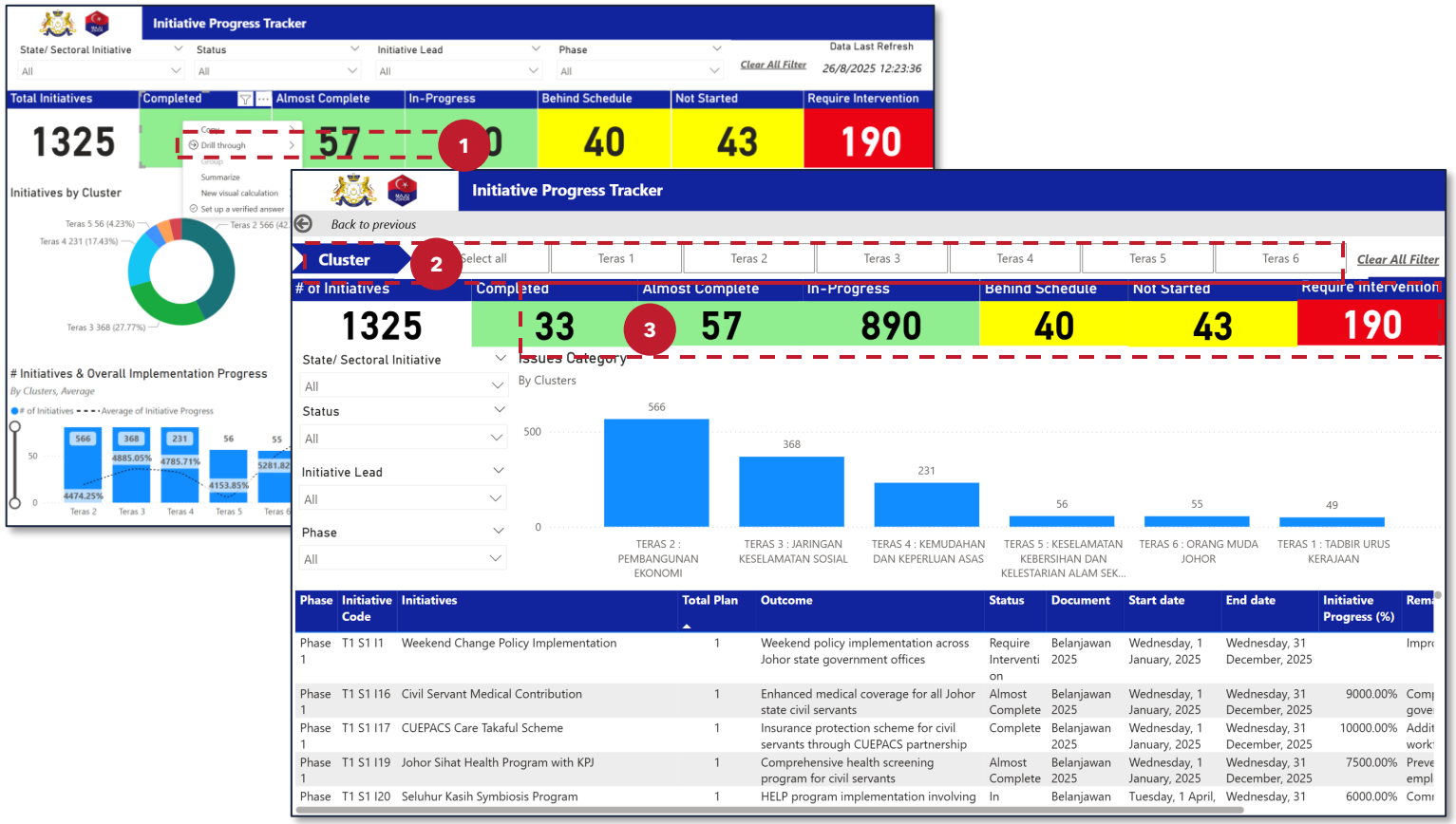
2 Data presented in "Table view" for **enhanced data visibility and analysis** if required

Source: PASB Recommendations

To further streamline usability, the dashboard includes a dedicated page where implementers and managers can efficiently identify key issues and bottlenecks requiring attention, all consolidated in a single view

Target Audience: Management, Implementers *(Project Manager, PMO, etc), All*

Mock Dashboard



Dashboard Highlight/ Features

1 The **drill-through** feature highlights relevant data-point, **simplifying the analysis process**

2 **Informative slicers/filter buttons** describing data associated with the selected clusters, providing **clear insights into data relationships**

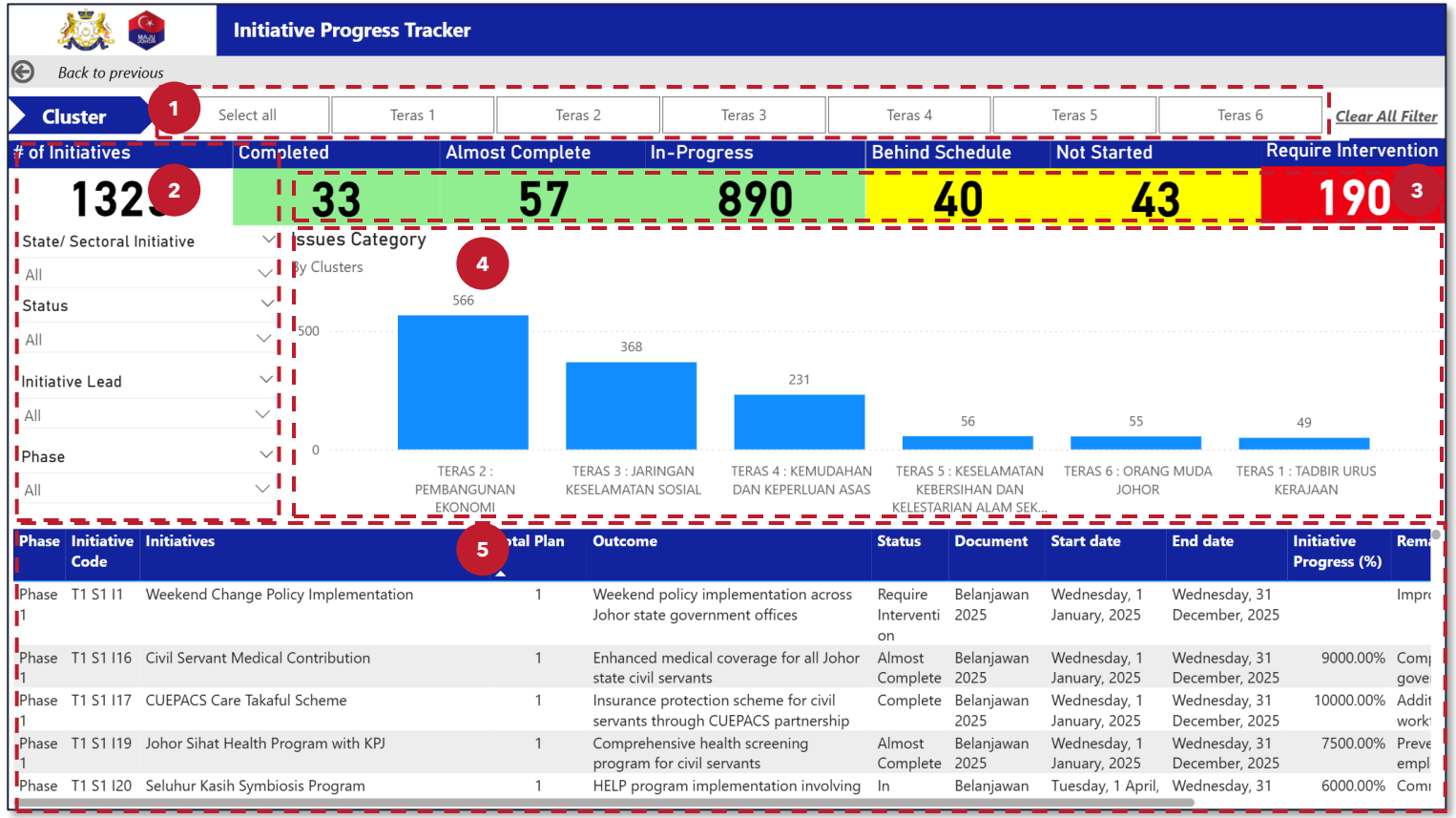
3 **Overview of strategic initiatives** based on the previously selected areas of interest *(e.g., Talent, Infrastructure, and Data)*, with a **focused emphasis on those requiring intervention**

Source: PASB Recommendations

A specialised view, designed for seamless project management and reporting, enables users to filter and access information and datasets relevant to their clusters or areas of responsibility, promoting informed decision-making and targeted intervention

Target Audience: Implementers *(Project Manager/ JDT PMO, etc), All*

Mock Dashboard



Dashboard Highlight/ Features

1 Filter/slicer buttons by clusters allow users to **select and display the relevant data and initiative progress**

2 Filter/ slicers list allowing user to **select and focus on area of interest**

3 A high-level overview of all **strategic initiatives**, with a **focused highlight on those requiring intervention**

4 Comprehensive **summary of issues categorized by clusters**

5 **In-depth initiative information**, with horizontal and vertical scrolling for easy access to relevant details

Source: PASB Recommendations

For efficient project management, a widely adopted and user-friendly licensed platform can be utilized to minimize bottlenecks and facilitate the consolidation of reports, enabling project managers to deliver streamlined and clutter-free reporting

Target Audience: Implementers *(Project Manager)*

1 2

Initiative Code	Initiatives	Document	State/ Sectoral Initiative	Phase	Outcome	Initiative Lead
T1 S1 I1	Advancement Towards Treated Water Self-sufficiency	Strategic Plan 2025	State	Phase 1-2	Implementation of treated water	KASA & SPAN
T1 S1 I2	Mitigation of Flood Risks by Establishing Johor as a Sponge City	Strategic Plan 2025	State	Phase 1	15 pilot areas established with s	JPS & MB Johor
T1 S1 I3	Digitalisation of Customs Clearance	Digital Transformation 2025	Sectoral	Phase 1	Digital platform reducing cleara	KPDNHEP & Custo
T1 S1 I4	Construction of PTP Free Zone 3 Access Road	Infrastructure Plan 2025	Sectoral	Phase 1-2	12km access road connecting I	JKR & PTP
T1 S1 I5	Enhancement of Rail Logistics Infrastructure and Inter-Terminal Transfe	Transport Master Plan 2025	State	Phase 1	ITT frequency increased from 4	SPAD & KTM
T1 S1 I6	Enhancement of Mersing's International Connectivity	Tourism Development 2025	Sectoral	Phase 1	New ferry terminal and upgrade	Tourism Johor
T1 S1 I7	Introduction of Elevated Autonomous Rapid Transit (EART) Services	Smart City Initiative 2025	State	Phase 1	25km EART network connectin	SPAD & IRDA
T1 S1 I8	Revitalisation of Segamat In-Land Port	Logistics Hub 2025	Sectoral	Phase 1-2	Inland port handling 200k TEUs	KEJORA & KTM
T1 S1 I9	Leveraging Gemas-JB EDTP1 Infrastructure for Commuter Services in .	Rail Connectivity 2025	State	Phase 1	Daily commuter services conne	KTM & SPAD
T1 S1 I10	Development of Lebuhraya Pantai Timur 4 (LPT4)	Highway Development 2025	State	Phase 1	180km expressway connecting	JKR & PLUS
T1 S1 I11	Construction of East Coast Rail Link 2 (ECRL2)	Rail Development 2025	State	Phase 1	200km rail extension from Ment	KTM & MRL
T1 S1 I12	Development of the West Coast Expressway Southern Link	Highway Expansion 2025	State	Phase 1	150km expressway extension fr	JKR & PLUS
T1 S1 I13	Development of Johor Transition Industrial Clusters (JTIC)	Green Economy 2025	State	Phase 1-2	3 pilot industrial clusters transiti	MIDA & CIDB
T2 S1 I1	Introduction of Special Land Use Permit Classifications Reform	Land Reform 2025	State	Phase 1	New land classification framew	JPBD & PTJ
T2 S1 I2	Formation of Johor Renewable-Energy Market Reform Group	Energy Transition 2025	State	Phase 1	Policy framework for renewable	SEDA & ST
T2 S1 I3	Activating Johor's AI Engine through Johor Artificial Intelligence Office (JA	AI Strategy 2025	State	Phase 1	JAIO established with 50 AI prof	MAMPU & MDEC
T2 S1 I4	Johor Industrial Park STAR Ratings	Quality Assurance 2025	State	Phase 1	50 industrial parks assessed ar	MIDA & CIDB
T2 S1 I5	Johor Regulatory Sandbox	Innovation Framework 2025	State	Phase 1	Regulatory sandbox supporting	MIDA & BNM
T3 S1 I1	Developing a Strategic Industrial Land Consolidation & Release Progran	Investment Promotion 2025	State	Phase 1-2	5000 hectares of strategic indu	MIDA & PTJ
T3 S1 I2	Establishing Mersing as part of Special Tourism Investment Zone (STIZ)	Tourism Investment 2025	Sectoral	Phase 1	STIZ and FCZ status approved	Tourism Johor & MI
T3 S1 I3	Expansion of Tourism Johor's Mandate to Drive Targeted Tourism Indus	Tourism Development 2025	Sectoral	Phase 1	Enhanced mandate covering in	Tourism Johor
T3 S1 I4	Launching a Johor Aerospace Council & Secretariat	Aerospace Development 2025	Sectoral	Phase 1	Council established with 15 ind	MIDA & MAI

Function

1 A **specially curated table** is designed to detail all initiatives, enabling project managers to **update initiative progress and identify bottlenecks** for streamlined and straightforward reporting, **eliminating the need for report duplication**

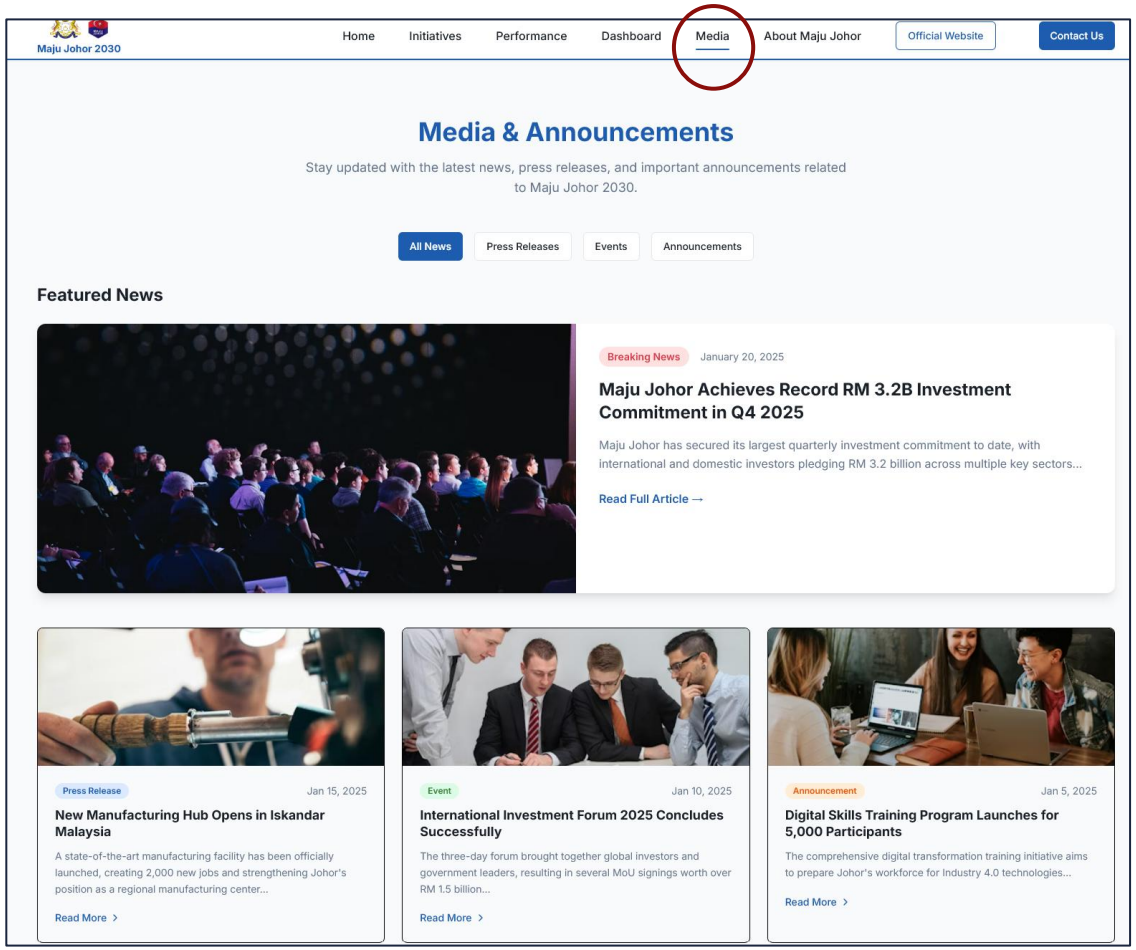
2 **A structured table** that serves as a direct source for the dashboard **and can be easily maintained** by all stakeholders without requiring additional manpower.

Source: PASB Recommendations

Providing real-time news and announcements to keep users updated on activities, investments, and programme milestones

5

"Media" tab takes you to the Media & Announcements page



Media & Announcements

- News articles, press releases, event updates.
- Announcement cards with date, title, and link.

Source: PASB Recommendations

Learn More About Maju Johor 2030: A Comprehensive Programme to Unlock Growth, Attract Investment, Build Future-Ready Talent, and Foster Sustainability, While Welcoming Feedback and Engagement from All Stakeholder

6

"About Maju Johor" provides background on the state's transformation agenda

About Maju Johor 2030

- Background of Johor Economic Transformation Programme.
- Purpose: to unlock growth, attract investment, build talent, and foster sustainability.
- Include leadership message (dummy text).

Source: PASB Recommendations

7.2

DMS Methodology Support.

DMS Dashboard to Drive Implementation

C. Executive Friendly Interface

B. Dashboard Input and Monitoring

- Project and Initiative Status
- Budget and Resource Allocation
- KPIs and Targets
- Issues and Challenges

Recursive problem solving

DMS Escalation Process

D. Updates and Problem Solving by Leadership

YAB Perdana Menteri

Bi-annually Federal & State problem solving, and decision making

YBhg Ketua Setiausaha Negara

Bi-monthly Federal & State problem solving, and decision making

YAB Menteri Besar Johor

Monthly Steering Committee Meetings and decision making. Communications to ***Rakyat***

YBhg Setiausaha Kerajaan Negeri Johor

Fortnightly leadership meeting, problem solving, and decision making

A. Implementation

Focus Area Leads guided by DMS Methodology Advisory Team

Weekly progress update and problem solving

Focus Area Champions with Initiative Owners

Weekly progress update on implementation status and challenges

Projects will be organised under Maju Johor Strategic Pillars to prioritise high-Impact initiatives

This ensures the Johor team focuses on transformative projects that drive Johor's strategic priorities, not day-to-day BAU activities

Foundation Initiatives

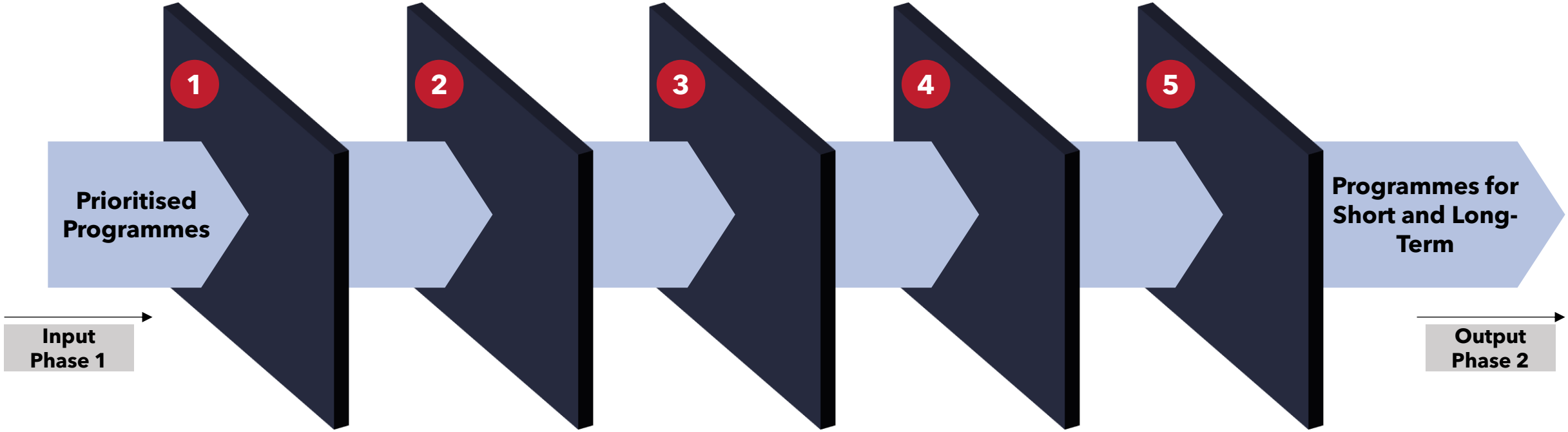
1. ***Rancangan Malaysia Ke-12 (RMK12)***
2. ***Rancangan Malaysia Ke-13 (RMK13)***
3. ***Belanjawan Johor***
4. ***Mesyuarat Tindakan Dun* (MTD)**
5. **Johor Economic Transformation Programme (JETP)**

The DMS Dashboard will track and prioritise high-impact projects across 7 pillars for disciplined delivery

1. ***Tadbir Urus Kerajaan*** (Government Governance)
2. ***Pembangunan Ekonomi*** (Economic Development)
3. ***Jaringan Keselamatan Sosial*** (Social Safety Net)
4. ***Kemudahan dan Keperluan Asas*** (Basic Infrastructure and Needs)
5. ***Keselamatan, Kebersihan dan Kelestarian Alam Sekitar*** (Safety, Cleanliness & Environmental Sustainability)
6. ***Orang Muda Johor*** (Johor Youth)
7. ***Projek Pemangkin**** (Catalytic Projects)

Note: *Projek Pemangkin* - Drive catalytic projects (Example Iskandar, logistics, digital economy, tourism) to spur long-term prosperity

DMS Methodology recommends prioritising and refining high-impact projects to ensure recursive problem solving targets initiatives that move the needle most for Maju Johor 2030



Initial Screening
Identify key feasibility gaps in funding, scope, resource and execution

Thematic Review
Validate alignment of Maju Johor's True North, KPIs, and national priorities with sectoral priorities

Benchmarking & Testing
Assess regional and global best practices for execution

Stakeholder Syndication
Secure stakeholder commitment on priorities, trade-offs, and KPIs

Final Refinement
Lock in high-impact, feasible programs with final KPIs

Phase 2 ensures all validated programmes are rigorously prioritised to focus on projects/initiatives that would move the needle the most, aligned with the Maju Johor 2030 and structured with clear feasibility and impact before moving into detailed execution planning

08

Appendix.

8.1

Sectoral Analysis & Strategy Recommendations.

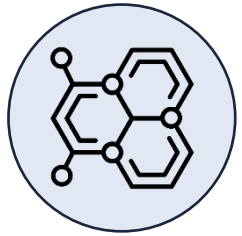
Chemical & Petrochemical.

The chemicals industry can be broadly categorised into 3 main sub-sectors which are organic chemicals, inorganic chemicals and bio-based feedstock

Sub-sectors of Chemical Industry

Sub-sectors

Organic Chemicals



Inorganic Chemicals

Bio-based Feedstock

Sub-segments / Examples

Organic Chemicals

1. **Base Chemical / Building Blocks**
   - Methanol
   - Ethylene
   - Propylene
   - Benzene
2. **Organic Intermediaries**
   - Acrylic acid
   - Propylene glycol
   - Phenol
   - MTBE
   - Paraxylene
3. **Plastics & Polymers**
   - Commodity plastics
   - Water soluble polymers
   - Engineering plastics
4. **Fertilisers**
   - Urea
   - Ammonia
   - Phosphate
5. **Specialty Chemicals**
   - Agrochemicals
   - Care Chemicals
6. **Agrochemicals**
   - Crop protection
   - Seeds

Inorganic Chemicals

1. **Inorganic Specialties**
   - Electronic chemicals
   - Catalyst
2. **Inorganic Building Blocks / Intermediaries**
   - Sulphur
   - Phosphorus
   - Chlorine
   - Rare earth elements

Bio-based Feedstock

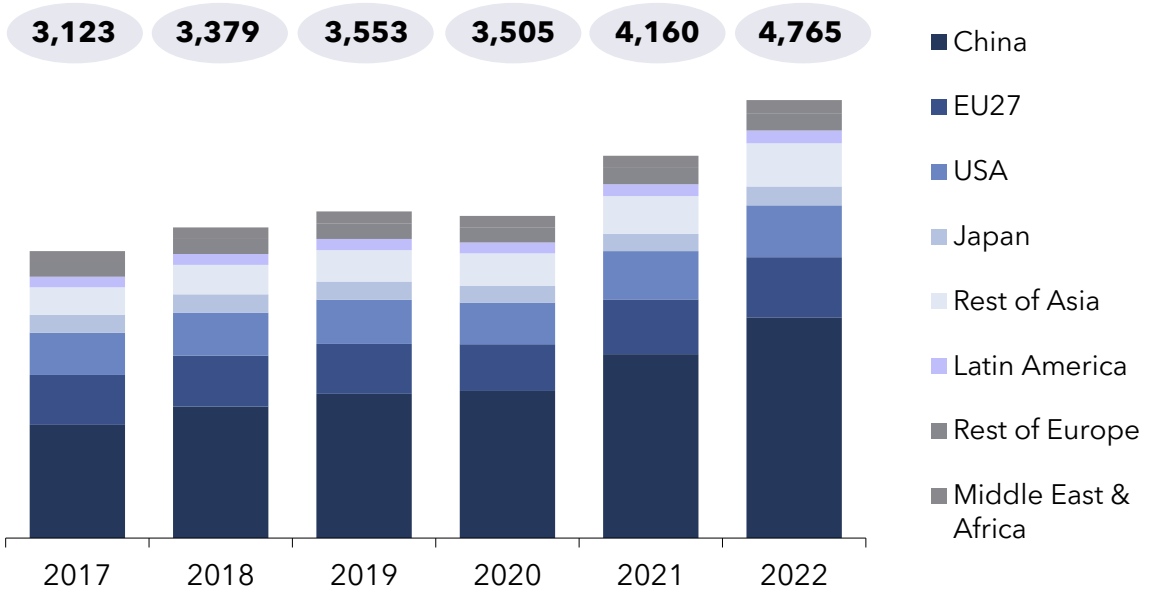
1. **Oleochemicals & Bio-chemicals**
   - Fatty acids
   - Methyl esters
   - Glycerine

Source: Chemical Industry Roadmap 2030, NIMP 2030 – Chemical Industry

The global chemicals market reached over USD4.7 trillion in 2022, with China leading growth, while emerging regions like Latin America and the Middle East show rising output

Global Chemicals Market Revenue by Region (2017 – 2022)
USD Billion

Total Revenue:



Year	China	EU27	USA	Japan	Rest of Asia	Latin America	Rest of Europe	Middle East & Africa
2017	1,230	543	460	195	300	115	160	120
2018	1,430	553	468	200	320	118	165	125
2019	1,570	543	480	198	340	122	170	130
2020	1,600	507	455	180	355	120	160	128
2021	2,000	595	525	190	410	130	175	135
2022	2,400	655	565	205	470	140	185	145

Key Highlights

- **Significant Global Growth:** The global chemical market grew from USD ~3.2 trillion in 2020 to USD ~4.7 trillion in 2022, reflecting a strong post-pandemic rebound and rising industrial demand. This is a growth of approximately 46% over two years, underscoring robust global recovery and investment in the sector.
- **Asia Dominates the Market:** China remains the largest contributor by far, with its market growing from USD 1.6 trillion in 2020 to USD 2.4 trillion in 2022 – representing over 50% of global revenue. The Rest of Asia (excluding China, Japan) and Japan together accounted for an additional ~15%, reinforcing Asia's chemical manufacturing dominance.
- **Moderate Growth in Western Regions:** The EU27 grew from USD 507 billion (2020) to USD 655 billion (2022).The USA saw growth from USD 455 billion (2020) to USD 565 billion (2022). These figures show moderate but steady expansion, reflecting resilience amid rising environmental and regulatory pressures.
- **Emerging Growth in Developing Regions:** Notable gains were also seen in the Middle East & Africa from USD 128 billion to USD 145 billion; and Latin America from USD 130 billion to USD 140 billion. This points to diversification of production hubs and potential FDI destinations.

Source: CEFIC; American Chemistry Council; Chemical & Engineering News, ICIS; Grand View Research; Statista; Market Research; PASB Analysis

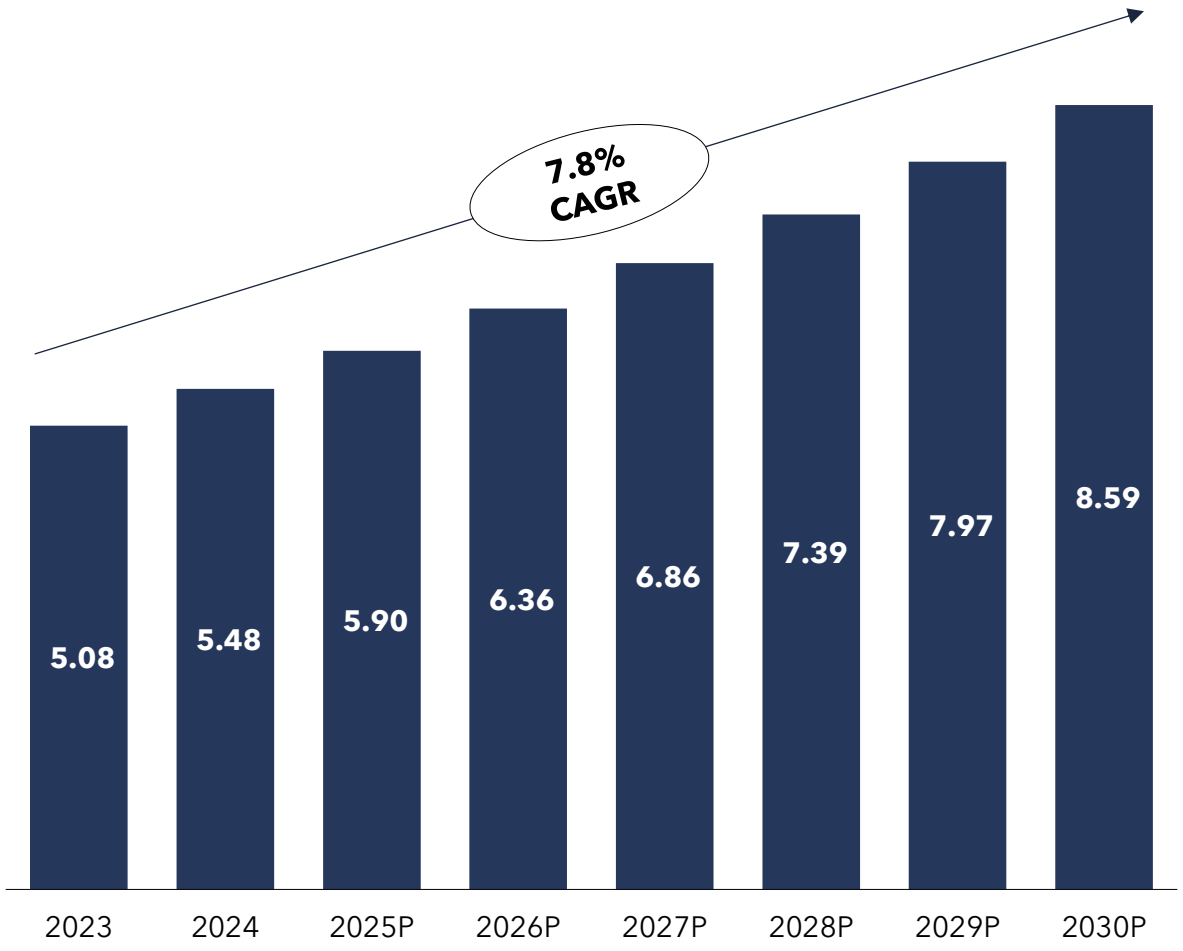
The chemical industry's future growth is expected to be fueled by increasing demand for sustainable and high-performance materials across sectors like EVs, healthcare and agriculture

Trends In the Global Chemical Industry	Description
1 Demand for Lightweight Vehicles, Electrification, and Alternative Fuels	• Growing need for chemical-derived products (e.g., battery chemicals, engineered polymers, high-performance plastics). • Increasing demand for semiconductors to support electronics and EV battery manufacturing in Asia Pacific. • Specialty chemicals (e.g., electronic chemicals) are used in semiconductor processes like doping, etching, and photolithography.
2 Nutrition and Health Lifestyle Changes	• Rising demand for nutrition and care chemicals driven by increased awareness and interest in improving personal health. • Growth in nutraceuticals, functional foods, and personal care markets. • Driven by an ageing population and increased health awareness post-COVID-19.
3 Demand for Agri-Science Applications	• Growing need for agrochemicals to enhance food security and agricultural productivity. • Demand for seed solutions, non-toxic formulations, and longer shelf-life products.
4 Demand for New Construction Materials and Technologies	• Urbanisation and mobility increase the need for construction chemicals (e.g., concrete admixtures, adhesives, sealants). • New materials and technologies support city infrastructure and EV adoption.
5 Demand for Industry 4.0 Technologies	• Increasing use of high-performance composites (e.g., carbon nanotubes, graphene, silicon) • These materials are essential for advanced sensors, 3D printing, and connected technologies

Source: Chemical Industry Roadmap 2030, NIMP 2030 – Chemical Industry, PASB Analysis

By 2030, the global chemicals market is projected to grow to over USD8.5 trillion, driven by technological advancement, sustainability initiatives and market dynamic

Global Chemicals Market (2023 – 2030)
USD Trillion



Source: GlobalNewsWire Research; Grand View Research

Key Drivers

1 Technological Advancement and Digital Transformation

- The industry is experiencing significant transformation through the adoption of digital technologies including AI, advanced analytics, and blockchain
- Implementation of digital twins and e-commerce platforms is enhancing demand forecasting and customer engagement capabilities
- Technologies like 3D printing and quantum computing are driving innovation in molecule discovery and production processes

2 Sustainability and Environmental Initiatives

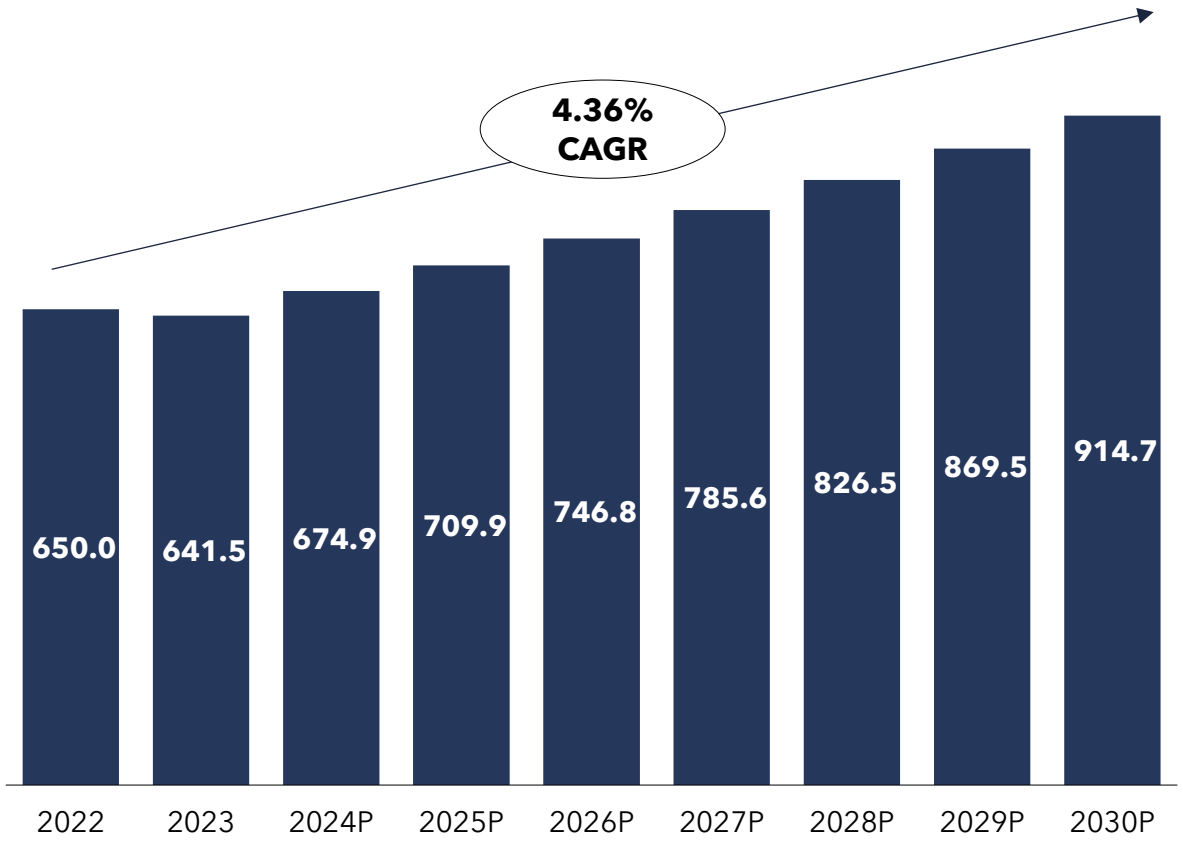
- The chemical industry supports more than 75% of all emissions reduction technologies needed to meet net-zero goals by 2050
- Growing focus on developing bio-based and renewable chemical solutions
- Implementation of circular economy principles in product design and manufacturing

3 Global Economic Growth and Market Dynamic

- Significant expansion in emerging markets, particularly in the Asia-Pacific region
- Major investments in energy transition driven by government policies and incentives such as the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA)
- Shift of relative wealth from West to East, with China and India becoming significant players in the market

For specialty chemicals, the market is projected to grow from USD650 billion in 2022 to USD914.7 billion in 2030, driven by digital transformation and sustainability requirements

Global Specialty Chemicals Market (2022 – 2030)
USD Billion



Key Drivers

1 Digital Revolution in Chemical Manufacturing

- Advanced technologies like AI, IoT, blockchain, and digital twins are enabling flexible, cost-efficient, and data-driven production
- Innovations such as additive manufacturing and virtual testing are accelerating product development and improving design optimisation

2 Asia-Pacific Powers Regional Market Growth

- Emerging markets in Asia-Pacific—led by Vietnam, India, and Malaysia—are attracting foreign investment and strengthening supply chains.
- Growth is fueled by strong demand for electronics, pro-digital policies, and deep integration into global trade networks

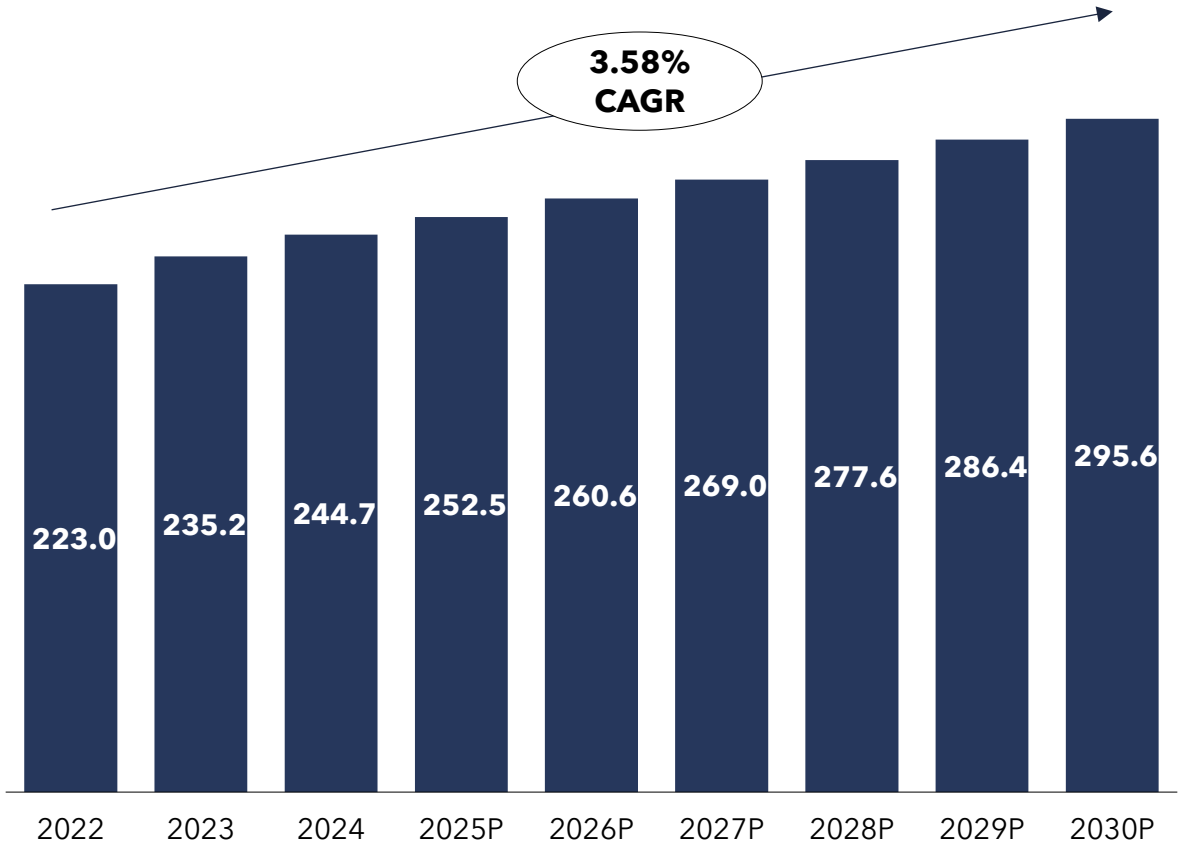
3 Sustainability is a Strategic Imperative

- The shift to green chemistry and bio-based chemicals is reshaping the industry with a focus on circular economy practices.
- Regulatory frameworks like REACH and ISO 14001 are accelerating the adoption of safer, eco-friendly chemical alternatives.

Source: Market.US; Grand View Research; Market Research Future

Additionally, global agrochemicals market is projected to grow at 3.6% CAGR, driven by rising food demand, digital transformation, and APAC dominance in agri-production

Global Agrochemicals Market (2022 – 2030)
USD Billion



Key Drivers

1 Rising Food Demand and Agricultural Pressure

- Global population is set to hit 9.7 billion by 2050, driving a 70–100% increase in food demand
- Declining arable land necessitates higher crop yields to ensure food security

2 Tech-Driven Transformation in Agriculture

- Precision agriculture tools—like GPS, IoT, and AI—optimize chemical use and enable real-time monitoring
- Digital farming improves resource efficiency, enhances yield prediction, and reduces chemical waste

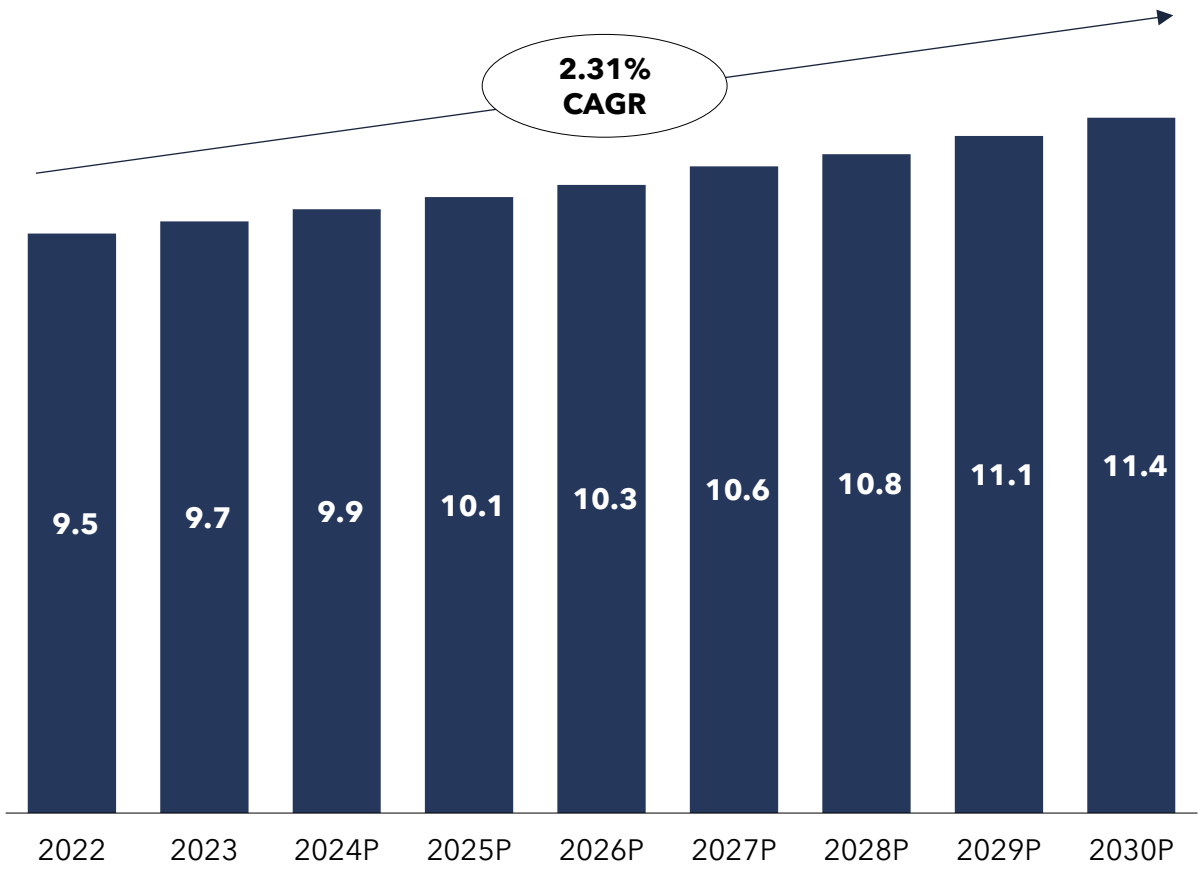
3 Asia-Pacific Leads Market Growth

- Dominance is driven by strong agricultural output, grain demand, and rapid tech adoption
- Growth is supported by foreign investment, resilient supply chains, and supportive policies in China, India, and Southeast Asia

Source: InsightAce Analytic; Cognitive Market Research; Mordor Intelligence

In Malaysia, the chemical industry is projected to grow steadily to USD11.4 billion by 2030, supported by strategic policies, infrastructure expansion, and enhanced trade access

Malaysia Chemicals Market Size (2022-2030)
USD Billion



Key Drivers

1 Strong Government Policy and Strategic Vision

- Chemical Industry Roadmap 2030 (CIR2030) targets a rise in chemical sector GDP contribution from 3.4% to over 4.5% by 2030
- Supported by aligned national policies like NIMP2030, NETR, and tax incentives for new manufacturing

2 Industrial Zones and Infrastructure as Growth Enablers

- Malaysia boasts 600+ industrial estates, anchored by key projects like RAPID, PIC, and Kulim Hi-Tech Park
- Ongoing development of tech-enabled chemical parks with upgraded connectivity and R&D facilities strengthens investment appeal

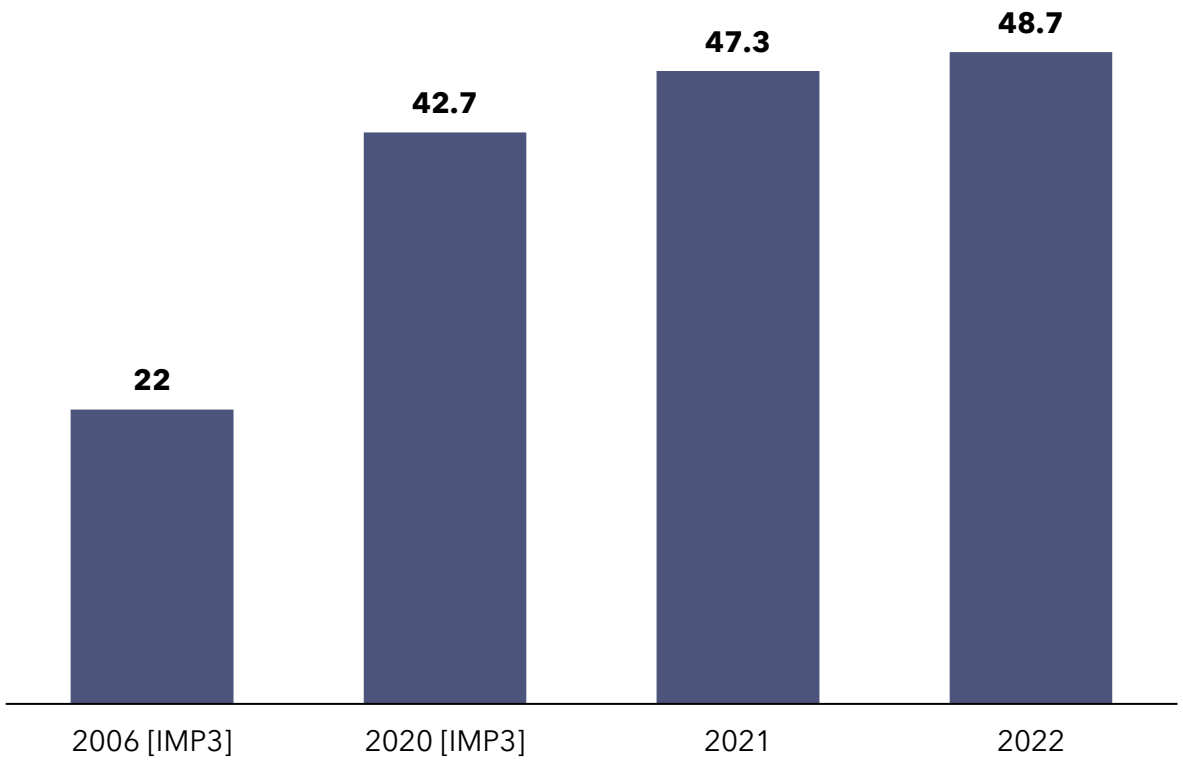
3 Trade Agreements Expanding Global Market Access

- Agreements like RCEP, CPTPP, and AFTA enhance access to global markets and reduce export costs
- Improved tariff-free trade, raw material access, and regional competitiveness boost Malaysia's global chemical export potential

Source: MIDA Investment Performance Report 2023; Chemical Industry Roadmap 2030;

Over the years, the industry has shown resilient growth in Malaysia, with GDP contribution rising steadily post-pandemic, driven by base chemical production and expected to expand further through high-value segments under CIR2030

Value-added of Chemical Industry (2006 - 2022)
RM Billion



Key Highlights

1 Sustained Long-Term Value Creation in the Chemical Sector
- From 2006 to 2020, the chemical industry's GDP contribution rose from RM22.0 billion to RM42.7 billion, at a 4.9% CAGR during the IMP3 period
- This growth reflects expansion in core chemical production, increased investment, and stronger export demand for base and intermediate chemicals

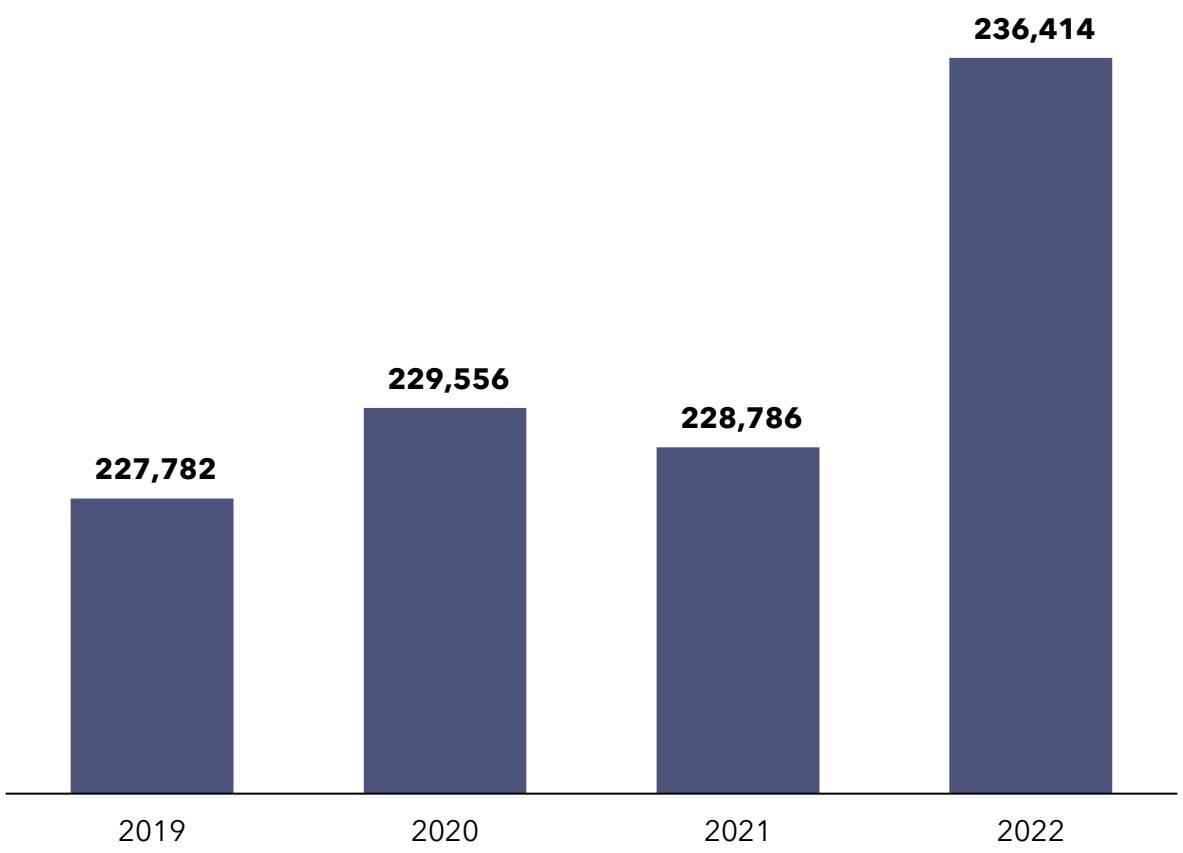
2 Post-2020 Recovery Led by Base Chemicals
- The industry rebounded strongly post-pandemic, growing 10.7% in 2021 and a further 2.9% in 2022, reaching RM48.7 billion
- Growth was driven by higher production of base chemicals and organic intermediates, supported by facilities like Pengerang RAPID

3 Increasing Contribution to National GDP
- The chemical sector is projected to increase its GDP share to over 4.5% by 2030, up from 3.4% currently, under the CIR2030 roadmap
- Continued value-added growth is expected from high-value sub-segments like specialty chemicals, performance polymers, and nutraceuticals

Source: NIMP; MIDA; Statista

Malaysia's chemical industry employment grew steadily from 2019 to 2022, driven by post-pandemic recovery, rising demand, and expanded production—despite temporary pandemic-related workforce contractions in 2021

Employment in Chemical Industry (2019 - 2022)
Number of Persons



Key Highlights

1 Steady Employment Growth Amid Sector Expansion
- Chemical industry employment rose from 227,782 in 2019 to 236,414 in 2022, reflecting a 1.2% CAGR over the period
- The increase aligns with growing production capacity and export activity, particularly in base and intermediate chemicals, supported by major facilities like RAPID

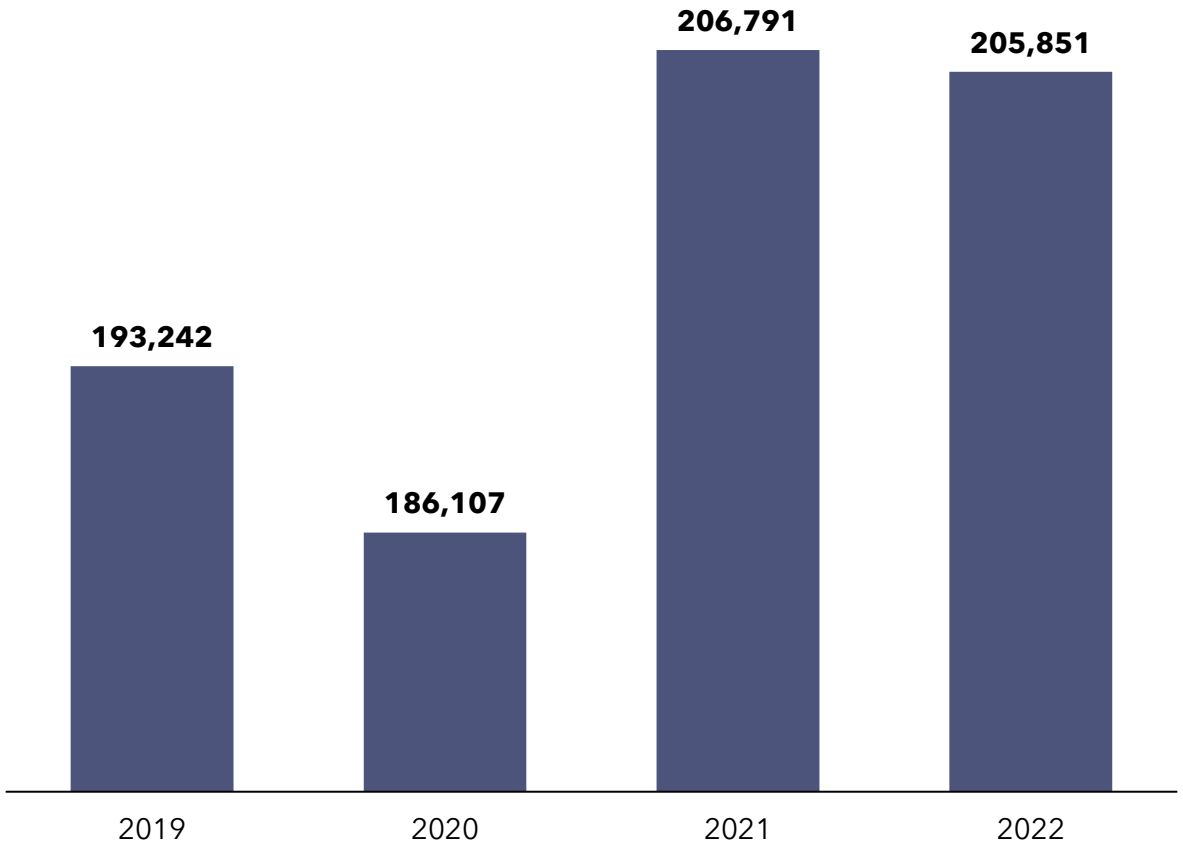
2 Pandemic-Induced Workforce Adjustments
- Despite sectoral growth, employment dipped in 2021 to 228,786 due to cost-cutting measures and uncertainty during COVID-19
- Manufacturers streamlined operations anticipating a prolonged downturn, but recovery in 2022 saw employment rebound to a new high

3 Labour Demand Driven by Market Growth
- Rising global and regional demand for chemical products boosted employment, particularly in production and logistics roles
- Johor and Selangor likely absorbed the bulk of new job creation due to their concentration of industrial chemical parks and port-linked zones

Source: NIMP; MIDA; Statista

Malaysia's chemical industry achieved notable labour productivity after the pandemic driven by efficiency gains, pandemic-induced demand, and resilient post-COVID recovery in output per worker

Labour Productivity of Chemical Industry (2019 - 2022)
Value added per employment (RM)



Source: NIMP; MIDA; Statista

Key Highlights

1 Steady Labour Productivity Growth
- Labour productivity in the chemical industry increased from RM193,242 in 2019 to RM205,851 in 2022, achieving a CAGR of 2.1% between 2019 - 2022
- This reflects greater efficiency in output generation per worker, driven by better production systems and process optimisation

2 Pandemic-Driven Productivity Surge
- 2021 recorded the highest productivity at RM206,791, likely due to pandemic-induced demand for essential chemical products (e.g., hygiene, packaging, disinfectants)
- Higher output was achieved even with a slightly reduced workforce, indicating intensified operational efficiency

3 Short-Term Volatility with Long-Term Gains
- Despite low in productivity in 2020 (RM186,107), significant increase in subsequent years points to strong industry resilience and adaptability
- This increase suggests improved capacity utilization, digitisation, and reallocation of labour to higher-value tasks post-COVID

Petroleum products and petrochemicals represent a subset of the chemicals industry focused on chemicals derived from petroleum and natural gas, which includes ethylene, propylene, benzene, and derivatives like plastics, synthetic rubber, resins, and solvents

Sub-sectors of Petrochemical Industry

Sub-sectors

Petroleum Products

Petrochemicals

Examples

Lubricating oils and refinery products such as:

- Liquefied petroleum gas
- Naphtha
- Gasoline
- Kerosene
- Fuel oils
- Gas oils
- Jet oils
- Diesel
- Bitumen

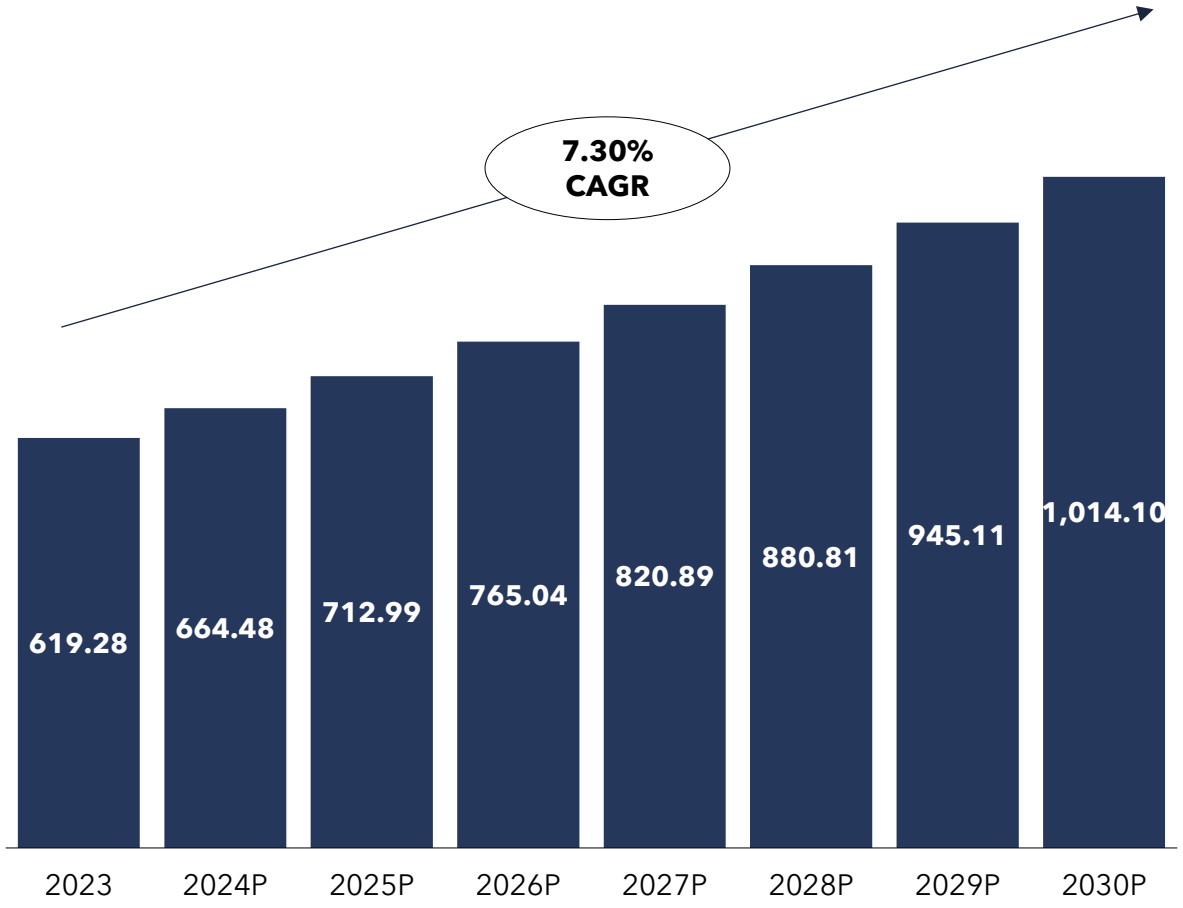
Derived from petroleum products and other hydrocarbon sources, with examples such as:

- Olefins
- Polyolefins
- Aromatics
- Ethylene oxides
- Glycols
- Oxo-alcohols

Source: NIMP 2030 – Petroleum Products and Petrochemicals Industry

The global petrochemicals market is projected to grow at a 7.3% CAGR to over USD1 trillion by 2030, driven by digital innovation, rising Asian demand, and sustainability transitions

Global Petrochemicals Market (2023 – 2030)
USD Billion



Key Drivers

1 Digital Transformation Enhances Efficiency and Yields

- Integration of IoT and AI systems enables predictive maintenance and real-time monitoring, minimising downtime and boosting productivity
- AI-powered advanced process controls optimise output and reduce material waste through continuous analytics
- Adoption of digital twin technology allows virtual simulations to streamline operations and enhance decision-making

2 Industrialization and Urbanisation Drive Demand

- Rapid manufacturing growth in China, India, and Southeast Asia is expanding the need for petrochemical inputs
- Rising urban populations and growing middle-class consumption are fueling demand for plastics, packaging, and synthetic materials
- End-use industries are shifting to Asia-Pacific due to cost advantages and supportive policy environments

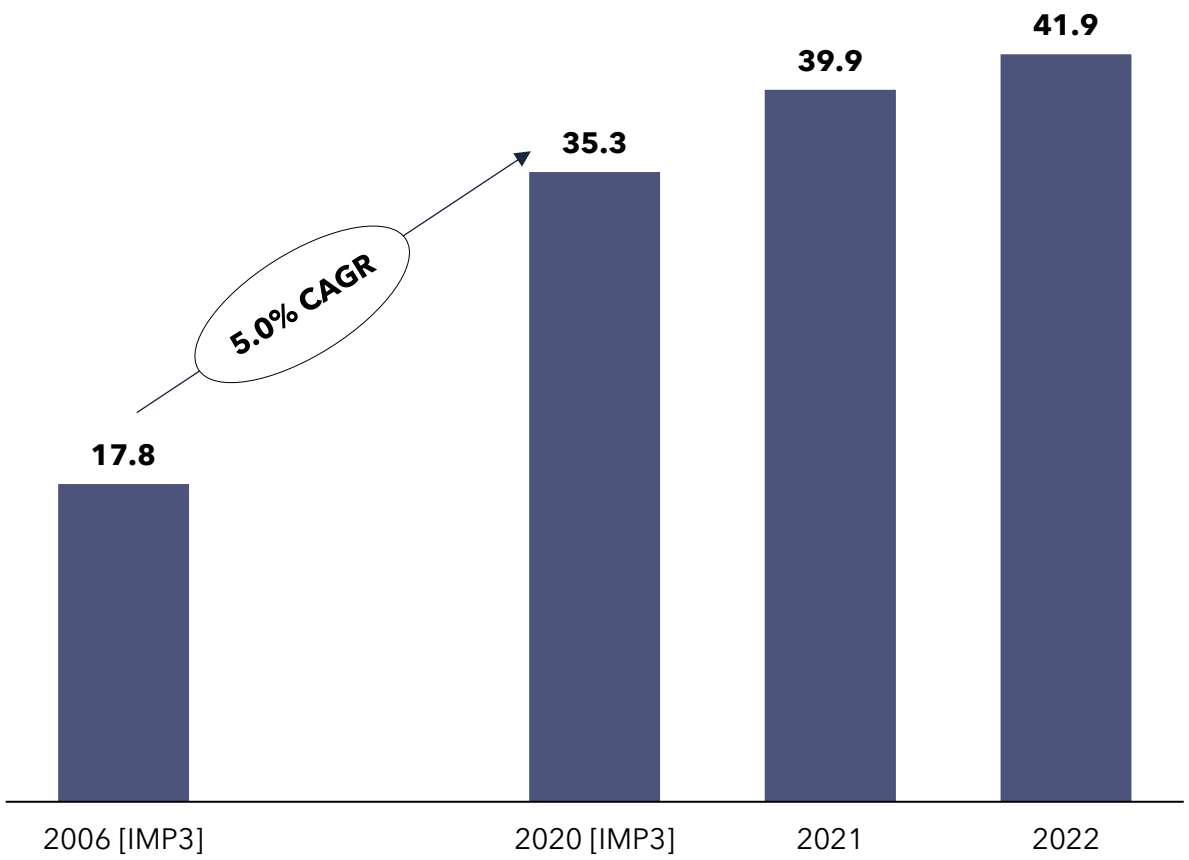
3 Sustainability and Innovation Fuel Market Evolution

- Transition to bio-based feedstocks and biomass inputs reduces reliance on fossil fuels
- Circular economy models and chemical recycling technologies improve resource efficiency and waste management
- Industry is accelerating development of biodegradable plastics and eco-friendly formulations to meet regulatory and consumer pressures

Source: Grand View Research; PetroChemExpert; PASB Analysis

The petrochemical industry in Malaysia shows strong post-pandemic recovery, with value-added growth driven by global demand, feedstock integration, and rapid's impact

Value-added of Petrochemical Industry (2006 - 2022)
RM Billion



Key Highlights

1 Sustained Growth Over the Long Term

- Between 2006 and 2020, value-added nearly doubled from RM17.8B to RM35.3B, reflecting a 5.0% CAGR from 2006 - 2020
- Growth driven by feedstock availability, export competitiveness, and early investments in integrated complexes

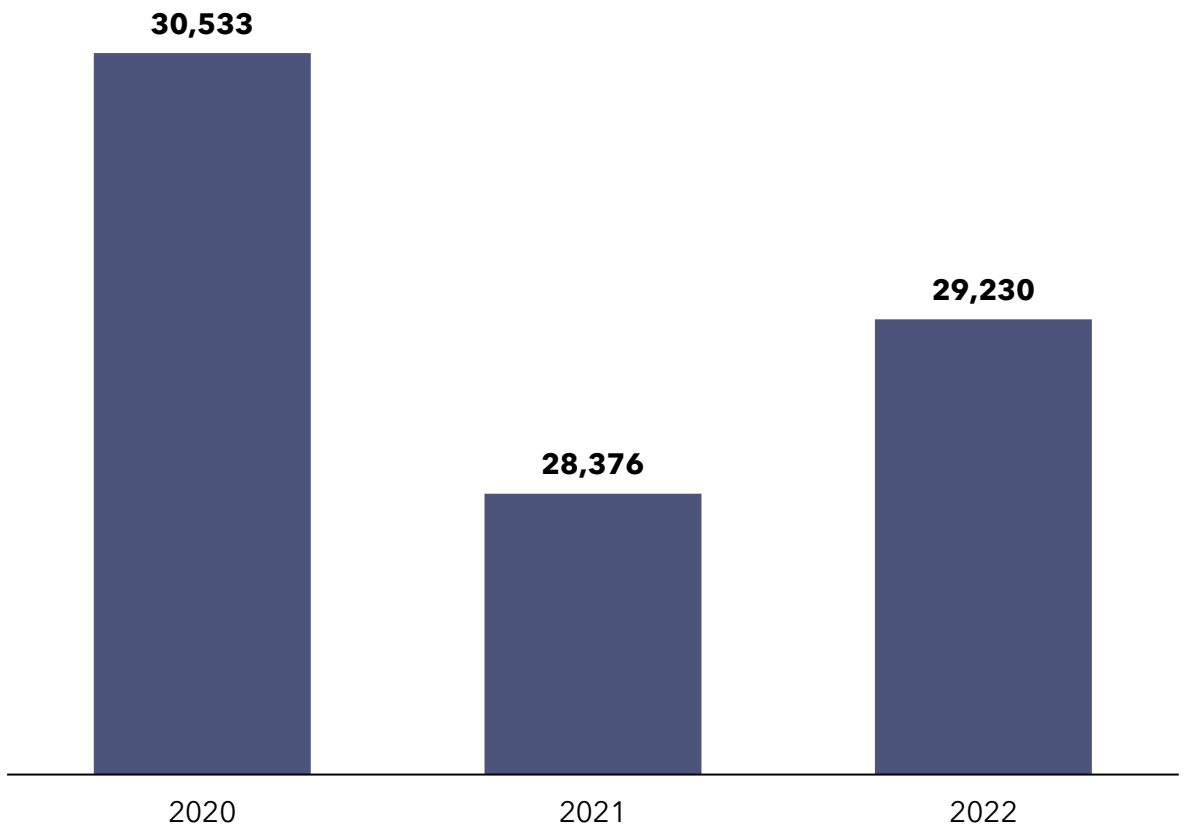
2 Post-Pandemic Recovery Accelerates Expansion

- In 2021, GDP contribution rose by 13%, reaching RM39.9B; in 2022, it grew another 5.2% to RM41.9B
- Recovery supported by increased global demand and RAPID's operational ramp-up in producing olefins, polymers, and specialty chemicals

Source: NIMP; MIDA; Statista

Petrochemical industry employment dipped during COVID-19 but recovered in 2022, supported by project restarts and downstream investments like Pengerang RAPID

Employment in the Petrochemical Industry (2020 - 2022)
Number of Persons



Key Highlights

1 Post-Pandemic Workforce Realignment

- Employment in the petrochemical sector dropped from 30,533 in 2020 to 28,376 in 2021 due to the COVID-19 pandemic
- Cost containment, operational uncertainty, and movement restrictions led to temporary downsising across production facilities

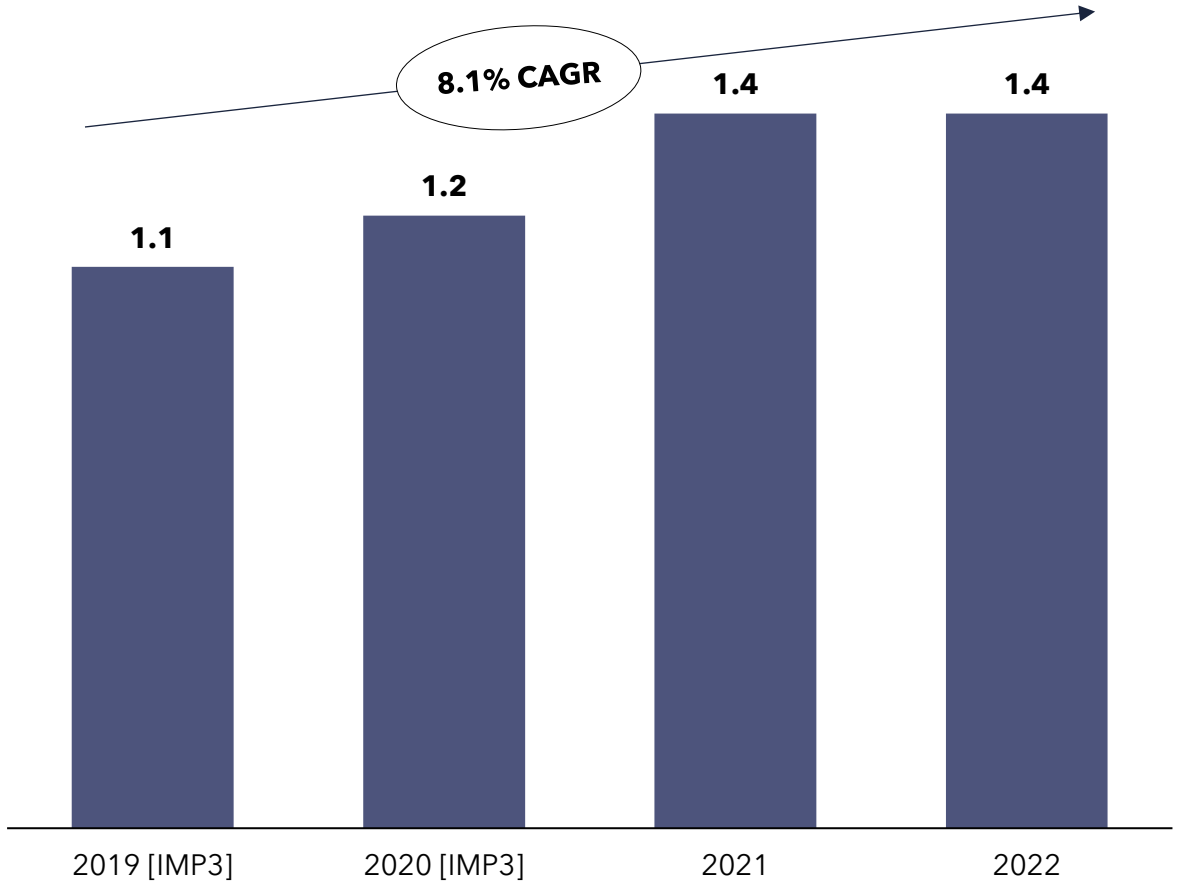
2 Recovery Driven by Industrial Restart

- Employment rebounded to 29,230 in 2022, aligned with the resumption of delayed projects and ramp-up of production
- Major complexes like Pengerang RAPID and growing downstream investments supported the revival

Source: NIMP; DOSM; MIDA; Statista

Malaysia's petrochemical industry achieved notable labour productivity after the pandemic driven by efficiency gains, pandemic-induced demand, and resilient post-COVID recovery in output per worker

Labour Productivity of Petrochemical Industry (2020 - 2022)
Value added per employment (RM million)



Key Highlights

1 Consistent Productivity Growth Amidst Sector Volatility

- Labour productivity rose from RM1.1 million in 2019 to RM1.4 million in 2022, reflecting steady efficiency gains despite employment fluctuations
- CAGR of 8.1% (2019–2022) indicates strong resilience and operational optimisation during a volatile post-pandemic period

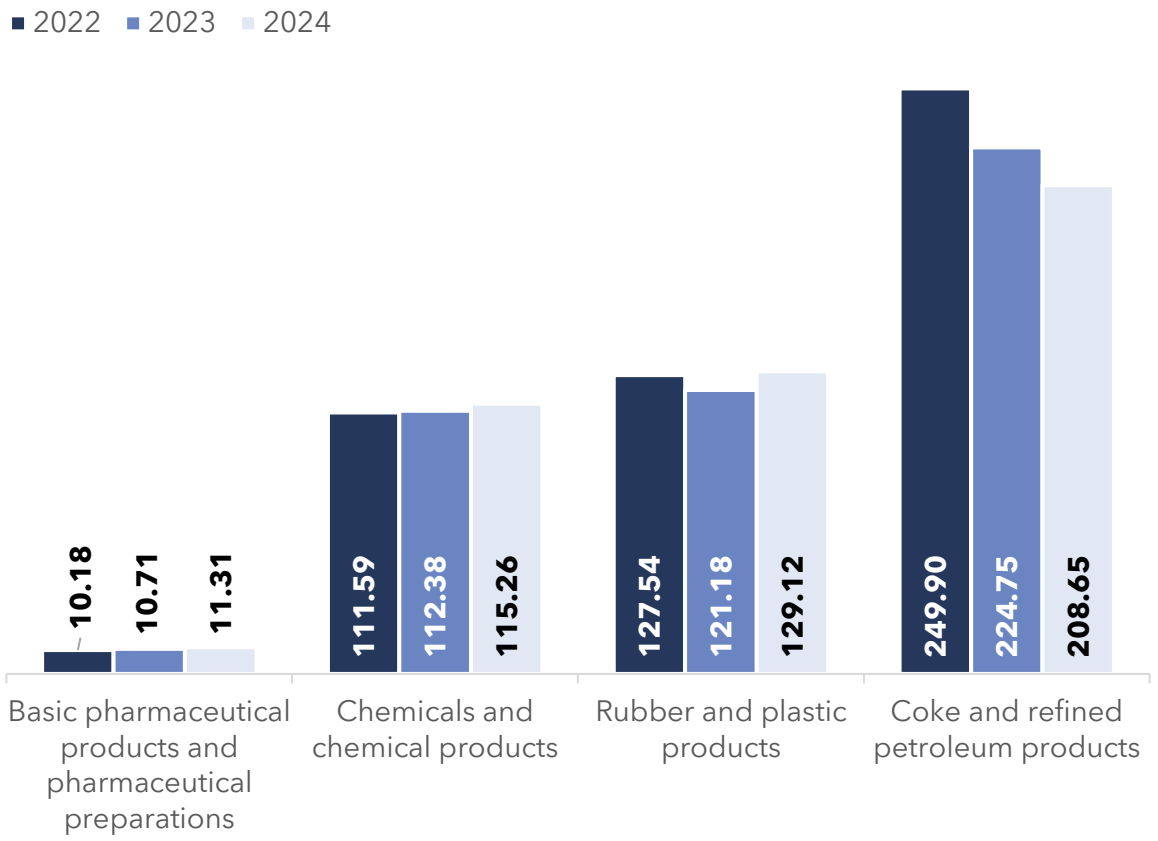
2 Automation and Technological Integration as Key Drivers

- Increased automation and digitalisation in refining and downstream operations significantly boosted output per worker
- Major facilities like Pengerang RAPID accelerated advanced process control adoption, reducing manual labour reliance

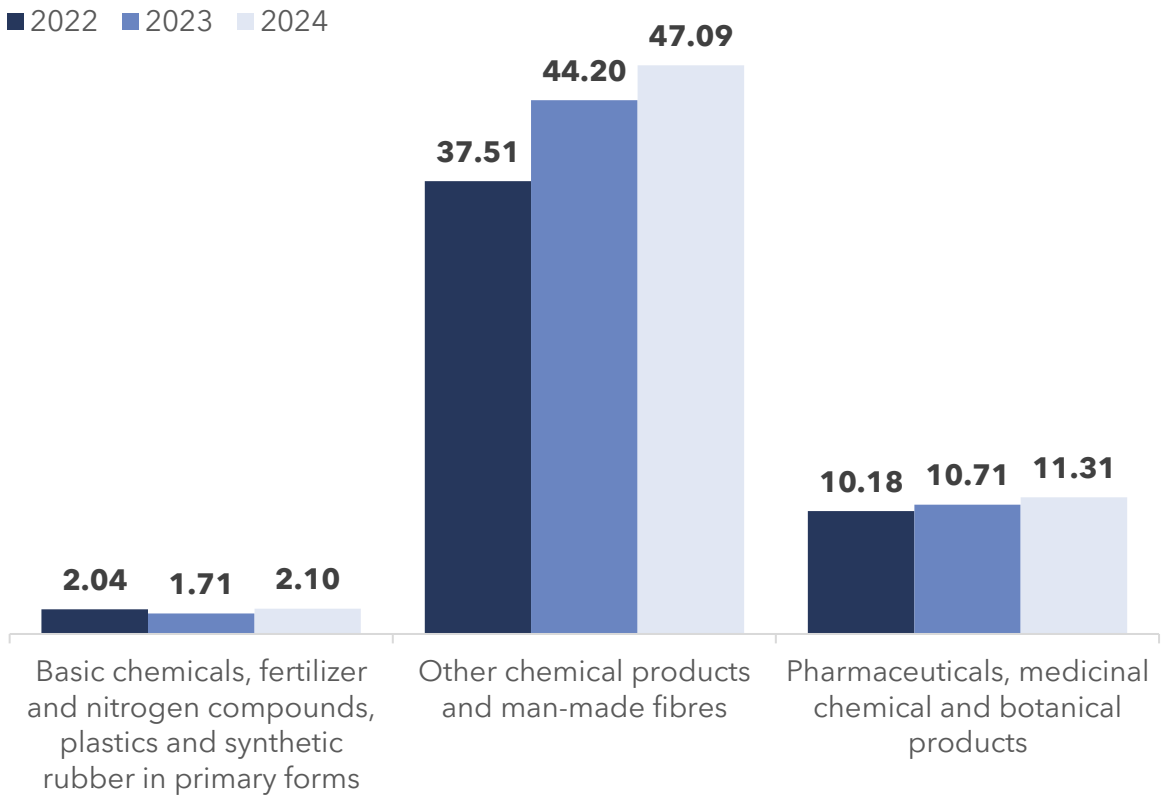
Source: NIMP; DOSM; MIDA; Statista

Malaysia's chemical & petrochemical sector remains resilient and diversified, with steady sales growth across most segments from 2022 to 2024, despite a decline in refined petroleum product sales due to global price normalisation

Petroleum, Chemical, Rubber and Plastic Sector Sales Value, 2022 - 2024
RM Billion



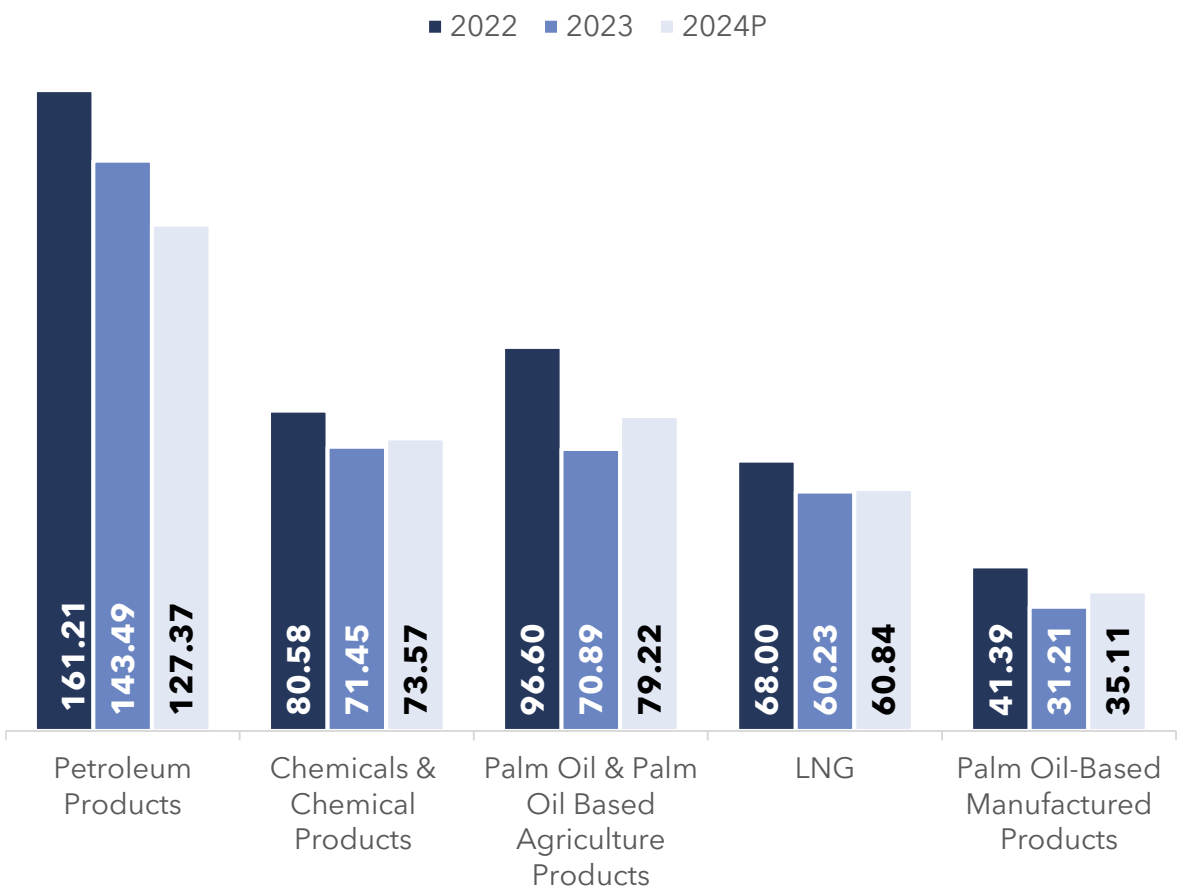
Sales Value of Manufacturing Sector by Group, 2024
RM Billion



Source: Monthly Manufacturing Statistics February 2025 (DOSM)

However, Malaysia's chemical and petrochemical exports have weakened from 2022 to 2024, with petroleum, chemical, and palm-based products all showing declining values amid softer global demand and price adjustments

Major Export Products – Chemical and Petrochemical, 2022 – 2024
RM Billion



Key Highlights

1 Declining Petroleum Export Revenues
- Petroleum product exports dropped from RM161.2B (2022) to RM127.4B (2024P), a 21% decline
- The fall reflects weaker global oil prices and easing post-pandemic energy demand

2 Chemical & Chemical Products Exports Show Volatility
- Exports fell from RM80.6B (2022) to RM73.6B (2024P), despite 2023's recovery
- Fluctuations suggest external demand sensitivity and price-driven trade dynamics

3 Palm-Based Exports Are Stable but Gradually Declining
- Palm oil & agro exports declined steadily from RM96.6B to RM79.2B between 2022–2024P
- Manufactured palm oil products also dropped, hinting at lower downstream demand

Source: Monthly Manufacturing Statistics February 2025 (DOSM); Trade Performance : December 2024 and January - December 2024 (DOSM); Trade Performance : December 2023 and January - December 2023 (DOSM)

In 2022, Malaysia's chemical exports were led by primary plastics, while China was the top export destination, accounting for 23.8% or RM19.2 billion

Malaysia - Top Exported Products of Chemical Industry 2022

1	Other Plastics in Primary Forms		**RM8.6 billion** 10.7%
2	Ethylene Polymers in Primary Forms		**RM8.4 billion** 10.4%
3	Inorganic Chemical Elements, Oxides & Halogen Salts		**RM7.0 billion** 8.6%
4	Manufactured Fertilisers		**RM6.9 billion** 8.5%
5	Polyacetals & Polycarbonates in Primary Forms		**RM6.1 billion** 7.6%

RM Billion – Export Amount;
% - % of Total Chemical Exports

Malaysia - Top Export Countries of Chemical Industry 2022

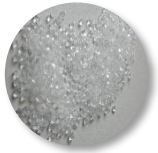
1		**China**	**RM19.2 billion,** 23.8%
2		**Thailand**	**RM8.6 billion** 10.6%
3		**Indonesia**	**RM7.7 billion,** 9.6%
4		**India**	**RM6.8 billion,** 8.5%
5		**Singapore**	**RM5.7 billion,** 7.1%

RM Billion – Export Amount;
% - % of Total Chemical Exports

Source: NIMP 2030 – Chemicals; MATRADE

For petrochemicals, Malaysia primarily exports polyethylene products, with China as the largest export destination, accounting for 30% of total national petrochemical exports

Malaysia - Top Exported Products of Petrochemical Industry 2022

1	**Polyethylene having a specific gravity of less than 0.94**		**RM3.5 billion** 7.9%
2	**Polyethylene**		**RM2.5 billion** 5.5%
3	**Methanol (Methyl Alcohol)**		**RM2.3 billion** 5.1%
4	**Polyethylene having a specific gravity of 0.94 or more**		**RM2.1 billion** 4.9%
5	**Acrylonitrile-butadiene-styrene (ABS) copolymers**		**RM2.0 billion,** 4.4%

RM Billion – Export Amount;
% - Percent. from Total Petrochemical Exports

Malaysia - Top Export Countries of Petrochemical Industry 2022

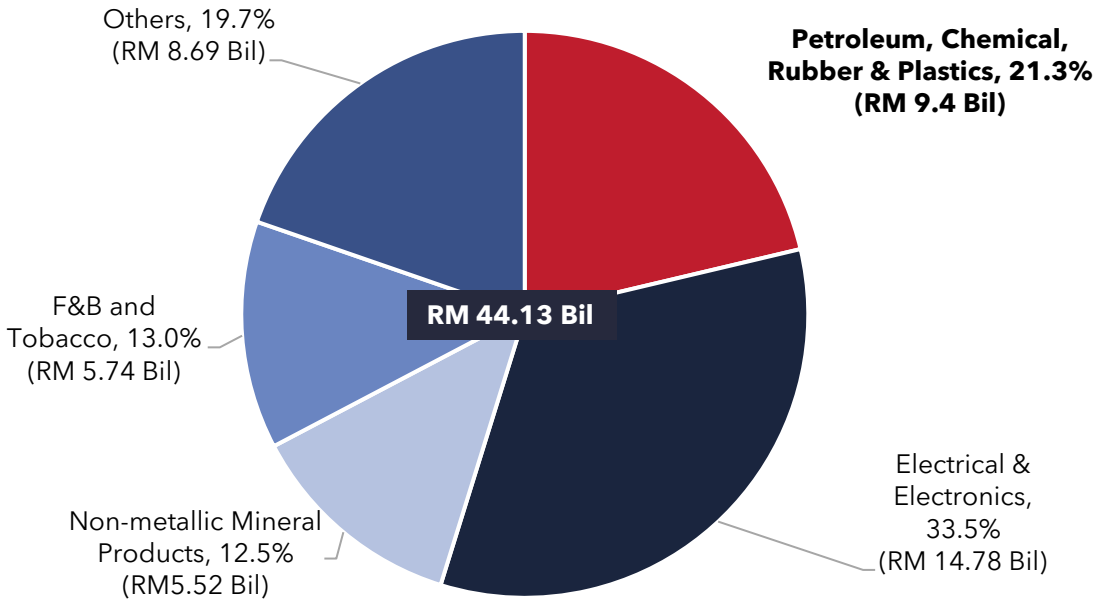
1		**China**	**RM13.4 billion** 29.8%
2		**Indonesia**	**RM5.7 billion** 12.6%
3		**India**	**RM4.6 billion** 10.2%
4		**Thailand**	**RM3.5 billion** 7.8%
5		**Vietnam**	**RM3.5 billion** 7.8%

RM Billion – Export Amount;
% - Percent. from Total Petrochemical Exports

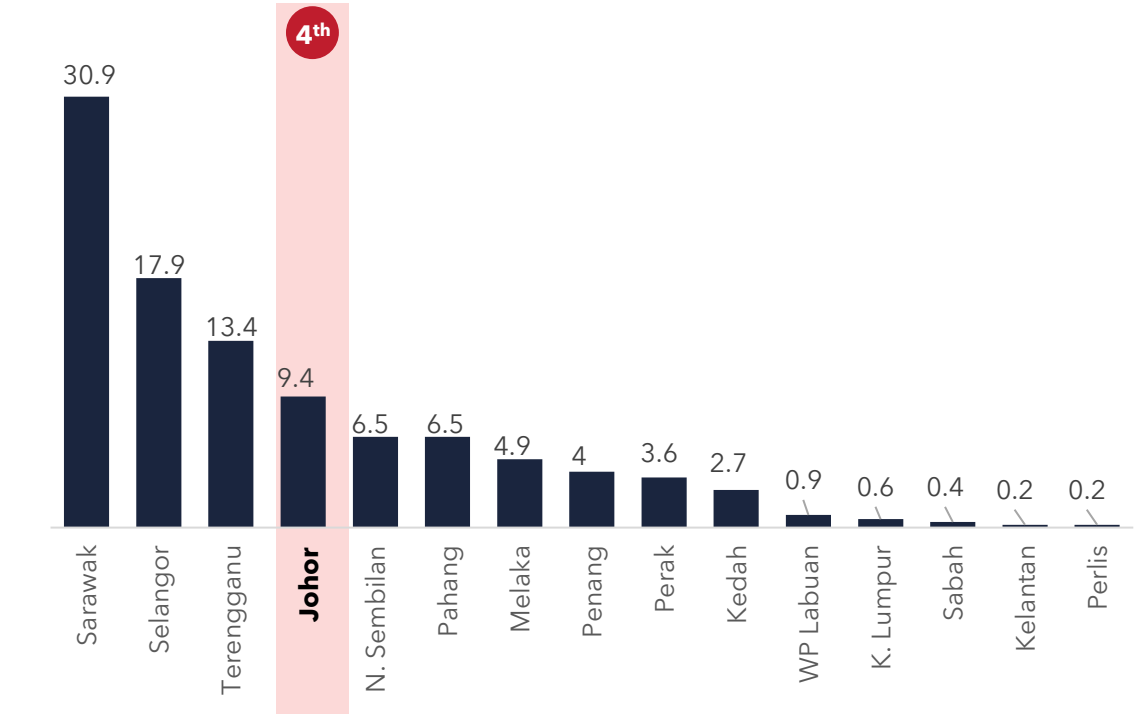
Source: NIMP 2030 – Chemicals; MATRADE

In 2023, the petroleum, chemical, rubber & plastics sector accounted for 21.3% of Johor's manufacturing GDP, Malaysia's 4th largest state chemical industry GDP contributor – highlighting its critical role in national petrochemical production and export competitiveness

Johor's Manufacturing GDP (2023), % and RM Billion



Petroleum, Chemical, Rubber & Plastics GDP by States (2023), RM Billion



- In 2023, the **Petrochemical, Chemical, Rubber & Plastic Products** sectors accounted for approximately **21.3% of Johor's manufacturing GDP,** contributing over **RM9.4 billion**. The sector represented around **6.3% of Johor's total GDP**, underscoring its vital role in the state's economy. At the national level, **Johor ranks 4th** as the largest GDP contributor within the sector
- Johor boasts a well-established petrochemical ecosystem, anchored by key industrial hubs such as the **Pengerang Integrated Petroleum Complex (PIPC)** and **Tanjung Langsat Industrial Park**, which host major industry players like Lotte Chemical, Dialog Group, and Puma Bitumen
- Its strategic location near Singapore and major international trade routes further enhances its role as a hub for petrochemical exports

Source: Laporan Sosioekonomi Negeri Johor 2023 (DOSM), Johor Immigration Department

The Chemical and Petrochemicals sector is being reshaped by global policy shifts that drive sustainability, push circularity, and reshape trade competitiveness and compliance

EU Chemicals Strategy for Sustainability (CSS)

Executive Summary

The EU's Chemicals Strategy for Sustainability (CSS), launched in 2020 under the European Green Deal, aims to phase out harmful chemicals, promote safer alternatives, and make Europe a global leader in sustainable chemical production. It sets stricter REACH regulations, expands hazard classifications, and incentivizes safe-by-design innovation.

Implications for the Chemical & Petrochemical Sector

- **Sustainability-Driven Reform**: Companies must adopt safer formulations and eliminate substances of concern, accelerating R&D into green chemistry and bio-based alternatives.
- **Compliance Pressure**: Malaysian and global exporters face stricter import requirements and higher regulatory costs for access to the EU market.
- **Competitiveness Shift**: First movers into sustainable and compliant chemical production gain strategic advantage in retaining access to high-value EU markets.

EU Circular Economy Action Plan (CEAP)

Executive Summary

The Circular Economy Action Plan (2020) is a key pillar of the European Green Deal, targeting product design, resource efficiency, waste minimisation, and closed-loop material flows. It promotes the reuse, recycling, and revalorization of materials across key sectors, including plastics and chemicals.

Implications for the Chemical & Petrochemical Sector

- **Push for Circular Materials:** Demand is rising for recyclable polymers, bio-based plastics, and chemical recycling technologies.
- **Design-for-Reuse:** Companies must redesign products and packaging for durability and recyclability, especially in plastic-heavy downstream sectors (e.g., automotive, electronics).
- **Export Conditions Tighten:** Circularity-linked standards become embedded in EU product regulations and procurement, reshaping the trade terms for raw and semi-processed chemical goods.

Global Plastics Treaty (UNEA Negotiations)

Executive Summary

The UNEA is negotiating a legally binding Global Plastics Treaty (due by end-2025) to end plastic pollution across its lifecycle. This treaty may include controls on virgin plastic production, bans on hazardous polymers, and global Extended Producer Responsibility (EPR) systems.

Implications for the Chemical & Petrochemical Sector

- **Structural Shift from Virgin Plastics:** Producers may face caps or taxes on virgin polymer production, shifting investment toward recycled resins and biodegradable alternatives.
- **Trade Realignment:** Future treaty obligations may introduce global norms on labeling, composition, and take-back schemes—impacting cross-border movement of plastics and resins.
- **Licensing and Technology Hurdles:** Compliance may depend on access to advanced sorting, depolymerisation, or upcycling technologies—requiring partnerships or tech transfer.

Source: European Union; EU Chemicals Strategy for Sustainability (CSS); EU Circular Economy Action Plan (CEAP); Global Plastics Treaty (UNEA Negotiations)

To ensure that Malaysia meaningfully participates in the progress and growth anticipated in the global chemical and petrochemical market, Malaysia has introduced several key strategies to guide the development of these sectors and spur innovation

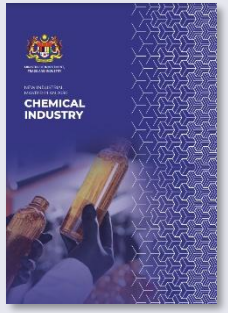
Chemical Industry Roadmap 2030

- The Chemical Industry Roadmap 2030 (CIR2030) is Malaysia's first dedicated strategic framework for advancing its chemical sector over the period from 2021 to 2030
    - CIR2030 outlines five aspirations:
        i. Increase value-add through diversification into specialty chemicals;
        ii. Enhance industry integration between upstream and downstream segments;
        iii. Boost global competitiveness and exports;
        iv. Improve sustainability across the chemical value chain; and
        v. Accelerate the adoption of new technologies and high-skilled job creation.

- To support these aspirations, CIR2030 prioritises 11 sub-segments grouped into base chemicals and intermediates, plastics and polymers, and specialty chemicals

National Industrial Master Plan 2030 - Chemical

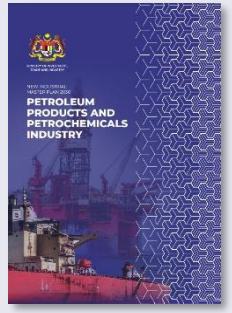
- The NIMP 2030 Sectoral Plan – Chemical Industry provides insights into the sector and its prospects based on its historical performance, opportunities and strategies to overcome existing challenges. The Chemical Industry Roadmap 2030 has identified 11 priority sub-segments which offers the most attractive development potential for Malaysia.



    - Base Chemicals and Intermediates
        i. Fertilisers
        ii. Oleochemicals
        iii. C1 Intermediates
    - Plastics and Polymers
        i. High performance composites
        ii. Synthetic rubber
        iii. Plastics (commodity, engineering, high performance)
    - Specialty Chemicals
        i. Agrochemicals
        ii. Care Chemicals
        iii. Nutrition Chemicals
        iv. Electronic Chemicals
        v. Construction Chemicals

National Industrial Master Plan 2030 – Petroleum Products and Petrochemicals Industry

- The NIMP 2030 Sectoral Plan – Petroleum Products and Petrochemicals Industry provides insights into the sector and strategies to grow the industry. The industry is broadly categorized into two-subsectors i.e. Petroleum products and Petrochemicals.

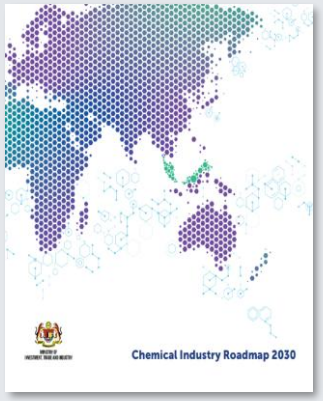


    - Petroleum products, includes lubricating oils and refinery products such as:
        i. Liquefied petroleum gas;
        ii. Naphtha;
        iii. Gasoline;
        iv. Kerosene;
        v. Fuel oils;
        vi. Gas oils;
        vii. Jet oils;
        viii. Diesel; and
        ix. Bitumen
    - Petrochemicals, derived from petroleum products and other hydrocarbon sources, with examples such as:
        i. Olefins;
        ii. Polyolefins;
        iii. Aromatics;
        iv. Ethylene oxides;
        v. Glycols; and
        vi. Oxo-alcohols

Source: Chemical Industry Roadmap 2030; NIMP 2030; MITI; MIDA; PASB Analysis

CIR2030 charts Malaysia's shift from basic commodity chemicals to high-value, sustainable, and innovation-driven segments, positioning the nation as a competitive global player

Chemical Industry Roadmap 2030 Overview



- **The Chemical Industry Roadmap 2030 (CIR2030)** is Malaysia's first dedicated strategic framework for advancing its chemical sector over the period from 2021 to 2030
- CIR2030 outlines five aspirations:
  i. Increase value-add through diversification into specialty chemicals;
  ii. Enhance industry integration between upstream and downstream segments;
  iii. Boost global competitiveness and exports;
  iv. Improve sustainability across the chemical value chain; and
  v. Accelerate the adoption of new technologies and high-skilled job creation.
- To support these aspirations, CIR2030 prioritises 11 sub-segments grouped into base chemicals and intermediates, plastics and polymers, and specialty chemicals

Challenges Identified In The CIR2030

- **Global Market Volatility and Supply Chain Disruptions**
  - ✓ To remain competitive, companies must re-evaluate portfolios and invest in diversification to avoid over-capacity in low-demand products. The COVID-19 pandemic exposed vulnerabilities in global supply chains and altered demand patterns across chemical sub-sectors.
- **Rising ESG Expectations and Sustainability Pressures**
  - ✓ Compliance with international standards (e.g., SDGs, ISO, REACH) and transitioning to bio-based and recycled feedstocks are essential for long-term viability.
- **Limited Technology and Innovation Capacity**
  - ✓ Malaysia's chemical sector lacks depth in high-value R&D and innovation-intensive sub-segments like bioplastics, IC packaging chemicals, and biopesticides.

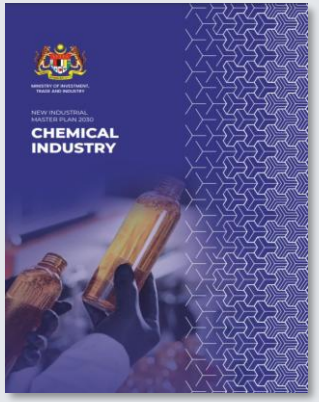
CIR2030 - Trends & Opportunities

Global Growth	Opportunities
• Global supply chains are undergoing realignment, prompting MNCs to diversify sourcing and production bases, creating new opportunities for Malaysia to position itself as a reliable regional hub for chemical manufacturing and exports—especially within the ASEAN bloc	• Malaysia should diversify into specialty and performance chemicals, especially in: Electronics chemicals, Agrochemicals, like biopesticides. Higher margins, global demand resilience, and alignment with Malaysia's existing strengths in manufacturing and palm oil derivatives.

Source: Chemical Industry Roadmap 2030

NIMP 2030 Chemical Sectoral Plan outlines Malaysia's strategy to elevate its chemical industry through high-value segments, innovation, sustainability & ecosystem development

NIMP - Chemical Industry Roadmap 2030 Overview



- **The NIMP 2030 Sectoral Plan – Chemical Industry** has identified 11 priority sub-segments which offers the most attractive development potential for Malaysia.
- Base Chemicals and Intermediates
  i. Fertilisers
  ii. Oleochemicals
  iii. C1 Intermediates
- Plastics and Polymers
  i. High performance composites
  ii. Synthetic rubber
  iii. Plastics (commodity, engineering, high performance)
- Specialty Chemicals
  i. Agrochemicals
  ii. Care Chemicals
  iii. Nutrition Chemicals
  iv. Electronic Chemicals
  v. Construction Chemicals

Challenges Identified in the NIMP (Chemical Industry)

- **Research, Development, Commercialisation and Innovation (RDCI)**
  ✓ Limited RDCI capabilities due to weak industry-academia collaboration, insufficient expertise, funding constraints, and low awareness of technical standards.
- **Ecosystem Challenges (Infrastructure & Chemical Parks)**
  ✓ Existing chemical parks lack focus on high-value products like green chemicals and high-performance composites.
- **Sustainability**
  ✓ Growing demand for green chemicals, but limited SME/start-up participation due to weak policies on carbon reduction, recycling, and waste management.

CIR2030 - Trends & Opportunities

Global Growth

- The NIMP has a far more optimistic outlook on the global chemical industry, expecting it to reach a market size of RM26.4 trillion by 2030, with a growth of 4.5 per cent.

Opportunities

- Malaysia can capture this industry growth by further expanding into higher value-added products such as agrochemicals, care chemicals, nutrition chemicals, electronic chemicals, high performance composites and plastics, synthetic rubber

Source: NIMP 2030 – Chemical Industry

NIMP 2030 Chemical Sectoral Plan provides a detailed identification of the strategies and action plans to further develop and improve the chemical industry in Malaysia

NIMP 2030 affirms the **five industry aspirations** under the CIR 2030:

i. increase industry value-add from building blocks;
ii. enhance industry downstream integration;
iii. increase competitiveness of chemical industry;
iv. improve sustainability of chemical industry; and
v. introduce technology to advance state of chemical industry.

NIMP 2030 - Linkage between Priority Sub-segments and Aspirations

Sub-Sectors	Increase value add	Enhance downstream integration	Increase competitiveness	Improve sustainability	Introduce new technology
1. Fertilisers	✓		✓	✓	
2. Oleochemicals	✓	✓	✓	✓	✓
3. C1 Intermediates	✓				
4. High Performance Composites		✓			✓
5. Synthetic Rubber		✓	✓	✓	
6. Plastics			✓	✓	✓
7. Agrochemicals		✓		✓	✓
8. Care Chemicals	✓	✓			
9. Nutrition Chemicals	✓	✓	✓		
10. Electronic Chemicals		✓	✓		✓
11. Construction Chemicals		✓			

NIMP 2030 - Strategies and Action Plans for Chemical Industry

- AP1: Improve existing industrial parks to support value chain integration of chemical industry
- AP2: Set up collaborative platform and enhance fiscal and monetary support to promote the RDCI ecosystem
- AP3: Establish free trade agreements and expedite product approval process to strengthen the ease of exports
- AP4: Adopt modernised operations such as automated and next-generation technologies to unlock value from value chain
- AP5: Provide sustainability incentives for operations and innovations
- AP6: Develop a regulatory framework to improve circular use of resources and reduce Malaysia's resource intensity
- AP7: Establish sustainability consortia with all industry stakeholders for holistic sustainability implementation
- AP8: Improve infrastructure in waste management and testing capabilities to provide conducive environment
- AP9: Drive investment growth through targeted campaign to further stimulate the investment landscape and foster innovation in Malaysia
- AP10: Review TVET education and ResidencePass Talent (RPT) programme to develop a large base of skilled labour

NIMP 2030 Mission 1: Advance economic complexity
- 1.1 Expand to high-value added activities of the value-chain
- 1.3 Establish cooperative 'vertical integration' for global value chain
- 1.4 Foster Research, Development, Commercialisation and Innovation (RDCI) ecosystem

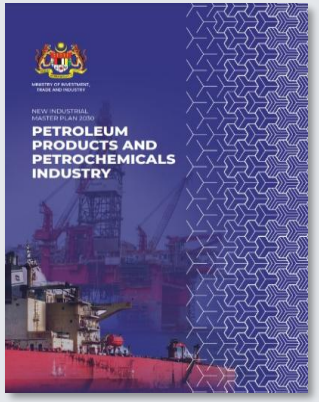
NIMP 2030 Mission 2: Tech up for a digital vibrant nation
- 2.1 Accelerate technology adoption

NIMP 2030 Mission 3: Push For Net Zero
- 3.1 Accelerate transition towards sustainable practices
- 3.4 Shift towards green infrastructure

Source: Chemical Industry Roadmap 2030, NIMP 2030 – Chemical Industry, PASB Analysis

NIMP 2030 - Petroleum Products and Petrochemicals outlines Malaysia's strategy to enhance value-added downstream output, smart manufacturing, and technology-driven growth

National Industrial Master Plan (NIMP) 2030 – Petroleum Products and Petrochemicals Industry



- **The NIMP 2030 Sectoral Plan – Petroleum Products and Petrochemicals Industry** provides insights into the sector and strategies to grow the industry. The industry is broadly categorised into two-subsectors i.e. Petroleum products and Petrochemicals
- Petroleum products, includes lubricating oils and refinery products such as:
  - i. Gasoline
  - ii. Fuel oils
  - iii. Gas oils
  - iv. Liquefied petroleum gas
  - v. Bitumen
  - vi. Kerosene
  - vii. Jet Oils
  - viii. Diesel
  - ix. Naphta
- Petrochemicals, derived from petroleum products and other hydrocarbon sources, with examples such as:
  - i. Olefins
  - ii. Aromatics
  - iii. Glycols
  - iv. Polyolefins
  - v. Ethylene oxides
  - vi. Oxo-alcohols

Challenges Identified In The NIMP 2030

- **Technology Enhancement**
  - ✓ Technology enhancement is vital for the industry, especially in specific areas such as high-end polymer applications, engineering plastics and composite materials. However, the industry faces challenges in technology enhancement due to limited funding access, talent and policies. The challenges relate to, among others, optimising the use of R&D centres for chemical processes and process technologies at local institutions of higher learning.
- **Adoption of Smart Manufacturing**
  - ✓ High cost has impeded the adoption of smart manufacturing among the industry players in Malaysia – especially for SME. The high initial investments are associated with acquiring and integrating new technologies, upgrading existing systems and training employees

CIR2030 - Trends & Opportunities

Global Growth

- The NIMP 2030 posits that by 2030, the global petroleum products and petrochemicals market size is expected to grow by 7.0%, reaching RM4.5 trillion.

Opportunities

- The industry has shifted its focus towards producing high value-added downstream petrochemical products. Opportunities include focusing on high value-added products, diversification and decarbonisation

Source: MIDA; National Industrial Master Plan (NIMP) 2030 – Petroleum Products and Petrochemicals; PASB Analysis

NIMP 2030 - Petroleum Products and Petrochemicals Industry provides a detailed identification of the strategies and action plans to advance the industry in Malaysia

- There are **three focus areas** under the NIMP 2030 that the industry aims to achieve:
  i. implement new regulations and adopt digitalisation and technology to enhance environmental sustainability
  ii. centralise resources and facilitate SME advancement to promote industry growth
  iii. participate in high value-added activities and introduce smart technologies to maintain attractiveness to investors.

NIMP 2030 - High Value-added Products and Activities

- NIMP 2030 posits that the industry has shifted its focus towards producing high value-added downstream petrochemical products and activities.
- Focusing on high value-added activities and products is important as it contributes towards attracting investments and sustaining the industry's competitiveness. **Below illustrates non-exhaustive examples of high value-added activities and products**:

Research and Development

- **Specialty petrochemicals and derivatives**
- **Advanced biofuels**
- **Circular products (e.g. recycled plastics and bio-based polymers)**

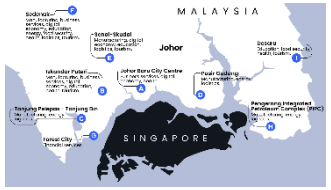
NIMP 2030 - Strategies and Action Plans for the Industry

AP1	Identify, streamline, promote and implement high value-added activities to attract investments and transitioning local players	**NIMP 2030 Mission 1: Advance economic complexity** 1.1 Expand to high-value added activities of the value-chain 1.2 Develop entire ecosystem to support the high value-added activities
AP2	Identify, streamline, promote and implement high value-added activities to attract investments and transitioning local players	
AP3	Enhance the uptake of incentives for smart plant or factory-of-the-future adoption by local industries and foreign investors	**NIMP 2030 Mission 2: Tech up for a digital vibrant nation** 2.1 Accelerate technology adoption
AP4	Introduce tighter energy and emission accounting principle towards preserving the environment	**NIMP 2030 Mission 3: Push For Net Zero** 3.1 Accelerate transition towards sustainable practices
AP5	Embark, encourage and promote carbon off-setting initiatives using new and emerging technologies for the petroleum products and petrochemicals industry	
AP6	Enhance strategic and frontier areas via centralised hubs which cater to the whole petroleum products and petrochemicals value chain from R&D to finished products	**NIMP 2030 Mission 4: Safeguard economic security and inclusivity** 4.2 Foster talent development and attraction

Source: National Industrial Master Plan (NIMP) 2030 – Petroleum Products and Petrochemicals; PASB Analysis

Johor's current chemical and petrochemical sector is defined by strategic zones like JS-SEZ, Tanjung Langsat, and PIPC, driving investment, innovation, and cross-border industrial collaboration with Singapore

Johor-Singapore Special Economic Zone (JS-SEZ)



This initiative aims to enhance economic collaboration between the two regions, focusing on sectors where they can complement each other, including **the chemical industry.** The JS-SEZ offers:

- a special tax rate of **5% for up to 15 years** for companies undertaking new investment in qualifying **manufacturing** and services activities
- a special tax rate of **15% for 10 years** for eligible knowledge workers working in the JS-SEZ

Tanjung Langsat Industrial Complex

- This complex is part of the Tanjung Langsat Port area and is dedicated to petrochemical industries.
- It handles bulk cargo such as liquefied petroleum gas (LPG) and dangerous chemicals, supporting various chemical manufacturing activities.
- Recent developments include significant investments, such as the establishment of a Sustainable Aviation Fuel (SAF) and Hydrogenated Vegetable Oil (HVO) biorefinery by EcoCeres, highlighting TLIC's growing role in sustainable industrial initiatives.

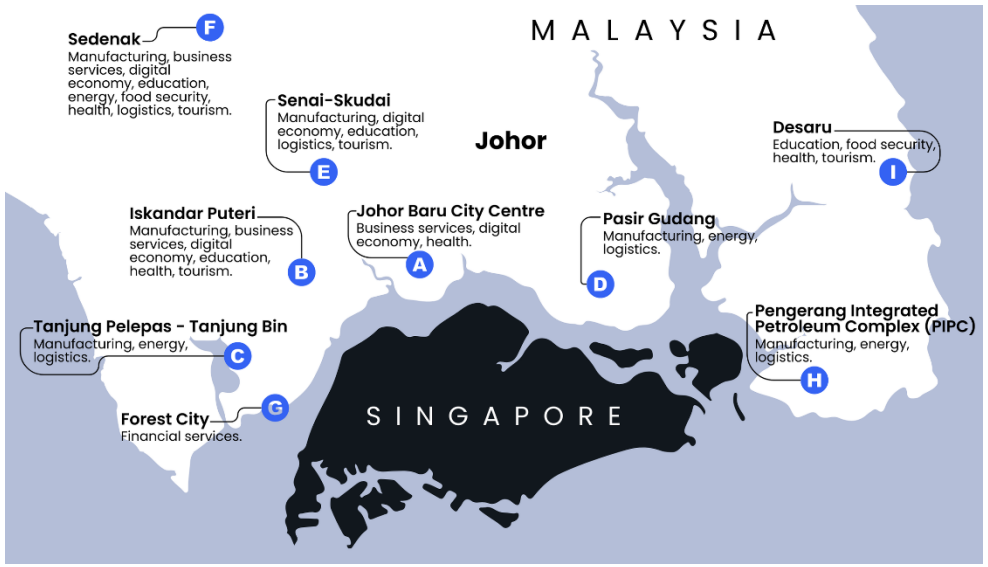
Pengerang Integrated Petroleum Complex (PIPC)

- A mega-development spanning approximately 80 square kilometers, PIPC houses oil refineries, naphtha crackers, petrochemical plants, and liquefied natural gas (LNG) terminals.
- It is designed to be a world-class integrated refinery and petrochemical hub, significantly contributing to Malaysia's downstream oil and gas sector.
- PIPC has also been identified as **Flagship H in the new JS-SEZ**.

Source: ASEAN Briefing, Invest Johor,

Johor-Singapore Special Economic Zone (JS-SEZ) has been established to boost cross-border synergies, infrastructure integration, and investment incentives to accelerate the growth of Johor's chemical and petrochemical industry

Johor-Singapore Special Economic Zone (JS-SEZ)



Integrated Growth Platform for Chemical and Petrochemical Industries

- The JS-SEZ enhances bilateral collaboration between Malaysia and Singapore, targeting high-potential sectors like specialty chemicals, oleochemicals, and advanced petrochemicals.
- The zone offers fiscal incentives including a 5% tax rate for up to 15 years for new manufacturing investments and 15% tax rate for eligible knowledge workers for 10 years.

Catalysing Investment Across Strategic Chemical Hubs

- JS-SEZ spans key industrial nodes including PIPC (Flagship H) and Tanjung Langsat Industrial Complex (TLIC), enabling seamless integration across upstream, midstream, and downstream value chains.
- With land availability, utilities, and skilled labour access, the JS-SEZ is poised to support growth in biochemicals, synthetic rubber, high-performance polymers, and care chemicals.

Cross-Border Logistics, Talent, and R&D Synergies

- The RTS Link and established port-air connections support real-time trade, logistics, and talent mobility across Johor and Singapore.
- Shared innovation ecosystems, including Singapore's R&D capabilities and Johor's production base, foster collaboration in green chemicals, process intensification, and advanced materials.

Source: Maju Johor; The Star; Property Genie; Stakeholder Engagement; PASB Analysis

Tanjung Langsat Industrial Complex (TLIC) strengthens Johor's role in specialty chemical manufacturing by offering tailored infrastructure, port-linked logistics, and a growing ecosystem for high-value downstream activities

Tanjung Langsat Industrial Complex (TLIC)

Location D – JS-SEZ (Tanjung Langsat – Kong Kong)

Purpose-Built Chemical Infrastructure & Industrial Estate

- Tanjung Langsat Industrial Complex is a dedicated chemical and specialty chemicals park supporting high-value, hazardous, and bulk chemical operations.
- The area supports base chemicals, organic intermediates (C1–C6), polymers, oleochemicals, and fertilizers, with strong potential for biochemicals and green chemistry growth.

Port-Linked Logistics and Export-Ready Infrastructure

- Direct access to Tanjung Langsat Port, a dedicated hazardous goods terminal with liquid cargo jetties, LPG terminals, and tank storage farms.
- The port supports the export of bulk chemicals and oleochemicals, offering cost-efficient marine logistics for manufacturers.

Enabling Downstream Manufacturing & JS-SEZ Integration

- Positioned within the Johor-Singapore SEZ, Tanjung Langsat benefits from cross-border logistics, skilled labour access, and fiscal incentives under the SEZ regime.
- The zone is increasingly attractive for specialty and advanced materials manufacturers in coatings, care chemicals, and industrial polymers, aligning with CIR2030 growth targets.

Robust Production Capacity with Oleochemical Focus

- TLIC houses 41 manufacturing facilities with a combined capacity exceeding 3.5 million metric tonnes per annum. The complex is a national hub for oleochemicals, biodiesel, and specialty chemicals, with 9 biodiesel plants and major palm oil derivative processors.
- TLIC also produces Malaysia's largest food-grade CO_2 and hydrogenated vegetable oil (HVO) for sustainable aviation fuel applications.

Source: JPDC; Stakeholder Engagement; PASB Analysis

PIPC positions Johor as a regional petrochemical leader by offering integrated infrastructure, global investor presence, and deep logistics connectivity, driving downstream expansion into specialty chemicals and boosting trade competitiveness

Pengerang Integrated Petroleum Complex (PIPC)

Location H – JS-SEZ (PIPC)

Established Industrial Ecosystem & World-Class Infrastructure

- PIPC is already home to major global players such as PETRONAS, Saudi Aramco, and Dialog Group, providing credibility and reducing risks for new investors
- State-of-the-art facilities, including Pengerang Integrated Complex (PIC), Pengerang Deepwater Terminals (PDT & PDT2), Pengerang Industrial Park (PIP) & OASIS@Pengerang
- Fully integrated utilities and logistics – Companies investing in Johor can benefit from shared infrastructure (power, water, gas, and waste management, as well as dedicated pipelines and transport networks for seamless material flow

Enhancing Downstream & Specialty Chemical Production

- PIPC's infrastructure allows Johor to expand beyond basic petrochemical production into high-value downstream industries, such as: Specialty chemicals for pharmaceuticals, coatings, and adhesives; Advanced materials for semiconductors, EV batteries & industrial polymers; Bio-based chemicals & green alternatives to meet sustainability demands.
- PIPC's refining and petrochemical facilities, including RAPID (Refinery and Petrochemical Integrated Development), have a refining capacity of 300,000 barrels per day and a petrochemical production capacity of 3.3 million tonnes per year

Strengthening Johor's Position as a Regional Trade & Logistics Hub

- Proximity to global shipping lanes & established export routes enhances trade efficiency.
- Deepwater terminals facilitate bulk chemical and petrochemical exports, reducing transportation costs for manufacturers.
- With Tanjung Langsat Industrial Complex nearby, Johor can become a key transshipment hub for chemical and petrochemical products across ASEAN, China, and India.

Source: JPDC; Stakeholder Engagement; PASB Analysis

The chemical industry's value chain spans from raw material feedstocks like crude oil and biomass to high-value end products such as pharmaceuticals, electronics, and automotive parts, demonstrating its critical role in both industrial supply chains and consumer markets

Value Chain of the Chemical Industry

Value Chain

Upstream	Midstream			Downstream
Feedstock	Base Chemicals/ Building Blocks	Intermediates	Polymers	End Consumer
Activities: • Extraction, refining, and purification of raw materials. • Primary processing such as distillation or cracking. **Examples of Products:** • Crude oil • Natural gas • Naphtha • Palm kernel oil • Biomass • Coal • LPG (Liquefied Petroleum Gas)	**Activities:** • Conversion of feedstocks into base or platform chemicals. • Basic synthesis processes such as steam cracking or reforming. **Examples of Products:** • Methanol • Ethylene • Propylene • Benzene • Toluene • Xylenes • Ammonia • Chlorine	**Activities:** • Further processing of base chemicals into more complex compounds. • Often involves catalytic reactions, blending, or chemical transformation. **Examples of Products:** • Acrylic acid • Phenol • Propylene glycol • MTBE • Phthalic anhydride • Butadiene	**Activities:** • Polymerisation or compounding of intermediates. • Granulation and preparation for manufacturing processes. **Examples of Products:** • Polyethylene (PE) • Polypropylene (PP) • Polyvinyl chloride (PVC) • Engineering plastics	**Activities:** • Manufacturing of consumer and industrial goods using polymers and specialty chemicals. • Packaging, coating, compounding, blending with additives, etc. **Examples of Products:** • Paints and coatings • Adhesives • Pharmaceuticals • Agrochemicals • Detergents and personal care • Automotive parts • Electronics

- The upstream processes include refining, cracking and purification of feedstocks.
- Feedstocks are acquired or extracted from raw materials as base chemicals for further processing.
- Non-exhaustive examples of raw materials include crude oil, natural gas, naphtha, palm kernel oil and biomass. Feedstocks undergo rounds of processing to produce building blocks, intermediates and polymers in midstream processes.
- In downstream processes, chemical products are used to produce specialised chemicals or final consumer general and industrial goods.

Source: Chemical Industry Roadmap 2030, NIMP 2030 – Chemical Industry, PASB Analysis

The chemical industry has extensive backward and forward linkages with industries required to support the development of chemical industry and those that benefit from the innovation multiplier effect from chemical industry

Backward

- **Petroleum & Natural Gas**: To be used as feedstock for basic chemicals and intermediates
- **Minerals**: To be used as feedstock for basic chemicals and intermediates
- **Manufacturing Related Services**: To provide pre- and post manufacturing services such as engineering support services
- **R&D Services**: To conduct relevant research and development activities (e.g., research on catalyst in production process)

Chemical Industry

Forward

- **Electrical & Electronic**: Electronic chemicals support manufacturing of semiconductor-related components
- **Pharmaceutical**: Nutrition chemicals support: the production of Active Pharmaceutical Ingredients (APIs) and nutraceuticals
- **Automotive**: Electronic chemicals, engineered polymers and high-performance plastics support the manufacturing of automotive parts and production of lubricants and fluids
- **Construction Services**: Construction chemicals support the production of chemical formulations such as concrete admixtures, adhesives and sealants

Source: Chemical Industry Roadmap 2030, NIMP 2030 – Chemical Industry, PASB Analysis

Malaysia hosts a strong presence of industry players across various sub-sectors, driving the development of the national chemical industry

Sub Sector Groupings of the Chemical Industry

Organic Chemicals

Key Industry Players

1 Base Chemicals/Buildings Blocks

- PETRONAS Chemicals Group Berhad (PCG)
- Lotte Chemical Titan Holding Berhad

2 Plastics and Polymers

- Lotte Chemical Titan Holding Berhad
- Eastman Chemical (Malaysia) Sdn Bhd
- Toray Plastics (Malaysia)

3 Organic Intermediates

- BASF PETRONAS Chemicals Sdn Bhd
- Petronas Chemicals Group Berhad (PCG)

4 Fertilisers

- FGV Fertiliser Sdn Bhd
- All Cosmos Industries Sdn Bhd
- Everchem Corporation Sdn Bhd

5 Specialty Chemicals

- Excellent Chemicals Industrial Sdn Bhd
- BASF (Malaysia) Sdn. Bhd.

6 Agrochemicals

- Hextar Group
- Agricultural Chemicals (M) Sdn. Bhd. (ACM)

Inorganic Chemicals

1 Inorganic specialties

- Evonik Malaysia Sdn Bhd

2 Inorganic building blocks/intermediates

- Chemical Company of Malaysia Berhad (CCM)
- Fineotex Chemical Limited

Bio-based Feedstock

1 Oleochemicals & Bio-chemicals

- KLK OLEO
- IOI Oleochemical Industries Berhad
- Greenwell Oleochemicals

Source: Chemical Industry Roadmap 2030, NIMP 2030 – Chemical Industry

Malaysia's petroleum and petrochemical industry spans upstream extraction to downstream specialty manufacturing, with value-added activities including refining, polymerisation, and formulation of complex chemicals like adhesives, surfactants, and agrochemicals

Value Chain of the Petroleum Products and Petrochemical Industry

Value Chain	Upstream	Midstream	Downstream (Refinery, Gas Processing and Petrochemical Processing)				
	Oil and Gas	Logistics	Petroleum Products	Petrochemicals			
			Feedstocks	Basic/ Building Blocks	Intermediates	Resin	Derivatives / Specialty Chemicals
	Activities: • Exploration • Field Development • Product Operations	**Activities:** • Transportation • Processing • Storage and Distribution	**Activities:** • Crude oil refining • Natural gas processing to extract feedstocks **Examples of Products:** • Naphtha • LPG (Liquefied Petroleum Gas) • Natural Gas Liquids (NGLs)	**Activities:** • Steam cracking or reforming of feedstocks • Production of base petrochemicals **Examples of Products:** • Ethylene • Propylene • Benzene • Toluene • Xylenes	**Activities:** • Conversion of building blocks into more complex chemical compounds • Blending and transformation via chemical reactions **Examples of Products:** • Acrylonitrile • Propylene Glycol • MTBE • Styrene	**Activities:** • Polymerisation and copolymerization • Compounding with additives **Examples of Products:** • Polyethylene (PE) • Polypropylene (PP) • Polyvinyl Chloride (PVC) • Polystyrene	**Activities:** • Formulation of end-use specialty chemicals • Integration into downstream manufacturing **Examples of Products:** • Paints & coatings • Surfactants • Agrochemicals • Adhesives • Personal care chemicals

- The upstream segment covers activities in the extraction of feedstock, which include exploration, appraisal, drilling, well development and production of feedstock.
- The midstream segment covers activities related to the transportation, processing, storage and distribution of petroleum feedstock.
- The downstream segment includes refinery, gas processing and petrochemical processing.

Source: MITI, NIMP 2030 – Petroleum Products and Petrochemicals Industry, PASB Analysis

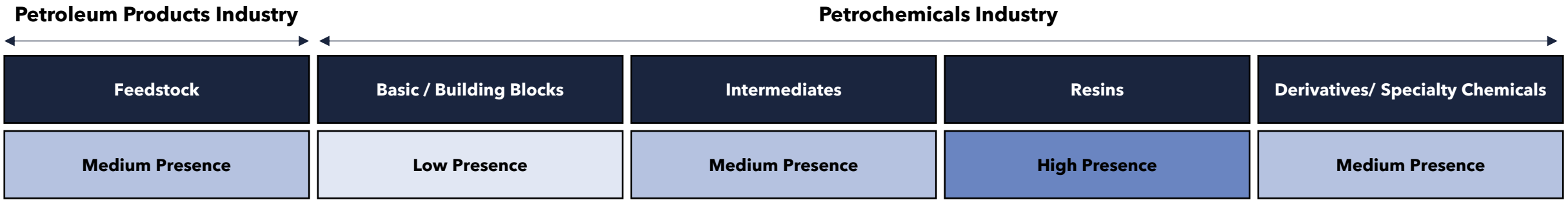
The petroleum industry has extensive forward linkages, with petrochemical-derived products such as plastic parts, fabricated plastics, and specialty chemicals widely used across various downstream industries

Industries With Forward Linkages With Petroleum Products and Petrochemicals Industry	
Petroleum Products: Polymers and Plastics Resins	• Plastics • Electrical and Electronics (E&E) • Construction and Building Technology • Automotive • Aerospace • Textiles • Medical Devices • Furniture
Petrochemicals: Fertilisers	• Agriculture
Petrochemicals: Specialty and fine chemicals (e.g. food additives, flavours and preservatives)	• Food Processing • Personal Care

Source: NIMP 2030 – Petroleum Products and Petrochemicals Industry

Malaysia plays a leading role in the regional oil, gas, and petrochemicals industry, supported by strong refining and processing capabilities, with future opportunities centered on expanding high-value specialty chemicals and domestic feedstock production

Presence of Industry Players along the Value Chain of Petroleum Products and Petrochemicals Industry



Key Highlights

Dominance in Malaysia's Oil & Gas Industry
- PETRONAS holds exclusive rights over all oil and gas resources in Malaysia. It operates in the petroleum products and petrochemicals industry via its subsidiary, PETRONAS Chemical Group Berhad (PCG)

Refining Capacity
- Malaysia has seven operational refineries located in Terengganu, Melaka, Negeri Sembilan, and Johor. The total refining capacity exceeds 700,000 barrels of crude oil per day

Gas Processing Facilities
- Malaysia possesses players in gas processing facilities that have a combined capacity of over 2,000 million standard cubic feet per day. Major facilities include: Four LNG facilities at the PETRONAS LNG complex in Sarawak. Six gas processing plants in Terengganu. Two regasification terminals in Melaka and Johor

Integrated Petrochemical Complexes
- Malaysia also possesses integrated petrochemicals complexes across the country. For example, PETRONAS operates four integrated petrochemical complexes producing basic and specialty chemicals: Kerteh, Terengganu; Gebeng, Pahang; Pasir Gudang, Johor; Pengerang, Johor

Industry Trends & Developments
- The petrochemicals industry is largely driven by multinational corporations (MNCs) focusing on: Resins, feedstock, intermediates, derivatives, and specialty chemicals.
- **Future growth** is expected in: High-value derivatives and specialty chemicals, which currently have low local industry presence.

Source: National Industrial Master Plan (NIMP) 2030 – Petroleum Products and Petrochemicals; PASB Analysis

With Malaysia's chemicals and chemical products sector going from strength to strength, the government intends to explore opportunities in niche new sub-segments, or specialty chemicals

"Malaysia's strong position in the petrochemical and basic chemical industry has enabled its expansion into the production of high-value specialty chemicals"

Datuk Sikh Shamsul Ibrahim Sikh Abdul Majid
CEO - Malaysian Investment Development Authority (MIDA)

Why Malaysia?

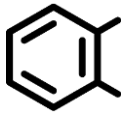
- **Emerging Opportunities**: High potential in crude oil to chemicals technology and specialty electronic chemicals to meet growing electrical and electronics sector demand. Market demand expected to grow by 5%, reaching $1.61 billion by 2027, led by Asia-Pacific (China, Japan, India).

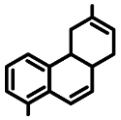
- **Expansion Beyond Manufacturing**: Malaysia aims to become a regional and global services hub for high-value-added activities. Companies can consolidate supply chain management functions, including: (1) Sourcing and procurement (supplier selection, contract management), (2) Product capacity planning and centralised distribution and (3) Shared services consolidation for efficiency.

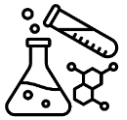
- **Strategic Hub for Multinational Corporations (MNCs)**: MNCs with regional subsidiaries and branches can integrate operations in Malaysia. Malaysia serves as an ideal central hub to manage and support service functions across Asia-Pacific.

- **Investor-Friendly Destination**: Strong track record in the global chemicals industry. Forward-looking policies enhance Malaysia's appeal as a long-term investment destination for chemical firms.

However, the CIR2030 highlights Malaysia's need to upgrade core capabilities, expand into specialty and sustainable chemicals, strengthen downstream integration, and attract investments to position itself as a high-value, innovation-driven chemical hub







Base Chemicals and Intermediates

Fertilisers
- Increase local production of EFFs
- Modernise manufacturing capabilities to be more competitive and sustainable by leveraging new technologies (e.g., green ammonia)

Oleochemicals
- Strengthen play in basic oleochemicals
- Increase share of specialty oleochemicals (e.g., sulphates, esters, ethoxylates)
- Boost sustainability of oleochemicals value chain

C1 - Intermediates
- Increase production of acetic acid derivatives to serve growing markets in Southeast Asia and Asia Pacific

Plastics and Polymers

Composites
- Develop composite manufacturing capabilities and competitiveness in pre-pregs/fabric value chain with focus on aerospace composites
- Develop fibres and resin precursor industries to allow composites backwards integration

Synthetic Rubber
- Develop local synthetic rubber capabilities to reduce downstream industry reliance on imports
- Improve the circular economy for synthetic rubber with focus on tyres and gloves

Plastics
- Diversify more into engineering plastics to support downstream industries and Asia Pacific demand
- Establish Malaysia as a major bioplastics manufacturer in Southeast Asia, capitalising on rich bio feedstock
- Improve circular economy through new recycling technologies and ecosystem of innovative players
- Selective expansion of commodity plastics production to satisfy regional demand and instill sustainable practices in plastics lifecycle

Specialty Chemicals

Agrochemicals
- Develop niche expertise in biopesticide technology to serve Southeast Asian markets
- Increase self-sufficiency in vegetable seeds

Care Chemicals
- Leverage oleochemical building blocks to expand into key personal care ingredients, then acquire capabilities to develop formulations for care products

Nutrition Chemicals
- Leverage palm-related building blocks to further expand capacity to become one of the leading emulsifier hubs in Asia
- Expand methionine production capacity to maintain regional competitiveness and emerge as one of the leading methionine exporters in SEA and APAC

Electronic Chemicals
- Become a leading manufacturer of IC packaging chemicals in Southeast Asia

Construction Chemicals
- Continue to track potential to prioritise high-value niche segments and replace imports with local production for upstream raw materials (e.g., polyurethane, acrylics)

Source: Chemical Industry Roadmap 2030

Johor can address these needs by attracting high-value investments in specialty chemicals, supporting export market diversification, enabling sustainable innovation, and upgrading enabling infrastructure and talent pipelines

Expand High-Value Downstream & Specialty Chemicals

Investment Opportunity

- Shift from bulk to higher-margin products such as pharmaceutical ingredients, EV battery chemicals, advanced polymers, and coatings to reduce reliance on low-value commodities.

Notable Players / Signals

- Petronas Chemicals Group investing in specialty and derivative chemicals; CCM Berhad, Duopharma, and Synthomer present in the region

Diversify Trade to Mitigate Global Oversupply Risks

Investment Opportunity

- Enable investor access to diversified export markets such as India, the Middle East, and RCEP/ CPTPP economies to hedge against oversupply from China and geopolitical tensions.

Notable Players / Signals

- Johor's port connectivity to Middle East and ASEAN underpins trade resilience; Lotte Chemical Titan is a key regional exporter.

Invest in Sustainable & Bio-Based Chemistry

Investment Opportunity

- Promote investments in biodegradable plastics, carbon capture, green hydrogen, and ESG-compliant surfactants to align with global climate and regulatory shifts.

Notable Players / Signals

- Sirim, Petronas, and BASF are investing in bio-based chemistry and sustainability-linked innovation.

Modernize Industrial Infrastructure & Enable Digital Manufacturing

Investment Opportunity

- Create an ecosystem for smart, cost-efficient production through automation, AI-driven optimisation, and energy-efficient utilities in chemical parks like Tanjung Langsat and Pengerang.

Notable Players / Signals

- Pengerang Integrated Complex (Petronas-Saudi Aramco JV) signals potential for advanced infrastructure-linked investments.

Build Skilled Talent & R&D Capabilities

Investment Opportunity

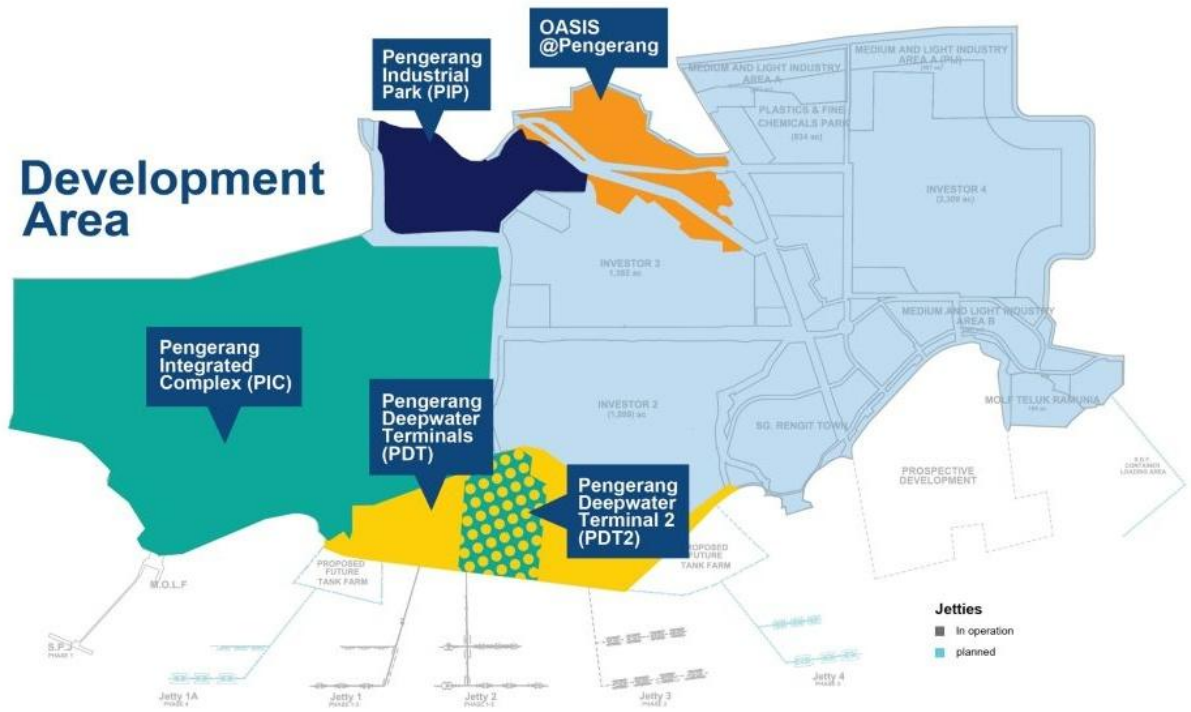
- Develop workforce pipelines in formulation, green chemistry, nanotech, and process automation, while facilitating public-private R&D collaboration to anchor innovation and pilot production.

Notable Players / Signals

- UTM Skudai, MRANTI, and Petronas Research support R&D; firms like Entegris require highly skilled engineers and chemists.

Despite the Pengerang Integrated Petroleum Complex (PIPC) being well-positioned for industrial growth, high land costs, fragmented ownership, and lack of ready infrastructure are major barriers deterring integrated investors

Pengerang Integrated Petroleum Complex (PIPC)



Availability of Affordable Land

- Within Pengerang, while there is a large area designated for development especially for industrial activity, key stakeholders have noted that unaffordability of land has turned away future integrated investors.
- Existing landowners have driven prices up due to market speculation.

Availability of "Plug & Play" Land and Infrastructure

- Key stakeholders have noted that future integrated investors have declined to invest due to the anticipated length of time it will take to acquire land. While the lands have been designated for industrial development, the land has not been acquired from the various existing owners and consolidated. This process alone would take on average 2-3 years.
- Additionally, investors are discouraged by the need of substantial investment to develop the newly acquired lands and equip it with the infrastructure to transform it to be ready for the actual investment.

Availability of a Solid Logistics Hub

- While Petronas operates a solid product port facility within PIC, the facility is not available for those operating outside of PIC.

Source: Stakeholder Feedback

Learning from leading chemical hubs, Johor must invest in innovation, integration and sustainability to move up the value chain and strengthen its global competitiveness (1/2)

Case Examples

Case Study 1:
Jurong Island, Singapore

Key Initiatives

- **Shared Utility Infrastructure:** Centralised power, water, and waste systems reduce costs, lower emissions, and promote circularity.
- **Co-location of Feedstock Players:** Over 100 firms linked via shared pipelines, improving efficiency and integration across upstream, midstream, and downstream segments.
- **Sustainability Roadmap (Version 2.0):** Jurong Island 2.0 emphasizes carbon reduction, digitalization, and the circular economy.
- **ICES Innovation Hub:** The Institute of Chemical & Engineering Sciences (ICES) provides R&D, pilot plant services, and commercialization support for high-value innovations.

Results

- Attracted global specialty and performance chemical manufacturers.
- Increased downstream value-added output through ecosystem synergies.

Johor must look beyond basic refining and bulk petrochemicals by building value-added clusters, promoting industrial integration, and investing in sustainability, innovation, and talent to compete on a global stage

Johor should replicate Jurong Island's **integrated infrastructure and co-location model** to attract high-value chemical manufacturers, reduce operational costs, and boost downstream value-added production through ecosystem synergies and innovation

Source: Jurong Island Version 2.0 (JIV2.0) Masterplan; EDB Investment Guide; Royal Commission for Jubail and Yanbu (RCJY)

Learning from leading chemical hubs, Johor must invest in innovation, integration and sustainability to move up the value chain and strengthen its global competitiveness (2/2)

Case Examples

Case Study 2:
Jubail Industrial City
Saudi Arabia

Key Initiatives

- **Royal Commission-Driven Masterplanning:** Unified planning across utilities and transport reduces emissions, ensures reliability, and lowers operational costs.
- **Feedstock Integration with Aramco:** Strategic linkage to upstream supply secures input for high-value downstream production.
- **Anchor Player Model:** SABIC leads multiple value chains, promoting cluster growth in specialty, intermediate, and performance chemicals.
- **Zoning for High-Value Production:** Dedicated areas for green chemicals, plastics recycling, and advanced materials manufacturing.

Results

- Emerged as one of the world's largest chemical production bases.
- Attracted FDI in downstream segments aligned with sustainability trends.

Johor must look beyond basic refining and bulk petrochemicals by building value-added clusters, promoting industrial integration, and investing in sustainability, innovation, and talent to compete on a global stage

Johor should adopt a **masterplanned, anchor-led cluster model,** like Jubail's, with integrated utilities, secure feedstock linkages, and dedicated zones to attract FDI into high-value, sustainable chemical manufacturing segments

Source: Jurong Island Version 2.0 (JIV2.0) Masterplan; EDB Investment Guide; Royal Commission for Jubail and Yanbu (RCJY)

As Johor aims to strengthen its chemical and petrochemical industry, it must move up the value chain from basic processing toward advanced, high-value, and sustainable production

Different tiers of chemical & petrochemical value creation

As we move from left to right…

- Johor moves from bulk production of lower value goods toward **advanced, higher-margin segments**
- Greater emphasis on **specialisation, R&D, and innovation**
- Requires stronger environmental compliance, higher skill levels, and sophisticated infrastructure
- Johor must strategically position itself to support **higher-value manufacturing, circular economy models, and clean technologies**

Tier 1: Basic Processing & Refining

- Focus on upstream activities: crude oil refining, steam cracking, basic petrochemical production (e.g., ethylene, propylene)
- Capital-intensive, but low-margin and highly dependent on commodity prices
- Typically involves large multinational oil & gas players
- Current status of Johor (e.g., PIPC, RAPID) already well established here

Tier 2: Intermediates & Commodity Chemicals

- Produces building blocks like polymers, solvents, and industrial gases
- Moderate value-added, used in construction, packaging, textiles, etc.
- Often sold in bulk and exported to downstream manufacturers
- Johor is active here (e.g., Lotte Chemical Titan) but still reliant on feedstock pricing and external buyers

Tier 3: Specialty Chemicals & Performance Materials

- Highly customised chemical compounds used in electronics, automotive, agriculture, and pharmaceuticals
- Higher profit margins and closer alignment with customer specifications
- Requires greater R&D, skilled workforce, and stricter quality control
- Emerging opportunity for Johor to attract investment and upgrade talent pipelines

Tier 4: Green Chemistry & Circular Economy Products

- Bio-based feedstocks, biodegradable plastics, chemical recycling, low-carbon chemicals
- Driven by global ESG trends and sustainability regulations
- High-tech, IP-driven, and often developed in partnership with research institutions
- Johor can lead in ASEAN by developing low-carbon zones and attracting clean tech players

Tier 5: Integrated Innovation Clusters & Advanced Materials

- Combines production, R&D, testing, and commercialisation in a closed-loop innovation ecosystem
- Focus on advanced materials (e.g., semiconductors, aerospace composites, nanomaterials)
- Often includes collaboration between MNCs, SMEs, universities, and startups
- Aspiration for Johor to establish a regional hub for chemical innovation and export-oriented high-tech manufacturing

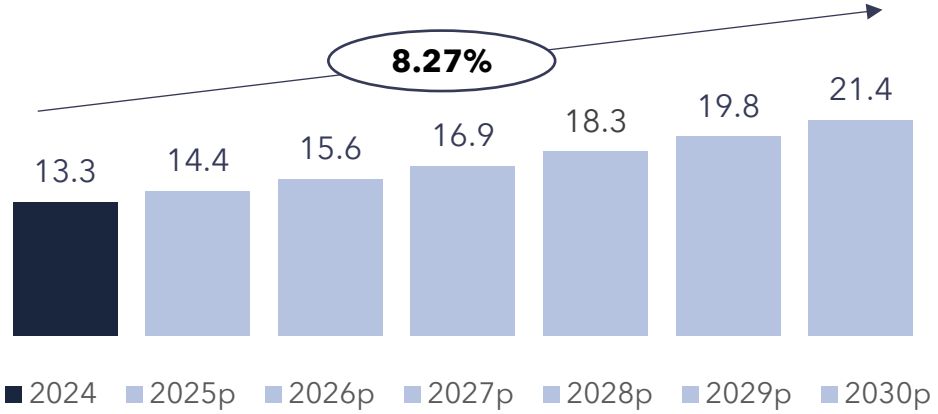
Where Johor's chem/petchem industry could focus on:

- Transitioning **from Tier 2 to Tier 3 and Tier 4: From volume to value**
- Incentivising R&D partnerships and downstream investors
- Building circular infrastructure and regulatory readiness for green chemicals
- Developing skilled talent for specialty and sustainable chemical production

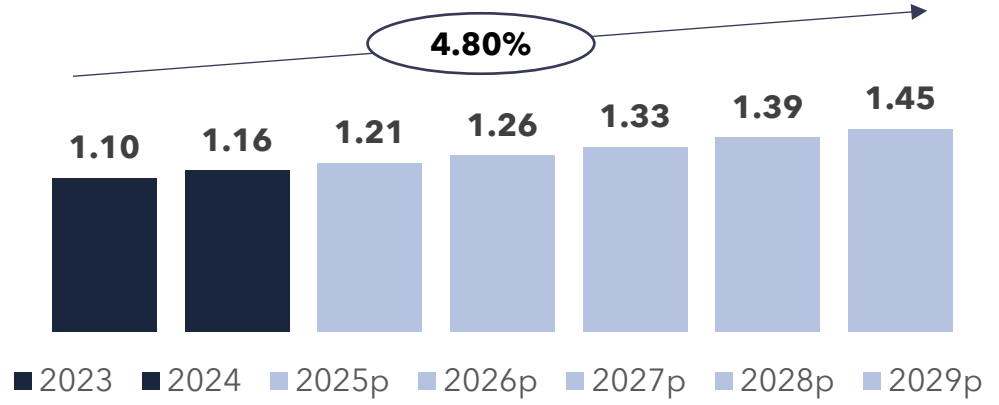
Healthcare & Pharmaceutical.

Globally, the healthcare and pharmaceutical sectors are poised for growth, with healthcare CAGR of 8.27% and pharmaceutical CAGR of 4.80%, driven by technology and markets

Global Healthcare Market Value (2024-2030)[1]
USD Trillion



Global Pharmaceuticals Market Value (2023-2029)
USD Trillion



Key Factors Driving Market Growth

Several **factors have contributed to the growth and evolution of the healthcare and pharmaceutical** sectors over the past decade:

1 Technological Advancements

The integration of technology **enhances patient care and operational efficiency**

2 Globalisation

A more interconnected global market and rapid **dissemination of new drugs and therapies**

3 Emerging Markets

Substantial GDP growth in China and India has translated into increased healthcare spending and **market expansion**

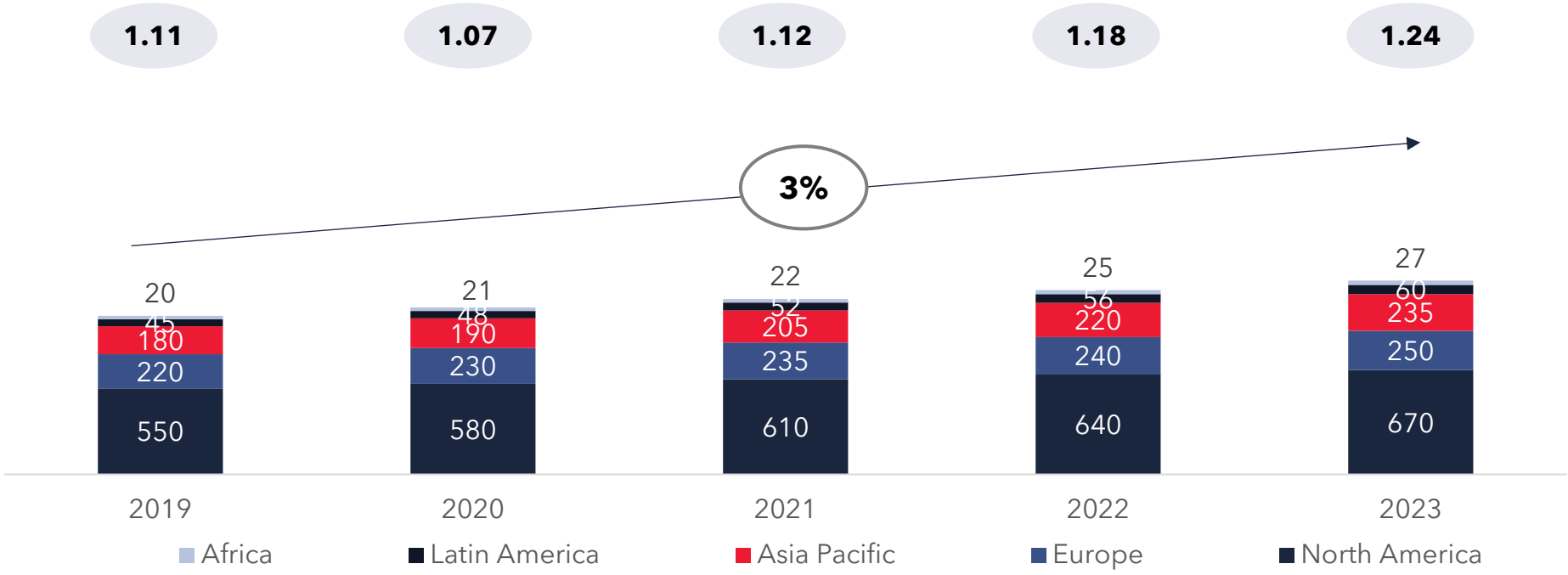
Emerging trends and their impact

- Spending on AI in healthcare is projected to reach USD 188 billion by 2030
- By 2050, the global population aged 60 and above is expected to double to 2.1 billion
- WHO estimates a shortfall of 10 million healthcare workers by 2030
- Policy changes are impacting the pharmaceutical industry's revenue models

Note: 1. Comprises the pharmaceuticals market as a subset of the entire healthcare services market.
Source: Verified Market Research, Statista, USA's National Library of Medicine, ZS, Deloitte, IQVIA

Asia Pacific is the third-largest market in 2023 and has the third highest CAGR among established markets, driven by high growth in China's pharmaceutical market

Global Pharmaceuticals Revenue by Region (2019-2023)
USD Trillion



Region		CAGR
Africa	1	7.8 %
Latin America	2	7.5 %
Asia Pacific	3	6.9 %
Europe		3.2 %
North America		5.1 %

- "Pharmerging" markets like Africa (7.8%), Latin America (7.5%), and Asia-Pacific (6.9%) are primary drivers in global pharmaceutical revenue growth due to rising healthcare demand, and the corresponding rapid expansion of generics, biologics and biosimilars
- On the other hand, North America (5.1%) and Europe (3.2%) are seeing slower growth due to pricing pressure, market maturity and regulations
- APAC growth is high due to a combination of factors: rapid economic growth, a large underserved population, rising investment in healthcare infrastructure, and an escalating burden of non-communicable diseases and aging populations

Source: Statista, RD World, WHO

APAC healthcare and pharmaceutical markets' projected growth are underpinned by a favorable mix of demand and supply side drivers

Subsector

Healthcare

Pharmaceuticals

Demand-Side Drivers

1. **Aging Populations**
   The region is aging faster than any other region in the world, with the elderly population representing *60% of the world's older persons in 2022*

2. **Growing Chronic Disease Prevalence**
   Comparative to 2022's global rates, the region accounts for over *20% of global mortality associated with chronic diseases*

3. **Rising Public Healthcare Expenditure**
   Between 2012-2022, the region's *domestic government health expenditure per capita (PPP[1]) expanded by 83%*

4. **Growing Middle Class and Private Healthcare Spending**
   Over 2012-2022, *while GDP per capita (PPP) in the region grew by 72% to $23,281, domestic private health expenditure per capita (PPP) rose by 89% to $290*

Growth in demand will spillover from broad-based healthcare demand-side drivers

Supply-Side Drivers

5. **Digitalisation and Tech-enabled Service Delivery**
   Digital health in the region took shape and accelerated at breakneck speed with the onset of the pandemic,and is now emerging as the *3rd most significant region for digital health funding globally in 2024*

6. **Rising R&D Spending and Innovation**
   In 2022, the region tracked a record USD 15 bil in R&D expenditure amongst top pharmaceutical firms in China, South Korea, Japan, Australia

7. **Drug Discovery and Generics Expansion**
   The region's growing R&D spending has allowed the discovery of 166 new active substances from 2009-2017, and accounts for 26.9% of the global generics contract manufacturing market in 2024

Note: 1. Purchasing Power Parity
Source: ESCAP, APACMed, World Bank, Galen Growth, BioSpectrum Asia, CIRS, Grand View Research

By 2030, roughly 1 in 5 people regionally will be aged 60 or older, significantly expanding demand for comprehensive, accessible, and specialised age-related healthcare solutions

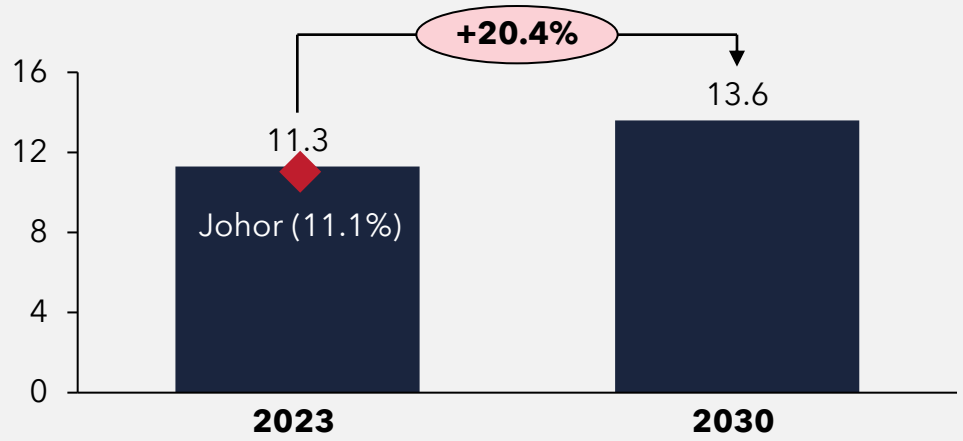
Underlying Factors for Regional APAC Growth

1. **Aging Populations**
   The region is aging faster than any other region in the world, with the elderly population representing *60% of the world's older persons in 2022*
2. Growing Chronic Disease Prevalence
3. Rising Public Healthcare Expenditure
4. Growing Middle Class and Private Healthcare Spending
5. Digitalisation and Tech-enabled Service Delivery
6. Rising R&D Spending and Innovation
7. Drug Discovery and Generics Expansion

Malaysia/ Johor vs. Regional Old-Age Population[1] Forecasts (2023-2030)

% of total population

Malaysia is anticipated to age more rapidly comparative to its regional counterparts, with its old-age population rising from 11.3% to 15.3% by 2030, and Johor is likely to follow-suit



Region	% of Old-Age Population		Increase
	2023	2030p	
World	14.2	16.5	**+16.3%**
APAC	14.1	17.3	**+22.7%**
SEA[2]	12.0	14.8	**+22.9%**

Key Highlights

- The SEA region is on track to outpace the world and broader APAC region in old-age population growth at a +22.9% increase
- Malaysia is anticipated to age rapidly in the coming decade, with a +20.4% increase in its old-age population by 2030
- For Johor, the old-age population accounts for 11.1% of the total population in 2023, implying that Johor is likely to track closely with the national aging trend
- Rapid regional population aging will drive proportional increases in regional and local demand for age-centric healthcare solutions - spanning preventive and geriatric services, home-care, etc.

Note: 1. Old-age population includes people who are aged 60 years and above; 2. Southeast Asia
Source: BPEN, United Nations, PASB Analysis

Increased and growing regional prevalence in NCDs[1] will amplify the burden of care on the healthcare sector, resulting in surge in demand for chronic-care services and therapeutics

Underlying Factors for Regional APAC Growth

1. **Aging Populations**
   The region is aging faster than any other region in the world, with the elderly population representing *60% of the world's older persons in 2022*
2. **Growing Chronic Disease Prevalence**
   Comparative to 2022's global rates, the region accounts for over *20% of global mortality associated with chronic diseases*
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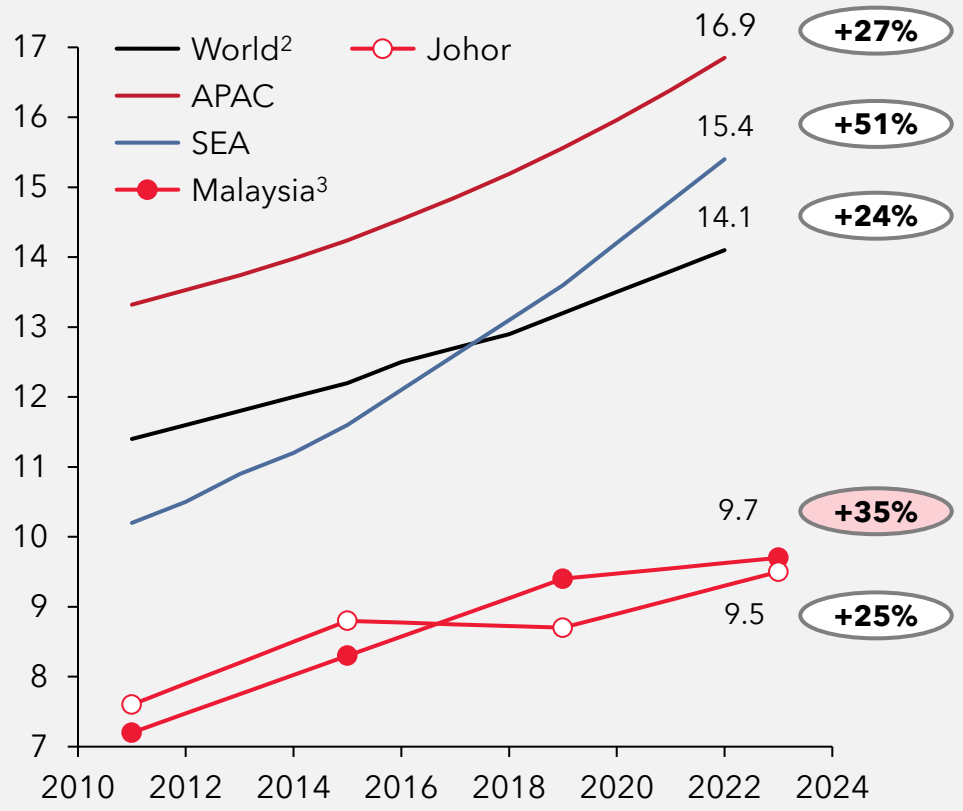
4. **Growing Middle Class and Private Healthcare Spending**
5. **Digitalisation and Tech-enabled Service Delivery**
6. **Rising R&D Spending and Innovation**
7. **Drug Discovery and Generics Expansion**

Regional Comparison of Diabetes Prevalence among Adults Aged 18+ (2012-2022)

as a % of total population

Diabetes prevalence nationally has risen by +35% over the last decade, marking 9.7% of the adult population, while Johor mirrors the expansion by +32% with a prevalence of 9.5%



Key Highlights

- Adult diabetes prevalence within the SEA region expanded the greatest (+51%) and stands at 15.4% of adult population, greater than the global average
- Malaysia follows closely in trend, with its diabetes prevalence rising by +35% and marks 9.7% of the adult population
- Johor's adult diabetes prevalence marked the twelfth-fastest increase nationwide, rising by +25%, reaching 9.5% of the adult population
- The sharp rise in adult diabetes regionally signals an imminent trend of chronic diseases, which presents an uptick in local demand and urgency for advanced therapeutics and preventive care

Note: 1. Non-communicable diseases; 2. World, APAC SEA data presented is available from 2011-2023; 3. Malaysia, Johor data is collected every 4 years (2011, 2015, 2019, 2023) with the NHMS
Source: APACMed, WHO, National Institutes of Health, Ministry of Health, PASB Analysis

The COVID-19 pandemic has drove a substantial surge in investments in public healthcare globally, with increasing government commitment in fortification of public healthcare systems

Underlying Factors for Regional APAC Growth

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   Between 2012-2022, the region's *domestic government health expenditure per capita (PPP) expanded by 83%*
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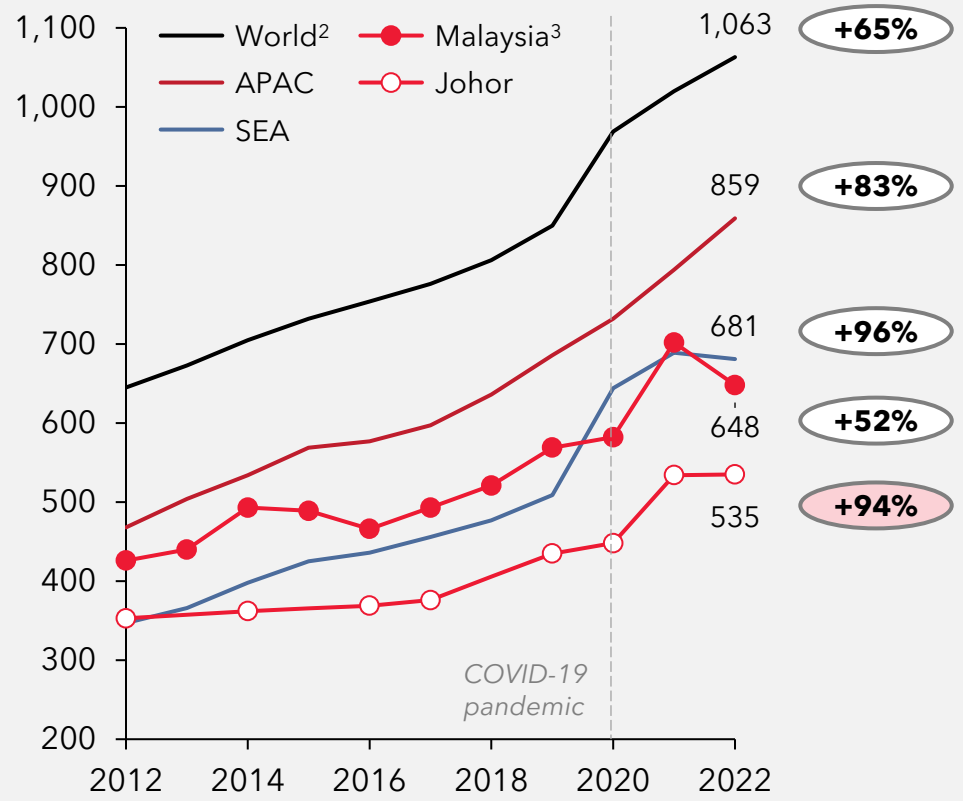
Regional Comparison of Public Healthcare Expenditure per Capita (2012-2022)[1]

PPP (current international $)

Malaysia's public healthcare expenditure has grown by more than half (+52%) over the last decade, while Johor saw an accelerated uplift in healthcare spending by an increase of +94% post-COVID



Key Highlights

- Across the SEA region, public healthcare expenditure has leapfrogged in the last decade by +96%, reaching $671 per capita
- Within Malaysia, the government has also grown its healthcare expenditure by half +52%, marking a $648 per capita healthcare expenditure
- Johor is also making similar strides in expanding public healthcare expenditure, and is up by +94%, with a $535 healthcare expenditure per capita
- Reinforcing government commitments in healthcare indirectly fuels the local healthcare sector's demand by expanding coverage, funding, product and service uptake

Note: 1. Data in 2013, 2015, 2018 is unavailable for Johor.
Source: World Bank, Ministry of Health, DOSM, PASB Analysis

The rise of wealth in the region has served to catapult current purchasing powers and living standards for many, driving demand for higher-quality healthcare products and services

Underlying Factors for Regional APAC Growth

1. Aging Populations
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3. Rising Public Healthcare Expenditure
4. **Growing Middle Class and Private Healthcare Spending**
   Over 2012-2022, while GDP per capita (PPP) in the region grew by 72% to $23,281, domestic private health expenditure per capita (PPP) rose by 89% to $290
5. Digitalisation and Tech-enabled Service Delivery
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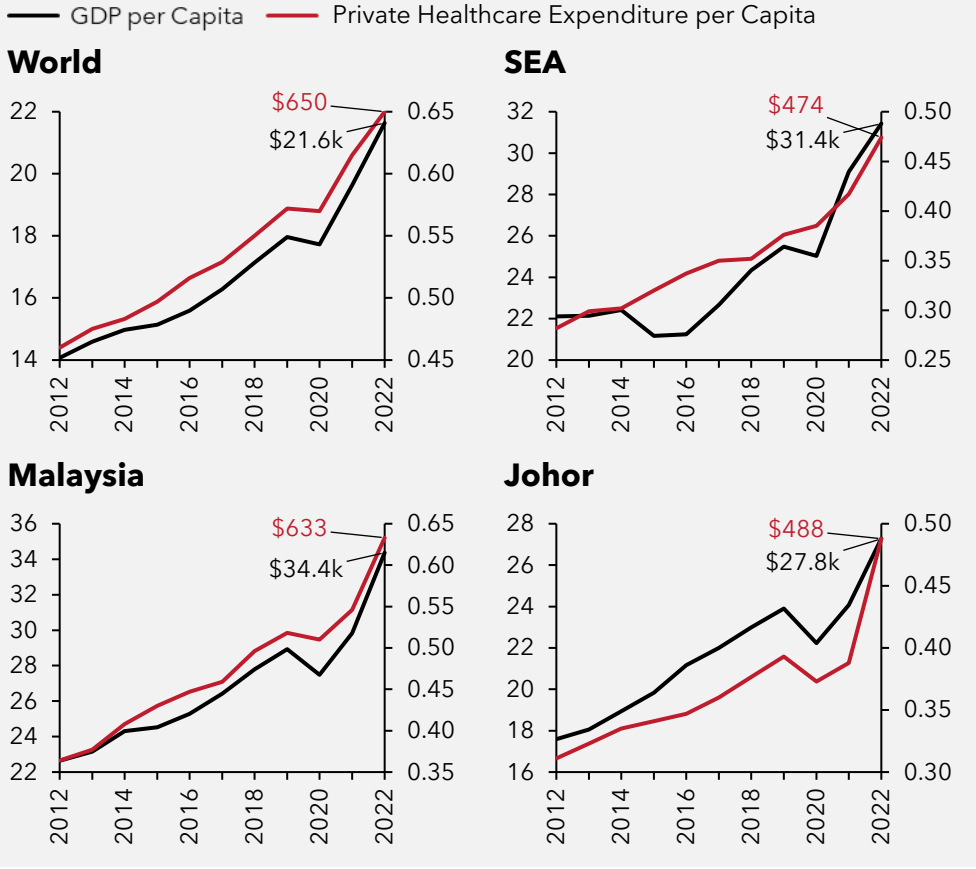
Regional Comparison of GDP per Capita vs. Private Healthcare Expenditure per Capita (2012-2022)[1]

PPP (current international $), thousands '000

Malaysia has experienced a +52% expansion in wealth , while Johor saw an accelerated uplift in healthcare spending by an increase of +94% post-COVID



Key Highlights

- GDP per capita regionally has grown by almost half (+42%), while private healthcare expenditure rose by over half (+68%) over the last decade
- Malaysia's GDP per capita increased by +52% while its private healthcare expenditure per capita grew by +74% to almost match the global average
- Johor has also achieved similar growth in size, with GDP per capita rising by 55% and private healthcare spend growing by almost double (+98%)
- A burgeoning middle-class across the region will stimulate robust sectoral growth locally via higher insurance take-up and demand for quality healthcare

Note: 1. Data in 2013, 2015, 2018 is unavailable for Johor.
Source: World Bank, Ministry of Health, DOSM, PASB Analysis

Riding the global digitalisation wave, regional investments in digital health are surging, driving uptake via increasing accessibility of quality healthcare to underserved communities

Underlying Factors for Regional APAC Growth

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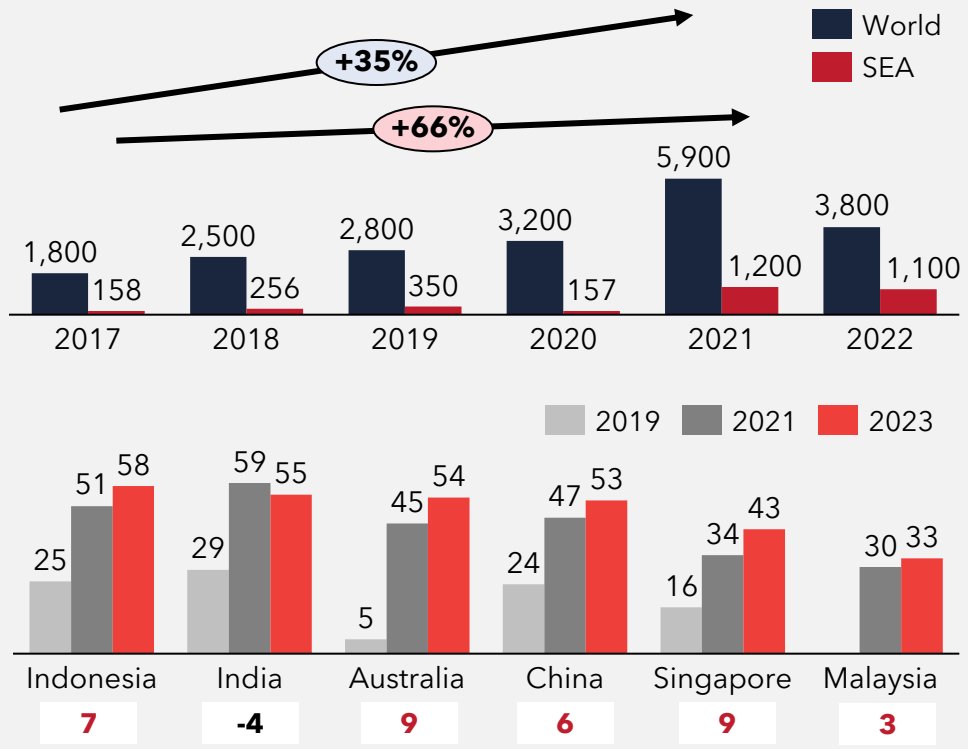
2. **Growing Chronic Disease Prevalence**
3. **Rising Public Healthcare Expenditure**
4. **Growing Middle Class and Private Healthcare Spending**
5. **Digitalisation and Tech-enabled Service Delivery**
   The region is now emerging as the 3rd *most significant region for digital health funding globally in 2024*
6. **Rising R&D Spending and Innovation**
7. **Drug Discovery and Generics Expansion**

Comparison of HealthTech Investments (2017-2022) vs. Country Telemedicine Adoption (2019-2023)

$USD millions, and % of respondents who used telemedicine services in the past 12 months

Regionally, public and private healthcare sectors are undergoing significant digital transformation



Growth 2021-23 (in percentage points)[1]

Key Highlights

- SEA's public/ private healthcare sectors are spearheading digital transformation, with government platforms like SG's HealthHub and private ventures like Biofourmis driving a +66% surge in investments, rapidly expanding healthcare access and quality
- While private digital health investments may lack behind SEA giants, Malaysia's digital health adoption is growing amidst the country's efforts in digitalising its public health records
- Johor is likely to follow Malaysia's footsteps in the enhancement and digitalisation of public healthcare infrastructure first
- Rising digital health investments, adoption will spur local demand from underserved populations

Source: World Bank, Ministry of Health, DOSM, PASB Analysis

Rising public and private pharmaceuticals R&D expenditure will expand healthcare accessibility across low-to-high-need treatment areas through breakthrough innovations

Underlying Factors for Regional APAC Growth

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6. **Rising R&D Spending and Innovation**
   In 2022, the region tracked a record USD 15 bil in R&D expenditure amongst top pharmaceutical firms in China, South Korea, Japan, Australia
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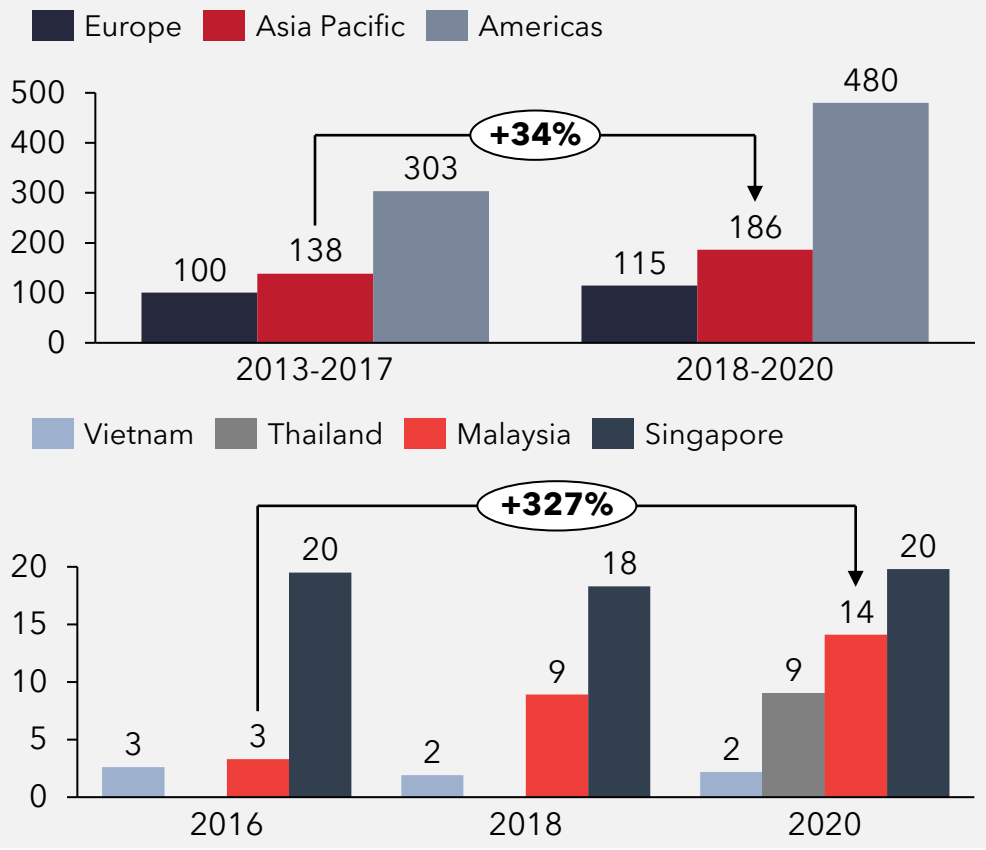
Comparison of Pharmaceutical BERD[1] (2013-2022)[2] vs. ASEAN Health GERD[3] (2016-2020)

PPP-converted $USD billions, and as a % of national GERD

APAC is tracking sizable pharmaceutical R&D growth at +34%, with Malaysia following in suit at a momentous +327% growth as it positions to move up the healthcare manufacturing value chain



Key Highlights

- Regionally, improved regulatory frameworks and government-led incentives are propelling local pharma R&D efforts, where regional pharmaceutical BERD is up by +34% from 2013-2017
- Malaysia's ambition to become a regional biopharma and medtech hub saw health GERD reach 14% of national GERD in 2020, and it now hosts ASEAN's first oncology API R&D centre
- With such tailwinds, Johor emerges as a high-potential node to attract further R&D investments as it moves up the pharma-manufacturing value chain
- Robust local biopharma R&D ecosystems will help unlock new and underserved populations, increasing treatment access

Note: 1. Business Expenditure on Research Development; 2. Based on 33 OECD and 6 non-OECD countries; 3. Gross Expenditure on Research Development; 4. Active Pharmaceutical Ingredient
Source: OECD, National Agency for Science and Technology Information, National Research Council of Thailand, MOSTI, Singapore Department of Statistics, MIDA

Increasing levels of R&D pharmaceuticals are accelerating high-value clinical research and drug discoveries, enabling healthcare access for unmet disease areas and market expansion

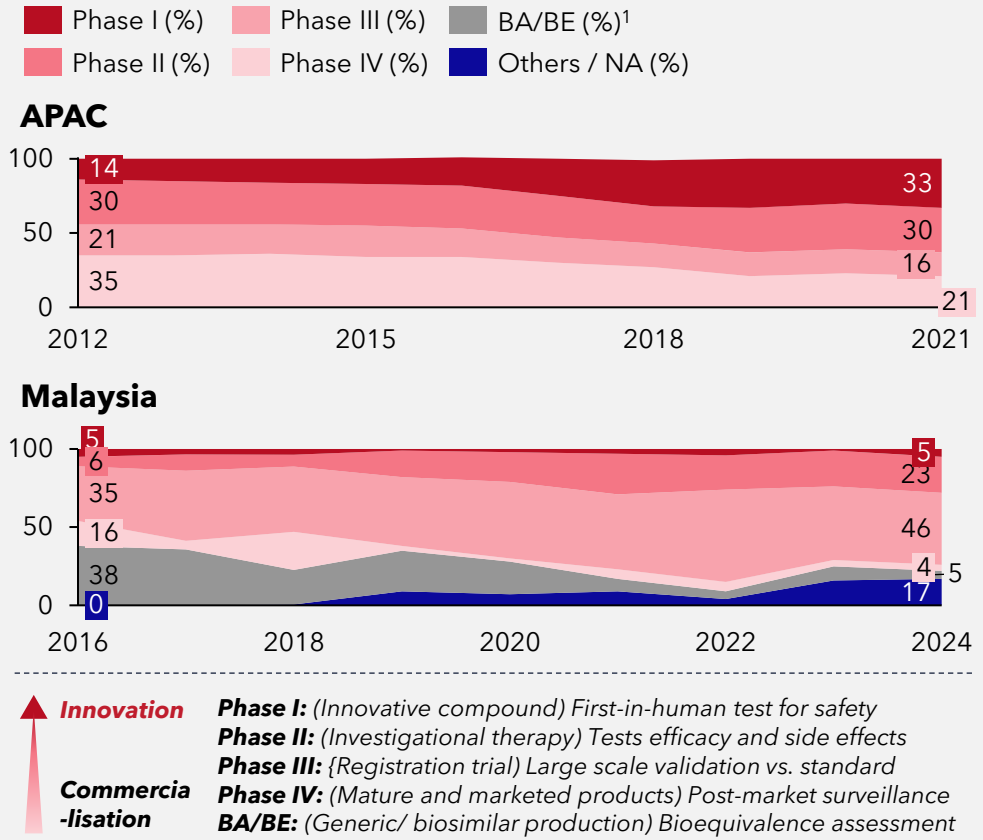
Underlying Factors for Regional APAC Growth

1. **Aging Populations**
2. **Growing Chronic Disease Prevalence**
3. **Rising Public Healthcare Expenditure**
4. **Growing Middle Class and Private Healthcare Spending**
5. **Digitalisation and Tech-enabled Service Delivery**
6. **Rising R&D Spending and Innovation**
7. **Drug Discovery and Generics Expansion**
   The region discovered 166 new active substances from 2009-2017, and accounts for 26.9% of the global generics contract manufacturing market in 2024

Share of Clinical Trials by Phase in Region (2012-2021) vs. Malaysia (2016-2024)

as a % of total

Advancement in pharma R&D is enabling more innovation within the region where novel clinical trials have grown by +19% from 2012-2021, with Malaysia catching up on Phase II development



Key Highlights

- Increasing level of pharmaceutical innovation within APAC is likely to spillover into SEA, as seen with the upstream shift into Phase 1 trials from 14% to 33% by 2021, suggesting growth in development of novel substances
- Similarly, Malaysia is transitioning from generics-based R&D to innovative trials (BA/BE declining by -33% and matched by a rise in Phase II by +17%), and moving up the R&D value chain
- While nascent, Johor is expected to benefit from national growth in R&D given its availability of 2 clinical research sites
- Growth in drug discoveries (higher efficacy, rare diseases) will drive greater market access and value for untapped areas

Note: 1. Bioavailability/Bioequivalence studies
Source: Trialtrove, Clinical Research Malaysia

Healthcare accessibility and pharmaceutical market will grow continuously in line with the rapid expansion in generics/ biosimilars due to rising healthcare demand and patent expiries

Underlying Factors for Regional APAC Growth

1. Aging Populations
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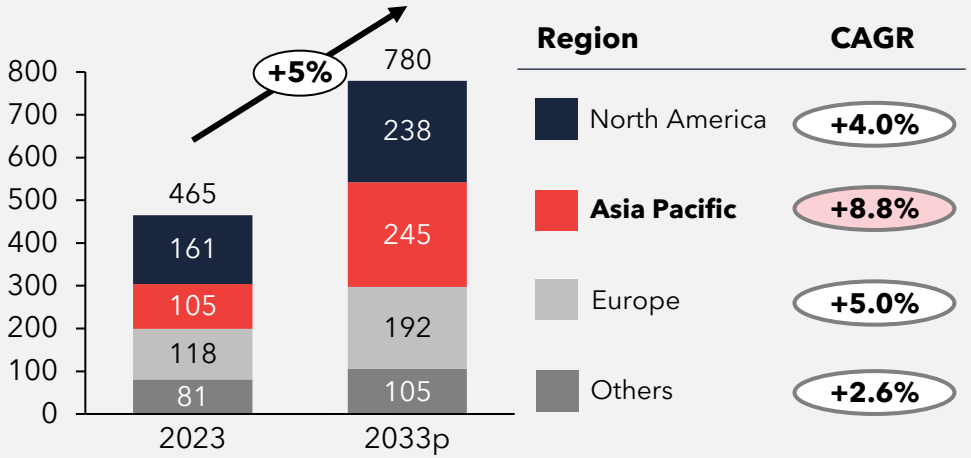
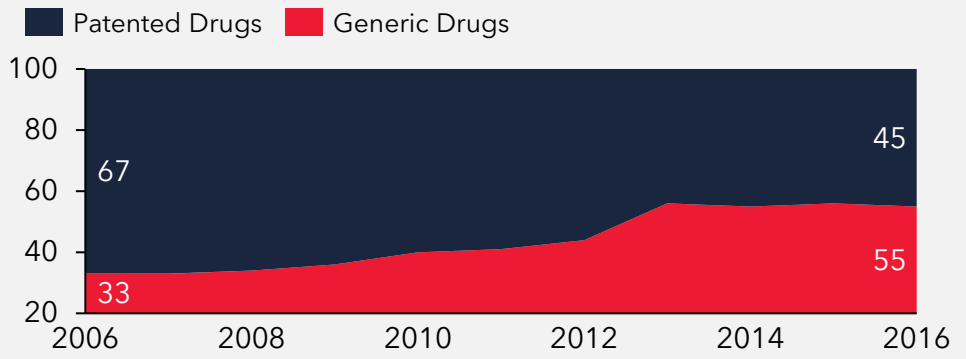
Regional Comparison of Generics Market (2023-2033p) vs. Malaysia Sales of Medicines (2006-2016)

$USD billions, and as a % of total prescription drugs

Advancement in pharma R&D is enabling more innovation within the region where novel clinical trials have grown by +19% from 2012-2021, with Malaysia catching up on Phase II development





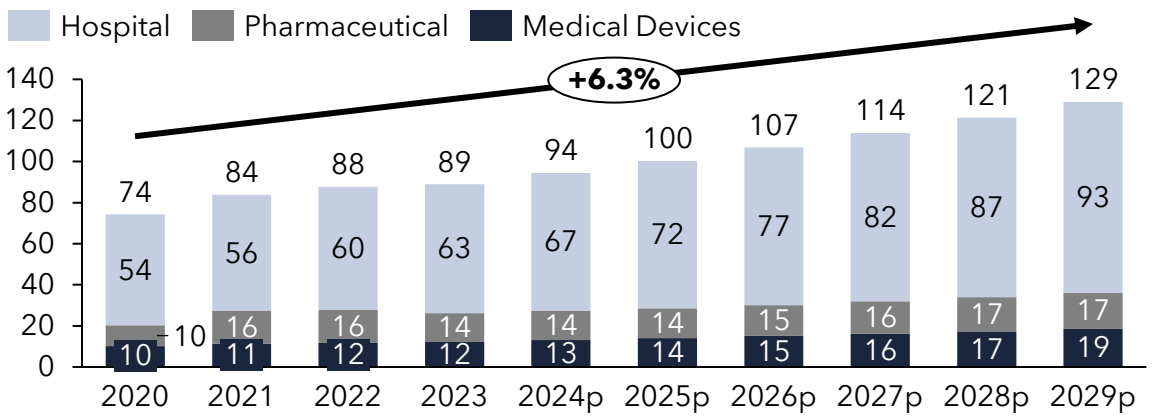
Key Highlights

- Patent expiries and rising healthcare demand are driving SEA's generics industry growth (+8.8% over the next decade), as governments and pharma firms seek cost-effective access and production of essential medicines
- Driven by a strong local generics manufacturing industry and government push for generics substitution, Malaysia's share of prescribed generics has risen from 33% to 55% since 2006
- Johor plays a key role in producing affordable insulin biosimilars[1] (i.e. Biocon Biologics) for nearly 300k people with diabetes locally
- Expansion to generics and its variants serves to propel greater healthcare access and demand

Note: 1. Biosimilars are a highly similar version of an already approved biologic (reference product) which is conventionally cheaper to manufacture
Source: Nova One Advisor, Malaysian Competition Commission, Biocon Biologics

Malaysia's healthcare and pharmaceutical sector is well-positioned for expansion, driven by rising regional demand

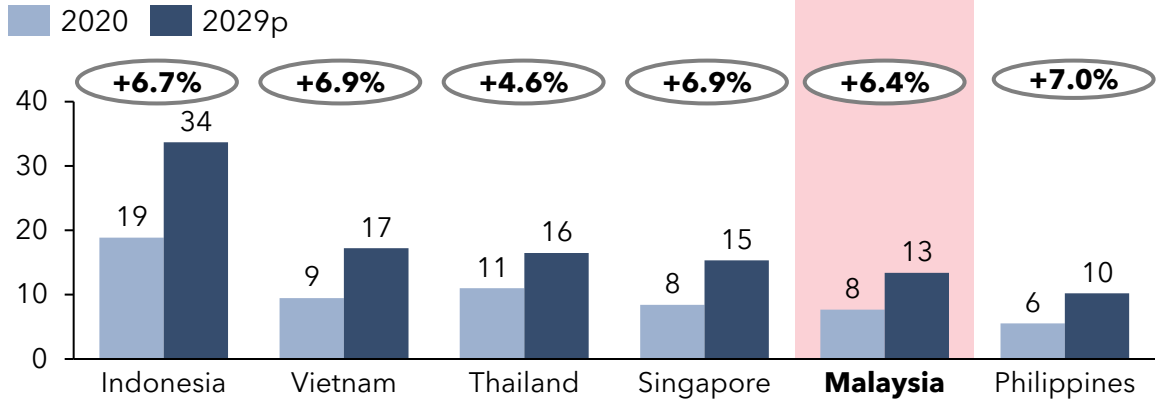
ASEAN Healthcare and Pharmaceutical Market Size[1]
USD billion



- The projected threefold increase reflects a structural transformation in ASEAN's healthcare landscape, driven by population growth, rising incomes and increased government spending on health
- For Malaysia, this regional surge presents a strategic opportunity to position itself as a regional logistics, medical tourism and manufacturing hub, given its proximity to major markets, Indonesia and Singapore
- Leveraging its infrastructure and industrial base, Malaysia is a prime gateway for companies looking to serve ASEAN markets

ASEAN's healthcare and pharmaceutical market is set to grow significantly, from $USD74 billion in 2020 to $USD129 billion by 2029, highlighting strong regional demand and investment opportunities

ASEAN Healthcare and Pharmaceutical Market Size by Country[2]
USD billion



- Despite its size, Singapore has managed to develop a robust healthcare and pharmaceutical market that rivals Malaysia. While smaller than Indonesia and Vietnam, Malaysia is presented with a strategic opportunity to catch up by modeling Singapore's agile growth
- Malaysia, with its strong manufacturing and talent base, and healthcare infrastructure expansion, is well-placed to accelerate its role in meeting regional demand, especially as neighbouring markets grow to become net importers of high-value pharmaceutical and medical goods

Though Indonesia, Vietnam and Singapore are leaders in market/ growth, Malaysia's relative competitive expansion highlights an opportunity to rise as an up-and-comer strategic production and service hub

Note: 1. Non-exhaustive aggregate derived from hospital, pharmaceutical and medical devices market estimates; 2. Non exhaustive and only includes hospital and pharmaceutical market estimates
Source: Statista

Malaysia's healthcare sector is set for strong sustained growth at 8% per annum, underscored by key drivers and growth in nascent subsectors such as medical devices

Malaysia's Healthcare and Pharmaceuticals GDP Contribution (2022) and Market Size (2020-2026p)[1]
RM billion, and USD billion

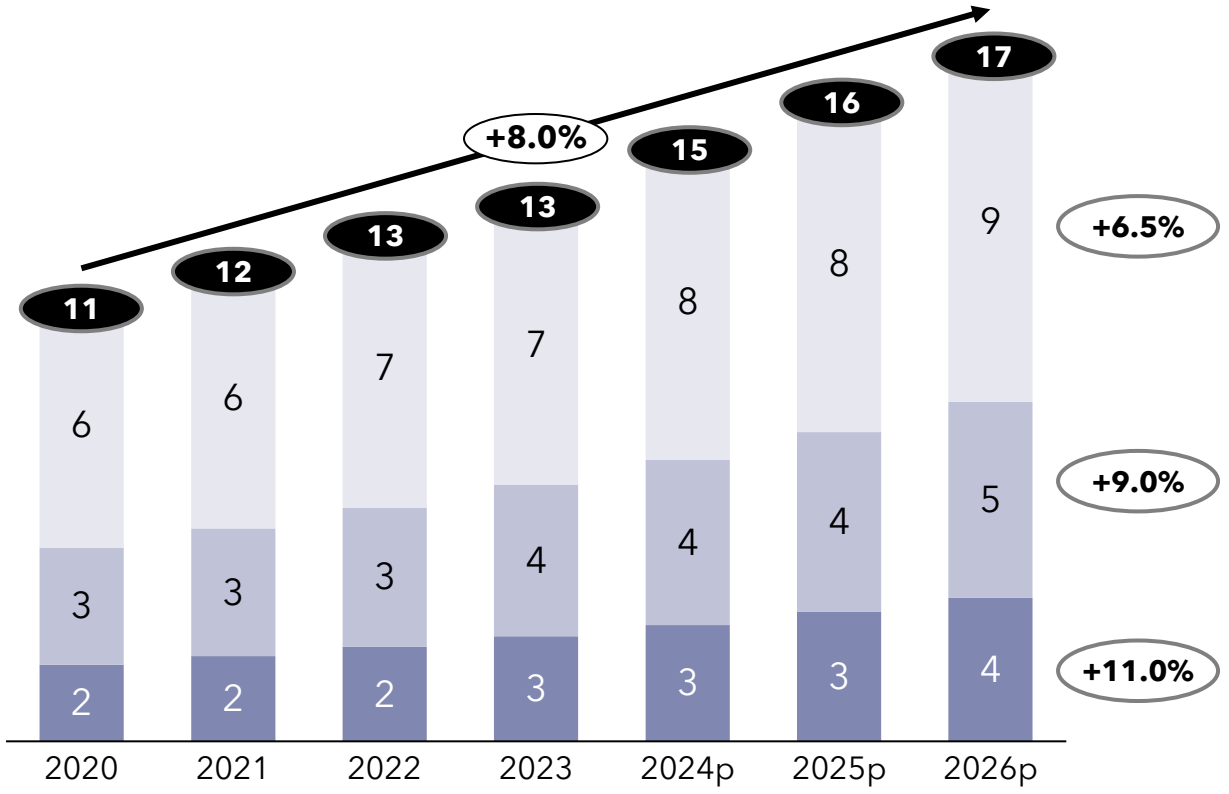
Malaysia's Healthcare Market comprises the following core subsectors:

Healthcare
RM107.3 bil
(6.1% of national GDP)

Hospitals
RM27.1 bil
(25.3% of healthcare GDP)

Pharmaceuticals
RM71.7 bil
(9.2% of healthcare GDP)

Medical Devices[2]
RM70.2 bil
(65.4% of national GDP)



Key National Drivers

Increased Private Health Expenditures
- Matching income growth, private healthcare spending has grown steadily, where demand for quality healthcare services has increased

Rising Public Healthcare Commitment
- Malaysia has imposed conducive regulatory reforms and commitment to improving hospitals, clinics which will serve to enable growth in the sector

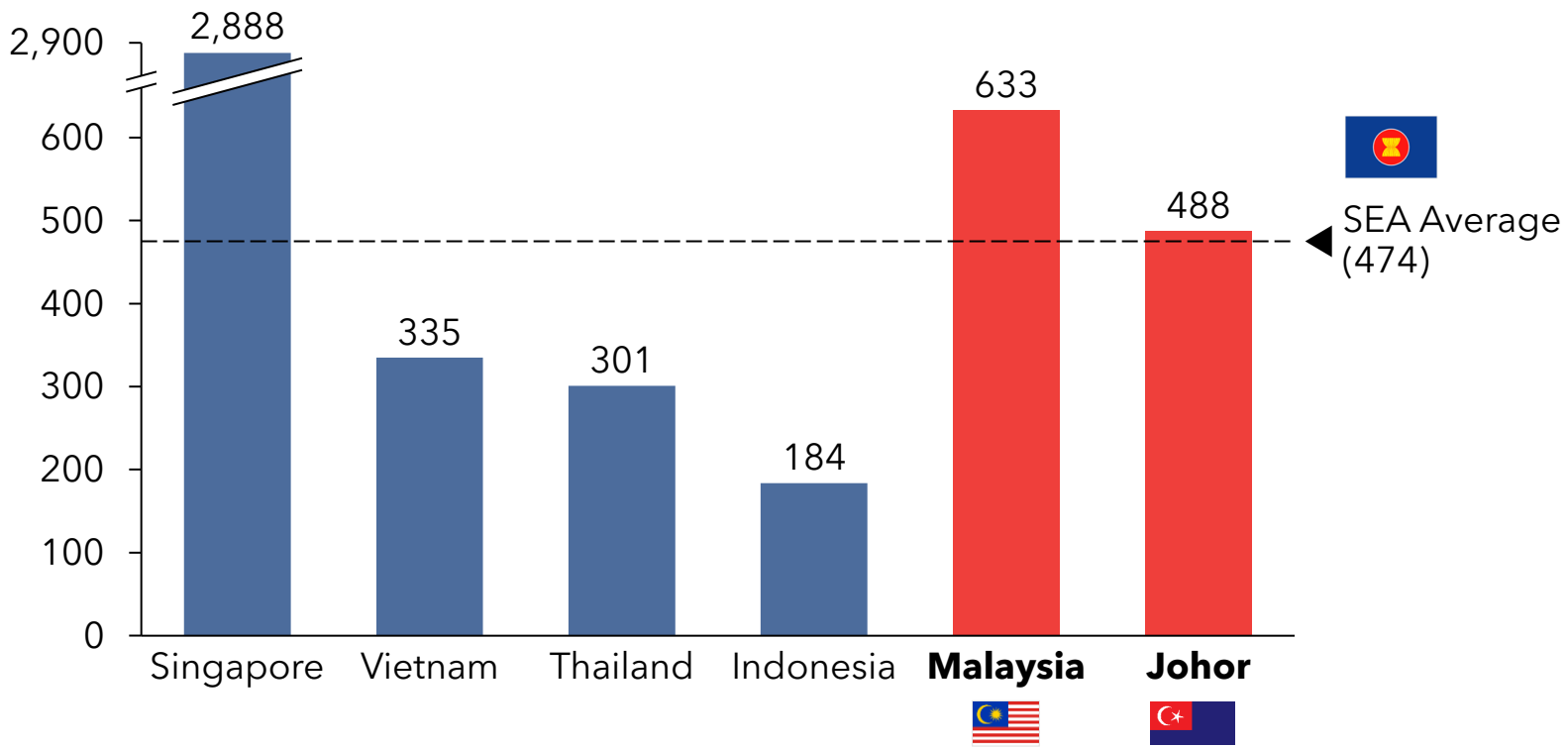
An Aging Population and Growing Chronic Disease Prevalence
- Malaysia is an aging nation with growing burden of NCDs, which will spur demand for aged care and specialised services

Growing Demand for Medical Tourism
- Malaysia's medical cost competitiveness is set to attract international patients for elective procedures and wellness care, and expand private market footprint

Note: 1. Non-exhaustive estimated aggregation of the healthcare sector on the basis of the most relevant core subsectors; 2. Includes consumables such as rubber gloves, medical gases, etc.
Source: Research and Markets, GlobalData, DOSM, PASB Analysis

At $488 per capita, Johor's private healthcare spending is higher than both Indonesia and ASEAN averages, reflecting a more developed and accessible healthcare market

Private Healthcare Expenditure per Capita in 2022
PPP (current international $), thousands '000



Key Highlights

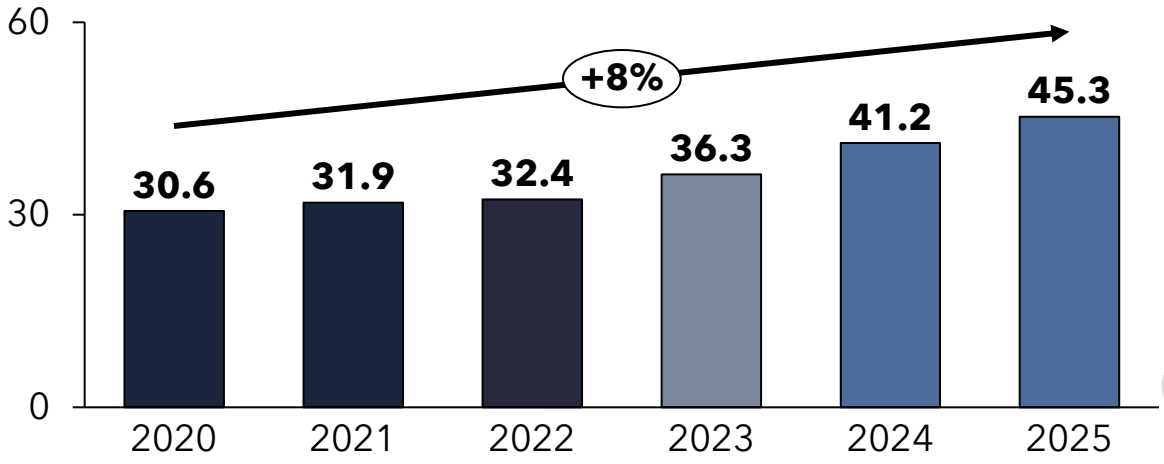
- Malaysia is **ahead of regional peers in private healthcare expenditure,** showing strong and **growing domestic demand for quality healthcare**
  - Signals an **attractive market for new players and investors** given the growing consumer appetite
  - Untapped **potential for movement up the healthcare value chain for high-value-based healthcare solutions**
- Malaysia **occupies a strategic middle ground** regionally, offering a **cost advantage over Singapore** and a **higher service quality than its lower-cost peers** – where Johor state can be positioned as a medical tourism gateway for countries with high healthcare costs or less developed healthcare infrastructure

Malaysia can be posited to have made relatively greater strides in healthcare access, medicine availability, public-private healthcare investments compared to its peers, thereby boosting the investment potential and market attractiveness of the healthcare sector

Source: World Bank, Ministry of Health, DOSM, PASB Analysis

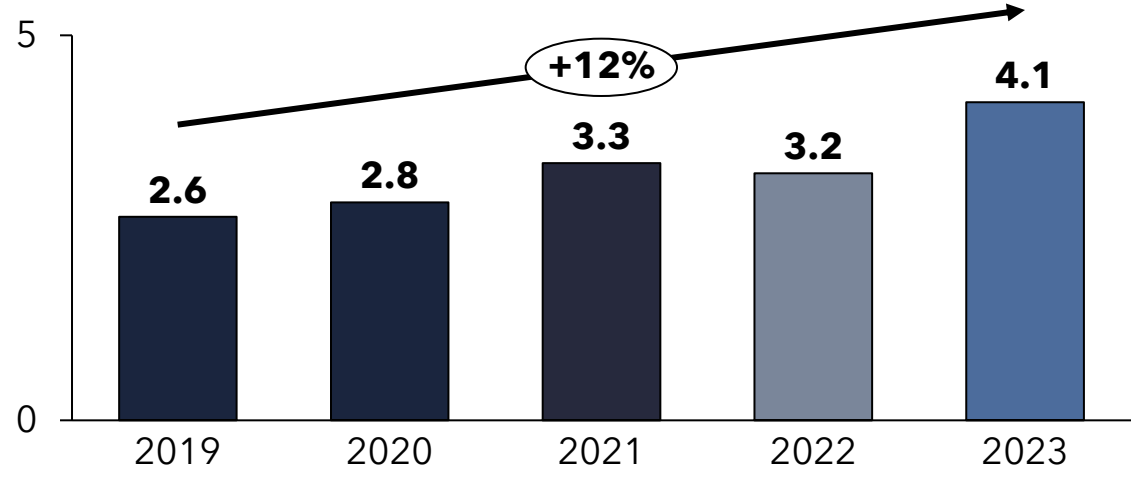
Malaysia's healthcare budget, growing at a robust 8% annually, demonstrates consistent government prioritisation and lays the groundwork for long-term sectoral growth

Malaysia Healthcare Budget (2021-2025)
RM billion



- Malaysia's growing healthcare budget reflects the government's **ongoing commitment to strengthening the healthcare system**
- This **upward trend** creates **opportunities for public-private partnerships, infrastructure development, and pharmaceutical innovation,** positioning Malaysia as a responsive and investment-ready healthcare ecosystem within ASEAN

Johor Healthcare Budget (2019-2023)
RM billion

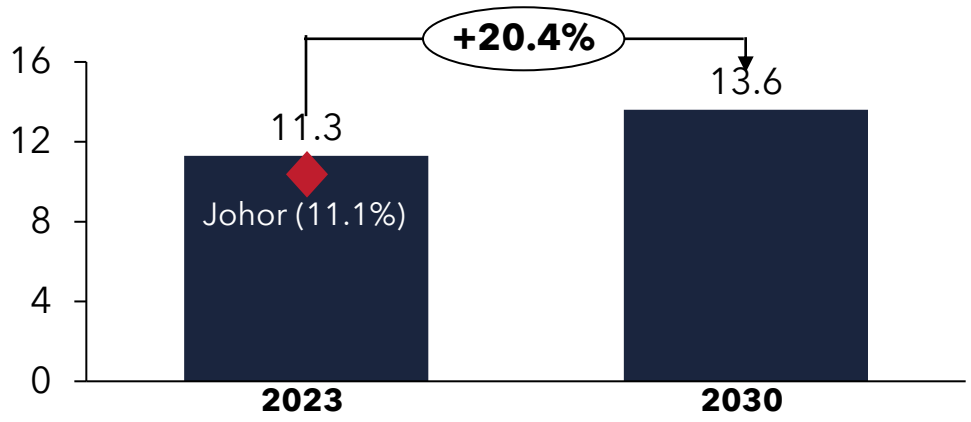


- In line with the national direction, Johor has also earmarked an increasing allocation of healthcare budget to **expand and upgrade its healthcare infrastructure** (i.e. public clinics and hospitals) to **ease rising demand from rapid population growth and accelerating urbanisation**
- Likewise, this positive trend enables opportunities for **more public-private partnered developments and growth of the healthcare sector**

Source: Malaysia Budget, Ministry of Health, New Straits Times, PASB Analysis

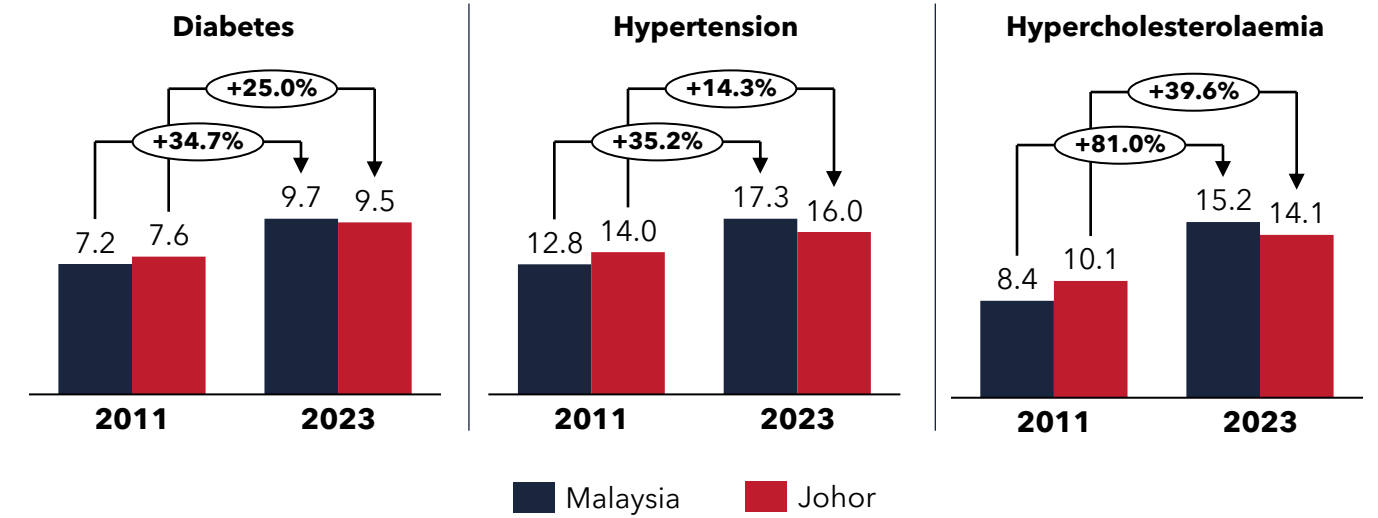
Malaysia's aging population and rising NCD burden reveals strong market potential and an urgent need to transition the healthcare system into one capable of long-term integrated care

Malaysia/ Johor Old-Age Population[1] Forecasts (2023-2030p)
as a % of total population



- **Malaysia is anticipated to age rapidly** in the coming decade, with a **+20.4% increase in its old-age population by 2030**
- Johor's current old-age population is comparable with the national average (Johor: 11.1%, Malaysia: 11.3%)**, and is expected to track the national aging trend in the same decade**
- An aging population will **increase local demand for age-centric healthcare solutions** – preventive/ geriatric services, etc. and is increasingly recognised as a national priority with the NPFP[2], HWP[3]
- **Malaysia's rapidly aging population signals an urgent need for a whole-of-nation approach in strengthening elderly care infrastructure**

Malaysia/ Johor Non-communicable Disease (NCD) Prevalence (2011-2023)
as a % of total population



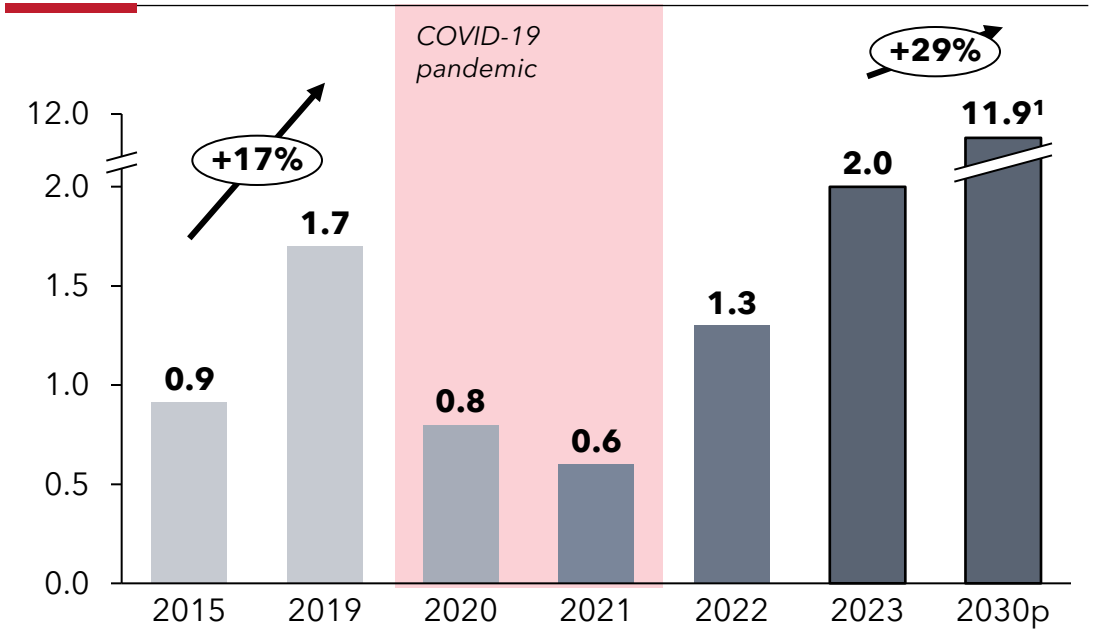
- **Malaysia is grappling with growing chronic disease burden,** and has experienced **a more than +30% increase in NCD prevalence** across diabetes, hypertension and hypercholesterolaemia over the last decade
- Johor is also **tracking a similar rise in chronic disease prevalence** across the 3 common NCDs, notably marking a **+39.6% increase in hypercholesterolaemia prevalence**
- **Malaysia's persistent and growing trend in NCD prevalence indicates a long-term structural shift in healthcare demand and presents the opportunity to transform current health systems into a long-term, integrated care model**

Note: 1. Old-age population includes people who are aged 60 years and above; 2. National Policy for Older Persons; 3. Health White Paper
Source: BPEN, United Nations, National Institutes of Health, Ministry of Health, PASB Analysis

Malaysia aims for +29% CAGR medical tourism growth over the next decade, underpinned by rising global demand and its continuous emphasis on strong value-for-quality positioning

Malaysia Medical Tourism Revenue (2015-2030p)

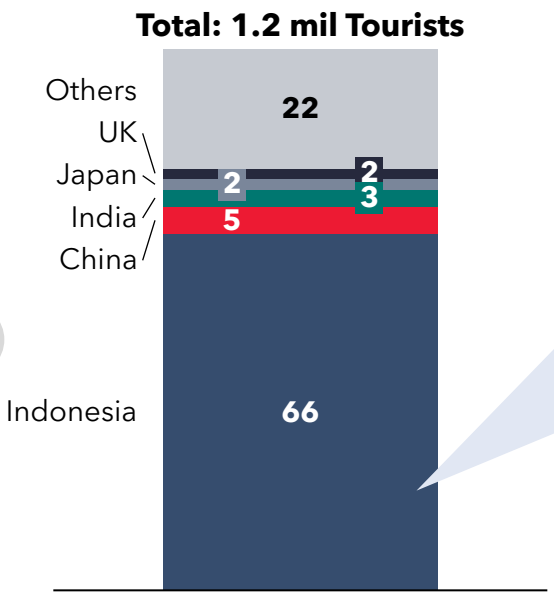
RM billion



- Malaysia **realised significant growth of +17% CAGR in medical tourism revenues pre-COVID (2015-2019)** but experienced a decline due to the COVID pandemic
- Revenues quickly rebounded post-COVID**, recovering to mark a record high of RM2.0 bil, +18% up from the previous peak**
- MHTC's **ambitious RM11.0 bil target (+29% CAGR from 2023)** showcases **national aspiration and commitment towards fostering a world-class medical tourism hub**

Malaysia Medical Tourism Source Countries (2019)

as a % of total medical tourist base



Top Malaysian Destinations for Indonesian Medical Tourists

	Source Cities	Share %
~50% (Penang – *preferred tourist destination*)	**Medan**	45-50%
	Acheh	25-30%
	Rest of Indonesia	~20-30%
~40% (Kuala Lumpur)	**Jakarta/ Bandung**	75%
	Surabaya	5-10%
	Rest of Indonesia	15-20%
~10%	—Others	

Johor **has strong potential to attract medical tourists from Jakarta, Bandung, and Surabaya due to its geographic proximity advantage** over Kuala Lumpur

Testimonies Regarding Value for Money in Malaysia's Medical Services (2023)

"I had a **patient who paid 2x more** than Malaysia for cancer treatment in private hospital in Jakarta"

- Indonesian medical tourism agent

"MRI scan would cost $300-400 in Malaysia, **$500-570 in Indonesia and over $1,200 in Singapore**"

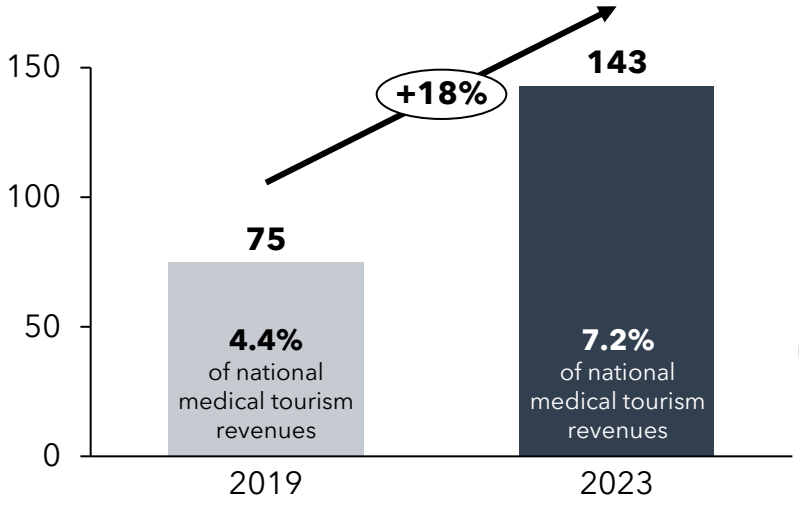
- Malaysian doctor

Malaysia's healthcare **quality-to-price ratios is competitive** and **can compete with top regional medical tourism hubs** with its value-for-money premium healthcare facilities

Note: 1. 2024 announcement of MHTC's target of USD 2.7 billion in medical tourism revenue by 2030, converted at an average April 2024 exchange rate of $USD1 = RM4.40
Source: Malaysian Healthcare Travel Council (MHTC), Channel News Asia, Alvarez and Marsal

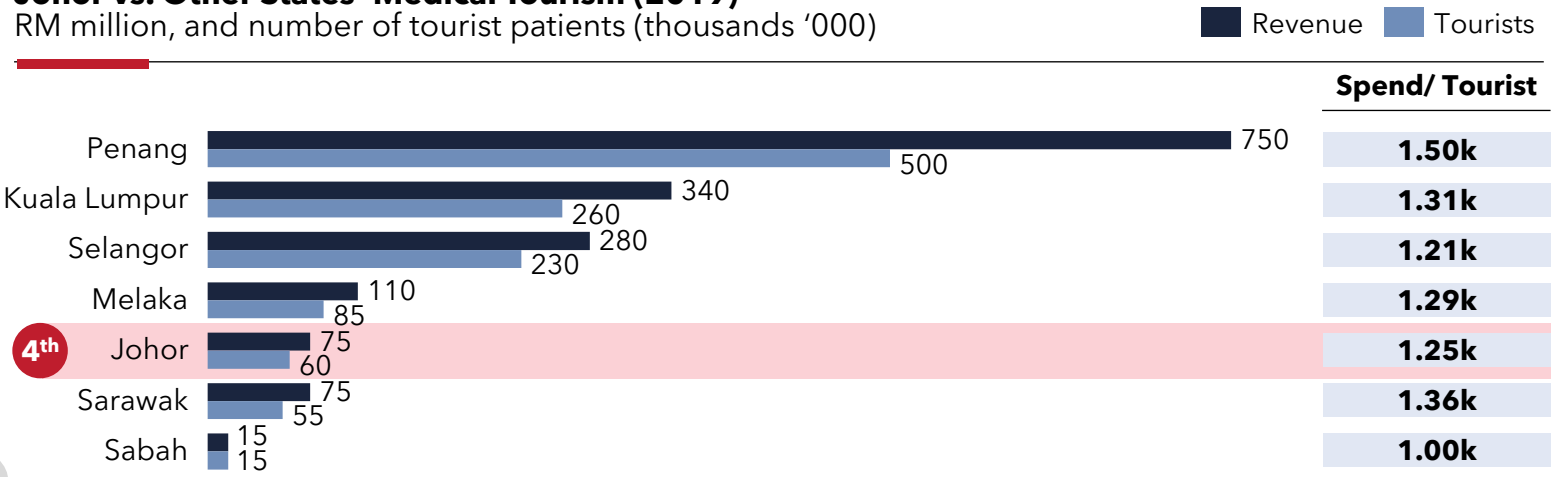
Johor is uniquely positioned to spearhead its medical tourism growth, bolstered by its strategic location, competitive cost advantage, and world-class healthcare services

Johor Medical Tourism Revenue (2019-2023)
RM million



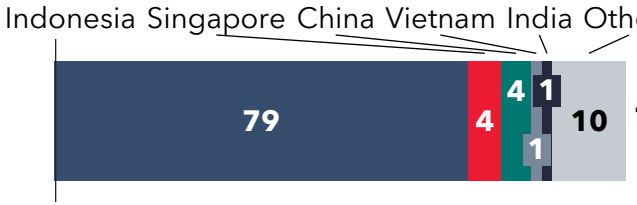
- Johor's **medical tourism revenues recorded an +18% CAGR over 2019-2023**, and an **expansion in its contribution to national medical tourism revenues by +2.8 percentage points**
- The **establishment of JMTC[1] in 2024 and strong involvement from various government stakeholders** in attracting foreign investment opportunities and increasing existing healthcare capacity, **reinforces Johor's commitment to grow the medical tourism sector as one of JS-SEZ core drivers**

Johor vs. Other States' Medical Tourism (2019)
RM million, and number of tourist patients (thousands '000)



Johor is **ranks 4th in overall medical tourism** as of 2019, with an **average spend/ tourist of RM1.25k**

Johor Top Medical Tourism Source Countries (2019) vs. International Connectivity (2025)
as a % of total medical tourist base, and number of weekly travels



Total: 60k Tourists

Weekly Flights

95 flights weekly, 6 destinations (local states)

Weekly Ferries

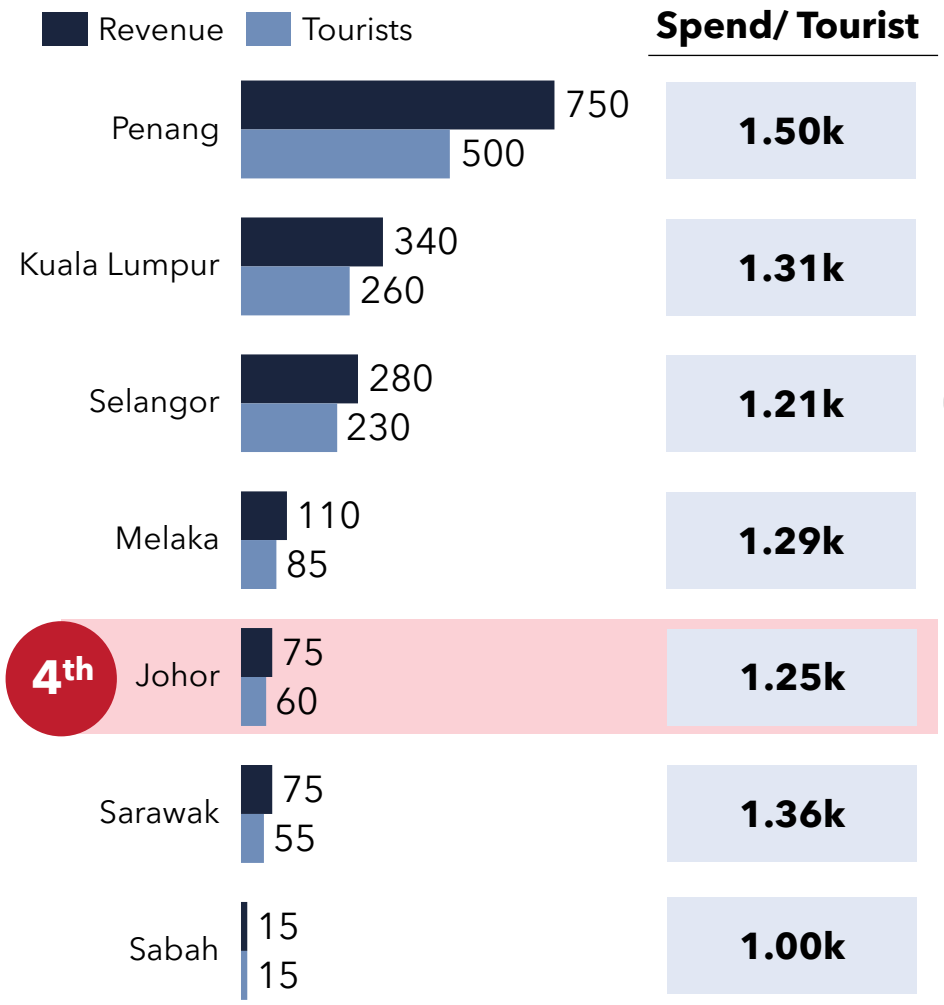
56 ferries weekly, 2 destinations (Johor-Indonesia)

- **Indonesia remains as Johor's largest medical tourism base** given its **proximity advantage**
- Indonesian tourists enter Johor through either flight (Jakarta, Bandung, Surabaya) or ferry (neighbouring islands like Batam, Bintan), while other tourists access Johor by KLIA-Senai Airport or Singapore border
- Overall, MHTC[2] anticipates **China and the Middle East** to be new opportunity markets for Malaysia

Note: 1. Johor Medical Tourism Council; 2. Malaysian Healthcare Travel Council
Source: Malaysian Healthcare Travel Council, The Star, Malay Mail, Flight/Ferry websites

Despite broader tailwinds backing Johor's medical tourism growth in recent years, Johor still falls far behind Penang and KL, and will need to build strong sectoral enablers in catching up

Johor vs. Other States' Medical Tourism (2019)
RM million, and number of tourist patients (thousands '000)



Underlying Factors for Johor's Positioning Relative to Penang

Underlying Factors	Supporting Data (2019)
1 Limited local and international connectivity • **Dispersed hospital locations** and **weak public transportation system**, which requires longer and personalised commutes • **Significantly lesser direct (domestic and international flights)** in comparison	**20-30 minutes** to closest private hospital on average **10-20 minutes** to closest private hospital on average **44 weekly flights, 6 domestic destinations** **267 weekly flights, 7 domestic and 8 foreign destinations**
2 Lacking targeted government support agencies • **Lacks dedicated centralised agency** akin to PMED (established in 2015) to actively coordinate partnership and marketing efforts between healthcare and tourism	**2 leading stakeholders** (State Ministry, IRDA) **3 leading stakeholders** (PMED[1], PGT[2], NCIA[3])
3 Underdeveloped and unintegrated tourism experiences • Local attractions remain underdeveloped, **lacking tourism and commercial appeal, and is disconnected from the healthcare ecosystem**	**N/A** **1 of 19 places selected as best destinations to visit by CNN Travel in 2019**

Key Opportunities for Johor

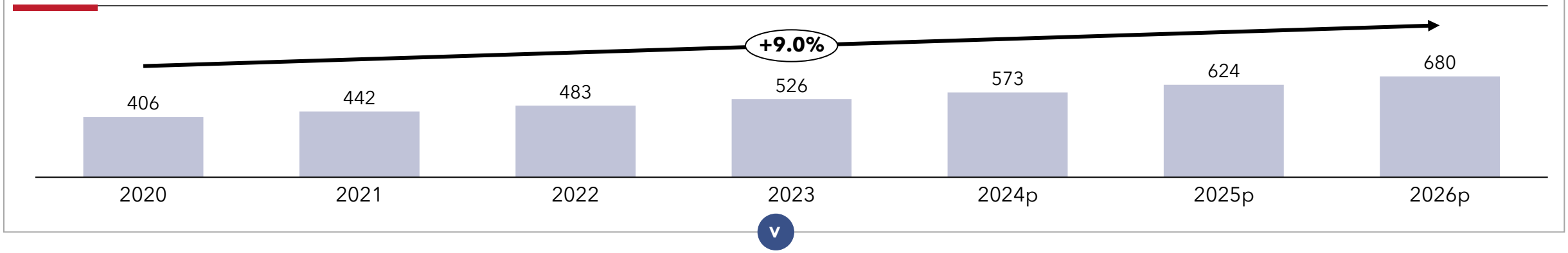
- **Enhance broader connectivity** by improving public transport systems and attracting airline carriers to introduce more direct flights from local/ international destinations
- **Improve brand presence and on-the-ground promotional efforts** via partnering with healthcare players to establish representative offices and host roadshows in key medical tourist source locations
- **Develop and bundle tourism experiences jointly with healthcare services to offer a packaged medical tourism journey** by facilitating end-to-end ancillary services e.g. healthcare concierge, etc.

Note: 1. Penang Centre of Medical Tourism (PMED), Penang Global Tourism (PGT), Northern Corridor Implementation Authority (NCIA)
Source: Malaysian Healthcare Travel Council, Map/Tourism websites, CNN Travel

To fully harness rising regional demand, Johor can build on its expanding pharmaceutical sector to draw high-value investments and establish itself as a premier medical hub, guided by successful global medical clusters

With Johor's extensive network of hospitals, close proximity to Singapore, and increasing R&D investments, Johor is well-positioned to emerge as the next healthcare hub, supported by a comprehensive end-to-end ecosystem

Johor's Simulated Pharmaceutical Market Size (2020-2026p)
In USD Million



Successful Healthcare or Pharmaceutical Hubs

Texas, USA

USD 3 billion
Investment in the Cancer Prevention and Research Institute of Texas (CPRIT)

USD 25.2 billion
Generated in economic activity between 2010-2020

Singapore

SGD 4 billion
Investment in biomedical sciences research between 2015-2020

SGD 7 billion
Increase in biomedical manufacturing output, a 34.7% increase

Source: Statista, ABI Research, MIDA, Pharmaceutical Commerce, PASB Analysis

Johor's strategies, particularly in the Iskandar Malaysia (IM) and special economic zones, align with national goals by focusing on healthcare and life sciences as key sectors for growth

Malaysia's national plans for healthcare and pharmaceuticals align well with Johor's regional strategies, particularly in developing the Iskandar Malaysia region as a healthcare destination

1

National Policy for Quality in Healthcare (NPQH)

- Enhance healthcare quality, focusing on **high-performing** healthcare services
- Ten key areas including **people-centered approach,** governance, etc.
- **Five-year implementation plan** starting in 2022

2

Health White Paper (HWP)

- Reform health systems, emphasising **preventive services, equitable access, and a responsive health system**
- Passed in June 2023, with a 15-year outlook

3

New Industrial Master Plan (NIMP) 2030

- Enhance **integration of value chains in the pharmaceutical sector,** boost local production capabilities for pharmaceutical, vaccines, and medicines
- Long-term vision with **milestones set for 2027** and beyond

4

Twelfth Malaysia Plan (2021-2025)

- Identify **pharmaceutical and medical devices sectors** as pivotal industries for economic growth, boost domestic investments, strengthen Malaysia's position as a **regional biomedical hub**

Additionally, the Johor state government has also prioritised healthcare and life sciences in its economic transformation

1

Maju Johor 2030 (MJ2030)

10 key growth engines

- Under the Maju Johor 2030 economic masterplan, Johor aims to diversify its economy by attracting investments in sectors such as life sciences and healthcare, positioning the state as a hub for these industries

2

Johor-Singapore Special Economic Zone (JS-SEZ)

- JE-SEZ is designed to promote investments across various sectors, including **healthcare**, aiming to enhance the region's appeal to global investors
  - **Desaru, JB, Iskandar Puteri, Sedenak**

Economic Growth and Investment Attraction

National initiatives are likely to spur economic growth in Johor by attracting investments in healthcare and pharmaceuticals, leading to job creation and increased economic activity

Source: ISEAS, MIDA, Ministry of Health

Malaysia's healthcare system features a strong public-private hospital network, supported by growing investments in workforce development and digital health to meet rising demand and enhance long-term resilience

Malaysia's healthcare system is characterised by a dual-tier structure, comprising both public and private sectors

This system is designed to cater to the diverse needs of its population:

1	Public	2	Private
• The public healthcare system, funded and managed by MoH is heavily subsidised and offers low-cost services accessible to all legal residents, including expatriates with work permits		• Private healthcare in Malaysia is funded through out-of-pocket payments and insurance, offering faster access, greater comfort, and modern facilities	

Malaysia's Healthcare Workforce

	Doctor-to-population ratio	Doctors	Specialist
2022	1.0 doctor per 412 people	79,443 actively practicing	9,726
2030		114,187 actively practicing	22,436

Source: ITA, Statista, MoH, Qualtechs

Malaysia Medical Tourism Revenue (2019-2023)

RM Million

R&D

- Malaysia leverages its **multi-ethnic population for clinical research,** particularly in **infectious diseases, oncology, cardiology, and hematology**

Manufacturing

- **Domestic pharmaceutical production** supplies **30%** of **local demand**
- Malaysia imports **88%** of high-tech medical devices from foreign countries signaling reliance

Distribution & Delivery

- Public Hospitals: **148**
- Private Hospitals: **207**
- Public Hospital Beds: **49,985**
- Private Hospital Beds: **~17,000**
- Total Hospital Beds: **~66,985**

Current market shares and key players consist of public and private healthcare facilities, medical device and pharmaceutical manufacturers that drive Johor's healthcare ecosystem

Johor's healthcare ecosystem is shaped by a mix of private hospitals, major medical device manufacturers, and pharmaceutical companies, bolstered by government support and investments

Healthcare Facilities

Public Facilities

- These facilities **are government-funded** and play a crucial role in delivering **affordable care, particularly to underserved communities**

Johor Public Hospital Bed Utilisation by Facility (as of Sept 2024)

Name	Normal beds	ICU beds	Normal utilisation	ICU utilisation
Hospital Enche' Besar Hajjah Khalsom	373	9	68.6%	0.0%
Hospital Pakar Sultanah Fatimah	544	16	0.0%	68.8%
Hospital Pontian	120	0	54.2%	-
Hospital Sultan Ismail	692	32	0.0%	62.5%
Hospital Sultanah Aminah	1,156	30	83.9%	86.7%

Private Facilities

- Johor has over 20 private hospitals, including leading providers
- Private healthcare in Johor **continues to grow with investments in modern medical technologies** and **world-class facilities**

Johor Private Hospitals by Bed Capacity

Johor Bahru — KPJ Healthcare — 515

Iskandar Puteri — Gleneagles Hospital Johor — 300

Iskandar Puteri — Columbia Asia Hospital - Iskandar Puteri — 287

Johor Bahru — Regency Specialist Hospital 立康医院 — 218

Johor Bahru — Kempas Medical Centre — 97

The top five private hospitals are concentrated in Johor Bahru and Iskandar Puteri with a combined total of 1,417 beds

Manufacturers

Medical Devices and Equipment

- Johor is a hub for **medical device manufacturers,** including global brands such as Insulet and Masimo
- The state produces a variety of **medical products**
- Johor's medical device manufacturing benefits from investments and **proximity to ASEAN markets, driving local and export demand**

Pharmaceutical

- Johor hosts **major pharmaceutical manufacturers such as Biocon**
- The pharmaceutical sector in Johor is poised for growth, supported by **government incentives and a skilled workforce**
- Johor plays a key role in Malaysia's expanding pharmaceutical market, with a focus on both **manufacturing and R&D initiatives**

Source: MoH, Hospital Websites, Wagenigen University, Statista

Johor's healthcare and pharmaceutical sector is poised for significant growth, driven by strategic government initiatives and a focus on technological advancements

	Healthcare Provider Services	Medical Devices & Equipment	Clinical & Pharmaceutical Research	Pharmaceutical Manufacturing and Distribution
Main Activities	• Focus on delivering **decent healthcare services** • Emphasis on **medical care**, **aged care**, and **lifestyle** and **well-being**	• Development and manufacturing of **advanced medical technologies**	• Active involvement in **research and development activities**	• Production of **generic and branded medicines** • **Distribution** through various channels
Key Players	Kementerian Kesihatan Malaysia; KPJ Healthcare; Regency Specialist Hospital; Gleneagles Hospital Johor; KG Hospital; Kensington Green Specialist Centre; Columbia Asia Hospital - Iskandar Puteri	Insulet Corporation; GN; Masimo; Alcon; Oliver Healthcare Packaging; Bactiguard	NT Novotech; Biotech's Partner at Every Phase; CRM Clinical Research Malaysia; Your Global Solutions in One Nation	Biocon Biologics; Transforming Healthcare. Transforming Lives.; Colorcon; SW Sunward; Oliver Healthcare Packaging

Growth Enablers

Government Support
Implementation of the Invest Malaysia Facilitation Centre Johor (IMFC-J) and the Johor Fast Lane (JFL) initiative to attract investments

Technological Advancements
Integration of technology in healthcare services and establishment of an Artificial Intelligence (AI) faculty at Universiti Teknologi Malaysia (UTM)

Strategic Collaborations
Establishment of the Johor-Singapore Special Economic Zone (JS-SEZ) to elevate business ecosystems

Source: ISEAS, MIDA, MoH, Wagenigen University, RHB Research

Evidently, Johor has emerged as a dynamic hub for healthcare and pharmaceutical investments, driven by its strategic location, access to regional markets, and developed infrastructure offering a comparative advantage over other locations in the region

1 Strategic Location and Connectivity

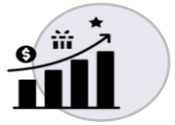
- Proximity to **Singapore and Indonesia** markets
- The Port of Tanjung Pelepas (PTP) and Johor Port offer **efficient trade routes**
- Well-connected by **road, sea, and air**
- Johor is linked to **key ASEAN markets, China, and India**

2 Growing Healthcare and Pharmaceutical Ecosystem

- Johor has over 20 private hospitals, healthcare centers, and specialised clinics, creating a **strong foundation for healthcare investment**
- Johor has established several **industrial parks focusing on pharmaceuticals**, such as IBTECH

3 Skilled Workforce

- Johor boasts a large **pool of skilled workers** in the medical and pharmaceutical sectors
  - Supported by local universities and technical colleges



4 Tax Incentives and Government Support

- The Malaysian government offers incentives for pharmaceutical companies
  - Such as **tax exemptions and grants**
- The **Johor-Singapore Special Economic Zone (JS-SEZ)** provides additional incentives for businesses

5 Market Growth and Demand

- Healthcare expenditure in Malaysia is **increasing steadily**
- The active pharmaceutical ingredients market in Malaysia is **projected to grow at a CAGR of 7.5%** over the next 5 years, which will benefit Johor as a key player in the industry

6 Investment in Research ans Development (R&D)

- Johor is increasingly **attracting global pharmaceutical companies and R&D centers**
- The state offers **advanced R&D facilities** supported by universities and research institutes to innovate in drug development and biotechnology

Source: Grand View Research, Stakeholder syndications

Johor's healthcare value chain is integrated across all segments, each contributing uniquely to support the state's ambition of becoming a regional medical tourism hub

Value Chain

Primary Activities

Upstream — Supply, Infrastructure Development and Manufacturing

Medical Education & Training
Universities, medical schools, and training for healthcare professionals

Healthcare Infrastructure Development
Construction of hospitals, clinics, and specialised healthcare facilities

Procurement of supplies

Raw Material Sourcing
Production and supply of medical-grade plastics, metals, materials

Medical Equipment R&D & Prototyping
Design, innovation, and development of new medical devices

Manufacturing & Assembly
Large-scale production of **pharmaceuticals, medical devices**

Health IT & Digital Solutions
Development of electronic medical records (EMR), AI-driven diagnostics, and telemedicine

Midstream — Service Provision, Distribution and Healthcare Delivery

Healthcare Service Providers
- **Primary Care:** GPs, clinics
- **Secondary Care:** Hospitals
- **Tertiary Care:** Specialist hospitals, advanced medical procedures, and critical care services.
- Diagnostic labs, telehealth services

Medical Tourism
- Healthcare services for international patients, rehabilitation centers, and wellness programs

Logistics, Wholesale & Distribution
- Transportation of pharmaceuticals, vaccines, and medical devices
  - Cold chain management
- Suppliers delivering medical equipment & consumables to hospitals & clinics

Equipment Leasing & Maintenance
- Rental, servicing, and calibration of medical devices

Downstream — Post-Treatment, Patient Use and Lifecycle Management

Home Healthcare & Elderly Care
Assisted living, palliative care, and home nursing services

Rehabilitation & Physiotherapy
Post-surgery recovery, physical therapy, and chronic disease management

Health Insurance & Financing
Private and public healthcare insurance schemes, medical aid funds.

Retail & End-User Access
Pharmacies, home medical supply stores, and online medical device sales

Medical Waste Management & Recycling
Safe disposal, steriliation, and recycling of medical equipment.

Healthcare Data & AI Integration
Wearable devices, remote patient monitoring, and AI-driven analytics.

Source: Hitrustalliance; Banyan Global; Regenerating the Healthcare Value Chain Analysis; PASB Analysis

A value chain analysis of Johor reveals opportunities to strengthen areas including R&D, manufacturing, and raw material sourcing

NON-EXHAUSTIVE

Value Chain

Primary Activities

Supply, Infrastructure Development and Manufacturing

Upstream

Medical Education & Training

NOVOTECH Biotech's Partner at Every Phase; CRM Clinical Research Malaysia Your Global Solutions in One Nation; UTM Universiti Teknologi Malaysia

Healthcare Infrastructure Development

Kementerian Kesihatan Malaysia; KPJ Healthcare; Gleneagles Hospital Johor; Regency Specialist Hospital; Columbia Asia Hospital - Iskandar Puteri; PKG Hospital; Kensington Green Specialist Centre; Thomson Hospital Kota Damansara

Raw Material Sourcing

Unable to confirm due to limited insights, but presence is likely minimal

Medical Equipment R&D & Prototyping

UTM Universiti Teknologi Malaysia

Manufacturing & Assembly

Insulet Corporation; Oliver Healthcare Packaging; Masimo

Health IT & Digital Solutions

KPJ Healthcare; Gleneagles Hospital Johor

Service Provision, Distribution and Healthcare Delivery

Midstream

Healthcare Service Providers

KPJ Healthcare; Gleneagles Hospital Johor; Regency Specialist Hospital; Columbia Asia Hospital - Iskandar Puteri; PKG Hospital; Kensington Green Specialist Centre; Thomson Hospital Kota Damansara; Mediviron

Medical Tourism

KPJ Healthcare; Gleneagles Hospital Johor; Thomson Hospital Kota Damansara

Logistics, Wholesale & Distribution

hellmann Worldwide Logistics; Röhlig Logistics; AiPharma a member of the pharm-d health science group; SYMEDIC; Prime Medical Concepts

Equipment Leasing & Maintenance

PAC Lease A Member of OCBC Group; Taraf Synergy; RESETT Sdn. Bhd. 198501001334(133781-T)

Post-Treatment, Patient Use and Lifecycle Management

Downstream

Home Healthcare & Elderly Care

Genesis Life Care Better care starts here; EHA 温馨老家 Embrace Healthier Aging; ECON

Rehabilitation & Physiotherapy

URBAN Sports & Rehab Centre; Your Physio 予康物理治疗; Gleneagles Hospital Johor; MasterWecare 慈康物理治疗及复建中心 Rehabilitation Centre 202003057313 (JM0931530-K)

Health Insurance & Financing

Prudential; Allianz; Zurich

Retail & End-User Access

guardian; AA pharmacy; Caring Pharmacy

Medical Waste Management & Recycling

Medi One; Medivest; FSSB; Wilgreen

Healthcare Data & AI Integration

KPJ Healthcare; Gleneagles Hospital Johor

Source: PASB Analysis

The National Industrial Master Plan (NIMP) value chain framework serves as the basis for analysing Johor's medical device value chain

Value Chain Analysis of Medical Devices

Value Chain of Medical Devices from the NIMP

Value Chain	Upstream		Midstream	Downstream	
	Research and Product Development	Component Manufacturing	Manufacturing and Assembly	Sales and Distribution	Post-sales Services
Services within Medical Devices Industry	**Supporting Industries and Services** (e.g. Medical packaging, testing, machinery and engineering support, electronic manufacturing services, sterilisation services, education and training, accreditation bodies and regulatory body				

Key Highlights

- The medical device value chain, as defined by the NIMP consists of three key segments: **upstream, midstream, and downstream**
- Additionally, the sector is reinforced by various **supporting industries and services**, such as **accreditation bodies, electronic manufacturing services, and packaging, among others**

Source: National Industrial Master Plan (NIMP) 2030; PASB Analysis

Malaysia's medical device value chain is primarily concentrated in consumables from upstream to downstream, with lower presence in more complex and advanced devices

Value Chain Analysis of Medical Devices

Presence of Industry Players along the Value Chain of Medical Devices in Malaysia

	Upstream		Midstream	Downstream	
	Research & Product Development	Component Manufacturing	Manufacturing and Assembly	Sales and Distribution	Post-sales Services
Consumables	High Presence	High Presence	High Presence	High Presence	High Presence
Surgical Instruments, Implants and Clinical Devices	Medium Presence	Medium Presence	Medium Presence	Medium Presence	Medium Presence
Health Equipment	Low Presence	Low Presence	Low Presence	Low Presence	Low Presence
Point of Care	Low Presence	Low Presence	Low Presence	Low Presence	Low Presence
Non and Minimal Invasive Products	Low Presence	Low Presence	Low Presence	Low Presence	Low Presence
Medical Devices from Convergence of Technology	Low Presence	Low Presence	Low Presence	Low Presence	Low Presence

Key Highlights on presence of industry players across all segments

High

Consumables

- Malaysia has a **strong presence in consumables** across all value chain segments due to its established manufacturing base, access to raw materials (e.g., rubber)
- This segment is **export-driven and supported by global demand,** especially post-COVID

Mid

Surgical Instruments, Implants, Clinical Devices

- These categories **require higher precision, sterilisation standards, and skilled labour**
- While some local manufacturers operate in this space, Malaysia lack**s a critical mass of OEMs and Tier 1 suppliers** resulting in moderate industry representation

Low

Advanced Equipment & Tech-Driven Devices

- Advanced medical technologies have low local presence due to **high R&D costs, limited innovation support, and reliance on imported components and certifications**
  - These create barriers for local industry entry

Source: National Industrial Master Plan (NIMP) 2030; PASB Analysis

Malaysia's medical device value chain shows strong presence in consumables, but limited investment in complex devices due to R&D, talent, and infrastructure gaps

Medical Device Category as per NIMP	Investment Presence	Potential Reasons
Consumables Gloves, syringes, IV tubes, catheters, test swabs	**High**	• **Low complexity** and **low capital** requirement make it attractive for local and foreign investors • **Established supply chain especially for raw materials in Malaysia** (e.g., rubber, plastics) • **Strong global demand**, especially post-COVID, led to rapid expansion • **Fewer regulatory hurdles** compared to high-tech devices
Surgical Instruments, Implants and Clinical Devices Scalpels, orthopaedic plates, stents, infusion pumps	**Medium**	• Higher precision and **sterilisation standards** required than consumables, **limiting entry to only mid-sized firms with technical capabilities** • Malaysia has some Tier 2 contract manufacturers, but **fewer OEMs, Tier 1 suppliers or R&D capabilities** • These products **require moderate investment**, access to **skilled talent**, and more **complex QA/QC systems**
Health Equipment **Point of Care** Point-of-care diagnostics, blood glucose monitor **Non and Minimal Invasive Products** Robotic surgery tools, wearable monitors **Medical Devices from Convergence of Technology** AI-powered imaging, digital stethoscopes	**Low**	• **Very high R&D and regulatory barriers** (e.g., Technology Readiness Level (TRL), real-world trials, cybersecurity validation) • Requires deep integration of hardware, software, and clinical insight – areas where local ecosystems **are not yet mature** • **Lack of medtech R&D infrastructure**, digital testing facilities, and limited access to bioinformatics/data scientists • Global players prefer to keep **high-tech innovation hubs** (e.g., Germany, US, Singapore) close to **HQs or research centres** • Smaller domestic market for such products **limits local scaling potential**

Note: QA/QC stands for Quality Assurance / Quality Control, OEM stands for Original Equipment Manufacturers
Source: National Industrial Master Plan (NIMP) 2030; PASB Analysis

Johor's medical device value chain is integrated across all segments, each contributing uniquely to support the state's ambition of becoming a regional healthcare hub

Value Chain	Research & Development (R&D)	Manufacturing	Marketing and Distribution
	Upstream	**Midstream**	**Downstream**
Primary Activities	**Research and Product Development** • Concept design, modelling and rapid prototyping • Benchmark testing mechanical, electrical and functional aspects • Clinical trials (Phase I–III) to test safety and efficacy • Regulatory approval with MDA[1] and patent filing for market entry **Component Manufacturing** • Precision fabrication of singular device components (e.g. plastic injection molding, PCB[2] manufacturing, machined parts) • Sourcing and manufacturing of sterile barrier packaging (e.g. steriliastion pouches) • Compliance with GMP[3] and quality standards	**Manufacturing and Assembly** • Precision fabrication of whole device components • Sterilisation and cleanroom assembly of device including systems/software integration • Quality control, safety testing, and batch validation before release	**Sales and Distribution** • Cold chain management and secure transportation to wholesalers • Supply chain coordination with pharmacies, hospitals, and healthcare providers • Sales and marketing strategies, including B2B[4] partnerships and direct consumer engagement

Note: 1. Medical Device Authority; 2. Printed Circuit Board; 3. Good Manufacturing Practices ; 4. Business-to-Business
Source: PASB Analysis

Value chain analysis reveals opportunities for Johor to strengthen manufacturing and R&D in high-value, innovative medical devices

NON-EXHAUSTIVE

Value Chain

Research & Development (R&D)	Manufacturing	Marketing and Distribution
Upstream	**Midstream**	**Downstream**
Primary Activities		
Research and Product Development CRM Clinical Research Malaysia – Your Global Solutions in One Nation UTM Universiti Teknologi Malaysia altek MED (CM) Maple Tree Global (CM) Racer Medical (CM) **Component Manufacturing** KJ Precision OSI Optoelectronics – An OSI Systems Company Rosti OSHIBA Oliver Healthcare Packaging artron	**Manufacturing, Assembly and Dosage** Insulet Corporation Masimo Owen Mumford GN Kelpac Medical – A PPC Industries Company Alcon altek MED (CM) Maple Tree Global (CM) Racer Medical (CM) AKASO nulatex TSL Latex Gloves	**Logistics, Sales and Distribution** DUOPHARMA AiPharma – a member of the pharm-d health science group DHL SYMEDIC guardian AA pharmacy Caring Pharmacy KPJ Healthcare Gleneagles Hospital Johor Columbia Asia – Columbia Asia Hospital - Iskandar Puteri Regency Specialist Hospital KG Hospital Kensington Green Specialist Centre 晶泽专科医院 Thomson Hospital Kota Damansara Klinik Faizal dan Rakan-Rakan 24 Jam & X-Ray Mediviron

Note: CM – Contract Manufacturer
Source: PASB Analysis

The National Industrial Master Plan (NIMP) value chain framework serves as the basis for analysing Johor's pharmaceutical value chain

Value Chain Analysis of Pharmaceutical

Value Chain of Pharmaceuticals from the NIMP

Value Chain	Upstream		Midstream	Downstream
	Research and Product Development	Component Manufacturing	Manufacturing, Assembly and Dosage	Logistics, Sales and Distribution
Services within Pharmaceutical Industry	Strategic command and control			
	Centre of Excellence			
	Outsource delivery and development			Warehousing & distribution
		Clinical trials		
		Contract development & manufacturing and scale-up		Marketing and Sales
	Extraction facilities			
	Industrial electronics			
	Machinery, equipment and maintenance services			
	Sterilisation services			
	Testing, certification and compliance			

Key Highlights

- The medical device value chain, as defined by the NIMP consists of three key segments: **upstream, midstream, and downstream**
- In addition, the sector is supported by a range of essential services, including **clinical trials, marketing and sales, accreditation, extraction facilities, and maintenance**

Source: National Industrial Master Plan (NIMP) 2030; Malaysian Investment Development Authority (MIDA)

High-complexity products show low local presence, while generics, supplements, and traditional medicine are seeing steady domestic growth

Value Chain Analysis of Pharmaceuticals

Presence of Industry Players along the Value Chain of Pharmaceutical Industry

		Upstream		Midstream	Downstream
		Research and Development (R&D)	Component Manufacturing	Manufacturing, Assembly and Dosage	Logistics, Sales and Distribution
Pharma Products	Innovator	Low Presence	Low Presence	Low Presence	Low Presence
	Biologics	Low Presence	Low Presence	Low Presence	Low Presence
	Generics	Medium Presence	Low Presence	Medium Presence	Medium Presence
Health Supplement		Medium Presence	Low Presence	Medium Presence	Medium Presence
Traditional Medicine		Medium Presence	Medium Presence	High Presence	Medium Presence
Veterinary Products		Low Presence	Low Presence	Low Presence	Low Presence

Key Highlights on presence of industry players across all segments

High — **Traditional Medicine (Manufacturing)**
Traditional medicine manufacturing is the only segment with high presence across all stages of Malaysia's pharmaceutical value chain, driven by **strong domestic demand and access to local herbal resources**

Mid — **Generics, Health Supplement and Traditional Medicine**
This segment shows a mixed presence, with medium activity primarily in **generics, supplements, and traditional medicine**, reflecting a strong domestic base

Low — **Innovator, Biologics, Vet products and most component manufacturing**
The low presence of advanced products like **innovator drugs and biologics** highlights the need to strengthen R&D and upstream capabilities

Source: National Industrial Master Plan (NIMP) 2030; PASB Analysis

Pharmaceutical investment in Malaysia centres on generics and supplements, with limited activity in higher-value segments due to R&D and infrastructure gaps

Pharmaceutical Category as per NIMP		Investment Presence	Potential Reasons
Pharmaceutical Products	**Innovator**	**Low**	• Requires **very high R&D investment**, **long development cycles**, and clinical trial infrastructure • Malaysia **lacks a strong biotech research ecosystem** and venture capital funding needed for discovery • **Limited availability of biosafety-level labs**, GMP biologics facilities, and access to global regulatory • Most MNCs **centralise R&D in the U.S., EU, or Singapore**
	Biologics	**Low**	
	Generics	**Medium** (Low presence in Component Manufacturing)	• Moderate investment with clear local and regional demand • **High dependence on imported APIs,** especially from China and India, limits upstream integration • Some local formulation and packaging capabilities exist (e.g. Duopharma, Pharmaniaga), but API manufacturing is minimal due to **cost and compliance barriers** • Regulatory approval processes (NPRA) can be time-consuming, **slowing go-to-market efforts**
Health Supplement		**Medium** (Low presence in Component Manufacturing)	• **Low-to-moderate complexity** makes this an attractive SME segment • However, **most active ingredients (e.g. herbal extracts, omega-3, enzymes) are still imported** • Few integrated facilities for standardisation, clinical validation, or halal-certified sourcing
Traditional Medicine		**Medium** (High presence in Manufacturing, Assembly and Dosage)	• **Strong cultural demand and market familiarity** across Malaysia and Southeast Asia • Local firms involved in processing, packaging, and branding, but fewer in upstream cultivation or R&D • Often lacks modernisation and traceability (e.g., GMP-compliant labs, toxicology testing).
Veterinary Products		**Low**	• **Market size is small** compared to human pharma, with lower margins and few firms specialise in veterinary R&D or manufacturing in Malaysia • Distribution and clinical demand fragmented across sectors (agriculture, pet care), **limiting scalability**

Source: National Industrial Master Plan (NIMP) 2030; PASB Analysis

Johor's pharmaceutical value chain is integrated across all segments, each contributing uniquely to support the state's ambition of becoming a regional healthcare hub

Value Chain	Research & Development (R&D)	Manufacturing	Marketing and Distribution
	Upstream	**Midstream**	**Downstream**
Primary Activities	**Research and Product Development** • Drug discovery, pre-clinical trials, and formulation development • Clinical trials (Phase I–III) to test safety and efficacy • Regulatory approval with NPRA[1] and patent filing for market entry **Component Manufacturing** • Production (or sourcing) of APIs[2] • Sourcing and manufacturing of packaging materials (e.g., blister packs, vials, coating systems) • Compliance with GMP[3] and quality standards	**Manufacturing, Assembly and Dosage** • Drug formulation, mixing, and production in sterile conditions • Assembly into final dosage forms (tablets, capsules, injectables) • Quality control, safety testing, and batch validation before release	**Logistics, Sales and Distribution** • Cold chain management and secure transportation to wholesalers • Supply chain coordination with pharmacies, hospitals, and healthcare providers • Sales and marketing strategies, including B2B[4] partnerships and direct consumer engagement

Note: 1. National Pharmaceutical Regulatory Agency; 2. Active Pharmaceutical Ingredients; 3. Good Manufacturing Practices; 4. Business-to-Business
Source: IMS Institute for Healthcare Informatics, UNODC, PASB Analysis

Value chain analysis reveals opportunities for Johor to strengthen component manufacturing, APIs, and high-value R&D in biologics and innovator drugs

NON-EXHAUSTIVE

Value Chain	Research & Development (R&D)	Manufacturing	Marketing and Distribution
	Upstream	**Midstream**	**Downstream**
Primary Activities	**Research and Product Development** SUNWARD NOVOTECH™ Biotech's Partner at Every Phase CytoMed Therapeutics 新细胞医学 Wen Ken 永健 CRM Clinical Research Malaysia – Your Global Solutions in One Nation UTM Universiti Teknologi Malaysia **Component Manufacturing** Biocon Biologics – Transforming Healthcare. Transforming Lives. Oliver Healthcare Packaging Colorcon	**Manufacturing, Assembly and Dosage** Biocon Biologics – Transforming Healthcare. Transforming Lives. SUNWARD Colorcon Wen Ken 永健 Softgel Manufacturing Chong Park – Since 1934 ECOLITE Linde	**Logistics, Sales and Distribution** AiPharma – a member of the pharm-d health science group SYMEDIC DHL guardian AA pharmacy Caring Pharmacy KPJ Healthcare Gleneagles Hospital Johor Columbia Asia – Columbia Asia Hospital - Iskandar Puteri Regency Specialist Hospital KG Hospital – Kensington Green Specialist Centre 晶泽专科医院 Thomson Hospital Kota Damansara Klinik Faizal dan Rakan-Rakan – 24 Jam & X-Ray Mediviron

Source: PASB Analysis

Backed by strong government leadership and its strategic role in the JS-SEZ, Johor is advancing integrated healthcare and pharmaceutical value chains, boosting investor confidence and regional competitiveness

Policy and Economic Development Plans

1

Johor-Singapore Special Economic Zone (JS-SEZ)

- The JS-SEZ initiative targets **100** projects over the next decade, including those in medical devices and pharmaceuticals
- This initiative is projected to add **20-80** basis points to Malaysia's GDP over the next two to ten years, potentially benefiting Johor's healthcare and pharmaceutical sectors

2

National Context

- Malaysia's 2025 budget allocated **RM45.3** billion to the Ministry of Health, indicating significant national investment in healthcare
- The pharmaceutical industry in Malaysia is targeting a **22%** growth rate, driven by exports of generics

State Leadership Driving Sector Growth

Menteri Besar Johor, **Datuk Onn Hafiz Ghazi**

*"The state government is confident that JS-SEZ will not only boost the economy through a more **integrated medical tourism sector** and positively impact the **well-being of the people** in Johor and Singapore, but it will also create more employment opportunities and drive development in the **healthcare industry**."*

State Health and Environment Committee chairman, **Ling Tian Soon**

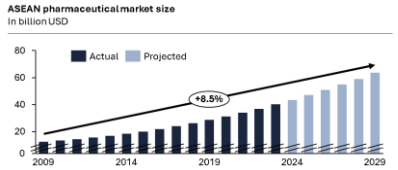
*"Although **foreign investors will establish private hospitals**, the state and federal governments are also keen to **build government-owned health facilities** within the zone. Two new hospitals, namely Hospital Pasir Gudang and Hospital Sultanah Aminah 2, will be built in the near future, featuring the **latest facilities to meet patient needs**."*

Source: MIDA, UBS Research, ASEAN Investment, Malaysia Budget 2025, Straits Times, Bernama

And, Johor's healthcare and pharmaceutical sectors continue to present significant growth opportunities with various positive drivers

The state is poised to benefit from rising medical tourism, with increasing demand from Singaporean and Indonesian patients seeking high-quality yet affordable healthcare services

1 Rising Regional Demand



- ASEAN healthcare market projected to reach **USD 60 billion by 2030**
- **Proximity to Singapore and Indonesia** positions Johor as a regional treatment and manufacturing hub

2 Expansion of Private Healthcare Providers

- **New and expanding hospitals**: Thomson Iskandar, Sunway Medical Centre, KPJ expansion
- **Strong medical tourism potential** driven by cost advantage and infrastructure

3 Untapped Potential in Pharma Manufacturing

- Opportunities in **generics, biosimilars, and halal-certified** pharmaceuticals
- Local production can **reduce import dependency** and support **national resilience**

4 Emerging Medical Device & Equipment Segment

- **Government support** to move up the value chain (NIMP-aligned)
- Growth in **mid-tech manufacturing, wearables, and diagnostics**

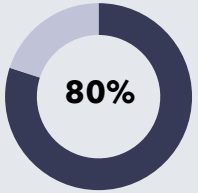
5 Government-Backed Investment Incentives

- SEZ tax packages, investment allowances, and PPP opportunities
- **Integration with national strategies** like NIMP 2030 and JS-SEZ

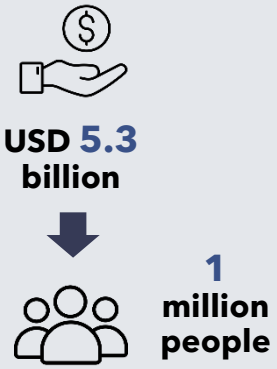
Source: MIDA, IRDA, NPRA, ASEAN Health Market Outlook, The Edge, CNA

While Johor's healthcare and pharmaceutical sectors show strong growth potential, supply chain vulnerabilities remain a key challenge that must be addressed

Vulnerabilities exposed by recent global events



Over-Reliance on Specific Regions
Approximately **80% of global active pharmaceutical ingredients (APIs)** and finished drug products (FDPs) are sourced from **China and India**, poses significant multiple risks



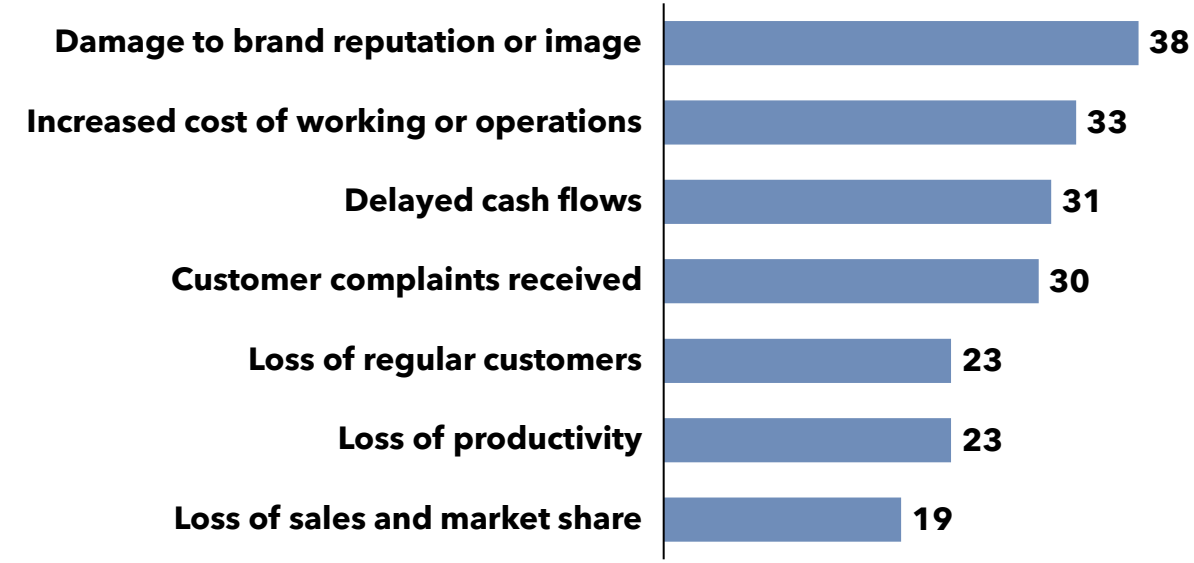
Supply Chain Disruptions During COVID-19
94% of Fortune 1000 companies reported supply chain disruptions due to COVID-19

The healthcare system in the United States incurred approximately USD 5.3 billion in direct costs for every million people seeking treatment for COVID-19

Inadequate Stockpiling and Inventory Management
During the pandemic, 73% of healthcare facilities reported challenges in procuring personal protective equipment (PPE)

Results of Supply-Chain Disruptions (post-Covid 19)

Ranked top outcomes of supply-chain disruptions
Percentage of respondents



Over the past three years, supply chain disruptions have significantly impacted companies with revenues exceeding USD 1 billion, with the most prominent outcomes including damage to brand image, increased cost of operations, delayed cash flows

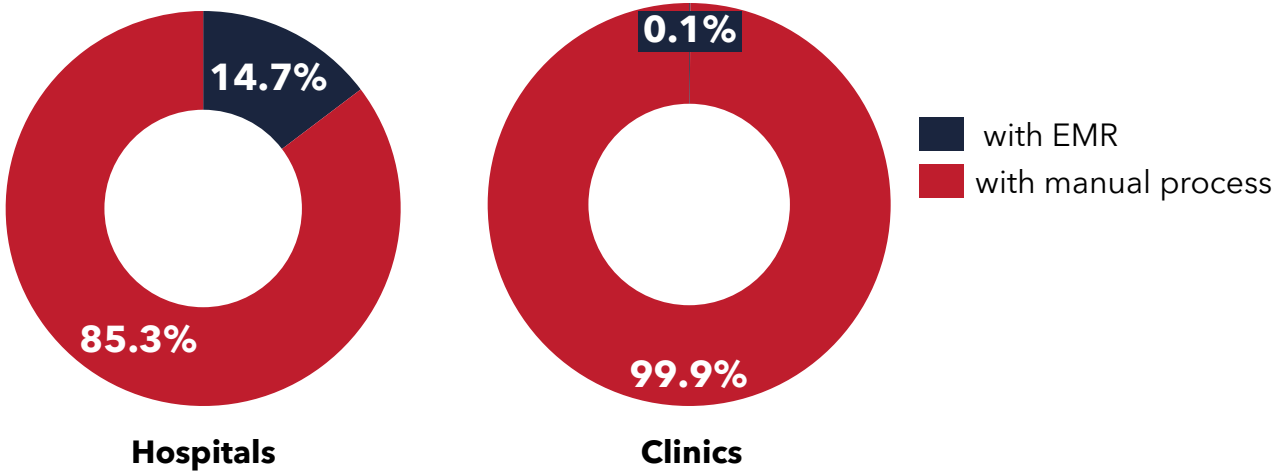
Source: US National Library of Medicine, McKinsey, Global Health Supply Chain Summit, The Business Costs of Supply Chain Disruption, The Economist Intelligence Unit Report commissioned by GEP

Additionally, while Malaysia holds strong ambitions to lead in healthcare innovation, its limited digitalisation which is currently below 15% must be addressed to unlock the full value of its healthcare and pharmaceutical ecosystem

The current status of electronic medical records (EMR) at the Ministry of Health's (MOH) health care facilities

Malaysia has been working on digitalising its healthcare system for over three decades, however,

<15%
of healthcare systems have fully embraced digitalisation



Current Status in Hospitals

- **150** hospitals

Current Status in Clinics

- **1,118** *Klinik Kesihatan*
- **78** *Klinik Ibu dan Anak*
- **1,691** *Klinik Desa*
- **322** *Klinik Komuniti*

- Currently, **only 14% of public hospitals and 0.1 % of health clinics** in Malaysia have Electronic Medical Record (EMR) systems, with the majority still reliant on manual processes
- To accelerate digitalisation, the Malaysian **government has allocated RM150 million under Budget 2024** to improve the Ministry of Health's IT systems
- Additionally, a phased roll-out of EMR systems is planned, with funding allocated to **digitalise 16 hospitals by 2024** and further expansion under the 13th Malaysia Plan to **cover all public health facilities by 2028**
- Prioritising investments in digital tools and analytics can enhance operational efficiency and supply chain transparency, making **Johor an attractive destination for healthcare and pharmaceutical companies**

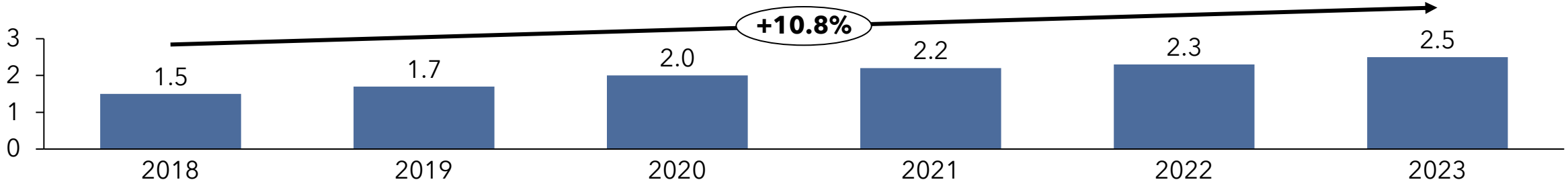
Source: MoH, Code Blue

Building on this, Johor can seize the opportunity to lead in cold chain infrastructure, addressing national gaps in the safe and timely delivery of temperature-sensitive medical products while capitalising on the sector's rising revenue

Johor plays a key role in Malaysia's MYR 2.5B cold chain market, despite gaps in rural medical logistics infrastructure

Enhance cold chain infrastructure
Given the importance of temperature-controlled supply chains in pharmaceuticals, investing in robust cold chain infrastructure is essential to prevent product spoilage and ensure availability during disruptions

Market Size for Malaysia Cold Chain Industry on the Basis of Revenues (2018 to 2023)
USD million



- Malaysia's cold chain market reached approximately MYR 2.5 billion in 2023, driven by increasing demand in the food and pharmaceutical sectors
- Johor Bahru is identified as a critical market due to its large population and well-developed logistics infrastructure, making it a key player in the nation's cold chain logistics
- Companies like Tiong Nam Logistics Holdings, based in Johor Bahru, have expanded their cold storage capacities to meet growing demands, indicating the region's active participation in the cold chain industry

Source: Trace Data Research

Additionally, challenges specific to Johor such as workforce shortages, regulatory and certification bottlenecks, and infrastructure gaps must be addressed through targeted investments, regulatory streamlining, and industry-driven innovation

Despite its growth potential, several roadblocks hinder industry expansion

❶ Workforce Shortages

There is an **insufficient supply of trained healthcare professionals, biomedical engineers, and regulatory specialists,** limiting the sector's ability to scale up services and production

❷ Migration and Competitive Salary

Local talent often **migrates to higher-paying opportunities in Singapore or abroad**, creating retention challenges for Malaysian employers

❸ Rising Dependence on Imports

With **rising healthcare demand and import reliance**, Johor must build a local value chain to strengthen self-sufficiency and support its regional hub ambitions

❹ Infrastructure Limitation

Insufficient cleanrooms and clinical testing labs, **limit Johor's ability to support high-value R&D and advanced manufacturing**, indicating need to build research infrastructure to drive innovation, attract investment, and **move up the healthcare value chain**

❺ Regulatory and Certification Bottlenecks

Lengthy approval processes and limited local capacity for international certifications (e.g. TRL, FDA, CE) slow down product development and market entry, particularly in the **medtech and pharmaceutical industries**

Johor's healthcare and pharmaceutical sectors present strong investment potential but face challenges such as regulatory complexity, workforce retention, and infrastructure limitations

Source: Various sources, PASB Analysis

CFC #1: Limited availability of trained healthcare professionals, pharmacists, and biomedical specialists is constraining sectoral growth and service delivery

Challenges

Workforce Shortages

Migration and Competitive Salary

Rising Dependence on Imports

Infrastructure Limitations

Regulatory and Certification Bottlenecks

Relevance to Johor

Addressing these workforce shortages is critical to sustaining healthcare quality, supporting medical tourism, and enabling future growth in healthcare and pharmaceutical services across the state

Johor faces critical shortages in doctors, nurses, pharmacists, and supporting workforce

The healthcare workforce gaps in Johor are evident in the significant shortfall of doctors and nurses needed to adequately support the sector

Doctor-to-population Ratio

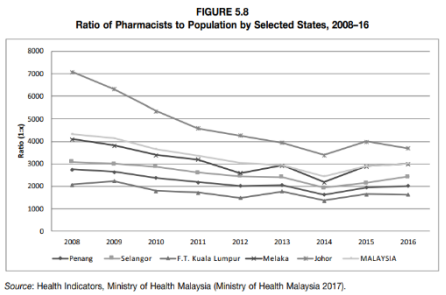
- Johor's current doctor-to-population ratio stands at **1:1,199**
- There are 4,815 registered doctors as of 2017

Nurse-to-population Ratio

- Johor currently has 12,533 nurses, with 8,777 in public and 3,756 in private facilities
- The nurse-to-population ratio stands at 3.2 per 1,000, slightly below the WHO benchmark of 3.5
- Estimated need for 15,000 to 18,000 additional nurses to meet growing demand

- The doctor-to-population ratio in Johor currently stands at **1:1,199**, falling short of the Ministry of Health's recommended ratio of **1:400,** indicating a need for **4,000 to 6,000 additional doctors to meet demand**
- While Johor meets the WHO benchmark for nurses, ongoing hospital expansions and its growing role as a regional medical hub are expected to strain existing capacity, highlighting need for workforce scaling

Pharmacist-to-population ratio in Johor



Source: Health Indicators, Ministry of Health Malaysia (Ministry of Health Malaysia 2017).

- Johor's pharmacist-to-population ratio has **historically been higher than the national average**, which stood at **1:1,662** in 2021, indicating a greater shortfall in the state
- While the WHO recommends a minimum of **1 pharmacist per 2,000 people**, Johor falls short of this benchmark, highlighting the need to expand its pharmaceutical workforce

Note: *As of 2022
Source: Wageningen University and Research; WHO; Ministry of Health (MoH) Malaysia

CFC #2: High-skilled talent, particularly from Johor, is often drawn to better-paying opportunities in Singapore and abroad, leading to retention challenges

Challenges

- **Workforce Shortages**
- **Migration and Competitive Salary**
- **Rising Dependence on Imports**
- **Infrastructure Limitations**
- **Regulatory and Certification Bottlenecks**

Relevance to Johor

Johor is especially vulnerable to talent migration, as locally trained nurses are drawn to Singapore for faster certification and significantly higher salaries–often comparable to specialist doctors in Malaysia due to currency exchange

Singapore's nursing pathway offers a more streamlined certification process, often allowing graduates to begin practicing upon completing their diploma, whereas Malaysia requires passing a national licensure exam to register

	Malaysia	Singapore
Education	• 3-year Diploma in Nursing **or** a 4-year Bachelor of Nursing, offered by institutions accredited by the NBM	• Diploma in Nursing (3 years, offered by ITE/Polytechnics) **or** Bachelor of Science in Nursing (NUS or overseas)
Licensing	• Must pass test by NBM and be a registered nurse under NBM	• Must register with the SNB and pass SNB licensure requirements, including English proficiency (if foreign-trained)
Employment	• Eligible to work in public (MOH) or private healthcare facilities	• Eligible to work in public health clusters (MOH Holdings) or private hospital • Foreign nurses may need Competency Assessment or adaptation
Progression	• Can pursue Post-Basic/Specialty training (e.g. critical care, pediatrics) • Option to pursue Bachelor's or Master's for senior roles or education	• **Clear promotion pathway:** Staff Nurse → Senior Staff Nurse → Nurse Clinician/Nurse Educator → Advanced Practice Nurse (APN)

V

Aspect	Malaysia	Singapore
Registration Body	**Nursing Board Malaysia (NBM)**	**Singapore Nursing Board (SNB)**
English Proficiency	**Not required for locals**	**Mandatory for all nurses (IELTS/OET)**
Career Ladder	**Less formalised than Singapore**	**Structured advancement with defined roles**
International Recognition	**Moderate**	**High (within ASEAN and OECD countries)**

Source: KKM, Nursing Board Malaysia (NBM), Singapore Nursing Board (SNB)

CFC #3: Rising demand and import reliance make a strong case for Johor to localise its healthcare value chain and become a regional medical hub

Challenges

Workforce Shortages

Migration and Competitive Salary

Rising Dependence on Imports

Infrastructure Limitations

Regulatory and Certification Bottlenecks

Relevance to Johor

By focusing on building an integrated healthcare value chain, Johor can enhance its self-sufficiency, reduce import dependency, and emerge as a competitive hub for medical devices and pharmaceuticals in the region

As Johor aspires to become a regional medical hub, the escalating demand for healthcare services is expected to increase reliance on imported medical devices, as well as pharmaceutical

Although Malaysia records a trade surplus in medical devices, 95% of advanced equipment is still sourced through imports

Malaysia's Trade Balance in Medical Instruments

In MYR *(HS4 90.18 (Harmonized System 1992 for 4-digits))*

Export

- Malaysia specialises in exporting **mid-tech consumables** (e.g. surgical gloves, catheters, syringes)
- These are produced in high volumes, making exports strong, **leading to a trade surplus by value**

Import

- Malaysia imports **95% of high-end medical equipment**–such as MRI machines and surgical robots
- This is due to **limited local capacity to design, assemble, or test these advanced technologies**

Device Type	Manufactured & Exported	Imported for Local Use
Consumables	✓ Yes	✗ No
MRI, CT, robotic systems	✗ No	✓ Yes
Diagnostic imaging implants	✗ Limited	✓ Yes

Given this landscape, Johor should consider expanding local manufacturing of advanced medical equipment

Malaysia's medical device market is projected to reach RM16.8 billion by 2028, growing at a **CAGR of 9.3%**

Medical device companies present in Johor
(non-exhaustive)

TEGRA | Masimo | Insulet

- Building high-tech medical device capabilities in Johor would **reduce import reliance, boost exports, and strengthen its position in regional and global markets**

Source: The Observatory of Economic Complexity (OEC); MIDA

CFC #4: Insufficient cleanroom facilities, clinical testing labs, and specialised hospitals are hindering the expansion of high-value manufacturing and care services

Challenges

Workforce Shortages

Migration and Competitive Salary

Rising Dependence on Imports

Infrastructure Limitations

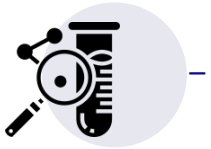
Regulatory and Certification Bottlenecks

Relevance to Johor

Johor requires robust infrastructure—including **cleanroom facilities, clinical testing labs, and specialised hospitals**—to meet rising healthcare and pharmaceutical demands and to position itself competitively as a regional medical hub

The lack of cleanroom facilities, clinical testing labs, and specialised hospitals limits Johor's ability to support advanced pharmaceutical production, medical device development, and complex patient care

Malaysia's standing in clinical trials and biotechnology innovation has seen notable advancements, though certain areas still present opportunities for growth



- In 2024, Malaysia,
  - **Ranked 1st in Southeast Asia**
  - **28th globally** for country readiness in global clinical trials
- This assessment considered factors such as **patient availability, clinical infrastructure, and operational capabilities**

Most Advanced (ISO 5–8 / GMP-capable facilities in Johor)

- **TransPak (TSP) –** Class 100 (ISO 5) & Class 1000 (ISO 6) cleanroom packaging
- **Oliver Healthcare Packaging –** ISO 7 & 8 certified, medical-grade production

Advanced (Industry-standard Labs in Johor)

- **Premier Integrated Labs –** General diagnostics, referrals
- **Kempas Medical Centre Lab –** Comprehensive clinical tests

Notes

ISO 5 = Most stringent (Class 100)
ISO 7–8 = Common in pharma, medtech
GMP (Good Manufacturing Practice) = Regulatory-grade compliance, often built on ISO standards

NON-EXHAUSTIVE

While there are developments in establishing cleanroom facilities, these initiatives are still in progress and may not yet fully meet the industry's demands

Additionally, there is also a lack of specialised hospitals, particularly for cardiovascular treatments

Medical professionals report **increasing cardiovascular** cases in Johor, with patients **often sent to Singapore or KL** due to lack of dedicated cardiac treatment centres

Limited specialised care in Johor **drives patients to seek advanced treatment outside** the state

Addressing this shortfall is crucial to **strengthen Johor's position as a comprehensive healthcare hub**

Source: IQVIA; The Star

CFC #5: Lengthy approval timelines and limited local capacity for global certifications delay market entry and reduce investor confidence

Challenges

Workforce Shortages

Migration and Competitive Salary

Rising Dependence on Imports

Infrastructure Limitations

Regulatory and Certification Bottlenecks

Relevance to Johor

Limited certification capacity in Johor, and Malaysia is delaying near-commercial medical products from reaching the market, hindering innovation and investor confidence

Certification for medtech and pharmaceutical products remains a challenge, as shown by IJN-UTM's prototype, highlighting the need for a more streamlined approval process

Certification Challenges and Lengthy Processes

Approval times

Medical Devices

Registration process for medical devices in Malaysia ranges from **3 to 12 months,** depending on device and regulatory requirements

Pharmaceutical

A study found that drug approvals in Malaysia faced a **median delay of 855 days,** largely due to regulatory factors, delaying access to innovative treatments

Limited Local Capacity for Global Certifications

Malaysia's **reliance on international certifications**, such as the European CE marking, and the **MDA decision to accept expired certificates** under certain conditions, highlights the **limited local capacity for independent global certification**

Flagship Products of IJN-UTM and Technology Readiness Level (TRL)

- IJN-UTM has developed flagship medical products that need to be assessed for TRL
- The majority of the products are **currently rated between TRL 4 and TRL 7**, with a significant number remaining at TRL 7, indicating that they are nearing **commercialisation (TRL 9)** but have not yet achieved full market readiness due to certification
- **Key products** include:
  - Vascular Patch
  - Stents
  - Blood Glucose
  - Monitoring Device
  - Telemedicine App

- The medical device certification process is lengthy, with external-use devices requiring **biocompatibility testing and internal-use devices facing even stricter requirements**
- This process can take up to a decade, often **delaying commercialisation and rendering some products obsolete**

Note: MDA is Medical Device Authority Malaysia
Source: IJN-UTM; Chow WL, Salleh NAM, Kang TS. Access to Innovative Medicines: *Regulation Change and Factors Associated with Drug Approval Lag in Malaysia*; Pacific Bridge Medical

Nevertheless, Johor has made significant strides in enhancing its healthcare infrastructure, with multiple private hospitals expanding their presence in the state

The sector benefits from various factors

Strong Private Sector Participation

- Johor hosts a robust private healthcare sector, with **active investment from leading hospital groups and medical** service providers

Potential for Medical Tourism

- Johor's **proximity to Singapore and Indonesia**, combined with **cost-competitive services and expanding healthcare infrastructure**, positions it as a destination for medical tourism

Strategic Location

- Proximity to Singapore and Indonesia
- Additionally, Johor is strategically positioned at the **heart of the Asia-Pacific (APAC)** region

Strong Manufacturing Ecosystem

- Johor's established industrial base supports the growth of medical device and pharmaceutical manufacturing, reinforced by **export-ready** infrastructure and incentives

- Johor's healthcare sector is well-positioned for growth, driven by strong **private sector participation, a strategic location near Singapore and Indonesia, and a supportive manufacturing ecosystem**
- Its **cost competitiveness and expanding infrastructure f**urther enhance its potential as a regional hub for medical tourism and high-value healthcare manufacturing within the Asia-Pacific region

In response to growing demand, several hospitals are expanding their presence by establishing new branches in Johor

- Johor's healthcare landscape is experiencing significant expansion, marked by substantial investments from both private hospital groups and public healthcare providers
  - **Thomson Iskandariah Hospital:** Thomson Medical Group is developing a 500-bed multi-specialty hospital in Johor Bahru, with construction slated to begin by late 2025 and completion targeted for 2030
  - **Sunway Medical Centre Iskandar Puteri:** Sunway Bhd plans to accelerate the development of Sunway Medical Centre Iskandar Puteri within the Johor-Singapore Special Economic Zone (JS-SEZ), aiming for completion by 2029
  - **KPJ Bandar Dato' Onn Specialist Hospital :** Undergoing renovations to add 60 beds, increasing capacity from 90 to 150 beds, with completion expected by November 2024
    - This is part of KPJ Healthcare's broader strategy to expand its total bed capacity to 5,000 by 2028
- These initiatives highlights Johor's emergence as a regional healthcare hub, leveraging its strategic location and robust infrastructure to attract medical tourism and enhance healthcare services

Source: The Edge; The Malaysian Reserve

Additionally, the government has introduced various support mechanisms to facilitate Healthcare and Pharmaceutical investments into Johor

	Categories of Support	Support Mechanism	Details
	Johor-Singapore Special Economic Zone (JS-SEZ) Incentives	Special Corporate Tax Rates	Eligible companies investing in qualifying **manufacturing and services** activities within JS-SEZ can benefit from a **corporate tax rate as low as 5% for up to 15 years**
		Investment Tax Allowance (ITA)	High-impact industries may receive **up to 100% ITA** on qualifying capital expenditures, enhancing the attractiveness of capital investments
		Stamp Duty Exemptions and Sponsorships	A **40% stamp duty exemption on commercial property transfers** and tax **deductions up to RM1 million** for hallmark event sponsorships are available to encourage business activities
	Infrastructure Development	Specialised Industrial Parks	The development of industrial zones such as **IBTEC offers cleanroom-ready facilities tailored for medical technology and pharmaceutical manufacturing**, providing ready-to-use infrastructure for investors
	Public-Private Partnerships (PPP)	Healthcare Facilities	Collaborations between public institutions and private entities, **exemplified by the partnership between UTM and Cypark**, aim to develop and operate new private multi-disciplinary specialist hospitals in Skudai, Johor, addressing healthcare needs and creating investment opportunities
	Talent Development Initiatives	Educational Grants and Scholarships	Institutions like UTM offer scholarships and financial aid to doctoral and research **master's candidates, supporting the development of a skilled workforce**
		Specialised Training Programs	Programs such as the **MBA in Healthcare Management** are designed to cultivate leadership and management skills within the healthcare sector, ensuring a pipeline of qualified professionals

Source: JS-SEZ, BDO Malaysia, Code Blue, The Edge, UTM, KPJU University

Johor's medical devices and equipment sector also shows significant promise, with recent major investments and a supportive ecosystem

Major Investments and New Manufacturing Facilities

Masimo

- Opened a **133,000 square feet** facility in Pasir Gudang
- Production area: **81,220 square feet**
- Warehouse area: **46,631 square feet**

Oliver Healthcare Packaging

- Constructing a new manufacturing facility in Johor, the **largest in Asia for the company**
- A 122,000 square foot manufacturing plant, with **ISO-7 and ISO-8 cleanroom certified**

Insulet Corporation

- Opened a **400,000 square feet** manufacturing facility
- **Twice the size of Insulet's highly automated manufacturing facility in Acton, Massachusetts**
- Currently, more than 350 full-time Insulet employees work at the new facility with plans to grow to more than 1,000 in the coming years, part of a USD 200 million investment in the area

Identified Gaps & Opportunities to Address

1. **High-Tech and Advanced Devices Production** — There's a reliance on imported high-tech and advanced medical devices, indicating a gap in local production capabilities for these types of products
2. **Research and Development (R&D)** — There's a need for more R&D initiatives to support the development of innovative medical devices
3. **Digital Healthcare Devices** — With the increasing importance of digital healthcare, there are gaps in the production of devices related to telemedicine and other digital health solutions

- Target to increase the **production of high-value medical devices by 30%** over the next 5 years
- Aim to **reduce reliance on imports** for advanced **medical devices by 20% within the same period**

- Aim to file at least **50 new medical device patents from Johor-based companies** or research institutions annually by 2028

Source: MIDA, Oliver HCP, Insulet

Furthermore, in response to the growing demand for specialised treatments, there have also been increasing calls for the establishment of a dedicated cardiac care centre, with promising developments emerging from the collaboration between IJN and UTM

Meeting Demand for Heart Health: Proposed Cardiac Centre Gains Momentum in Johor

1 Rising Heart Disease Cases

- Johor is experiencing an increase in heart attacks and cardiovascular conditions, creating urgent **demand for specialised care**

2 Cross-Border Healthcare Costs

- Many Johoreans are forced to seek emergency cardiac treatment in Singapore, paying double or triple the cost compared to local treatment, leading to financial strain and healthcare leakage

3 Medical Tourism & Economic Loss

- The absence of a cardiac centre means Malaysia is **losing revenue to Singapore**
  - Establishing such a facility would help retain local patients and **promote Johor as a medical tourism destination**

4 Support from Stakeholders

- Medical experts and planners, including Dr. UsHa Hoh and Saravanan Murugan, support the idea, noting it would **attract talent, improve emergency outcomes, and strengthen the state's health infrastructure**

5 Public Health Urgency

- Delayed treatment has already led to preventable deaths, highlighting the **need for a dedicated facility to handle time-sensitive cardiac** emergencies effectively

Proposal for a Cardiovascular Treatment Centre in Johor

Institut Jantung Negara - Universiti Teknologi Malaysia (IJN-UTM)

Current State

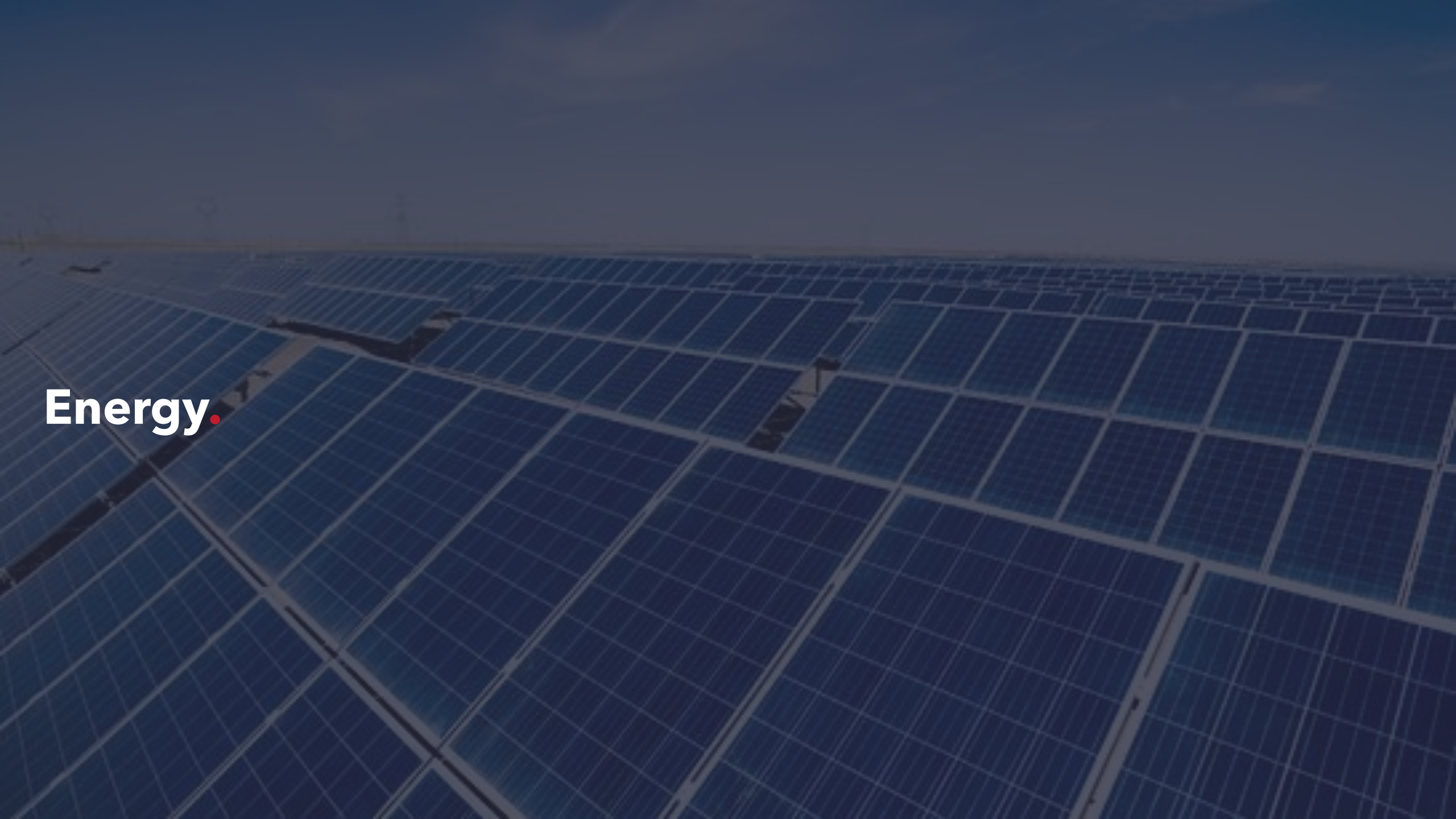
- IJN aims to establish a dedicated cardiovascular centre at UTM, where a **potential site has already been identified**
- The current IJN-UTM facility serves as an R&D hub, hence, it lacks the **infrastructure and provision for cardiac treatment,** despite growing patient demand, including from Singapore

Investment Opportunities

- To advance the initiative, comprehensive planning is needed—covering **feasibility studies, facility upgrades, specialist recruitment, and equipment installation**
- Alongside financial support such as **subsidies** from the Johor State Govt. to ensure sustainability and accessibility

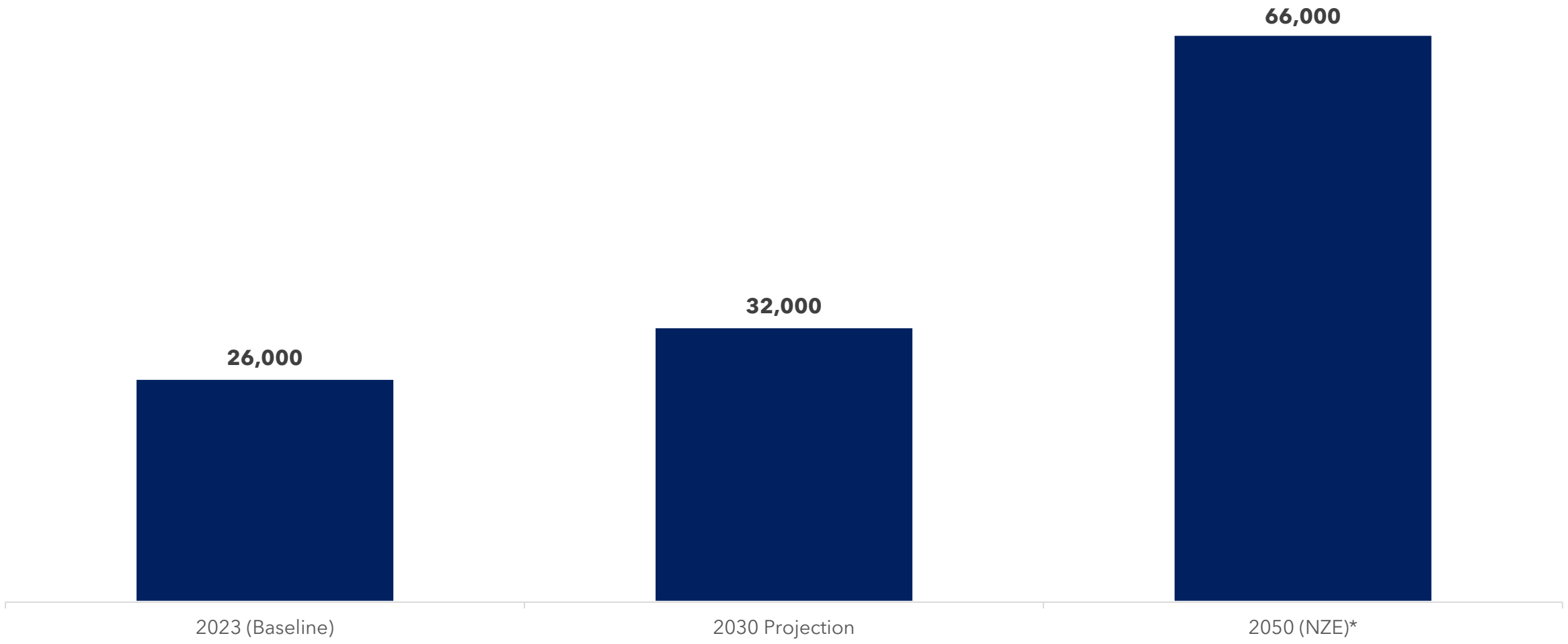
If developed, this centre would not only decentralise cardiac care from Kuala Lumpur but also strengthen Johor's healthcare ecosystem, support medical tourism, and serve as a training and research hub in collaboration with UTM's academic resources

Source: Stakeholder Syndications


Energy.

The global energy consumption is projected to grow from 26,000 TWh in 2023 to 66,000 TWh in 2050 (Net Zero Emissions scenario)

Projected Global Energy Consumption 2023 – 2050
Terawatt-hours (TWh)



Source: International Energy Agency, PASB Analysis
*NZE: A normative scenario that maps out a pathway to achieve net-zero carbon emissions globally by 2050, aligned with limiting warming to 1.5°C

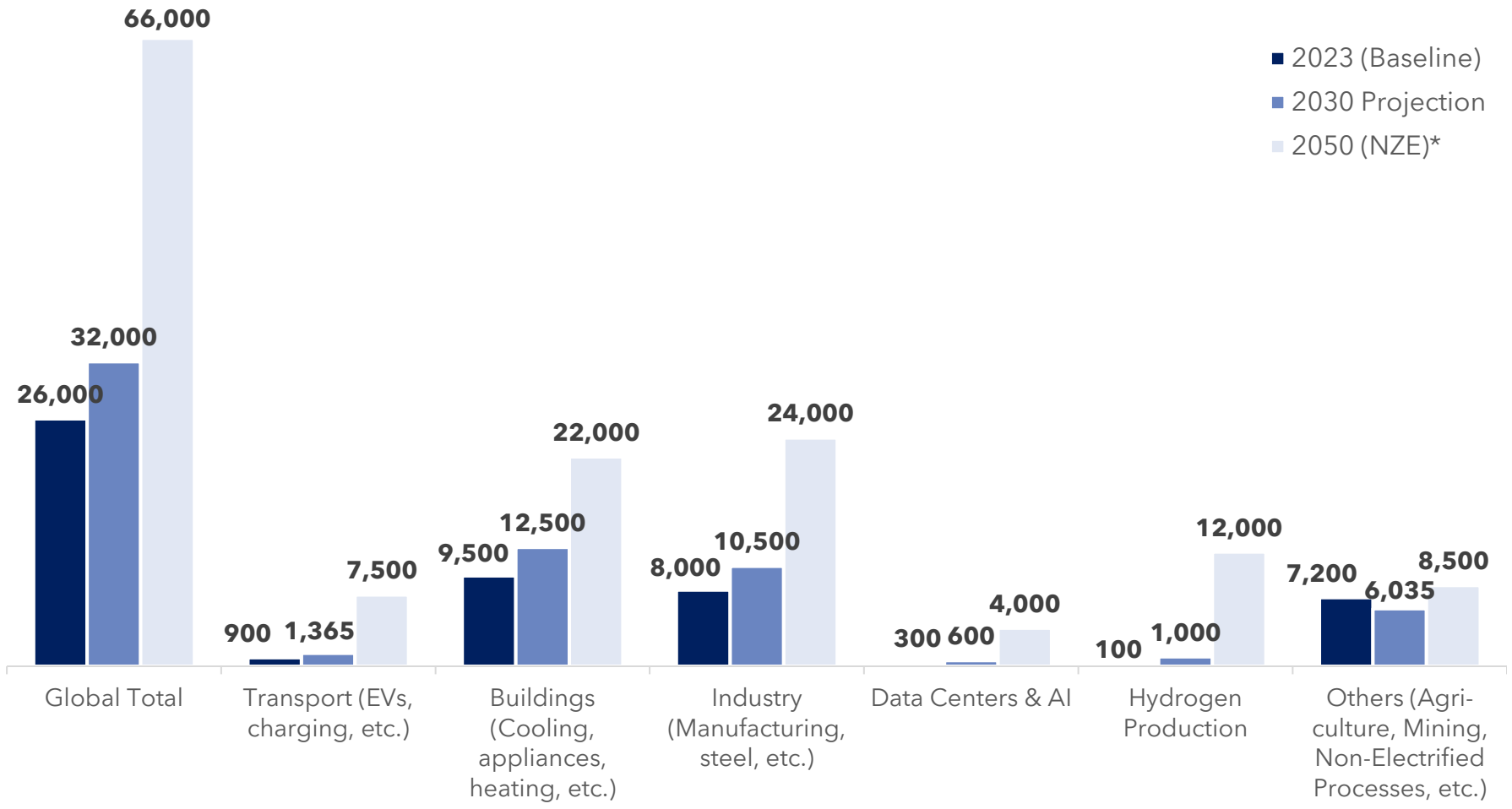
The International Energy Agency's provides three core scenarios i.e. STEPS, APS, and NZE, that offer contrasting futures based on policy strength, with NZE requiring the most ambitious global action to align with 1.5°C climate goals

STEPS (Stated Policies Scenario)	APS (Announced Pledges Scenario)	NZE (Net Zero Emissions by 2050 Scenario)
Reflects current government policies and measures that are in place or under development. It shows where the energy system is headed based on today's stated intentions and policies, without assuming future policy strengthening.	Incorporates all climate-related targets and pledges made by governments, including long-term net zero goals, regardless of whether they are backed by specific policies or legislation.	A normative scenario showing a global pathway to net zero CO_2 emissions by 2050, aligned with limiting global warming to 1.5°C. It assumes transformative changes across all sectors and very strong policy implementation.

Source: Global Hydrogen Review 2024; Southeast Asia Energy Outlook 2024; Net Zero by 2050: A Roadmap for the Global Energy Sector

By 2050, global energy demand will more than double, driven by electrification, hydrogen, and AI industries, while traditional sectors shrink, transforming the global energy landscape

Projected Global Energy Consumption by Sector 2023 – 2050
Terawatt-hours (TWh)



Key Highlights

- Industry (35-36% share) and Buildings (33% share) will continue to be the largest energy consumers, even as efficiency measures and electrification moderate their growth. The absolute energy demand in these sectors nearly doubles by 2050, despite efforts to curb energy waste.
- The "Others" category includes agriculture, mining, fossil fuel energy production, non-electrified processes, and other minor energy-consuming sectors. This category shrinks over time as electrification and efficiency gains replace traditional energy use, particularly in the APS and NZE scenarios.
- By 2050, the global energy system will be almost entirely reshaped—with hydrogen, EVs, and AI-powered industries emerging as the key growth drivers, while traditional sectors decline. The energy mix will continue shifting towards electrification, efficiency, and cleaner alternatives, creating a fundamentally different energy landscape compared to today.

Source: International Energy Agency, PASB Analysis
*NZE: A normative scenario that maps out a pathway to achieve net-zero carbon emissions globally by 2050, aligned with limiting warming to 1.5°C

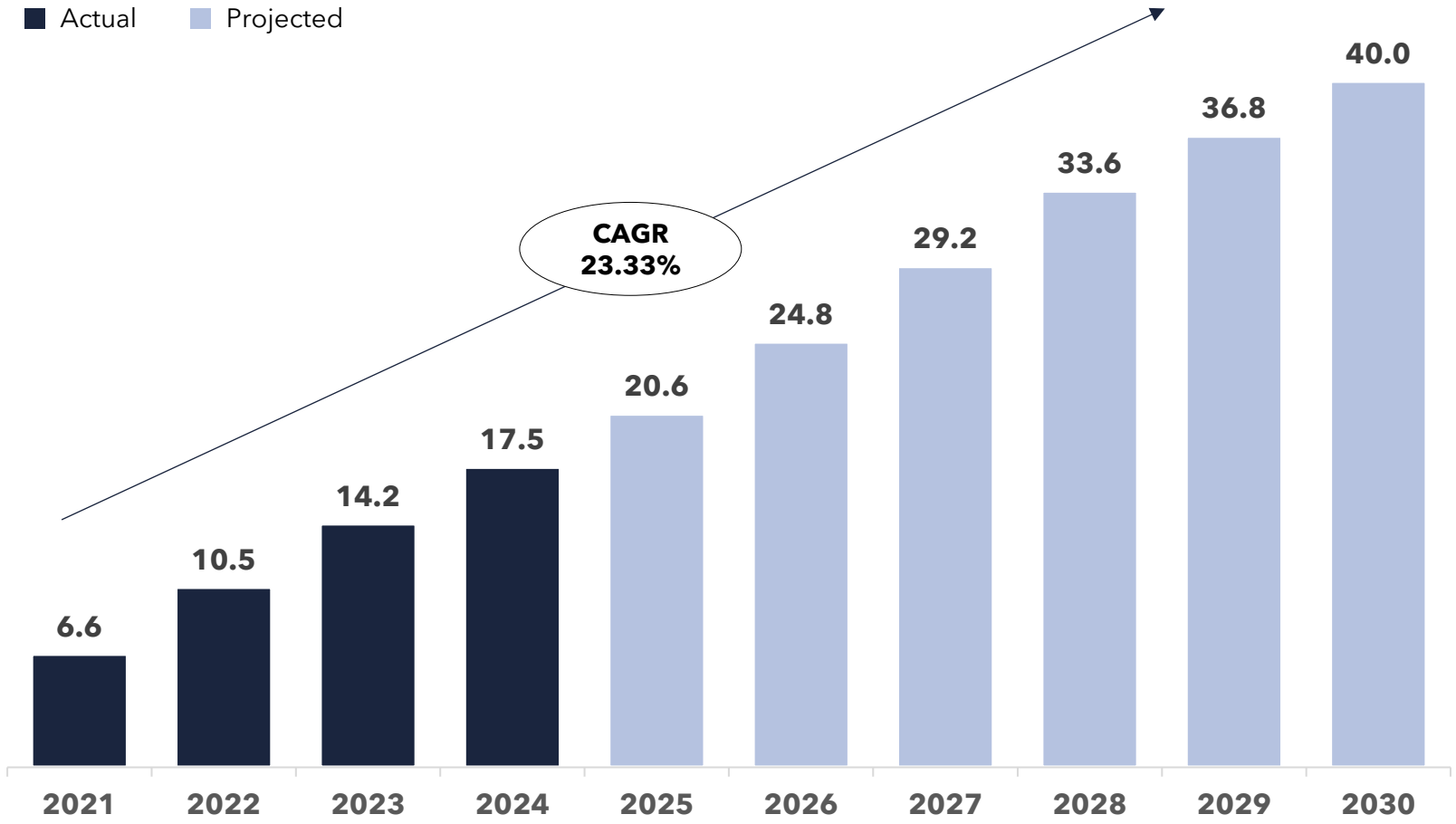
Energy consumption growth moving forward is expected to be driven primarily by factors such as increased transportation electrification, data centers and artificial intelligence

Key Factors Increasing Energy Consumption	Description
1 Electrification of Transportation & Industry	• The transport sector is projected to see the fastest rate of electricity demand growth due to the increasing adoption of electric vehicles (EVs). Expanding EV fleets will account for a significant portion of overall demand growth, particularly in advanced economies like the United States and the European Union. • Many industrial processes are shifting toward electrification to improve efficiency and reduce emissions. This trend is particularly strong in China and India, where rapid industrialisation is increasing energy demand.
2 Data Centers and Artificial Intelligence (AI)	• The number of data centers worldwide exceeded 11,000 in 2024, and electricity demand from these centers is accelerating. Globally, data centres consumed around 1.5% of electricity consumption in 2024. • AI-driven computing is driving massive electricity demand growth, particularly for cloud computing and machine learning applications.
3 Economic and Population Growth	• Emerging market and developing economies are expected to contribute nearly 80% of global electricity demand growth by 2030, with China alone accounting for over 45% of the increase. • The global population is expected to grow from 8 billion in 2023 to 9.7 billion by 2050, with significant urbanization in Africa and Asia leading to higher energy consumption.
4 Increased Space Cooling and Appliance Usage in Buildings	• Economic expansion, rising incomes, and urbanization are driving higher electricity consumption in buildings. A growing number of households in emerging markets are purchasing air conditioners and other appliances, further boosting demand. • The demand for space cooling is expected to rise at an annual rate of 3.7% until 2035, driven by increasing global temperatures and heat waves

Source: World Energy Outlook 2024; PASB Analysis

Global electric vehicle sales surged to 14 million in 2023, led by China, with projections reaching 40 million by 2030 as the transportation sector and the supporting infrastructure increasingly electrifies

Global EV Sales Data and Projections 2021 – 2030
Number of Electric Vehicles, Million



Source: International Energy Agency, PASB Analysis

Key Highlights

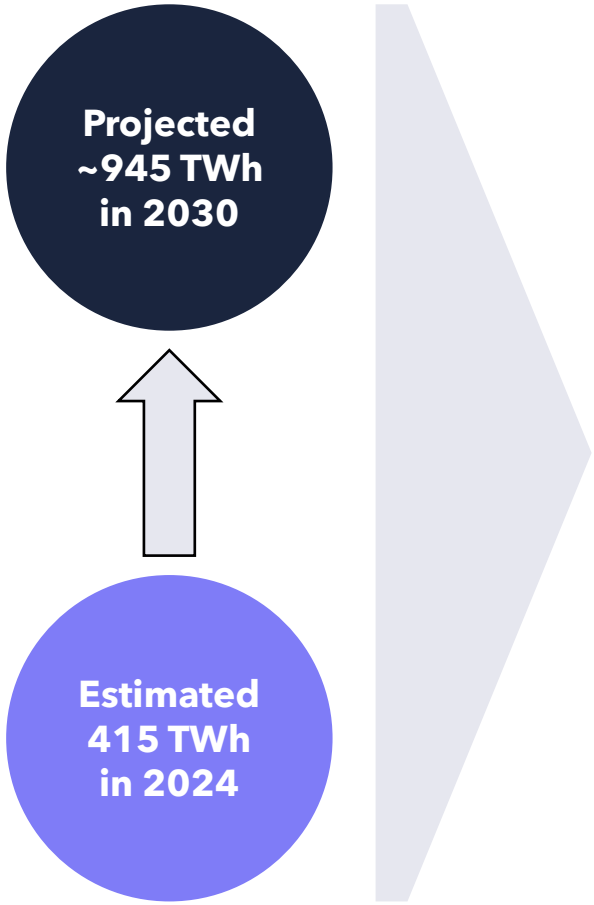
Global Electric Car Sales Are Surging, Led by China

- 17.5 million electric cars were sold in 2024, almost threefold the total sales volume in 2021
- China alone accounted for 60% of global EV sales, with 8.1 million units sold, despite the removal of national subsidies

EV Markets Are Concentrated but Maturing in Key Regions

- 95% of EV sales were in China, Europe, and the U.S., where EVs now represent 18–35% of new car sales, depending on the market
- Growth is stabilising as these markets mature, but still expanding rapidly in volume

AI-driven data centre electricity consumption is accelerating rapidly, with global demand projected to more than double from 415 TWh in 2024 to 945 TWh by 2030, driven by AI workloads and high-performance computing



Dominant Drivers of Energy Consumption Growth – Data Centre's and AI

AI Workloads & Processing Intensity

- AI model training and inferencing demand specialised accelerated servers, which are much more energy intensive than conventional servers.
- By 2030, accelerated servers will account for nearly 50% of the net increase in data centre electricity consumption, with some servers exceeding 10 kW each.

Expanding Digital Services & Cloud Computing

- Continued growth of cloud services, social media, streaming, and generative AI services is driving massive computing needs.
- The demand for AI-capable services is expanding beyond tech hubs, creating sustained pressure on data centre development globally.

Infrastructure Concentration & Grid Strain

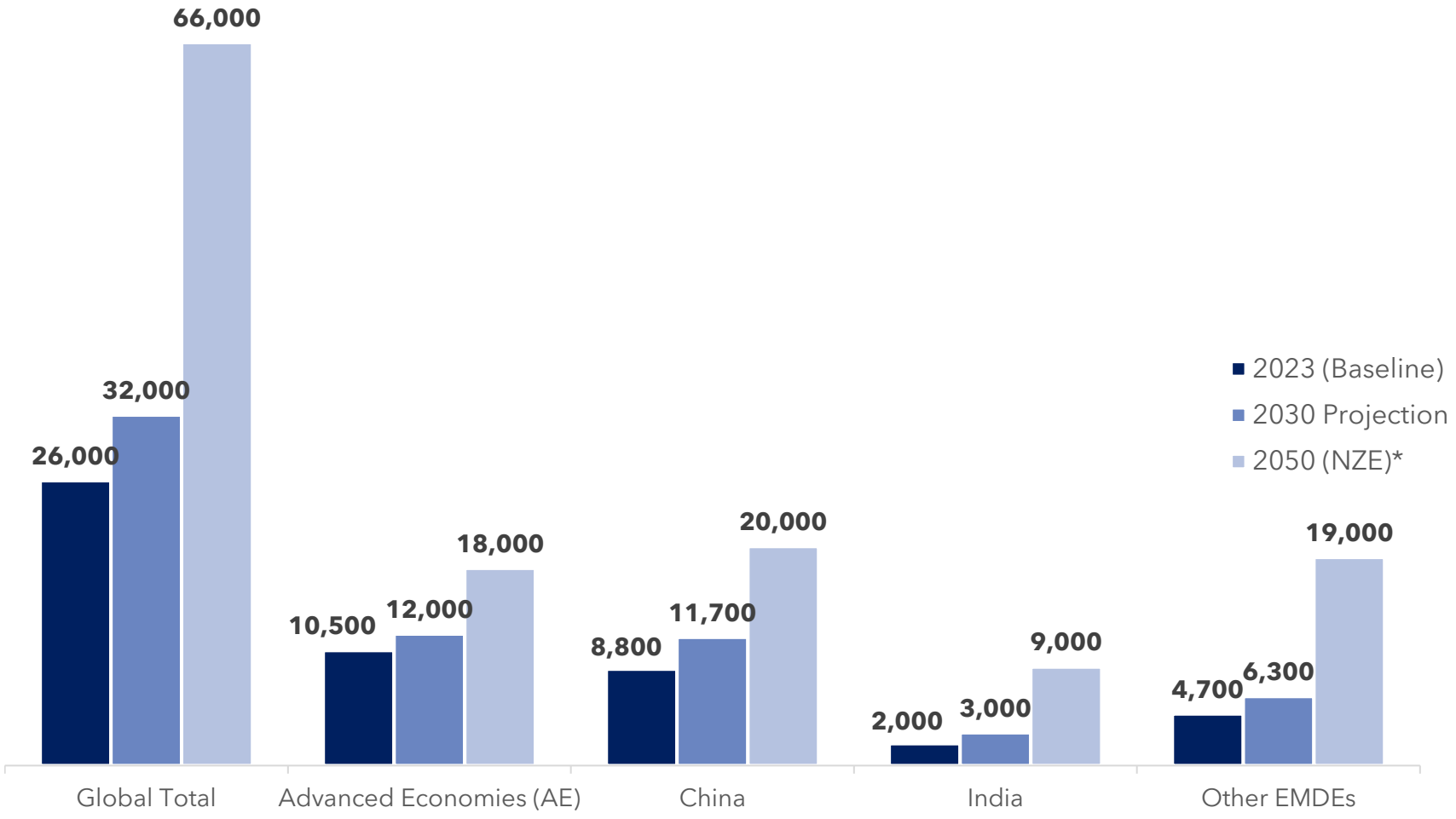
- AI-focused data centres are highly concentrated in specific hubs, intensifying grid loads and posing risks to power resilience and infrastructure bottlenecks.
- Southeast Asia, including Johor and Singapore, is emerging as a key AI data centre hub, compounding energy and water demands.

The surge in AI and digital services is set to double global data centre electricity demand by 2030, straining power grids, infrastructure, and sustainability systems. Strategic planning for grid upgrades, clean energy, and resource-efficient data centres is critical to support this exponential AI-driven growth.

Source: Energy and AI Report 2025 - IEA; PASB Analysis

By 2050, the global energy system will be drastically transformed, with emerging economies consuming the majority of electricity while consumption in advanced economies stabilise

Projected Global Energy Consumption by Region 2023 – 2050
Terawatt-hours (TWh)



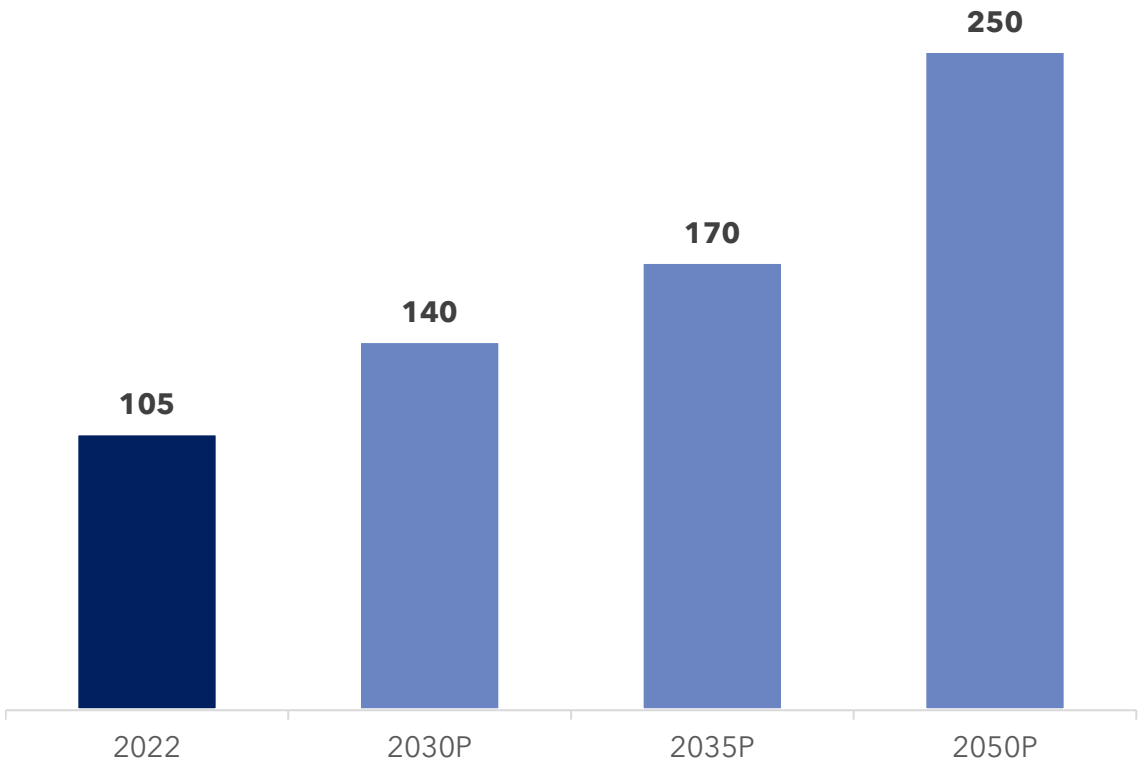
Key Highlights

- **Emerging Markets Drive the Bulk of Future Growth**: By 2050, emerging markets will account for nearly 75% of global electricity consumption, marking a dramatic shift in energy demand distribution. The increase in energy use reflects economic convergence, rising living standards, and energy-intensive industrialization in these regions.
- **Advanced Economies Shift Towards Electrification & Efficiency**: Most of the demand increase in advanced economies will come from EVs (65% of demand growth in the U.S. and EU). AI-driven data centers and digitalization will account for a growing share of new energy demand in these regions.
- **China and India Will Lead Global Energy Demand Growth**: China's electricity demand nearly doubles by 2050, with industrial electrification, EV adoption, and appliance use as key drivers. India's electricity consumption triples by 2050, driven by rising incomes, industrialization, and urbanization.

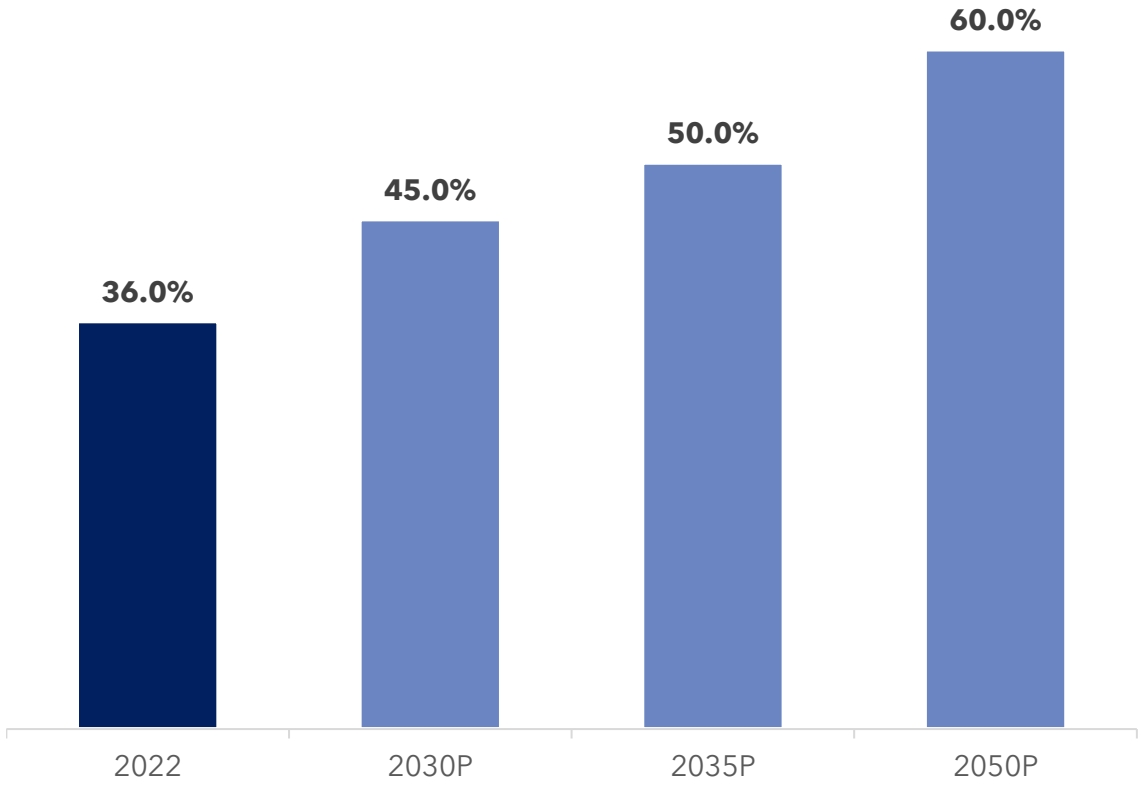
Source: International Energy Agency, PASB Analysis
*NZE: A normative scenario that maps out a pathway to achieve net-zero carbon emissions globally by 2050, aligned with limiting warming to 1.5°C

By 2050, energy consumption in space cooling is expected to grow more than double driven by rapid growth in urbanisation, rising incomes, and increasing demand for thermal comfort in emerging economies

Space cooling energy consumption, 2022-2050
Billion Square Meters



Share of households with air conditioners 2022-2050
Percentage (%)



Source: International Energy Agency, PASB Analysis

Meeting the 2030 NZE targets will require global hydrogen demand to surge from 97 Mt to 150 Mt, driven by a rapid 80-fold expansion in new applications and strong policy enforcement

Total Hydrogen Demand (Historic and Projected)

2023

- **Total Demand**: Reached 97 million tonnes (Mt) in 2023.
- This represented a 2.5% increase compared to 2022.
- Demand growth was driven by traditional uses (refining, ammonia, methanol, steel), not by new sectors or climate policies.
- ~100% of demand was met by fossil-based hydrogen, mostly unabated.

Projection by 2030

2030 STEPS

- **Total Demand**: Projected to exceed 110 million tonnes (Mt) by 2030.
- Growth continues in traditional applications like refining and chemicals
- Low-emissions hydrogen expected to reach ~6 Mt (~10% of total demand)
- New applications (e.g. steel DRI, power generation, shipping, aviation fuels) remain marginal (<1%)
- Growth is incremental, reflecting moderate policy implementation

OR

2030 NZE Scenario

- **Total Demand**: Projected to reach around 150 Mt by 2030.
- Requires significant acceleration across both existing and new sectors
- ~65 Mt of this demand (45%) would need to be low-emissions hydrogen
- ~60 Mt comes from new applications –an 80-fold increase compared to 2023
- Implies robust deployment and supportive regulation on both supply and demand sides

Source: Global Hydrogen Review 2024 - IEA; PASB Analysis

Low-emissions hydrogen remains a niche market in 2023, but under strong policy conditions (NZE scenario), demand could soar tenfold by 2030, making it a central pillar of decarbonisation strategies in hard-to-abate sectors

Low Emissions Hydrogen Demand (Historic and Projected)

2023

- **Low-Emissions Hydrogen Demand**: Less than 1 Mt (million tonnes).
- Accounting for under 1% of global hydrogen demand.
- Despite ~10% year-on-year growth, the overall share remains minimal.
- Usage is largely limited to pilot projects, voluntary early adoption, and demonstration efforts—not driven by large-scale policy or market demand.

Projection by 2030

2030 STEPS

- **Low-Emissions Hydrogen Demand:** >6 Mt of low-emissions hydrogen.
- This would represent about 10% of total hydrogen demand by 2030.
- Growth is driven by modest policy support, pilot projects, and corporate sustainability goals.
- Adoption beyond traditional sectors (refining, chemicals) remains limited due to cost gaps, lack of demand-side policies, and low commercial maturity.

OR

2030 NZE Scenario

- **Low-Emissions Hydrogen Demand**: 65 Mt, which is ~45% of total hydrogen demand by 2030.
- Requires a 10x scale-up from 2023 levels.
- Growth hinges on: Strong global policy action; Widespread subsidies/incentives; Aggressive deployment in new applications (steel, shipping, aviation, power).
- This scenario anticipates nearly 40% of hydrogen demand coming from new applications—an 80-fold increase from 2023.

Source: Global Hydrogen Review 2024 - IEA; PASB Analysis

Southeast Asia is set to be one of the world's fastest-growing energy consumers, with 33% demand increase driven by industry, transport and data centers

Southeast Asia Energy Demand Growth Projections

- Southeast Asia sees the second-fastest growth in energy demand globally, after India.
- Energy demand in the region grew by 5% in 2023, driven by industry, transport, and rising electricity demand for cooling and digital infrastructure.
- Growth slows to an average of 2.5% per year over the next decade, but total demand is set to increase by over 20 exajoules (EJ) by 2050.
- By 2035, Southeast Asia's energy demand is projected to be one-third higher than in 2023.

Fossil Fuel Dependency & Import Trends

- In 2023, fossil fuels accounted for nearly 75% of Southeast Asia's power generation mix.
- Coal remains dominant, making up 60% of new electricity generation over the past 20 years.
- The region is expected to become a net importer of natural gas by the late 2020s, increasing its energy security concerns.
- Oil and gas demand continues rising until 2050 under the STEPS scenario, though in APS, fossil fuel consumption peaks in the mid-2030s and declines thereafter.

Renewable Energy & Energy Transition Efforts

- Investment in renewables is expected to triple by 2035 in the STEPS scenario, with nearly threefold increases in installed renewable capacity.
- In APS, renewable capacity expands twice as fast as in STEPS, and spending on energy efficiency rises by 30%.
- 8 out of 10 Southeast Asian countries have net-zero or carbon neutrality targets for 2050-2065.
- The ASEAN Plan of Action for Energy Cooperation aims for 23% renewable energy share by 2025.

Coal-Fired Power & Emission Challenges

- Southeast Asia has 110 GW of installed coal-fired capacity, with over 50% of it being less than 10 years old.
- Coal remains central to the region's power sector due to affordability concerns and system reliability needs.
- In STEPS, coal use remains stable until the 2040s, while in APS, it peaks around 2030 and then declines.
- Malaysia, Thailand, Indonesia, and Vietnam have announced coal phase-out targets for 2045-2056.

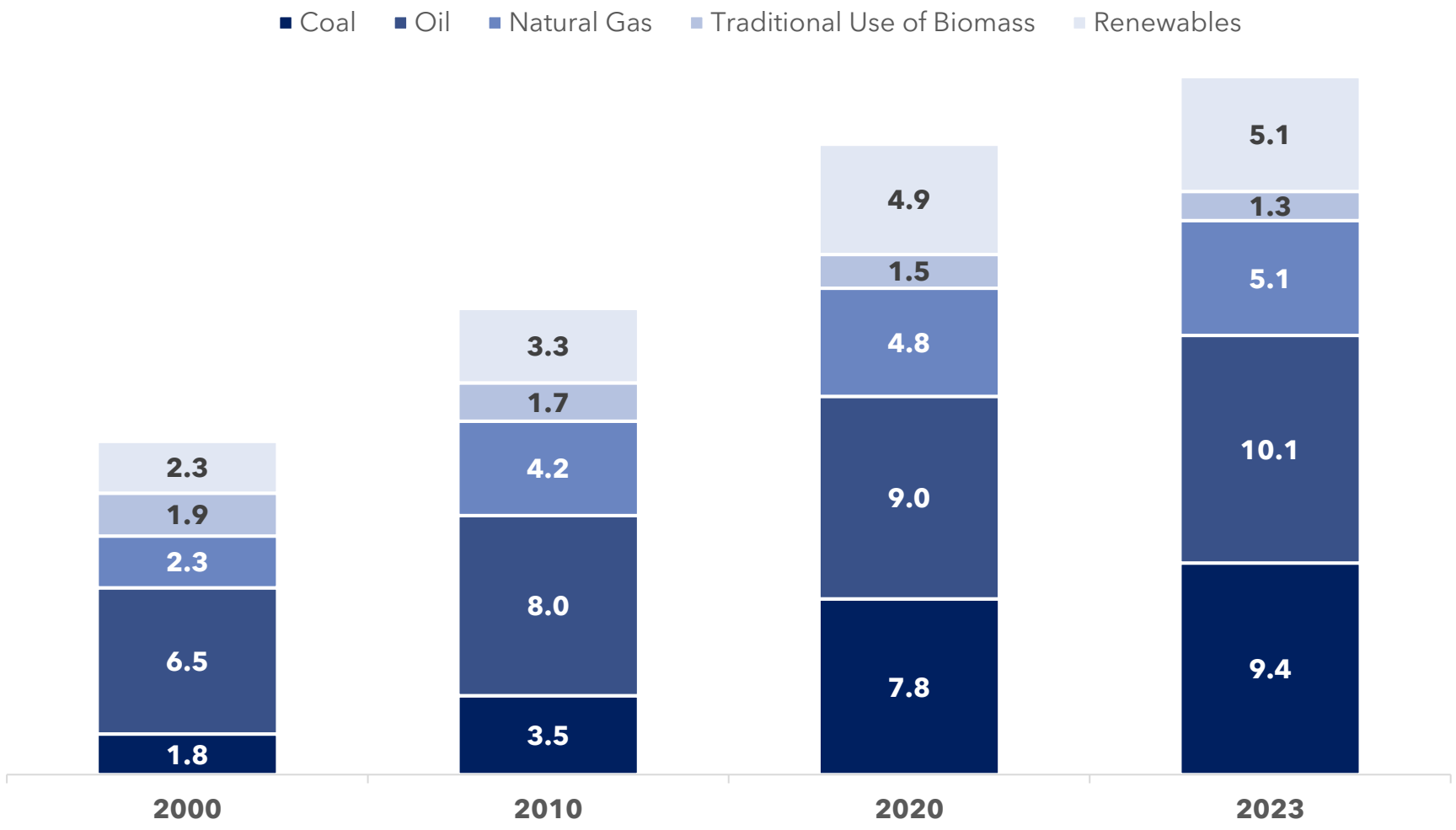
Electrification of Transport & Industry Growth

- Electric vehicle (EV) adoption is rising rapidly, led by Vietnam's VinFast, which accounted for 15% of new car sales in 2023.
- Indonesia is now the world's largest nickel producer, critical for EV battery supply chains.
- The region is seeing higher demand for electricity in industrial zones, manufacturing, and data centers.

Source: International Energy Agency Southeast Asia Energy Outlook 2024;, PASB Analysis

Southeast Asia's economies and energy systems have experienced rapid growth over the past two decades, leading to substantial increases in energy consumption

Energy demand by fuel in Southeast Asia, 2000-2023
Exajoules (EJ)



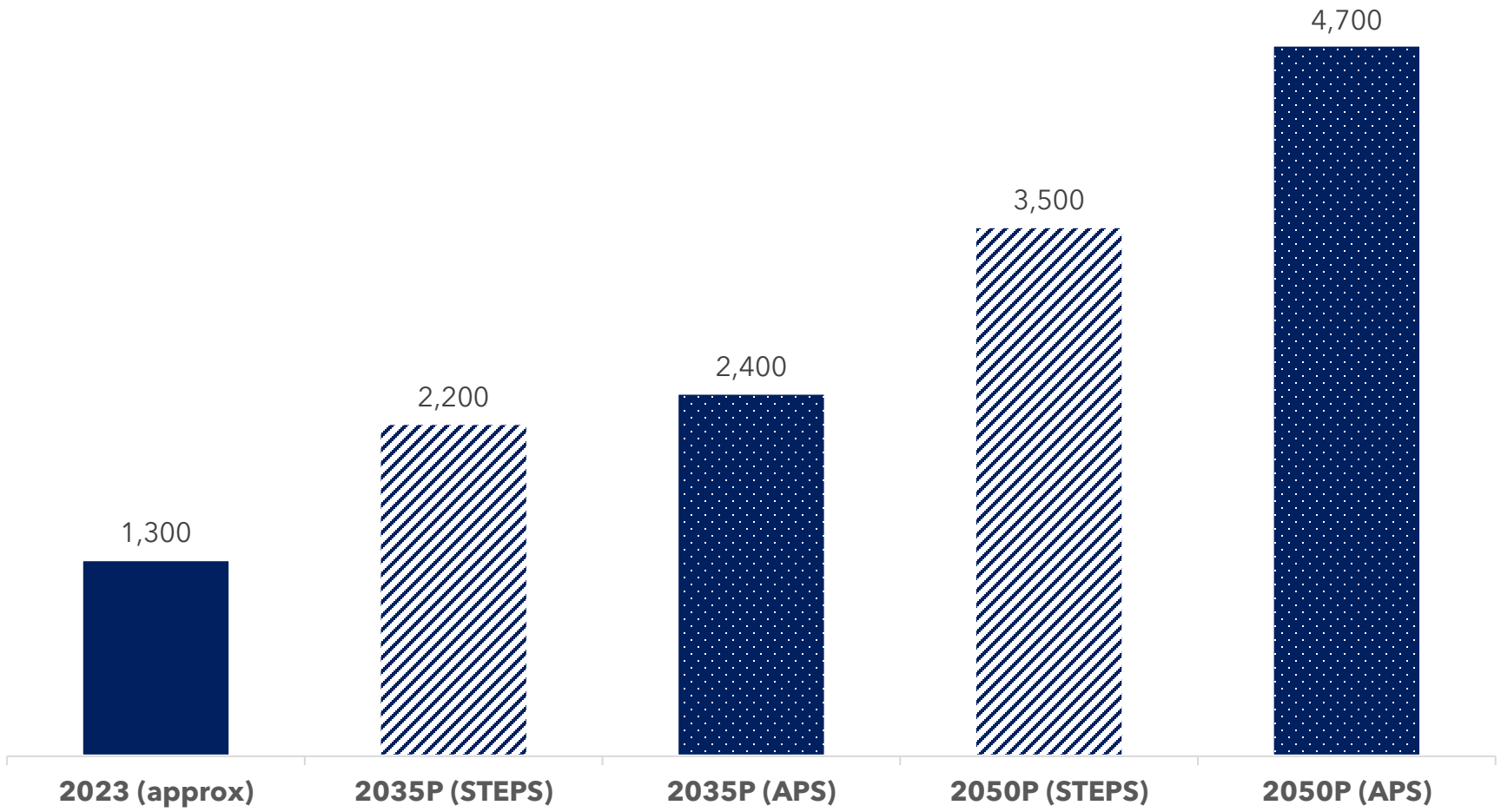
Key Insights

- **Fossil Fuels, Especially Coal, Still Dominate Southeast Asia's Energy Growth**: Despite rising clean energy contributions, over 70% of energy demand growth since 2000 has been met by fossil fuels—coal's share rose from 9% to 28%, driven largely by Indonesia and Viet Nam.
- **Oil and Gas Imports Are Rising, Undermining Energy Security**: Oil remains the largest fuel source, but declining regional production has led to 2.5× more imports since 2000, while natural gas demand outpaced supply, eroding the region's historical export position..
- **Renewables Are Growing, but Dominated by Traditional Source**: While renewable energy supply has nearly tripled since 2000, 96% still comes from hydropower, geothermal, and bioenergy; solar and wind are expanding fast but remain a small share overall.

Source: Southeast Asia Energy Outlook 2024 – IEA; PASB Analysis

Southeast Asia's electricity demand is projected to nearly double by 2035 under both STEPS and APS, driven by rapid electrification of buildings, industry, and transport, with rising urbanisation and appliance ownership accelerating consumption

Electricity demand in Southeast Asia, 2023 - 2050
Terawatt hours (TWh)



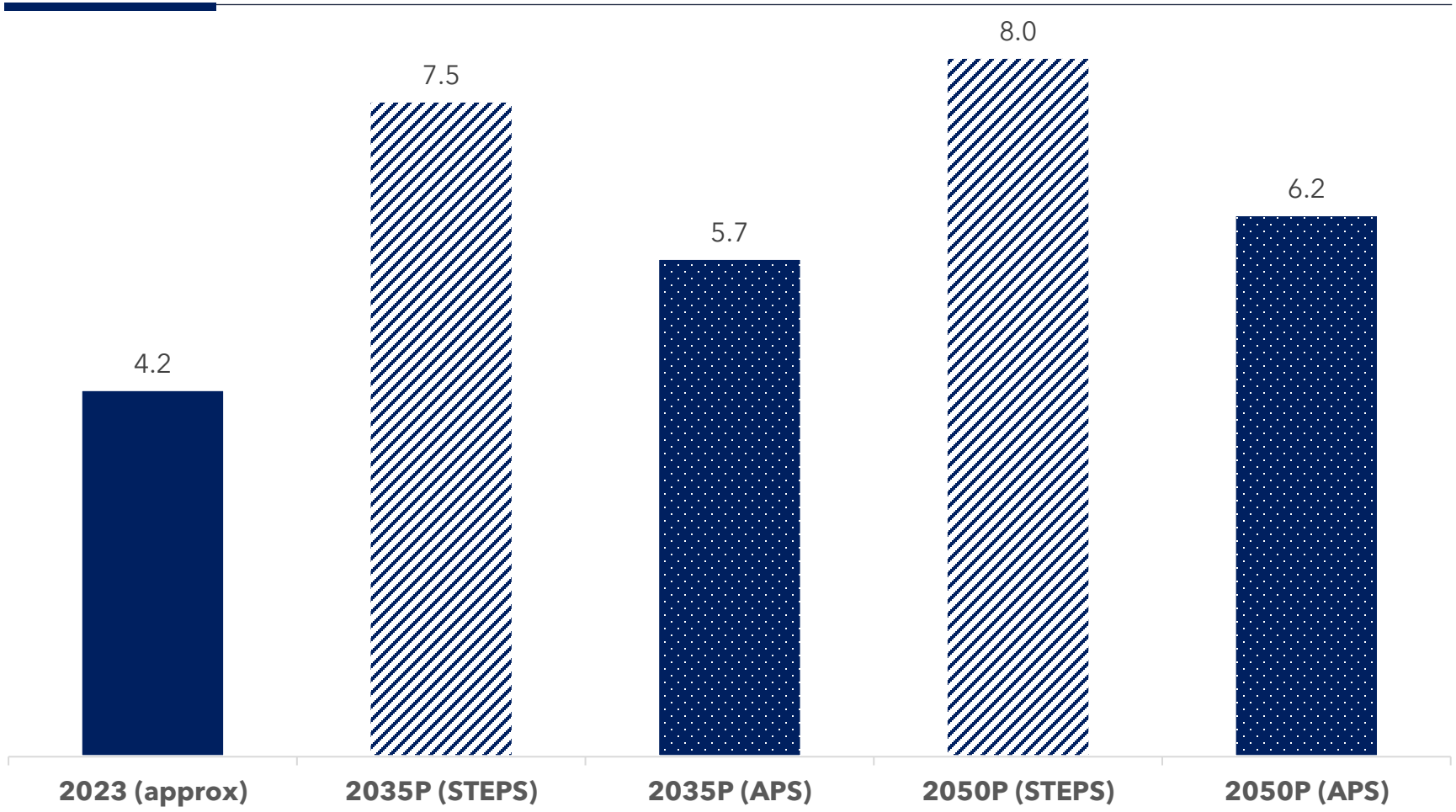
Accelerated Electrification

- Electricity demand growth is driven by rapid electrification of end-uses, especially in buildings, industry, and transport.
- In the buildings sector, electricity is projected to account for over 50% of final energy demand by 2035, rising to more than 80% by 2050 under both scenarios.
- Rising incomes, urbanisation, and higher living standards continue to expand ownership of appliances and air conditioners, particularly in emerging economies like Indonesia, Vietnam, and the Philippines

Source: Southeast Asia Energy Outlook 2024 – IEA; PASB Analysis
Note: STEPS = Stated Policies Scenario; APS = Announced Pledges Scenario

Southeast Asia's buildings sector energy demand will nearly double by 2050, driven by affluence, urbanisation, and cooling needs, but stronger efficiency and clean cooking efforts under APS could significantly moderate this growth

Energy Consumption of the Buildings Sector in Southeast Asia, 2023 - 2050
Exajoules (EJ)



Key Insights

- **Increased affluence**: Rising incomes and household affluence, leading to more appliance ownership and demand for air conditioning.
- **Urbanisation and floorspace expansion**: Floorspace projected to grow by over 30% by 2035 and 83% by 2050.
- **Cooling demand surge**: Space cooling expected to increase sixfold by 2050, accounting for over 35% of electricity use in buildings under STEPS.
- **Access to clean cooking remains a challenge**: In 2023, 20% of population lacked clean cooking access, leading to health impacts. In STEPS 2035, this reduces to 12% while in APS 2035, reduced further to less than 7%.

Source: Southeast Asia Energy Outlook 2024 – IEA; PASB Analysis
Note: STEPS = Stated Policies Scenario; APS = Announced Pledges Scenario

By 2050, Southeast Asia's buildings sector will see a major shift toward electrification, with electricity surpassing 80% of energy use, while biomass and fossil fuels sharply decline under both STEPS and APS

Energy Mix Breakdown For The Buildings Sector

2023	2050 (STEPS)	2050 (APS)
Electricity: ~50% of total buildings energy consumption.	**Electricity**: Increases to ~80% of buildings sector energy use.	**Electricity**: Even higher share than STEPS, due to stronger electrification.
Traditional Biomass: ~21%.	**Traditional Biomass**: Still nearly 10%, due to incomplete clean cooking transition.	**Traditional Biomass**: Drops to less than 5% due to accelerated clean cooking efforts.
Fossil fuels (mainly LPG and kerosene): ~25%.	**Fossil fuels (LPG and kerosene)**: Declines significantly but remains in some regions.	**Fossil fuels (LPG and kerosene)**: Significantly reduced.
Modern bioenergy, solar thermal, geothermal: Very small, emerging.	**Modern renewables (bioenergy, solar thermal, geothermal)**: Increase to over ~0.25 EJ, about four times higher than today.	**Modern renewables (bioenergy, solar thermal, geothermal)**: Slightly higher than STEPS due to stronger policy support and incentives.

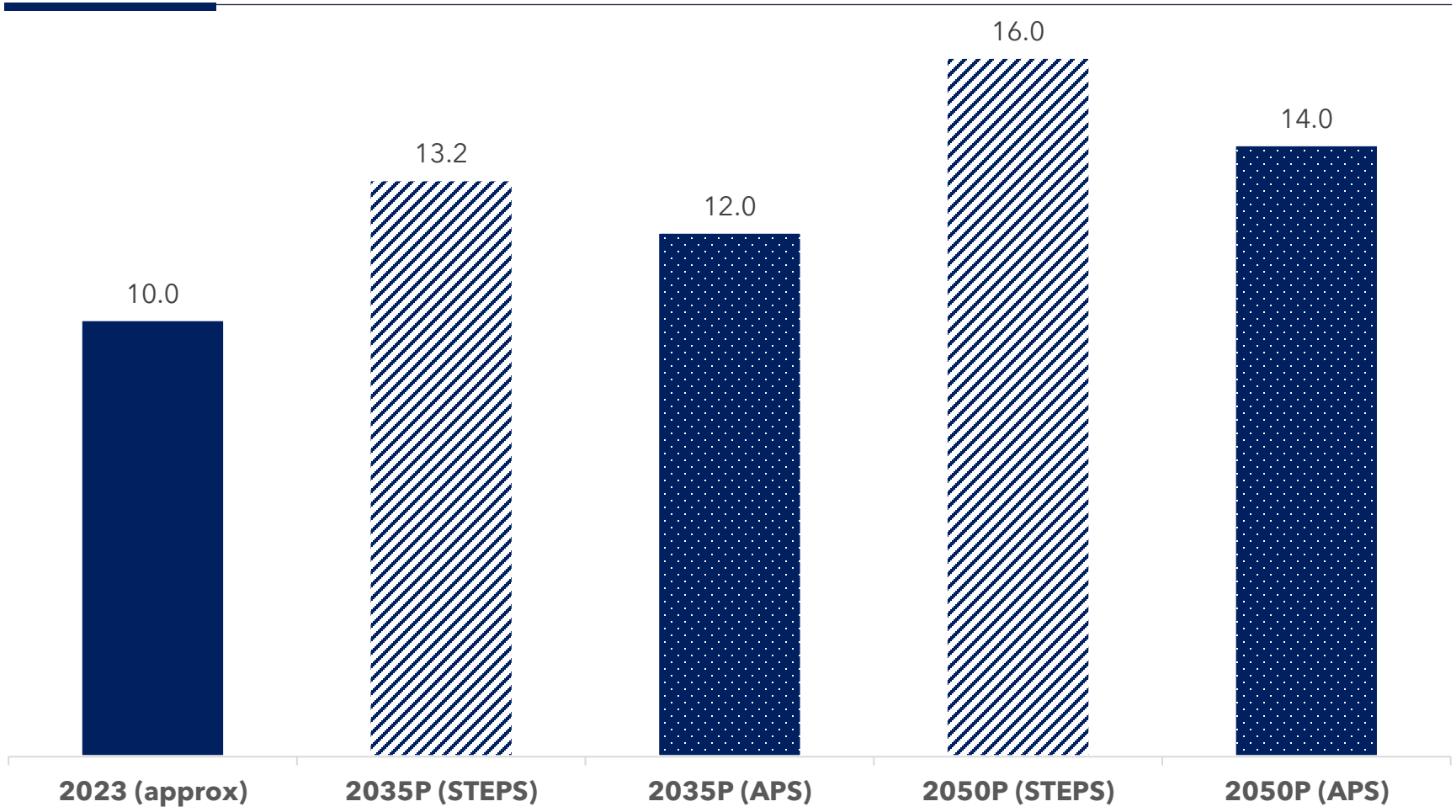
Projection by 2050

OR

Source: Southeast Asia Energy Outlook 2024 – IEA; PASB Analysis
Note: STEPS = Stated Policies Scenario; APS = Announced Pledges Scenario

Southeast Asia's industrial energy demand will grow steadily to 2050, but efficiency gains, electrification, and cleaner fuel shifts—particularly under APS—moderate demand growth compared to economic and output expansion

Energy Consumption of the Industry Sector in Southeast Asia, 2023 - 2050
Exajoules (EJ)



Key Insights

- **Continued Industrial Output Growth Drives Energy Demand**: The industry sector remains the largest energy-consuming sector, accounting for around 50% of final energy demand in 2023 and maintaining this dominant position through 2050 under both STEPS and APS. Steel, cement, and chemicals production continue expanding, especially driven by urbanization, infrastructure, and manufacturing growth in Indonesia, Vietnam, and other ASEAN countries.
- **Energy Intensity Declines Due to Efficiency & Process Improvements**: Attributed to adoption of best available technologies (BATs), electrification of low-temperature processes, and material efficiency strategies, especially more pronounced under APS.
- **Shift Toward Electrification and Cleaner Energy Mix**: Electricity's share in industrial energy use increases, especially in the APS, as industries electrify heating and mechanical processes. Use of coal and oil declines, while renewables (including bioenergy and hydrogen) grow, particularly in energy-intensive subsectors like steel and chemicals under APS.

Source: Southeast Asia Energy Outlook 2024 – IEA; PASB Analysis
Note: STEPS = Stated Policies Scenario; APS = Announced Pledges Scenario

By 2050, Southeast Asia's industry sector energy mix shifts markedly toward cleaner sources under APS, with electricity and hydrogen together reaching nearly 60%, significantly reducing coal reliance from 44% to 14%

Energy Mix Breakdown For The Industry Sector

2023	2050 (STEPS)	2050 (APS)
Coal: ~44% (especially in energy-intensive industries)	**Coal**: ~28% (still high, reflects limited shift away from fossil fuels)	**Coal**: ~14% (significantly reduced due to stronger decarbonisation)
Oil: ~9%	**Oil**: ~6%	**Oil**: ~5%
Natural Gas: ~16%	**Natural Gas**: ~14%	**Natural Gas**: ~11%
Modern Bioenergy: ~8%	**Modern Bioenergy**: ~11%	**Modern Bioenergy**: ~13%
Electricity: ~19%	**Electricity**: ~35%	**Electricity**: ~44% (reflecting aggressive electrification, particularly in steel and chemicals)
Hydrogen and Other (incl. geothermal, solar thermal, district heating, non-renewable waste): Very small, emerging	**Hydrogen and Other (incl. geothermal, solar thermal, district heating, non-renewable waste)**: ~6% (Hydrogen grows but remains relatively modest)	**Hydrogen and Other**: ~13% (Hydrogen adoption becomes much more prominent as a clean fuel, especially in hard-to-abate sectors)

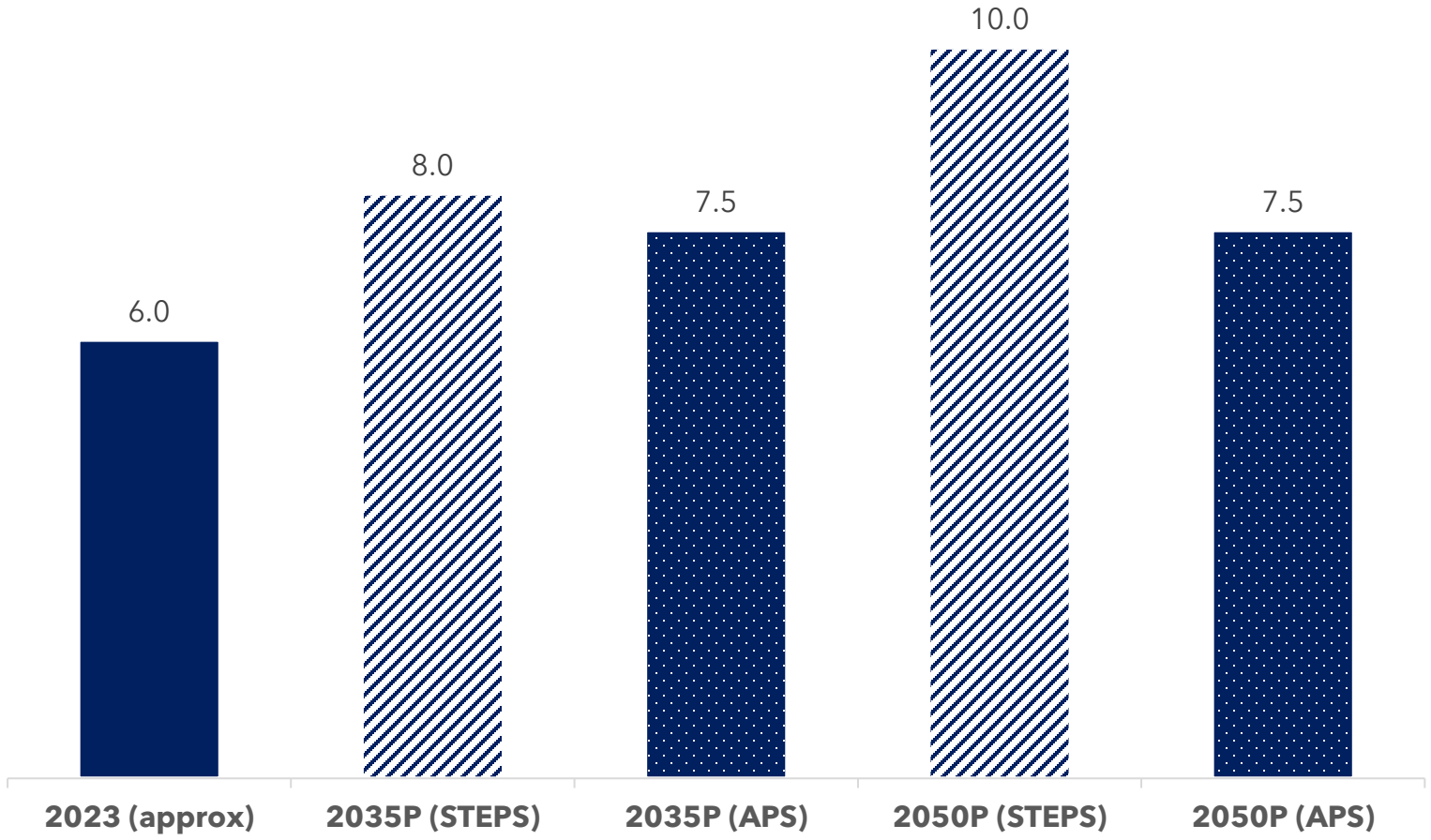
Projection by 2050

OR

Source: Southeast Asia Energy Outlook 2024 – IEA; PASB Analysis
Note: STEPS = Stated Policies Scenario; APS = Announced Pledges Scenario

Southeast Asia's transport energy demand rises with growing mobility, but under APS, faster electrification, efficiency gains, and modal shifts reduce demand to 7.5 EJ by 2050, significantly lower than STEPS' 10 EJ, curbing oil dependence and emissions

Energy Consumption of the Transport Sector in Southeast Asia, 2023 - 2050
Exajoules (EJ)



Key Insights

- **Rising Transport Demand Drives Energy Consumption, Especially Under STEPS**: In STEPS, transport energy consumption grows from ~6.5 EJ in 2023 to ~10 EJ by 2050, driven by rising vehicle ownership, freight activity, and growing demand for mobility across urbanizing ASEAN economies. Under APS, demand peaks earlier by 2035 at ~7.5 EJ, reflecting faster deployment of efficient and clean transport solutions, despite continued growth in transport services.
- **Electrification and Fuel Switching Under APS Significantly Curtail Oil Dependency**: APS accelerates electrification, with electricity and clean fuels making up a larger share of transport energy, reducing oil consumption sharply by 2050, particularly in road transport. In STEPS, slower electrification keeps oil as the dominant fuel, leading to higher energy consumption and emissions in the sector through 2050.
- **Efficiency Gains and Modal Shifts Become Key Demand Moderators in APS**: APS sees more aggressive efficiency gains through stringent vehicle standards, greater uptake of EVs, and improved logistics, keeping transport energy demand stable despite rising travel activity. Modal shifts to public transport, rail, and low-emission freight corridors are more pronounced in APS, easing energy consumption growth, while STEPS lags in these transitions.

Source: Southeast Asia Energy Outlook 2024 – IEA; PASB Analysis
Note: STEPS = Stated Policies Scenario; APS = Announced Pledges Scenario

By 2050, Southeast Asia's transport sector will see oil's dominance fall to ~50% under APS, as electrification and biofuels rise sharply to ~25% each, driven by stronger fuel switching, EV adoption, and cleaner freight modes

Energy Mix Breakdown For The Transport Sector

2023	2050 (STEPS)	2050 (APS)
Oil: Dominates with ~90% share, especially in road transport.	**Oil**: Remains the dominant fuel with ~80% share.	**Oil**: Drops sharply to ~50%, reflecting aggressive electrification and fuel switching.
Electricity: Very small, primarily from rail and metro systems.	**Electricity**: Increases slightly to ~5%, with limited electrification of vehicles and rail expansion.	**Electricity**: Surges to ~25%, driven by mass adoption of EVs, electrified buses, and two-wheelers.
Biofuels & Others: Negligible share, emerging but not yet significant.	**Biofuels & Others**: Grow modestly to ~15%, mostly in blending mandates and biofuel adoption.	**Biofuels & Others**: Grow to ~25%, particularly in aviation, shipping, and long-distance freight sectors, complementing electrification.

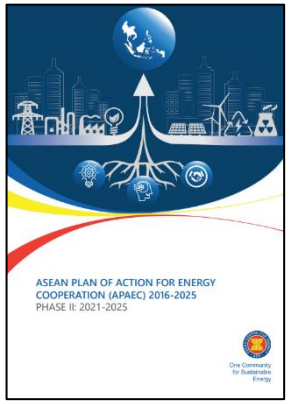
Projection by 2050

OR

Source: Southeast Asia Energy Outlook 2024 – IEA; PASB Analysis
Note: STEPS = Stated Policies Scenario; APS = Announced Pledges Scenario

ASEAN Member States have agreed to a regional energy cooperation to enhance energy security, sustainability, and affordability across its member states

ASEAN Plan Of Action For Energy Cooperation (APAEC) 2016-2025



ASEAN's **primary energy demand is projected to more than double** from 625 MTOE (2017) to 1,589 MTOE (2040). The APAEC Phase II (2021-2025), endorsed at the 38th ASEAN Ministers of Energy Meeting (AMEM), focuses on energy security, accessibility, affordability, and sustainability, with an emphasis on accelerating energy transition and strengthening resilience through innovation and cooperation

APAEC Programme Areas

- **ASEAN Power Grid (APG):** Develop a planned network of cross-border electricity interconnections among ASEAN member states, designed to enable multilateral electricity trade and optimize regional power generation, especially from renewable and low-carbon sources
- **Trans-ASEAN Gas Pipeline:** Develop a common gas market and improve infrastructure and commercial readiness, following the 2018 Gas Advocacy White Paper (GAWP).
- **Regional Energy Policy & Cooperation:** Strengthen partnerships with Dialogue Partners (DPs) and International Organizations (IOs) to enhance policy planning and energy transition strategies
- **Nuclear Energy:** Promote regional initiatives for human capital development in nuclear science and technology for future power generation.
- **Renewable Energy (RE):** 23% RE share in Total Primary Energy Supply (TPES) by 2025; 35% RE share in installed power capacity; Large-scale RE deployment, increased investments, and exploration of hydrogen and fuel cell technologies.

KEY RESULTS

ASEAN Power Grid

- As of 2022, 9 of the 18 interconnection projects defined in the ASEAN Interconnection Masterplan Study (AIMS) III are now fully operational.
- The LTMS-PIP officially commenced on 23 June 2022, with approximately 266 GWh of electricity traded to date.
- The implementation of APG has advanced as part of the ongoing AIMS III.

Trans-ASEAN Gas Pipeline

- A total of 13 cross-border pipelines, spanning 3,631 km, have been established, connecting six countries.
- 12 regasification terminals across these countries have been developed, with a combined capacity of 49.5 Mtpa

Regional Energy Policy & Planning

- Regional energy policy and planning have been strengthened through enhanced collaboration with DPs/IOs, including the establishment of the first SOME-EU and SOME-ADB initiatives.
- Published AEO7 in 2022 and AEO8 in 2024.

Coal & Clean Coal Technology

- By 2022, a total of 18.9 GW of combined cycle turbine installed power capacity has been achieved, alongside the operation of 13 coal-biomass co-firing plants with a combined capacity of 7.3 GW

Civilian Nuclear Energy

- A total of 400 policymakers and relevant stakeholders have been trained through seven regional Nuclear Capacity Building and Training Programs.

Source: ASEAN Plan of Action for Energy Cooperation (APAEC); ASEAN Energy in 2025 – ASEAN Centre for Energy (ACE); PASB Analysis

At COP29, Malaysia reaffirmed its commitment to climate action, urging accelerated finance, technology transfer, and regional cooperation to enable a just energy transition and deployment of low-emission technologies like hydrogen and CCUS

Malaysia - Commitment to COP29 Energy Transformation Pledges

Malaysia has endorsed all three major energy-related pledges launched at COP29, demonstrating strong commitment to accelerating the clean energy transition. These pledges support Malaysia's ambitions to enhance grid and storage infrastructure, develop green energy zones and corridors, and scale up clean hydrogen solutions in alignment with its net-zero and energy security goals.

COP29 Global Energy Storage and Grids Pledge

Introduction

This pledge commits countries and stakeholders to make energy storage and modernized grid infrastructure a cornerstone of global energy transitions, vital to integrating renewables, improving resilience, and enabling net-zero pathways.

Key Details

- Global target to deploy 1,500 GW of energy storage by 2030 (6× 2022 levels).
- Target to add or refurbish 25 million km of electricity grids globally by 2030.
- Recognizes grid and storage as essential enablers for renewable integration, energy security, and managing peak demand.

Key Obligations

- Develop enabling policies and financing frameworks for both storage and grid infrastructure, including removal of deployment barriers.
- Promote diverse technologies, such as battery storage, pumped hydro, hydrogen, and thermal storage, to enhance resilience.
- Strengthen international cooperation, workforce development, and inclusive participation, especially of women, youth, and local communities.

COP29 Green Energy Pledge on Green Energy Zones and Corridors

Introduction

This pledge promotes the creation of strategically located green energy zones and regional green corridors to accelerate renewable deployment, foster sustainable industrialization, and enhance electricity interconnections.

Key Details

- Builds on the COP28 renewables pledge to triple installed renewable capacity and double energy efficiency rates by 2030.
- Highlights the importance of High Voltage Direct Current (HVDC) transmission and interconnected grids.
- Frames green energy zones as drivers of investment, eco-industrial development, and community benefits.

Key Obligations

- Develop and promote green energy zones through infrastructure upgrades, incentives, eco-industrial parks, and inclusive planning.
- Advance regional electricity integration through harmonized regulations, joint infrastructure, and enabling cross-border electricity trade.
- Mobilize financing and ensure transparency in project procurement, with strong environmental and social safeguards.

COP29 Hydrogen Declaration

Introduction

This declaration unites governments and stakeholders in a commitment to scale up renewable and low-carbon hydrogen as a key solution for industrial decarbonisation, clean energy integration, and climate goals.

Key Details

- Recognises hydrogen's critical role in hard-to-abate sectors like steel, shipping, and aviation.
- Notes that current hydrogen supply is 96% fossil-based, emitting over 900 Mt CO_2/year, with less than 1 Mt from clean sources.
- Stresses the urgency of transitioning existing hydrogen production to low/zero-emission pathways..

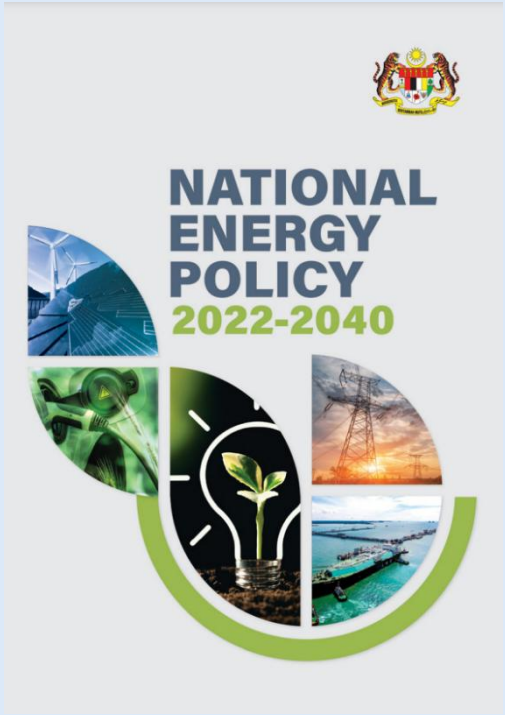
Key Obligations

- Scale up clean hydrogen production and decarbonize existing fossil hydrogen, especially in industrial end-uses.
- Establish global certification and standards to support hydrogen trade and carbon intensity verification.
- Enable just transitions, skills development, international cooperation, and research into scalable hydrogen solutions.

Source: ASEAN Energy in 2025 – ASEAN Centre for Energy (ACE); COP29 Website

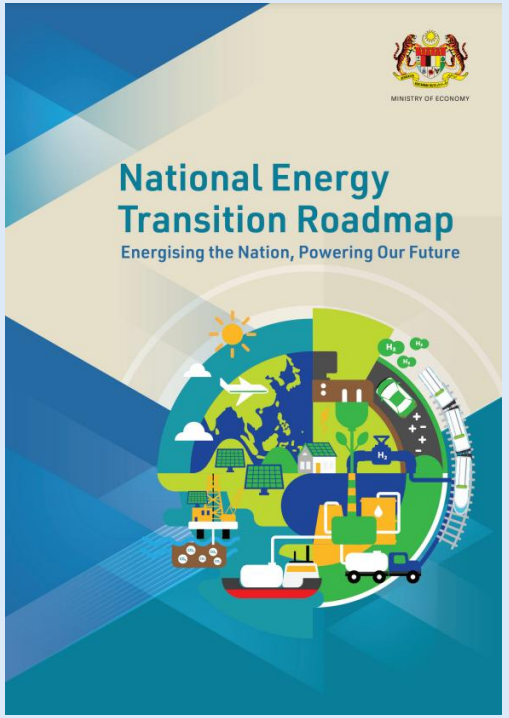
Aligned with international obligations, Malaysia's National Energy Policy (DTN) and National Energy Transition Roadmap (NETR) drives the country's shift towards a low-carbon, resilient economy by phasing out coal, increasing renewable energy to 23% by 2050

National Energy Transition Policy 2022 – 2040 (DTN)



- **DTN outlines Malaysia's aspirations, objectives, strategies and enablers to support WKB 2030** and 2030 Agenda
- The energy sector drives economic growth, contributing **28% of GDP, employing 25% of the total workforce.**
- It is also a major source of national income, with petroleum-related revenues making up 31% of fiscal income and energy exports accounting for 13% of total exports.
- Beyond economic contributions, the sector supports **over 10 million consumers** with electricity and ensures fuel supply for transportation, enabling mobility.

National Energy Transition Roadmap (NETR)



- **Malaysia's blueprint for transitioning to a low-carbon economy**, aiming to shift from fossil fuel dependency to greener energy sources by 2050.
- NETR includes **50 initiatives under six energy transition levers and five enablers**, with 10 flagship projects announced in 2023. A mix of grants, loans, incentives, and investments will finance the transition, expected to uplift GDP from RM25 billion (2023) to RM220 billion (2050) and create 310,000 jobs.
- Malaysia continues to benefit from domestic oil and gas (13% of GDP in 2021), ensuring energy security at affordable prices.
- However, climate change, urbanization, and evolving lifestyles necessitate a sustainable energy transition.

Source: National Energy Policy 2022 – 2040; National Energy Transition Roadmap; PASB Analysis

NETR identified 8 key challenges in Renewable Energy that would need to be addressed in order to ensure rapid and effective energy transition to renewables

1 Scattered LSS Development and Lengthy Permits Increase Costs

The fragmented rollout of LSS projects and prolonged permitting processes result in higher fixed development costs, reducing the scalability and impact of LSS on national RE targets.

2 Regulatory Barriers Stifle Solar Innovation

The technology-agnostic LSS bidding mechanism discourages adoption of innovative solar technologies such as floating solar and agrivoltaics systems.

3 Land Acquisition Delays Limit RE Expansion

Prolonged and complex land acquisition processes are a bottleneck for scaling up RE projects, particularly in large-scale solar deployment.

4 NOVA Programme is Too Exclusive

The Net Offset Virtual Aggregation (NOVA) programme is limited to commercial and industrial users, preventing broader adoption across other segments (e.g. residential or community-based systems).

5 Grid Infrastructure Misalignment Hampers RE Integration

There is a lack of alignment on grid investment timing, quantification, and funding, making it difficult to integrate higher shares of RE into the national grid.

6 Need for Transparent TPA Framework

A Third-Party Access (TPA) regulatory framework is needed to address supply-demand mismatches, especially to facilitate corporate green power procurement.

7 No RE Exchange Platform Limits Market Efficiency

The absence of a renewable energy trading platform prevents Malaysia from benefiting from price premiums through exports and reserve sharing.

8 Lack of Transparent Price Discovery Mechanism

There is currently no clear price discovery process for willing buyer-willing seller RE transactions, reducing market competitiveness and investor confidence.

Source: NETR

In order to address these challenges, NETR is structured the strategy in two parts: Part 1 focuses on catalytic projects and transition levers, while Part 2 sets targets, pathways, and frameworks to sustain long-term decarbonisation and energy transition efforts

NETR Part 1

Energy Transition Levers	10 Flagship Catalyst Projects
Energy Efficiency	Energy Switch
Renewable Energy	Renewable Energy Zone Energy Storage Energy Secure
Hydrogen	Green Hydrogen Hydrogen for Power
Bioenergy	Biomass Demand Creation
Green Mobility	Future Mobility Future Fuel
CCUS	CCS for Industry

NETR Part 2

Establish low carbon pathway, energy mix and emission target reduction for the energy sector

Energy transition ambition and macro position

Energy transition levers

- Energy Efficiency
- Renewable Energy
- Hydrogen
- Bioenergy
- Green Mobility
- CCUS

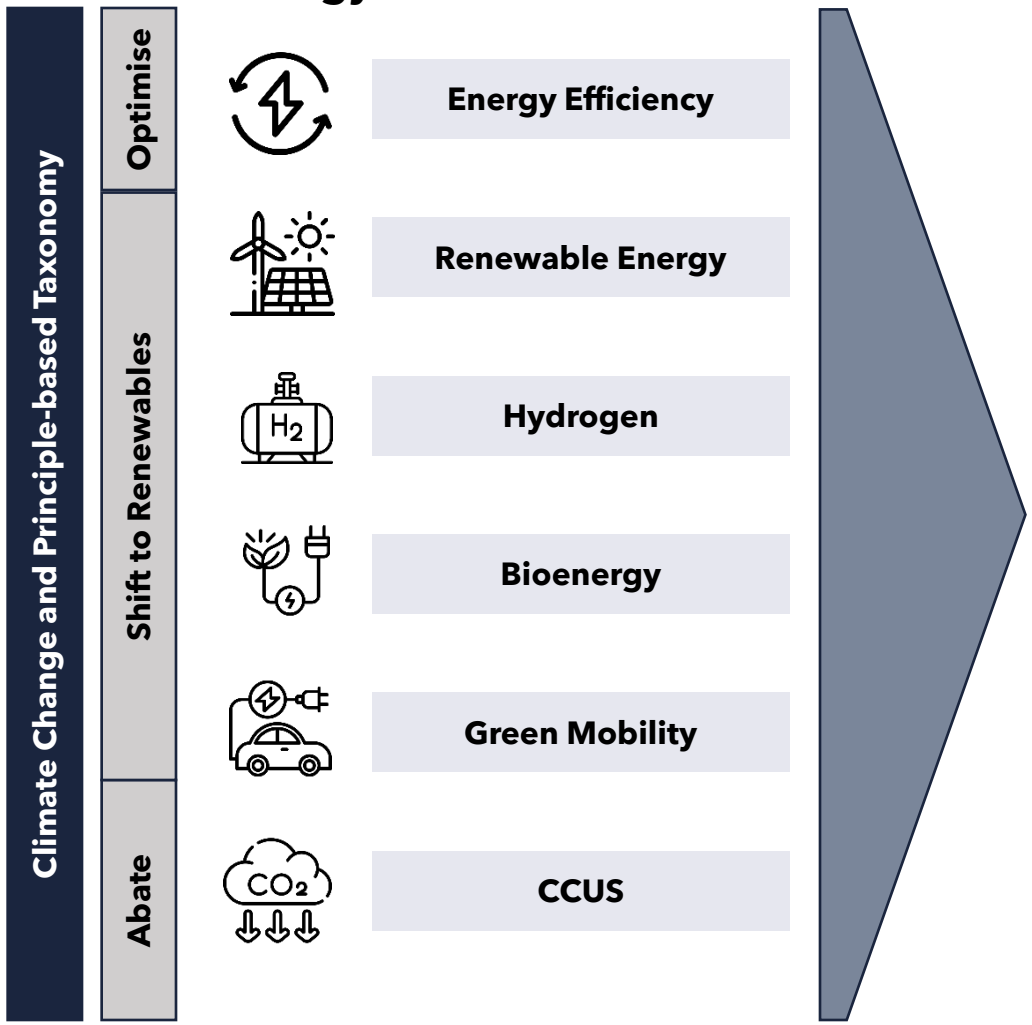
Cross-cutting Enablers

- Financing and Investments
- Human Capital and Capabilities
- Policy and Regulation
- Technology and Infra.
- Governance

Source: NETR

Malaysia's energy transition strategy prioritises renewables, hydrogen, and green mobility to cut emissions, create economic opportunities, and boost inclusivity–supported by ambitious RE targets and cross-border electricity trade reforms

Energy Transition Levers



Prioritisation Criteria

- **Emission reduction potential**: Advancing green growth and enhancing sustainability to become a low-carbon nation while addressing energy trilemma.
- **Economic opportunities**: Propelling strategic and high impact industries, especially for SMEs, strengthening investments and create job opportunities.
- **Cost effectiveness**: Promoting investments, especially in nascent technologies to yield long-term benefits.
- **Social inclusiveness**: Strengthening the security, wellbeing and inclusivity through clean energy sources that would benefit communities without compromising future generations.

National RE Policy

- **Increase the target for installed RE capacity from 40% in 2040 to 70% by 2050. The higher target is expected to generate new economic opportunities by attracting multinational companies, especially RE 100 companies, to operate in Malaysia**
- **Expand RE development based on the concept of a self-contained system to encourage investment in the RE value chain and diversify RE programmes according to the principle of willing buyer, willing seller**
- **Scale-up the installation of solar systems in government buildings**
- **Allow cross-border RE trade through the establishment of an electricity exchange system**

Source: NETR

Malaysia's NETR adopts a "Responsible Transition" scenario as its best-fit path to achieve net-zero by 2050 – balancing decarbonisation with socioeconomic gains, while remaining flexible to recalibrate targets in line with emerging technologies

NETR Responsible Transition Pathway

Broad-based energy efficiency initiatives through demand-side management across key sectors to reduce wastage and extend the lifespan of indigenous energy resources

Increased use of RE in the power generation mix

Close to fully phased-out coal from the power generation mix

The shift to electrification and biofuels expedited in the transport sector

Sector	Key Driver	2040 DTIN Low Carbon Nation Aspiration	2050 NETR Responsible Transition
Renewable Energy	Coal share of installed capacity (%)	19%	0%
	RE share of installed capacity (%)	41%	70%
Hydrogen	Green hydrogen production (MTPA)	N/A	Up to 2.5 MTPA
	Grey hydrogen feedstock phase off (%)	N/A	100%
	Hydrogen hubs (#)	N/A	3
Bioenergy	Biofuel capacity (billion litres)	N/A	3.5
	Bioenergy power generation (GW)	N/A	1.4

Source: NETR

Malaysia's energy transition is accelerating with strong solar growth and coal reduction, yet natural gas will remain essential through 2033 to ensure supply security amid rising industrial and digital demand

Shift Toward Renewables

- Malaysia is actively expanding its renewable energy (RE) share, with solar energy at the forefront.
- Government-led initiatives like the Large-Scale Solar (LSS) schemes (e.g., LSS5) and Net Energy Metering (NEM) for rooftops are driving solar adoption, expected to grow at 10.2% annually from 2024 to 2033.
- RE policies align with the National Energy Transition Roadmap (NETR), targeting 70% RE installed capacity by 2050.

Fossil Fuels Still Dominate

- Despite RE growth, fossil fuels—especially natural gas—remain the backbone of Malaysia's energy mix through 2033.
- Gas will become the dominant fuel by 2031, making up 41% of electricity generation by 2033.
- This continued reliance is driven by the need to ensure stable supply amid rising demand and gradual coal phase-out.

Coal Phase-Out Strategy

- Coal's role in the energy mix will decline significantly, from 46% in 2024 to 36% by 2033, with full phase-out planned by 2044.
- This reduction will be offset by increased use of gas as a transition fuel to ensure supply security.

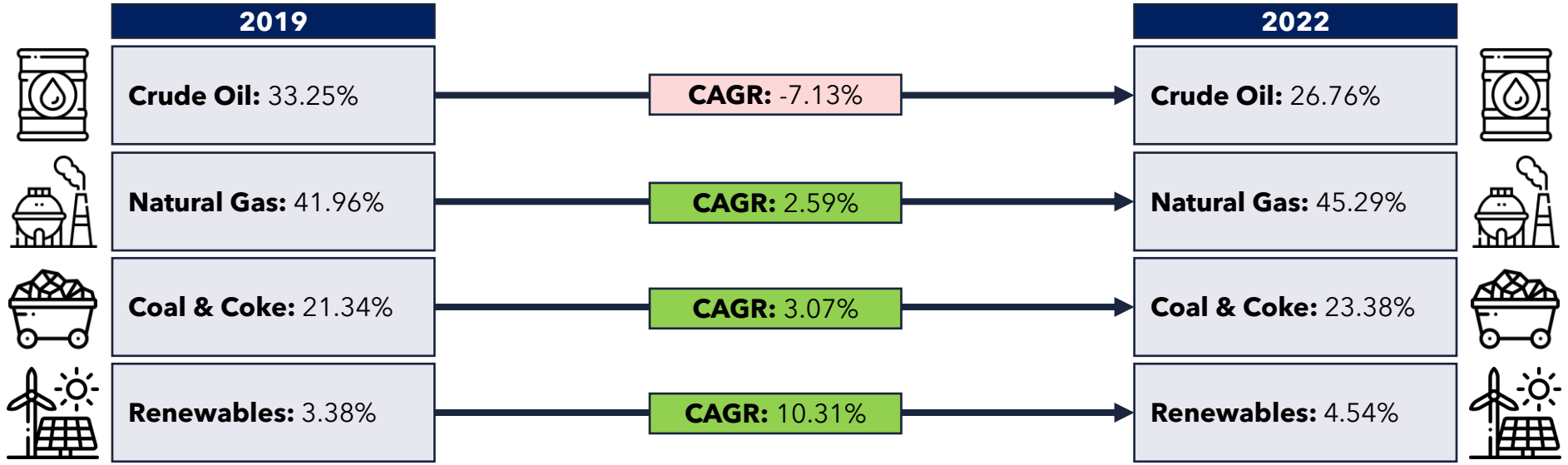
Energy Policy Alignment

- Malaysia's approach balances climate ambition with energy reliability, using fossil fuels as a bridge while scaling renewables.
- The shift is structured, phased, and tied closely to industrial and digital growth sectors (e.g., manufacturing, data centres) that demand secure power supply.

Source: TNB, PASB Analysis

Malaysia's energy mix from 2019–2022 shows stable reliance on natural gas, declining crude oil use, fluctuating coal dependence, and slow but steady growth in renewables, signaling a gradual shift toward cleaner energy

Malaysia Historic Primary Energy Supply by Fuel Type 2019 – 2022, % Percentage of Total

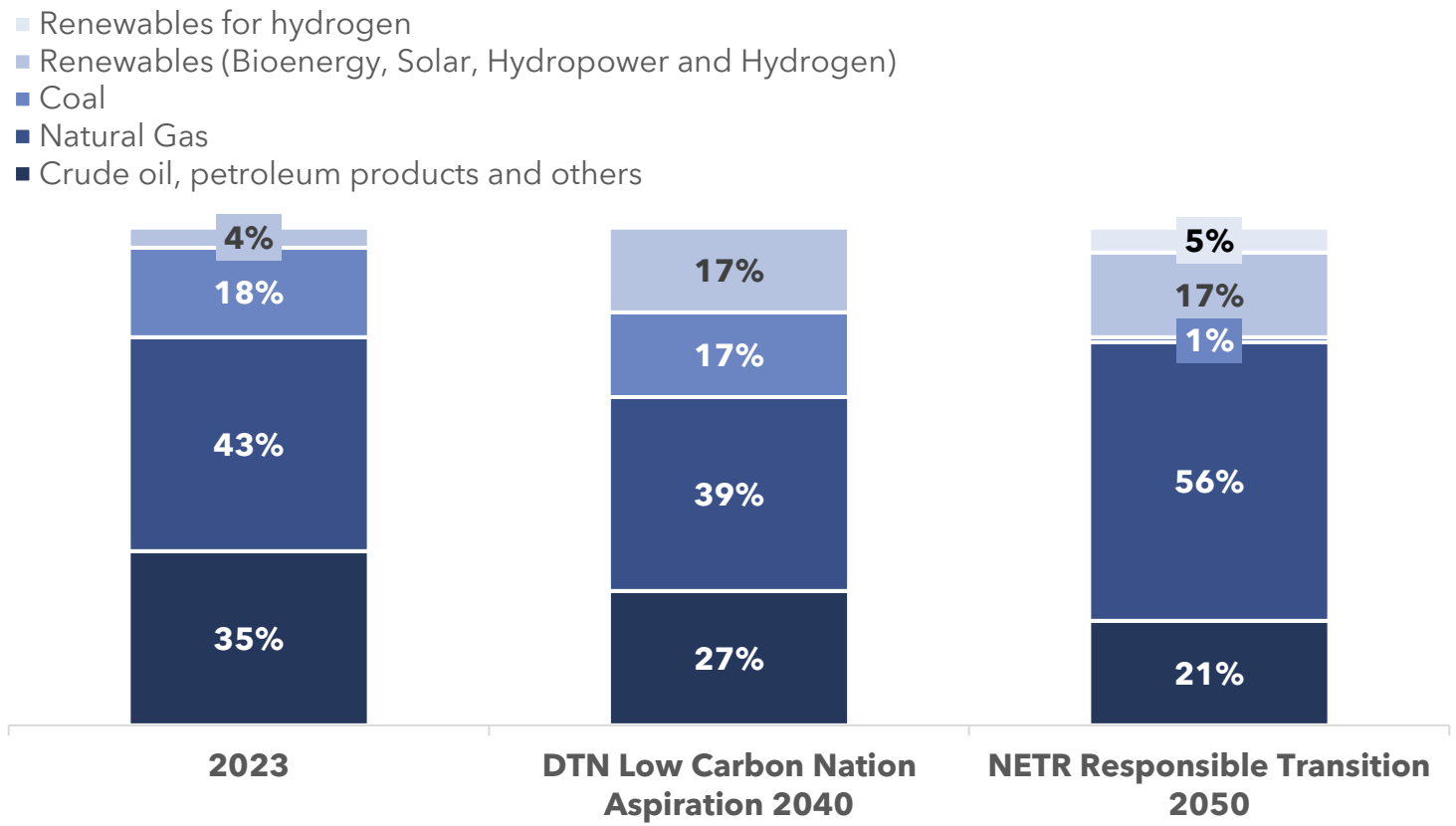


Year	Crude Oil	Natural Gas	Coal & Coke	Others	Renewables - Biodiesel	Renewables - Biogas	Renewables - Biomass	Renewables - Hydro Power	Renewables - Solar
2022	26.76%	45.29%	23.38%	0.03%	1.18%	0.13%	0.22%	2.72%	0.29%
2021	25.69%	45.43%	24.62%	0.04%	0.89%	0.11%	0.16%	2.87%	0.19%
2020	27.34%	42.37%	26.30%	0.07%	0.84%	0.15%	0.25%	2.49%	0.19%
2019	33.25%	41.96%	21.34%	0.07%	0.66%	0.11%	0.20%	2.28%	0.13%

Source: NETR, Suruhanjaya Tenaga; PASB Analysis

By 2050, coal will be nearly eliminated from Malaysia's energy mix–dropping from 18% to just 1%–as the country transitions toward cleaner sources like natural gas and renewables under the NETR Responsible Transition pathway

Malaysia Projected Total Primary Energy Supply (TPES) by 2050



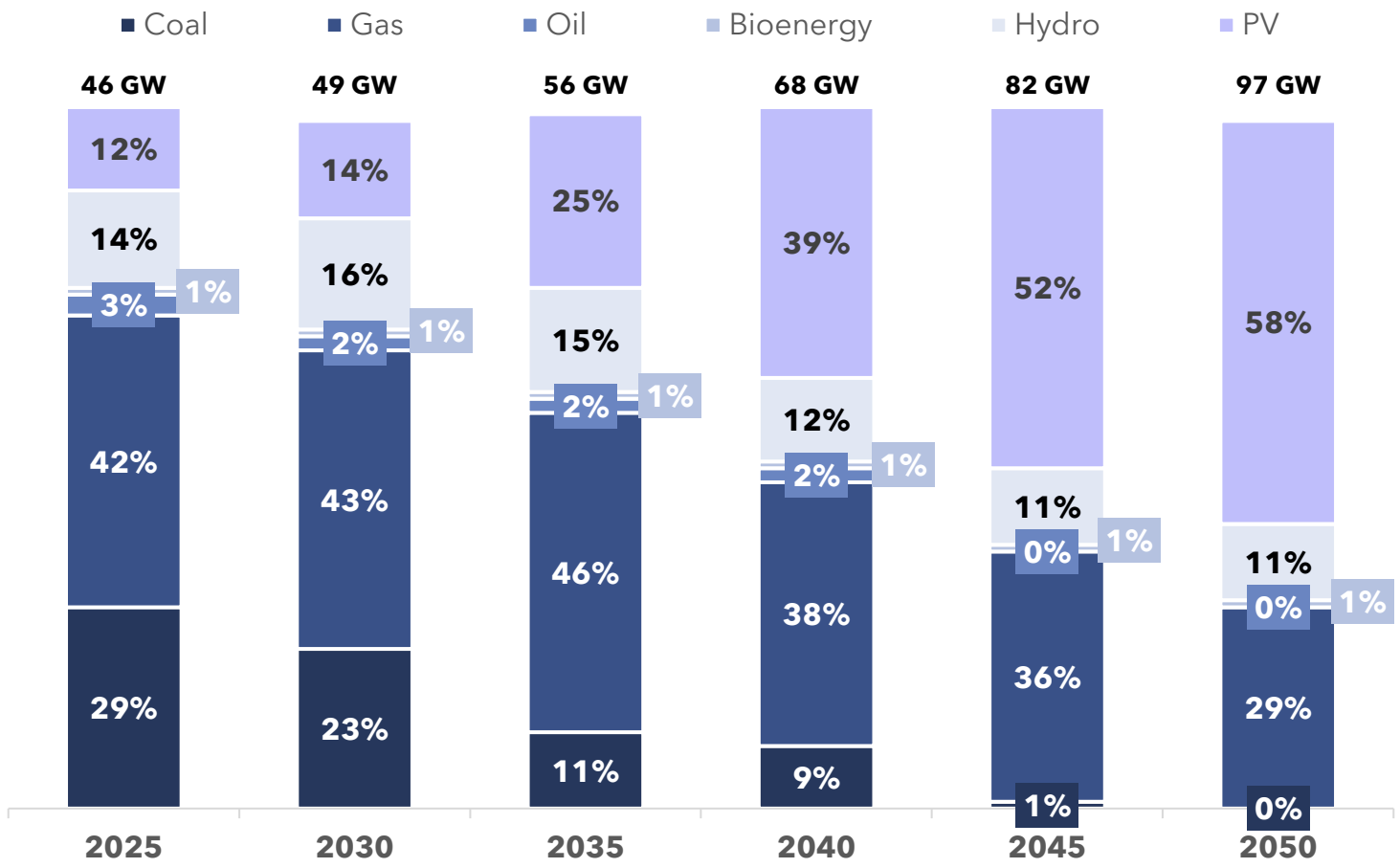
Source: NETR, PASB Analysis

Key Insights

- **Coal to Be Nearly Eliminated by 2050:** Under the RT pathway, coal will be almost fully phased out from Malaysia's Total Primary Energy Supply (TPES), dropping from 18% in 2023 to just 1% by 2050 – signaling a major structural shift in the national energy mix.
- **Renewables Will Rise Fivefold:** Renewables (including solar, hydro, bioenergy, and hydrogen) will grow significantly, from 4% in 2023 to 22% in 2050, supported by energy storage and RE imports to address intermittency.
- **Natural Gas as Transition Backbone:** Natural gas will remain central to the energy system, making up 56% of TPES by 2050, reflecting its role as a transitional fuel while renewables and storage scale up.

By 2050, Malaysia's installed power capacity will be dominated by solar PV, replacing coal, while natural gas remains essential for steady generation due to solar's lower capacity factor and reliability limits

Malaysia Projected Power System Installed Capacity Mix 2050 and Installed Capacity (GW)



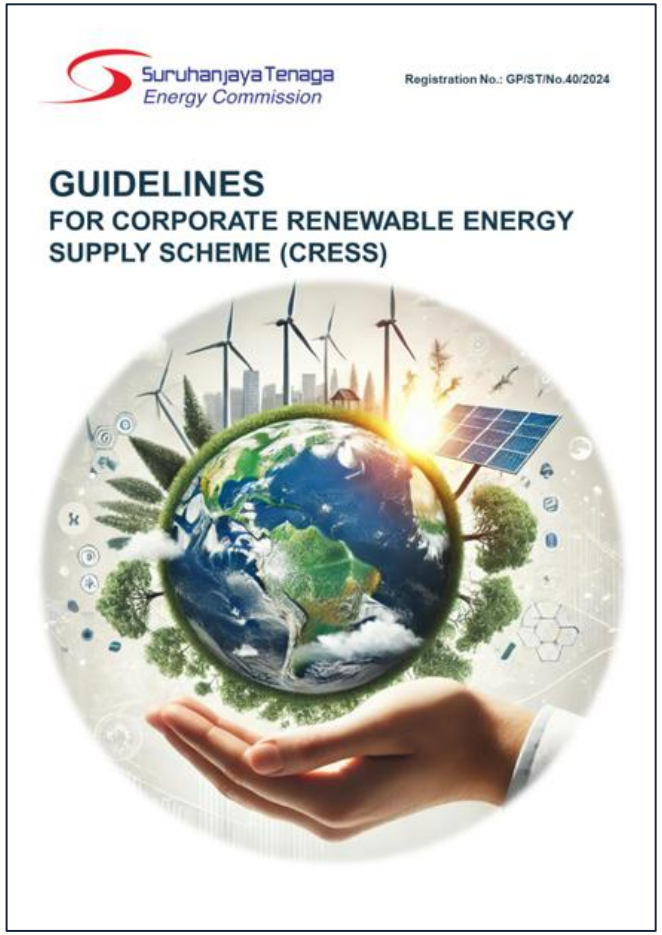
Source: NETR, PASB Analysis

Key Insights

- **RE Will Dominate Installed Capacity, But Not Generation Mix:** While renewables will make up the majority of installed capacity by 2050, their actual contribution to electricity generation will be lower than fossil fuels, especially natural gas, due to solar's lower capacity factor.
- **Coal-Fired Power Will Be Phased Out:** Coal's share will decline as no new coal plants are developed and existing ones retire naturally, leading to an almost complete phase-out by 2045.
- **Natural Gas as a Transition Fuel:** Natural gas will serve as a lower-carbon baseload option, replacing coal as the dominant fossil fuel for steady power supply.
- **Solar PV Will Drive the 70% RE Target:** Achieving the 70% RE share by 2050 will rely heavily on solar PV, requiring rapid capacity growth to reach 59 GW by 2050

In order to support this transition to renewables, Malaysia has introduced CRESS which enables Malaysian corporates to secure clean energy through virtual agreements, advancing renewable adoption, thus supporting NETR goals

Corporate Renewable Energy Supply Scheme (CRESS)



Objective

CRESS is Malaysia's flagship mechanism designed to enable corporate buyers to directly procure renewable electricity from third-party renewable energy generators through virtual power purchase agreements (VPPAs) and other corporate procurement models.

Mechanism Structure

- It allows offsite renewable energy procurement, where corporates can lock in clean electricity supply at agreed prices without being physically connected to the renewable project.
- This accelerates renewable energy adoption by industries, especially in energy-intensive sectors.

Capacity & Rollout

- The scheme supports up to 800 MW of renewable energy capacity, marking a significant step to expand corporate renewable procurement and diversify the country's clean energy investment ecosystem.

Policy Context

- CRESS complements Malaysia's broader renewable energy targets under the National Energy Transition Roadmap (NETR) and is intended to stimulate private sector leadership in the energy transition.

Relevance to Industry

- This is especially relevant for data centres, industrial parks, and export-driven manufacturers, aligning corporate decarbonisation goals with Malaysia's clean electricity offerings.

Source: Guidelines For Corporate Renewable Energy Supply Scheme (CRESS); PASB Analysis

Malaysia is generating enough energy surplus to power new major development projects as well as grow its exports for now, however, will need to continue to grow renewable energy production and accelerate the energy transition to keep pace with development

"Taken together with various energy-focused projects in all states and regions of Malaysia ... we are confident of a surplus of energy that feeds developments such as the JS-SEZ, as well as have enough to grow our exports of energy"

Prime Minister Datuk Seri Anwar Ibrahim
26th September 2024

- **Push For Net Zero:** Prime Minister Datuk Seri Anwar Ibrahim said the government would continue to pursue renewable energy and energy transition initiatives, as it aims to achieve net-zero emissions by 2050, while still focusing on projects like the Johor-Singapore SEZ
- **Data Centre Energy Demands:** Johor is expected to see a rise in energy demand, having attracted large investments in data centre facilities in recent years from tech giants such as Nvidia, and China's ByteDance
- **Broader Advanced Technology Energy Demands**: To meet the demands of cloud computing and artificial intelligence (AI), investments in data centers in Malaysia have surged
- **Potential Risks:** However, this has raised concerns about the shortage of power and water in Selangor, Johor. Local governments have stated that they will prioritize domestic needs and encourage future data centers to use green energy

Source: Malay Mail; Reuters; PASB Analysis

Malaysia should strongly consider the development of nuclear energy to meet exponentially intensifying energy demands of a high-tech future

- Malaysia is readying itself for the likely use of nuclear energy after 2035 as it struggles to meet renewable energy and net-zero carbon emission targets.
- The Malaysian Cabinet, after discussing in late November a nuclear road map proposed by the National Energy Council (MTN), decided that nuclear is "one of the options of electrical power generation" post-2035.
- The paper by the MTN – chaired by Prime Minister Anwar Ibrahim with several other ministers as members – was prepared after the Cabinet requested it in April 2024.

Historically, the average construction time for nuclear reactors has been around 8.8 years, with a median of 8.4 years. As such, it is worth considering nuclear energy as an option now.

Nuclear Energy: A Critical Component of the ASEAN Energy Mix?

- Malaysia's move follows in the footsteps of neighbouring Indonesia and Singapore, which have both made forays into energising their grids with nuclear energy.
- Indonesia is set to begin testing its first reactor in 2028, the first of more than 20 nuclear plants slated to be introduced by 2050.
- Singapore inked a 30-year deal known as a 123 Agreement on Nuclear Cooperation with the United States in July, which will allow the Republic to access the latest nuclear technology from American organisations, although no firm decision has been made on deploying nuclear plants.

Source: Nuklear Malaysia, Straits Times; PASB Analysis

As Johor aims to strengthen its energy ecosystem, it must move up the value chain from fossil-based generation toward clean, decentralised, and technology-driven energy systems

Different tiers of chemical & petrochemical value creation

As we move from left to right…

- Johor transitions from fossil-based, centralised energy systems toward sustainable, decentralised, and innovation-led clean energy infrastructure
- Increasing emphasis on decarbonisation, digitalisation, and value-added energy exports (e.g., hydrogen, smart systems)
- Requires enhanced grid readiness, clean energy financing, and future-ready talent
- Johor must position itself as a regional hub for low-carbon energy production, technology localisation, and industrial decarbonisation

Tier 1: Fossil Fuel Extraction and Refining

- Conventional energy supply: coal, natural gas, oil-based power plants
- Includes refining, gas processing, and captive generation for industry
- Capital-intensive and reliable, but high in carbon emissions and vulnerable to future carbon pricing
- Johor is well-established here: RAPID (gas processing, cogeneration), Tanjung Bin (coal), Sultan Iskandar (gas)

Tier 2: Grid-Tied Renewable Energy (RE) Deployment

- Solar PV, small hydro, biomass connected to the national grid
- Clean but still dependent on centralised grid infrastructure and demand-side uptake
- Moderate local value-add (e.g., EPC contractors, O&M)
- Existing early-stage solar projects in Pontian and Pasir Gudang, but capacity remains <100 MW

Tier 3: Distributed & Smart Energy Systems

- Rooftop solar, energy storage systems, microgrids, virtual power plants
- Offers energy resilience for industrial zones and high-load areas
- High local integration value – supports local installers, aggregators, software developers
- Johor has potential to scale this in Senai, Pasir Gudang, Iskandar, and port areas
- Requires grid modernisation and new regulatory models (e.g., peer-to-peer trading, third-party access)

Tier 4: Clean Fuels & Carbon Mitigation Solutions

- Green hydrogen, ammonia, biomass infrastructure, low-carbon fuels
- Supports industrial decarbonisation and cross-border green energy trade
- R&D and infrastructure-intensive, but positions Johor in high-value regional clean fuel markets
- Potential in Pengerang and Langsat for hydrogen bunkering/export
- Aligned with global ESG standards and corporate net-zero commitments

Tier 5: Energy Technology Innovation & Export Ecosystems

- Local manufacturing of clean energy systems: PV modules, electrolysers, batteries, EV infrastructure
- IP creation and localisation of smart grid software, energy analytics, and automation tools
- High-value, export-oriented – often involves collaboration between MNCs, universities, and startups
- Johor can become a manufacturing and innovation base for Southeast Asia's energy transition supply chain
- Aspirational goal: establish Johor as a Clean Energy Tech & Export Hub for ASEAN

Where Johor's energy industry could focus on:

- Transitioning from Tier 2 to Tiers 3–5: From deployment to innovation and value-added export
- Building smart grids, hydrogen hubs, and industrial microgrids
- Establishing RE-linked industrial zones with digital energy infrastructure
- Incentivising R&D localisation and clean tech manufacturing
- Upskilling talent for solar, hydrogen, battery systems, and digital energy technologies

The energy industry's value chain spans from resource extraction to end-user consumption and circular energy services, playing a foundational role in powering economic activity, industrial output, and sustainable development

Value Chain of the Energy Industry

Upstream: Resource Extraction & Production

Activities:
- Exploration, extraction, and production of primary energy resources.
- Includes both fossil fuels (e.g., oil, gas, coal) and renewables (e.g., solar, wind, hydro, biomass).

Examples of Resources:
- Crude oil
- Natural gas
- Coal
- Nuclear (Uranium, thorium, etc)
- Solar irradiance
- Wind
- Hydropower
- Biomass

Midstream Processing, Storage & Transmission

Activities:
- Transportation of energy via pipelines, transmission lines, tankers.
- Storage of energy (gas terminals, pumped hydro, battery storage).
- Initial processing such as refining or liquefaction.

Examples of Infrastructure:
- LNG terminals
- Gas pipelines
- HVDC transmission lines
- Grid-scale batteries
- Oil refineries

Downstream Distribution & Retail Supply

Activities:
- Conversion and delivery of energy to final customers (electricity, gas, fuels).
- Operation of distribution grids and retail energy services.
- Energy pricing, billing, and service management.

Examples of Outputs:
- Electricity
- Gas for households or industry
- Refined fuels (petrol, diesel, aviation fuel)
- District heating

End Use & Services Decarbonisation, Digitisation and Demand-Side Innovation

Activities:
- Consumption by residential, commercial, industrial, and transport sectors.
- Energy efficiency improvements, electrification of end-use, and adoption of smart grids.
- Circular models: carbon capture, energy recovery, and grid feedback via prosumers

Examples of Applications:
- Powering homes, factories, vehicles;
- Smart meters and home energy management;
- Rooftop solar (prosumer generation);
- EV charging infrastructure;
- Energy-as-a-Service (EaaS)

Source: National Energy Transition Roadmap (NETR); National Energy Policy 2022–2040 (NEP 2040); PASB Analysis

Maju Johor 2030 positions Energy as a strategic enabler for sustainable growth, with focus on clean energy, industrial decarbonisation, and regional energy connectivity

Energy as a Strategic Sector for Industrial Transformation

The energy sector – particularly clean and low-carbon energy – plays a key enabling role in Johor's push toward sustainable industrialisation and green economic growth.

Johor's strong oil & gas base, combined with emerging solar, hydrogen and wind capabilities, positions it to drive industrial energy transition and attract green tech investment.

Clean energy will support Johor's ambitions to anchor energy-intensive industries, modern logistics hubs, and digital infrastructure (e.g., data centres, smart manufacturing).

Renewable & Clean Energy Prioritised in Maju Johor 2030

Energy is among the key focus areas under Maju Johor 2030's strategic investment themes. Initiatives include:

- Scaling up solar and renewable energy capacity, including floating and rooftop solar
- Attracting global clean energy investors (e.g., Tesla, Gentari, Masdar)
- Supporting the development of hydrogen, electric vehicles (EV), and green fuel infrastructure
- Greening energy supply to support high-value sectors like E&E, logistics, and petrochemicals

Johor as a Regional Clean Energy Gateway

Johor's proximity to Singapore and strong port infrastructure (e.g., Pengerang, Tanjung Langsat, PTP) position it as a clean energy export hub.

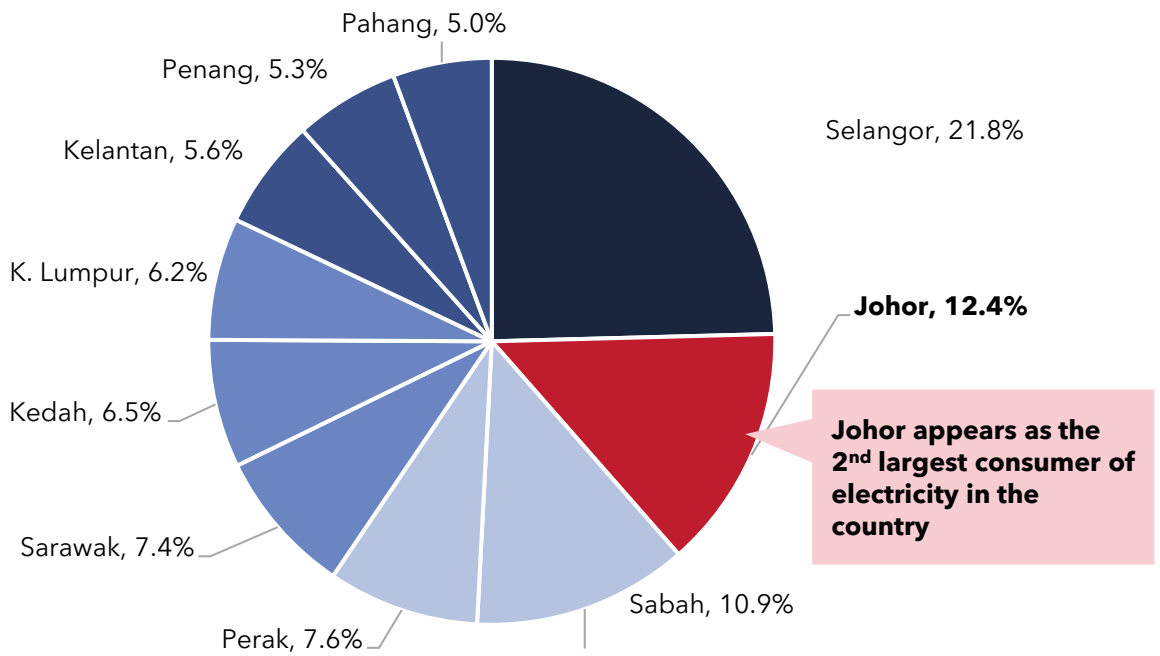
Johor is exploring cross-border electricity trade and green hydrogen cooperation under the Johor–Singapore SEZ and ASEAN Power Grid.

The state is also advancing industrial decarbonisation in areas like PIPC, Pasir Gudang, and Senai through electrification, energy efficiency, and potential carbon capture hubs.

Source: Maju Johor 2030, Johor State Government, MITI, The Star, The Edge Malaysia, KASI Asia, SEZ MOU (2024)

Johor is the 2nd largest electricity consumer in Malaysia (12.4%), driven largely by the rapid growth of its data centre industry – which alone could demand over 5,000 MW by 2035, posing major energy security and sustainability challenges

Estimates on Electricity Consumption by Top 10 States[1] (2023), %



Johor appears as the 2nd largest consumer of electricity in the country

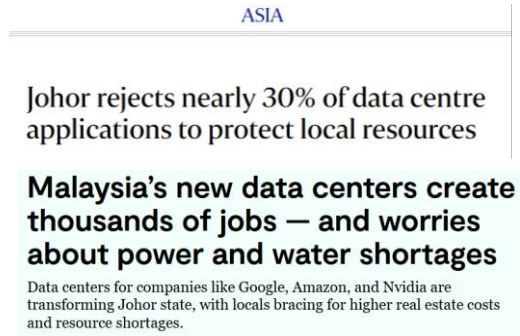
- According to estimates, Johor ranks as the **2nd largest consumer of electricity in the country**, driven by its growing population and expanding economic activities.
- As Johor emerges as a leading regional hub for data centers, concerns are mounting over potential power shortages and the ability to sustain the increasing energy demands of these high-consumption facilities

Johor Data Center Landscape

1st	Johor ranks the largest data centre market in Malaysia
9th	Johor ranks 9th largest data centre market in APAC
39	Johor has 39 data centers, operated by 27 providers
13	Currently there are 13 data centers under construction

"Electricity demand from data centers could exceed 5,000 MW by 2035, or nearly a fifth of the installed capacity of Peninsular Malaysia where Johor is located"

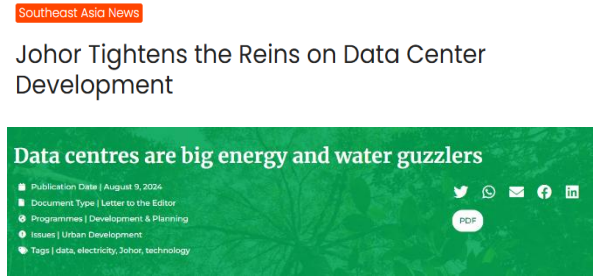
Tenaga Nasional Berhad (TNB)


ASIA

Johor rejects nearly 30% of data centre applications to protect local resources

Malaysia's new data centers create thousands of jobs — and worries about power and water shortages

Data centers for companies like Google, Amazon, and Nvidia are transforming Johor state, with locals bracing for higher real estate costs and resource shortages.


Southeast Asia News

Johor Tightens the Reins on Data Center Development

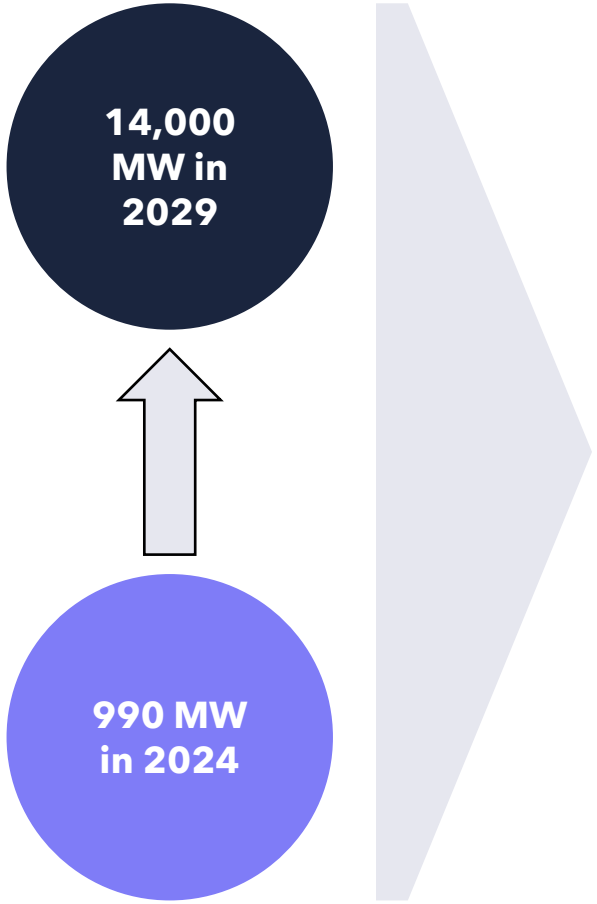
Data centres are big energy and water guzzlers

Publication Date | August 9, 2024
Document Type | Letter to the Editor
Programmes | Development & Planning
Issues | Urban Development
Tags | data, electricity, Johor, technology

PDF

Note: [1]Energy consumption is assumed to be directly proportional to the size of the population, neglecting other factors
Source: DOSM, Global Challenges, Baxtel, PASB Analysis

Malaysia's explosive data centre growth that is concentrated in Johor is set to dramatically increase energy demand, highlighting urgent needs for power grid upgrades, sustainable energy planning, and diversified generation to avoid severe supply bottlenecks



Tenaga Nasional Bhd (TNB) has already received applications for 2,000MW from 10 data centres, raising concerns about power shortages unless new capacity is added, which could take over four years

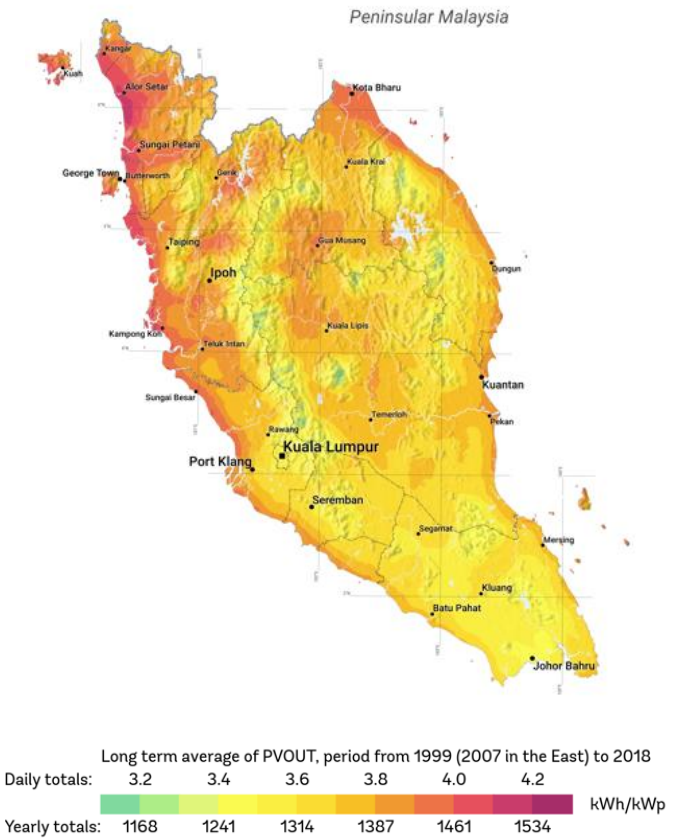
- **Energy Demand & Sustainability**: Industry experts suggest nuclear power as an alternative if fossil fuel-based reserves are insufficient. TNB's renewable energy expansion may not meet demand in the near term.
- **Water Usage**: A 100MW data centre consumes 4.2 million litres of water daily, equating to a city of 10,000 people, highlighting potential shortages.
- **Construction & Infrastructure Needs**: More investment in power grids, internet exchanges, fiber optics, and cable landing stations is expected. Companies like Gamuda Bhd & IJM Corp Bhd are poised to benefit due to their advanced industrial building system, enabling faster data centre construction.

Malaysia's (and by extension Johor's) data centre boom will drive energy and infrastructure expansion, benefiting key players like TNB, TM, Gamuda, and IJM Corp. Johor's rapid emergence as Malaysia's top data centre hub, with projected demand exceeding 5,000 MW by 2035, highlights urgent energy infrastructure needs to support digital growth and prevent future grid strain.

Source: Public Invest; New Straits Times; PASB Analysis

Johor's abundant solar-suitable land, stable irradiance, and proven high-efficiency PV performance position it as a key regional solar energy hub, despite challenges from humidity and rainfall that require robust system design

Malaysia – Photovoltaic Power Potential



What is Photovoltaic Power Potential?

Photovoltaic power potential refers to the maximum amount of solar electricity that can be generated by converting sunlight into electricity using photovoltaic (PV) technology at a given location over a year.

Johor - Photovoltaic Power Potential

Stable Solar Resource

- Johor enjoys consistent, high solar irradiance year-round, with average monthly global solar radiation between 6.79–6.79 kWh/m², supported by stable sunrise/sunset patterns near the equator.
- The clearness index of 0.65–0.7 supports steady solar energy production with minimal seasonal variation, favoring both utility and rooftop PV.

Largest Solar Landbank

- Johor offers 601,202 acres (24.11%) of optimal solar-suitable land, making it the largest identified PV development landbank in Malaysia.
- This enables large-scale projects and solar clusters, ideal for both domestic power generation and potential green energy exports via cross-border connections.

Benchmark Project Efficiency

- Johor's existing PV systems, such as UTHM's 6.9 MWp plant, show high performance ratios (78%) and final yields over 100%, demonstrating proven technical viability and financial returns.
- These metrics, combined with CO_2 savings of 5,450 tons annually, highlight strong climate and economic benefits for scaling solar in Johor..

Manageable Climate Challenges

- Johor's high humidity and rainfall pose efficiency and O&M challenges, but can be mitigated with bifacial panels, anti-soiling coatings, and robust cleaning protocols.
- Proximity to industrial centers and strong grid infrastructure enhances PV integration feasibility, reducing curtailment and optimizing solar economics.

Source: World Bank Group; Global Solar Atlas; "Challenges and Practices in the Land Administration of Solar Farming Development in Johor, Malaysia" – Rohani, Sahid & ors; "Johor's leap towards sustainable energy dominance" – MIER; PASB Analysis

Johor contains significant prospects to function as a hydrogen hub, evidenced by substantial interest in hydrogen investments in the state, supporting Malaysia's green economy and regional energy exports

Hydrogen Potential in Johor

1

MAHARANI ENERGY GATEWAY

Maharani Energy Gateway (MEG)

A US$2 billion project in Muar, Johor, MEG aims to establish a combined cycle gas turbine power plant and a green hydrogen and ammonia plant. This initiative is set to bolster Malaysia's green energy landscape and create approximately 45,000 job opportunities

2

gentari

CityEnergy
Good Energy for our City

Gentari x City Energy - Feasibility Study On Potential For Hydrogen Export To Singapore

Gentari, Petronas' renewable energy arm, is conducting a feasibility study with Singapore's City Energy to export low-carbon hydrogen via a pipeline from Johor to Singapore, targeting operational readiness by 2027.

3

TLP Terminal
A JCORP Company

Potential of Tanjung Langsat Port

Identified as a strategic location for hydrogen-related activities, the port is set to become a hub for ammonia importation and hydrogen fuel supply, supporting both industrial power generation and marine transportation.

Source: Reuters; Malay Mail; Maritime Gateway

Investments such as the UEM Sunrise Renewable Energy Industrial Park are critical for Johor's renewable energy capacity, driving ecosystem growth, investment attraction, and supporting Malaysia's clean energy transition and industrial decarbonization ambitions

UEM Sunrise - Renewable Energy Industrial Park in Gerbang Nusajaya

Project Overview

The UEM Sunrise Renewable Energy Industrial Park in Gerbang Nusajaya, Johor, is a 40-acre project developing renewable energy generation, manufacturing, and research facilities, supporting Malaysia's energy transition and fostering investment in green technologies and EV ecosystems

Key Components

- **Renewable Energy Hub**: The park will feature a hub housing a state-of-the-art solar module factory and advanced research facilities, aimed at spurring the growth of Malaysia's energy transition and electric vehicle (EV) ecosystems.
- **Hybrid Solar Power Plant**: A one-gigawatt hybrid solar power plant project is part of the initiative, serving as a flagship catalytic project under NETR.
- **Research and Development (R&D) Center**: In collaboration with Gotion High-Tech, an R&D centre will be established within the park to focus on battery energy storage solutions (BESS) and power battery technology.

Strategic Importance

- **Location Advantage**: Gerbang Nusajaya's proximity to Singapore and access to major air and seaports enhance its appeal to international investors.
- **Economic Impact**: The development is expected to act as a crucial driver in Iskandar Puteri's economic growth and transformation, enabling the ecosystem surrounding renewable energy and EV value chains.
- **Job Creation**: The project is anticipated to create significant job opportunities, both directly and indirectly, contributing to the local economy.

Partnerships and Collaborations

- **Gotion High-Tech**:Partnering to develop the R&D centre focusing on battery technologies.
- **CMEC**: Collaborating on renewable energy, industrial parks, infrastructure, and data centers.
- **ITRAMAS**: Providing expertise in local market access and commercialisation, and collaborating with local organizations and academic institutions to foster innovation and develop local talent.

Source: UEM Sunrise; PASB Analysis

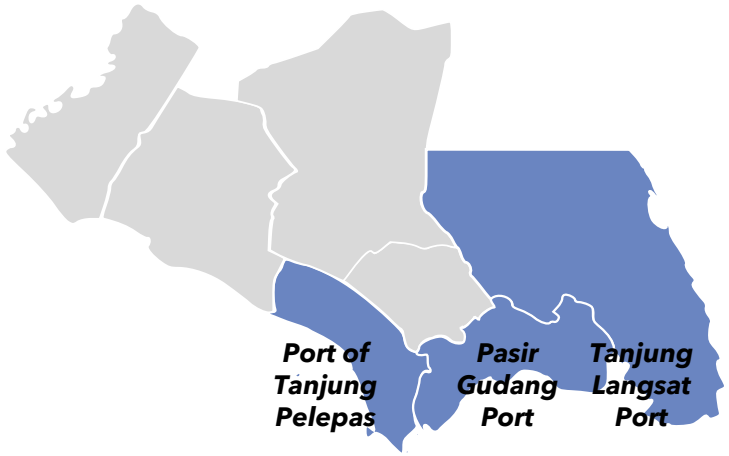
Learning from leading energy hubs, Johor must invest in infrastructure, innovation, and clean energy ecosystems to move up the value chain and strengthen its energy resilience and competitiveness

Case Examples	Key Success Factors	Selected Examples
Case Study 1: Texas Gulf Coast, USA Houston – Freeport – Corpus Christi Energy Corridor	• Integrated industrial-energy-port ecosystem with refining, LNG, hydrogen, and petrochemical infrastructure • Strategic co-location of pipelines, terminals, and skilled workforce • Strong public investment and regulatory support for clean hydrogen and CCUS projects	• Houston Ship Channel: home to over 500 energy companies (e.g., ExxonMobil, Shell, Chevron) • Gulf Coast Hydrogen Hub: USD 1.2B federal support; aims to produce 1 million tonnes/year of low-carbon hydrogen • CCUS corridors in Freeport and Port Arthur: shared infrastructure serving petrochemical clusters
Case Study 2: Rotterdam Energy Port, Netherlands Port of Rotterdam Hydrogen & Clean Energy Hub	• World-class port infrastructure supporting multi-energy value chains (hydrogen, biofuels, LNG, CCUS) • Long-term roadmap for green shipping, port electrification, and climate neutrality • Robust public-private collaboration in R&D, innovation hubs, and pilot projects	• Port of Rotterdam Hydrogen Backbone: connecting industrial clusters with hydrogen imports from offshore wind and North Africa • Porthos CCUS project: stores 2.5 million tonnes of CO_2 annually under the North Sea • Energy Transition Campus Rotterdam: public-private innovation hub focused on decarbonisation and clean fuels

Johor must look beyond conventional fossil-based energy by building integrated clean energy-port-industrial ecosystems, advancing clean hydrogen and wind, and fostering innovation, talent, and cross-border trade to compete globally

Source: Jurong Island Version 2.0 (JIV2.0) Masterplan; EDB Investment Guide; Royal Commission for Jubail and Yanbu (RCJY)

Johor's strategic ports, including Tanjung Langsat, Pasir Gudang, and Tanjung Pelepas, position the state to become a regional green bunkering hub, leveraging existing infrastructure, fuel diversification, and emerging maritime decarbonisation demand



Overview – Ports In Johor

- **Tanjung Langsat Port (TLP)**: Under Johor Corporation (JCorp), TLP is being developed into a carbon-neutral port. Currently studying establishing an ammonia receiving terminal, bunkering supply base, and ammonia-fired gas turbine power plant to supply green energy to industries in Johor.
- **Pasir Gudang Port**: Johor Port Berhad has positioned Pasir Gudang as an LNG bunkering port, enhancing its capabilities to support alternative marine fuels.
- **Port of Tanjung Pelepas (PTP)**: PTP has successfully completed its first methanol bunkering operation, demonstrating its readiness to handle alternative marine fuels.

'Green' or 'Sustainable' Bunkering

- Green bunkering refers to the provision and supply of low-carbon or zero-carbon fuels to ships, replacing traditional marine fuels like heavy fuel oil (HFO) and marine gas oil (MGO).
- It supports the decarbonisation of maritime shipping by enabling vessels to refuel with cleaner alternatives such as: Green ammonia; Green methanol; Biofuels; Hydrogen (including liquid or compressed forms); Electricity (for battery-powered vessels or hybrid ships).

Shipping Decarbonisation Driver

- Enables the switch from fossil marine fuels to low- and zero-carbon alternatives like green ammonia, methanol, biofuels, hydrogen, and electricity.
- Supports the IMO's 2050 net-zero emissions goals by accelerating clean fuel adoption in global shipping.

Infrastructure & Safety

- Requires investment in specialised terminals, bunkering vessels, storage, and safety protocols for handling new fuels.
- Needs robust regulations, certification, and international standards to ensure safe, efficient operations at ports and at sea.

Economic Port Opportunities

- Offers ports a chance to become green fuel hubs, attracting green shipping and related industries.
- Unlocks new jobs, logistics services, and positions ports in global green corridors and maritime alliances.

Source: Maritime Gateway; Nestia News; Offshore Energy

Pasir Gudang Port remains Johor's key conventional bunkering hub but faces mounting pressures from tightening IMO regulations, Singapore's fuel diversification, and global energy transition risks, demanding strategic diversification into alternative fuel services

JohorPort®

Role as Johor's Conventional Bunkering Hub

- Pasir Gudang Port, operated by Johor Port Berhad (a MMC Group company), is Johor's primary centre for conventional bunkering. It offers marine fuel oil (MFO), marine gas oil (MGO), and lubricants for ships transiting the Straits of Malacca and Singapore Strait.
- The port is strategically located close to Pasir Gudang Industrial Estate, supporting bulk carriers, tankers, general cargo vessels, and offshore support vessels.
- Johor Port has long established itself as Malaysia's second-largest conventional bunkering port after Port Klang, due to its deepwater terminals and proximity to key trade routes

Current Trends and Developments

- Johor Port Berhad has announced plans to enhance its LNG bunkering capability, but conventional bunkering remains the dominant fuel supply activity at the port.
- Growing competition from Singapore's bunkering ports, especially with Singapore's push into LNG and biofuels bunkering, prompting Johor to consider diversifying into alternative fuel bunkering while maintaining its conventional bunkering base.

Challenges & Opportunities

IMO Regulation Pressure

- The IMO 2020 sulfur cap has significantly reduced the demand for high sulfur fuel oil (HSFO), forcing suppliers at Pasir Gudang to shift toward low-sulfur fuels, adding logistical and storage complexity.
- Upcoming IMO targets toward decarbonization and carbon intensity reductions by 2030 and 2050 will further impact conventional bunkering, necessitating upgrades in supply infrastructure and compliance with tighter environmental standards.

Competitive Market Dynamics

- Singapore remains the dominant bunkering hub, with superior infrastructure, economies of scale, and diversified bunker fuel offerings, capturing the bulk of traffic through the Singapore Strait and outpacing Johor.
- Pasir Gudang faces price pressures, service expectations, and a fragmented supplier base, making it challenging to compete unless value-added services or niche segments are developed (e.g., servicing regional coastal shipping, offshore vessels).

Energy Transition Risks

- The global shipping industry's pivot toward LNG, biofuels, and future fuels like ammonia and methanol risks eroding the long-term viability of conventional bunkering if Pasir Gudang does not diversify its fuel offerings.
- The port's current dependency on oil-based bunkering creates stranded asset risks, unless proactive steps are taken to invest in alternative fuel bunkering terminals, retrofitting, and supplier partnerships.

Source: Johor Port; Maritime Gateway; Nestea News; Offshore Energy; International Maritime Organization (IMO); Singapore Maritime & Port Authority (MPA); Lloyd's List; Ship & Bunker; PASB Analysis

Tanjung Langsat Port is emerging as Johor's green bunkering hub, leveraging biofuel infrastructure, regional feedstock, and JS-SEZ advantages to position itself competitively in Asia's expanding alternative marine fuel market

TLP Terminal
A JCORP Company

Potential Role as Johor's Emerging Green Bunkering Hub

- **Strategic Infrastructure Development**: Tanjung Langsat Port's position within the Johor-Singapore Special Economic Zone (JS-SEZ) provides a strategic advantage for developing green bunkering capabilities.
- **Biofuel Hub Development**: Through the confirmed collaboration between BAC Renewable Energy, Dovechem Group, and TLP Terminal, the port is set to establish the BAC RE ASEAN Biofuels Storage & Exporting Hub. This project will initially provide 33,000 tons per annum Bio-LNG capacity with 7,500 cubic meters of storage, expanding to 350,000 tons annually in its second phase, positioning TLP as a significant player in the region's green maritime infrastructure

Current Trends and Developments

- The port is actively developing its green bunkering capabilities through a phased approach, with the first phase of the BAC RE ASEAN Biofuels Storage & Exporting Hub targeting completion by 2027. This development includes specialized storage facilities for Bio-LNG and future expansion into biomethanol handling services, demonstrating a comprehensive approach to alternative marine fuels

Challenges & Opportunities

Technical & Safety Factors

- **Infrastructure Requirements**: The handling of biofuels requires specialized infrastructure and safety protocols, particularly for Bio-LNG and biomethanol storage and bunkering operations.
- **Safety Standards Compliance**: The port must adhere to stringent international safety regulations and technical standards for biofuel handling, including compliance with the IMO's International Code of Safety for Ships using Gases or other Low-flashpoint Fuels (IGF Code).

Market Position & Competition

- **Regional Competition**: TLP faces competition from established bunkering hubs, particularly Singapore, which has made significant progress in developing green bunkering capabilities and established comprehensive frameworks for alternative marine fuels.
- **Market Opportunity**: The port can leverage the growing demand for green marine fuels, with the global market projected to expand significantly, and the Asia Pacific region holding 39% of the global green marine fuel market share.

Supply Chain & Feedstock

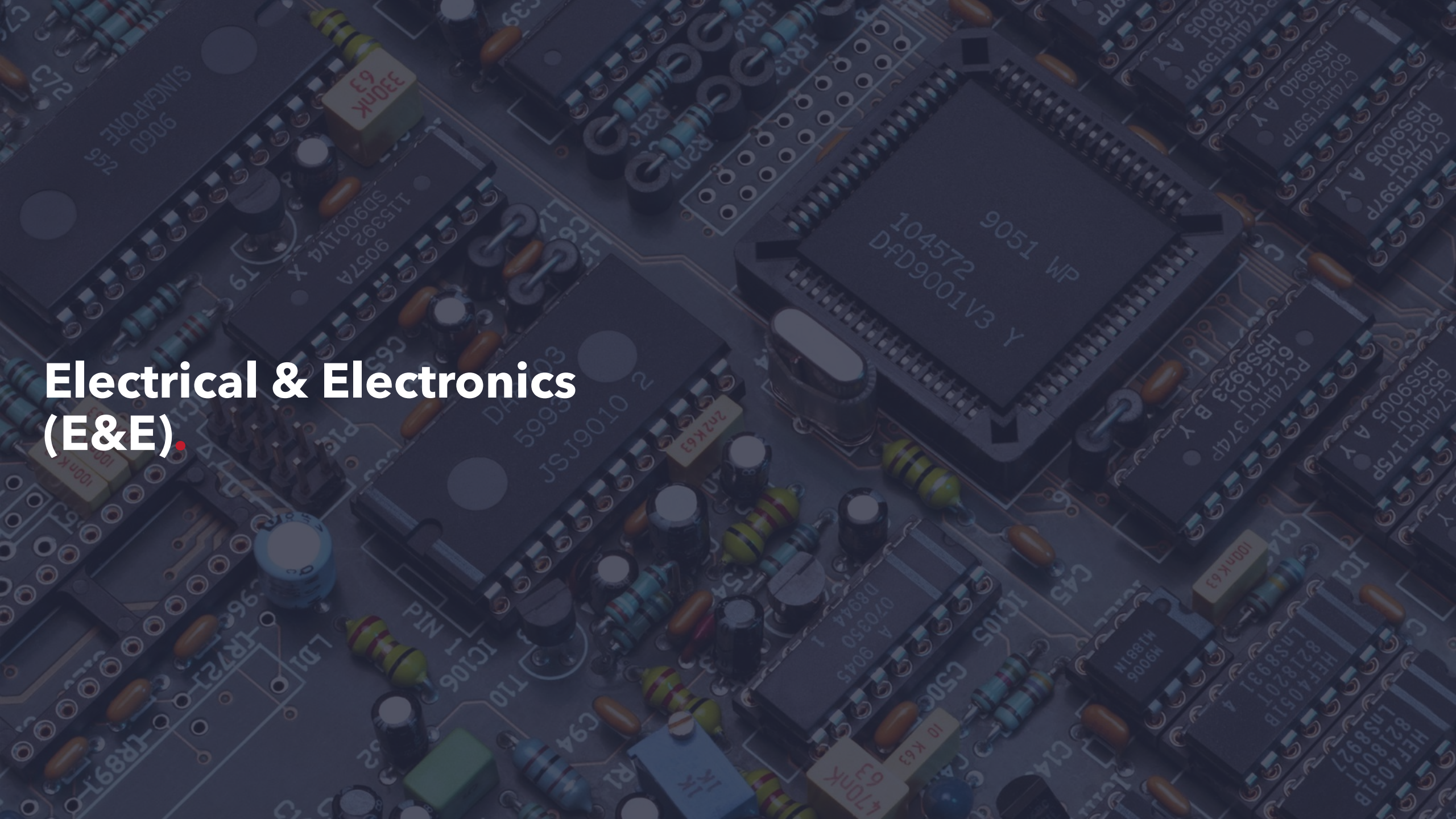
- **Feedstock Availability**: The region's abundant palm oil waste feedstock, estimated at 3.3 million tons annually, provides a substantial resource base for biofuel production.
- **Supply Chain Integration**: The port's proximity to major industrial complexes and its position within the JS-SEZ creates opportunities for efficient supply chain integration and logistics optimization

Source: PTP Website; The Edge; Maritime Gateway; Nestea News; Offshore Energy; International Maritime Organization (IMO); Singapore Maritime & Port Authority (MPA); Lloyd's List; Ship & Bunker; PASB Analysis

Johor's energy ecosystem should be further strengthened to enhance energy security, attract clean energy investments, and position itself as a regional low-carbon hub

	Current State and Opportunities	Aspirational State
1 **Existing Energy Infrastructure**	• Strong fossil-based generation capacity (coal, gas, refinery cogeneration) • Underutilised solar potential and limited renewable energy integration	• Diverse and well-balanced energy mix with increasing share of renewables and clean fuels • High reliability and efficiency across grid-connected and off-grid infrastructure
2 **Clean Energy Diversification**	• Early-stage hydrogen, solar and wind initiatives • Limited scale and commercialisation of low-carbon technologies	• Large-scale solar, hydrogen and wind clusters with industrial users and export infrastructure • Johor positioned as a clean fuel production and export base for ASEAN
3 **Infrastructure & Connectivity**	• Grid not fully ready for high RE penetration and two-way power flows • Lack of hydrogen pipelines, energy storage, and smart grid systems	• Modernised and smart grid infrastructure with EV-readiness, storage, and clean energy zones • Seamless power connectivity and inter-region transmission, including cross-border RE trade with Singapor
4 **Other Enablers**	• Skills gaps in clean energy, digitalisation and project finance • Limited public-private coordination and project de-risking mechanism	• Skilled workforce supporting RE, hydrogen, and energy efficiency services • Stronger green financing, investor confidence, and public-private delivery platforms
What does it mean to Johor's energy industry?	**Johor is heavily reliant on fossil fuels and has underleveraged its clean energy potential.Grid constraints, regulatory uncertainty, and lack of large-scale projects are slowing its ability to lead in Southeast Asia's clean energy transition.**	**Enable Johor to become a competitive, low-carbon energy hub scaling up clean infrastructure, strengthening talent and regulation, and facilitating high-impact investments across the energy value chain.**

Source: PASB Analysis



Electrical & Electronics (E&E).

The electrical & electronics industry can be broadly categorised into 4 main sub-sectors which are electronic components, consumer and industrial electronics as well as electrical products

Sub-sectors of E&E Industry

Sub-sectors	Electronic Components	Consumer Electronics	Industrial Electronics	Electrical Products
Products / Activities	• Integrated circuit (IC) design • Wafer fabrication • LED substrate • Epitaxy manufacturing • Printed circuit board (PCB) • Precision plastic parts	• TV / Radio receivers • Media players • Speakers • Electronic games • Embedded systems	• Computer and peripherals • Data storage • Office equipment • Telecommunication devices • Transmitters and routers	• Electronic motors, generators and transformers • Solar cells, modules and balance of systems (BoS) • Wire, cables and batteries • Lighting equipment and luminaries • Domestic appliances

Source: NIMP 2030 (Electrical & Electronics Industry), MOSTI

Each E&E sub-sector is led by a global champion–like TSMC, Apple, Siemens, and Schneider–whose dominance comes from deep specialisation and integration across their value chains

Sub-sectors of E&E Industry by Products

Electronic Components

- Integrated circuit (IC) design
- Wafer fabrication
- LED substrate
- Epitaxy manufacturing
- Printed circuit board (PCB)
- Precision plastic parts

Consumer Electronics

- TV/ Radio receivers
- Media players
- Speakers
- Electronic games
- Embedded systems

Industrial Electronics

- Computer and peripherals
- Data storage
- Office equipment
- Telecommunication devices
- Transmitters and routers

Electrical products

- Electric motors, generators and transformers
- Solar cells, modules and Balance of Systems (BoS)
- Wire, cables and batteries
- Lighting equipment and luminaires
- Domestic appliances

Global Leaders

TSMC is the world's largest dedicated semiconductor foundry, gaining over 60% of the contract chipmaking market. The company specialises in producing high-performance chips for clients like Nvidia and Apple

Apple leads the global consumer electronics market with a 21% share, driven by its innovative products. The company's focus on design, user experience, and a robust ecosystem has solidified its market dominance

Siemens is a global leader in industrial automation and digitalisation, providing solutions for various industries. The focus on integrating hardware and software solutions has positioned it at the forefront of the industrial electronics sector

Specialising in energy management, Schneider Electric provides a portfolio of electrical products and services. Its focus on digital transformation has reinforced its leadership in the electrical products market

Source: Reuters, Market US News, SURFE, PASB Analysis

The E&E sector continues to reach new heights, as electronic components find new uses for cloud infrastructure, smart devices and EVs

Key Megatrends

1. **Semiconductor Market Expansion**
   - The global semiconductor market is projected to reach **USD 1 trillion by 2030**, up from **USD 600 billion in 2022**, driven by AI, 5G, automotive electronics, and edge computing
   - Demand is surging as chips become the backbone of smart devices, EVs, and cloud infrastructure across sectors

2. **Electronics Miniaturisation & Integration**
   - Market for compact, high-performance electronics (e.g., wearables, IoT, advanced sensors) is growing at a **CAGR of ~10%,** fueled by demand for portability and functionality
   - This drives the rise of **System-in-Package (SiP), 3D ICs, and MEMS**, reshaping design and manufacturing ecosystems

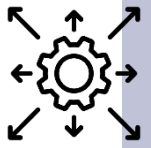
3. **Electrification & Power Electronics Growth**
   - The power electronics market is expected to hit **USD 60–70 billion by 2030**, supporting the shift to EVs, smart grids, and renewable energy
   - Wide-bandgap semiconductors (e.g., SiC, GaN) are enabling more efficient, compact, and high-voltage power systems

4. **Smart & Connected Electronics (IoT Ecosystem)**
   - Global IoT electronics market is set to **surpass USD 650 billion by 2030,** as connectivity becomes essential in homes, factories, and cities
   - Growth is driven by **Industry 4.0, smart homes, and digital twins**, requiring advanced sensors, edge chips, and connectivity modules

Source: McKinsey, WSTS, Yole Group, Market Research Future, IEA, Infineon, MarketsandMarkets, Statista, IoT Analytics

The global E&E industry is on a strong growth trajectory towards 2030, driven by rapid IoT expansion, AI and 5G integration, and rising demand for efficient manufacturing

Growth Drivers of E&E Industry Towards 2030

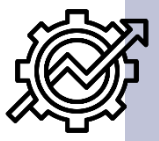


Expansion of the Global E&E Market

- **Robust Market Growth**: The global electrical and electronics market is projected to grow from **USD3.95 trillion in 2024** to **USD4.26 trillion in 2025**, reflecting a compound annual growth rate (CAGR) of 7.9%. This growth is driven by increased consumer electronics demand and globalization of supply chains
- **Future Projections**: The market is expected to reach **USD5.58 trillion by 2029**, maintaining a CAGR of 7.0%. Factors contributing to this growth include renewable energy integration and advancements in environmental sustainability

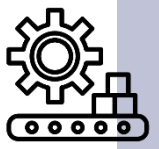
Proliferation of IoT Devices

- **Surge in Connected Devices**: The number of connected Internet of Things (IoT) devices is estimated to grow **to 40 billion by 2030**, highlighting the rapid expansion of interconnected technologies.
- **Dominance in Consumer Sector**: By 2030, the consumer sector is anticipated to lead in IoT connections, with over **24 billion connected devices**, underscoring the increasing integration of IoT in daily consumer applications



Technological Advancements Fueling Innovation

- **AI and 5G Integration**: The convergence of Artificial Intelligence (AI) and 5G technology is set to revolutionize consumer electronics, enabling real-time data processing and seamless communication between devices
- **Emergence of AIoT**: The integration of AI into IoT devices, known as Artificial Intelligence of Things (AIoT), is creating intelligent ecosystems capable of automated operations and predictive maintenance, enhancing user experiences



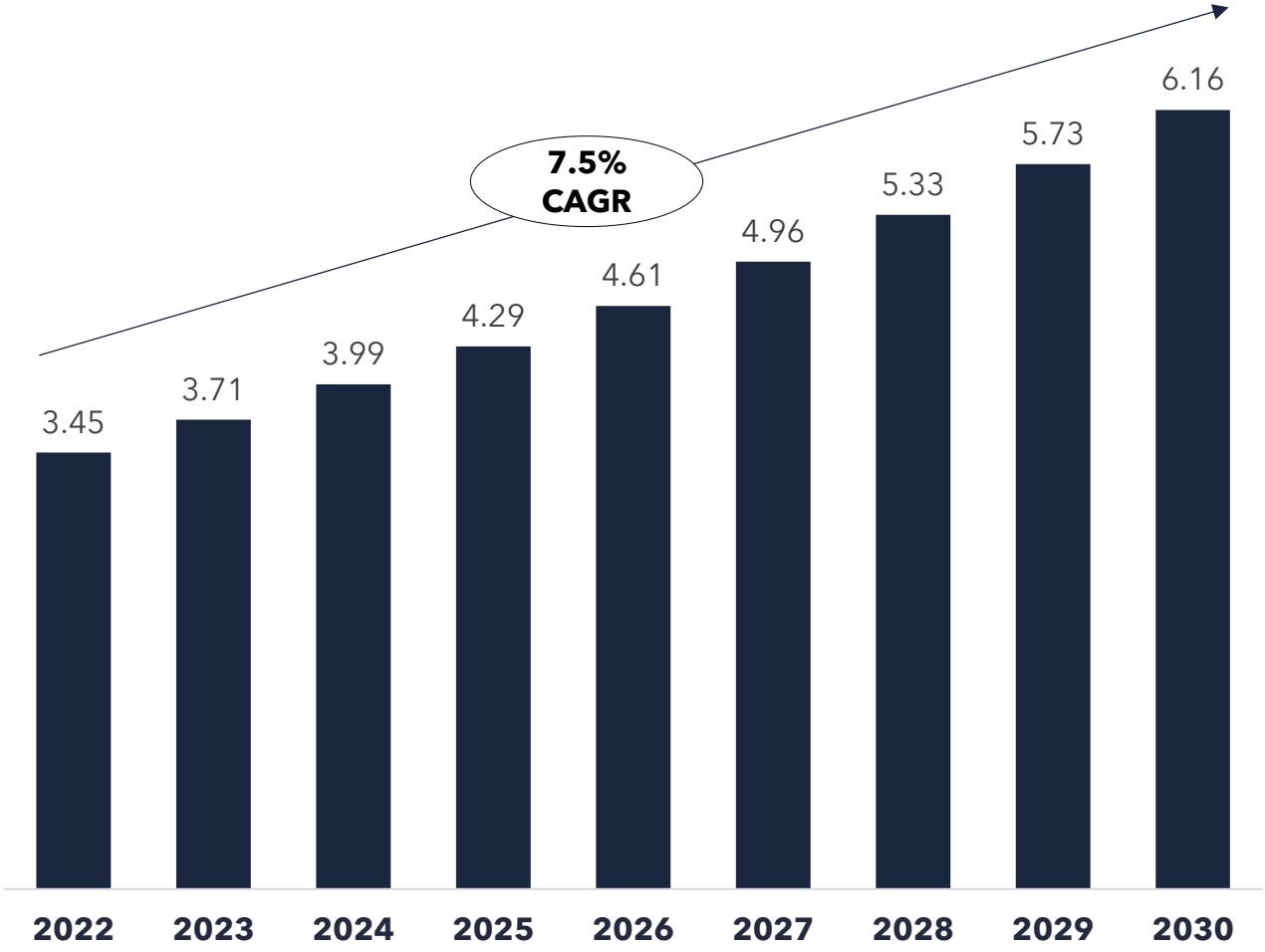
Growth in EMS and ODM

- **Market Expansion**: The global EMS and ODM market, valued at **USD672.7 billion in 2022**, is projected to reach **USD1.4 trillion by 2030**, growing at a **CAGR of 9.2%,** driven by the increasing demand for consumer electronics and efficient manufacturing solutions
- **Regional Growth**: China, as a significant player, is forecasted to achieve a market size of **USD540.6 billion by 2030**, reflecting a **CAGR of 10.2%,** highlighting the region's pivotal role in the EMS and ODM sectors

Source: Research and Markets, IoT Analytics, Statista, ACL Digital

The global E&E market is projected to grow from USD 3.45 trillion in 2022 to USD 6.16 trillion by 2030, driven by digitalisation, policy support, and emerging market demand

Global E&E Market Size, 2022 – 2030
(USD trillion)



Source: Contrive Datum Insights, PASB Analysis

Growth Drivers

- Industry consolidation and proactive government policies (e.g. trade facilitation, IP protection) are fueling global E&E market expansion

Market Restraints

- Disruptions in global supply chains, stricter environmental compliance, and risks of intellectual property theft pose significant challenges that can hamper operational efficiency and increase costs.

Opportunities Ahead

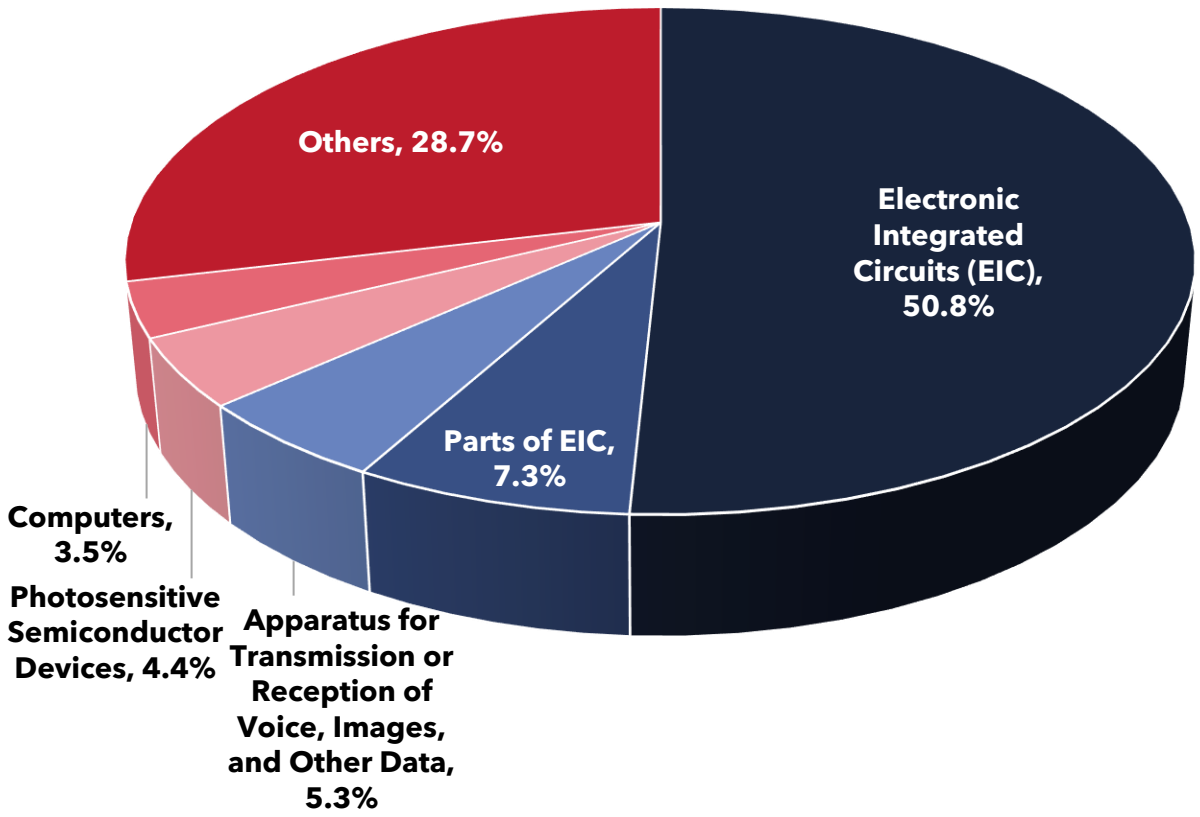
- Digital transformation across sectors and the rise of e-commerce are opening new demand streams, especially in emerging markets. These trends enable electronics firms to scale faster and access new customer segments

Key Challenges

- Regulatory complexity, IP risks, and talent shortages remain pressing issues. Navigating diverse compliance requirements and attracting skilled labour are crucial for sustaining long-term competitiveness

Over half of global E&E exports are driven by integrated circuits, with the remaining spread across critical components and niche products like sensors and data transmission devices

Global E&E Exports by Type, 2023
%



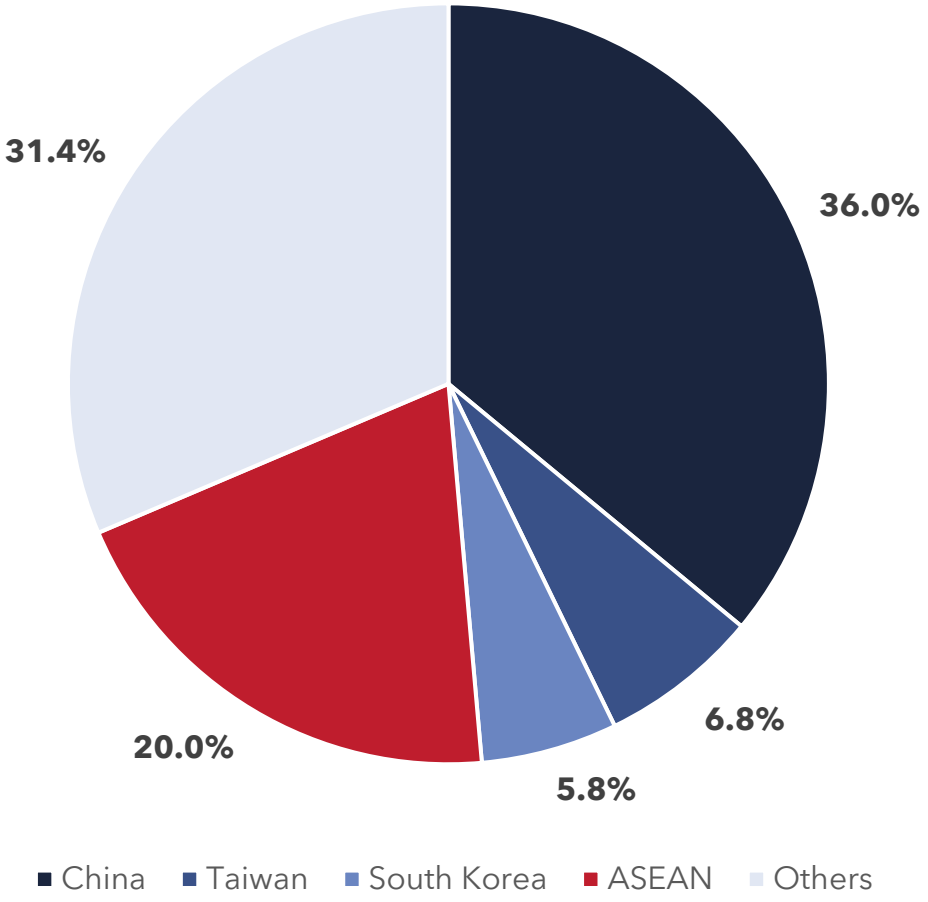
Key Highlights

- Electronic Integrated Circuits account for 50.8% of E&E exports, underscoring the central role of semiconductors in the global digital economy
- Supporting components such as "Parts for Electronic Integrated Circuits" (7.3%) highlight the complexity of the semiconductor supply chain, with upstream and midstream players essential to final chip production
- Voice, image, and data transmission equipment (5.3%) remains significant, driven by sustained investments in telecommunications, cloud computing, and data centres
- Photosensitive semiconductor devices (4.4%) serve a niche but critical role in enabling sensor technologies, photovoltaics, and imaging applications
- "Others" includes miscellaneous electrical and electronic products that are still significant to trade but individually contribute smaller percentages – hence grouped together. Some examples would be resistors, capacitors, inductors, electromechanical relays and timers

Source: CEIC, WITS, PASB Analysis

China leads global E&E exports at 36%, with Taiwan and South Korea playing smaller but vital roles in high-value, niche segments

Global E&E Exporters by Country, 2023



Source: CEIC, PASB Analysis

Key Highlights

China is the Dominant Exporter

- With 36% of global Electrical & Electronics (E&E) exports, China is clearly the leader in this sector. This dominance suggests that China plays a critical role in global supply chains, and any disruptions in its manufacturing or trade policies could have significant global impacts

ASEAN is a Key Regional Player

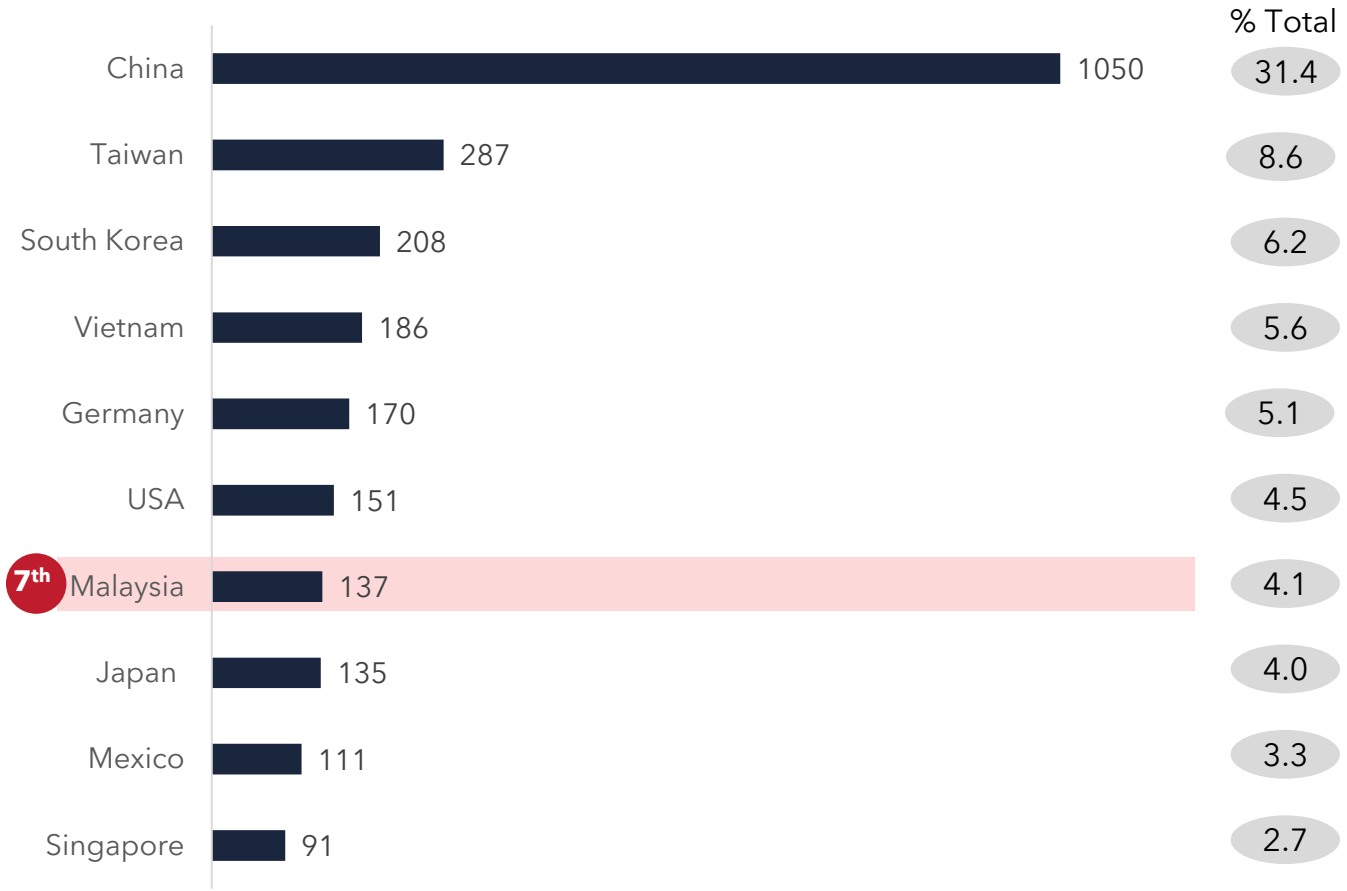
- The ASEAN region accounts for 20%, making it the second-largest group after China. This points to the growing importance of Southeast Asia as an alternative manufacturing hub, possibly driven by global companies diversifying their supply chains away from China (a trend often referred to as "China+1")

Taiwan and South Korea Specialise but Have Smaller Shares

- Taiwan (6.8%) and South Korea (5.8%) have relatively smaller shares, but their roles in high-tech components (like semiconductors) are vital. Their lower percentage does not necessarily reflect lesser importance but rather specialization in high-value, niche segments of E&E

Asia dominates the global E&E exports, with 7 of the top 10 exporters from the region. Malaysia ranks 7th worldwide, highlighting its position in an increasingly competitive and diverse Asian landscape

Global E&E Exports, 2023
USD Billion



Source: OEC, CEIC, PASB Analysis

Key Highlights

China dominates E&E exports

- With exports valued at USD 1.1 trillion, China commands a staggering 31.4% of the global E&E export market—almost four times the share of the next country, reflecting its scale, deep integration in global supply chains, and strength in both components and finished products

Asia leads the global E&E trade

- 7 out of the top 10 exporters are from Asia (China, Taiwan, South Korea, Vietnam, Malaysia, Japan, and Singapore), underscoring the region's critical role as the hub of electronics manufacturing and exports

Malaysia is a top 10 exporter globally

- Ranked 7th in the world, Malaysia exported USD 137 billion worth of E&E goods in 2023, contributing 4.1% of global share—reflecting its strong position in semiconductor packaging, testing, and electronic manufacturing services (EMS)

ASEAN–led by Thailand, the Philippines, and Malaysia–is a vital hub in the global electronics supply chain, powering HDD and semiconductor production for top global tech brands

ASEAN's Dynamic Role

- Thailand, the Philippines, and Malaysia are key suppliers of Hard Disk Drives (HDDs) within ASEAN, forming a production network closely linked to China

- Major global manufacturers like Western Digital, Seagate, Hitachi, and Toshiba operate in the region

- Together, these three countries supply over 60% of China's HDD imports, with Thailand alone contributing one-third – highlighting ASEAN's critical role in the global HDD supply chain

Thailand

- A major electronics hub in Southeast Asia with over **2,300 companies and 750,000 employees**, and is a global leader in hard drives, integrated circuits, semiconductors, and electrical appliances
- It is **ASEAN's largest electrical appliance producer**, **2nd globally in air conditioner production**, and **4th in refrigerators**
- **Top global brands operate in Thailand**, including Philips, Electrolux, Western Digital, Seagate, Sony, LG, Samsung, and Acer, among others

Philippines

- The Philippines hosts **major global tech players**, including **7 of the top 20 chipmakers** (e.g. Texas Instruments, Philips, Sanyo) and **4 major hard drive producers** (e.g. Hitachi, Toshiba).
- Key exports are **hard drives and semiconductors**, making the country a crucial player in electronics manufacturing
- The Philippines produces **2.5 million hard drives monthly** and holds **10% of the global semiconductor manufacturing services market**

Source: Invest ASEAN

ASEAN's electronics growth is deeply tied to integrated trade with China and Japan, with rising demand and FDIs positioning countries like Malaysia and Philippines for future gains

China's Strategic Role in ASEAN's Electronics Supply Chain

- China is a key partner—**not a competitor**—in ASEAN's electronics industry, according to the Asian Development Bank
- China alone accounts for **roughly 31.4 %** of global E&E exports—more than the next three exporters combined—making its market moves a bellwether for the entire industry
- **20–25 % of China's electronic inputs** come from ASEAN partners, who supply semiconductors, PCBs, connectors and more—so what happens in China's factories directly ripples through the regional value chain

ASEAN Gains from Japan's Economic Reflation

- ASEAN economies stand to benefit from **Japan's reflation**, driven by cheaper intermediate goods used in production
- **Indonesia is the biggest beneficiary**, as Japan plays a dual role as both its supplier and consumer
- **Malaysia is also set to gain**, with rising exports of end-user products to Japan amid stronger Japanese domestic demand

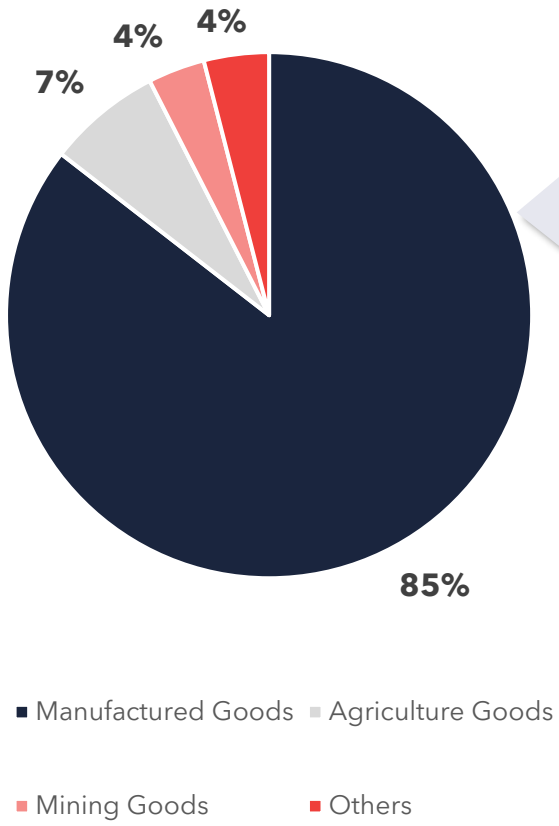
ASEAN's Integrated Networks Boost Electronics Growth

- ASEAN's integrated production networks **enhance trade** with major economies like China and Japan, driving growth in the electronics sector
- **Thailand's export strength** in products like radios, TVs, and printers continues to support its electronics industry
- Despite short-term underperformance, the **Philippines is seen as ASEAN's top long-term growth story**, with rising FDIs and future export potential, according to Credit Suisse

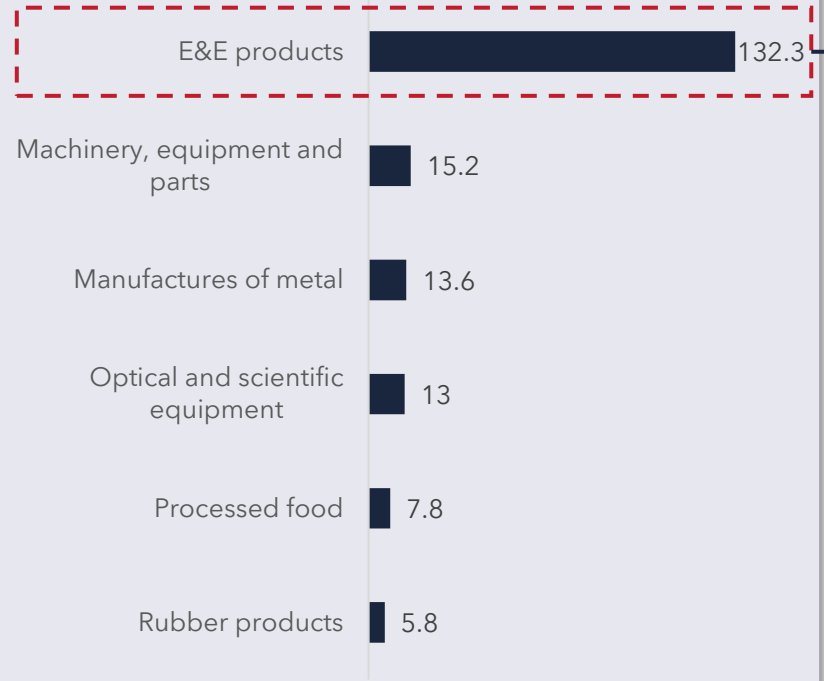
Source: Invest ASEAN, PASB Analysis

In 2024, E&E products drove Malaysia's exports, making up 39.9% (USD132.3 billion), with electronic integrated circuits alone contributing over half that value

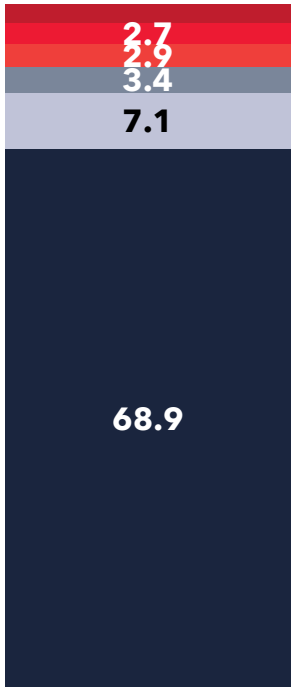
Export Performance of Major Sectors, 2024
(USD Billion)



In 2024, exports of manufactured goods reached **USD 283.6 billion**, making up **85.5%** of total Malaysia's exports. Further breakdown of the manufactured goods are:



E&E products held the biggest share of Malaysia's total exports at **39.9%**, amounts to **USD132.3 billion**.
E&E products that recorded significant export growth in 2024 were:



Source: MATRADE

Malaysia's E&E industry is concentrated in assembly, testing, and packaging, with limited R&D and design presence—highlighting a gap in higher-value segments

Presence of Industry Players along the Value Chain of E&E Industry

Value Chain		R&D	Design	Manufacturing	Assembly, Test, & Packaging
Electronic Components		Low Presence	Medium Presence	Low Presence	High Presence
Consumer Electronics		Low Presence	Low Presence	Low Presence	High Presence
Industrial	Computer Equipment	No Presence	Low Presence	Low Presence	High Presence
Industrial	Communication Equipment	No Presence	No Presence	High Presence	Medium Presence
Electrical		Low Presence	Medium Presence	High Presence	High Presence

Source: NIMP

Malaysia's E&E landscape is regionally specialised—with Johor complementing northern and central hubs through its role in manufacturing-related services (MRS)

Geographic Distribution of E&E Industry Players

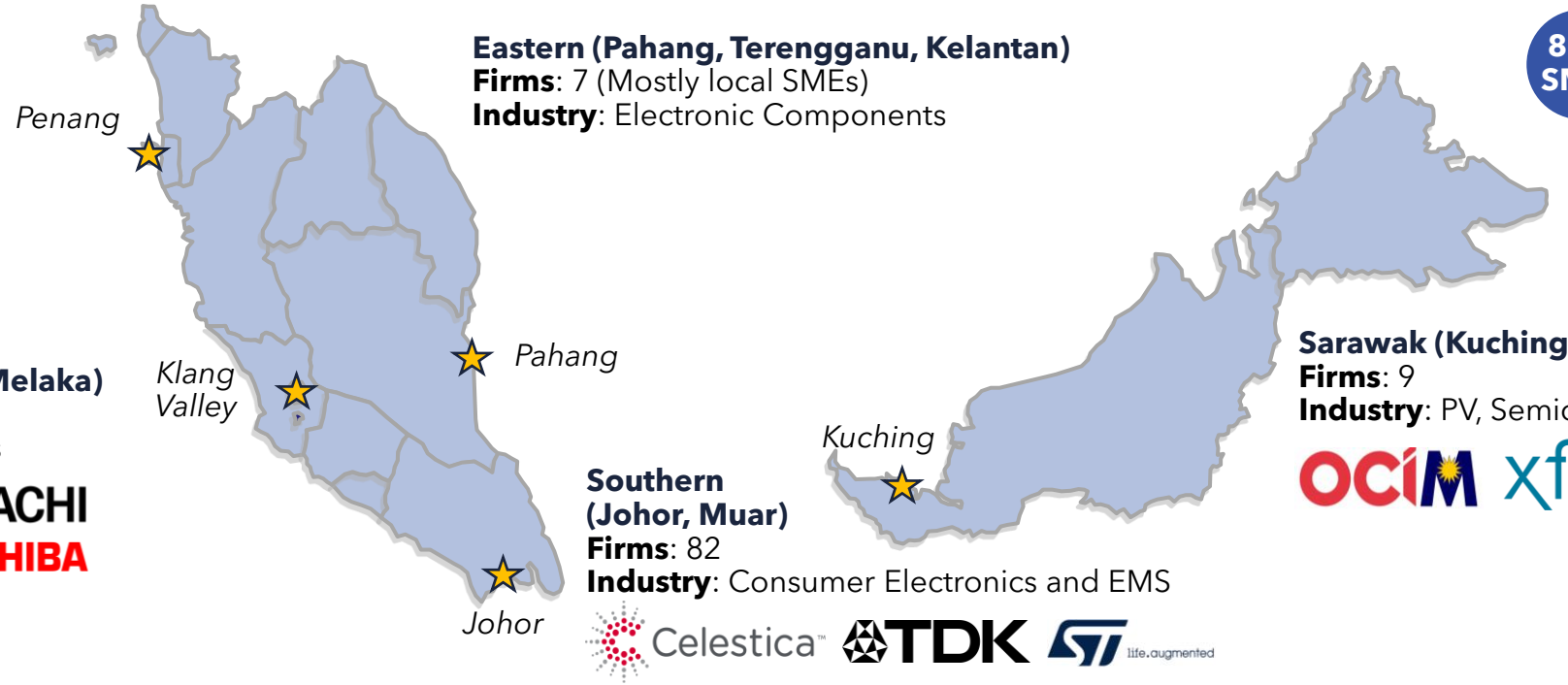
Northern (Penang, Kedah Perak)
Firms: 212
Industry: Electronic Components

Central (KV, Negeri Sembilan, Melaka)
Firms: 212
Industry: Electronic Components

Eastern (Pahang, Terengganu, Kelantan)
Firms: 7 (Mostly local SMEs)
Industry: Electronic Components

Southern (Johor, Muar)
Firms: 82
Industry: Consumer Electronics and EMS

Sarawak (Kuching, Bintulu)
Firms: 9
Industry: PV, Semiconductors



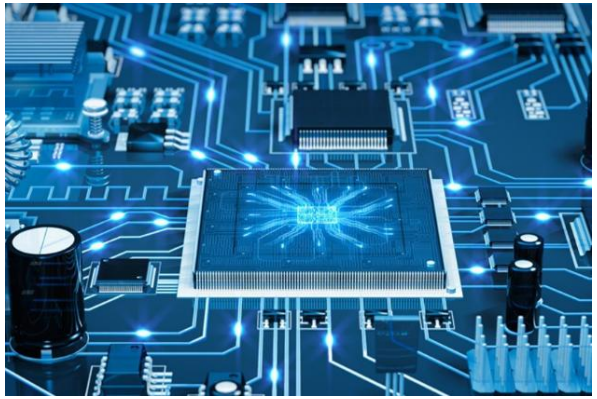
Key Highlights

- **Penang** serves as **Malaysia's leading hub** for the E&E sector, with a strong focus on **semiconductor component** manufacturing
- **Klang Valley** and **Seremban** are key centers for the production of **consumer electronics** and other **electrical end-products**
- **Johor** specialises in **manufacturing-related services (MRS)** and **semiconductor back-end operations**
- **Pahang**, **Terengganu**, and **Kelantan**, are primarily driven by **small and medium-sized enterprises (SMEs)** within the E&E sector
- **Sarawak** plays a crucial role in **supplying raw materials** to support the E&E industry

Source: NIMP

Johor's E&E sector thrives as a key national export hub, boosted by strong foreign investment, strategic policies, and proximity to Singapore's logistics and talent ecosystem

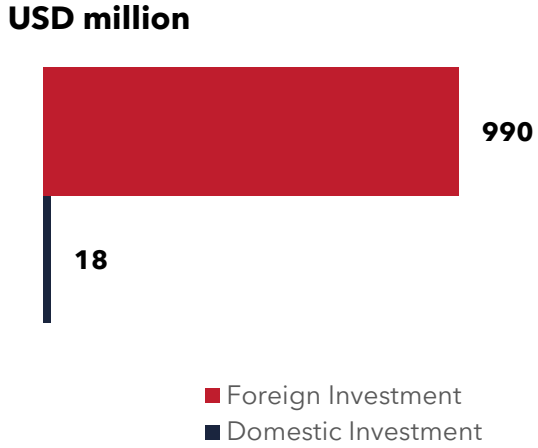
Johor's E&E Profile



- Johor-produced electronics accounted for roughly USD11.88 billion of Malaysia's USD 28.2 billion in total E&E exports in 2023 (≈42 % of the national total)
- Johor's manufacturing sector expanded 2.8 % in 2023—well above the 0.7 % national manufacturing growth—powered largely by electronics assembly, PCB fabrication and related value-adds
- Under Malaysia's New Industrial Master Plan 2030, the Pasir Gudang–Kulai corridor in Johor is officially designated as one of six national E&E hubs, locking in preferential policies and infrastructure for global EMS players
- Johor is the third-largest manufacturing base in the country (after Penang and Selangor) in terms of number of facilities
- It has carved out a niche as an Electronics Manufacturing Services (EMS) hub, hosting some of the world's leading contract manufacturers

Source: BURSA Malaysia, NIMP, MIDA, PASB Analysis

In terms of investment, Johor's E&E are significant (2023)



Proximity to Singapore also shapes its E&E landscape

The proximity enables efficient logistics (many Johor manufacturers ship via Singapore's ports/airports) and access to Singapore's ecosystem, while also exposing Johor to cross-border competition for talent and investment

Johor's E&E cluster pairs global EMS giants with homegrown PCB and SMT specialists to deliver a complete end-to-end production ecosystem

E&E Company	Main activity in Johor	District	International / Local
STMicroelectronics Sdn Bhd	Back-end IC assembly & test ("chip assembly & test")	Muar	International
Micron Semiconductor Malaysia Sdn Bhd	NAND / NOR / multi-chip package assembly & test	Muar	International
Flextronics (Flex Ltd)	Electronics Manufacturing Services (EMS) – contract assembly & test	Pasir Gudang	International
Celestica (Malaysia) Sdn Bhd	EMS & contract electronics manufacturing	Pasir Gudang	International
Western Digital Malaysia Sdn Bhd	Hard-disk and storage device assembly	Kulai	International
Seagate International (Johor) Sdn Bhd	Aluminium-substrate & PCB assembly for HDDs	Kulai	International
Foxconn Technology Malaysia Sdn Bhd	EMS, module & system assembly	Johor Bahru	International
IPEX Global Manufacturing Sdn Bhd	PCB, cable-assembly & connector modules	Pasir Gudang	International
V.S. Industry Bhd	EMS & component assembly	Pasir Gudang	Local
SKP Resources Bhd	PCB & electronics subcontract manufacturing	Pasir Gudang	Local
SMT Technologies Sdn Bhd	Distribution of SMT pick-and-place machines & tooling	Pasir Gudang	Local
Panasonic Manufacturing Malaysia Sdn Bhd	Production of electronic components & equipment (e.g. film capacitors, relays)	Kulai	International

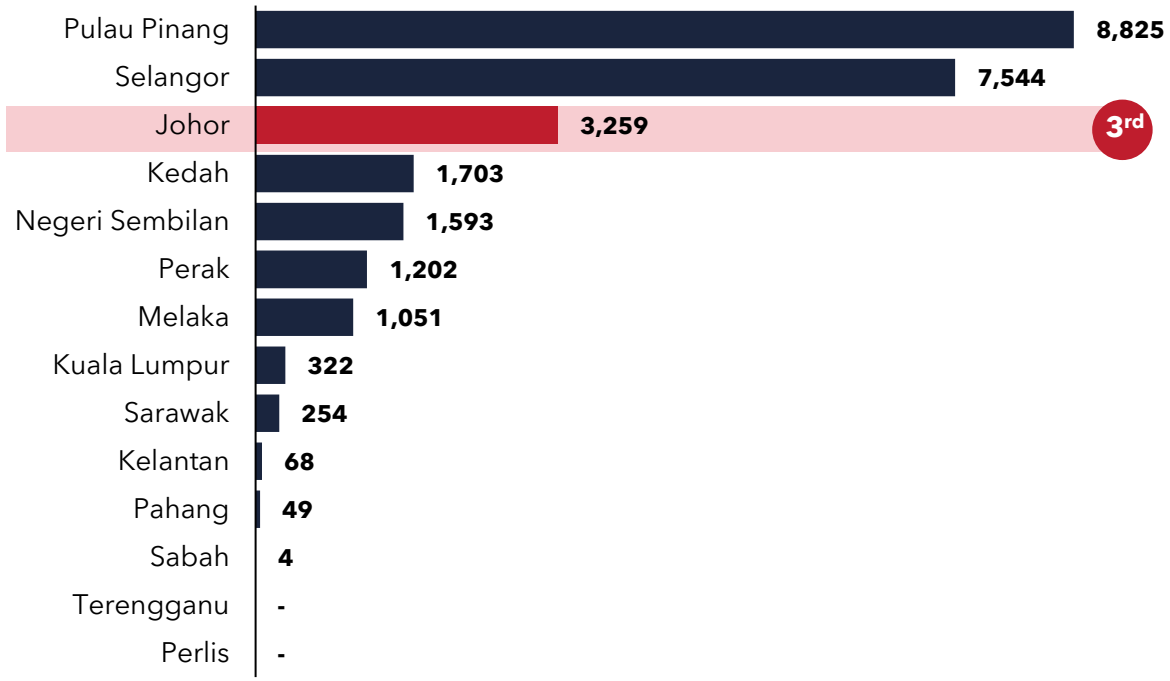
Key Takeaway

The strong presence of global E&E giants in Johor is catalysing local industry growth—proven by the emergence of homegrown players like V.S. Industry, SKP Resources, and SMT Technologies in the same ecosystem

Source: MIDA, Bursa Malaysia, Company Websites, PASB Analysis

Johor ranks 3rd in Malaysia's E&E sector, with the industry playing a pivotal role in its economy—driving 34% of manufacturing GDP and 10% of total state GDP

E&E GDP by States (2023), USD Million



Key Insights

- Johor ranks **3rd nationally** in E&E investments, trailing only Pulau Pinang and Selangor, highlighting its growing significance in Malaysia's electronics sector
- There's a steep drop-off after the top three, with **Johor's GDP is twice compared to Kedah and Negeri Sembilan**, underscoring the concentration of activity in select states

Johor's E&E Contribution (2023), USD Billion

USD3.3 bil

12.6% of Malaysia's E&E GDP

10.0% of Johor's State GDP

34% of Johor's Manufacturing GDP

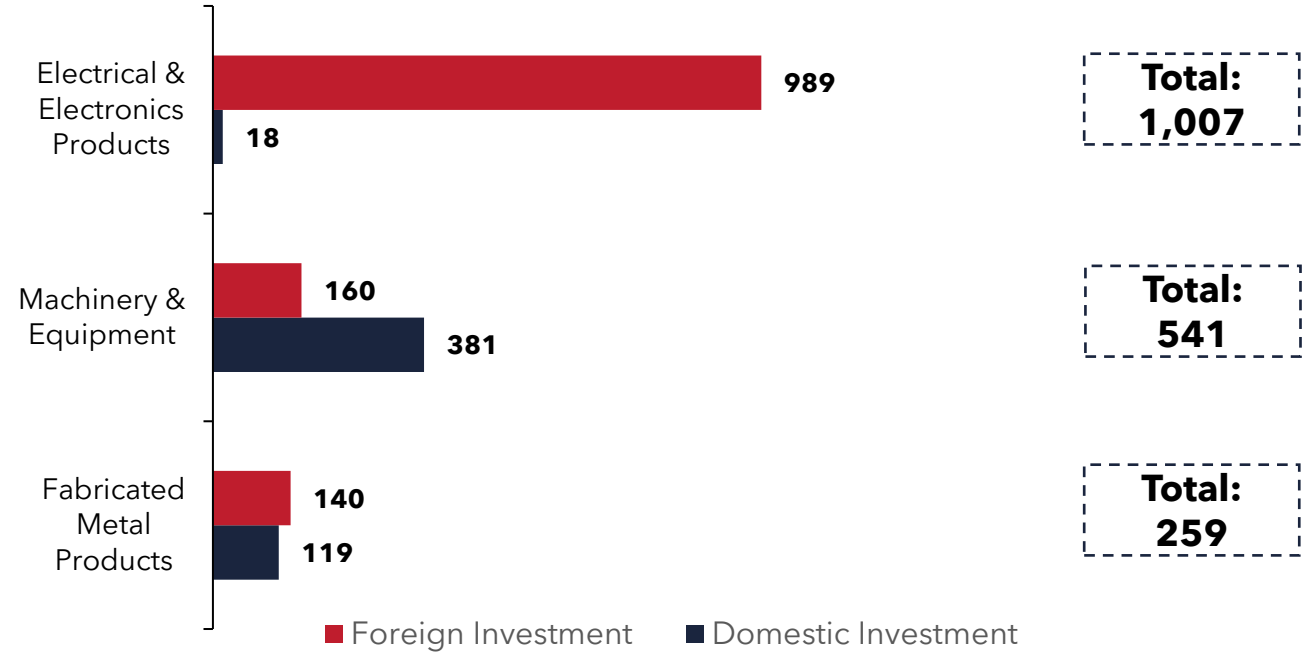
Key Insights

- Johor is a **major national player**, contributing 12.6% to Malaysia's total E&E GDP in 2023
- E&E is a **key driver of Johor's economy**, making up 34% of its manufacturing GDP and 10% of its overall state GDP

Source: MIDA, DOSM, PASB Analysis

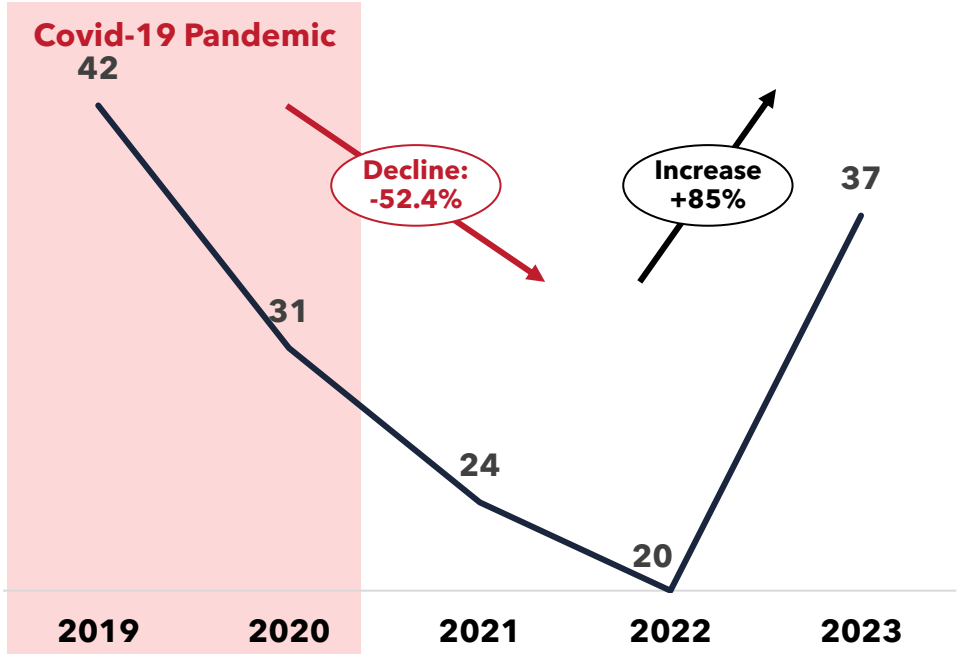
Johor's E&E sector attracted USD1.07 bil in investments—mostly foreign—while approved projects surged 85%, marking a strong post-pandemic recovery and renewed global confidence

Top 3 Total Manufacturing Investment in Johor (2023), USD Million



- E&E manufacturing dominates investment in Johor (**USD 1.01 bil**), but foreign capital (**USD 989 mil**) overwhelmingly drives this, signaling a need to strengthen domestic participation in high-value electronics production
- Domestic investment in E&E (**USD 18 million**) is negligible compared to other sectors, highlighting limited local industry involvement
- Unlike E&E, machinery & equipment investment is more balanced (**USD 381 mil** domestic vs. **USD160** foreign), suggesting a stronger local ecosystem

Approved E&E Projects in Johor, 2019-2023

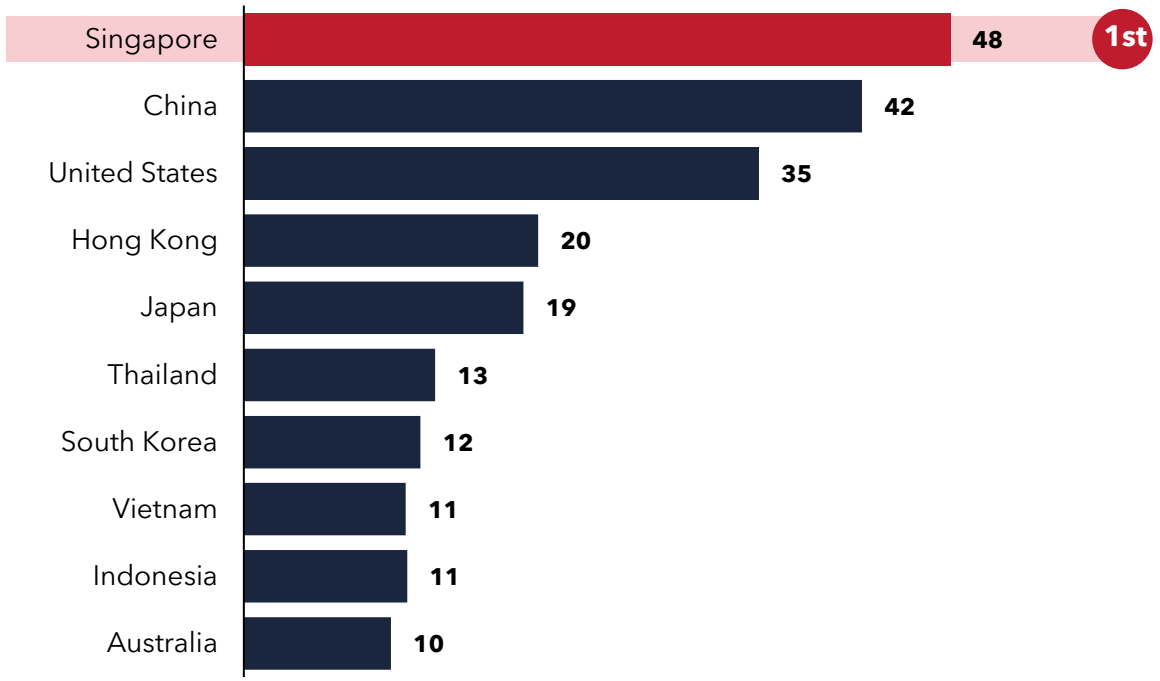


- A **52.4%** drop in approved E&E projects (2019-2022) reflects COVID-19's impact on operations, supply chains, and industry confidence
- The **85%** surge in 2023 suggests renewed growth, likely driven by supply chain shifts, government support, and industry recovery

Source: MIDA, PASB Analysis

Singapore stands out as Malaysia's top trade partner in 2023, leading in exports and ranking second in imports—underscoring its central role in regional trade flows

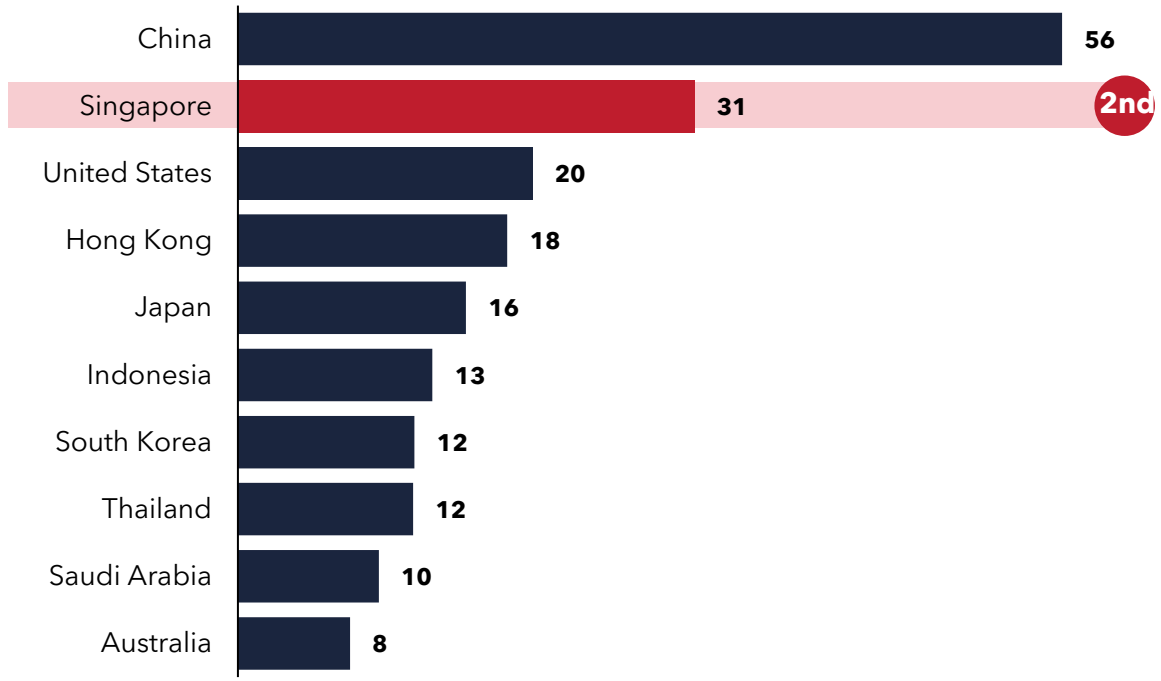
Malaysia's Top 10 Export Destinations (2023), USD Billion



Key Insights

- **Singapore is Malaysia's top export destination** in 2023, receiving USD 48 billion in goods—demonstrating strong regional trade ties
- The U.S. ranks third but **remains Malaysia's top non-Asian export** market, with USD 35 billion, highlighting its global economic relevance despite distance

Malaysia's Top 10 Import Sources (2023), USD Billion



Key Insights

- China remains **Malaysia's top import source**, contributing USD 56 billion in 2023—highlighting deep supply chain dependencies
- Singapore is **Malaysia's second-largest import partner**, with USD 31 billion, reinforcing its role as both a key export and import hub in regional trade

Source: TrendEconomy, PASB Analysis

In 2023, Johor recorded USD6.9 billion in foreign direct investment (FDI), with Singapore being one of the main investors in the manufacturing sector, which includes the E&E industry

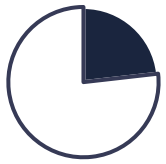
Bilateral economic cooperation

In 2023, Malaysia was Singapore's third largest trading partner, with total bilateral trade amounting to

US$92.6 billion

In the same year, Singapore was Malaysia's largest source of foreign direct investment (FDI), contributing **USD 9.7 billion** or 23.2% of Malaysia's total FDI

USD9.7 billion

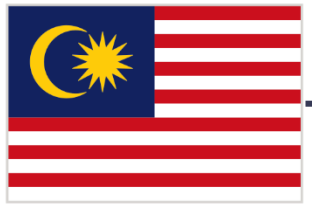


23.2%
of Malaysia's FDI

Within Malaysia, Johor recorded

USD6.9 billion

in 2023 FDI, with Singapore as one of the main investors in the manufacturing sector



In 2023, total trade between Malaysia and Singapore reached **USD92.6 billion**

Malaysia's exports to Singapore were **USD 48.1 billion**

The main exported goods were:

1. **E&E equipment (USD22.2 billion)**
2. Mineral fuels (USD7.8 billion)
3. Nuclear parts (USD4.7 billion)
4. Medical equipment (USD1.6 billion)
5. Precious metals (USD0.9 billion)

Singapore's exports to Malaysia were **USD 44.5 billion**

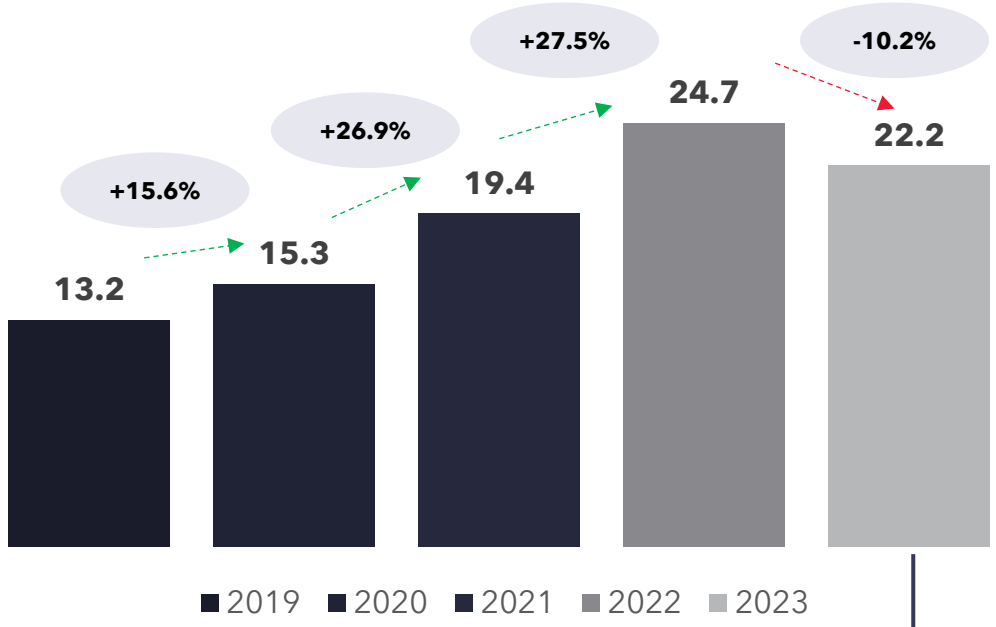
The main exported goods were:

1. **E&E equipment (USD15.2 billion)**
2. Mineral fuels (USD11.6 billion)
3. Nuclear parts (USD5.6 billion)
4. Precious metals (USD2.1 billion)
5. Medical equipment (USD1.2 billion)

Source: MIDA, Singapore DOS, ITC Trade Map

Malaysia's E&E exports to Singapore saw steady growth until 2022, before dipping by 10.2% in 2023, while Johor's manufacturing FDI surged to USD2.09 billion in 2023

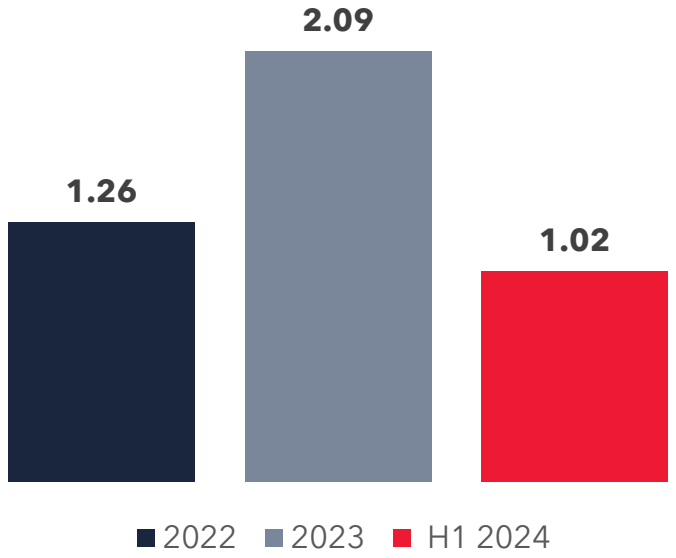
Malaysia exports of E&E equipment to Singapore (USD billion)



Malaysia top 3 exports of E&E equipment to Singapore in 2023

1. Electronic Integrated Circuits and Microassemblies: USD19.98b
2. Diodes, Transistors, and Similar Semi-conductor Devices: USD1.12b
3. Electrical Apparatus for Line Telephone or Line Telegraphy: USD872.57m

Johor's manufacturing FDI (USD billion)



- In 2023, the manufacturing sector contributed more than **USD2.09 billion** in FDI with the main investors coming from Singapore, Taipei and the United States
- The DDI for manufacturing is at **USD1.13 billion** and total investment for the sector stood at **USD3.11 billion**

Source: ITC Trade Map, MIDA

Johor can amplify its E&E growth by leveraging Singapore's ASEAN trade links and value chain networks, especially with key partners like Vietnam, Thailand, and the Philippines

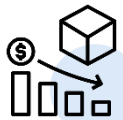
Singapore E&E Relationship with Johor

Strategic Economic Integration

- The Johor-Singapore Special Economic Zone (JS-SEZ) is positioned as a game-changer, potentially **enhancing trade and investment in high-value sectors such as E&E**

Significant Investment

- Singapore is a major investor in Johor, contributing to around **70% of Johor's total foreign direct investment (FDI),** particularly in the manufacturing sector



Cost-Competitive Base

- Johor serves as a cost-competitive base for Singapore-based businesses, especially mid-sized firms, due to its **lower cost of living and operational costs**

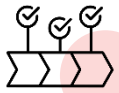
Singapore E&E Relationship with Other ASEAN Nations

Regional Integration

- The ASEAN Economic Community (AEC) framework facilitates trade and investment across ASEAN nations, including in the E&E sector, by **reducing tariffs and aligning regulations**

Key Partners

- **Vietnam**, **Thailand**, and the **Philippines** play crucial roles in global exports of electronics and are integral to the E&E value chains in ASEAN



Value Chain Participation

- Countries like Thailand and the Philippines are characterized by high **foreign value-added (FVA)** participation, indicating strong backward linkages in the supply chain

Through the Johor-Singapore SEZ and its cost-competitive base, Johor is well-positioned to tap into Singapore's established trade links with ASEAN partners like Vietnam, Thailand, and the Philippines—unlocking broader market access and regional supply chain opportunities

Source: MIDA, Singapore Business Federation, The Diplomat, ISEAS, Invest ASEAN, Asean-Japan Centre, PASB Analysis

The cross-border collaboration between Johor and Singapore in supply chain integration, particularly in the E&E sector, is characterised by several key initiatives

Johor-Singapore Special Economic Zone

This initiative aims to enhance economic collaboration between the two regions, focusing on sectors where they can complement each other, including **E&E.**

JS-SEZ offers:

- a special tax rate of **5% for up to 15 years** for companies undertaking new investment in qualifying **manufacturing** and services activities
- a special tax rate of **15% for 10 years** for eligible knowledge workers working in the JS-SEZ

Infrastructure Development

The introduction of a **Rapid Transit System (RTS)** and **a passport-free travel system** are expected to reduce travel time and ease cross-border business operations

>300,000 people
cross the Johor-Singapore land border daily via the two causeways linking the two nations

Passport-free QR code
clearance at Singapore's land checkpoints with Malaysia was introduced in March 2024

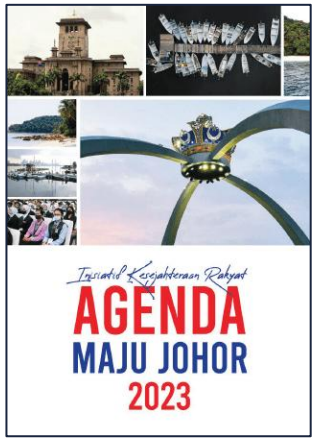
Logistics and Supply Chain Integration

- Johor's strategic location support efficient supply chain management and distribution of E&E products
- There is an establishment of fulfillment centers in **Iskandar Malaysia**, where goods are stored, packed, and shipped to customers in Malaysia, Singapore, and the broader Southeast Asian region

While Johor and Singapore already enjoy a strong economic partnership, ongoing initiatives like the JS-SEZ, RTS link, and integrated logistics infrastructure are set to further deepen cross-border collaboration—unlocking greater efficiency, talent mobility, and competitiveness in high-value sectors like E&E

Source: ASEAN Briefing, Invest Johor,

Maju Johor 2030 positions E&E as a key growth driver, with focus on advanced manufacturing, sustainable development via iBTEC, and tech-logistics integration in Kulai



E&E as a Key Growth Engine

- The Electrical & Electronics (E&E) sector, paired with advanced manufacturing, is identified as one of Johor's 10 key economic growth engines
- With a strong existing ecosystem of suppliers and integrated Electronic Manufacturing Services (EMS), Johor is primed to scale high-value manufacturing in response to global demand for sophisticated products and services

Advanced E&E as a Focus Sector in Ibrahim Technopolis (iBTEC)

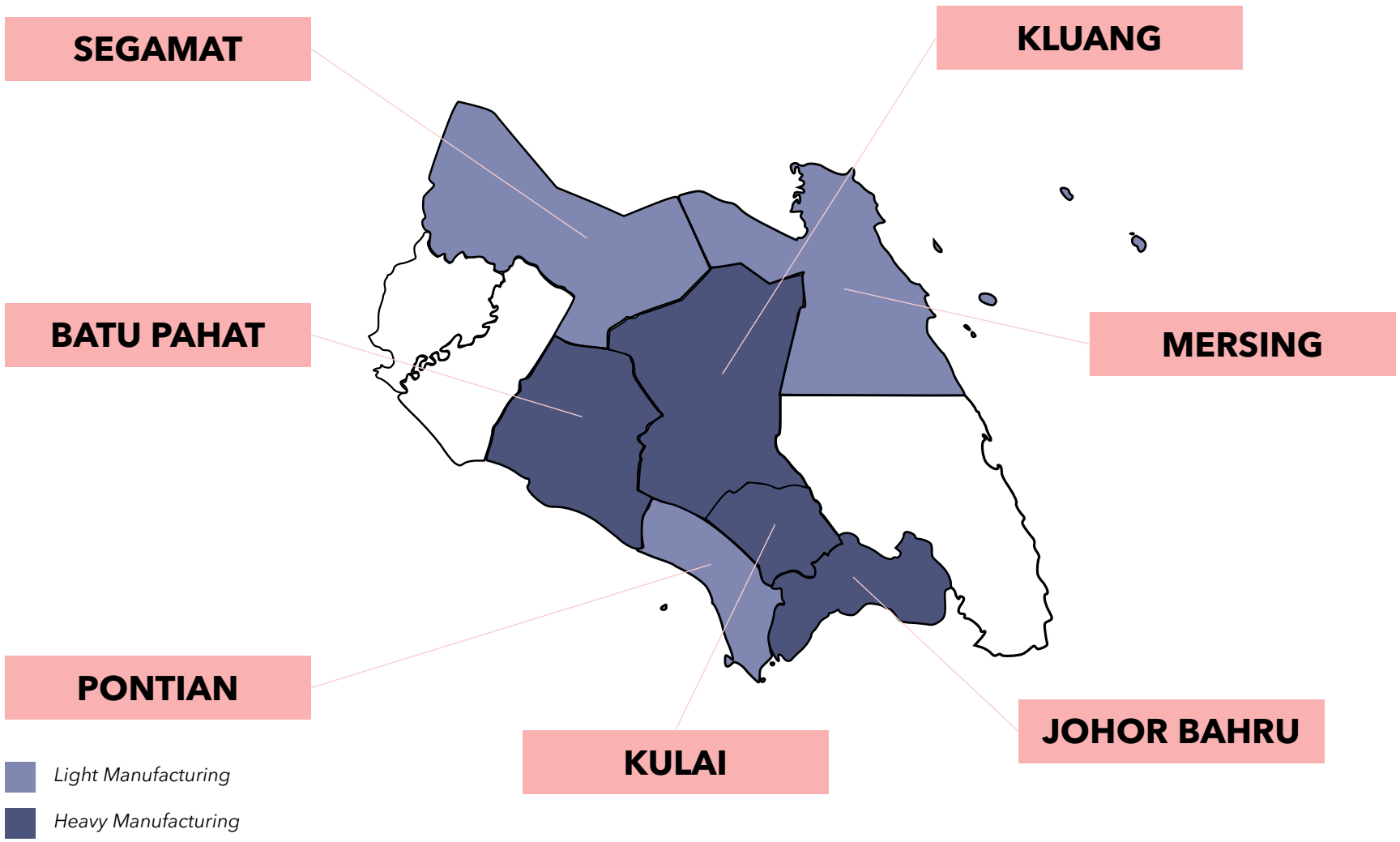
- Advanced E&E is one of the nine priority sectors identified for the development of Ibrahim Technopolis (iBTEC) – a smart, eco-industrial township designed to drive high-tech innovation and sustainable living
- The initiative includes the creation of a smart and sustainable ecosystem to support E&E businesses and enhance Ibtec's industrial competitiveness

Kulai as an Emerging Tech and Logistics Hub

- Kulai is positioned as a key technology hub in Johor, with a strong focus on advanced E&E activities. It also plays a strategic role in logistics, anchored by the presence of Senai International Airport
- Ongoing infrastructure expansion further supports Kulai's role in enhancing regional mobility and industrial connectivity

Source: Maju Johor 2030, PASB Analysis

Johor's heavy manufacturing zones align well with key E&E hubs, while Muar's rising role presents a valuable opportunity to expand the state's high-value industrial footprint



KEY INSIGHTS

Strategic Alignment with Heavy Manufacturing Zones

- The heavy manufacturing districts highlighted—Johor Bahru, Kulai, Batu Pahat, and Kluang—closely align with the current footprint of major E&E companies, especially in Kulai and Johor Bahru, confirming the effectiveness of spatial planning under Maju Johor 2030 in supporting high-value E&E activity

Muar as an Outlier with Strategic Significance

- Despite not being mapped as a heavy manufacturing zone, Muar hosts two major E&E players—STMicroelectronics and Micron—demonstrating its emerging role in advanced electronics. This signals a potential opportunity for future policy refinement to integrate Muar more formally into Johor's heavy manufacturing strategy

Source: Maju Johor 2030, PASB Analysis

Malaysia and Johor in particular excels in semiconductor manufacturing and ATP, but unlocking greater value in the E&E chain will require stronger R&D and original design capabilities

Value Chain	Research and Development (R&D)	Design	Manufacturing	Assembly, Test, Packaging
Global	In the upstream R&D stage, advanced economies lead by investing heavily in innovation	The design phase is dominated by countries with strong innovation ecosystems	Manufacturing is the traditional stronghold of East Asia in the E&E value chain	Global semiconductor packaging is fragmenting–Taiwan leads, others race to localize
Malaysia	**0.95%** Of national's GDP is spent on R&D, which is low relative to peers. Most E&E firms in Malaysia focus on manufacturing and assembly; only a few conduct significant R&D or product development locally	Malaysia has "**few local Original Brand Manufacturers (OBMs)**" in electronics	**13%** of the world's semiconductor assembly/test tasks is handled by Malaysia, thanks to the many OSAT companies and captive facilities	**6th** globally, Malaysia is a major player in ATP services, with Penang and Johor as key ATP hubs
Johor	The state hosts **universities like UTM (Universiti Teknologi Malaysia)** which produce engineering research but Johor does not have a major semiconductor R&D centre or design lab.	Major Johor EMS companies provide some design-for-manufacturing services and product engineering	Johor is known as an EMS hub for some of the world's largest companies in this space	Johor hosts several major ATP facilities, particularly in Kulai, Johor Bharu, Muar, and Pasir Gudang

Key Highlights

- **Malaysia Punches Above Its Weight in Manufacturing & ATP:** Malaysia handles 13% of global semiconductor assembly/test tasks and ranks 6th in global ATP, with Johor and Penang as key hubs
- **Weak R&D and Design Limits Upstream Integration:** Only 0.95% of GDP is spent on R&D, and Malaysia has few local OBMs–hindering innovation and upstream value capture in the E&E sector
- **Johor is a Manufacturing Powerhouse, But Lacks R&D Muscle:** While Johor is a key EMS and ATP hub, it lacks semiconductor R&D and design labs, relying more on downstream activities

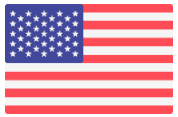
Source: Ministry of International Trade And Industry (MITI) | PEMANDU Analysis

With a strong STEM talent base and institutions like UTM, Johor has a prime opportunity to evolve from an assembly hub into a thriving E&E innovation and R&D cluster

Research and Development (R&D) → Design → Manufacturing → Assembly, Test, Packaging

Global

In the upstream R&D stage, advanced economies lead by investing heavily in innovation



The United States spends roughly 3% of GDP on R&D (with tech giants like Apple, Google, Intel contributing tens of billions in R&D annually)

South Korea invests over 5% of its GDP in R&D – one of the highest rates worldwide

Germany also excel via strong industrial R&D consortia (e.g., Fraunhofer Institutes driving electronics and automotive electronics research)

Taiwan have built world-class semiconductor R&D ecosystems – e.g., Taiwan's ITRI and academia produced innovations that enabled TSMC and MediaTek's rise

Malaysia

Malaysia lags behind these leaders in R&D intensity

0.95% Of national's GDP is spent on R&D, which is low relative to peers

726 Researchers per million population – a fraction of advanced nations (S.Korea has ~7,500 per million)

36th In GII 2021 (34th in innovation outputs) – Malaysia's innovation ranking is modest

40% Of Malaysian graduates are in STEM, ranking #1 in SEA (2020)

Most E&E firms in Malaysia focus on manufacturing and assembly; only a few conduct significant R&D or product development locally

Johor

Johor, in particular, has little presence in upstream semiconductor R&D or original product research

The state hosts **universities like UTM (Universiti Teknologi Malaysia)** which produce engineering research, and some public research agencies have minor facilities, but Johor does not have a major semiconductor R&D centre or design lab.

The **lack of large R&D investments** in Johor is partly structural – its industry profile is EMS and assembly (lower in the chain), and it historically attracted manufacturing-oriented FDI rather than R&D centers

This is a gap area: despite having a skilled workforce pipeline, Johor has yet to develop a significant "innovation cluster" in E&E

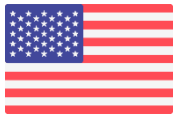
Source: Statista, WIPO, UNESCO, PASB Analysis

With growing vertical integration and niche design capabilities emerging in Johor, there's strong potential to evolve beyond EMS into original product and design innovation

Research and Development (R&D) → **Design** → Manufacturing → Assembly, Test, Packaging

Global

The design phase is dominated by countries with strong innovation ecosystems



The U.S. leads in semiconductor chip design (home to fabless giants like Qualcomm, NVIDIA, AMD and design teams of Intel, Apple)

Germany excels in engineering design for automotive electronics, industrial control systems, and precision instruments

Taiwan has a thriving IC design sector (e.g. MediaTek for mobile chipsets) and numerous design service companies supporting its semiconductor foundries

South Korea designs world-class memory and display panels (Samsung, SK Hynix) and consumer devices

Malaysia

Malaysia's E&E industry has historically been oriented toward production rather than original design

intel. infineon

have IC design teams in Penang

While some MNCs have set up design centers in Malaysia, local design activity remains limited

OEM ODM OBM

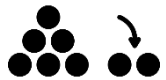
Malaysia has "**few local Original Brand Manufacturers (OBMs)"** in electronics, meaning most local firms do not sell under their own brands – they either build to spec for others (OEM/ODM) or focus on components

This is a structural weakness noted by analysts: Malaysian E&E firms have greater presence in OEM/assembly, and lack home-grown brands or design-focused companies to drive innovation

As a result, Malaysia files relatively fewer high-value patents in E&E and often relies on foreign design IP

Johor

Johor exemplifies this challenge



Major Johor EMS companies provide some design-for-manufacturing services and product engineering (including mold and tooling design, as they tout vertical integration), but they do not generally create their own branded products or core IP

There are small pockets of design – e.g. some firms do design of electronics enclosures, printed circuit layouts, or value-engineering of existing products – but no significant semiconductor design houses or electronics R&D centers operate out of Johor

Overall, Johor's role in the design stage of the value chain is minor. Malaysia ranks only mid-table in indicators like "Knowledge Creation" and patent output in the GII

Johor (and Malaysia at large) punches below its weight in design, especially when benchmarked against global innovation champions

Source: SME Bank, WIPO, PASB Analysis

Johor anchors Malaysia's E&E value chain through high-volume EMS and semiconductor backend operations, supported by strong infrastructure and global industry presence

Research and Development (R&D) → Design → **Manufacturing** → Assembly, Test, Packaging

Global

Manufacturing is the traditional stronghold of East Asia in the E&E value chain

China is the world's electronics manufacturing powerhouse, contributing 1/3 of global E&E exports

Taiwan leads in semiconductor wafer fabrication and advanced packaging – It accounts for over 60% of global semiconductor foundry output

Philippines have specialised in semiconductor assembly and test (backend manufacturing)

Thailand is big in consumer electronics and electrical appliances assembly (e.g., air conditioners, TVs)

Malaysia

Manufacturing is the core strength of Malaysia's E&E sector, contributing 27% of Malaysia's manufacturing GDP

13% of the world's semiconductor assembly/test tasks is handled by Malaysia, thanks to the many OSAT companies and captive facilities

72% of E&E firms cite production/assembly as their primary activity and many are in ATP (Assembly, Test, Packaging) for semiconductors

6% of a semiconductor's value chain lies in the assembly and testing segment—where most of Malaysia's E&E players are concentrated

In summary, Malaysia is a key global player in semiconductor packaging, assembly and testing – the "back-end" process after chip fabrication

Johor

Johor plays a significant role in Malaysia's E&E manufacturing landscape, albeit with a different focus than Penang

Johor is known as an EMS hub for some of the world's largest companies in this space

Additionally, Johor has semiconductor backend operations, contributing to the semiconductor supply chain

Johor's manufacturing ecosystem is bolstered by its infrastructure – the state has multiple gazetted industrial parks with good connectivity, and two major ports facilitate exporting heavy volumes of electronics quickly

In short, Johor's strength is in high-volume, efficient production of electronics with flexibility and cost-effectiveness

Source: SME Bank, Kenanga Research, MIDA, Bursa Malaysia, PASB Analysis

Malaysia ranks 6th globally in ATP, with Johor excelling in high-volume test and packaging– but lagging in advanced, R&D-driven capabilities

Research and Development (R&D) → Design → Manufacturing → **Assembly, Test, Packaging**

Global

Global semiconductor packaging is fragmenting– Taiwan leads, others race to localise

Taiwan dominates advanced semiconductor packaging, setting global standards in 2.5D/3D integration

China has ramped up ATP capacity aggressively through local OSAT (Outsourced Semiconductor Assembly and Test) giants like JCET and Tongfu Microelectronics

Singapore and the Philippines remain strongholds for backend semiconductor packaging and test, supporting global foundries and IDMs

The U.S. is reshoring parts of its ATP process under the CHIPS Act, with players like Intel and Amkor investing in new ATP plants

Malaysia

Malaysia has developed a strong ATP capability, which supports its E&E sector

6th globally, Malaysia is a major player in ATP services, with Penang and Johor as key ATP hubs

13% of global semiconductor assembly/test tasks are handled in Malaysia, mainly by major OSAT firms

72% of firms cite production or assembly as their main activity, underscoring ATP as the backbone of Malaysia's E&E sector

Recent shifts show movement toward advanced packaging (e.g., SiP, 3D-IC), though local capability in R&D-heavy ATP tech still trails Taiwan or Korea

Johor

Johor excels in high-volume ATP but lacks advanced packaging capabilities

Johor hosts several major ATP facilities, particularly in Kulai, Johor Bharu, Muar, and Pasir Gudang

These plants focus on high-volume, cost-effective test and packaging – not advanced nodes – but serve global supply chains reliably

Johor's strength lies in:

- Skilled labour from TVET and polytechnic institutions
- Excellent port logistics and export infra
- Lower land/operational costs vs Penang

However, Johor still lags in advanced packaging capabilities (like fan-out or wafer-level packaging), and lacks co-located R&D or prototyping centers – limiting vertical integration

Source: MDBC, Arc Group, PASB Analysis

Globally, the E&E sector is integral to various industries, serving both as a driver and backbone of key industries

1	Robotics	• E&E provides the core components for robotic systems, including sensors, actuators, and control systems	USD68 billion	valuation of global robotics market (2023)	USD165 billion	expected to grow by end of 2029
2	Internet-of-Things	• E&E provides the foundational infrastructure for IoT devices, including sensors, microcontrollers, and communication modules	USD30 billion	valuation of global IoT in energy market (2023)	USD66 billion	expected to grow by end of 2031
3	Advanced Materials	• E&E applications drive the demand for materials with specific properties, such as improved conductivity, thermal management, or flexibility	USD24 billion	valuation of global advanced materials market (2024)	USD58 billion	expected to grow by 2032
4	Renewable Energy	• E&E provides crucial components for renewable energy systems, such as inverters for solar panels and control systems for wind turbines	USD1.2 trillion	valuation of global renewable energy market (2023)	USD3.6 trillion	expected to grow by 2030
5	MedTech	• E&E enables the development of sophisticated medical devices with features like real-time monitoring and data collection	USD512 billion	valuation of global medical devices market (2022)	USD799 billion	expected to grow by 2030

Source: Automation Yeruham, e&, US National Institute of Standards and Technology, PASB Analysis

Similarly, the E&E sector is the backbone of Johor's JETP ambitions–powering innovation and efficiency across all priority industries from energy to healthcare

01 **E&E underpins digital transformation across all priority sectors**, enabling smarter, more efficient systems through automation, sensing, and advanced electronics–making it a foundational enabler in Johor's economic future

02 **The sectors listed below are key pillars under JETP strategy**, and all require advanced E&E integration to transition toward higher-value, sustainable, and tech-driven growth

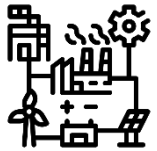
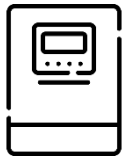
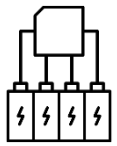
As Johor accelerates its shift toward a high-tech, sustainable economy under JETP, the growth of E&E is not just complementary–**but essential**–to scaling these strategic sectors

Sector	E&E Integration Point		
Energy	Smart Grids	Renewable Energy Integration	Energy Storage Systems
Chemical & Petrochemical	Industrial Process Automation	Predictive Maintenance	Advanced Process Safety Systems
Aerospace	Avionics and Flight Control Systems	Embedded Systems in Aerospace Manufacturing	Aircraft Health Monitoring Systems
Healthcare and Pharmaceuticals	Monitoring & Medical Devices	Diagnostic Imaging & Lab Equipment	Pharmaceutical Manufacturing & Cold Chain Logistics
Agriculture	Precision Farming	Smart Irrigation	Post-Harvest Automation

Source: PASB Analysis

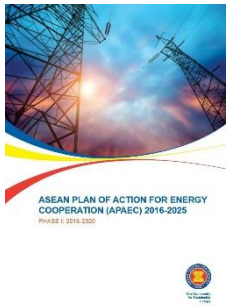
Smart grids, renewable integration, and energy storage systems are critical E&E integration points to strengthen the future energy ecosystem

ENERGY SECTOR

	E&E Integration Point	
 **Smart Grid**	• Requires Advanced Metering Infrastructure (AMI), grid sensors, SCADA systems, and communication modules to enable real-time visibility of electricity flow	• Allows fault detection, load forecasting, and automation of grid balancing, reducing downtime and improving grid resilience
 **Renewable Energy Integration**	• Relies on inverters, converters, and grid-tied *controllers to handle the intermittent nature of solar and wind energy*	• Integration with DERMS (Distributed Energy Resource Management Systems) allows decentralized RE assets to be managed intelligently
 **Energy Storage Systems**	• Demands Battery Management Systems (BMS), IoT-based control electronics, and embedded system controllers	• Critical for stabilizing supply-demand fluctuations by storing excess RE output during off-peak hours and releasing during peak demand

Source: ASEAN Energy Outlook, IRENA, IEA, PASB Analysis

Regional and national energy plans signal a strong demand for E&E technologies to digitalise grids, enable real-time monitoring, and manage renewable integration



ASEAN Plan of Action for Energy Cooperation (APAEC), Phase II (2021–2025)

- Aims for 23% renewable energy share in ASEAN's total primary energy supply by 2025

- Strong push for digitalization, smart grids, and embedded E&E systems in grid infrastructure

TNB Grid of the Future (2020–2040)

- RM25 billion earmarked to modernize Malaysia's grid through :
  - Smart substations
  - AMI rollout
  - System-wide automation

- Emphasis on predictive maintenance, real-time monitoring, and E&E systems embedded into energy infrastructure

Malaysia Renewable Energy Roadmap (MyRER)

- Targets 31% of electricity generation from renewables by 2025 (up from 24% in 2020)

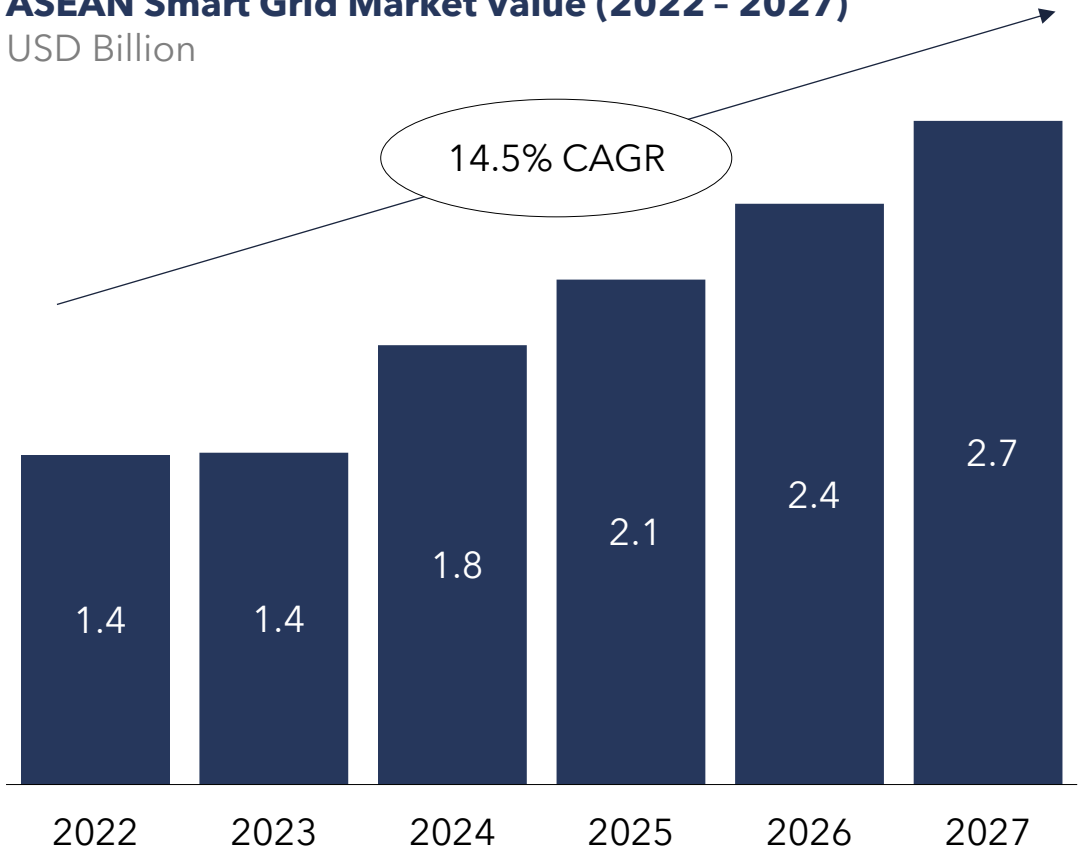
- This transition requires a sharp increase in deployment of E&E technologies to manage grid volatility and load balancing

Source: ASEAN Secretariat, Tenaga Nasional Berhad (TNB), Energy Commission Malaysia, PASB Analysis

ASEAN's smart grid boom is fueled by digital investments and rising demand for E&E components like smart meters, control systems, and fault detection devices

ASEAN's smart grid market is poised to grow at 14.5% CAGR, reaching USD 2.7 billion by 2027

ASEAN Smart Grid Market Value (2022 – 2027)
USD Billion



Key Insights

1

Growth driven by investments in grid automation, energy transition policies, and private sector-led digital solutions

2

Smart meters, control systems, and embedded fault detection devices are the fastest-growing E&E components in this ecosystem

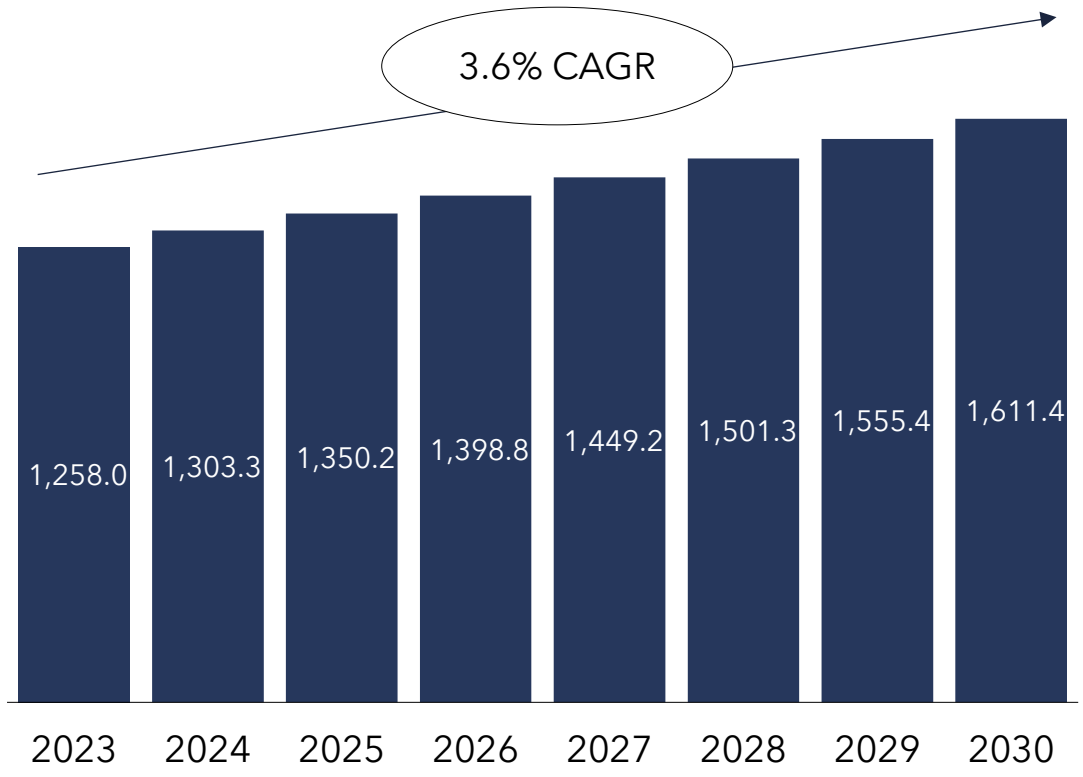
Source: Mordor Intelligence, PASB Analysis

ASEAN's rising electricity demand, driven by urbanisation, EV adoption, and industrial growth, calls for E&E-intensive solutions to enable smarter, more resilient grids

ASEAN's total electricity consumption is projected to grow steadily at 3.6% CAGR...

Total Electricity Consumption in ASEAN (2023 – 2030)

TWh (Terawatt-hour)



..driven by:

1.

Rapid urbanisation
ASEAN cities are expected to add **90 million more urban dwellers** by 2030

2.

Electrification of transport
EV sales in ASEAN expected to reach **3 million units by 2030**, driving grid electricity demand

3.

Industrial sector growth
Manufacturing hubs like Vietnam, Thailand, and Malaysia increasing grid-connected industrial loads by **>5% annually**

Meeting this demand sustainably requires **E&E-intensive solutions**:
- Advanced sensors for load monitoring
- Real-time grid management platforms
- IoT-based smart substations and microgrids

Source: ASEAN Centre for Energy, PASB Analysis

Malaysia's RE transition hinges on large-scale deployment of E&E technologies to manage grid stability, load variability, and decentralized energy generation

Key E&E Technologies Required for RE Integration

- **Smart inverters** to synchronize distributed solar generation with national grid voltage/frequency
- **Real-time energy management systems** to manage fluctuating solar/wind inputs
- **Advanced battery management systems** for grid-connected storage, ensuring energy stability
- **IoT-based predictive maintenance sensors** on solar farms, biomass plants, and wind turbines

Drivers Behind Malaysia's RE Push

- Paris Agreement commitment to reduce greenhouse gas emissions by 45% by 2030
- High industrial electricity consumption sectors (manufacturing, logistics) moving toward RE procurement and carbon neutrality
- Government green incentives like Green Investment Tax Allowance (GITA) and Green Technology Financing Scheme (GTFS)

Latest Development

Solarvest Holdings Bhd has been contracted by **TNB** to build a 500-MW solar park under the fifth round of the country's large-scale solar (LSS) programme. The deal worth MYR 401 million (USD 90.2m/EUR 82.6m) is set to create the largest single-site solar farm in ASEAN.

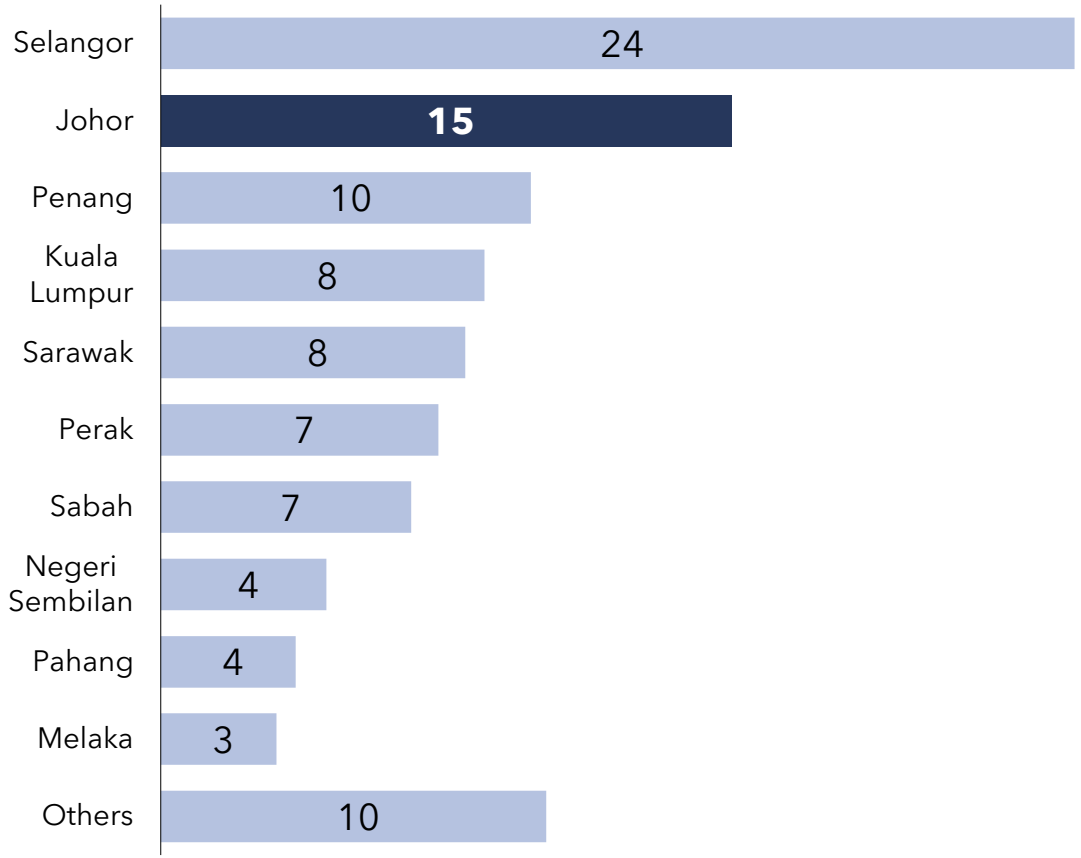
Transitioning Johor's industrial base to RE reliance requires large-scale deployment of E&E technologies to handle decentralised generation, load variability, and carbon tracking

Source: MyRER, Energy Commission, Solarvest, PASB Analysis

Johor's rapid industrial-driven electricity growth demands urgent deployment of E&E solutions to strengthen grid resilience, efficiency, and sustainability

Johor is the second-largest electricity consumer in Malaysia after Selangor

Electricity Consumption Share by State (2023)



Source: Energy Commission Malaysia, National Energy Statistics, PASB Analysis

Key Insights

Energy Profile Characteristics of Johor

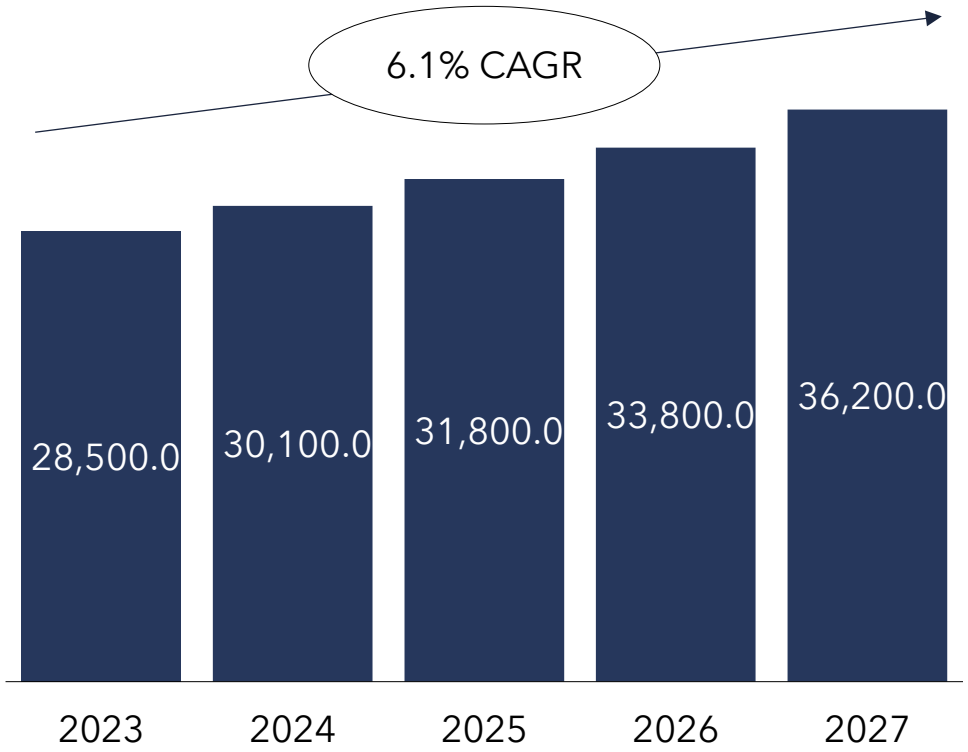
- Heavy industries, port logistics, data centers, and green manufacturing parks are increasing Johor's base load year-on-year
- Johor's electricity demand grew 5.8% CAGR from 2018–2023, faster than Malaysia's national average of 4.1%

Strategic Urgency

- Johor's massive energy demand cannot be supported by traditional grid systems alone. To ensure resilience, efficiency, and ESG compliance, Johor must embed large-scale E&E solutions into:
  - Transmission and distribution (T&D) systems
  - RE generation monitoring and control
  - Demand-side energy efficiency management (industrial facilities, ports, large consumers)

Johor's 6.1% energy demand surge, driven by green and digital industries, necessitates advanced E&E systems to modernise grid resilience and control

Energy Demand Profile for Johor (2023-2027) GWh



- Growth mainly driven by digital economy infrastructure (data centers), green manufacturing, RE installations

Strategic E&E Needs to Serve Green Industries

- **Smart substation upgrades with embedded voltage regulation modules.**
- **Real-time power quality monitoring systems (sensors + software)**
- **Smart microgrid controllers for data centre parks**
- **Energy storage systems with advanced BMS integration**
- **RE-sourcing tracking systems (blockchain + IoT)**

Source: Energy Commission Malaysia, PASB Analysis

Rising industrial energy demand in Johor underscores the urgent need for smart E&E infrastructure to stay competitive with ASEAN's green chemical pivot

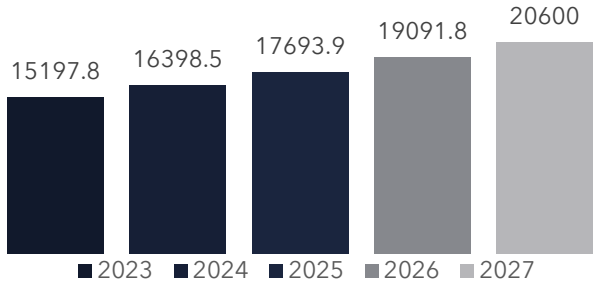
If Johor's chemical sector fails to evolve, it directly weakens Malaysia's national industrial competitiveness

Johor contributes **~25% of Malaysia's chemical manufacturing capacity**, centered around Pengerang, Pasir Gudang, and Tanjung Langsat

Johor is Malaysia's **third-largest manufacturing state** overall (RM 74 billion manufacturing value-added in 2022), after Selangor and Penang

Smart E&E infrastructure is not optional – it is essential to support the chemical industry's growth

Johor Industrial Energy Demand Forecast (2023-2027)
GWh (GigaWatt per hour)



- Rising industrial energy demand will stress Johor's infrastructure
- Without embedded smart energy management systems (BMS, IoT controls), Johor risks:
  - Grid instability
  - Higher emissions intensity
  - Failure to meet ESG investment thresholds

ASEAN competitors are pivoting quickly toward smart, green chemical production

- Vietnam attracted USD 2 billion in new green chemical projects (2021–2023) with smart factory requirements

- Thailand's Eastern Economic Corridor (EEC) offering Industry 4.0 tax breaks for petrochemical sector upgrades

Johor's current chemical strength gives it a competitive edge –but only rapid E&E modernization (in automation, smart energy, emissions control) can future-proof its role as Malaysia's premier chemical hub

Source: ASEAN, Energy Commission, Invest Johor, PASB Analysis

E&E technologies are critical in the chemical & petrochemicals sector to automate processes, enable predictive maintenance, and enhance safety through real-time monitoring

CHEMICAL AND PETROCHEMICAL SECTOR

	E&E Integration Point	
Industrial Process Automation	• Modern chemical plants are increasingly controlled by Distributed Control Systems (DCS) and Programmable Logic Controllers (PLC)	• Embedded electronics and smart sensors monitor key parameters (pressure, flow, temperature) in real-time, enabling safe, efficient production
Predictive Maintenance	• Smart vibration sensors, thermography sensors, and IoT-based analytics enable predictive maintenance of pumps, valves, compressors, and reactors	• Helps chemical companies avoid unplanned shutdowns, reducing operational costs by up to 20% annually
Advanced Process Safety Systems	• Integration of safety instrumented systems with E&E allows automated emergency shutdowns (ESD) and fire & gas detection	• Real-time electronic monitoring reduces risks of catastrophic failures

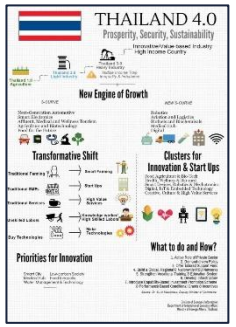
Source: ABB Chemicals, Frost & Sullivan, Schneider Electric, PASB Analysis

Regional leaders are accelerating Industry 4.0 adoption in the chemical sector, embedding E&E systems to drive smart manufacturing, energy efficiency, and real-time monitoring

Malaysia's Chemical Industry Roadmap 2030 (CIR2030)

- Targets **50% of new chemical investments to involve Industry 4.0 integration** – including full adoption of automation, digital control systems, and embedded electronic process monitoring

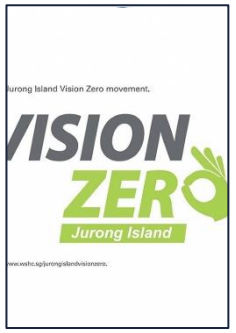
- Prioritizes E&E integration in specialty chemical areas like agrochemicals, advanced polymers, and bio-based chemicals



Thailand's Petrochemical 4.0 Strategy

- Under Eastern Economic Corridor (EEC**) framework, Thailand aims to transition 30% of its petrochemical sector** into smart chemical manufacturing by 2027

- Thailand's chemical plants now embed on average 3.2 sensors per processing unit, up from 1.8 sensors in 2018



Singapore's Jurong Island Vision

- Jurong Island 2.0 strategy emphasizes energy efficiency and smart operations
- Over **75% of chemical facilities** already deploy real-time operational monitoring using embedded electronics and predictive analytics as of 2023

- Plans to achieve full energy-efficiency digitalization across the island by 2030

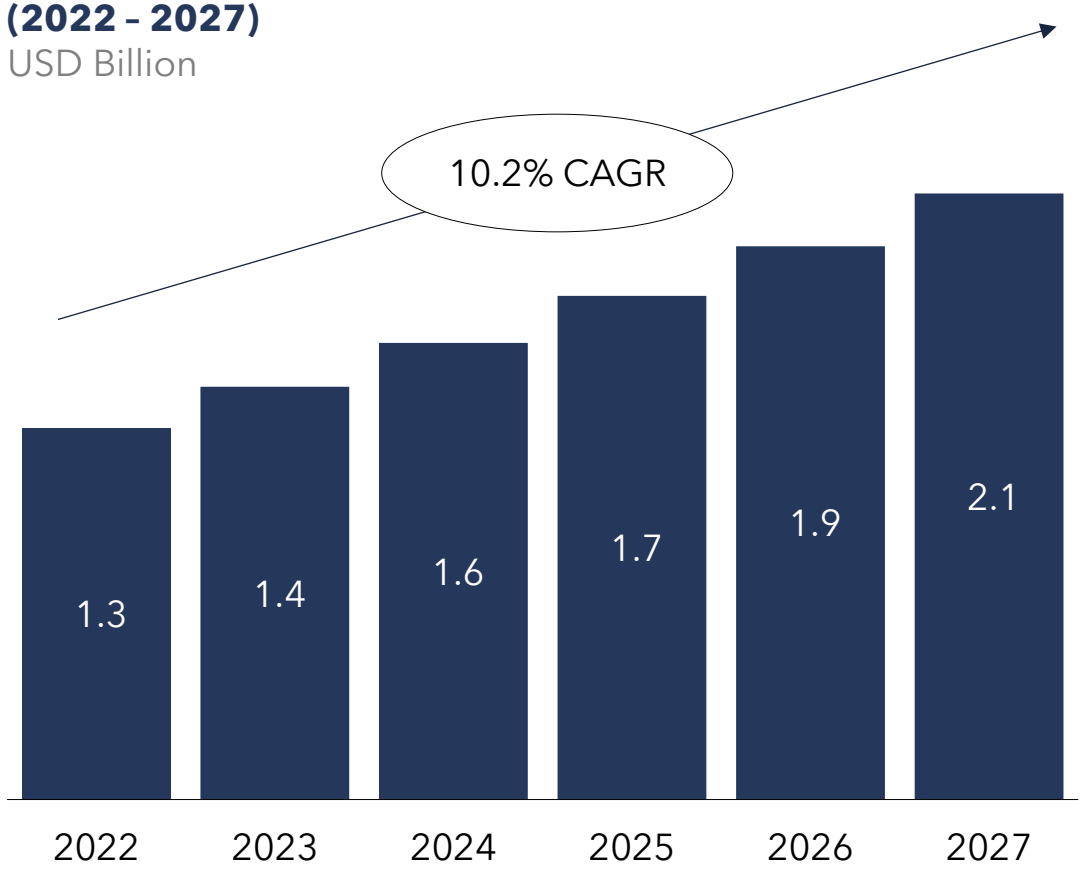
Source: MITI, Thailand Board of Investment, Singapore Economic Development Board (EDB), PASB Analysis

ASEAN's 10.2% CAGR in chemical process automation is fueled by smart factory adoption, ESG pressures, and automation needs amid skilled labour shortages

ASEAN's chemical process automation market is expanding at 10.2% CAGR..

ASEAN Chemical Process Automation Market Size (2022 – 2027)

USD Billion



..driven by:

1

Rising demand for smart factories

43% of ASEAN chemical companies surveyed in 2022 reported starting digital transformation initiatives

2

ESG compliance

Increasing pressure from global buyers for ASEAN exporters to meet process and safety standards

3

Manpower shortage

Automation and electronics-driven control systems address the increasing skills shortage in chemical sectors

Breakdown of E&E Applications within Chemicals Sector (2023 Share):

- Process Control & Automation Systems:45%
- Industrial IoT Sensors: 25%
- Explosion-Proof and Intrinsically Safe Electronics: 20%
- Digital Twin Systems & Advanced Simulation Tools: 10%

Source: Research and Markets, Frost & Sullivan, PASB Analysis

The shift toward high-margin specialty and green chemicals demands E&E driven digitalisation to meet global ESG standards and secure export competitiveness

Strategic Shift Toward Specialty & Green Chemicals

- Global specialty chemicals demand projected to grow **3x faster** than basic chemicals between 2023–2030
- **ASEAN governments are pushing for:**
  - Bio-based chemicals
  - High-value specialty polymers
  - Chemicals supporting renewable energy, EV batteries, healthcare industries

E&E systems (automation, IoT, embedded process monitoring) are critical enablers for producing high-specification specialty chemicals

Malaysia's Position in ASEAN:

2nd in ASEAN
for total chemical exports (after Singapore)

~1.3%
Share of global chemical exports (~3.8%, Singapore)

Malaysia's strategy is to move away **from basic chemicals (low margin)** toward **specialty and green chemicals (high margin)** – requiring digitalization and electronics integration

Why Johor Needs to Adapt

- Global buyers (e.g., automotive OEMs, electronics companies) are **imposing stricter supply chain ESG standards**
- **Exporters failing to demonstrate digitally monitored, low-carbon chemical production risk**
  - Losing European and US markets due to EU CBAM (Carbon Border Adjustment Mechanism) starting 2026
  - Falling behind global green certifications (ISO 50001 Energy Management, ISO 14067 Carbon Footprint Standards).

Global and ASEAN chemical sectors are evolving toward digital, green, and high-value segments – Johor **must** upgrade its E&E backbone to maintain competitiveness in exports and industrial growth.

Source: McKinsey, UN Comtrade, PASB Analysis

Despite its strong chemical footprint, Johor risks losing future investments without urgent upgrades in automation and E&E integration

Malaysia's Chemical Industry Snapshot (2022–2023)

- Total contribution to GDP (Manufacturing Sector): **6.9%**
- Total export value for chemical and chemical products: **RM95 billion (~USD 21 billion)**
- Accounts for **~6.2%** of Malaysia's total merchandise exports
- Main export markets: Singapore, China, Japan, United States.

Johor's Specific Role in Malaysia's Chemical Sector

- Johor contributes **~25%** of Malaysia's chemical manufacturing capacity
- Johor's **key chemical clusters**:
  - Pengerang Integrated Complex (PIC): Largest downstream oil & gas and chemical processing hub in Southeast Asia
  - Tanjung Langsat Industrial Complex: Specializes in specialty chemicals, oleochemicals, advanced materials
  - Pasir Gudang Industrial Zone: Heavy concentration of petrochemical, fertilizer, and specialty chemical industries

Johor's Strategic Strengths

Location advantage: Close proximity to Singapore, Indonesia (Batam, Riau Islands), key trading ports
Existing infrastructure: Integrated ports for chemical shipping
Large energy supply: Supported by Pengerang Co-generation Plant, critical for energy-intensive chemical operations

Johor's chemical base is strong, but gaps in automation and E&E integration risk deterring future specialty chemical investments

Source: DOSM, Invest Johor, PASB Analysis

E&E technologies are revolutionising agriculture by enhancing precision, efficiency, and sustainability–delivering measurable gains in yield, cost savings, and resource optimisation

AGRICULTURE SECTOR

	E&E Integration Point	
Precision Farming	• GPS-guided machinery, drones and GNSS receivers enable site-specific seeding, fertilisation and spraying	• Reduces input costs by up to 30 % and boosts yields by 15–20 % through variable-rate application based on real-time soil and crop data
Smart Irrigation	• IoT soil-moisture sensors, automated valves and drip-irrigation controllers allow dynamic water delivery	• Cuts water use by 30–50 %, preventing crop stress and lowering pump energy bills by 25 % via optimized irrigation schedules
Post-Harvest Automation	• Electronic sorting machines, optical sensors and robotics streamline grading, packing and cold-chain logistics	• Slashes manual labor needs by 40 %, reduces post-harvest losses by 15 %, and extends shelf life by up to 7 days through precise handling

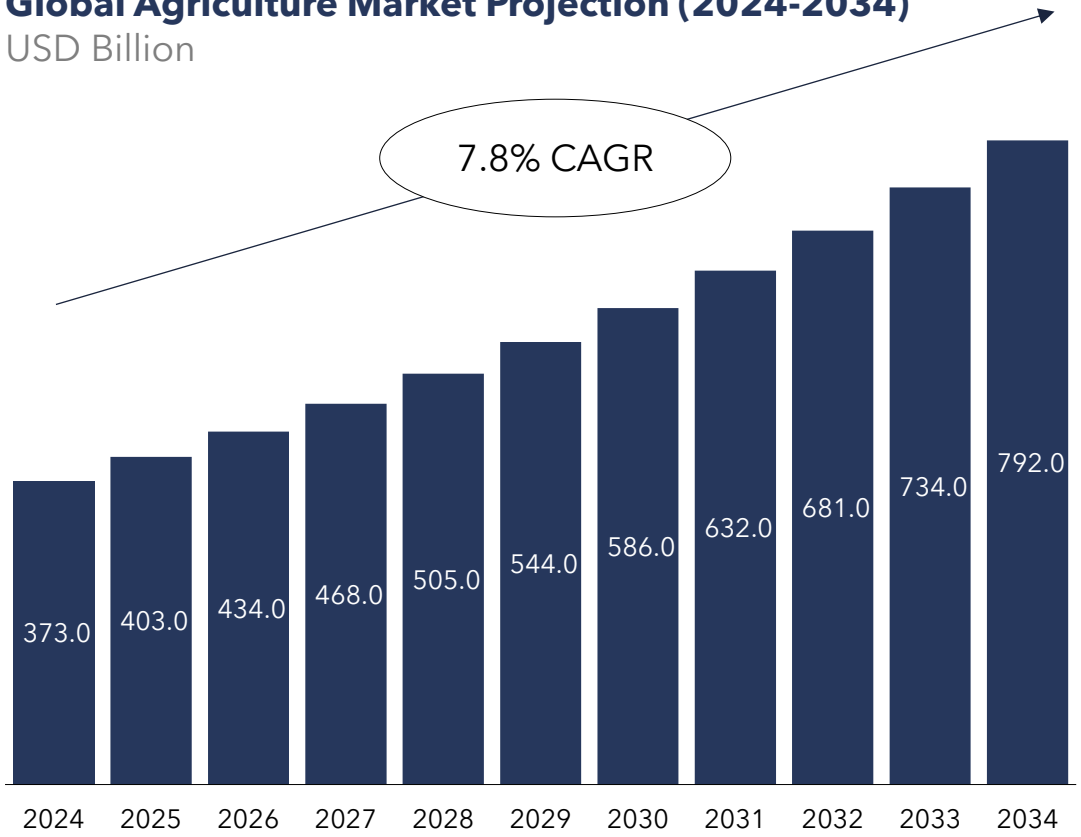
Source: FAO, PASB Analysis

Asia-Pacific's booming smart agriculture market is fueling demand for E&E components in precision farming, irrigation systems, and livestock monitoring

The global agriculture market is set to grow from USD 373 billion in 2024 to USD 792 billion by 2034

Global Agriculture Market Projection (2024-2034)

USD Billion



..driven by:

1.

Precision Farming
Utilizing GPS, IoT sensors, and data analytics to optimize field-level management

2.

Smart Irrigation Systems
Employing automated systems to manage water resources efficiently

3.

Livestock Monitoring
Implementing wearable devices and sensors to monitor animal health and productivity

- The expansion of smart agriculture is driving increased demand for E&E components such as sensors, microcontrollers, and communication modules
- This presents opportunities for local E&E manufacturers to cater to the growing needs of the agriculture sector

Source: Precedence Research, PASB Analysis

Malaysia's agriculture challenges—from low productivity to labour shortages—underscore the need for E&E-driven smart solutions to boost efficiency, resilience, and food security

	Agriculture Challenges	E&E Opportunities
Declining Productivity and Competitiveness	• Agriculture's contribution to GDP fell from **12% in 1990** to **7.1% in 2022** • Labour productivity in agriculture remailabour**% lower** than the national average (2022)	• E&E enablers like sensor-driven fertigation and automated machinery are critical to raise yield per hectare and labour efficiency
High Dependency on Imports and Food Security Gaps	• Malaysia imported **RM 63.6 billion worth of food** in 2022 – a growing agri-food trade deficit. • Key gaps exist in rice, fruits, dairy, and animal feed – exposing the country to global price shocks	• Smart farming (IoT, drones, yield sensors) can optimize domestic production and reduce import dependency
Aging Farmer Population and Labour Shortage	• **61% of Malaysian farmers** are over 50 years old; youth participation remains low • Farm labour costs rising, while younger generation prefers tech-oriented industries	• Autonomous tools and embedded robotics (e.g. auto-irrigators, drone sprayers) offer long-term solutions for labor-intensive tasks
National Agrofood Policy 2.0	• The policy targets **20% smart farm adoption by 2025** and mainstreaming agri-innovation by 2030 • Encourages precision agriculture, controlled-environment systems, and sensor-driven traceability	• E&E adoption is central – from real-time data capture to post-harvest logistics control

Source: DOSM, PASB Analysis

Johor leads in agricultural GDP but faces urgent risks from low digital adoption and lack of smart farming rollout amid rising global competition and food security pressures

Johor's Strength Today, but Productivity Risks Ahead

- Johor is Malaysia's #1 state in agricultural GDP contribution (RM 17.21 billion in 2023)
- Despite strong land, port, and crop diversity advantages, **digital adoption remains low**
- Compounded by aging farmers, water stress, and small fragmented plots, Johor's agri-productivity risks plateauing

Export Market Shifts and Regional Competition

- Global buyers demand **digital traceability, ESG compliance, and carbon footprint tracking** – E&E-backed systems are now a baseline
- Johor's proximity to Singapore and access to premium markets is an edge, but:
  - Vietnam and Thailand are investing billions in smart farming
  - Johor has no coordinated, state-wide rollout of smart agriculture yet

National Urgency: Food Security, Climate, and Policy Alignment

- Malaysia's food trade deficit reached **RM 63.6B** in 2022 – and Johor must contribute to import substitution
- Climate pressure (e.g., flooding) makes precision irrigation and data-driven farming an urgent need

Johor holds strategic land, ports, and output scale –but without urgent, state-wide E&E investment in agriculture, it risks being left behind as ASEAN pivots to smart, sustainable food production

Source: DOSM, Invest Johor, PASB Analysis

E&E technologies are critical to aerospace, powering everything from flight control to real-time aircraft health diagnostics through advanced sensors and embedded systems

AEROSPACE SECTOR

	E&E Integration Point	
Avionics and Flight Control Systems	• Aircraft rely heavily on E&E systems such as embedded flight control computers, inertial navigation units, and autopilot modules	• Advanced avionics systems integrate **sensors, displays, processors, and wiring harnesses** – forming the brain of modern aircraft • Demand is rising for **modular and upgradeable system**s, especially in commercial and defense aviation
Embedded Systems in Aerospace Manufacturing	• E&E components power CNC machines, composite automation, and robotic arms used in aircraft part production	• Sensors and real-time control systems enable **tight tolerances, digital twins, and predictive maintenance** during manufacturing • Aerospace electronics manufacturing includes **power electronics, PCBs, FPGAs, and microcontrollers** integrated in aircraft subsystems
Aircraft Health Monitoring Systems (AHMS)	• Modern aircraft are embedded with thousands of **sensors** to monitor engine health, vibration, stress loads, and component wear	• These systems feed real-time data to maintenance crews for **predictive diagnostics**, reducing downtime and cost

Source: PASB Analysis

Regional aerospace blueprints are all driving E&E integration through strategic investments in embedded systems, automation, and smart component manufacturing

Malaysia Aerospace Industry Blueprint 2030

- Generate RM55.2 billion in revenue and create 32,000 high-skilled jobs
- Achieve 50% local content in aerospace manufacturing and MRO

- E&E Link:
  - Focus on systems integration and precision manufacturing
  - Local E&E players encouraged to produce PCBs, embedded controls, and smart test equipment

Singapore Aerospace Industry Transformation Map (ITM)

- Value add of S$4 billion, an increase of >25% from 2015
- Create 1,000 new jobs
- Globally recognised aerospace nation, capable of design, engineering, production and aftermarket services for the world's major aircra programmes

- E&E Link:
  - Heavy investment in embedded smart systems for AHMS (Aircraft Health Monitoring)
  - Strong push for automation and E&E upgrades in repair shops and testing labs

Thailand Aerospace Industrial Development Plan

- Develop U-Tapao and Eastern Economic Corridor (EEC) as a regional aircraft MRO and component manufacturing hub
- Attract international OEMs and Tier-1 suppliers
- Create 14,000 aerospace jobs by 2026

- E&E Link: Incentives for E&E-focused investments in wire harnesses, flight control modules, and sensor systems

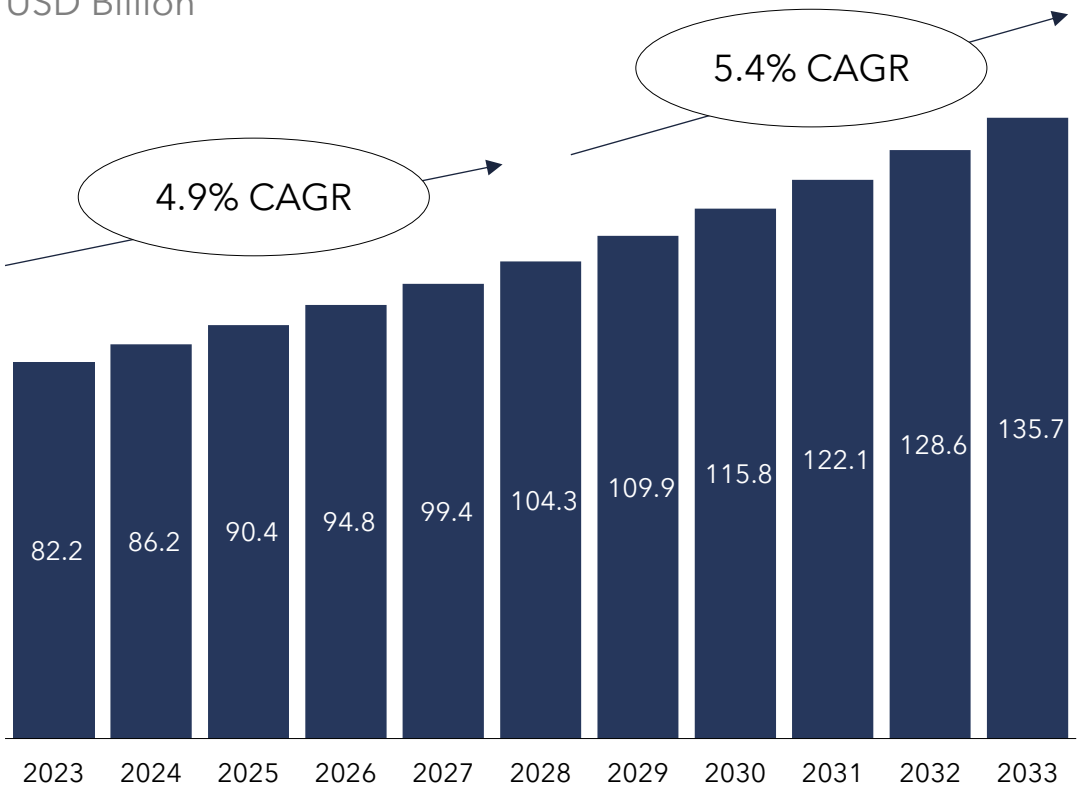
Source: National Aerospace Industry Blueprint 2030, MIDA

Global aerospace MRO market to grow from USD 82.2B (2023) to USD 135.7B (2033), driven by aging fleets and rising maintenance demand

The global aerospace MRO market is projected to grow from USD 82.2 billion in 2023 to USD 135.7 billion in 2033

Global Aerospace MRO Market (2023-2033)

USD Billion



The aerospace MRO market is segmented by:

1

Engine

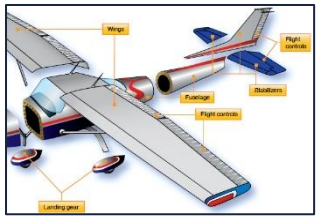
Maintenance, repair, and overhaul of aircraft engines to ensure optimal performance and safety

2

Line

Routine and minor maintenance performed between flights or overnight

3



Airframe

Structural maintenance of the aircraft body, including fuselage, wings, and landing gear

4

Other Types

Includes component repairs, avionics servicing, cabin refurbishments, and specialized modifications

Source: ResearchandMarkets, PASB Analysis

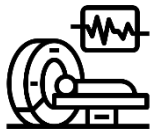
Electronics integration is the core enabler powering aerospace innovation–from digital cockpits and predictive MRO to electric propulsion and smart systems

		E&E Opportunities
Surging Demand for Aircraft Driven by Asia-Pacific Travel Boom	• Global air passenger traffic expected to reach **pre-COVID levels by 2024**, then **double by 2040** • Asia-Pacific projected to contribute **more than 50%** of new aircraft deliveries by 2040	• E&E systems – including avionics, fly-by-wire controls, and embedded electronics – are critical to new aircraft design and maintenance readiness
Shift to Next-Gen Aircraft Requires Deep Electronic Integration	• Airlines are demanding **lighter, more fuel-efficient** aircraft with digital cockpits and automated systems • New-generation aircraft (e.g. Airbus A350, Boeing 787) contain **2x more sensors and avionics** than older models	• The future of aerospace is digital – with embedded electronics in every subsystem from cockpit to cargo hold
MRO Transformation: From Manual to Predictive Maintenance	• Airlines and defense fleets are moving toward **data-driven MRO** models • Embedded health monitoring systems (AHMS) and electronic diagnostic tools are now industry standard	• Countries investing in MRO (like Malaysia) must match this shift with electronics-enabled maintenance infrastructure
Green Aviation and Electrification Trends	• The push for **sustainable aviation** is accelerating demand for: – Electric/hybrid propulsion systems – Battery management systems (BMS) – Lighter electronic systems to reduce fuel burn	• Growth of electric aviation creates **a new frontier for E&E innovation** – from power electronics to control boards

Source: IATA, Boeing, Deloitte, PASB Analysis

E&E technologies are vital to modern healthcare, enabling real-time monitoring, precision diagnostics, and automated pharmaceutical manufacturing and distribution

HEALTHCARE & PHARMACEUTICALS SECTOR

	E&E Integration Point	
Monitoring & Medical Devices	• Devices such as ECGs, pulse oximeters, and insulin pumps are built around sensors, microcontrollers, and wireless modules	• Wearables and bedside monitors use MEMS sensors, low-power chips, and embedded Bluetooth/WiFi modules to transmit patient vitals in real-time.
 **Diagnostic Imaging & Lab Equipment**	• CT scanners, MRI machines, and ultrasound devices require high-frequency analog electronics, signal processors, and imaging ICs	• Blood analyzers and PCR machines integrate thermal controllers, optical sensors, motion actuators, and programmable logic controllers (PLCs)
Pharmaceutical Manufacturing & Cold Chain Logistics	• Sterile drug production requires sensor-embedded PLC systems, which control temperature, pressure, humidity, and fill cycles with millisecond precision	• Cold chain infrastructure integrates thermistors, GPS tracking, vibration sensors, and IoT data loggers to ensure regulatory compliance and safety • E&E is essential in both automating production and ensuring integrity in distribution

Source: PASB Analysis

Southeast Asia is integrating E&E technologies like into national healthcare strategies to drive smarter, preventive, and connected care systems

			E&E Link:
	Malaysia Healthcare Travel Industry Blueprint 2021-2025	• Position Malaysia as a world-class healthcare travel destination with integrated digital health systems • Achieve **RM2.4 billion** in revenue from the health tourism sector	– Push for connected medical devices, digital diagnostics, and remote patient monitoring tools – Encourages investments in IoT-enabled hospital infrastructure and embedded health devices
	Singapore Healthier SG	• Shift from reactive to preventive care via tech-driven population health systems • Provide a family physician and one health plan for every resident aged 60 and above starting in 2023	– Deployment of wearables for population-wide monitoring, embedded in national health database – Integration of hospital-wide automation and telehealth diagnostics
	Thailand eHealth Strategy 2017-2026	• Enhance digital health systems to improve health outcomes and well-being • Digitize 70% of public hospitals and create a unified electronic health record system	• Mass procurement of connected diagnostic kits, smart beds, and hospital IoT systems • Expansion of smart elderly care homes powered by fall sensors and wireless vitals monitoring

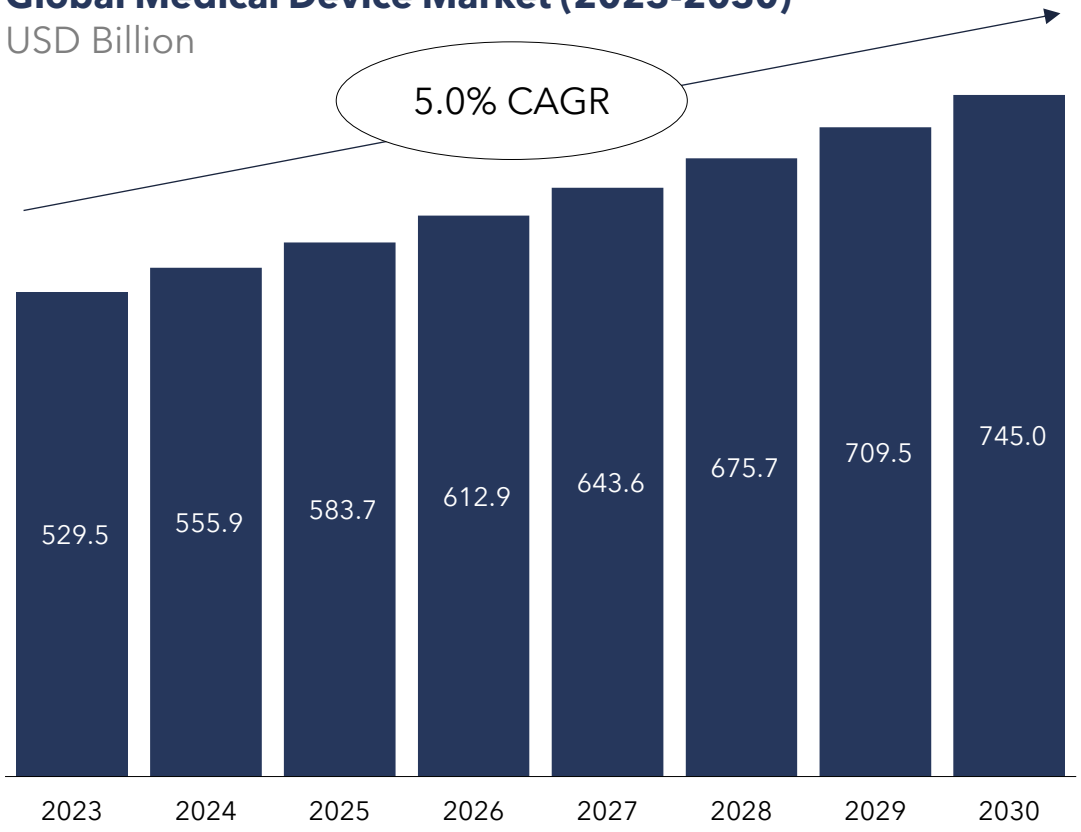
Source: Malaysia Healthcare Travel Council, Ministry of Health Singapore, Thailand Digital Government Development Agency

Healthcare is booming – the global medical device market will reach USD 745B, and Malaysia's healthcare market will more than double by 2030

The global medical device market is set to grow from USD 523 billion in 2023 to USD 745 billion by 2030

Global Medical Device Market (2023-2030)

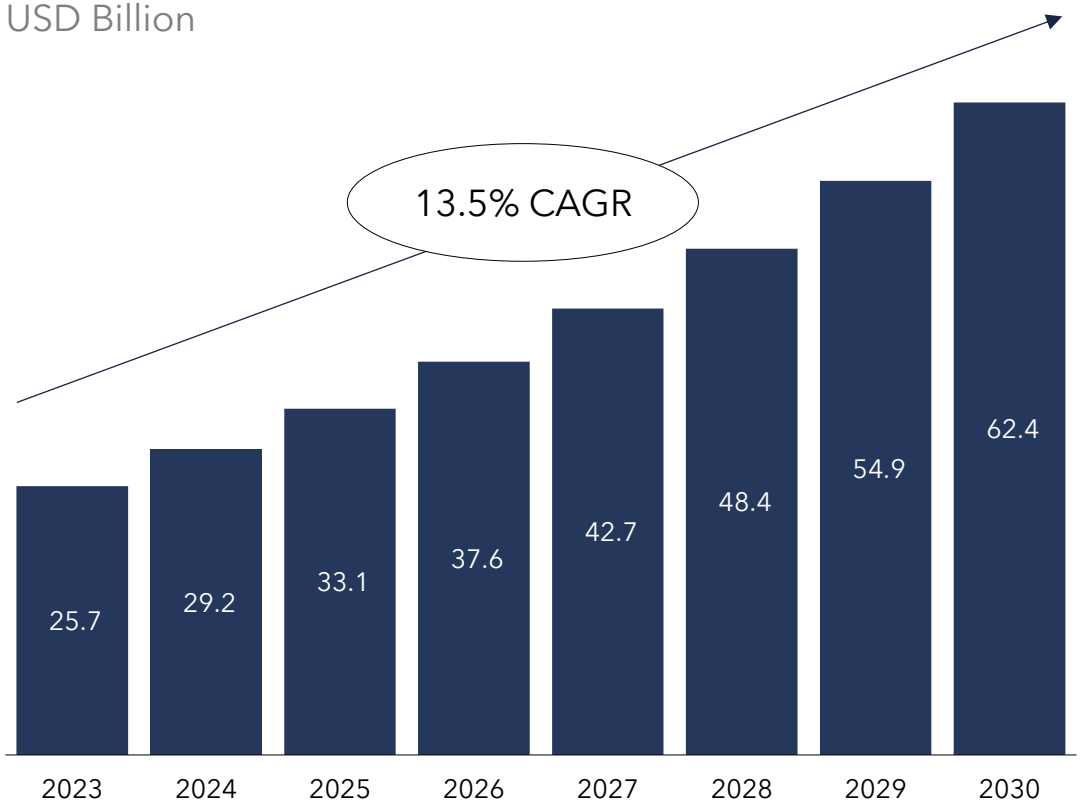
USD Billion



Malaysia's healthcare market is projected to more than double from USD 25.7B in 2023 to USD 62.4B by 2030

Malaysia Healthcare Market (2023-2030)

USD Billion



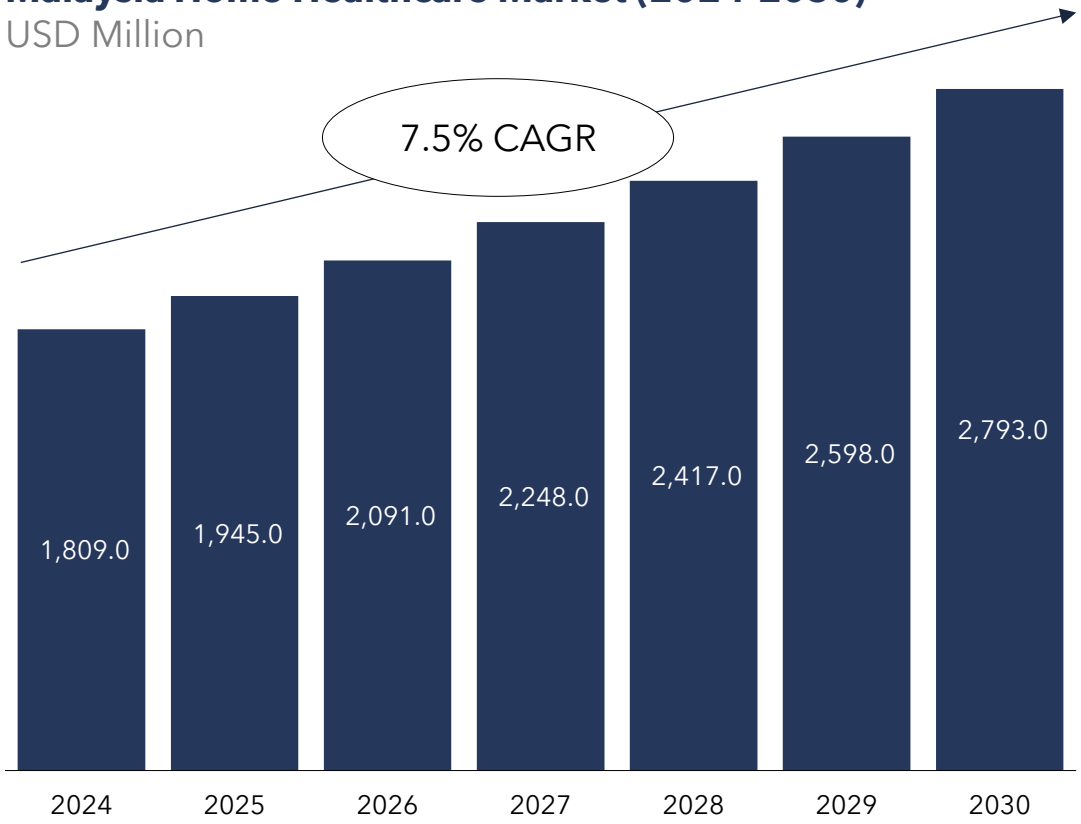
Source: Matrade

Malaysia's home healthcare market is rising steadily at 7.5% CAGR, driven by growing demand for in-home respiratory, dialysis, IV, and diagnostic care solutions

Malaysia's home healthcare market is projected to expand from USD 1.8B in 2024 to USD 2.8B by 2030

Malaysia Home Healthcare Market (2024-2030)

USD Million



Some of the home healthcare market segmentations are:

1

Home Respiratory Equipment
Devices used at home to help patients with breathing difficulties or other respiratory conditions

2

Home IV Pumps
Devices that deliver medications or fluids intravenously or subcutaneously to a patient at home

3

Home Dialysis Equipment
Tools and materials used for performing dialysis treatments at home

4

Multi Para Diagnostic Monitors
A medical device that continuously monitors and displays a patient's vital signs, providing real-time information

Source: GrandViewResearch

Digitalisation of healthcare is accelerating AI-driven drug discovery, remote monitoring, smart pharma manufacturing, and advanced bioconvergence therapies

		E&E Opportunities
AI-Driven Drug Discovery & Personalized Medicine	• By 2025, artificial intelligence (AI) is projected to contribute to 30% of new drug discoveries, enhancing efficiency and enabling personalized treatments	• Advanced computing hardware and sensors are essential to support AI algorithms in processing vast biomedical datasets for drug discovery and personalized medicine
Growth of Digital Health & Remote Monitoring	• The adoption of digital health solutions, including telemedicine and wearable devices, is accelerating, with AI-powered personalized treatments and digital home monitoring becoming key trends in 2025	• Development of low-power sensors, wireless communication modules, and embedded systems is critical to enable real-time health monitoring and data transmission
Supply Chain Resilience & Smart Manufacturing	• In response to global disruptions, pharmaceutical companies are investing in smart manufacturing and AI to enhance supply chain resilience, with over 85% of biopharma executives focusing on these areas	• Implementation of industrial IoT devices, automation controllers, and real-time monitoring systems is vital for efficient and resilient pharmaceutical manufacturing processes
Advanced Therapies & Bioconvergence	• The integration of biology with engineering and digital technologies, known as bioconvergence, is leading to advancements in personalized medicine, including the development of biochips and organ-on-a-chip technologies	• Designing and fabricating bioelectronic interfaces, microfluidic devices, and nanosensors are essential for the development and implementation of advanced therapeutic solutions

Source: WEF, Capgemini, ZS

E&E is the critical enabler powering the rise of intermediary markets like data centers and robotics—core building blocks of Johor's digital and automation-driven future

01 **E&E powers the backbone of intermediary technology markets,** enabling performance, reliability, and scalability in emerging digital and automation infrastructures

02 **Data centers and robotics are rapidly growing markets—**and both rely heavily on E&E innovation in semiconductors, sensors, control systems, and energy management to scale and evolve

As Johor builds out its digital and automation infrastructure under JETP, **the growth of E&E is not just supportive—but foundational**—to powering emerging intermediary markets such as data centers and robotics

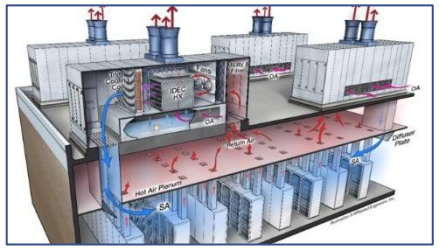
Sector	E&E Integration Point		
Data Centres	High-performance semiconductors & power management systems	Advanced sensor systems & automation	High-speed connectivity hardware
Robotics	Actuators & Drives	Perception & Sensors	Control Systems & Software

Source: PASB Analysis

Efficient data centre operations hinge on robust power, precision cooling, and high-speed networking systems to ensure uptime, energy savings, and seamless connectivity

Power Infrastructure

- Uninterruptible Power Supplies (UPS) systems are vital for maintaining continuous power to data centers, protecting sensitive equipment from power outages and fluctuations
- Power Distribution Units (PDUs) distribute electrical power to servers and networking equipment within data centers. Advanced PDUs offer features like remote monitoring and energy usage analytics
- Data centers often employ redundant power configurations (e.g., N+1, 2N) to ensure reliability. This involves multiple power sources and backup generators to prevent downtime during power failures



Cooling Systems

- Computer Room Air Conditioning (CRAC) units regulate the temperature and humidity within data centers, essential for the optimal performance of servers and equipment
- In-Row Cooling System are placed between server racks, providing targeted cooling and improving energy efficiency. They are particularly effective in high-density data centre environments
- Implementing hot and cold aisle containment strategies enhances cooling efficiency by preventing the mixing of hot and cold air streams, thus reducing energy consumption.

Networking Equipment

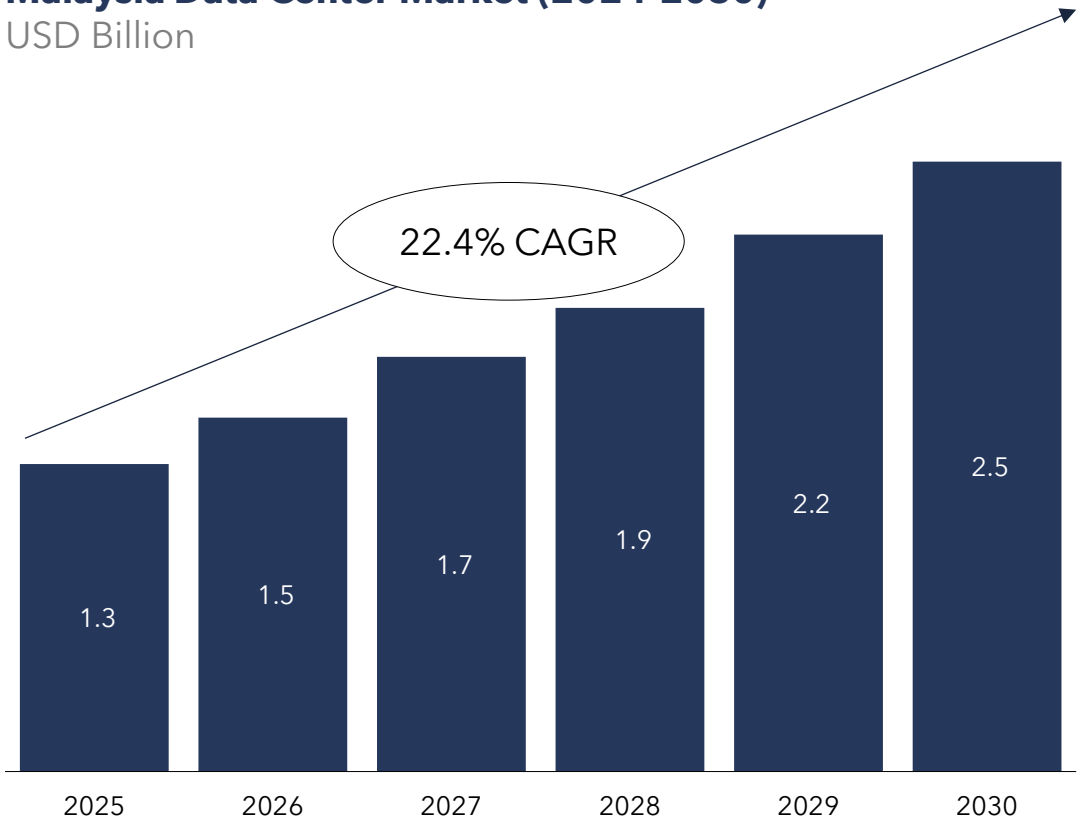
- High-performance switches and routers are essential for managing data traffic within and outside the data centre. They ensure low-latency and high-throughput connectivity, crucial for modern applications and services
- Fiber optics provide high-speed data transmission over long distances with minimal signal loss, making them ideal for data centre networking infrastructure

Source: Verified Market Research, PASB Analysis

Malaysia's booming data centre market—tripling by 2030—is attracting both global giants and ambitious new players

Malaysia's data centre market is expected to more than triple from USD 4.0 billion in 2024 to USD 13.6 billion by 2030

Malaysia Data Center Market (2024-2030)
USD Billion



Malaysia's data centre surge draws major players and new entrants alike

Some of the key colocation data centre investors in the Malaysia data centre market include:

AIRTRUNK, AIMS, BRIDGE DATA CENTRES, EQUINIX, GDS万国数据, Keppel Data Centres, NTT DATA

The rising demand and significant growth opportunities have led to a huge number of new entrants investing in the Malaysia data centre market. Some of these new entrants include:

STACK INFRASTRUCTURE, EPOCH, edgeconnex®, EDGNEX DATA CENTERS BY DAMAC

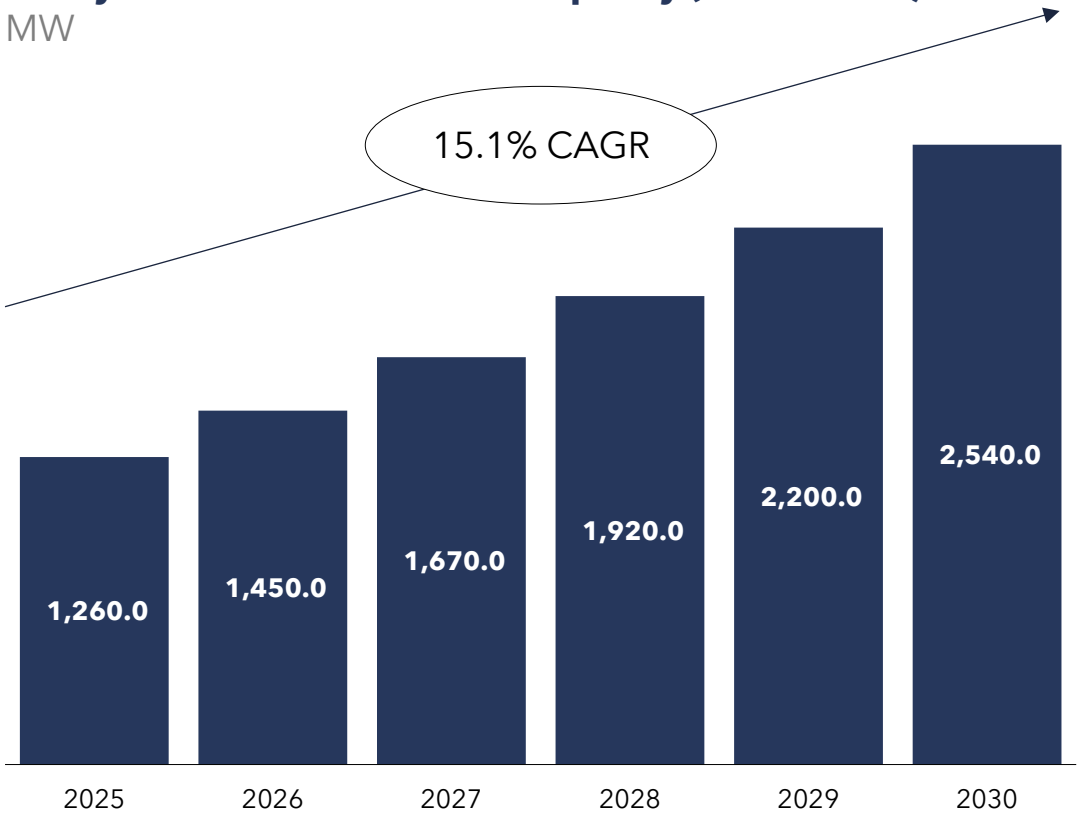
Source: ResearchAndMarkets, PASB Analysis

Malaysia's colocation revenue is expected to nearly triple by 2030, driven by the doubling of national data centre power capacity

Malaysia's data centre power capacity is projected to double from 1,260 MW in 2025 to 2,540 MW by 2030

Malaysia Data Center Power Capacity (2025–2030)

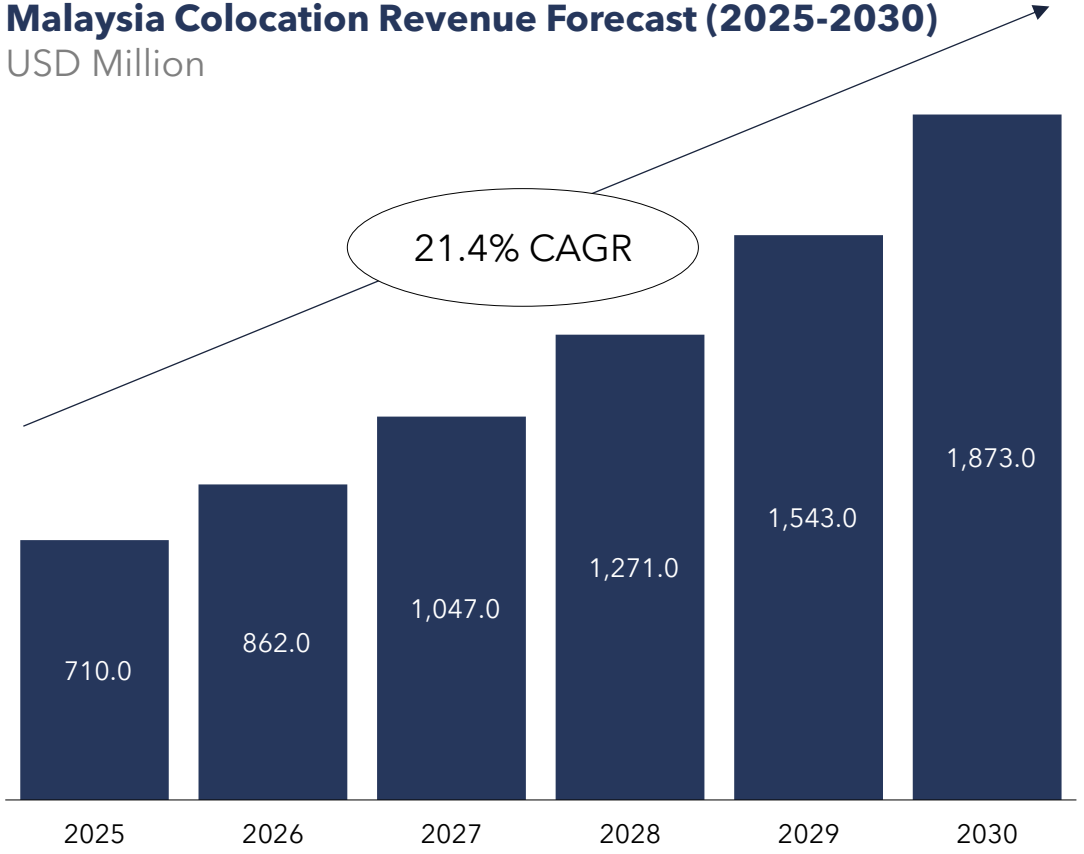
MW



Malaysia's colocation revenue is projected to rise to USD 1.87B by 2030, in line with booming data centre market

Malaysia Colocation Revenue Forecast (2025-2030)

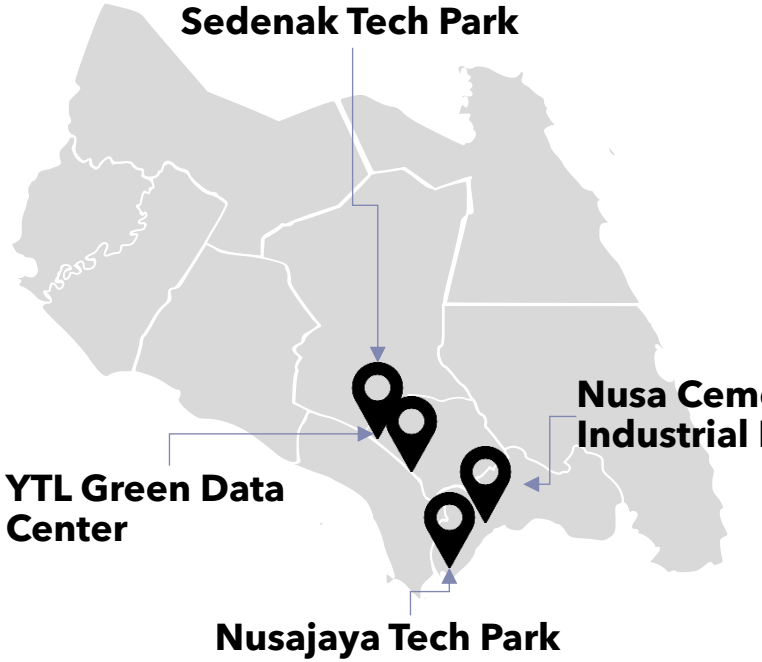
USD Million



Source: Mordor Intelligence, PASB Analysis

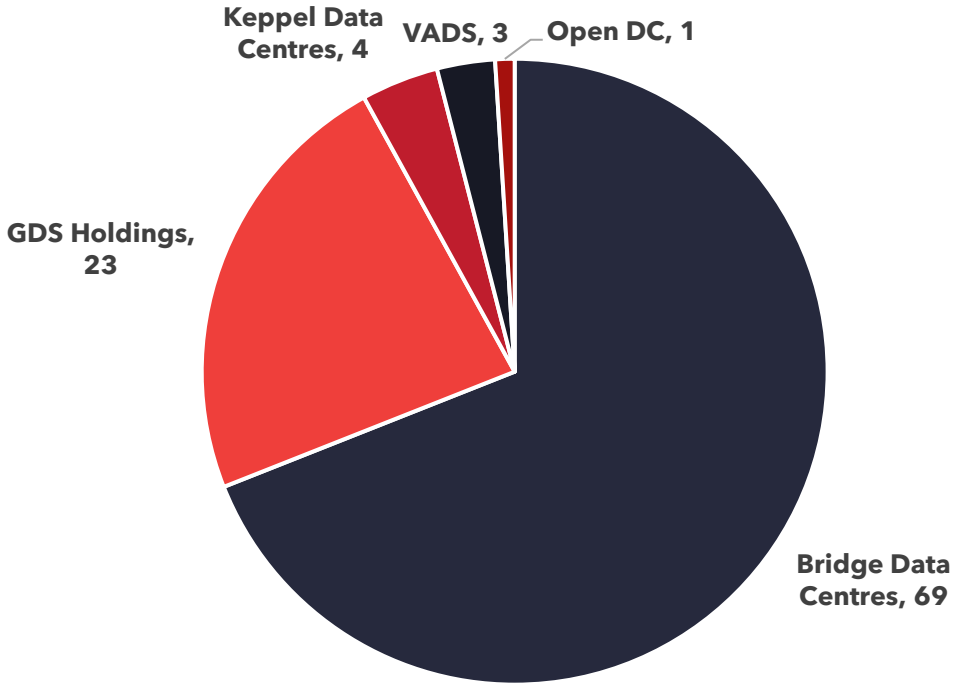
Johor's data centre market is rapidly scaling with clustered developments, dominant players like Bridge DC, and hyperscale campuses exceeding 100 MW capacity

Clusters



Data centres in Johor are forming multiple clusters, particularly outside the city centre – with key hubs emerging around Nusajaya Tech Park, Sedenak Tech Park, YTL Green Data Centre Park, and Nusa Cemerlang Industrial Park.

Market Share % by Live Capacity



Johor's live data centre capacity is currently driven by a mix of domestic and international operators

Size Distribution

Johor sees multiple hyperscale campuses that, when full completed, will each deliver:

>100 MW

Source: DC Byte

Advanced E&E components like drives, sensors, and control systems are the backbone of smart robotics—enabling precision and speed essential for next-gen industrial automation

Actuators & Drives

- Servo motors, stepper motors and harmonic drives deliver precise position, speed and torque control
- Enables millimeter-level repeatability and cycle times under 0.2 s, critical for high-speed pick-and-place, assembly and welding tasks

Perception & Sensors

- Machine-vision cameras, LiDAR scanners and force-torque sensors provide real-time feedback on part location, shape and contact forces
- Supports complex part identification, error-proofing and adaptive force control—reducing scrap rates by up to 25 %

Control Systems & Software

- Industrial robot controllers (e.g., FANUC, ABB), PLC/PC-based control and ROS-driven orchestration coordinate multi-axis motion and safety interlocks
- Automates sequence tuning, collision avoidance and CAM integration, cutting programming time by 40 % and boosting OEE by 10–15 %

Key Insight

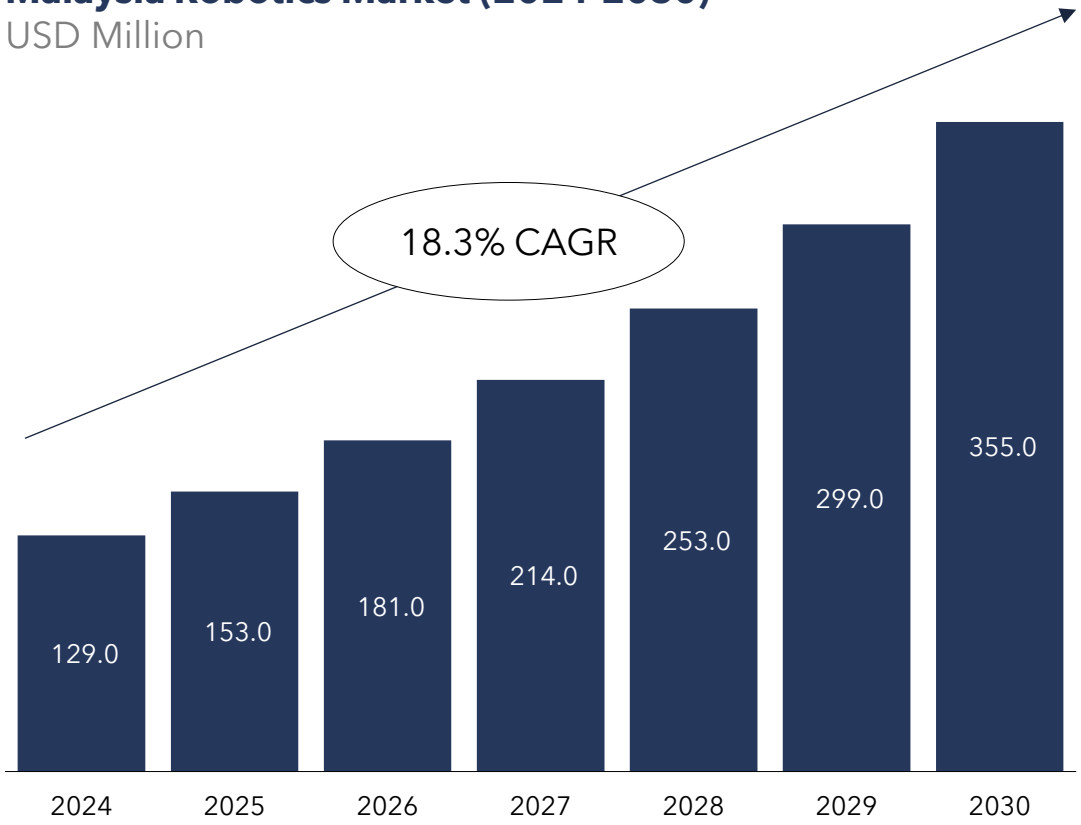
- Embedding high-precision drives, smart sensing and advanced control software transforms robotic cells into adaptive, high-throughput workhorses—delivering faster cycle times, lower defects and seamless integration with Industry 4.0 workflows

Source: Verified Market Research, PASB Analysis

Malaysia's robotics market is set to nearly triple by 2030–driven by policy incentives, workforce constraints, and strong SME adoption pushing automation to the forefront

Malaysia's robotics market is expected to almost triple from USD129 million in 2024 to USD355 million by 2030

Malaysia Robotics Market (2024-2030)
USD Million



Policy support, workforce gaps, and rising SME adoption are collectively accelerating robotics demand

Factors that surge the demand:

Government push

- Under the Industry4WRD policy, the Ministry of International Trade and Industry aims to boost Industry 4.0 tech adoption–including robotics–by 30% in manufacturing by 2025, backed by a RM 5.2 billion (USD 1.2 billion) transition fund

Labor shortage driver

- In 2023, 62% of Malaysian firms struggled to recruit skilled workers (MEF), intensifying demand for automation

SME uptake

- Facing manpower scarcity and rising wages, Malaysian SMEs have ramped up robotics use by 25% over the past two years (MARii)

Source: Verified Market Research, PASB Analysis

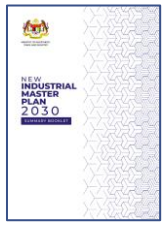
Malaysia's automation drive enables firms to tackle labour shortages while adapting to increasingly dynamic production demands

Malaysia's push to more than triple robot density by 2030 reflects a strategic response to labor shortages

Robot Density per 10,000 employees (set by Malaysian government)

55 units *by 2019* → **195 units** *by 2030*

This commitment is further reinforced by:



which focuses on enhancing economic complexity, advancing digital adoption, achieving zero emissions, and ensuring economic security and inclusivity

Workforce shortages in Malaysia are accelerating robotics adoption, enabling 25–75% manpower reduction while reshaping jobs toward higher-value roles in robot operation, programming, and maintenance

Manufacturing automation enabling firms to balance high-volume efficiency with evolving production needs

There are three primary types of automation in manufacturing:

Fixed Automation

- Engineered for high-volume, continuous production. Devices like transfer lines and automatic assembly machines excel at one dedicated task but require significant upfront investment and offer little flexibility

Programmable Automation

- Suited to batch runs where the same equipment must handle different products. Examples include CNC machine tools and industrial robots that can be reprogrammed between batches, balancing versatility with efficiency

Flexible Automation

- Combines the efficiency of fixed systems with the adaptability of programmable setups. Rapid changeovers and modular tooling let manufacturers switch products with minimal downtime, maximizing productivity across varied production runs

Source: Okaya, PASB Analysis

Aerospace.

The aerospace industry can be broadly divided into five sub-sectors which are MRO, aerospace manufacturing, system integration, engineering & design services and education & training

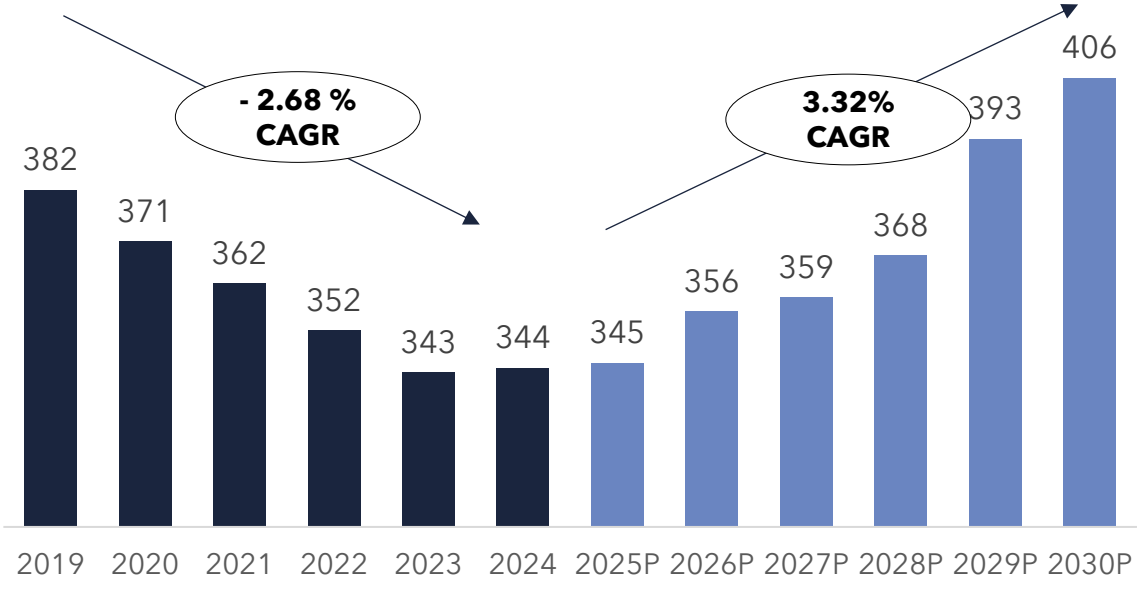
Sub-sectors of Aerospace Industry

Sub-sectors	Maintenance, Repair & Overhaul (MRO)	Aerospace Manufacturing	Systems Integration	Engineering & Design Services	Education & Training
Sub-sectors Breakdown	• Airframe • Engine • Component • Line • Modification • Tear Down and Remanufacturing	• Aero-structure (e.g. composites and metallic) • Avionics • Engines • Airframe equipment • Cabin interior	• Monitoring application/ Mission systems/ In-flight entertainment • Flight management systems/ Ground systems • Simulators • Remote sensing and communications satellites • Unmanned Aerial Vehicles (UAV) systems • Missiles and rockets systems	• Engineering and Design	• Higher learning institutions • Technical training academies • CAAM Part 147 approved training organisations

Source: NIMP (Aerospace), NAICO, RMK-12

The global aerospace market is projected to grow to USD434 billion by 2030, indicating immense growth potential driven by airline operations, business aviation and passenger services

Global Aerospace Market Growth Projection (2019 – 2030)
USD Billion



Projected to grow at 3.32% CAGR, the aerospace sector points to strong long-term fundamentals, with aerospace poised to become a vital engine of global innovation.

Global Aerospace Drivers

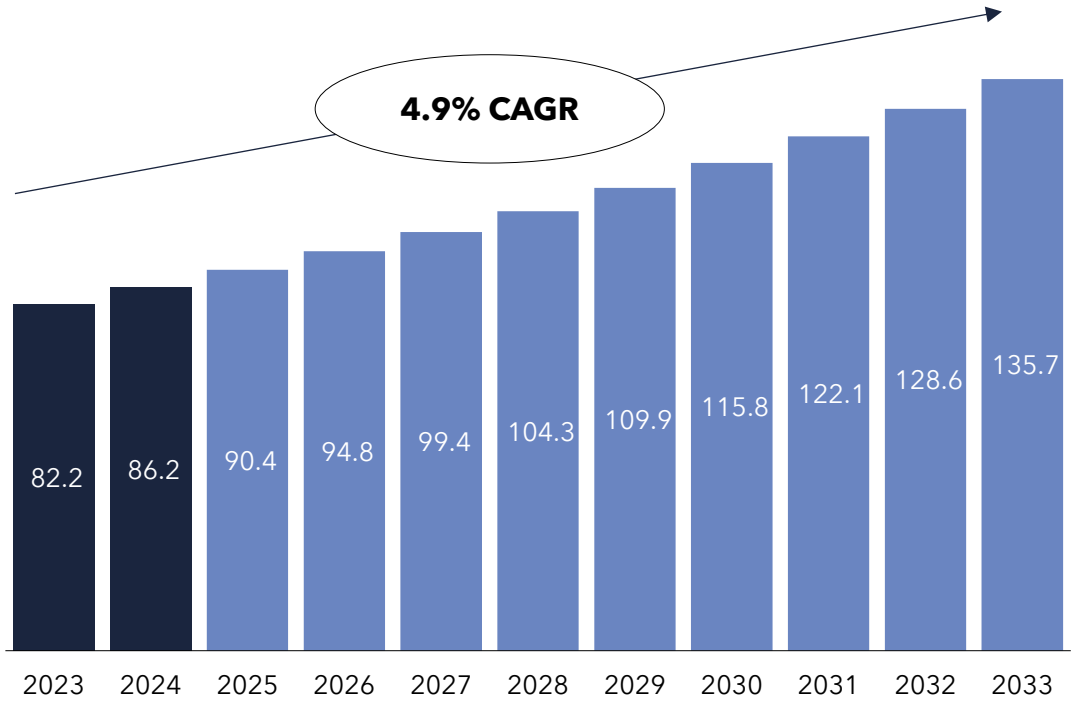
1. **Commercial Air Travel Recovery:** Surge in passenger traffic post-COVID, especially in Asia-Pacific and Middle East.
2. **Innovation:** From the development of advanced materials to the creation of cutting-edge technologies in aircraft and satellite manufacturing, progress in this sector has had a direct impact on the efficiency and safety of flights.
3. **Passenger Aviation:** Demand for passenger aviation surged despite constrained capacity and higher ticket prices.
4. **Aircraft Demand:** The demand for aircraft continues to outpace production capacity, resulting in a backlog equivalent to 11 years of current production. The vast, untapped expected market of new customers and an optimistic long-term forecast indicate significant growth potential for the industry.

2025 will be a pivotal year for "operationalisation" of technologies like AI, advanced manufacturing, and digital MRO. Commercial and defense aerospace markets are expected to grow, with technology playing a key role in driving margins and innovation.

Source: Euromonitor; Precedence Research; Global News Wire; Deloitte, PASB Analysis

The global Maintenance, Repair & Overhaul (MRO) market is expected to grow from USD 82.2B (2023) to USD 135.7B (2033), driven by ageing fleets and rising maintenance demand

Global Aerospace MRO Market (2023 – 2033)
USD Billion



The global aerospace MRO market outlines an accelerated 4.9% CAGR from 2023 at USD 82.2 billion to USD 135.7 billion in 2030 - reflecting increased MRO demand from aging fleets

Key Highlights

1 MRO is a core cost driver in the aviation industry

- MRO is one of the most significant lifecycle costs for commercial and general aviation fleets.
- Shortage of new planes globally due to supply chain disruptions and rising labour costs have resulted in aircraft carriers having to extend the lifespan to keep older planes in the air, driving up demand for MRO services.

2 Fleet expansion driving MRO Demand

- The global aviation fleet is growing rapidly with a particular emphasis on commercial aircraft which as a direct result, will generate the need for more frequent and diverse MRO services.
- A significant portion of this expansion will be driven by the commercial and military sectors.

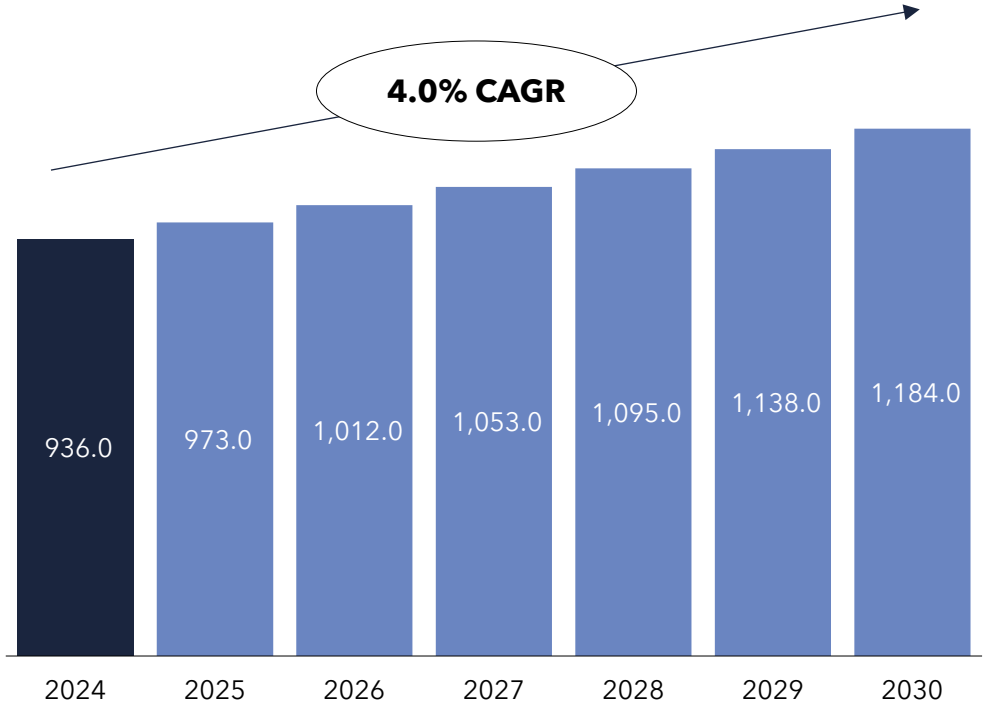
3 Technological advancements to transform the MRO landscape

- The industry is increasingly adopting AI-driven systems to monitor and predict equipment failures before they occur, reducing downtime and increasing efficiency.
- These technologies will allow airlines and MRO providers to better manage resources, optimize labour, and proactively address potential failures, thus reducing costly repairs.

Source: ResearchandMarkets, STS Aviation Group, Deloitte, Reuters, PASB Analysis

The Global Aerospace Manufacturing is set for steady growth that is driven by demand, innovation and technological advancements

Global Aerospace Manufacturing Parts (2024 – 2030)
USD Billion



Note: The aerospace manufacturing parts captures the global industrial value of aircraft production across commercial, business aviation, defense and space segments.

The global aerospace manufacturing parts is projected to grow from USD 936 billion in 2024 to USD 1184 billion in 2030

Key Highlights

1 Increasing demand for new commercial aircrafts

- The market is growing on account of rising passenger traffic especially in Asia Pacific and Middle East, expecting to drive the demand and production aerospace parts over the coming years.
- Leading global hubs for aerospace manufacturing is the United States, Singapore, South Korea and Canada.

2 Innovation driving significance advancements in the industry

- A significant impact of AI is in aerospace design. AI tools allow engineers to explore innovative designs and optimize configurations. AI helps reduce the weight of aircraft while improving their strength and efficiency. This is particularly important in fuel consumption optimisation.

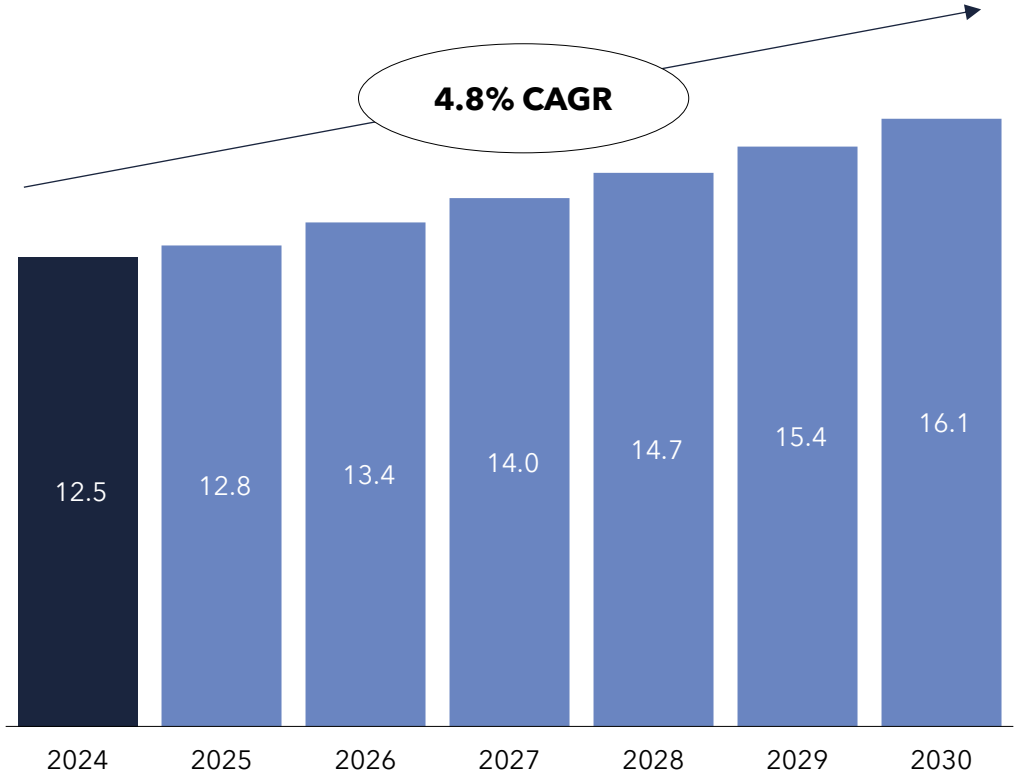
3 Increasing demand for lightweight materials

- Carbon composites, titanium alloys and advanced ceramics are gaining popularity due to their higher strength-to-weight ratios and ability to withstand extreme conditions of flights.
- With sustainability becoming increasingly important in aerospace parts manufacturing, reducing the overall weight of the aircraft contributes to enhanced fuel efficiency which reduces carbon emissions.

Source: Precedence Research, Grand View Research PwC, Axiscades

The global aerospace systems integration market gains momentum with next-gen aircraft and autonomous capabilities driving the demand

Global Aerospace Systems Integration (2024 – 2030)
USD Billion



The global aerospace systems integration is projected to grow from USD 12.5 billion in 2024 to USD 16.1 Billion in 2030 at 4.8% CAGR

Key Highlights

1 Increased Aircraft Platform Complexity

- The growing integration of advanced onboard systems such as next-generation avionics, connectivity suites, environmental monitoring, and electrified propulsion systems has significantly raised platform complexity across both aircrafts..
- For example, the Airbus A350 integrates over 50 different systems, including fly-by-wire flight control, predictive maintenance analytics, and advanced fuel management, requiring deep integration expertise across hardware and software layers

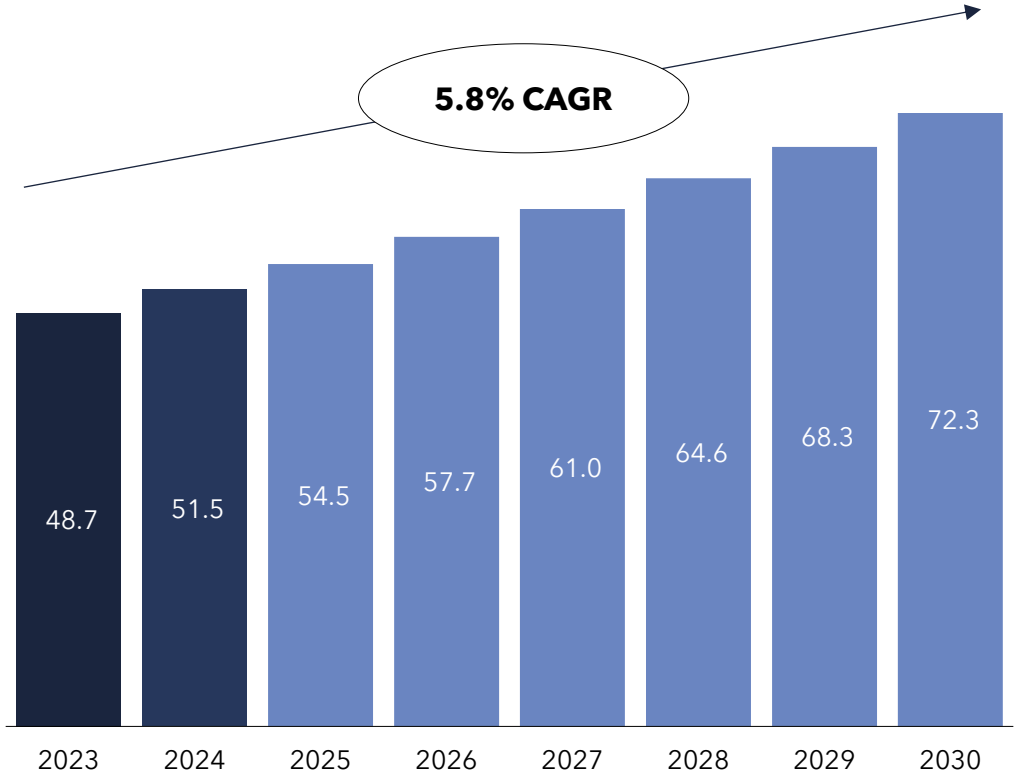
2 Surge in Autonomous and Unmanned Systems

- The global boom in unmanned systems including drones, advanced air mobility (AAM) vehicles, and optionally piloted aircraft is creating a surge in systems integration needs.
- Particularly in integrating navigation, AI, edge computing, propulsion, and remote-control systems into compact, modular platforms.
- Regulatory compliance is shaping the evolution of unmanned aviation, with frameworks such as the European Union Aviation Safety Agency (EASA)'s U-space regulations and the Federal Aviation Administration (FAA)'s unmanned systems Integration Roadmap advancing the need for robust systems integration to enable safe and coordinated operations between manned and unmanned aircraft.

Source: Verified market reports, IFM Management Technology Policy, Aerospace, PASB Analysis

The global aerospace engineering and design services market to reach USD 72 Billion by 2030, driven by sustainable and modernised aircraft solutions

Global Aerospace Engineering & Design Services (2023 – 2030)
USD Billion



The global aerospace engineering and design services market is projected to grow from USD 48.7 billion in 2023 to USD 72.3 billion in 2030

Key Highlights

1 Aircraft modernisation from structure to engine

- An essential factor driving the aerospace engineering services is due to the modernisation of aircrafts where necessary equipment and advanced technologies are integrated to gain optimum productivity and efficiency of the aircraft.
- The Boeing 737, one of the most widely used commercial aircraft, is being modernised with newer variants like the 737 Max. These upgrades offer improved fuel efficiency, extended range, and higher passenger capacity, allowing airlines to expand medium-haul operations more economically.

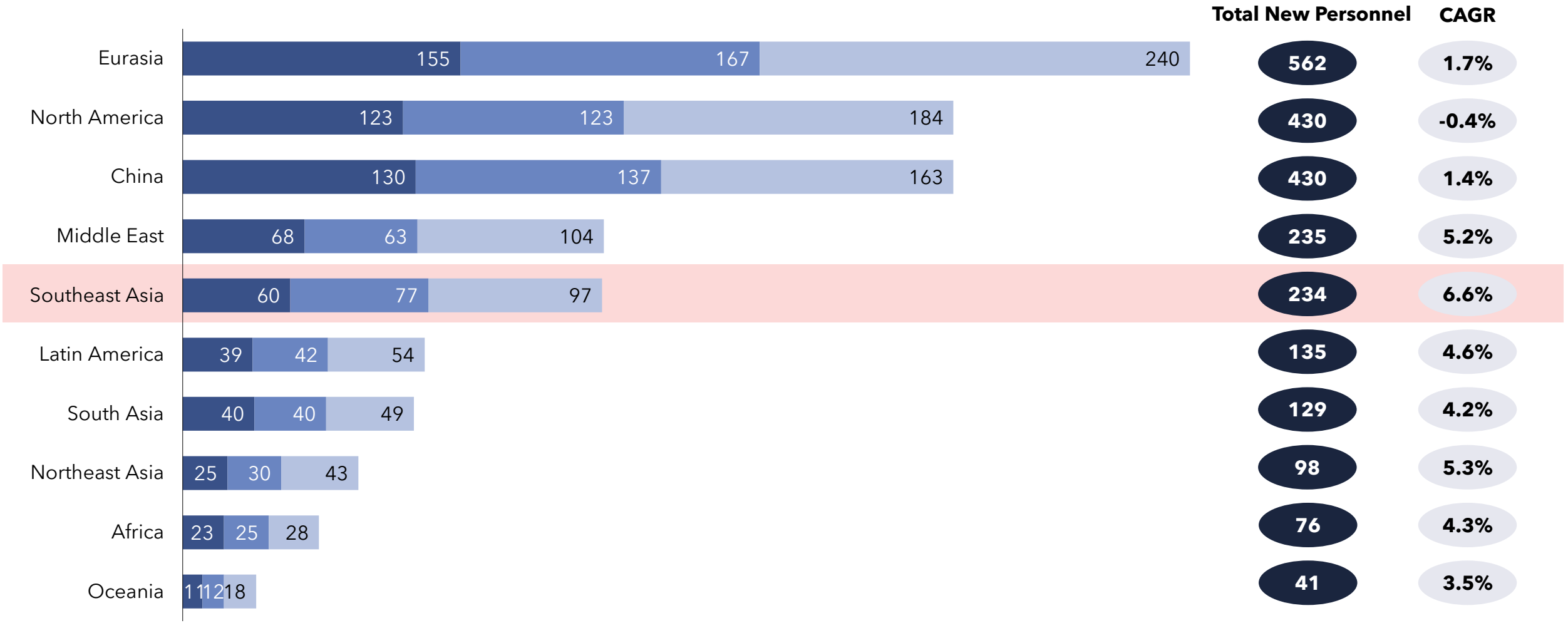
2 Growing adoption of sustainable aviation technologies

- As the aviation industry advances towards decarbonization driven by regulatory pressures and net-zero commitments manufacturers are accelerating the development of electric, hybrid-electric, and SAF-compatible systems.
- These changes demand significant reengineering of airframes, propulsion systems, and fuel integration technologies. This transition is fuelling global demand for aerospace engineering and design services, particularly in areas such as systems integration, propulsion redesign, lightweight materials, and digital modelling—creating new opportunities for service providers across the aerospace value chain.

Source: Market Research Report – Business Research Insights, IATA News, Aviation Week, Business Insights, World Economic Forum

The global aerospace industry will require 2.4 million new personnel by 2043, with Southeast Asia as one of the fastest growing regions for staffing

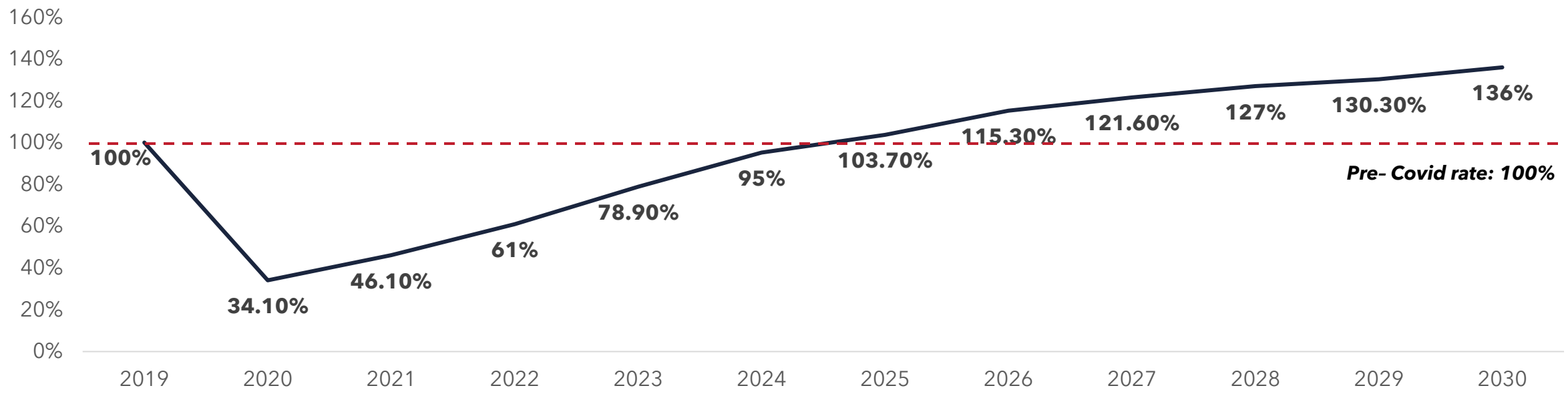
New Personnel Required by Region (2024-2043)
'000



Source: Boeing 2024 Pilot and Technician Outlook

The commercial aerospace sector has shown incredible resiliency and continues to rebound from the pandemic with the forecast surpassing pre-covid level in 2025

Commercial Air Travel Recovery Globally (%) (2019 – 2030)



1 Air travel for commercial flights is on track for full recovery

- After the steep drop in 2020 due to the COVID-19 pandemic, global commercial air travel has steadily rebounded
- According to Bain & Company and IATA, global, recovery are projected to return to 2019 levels by 2025 and surpass them by 2030.

2 Asia-Pacific is Leading the Recovery and Growth

- Asia-Pacific is projected to be the fastest-growing aviation market in the next 20 years, accounting for over 40% of new air traffic demand.
- The region is forecasted to take delivery of over 4,200 new aircraft between 2024 and 2033, outpacing other regions

Source: Bain & Company, EY, IATA, Boeing

Global Aircraft – Boeing and Airbus backlogs signal urgent need to accelerate production capacity and supply chain scaling

Airbus Top 4 Aircraft Production vs Backlog Breakdown

Aircraft	Production	Backlog
A220	8	512
A320	50	7,213
A330	3	240
A350	9	719
Total:	70	8,684

Note: This data is of Q1 2025

Being Top 4 Aircraft Production vs Backlog Breakdown

Aircraft	Production	Backlog
B-737	38	4,772
B-767	3	109
B-777	3	563
B-787	6	792
Total:	50	6,236

Note: This data is of Q1 2025

Backlogs Exceeding a Decade of Production

Airbus and Boeing have a combined backlog of nearly 15,000 aircraft, while only producing 120 aircraft quarterly (Q1 2025). This equates to over 11 years of production at current rates, underscoring a critical capacity bottleneck in global aerospace manufacturing.

Implications for the Global Aerospace Ecosystem

The scale of backlog reinforces massive growth potential across the aerospace value chain – from aircraft structures and avionics to component MRO and skilled labour. It also puts pressure on OEMs, suppliers, and regulators to address supply chain constraints, talent gaps, and infrastructure scalability to meet delivery timelines and avoid revenue leakage from delayed orders.

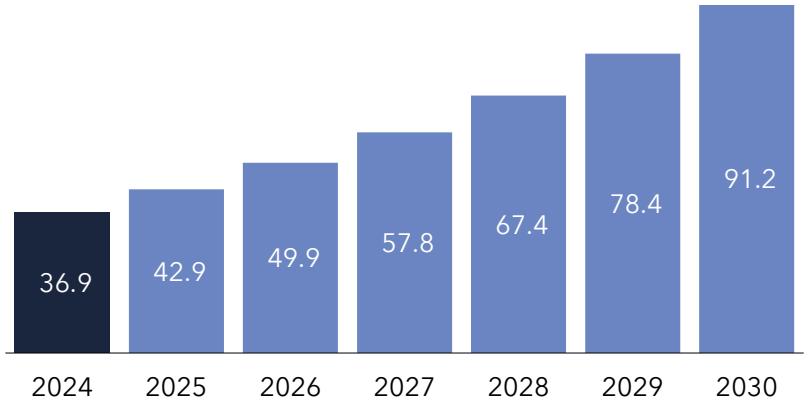
Source: Airbus, Boeing, IATA, PASB Analysis

The global aerospace outlook is being shaped by emerging shifts in air mobility, sustainability, digitalisation, and autonomy, driving the industry toward a cleaner, smarter, and more connected future of flight (1/2)

Trends in the Global Aerospace Industry

1 Expanding Unmanned Aerial Systems

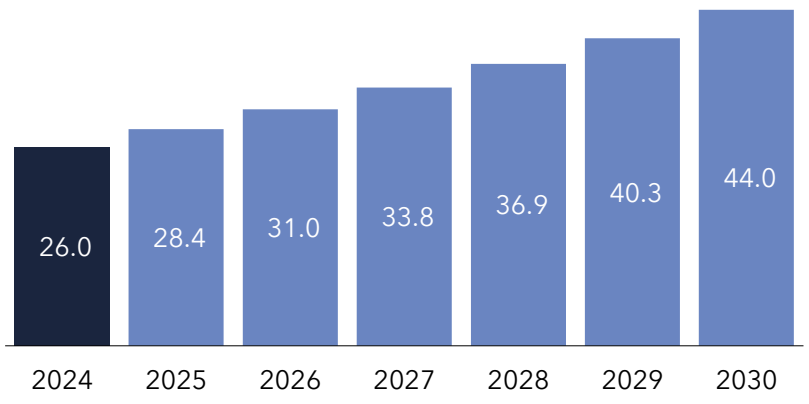
USD Billion



- Unmanned aerial vehicles and systems, referred to as drones, represent a valuable alternative for various operational tasks due to their versatility, flexibility, cost-effectiveness,and reusability in an array of industries including construction, real estate, infrastructure, oil and gas, agriculture, and logistics.
- Unmanned Aerial Systems is projected to grow from USD 31.70 billion in 2023 to **USD 91.23 billion by 2030**, exhibiting a **CAGR of 16.3%.**

2 Integrating AI & Digital Technologies in Aftermarket Services

USD Billion



- Artificial intelligence, machine learning, generative AI, and extended reality are emerging as key technologies shaping the future of aerospace. These technologies are aimed at improving operational efficiency and enhancing the overall customer experience through more intelligent and predictive sustainment practices.
- The global AI in Aerospace was valued at USD 26 – 29 billion in 2024 and is projected to double to **USD 44 billion in 2030**.

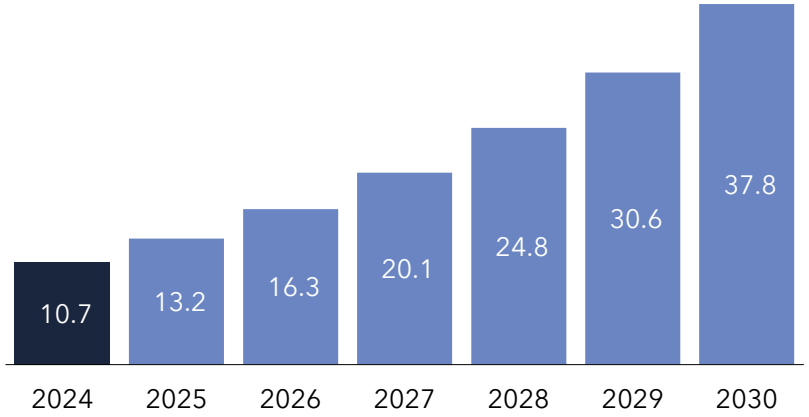
Source: Deloitte, Frost & Sullivan, Reuters, World Economic Forum, International Civil Aviation Organization, Research Paper (Etheredge, 2025) Artificial Intelligence in Aerospace and Avionics: Trends, Competition, and Policy Outlook

The global aerospace outlook is being shaped by emerging shifts in air mobility, sustainability, digitalisation, and autonomy, driving the industry toward a cleaner, smarter, and more connected future of flight (2/2)

Trends in the Global Aerospace Industry

3 Advancing Air Mobility

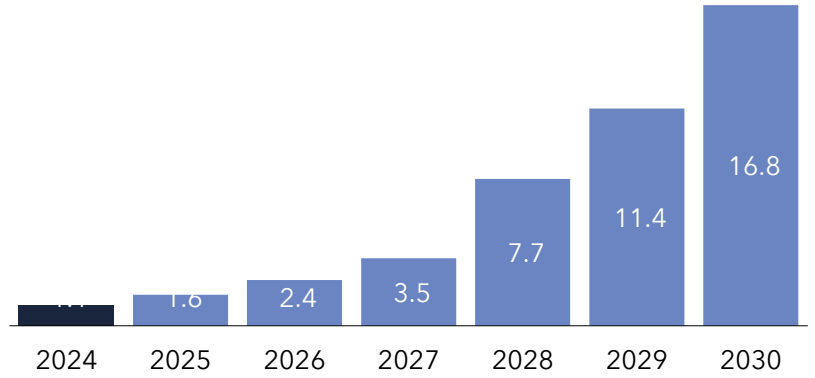
USD Billion



- The advanced air mobility (AAM) industry, focusing largely on electric vertical takeoff and landing (eVTOL) aircraft, has received attention and investment in recent years with opportunities in the commercial, government & military markets.
- The global advanced air mobility market is expected to reach an estimated **USD 37.8 billion by 2030** with **a CAGR of 23.4% from 2024 to 2030.**

4 Accelerating Sustainable Solutions in Aerospace

USD Billion



- The industry's net-zero target is accelerating through global initiatives in sustainable aviation fuels (SAF), hydrogen-powered engines, and next-gen propulsion technologies aiming at reducing carbon emissions and boosting efficiency improvements.
- The global SAF market size is projected to grow from USD 1.1 billion in 2023 to **USD 16.8 billion by 2030**, at a CAGR of **47.7% from 2023 to 2030.**

Source: Deloitte, Frost & Sullivan, Reuters, World Economic Forum, International Civil Aviation Organization, Research Paper (Etheredge, 2025) Artificial Intelligence in Aerospace and Avionics: Trends, Competition, and Policy Outlook

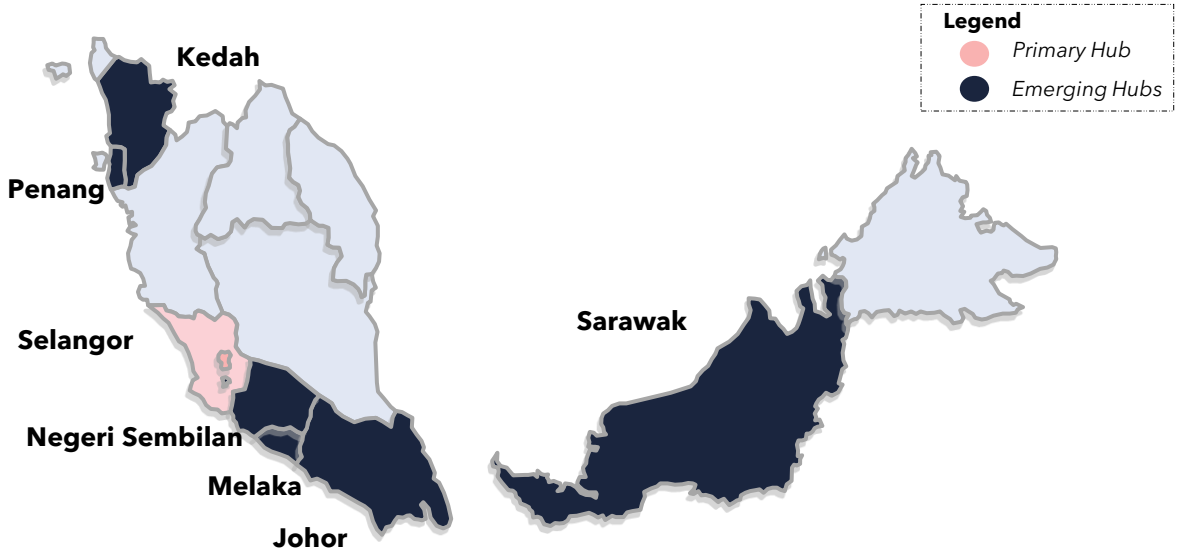
ASEAN is well positioned to expand sizably amidst burgeoning of regional air transport demand, enabled by the region's increasing ecosystem partnerships and comparative advantage for manufacturing expansions

Key Growth Aerospace Drivers in ASEAN	Description
1 Increasing Ecosystem Partnerships to Boost Regional Production/ MRO Capabilities	• To overcome the industry's inherent complexity of solutions and operations on top of supply chain uncertainties, cross-country and inter-country partnerships have become core to the region's strategy to continuously evolve and future-proof the production/ MRO capabilities of ASEAN • Regionally, Rolls-Royce has notably partnered with several industry players to enhance its service capabilities: – **Singapore** – SIA Engineering Company (SIAEC) and Singapore Aero Engine Services Private Limited (SAESL) provides best-in-class aero engine and component repair services for Rolls-Royce's Trent engine family – **Malaysia** – UMW Aerospace Sdn Bhd. Provides engine assembly and testing services for Rolls-Royce's Seletar Campus facility in Singapore
2 Rising Demand for Air Transport within the ASEAN Region	• Uplifts in consumer affluence has led to the rise of commercial travel in the region by roughly 10% every year, and this has resulted in numerous airline fleet expansions e.g. AirAsia Group to meet the growing demand • Increased trade within the region has also enabled the near-quadrupling of air transport fleets over the past two decades, from 2,600 to approximately 10,000 aircrafts
3 A Maturing, Competitive and High-skilled Manufacturing Hub	• Due to the region's relatively competitive labor costs, a skilled workforce, and government incentives, ASEAN nations are increasingly becoming attractive destinations for aerospace production and aircraft MRO • For instance, Asia Digital Engineering and UPECA Aerotech expanded into Malaysia to leverage its cost-competitive labour market and skilled workforce capabilities, while capitalising on increasing regional demand

Source: Rolls Royce, The Edge Malaysia, ASEAN Media Directory, PASB Analysis

Malaysia's aerospace sector plays a critical role in driving the country's advancement with key states driving it as a high growth industry

Geographical Distribution of Aerospace Players across Malaysia



- Malaysia's aerospace industry is highly concentrated in select states, with Selangor currently hosting over 67% of Malaysia's aerospace ecosystem.
- There are over 240 key players involved in Malaysia's aerospace industry. Of these players,
  - 54% are involved in Maintenance, Repair and Overhaul (MRO)
  - 20% are involved in Aerospace Manufacturing and Engineering & Design Services
  - 26% are involved in Systems Integration and other supporting services

Key Aerospace Hubs and Focus Areas within Malaysia

Selangor

- Malaysia's aerospace powerhouse with strong concentration in MRO, aero manufacturing, engineering and aviation services services supported by KLIA and Subang as major air logistics and operational hubs.
- Home to a network of global and local aerospace players, dedicated industrial parks, and flagship initiatives like the Selangor Aviation Show.

GE Aerospace, Spirit AeroSystems, SR Technics, Airbus Helicopters, SDMK, Sapura Secured Technologies

Penang

- Emerging as a specialised aerospace manufacturing, avionics and systems integration hub, anchored by strong E&E and precision engineering capabilities.

Paradigm Aerospace, kontron, SAM, Honeywell Aerospace

Kedah

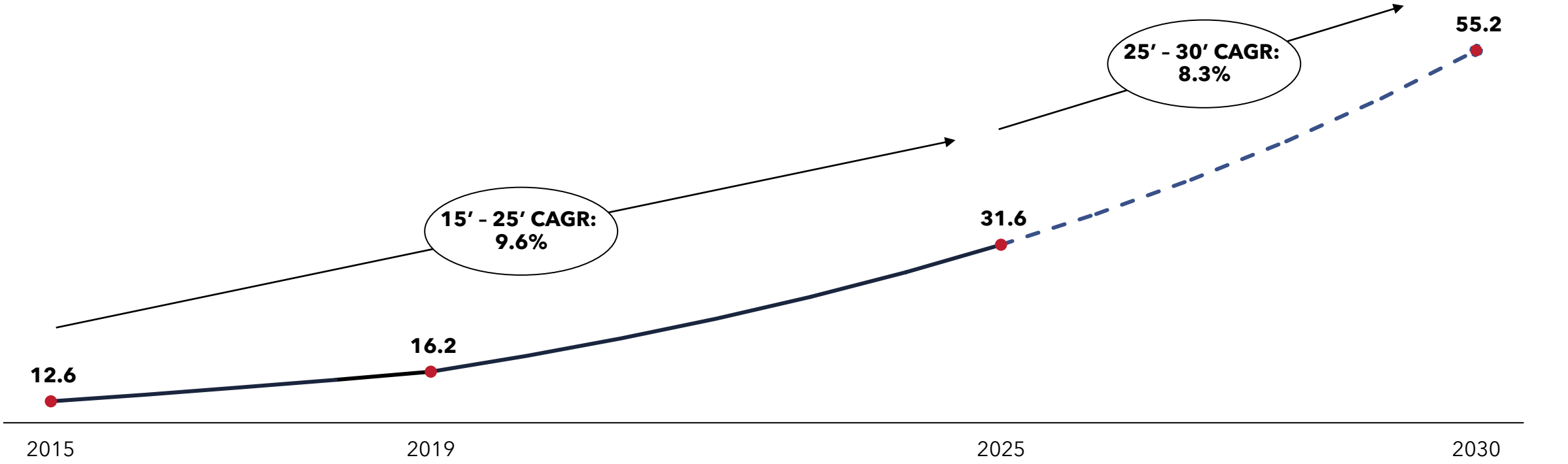
- Kedah Aerotropolis (Kulim Airport) anchors the state's aerospace growth, with a focus on advanced component manufacturing and MRO services.

ST Engineering, ACM, NCER Malaysia

Source: MIDA, NAICO, Invest Selangor, Invest Penang, News, PASB Analysis

Malaysia's aerospace industry is projected to generate over RM55 billion in revenue by 2030, a fourfold increase from RM12 billion in 2015

Total Revenue Projection for Aerospace in Malaysia (2015 – 2030)
RM Billion



From RM12.6 billion in 2015 to a projection of RM55.2 billion in 2030, the aerospace sector points to strong long-term fundamentals, with aerospace poised to become a vital engine of innovation in Malaysia

Source: Aviation Week Intelligence Network, YCP Insights & Publications

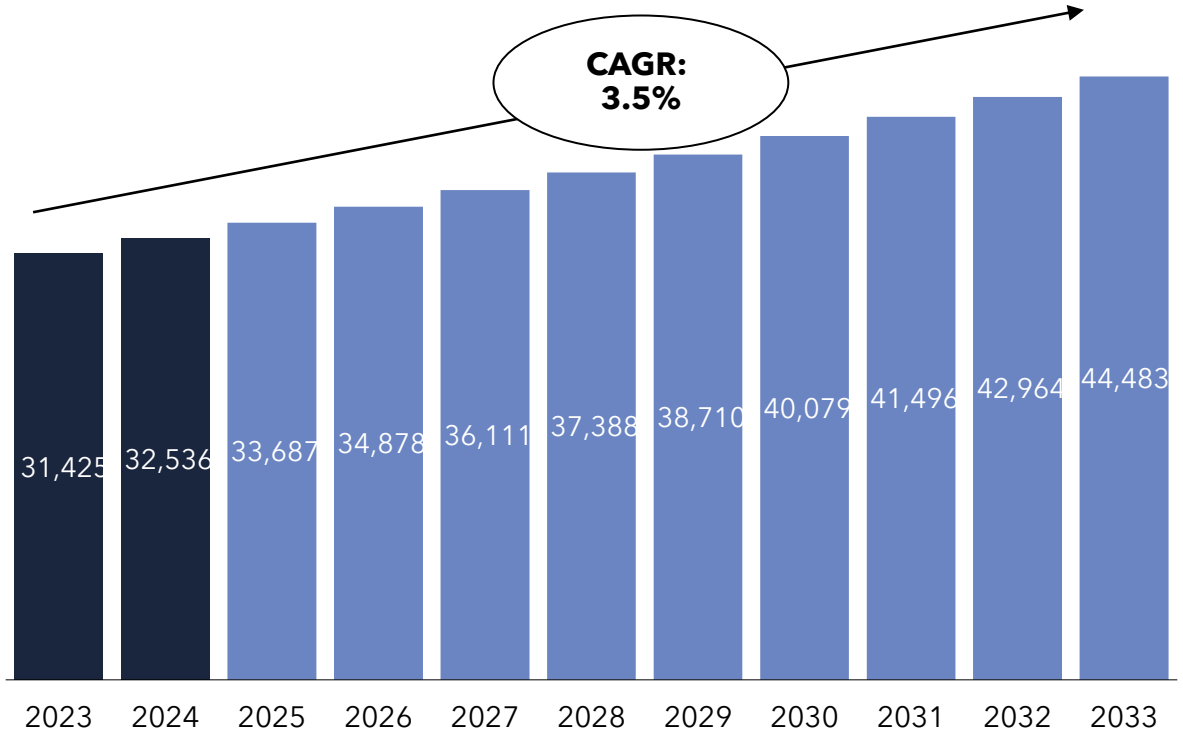
Malaysia's aerospace industry is entering a new growth phase, underpinned by shifting global supply chains, surging regional demand, and targeted national policies that are expanding high-value domestic capabilities

Key Growth Aerospace Drivers in Malaysia	Description
1 Shift in Global Supply Chains Creating New Regional Hubs	• Over 4,200 aircraft deliveries are projected in the Asia Pacific between 2024 and 2033, cementing the region as the largest future market for commercial aviation • Malaysia stands to benefit from this demand as OEMs and Tier 1 suppliers seek to expand component sourcing, final assembly support, and aftermarket services across the region
2 Increasing Demand for Air Services in the Region	• ASEAN's air travel and cargo markets are experiencing record growth, driven by rising middle-class mobility, e-commerce, and supply chain shifts out of China • This is reinforced by IATA's 8.3% air cargo demand growth and Boeing's projections for over 8% annual aviation growth in South Asia
3 Expanding Domestic Capabilities & Local Value Creation	• Programs under the Aerospace Blueprint 2030 are designed to deepen local integration into global supply chains, reduce foreign dependence, and nurture certified local vendors • This shift toward value-added activities supports job creation, technological upgrading, and ultimately contributes to Malaysia's projected aerospace revenue growth

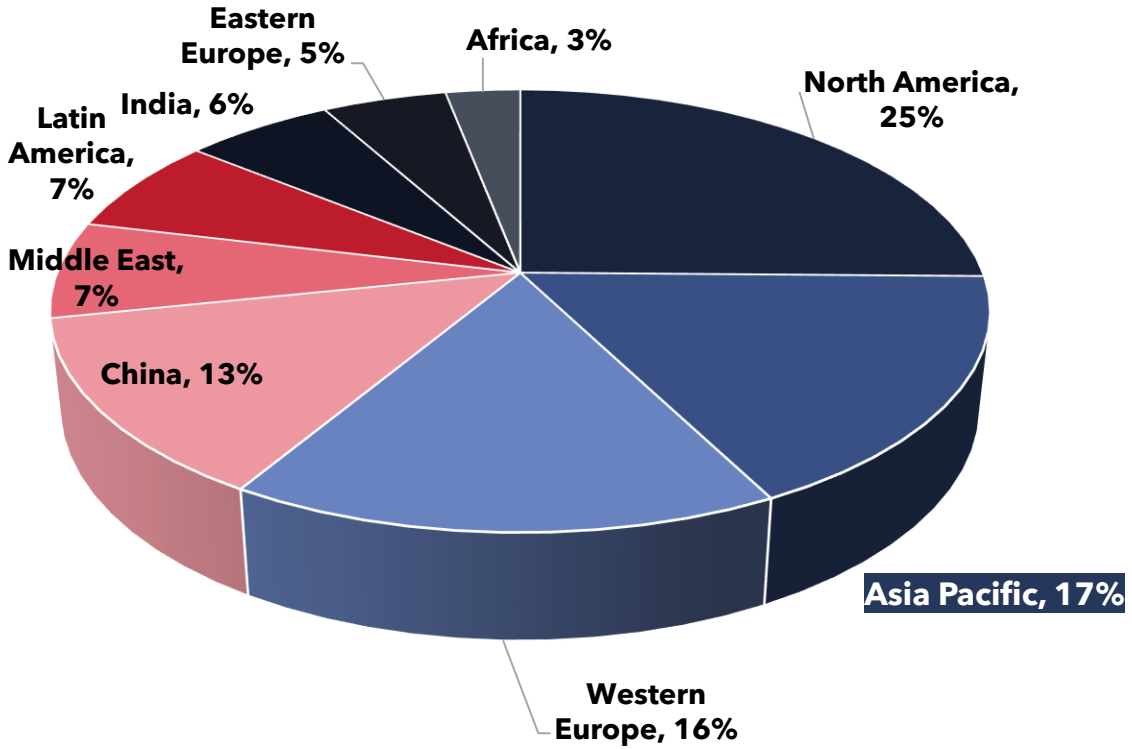
Source: Aviation Week Intelligence Network, YCP Insights & Publications, PASB Analysis

By 2033, Asia Pacific is projected to be the second-largest region for commercial aircraft in-service, accounting for 17% of the global fleet

Global Projection on In-Service Commercial Aircraft Fleet, 2023 – 2033



Projection on In-Service Commercial Aircraft Fleet by Region, 2033



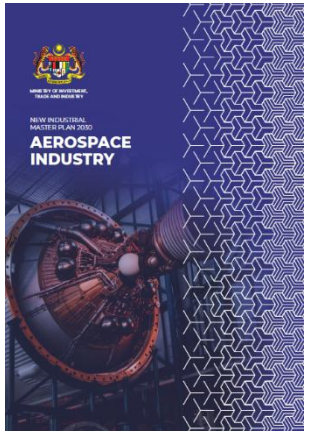
- The global in-service commercial aircraft fleet is expected to grow at a CAGR of 3.5% from 2023 to 2033, reaching 44,483 aircraft by 2033. Of this, Asia Pacific is projected to account for 17%, or over 7,600 aircraft
- Strategically located at the heart of the region, Malaysia is well-positioned to capitalise on the growth of the world's largest air travel market by leveraging its aviation infrastructure

Source: Airbus, Aviation Week Intelligence Network, YCP Insights & Publications, PASB Analysis

As a high value sector with strong growth potential, Malaysia's aerospace industry is guided by the National Industrial Master Plan and Malaysian Aerospace Industry Blueprint 2030

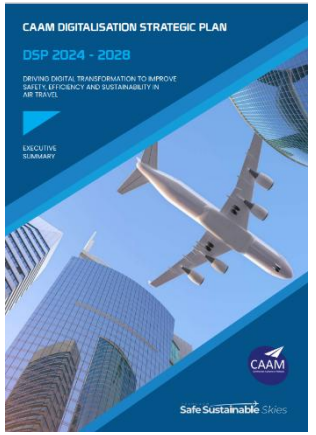
NON-EXHAUSTIVE

National Industrial Master Plan (NIMP) 2030 - Aerospace



- The NIMP Aerospace 2030 outlines key strategies, including fostering innovation, establishing Centres of Excellence, promoting green technologies like bio-jet fuel, and enhancing collaboration across the aerospace ecosystem.
- Specific targets include expanding and positioning Malaysia as the leader in aerospace manufacturing in Southeast Asia.

The Civil Authority of Malaysia (CAAM) Digitalisation Strategic Plan 2028



- CAAM launches its Digitalisation Strategic Plan 2024- - 2028 as a long-term initiative to enhance the safety, efficiency and sustainability of air travel in Malaysia presented by digital transformation reshaping the aviation landscape.
- In tree phases. this strategic plan aims to make Malaysia's aviation industry a resilient and sustainable economic driver by integrating advanced technologies into its processes.
- By 2028, CAAM aims to have all aviation safety-related data interconnected, enabling proactive air safety oversight

Malaysian Aerospace Industry Blueprint 2030 (MAIB 2030)

- MAIB 2030 is an initiative by the Malaysian Industry Government Group for High Technology (MIGHT), an organization under the Prime Minister's Department, as the Secretariat of the Malaysian Aerospace Council (MAC).
- The aerospace industry defined in this blueprint covers the industrial activities that relate to design, development, manufacturing, construction, maintenance & disposal of aircraft, spacecraft, missiles and rockets.
- The MAIB 2030 functions to guide the development of the aerospace industry under the NIMP 2030.

Malaysian Aviation Decarbonisation Blueprint

- The Malaysia Aviation Decarbonisation Blueprint is intended to serve as a guiding document on Malaysia's short-term and long-term initiatives on developing a sustainable aviation sector.
- It includes strategies like improvements in aircraft technology, operational practices, sustainable aviation fuels, and market-based measures to achieve aviation net-zero targets by 2050.

Source: MITI, Malay Mail, Open Government Asia, Bernama, NIMP – 2030 (Aerospace). AMCHAM

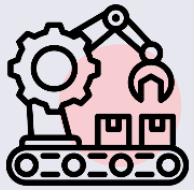
The Malaysian Aerospace Industry Blueprint and National Industrial Master Plan have identified shared targets for the aerospace industry in 2030

Malaysian Aerospace Industry Blueprint 2030 and National Industrial Master Plan (NIMP 2030) Sub-Sector Targets

Maintenance, Repair & Overhaul (MRO)

5%

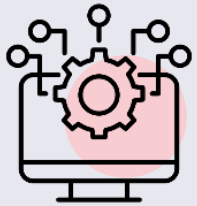
of global market share captured



Aerospace Manufacturing

#1

In Southeast Asia for aerospace parts and components sourcing



Systems Integration

70%

Self-reliance for domestic integration and upgrading of strategic assets

Engineering & Design Services

3.5%

Global market share captured

Education & Training

#1

Supplier of aerospace talent in Southeast Asia

Source: MAIB 2030

These key policies outline strategies and action plans for Malaysia to strengthen its local players, increase upstream participation and gain comparative advantage in Asia

NIMP 2030 Aerospace Focus Areas

Strengthen competitiveness and capabilities of local players

Encourage the growth of technology suppliers by investing more in R&T activities

Improve Malaysia's aircraft content and participation in upstream market

Reduce dependency on foreign designs for military aircraft upgrades by prioritising local design and engineering solutions

Sustain comparative advantage in identified focus areas

NIMP 2030 Strategies and Action Plans for the Industry

1. **Form cluster and zone for aerospace activities** prioritising complex and high value-added products and services
2. **Develop technologies in aeronautics (UAV and composites) and astronautics** to achieve regional market leadership
3. **Strengthen implementation of the Industrial Collaboration Programme (ICP)** to increase local participation in government procurement
4. **Establish a one-stop centre to coordinate the certification process** of various regulatory bodies related to aerospace
5. **Establish a Centre of Excellence for aerospace to provide training** and share industry best practices and facilities
6. **Establish an aerospace digital system as a central data repository** to allow real-time information sharing between stakeholders and industry players
7. **Position Malaysia as the key regional producer of bio-jet fuel** that adheres to the International Civil Aviation Organisation (ICAO) regulations
8. **Develop strong and effective collaboration** among all stakeholders to create a sustainable ecosystem
9. **Introduce incentives or financial assistance to promote R&D,** innovation and high value-added investments
10. **Strengthen education and training services** to prepare capable workforce for the aerospace industry

Source: MAIB 2030, NIMP, MIDA

Malaysia's aerospace value chain encompasses activities from design to manufacturing and systems integration, supported by critical services like engineering expertise, R&D, and talent development to fuel industrial innovation and global competitiveness

Value Chain	Upstream			Downstream	
	Design & Development	**Manufacturing Activities**	**Assembly & Integration**	**Sales & Operations**	**Maintenance & Aftercare**
Primary Activities	Encompasses the conceptualisation, design, and development of aerospace products, and related systems. **Examples of Key Activities:** • Aerodynamic and structural design • Avionics and system architecture development • Simulation and modeling (e.g., CAD, CAE)	Involves the production of aerospace parts, components, and systems. **Examples of Key Activities:** • Fabrication of aerostructures (eg: wings) • Production of engine components • Manufacturing of avionics and electronic systems	Covers the assembly and integration of various aircraft components and systems into a complete, functional aircraft. **Examples of Key Activities:** • Structural assembly • Systems integration • Testing and validation • Quality assurance	Focuses commercial aspects of the aerospace industry, including, sales, and operational deployment of aircraft. **Examples of Key Activities:** • Marketing and sales • Customer support • Fleet management • Operational planning • Leasing and financing	Focuses on the ongoing maintenance, repair, and overhaul (MRO) of aircraft to ensure safety, reliability, and compliance with aviation regulations. **Examples of Key Activities:** • Routine & predictive maintenance • Repairs and overhauls • Upgrades and modifications • Regulatory compliance

Support Services

- **Engineering Services** : Focuses on the research, conceptualization, design, and development of aerospace systems.
- **Education & Training** : Responsible for developing a highly skilled workforce for the aerospace industry.
- **Research & Technology :** Development of innovative technologies aimed at enhancing performance, safety, efficiency, and sustainability.

Source: NAICO Malaysia, NIMP 2030 – Aerospace, PASB Analysis

Malaysia's Aerospace Ecosystem is anchored in five core sub-sectors that form the backbone of industry development

NON-EXHAUSTIVE

Regulators

CAAM CIVIL AVIATION AUTHORITY OF MALAYSIA

MAVCOM Malaysian Aviation Commission Suruhanjaya Penerbangan Malaysia

Government Agencies

NAICO MALAYSIA

MAIA Malaysia Aerospace Industry Association

Maintenance, Repair and Overhaul (MRO)	Aerospace Manufacturing	Systems Integration	Engineering and Design Services	Education and Training
Malaysia is a regional hub for MRO activities, particularly in base maintenance and engine overhaul with over 230 MRO-related companies including helicopters.	Aerospace manufacturing is one of the fastest growing subsectors within the industry, both in the areas of metallic and composite details and assemblies.	Systems integration is a developing area within Malaysia's aerospace industry, primarily involving the assembly and integration of avionics, electronic systems, and subsystems for aircraft.	Supports a growing niche of aerospace engineering and design services, particularly in structural design, simulation, and technical documentation.	Developed a network of higher education and technical institutions offering aerospace-related programmes to build industry-ready talent such as pilots, technicians and engineers.
Key Players: GKN AEROSPACE, GE Aerospace, SR Technics, AIRBUS HELICOPTERS	**Key Players:** CTRM System Integration, Honeywell Aerospace, ACM, SPIRIT AEROSYSTEMS, SAM	**Key Players:** SDMK, Contraves, kontron	**Key Players:** Sapura Secured Technologies, AVIATION DESIGN CENTER, G7 AEROSPACE	**Key Players:** UNIVERSITY COLLEGE of AVIATION MALAYSIA, Universiti Kebangsaan Malaysia, UniKL UNIVERSITI KUALA LUMPUR

Research & Technology

AMIC AEROSPACE MALAYSIA INNOVATION CENTRE

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Source: MITI, NAICO Malaysia, NIMP 2030 – Aerospace, PASB Analysis

To-date, Malaysia has a high presence in MRO Aftercare, Aerospace Manufacturing, and Education & Training services for design, manufacturing and aftercare

Presence of Industry Players along the Value Chain of Aerospace Industry

	MRO	Aerospace Manufacturing	Systems Integration	Engineering & Design Services	Education & Training
Design & Development	Low Presence	Low Presence	Medium Presence	Low Presence	High Prescence
Manufacturing	No Presence	High Presence	Medium Presence	No Presence	High Presence
Assembly & Integration	No Presence	Low Presence	Low Presence	No Presence	Low Presence
Aftercare	High Presence	Low Presence	Low Presence	No Presence	High Presence

MRO
- Historically been driven by MRO activities particularly in Selangor. Focus has been skewed towards aftercare services rather than upstream segments

Aerospace Manufacturing
- High presence in aerospace manufacturing particularly for aircraft structures. These can be attributed to global OEM and Tier 1 suppliers such as Spirit Aerosystems

System Integration
- Involves complex softwares and systems that require high technological maturity. Malaysia's current market may not yet offer the mass needed to sustain this activity at scale

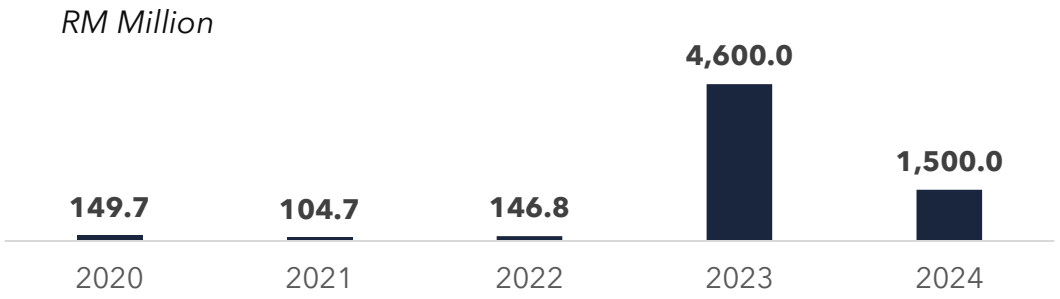
Engineering & Design Services
- The minimal presence reflects the absence of anchor players demanding for such services. Most high-value work is conducted in more mature aerospace markets with robust R&D systems

Education & Training
- The strong presence of education and training providers across design, manufacturing, and aftercare likely reflects demand-driven growth, especially to meet MRO workforce requirements

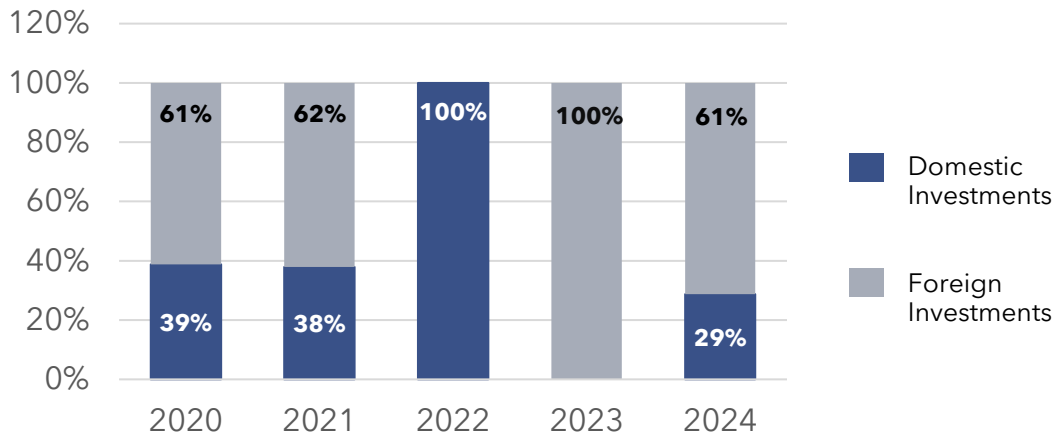
Source: MITI, NAICO Malaysia, NIMP 2030 – Aerospace, PASB Analysis

Aerospace investments in Malaysia have scaled significantly since 2023, led by foreign investment and growing project activity, reflecting increased investor confidence and ecosystem readiness

Overview of Aerospace Investments from 2020 - 2024



Breakdown of Aerospace Domestic vs Foreign Investments



Key Highlights:

Surge in Investment between 2023 & 2024

Malaysia secured approximately RM 6.1 billion in approved aerospace investments across 2023 and 2024 – reflecting strong international interest and positioning the country for rapid sectoral expansion.

In December 2023, Boeing fully acquired Aerospace Composites Malaysia, a joint venture with Hexcel Corporation. The renamed Boeing Composites Malaysia facility provides composite products and subassemblies for all Boeing commercial airplane models including the 737 MAX and 787 Dreamliner and is Boeing's first wholly owned manufacturing facility in Southeast Asia. The site employs an all-Malaysian workforce of approximately 1,000 people.

Korea Aerospace Industries (KAI) has announced a USD920 million deal with Malaysia's Ministry of Defense (MINDEF) to supply 18 FA-50 light combat aircraft (LCA).

Eaton and SIA Engineering Company Limited (SIAEC) have entered into a significant agreement to establish a joint venture (JV) focused on component maintenance, repair, and overhaul (MRO) services in Malaysia. The JV will inspect, test, repair, maintain, modify and overhaul Eaton-manufactured aircraft components installed on airframe and engine fuel systems and hydraulics systems.

Source: MIDA, NIMP 2030 – Aerospace, Business Today, Reuters, BOEING, PASB Analysis

With steadfast infrastructure and legislation in place, Malaysia's aerospace industry is projected to continue growing as investments increase in manufacturing, MRO, R&D, technology capabilities and the development of a highly skilled workforce

Selangor

Selangor Aero Park development MOU to be inked with Khazanah, MAHB in March, says MB

By Bernama / Bernama 26 Feb 2025, 08:46 pm

Building on Malaysia's aerospace partnerships

By CHARLES RAMENDRAN

Negeri Sembilan

NAFCO Group Launches Cutting-Edge Aerospace Manufacturing Facility In Malaysia With USD40mil Investment

Seremban Facility Marks Strategic Expansion in Southeast Asian Aerospace Manufacturing

Sarawak

KUCHING: Sarawak is exploring strategic collaborations with Airbus to develop the state's aerospace industry, says Tan Sri Abang Johari Openg.

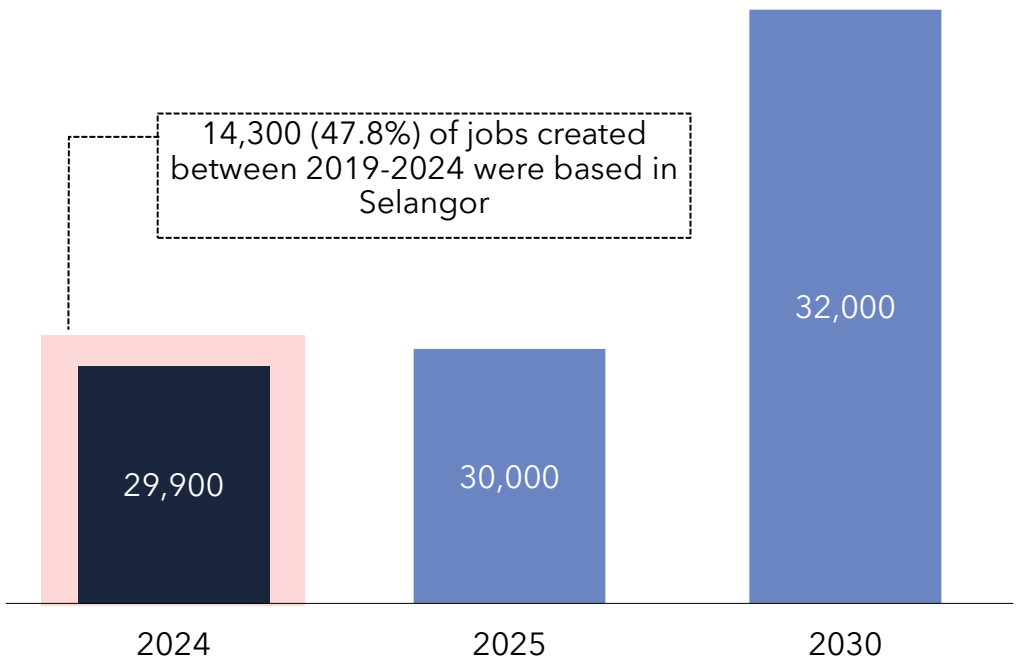
The Sarawak Premier said both parties would explore six key areas of cooperation to establish Sarawak as a new aerospace hub in the Asia Pacific.

KUCHING (May 16): i-CATS University College and the National Aerospace Industry Corporation (Naico) Malaysia will officially sign a Memorandum of Understanding (MoU) at the prestigious Langkawi International Maritime and Aerospace Exhibition (LIMA 2025) on May 20, in a landmark move to position Sarawak as a regional leader in aerospace and satellite technology.

Source: MIDA, The Star Online, Free Malaysia Today, The Edge Malaysia , Bernama

As aerospace investments grow nationwide, Malaysia needs to expanding its skilled workforce to meet rising industry demand with a target of 32,000 aerospace jobs in 2030

Aerospace Jobs in Malaysia (Actual vs Target)



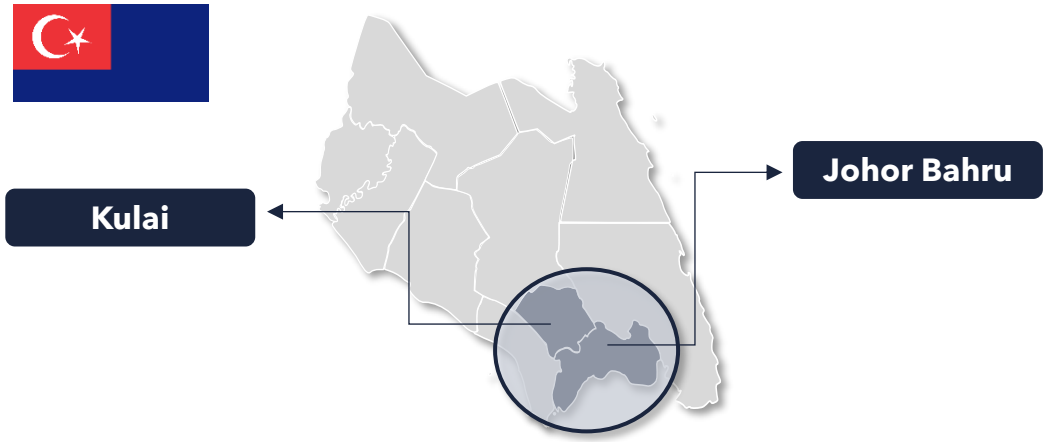
Key Highlights

1. **Malaysia's aerospace job growth remains on an upward trajectory**, reaching **29,900 jobs in 2024** and targeting **32,000 by 2030** – reflecting growing workforce needs in tandem with sector expansion.
2. Nearly **48% of jobs created from 2019–2024** were concentrated in **Selangor**, indicating regional imbalances and the need for broader talent pipeline development across other states.
3. With continuous investments in aerospace MRO, manufacturing, and engineering services, **demand for specialised, certified talent is expected to intensify**—underscoring the need to strengthen training and upskilling programmes.
4. **2025 projection (30,000 jobs)** already surpasses 2024's actual numbers, suggesting a tight labour market unless proactive measures are taken.

Source, MAIA, NIMP 2030 – Aerospace, PASB Analysis,

Johor's aerospace ecosystem is taking shape, driven by key investments, regional connectivity and growing aviation-related services in Kulai and Johor Bahru

Overview of aerospace presence in districts of Johor



Key Activities in Johor Bahru and Kulai:

- International Airport
- Maintenance, Repair & Overhaul (MRO)
- Aerospace Manufacturing
- Education & Training Institutions

Johor's Strategic Positioning

Emerging Key Player

- Johor is emerging as a key player in Malaysia's aerospace sector, driven by anchor investments from GKN Aerospace and Asia Digital Engineering.

Southern Advantage

- Senai International Airport, the only international airport in southern Peninsular Malaysia, strengthens Johor's role as a southern gateway for cross-border aerospace operations.

Industrial Foundation

- Johor's maturing industrial base, and the Senai Airport Industrial Zone provides critical infrastructure to support high-value aerospace services such as MRO and manufacturing.

Source: Free Malaysia Today, Maju Johor

Senai International Airport plays a pivotal role in supporting Johor's aerospace growth through its expanding infrastructure, regional connectivity, and growing air traffic capacity

Senai International Airport Overview

3,800 m

Senai Airport extended its runway and taxiways to enhance operational capabilities, accommodate larger aircraft, and support future growth in international connectivity and cargo operations.

134 acres

Available land for lease at Senai Airport

11 Parking Bays

4 Passenger Contact Bays
3 Passenger Remote Bays
4 Cargo Remote Bays

Senai International Airport (LTAS)

Senai International Airport Connectivity

16 Destinations

4 ASEAN Cities – Singapore, Bangkok, Ho Chih Minh, Jakarta

12 Domestic States – Penang, Kuala Lumpur, Kuching, Kota Kinabalu*

406 Flights Weekly

Airlines – Malaysia Airlines, Air Asia, Firefly, Batik Air

4 mil Passengers

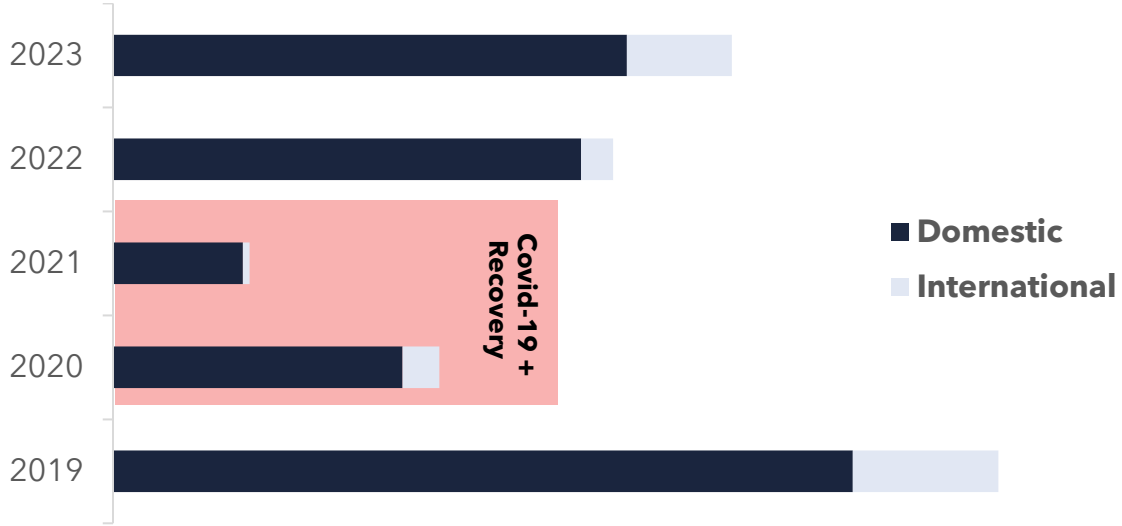
Current handling capacity per annum

*Note: * were selected as top 4 flight destinations as they currently fly more than 14 times weekly*

Source: Senai Airport Terminal Services

Senai Airport Terminal Services serves as a strategic link between strengthening domestic connectivity and building cross border synergies

Breakdown of Domestic and International Flights at Senai International Airport (2019 – 2023)



Notable Insights:

- Senai's steady recovery in domestic and international traffic post-COVID reflects renewed demand for regional air mobility.
- It lays the groundwork for deeper integration into ASEAN and cross-border aerospace operations

Unlocking through Senai International Airport's role in recovery and connectivity

Domestic strength as a launchpad

Senai's strong domestic recovery in domestic flight volumes provides a stable operational base to scale regional routes, attract international carriers and support aviation-related services

Twinning complementary approach

Senai can complement Changi by offering space and cost benefits, opening opportunities for MRO, cargo diversion, and support services as part of a dual-airport model under JS-SEZ

Catalyst for cross-border aerospace integration

With international flights gradually increasing, Senai can anchor cross-border aerospace activity enabling integrated supply chains, talent mobility, and shared servicing across ASEAN.

Source: Senai International Airport Report, News, PASB Analysis

Johor has developed several aerospace industrial zones and parks highlighting its strategic initiatives to enhance its aerospace industry infrastructure, attracting global investments and fostering economic growth in the region

JS-SEZ Flagship F

Senai Airport Aviation Park (SAAP)

- Located next to Senai International Airport, SAAP is a dedicated aviation park designed to support aerospace-related activities.
- It hosts Maintenance, Repair, and Overhaul (MRO) facilities, Fixed Base Operations (FBO) for business and general aviation, aviation academies, manufacturing and assembly centers, and logistics hubs.
- The park also provides private jet terminals, ground support services, and security solutions.

- Strengthens Johor's MRO capabilities, attracting both domestic and international airlines for maintenance and repairs.
- Encourages aerospace manufacturing and assembly, creating jobs and fostering skills development.

i-Park@Senai Airport City

- A fully integrated eco-friendly industrial park developed by AME Elite Consortium Berhad, located near Senai Airport.
- It covers 189 acres of freehold land and offers world-class infrastructure including gated and guarded facilities, high-speed fiber broadband, and natural gas supply.

- Attracts aerospace manufacturers with its state-of-the-art industrial facilities.
- Provides a conducive environment for aerospace R&D and innovation, supporting advanced manufacturing techniques like 3D printing and precision engineering.

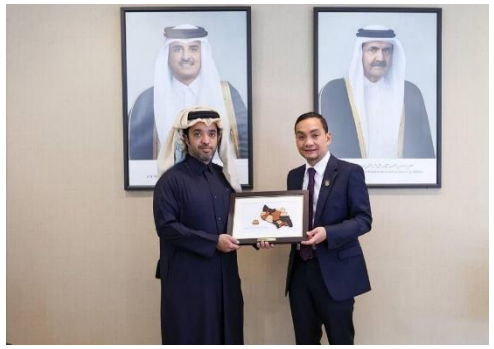
Nusajaya Tech Park

- A 519-acre technology and industrial park developed through a joint venture between Ascendas-Singbridge (Singapore) and UEM Sunrise (Malaysia).
- It caters to industries such as electronics, pharmaceuticals, engineering, logistics, and aerospace.
- Designed as a smart and sustainable industrial park, it includes high-tech infrastructure, green energy solutions, and customized industrial spaces..

- Attracts global aerospace players with high-tech manufacturing facilities, fostering technology transfer and skill development.
- Supports aerospace parts production and high-value engineering activities, reducing reliance on imports.

Johor is gaining traction as an emerging player in the aerospace sector with foreign key players such as Qatar Airlines expressing interest in the state, underscoring the region's growing connectivity and potential

Leadership Driving Sector Growth



"Qatar is showing a high interest in investing in Johor and is ready to introduce JS-SEZ to the main investors in Qatar and their international network which will certainly open up great opportunities for investment and strategic cooperation between the two countries"

Yang Amat Berhormat Dato' Onn Hafiz bin Ghazi,
Menteri Besar Johor
- January & April 2025 -

Indicative Sector Development Plans:

Exploring Cross Sector Investment Opportunities

- Leveraging Qatar's global network to position Johor as a regional investment hub
- **Aerospace & Logistics**: Potential investments in airport-related infrastructure, logistics zones and training
- **Tourism**: Exploring new regional routes or partnerships to boost cross-border air connectivity

Key Implications for Johor

Strengthen investor confidence

Qatar's engagement sends a signal of confidence in Johor's economic potential, strengthening its credibility among global investors and encouraging further investment interest into the state.

Benefits for Johoreans

The collaboration aims to deliver job creation, economic diversification, and improved infrastructure, signaling socioeconomic benefits for the people of the state

Source: Malay Mail, The Star, Invest Johor, The Iskandarian, PASB Analysis

The aerospace direction in Johor shows promising momentum with existing manufacturing companies forming the foundation for a specialised industrial cluster supported by JS-SEZ actively incentivising investments

Malaysia Aerospace Industry Association

"With the regional growth in tourism, aftermarket demand and aerospace manufacturing supply chain, aided by Malaysia's cost-competitiveness, the industry will grow significantly over the next five years and beyond.

Johor already has well-established companies operating in aero-manufacturing. As such, the SEZ will likely encourage more overseas investors to establish operations in Johor "

- David A Jones, Managing Director -

Key Takeaways on Johor's Aerospace Industry

Opportunities for Johor:

Emerging Economy
Strong industrial base provides potential for Johor to develop aerospace specialisation in engineering and manufacturing

Cross Border Collaboration
Proximity to Singapore's advanced aerospace ecosystem enables Johor to serve as a complementary hub, creating synergies amongst each other

Gaps & Obstacles:

Highly Competitive Industry
Strong regional competition from established aerospace clusters (EG: Selangor, Singapore) limits Johor's ability to differentiate without niche specialisation

Low Supply Chain Integration
Lack of integration between anchor manufacturers and local SMEs limits Johor's ability to build a cohesive aerospace supply ecosystem and capture greater value domestically

Source: The Star, MAIA Newsletter, PASB Analysis

With strategic location advantages, strong industrial capabilities, a skilled workforce, and government support, Johor is uniquely positioned to expand its aerospace sector and position itself as a leading aerospace hub in Asia-Pacific

1 Strategic Location & Proximity to Singapore

- **Bordering Singapore**, Johor benefits from close proximity to **Seletar Aerospace Park**, a major aerospace hub in Southeast Asia.
- This **geographical advantage** allows Johor to attract **spillover investments** from Singapore, particularly from aerospace companies looking for cost-effective expansion opportunities.
- With enhanced **cross-border connectivity**, Johor can become a **preferred alternative** for MRO services, component manufacturing, and aerospace R&D, given **lower operational costs** compared to Singapore.

2 Existing Aerospace Infrastructure & Industrial Ecosystem

- Aside from **existing key aerospace infrastructure** such as SAAP, i-Park@Senai Airport City and Nusajaya Tech Park**,** the **presence of established aerospace players,** such as GKN Aerospace and Asia Digital Engineering (ADE), demonstrates investor confidence and provides a strong foundation for further industry growth.

3 Strong Manufacturing & Engineering Base

- Johor is **Malaysia's leading manufacturing hub,** contributing significantly to **high-value industries**, including precision engineering, electronics, and logistics—all crucial for aerospace development.
- Existing industrial expertise in **metal fabrication, composite materials, and high-tech manufacturing** provides a natural transition into aerospace component production.
- With well-established **supply chain networks,** Johor can scale up aerospace manufacturing to serve both local and international markets.

4 Skilled Workforce & Training Facilities

- **54% of Southeast Asia's aerospace talent** is already supplied by Malaysia, with Johor playing a key role in talent development.
- **The presence of aviation academies** and technical training institutions ensures a steady pipeline of skilled professionals, including engineers, technicians, and MRO specialists.
- Aligning **education programs with aerospace industry needs** will further enhance Johor's ability to meet growing workforce demands.

5 Competitive Cost Structure

- Johor offers **lower operational costs** than other established aerospace hubs like Singapore and Kuala Lumpur, making it an attractive **alternative for aerospace investments**.
- **Affordable land and labour costs** provide cost advantages for MRO operations, manufacturing plants, and R&D centers.

Source: MIDA, Bernama, The Malaysian Reserve, PASB Analysis

The expansion plans of Senai Airport has the potential to significantly drive Johor's aerospace sector growth anchoring on four strategic pillars, positioning the state as the national southern gateway and an international aviation hub

Southern Gateway

- Serves as a strategic aerospace access point for the Southern corridor of Peninsular Malaysia
- Leverage Johor's proximity to Singapore and ASEAN to serve as the entry point

MRO Aerospace Ecosystem

- Providing aftermarket services for maintenance, repairs, inspections and overhauls of aircraft components
- With MRO as a national priority, Johor can carve a niche in component servicing—an important step to move up the value chain

Business Aviation Hub

- Positioning as a regional hub with full suite of BA value chain and services
- Leveraging Malaysia's position as the 9th largest base for business jet fleet in Asia Pacific

General Aviation Centre

- Refers to non-commercial aviation such as private jets, charter aircrafts, training aircraft and recreational planes
- Enables Johor to build a high-value niche that complements commercial aviation hubs in the country

Source: Senai International Airport Masterplan 2025

Johor's aerospace sector remains in early stages of transitioning into high-complexity, innovation-led growth. It's current position presents strategic opportunities to lead in niche, underdeveloped areas such as general aviation, specialised MRO, and sustainable aerospace technologies

Key Gaps in Johor's Aerospace Industry: Limited local participation in high-value aerospace activities

- Malaysia's aerospace strategy, as outlined in the Malaysian Aerospace Industry Blueprint 2030 and NIMP 2030**, focuses on strengthening high-value sub-sectors** such as **MRO, manufacturing, systems integration**, and engineering services to **move up the global value chain**.
- While core activities are currently concentrated in central and northern regions, **Johor offers a strategic opportunity to develop niche and emerging segments** – including general aviation, specialised MRO, and next-generation technologies like electric aircraft and UAVs.
- `
- **Addressing these through targeted industry-driven** initiatives, can strengthen Johor's position in the regional aerospace landscape & move up the value chain and evolve Johor into a key southern gateway.

Potential Opportunities for Johor to maximise growth:

- **Focus Area 1: Untapped potential to lead in emerging and niche aviation technologies**
- **Focus Area 2: Specialise in high-value component-level MRO servicing**
- **Focus Area 3: Build niche in manufacturing aerospace component capabilities**

Source: PASB Analysis, MIDA, MAIB 2030

Johor has the potential to lead in emerging and niche aviation technologies in Malaysia (1/2)

Identified Opportunities	Rationale	Potential Investment Areas:
Lead Industrial Anchor	• Malaysia currently lacks a designated anchor project or facility for manufacturing next-generation aircraft types such as electric aircraft, UAVs, seaplanes, and AAM platforms. • Most national and state-level efforts are focused on traditional commercial aviation MRO and parts. • There are no dedicated zones for for next-gen aviation platforms limiting competitiveness in securing long-term investments from next-gen OEMs or aviation tech startup.	✓ Prototyping, LRIP (Low Rate Initial Production), and final assembly facilities ✓ Public-private R&D clusters for UAV systems, flight testing, and certification protocols ✓ Sandbox test zone for cross-border UAV logistics
Well-Connected Ecosystem	• Johor's UAV-related activities (e.g., drone assembly, agri-tech applications) are small-scale and scattered across various players, with limited upstream manufacturing integration. • There is minimal collaboration between academia, regulators (CAAM), and industry to support R&D, testing protocols, or certification systems for new aviation technologies.	• Facilities for end-to-end production: frame assembly, avionics, propulsion systems, and payload integration • Infrastructure to support UAV/eVTOL prototyping, simulation, and real-world testing • Public-private fundingand partnerships for joint research in UAV design, AI-based navigation, and regulatory frameworks

Source: PASB Analysis, MIDA, MAIB 2030

Johor has the potential to lead in emerging and niche aviation technologies in Malaysia (2/2)

Current Landscape

Johor's Involvement in Seaplane Development

- Delta Aerospace is the first seaplane country in Malaysia.
- It's first LA-8 aircraft arrived in Senai Port in March 2022 marked its role in the assembly and technical preparation of niche aviation platforms.

R&D Push in UAV, Drone Technologies and Advanced Air Mobility

- Malaysia's Drone Technology Action Plan 2030 targets an ambitious RM50.7 billion contribution to GDP by 2030 from the drone industry
- Education and training institutions in Johor such as University Teknologi Malaysia (UTM), Aero Malaysian Engineering Centre and Asia Aeronautical Training Academy are actively involved in research supporting next gen aviation, materials testing and simulations environment.

Johor has shown early signals of capability in next-gen aviation platforms but lacks dedicated zones or anchor projects, reflecting an underdeveloped industrial base.

Potential Opportunities for Johor to maximise growth

Opportunity: Establish production hub for next-generation aviation technologies, including electric aircraft, sea planes, and unmanned systems.

Next-gen technolgoies like UAVs, light aircraft, and seaplanes typically have smaller size, shorter range, and simpler infrastructure requirements making it a possibility for Johor to be a suitable first-mover state.

Areas Johor can tap into:

✓ Establish a UAV Test Bed that can be accessed through land and coastline in Southern Johor

✓ Pilot Low-Rate Initial Production (LRIP) Fscility for UAV and eVTOL parts

✓ Launch a Seaplane Flight & Trfaining & Maintenance hub by using existing Delta's infrastructure

Position Johor as an entry point for niche production and testing hub for seaplanes, UAVs, electric aircrafts and upcoming aviation technologies.

Source: MIDA, Free Malaysia Today, PASB Analysis

Johor is well-positioned to advance into high-value component MRO, strengthening its role in the Aerospace Value Chain (1/2)

Identified Opportunities	Rationale	Potential Investment Areas:
Specialisation in MRO Component Servicing	• Global MRO market for components is worth over **USD 20 billion** and expected to grow with aging fleets and increased air traffic in Asia • ASEAN's growing aircraft fleet (commercial, business, and GA) is driving demand for high-turnaround, localised component MRO services. • Many aircraft components (e.g., avionics modules, air cycle machines, wheels/brakes) require routine servicing every 6–18 months – creating a recurring demand cycle. • Large share of component MRO services are outsourced to countries such as Germany, US and France for repair • Turnaround times can be longer – growing aviation activity in Asia demands closer MRO Networks	✓ Dedicated MRO Component Hub focusing on high-turnaround component repair (e.g., avionics, air cycle machines, wheels/brakes) ✓ Specialised Component Testing & Certification Centre ✓ Tier-2 & Tier-3 Supplier Integration Programmes
Market Diversification	• Over 80% of Malaysia's MRO activity is concentrated on airframe (base/line) and engine overhaul, limiting component-level expertise despite growing demand for component repair servicing. • Most MRO services is located in Selangor in Malaysia and in the region, they are outsourced to Singapore. • Many local aerospace SMEs remain Tier 3 or below, providing machining or subassembly support but lacking access to higher-tier repair roles due to certification and capacity constraints.	✓ SME Accelerator for High-Cert MRO Services for Tier-3 suppliers to move into Tier-2 roles ✓ Cross-border MRO Partnership Zones that complement Singapore's high-end services ✓ Aerospace Industrial Upskilling Centre

Source: PASB Analysis, MIDA, MAIB 2030

Johor is well-positioned to advance into high-value component MRO, strengthening its role in the Aerospace Value Chain (2/2)

Current Landscape

MRO Key Players in Johor:

GKN Aerospace, Nusajaya Tech Park, Johor

- Recognised globally as a multi-technology Tier 1 Aerospace Supplier
- Repair and research facility focusing on aero-engines parts such as low-pressure components. Research is centered on the application of additive manufacturing technology in engine parts repair.

Asia Digital Engineering, Senai, Johor

- ADE is the engineering arm of Capital A (Air Asia Group Berhad)
- 1st major MRO Hangar Facility in Senai that services Asir Asia's growing fleet of commercial airlines and other third party airlines.
- Offers spectrum of aircraft services such as line maintenance, base maintenance, component repair and overhaul and warehouse management

MRO Players , GKN and ADE focuses primarily on base and line maintenance, including full aircraft servicing.

Potential Opportunities for Johor to maximise growth

Opportunity: Develop specialised facility for servicing component-level MRO and integrating local SMEs into global supply chains & high value markets

MRO component servicing refers to the MRO of aircraft components, parts and systems rather than the entire aircraft.

Wheel & Brakes	▪ Regional demand is strong due to common fleet types (A320, B737) ▪ High-turnover item – average overhaul every 250 – 300 landings
Avionics	• Increasing complexity of electronics = growing need for specialist servicing. • Does not require hangar space; cleanrooms and benches suffice.
Landing Gears	• Requires frequent inspection, repair, and overhaul due to exposure to high stress during take-off and landing cycles.

Johor can develop dedicated servicing facilities for critical components like wheels, brakes, avionics, and landing gears, which are in high regional demand.

Source: MIDA, News , Articles, PASB Analysis

Johor can position itself as a niche aerospace manufacturing hub by specialising in precision component capabilities (1/2)

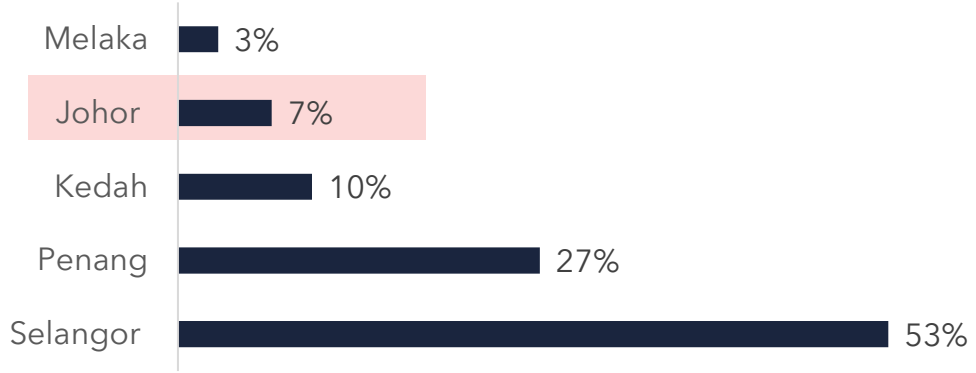
Identified Opportunities	Rationale	Potential Investment Areas:
Utilising Manufacturing Potential	• Johor has an existing strong base in electrics and electronics manufacturing • Current national concentration in Selangor leading to missed opportunities in the Southern Corridor • Johor's industrial parks in Senai can be further optimized for aerospace manufacturing • Singapore is a global aerospace manufacturing hub but relies heavily on imports for mid-tier parts and tooling	✓ Establishment of mid-tier aerospace tooling and component clusters, Target production of complex parts (e.g., brackets, housings, connectors) to fill supply chain gaps currently imported by of aerospace supplier parks in Senai or South Johor→ Build co-located manufacturing ecosystems linked to OEMs and Tier-1 firms with shared services (QA labs, logistics, design centres)Investment in smart manufacturing technologies (e.g., CNC, additive manufacturing)→ Position Johor as a hub for future-ready aerospace part production for small-lot, high-precision items
Increase Domestic Production	• Many Malaysian SMEs are not integrated into OEM/Tier 1 supply chains due to lack of certifications (AS9100, NADCAP), consistent QA systems, and long-term contracts. • There is limited participation of Johor-based firms in multi-tier supplier structures, joint ventures, or risk-sharing partnerships • As a result, Malaysia imports most key components or relies on foreign Tier-1s operating in isolation, without deep linkages to domestic ecosystem	• SME certification & scale-up support programmes • Multi-tier aerospace supplier development platforms between Johor SMEs and foreign Tier-1/Tier-2 firms • Incentivised localisation of component production (e.g., actuators, fasteners, panels) • Integrated aerospace supply chain digitalisation hub

Source: PASB Analysis, MIDA, MAIB 2030

Johor can position itself as a niche aerospace manufacturing hub by specialising in precision component capabilities (2/2)

Current Landscape

Aerospace Manufacturing Players by State



- Malaysia's aerospace manufacturing is **heavily concentrated in Selangor (53%) and Penang (27%),** driven by OEM and Tier 1 players like Spirit AeroSystems, Safran, Honeywell.
- The bulk of manufacturing in these states **focuses on large structural components** such as airframes, wings, nacelles produced for major commercial aircraft platforms.
- Johor currently holds only ~7% of aerospace manufacturing activity but is home to notable manufacturing players such as:

BARNES AEROSPACE — *Focus: Engine Components & Air Frame*

Celestica — *Focus: Electronics manufacturing services*

Despite emerging players, Johor's aerospace manufacturing footprint remains limited – indicating room for targeted growth

Potential Opportunities for Johor to maximise growth

Opportunity: Establishing Johor as a specialised Aerospace Manufacturing Hub could serve as a high-value platform to boost aviation trade and industry linkages with regional and global aerospace value chain

*These are specific areas where Johor can **rapidly build it's niche** to attract investment, and plug into global supply chains:*

Cabin Interiors (Seats, Panels)

- ❑ Compatible with Johor's existing E&E Manufacturing Base
- ❑ Easy to scale with automation

Composite & Plastic Parts

- ❑ Leverages local plastics for cabin interiors, ducts, brackets
- ❑ Access to growing demand for lightweight components

Facility could provide these capabilities:

- *Repair & Inspection*
- *Trimming*
- *Fabrication*
- *Assembly*

Focus on high-mix, low-volume components with certification and precision needs where Johor can move up the value chain

Source: Frost & Sullivan, Articles, News, PASB Analysis

Johor's foundational strengths provide a strategic launchpad to tap into high-value, underdeveloped aerospace segments

Johor's Unique Selling Point

01 Cost effective with regional connectivity

With land availability, industrial capacity, and a growing base of certified suppliers, Johor provides affordable access to high-quality manufacturing and MRO services.

02 Industrial foundation

Johor's mature E&E ecosystem and industrial zones form a strong foundation to transition into aerospace, particularly in parts manufacturing, systems integration, and tooling for mid-tier production.

03 Supply chain proximity

Johor's proximity to Singapore enables it to serve as a strategic extension of regional aerospace value chains – complementing and capturing spillover demand.

04 Untapped local ecosystem for scale-up

Johor's underutilised SME base presents a scale-up opportunity. With investment in certifications and capability development, it can evolve into a local supplier ecosystem, reducing reliance on imports.

05 Platform for research and innovation development

With existing research institutions, Johor can address a national gap in aerospace R&D – serving as a platform for next-gen technologies like UAVs, electric aircraft, and seaplanes.

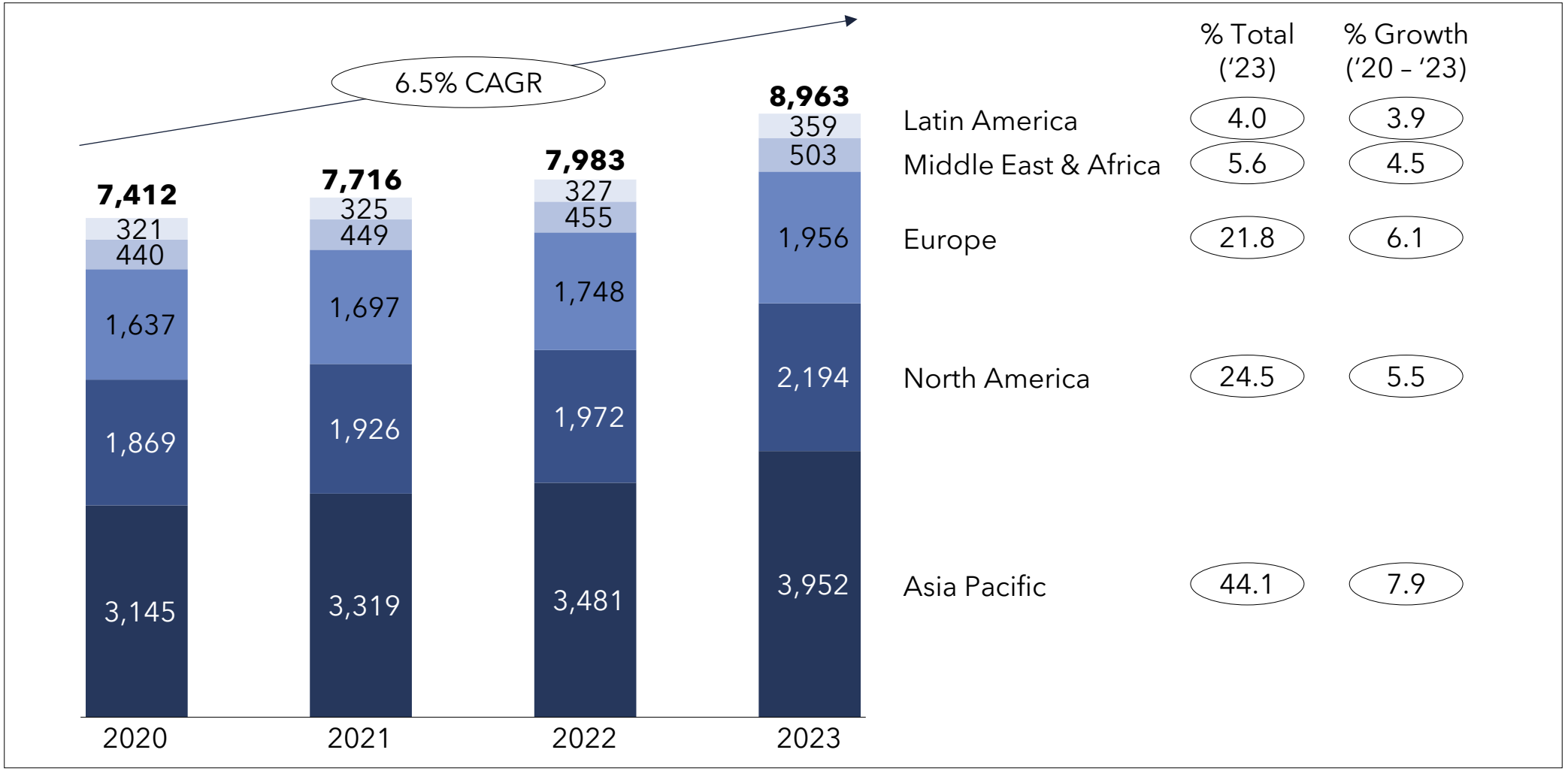
Source: PASB Analysis

Logistics.

The global logistics market has historically seen ~7% growth p.a., driven by the Asia Pacific region…

Logistics Market Revenue by Region (2020 – 2023)

USD Billion

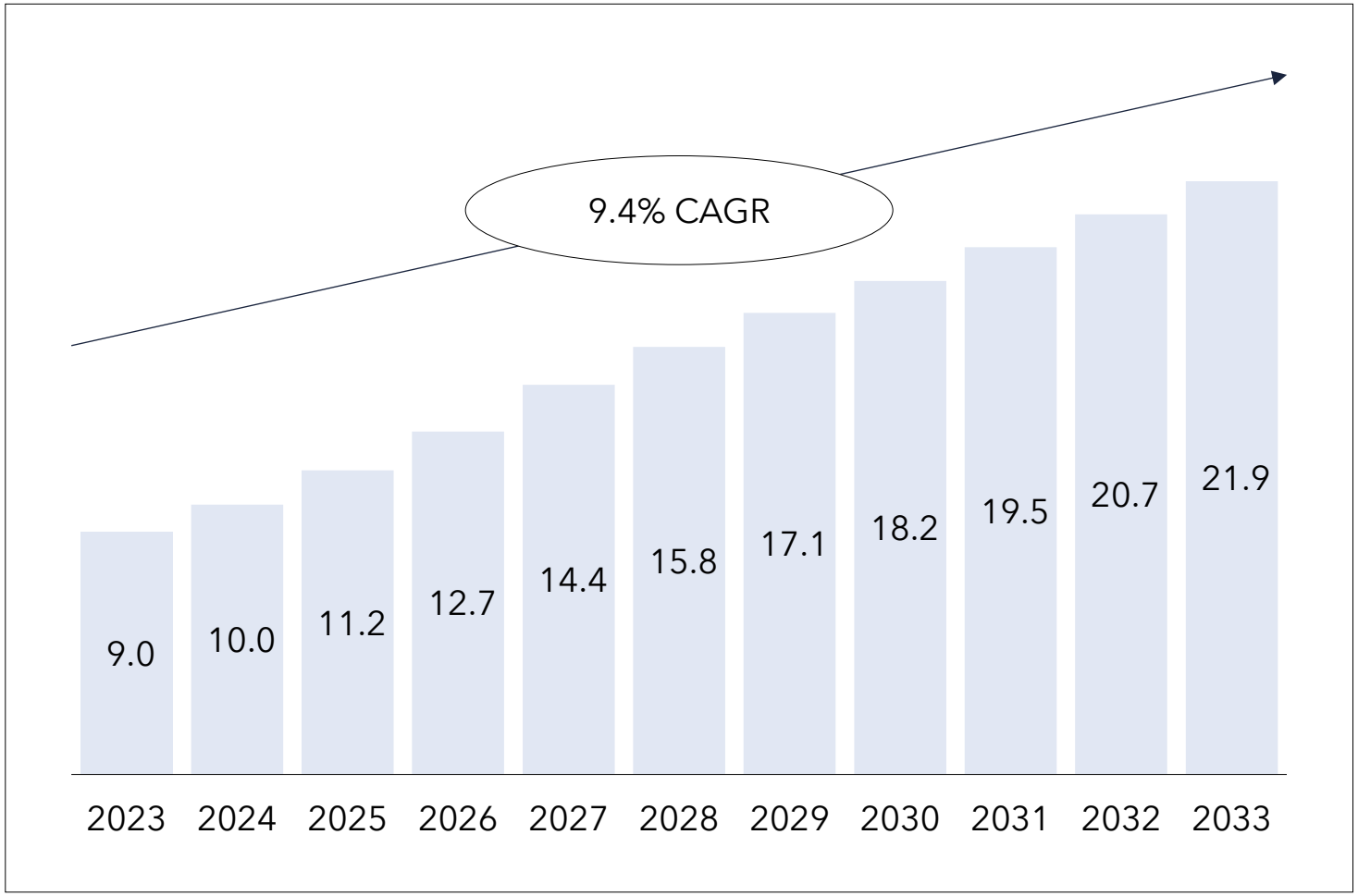


Source: Precedence Research

...and is projected to grow ~9% p.a.; Market is estimated to be worth ~USD22 Trillion by 2033, driven by e-commerce, technology adoption and rapid regional economic growth

Global Logistics Market (2023 – 2033)

USD Trillion



Details

- Rapid regional economic growth driven mainly by China and India, drives **uplift of production and trade**, which can boost demand for logistics services
- Growth of the **e-commerce industry** can lead to greater demand for warehousing, transportation and last-mile delivery services
- Increasing investment by governments:
  - Improvement of **transportation infrastructure**
  - Enhancement of **capacity and efficiency** of logistics networks via digitalisation and automation (e.g., IoT, AI, etc.)

Source: PASB Analysis

Johor's logistics industry represents ~4% of the state's GDP and has grown at a decent 7% per annum

GDP by Economic Activity at Constant 2015 Prices (2023)
RM Billion

			% Total (2023) Percentage	CAGR (2015 – 2023) Percentage
Agriculture	Crop	11.7	8%	1%
	Livestock	4.4	3%	4%
	Forestry and logging	0.0	~0%	-7%
	Fisheries	1.1	1%	-1%
Mining	Mining and quarrying	0.7	~0%	5%
Manufacturing	Vegetable and animal oils & fats, food processing,…	5.7	4%	3%
	Textiles, wearing apparel and leather products	1.9	1%	5%
	Wood products, furniture, paper products and printing	5.2	3%	5%
	Petroleum, chemical, rubber and plastic products	9.4	6%	5%
	Non-metallic mineral products, basic metal and…	5.5	4%	1%
	Electrical, electronic and optical products	14.8	10%	6%
	Transport equipment, other manufacturing and repair	1.6	1%	0%
Construction	Construction of buildings	1.9	1%	-9%
	Civil engineering	1.7	1%	-5%
	Specialised construction activities	0.8	1%	1%
Services	Utilities, transportation & storage and information &…	21.4	14%	7%
	Wholesale and retail trade, F&B and accommodation	23.1	16%	5%
	Finance and insurance, real estate and business…	14.9	10%	4%
	Other services	7.6	5%	4%
	Government services	13.0	9%	5%
Import Duties	Plus: Import duties	1.7	1%	4%
	GDP at purchasers' prices	148.2		

Focus

Using transportation & storage as proxy data, logistics GDP contribution is estimated to be **RM6.2bil or 4.1% of state GDP[1]**

Note: [1]"Transportation & storage" sub-segment's contributions were used to estimate logistics GDP contribution to the state. Under "Utilities, transportation & storage and information & communication" segment, excluding "utilities" and "information & communication" sub-segments mean remaining sub-segments represent ~29% of segment total (Estimated based on national average).
Source: DoSM, PASB Analysis

In 2023, Johor recorded the 3rd highest trade value in Malaysia and has seen 8% p.a. growth, outpacing national trade growth

Total Trade Activities by State (2023)

RM Billion

		% Total	CAGR ('18 – '23)
Pulau Pinang	697.7	26.6	8.2
Selangor	574.9	22.0	5.4
Johor	561.6	21.4	8.0
Kuala Lumpur	157.9	6.0	7.2
Sarawak	142.4	5.4	6.2
Kedah	126.9	4.8	15.5
Negeri Sembilan	71.1	2.7	6.8
Melaka	70.8	2.7	1.4
Perak	66.2	2.5	2.4
Pahang	56.8	2.2	16.1
Sabah	41.5	1.6	-1.2
Terengganu	22.8	0.9	-2.2
Labuan	19.1	0.7	15.0
Kelantan	6.5	0.2	1.3
Perlis	2.8	0.1	-1.0
Total	2,618.6		7.0

Source: DoSM

Details

- Johor recorded the **3rd highest total trade activity** nationally, represents **21% of Malaysia's total trade activity**
- Recorded historical growth of **8% p.a., outpacing national CAGR of 7%**
- Growth in total trade activity **indicates demand growth for logistics services**

Diving deeper, Johor is the 2nd largest exporter and importer in Malaysia, driven by its proximity to Singapore, diverse economic base and robust infrastructure

Johor is the country's 2nd largest exporter, representing 20% of Malaysia's exports…

Merchandise Export By State (2023)
RM Billion

		% Total
Pulau Pinang	447.4	32
Johor	290.0	20
Selangor	252.7	18
Sarawak	111.6	8
Kuala Lumpur	66.2	5
Kedah	61.2	4
Pahang	32.7	2
Perak	32.4	2
Sabah	31.1	2
Melaka	29.2	2
Negeri Sembilan	26.4	2
Labuan	16.1	1
Terengganu	15.8	1
Kelantan	4.1	~0
Perlis	1.4	~0
Total	1,418.4	

…it also ranks 2nd from an import standpoint, importing 23% of the country's imports

Merchandise Import By State (2023)
RM Billion

		% Total
Selangor	322.2	27
Johor	271.5	23
Pulau Pinang	250.3	21
Kuala Lumpur	91.6	8
Kedah	65.6	5
Negeri Sembilan	44.7	4
Melaka	41.6	3
Perak	33.8	3
Sarawak	30.8	3
Pahang	24.0	2
Sabah	10.4	1
Terengganu	7.0	1
Labuan	3.0	~0
Kelantan	2.4	~0
Perlis	1.4	~0
Total	1,200.2	

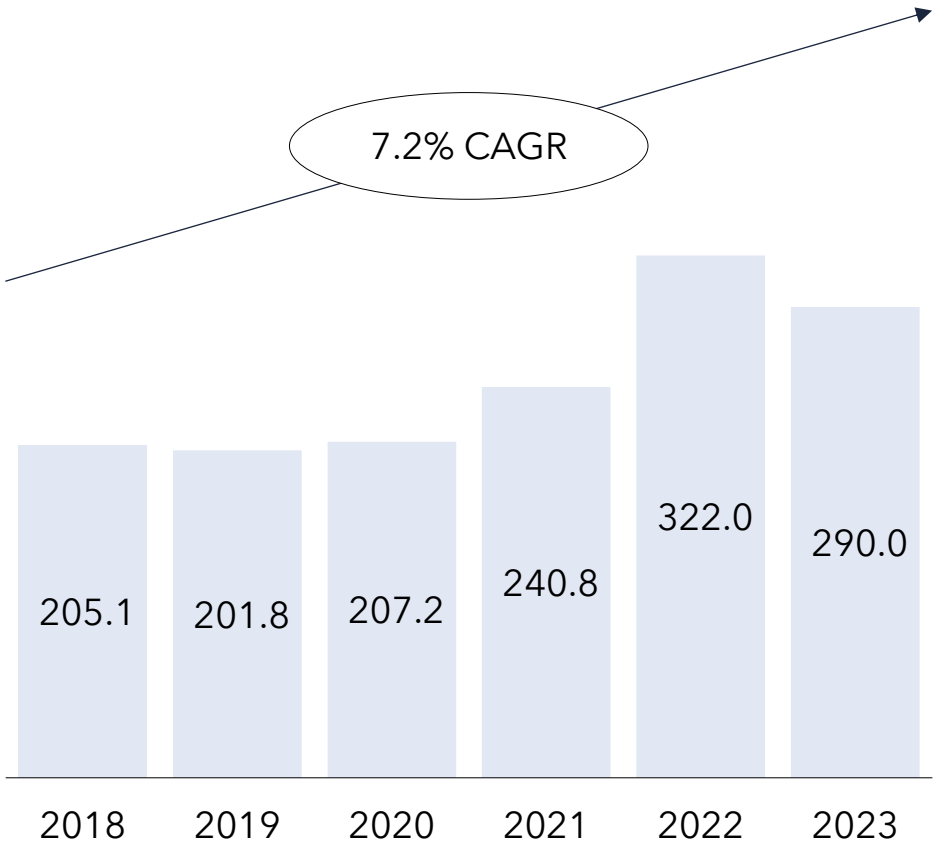
Source: DoSM

Johor's export grew 7%, driven by a mix of commodities; Refined petroleum product is the top export commodity

Johor's export grew ~7%, ending 2023 with an export value of RM290bil...

Johor's Merchandise Export (2018 – 2023)

RM Billion



...driven by a mix of commodities, with refined petroleum products taking the lead, representing 29% of total exports

Merchandise Export By Top 5 Commodities (2023)

RM Billion

ILLUSTRATIVE

Refined petroleum products — 83.6 — % Total: 29

Electronic integrated circuits — 28.0 — % Total: 10

Other E&E products — 21.7 — % Total: 7

Palm oil — 11.4 — % Total: 4

Palm based oleochemical — 7.4 — % Total: 3

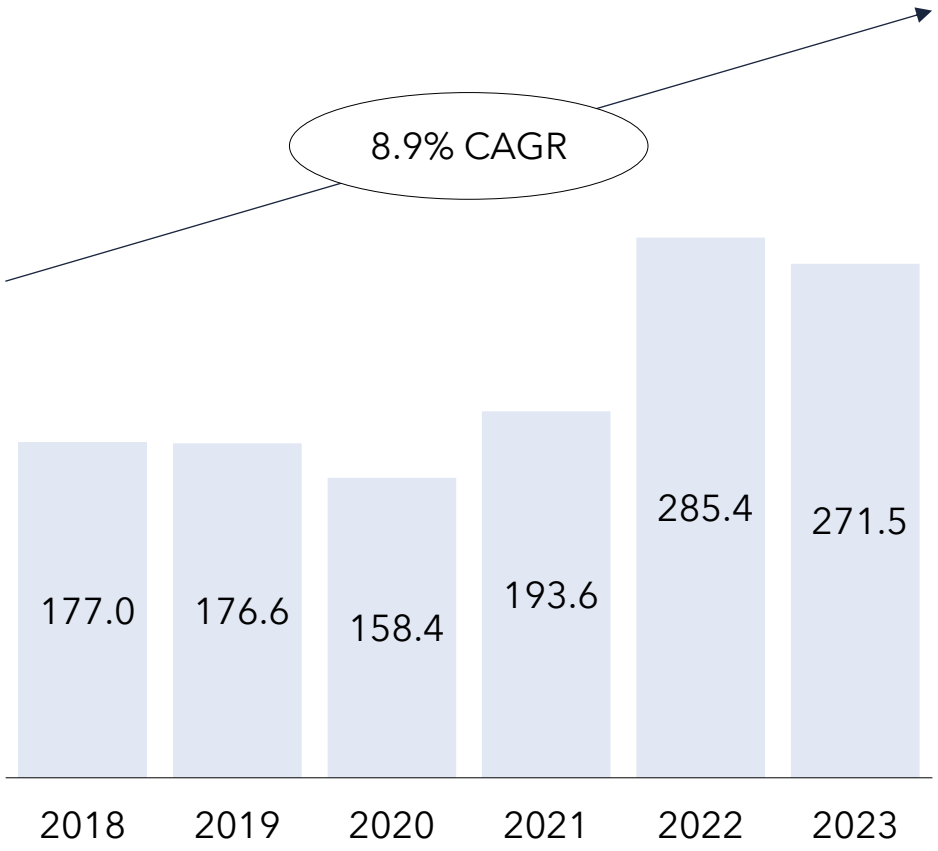
Source: DoSM

Whereas imports grew 9%, also driven by a mix commodities; Refined petroleum product is also the top import commodity

Johor's import grew ~9%, ending 2023 with an export value of RM271bil...

Johor's Merchandise Import (2018 – 2023)

RM Billion



...driven by a mix of commodities, with refined petroleum products taking the lead, representing 29% of total imports

Merchandise Import By Top 5 Commodities (2023)

RM Billion

ILLUSTRATIVE

Refined petroleum products — 79.3 — % Total: 29

Crude petroleum — 38.0 — % Total: 14

Electronic integrated circuits — 23.7 — % Total: 9

Other E&E products — 9.4 — % Total: 3

Electrical apparatus & parts — 4.9 — % Total: 2

Source: DoSM

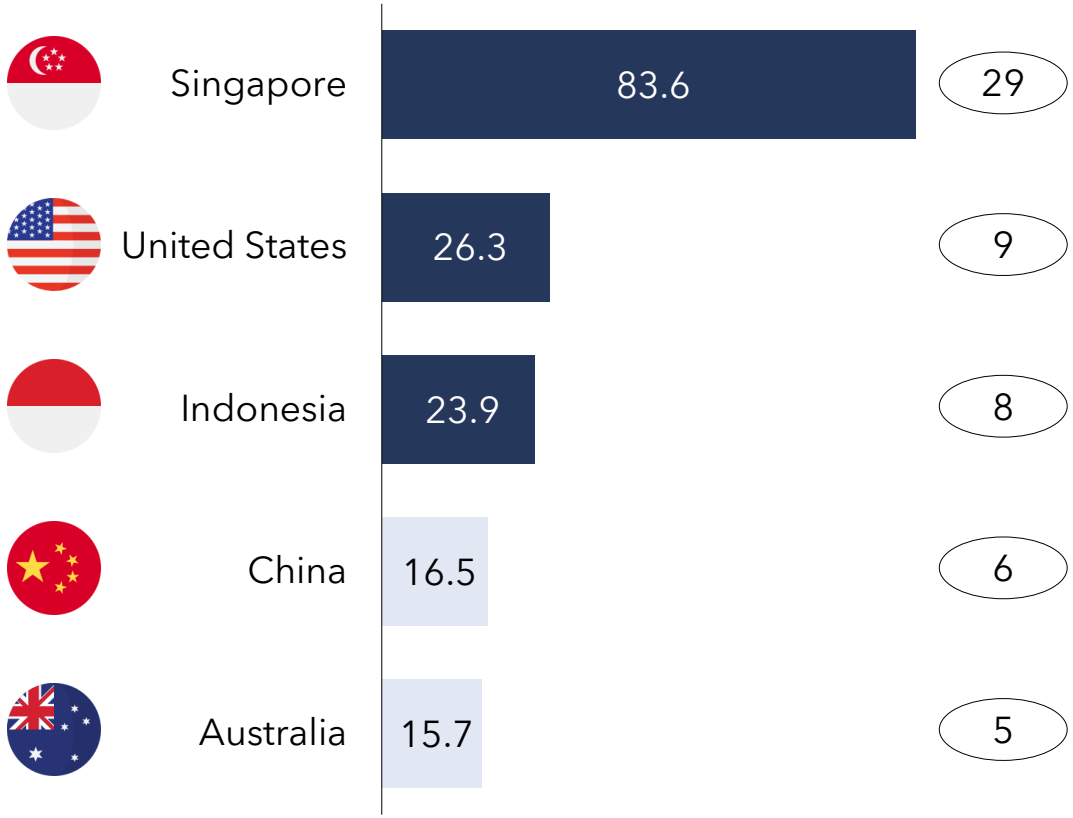
Singapore is Johor's most prominent export and import trading partner, representing almost 30% of exports and 20% of imports

NON-EXHAUSTIVE

Top 3 export partners are Singapore, United States and Indonesia

Merchandise Export By Major Trading Partner (2023)

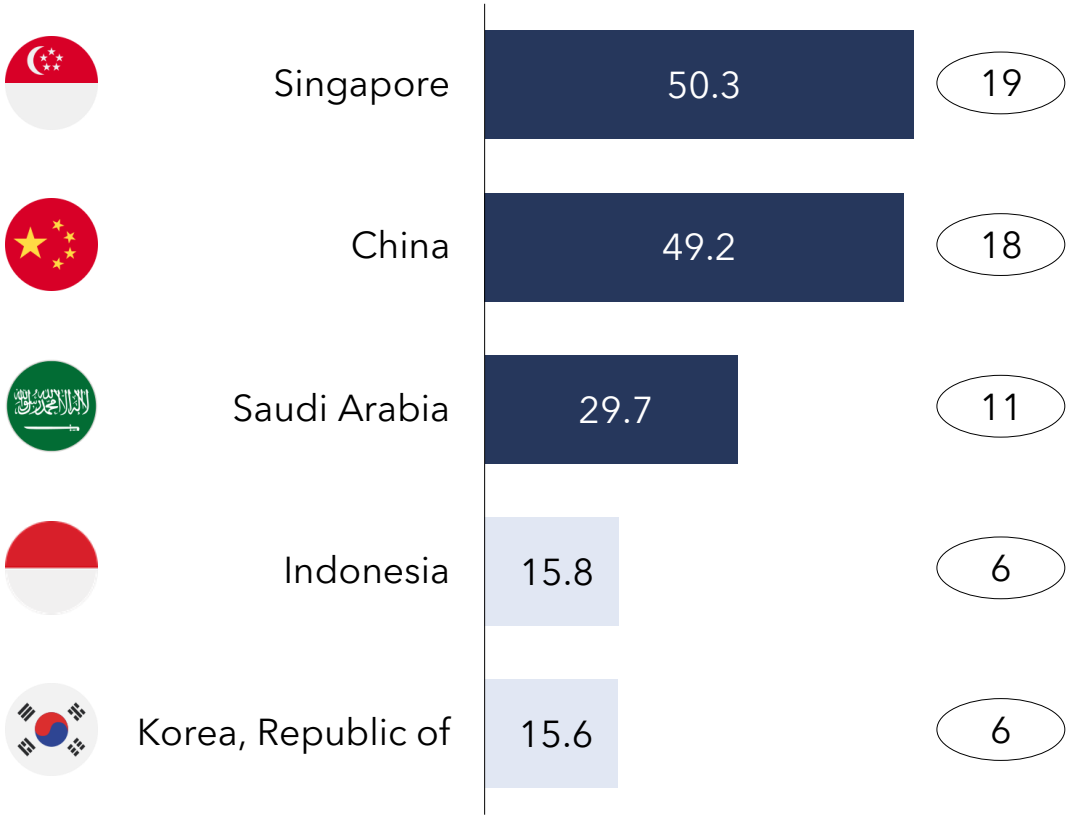
RM Billion



Top 3 import partners are Singapore, China and Saudi Arabia

Merchandise Import By Major Trading Partner (2023)

RM Billion

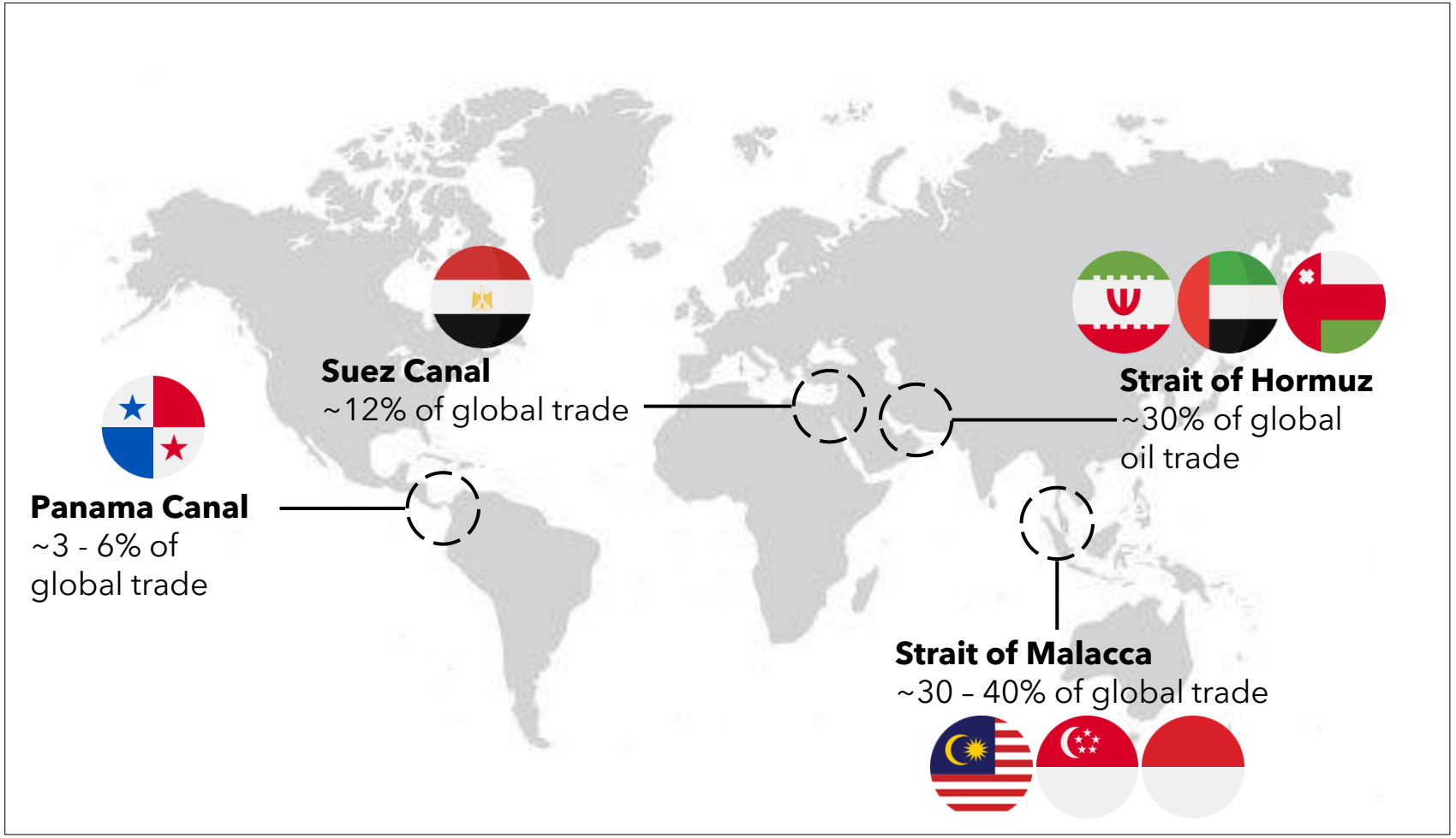


Note: Excluded "Other Countries" category in the prioritisation of top 5 countries
Source: DoSM

Johor is geographically blessed with its strategic location in the Strait of Malacca, a vital maritime corridor representing ~30 – 40% of global trade

NON-EXHAUSTIVE

Selected Maritime Corridors Crucial to Global Shipping



Quick Facts

- **Key shipping channel** between Indian Ocean and Pacific Ocean
- **Shortest maritime route** between Europe and East Asia
- Alternative routes present, but is more **distant and face logistical headwinds**
- One of the **busiest** shipping lanes globally:
  - 94k vessels pass through p.a.
  - USD3.5 trillion worth of trade p.a. (30 – 40% of global trade)

Source: PASB Analysis

Moreover, Malaysia is amongst the top 30 countries in the world and one of the best in Asia for logistics

Logistics Performance Index amongst Countries in Asia (2023)

		Global Ranking
Singapore	4.3	1
Hong Kong	4.0	7
Japan	3.9	13
South Korea	3.8	17
China	3.7	19
Malaysia	3.6	26
Thailand	3.5	34
India	3.4	38
Philippines	3.3	43
Vietnam	3.3	43
Indonesia	3.0	61
Sri Lanka	2.8	73
Bangladesh	2.6	88
Mongolia	2.5	97
Cambodia	2.4	115
Lao	2.4	115
Afghanistan	1.9	138

Source: World Bank

Malaysia VS Selected Countries (2023)

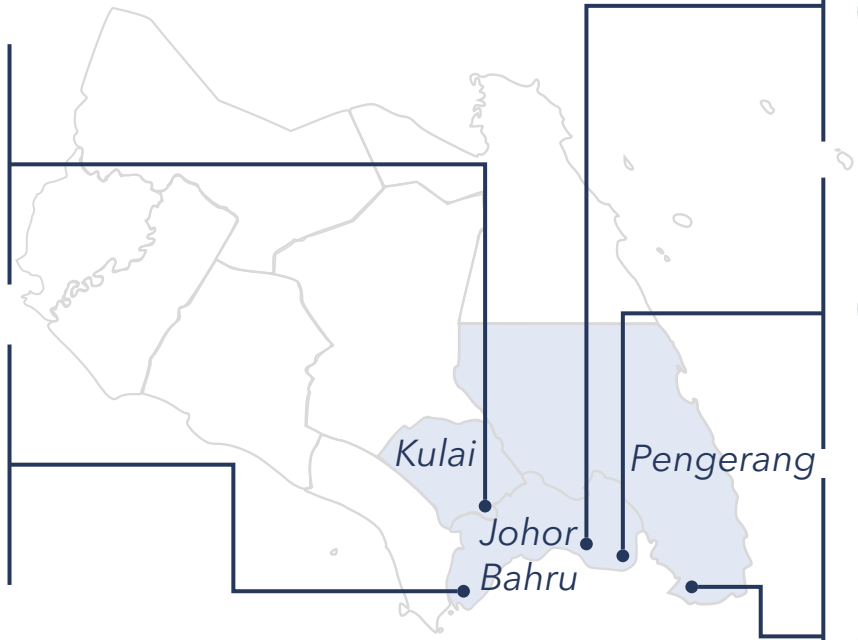
	Malaysia	Singapore	Hong Kong
Customs Score	3.3	4.2	3.8
Infrastructure Score	3.6	4.6	4.0
International Shipment Score	3.7	4.0	4.0
Logistics Competence and Quality Score	3.7	4.4	4.0
Timeliness Score	3.7	4.3	4.1
Tracking and Tracing Score	3.7	4.4	4.2

Leveraging its strategic location, the development of major ports has laid the foundation for Johor's comprehensive logistics ecosystem, facilitating global trade…

Major Ports in Johor

Senai International Airport
Air cargo hub handling perishables, dangerous goods, odd-sized cargo

Pelabuhan Tanjung Pelepas (PTP)
Major container transshipment hub with deep-sea connectivity



Johor Port Berhad
Integrated multi-purpose port; World's largest edible oil terminal and LME-certified metal storage

Tanjung Langsat Port (TLP)
Specialised port focused on liquid bulk (e.g., petrochemicals and LNG)

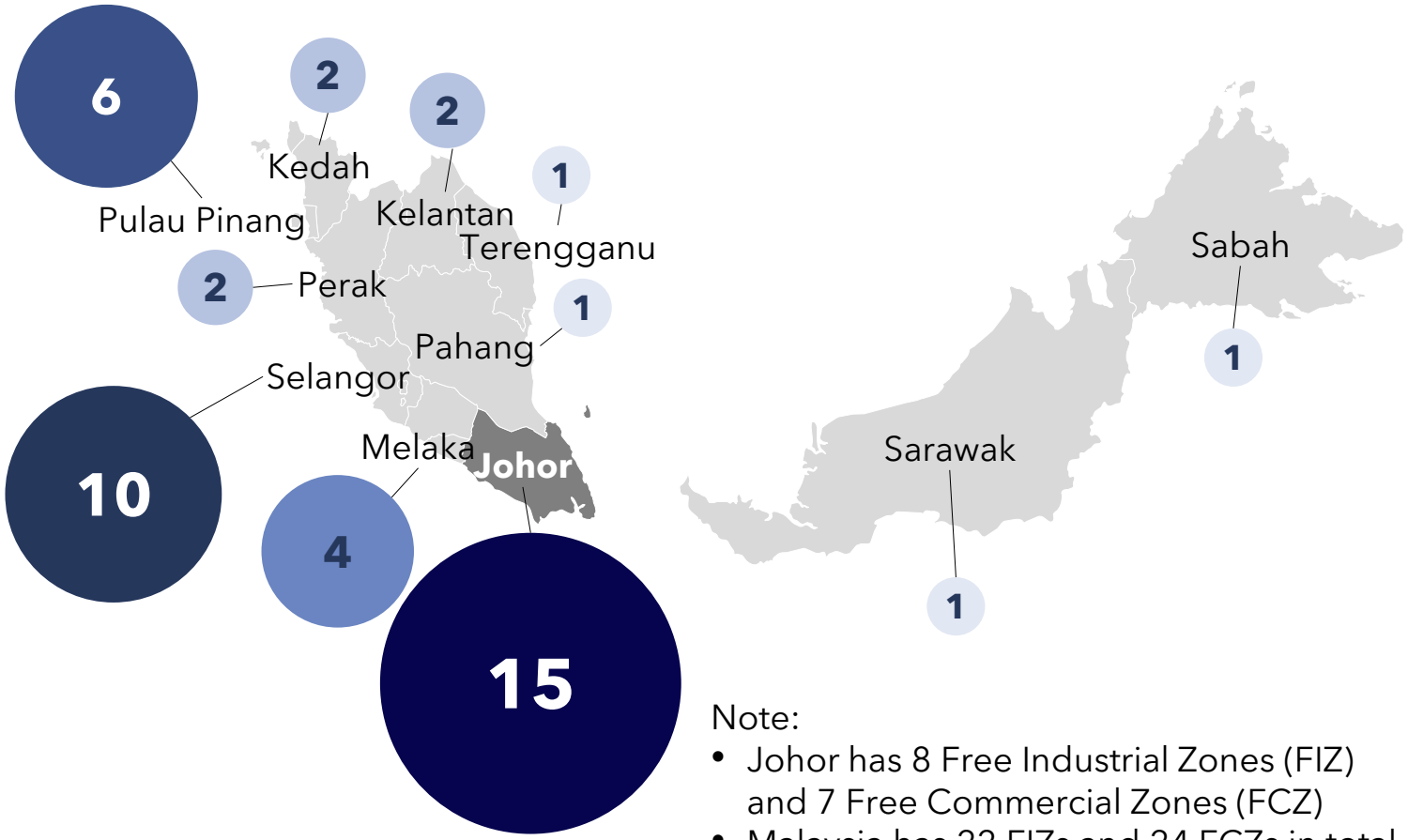
Pengerang Terminals (PTSB)
Deep-water terminals for crude oil, refined products and petrochemicals, anchored by Pengerang Integrated Complex (PIC)

These ports also serve surrounding Free Zones and industrial estates (e.g., Senai and Pasir Gudang); which also have other logistics players supporting various parts of the logistics value chain

Note: There are upcoming logistics infrastructure not captured here (e.g., Maharani Energy Gateway Deep Sea Port)
Source: PASB Analysis

...and is enabled by Free Trade Zones (FTZ); Johor has the most FTZs in the country, which positions the state well to attract businesses and facilitate global trade activities

Free Trade Zones in Malaysia by States, Number of Free Trade Zones



Note:
- Johor has 8 Free Industrial Zones (FIZ) and 7 Free Commercial Zones (FCZ)
- Malaysia has 22 FIZs and 24 FCZs in total

Further Details

- **Definition of Free Trade Zone (FTZ):**
  - Special area where goods can be brought in, stored, made into products, or changed, and then sent out again without paying customs taxes or going through the usual customs checks right away
  - FTZs are normally located near ports
  - Objective is to allow businesses to trade more easily, lower costs, attract investments via simplification of rules and reducing taxes
  - Taxes and duties apply only when goods leave the zone

- **Different types of Free Trade Zone (FTZ):**
  - **Free Industrial Zone (FIZ):** Area where manufacturers import raw materials and manufacture goods for export (i.e., more for export-oriented manufacturing businesses)
  - **Free Commercial Zone (FCZ):** To promote commercial and trade activities, (e.g., warehousing, repackaging, re-export, and trading activities excluding retail)

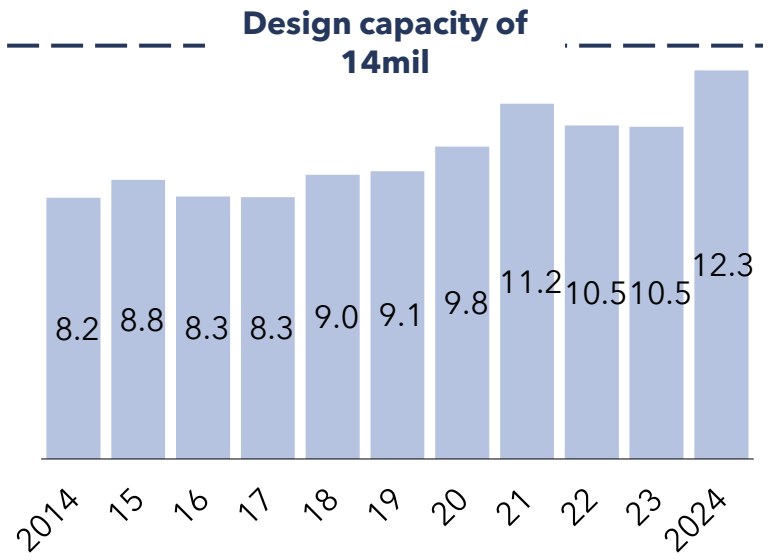
Note: Information as of 2024
Source: DHL, PASB Analysis

PTP is a major transshipment hub serving Southeast Asia region; It is the 15th busiest container port and is the 5th most efficient globally

PTP Quick Facts

- Major transshipment hub for Southeast Asia (90% of throughput is transshipment)
- Malaysia's most advanced container terminal
- 15th busiest container port globally, 5th most efficient in the world
- 4 berths, totaling approximately 5.04 km in linear wharf design
- Pelepas Free Zone covers 1,600 acres, housing over 40 companies that employ around 11,000 people, contributing approximately RM2.9 billion in investments

TEUs Handled by PTP (2014 – 2024), Million



- Steady 4.1% growth p.a., (2014 – 2024) and handled 12.3mil in 2024
- Based on 2024 figures, translates to 88% of design capacity
- PTP slated for expansion to grow container operations to serve growing demand

Key Features

57
Super-Post Panamax Cranes

206
Electric Rubber Tyred Gantry Cranes

572
Prime Movers

743
Trailers

31
Empty Handlers

4
Reach Stackers

Source: MoT

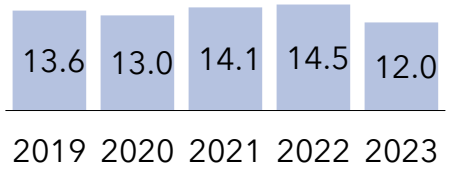
Johor Port is a multi-purpose port that mainly handles liquid bulk cargo; It has the world's largest edible oil terminal and is the regional hub for LME[1] cargo

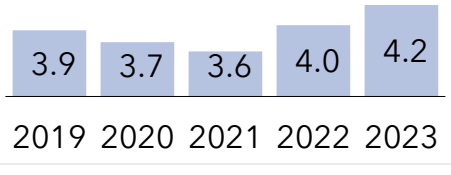
Johor Port Quick Facts

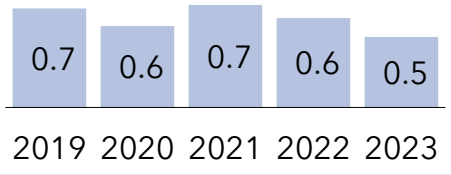
- Located in Pasir Gudang, Johor, Malaysia, at the southern tip of Peninsular Malaysia
- Commenced operations in 1977 and is recognised as Malaysia's original Southern Gateway Multi-Purpose Port
- Johor Port operates over 1,000 acres, with 660 acres designated as a Free Zone
- 24 berths with total berthing length of 4.9km
- World's largest terminal for edible oil
- LME cargo regional hub

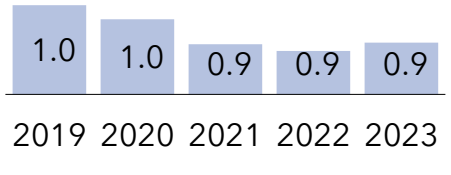
Throughput by Cargo Type

Cargo Type	Throughput (2019 – 2023)	CAGR (2019 – 2023)	% Capacity (2023)
Liquid Bulk	**Volume Handled**, Million FWT	-8%	80%
Dry Bulk	**Volume Handled**, Million FWT	2%	53%
Break Bulk	**Volume Handled**, Million FWT	-3%	24%
Container	**TEUs Handled**, Million	-3%	65%









Note: [1]London Metal Exchange
Source: Johor Port, MoT

Tanjung Langsat Port is an industrial port that caters to the logistical needs of businesses mainly in the oil and gas industry

NON-EXHAUSTIVE

Tanjung Langsat Port Quick Facts

- Strategically located next to the Tanjung Langsat Industrial Complex, approximately 5,000 acres, providing excellent access to logistics and transportation
- An industrial port designed to accommodate heavy and medium industries, including petrochemicals, chemicals, and logistics-related businesses
- Plays a pivotal role in attracting substantial investments, with reported investments totaling around RM34 billion, creating over 15,500 jobs in the region

Key Features

Liquid Storage
Handling and storage of petroleum products, petrochemicals, edible oils

Regional Marine Supply Base
Up to 100 acres, providing offshore oil and gas industry support

Liquid Storage Capacity by Storage Terminal, Cubic metres

Dialog Terminals Langsat 1	476,000
Dialog Terminals Langsat 3	205,777
Dialog Terminals Langsat 2	171,000
Musim Mastika Oils & Fats	70,200
Langsat Bitumen Terminal	70,000
Langsat Bulkers	47,400
Norman Process Oil Malaysia Plant	43,000
Menajaya Oil & Fats	20,300
Total	1,103,677

Source: Tanjung Langsat Port

Pengerang Deepwater Terminals is a next-generation port and storage terminal; Aims to become a regional downstream hub for oil, gas and petrochemical industries

NON-EXHAUSTIVE

Pengerang Deepwater Terminals Quick Facts

- Spans about 1,200 acres with 3 terminal facilities (Phase 1, 2, 3A)
- Deepwater port capable of accommodating Very Large Crude Carriers (VLCCs) and Q-Max LNG carriers
- Established Pengerang Independent Terminals via joint-venture:
  - Royal Vopak
  - Dialog Group
  - Johor state

Storage Capacity by Phase

Phase	**Size,** Acres	**Product**	**Storage Capacity,** cbm
Phase 1 Pengerang Independent Terminals	150	Crude and clean petroleum products	1.7mil
Phase 2 Pengerang Terminals (Two) and Pengerang LNG	157	Crude, refined products, petrochemicals, liquefied petroleum gas (LPG)	1.3mil
		Liquefied Natural Gas (LNG)	400,000
Phase 3 "One Stop Integrated Terminal" (Currently being developed)	~300	Middle distillates (Based on current development)	430,000 (Based on current development)

Source: Pengerang Deepwater Terminals

Senai Cargo Terminal is Johor's sole air logistics entry and exit point, and is slated for further enhancement and expansion

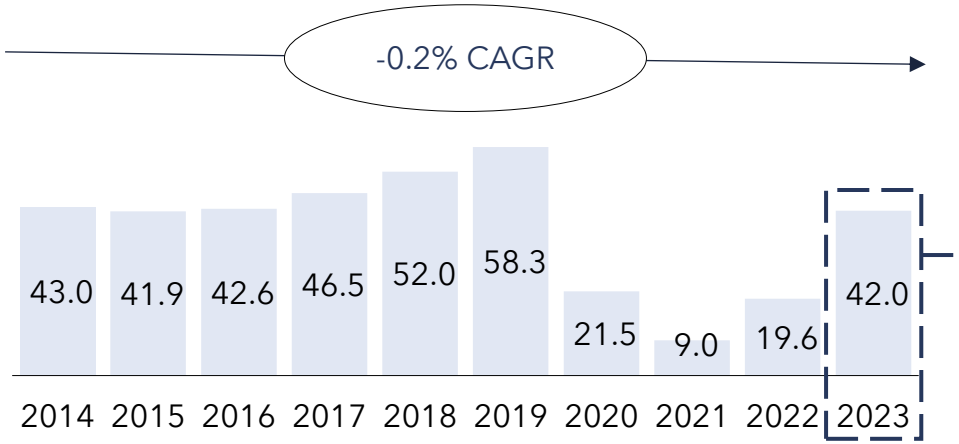
NON-EXHAUSTIVE

Senai Cargo Terminal Quick Facts

- Built-up area of ~3,600 square metres
- Can handle up to 80,000 tonnes of cargo per annum
- Equipped with dedicated dangerous goods area, build-and-break area, and temperature-controlled storage for perishables
- One-stop customs clearance facility to streamline cargo processing
- Senai Airport Free Industrial Zone (SAFIZ) covers 107.4 acres

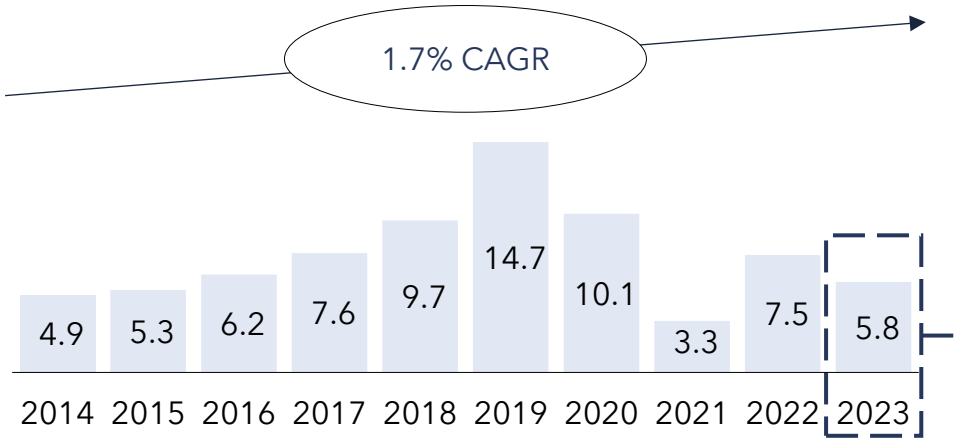
Selected Operating Metrics

Commercial Aircraft Movements (2014 – 2023), Thousand



- While 2023 figures have more than doubled since 2022, it is still ~72% of 2019 (Pre-COVID) figures
- According to this indicator, may suggest that Senai Airport has yet to recover from COVID-19 impacts

Cargo Handled (2014 – 2023), Tonnes (Thousand)



Cargo Handled (Actual VS Design), Tonnes (Thousand)

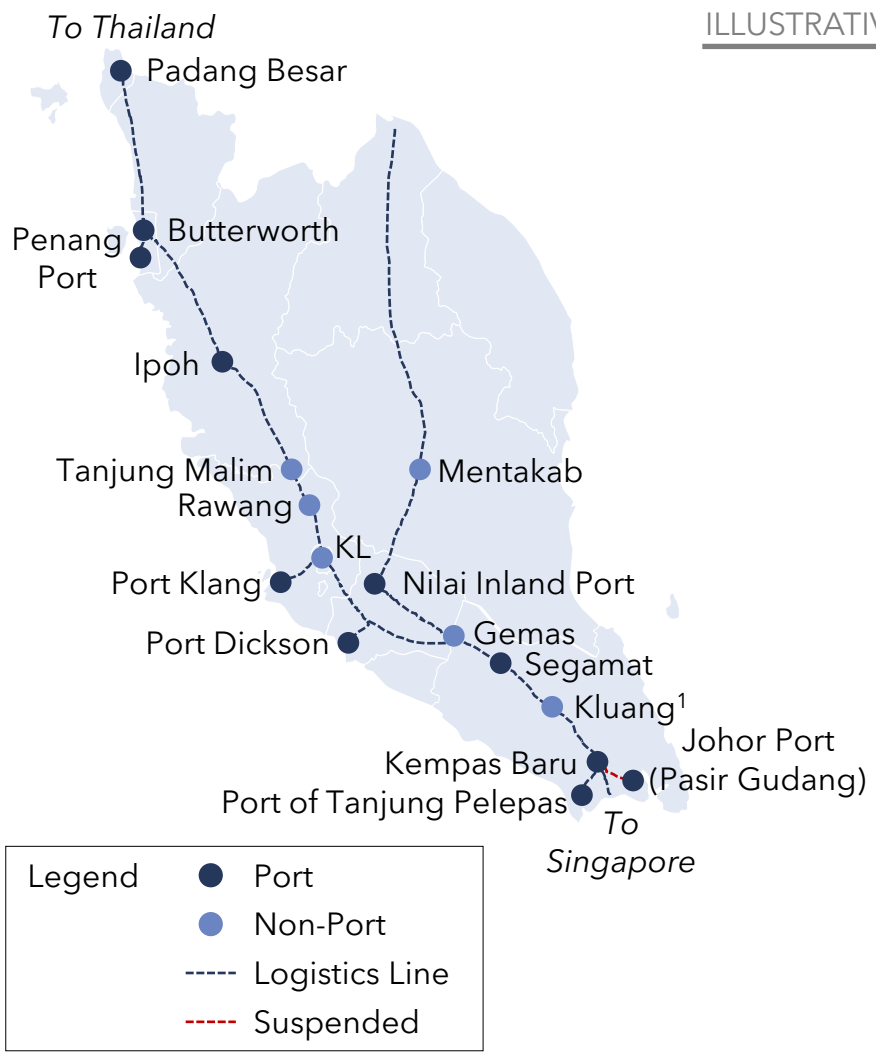
~7% of capacity

Cargo Handled (Int. VS Dom.), Percentage of Total

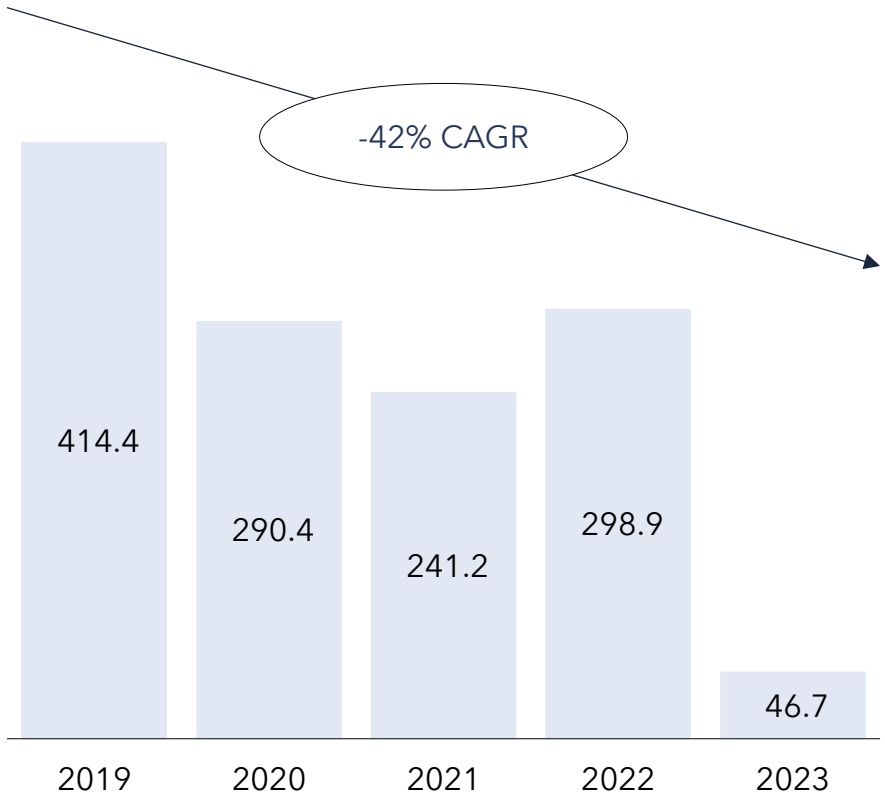
Source: Senai Airport, MoT

While major ports across Peninsular Malaysia are well connected via logistics rail lines, Johor has seen rapidly declining rail cargo throughput, possibly due to poor track conditions

KTMB Cargo Network Across Peninsular Malaysia



Rail Cargo Throughput in Johor, Metric Tonne (Thousand)



Further Details

Rail cargo throughput declined possibly due to:

- Poor track conditions which may have forced trains to travel at lower speeds due to derailment risks
- Shippers thus shifted towards truck logistics solutions, despite congestions
- As an example, suspension of the crucial cargo-only rail line between Kempas Baru and Johor Port (40km long) by the Land Public Transport Agency (APAD) in 2024 due to poor track conditions, reinforcing the hypothesis

Note: Kluang integrated to rail logistics line
Source: The Star, KTMB, MoT, PASB Analysis

IBTEC is a 7,290-acre smart and sustainable industrial township in Johor where one of its core priorities would be to advance Johor's smart logistics and warehouse capabilities

IBTEC Quick Facts

- 7,290 acres with RM27bil Gross Development Value (GDV)
- Township in **Sedenak**, focusing on technology, sustainability and high-quality urban living
- Overall development by **JLand Group Sdn Bhd (JLG)**
- Consists of:
  - **Sedenak TechPark (STeP)**, which is a major data centre hub
  - **Discovery City**, which spans 582 acres, being developed by Zaha Hadid Architects (ZHA)
- Multi-phase development which started in 2014, to be completed by 2047

Priority Sectors

- Advanced E&E
- Medical & Pharmaceutical Manufacturing
- Robotics, Drone & AI Technology
- Data Centres & Cybersecurity
- Solar Farm & Co-Gen Facility
- Food Technology
- Smart Logistics & Warehousing
- Residential & Commercial

Note: [1]Ibrahim Technopolis
Source: Maju Johor 2030, JCorp Integrated Annual Report 2022

The state has also identified Kluang as a strategic priority, with plans to develop it into a key logistics hub in Johor, supported by the development of major infrastructure projects

Key infrastructure development projects announced to improve connectivity…

Gemas – Johor Bahru Electrified Double Track (192km electrified rail services) – *Expected to launch Aug 2025*

Widening of roads and expressways (PLUS highway)

Construction of 2.1km long bypass (Alleviates congestion, benefits 30,000 vehicles daily)

…which can position Kluang to become a prominent logistics hub in Johor

"***Kluang set to become Johor's next logistics powerhouse*** *with major infrastructure boost, including electrified rail and highway upgrades*"

Yang Amat Berhormat
Dato' Onn Hafiz bin Ghazi,
Menteri Besar Johor

Source: PASB Analysis

The Maharani Energy Gateway project will be equipped with a deep-sea port to serve its energy hub and will subsequently uplift Johor's logistics industry

While the Maharani Energy Gateway project primarily caters to the energy sector…

- Sea reclamation project located near **Muar**
- **3 artificial islands**, **1,295 hectares** in total
  - Island A: Oil and gas storage and deep-sea port operations
  - Island B: Petrochemical plant
  - Island C: Ship repair facilities
- When realised, it will be a strategic **energy hub** with a **deep-sea port**
- Memorandums of Understanding (MoU) signed on **29th January 2024**

…its deep-sea port facilitates trade and movement of goods, which uplifts the logistics industry

Quick Facts

RM9.5bil
Investment secured

45,000
Job opportunities

60bil
Barrels of storage space

Key Facilities

- Combined Cycle Gas Turbine (CCGT) powerplant
- Green hydrogen and green ammonia production facilities
- O&G storage, petrochemical plants
- Ship maintenance facilities

Source: Maju Johor 2030, Maharani Energy Gateway

With its well-established ecosystem, Johor evidently offers comprehensive logistics services across the value chain, with strong private sector participation

Logistics Services	Description and Service Offerings	Availability in Johor
Port and Terminal Services	Cargo handling, vessel berthing, and temporary storage to ensure smooth import/export flows and intermodal transfers	✓
Freight Forwarding	Coordinating shipments, customs clearance, and documentation across transport modes to streamline cross-border trade compliance	✓
Warehousing and Storage	Providing secure storage, inventory management to optimise stock availability and handling	✓
Transportation Services	Moving goods via road, rail, air, or sea, including last-mile delivery and multimodal logistics to connect global supply chains efficiently	✓
Contract Logistics	End-to-end supply chain outsourcing, integrating warehousing, transport, and technology for seamless client-vendor coordination	✓
Distribution and Fulfilment	Managing order processing, rapid delivery networks, and reverse logistics; Usually to meet e-commerce and retail demands	✓
Specialised Logistics Services	Handling unique cargo needs like temperature-sensitive goods, hazardous materials, or halal-certified products with compliance-driven protocols	✓
Other Services	Value-added services (packaging, quality check) and ancillary services (insurance, trade finance)	✓

Example Companies

NON-EXHAUSTIVE

PTP, JohorPort, SX GROUP, SenaiAirport, TLP Terminal (A JCORP Company), DIALOG, maskargo, MAERSK, DHL Group, teleport, Shopee, DB SCHENKER, TIONG NAM (www.tiongnam.com)

Source: PASB Analysis

As other key industries "move up the value chain" and global supply chains become more complex, Johor's logistics industry must also step up to support their growth

Different Types of Logistics Service Provider

As we move from left to right…

- Company has **lesser control** over their own supply chain and **outsources** logistics services more
- More **advanced technology integration and adoption**
- More catered to **larger enterprises** with increasingly **complex global supply chains**
- Johor logistics industry shall mature and cater to these players as we aim to "move up the value chain" in manufacturing sectors

1PL: First-Party Logistics

- Company **self-manages** goods transportation
- Generally, **no technology integration**
- Typically catered to **small-scale businesses** with minimal supply chain complexity

2PL: Second-Party Logistics

- **Outsourcing of transportation services** to logistics provider (i.e., in some instances, may include also storage services)
- **Minimal** technology integration
- Typically used by **manufacturers or exporters**

3PL: Third-Party Logistics

- 3PL company acts as the "middle-man" between company and customers and provides of **a range of logistics services** (e.g., warehousing, inventory management, order fulfilment, transportation)
- **Moderate** technology integration
- While typically used by **small / medium sized enterprises**, some large enterprises also utilise 3PL services

4PL: Fourth-Party Logistics

- 4PL companies are "strategic partners" and can **coordinate multiple 3PLs** and service providers to optimise the **end-to-end supply chain**
- **High** technology integration
- **Large enterprises** who want strategic oversight and end-to-end supply chain management

5PL: Fifth-Party Logistics

- **5PL optimises the full network integration** (streamlining of multiple supply chains into a "system") by leveraging advanced tech
- **High** technology integration, leveraging **advanced technologies** (e.g., AI, IoT, Big Data)
- **Large global / regional enterprises** and **e-commerce companies** with large-scale global networks

Source: PASB Analysis

With the geopolitical landscape growing more uncertain, Johor must develop strategies that align with global trends in order to establish global supply chain resilience

Global trends in the logistics industry

NON-EXHAUSTIVE

01

Growth in 3PL / 4PL / 5PL, Driven by e-Commerce Expansion and Prominence

Outsourcing of logistics and supply chain management functions help with scalability

02

Building Supply Chain Resilience Through Inventory Buffers & Diversification

Emphasis on mitigating supply chain risks and minimising disruptions (e.g., Just-In-Time)

03

Reconfiguration and Reshoring of Global Supply Chains Due to Uncertainty

Geopolitical tensions prompted companies to rethink supply chain strategies

04

Leveraging Omnichannel For Real-Time Visibility Across Supply Chains

Real-time tracking systems to monitor inventory improves customer experience

05

Growing Emphasis on Hiring Skilled Labour to Address Talent Gaps

Logistics industry faces skilled talent shortages necessary to facilitate digital transformation

06

Sustainability Efforts Becoming Central to Reduce Carbon Footprint

Growing emphasis to reduce carbon footprint via eco-friendly practices (e.g., EV, optimisation)

Source: PASB Analysis

Learning from Johor's ever-improving competitors and leading logistics hubs, consistent improvements to the logistics ecosystem is imperative to stay relevant

Case Examples	Key Success Factors	Selected Examples
Case Study 1: Singapore	Continuous investments to enhance port infrastructure, adopt advanced technologies to reduce turnaround time	• Tuas Port being developed into a **fully automated port** with AGVs[1], electrified automated yard cranes, NGVTMS[2]
Case Study 2: Hong Kong	State-of-the-art facilities and efficient customs processes to streamline cargo handling and reduce turnaround times	• HKIA Cargo Data Platform reduces paperwork and expedites clearance process • **Cainiao Smart Gateway Logistics Centre** is largely automated with minimal labour
Case Study 3: FedEx World Hub, Memphis, USA	Centralised operations model (i.e., seamless multimodal goods transfer between air and land freight) with automated sorting systems, which allows for efficient sorting and distribution of goods	• Hubs Operations Command Centre oversees package movements in **real-time** • Six-sided scanning for **accurate package identification** • Comprehensive network of **conveyor belts**

Takeaway

Beyond growing connections and attracting global companies to be based near its hubs, there were also **continuous investments** to improve operational efficiency to reduce turnaround times

Note: [1]Automated Guided Vehicles, [2]Next Generation Vessel Traffic Management System
Source: PASB Analysis

With a seamless, integrated, sustainable, agile logistics ecosystem, Johor can be the preferred logistics gateway into Asia with long-term competitive advantage

Question

"How do we mature Johor's logistics ecosystem and crystallise its reputation as the preferred logistics gateway into Asia with long-term competitive advantage?"

Success Factors

Seamless

Seamless operations by optimising connectivity across land, sea, and air transport. Efficient port productivity at Johor Port and Port of Tanjung Pelepas, combined with low vessel dwell times and streamlined cross-border processes with Singapore, ensure uninterrupted cargo flow

Integrated

Integration is key to Johor's logistics maturity, uniting multimodal transportation. The JS-SEZ exemplifies this by fostering cross-border trade, shared infrastructure, and one-stop investment centres, creating a cohesive logistics network

Sustainable

Reduced carbon emissions and environmental impact, aligning Johor's logistics sector with global sustainability standards. The industry must continuously innovate to ensure sustainable growth, relevance and long-term competitive advantage

Agile

Adaptive strategies in addressing global trade shifts. Swift response to global supply chain disruptions (e.g., Red Sea crisis) can position Johor as a resilient, preferred logistics gateway into Asia

Sea, air, and land logistics each play essential and complementary roles in establishing Johor's logistics ecosystem as the preferred gateway for global trade

NON-EXHAUSTIVE

Sea

Objective

To leverage Johor's deepwater ports to facilitate large-volume, cost-effective international trade and transshipment, supporting Malaysia's role as a global maritime gateway

Focus Areas

Container port capacity expansion and productivity enhancement via digitalisation and automation to gain long-term competitive edge

Air

Objective

To enhance Johor's air cargo connectivity and fundamental capabilities to serve growing high-value industries to stay competitive in regional and global markets

Focus Areas

Air cargo terminal connectivity enhancement, capabilities and productivity enhancement to serve high-value, time-sensitive industries

Land

Objective

To develop specialised, state-of-the-art smart warehouses and distribution centres that integrate seamlessly into global supply chains

Focus Areas

Establishment of regional distribution hubs / smart warehouses and enhance handling of special goods (e.g., dangerous goods, temperature-sensitive, Halal)

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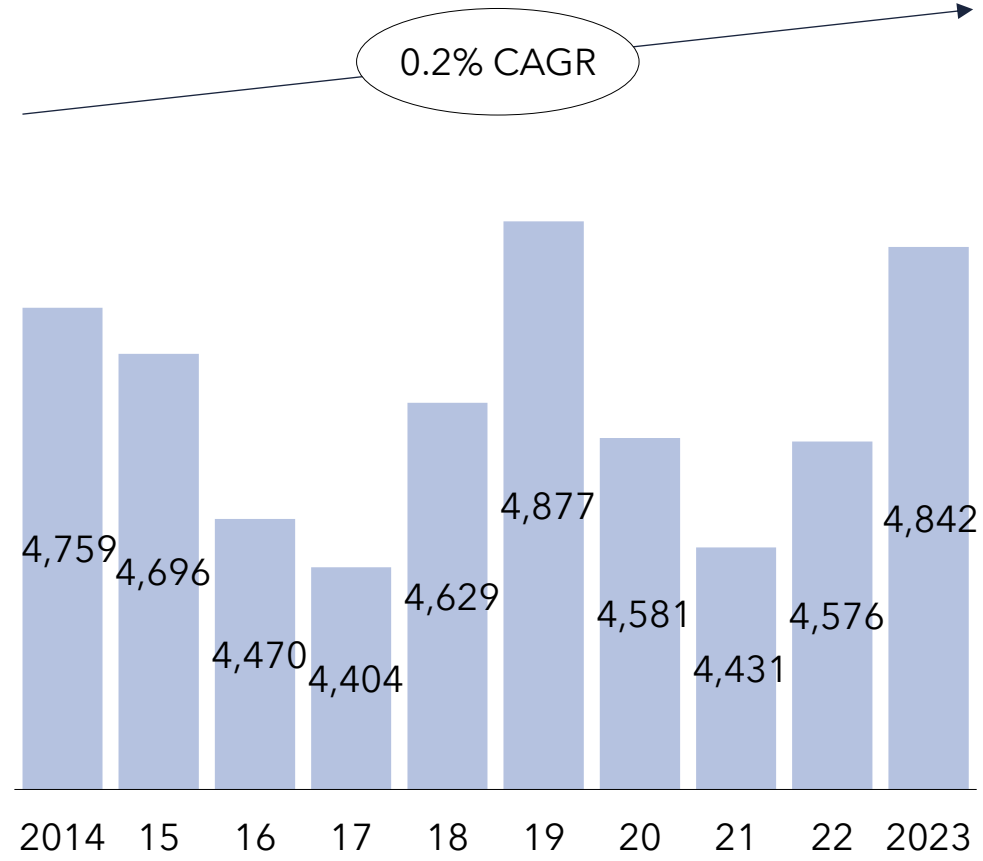
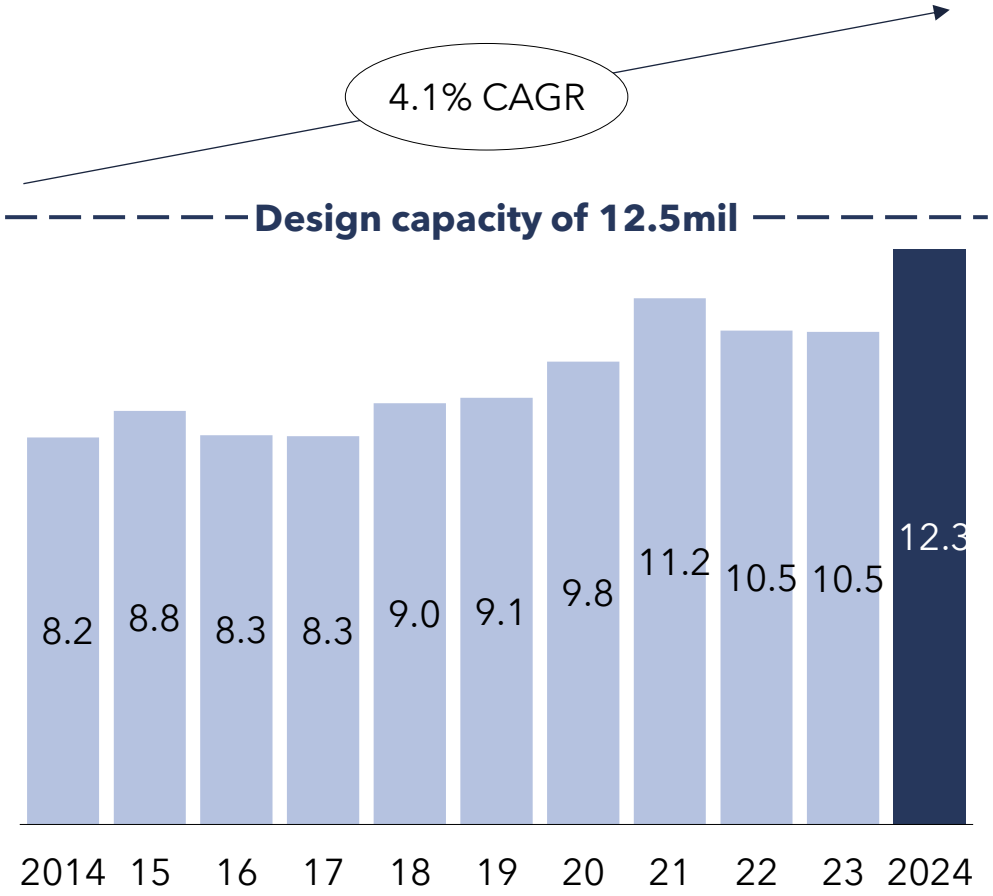
TEUs handled by PTP has grown steadily at ~4% p.a. and has recently handled ~12.3mil TEUs in 2024; It is already operating at 98% capacity, the port requires immediate expansion

Number of Vessels Calling at Port of Tanjung Pelepas (2014 – 2023)



TEUs Handled by Port of Tanjung Pelepas[1] (2014 – 2024), Million



Note: [1]Includes import, export and transshipment
Source: Ministry of Transport

Moreover, according to the Container Port Performance Index (CPPI), PTP is amongst the most productive and advanced ports

Top 10 Ports Based on CPPI Ranking (2023)
Ranking

#1	Port of Yangshan		
#2	Port of Salalah		
#3	Port of Cartagena		
#4	Port of Tanger Med		
#5	Port of Tanjung Pelepas		
#6	Port of Chiwan		
#7	Port of Cai Mep		
#8	Port of Guangzhou		
#9	Port of Yokohama		
#10	Port of Algeciras		

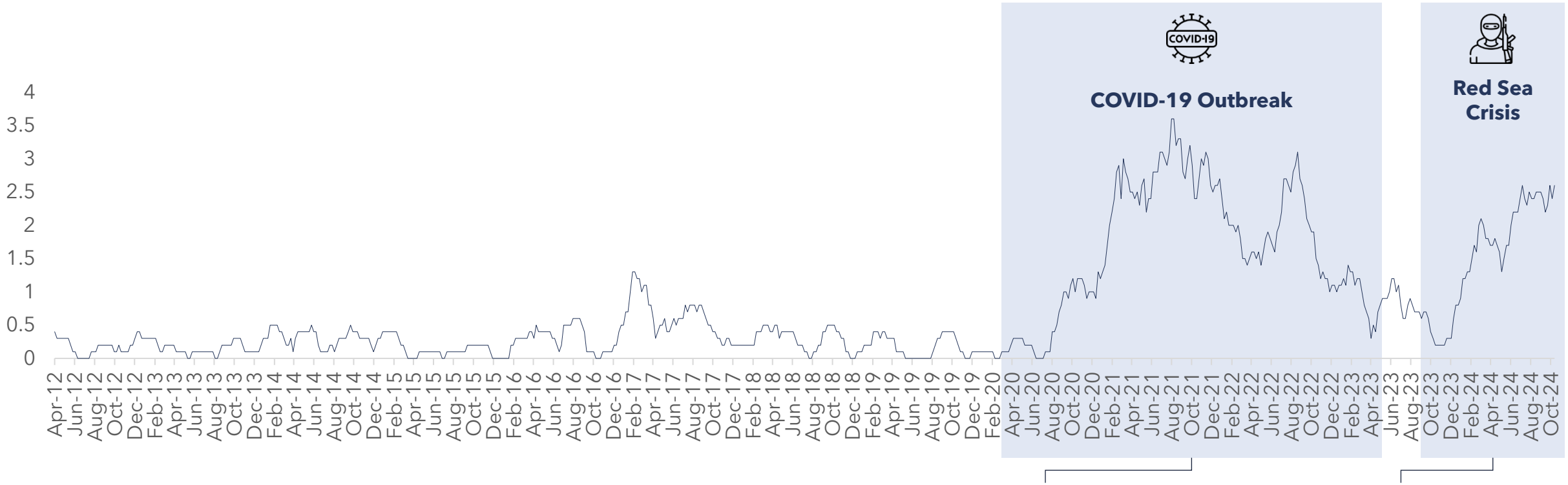
Port of Tanjung Pelepas ranked #5

For comparison purposes, Port of Singapore ranked #17

Source: CPPI

Looking back, COVID-19 and the Red Sea Crisis has caused significant vessel bunching and disrupted global supply chains…

Asia – North Europe Average Vessel Bunching, Number of Services Exceeding Scheduled Service Per Week



COVID-19 Outbreak:
Lockdown and factory closures reduced cargo volumes and port staff availability while shipping lines reduce vessel operations; When restrictions were removed, demand surged, causing bunching

Houthi Attacks, Red Sea Crisis:
Due to attacks, vessels rerouted from the Red Sea to the Cape of Good Hope, which has increased distance and transit time, rerouting and rescheduling caused vessel bunching

Source: Sea-Intelligence

...and has taught logistics players important lessons on how to be more prepared, more agile to mitigate future risks

Key Lessons from COVID-19 and Red Sea Crises

01 **Vulnerability of global maritime logistics**
Prone to sudden shocks attributed to labour shortages, port closures, demand fluctuations

02 **Lack of scenario planning and coordination**
Cooperation amongst governments, port authorities, shipping lines and other stakeholders to maintain operations

03 **Low adoption of technology and digitalisation**
Digital tools such as real-time tracking, contactless operations, and automated clearance procedures

How Ports Can Better Prepare and Mitigate Risks

Establish buffer capacity
Maintaining some excess capacity in berths, equipment, labour can absorb sudden surges

Enhance hinterland connectivity
Improve inland transport to reduce congestion and delays

Strengthen stakeholder coordination and collaboration
Key stakeholders must be aligned to execute crisis management plans; Ports should also have robust protocols ready for various crisis scenarios for rapid, coordinated responses

Leverage digital platforms and automation
Implement smart port technologies to improve productivity (AI-driven scheduling, digital documentation, robotics) and real-time tracking (e.g., IoT)

Source: PASB Analysis

Across the border, the Port of Singapore is the world's busiest and largest transshipment hub, handling ~41mil TEUs per annum

Port of Singapore Quick Facts (2024)

- **World's busiest and largest transshipment hub**
- **Port of Singapore terminals:**
  - Tanjong Pagar
  - Keppel
  - Brani
  - Pasir Panjang
  - Sembawang
  - Jurong
  - Tuas

126K
Vessel Arrivals

622.7 Mil Tonnes
Cargo Throughput

41.1 Mil
TEUs Handled

600
Ports linked to the Port of Singapore

90%
Transshipment Container Throughput, As % of Total Throughput

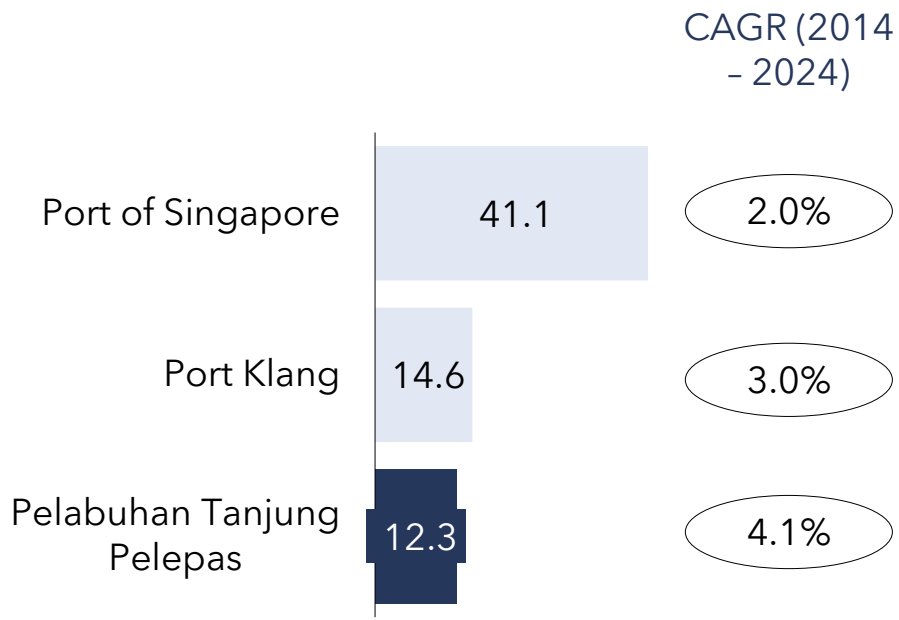
Source: MPA, PSA

What has contributed to its success

- **Global recognition** as the top global transshipment hub
  - Ranked as Asia's top logistics hub for over 10 consecutive years
- **Connectivity and capacity**
  - Extensive network of feeder and deep-sea connections, offers high connectivity to shippers
  - Continually expanded its capacity to match growing demand
- **Strong partnerships**
  - Tripartite cooperation between government, industry stakeholders and labour unions, offers stability
- **Operational efficiency**
  - Made technological investments to improve operational efficiency (e.g., AGV, advanced planning systems), reducing turnaround times

Despite Singapore's lack of space and higher operating cost, TEUs seem to go to Singapore; Throughput is driven by shipping line, alliances and connectivity

TEUs Handled by Selected Ports (2024), Million



- In 2024, Port Klang and PTP collectively handled 26.9mil TEUs, 35% lower than 41.1mil TEUs handled by the Port of Singapore, despite Singapore's lack of space and higher operating costs
- PTP's CAGR was double of Port of Singapore's CAGR; PTP saw healthy TEU growth

Case Example and Possible Explanation

PSA Singapore and Evergreen Marine Establish Joint Venture for Container Terminal Operations in Singapore

- Throughput ultimately depends on shipping lines (e.g., Maersk, Hapag-Lloyd, etc) and alliances (e.g., Gemini, Ocean Alliance)
- Shipping lines prefer port operators that enter joint-ventures with them for terminal self-operation, ensuring dedicated terminal access and long-term capacity assurance
- With existing relationship built, major shipping lines and their alliance has significant influence on planning and expansion of terminals, reinforcing their preference

Source: PASB Analysis

Singapore's Tuas Mega Port will soon operationalise in 2040; It will be a fully automated port with long-term competitive advantages, primarily on the cost and productivity front

Port of Singapore Expansion: Tuas Mega Port

Details

Tuas Mega Port
Singapore

- New mega container port on the western tip of Singapore
- Consolidates all container operations
- Full completion by 2040, when completed, it will be the world's largest fully automated container terminal

Quick Facts

65 Mil
TEUs Handling Capacity

1,337
Hectares

Features state-of-the-art automation:
- Automated Quay Cranes (AQCs),
- Automated Guided Vehicles (AGV)
- AI-driven terminal management systems

Risks and Implications to Johor Logistics

Potential Cost Pressures
Consolidation of 4 container terminals into 1 fully automated terminal can realise cost synergies and reduce labour costs, significantly reducing unit handling costs in the long-term, while improving productivity

Shippers Given Capacity Assurance
Large capacity and high productivity allows shipping lines to scale operations, reinforcing shipping line preferences towards Singapore

Shift Towards Greener Solutions
Green technologies used such as electric cranes and reduce carbon footprint and environmental compliance expenses

Source: PASB Analysis

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NON-EXHAUSTIVE

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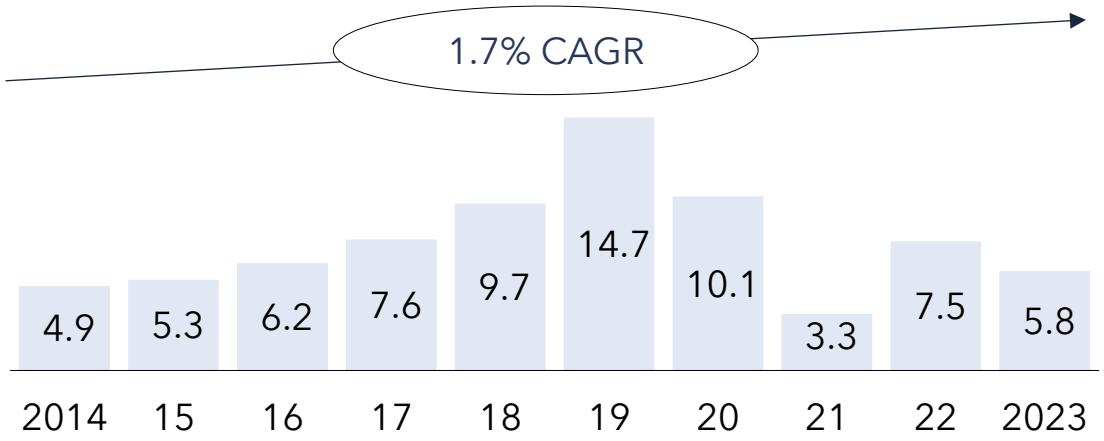
Senai cargo terminal operates at <10% of its design capacity with a <2% growth p.a., and handles mainly domestic cargo

It now handles <10% of the design capacity and has grown under 2% per annum...

Total Cargo Handled[1] (2014 – 2023)

Tonnes (Thousand)

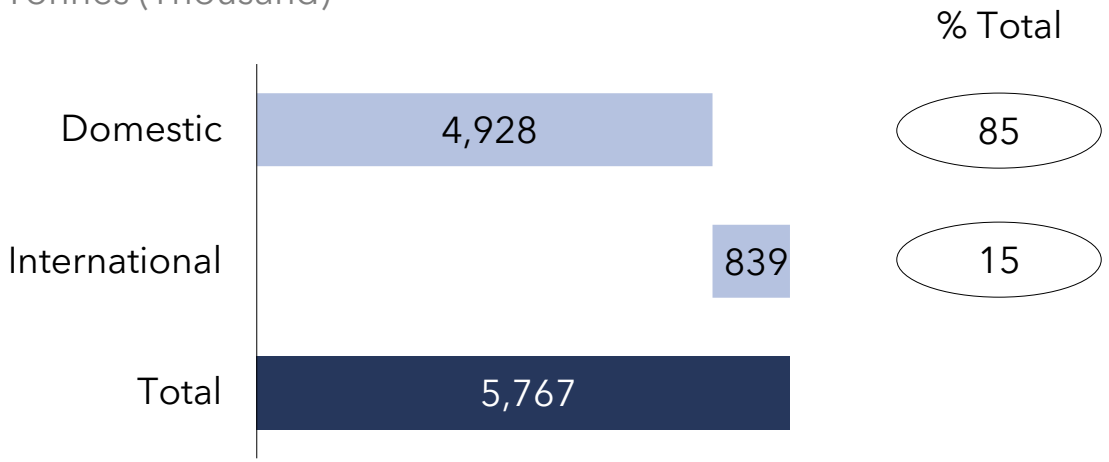


- Design capacity of 80,000 tonnes p.a.
- Cargo handled peaked in 2019 just before COVID-19, ~14,700 tonnes handled (~18% of design capacity)
- Handled ~5,800 tonnes of cargo in 2023 (~7% of design capacity), achieved only ~40% of pre-COVID figures

...and mainly handles domestic cargo, which represents 85% of total cargo handled

Total Cargo Handled (2023)

Tonnes (Thousand)



- 90% of cargo are perishable items and live seafood, connecting East Malaysia to Johor
- Players may prefer sea logistics due to practicality, lower costs and closer proximity to seaports

Note: [1]Includes cargo loaded and unloaded
Source: MOT, Senai Airport Terminal Services (SATS), PASB Analysis

While air logistics demand may have been low, there are still strong reasons to believe in Johor's air logistics potential going forward

Possible Explanations for Relatively Lower Air Logistics Demand in Johor

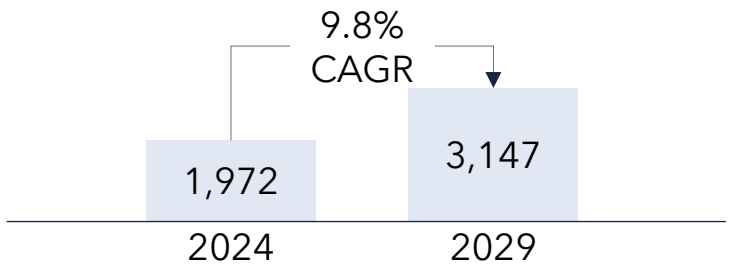
	Limited but Rapidly Growing High-Value Manufacturing Base	Proximity to Established Air Logistics Hubs and Infrastructural Differences
Description	• Manufacturing landscape largely dominated by industries that typically utilise sea freight, which tends to be more cost-effective (i.e., heavy industries, etc.) • Scale and specialisation of high-value, time-sensitive industries are relatively limited (e.g., pharmaceutical, perishables, etc.)	• Senai cargo terminal's infrastructure may not be competitive relative to Changi Airport or KLIA's Advanced Cargo Centre, which operate at vastly greater scales, higher productivities and realised economies of scale • Limited international air connectivity and frequency
Reasons to Believe: Trends and Opportunities	• Significant efforts nationally and at the state level to attract investments into these high-value, time-sensitive industries • Due to recent introduction of enabling policies (i.e., JS-SEZ), air logistics demand may see an uptick going forward	• Opportunity to collaborate with private sector players via joint-ventures and adopt a consultative approach to strategic planning • Coordinated planning and resource pooling facilitates effective infrastructural upgrades for better competitivity • Attract charter cargo flights

Source: PASB Analysis

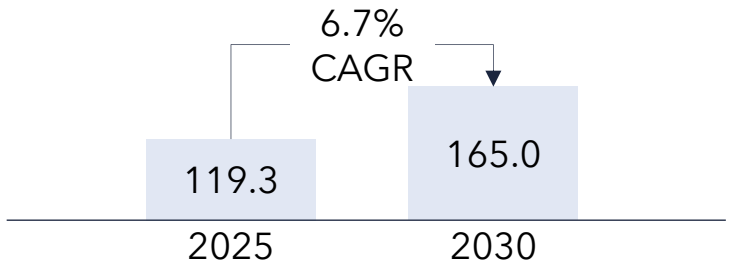
Regional markets with time-sensitive operations are growing; This is an opportune moment to enhance Senai's cargo infrastructure…

Growth Drivers (Selected Markets)

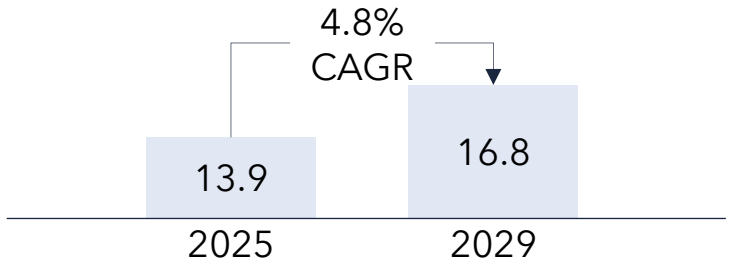
E-commerce Market in Asia, USD Billion



Food Market in Malaysia, USD Billion



Pharmaceuticals Market in SEA, USD Billion



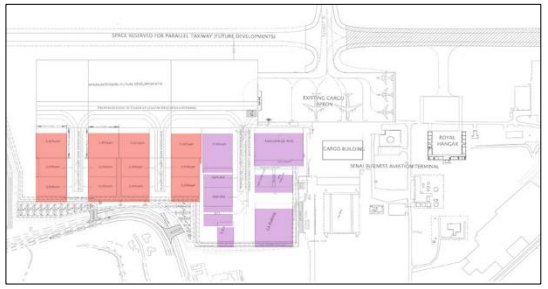
Source: PASB Analysis

Current State	Aspirational State	Success Factors
Limited freighter cargo, cargo throughput dominated by belly cargo on domestic routes	Grow international freighter cargo segment, less reliance on belly cargo	Attract international chartered freighter flights
Stiff competition from larger airports with better infrastructure and advanced cargo terminals	State-of-the-art cargo terminals to serve distribution centres (e.g., e-commerce) and cold chain facilities for high-value industries (e.g., pharmaceuticals)	Major enhancement of cargo terminal, driven by private sector demand (i.e., explore joint-ventures with anchor tenants)

...while also attracting major private sector players and housing them in industrial areas within Senai Airport's ecosystem to grow regional air logistics share

Industrial areas located in the vicinity of Senai International Airport

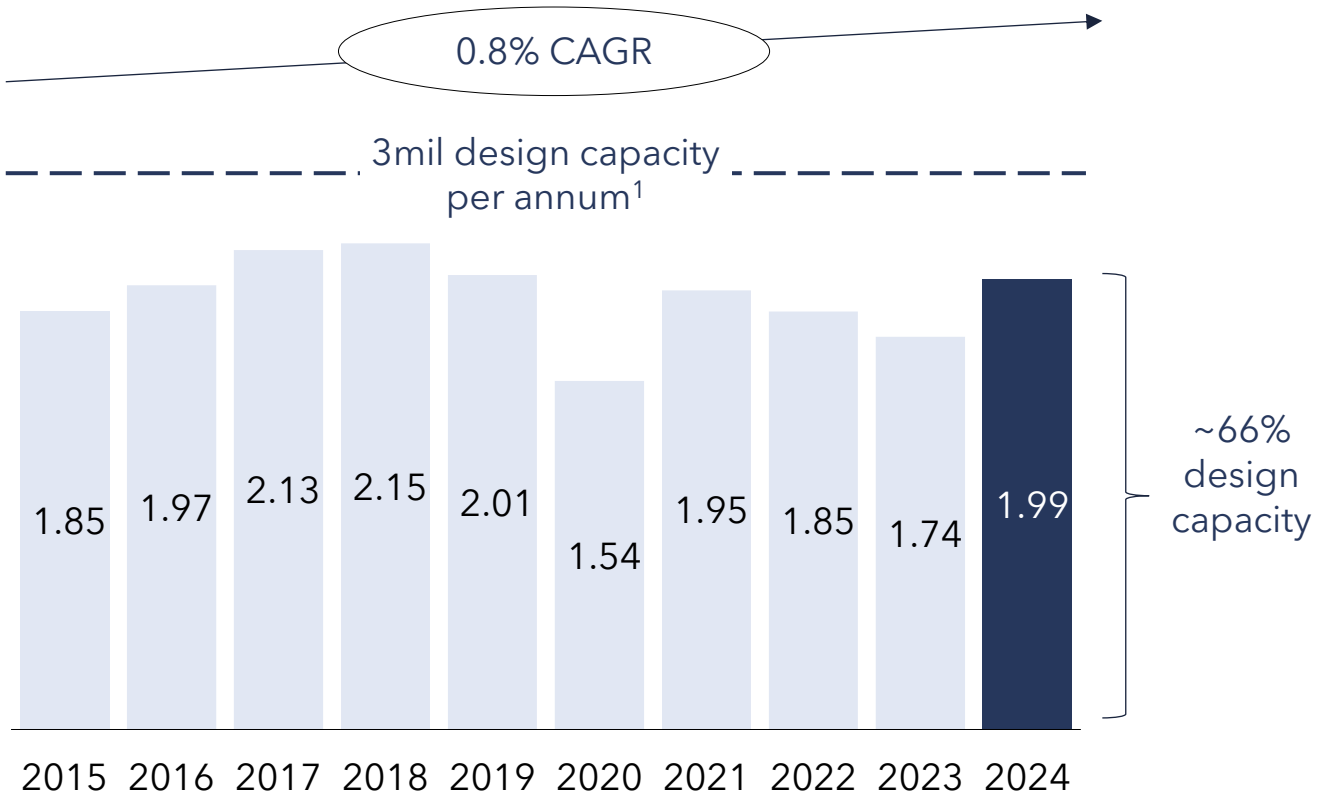
NON-EXHAUSTIVE

	Senai Airport Aviation Park (SAAP)	Senai Airport Free Industrial Zone (SAFIZ)	Senai Airport City
			
Development Size, Acres	42.2	107.4	2,718
Development Details	• Maintenance, Repair and Overhaul (MRO) activities • Logistics and distribution centre • Manufacturing and assembly centre	• Equipped with essential infrastructure and various business incentives offered to tenants • Built to attract high-value industries e.g., aerospace, logistics, manufacturing	• Free Zone Area targeting import and export-oriented industries • Targeted sectors e.g., E&E, logistics and warehousing, FMCG
Tenants	ADE ASIA DIGITAL ENGINEERING; EJA EXECUTIVE JETS ASIA	BMW; Celestica; POKKA	DHL

Source: Senai Airport Terminal Services (SATS), PASB Analysis

Across the border, Singapore's Changi Airport handled nearly 2mil metric tonnes worth of air cargo in 2024, translates to ~66% of design capacity...

Air Cargo Throughput in Singapore (2015 – 2024)[1], Metric Tonnes (Million)



Details

- Strategic location and strong connectivity
  - Situated at the crossroads of major international trade routes, effectively facilitating global trade
  - Cargo network covers over 160 cities worldwide, strong partnerships with air cargo operators
- Air logistics demand driven by Singapore's advanced manufacturing base and disruption of maritime transport
  - High concentration of time-sensitive and temperature-sensitive sectors (e.g., pharmaceuticals, electronics and e-commerce)
  - Modeal shift from sea to air freight due to disruptions
- Robust air cargo infrastructure and continuous technological innovation
  - State-of-the-art cargo handling facilities
  - Dedicated airside facilities for express integrators
  - Contributes to high operational efficiency and capacity

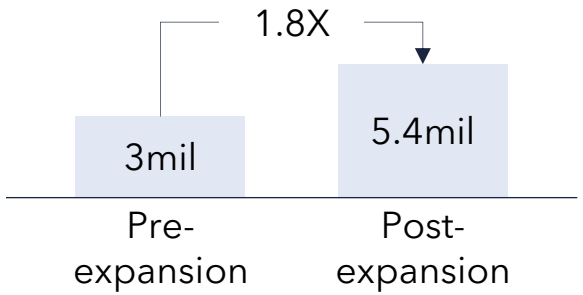
Note: [1]Sum of air cargo discharged and loaded in Singapore, [2]Design capacity as per 2024, there are further expansion plans which may increase annual cargo capacity
Source: PASB Analysis

...and is undergoing further expansion and enhancement, crystallising its global position as the world's leading air logistics hub

Changi East Development Illustrations

Details

Air Cargo Handling Capacity Per Annum, Metric Tonnes



- Changi East is Changi Airport's largest expansion, includes (Non-exhaustive):
  - Terminal 5 (New terminal)
  - Changi East Industrial Zone
- Air cargo currently managed at Changi Airfreight Centre, will be expanded to Changi East Industrial Zone (CEIZ)
- Future air cargo hub will be smarter, more connected and more efficient via data, technology and automation (e.g., autonomous guided vehicles, direct access to freighter aircraft from terminals)

Key Takeaways: What Johor Could Do

What Johor could do:
As Johor anticipate the growth of high-value, time-sensitive, temperature-sensitive industries, Senai Airport expansion should be expedited to serve these industries in Johor and gain competitive edge

Implication if Senai Airport is not expanded / enhanced:
Without proper air logistics infrastructure, may be difficult to attract high-value industries; Those high-value industries already here may be served by Singapore, which is an opportunity cost to Johor

Source: Changi Airport, The Straits Times, PASB Analysis

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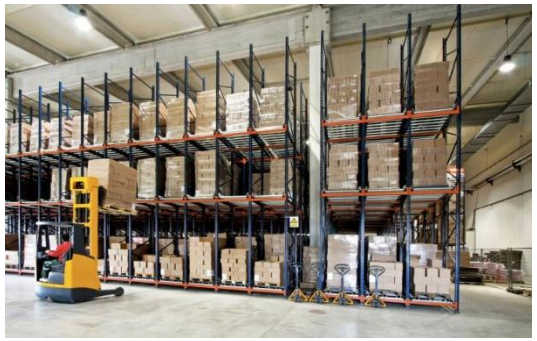
Establishment of regional distribution hubs / smart warehouses and enhance handling of special goods (e.g., dangerous goods, temperature-sensitive, Halal)

As global supply chains become more complex, warehouses are integrating tech and automation to handle sophisticated distribution operations…

Traditional Warehouse Characteristics



- Fixed-location facility mainly designed for long-term storage of large volumes of goods with highly manual labour processes, with very limited automation capabilities
- Limited capabilities would mean these warehouses do not typically specialise in distribution functions
- Primary role is long-term storage, as opposed to complex distribution operations

Case Examples: Smart Warehouses for Goods Distribution

Zara Distribution Centre
Arteixo, Spain

- Zara's main distribution centre, "The Cube", located in the heart of Zara's fast-fashion supply chain
- One of the most advanced hybrid smart warehouses globally (Highly automated)
- Automated systems for packing and sorting
- Real-time inventory management via RFID tagging, integrated with real-time sales data

Walmart Distribution Centre
Arizona, USA

- One of Walmart's large-scale distribution centres in US for retail and e-commerce fulfilment
- Extensively leverages technology:
  - RFID
  - Automated Staorage and Retrieval Systems (AS/RS)
  - Autonomous Mobile Robots (AMR)
  - Warehouse Management Systems (WMS)
  - AI and Machine Learning for demand forecasting

Source: PASB Analysis

...moreover, there are different levels of warehouse automation; Warehouses should aspire to become fully automated, achieving "lights-out" operations

Different Maturities of Automation

	★☆☆ Basic Automation	★★☆ Semi Automation	★★★ Full Automation
Examples of Technological Solutions	• Warehouse Management System • Conveyor • Radio Frequency Scanners (RF)	• Automated Mobile Robots (AMRs) • Automated Guided Vehicles (AGVs)	• Automated Storage and Retrieval Systems (AS/RS) • Automated high-bay cranes
Rationale	• Easier handling of products • Digitalisation of transactions capturing process	• Generate some form of labour savings • Productivity increase	• Significant savings • Capacity and throughput optimisation • Preferred next-gen digital distributor
Use Cases	• Distribution centres (i.e., usually for businesses with large / bulky items) • Cross-docks[1]	• Automation of existing distribution centres • Cross-docks[1]	• Regional distribution centres • Micro-fulfilment centres • Dark stores

Takeaways

End-state aspiration is to achieve "lights-out" warehouses that operate autonomously

Note: [1]Logistics strategy involving the direct transfer of goods from incoming transportation to outgoing transportation, bypassing storage
Source: McKinsey

Regional Distribution Centres being established across Malaysia; Given Johor's comprehensive logistics ecosystem, it has ample opportunity to house these facilities

Examples	Location	Description
BMW	Senai, Johor (In Senai Airport Free Industrial Zone)	• BMW's 700k sq ft **Regional Parts Distribution Centre** • Dispatches 15 40-ft TEUs via sea freight per week, 33k cubic metres of airfreight delivery per week
DAISO	Pulau Indah, Selangor (Near Port Klang)	• 1.7mil sq ft **Global Distribution Centre**, Daiso's largest warehouse in the world • Serves 22 countries across Asia, Middle East, Americas, Australia and New Zealand
IKEA	Pulau Indah, Selangor (Near Port Klang)	• Amongst IKEA's top 10 largest **Regional Distribution Centres** globally • Largest distribution centre in South East Asia • Approximately 1mil sq ft, with an investment value of RM908mil • Serves 12 retail stores in ASEAN; To serve 20 stores by 2026
ZALORA	Shah Alam, Selangor	• Zalora's 470k sq ft **e-commerce fulfilment hub** / regional distribution centre serving the Southeast Asian market • Features real-time inventory tracking, centralised stock management, order processing

Takeaways

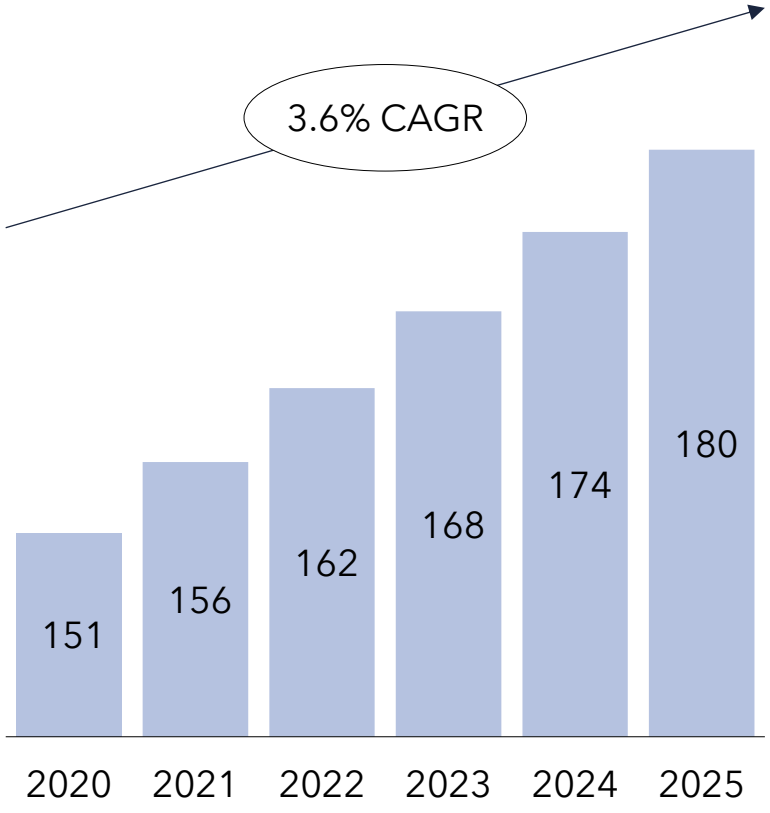
- As regional distribution centres' involve complex supply chain management, these facilities **leverage advanced technologies** like robotics, IoT, AI, and RFID to streamline operations, cut costs, and enhance supply chain resilience
- These state-of-the-art distribution centres will **boost Johor's role in regional and global supply chains**, enhancing its reputation as the **preferred logistics hub**
- Moreover, regional distribution centres operating in Singapore can expand into Johor, achieving **cross-border logistics synergies**

Source: PASB Analysis

Warehouses have historically grown steadily at 4% per annum, while the warehouse automation market is expected to see aggressive projected growth rates of 15%

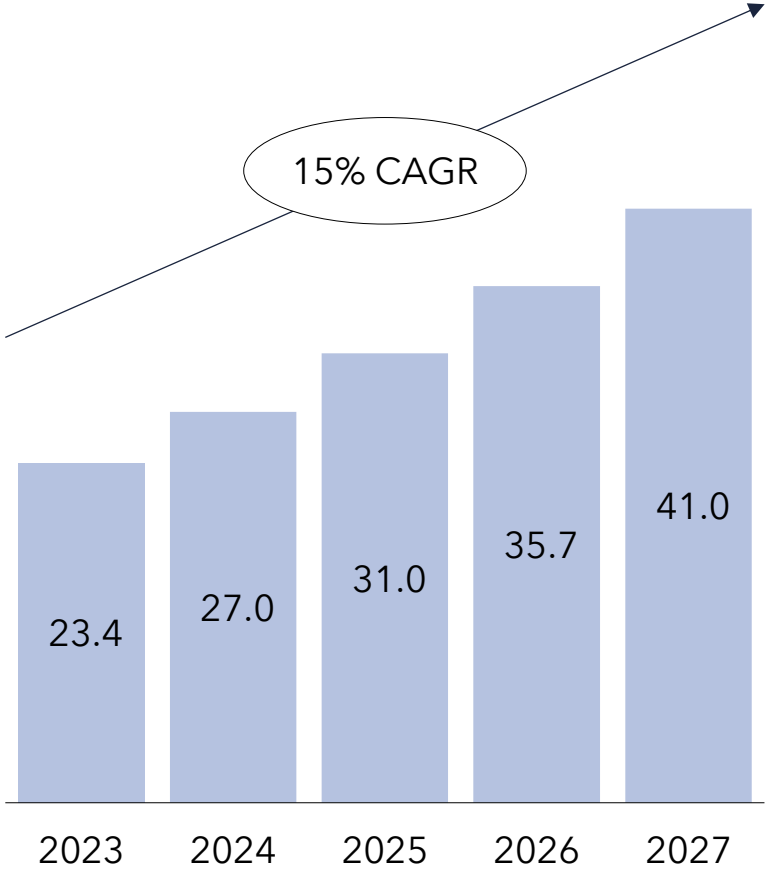
Number of Warehouses Globally (2020 – 2025)

Thousand



Global Warehouse Automation Market (2023 – 2027)

USD Billion



Examples of Players in Warehouse Automation

DEMATIC

- Known for automated storage and retrieval systems (AS/RS), conveyor systems, and AI orchestration
- Serves large retail, e-commerce and manufacturing clients globally

Honeywell Intelligrated

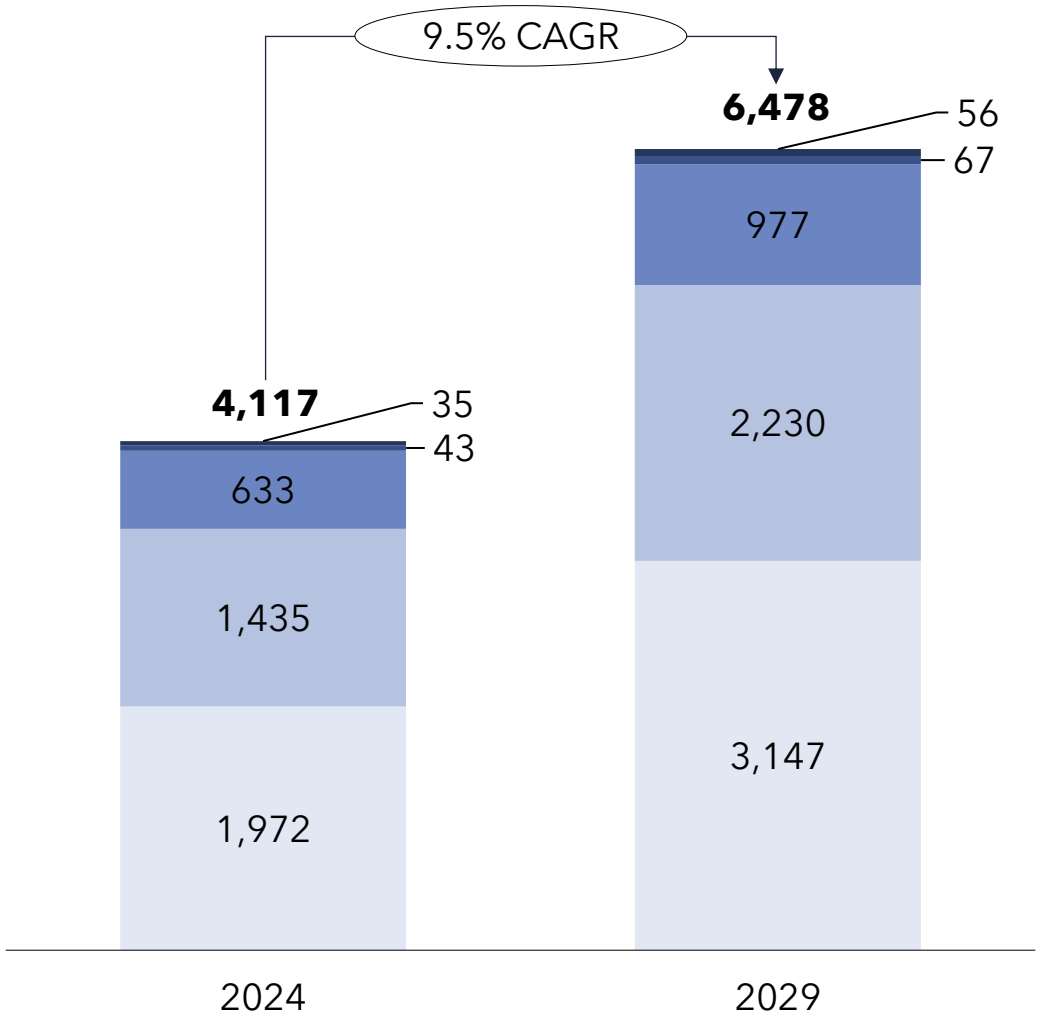
- Provides modular robotics, conveyor and sortation systems, voice-directed picking, labour management software
- Widely used by Fortune 500 retailers and consumer packaged goods companies

Source: PASB Analysis

Moreover, global e-commerce is expected to grow ~10% p.a., with Asia as the core driver due to rapid growth in emerging markets, e-commerce platforms and digital adoption

Global e-Commerce Market (2024 – 2029)

USD Billion



	% Total ('29)	CAGR
Africa	0.9%	10.1%
Oceania	1.0%	9.5%
Europe	15.1%	9.1%
Americas	34.4%	9.2%
Asia	48.6%	9.8%

Source: PASB Analysis

Details

- Global e-commerce growth projected to grow 9.5% p.a.
- Asia's share remains largest, just under 50% of global e-commerce market by 2029
- Rapid growth of e-commerce industry is mainly driven by Southeast Asia, attributed to:
  - Rapid digital adoption (i.e., widespread smartphone use)
  - Emergence of e-commerce platforms (e.g., Shopee, Lazada, etc.)
  - Strong growth in emerging markets (e.g., Vietnam, Thailand)

Relative to land-scarce Singapore, Johor can be a more cost-effective option to logistics players and serve Singapore spillover demand

Quick Comparison Between Singapore and Malaysia[1]

	Singapore	Malaysia
Estimated Price Per Sq Ft, RM	RM5.26 – RM15.46[1]	RM1 – RM2.50
Industrial Property Occupancy Rate, Percentage Total	~91%	Likely much lower than Singapore on average
Market Characteristics	Premium pricing due to high demand attributed to land scarcity	Competitive pricing, making it a cost-effective option for logistics players

Cross-border Synergies Case Example

01 Johor has an abundance of warehouses to support logistics growth in both Singapore and Johor

02 While Singapore's ports may have certain advantages, some back-end operations could potentially be shifted to Johor in the short term

03 As an example, major e-commerce Global Distribution Centre in Singapore can handle complex distribution operations in Singapore while leveraging Johor operations for storage / inventory management

04 In the long term, this could attract other logistics players to follow suit, and Johor may even attract global firms to setup Global Distribution Centres here

Note: [1]Used Malaysia as proxy, [2]Conversion rate of 1 SGD = 3.29 MYR
Source: Industrialguru.sg, PropertyGuru, iProperty, Statista, PASB Analysis

Global specialised handling market estimated at ~USD 961 bil and growing, enhancing capabilities in specialised goods handling can carve a niche for Johor's logistics industry

Type of Specialised Handling	Brief Description	Global Market (2024) USD Billion	Growth Rate Percentage	Key Success Factors
Cold Chain	• Specialised handling of **temperature-sensitive** goods (e.g., pharmaceuticals, perishable goods)	325	13%[1]	• GDP, HACCP, ASEAN standards compliance • Incentives to offset high CAPEX and OPEX
Dangerous Goods	• Safe handling of **hazardous materials** (e.g., chemicals, flammable, explosives)	241	7%[2]	• Adherence to IATA / IMDG • Staff training certification in DG handling
Halal	• End-to-end goods management in **compliance with Shariah principles**	395	10%[3]	• Halal-certification (JAKIM, MS2400, etc.) • Halal traceability
		961		

Note: [1]2024 – 2032, [2]2024 – 2030, [3]2025 to 2030
Source: PASB Analysis

Cold chain logistics is the specialised handling of temperature-sensitive goods throughout the supply chain...

NON-EXHAUSTIVE

Cold Chain Logistics Definition

- Specialised management, storage, and transportation of temperature-sensitive goods
- Ensure goods remain at controlled temperatures throughout supply chain (from production to consumption)
- Crucial for preserving quality, safety, integrity of perishable products (e.g., fresh produce, meat, seafood, pharmaceuticals, chemicals)

Key Aspects of Cold Chain Logistics

Temperature Control
Maintaining specific low-temperature ranges (refrigerated, frozen, ultralow) to prevent spoilage / degradation of foods

Cold Storage
Facilitates and infrastructure equipped to store goods at required temperatures while awaiting transport

Cold Transport
Use of refrigerated vehicles, containers, or packaging systems to keep products at stable temperature and humidity

Cold Processing and Distribution
Handling and processing products in sanitary, temperature-controlled environments

Source: PASB Analysis

...and is often complex and challenging due to the need for precise temperature and humidity control throughout the entire value chain to ensure product integrity

Cold Chain Logistics Value Chain

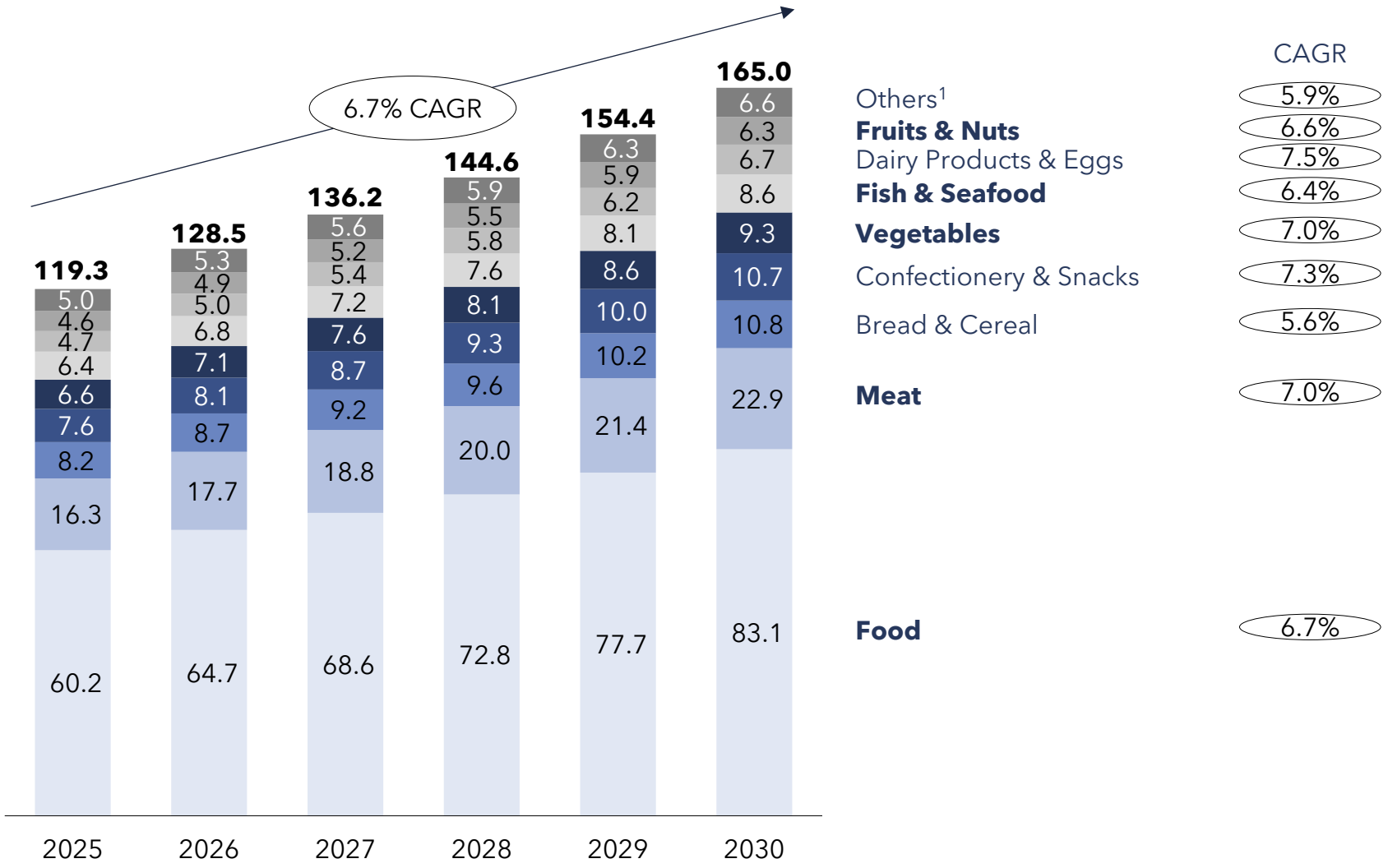
Harvesting	Bulk storage		Processing	Palletised storage of finished products			Consumption
Production of raw material	**Pre-processing storage**	**Logistical hub storage**	**Processing into finished products**	**Post-processing storage**	**Logistic hub storage**	**Distribution centre**	**Retail / Consumer**
Initial stage where fresh produce is picked from farms or orchards	After harvesting, produce is temporarily stores in bulk near farm before processing	Once collected from farm, produce transferred to centralised logistical hub	Processing could include washing, grading, sorting, packing	After processing, final products are palletised and stored in cold storage facilities	Pallets transported to centralised / intermediary logistics hub for storage	Distribution centres receive pallets and prepare them for last-mile delivery	Produce unpacked and displayed for consumers or in backroom storage

Moreover, there is also **temperature-controlled transportation** between nodes (refrigerated vehicles, reefers, etc.) to maintain strict temperature and humidity controls

Source: PASB Analysis

Demand for cold-chain logistics services is healthy; It is driven by certain foodstuffs which are expected to grow ~7% p.a. from now until 2030...

Food Market in Malaysia (2022 – 2030), USD Billion



	CAGR
Others[1]	5.9%
Fruits & Nuts	6.6%
Dairy Products & Eggs	7.5%
Fish & Seafood	6.4%
Vegetables	7.0%
Confectionery & Snacks	7.3%
Bread & Cereal	5.6%
Meat	7.0%
Food	6.7%

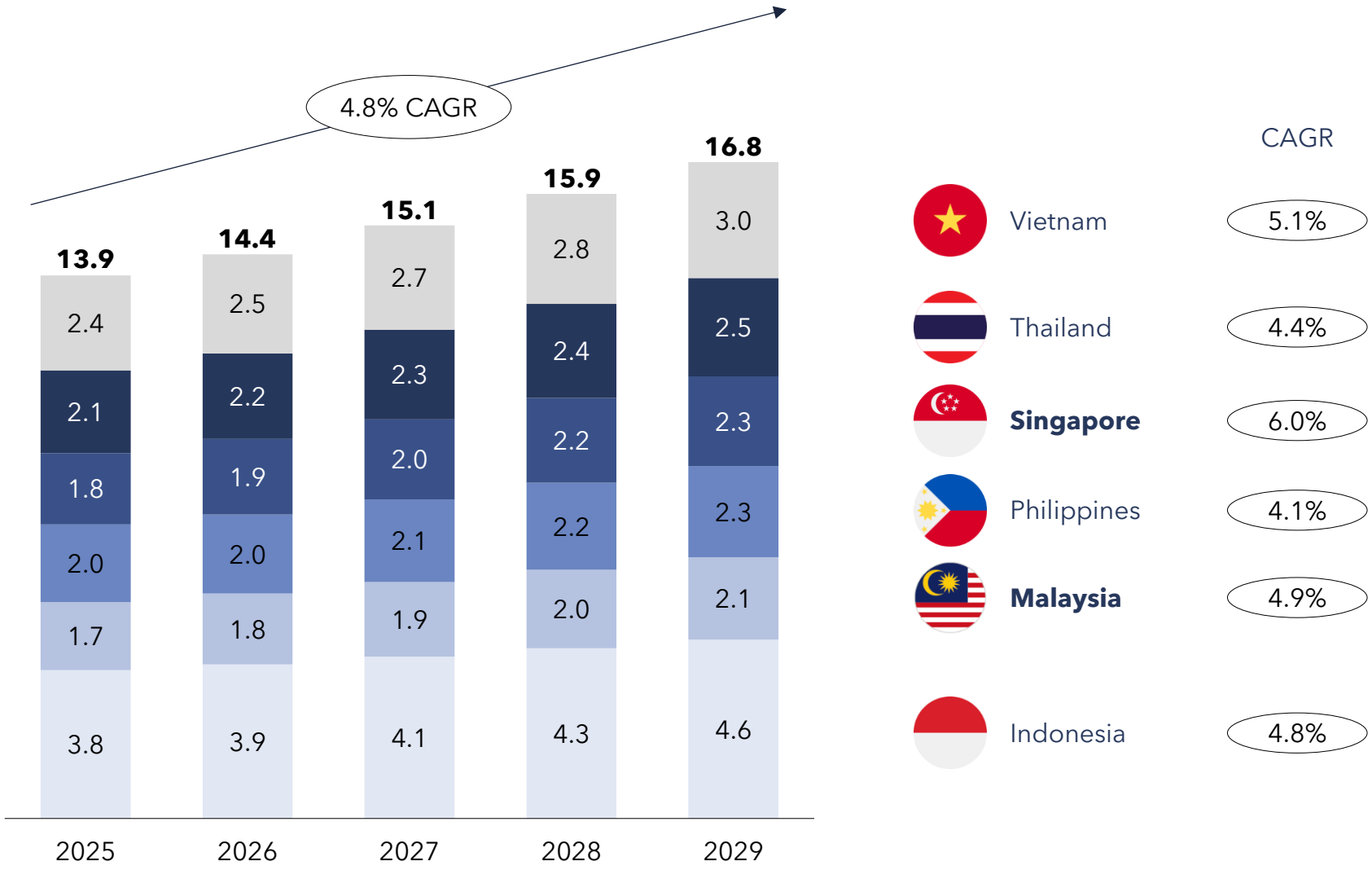
Note: Include sauces & spices, convenience food, spreads & sweeteners, oils & fats, baby food, pet food
Source: PASB Analysis

Details

- Food that typically require cold-chain logistics include:
  - Fruits & nuts
  - Fish & seafood
  - Vegetables
  - Meat
  - Food
- These types of food are expected to grow at around 6 – 7% between 2025 to 2030

...it is also driven by pharmaceuticals, which is expected to grow ~5 – 6% in Malaysia and Singapore

Pharmaceutical Market in Southeast Asia (2025 – 2029), USD Billion



	CAGR
Vietnam	5.1%
Thailand	4.4%
Singapore	6.0%
Philippines	4.1%
Malaysia	4.9%
Indonesia	4.8%

Note: Include sauces & spices, convenience food, spreads & sweeteners, oils & fats, baby food, pet food
Source: PASB Analysis

Details

- The pharmaceuticals industry require cold chain logistics since many of its products are highly sensitive to temperature variations, which affects efficacy and safety
- Malaysia's pharmaceutical industry is projected to grow ~5% from now until 2029
  - Moreover, Johor is also actively growing its own pharmaceutical industry, creating localised demand for cold chain logistics services
- Singapore's pharmaceutical industry grows 6% within the same period
  - With JS-SEZ, Johor's cold chain logistics sub-segment could realise cross-border synergies with pharmaceutical companies based in Singapore

Johor already has relatively strong cold chain capabilities and can be scaled to serve unmet demand attributed to food and pharmaceutical industries

NON-EXHAUSTIVE

Private Sector Player	Description	Capabilities
TIONG NAM www.tiongnam.com	• One of the largest total logistics providers in APAC region	**Storage** • 300,000 sq ft of cold storage facilities • Cold rooms support frozen, chilled, ambient storage **Transportation** • Fleet of trucks capable of multiple temperature settings (ambient to deep freezing)
TASCO	• Leading cold chain logistics provider • 60% market share nationally	**Storage** • 400,000 sq ft of temperature-controlled storage • Deep frozen storage capabilities (-30°C), serves 80% of Malaysia's ice cream market **Transportation** • 200+ trucks support nationwide cold chain distribution • Customised retail logistics for over 3,000 retailers **Certification** • Good Distribution Practice (GDP) certified for pharmaceutical cold chain logistics
	• Offers total logistics solutions with focus on cold chain services in JB	• Caters to food and pharmaceutical sectors

Dangerous goods is the specialised handling of goods with hazardous properties that pose healthy, safety, property, environment risks

NON-EXHAUSTIVE

Dangerous Goods Definition

- Specialised handling, storage, and transportation of goods that pose significant health, safety, property, environment risks
- Also called hazardous material or hazmat
- Requires strict regulatory compliance, specialised packaging, labeling, and trained personnel to minimise risk

Key Aspects of Dangerous Goods Logistics

Broad Yet Specific Classification of Dangerous Goods
9 different classes with different hazard types (e.g., explosives, flammable, etc.)

International Regulatory Frameworks
Strictly regulated internationally (e.g., IMDG[1], IATA[2] Dangerous Goods Regulations)

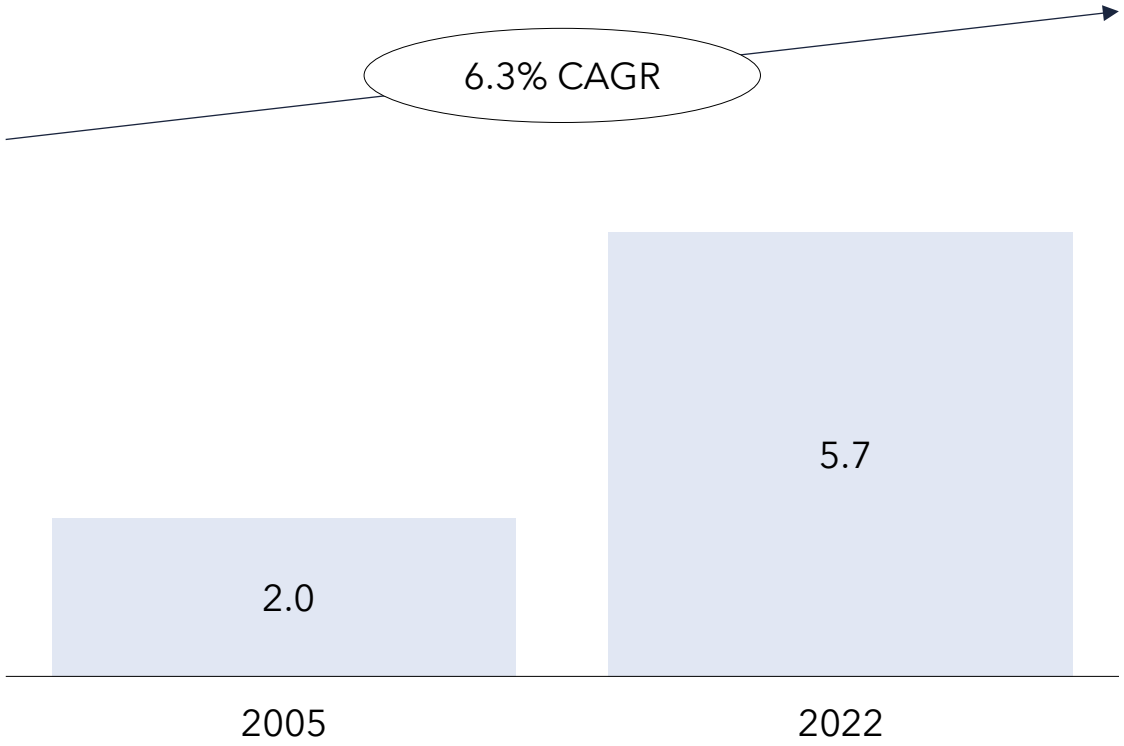
Packaging and Labelling
Packaged in approved containers to prevent leaks and clearly labelled based on class

Handling and Safety Measures
Trained personnel and strict adherence to safety protocols to prevent accidents

Note: [1]International Maritime Dangerous Goods Code, [2]International Air Transport Association
Source: PASB Analysis

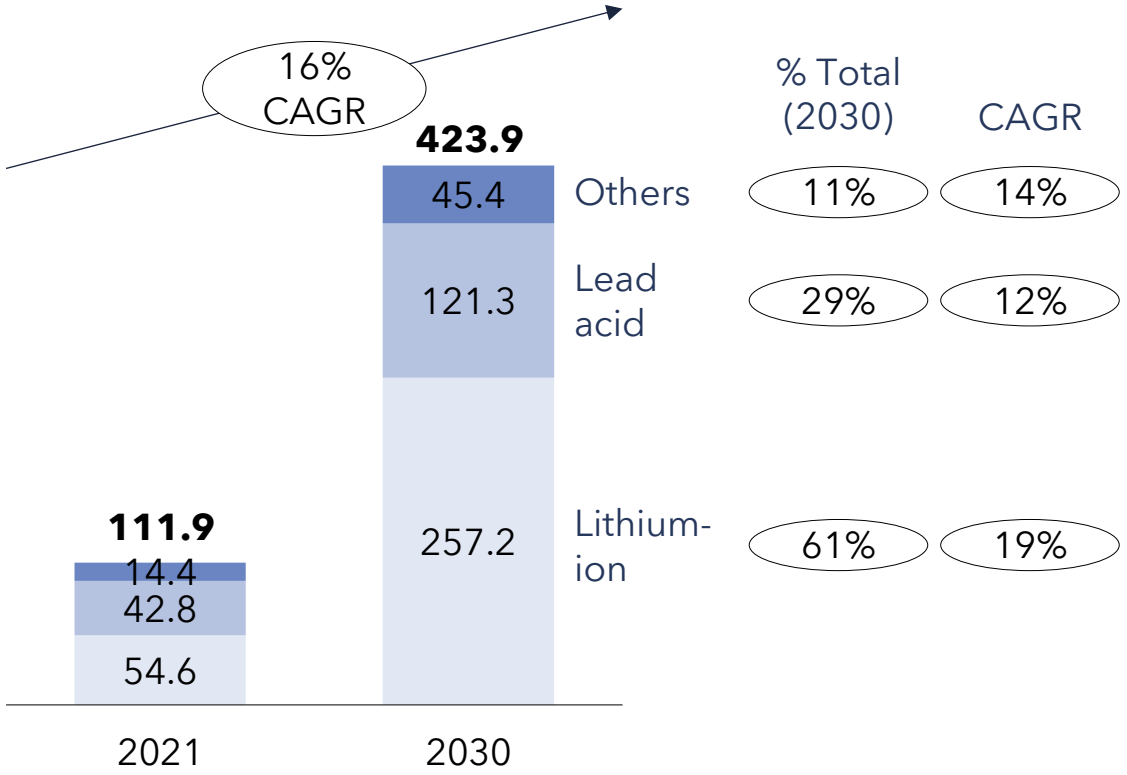
Global growth of chemical and battery industries can drive demand of dangerous goods logistics services

Global Chemical Industry Revenue (2005 - 2022), USD Trillion



- Global chemical industry has historically grown steadily at ~6% CAGR over a period of 17 years, fueled by its supply to high-growth sectors (e.g., automotive, construction, electronics)

Global Battery Market (2021 – 2030), USD Billion



- Global battery market to grow at aggressive 16% CAGR (2021 – 2030), mainly driven by prominence of lithium-ion batteries:
  - Represents 61% of the market in 2030
  - To grow at very aggressive 19% CAGR
  - Mainly due to EV demand

Note: Includes zinc-manganese dioxide, nickel-metal hydride, nickel-cadmium, flow battery, sodium-sulfur, nickel-zinc, small sealed lead-acid, other technology
Source: PASB Analysis

Halal logistics is a form of supply chain management that is Shariah-compliant, often with very strict enforcement and quality control to ensure integrity and purity of products

NON-EXHAUSTIVE

Halal Logistics Definition

- Management of supply chain activities (e.g., procurement, transportation, storage, and handling) that fully complies with Islamic Shariah law
- Ensures integrity and purity of halal products from origin to consumption

Key Aspects of Halal Logistics

Certification and Compliance
Implement Halal Management Systems and obtain certification accredited by authorities, such as, JAKIM

Segregation
Absolute separation of halal and non-halal products, utilisation of exclusive halal infrastructure

Traceability & Documentation
Maintain detailed records to verify halal status

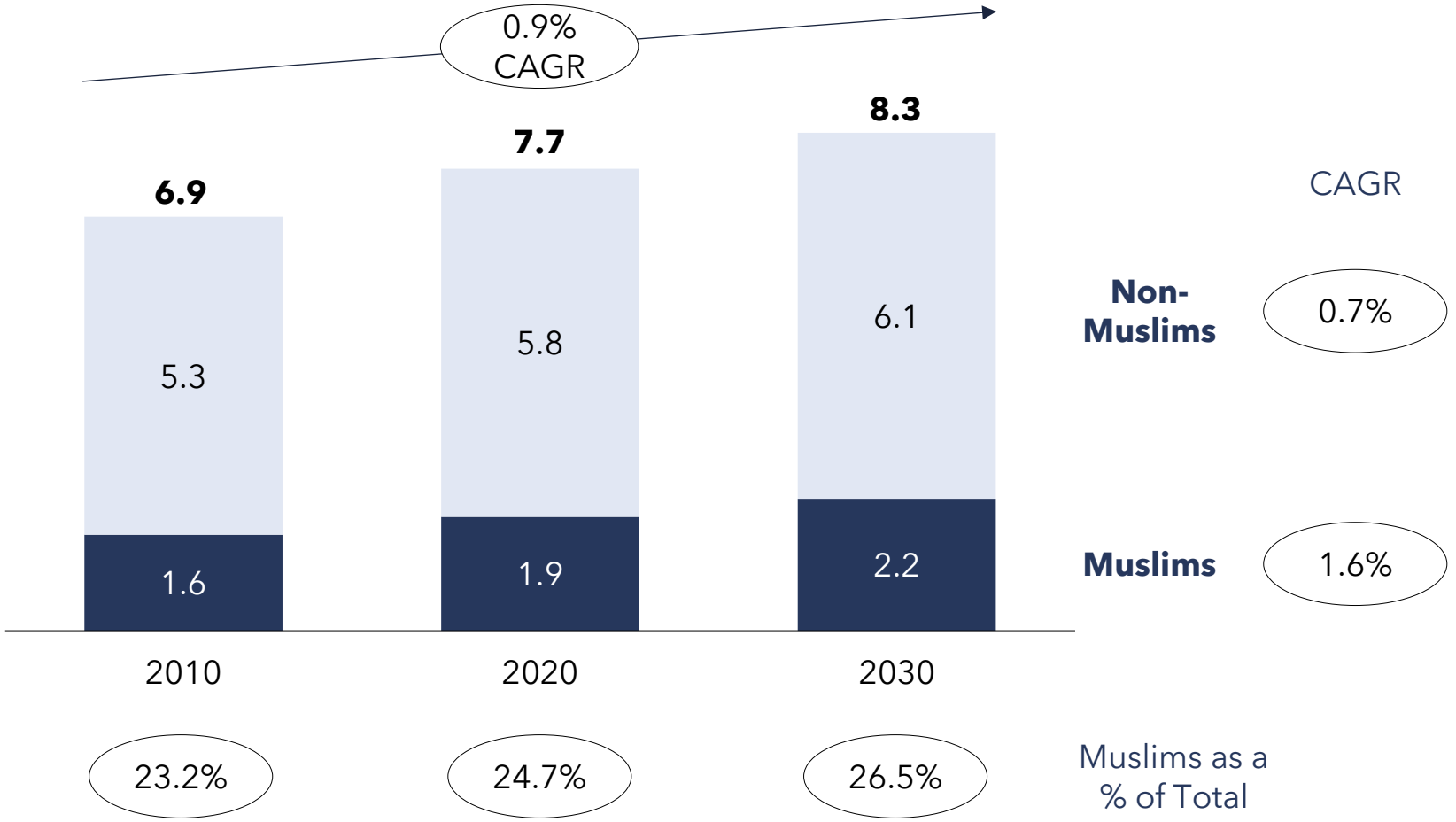
Packaging and Labelling
Indicates halal status to reinforce consumer trust

Handling
Trained in halal principles and handling procedures

Source: PASB Analysis

Halal logistics demand driven by global growth of Muslim population at 1.6% per annum, outpacing global population growth

Global Population by Muslims and Non-Muslims, Billion



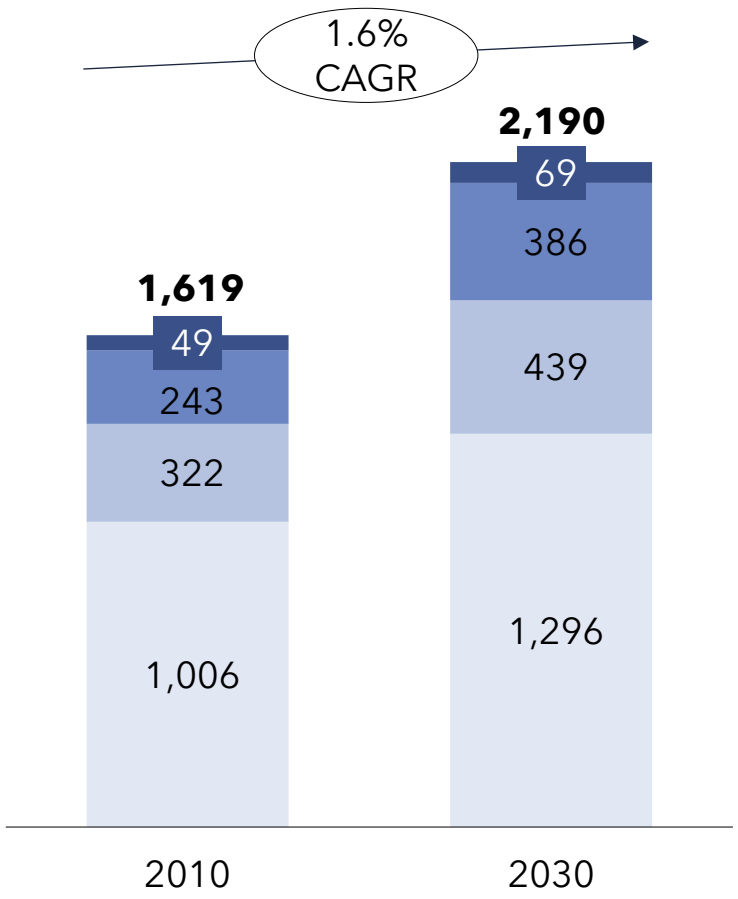
Source: Pew Research

Takeaways

- While global population grows at 0.9% p.a., the growth of global Muslim population outpaces non-Muslims (1.6% VS 0.7%), driven by:
  - Higher fertility rates in Muslim-majority countries relative to non-Muslim countries (2.9 children per women VS 2.2 children)
- Muslims as a percentage of total population in 2010 was 23.2% and will grow to 26.5% by 2030, giving a total addressable market of 2.2bil Muslims

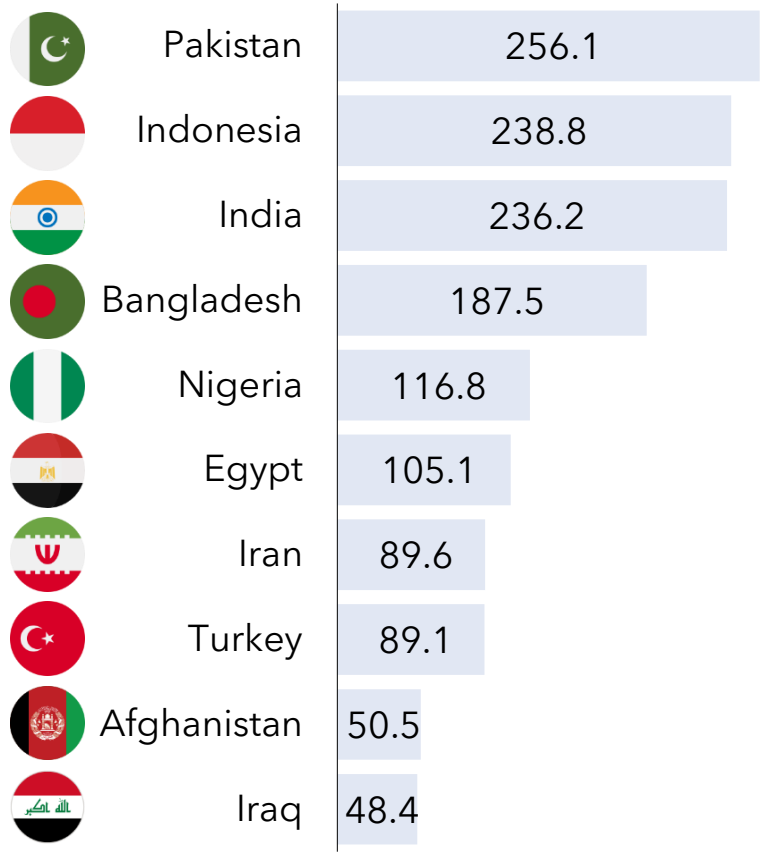
By 2030, close to 60% of the global Muslim population will be located in the Asia Pacific region

Global Muslim Population by Region, Million



	% Total (2030)	CAGR
Europe and Americas	3%	1.7%
Sub-Saharan Africa	18%	2.3%
Middle East – North Africa	20%	1.6%
Asia Pacific	59%	1.3%

Top 10 Countries with Largest Projected Muslim Population (2030), Million



Johor is located in the most Muslim-populated region; It could increase Halal logistics market penetration in countries like Indonesia, India and Bangladesh

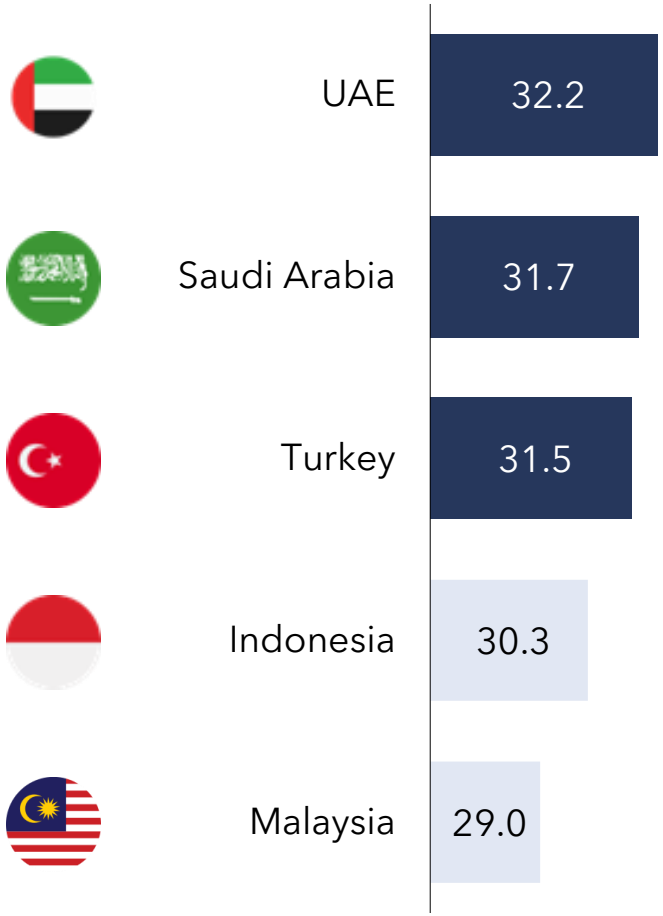
Source: Pew Research

Moreover, Malaysia has the strongest Islamic economy ecosystem and could facilitate not only regional trade, but global trade between the Middle East and other areas in Asia

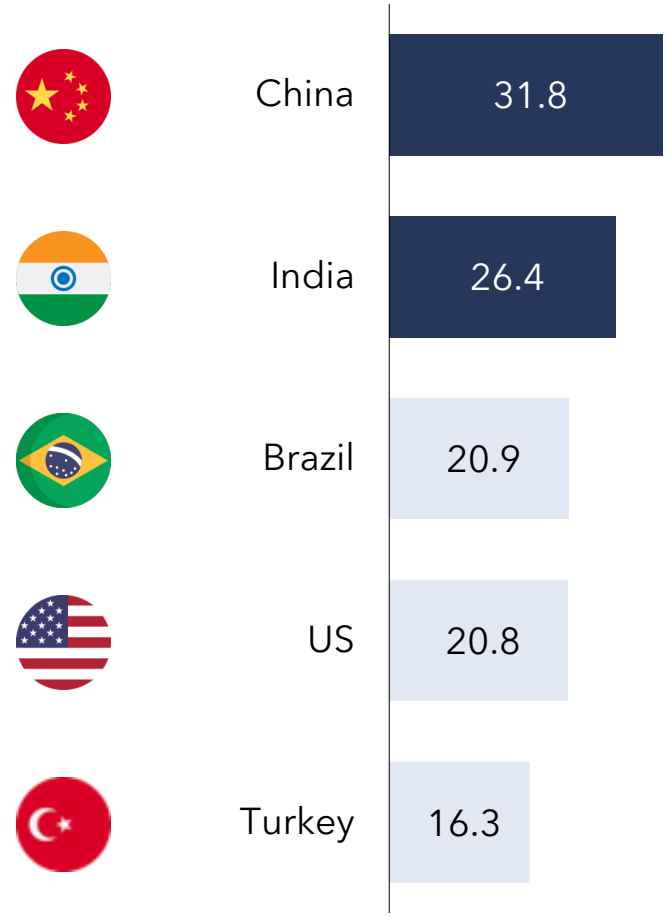
Government Islamic Economy Indicator Ranking 2023, Ranking

Malaysia	1
Saudi Arabia	2
Indonesia	3
UAE	4
Bahrain	5
Iran	6
Turkey	7
Singapore	8
Kuwait	9
Qatar	10
Jordan	11
Oman	12
Pakistan	13
South Africa	14
UK	15

Top 5 OIC Importers, USD Billion



Top 5 OIC Exporters (2022), USD Billion



Source: Global Islamic Economy 2023/24

Challenges faced by Johor's logistics industry at a glance

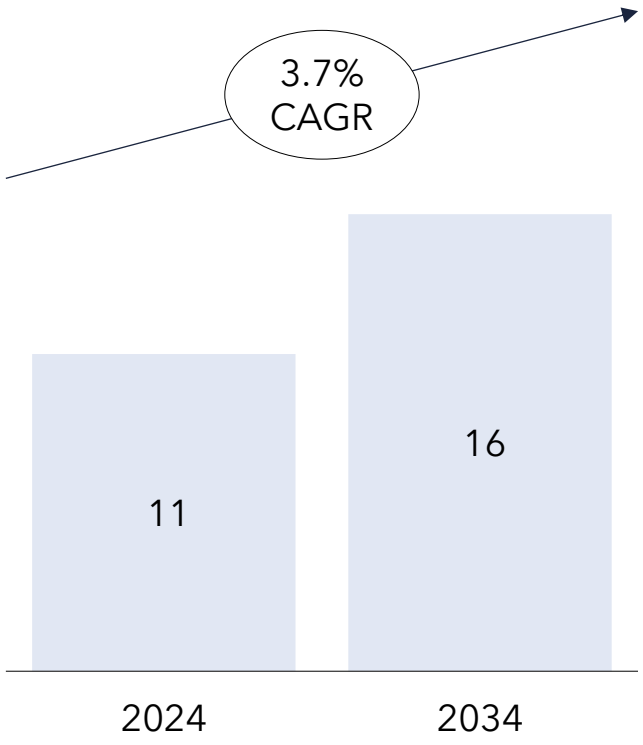
Challenges	Description
Bottlenecks at borders	• Manual processes: – **Slow cargo clearance** due to **manual inspections** and **inconsistent documentation standards** – **Errors** in commercial invoices or bills cause further shipment delays • Cross-border disparities: – **Differing import / export regulations** between Malaysia and Singapore • **Overlapping requirements** from various local agencies
Maturity of air logistics	• Senai International Airport's current infrastructure and cargo facilities **may be limited**
Road infrastructure and overall connectivity	• While sea logistics infrastructure in Johor is mature with low dwell times, there may still be **inadequate road infrastructure in rural areas**, which limits the movement of goods, especially in the **last-mile**
Adoption of digital solutions and technological maturity	• Some SMEs may not utilise real-time tracking systems and may still rely on **manual updates** • **Advanced technology underleveraged** by logistics players (e.g., IoT and AI)
Intensifying competition from neighbouring hubs	• While Johor **now has cost advantages** over Singapore (e.g., relatively lower warehousing costs), Singapore has been actively investing into infrastructure enhancement, this could provide **significant efficiency uplift** and **improve cost-effectiveness in the long run** • E.g., Consolidation, expansion and automation of Singapore's Tuas Mega Port could nab TEU flows into / out of Johor
Financing requirements	• **Ample room for private-sector participation** to enhance overall logistics infrastructure
Human capital and skilled labour	• Sizeable labour shortages in **IT** and **supply chain management** • While talent-sharing programmes with Singapore have been proposed, **visa restrictions** and **employment pass rejections** hinder said proposal

Tourism.

Global tourism market projected to grow ~4% while the APAC region grows ~6%, driven by expanding middle-class and growing experiential travel

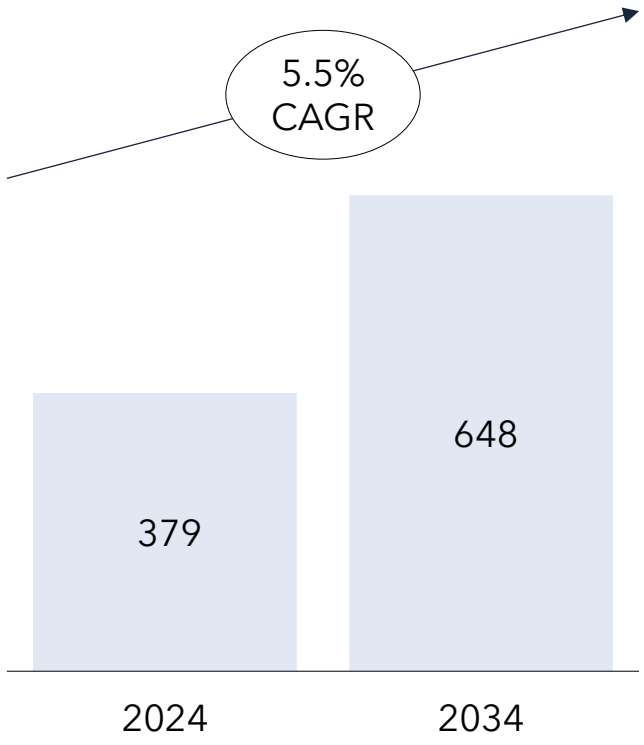
Global Tourism Gross Domestic Product (GDP) Contribution (2019 – 2034)

USD Trillion



APAC Tourism Gross Domestic Product (GDP) Contribution (2019 – 2034)

USD Billion



Details

Expanding middle-class and increased disposable income

Rising affluence in emerging markets and developing economies is expanding the pool of travelers able to afford international travel, fueling sustained growth in tourist arrivals

Growing demand for sustainable and experiential travel

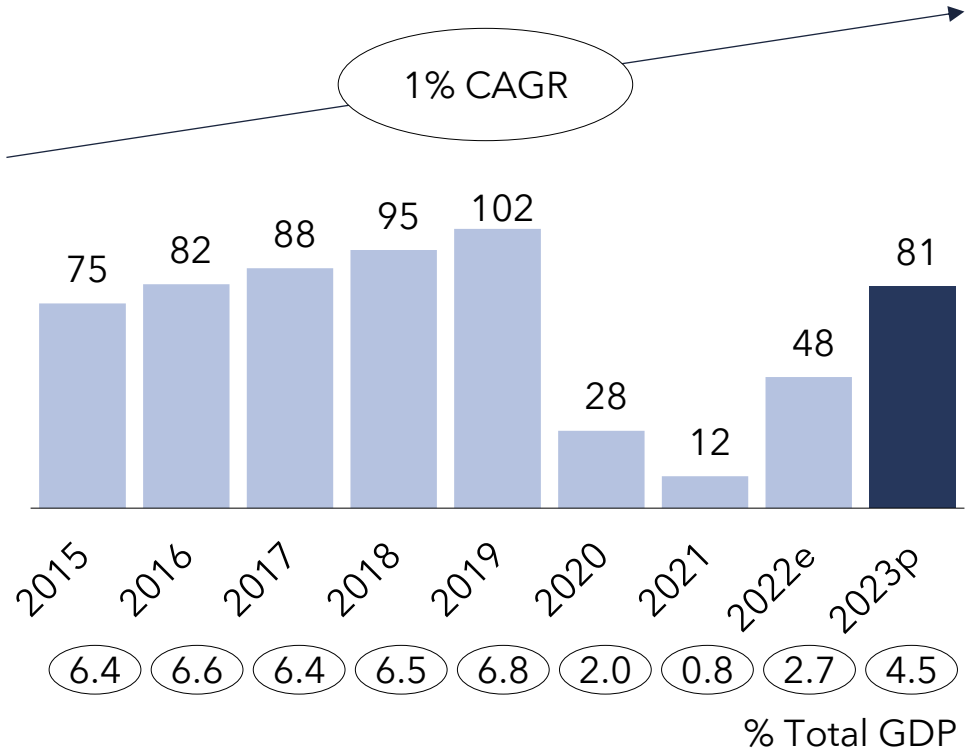
Travelers increasingly seek eco-friendly, immersive, and wellness-focused experiences, pushing destinations to adopt sustainable tourism practices and offer unique cultural and nature-based activities

Source: PASB Analysis

Malaysia's tourism industry directly contributed 4.5% of total GDP (or RM81bil) and employs 21% of workforce (or ~3.4 mil people) in 2023[1]

Tourism Direct Gross Domestic Product (GDP) (2015 – 2023)

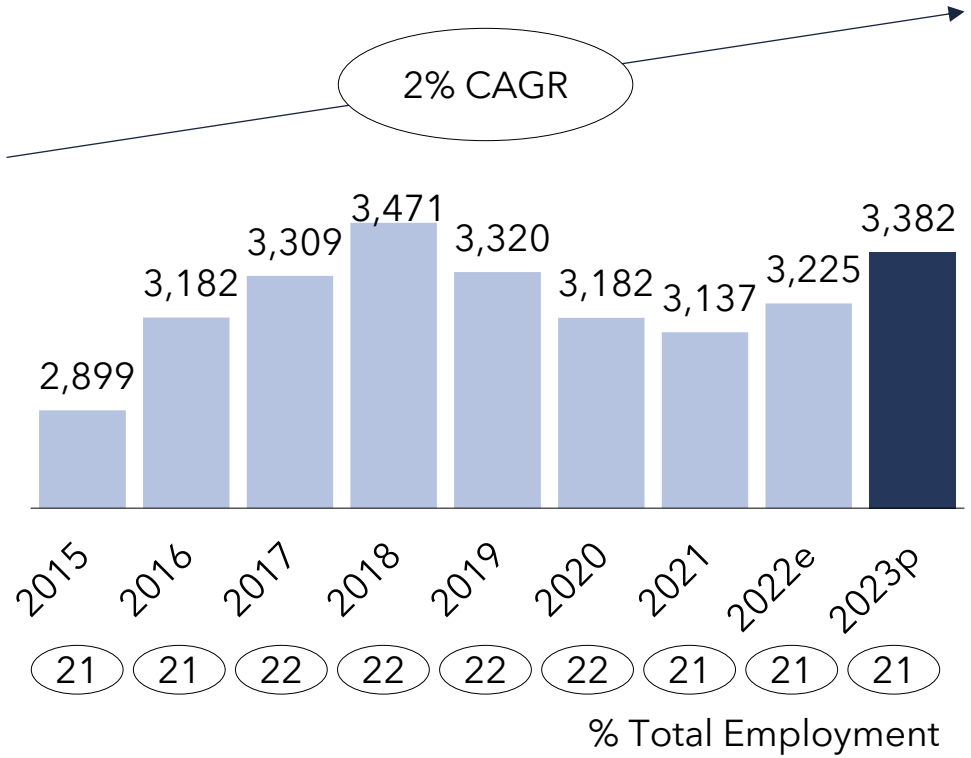
RM Billion



- Tourism directly contributed RM81bil to national GDP in 2023 (79% of 2019 figures)
- 2015 – 2023 CAGR: 1%
- 2015 – 2019 CAGR: 8%
- 2020 – 2023 CAGR: 42%

Employment in Tourism Industry (2015 – 2023)

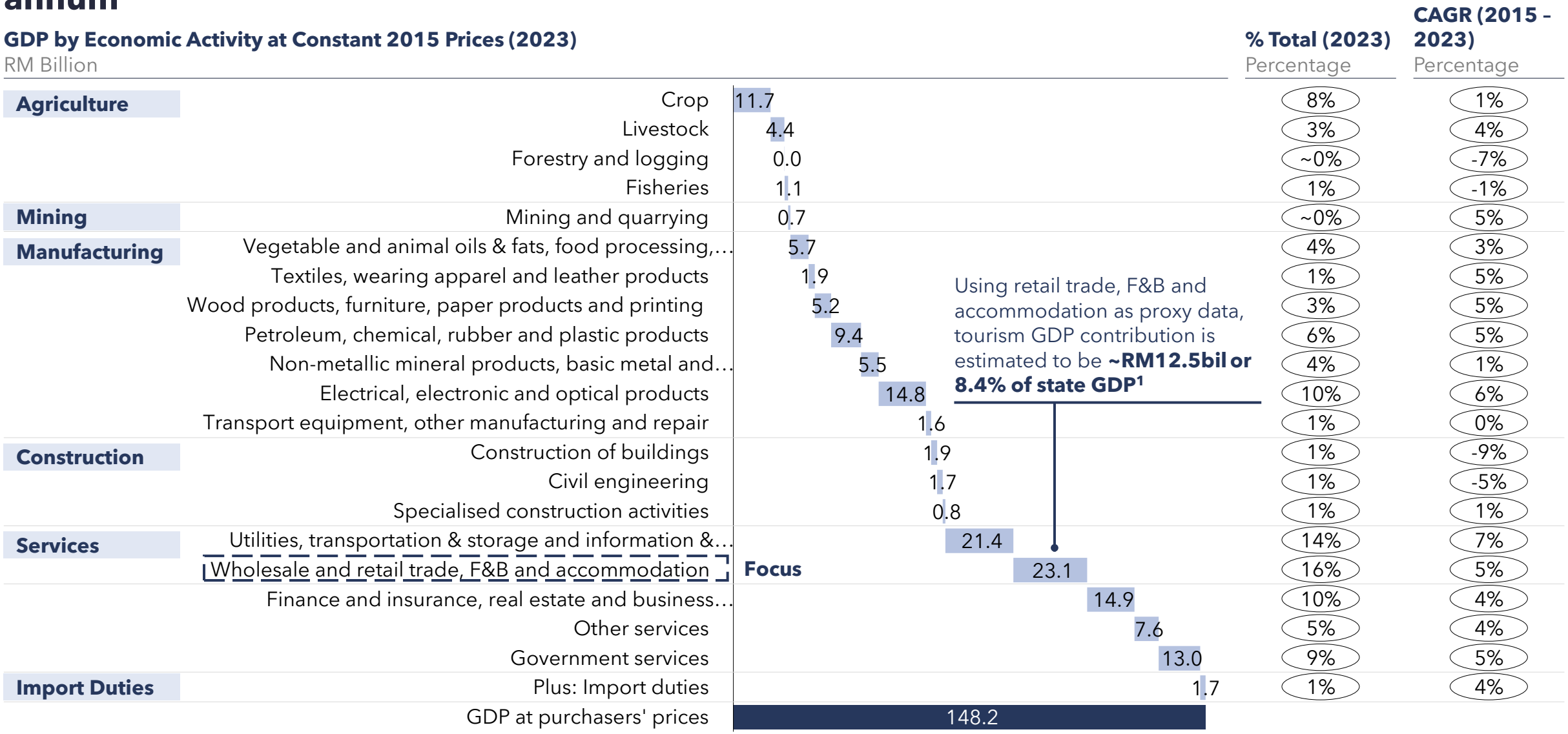
Number of Employee (Thousand)



- Tourism industry employed ~3.4mil people (2% above 2019 figures)
- 2015 – 2023 CAGR: 2%
- 2015 – 2019 CAGR: 3%
- 2020 – 2023 CAGR: 2%

Note: [1]Direct contribution only, actual contribution (including indirect contribution) may be higher
Source: DoSM, PASB Analysis

Johor's tourism industry represents ~8% of the state's GDP and has grown at a decent 5% per annum



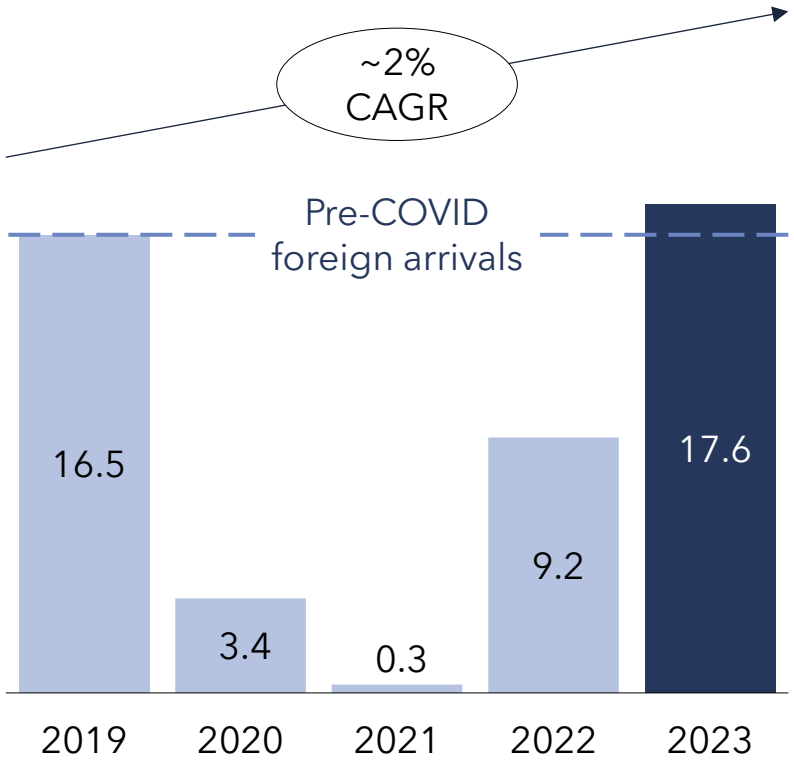
Note: [1]"Retail trade, F&B and accommodation" sub-segments' contributions were used to estimate tourism's GDP contribution to the state. Under "wholesale and retail trade, F&B and accommodation" segment, excluding "wholesale trade" sub-segment means remaining sub-segments represent ~54% of segment total (Estimated based on national average). Considering only "F&B and accommodation" sub-segment, translates to ~RM3.5bil (~2.5% of total). Estimations are likely conservative, actual contribution could possibly be higher

Source: DoSM, PASB Analysis

17.6mil foreign arrivals into Johor recorded in 2023, surpassing pre-COVID figures; Arrivals from Singapore remains most prominent, representing ~80% of arrivals

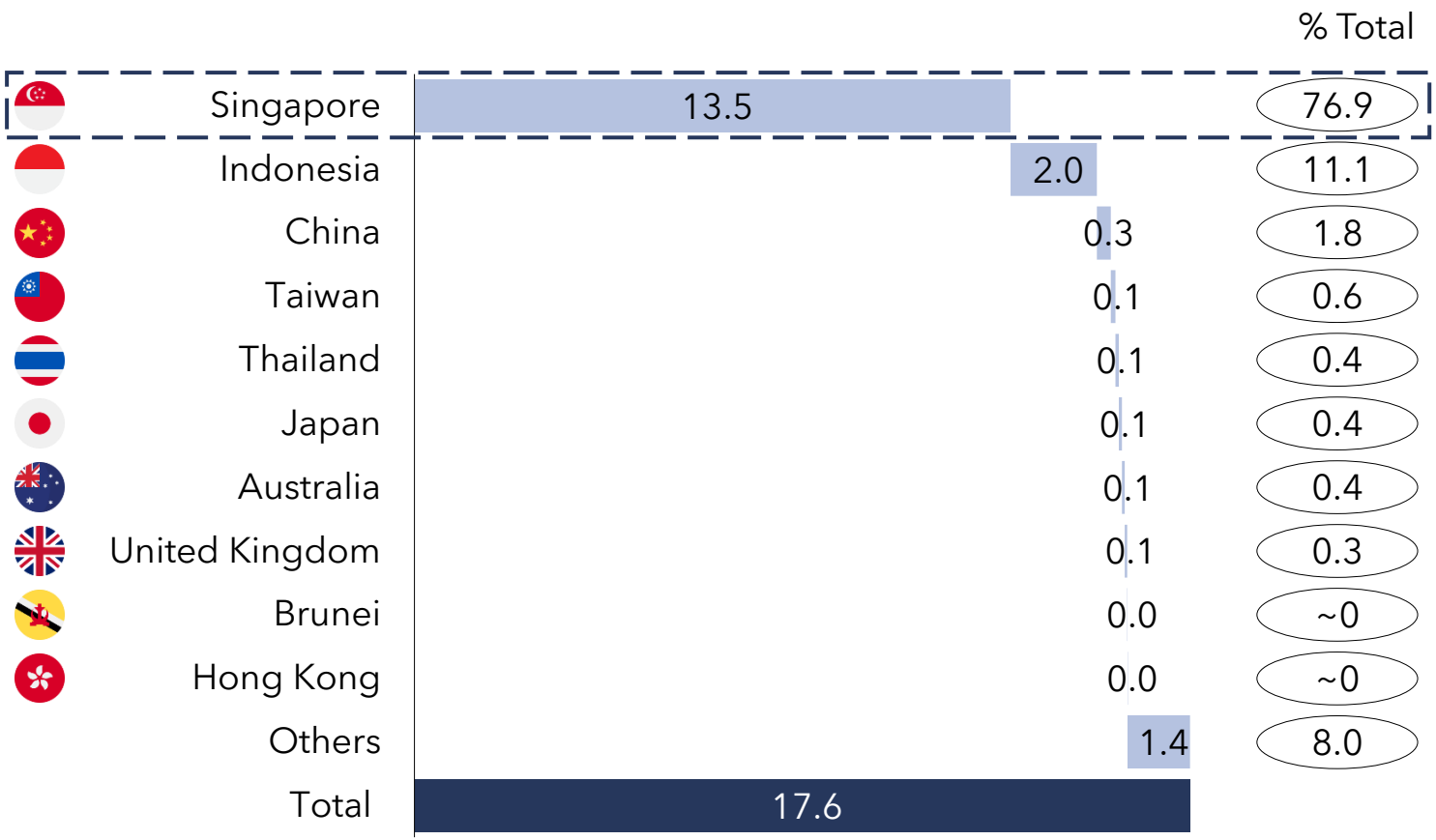
Foreign Arrivals Into Johor (2015 – 2023)

Number of Foreign Arrivals (Million)



Foreign Arrivals By Countries Into Johor (2023)

Number of Foreign Arrivals (Million)



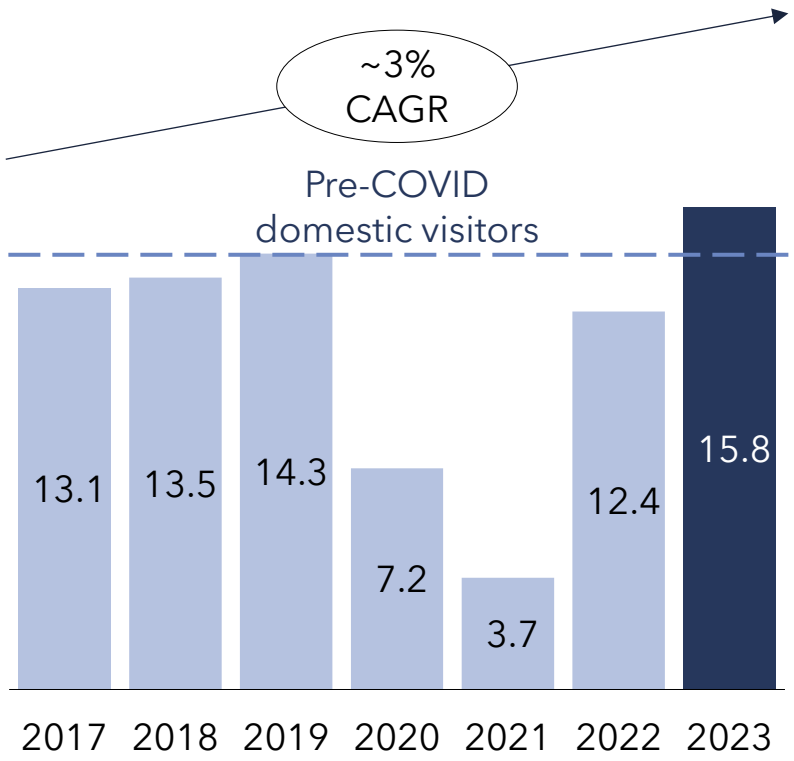
While foreign arrivals have been increasing, Johor's tourism potential could be further unlocked by also targeting growth of non-Singaporeans

Source: BPEN Johor Data Asas 2023

Domestically, Johor recorded 15.8mil visitors in 2023, making it the 7th highest in Malaysia, representing ~7% of national total…

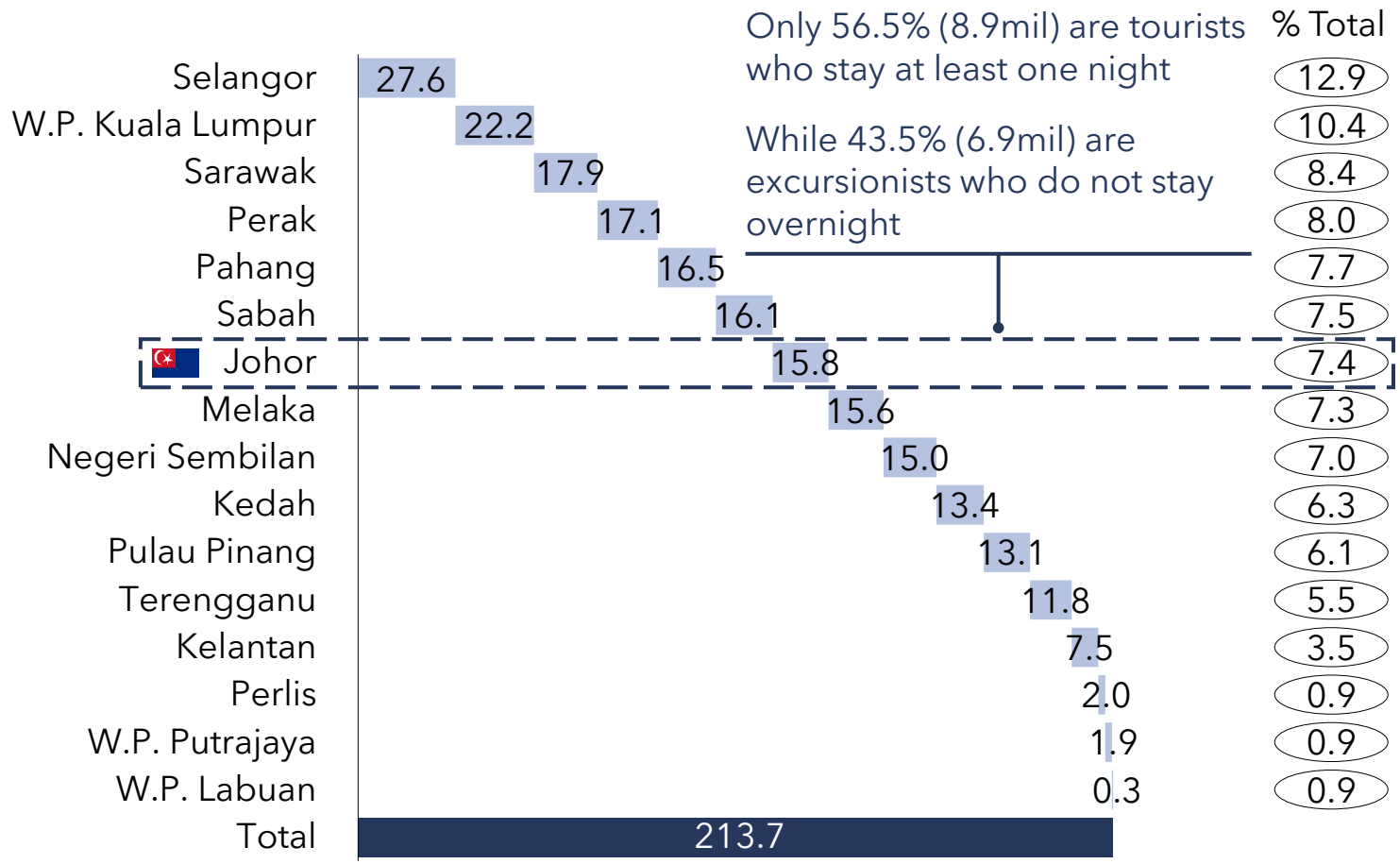
Domestic Visitors[1] in Johor (2017 – 2023)

Number of Domestic Visitors (Million)



Domestic Visitors By States (2023)

Number of Domestic Visitors (Million)



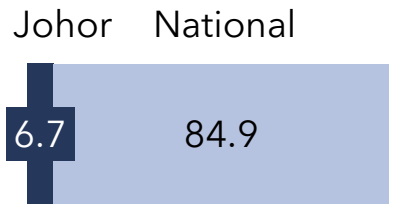
While domestic visitors have been increasing, there is likely still room to convert excursionists into tourists

Note: [1]Domestic visitors include both tourists and excursionists; Source: DoSM

...and spent ~RM7bil, driven by shopping, F&B, fuel, accommodation, transportation...

Domestic Visitors[1] Total Expenditure (2023)

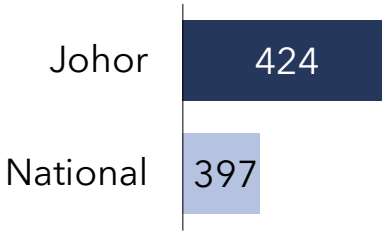
RM Billion



Johor's domestic visitors' expenditure represents 7.9% of national total

Expenditure Per Domestic Visitor (2023)

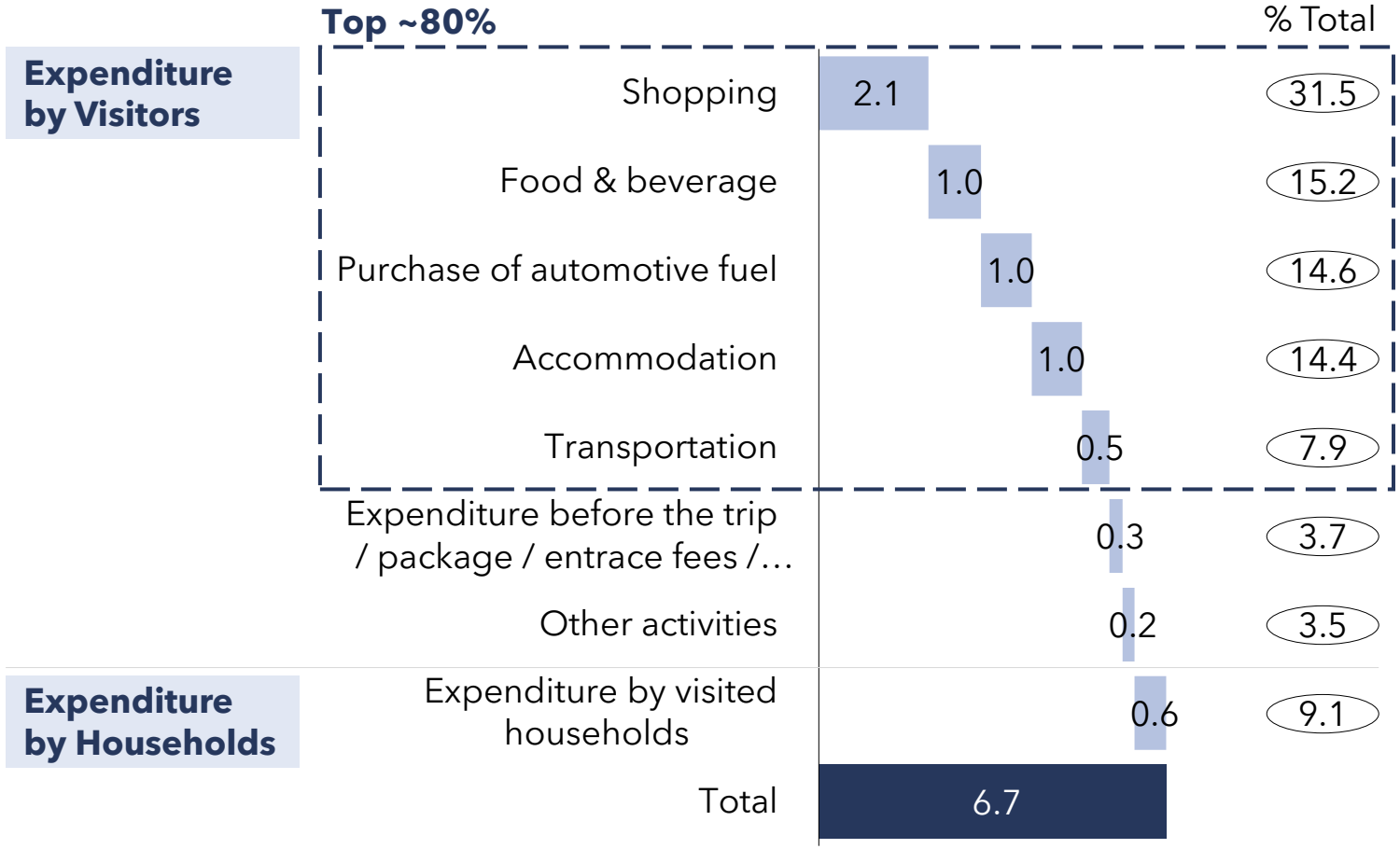
RM



Expenditure per capita in Johor is 6.7% higher than national average

Total Receipts from Domestic Visitors by Component

RM Billion

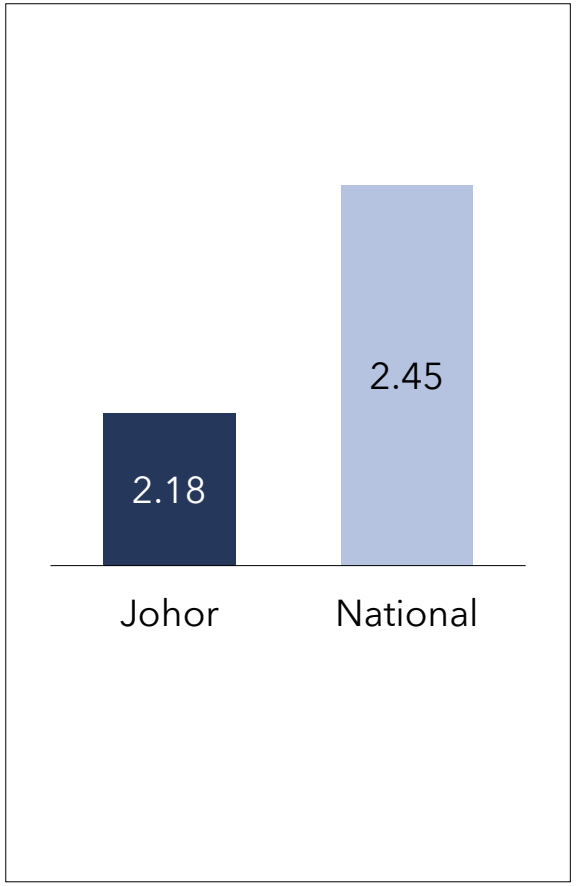


Note: [1]Domestic visitors include both tourists and excursionists
Source: DoSM

...and stays an average of 2.18 days since more than half of domestic tourists come to Johor to visit relatives and friends

Average Length of Stay (2023)

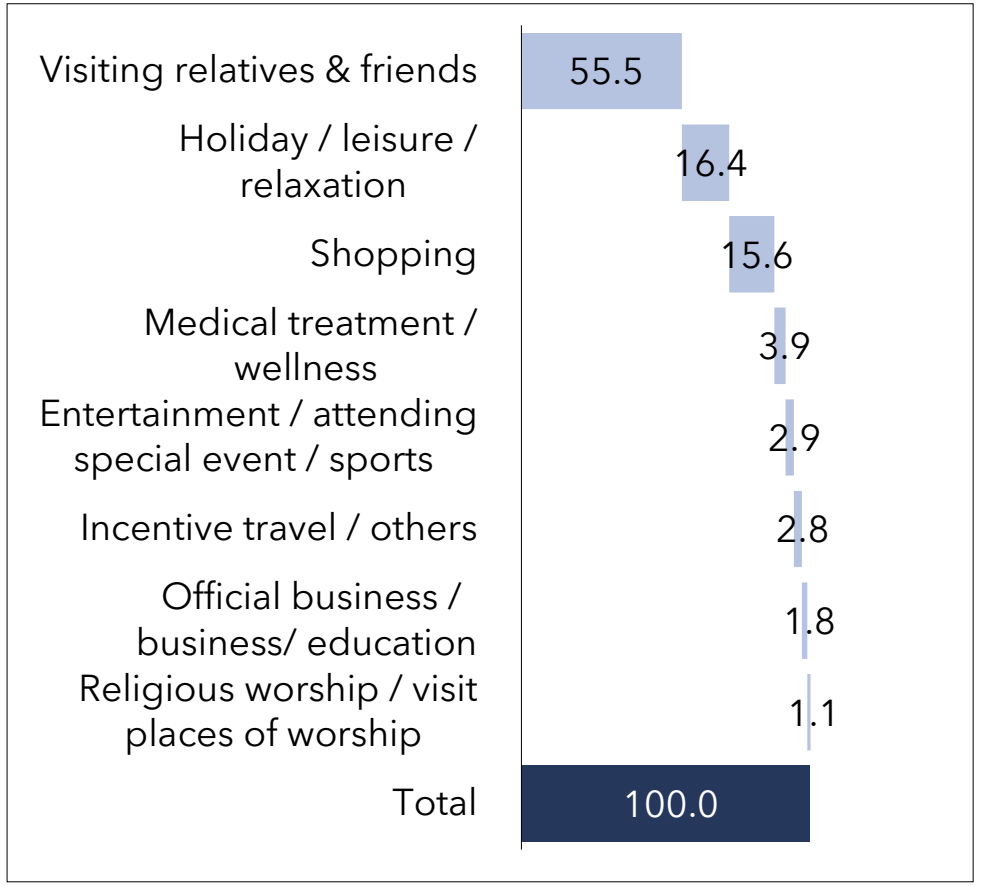
Number of Days



Average length of stay is 11% lower than national figures

Share of Domestic Trips by Purpose of Visit (2023)

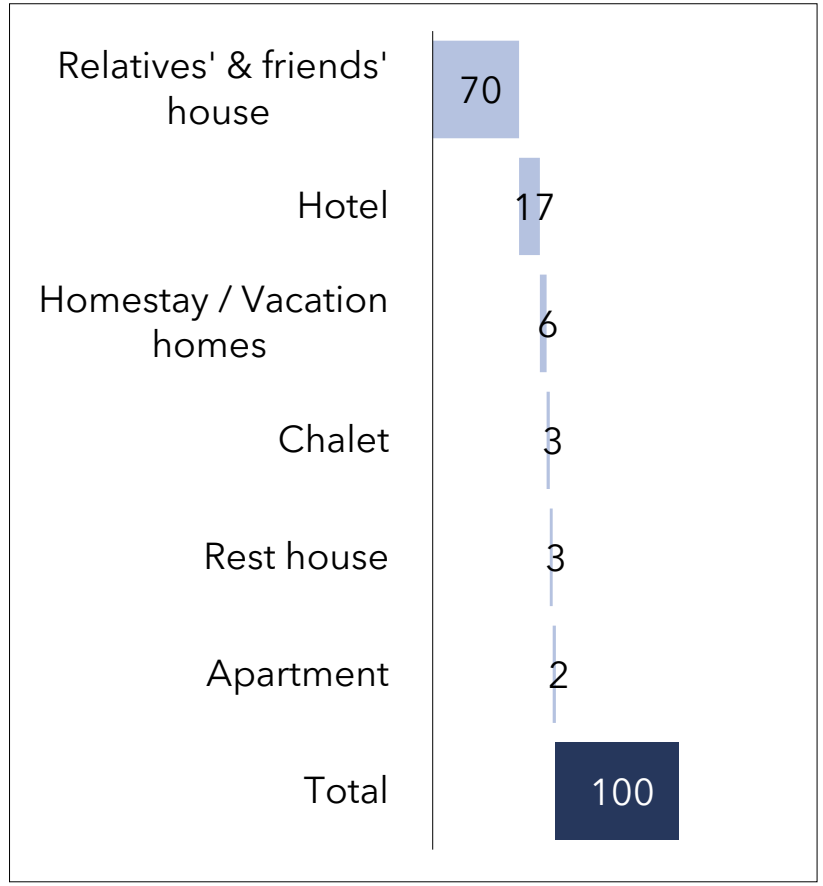
Percentage



~56% domestic tourists come to Johor to visit relatives & friends, which tend to be shorter trips

Tourist Arrivals by Accommodation (2023)

Percentage



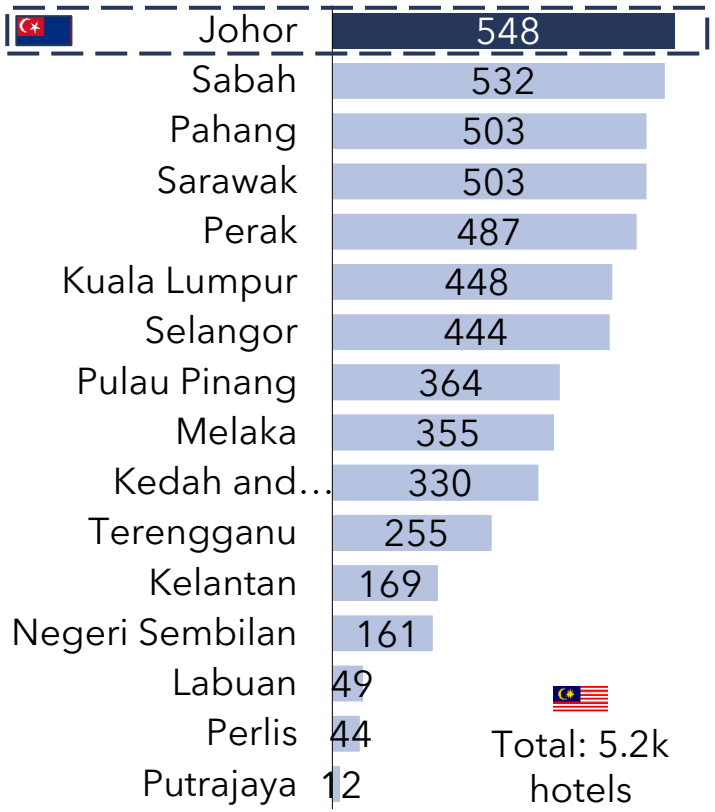
Moreover, ~70% of domestic tourists stay in relatives' & friends house

Note: [1]Domestic visitors include both tourists and excursionists
Source: DoSM

As a result, accommodations in Johor have an Average Occupancy Rate (AOR) of ~51%, mainly attributed to day-trippers and oversupply of rooms

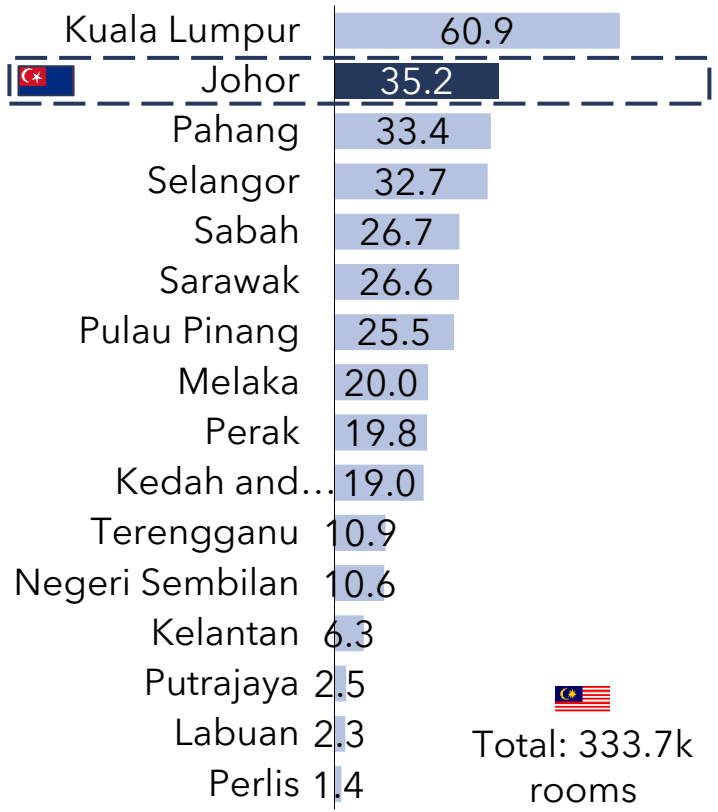
Johor has the most hotels in Malaysia...

Hotels By State
Number of Hotels



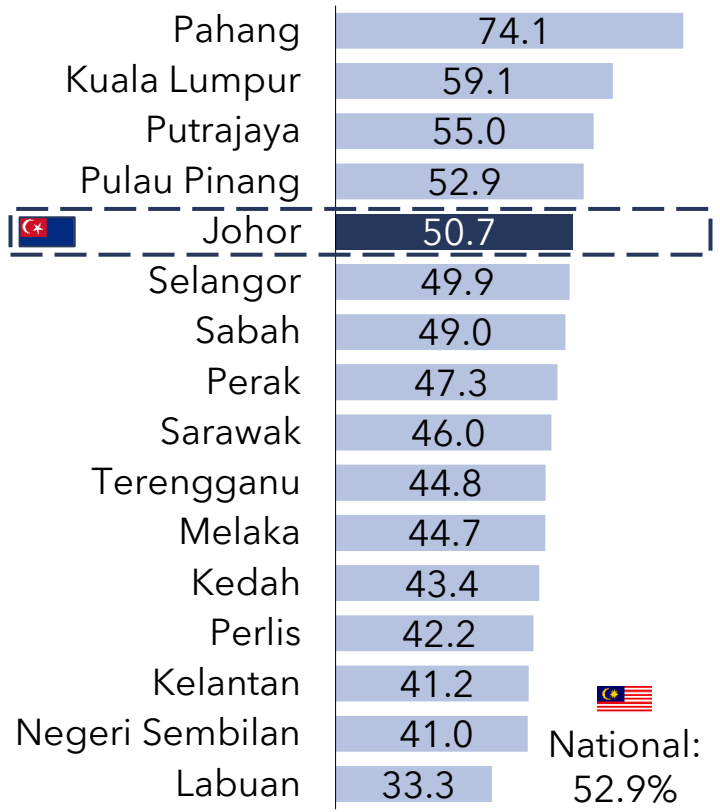
...and ranks 2nd by room supply...

Rooms By State
Number of Rooms (Thousands)



...and has an AOR of 50.7%, below the national AOR of 52.9%

Average Occupancy Rates (AOR)
Percentage



Source: Tourism Malaysia

There are 15 entry points into Johor and 96% of foreign arrivals were via land, with the already congested BSI and KSAB representing the bulk of arrivals

15 entry points total into Johor via land, air and sea

Foreign Tourist Arrivals by Entry Point In Johor (2023)

Million

		Focus	% Total	
Land	Bangunan Sultan Iskandar (BSI)	44.5	64	~96
	Kompleks Sultan Abu Bakar (KSAB)	21.7	31	
	Woodlands Train Check Point	1.0	1	
Air	Senai International Airport	1.2	2	~2
Sea	Stulang Laut	0.3	~0	~2[1]
	Pelabuhan Tanjung Pelepas	0.2	~0	
	Pasir Gudang	0.2	~0	
	Puteri Harbour	0.2	~0	
	Kukup	0.1	~0	
	Muar	0.1	~0	
	Minyak Beku	0.0	~0	
	Tanjung Pengelih	0.0	~0	
	Desaru Coast Ferry Terminal	0.0	~0	
	Tanjung Belungkor	-	0	
	Sebana Cove	-	0	
	Total	69.5		

Details

Land arrivals:

- Represents 96% of foreign arrivals, with 99% of land arrivals represented by BSI and KSAB
- No efficient alternatives for now, which could be one of factors causing chronic congestion at checkpoints

Air arrivals:

- Only 2% arrive via air, indicating lack of global connectivity
- Top international flights are to / fro Jakarta and Bangkok

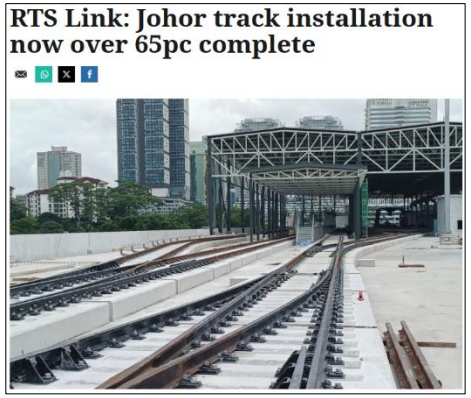
Sea arrivals:

- Only 2% arrive via sea, not the vast majority's preferred mode of transportation

Note: [1]Rounding errors
Source: BPEN Johor (Data Asas Johor 2019 – 2023)

Ongoing efforts to decongest checkpoints and improve land connectivity…

RTS is almost 65% complete, on track to be completed by 2026


RTS Link: Johor track installation now over 65pc complete

*"The project's operator, RTS Operations Sdn Bhd (RTSO), **expressed confidence that the progress is on schedule**, with ongoing work concentrated at the Wadi Hana Depot area"*

LRT or tram-bus network to ease congestion further

Malaysia looking at LRT or tram-bus system for RTS Link to ease congestion in JB

*"The Malaysian government is looking to **build a light rail transit (LRT) or a tram-bus network in Johor Bahru** and its surrounding districts, in a **move to ease congestion once the Johor Bahru-Singapore Rapid Transit System (RTS) Link from Woodlands is completed"***

Fixes at checkpoints to facilitate people movement

Johor rolls out major fixes for Causeway congestion — expect faster checkpoints, better facilities

*"…**implementation of a QR code system for car lanes** at both the Sultan Iskandar Building (BSI) and the Sultan Abu Bakar Complex (KSAB), as well as **enforcement measures against factory buses**…*
*…Immigration Department **staff shifts will be reorganised** to increase the efficiency of the passport counters and the **opening of a pedestrian walkway** from Jalan Lingkaran Dalam to the BSI entrance's bus lane…*
*…replacement of aging infrastructure such as elevators, escalators and travellators to **improve the condition of facilities at BSI"***

And others e.g., operationalisation of **Gemas – Johor Bahru electrified double-tracking project** in Q2 2025

Source: Various news articles, PASB Analysis

...Senai International Airport expansion plans will build global air connectivity, attracting new tourist segments and diversifying foreign arrivals mix

Senai International Airport expansion plans...

Qatar Airways has shown interest in landing at Senai airport, says Johor MB

ISKANDAR PUTERI: Johor Baru could soon be one of the destinations for Qatar Airways with the airline showing interest in landing at Senai International Airport.

Johor Mentri Besar Datuk Onn Hafiz Ghazi said that recently, he and a delegation accompanied Johor Regent Tunku Ismail Sultan Ibrahim on a visit to Doha.

"During our visit to Qatar, we met with several key players there. One of them was Qatar Airways, which showed interest in landing at Senai International Airport and setting up their maintenance, repair and overhaul (MRO) centre there.

"Qatar Airways is requesting for more information from the state government especially in terms of logistics and we have sent all the necessary documents and data required by them on Monday (Jan 13)," he added.

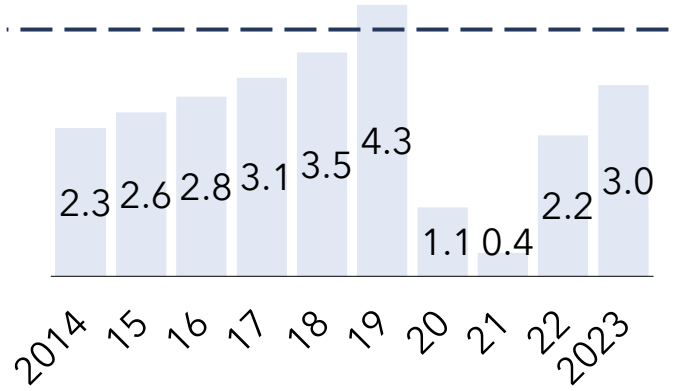
Onn Hafiz said this when met after attending the Johor economic transformation programme strategic workshop with state civil servants at a hotel here on Thursday (Jan 16).

*"Federal government has allocated **RM2bil** to carry out **upgrading works** at Senai International Airport...*

*...Johor Baru could soon be one of the destinations for **Qatar Airways** with the airline **showing interest** in landing at Senai International Airport"*

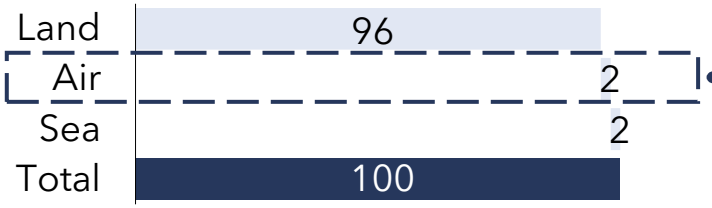
...will likely attract new tourist segments and transform foreign arrival mix

1 Total Passengers Handled (2014 - 2023)[1], Number of Passengers



Over **80%** of passengers served are **domestic**; Global connectivity improves as more international airlines land in Senai, bringing in **international passengers** globally

2 Foreign Arrival by Mode of Transport, Percentage of Total



Arrivals by air likely to grow, **diversifying arrival mix** to beyond Singapore arrivals

Note: [1]Includes arrival and departure for domestic and international flights, excludes transit
Source: Various news articles, MOT, Senai Airport Terminal Services (SATS), PASB Analysis

To unlock Johor's full tourism potential, it must leverage on its unique tourism assets, which offer a unique blend of retail, culture, nature, heritage and history (1/4)

NON-EXHAUSTIVE

District	Unique Selling Point (USP)	Places of Interest	Reactional Activities	Illustrative Examples
1 **Johor Bahru**	• Known as "The Southern Gateway", it is the main gateway between Malaysia and Singapore via 1st and 2nd link • Well-developed and diverse **retail landscape**	• Kompleks Kraf Johor • Zoo Johor • Muzium Tokoh • Puteri Harbour • Laman Mahkota Istana Bukit Serene • Masjid Jamek Sultan Abu Bakar • Gurdwara Sahib • Glass Temple • Chinese Heritage Museum • Johor Ancient Temple • Church of Immaculate Conception • Stadium Sultan Ibrahim • Yayasan Warisan Johor	• Legoland Malaysia • Austin Heights Water Park • Xpark Sunway Iskandar • Blueice Skating Rink • Tunku Mahkota Ismail Youth Centre • Shopping: – Toppen – JBCC – KSL – AEON Tebrau – IKEA Tebrau – Mid Valley South Key – Paradigm Mall Johor Bahru	
2 **Muar**	• Celebrated as a **cultural hub** • Birthplace of traditional arts e.g., Zapin dance and Ghazal music • Cleanest Tourist City in ASEAN in 2018	• Maharani Mural Lane • Muar Art Gallery • Muar Cultural Walk • Muar River Cruise • Pagoh Education Hub	• Pantai Leka, Parit Jawa • Kolam Air Panas, Sungai Gersik	

Source: Tourism Johor

To unlock Johor's full tourism potential, it must leverage on its unique tourism assets, which offer a unique blend of retail, culture, nature, heritage and history (2/4)

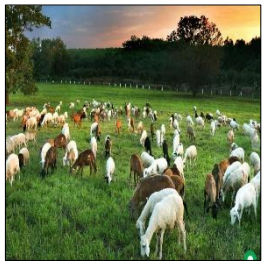
NON-EXHAUSTIVE

District	Unique Selling Point (USP)	Places of Interest	Reactional Activities	Illustrative Examples
3 Batu Pahat	• Worthwhile destination for visitors seeking **natural beauty** (e.g., beaches) and **rural villages**, complemented by friendly locals	• Old Street Commercial Centre • Ladang Nanas Kampung Parit Tengah • Bandar Seramik Ayer Hitam	• Taman Rekreasi Tasik Y • Pantai Minyak Beku • Pantai Punggur • Pantai Sungai Lurus • Pantai Teluk Warisan • Batu Pahat Pump Track	
4 Kota Tinggi	• Known as the "Tourism **Historical** District", it is rich in historical treasures, coupled with breath-taking waterfalls, forests and **beaches**	• Kampung Makam • Makam Cik Siti Jalang • Muzium Kota Johor Lama • Muzium Kota Tinggi • Muzium Nelayan	• Desaru Coast Adventure Water Park • Kota Tinggi Firefly Park • Desaru Fruit Farm • Air Terjun Kota Tinggi	
5 Mersing	• Famous for **ecotourism** (e.g., Endau-Rompin Johor National Park), which is one of the oldest forest reserves in the world • Visitors can also visit **7 islands** nearby, surrounded by the South China Sea	• Jeti Nelayan Teluk Buih • Mersing Bee Farm • Laman Samudera • Pantai Penyabong	• Geopark Mersing • Teluk Gorek • Pantai Air Papan • Setindan View • Far East Planet Agrofarm • Endau-Rompin Peta	

Source: Tourism Johor

To unlock Johor's full tourism potential, it must leverage on its unique tourism assets, which offer a unique blend of retail, culture, nature, heritage and history (3/4)

NON-EXHAUSTIVE

District	Unique Selling Point (USP)	Places of Interest	Reactional Activities	Illustrative Examples
6 Segamat	• Fertile soil suitable for growing durian, making it the "Land of the King of Fruits" • Also well-known for **ecotourism** (e.g., Taman Negara Johor Endau-Rompin Selai)	• Jambatan Putus Buloh Kasap • Labis Sunrise Farm • Taman Negara Johor Endau-Rompin Selai • Air Terjun Sungai Bantang, Bekok	• Taman Eko Rimba Taka Melor • Kolam Air Panas Labis	
7 Pontian	• "Tanah Terhujung Benua Asia", which means the land at the end of the Asian Continent • Known for **ecotourism** e.g., national forests, **mangrove swamps** • Famous for its pineapples	• Taman Negara Johor Pulau Kukup • Kelong Sri Pantai Pontian • Tugu Nanas Pontian • Muzium Bugis	• Taman Rekreasi Sungai Rambah • Pasar Nelayan Sungai Ayer Baloi	
8 Kluang	• Surrounded by hilly terrains with waterfalls, it is a popular **hiking location** amongst hikers • Also known to be an **agrotourism** destination	• UK Farm Agro Resort • Hutan Lipur Gunung Belumut • Kahang Adventure Eco Camp • Dataran Tasik Kluang • Kluang Street Art	• Taman Rekreasi Gunung Lambak	

Source: Tourism Johor

To unlock Johor's full tourism potential, it must leverage on its unique tourism assets, which offer a unique blend of retail, culture, nature, heritage and history (4/4)

NON-EXHAUSTIVE

District	Unique Selling Point (USP)	Places of Interest	Reactional Activities	Illustrative Examples
9 Kulai	• Rapid development opportunities, being only 29km away from Johor Bahru, equipped with various **shopping malls** (e.g., Johor Premium Outlet)	• Putuo Village • Hutan Bandar Putra Kulai • IOI Palm Villa Golf	• Let's Art @ Sawit • Lorong Kita • Rainforest Tree House • Star Fish Leisure Farm • Shopping: – Johor Premium Outlet – IOI Mall Kulai – AEON Mall Kulai	
10 Tangkak	• Houses the highest mountain in the South Peninsular of Malaysia, Gunung Ledang, also known for **ecotourism**	• Dataran Tangkak • Sawah Ring	• Taman Negara Johor Gunung Ledang • Taman Awam Tanjung Agas	

Source: Tourism Johor

Tourist journey roadmap reveals potential focus areas along each touchpoint[1]

	Tourism Promotion and Marketing	Entry / Exit Points and Transportation	Accommodation	Urban Tourism	Tourism Niches / Sub-segments
Description	**Activities:** • Targeted tourism promotion and marketing via offline and online channels **Focus areas:** • Improve websites and develop high-quality content • Increase social media presence via influencer collaboration • Utilise SEO to improve Johor's visibility	**Activities:** • Immigration and customs clearance • Public transportation • E-hailing **Focus areas:** • Land: Improve border crossing productivity via digitalisation, capacity expansion, new causeways, RTS; Improve public transportation services • Air: Improved air connectivity • Sea: International cruise ships berth in major Johor seaports	**Activities:** • Accommodation and hospitality services • Recreational facilities • Wellness and spa **Focus areas:** • Premium / Luxury accommodations with strong international presence	**Activities:** • Landmark tourism • Cultural and historical experiences • Retail experiences • F&B **Focus areas:** • Rejuvenate city with prominent landmarks and high walkability • Transform retail and F&B landscape – Premium / luxury malls – Large-scale duty-free complexes – Gastronomic hubs	**Activities:** • Immersive experiences • Corporate meetings and events • Medical treatments and packages • Events and festivals **Focus areas:** • Ecotourism / Cultural tourism • MICE tourism • Medical and wellness tourism • Sports tourism • Events
Stakeholders	TOURISM JOHOR MINISTRY OF TOURISM, ARTS & CULTURE MALAYSIA	MMC SenaiAirport PAJ prasarana	Hilton HOTELS & RESORTS Amari BRIGHTEN YOUR WORLD RENAISSANCE HOTELS thistle KSL HOLDINGS BERHAD SUNWAY HOTELS & RESORTS	JCORP Johor Corporation WCT JOHOR PREMIUM OUTLETS IGB BERHAD JOHOR BAHRU CITY SQUARE KOMTAR JBCC IKANO	ISKANDAR INVESTMENT DESARU COAST MALAYSIA THE WESTIN DESARU COAST RESORT ANANTARA DESARU COAST RESORT & VILLAS JOHOR NATIONAL PARKS EduCity Iskandar Malaysia Hard Rock HOTEL DESARU COAST One&Only DESARU COAST Malaysia SUNWAY KPJ

Note: [1]Non-exhaustive
Source: PASB Analysis

Both federal and state governments are committed to promote the tourism industry, it is now an opportune moment to unlock Johor's tourism potential

Prime Minister YAB Dato' Seri Anwar Ibrahim launched Visit Malaysia 2026 (VM2026) on 6th January 2025...

- Theme: **"Surreal Malaysia"**
- Campaign launched on 6th January 2025

35.6mil
International Tourists Targeted

RM147.1bil
Tourism Receipts

RM550mil
Allocated for Tourism Promotion

...Visit Johor Year 2026 (VJY2026) will take place in parallel, promoting its culture, nature, heritage and history...

- Theme: **"Majestic Johor"** to exhibit cultural richness, nature, heritage, history

RM67.6mil
Allocated for Tourism Development (2024)

12mil
Foreign Tourists Targeted

...and the tourism industry's growth can be catapulted via the Johor-Singapore Special Economic Zone (JS-SEZ)

- Ambitious initiative by Johor government to strengthening **cross-border economic collaboration with Singapore**
- Agreement **improves flow of goods and enable freer movement** between Johor and Singapore, which facilitates development of tourism sector
- **4 zones** in JS-SEZ targeted for tourism (Non-exhaustive):
  - Sedenak
  - Senai-Skudai
  - Desaru
  - Iskandar Puteri

Source: Tourism Malaysia, Tourism Johor, various news articles

Post COVID-19, preferences of APAC tourists have generally shifted towards more authentic, localised and specialised experiences; Johor's tourism industry should be aligned with this

APAC Region Tourism Trends and Key Success Factors

NON-EXHAUSTIVE

01

Shifting tourist preferences towards **secondary destinations**, or less crowded destinations

Key Success Factor:
- Enhance basic tourist-friendly amenities
- Improve rural connectivity (i.e., road / expressways and efficient public transportation)

02

Growing prominence in **authentic, experiential travel experiences**, closely connecting tourists with local **culture** and **cuisine**

Key Success Factor:
- General upskilling of tour guides to showcase local culture and cuisine (i.e., linguistic abilities, local expertise and specialised knowledge)

03

Growing emphasis on **ecotourism / nature / sustainable tourism**

Key Success Factor:
- Integrated resorts near beach or nature
- Enhance basic tourist-friendly amenities
- Improve rural connectivity (i.e., road / expressways and efficient public transportation)

04

Rise in specific purpose-driven travel, such as, **MICE** and **sports tourism**

Key Success Factor:
- State-of-the-art facilities and infrastructure with capacity to handle large international events

05

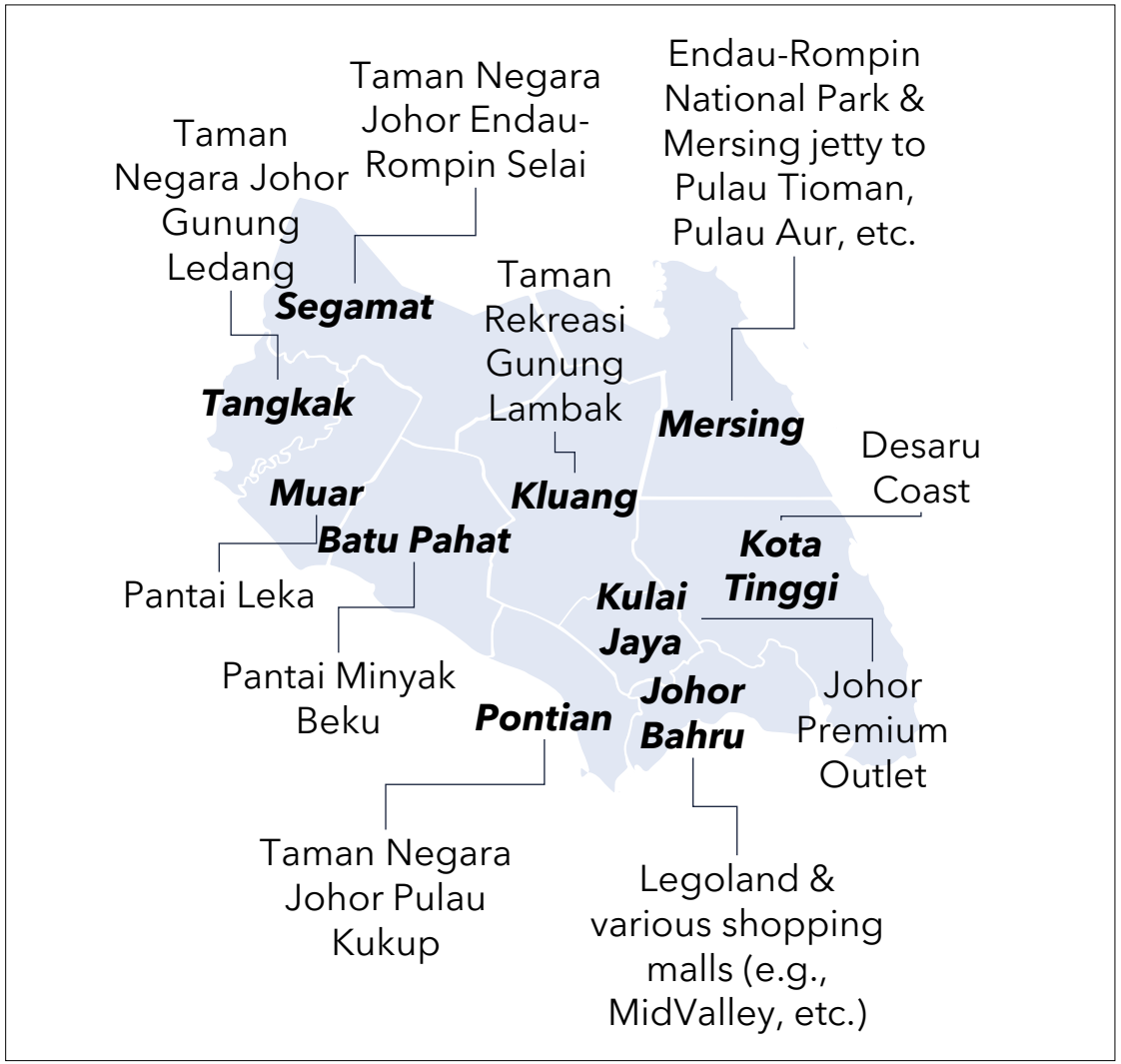
Leveraging **technology** to develop **personalised** travel itineraries and booking

Key Success Factor:
- Improved digital adoption across the tourism industry

Source: PASB Analysis

Despite Johor's abundance of attractions, its vast 19,166 km² area means tourism sites are geographically fragmented

Overview of Tourism Attraction Sites by District



Source: PASB Analysis

The "Givens": Benefits and Challenges of Johor's Large Land Mass

Benefits

Diverse attractions
Wide-array of tourism products, from beaches and islands to rainforests, mountains, and cultural sites

Significant room for expansion
Vast area supports large-scale tourism infrastructure projects, such as theme parks, cruise terminals, integrated resorts, potentially attracting significant foreign investment

Reduced overcrowding
Wide distribution of attractions can help prevent overcrowding, enhancing visitor experience and environmental pressure

Challenges

Geographical fragmentation
Attractions are widely dispersed, making it challenging for tourists to visit multiple sites efficiently

Transportation & connectivity
Greater distances require greater investment in roads and public transportation

Promotion & marketing
Promoting a unified destination image is challenging, diluting brand and tourist experience

Successful global tourism destinations often possess diverse yet interwoven tourism ecosystems; A strong tourism ecosystem encourages tourists to stay longer and spend more

What we can learn from successful tourism destinations

Why learn from Singapore?

5th most visited city in the world, 2nd in Asia-Pacific

Why learn from Penang?

UNESCO World Heritage Site

Why learn from Dubai?

From desert to global luxury hub

Key success factor: Diverse yet interwoven tourism ecosystem

Diverse Range of Tourism Activities
Wide variety of high-quality experiences, creating a significant "tourist pull factor"

Rich in History and Culture
Well-preserved heritage sites, vibrant cultural events, offers tourists a localised experience

Tourist-Friendly Attractions
Safe, clean, accessible and well-kept attractions, with a highly skilled hospitality workforce

Reliable Public Transportation
Frequent, punctual, comfortable public transportation

Strong International Connectivity
Well-connected airports, seaports, border crossings, with efficient customs processes

Strong Promotion, Marketing and Brand
Strong targeted marketing campaigns crystallises tourism branding, making it top-of-mind for tourists

Adopting an ecosystem perspective and driving overall ecosystem improvement is pivotal to increase average stay length and tourist expenditure

Source: PASB Analysis

Johor's integrated tourism ecosystem possesses strong potential to become a welcoming and globally recognised destination

Question

"How do we establish a welcoming world-class destination for integrated sustainable tourism?"

Success Factors

Welcoming

Johor would not just be another one of your average one-time getaways, but rather – an unforgettable haven where every corner feels familiar, every smile feels sincere, culminating in an embrace that lingers long after you've left. A forever home you'll always yearn to return to

World-Class

Positioning Johor as not just another dot on the map, but a landmark destination where impeccable care and unique experiences redefine hospitality - crafting moments so extraordinary, they set a new benchmark for every journey after

Integrated

Beyond isolated experiences, Johor offers a well-connected and diverse tourism ecosystem - where Johor's natural, cultural, entertainment, experiential, shopping and sporting riches converge through accessible connectivity to deliver a seamless journey greater than the sum of its parts

Sustainable

Not just built for today, but a living, resilient tourism landscape - adaptable to change, fortified against shocks, and dedicated to preserving Johor's tourism legacy for generations to come

Urban rejuvenation and tourism sub-segments should be prioritised to establish a strong "pull factor" for foreign tourists to visit Johor

NON-EXHAUSTIVE

Urban Tourism

Objective

To position JB city as a globally recognised modern city by enhancing its urban infrastructure, cultural vibrancy; Creating a strong and positive impression that attracts and retains international tourists

Focus Areas

- Rejuvenate city with prominent landmarks and high walkability
- Transform retail and F&B landscape:
  - Establish premium / luxury malls
  - Large-scale duty-free complexes
  - Gastronomic hubs

Tourism Sub-Segments / "Tourism Niche"

Objective

To carve a niche and strengthen Johor's unique tourism ecosystem, attracting diverse tourist segments, enhancing average stay length and spend per capita

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- Ecotourism
- MICE tourism
- Medical and wellness tourism
- Sports tourism

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Johor Bahru is the state's main city and has strong potential to become a leading urban tourism destination

What Urban Tourism Is

- Urban tourism involves visiting cities to experience cultural, historical, and modern attractions like museums, monuments, and nightlife
- Activities include:
  - Sightseeing
  - Events
  - Shopping
  - Cultural experiences

Asia-Pacific Best Cities by Ranking[1]

#1	Singapore	#52	Bandung
#6	Bangkok	#53	Manila
#10	KL	#60	Da Nang
#23	Jakarta	#68	Surabaya
#28	Hanoi	#85	Pattaya
#29	Johor Bahru	#87	Medan
#31	Penang	#90	Malang
#31	Ho Chi Minh	#91	Davao City
#41	Phnom Penh	#92	Cebu
#48	Denpasar	#98	Ipoh

- Johor Bahru is ranked #29
- Only behind Singapore, Bangkok, KL, Jakarta and Hanoi, out of Asia-Pacific cities

Urban Rejuvenation Opportunities

While Johor Bahru has a relatively desirable ranking, there is still an opportunity for improvement and consider continuous urban rejuvenation

01

Enhance tourism appeal since this is Johor's main city, it is likely

02

Catapult urban development by leveraging ongoing public transportation development projects e.g., RTS, EART

Note: 1Gauged based on a city's livability (quality of life), lovability (cultural appeal, recreation, etc.), prosperity (economic opportunity, infrastructure, etc.)
Source: 2025 Asia-Pacific Best Cities Report (Resonance and Ipsos), PASB Analysis

Successful urban rejuvenations strike the right balance between modernity, preservation, connectivity and sustainability

Selected Case Example	Description of Example	Rationale of Case Example	Key Success Factors of Case Example
Docklands, London, UK	• Vibrant tourism and business district in East London • Transformed from city's industrial docks into a mixed-use waterfront area • Includes Canary Wharf, Royal Docks, etc.	• Prime example of successful urban rejuvenation (i.e., transformation of a declining waterfront into a vibrant, attractive urban district)	• Creation of **London Docklands Development Corporation**, a dedicated authority with powers over land acquisition, planning, infrastructure renewal • Well-connected **public transportation** to complement future development (i.e., DLR[1], Jubilee Line) • Strong **Public-private Partnership (PPP)** • Anchor **landmark sites** (e.g., Canary Wharf skyscrapers)
Puerto Madero, Buenos Aires, Argentina	• Revitalised waterfront district along Rio de la Plata riverbank in the Central Business District (CBD) • One of Buenos Aires' trendiest and vibrant neighbourhoods	• One of the world's most successful waterfront renewal projects • Integration of public spaces and environmental improvement, enhancing city image	• Creation of **Corporación Antiguo Puerto Madero S.A.**, a dedicated public corporation, to coordinate overall redevelopment • **Flexibility** and adaptability of masterplan and land use • **Staged sale of land plots** to private developers, proceeds subsequently reinvested into public infrastructure, minimising state financial burden
Cheonggyecheon stream, Seoul, South Korea	• 5.8km-long urban waterway restored in 2005, making it one of the most scenic, pedestrian-friendly corridors in downtown Seoul • Enhanced Seoul's urban identity as a green, livable city	• Restoration spurred significant economic development in central Seoul, increasing property values in surrounding areas • Improved flood management and climate resilience • Resembles Sungai Segget flowing through JB City	• **Extensive consultation** with citizens, experts and stakeholders through a Citizen's Committee, building consensus and trust • **Struck the right balance** between historical preservation, environmental goals, flood control and urban infrastructure needs

Note: [1]Docklands Light Rail
Source: PASB Analysis

Urban landmarks are distinct unique features that stand out from its surroundings and could leave a lasting impression on tourists

While Johor Bahru already has remarkable landmarks…

Sultan Ibrahim Building

Menara JLAND

Sultan Abu Bakar State Mosque

Istana Bukit Serene

Jalan Tan Hiok Nee

Jalan Wong Ah Fook

…there is an opportunity to further establish landmarks to strengthen its tourism identity, leaving a lasting impression on tourists

Katara Towers
Doha, Qatar

- Inspired by crossed scimitar swords from Qatar national seal, symbolises its cultural identity
- Houses 2 ultra-luxury hotels with private residences and commercial spaces

Kingdom Centre Tower
Riyadh, Saudi Arabia

- Most distinct feature is its parabolic arch at the top of the tower, redefining Riyadh's skyline
- Houses a mix of offices, luxury hotels, apartments and award-winning Al-Mamlaka Mall

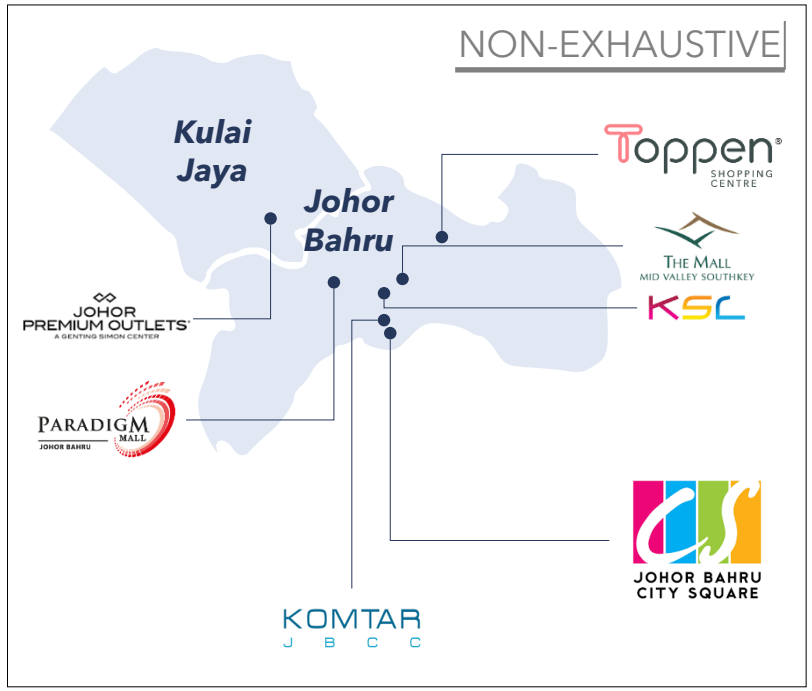
KOMTAR Tower
Penang, Malaysia

- Envisioned as a "city within a city" to revitalise George Town's urban centre
- Tallest infrastructure in Penang
- Houses a mix of office and retail space

Source: PASB Analysis

Amidst a healthy and diverse retail landscape in Johor, the state currently does not have a dedicated shopping district offering a consolidated retail experience

Selected Malls in Johor Bahru



- Johor Bahru and Kulai Jaya has a large variety and different tiers of shopping malls
- Respective shopping mall location considered to be fragmented
- Does not have a dedicated shopping district with malls consolidated in one area

Examples of Shopping Districts

Orchard Road
Singapore

2.2km upscale shopping area and major tourist attraction

Causeway Bay
Hong Kong

Bustling shopping district with luxury boutiques and department stores

Bukit Bintang
KL, Malaysia

Offers a unique mix of upscale malls, street vendors and entertainment

Upside to Johor: Benefits of a vibrant shopping district

Integrated, vibrant shopping district increases footfall

Raises property values in surrounding areas and encourages investments

Global recognition and positions JB as a dynamic metropolis

Source: PASB Analysis

Standalone premium / luxury duty-free malls could attract foreign high-value tourists with high willingness to spend

Case Examples: Standalone Duty-Free Malls

	Haikou International Duty-Free Complex Hainan, China	**Sanya International Duty-Free** Hainan, China	**Shinsegae Duty Free Myeongdong** Seoul, South Korea
Description	• World's largest duty-free shopping complex, blending retail, entertainment, and tourism on Hainan Island • Total mall area of 280,000m^2 • RMB12.8bil (USD1.8bil) investment value	• Landmark oceanside duty-free mall offering top global brands in a resort setting • Total mall area of 120,000m^2 (Phase 1)	• Premium urban duty-free experience set in the heart of Seoul's shopping district • Several duty-free floors in Shinsegae Department Store
Rationale of Case Example	• Positions Johor as the premier / luxury tourism destination with renowned brands at competitive prices • Attracts high-value tourists with high willingness to spend	• Duty-free retail can anchor tourism in a resort city	• Shows the power of urban integration-duty-free retail embedded in a vibrant city centre boosts both shopping and tourism
Key Success Factor	• Strong partnerships with global luxury brands to ensure competitive and vibrant retail mix	• Integration with hotels, entertainment, and tourism infrastructure to enhance visitor appeal	• Prime city-center location with high foot traffic and excellent transport links

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- Events and festivals (e.g., sports, cultural tourism)

Blessed with pristine islands and national parks, Mersing has immense potential to become a globally recognised ecotourism destination

Legend
- Town
- Beach
- Island
- Others[1]

Overview of Mersing's Selected Attractions

NON-EXHAUSTIVE

Details

1. Mersing Town
2. Taman Negara Endau-Rompin
3. Gunung Arong
4. Tasik Hijau Jemaluang
5. Pantai Tanjung Resang
6. Pantai Tanjung Leman
7. Pulau Mawar
8. Pulau Aur
9. Pulau Hujung
10. Pulau Tengah
11. Pulau Dayang
12. Pulau Harimau
13. Pulau Mensirip
14. Pulau Rawa
15. Pulau Besar
16. Pulau Mentigi
17. Pulau Tinggi
18. Pulau Pemanggil
19. Pulau Tioman[2]

Note: [1]Includes national parks, mountains and lakes; [2]Pahang
Source: mersing.gov.my

According to some tourists, some islands in the Mersing Archipelago have been described as "the Maldives of Malaysia"

NON-EXHAUSTIVE

Comments on Mersing Neighbouring Islands

*"The beaches **looked exactly like the ones I've seen in the Maldives** and dreamed about going to. I have never ever seen sea so blue or sand so white!"*

Anonymous Travel Blogger

*"In love with this island and I called it the **Malaysian version of Maldives** with white sands, nice beach, beautiful coral reefs and fishes while birds and peacocks walk or fly freely"*

Anonymous TripAdvisor Post on Pulau Rawa

Selected Illustrative Examples

Pulau Rawa

- One of the more developed islands in the area with notable resorts e.g., Rawa Island Resort
- 16 – 18km from Mersing Jetty, takes around 30 – 60 minutes via speedboat or ferry

Pulau Besar

- Moderately developed, relative to other islands
- 15 – 20 km from Mersing Jetty, takes around 30 – 45 minutes, subject to boat type

Pulau Aur

- More remote and rustic with limited accommodation (i.e., small resorts)
- 40 – 50km from Mersing Jetty, takes around 2 – 3 hours via ferry
- Irregular ferry services between Mersing and Pulau Aur

Source: PASB Analysis

While islands like Pulau Rawa and Pulau Tengah have relatively higher-end accommodations, there is still significant development potential across the Mersing archipelago

PRELIMINARY

Relative Maturity	Description	Island Name	Illustrative Examples: Accommodation Options
Category 1: Relatively Well-Developed	• More accommodation options, includes higher-end resorts and chalets • Relatively more commercialised with higher tourist footfall	• Pulau Rawa • Pulau Tengah	**Rawa Island Resort (3*)** Pulau Rawa **Batu Batu Resort (4*)** Pulau Tengah
Category 2: Low to Moderate Development	• Limited accommodation options, mostly small-scale resorts • Relatively less commercialised with lower tourist footfall	• Pulau Besar • Pulau Aur • Pulau Mensirip • Pulau Dayang • Pulau Hujung • Pulau Mawar • Pulau Harimau • Pulau Sibu • Pulau Tinggi • Pulau Pemanggil • Pulau Mentigi	**Aseania Beach Resort (3*)** Pulau Besar **D'Coconut Island Resort (3*)** Pulau Besar

Plots of land on islands identified for tourism development could be leased to private, globally recognised luxury resorts on a fixed-term basis to transform Mersing into a luxury tourism destination

Note: Categories defined based on online research; Some of these islands are more rugged and may be less suitable for resort development
Source: PASB Analysis

Initially, Maldives' tourism potential was doubted; Today, it is one of the world's top luxury destinations…

Maldives' Transformation Timeline

1970s: "Underdog"
- Unknown internationally
- Mainly a fishing village
- Kurumba[1] opened in 1972
- UNDP concluded tourism would not succeed due to lack of infrastructure

1980s: "Innovation"
- Introduction of "One Island, One Resort" (OROI) policy, ensures exclusivity and high-quality experiences
- Rapid infrastructure development

1990s: "Expansion"
- Growth in foreign investments and resorts
- Enhancement of global reputation as pristine, exclusive tourism destination

2000s: "Luxury"
- Redefined luxury tourism with world-class brands entering the market
- Maldives crystallised as high-end travel destination, attracting celebrities globally

Present: "Sustainability"
- Maintain long-term status as the top luxury destination
- More emphasis on marine conservation and local empowerment

Illustration

Kurumba Resort Maldives in the 1970s

Maldives is now a modern, luxury tourism destination

Overall development and transformation of its capital, Malé

Note: [1]First modern resort in the Maldives
Source: CNN, PASB Analysis

…its successful transformation boils down to visionary Tourism Master Plans and infrastructure development, further catalysed by foreign private-sector investments

Key Success Factors

Tourism Master Plans and Zoning

- Introduction of "One Island, One Resort" policy to ensure exclusivity and environmental protection
- Regulations introduced to limit built-up areas on resorts, building designs must consider environmental protection
- Guidelines to control quality of hospitality workforce and facilities
- Plots for tourism development were leased from government on fixed-term contracts under competitive bidding process in 2006

Development of Maldives International Airport

- Government prioritised the upgrading of the main international airport near Malé
- Early resort development was initially concentrated near the airport for accessibility
- Creation of wide network of charter air services to catapult tourist inflows; Coupled with attractive travel promotions, this attracted foreign private investments

Sea Transport Mechanisation and Modernisation

- Nationwide, government-led effort to upgrade vessels with diesel engines
- Improved airport transfers, enhanced connectivity between resort islands
- Introduction of speedboat and seaplane services

Mersing could implement some of these measures to take Mersing's tourism landscape to the next-level

,Source: PASB Analysis

While there are other connectivity enhancement opportunities, the introduction of seaplane operations could be the gamechanger to Mersing's tourism landscape

Getting to Mersing archipelago (via sea)

Current State

- **Upstream (Getting to Mersing):**
  - **Air:** Mostly domestic flights into Senai International Airport
  - **Sea:** Mersing jetty is a domestic terminal, no international connectivity
  - **Land (Car):** Via Federal Route 3 from JB (2 hours)
  - **Land (Coach):** Standard coaches (e.g., Transnasional, MARA Liner)
  - **Land (Rail):** No direct rail services between JB and Mersing
- **Downstream (Mersing to islands):**
  - Limited, infrequent services
  - Services typically booked via resort

Opportunities

- **Upstream (Getting to Mersing):**
  - **Air:** Increase international chartered flights
  - **Sea:** Upgrade Mersing jetty and establish international connectivity
  - **Land (Car)**: Upgrade existing road infrastructure
  - **Land (Coach):** Introduce direct luxury coach services
  - **Land (Rail):** Express rail services between JB and Mersing
- **Downstream (Mersing to islands):**
  - Introduce regular ferry / speedboat services to key islands

Getting to Mersing archipelago (via air)

- Currently **not available**

- Introduce **seaplane services** departing from:
  - Singapore (e.g., Seletar or Changi)
  - Senai International Airport
  - Kuala Lumpur (e.g., KLIA or Subang)

Focus

Selected Seaplane Case Examples

Maldives

- Seaplane operations connect Velana International Airport to over 170 resorts located around Maldives
- Flight duration could range from 10 to 90 minutes

Pulau Perhentian, Malaysia

- Celebrated first private seaplane services in mid-2024
- Reduces travel time from 45 minutes (by boat) to 10 – 15 minutes (by seaplane)

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- Events and festivals (e.g., sports, cultural tourism)

MICE is a specialised tourism segment focused on meetings, incentives, conferences and exhibitions

MICE Tourism Definition

- MICE tourism stands for Meetings, Incentives, Conferences, and Exhibitions
- Refers to business tourism where large groups, usually from corporate or professional backgrounds, travel for organised events, meetings, or conferences
- MICE tourism is known for high visitor spending and significant economic impact on host destinations

Key Activities

Meetings
Corporate meetings, board meetings, and annual general meetings

Incentives
Reward trips and incentive travel programs for employees or partners

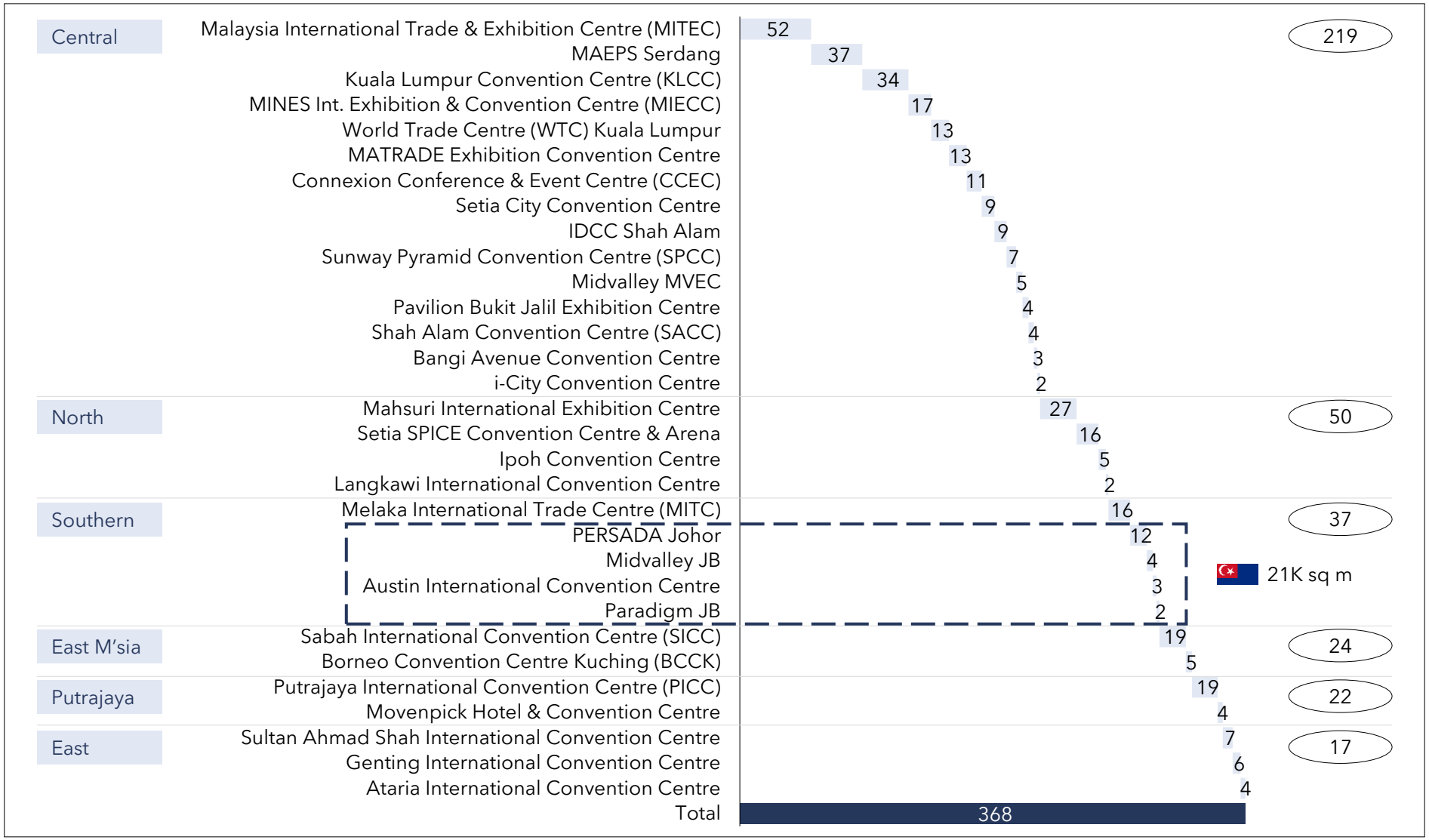
Conferences
Professional or academic conferences, seminars, and conventions

Exhibitions
Trade shows, expos, and product launches

Source: PASB Analysis

To date, Johor has four purpose-built convention and exhibition centres, amounting to a function space of 21,000 square metres

Purpose-built Convention and Exhibition Centres in Malaysia, Thousand sq m



Illustration

PERSADA Johor

Midvalley JB

Austin International Convention Centre

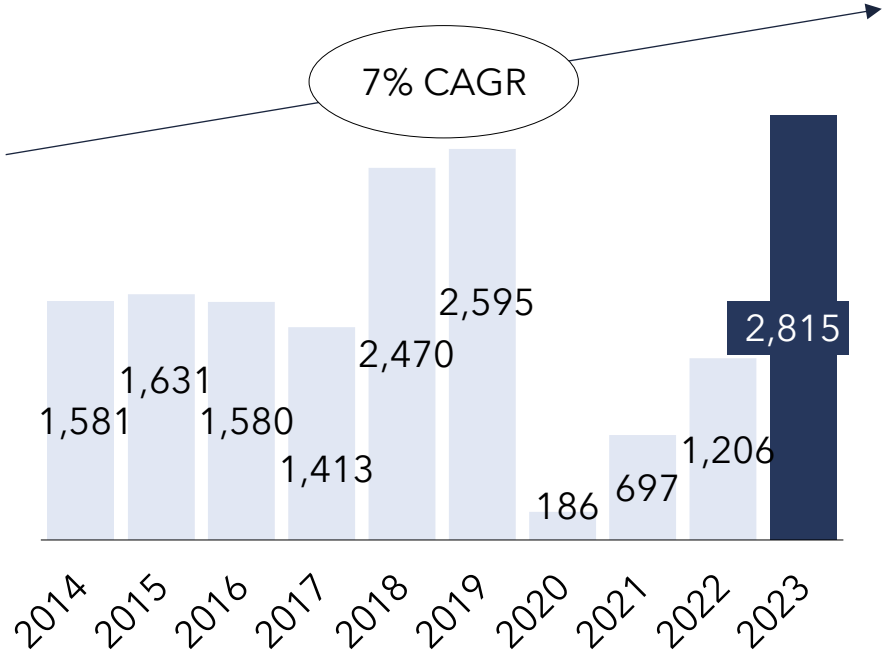
Paradigm JB

Note: Does not include convention centres located in hotels; Data as of 2023
Source: MACEOS

Historically, MICE contributes significantly to Malaysia's tourism industry and has grown at healthy rates

Estimated Economic Impact (EEI) (2014 – 2023)

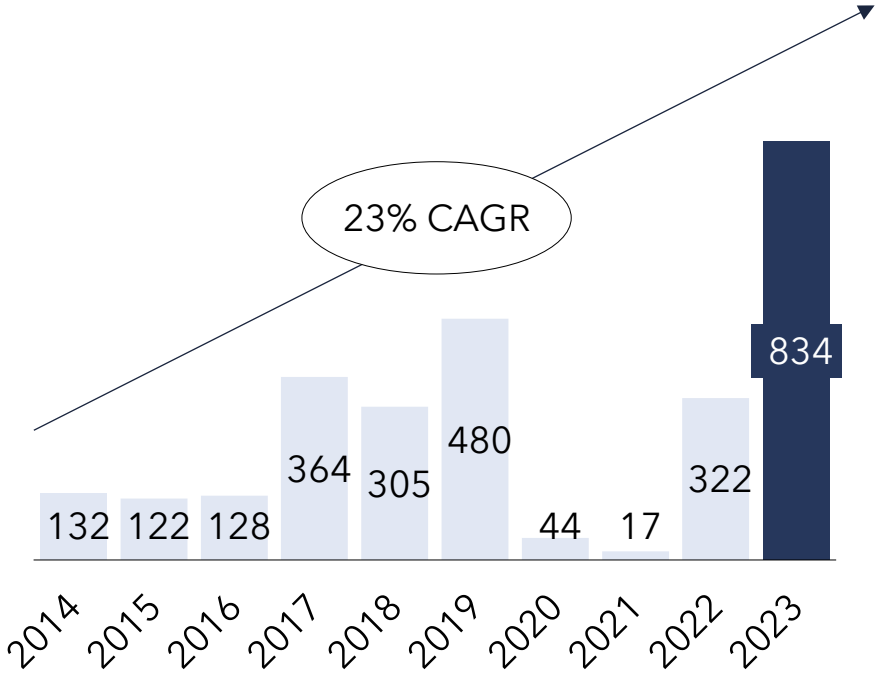
RM Million



- Achieved RM2.8bil in 2023 (8% above 2019 figures)
- 2014 – 2023 CAGR: 7%
- 2014 – 2019 CAGR: 10%
- 2020 – 2023 CAGR: 147%

Estimated Total Delegates (2014 – 2023)

Thousands



- Facilitated 834K delegates in 2023 (74% above 2019 figures)
- 2014 – 2023 CAGR: 23%
- 2014 – 2019 CAGR: 29%
- 2020 – 2023 CAGR: 167%

Reasons for Uptick

- Significant government and private sector investment in MICE infrastructure
- Stronger strategic marketing and international positioning (e.g., proactive participation in international MICE trade shows)
- Growth in "bleisure" (business events + leisure) experiences

Note: These are business events supported by MyCEB
Source: MyCEB, PASB Analysis

Johor can capture spillover demand from Singapore; Moreover, MICE should be aggressively pursued since business tourists spend at least twice the amount of leisure tourists

Johor can capitalise on spillover demand from Singapore

- Singapore targets to increase MICE tourism receipts significantly by 2040, likely attracting foreign business tourists aggressively via promotion and marketing
- Johor could offer more cost-effective MICE solutions to entice corporations to the state
- JS-SEZ encourages cross-border business activities, MICE segment in Johor likely to benefit from this

Business tourists tend to spend at least twice the amount of leisure tourists

- On average, business tourists spend twice the amount of leisure tourists, making MICE a highly valuable segment
- Business tourists are more inclined to spend / has greater willingness to pay in all areas e.g., accommodation, F&B, retail
- Spending pattern is consistent globally

Source: MyCEB, PASB Analysis

Singapore is capitalising on APAC's MICE growth and is strengthening its position as a leading business events hub

News article extract on Singapore MICE tourism

- Global MICE industry expected to double over the next decade and Asia-Pacific as a fast-growing market
- Singapore is thus investing in future-proof infrastructure (i.e., new MICE hub in downtown area)
- Singapore also aims to triple MICE tourism receipts by 2040

Why Singapore is widely recognised as Asia's leading MICE destination

Strong Government Support

Support in the form of MICE-centric incentives and programmes

Excellent Connectivity

Excellent air connectivity via Changi Airport, efficient public transport and visa facilitation

World-Class Infrastructure

State-of-the-art convention centres (e.g., EXPO, Suntec, etc.)

Safety and Cleanliness

High standards of urban management and security

Quality Services

Professional event organisers and skilled hospitality workforce

Illustrative Examples of Infrastructures

Suntec Singapore Convention and Exhibition Centre (42,000m^2)

Singapore EXPO Convention and Exhibition Centre (~100,000m^2)

Sands Expo and Convention Centre (Over 120,000m^2)

Source: The Business Times, Meetings & Conventions Asia, PASB Analysis

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Medical tourism is the act of travelling abroad to obtain medical treatment, which may be specialised, more cost-effective and with better accessibility

NON-EXHAUSTIVE

Medical Tourism Definition

- Practice of travelling abroad to obtain medical treatment
- Generally referred to patients from less-developed countries travelling to more developed countries for treatments
- Also includes people from developed countries seeking more cost-effective and accessible medical care
- Occasionally also related and associated with wellness tourism (yoga, spas, traditional healing practices)

Examples of Treatments / Key Activites

Dental
Includes procedures such as dental surgery, implants

Oncology
Cancer treatments (chemotherapy, radiation)

Fertility
Reproductive treatments (IVF, egg freezing, insemination)

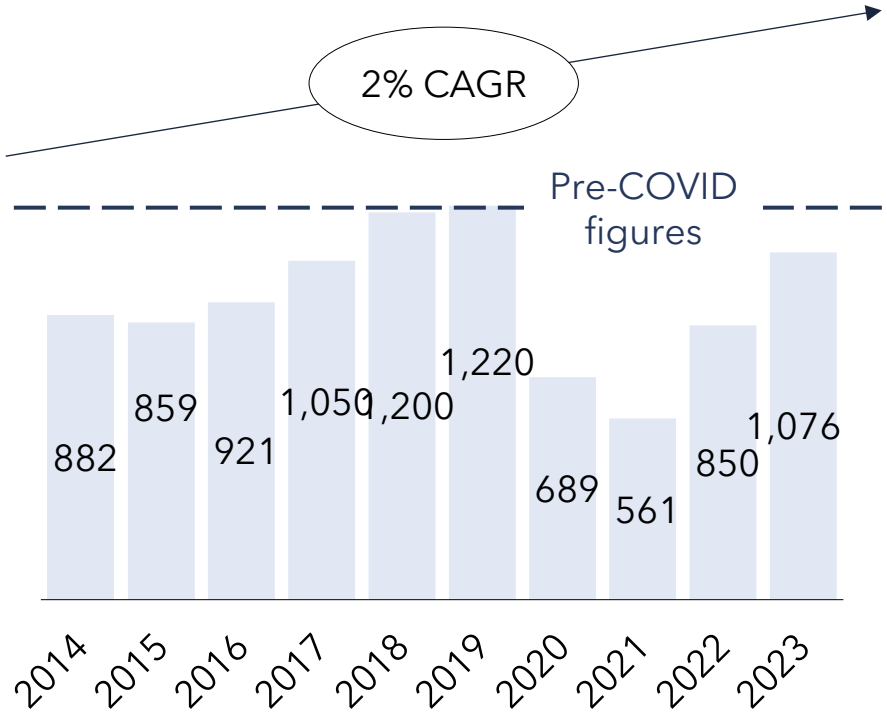
Cosmetic
Elective aesthetic surgeries (liposuction, breast augmentation)

Source: PASB Analysis

In 2023, 1.1mil individuals travelled to Malaysia for healthcare, generating RM1.7bil; Revenue growth outpaced traveler growth, signifies growing spend per individual...

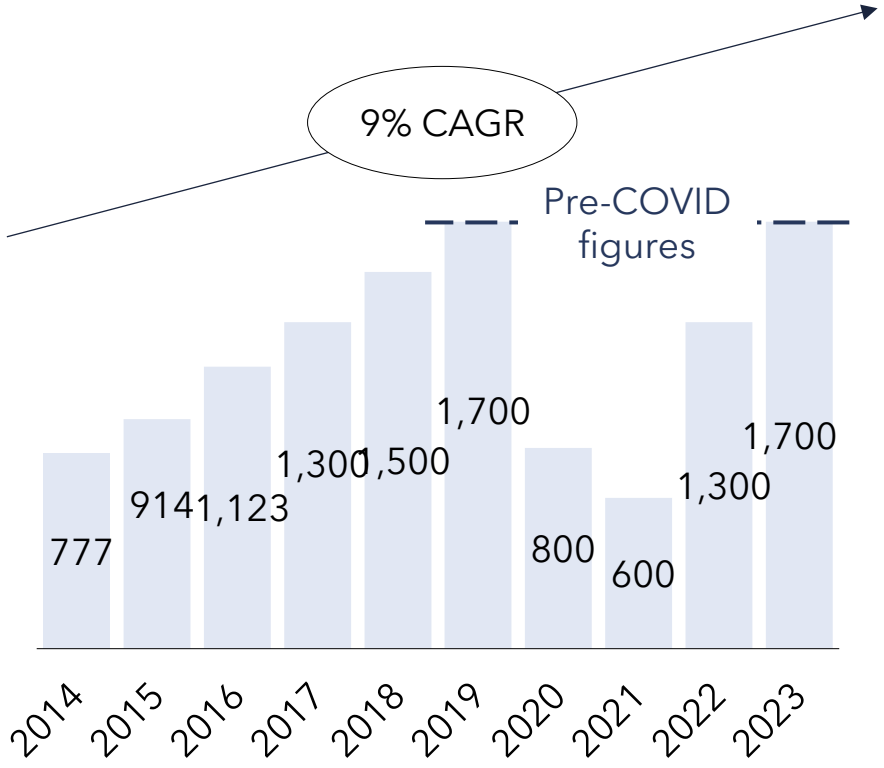
Number of People Who Travelled to Malaysia for Healthcare (2014 – 2023)

Thousands



Revenue from Medical Tourism in Malaysia (2014 – 2023)

RM Million



Details

- Number of people who travelled to Malaysia for healthcare in 2023 was 88% of pre-COVID figures (1.1mil in 2023 VS 1.2mil in 2019) and has yet to meet pre-COVID figures
- However, revenue generated from medical tourism in 2023 was RM1.7bil, already meeting pre-COVID figures; May indicate growing medical spend per individual

Source: MHTC, PASB Analysis

...likely driven by advanced, specialised medical treatments and other fundamental factors, such as, affordability, accessibility and Malaysia's unique cultural touches

NON-EXHAUSTIVE

Why Medical Travelers Keep Coming to Malaysia for Treatment

Advanced Medical Standards and Technology

Malaysia continuously adopts the latest medical breakthroughs and technologies, such as the National Heart Institute's use of advanced pacemakers, ensuring world-class treatment options

Relative Affordability

Medical procedures in Malaysia cost 3-4 times less than in many developed countries, making it highly attractive for cost-conscious patients without compromising quality

Strategic Location and Cultural Compatibility

Malaysia is conveniently located near major source markets like Indonesia, Singapore, and the Middle East, and offers culturally sensitive care including halal options, appeals to nicher segments

Shorter Waiting Times and Accessibility

Unlike some developed nations with long waiting lists, Malaysia provides timely access to specialists and procedures, supported by 24/7 medical care and efficient hospital services

Excellent Patient Experience

Malaysian hospitals often resemble luxury resorts with modern facilities and hospitality-focused services, offering comfort and personalised care that enhance the overall treatment experience

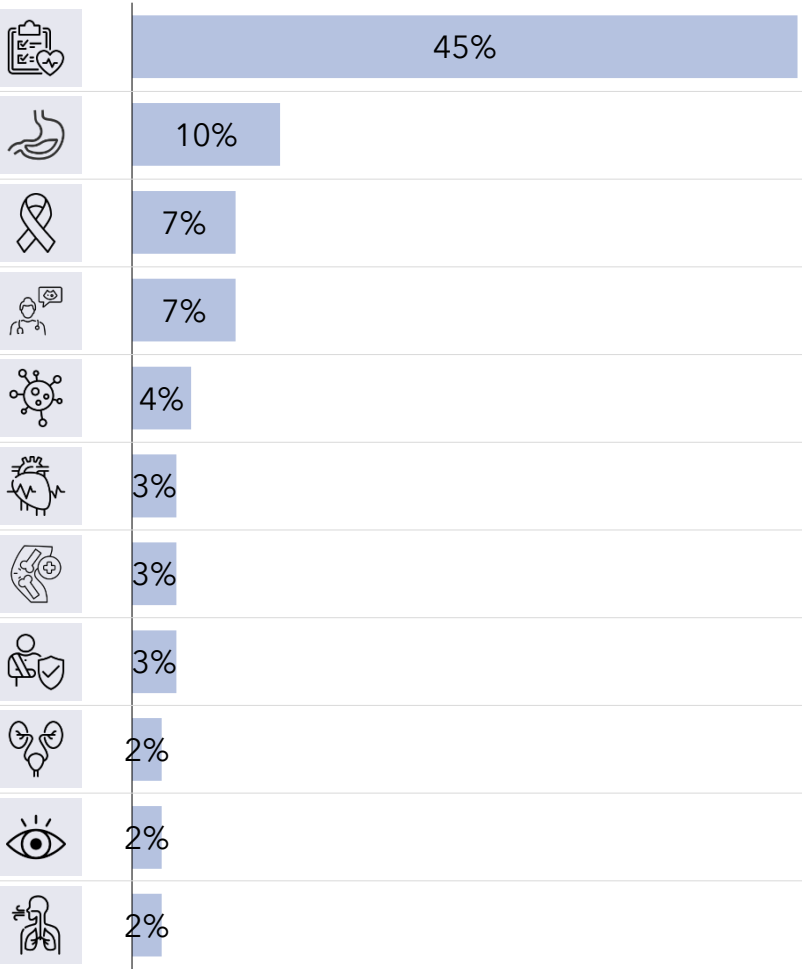
Integration of Treatment and Tourism

Patients can combine medical care with vacation opportunities, enjoying Malaysia's tourist attractions and wellness services during recovery

Source: PASB Analysis

Close to 50% of medical travelers come to Malaysia for overall health screening and consultation before seeking further treatment

Health Treatment Sought by Health Travelers (2019)



Treatment	% Share of Total, Percentage	Description
Health Screening	45%	Checking of overall health to detect early signs of diseases (blood test, cholesterol)
Gastroenterology	10%	Medical specialty focused on the digestive system and its disorders (ulcers, colonoscopy)
Cancer & Neoplasm	7%	Diagnosis and treatment of malignant tumors and abnormal tissue growths (chemotherapy)
Obstetrics and Gynaecology	7%	Medical care related to pregnancy, childbirth, and female reproductive health (prenatal care)
Infectious Diseases	4%	Diagnosis and treatment of diseases caused by pathogens (HIV/AIDS, malaria)
Cardiology	3%	Medical specialty dealing with heart and blood vessel disorders (heart attacks, angioplasty)
Orthopaedic Surgery	3%	Surgical treatment of musculoskeletal system issues (knee replacement, spinal surgery)
Accidents and Injuries	3%	Emergency and trauma care for physical injuries (fractures, burns, wound care)
Urology	2%	Focuses on urinary tract and male reproductive organs (kidney stone removal, prostate surgery)
Ophthalmology	2%	Medical and surgical care of the eyes and visual system (cataract surgery, laser eye surgery)
Respiratory Medicine	2%	Diagnosis and treatment of lung and breathing-related conditions (asthma, pneumonia care)

Source: MHTC

Johor has 30 private hospitals and 1,866 beds; It is amongst one of the top states with developed private medical infrastructure

NON-EXHAUSTIVE

Private Hospitals in Malaysia by State (2023)

Number of Private Hospitals

		% Total
Selangor	54	25.5
W.P. KL	38	17.9
Johor	30	14.2
Perak	19	9.0
Pulau Pinang	18	8.5
Sarawak	13	6.1
Kedah	8	3.8
Negeri Sembilan	8	3.8
Sabah	8	3.8
Pahang	5	2.4
Melaka	4	1.9
Kelantan	3	1.4
Terengganu	2	0.9
Perlis	1	0.5
W.P. Putrajaya	1	0.5
Total	212	

Beds in Private Hospitals in Malaysia by State (2023)

Number of Beds

		% Total
Selangor	5,095	27.1
W.P. KL	3,560	19.0
Pulau Pinang	2,575	13.7
Johor	1,866	9.9
Perak	1,261	6.7
Melaka	943	5.0
Pahang	763	4.1
Negeri Sembilan	687	3.7
Kedah	669	3.6
Sarawak	611	3.3
Sabah	398	2.1
Kelantan	179	1.0
Terengganu	131	0.7
Perlis	37	0.2
W.P. Putrajaya	4	~0
Total	18,779	

Examples

Gleneagles Hospital
MEDINI IOHOR

Premier tertiary hospital offering advanced multidisciplinary care

COLUMBIA ASIA HOSPITALS

Recognised for its modern facilities (cardiology, orthopaedics, neurology)

Based on number of private hospitals or beds, Johor is ranked 3rd or 4th in the country in terms of its private medical infrastructure landscape maturity, positioning it as one of the most foundationally sound medical hubs with healthy supply

Source: PASB Analysis

Urban rejuvenation and tourism sub-segments should be prioritised to establish a strong "pull factor" for foreign tourists to visit Johor

NON-EXHAUSTIVE

Urban Tourism

Objective

To position JB city as a globally recognised modern city by enhancing its urban infrastructure, cultural vibrancy; Creating a strong and positive impression that attracts and retains international tourists

Focus Areas

- Rejuvenate city with prominent landmarks and high walkability
- Transform retail and F&B landscape:
  - Establish premium / luxury malls
  - Large-scale duty-free complexes
  - Gastronomic hubs

Tourism Sub-Segments / "Tourism Niche"

Objective

To carve a niche and strengthen Johor's unique tourism ecosystem, attracting diverse tourist segments, enhancing average stay length and spend per capita

Focus Areas

- Ecotourism
- MICE tourism
- Medical and wellness tourism
- Events and festivals (e.g., sports, cultural tourism)

A healthy calendar with events planned throughout the year can boost tourist arrivals, the economy and enhance tourism image

Importance of Events and Festivals for the Tourism Industry

Sustainable and Consistent Tourist Arrivals
Well-planned events calendar throughout the year ensures healthy and sustained tourist inflows

Economic Impact
Tourist spending on accommodation, F&B, transportation, shopping can benefit MSMEs and beyond

Branding and Perception
Events help position destinations as vibrant, culturally rich, and attractive, differentiating them from competitors

Case Example

Rio de Janeiro Carnival
Rio de Janeiro, Brazil

- Considered "the greatest party on planet earth"
- Known for its vibrant costumes, samba music
- Samba Parade is key highlight, where top samba schools compete with floats, costumes, choreography
- Expected to boost Rio's economy by **R$5.7bil (~RM4.3bil)** in 2025 alone

Source: PASB Analysis

Johor organises many events and festivals, prioritising international events can solidify its image and identity as a vibrant global destination

Events and Festivals in Johor

Chingay Parade Festival
A vibrant cultural parade showcasing traditional performances, floats, and multicultural festivities

World Kite Festival
International kite festival featuring participants from over 40 countries

Trans QJM Gunung Pulai Ultra 2025
Endurance and mountain biking events attract regional and international athletes

Ironman
Major international triathlon event held annually in Desaru Coast, attracting over 1,000 athletes globally

Ombak Festival
Luxurious weekend getaway filled with music, arts, culture, family-friendly activities and culinary experiences

Various Football Events
Events like Malaysia Super League, AFC Champions League Elite, Malaysia Cup and Malaysia FA cup can attract tens of thousands of spectators

Potential Opportunities

- Host international music festivals (e.g., replicate Borneo Jazz Festival, Rainforest World Music Festival)
- Prioritise major, high-profile international and regional sports events while upgrading sports facilities, to position Johor as a sports hub:
  - Bid to host international football competitions (e.g., AFC Champions League, FIFA) in Sultan Ibrahim Stadium
  - International marathons (e.g., Johor International Marathon to be held in 2025)
  - International cycling events (e.g., replicate Le Tour de Langkawi)

Source: PASB Analysis

Johor's tourism industry challenges at a glance

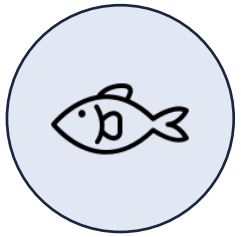
NON-EXHAUSTIVE

Challenges	Description
Competitive edge and USP as global tourism destination	• Regional competition to attract tourists remain fierce in APAC and ASEAN region • Only the most unique tourism destinations with strong USPs and targeted marketing will succeed in attracting tourists • While Johor has an abundance of tourism attractions (e.g., cultural, historical, natural), a strategic USP must be defined (e.g., what is special about Johor as a tourism destination? What makes it better than its regional competitors?)
Disjointed tourism landscape / ecosystem	• Due to its large land mass, while Johor has an abundance of tourism attraction sites, these tourist attraction sites may be too far-apart, which leads to a fragmented tourism landscape / experience • E.g., leisure tourist who explored Ibrahim International Business District (IIBD) may find it logistically challenging to travel to other attractions, such as, Desaru Coast / Endau-Rompin National Park
Vibrance of tourism attraction sites	• Some tourism sites, especially in rural areas, could be upkept better and made more tourist-friendly (i.e., signs and info guides) • While festivals / events are commonly held, some cities and towns may lack still vibrance and entertainment
Tourism data collection	• While foundational tourism data is captured, specific segmented tourism data required to facilitate data-informed decision making may be limited • E.g., foreigner receipt per capita, foreigner average stay length, tourist spending habits / surveys, etc.
Connectivity across sea, land, air	• Land: – Chronically congested checkpoints, especially during rush hours – Lack of road connectivity to rural areas • Air: Limited global air connectivity • Sea: Lack of major international cruise ships berthing at Johorean ports
Financing of tourism projects	• Tourism projects occasionally get de-prioritised due to perceived low returns • Limited private sector participation to develop an integrated, well-connected tourism ecosystem
Skilled labour	• Shortage of skilled labour focused on customer centricity, hospitality, business management in Johor's tourism industry

Agriculture.

The agriculture industry can be broadly categorised into 4 main sub-sectors which are crop, livestock, fisheries and forestry & logging

Sub-sectors of Agriculture Industry

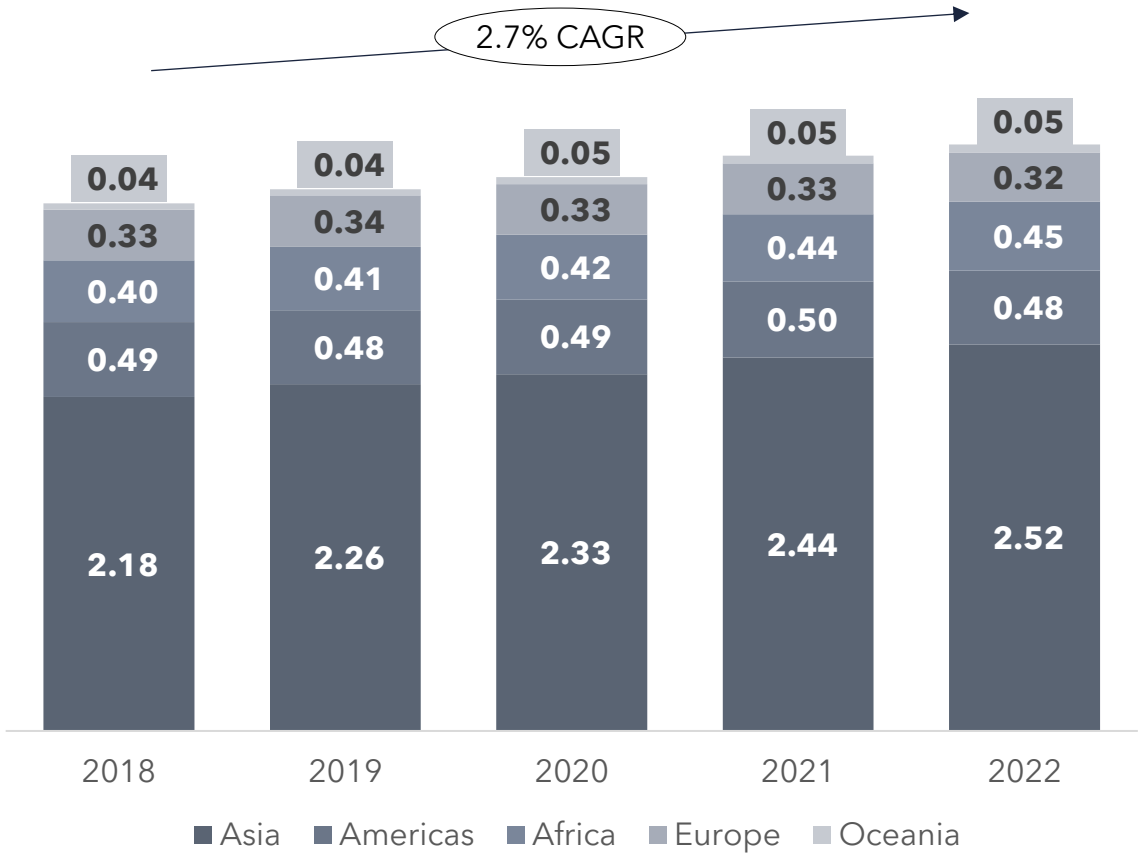
Sub-sectors	Crop	Livestock	Fisheries	Forestry & Logging
				
	NON-EXHAUSTIVE	NON-EXHAUSTIVE	NON-EXHAUSTIVE	NON-EXHAUSTIVE
Products / Activities	**Industrial Crops:** • Oil Palm • Rubber **Fruits:** • Durian • Pineapple **Vegetables:** • Long Beans • Lady Finger **Cash Crops:** • Cassava • Sweet Potato	• Beef • Buffalo • Chicken • Duck • Chicken Eggs • Duck Eggs	• Fish • Prawns • Green Mussel	• Sawn Timber • Plywood • Veneer • Moulded Wood

Source: Jabatan Pertanian Malaysia, DOSM, PASB Analysis

The global agriculture market is booming, fueled by rising food demand and rapid growth in developing regions, now contributing 73% of global output

Global Agriculture Market (2018 – 2022)
USD Million

The global market size climbed steadily from 3.45 trillion in 2018 to 3.83 trillion in 2022 with a 2.7 % CAGR



Key Growth Drivers

Rising food demand
World population heading to 10 billion by 2050

Major producers like China, India, and the United States lead output, while emerging economies contribute an ever-larger share

In fact, developing regions now account for almost **73% of global agricultural production**, reflecting rapid growth in Asia, Africa, and Latin America

Source: Statista, PASB Analysis

Global agriculture is rapidly evolving with strong momentum in precision tech, data analytics, and organic farming–yet faces mounting climate risks and shifting trade dynamics

Global Megatrends in Agriculture Sector

Growth Factors

1

Adoption of Agtech and Big Data Analytics

- Driving factors include digitisation and optimisation of resource utilization
- Integration of AI and IoT in agriculture analytics is enhancing predictive analytics and real-time decision-making capabilities

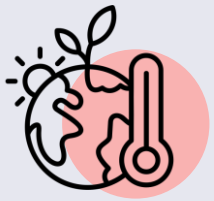
2

Growth of Organic Farming

- The global area under organic farming increased by 2.5 million hectares in 2023, totaling nearly 99 million hectares
- Oceania accounts for more than half of the global organic area

Risk Factors

3



Climate Change Impact on Crop Yields

- A 1°C increase in temperature has been associated with yield reductions of 7.5% for maize and 6.0% for wheat
- In the United Kingdom, the 2024 wheat harvest dropped by 20% due to record-breaking rainfall

4

Shifts in Global Agricultural Trade

- Food and agricultural trade nearly quintupled from USD 400 billion in 2000 to USD 1.9 trillion in 2022
- US-China tariffs and trade relations continue to shift reliance on exports to other countries

Source: IMARC, McKinsey, Our World in Data, MarketsandMarkets, PASB Analysis

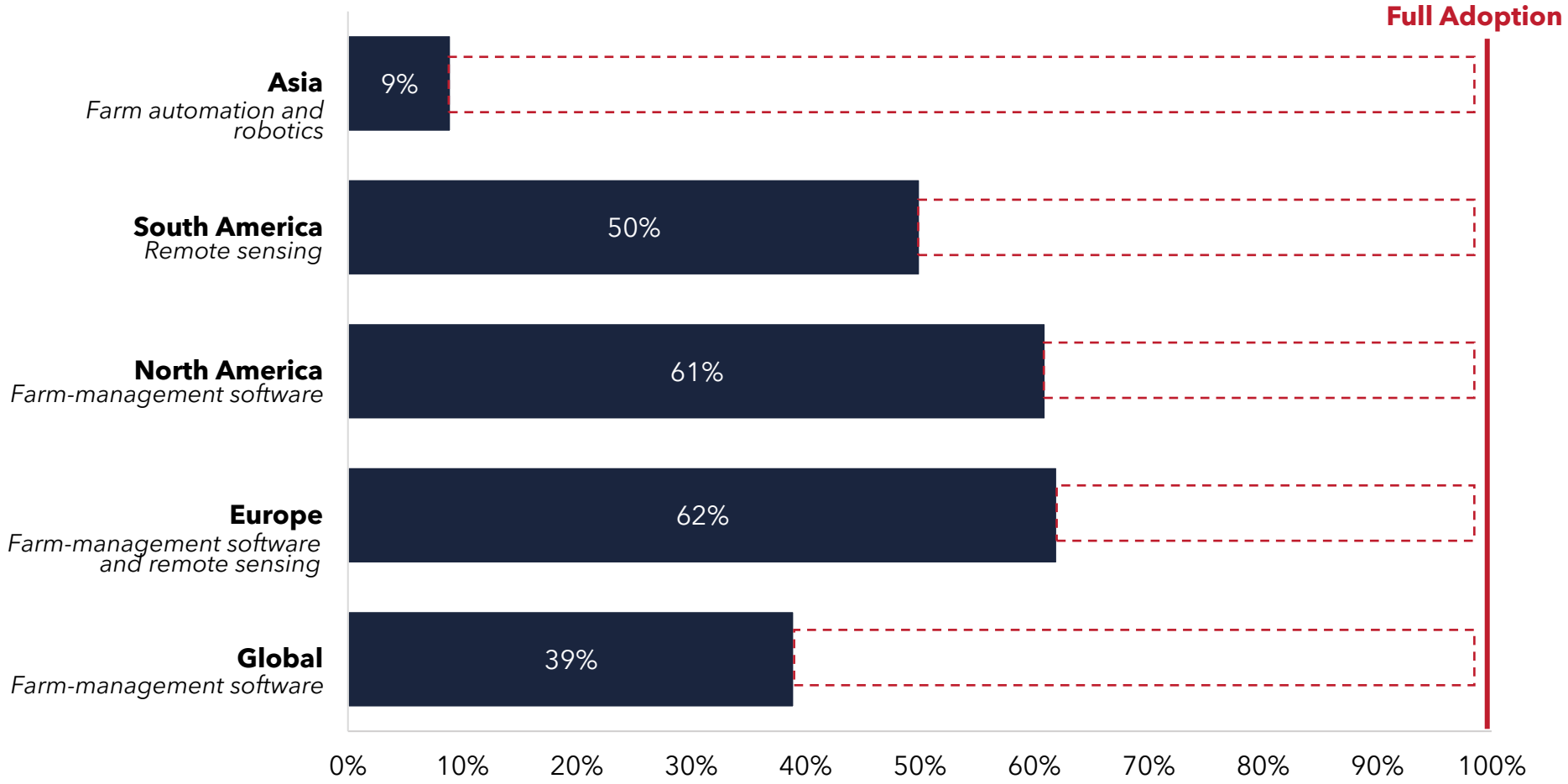
North America and Europe currently lead Agtech adoption, while farmers in Asia are particularly slow owing to unclear ROI and high prices

Growth Factor

1

Adoption of Agtech and Big Data Analytics

Adoption of Most Popular Agtech Use Case by Region (2022)



Source: McKinsey & Company (2022)

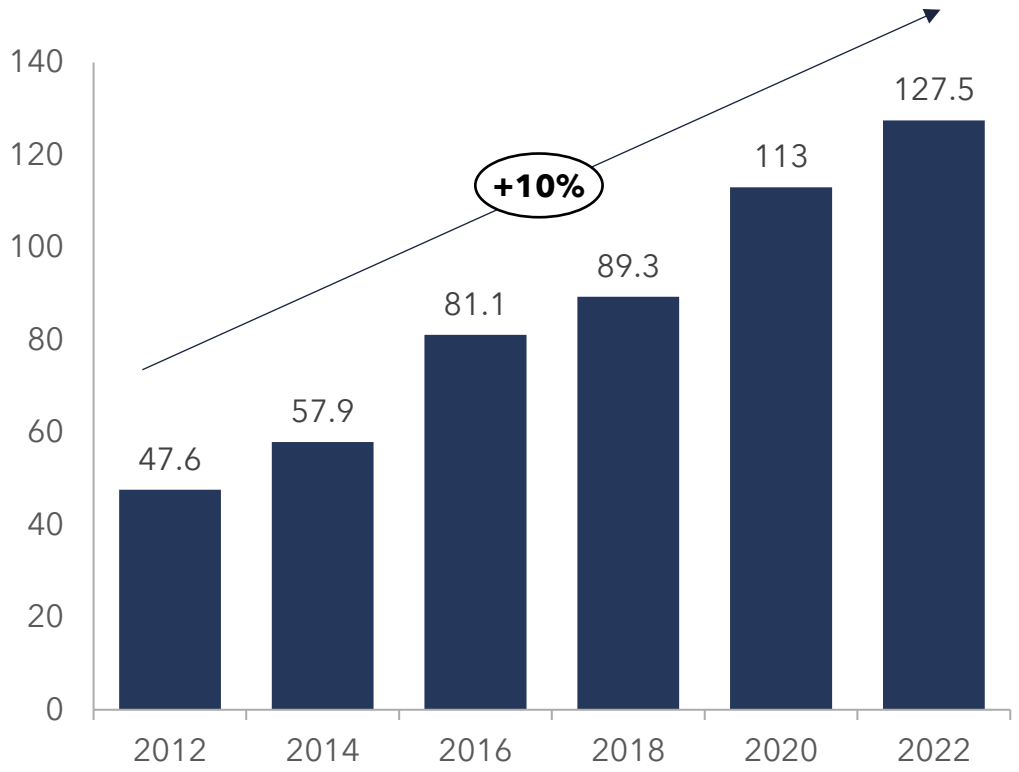
The market for organic food has grown by a 10% CAGR between 2012 to 2022, with sales driven by demand from the USA and Europe, and new markets emerging in North Asia

Growth Factor

2

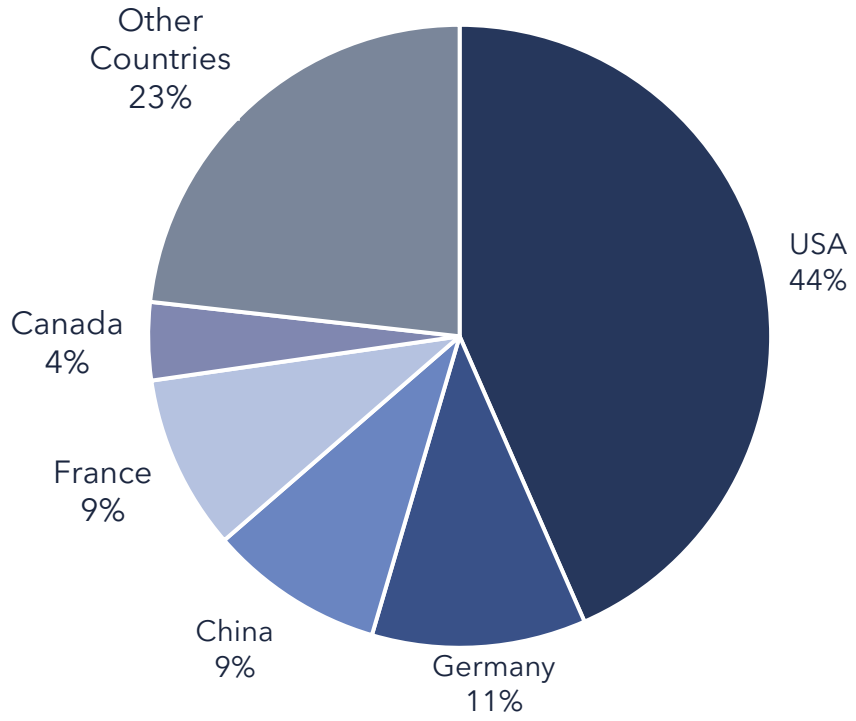
Growth of Organic Farming

Growth in global market for organic food & drink, 2012-2022
Retail sales in EUR Billion



Demand for organic and health foods grew significantly over the past decade, powered by the COVID-19 pandemic

Distribution of retail sales by country, 2022
Retail sales in EUR Billion



The third largest market was China (EUR12 billion), with Japan also registering a +8.4% growth rate in 2022

Source: FiBL & IFOAM – Organics International (2024)

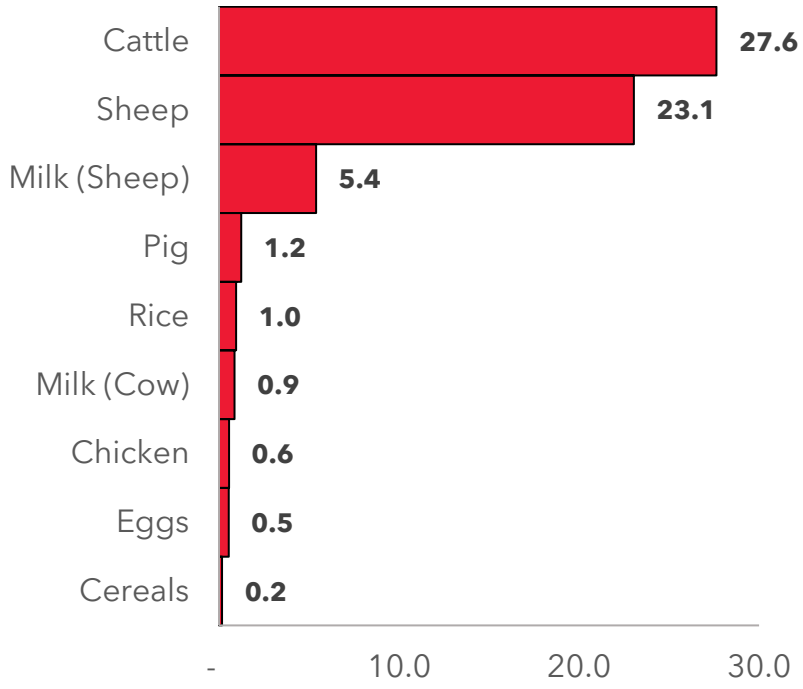
Agriculture systems both suffer from and contribute significantly to climate change, making sustainable farming practices a top priority globally

Risk Factor

3

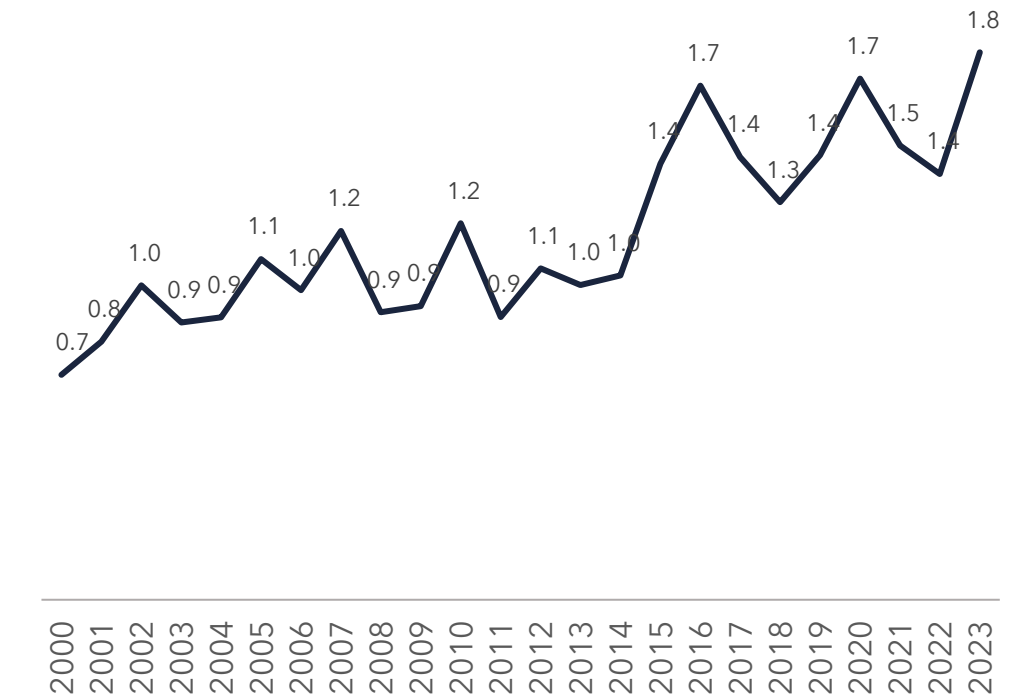
Climate Change Impact on Crop Yields

Global Emissions Intensity Of Agricultural Commodities (2022)



The most CO2-intensive commodities are cattle meat (27.6 kg CO2 eq/kg) and sheep meat (23.1 kg CO2 eq/kg)

Temperature Change Measured by Land over Region (2000-2023)



2023 was the warmest year at the global level, with Asia experiencing a +1.77°C increase in temperatures

Source: FAO World Food and Agriculture Statistic Yearbook (2024)

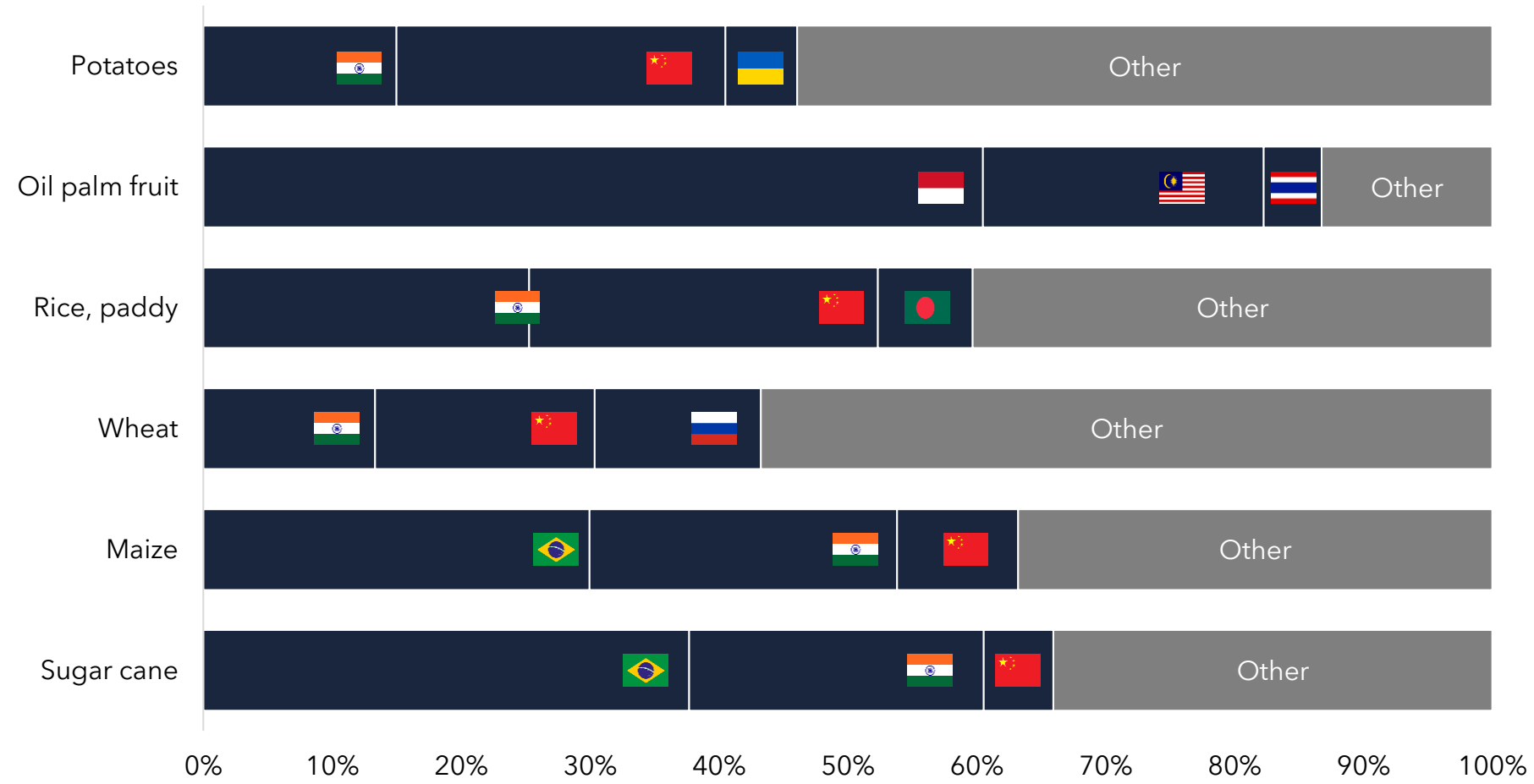
Production of key agricultural commodities is currently concentrated in several major producers, exposing it to supply chain vulnerabilities and shifts in global trade

Risk Factor

4

Shifts in Global Agricultural Trade

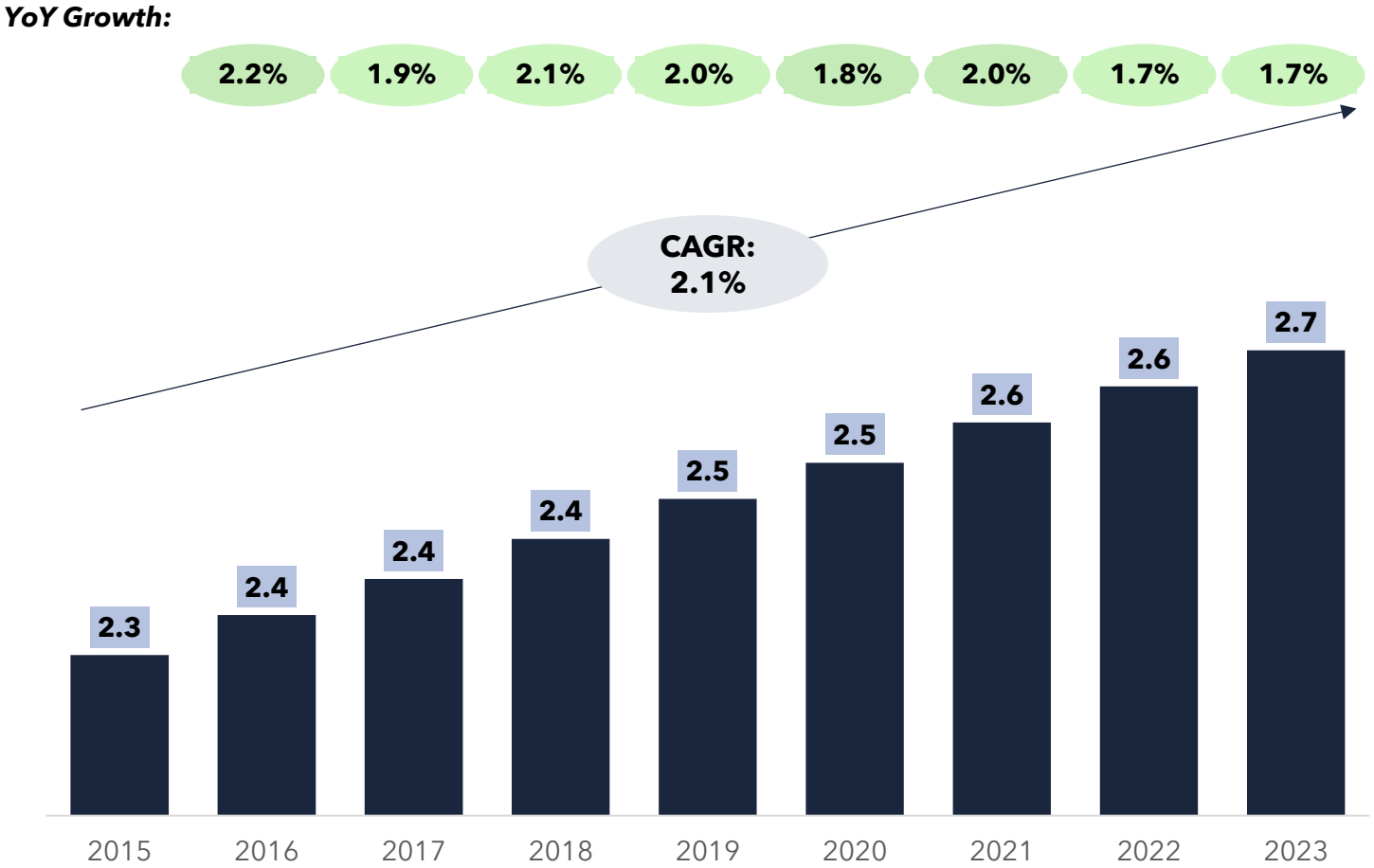
Main Producers of Global Primary Crops (2022)



Source: FAO World Food and Agriculture Statistic Yearbook (2024)

Asia's agriculture value-added rose from USD 2.30 trillion in 2015 to USD 2.68 trillion in 2023 at a 2.1 % CAGR—underscoring resilient, yield-driven growth across the region despite limited land expansion

Asia Agriculture GDP (Constant Prices 2015), 2015 – 2023
USD trillion



Source: DOSM, PASB Analysis

Key Takeaways

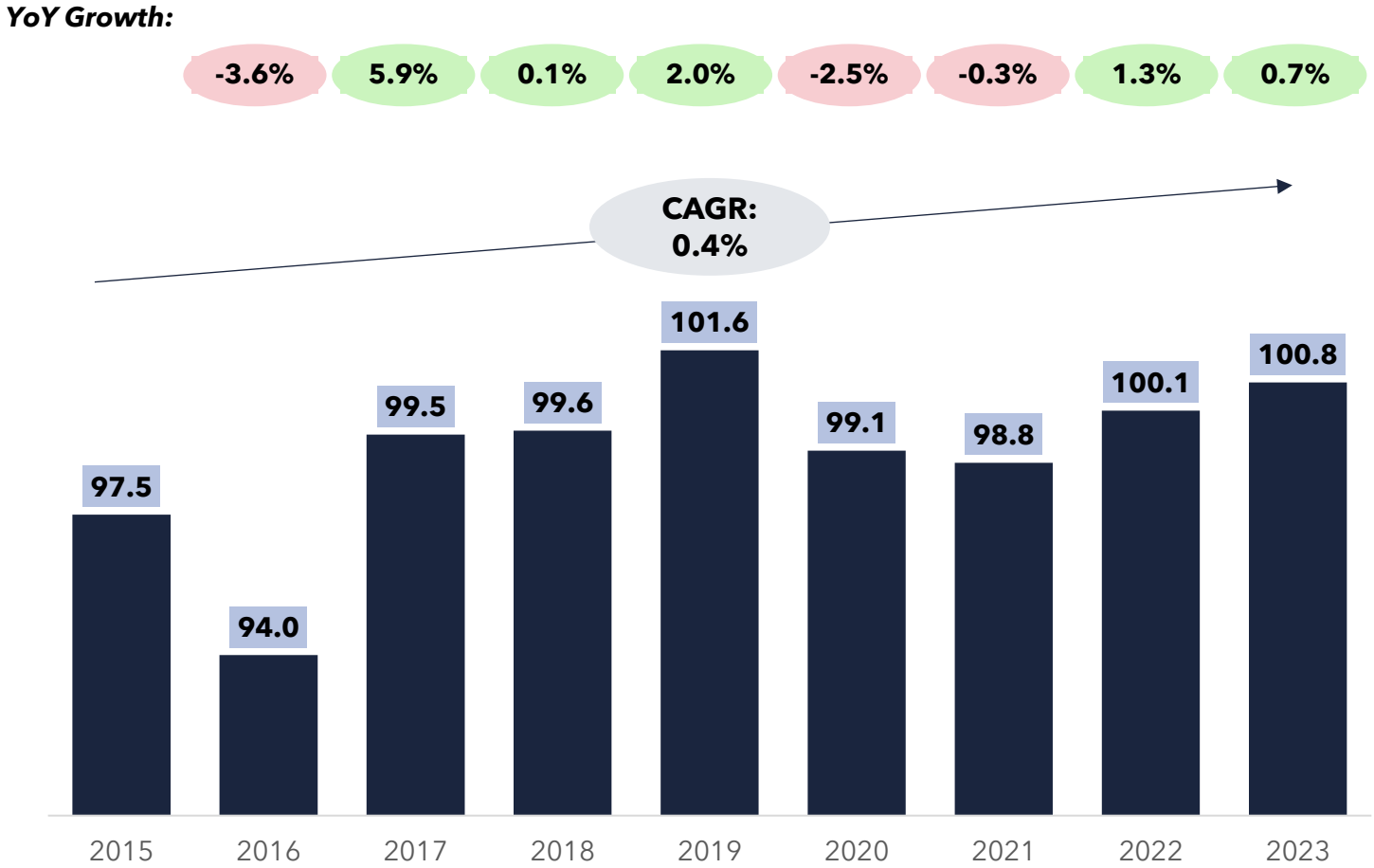
Steady expansion
- Asia's agriculture GDP rose from USD 2.30 trillion in 2015 to USD 2.68 trillion in 2023 at a 2.1 % average annual growth, demonstrating resilience despite climate and supply-chain challenges

Outpacing national peers
- At a 2.1 % CAGR, Asia's agricultural growth significantly outstrips Malaysia's 0.4 % over the same period, implying that regional drivers—like rising food demand, mechanisation and digital farming—are more pronounced

Likely productivity gains
- Given limited net cropland expansion, this consistent rise suggests yield intensification—through improved seeds, mechanisation and precision inputs—has underpinned much of Asia's agricultural value-added growth

Malaysia's agriculture industry experiences volatile year-on-year growth between 2015 and 2023, recording a modest overall increase of just 0.4%, from RM97.5 billion to RM100.8 billion

Malaysia Agriculture GDP (Constant Prices 2015), 2015 – 2023
RM Billion



Key Takeaways

Pre-pandemic peak and volatility
After a dip to RM 94.0 b in 2016, agriculture GDP surged to RM 101.6 b by 2019—driven by strong commodity prices and expanded output—but then fell back during the COVID years

Pandemic dip and rebound
The sector contracted by 2.5 % in 2020 and 0.3 % in 2021 amid labor and supply-chain disruptions, before recovering 1.3 % in 2022 and 0.7 % in 2023

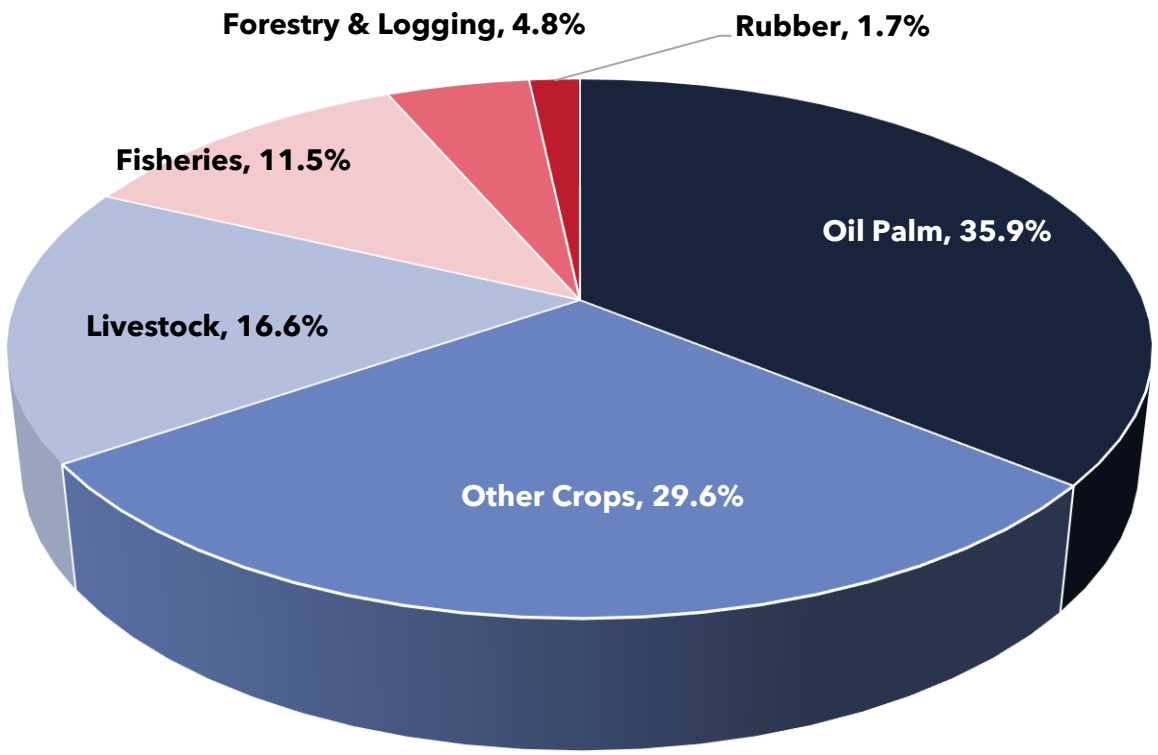
Stagnant long-term growth
With just a 0.4 % CAGR from 2015 to 2023, Malaysia's agriculture has seen only modest expansion—suggesting productivity and value-addition gains are needed to accelerate growth

Source: DOSM, PASB Analysis

Oil palm is the largest contributor to Malaysia's agriculture GDP, accounting for 36%, followed by other crops, livestock, fisheries, forestry & logging and rubber

Malaysia Agriculture GDP by Sub-sectors, 2023
%

National Agriculture GDP (2023): RM100.8 billion



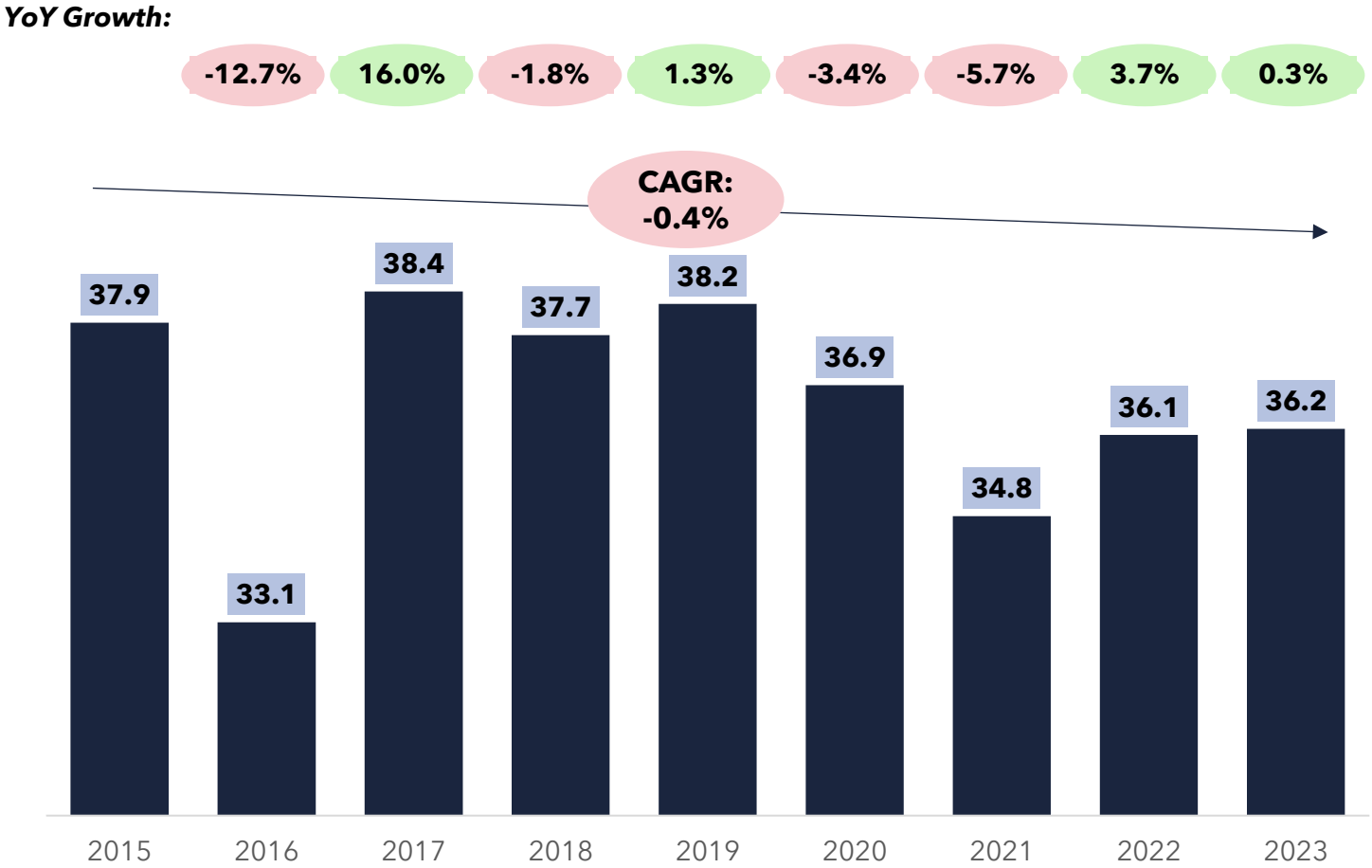
Key Takeaways

- **Palm Oil:** Palm oil is the largest contributor to Malaysia's agriculture GDP in 2023, accounting for 36% or RM36.2 billion
- **Other Crops:** Other crops including paddy, vegetables, fruits, and various food crops contribute nearly 30% to agriculture GDP in 2023. Vegetables makes up the largest portion this segment with RM13.8 billion or 13.7% of the total agriculture GDP
- **Livestock:** Poultry dominates the livestock segment, contributing RM10.2 billion to the agriculture GDP
- **Fisheries:** Fisheries account for 11.5% of agriculture GDP, with marine fishing being the largest contributor at RM7.3 billion
- **Forestry & Logging and Rubber:** Combined, these two sectors contribute 6.5% to Malaysia's agriculture GDP in 2023

Source: DOSM, PASB Analysis

Malaysia's oil palm sector rebounded post-covid due to global price rallies, but 2023's modest growth signals a return to normalcy amid price corrections, cost pressures, and sustainability-driven constraints

Oil Palm Agriculture GDP (Constant Prices 2015), 2015 – 2023
RM Billion



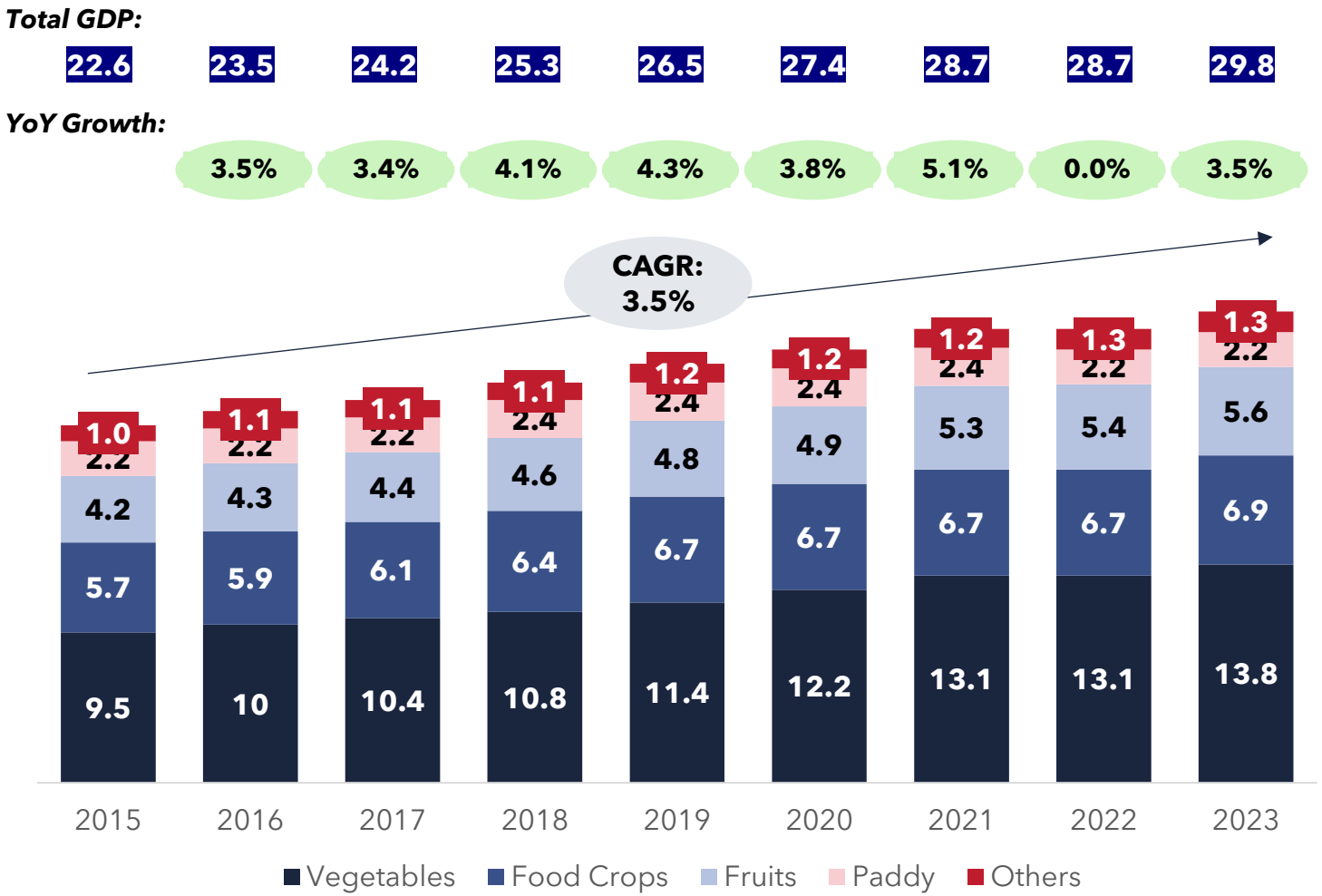
Source: DOSM, PASB Analysis

Key Takeaways

- **Post-Pandemic Rebound:** Oil palm GDP surged from RM34.8 billion in 2021 to RM36.1 billion in 2022 – a 3.7% increase, driven by global palm oil price rallies and higher export demand during the commodity supercycle post-pandemic period
- **Moderate Growth in 2023:** 2023 only recorded 0.3% growth due to price corrections, cost pressures (e.g., labour), or policy-driven sustainability constraints affecting expansion
- **Overall Growth:** The industry recorded an overall decline of -0.4% CAGR between 2015 to 2023 from RM37.9 billion to RM36.2 billion driven by price volatility, rising cost pressures, and sustainability-related constraints. Consequently, oil palm's share of national agriculture GDP declined from 38.8% in 2015 to 35.9% in 2023

Malaysia's diversified other crops segment has shown resilient and steady growth with CAGR of 3.5% between 2015 to 2023, underscoring its role in supporting food security and rural economies

Other Crops Agriculture GDP (Constant Prices 2015), 2015 – 2023
RM Billion



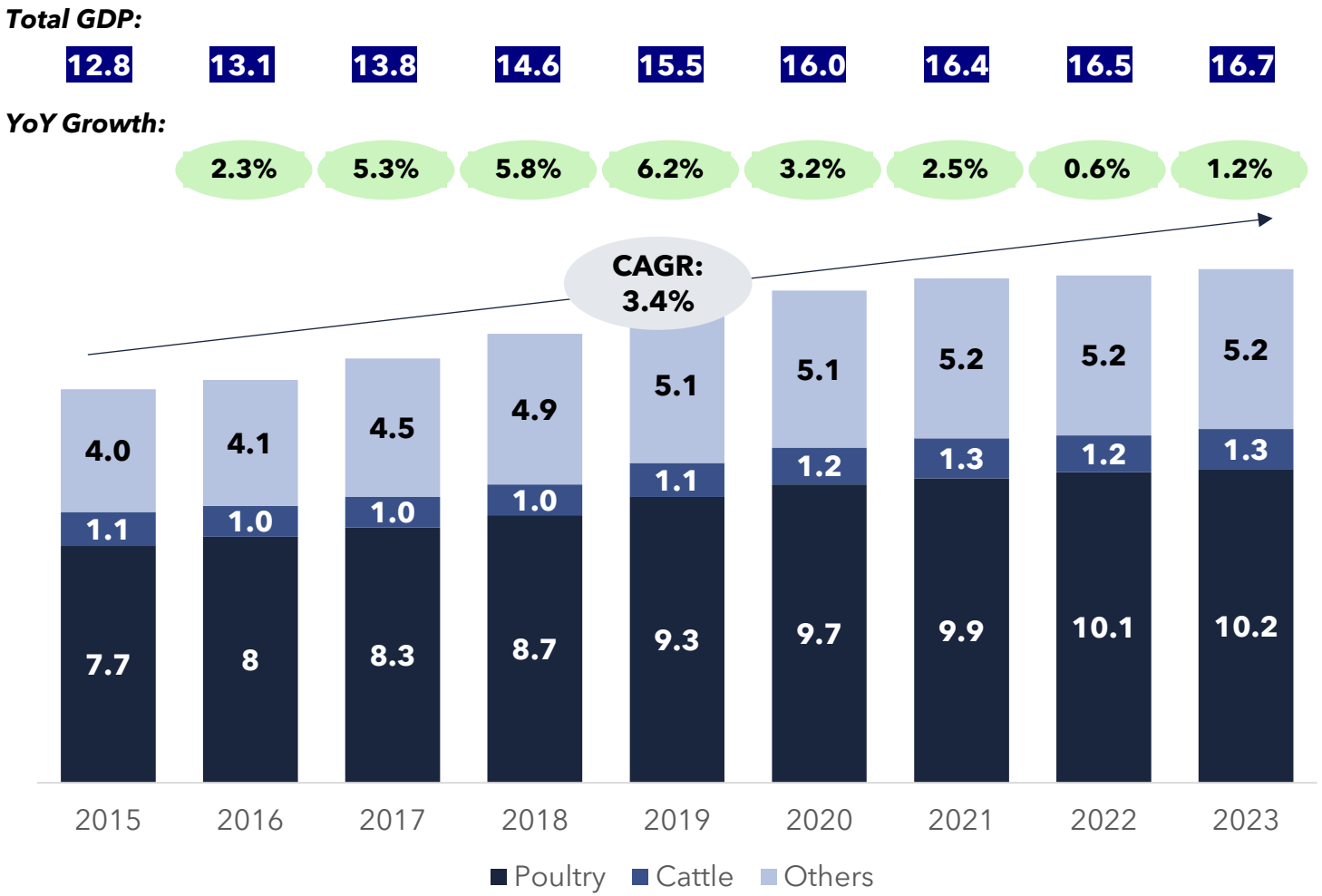
Source: DOSM, PASB Analysis

Key Takeaways

- **Diverse Agricultural Base:** Other crop category includes paddy, vegetables, fruits, and food crops, reflecting diversified production that supports rural livelihoods and food security. Growth across multiple crop types insulates the sector from price shocks or volatility in any single commodity.
- **Long-Term Growth Stability:** Other crops agriculture GDP rose steadily from RM 22.7 billion in 2015 to RM 29.8 billion in 2023, reflecting an average annual growth of 3.5%. This steady growth has been primarily driven by vegetable and fruit crops which have shown consistent growth of 4.8% and 3.8% respectively between 2015 to 2023

Malaysia's livestock sector has shown steady and resilient growth, led by poultry and supported by cattle and other livestock, reflecting strong demand, sectoral diversification, and consistent economic contribution despite global uncertainties

Livestock Agriculture GDP (Constant Prices 2015), 2015 – 2023
RM Billion



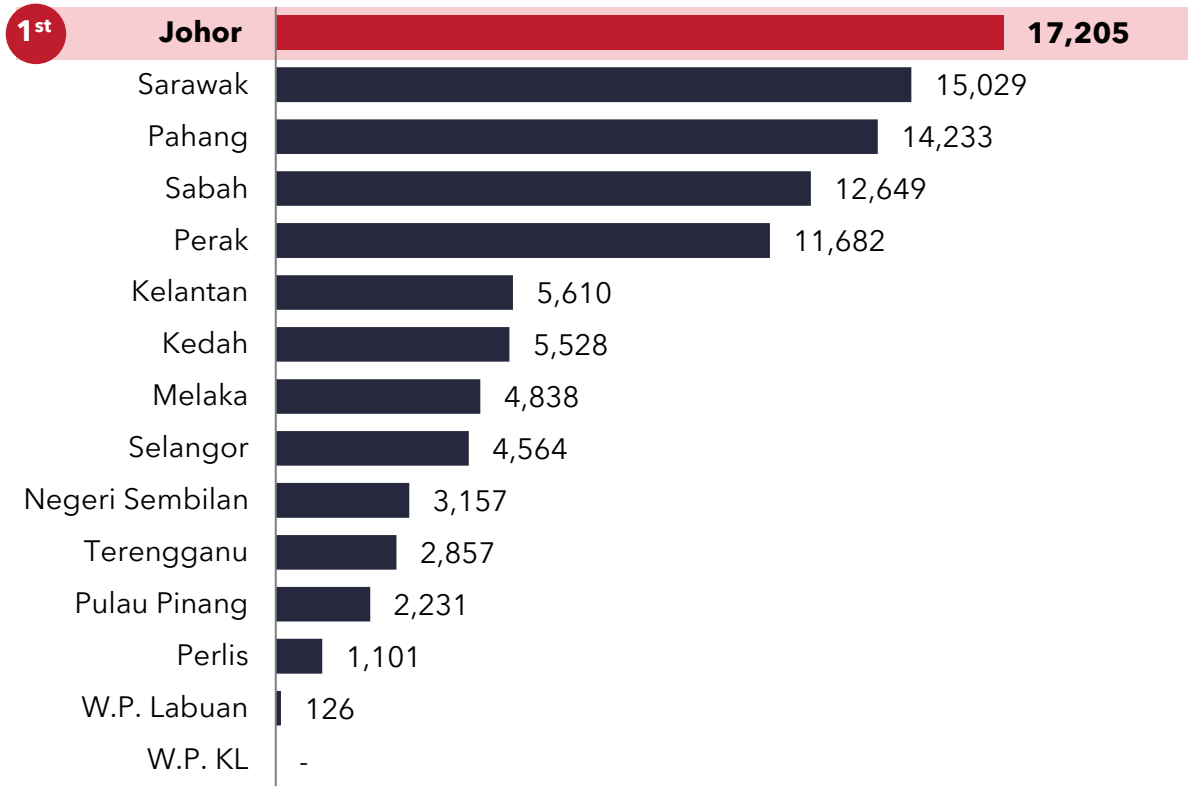
Source: DOSM, PASB Analysis

Key Takeaways

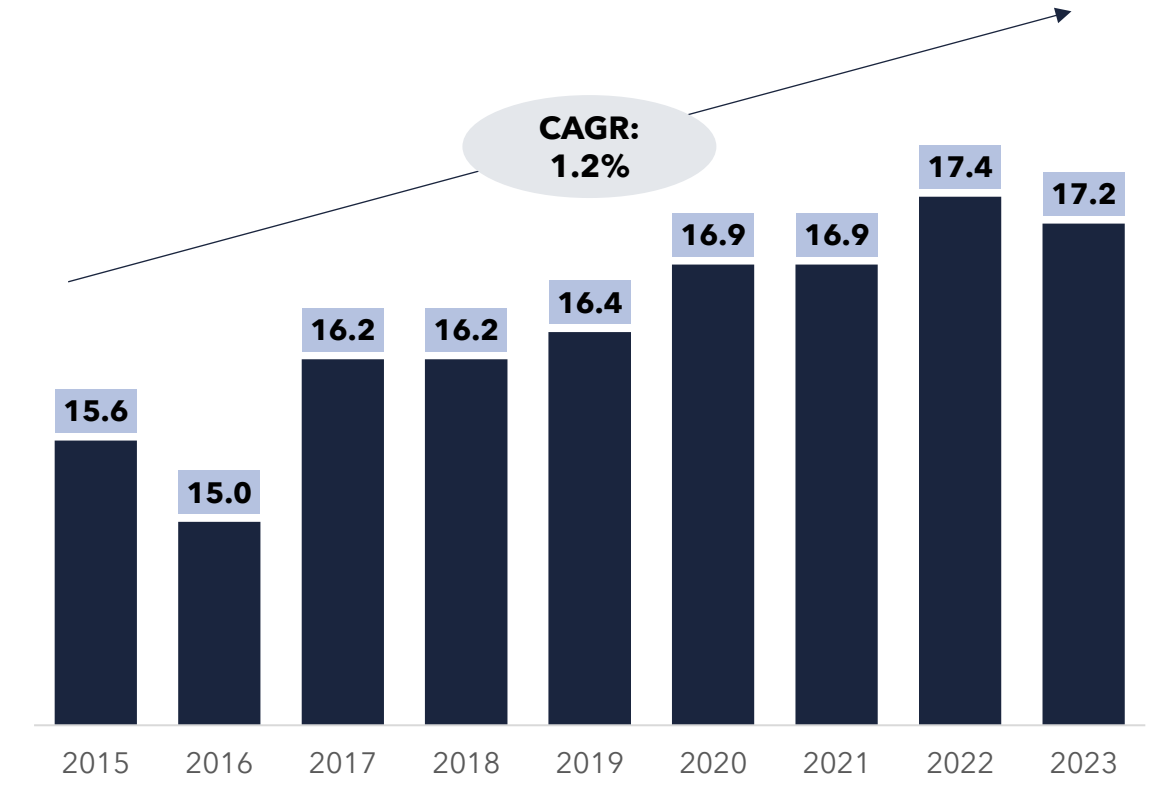
- **Poultry Dominates the Livestock Sector:** Poultry consistently contributes the largest share to livestock GDP, growing from RM7.7 billion in 2015 to RM10.2 billion in 2023, reflecting strong domestic demand and industrial-scale production. Its steady growth highlights poultry as the most commercially scalable and economically resilient sub-sector in Malaysian livestock
- **Resilience Growth:** Despite economic volatility and pandemic-era disruptions, livestock GDP maintained a consistent upward trajectory, increasing at a CAGR of 3.4% between 2015 to 2023. This suggests strong consumption patterns and food security prioritization, with the sector showing resilience to macroeconomic challenges

Johor is Malaysia's largest contributor to the agriculture sector in 2023, with RM17.2 billion in output, although growth has been relatively modest in the past eight years

Agriculture Sector GDP by States, 2023
RM Million



Agriculture GDP in Johor, 2015 - 2023
RM Billion



- With **RM17.2 billion** in agricultural output in 2023, Johor accounts for **17.1% of Malaysia's total agricultural GDP**, reinforcing its position as a key contributor to the national agro-economy
- The sector represented **11.6% of the state's GDP**, though its growth has remained subdued—expanding at a **CAGR of only 1.2%** from RM15.6 billion in 2015

Source: DOSM, PASB Analysis

Crop and livestock sub-sectors are the main drivers of Johor's agriculture GDP, contributing over RM16 billion or 93% of the state's total agricultural output in 2023

NON-EXHAUSTIVE

Johor Agriculture GDP by Sub-sectors, 2023

Sub-sector	Gross Domestic Product, RM Million	% Total	CAGR (2015 – 2023)	Main Produce
Crop	11,680	67.9	0.6	• Oil palm
Livestock	4,364	25.4	4.0	• Chicken • Duck
Fisheries	1,134	6.6	-6.9	• Fish • Prawn
Forestry and Logging	28	0.2	-1.3	• Sawn timber • Plywood
Total Agriculture GDP	17,206			

Focus

Takeaways

- **Crop production was the largest contributor** to Johor's agriculture GDP in 2023, generating over 67.9% of total (or RM11.6 bil)
- **Livestock is the second largest contributor**, representing 25.4% of Johor's agriculture GDP (or RM4.4 bil)
- **Fisheries, forestry and logging represents a combined ~7% of agriculture GDP and have seen declining growth rates** of approximately -7% and -1%, respectively

Source: DOSM, PASB Analysis

For crops, palm oil represents ~97% of Johor's major agriculture commodities and grew at an aggressive 19% p.a.

Production of Major Agriculture Commodities in Johor (2023)

Crop Type		Production Value, RM Million	% Total	CAGR ('19 – '23)
Industrial Crop	Palm Oil	11,724.4	97.1	19.1
	Coffee	3.6	~0	6.5
	Coconut	0.1	~0	-81.7
	Cocoa (Dried Seed)	0.0	~0	-49.9
Fruits	Fresh Pineapple	265.5	2.2	1.3
	Canned Pineapple	74.9	0.6	1.3
	Other Fruits	3.3	~0	8.3
Vegetables	Vegetables	0.6	~0	4.9
Cash Crops	Cash Crops	0.1	~0	1.7
	Total	12,073		

Source: BPEN Data Asas (2023)

Commanding Malaysia's top oil-palm output/refining and orchards that supply a third of national durians year-round, Johor converts full value-chain control into export supremacy

Snapshot of Johor's commanding palm oil leadership

Estate Footprint

- Johor cultivates about 671 000 ha of oil-palm land – nearly one-in-eight hectares nationwide, **the biggest estate footprint** in Peninsular Malaysia

CPO Powerhouse

- Johor's 2023 crude-palm-oil output at **≈ 2.9 million t**, around **15 % of Malaysia's total** and the largest in Peninsular Malaysia

Top Yields

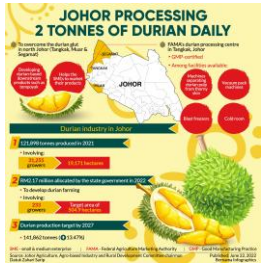
- Johor estates delivered an average **17.4 t/ha fresh-fruit-bunch yield** in 2023 – about 10 % above the national mean (15.8 t/ha)

Downstream & Port Muscle

- Pasir Gudang houses the **world's largest palm-oil terminal (460 000 t storage)**, while Johor-based PGEO refines over 30 % of Malaysia's CPO

- Johor controls the palm-oil journey end-to-end—boasting the peninsula's largest estate footprint while Pasir Gudang's world-leading terminal and PGEO's >30 % national refining share anchor downstream supremacy
- Above-average yields fuel a hefty ≈ 2.9 Mt CPO output, giving Johor about 15 % of Malaysia's total and the top spot in Peninsular production.

Johor dominates Malaysia's durian output, acreage, exports, seasons, and processing

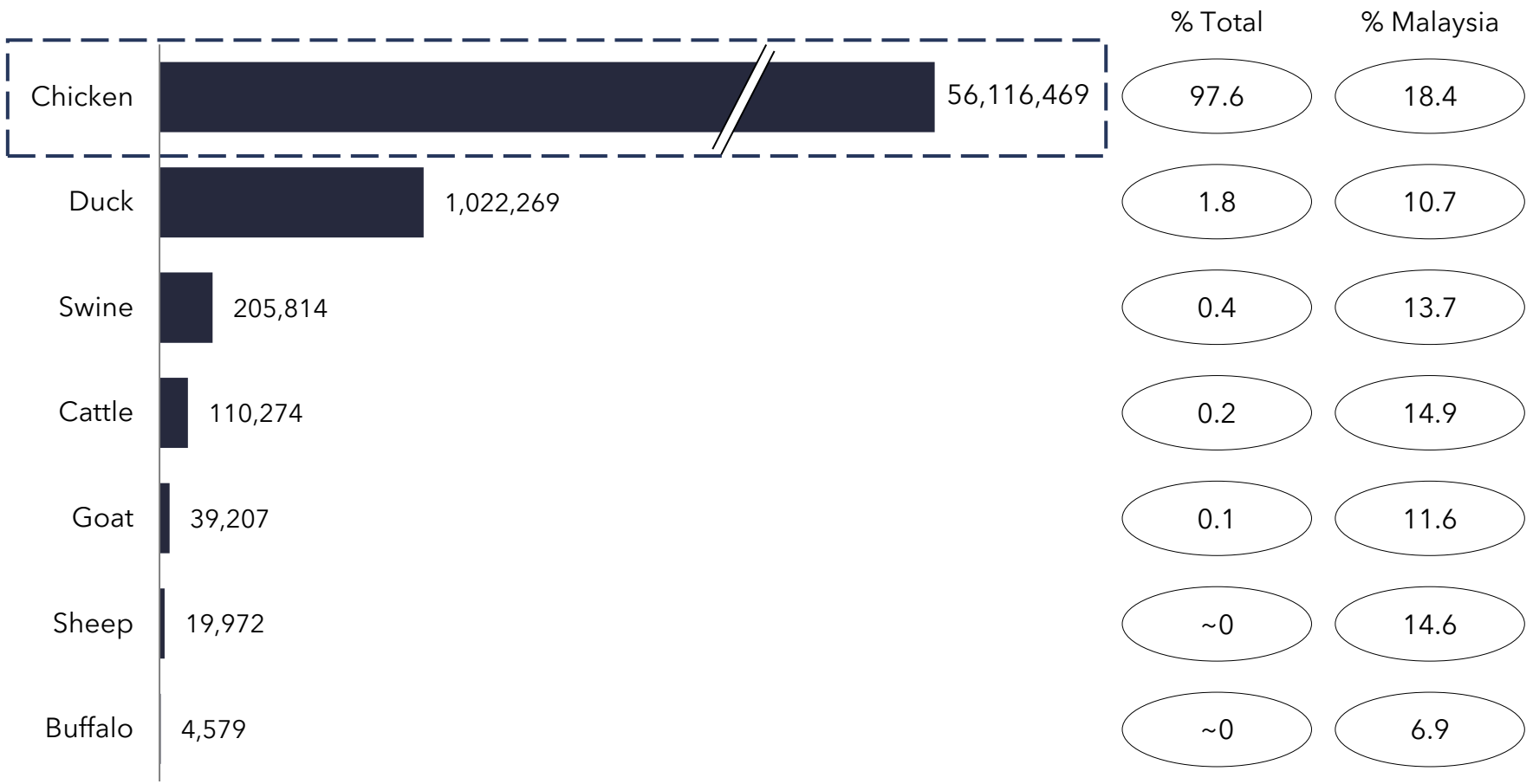


- **Largest share nationwide**: Johor accounted for 30.5 % of Malaysia's total durian production in 2022, ahead of Pahang (26.9 %) and every other state
- **Rising volumes**: State output climbed from 138,946 t (2022) to 148,365 t (2023), already surpassing Johor's 2027 KPI target of 141,862 t.
- **Biggest orchard footprint**: Johor now has ≈20,276 ha under durian (2023)—the largest planted area recorded by any Malaysian state and up 1.5 % from 2022
- **Export powerhouse**: Durian shipments from Johor generated over RM 81 million in export revenue in 2023, underscoring the state's outsized role in Malaysia's booming China-oriented durian trade
- **Three harvest seasons a year**: Johor trees fruit in Jan–Feb, Jun–Sep, and Nov–Dec, letting the state supply fresh durian when several competitors are off-season
- **Dedicated processing hub**: Tangkak district—Johor's top producer—is being upgraded as a durian processing and cold-chain hub to scale frozen-durian exports

Source: MPOB, Johor Port, State Agriculture Dept, PASB Analysis

For livestock production, chicken represents ~98% of the state's total livestock; The state produces ~18% of the country's poultry, making it Malaysia's most significant producer

Johor Number of Livestock by Types, 2023



Source: Department of Agriculture

Details

- **Favorable Production Conditions:** Broiler contract farming in Johor is more viable and profitable compared to other regions due to efficient feed conversion and cash flow management. The mortality rate of poultry is lower in Johor compared to other states such as Sabah

- **Strategic Location and Infrastructure:** Johor's location facilitates efficient transport, reflected in the cheaper price of Day-Old Chicks (DOC) compared to Sabah, which may include transportation costs from Peninsular Malaysia

Johor places strong emphasis on the agriculture sector, with a dedicated strategy under Maju Johor 30 to position the state as Malaysia's food basket and a key hub for palm oil downstream activities

Downstreaming the Johor Palm Oil Industry

Description:

- Facilitate the entry of palm oil manufacturers into the state to produce higher value-added and sustainable oil palm-derived products, in collaboration with relevant agencies

Key Features:

- Promote sustainable practices and support the establishment of new facilities for value-added palm-based products
- Strengthen Federal-State collaboration to channel biogas from Palm Oil Mill Effluent (POME) into the national grid
- Explore opportunities for manufacturing oleochemical derivatives and end-user products

Positioning Johor as Malaysia's Food Basket

Description:

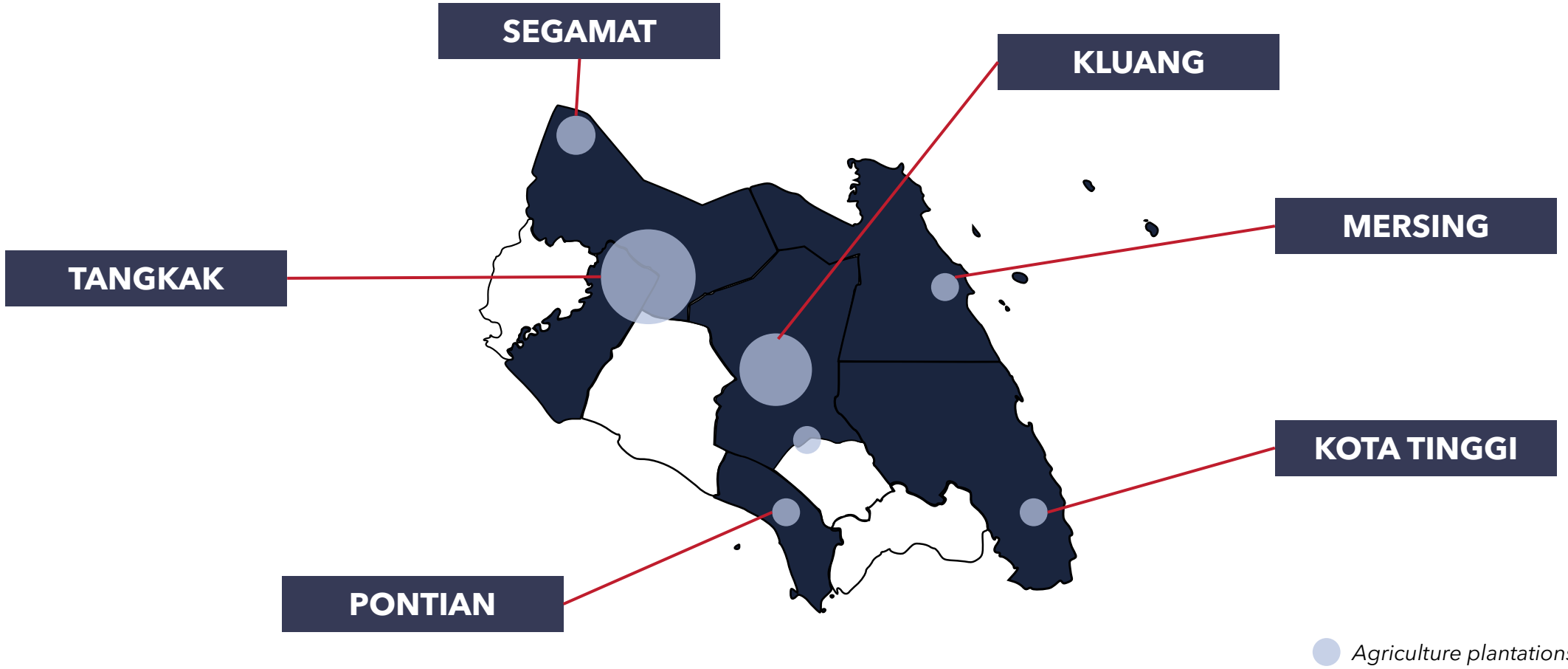
- Expand Johor's agricultural production to strengthen food security and tap into growing export opportunities

Key Features:

- Facilitate access to funding, training, and R&D for farmers and agribusinesses
- Promote digital adoption for better market insights and financial resilience
- Establish CPPCs and Distribution Centres to enhance logistics and reduce waste
- Diversify agriculture and agro-processing to boost value creation
- Implement an integrated food security programme across the value chain
- Enhance halal standards and support commercialisation of halal products

Source: Maju Johor 2030

Six districts in Johor – Segamat, Kluang, Mersing, Kota Tinggi, Pontian, and Tangkak – have identified agriculture as a key focus initiative under Maju Johor 2030 (1/3)



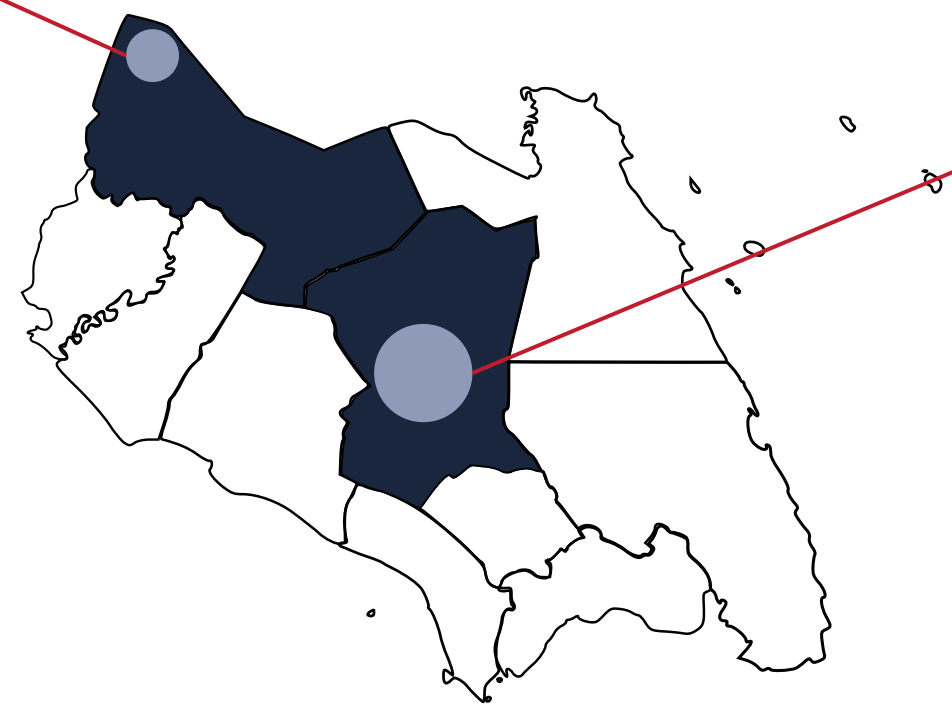
Six key districts – Segamat, Kluang, Mersing, Kota Tinggi, Pontian, and Tangkak – drive Johor's role as Malaysia's top agriculture contributor, leveraging its natural resources to strengthen food security and position the state as the nation's "food basket"

Source: Maju Johor 2030

Six districts in Johor – Segamat, Kluang, Mersing, Kota Tinggi, Pontian, and Tangkak – have identified agriculture as a key focus initiative under Maju Johor 2030 (2/3)

SEGAMAT

- Developing an agro mix farm (secondary) in Peta Temalik
- Redeveloping of economically uncultivated agricultural areas
- Establishing an integrated agricultural industry hub
- Enhancing productivity of Segamat durian hub
- Developing Kelah Fish Sanctuary and improving fisheries resources in public water areas
- Increasing the productivity of Kelulut Honey
- Developing commercially and eco-friendly Baung fish clusters in Segamat



KLUANG

- *Downstreaming the Johor palm oil industry*

Agriculture plantations and farms

Source: Maju Johor 2030

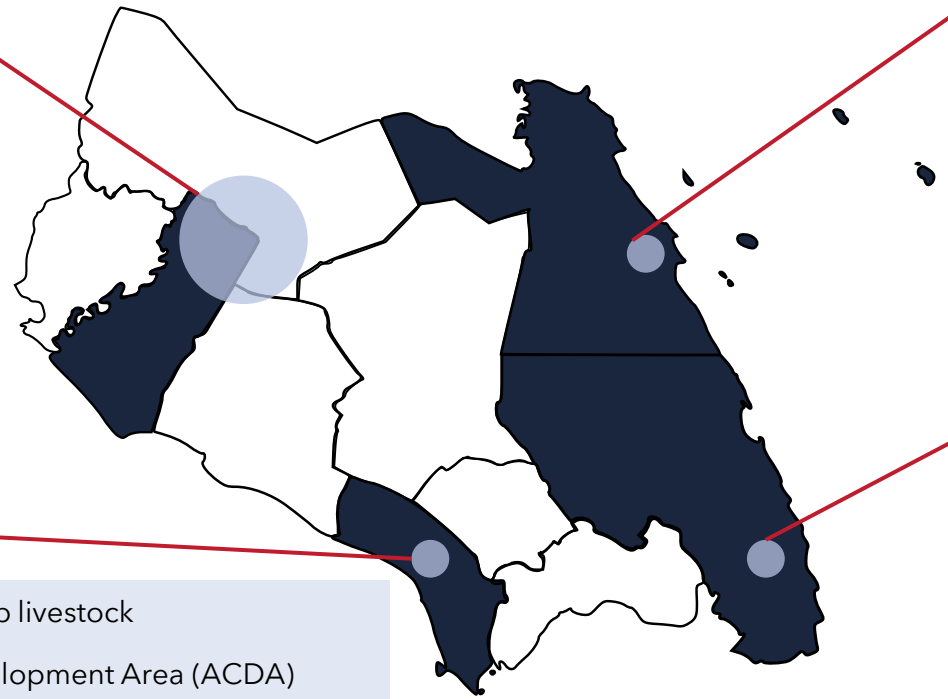
Six districts in Johor – Segamat, Kluang, Mersing, Kota Tinggi, Pontian, and Tangkak – have identified agriculture as a key focus initiative under Maju Johor 2030 (3/3)

TANGKAK

- Developing the rice industry project
- Developing the fruit and vegetable industry
- Establishing and expanding zones for livestock farming of cattle, buffalo, goats, sheep, chicken eggs and meat, fisheries, and aquaculture
- Establishing a small medium enterprise zone for agriculture

PONTIAN

- Enhancing zoning of areas for goat and sheep livestock
- Developing an Agriculture Concentrate Development Area (ACDA)
- Enhancing the Transformasi Usahawan Sektor Ternakan (TRUST scheme)
- Expanding chicken farming areas



MERSING

- Developing the Jemaluang Dairy Valley farm
- Developing the Endau Mersing fishery park in the production of fish products

KOTA TINGGI

- Enhancing fish landing facilities and upgrade fisheries product marketing facilities at LKIM Sedili Port
- Encouraging oil palm crops as a replacement for unproductive rubber crops
- Establishing the Kota Tinggi Beef Valley

Agriculture plantations and farms

Source: Maju Johor 2030

The agriculture value chain encompasses activities from land preparation and harvesting to processing, packaging and distribution across Johor's palm oil, fruit and vegetable sectors

Value Chain	Production & Farming	Processing & Value Addition	Distribution & Market Access
Palm Oil	**Land Preparation & Crop Management** • Select high-yield seedlings, optimize layouts, and apply fertilization and pest control **Harvesting & Collection** • Use mechanized tools for efficient FFB harvesting and reduced labour dependency	**FFB Processing & Oil Extraction** • Move harvested fresh fruit bunches to mills for sterilization, stripping, and crude palm oil (CPO) extraction **Refining & Packaging** • Process CPO into derivatives like oleochemicals and biodiesel, then pack products for distribution	**Distribution & Retail** • Transport crude and refined palm oil to wholesalers, refineries, and global markets **Industrial Supply & Manufacturing** • Provide palm oil derivatives for food, cosmetics, and biofuel industries
Fruits	**Orchard Preparation & Management** • Condition soil, plant suitable fruit tree varieties, and regulate water usage with smart irrigation **Harvesting & Sorting** • Use AI-driven disease detection, pick fruits at peak ripeness, and sort them for quality and post-harvest handling	**Sorting & Storage** • Classify produce by size and ripeness, then use cold chain logistics to maintain freshness **Processing & Value Addition** • Extract juices, dry fruits, and prepare jams or canned products for retail	**Wholesale & Export** • Supply fresh fruits to supermarkets, wet markets, and global markets with blockchain traceability for authenticity **E-Commerce & Direct Sales** • Offer fresh fruit delivery through online platforms and direct-to-consumer channels.
Vegetables	**Soil Preparation & Crop Management** • Use traditional or hydroponic/greenhouse systems, apply fertilizers, and control pests for high yields **Harvesting & Handling** • Collect vegetables at the right maturity stage to maintain freshness and quality	**Cleaning & Packaging** • Wash, sort, and pack vegetables using biodegradable smart packaging to maintain freshness and reduce waste **Processing & Value Addition** • Prepare sauces, pickled vegetables, frozen meal packs, and ready-to-eat salads	**Wholesale & Retail Supply** Transport fresh vegetables to supermarkets, grocers, and food processing plants **Digital & Institutional Sales** Expand sales through digital platforms, exports, and supply to hotels and restaurants

Crops are Johor's top agri contributor—led by palm oil, fruits, and vegetables—hence their selection for value chain focus

Johor's above-average farm outputs provide a robust production foundation ripe for capturing higher-value opportunities downstream

Value Chain	Production & Farming	Processing & Value Addition	Distribution & Market Access
		Global	***Malaysia***	***Local***
Palm Oil	**Land Preparation & Crop Management** • Select high-yield seedlings, optimize layouts, and apply fertilization and pest control **Harvesting & Collection** • Use mechanized tools for efficient FFB harvesting and reduced labour dependency	**Indonesia** Estates such as Golden Agri hit ≈ 20 t FFB ha^{-1} by pairing high-yield clones with drone spraying and AI harvest-scheduling	Labour crunch has pushed Malaysian majors (Sime Darby, IOI, FGV) to trial harvesting exoskeletons and drone fleets across >40 000 ha	• Johor estates averaged 17.41 t ha^{-1} in 2023—≈10 % above the national mean
Fruits	**Orchard Preparation & Management** • Condition soil, plant suitable fruit tree varieties, and regulate water usage with smart irrigation **Harvesting & Sorting** • Use AI-driven disease detection, pick fruits at peak ripeness, and sort them for quality and post-harvest handling	**Spain** 3.5 Mt yr^{-1} of off-season fruit & veg from 40 000 ha of low-water greenhouses, exporting 75 % to the EU	Malaysia harvested ≈ 1.89 Mt of fruit in 2023 (durian 529 kt tops the list)	• State farms on **50 217 ha produced 772 kt of fruit in 2022**; the agri-exco has earmarked RM 14.5 m to upscale smart-irrigated orchards by 2027
Vegetables	**Soil Preparation & Crop Management** • Use traditional or hydroponic/greenhouse systems, apply fertilizers, and control pests for high yields **Harvesting & Handling** • Collect vegetables at the right maturity stage to maintain freshness and quality	**Japan** Spread's 3 000 m^2 vertical plant-factory turns out 20 000 lettuce heads day^{-1} with <1 L water per head	National vegetable output ≈ 1.25 Mt in 2023 (-8 % vs 2022) on ~46 000 ha; imports still fill >45 % of demand	• State programme backing **86 hydroponic entrepreneurs** already delivered **8 618 t veg & fruit** in 2024—targeting +7 kt by Q3 2025

Source: Golden Agri, MPOB, Revolve, State Agriculture Department, PASB Analysis

Johor's palm, fruit and vegetable chains stretch from global refining and export hubs to budding local processing and distribution—highlighting deep market integration

Value Chain	Production & Farming	Processing & Value Addition	Distribution & Market Access	
		Global	***Malaysia***	***Local***
Palm Oil	**FFB Processing & Oil Extraction** • Move harvested fresh fruit bunches to mills for sterilization, stripping, and crude palm oil (CPO) extraction **Refining & Packaging** • Process CPO into derivatives like oleochemicals and biodiesel, then pack products for distribution	**Netherlands** EU's gateway for palm-oil refining & biodiesel; massive tank farms, specialty-fat and oleochemical clusters	**Oleochemical exports** **2.87 Mt worth RM 16 bn in 2023 (MPOB)**	• **iSPOC** (Pasir Logok, Kota Tinggi): RM 172 m mill + specialty-fat refinery + kernel crushing + bio-energy plant; start-up 2026
Fruits	**Sorting & Storage** • Classify produce by size and ripeness, then use cold chain logistics to maintain freshness **Processing & Value Addition** • Extract juices, dry fruits, and prepare jams or canned products for retail	**Thailand** #1 canned-pineapple exporter; 72 % of 1.65 Mt crop goes into cans, juice, dehydrated snacks	**Processed fruit/veg exports** **USD 157 m (RM 728 m) in 2023** – just 0.05 % of total exports	• **FarmByte Food Hub (Ulu Tiram):** building a CPPC & 2 cold-chain DCs to make frozen pulp, juices, dried fruit snacks
Vegetables	**Cleaning & Packaging** • Wash, sort, and pack vegetables using biodegradable smart packaging to maintain freshness and reduce waste **Processing & Value Addition** • Prepare sauces, pickled vegetables, frozen meal packs, and ready-to-eat salads	**Netherlands** Westland IQF (Individually Quick Frozen) & salad-kit plants export > 700 kt frozen / pre-cut veg yearly with smart packaging	**Dried vegetables** **US$ 22.4 m, 66 kt exported in 2023** (90 % to Thailand/Singapore)	• **FarmByte CPPC** will introduce automated wash/sort & biodegradable smart-packs for leafy greens + chilli, launching 2025

Source: FarmByte, World Stop Exports, PASB Analysis

Johor's palm oil, fruit and vegetable chains culminate in dynamic distribution networks– linking local colocation hubs to global buyers and securing premium market access

Value Chain	Production & Farming	Processing & Value Addition	Distribution & Market Access	
		Global	*Malaysia*	*Local*
Palm Oil	**Distribution & Retail** • Transport crude and refined palm oil to wholesalers, refineries, and global markets **Industrial Supply & Manufacturing** • Provide palm oil derivatives for food, cosmetics, and biofuel industries	**Netherlands** Europe's main entry hub for tropical oils; offers integrated tank-storage, on-site refining and bio-fuel blending that re-exports product across the EU	Malaysia shipped **1.07 Mt of palm oil to the EU in 2023 (≈ RM 4 bn),** down from 2.09 Mt in 2019 as buyers tighten sustainability criteria	• **JPG** now has ≈ 61,000 ha (99 %) estates + all 5 mills RSPO-certified, securing "identity preserved" supply for EU buyers (2024)
Fruits	**Wholesale & Export** • Supply fresh fruits to supermarkets, wet markets, and global markets with blockchain traceability for authenticity **E-Commerce & Direct Sales** • Offer fresh fruit delivery through online platforms and direct-to-consumer channels.	**Chile** Dedicated cold-chain corridors move > 110 m boxes of cherries to China each season	**Pineapple exports hit RM 5.75 bn in 2023;** Singapore remains top buyer	• **FarmByte Food Hub** (digital B2B platform + cold-chain centre, 2024) begins onboarding Johor growers; aims to aggregate & bulk-ship fruits direct to Singapore
Vegetables	**Wholesale & Retail Supply** Transport fresh vegetables to supermarkets, grocers, and food processing plants **Digital & Institutional Sales** Expand sales through digital platforms, exports, and supply to hotels and restaurants	**Netherlands** €15.6 bn fruit-&-veg exports in 2024; advanced greenhouse clusters feed Schiphol "fresh-chain" air-cargo and Rotterdam maritime links	**Malaysia exported USD 1.49 bn vegetable products in 2023;** 30 % to Singapore, 23 % to China	• **FarmByte × Archisen** 52,000 sq ft indoor vertical-farm starts Q1-2025; 70 % of 306 t leafy greens pre-sold to Singapore retailers

Source: Port of Rotterdam, MPOC, FreshFruitPortal, Bernama, FarmByte, JPG, PASB Analysis

Johor's agriculture is the bedrock for sustainable growth—precision farming and real-time analytics promise to boost yields, cut costs and fortify supply chains

Agriculture underpins Johor's sustainable growth—enabling smarter, more resilient food systems through precision farming, IoT sensing and data-driven analytics, and serving as a cornerstone of the state's future

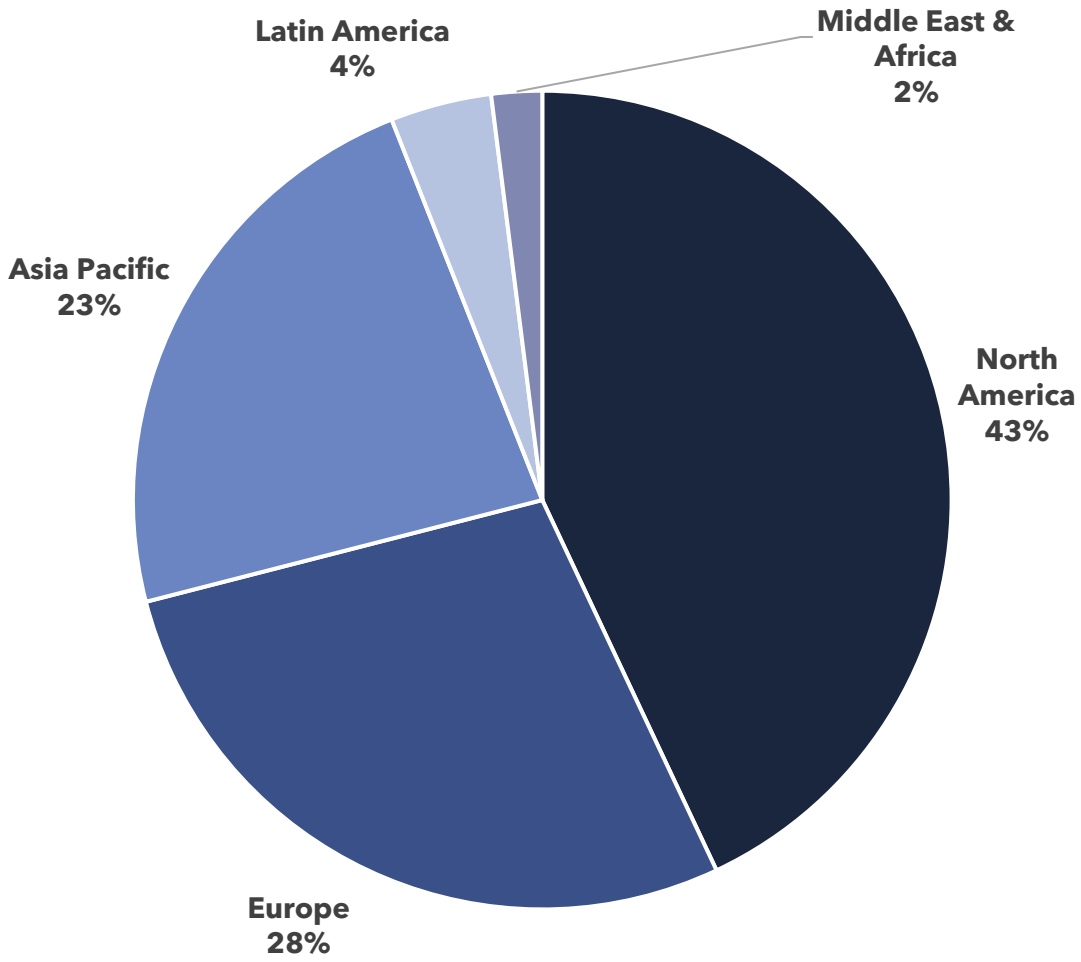
Agri-tech drives Johor's sustainable transformation—delivering higher yields, lower input costs and resilient supply chains through precision farming, real-time monitoring and data-driven decision

Case for Change	Why It Is Needed
Catalysing Johor's Agri-Tech Transformation	• Johor leads industrial-crop output at 128 173 t but its 9.3 t/ha yield—5th nationally—reveals significant farm-level efficiency shortfalls • Johor's 142,129 ha of independent oil-palm plots made up ≈40 % of Peninsular Malaysia's smallholder area in 2023
Driving Crop Diversification and Yield Gains through Urban & Vertical Farming	• Johor leads Malaysia's agriculture with a USD 4 b GDP—15 % ahead of Sarawak—but its agro-processing value (USD 1.3 b) trails Selangor's fourfold output, highlighting untapped potential for higher-margin processing • 3.9 million kg of lettuce and premium salad leaves imported worth USD3.4 m despite 102 Mt local national output—imports mostly from China & Thailand for year-round supply
Accelerating Johor's Sustainability Momentum Across Certification, Compliance, and Circular Agri-Projects	• Only 256 Johor smallholders (12 % of a 2,103-member group) reached full RSPO certification in 2023 under Johor Plantations Group's programme • RSPO-certified area in Malaysia reached 920,173 ha in 2024 – but that is only ~16 % of the country's 5.65 M ha oil-palm land, leaving a large compliance gap

Source: PASB Analysis

North America leads with 43 % of smart-ag revenue, but Asia Pacific's 23 % share and fastest growth signal prime opportunity for Johor's tech-driven agriculture push

Smart Agriculture Market Share by Region (2023)
%



Key Highlights

North America dominated the smart agriculture market in 2023 with a revenue share of 43%

- Growing government initiatives and favorable guidelines for the expansion of the agriculture sector
- Several market players are collaborating with government to implement smart agriculture
- Subsidies and tax incentives are provided for the development of smart agriculture

Asia Pacific is growing at the fastest rate, led by strong government initiatives and organic agriculture

- Nations such as Singapore, Japan, and India are taking constant efforts for the growth of smart agriculture market
- Government is providing financial help for developing smart agriculture
- The rise in adoption of organic agriculture is also supporting the growth of smart agriculture market in Asia Pacific

Around the world, governments are advancing food sustainability through agritech, with focused national strategies, cutting-edge innovation, and financial support

Case Study: Thailand

Advancing Smart Farming

- **National Strategy**: Thailand's 20-Year National Strategy emphasizes smart agriculture to enhance competitiveness and sustainability
- **Technological Adoption**: Initiatives include the use of drones for fertilization, AI-driven platforms like HandySense B-Farm, and blockchain for supply chain transparency

Case Study: The Netherlands

Pioneering Agricultural Automation

- **Global Standing:** Despite its small size, the Netherlands is the world's second-largest exporter of agricultural products, attributed to its advanced agri-tech practices
- **Innovations:** The country utilizes vertical farming, precision agriculture, and robotics, such as the Lely Astronaut milking robot, to optimize productivity and sustainability

Case Study: Singapore

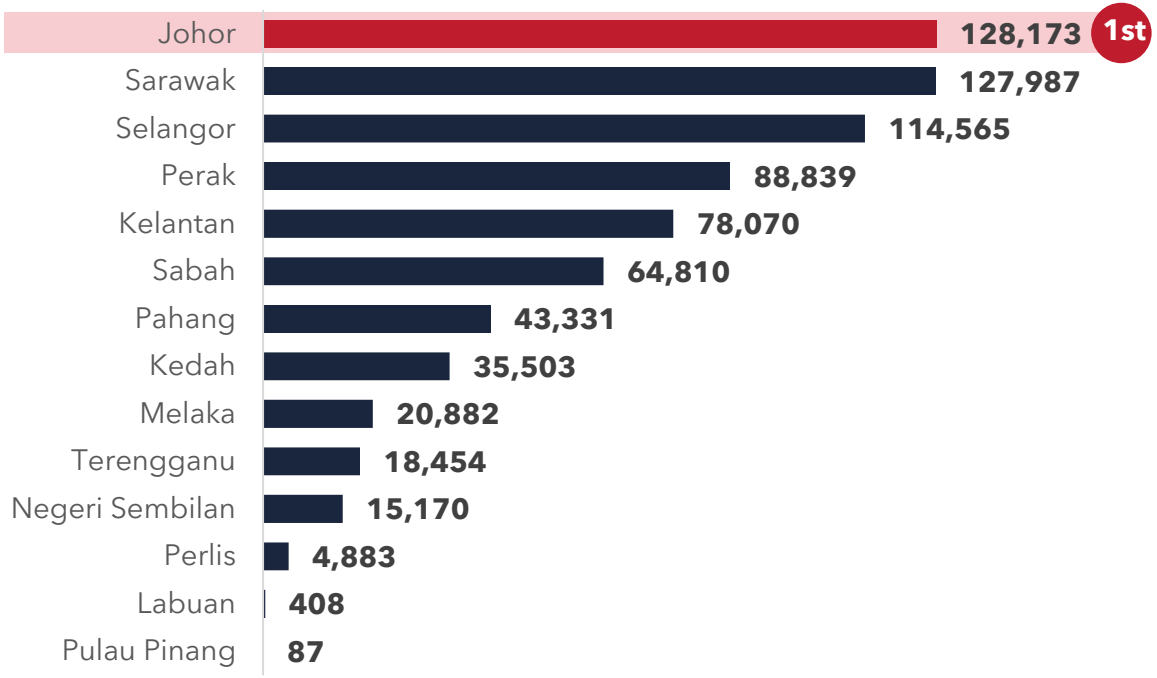
Urban Agri-Tech Hub

- **Strategic Development:** Singapore aims to become a regional agri-tech hub, focusing on urban farming, vertical agriculture, and R&D through initiatives like the Agri-Food Innovation Park
- **Government Support:** The government provides funding and infrastructure to support agri-tech startups and research, enhancing food security and sustainability

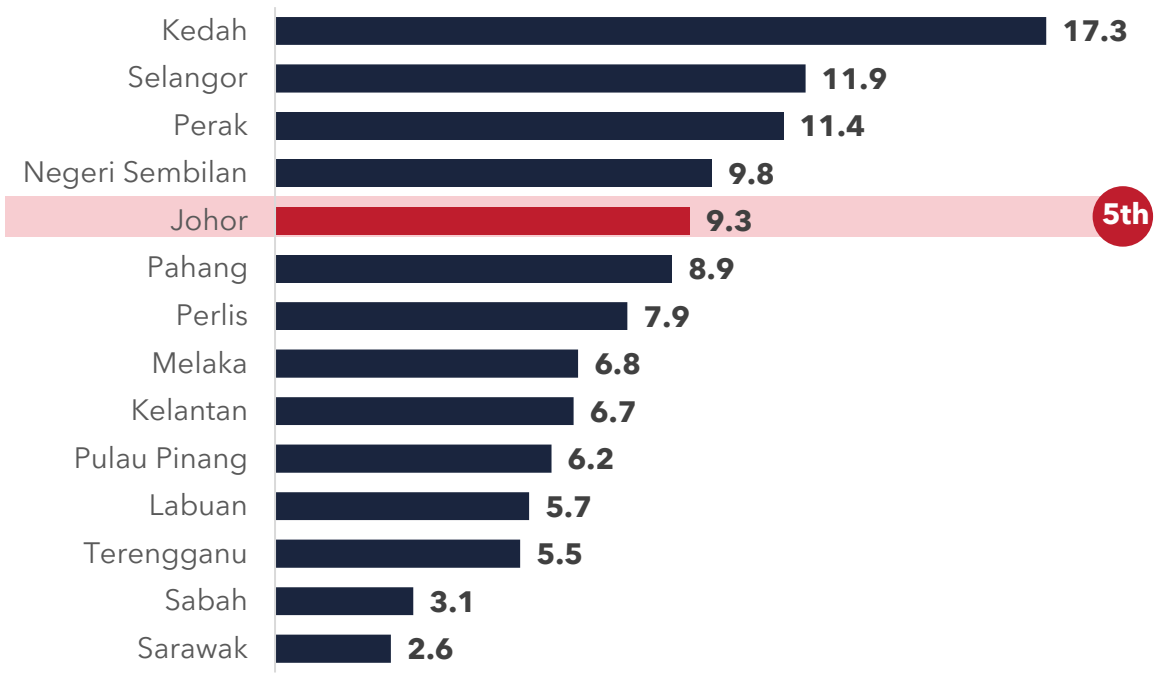
Source: SSRN, European Uniion, McKinsey, PASB Analysis

Johor's volume leadership coupled with its mid-tier yields underscores a prime opportunity for ag-tech adoption to bridge the productivity gap

Industrial Crop Production by States (2022) metric tonne



Industrial Crop Yield by States (2022) metric tonne/hectare



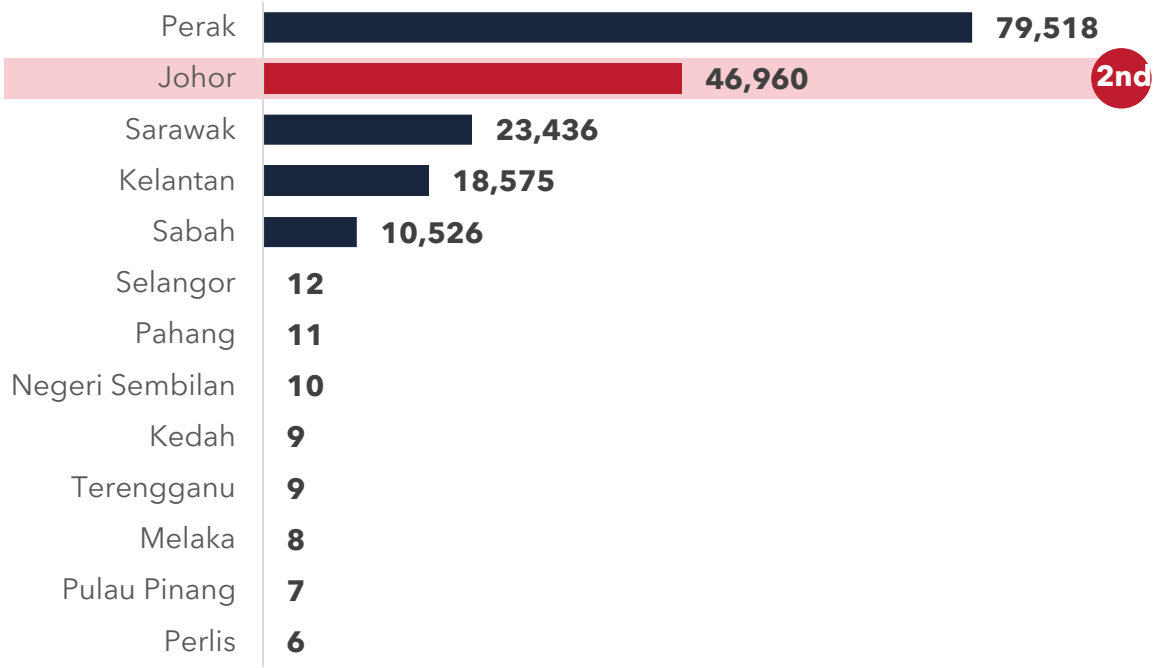
Key Insights

- **Production leader**: Johor tops the charts with 128 173 t of industrial crops, narrowly outpacing Sarawak's 127 987 t
- **Yield gap**: Its 9.3 t/ha output ranks only 5th, well below Kedah's 17.3 t/ha and Selangor's 11.9 t/ha, signaling inefficiencies on the farm
- **Tech-driven uplift**: Adopting precision-ag solutions—drone-based NDVI mapping, IoT soil-moisture sensors and variable-rate nutrient application—could realistically boost Johor's yields by 20–30 %

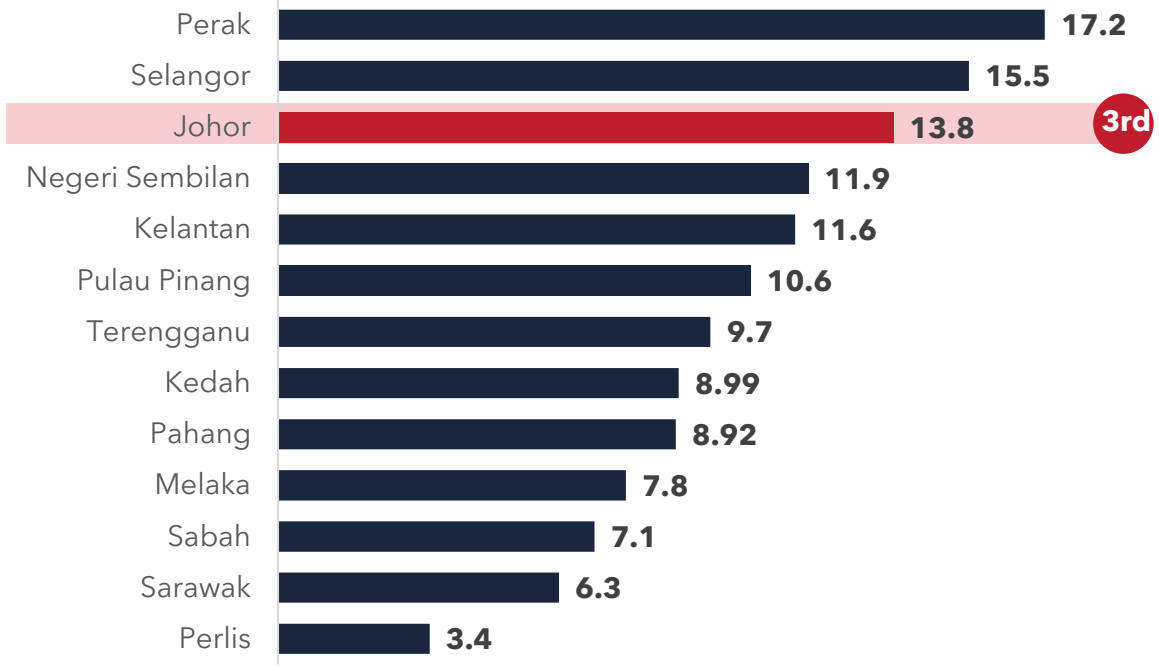
Source: Laporan Sosioekonomi Negeri Johor 2023 (DOSM), Johor State Agricultural Department, PASB Analysis

Despite ranking second in cash-crop volume, Johor's 13.8 t/ha yield falls behind top performers—highlighting how precision-agtech could unlock substantial efficiency gains

Cash Crop Production by States (2022) metric tonne



Cash Crop Yield by States (2022) metric tonne/hectare



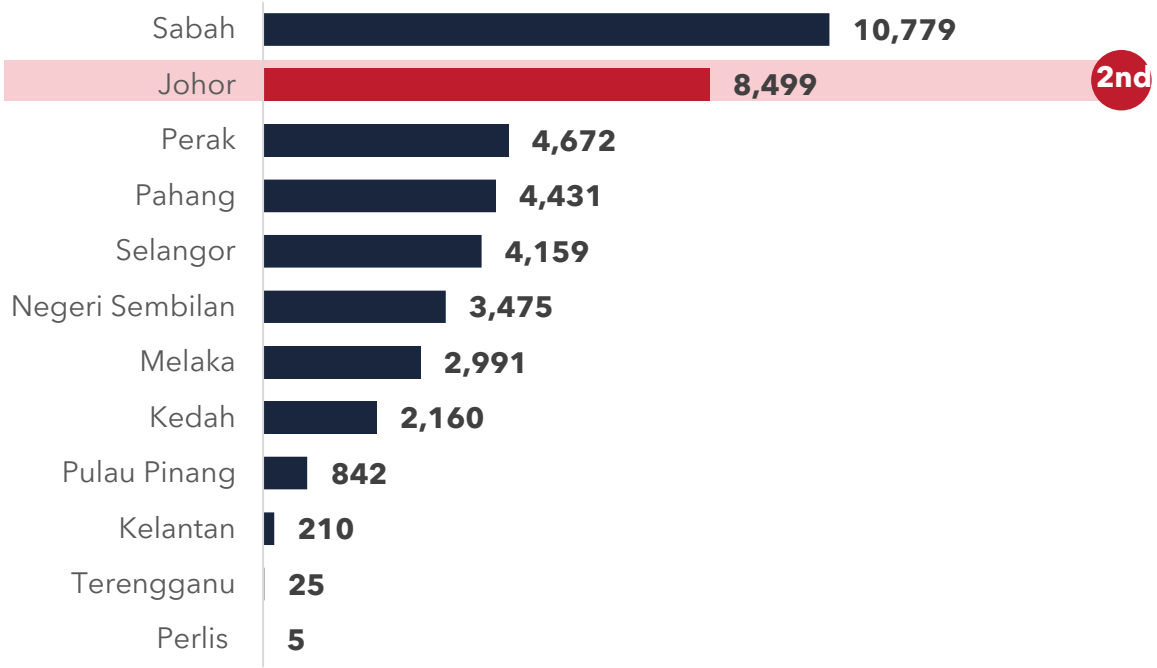
Key Insight

- **Perak dominates production, Johor holds strong second place**: In 2022 Perak led cash-crop output with 79 518 t, followed by Johor at 46 960 t—more than double Sarawak's volume
- **Top yields don't always align with volume**: Perak (17.2 t/ha) and Selangor (15.5 t/ha) outpace Johor's 13.8 t/ha, showing that high output states can still boost per-hectare efficiency
- **Efficiency upside**: Negeri Sembilan achieves 11.9 t/ha on much smaller acreage, suggesting Johor could leverage targeted agritech—like precision-irrigation and soil-nutrition sensing—to lift yields further

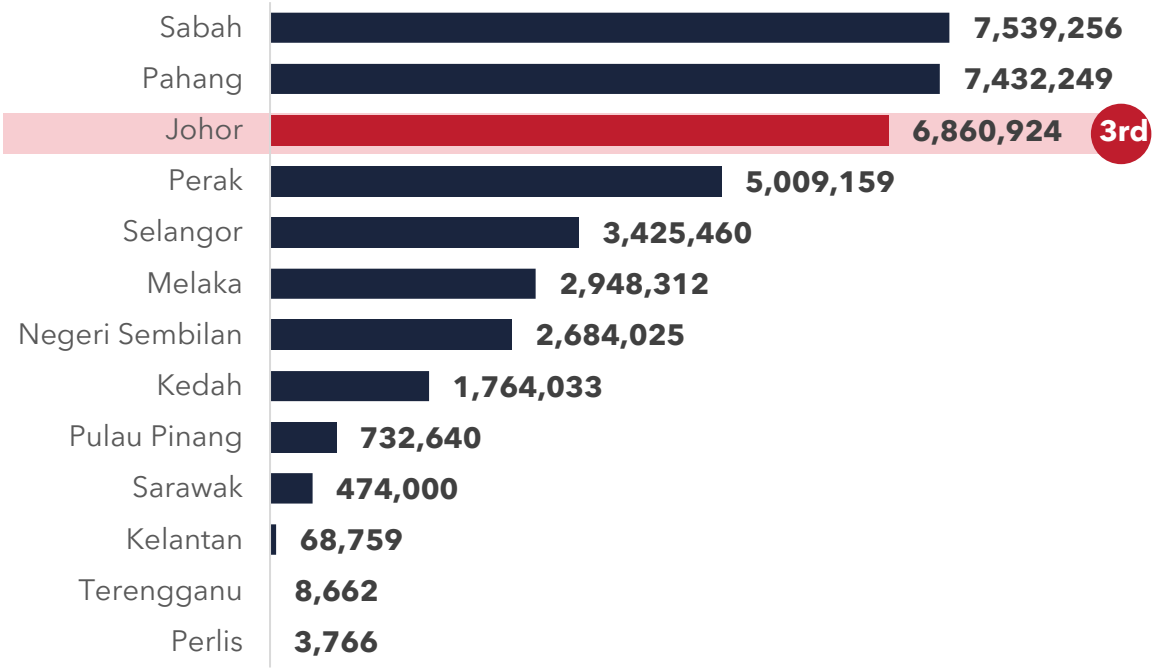
Source: Laporan Sosioekonomi Negeri Johor 2023 (DOSM), Johor State Agricultural Department, PASB Analysis

Johor's large dairy herd (8 499 head) secures 2nd place in cattle numbers, but its per-cow yield lags Pahang—signaling potential gains from precision-feeding and herd monitoring

Dairy Cattle Population by States (2022)



Milk Production by States (2022) liter



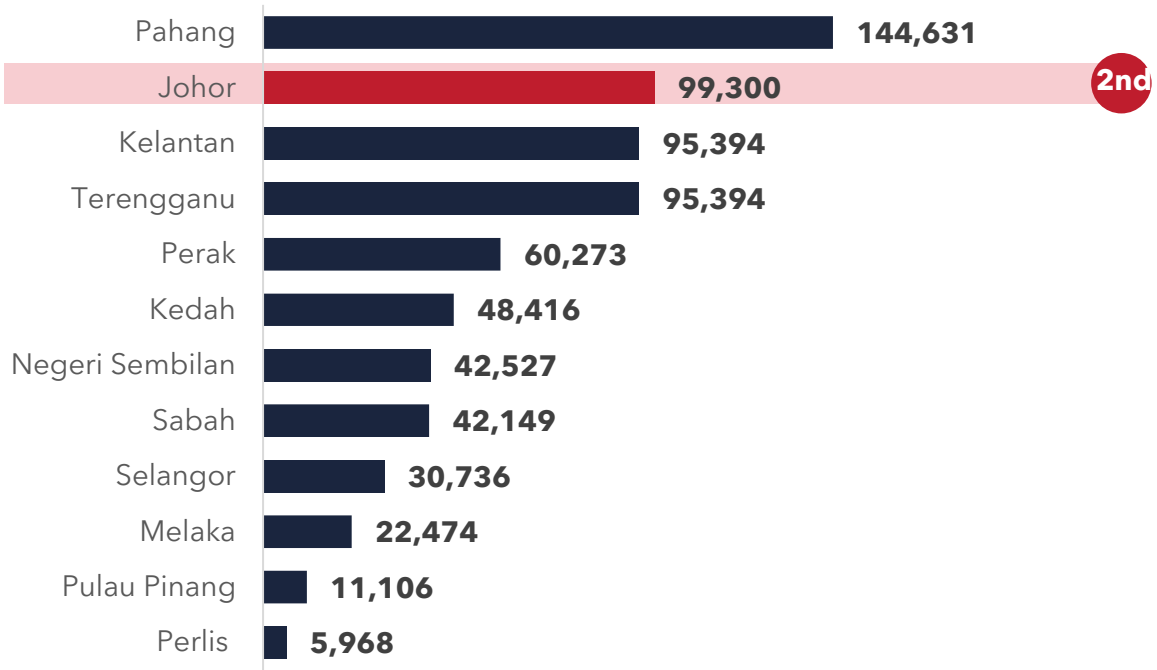
Key Insight

- **Sabah leads the sector**: With 10 779 dairy cattle and 7.53 million L of milk, Sabah tops both herd size and production
- **Johor's herd vs. output**: Johor ranks 2nd in cattle (8 499 head) but 3rd in milk (6.86 million L), indicating only moderate per-cow productivity
- **Yield gap spotted**: Pahang's cows average 1 676 L/head, more than double Johor's 807 L/head, highlighting clear upside in optimizing feeding and herd-management practices

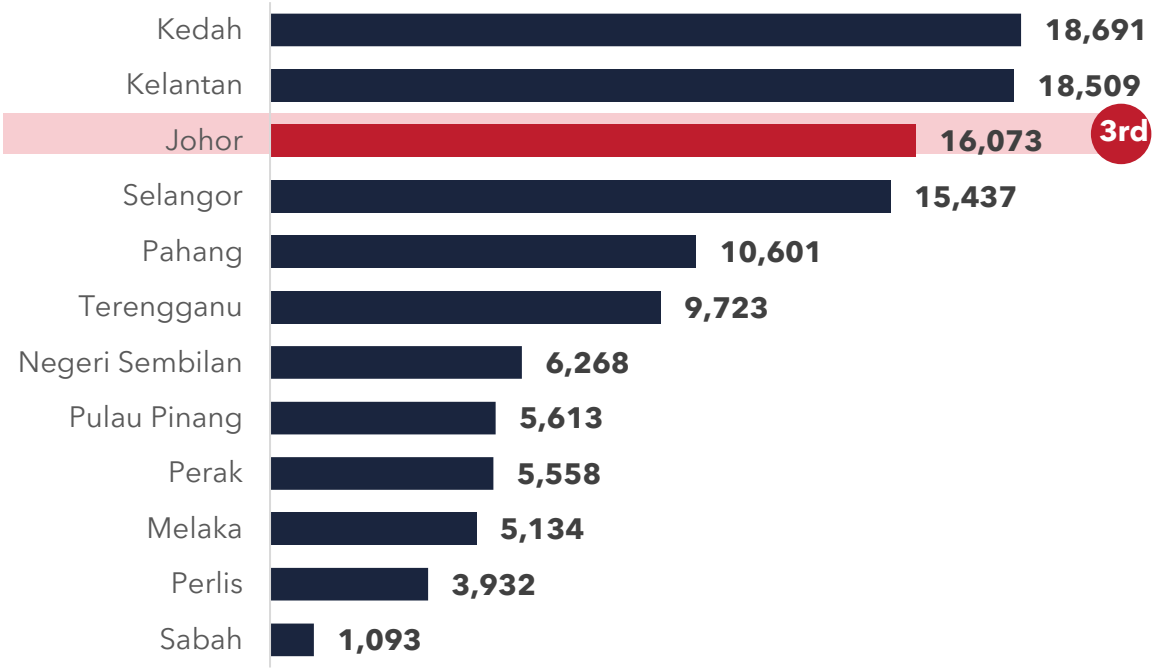
Source: Laporan Sosioekonomi Negeri Johor 2023 (DOSM), Johor State Agricultural Department, PASB Analysis

Despite Johor's strong beef-cattle herd, its lower slaughter rate signals untapped efficiency—where precision-feeding could drive higher turnover and yields

Beef Cattle Population by States (2022)



Number of Slaughter Cattle by States (2022)



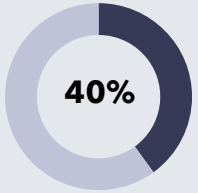
Key Insight

- **Pahang's herd dominance**: Pahang leads beef-cattle numbers with 144 631 head, while Johor ranks second at 99 300
- **Slaughter throughput gap**: Johor slaughters 16 073 cattle (3rd), implying a lower turnover rate (≈16 % of its herd) compared to Kelantan's ≈19 %, suggesting potential to ramp up processing
- **Productivity opportunity**: Aligning herd management with precision feeding and RFID-based tracking could help Johor boost both slaughter rates and per-animal yields

Source: Laporan Sosioekonomi Negeri Johor 2023 (DOSM), Johor State Agricultural Department, PASB Analysis

Holding 40 % of Peninsular Malaysia's smallholder land and spearheading digital and MyGAP adoption, Johor channels almost its entire 142 k ha smallholder acreage into palm oil

Johor Smallholders: Largest, Certified, Digitally Connected



Nation's largest independent smallholder landbank
Johor's **142,129 ha** of independent oil-palm plots made up ≈**40 % of Peninsular Malaysia's smallholder area in 2023**, giving the state unmatched grassroots scale

#2 for MyGAP-certified

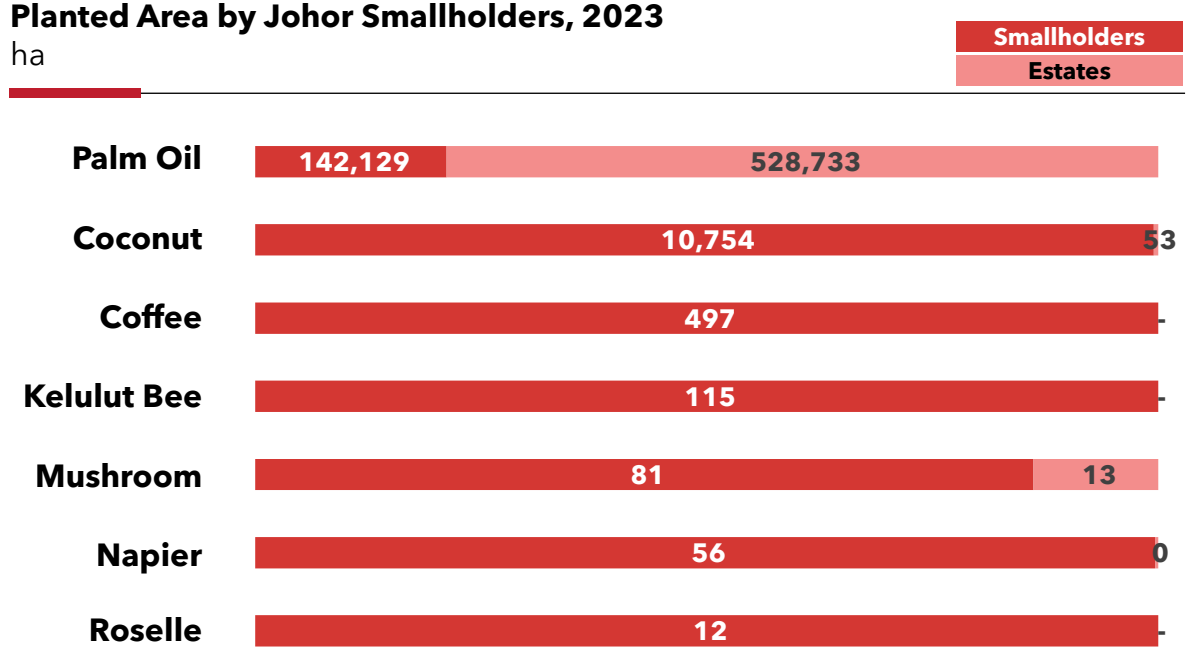
37 MyGAP-certified farms

Front-runner in certification and good-practice adoption
Johor ranks **#2 for MyGAP-certified crop smallholders** and **hosts 37 MyGAP-certified livestock farms** (the most of any state), signalling strong compliance with export-grade sustainability standards

Digital agritech lift-off
The 2023-launched **FarmByte Food Hub** is onboarding Johor's smallholders onto a smartphone platform that provides IoT-based advice, transparent market prices and rapid offtake

Palm Oil Towers Over Johor Smallholders' 2023 Crops

Planted Area by Johor Smallholders, 2023
ha



Johor's 2023 smallholder landscape is overwhelmingly skewed toward oil palm, with ≈142 k ha under the crop—more than 13 times the coconut area and hundreds of times the combined footprint of coffee, kelulut-bee farming, mushrooms, napier grass and roselle—underscoring palm oil's unrivalled grip on small-scale agriculture in the state

Source: Department of Agriculture, Ministry of Plantation and Commodities, Khazanah Research Institute, FarmByte, PASB Analysis

Johor's early ag-tech pilots—from JPG mechanization to FarmByte's digital hub—lay a strong foundation that, if scaled rapidly, could transform the state's entire agricultural ecosystem

Case Study: Innovative Mechanisation by Johor Plantations Group (JPG)

Mechanical Buffalo Equipped with Raker (MB Raker)

- Developed by JPG, this machine has increased palm base raking productivity by **250%,** achieving **3.5 hectares per man-day** compared to the conventional **1 hectare per man-day**
- Deployment of **21 units** across estates has resulted in labour savings equivalent to **74 workers**, translating to a cost reduction of **RM418,026** in recruitment and basic amenities

Mini Tractor Grabber Scissor Lift (MTGSL)

- This equipment enhances Fresh Fruit Bunch (FFB) evacuation efficiency, increasing the land-to-labor ratio from 1:18 hectares to 1:25 hectares, and reducing FFB loading costs through direct in-field evacuation

Case Study: Digital Agro-Food Ecosystem by FarmByte Food Hub

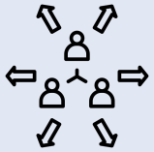
- Launched in Ulu Tiram, the FarmByte Food Hub integrates farmers, processors, distributors, and retailers through a digital platform, enhancing efficiency and transparency across the agro-food value chain
- The hub provides farmers with digital tools, market intelligence, and real-time production schedules, empowering them to make informed decisions and improve productivity

National Perspective on Mechanization

While paddy production in Malaysia is fully mechanized, smallholder sectors like oil palm and rubber still rely heavily on manual labour. The government aims to intensify mechanization through financial assistance and R&D initiatives

Source: JPG, Farmbyte, FFTC

Johor's yield gaps and fragmented smallholders mark a launch-pad for tech-enabled productivity leaps and higher-value crop diversification

Critical Pain Points	Descriptions
1 High Volume, Low Yields: Johor's Productivity Gap	• With 128 173 t, Johor narrowly outpaces Sarawak (127 987 t) as Malaysia's top industrial-crop producer in 2022. Although a volume leader, Johor's yield of 9.3 t/ha ranks only 5th, well below Kedah's 17.3 t/ha and Selangor's 11.9 t/ha, indicating room to boost per-hectare productivity • Johor ranks 2nd in total cash crop production, contributing significantly to Malaysia's agricultural output with over 46,000 metric tonnes. Despite its scale, Johor's crop yield ranks 3rd, trailing behind Perak and Selangor – suggesting room to enhance land productivity through modern practices • Johor has the second-largest dairy cattle population, with over 8,000 heads—highlighting its significance as a livestock-producing state. Milk production ranks only third, despite Johor's large herd size—indicating lower yield per animal compared to Sabah and Pahang • With 16 k head processed, Johor turns over about 1 in 6 of its 99 k-strong herd each year—double Pahang's slaughter ratio—showing a comparatively active value chain from farm to abattoir. Despite ranking 2nd in herd size, Johor trails Kedah and Kelantan in slaughter numbers, suggesting scope for additional feedlot capacity or downstream meat-processing investments to fully monetise its sizeable herd
2 Fragmented Smallholders: Oil Palm Crowds Out Other Crops 	• Johor's 147 342 ha of independent oil-palm plots made up ≈40 % of Peninsular Malaysia's smallholder area in 2023, giving the state unmatched grassroots scale • Johor's 2023 smallholder landscape is overwhelmingly skewed toward oil palm, with ≈142 k ha under the crop—more than 13 times the coconut area and hundreds of times the combined footprint of other industrial crops

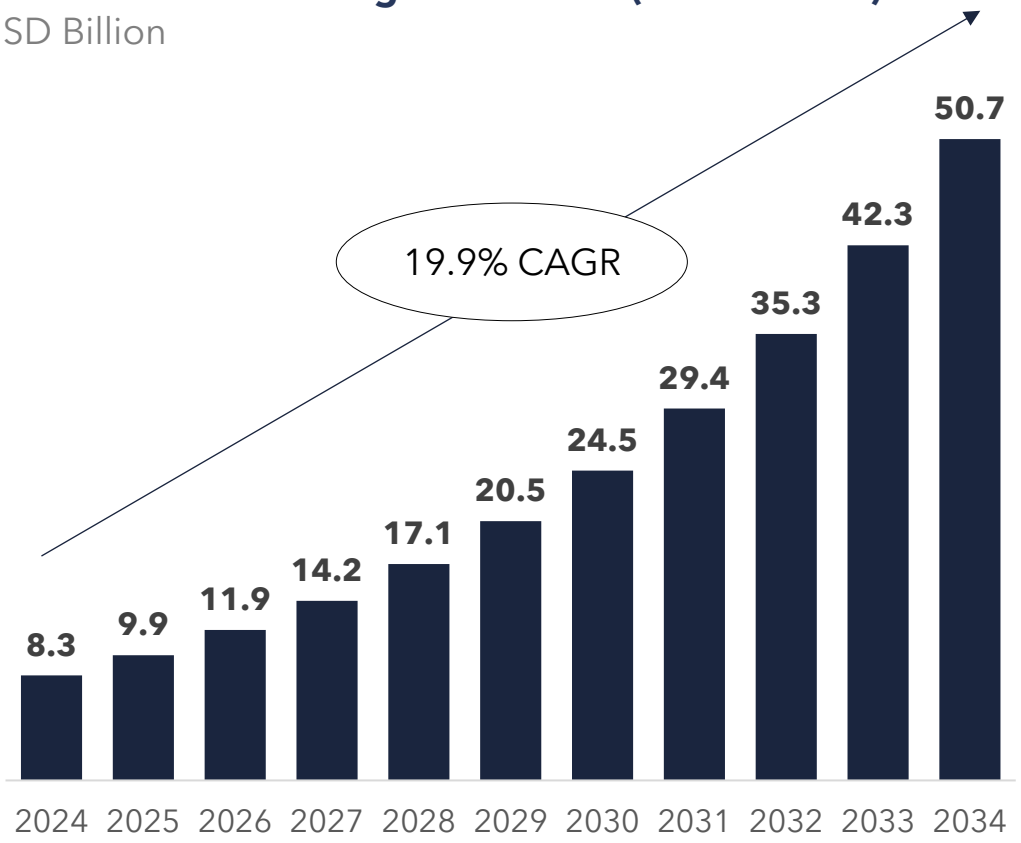
Source: PASB Analysis

The global vertical farming market is on track to grow more than 6x from USD 8.3B in 2024 to USD 50.7B by 2034, driven by urbanisation and agri-tech innovation

The market is projected to grow from USD 8.3B in 2024 to USD 50.7B by 2033, driven by a steady CAGR of 19.9%

Global Vertical Farming Market Size (2024 – 2034)

USD Billion



Key Drivers

Urbanisation

The increasing urban population is driving demand for innovative farming methods like vertical farming to ensure food securit

Technological Advancements

Advancements in hydroponics, aeroponics, and controlled environment agriculture are facilitating the growth of vertical farming

Johor can capitalize on the vertical farming trend by establishing urban farming initiatives and integrating advanced technologies to boost premium agri-based specialties

Source: Polaris

Vertical farming is gaining ground as a smart solution to land scarcity and organic demand, but scaling remains costly–driven by tech, energy, and facility investments

Vertical farming is rising as land shrinks and demand grows for clean, organic produce

Declining arable land is accelerating the rise of vertical farming as a space-efficient, resource-saving solution for future agriculture

The shift toward organic and pesticide-free produce is fueling vertical farming, offering cleaner, controlled environments that align with rising consumer demand for sustainable and healthy food

High setup costs remain the biggest barrier to scaling vertical farming

The primary challenge facing the market is the **high initial investment** required to set up and operate a vertical farm. Contributing factors to these higher costs include:

- **Equipment and technology**
- **Regulatory challenges**
- **Labour**
- **Energy consumption**
- **Facility**

Global vertical farming is led by innovators in driving sustainable agri-tech

Major players in the global vertical farming market include:

AeroFarms
ILLUMITEX THE DIGITAL HORTICULTURE COMPANY
AMHYDRO online store
agrilution
BRIGHT FARMS LOCALLY GROWN
EVERLIGHT
FREIGHT FARMS
growUP
GREEN SENSE FARMS Watch us grow
vertical farm systems growing for the future

Source: Polaris, PASB Analysis

Global vertical farming is accelerating, with the U.S. and Europe leading through strong public-private investments, technological innovation, and policy support

North America spearheads tech-driven vertical farming with public-private backing

- North America leads the global vertical farming market, driven by advanced technologies, AI integration, and strong private investments like Plenty Unlimited's $400M indoor farm
- The USDA's $7.4M in urban agriculture grants (2023) underscores the region's push for sustainable, year-round food production through controlled environment agriculture (CEA)

Europe accelerates vertical farming with public-private agri-tech funding

Europe is advancing vertical farming, supported by its 741M population and 73% urbanization

The UK launched a $6.4M funding competition to blend public and private investments in agri-tech

The EU's Horizon Europe program drives innovation through major funding for sustainable agriculture

U.S. drives vertical farming growth through investment and innovation

- The U.S. leads globally with over 2,000 vertical farms as of 2024
- Walmart's $400M investment in Plenty highlights commercial confidence in urban agriculture
- USDA's $14.2M in grants and state-level programs are advancing access to sustainable, nutritious food
- The U.S. is solidifying its global dominance in vertical farming through public and private innovation

Source: GlobeNewsWire, PASB Analysis

U.S. vertical farming is gaining momentum through strategic partnerships, tech-enabled smart farms, and market-focused investments

Recent developments in the USA Market

BrightFarms Partners with Element Farms to Scale Local Spinach Supply

- **Brand Expansion Through Licensing:** BrightFarms signed an exclusive licensing deal with Element Farms in 2023 to distribute indoor-grown spinach across the Northeast under its brand
- **Rising Demand for Local Greens:** The partnership targets growing consumer appetite for fresh, high-quality, and locally grown leafy produce

Kalera Refocuses on U.S. Market with Strategic Divestment

- **International Exit for Strategic Clarity:** In 2023, Kalera sold its international operations to Growy Holdings to streamline and concentrate efforts within the U.S
- **Sharpened Focus on U.S. Fresh Produce:** This move is aimed at strengthening Kalera's financial health and maximizing growth in the high-potential U.S. fresh produce market

Bowery Farming Launches Flagship Smart Farm in Pennsylvania

- **Scaling with Advanced Technology:** In 2022, Bowery opened its largest and most advanced vertical farm in Bethlehem, Pennsylvania, reinforcing its leadership in the sector
- **Pioneering Water Efficiency:** The farm features a cutting-edge transpiration system designed to reclaim nearly all water used during the growing process

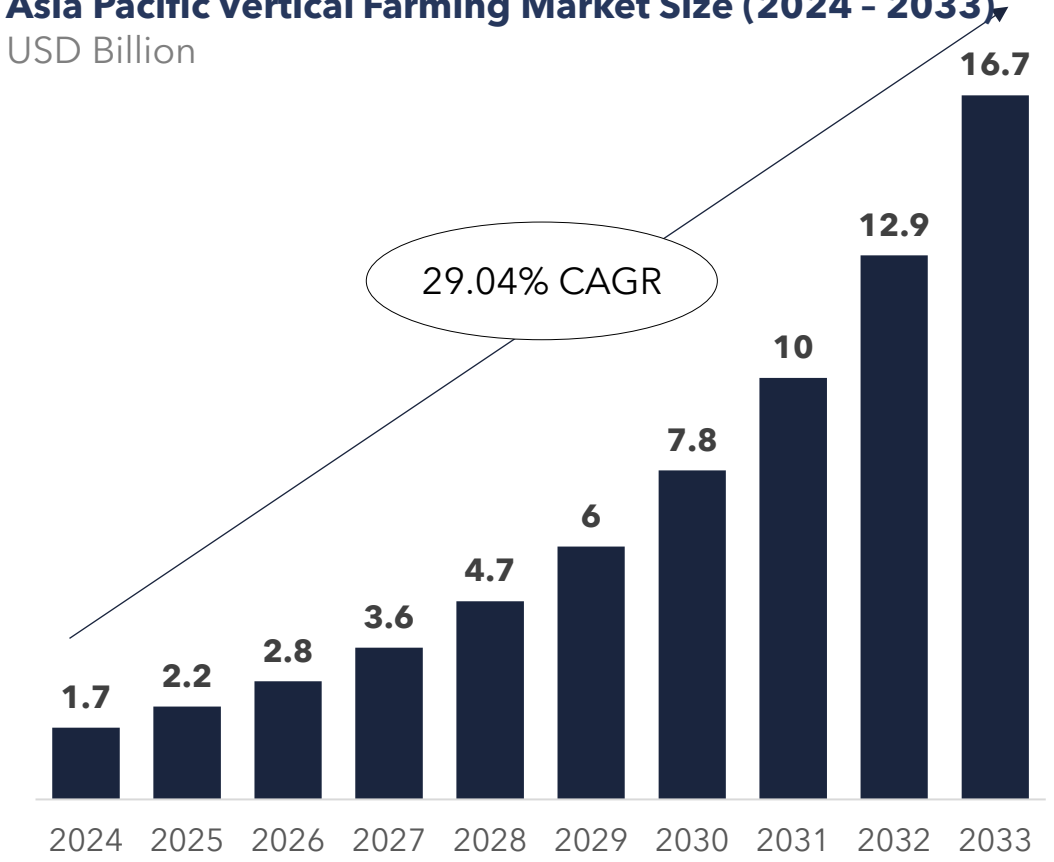
,Source: GlobeNewsWire, PASB Analysis

Asia-Pacific vertical farming is surging to USD 16.7B by 2033, driven by land scarcity, health trends, and smart tech adoption

The market is projected to grow from USD 1.7B in 2024 to USD 16.7B by 2033, driven by a steady CAGR of 29.04%

Asia Pacific Vertical Farming Market Size (2024 – 2033)

USD Billion



Key Insights

Drivers of Market Growth

- **Shrinking arable land** due to urbanization, deforestation, and climate change is accelerating vertical farming adoption
- **Environmental benefits** such as reduced pesticide use, lower water consumption, and minimized pollution make vertical farming an attractive alternative
- **Rising demand for organic food** and growing awareness of health issues are pushing demand for pesticide-free vertical produce

Technology as an Enabler

- **Automation and smart farming tools** (like IoT-based crop monitoring) are boosting productivity and accuracy, supporting market expansion
- Countries like **China** are leading adoption due to high disposable incomes and preference for pollution-free food

Challenges to Growth

- **High initial investment costs** and the need for skilled labour make vertical farming expensive, especially in urban areas
- **Energy consumption** remains a major challenge due to reliance on artificial lighting and controlled environments

Source: Market Data Forecast, PASB Analysis

Recent breakthroughs in Japan, Singapore, and South Korea highlight vertical farming's growing efficiency, automation, and government-backed scalability across Asia

Recent developments

Alesca Life's Vertical Farming Leap in Japan

- **Low-Cost, High-Efficiency Model**: The Osaka-based vertical farm operates at 30–60% lower capital cost per kg and 10–20% lower operating cost compared to national averages
- **Retail-Ready Setup**: Designed for in-store salad production, the farm processes over 100 kg daily using 10–12 container units

Hyundai's High-Tech Farm-to-Table Concept in Singapore

- **Restaurant-Smart Farm Integration**: Launched in May 2024 with Chef Corey Lee, Na Oh restaurant sources ingredients directly from an in-house robotics-driven vertical farm
- **Automated 2-Floor Farm**: The facility uses robotics and automation to produce over 30 kg of fresh produce daily, showcasing efficiency in urban farming

South Korea's National Push for Smart Vertical Farming

- **Government-Backed Tech Integration**: In March 2024, South Korea launched a national initiative to boost vertical farming through robotics, AI, and ICT integration
- **Policy Reforms to Accelerate Growth**: New regulations will ease land use and allow vertical farms in commercial areas, encouraging advanced agri-tech adoption and global expansion

Source: Market Data Forecast, PASB Analysis

Asia Pacific's vertical farming surge is led by hydroponics and building-based systems, backed by automation-driven hardware and rising adoption

Hydroponics dominates, with aeroponics and aquaponics serving niche roles

Hydroponics leads Asia Pacific's vertical farming due to its high yields, low resource use, and scalability for commercial production

Aeroponics is valued for precision and water efficiency, while **aquaponics** attracts those focused on integrated, sustainable farming

Other insights

By Structure

- **Building-based vertical farming** dominates the market for its resource efficiency and location flexibility
- **Container-based systems** remain secondary with more limited scalability

By Offering

- **Hardware** currently leads Asia Pacific's vertical farming market due to automation uptake
- **Cloud-based software** is quickly rising as a key enabler for smart farm management

By Country

- **China**: Expected to dominate the market due to presence of major players and rising demand for pesticide-free produce
- **Japan**: High-income economy with strong preference for organic food
- **India, Malaysia, Vietnam**: Early-stage adopters; showing increasing interest in vertical farming
- **South Korea, Australia**: Advancing in vertical farming capabilities driven by productivity and quality food output

Source: Market Data Forecast, PASB Analysis

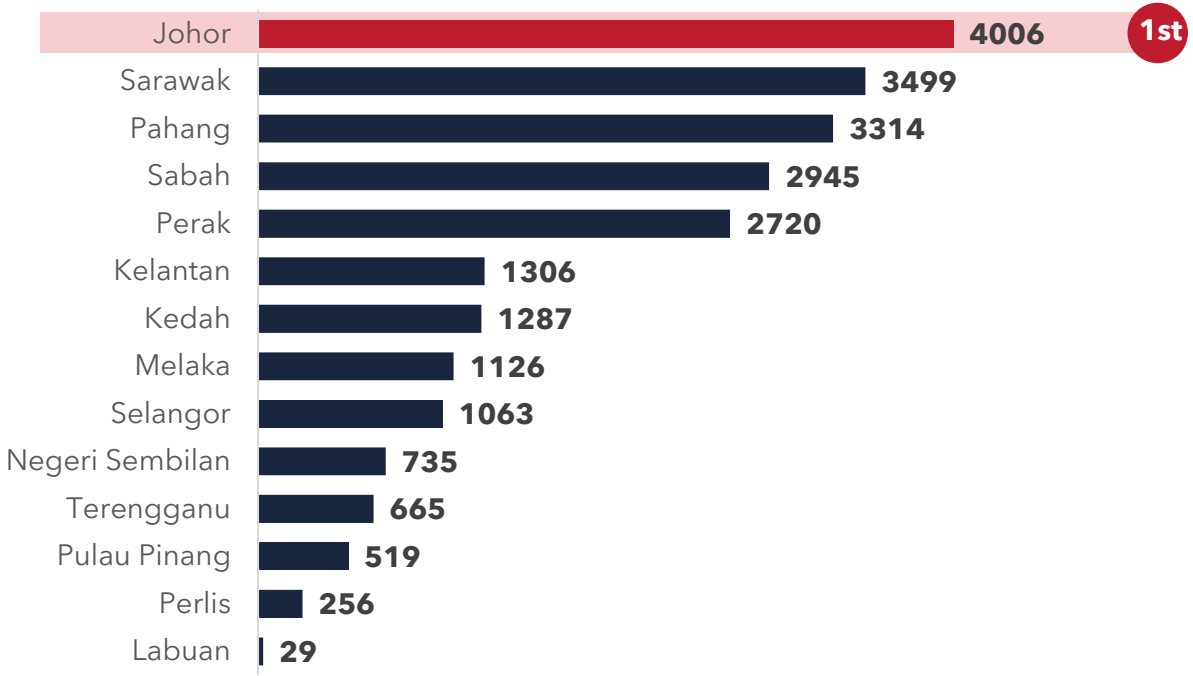
Johor can capitalise on global agro trends by leveraging niche crops, vertical farming, and trade access to boost high-value exports

Major Trends	Global Consumer Shifts	Market & Technology Outlook	Strategic Implications for Johor
Surge in Global Demand for Premium and Niche Agro-Based Products	• Consumers, especially in high-income and urbanizing markets, are increasingly willing to pay a premium for differentiated agro-products – including organic, functional foods and sustainably sourced items	• This shift is driving countries to prioritize value-added processing to boost export value. For example, processed fruit and vegetable exports are growing faster than raw exports globally, with a CAGR of 6.7% from 2020–2024	• Johor can tap into this by expanding downstream capacities in its specialty crop base (e.g. pineapple, coconut, herbs) for higher-margin markets in Asia-Pacific, Middle East, and Europe.
Mainstreaming of Controlled Environment Agriculture (CEA)	• Vertical farming and CEA systems – which use climate control, hydroponics, and automation – are expanding globally as solutions to land constraints, yield volatility, and urban food demands	• The global vertical farming market is projected to grow from USD 5.5 billion in 2023 to over USD 24 billion by 2029	• While these technologies were previously niche, rising investment and declining costs are making them viable for mass application – including in Southeast Asia • Johor's urban corridors (e.g., Iskandar Puteri, Pasir Gudang) offer ideal testbeds for such high-tech cultivation systems
Expansion of Export Market Access via Trade Agreements	• Malaysia's participation in regional trade agreements (RCEP, CPTPP) and leadership in halal certification opens up fast-growing markets for processed and branded agro-products – particularly halal-certified dairy, condiments, and ready-to-eat meals.	• ASEAN agro-exports are projected to grow 5–7% annually through 2025, driven by demand from China, GCC, and South Asia	• Johor's existing logistics advantage (ports, cross-border linkages) gives it a competitive edge to lead Malaysia's move into premium halal-certified agro exports

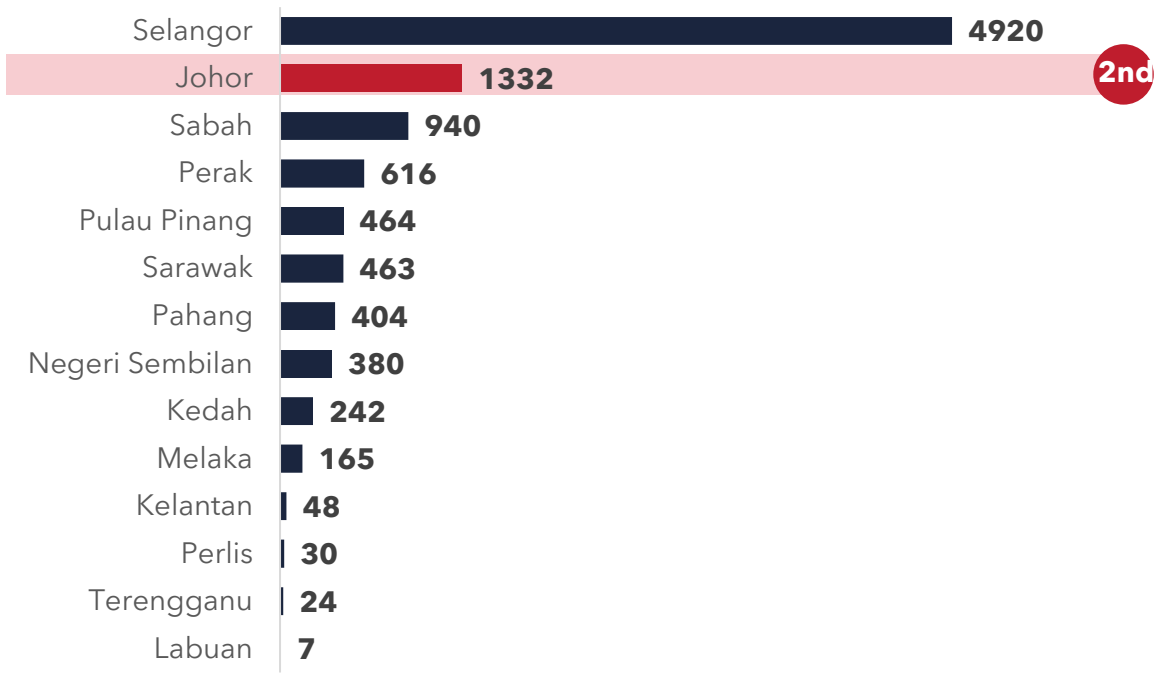
Source: FAO, ASEAN Economic Outlook, PASB Analysis

Johor leads farm output but trails in processing—clear headroom to convert raw abundance into higher-margin value-added growth

Agriculture GDP by States (2023) USD Million



Agro-Processing GDP by States (2023) USD Million



Key Insight

- Johor **generates the largest agriculture GDP in Malaysia** (≈ US$ 4 b), outpacing Sarawak by ~15 % and anchoring the nation's primary-production base
- In agro-processing, Selangor overtakes with almost four times Johor's value; Johor's strong second place (≈ US$ 1.3 b) points to clear headroom for the state to **convert more of its raw output into higher-margin products**
- Smaller states like Pulau Pinang punch above their weight in processing relative to farm output, hinting that Johor—already equipped with logistics hubs such as Pasir Gudang and PTP—could capture similar value-chain gains by **expanding processing capacity and technology adoption**

Source: Laporan Sosioekonomi Negeri Johor 2023 (DOSM), Johor State Agricultural Department, PASB Analysis

High imports of lettuce and spinach into the KL–Johor–Singapore corridor highlight Johor's chance to meet demand with vertical farms supplying consistent, premium greens

High-demand "cool-climate" crops that vertical farms in Johor could profitably supply

1 Lettuce & premium salad leaves

- Salad consumption keeps climbing in metro KL/Johor-Singapore corridor
- **3.9 million kg imported** worth **USD3.4 m** despite 102 Mt local national output—imports mostly from China & Thailand for year-round supply

2 Strawberries & other berries

- Top-tier hotel/ café menus in Johor & SG treat berries as premium add-ons
- **2.9 million kg imported worth USD18.1 m**—5× bigger value than lettuce; main suppliers = Korea, Australia, USA

3 Spinach / kale / high-value leafy greens

- Health-centric F&B (smoothies, poke bowls, vegan menus) drives steady uptake
- **1.1 million kg spinach imported from China alone (USD2.5 m**); kale sits in the same "other veg" group Singapore buys USD218 m of annually

4 Capsicum / coloured bell peppers & cherry tomatoes

- Both command shelf prices above MYR 5.70 kg (USD1.26) and are a "traffic-light" staple for supermarkets & salad chains
- >1 400 import consignments of capsicum in the past 12 months; cherry-tomato imports grew 1 000 % y-o-y on shipping data

5 Fresh culinary herbs (basil, parsley, mint)

- Singapore alone took 67 % of global basil-leaf imports in 2024 as demand for "hyper-fresh" herbs surged in cloud-kitchens
- Air-freighted herbs lose aroma fast; Johor growers limited by heat & rain

Source: Selina Wamucii, WITS, TRP, TrendEconomy, Volza, PASB Analysis

Strategic investment in organic farming, medicinal herbs, and edible flowers can position Johor as a leader in high-value agrofood exports, leveraging global demand for premium, natural products

Niche markets	Data points	Why Johor should consider
1 **Organic Farming**	• The global organic food market was valued at **USD137 billion** in 2021, up from **USD96 billion the previous year** • Projections indicate the market could reach approximately **USD375.80 billion by 2030**	• Southeast Asian countries are seeing a surge in organic agriculture, driven by both **local consumption** and **export opportunities** • Johor's **tropical climate** and **favorable soil conditions** could be leveraged for organic farming, which relies heavily on natural growing conditions
2 **High-Value Herbs & Medicinal Plants**	• The global herbal medicine market is projected to grow from **USD 169.1 billion** in 2023 to **USD 279.8 billion** by 2028, with a CAGR of **10.6%**	• The demand for herbal medicines is particularly strong in Asia, where traditional systems like **Ayurveda** and **Traditional Chinese Medicine (TCM)** are gaining global recognition • There's a growing consumer preference for natural and plant-based remedies, driven by concerns over the side effects of synthetic drugs
3 **Edible Flowers for High-End Culinary Applications**	• The global edible flowers market is projected to reach **USD 503.22 million** by 2032, with a CAGR of **4.9**% from 2023 to 2033	• Johor's tropical climate is ideal for growing a variety of edible flowers year-round, including **hibiscus** and **roses** • Edible flowers command **premium prices** in high-end culinary markets, offering higher profit margins compared to traditional crops

Key Takeaways

- Johor's climate and soil make it ideal for organic farming, medicinal herbs, and edible flowers, aligning with growing global demand
- Rising consumer preference for natural and premium products presents strong export opportunities for Johor's agrofood sector

Source: Kadence, Zion Market Research, BCC Research

Johor's established pilots—from the Jemaluang Dairy Valley to FarmByte's vertical farm—show the state's agri-innovation roots, which can be scaled even further for broader impact

Notable Developments

1

Jemaluang Dairy Valley (JDV)

- **Scope**: 275-ha integrated dairy cluster in Jemaluang (Mersing)
- **Output Target**: ≈ 5.4 million L fresh milk / year, lifting national supply ≈ +10 % within 3 years
- **Strategic Value**: Cuts milk-import bill, anchors downstream dairy processing in eastern Johor

2

FarmByte × Archisen Smart Indoor Vertical Farm

- **Facility**: 52 000 sq ft, fully climate-controlled; RM 36.7 m capex
- **Production**: ≈ 306 t leafy veg / yr (crystal lettuce, ice-plant, mustard greens) via zero-pesticide hydroponics
- **Market Focus**: 70 % output pre-sold to Singapore; flagship for JS-SEZ food-security programme

3

Sunway XFarms Hub

- **Network Plan**: Part of 1 million sq ft decentralised farm rollout (KL, Ipoh, Penang, Johor)
- **Site Metrics** : ~37 000 sq ft hub; targets 13 000 kg veg / month using IoT-driven CEA; water use ▼ 90 %, yield ▲ 10× vs open field
- **State Role**: Positions Iskandar Puteri as a tech-enabled agri node; opens doors for R&D tie-ups with J-Biotech & local universities

4

State Agriculture Chairman
Datuk Zahari Sarip

"Discussions are under way for similar vertical farming projects to be carried out in other districts, involving continued collaboration with Archisen
Additionally, the state government is exploring long-term research and development partnerships with Johor Biotech to drive agricultural innovation"

Source: Kulim Malaysia Berhad, FarmByte, PASB Analysis

By closing its agro-processing gap and localising high-value crop, Johor can capture a lucrative, premium agribusiness opportunity

Critical Opportunities	Description
1 Unlocking Value-Add: Addressing Johor's Agro-Processing Gap	• Johor generates the **largest agriculture GDP in Malaysia** (≈ US$ 4 b), outpacing Sarawak by ~15 % and anchoring the nation's primary-production base • In agro-processing, Selangor overtakes with almost four times Johor's value; Johor's strong second place (≈ US$ 1.3 b) points to **clear headroom for the state to convert more of its raw output into higher-margin products** • Smaller states like Pulau Pinang punch above their weight in processing relative to farm output, hinting that Johor—already equipped with logistics hubs such as Pasir Gudang and PTP—could capture similar value-chain gains by **expanding processing capacity and technology adoption**
2 Capturing High-Value Crop Opportunities in Johor	• **3.9 million kg of salad imported worth USD3.4 m** despite 102 Mt local national output—imports mostly from China & Thailand for year-round supply • **2.9 million kg of strawberries & other berries imported worth USD18.1 m**—5× bigger value than lettuce; main suppliers = Korea, Australia, USA • **1.1 million kg spinach imported from China alone (USD2.5 m**); kale sits in the same "other veg" group Singapore buys USD218 m of annually • **>1 400 import consignments of capsicum in the past 12 months**; cherry-tomato imports grew 1 000 % y-o-y on shipping data • Singapore alone **took 67 % of global basil-leaf imports in 2024** as demand for "hyper-fresh" herbs surged in cloud-kitchens

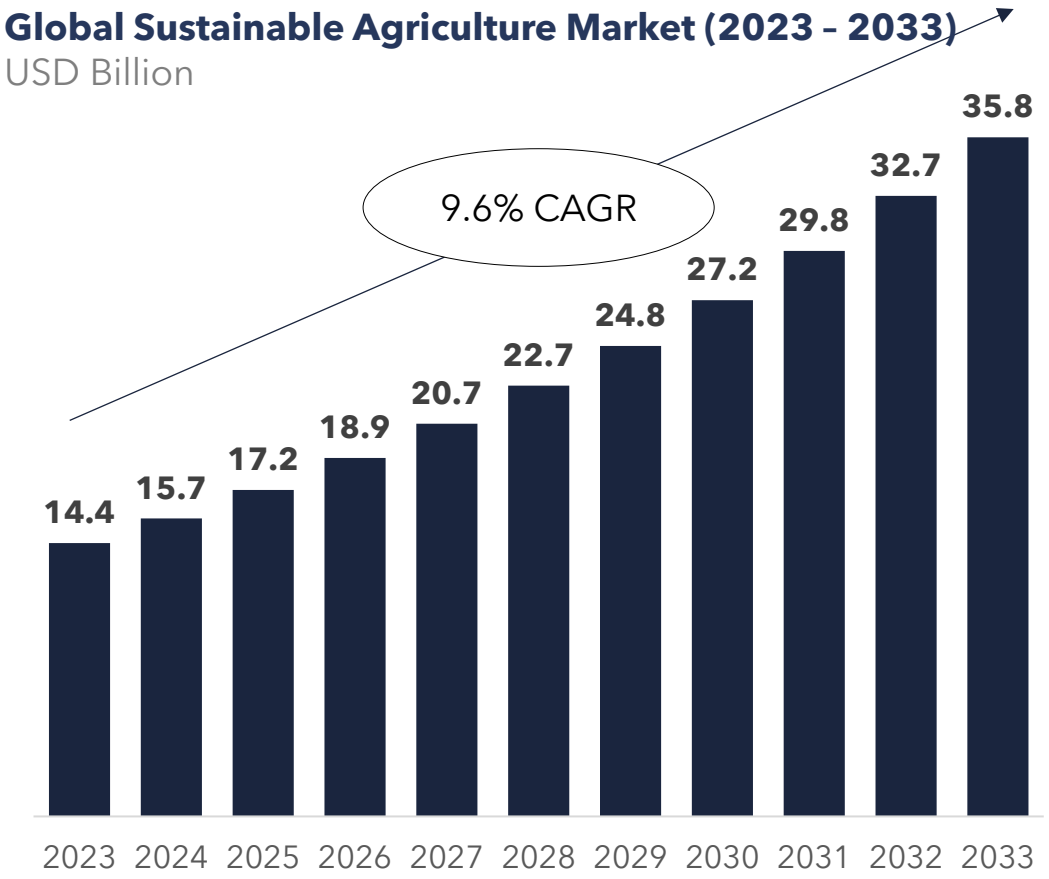
Source: PASB Analysis

Rising demand and precision technologies are propelling sustainable agriculture forward, enabling eco-friendly, high-efficiency farming for a greener future

The market is projected to grow from USD 14.4B in 2023 to USD 35.8B by 2033, driven by a steady CAGR of 9.6%

Global Sustainable Agriculture Market (2023 – 2033)

USD Billion



Key trends:

Consumer-driven demand

Rising awareness of conventional agriculture's environmental harms is fueling a shift toward organic, locally sourced and transparently produced foods

Environmental impact reduction

By prioritizing local markets and organic methods, sustainable agriculture cuts carbon footprints through shorter transport distances and lowers chemical inputs

Opportunities and Future Prospects

Precision agriculture is driving sustainable farming by using IoT, AI, and data to optimize yields, reduce resource waste, and minimize environmental impact

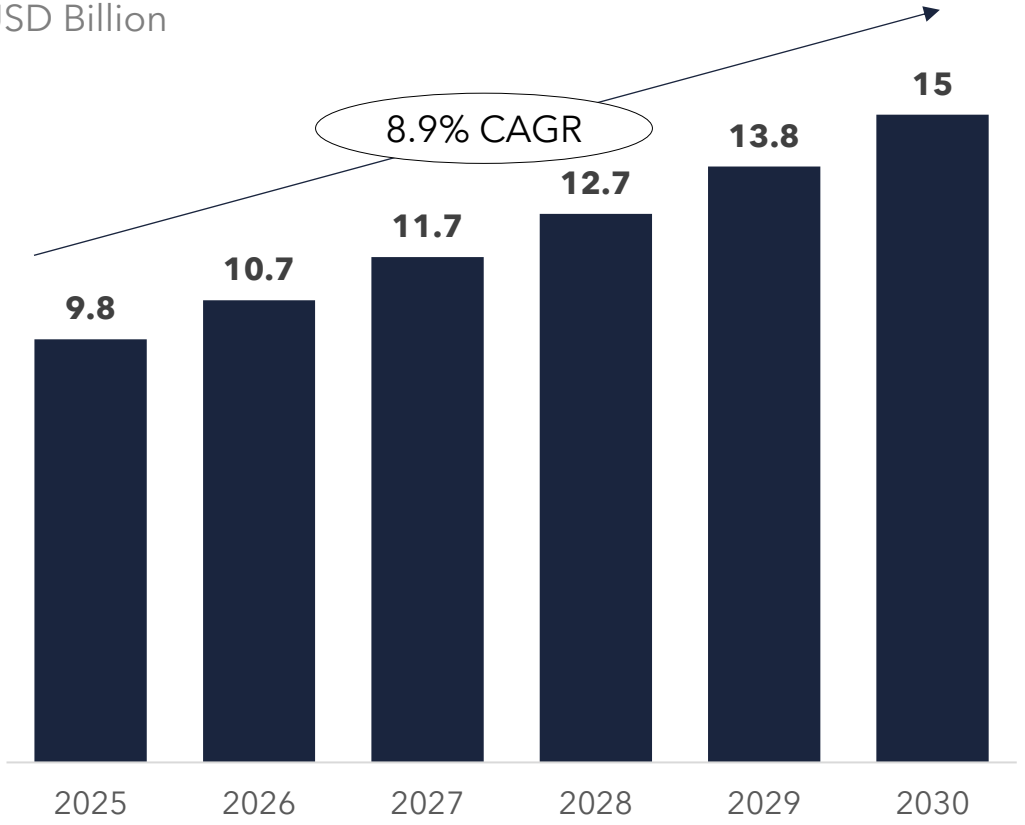
Source: Spherical Insights, PASB Analysis

Asia-Pacific's sustainable agriculture market is set to expand from USD 9.8 B in 2025 to USD 15 B by 2030 (8.9 % CAGR), driven by a 19 % surge in organic acreage, 1.8 M+ farmers

The market is projected to grow from USD 9.8B in 2025 to USD 15B by 2030, driven by a steady CAGR of 8.9%

Asia-Pacific Sustainable Agriculture Market (2025 – 2030)

USD Billion



Key trends:

Rapid expansion of organic acreage
Asia-Pacific's organic farmland grew by **19.3%** from 2017 to 2022, reaching **3.7 million ha** in 2021—26.4% of the world's total organic area

Producer concentration
As of 2023, the region counted **1.83 million** organic farmers, with **India alone accounting for 1.3 million**; China led in area (2.5 million ha, 66.1% of the region's organic land), followed by India (19.3%), Indonesia (1.5%) and Australia (1.4%)

Crop mix dominated by row crops
In 2023, row crops (paddy, wheat, pulses, soybeans, millets) occupied 67.5% (≈2.5 million ha) of the region's organic land, while cash crops (sugar, tea) held 18.5% (≈0.7 million ha), driven by rising global demand for organic sugar and tea

Source: Mordor Intelligence, PASB Analysis

By certifying 369 new MyGAP farms, matching a decade of myOrganic registrations in 2023 alone, and onboarding 256 RSPO smallholders, Johor is forging a robust pipeline of eco-verified producers for premium markets

MyGAP–Good Agricultural Practice

- **1,924 Johor farms now certified** (↑ 24 % in 2023 alone)
  - 1,555 farms covering 13,108 ha were certified up to 2022
  - A **further 369 farms gained MyGAP status in 2023**–by far the biggest one-year jump of any Malaysian state
- Gives Johor the country's deepest bench of third-party-audited "safe & sustainable" crop producers, a ready pool for premium and export supply chains

MyOrganic (Malaysia's national organic label)

- **14 new Johor farms awarded in 2023** (fruit & veg paddocks up to 30 ha each)
- Organic acreage is still tiny, but growth is accelerating–2023 registrations in Johor equalled the whole previous decade

RSPO-certified independent oil-palm smallholders

- **256 Johor smallholders (12 % of a 2,103-member group) reached full RSPO certification in 2023** under Johor Plantations Group's programme
- Shows the state is pushing world-benchmark sustainability beyond big estates into the fragmented smallholder base

Source: State Agricultural Department, JPG, PASB Analysis

Johor's ISPOC transforms palm waste into 100% renewable energy, bio-fertiliser and fiber–delivering low-carbon value and premium smallholder inclusion

Facts about ISPOC (Integrated Sustainable Palm Oil Complex)

Location & timeline:
- Pasir Logok estate, Sedili, Kota Tinggi
- Ground-breaking Mar 2025 → commissioning Q3 2026

Integrated complex (all on one site):
- Palm-oil mill
- Specialty oils & fats refinery
- Kernel-crushing plant
- Bio-energy power plant
- Animal-feed mill + R&D centre

Economic impact:
- 250 direct skilled jobs + multiplier effects for smallholders & logistics

Strategic implications & circular-economy deductions

Johor's biggest chance to turn raw scale into low-carbon value

- **Renewable energy**: all steam & power comes from biogas (POME) and biomass (EFB + PKS) → 100 % RE supply, slashing Scope 1&2 emissions
- **Zero-waste**: solids recycled into bio-fertiliser/animal feed; gases → electricity/RNG; water → estate irrigation.

Key Implications for Johor

Circular-economy upside

- EFB → 200 kt pulp/packaging fibre (RM ≈ 900 m revenue)
- POME → 150 GWh biogas power (-135 kt CO_2e)
- PKS/fibre → 200 MW steam for refinery + export pellets
- Bio-fertiliser return → +5 % FFB yield, carbon-credit sale

Smallholder inclusion → RSPO premiums

iSPOC's Centre of Excellence is already onboarding 289 local smallholders to certification schemes, lifting farm-gate prices

Source: JPG, The Iskandarian, PASB Analysis

To safeguard Johor's share of the USD 0.9 billion EU palm-oil market, producers must achieve full RSPO certification and EUDR traceability by end-2025

EU Palm-Oil Restrictions & RSPO Compliance

EU Market at Risk
The EU imported **≈ 1.07 million t of Malaysian palm oil in 2023 (7.1 % of Malaysia's total exports)** – worth roughly **RM 4 billion (≈ USD 0.9 bn)** to producers, including Johor-based firms

New EU Deforestation Regulation (EUDR)

- Entered into force **29 Jun 2023**; bans palm-oil (and six other commodities) grown on land deforested after **31 Dec 2020**
- Large & medium companies must prove **full geolocation traceability** or be shut out of the EU from **30 Dec 2025** (after a one-year grace extension). Penalties can reach **4 % of EU turnover**

RSPO as The Fast-Track Passport

- **RSPO-certified area in Malaysia reached 920,173 ha in 2024** – but that is only ~16 % of the country's 5.65 M ha oil-palm land, leaving a large compliance gap
- **Johor Plantations Group (JCorp**) already has ≈ **60,964 ha (98.7 % of its estates**) RSPO-certified, showing the state can scale compliance quickly.

2024 RSPO Upgrade

Members adopted **new Principles & Criteria** that align RSPO cut-off dates and traceability rules with the EUDR, making RSPO certification the most practical route for Johor exporters to retain EU access

Source: MPOB, Reuters, RSPO Documentations, PASB Analysis

In addition to sustainable farming practice, Johor is also actively transforming into a circular bio-economy—turning waste into revenue, slashing emissions and unlocking premium niches from biomethane to insect protein

Snapshot of Johor's current circular-economy moves in agriculture

JPG Pioneers Sustainable Palm Oil with Biomethane Innovation

- Turns palm-oil-mill effluent from a methane liability into grid-quality fuel, creating a new revenue line while slashing GHG emissions
- Guarantees **≥ 250 000 MMBtu yr^{-1}** to Gas Malaysia under a 15-year offtake; two follow-up plants lift group capacity to **≈ 676 000 MMBtu yr^{-1}**

Protenga Trebling Insect-Protein Output in 2024

- Demonstrates modular BSF "mini-mills" that can sit beside palm-oil or food-processing sites to upcycle side-streams on-site
- Capacity set to **triple to ~4 000 t yr^{-1}** insect output in 2024 after new Johor expansions

FOLO Farm Champions Organic, Nutrient-Rich Produce

- Community-scale proof that household scraps can feed soils instead of landfills
- Rescues **3–4 t food waste day^{-1}**, turning it into **~1.2 t compost**; supplies 150 CSA families

Bottom line: Johor is no longer just a producer of primary crops – it is quietly stitching together a circular bio-economy that monetises waste, shrinks carbon footprints and opens higher-margin market niches from green gas to insect protein

,Source: JPG, YTL Foundation, PASB Analysis

Johor is rapidly embedding sustainability—scaling farm certifications, securing EU-compliant palm exports, and piloting circular-economy projects—to transform its agricultural value chain

Johor's Sustainability Activities	Descriptions
1 Johor's Sustainability Certification Surge in 2023	• **1,924 Johor farms now certified (↑ 24 % in 2023 alone).** 1,555 farms covering 13,108 ha were certified up to 2022. A further 369 farms gained MyGAP status in 2023—by far the biggest one-year jump of any Malaysian state • **14 new Johor farms awarded in 2023 with MyOrganic** (fruit & veg paddocks up to 30 ha each). Organic acreage is still tiny, but growth is accelerating—2023 registrations in Johor equaled the previous decade • 256 Johor smallholders (12 % of a 2,103-member group) reached full RSPO certification in 2023 under Johor Plantations Group's programme
2 EU Compliance Imperatives for Johor's Palm Oil Exports	• **The EU imported ≈ 1.07 million t of Malaysian palm oil in 2023** (7.1 % of Malaysia's total exports) – worth roughly RM 4 billion (≈ USD 0.9 bn) to producers, including Johor-based firms • Entered into force 29 Jun 2023; bans palm-oil (and six other commodities) grown on land deforested after 31 Dec 2020. Large & medium companies must prove full geolocation traceability or be shut out of the EU from 30 Dec 2025 (after a one-year grace extension). Penalties can reach 4 % of EU turnover • **RSPO-certified area in Malaysia reached 920,173 ha in 2024** – but that is only ~16 % of the country's 5.65 M ha oil-palm land, leaving a large compliance gap. Johor Plantations Group (JCorp) already has ≈ 60,964 ha (98.7 % of its estates) RSPO-certified, showing the state can scale compliance quickly • Members adopted new Principles & Criteria that align RSPO cut-off dates and traceability rules with the EUDR, making RSPO certification the most practical route for Johor exporters to retain EU access
3 Johor's Pilot Projects Powering a Circular Agricultural Economy	• **JPG turns palm-oil-mill effluent from a methane liability into grid-quality fuel**, creating a new revenue line while slashing GHG emissions. This guarantees ≥ 250 000 MMBtu yr^{-1} to Gas Malaysia under a 15-year offtake; two follow-up plants lift group capacity to ≈ 676 000 MMBtu yr^{-1} • **Protenga demonstrates modular BSF "mini-mills" that can sit beside palm-oil or food-processing sites to upcycle side-streams on-site**. The capacity is set to triple to ~4 000 t yr^{-1} insect output in 2024 after new Johor expansions • FOLO Farm provides community-scale proof that household scraps can feed soils instead of landfills. This rescues 3–4 t food waste day^{-1}, turning it into ~1.2 t compost; supplies 150 CSA families

Source: World Economic Forum (WEF), INSEAD Knowledge, PASB Analysis

8.2

Project Charters.

Chemical & Petrochemical.

Disclaimer Notes

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Green Energy & Sustainable Aviation Fuel (SAF) | Project Overview

There is growing global and regional momentum to scale investments in SAF and green energy, particularly in Johor, where investors can leverage abundant feedstock resources such as palm oil residues, used cooking oil, and microalgae

Project Highlights:

Concept Description

An exploratory SAF and green energy biorefinery proposed by Gryffin Partners in Johor, aimed at converting sustainable feedstocks—such as palm oil waste, used cooking oil, and biomass—into commercial-grade SAF, HVO, and bio-naphtha

Visualisation of the Project

Project Status: Feasibility study in progress

Project Location: Pengerang Integrated Petroleum Complex (PIPC), Kota Tinggi

Project Details:

- Production Capacity: Estimated at 10,000–15,000 barrels/day (~160,000 to 240,000 tonnes/year)—in line with early-stage SAF projects regionally
- Land & Utilities: Target site within existing industrial estates with seamless access to deep water port, power, hydrogen blending, and feedstock logistics
- Timeframe: Feasibility & FID (2025–2026), construction & commissioning (2027–2029), commercial operations starting around 2030

Implementing Agency
- Invest Johor

Project Owner
- Gryffin Partners

Stakeholders
- MBJB
- PTG
- Department of Environment

Investment Required (MYR mil):

FY	Public	Private
2025	-	915
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**915**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

Source: Stakeholder Engagement

Recycling of Plastic Waste | Project Overview

There is growing corporate and public sector commitment to circular economy principles and plastic waste reduction. Johor aims to attract investment in advanced recycling solutions. The flagship recycling project in Johor is currently being driven by PCG

Project Highlights:

Concept Description	Kytari Sdn Bhd (a subsidiary of PETRONAS Chemicals Group) is developing Asia's largest advanced chemical recycling facility to use plastic energy's patented TAC™ process to convert mixed end-of-life plastics into pyrolysis oil (TACOIL™), a chemical feedstock for sustainable/recycled plastics, backing national circular economy goals

Visualisation of the Project

Project Status: FID has been reached; detailed engineering and construction preparations are underway

Project Location: Pengerang Integrated Complex (PIC), Johor

Project Details:

- Technology: In collaboration with Plastic Energy (UK), the plant will use patented TAC™ (Thermal Anaerobic Conversion) technology to convert end-of-life plastics into pyrolysis oil (TACOIL™)
- Capacity: 33,000 tonnes per annum of plastic waste processed
- Output: Pyrolysis oil used to produce circular, food-grade plastics
- Strategic Alignment: Supports Malaysia's Plastic Sustainability Roadmap 2021–2030 and PCG's New Plastics Economy agenda
- Impact: Promotes circular economy by reducing plastic pollution and enabling sustainable feedstock recycling

Implementing Agency
- Invest Johor

Project Owner
- Kytari Sdn Bhd

Stakeholders
- MBJB
- Department of Environment

Investment Required (MYR mil):

FY	Public	Private
2025	-	800
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**800**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2026

Source: Stakeholder Engagement

Dialog Group Project (Tango & Camelia) | Project Overview

Dialog Group, with its deep presence in Johor's Pengerang Integrated Petroleum Complex (PIPC), is exploring the "Tango & Camelia" FLNG initiative to enhance Johor's role as a strategic midstream and LNG processing hub, capturing opportunities in flexible LNG supply, bunkering, and exports

Project Highlights:

Concept Description	Dialog Group Berhad, via its infrastructure operations in Johor, is developing a floating LNG (FLNG) facility capable of monetising offshore gas fields and serving regional LNG demand, leveraging modular LNG technology to liquefy, store, and offload LNG directly from floating production units

Visualisation of the Project

Project Status: Currently under early engagement and feasibility exploration; further confirmation of final investment decision (FID) required

Project Location: Pengerang, Johor

Project Details:

- Technology & Infrastructure: Floating LNG (FLNG) platform capable of processing, liquefying, and storing natural gas offshore, with offloading directly to LNG carriers
- Capacity: Depending on configuration, FLNG units may range 0.5 – 3.5 MTPA (million tonnes per annum) LNG output
- Strategic Rationale: Enhances LNG flexibility, reduces reliance on land-based terminals, and enables Malaysia to monetise smaller gas fields economically
- Impact: Strengthens Johor's role as a regional energy hub, expands LNG export options, and supports Southeast Asia's growing gas demand and energy transition

Implementing Agency
- PDT

Project Owner
- Dialog Group Berhad

Stakeholders
- N/A

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

Bitumen Production | Project Overview

Cascadian Asphalt Industries, a leading local bitumen manufacturer, is exploring a new, state-of-the-art processing and export facility at Tanjung Langsat to boost supply resilience, support infrastructure rollout, and tap regional export markets

Project Highlights:

Concept Description	Development of a new state-of-the-art bitumen processing and export facility in Tanjung Langsat to enhance domestic production, increase exports, and support government infrastructure projects

Visualisation of the Project

Project Status: Initial scoping and planning underway; feasibility assessment in progress, with regulatory and site approvals being sought

Project Location: Tanjung Langsat

Project Details:

- Expansion Plan: Development of a new bitumen processing facility on a 10-acre site in Tanjung Langsat Industrial Area
- Facility construction expected to take 3–4 years
- Target production to support: Malaysian government infrastructure projects; Local premix factories; Export markets (via Chevron Singapore distribution network)
- Projected revenue increase from RM 150–180 million to RM 250–300 million annually

Implementing Agency
- MIDA

Project Owner
- Cascadian Asphalt Industries

Stakeholders
- MBPG
- PTG
- Department of Environment

Investment Required (MYR mil):

FY	Public	Private
2025	-	60
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**60**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

Source: Stakeholder Engagement

Medium Chain Triglycerides (MCT) | Project Overview

With growing global demand across food, nutraceuticals, personal care, and pharmaceutical sectors, Medium Chain Triglycerides (MCTs) represent an opportunity to elevate Johor's specialty chemical ambitions. Apical Oils & Fats, already established in refining and oleochemicals, could lead a strategic downstream investment in MCT processing

Project Highlights:

Concept Description	A proposed investment by Apical Oils & Fats Sdn Bhd to establish an in-Johor facility dedicated to the production of Medium Chain Triglycerides derived from palm kernel oil

Visualisation of the Project

Project Status: Under conceptual planning

Project Location: Pasir Gudang

Project Details:

- Product Focus: Medium Chain Triglycerides (MCTs), rich in C8 (caprylic) and C10 (capric) fatty acids, produced via fractionation or interesterification methods from palm kernel oil
- Type of Investment: Greenfield or brownfield expansion of oleochemical refining capability
- Strategic Fit: Enhances Malaysia's downstream capacity in oleochemicals, aligning with national goals to add value to palm derivatives
- Impact: Supports high-growth international markets in health foods, dietary supplements, nutraceuticals, and personal care by supplying premium specialty fats

Implementing Agency
- Further input required

Project Owner
- Apical Oils & Fats Sdn Bhd

Stakeholders
- Further input required

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

Healthcare & Pharmaceutical.

Disclaimer Notes

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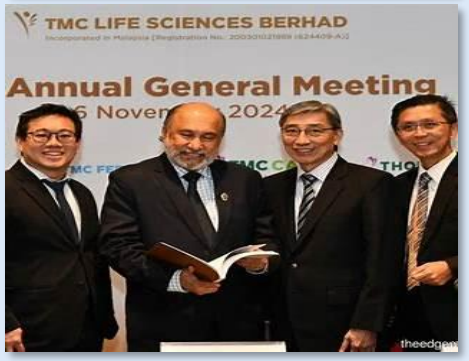
Thompson Iskandar Hospital | Project Overview

There is an urgent need to build new hospitals to address rising patient volumes, enhance access to quality healthcare, and support Malaysia's growing role as a regional medical tourism hub

Project Highlights:

Concept Description	Establishment of specialist hospital in central JB to service both local patients and international medical tourists seeking a premium experience

Visualisation of the Project



Project Status: Construction set to begin 2026

Project Location: Johor Bahru

Project Details:

- A 500-bed premium specialist hospital developed by TMC Life Sciences Berhad on a 1.5-hectare waterfront site in central Johor Bahru.
- Part of a broader 9.23-hectare medical hub near the RTS Link and Johor-Singapore Special Economic Zone (JS-SEZ)
- Will feature 400 medical suites, a medical training institute, research facilities, and a 33-storey commercial tower
- Centres of excellence include oncology, orthopaedics, O&G, fertility, and general surgery
- Targets 60–80% local patients and cross-border medical tourists from Singapore and Indonesia

Implementing Agency
- Department of Health Johor

Project Owner
- TMC Life Sciences Bhd

Stakeholders
- Pejabat Tanah Daerah
- MBJB
- Malaysia Healthcare Travel Council (MHTC)

Investment Required (MYR mil):

FY	Public	Private
2025	-	1,560
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**1,560**

Projected Implementation Timeframe:
- Start Date: 2026
- End Date: 2030

Source: The Edge Malaysia, Code Blue, The Sun Daily, TMC Life Sciences

Hospital Sultanah Aminah 2 | Project Overview

There is an urgent need to build new hospitals to address rising patient volumes, enhance access to quality healthcare, and support Malaysia's growing role as a regional medical tourism hub

Project Highlights:

Concept Description	Construction of a new government hospital to expand public healthcare capacity and alleviate pressure on existing facilities in central Johor Bahru

Visualisation of the Project

Project Status:
- Preliminary Works: Completed as of November 2024
- Stakeholder Discussions: Expected to commence in 2025
- Construction Start: Targeted for 2026

Project Location: Skudai, Johor Bahru

Project Details:
- Land allocation is 28.33 hectares provided by the Ministry of Defence from a 202.34-hectare site
- Capacity of 1,500 beds, making it the largest hospital in Johor upon completion
- Project cost is estimated at RM500 million
- Development model is to be implemented under a public-private partnership (PPP) framework, as part of the Public-Private Partnership Master Plan 2030 (PIKAS 2030)
- To alleviate congestion at existing hospitals, Hospital Sultanah Aminah (HSA) and Hospital Sultan Ismail (HSI) which have occupancy rates around 90%

Implementing Agency
- Department of Health Johor

Project Owner
- Unit Kerjasama Awam-Swasta (UKAS)

Stakeholders
- Pejabat Tanah Daerah
- MBJB

Investment Required (MYR mil):

FY	Public	Private
2025	-	500
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**500**

Projected Implementation Timeframe:
- Start Date: 2026
- End Date: 2030

Source: The Star, Malay Mail, The Iskandarian, Astro Awani

Maria Hospital 2 at Permas Jaya | Project Overview

There is an urgent need to build new hospitals to address rising patient volumes, enhance access to quality healthcare, and support Malaysia's growing role as a regional medical tourism hub

Project Highlights:

Concept Description	Expansion of an existing private hospital group to improve specialist service access in the Permas Jaya area

Visualisation of the Project

Project Status: The project is at the study phase

Project Location: Permas Jaya

Project Details:

- A 3.5-acre hospital, as well as 1.5-acre senior living and retirement home
- Project details were shared by IRDA, pending further confirmation from Maria Hospital management
- Project cost is approximately RM 500 million with an addition of another 100 beds
- Proposed location is well-developed township with strong infrastructure
- Strategically positioned for private healthcare expansion

Implementing Agency

- Department of Health Johor

Project Owner

- Maria Hospital

Stakeholders

- Pejabat Tanah Daerah
- MBJB
- Malaysia Healthcare Travel Council (MHTC)

Investment Required (MYR mil):

FY	Public	Private
2025	-	500
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**500**

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2030

Source: Maria Hospital Website, IRDA

KPJ Dato Onn Hospital | Project Overview

There is an urgent need to build new hospitals to address rising patient volumes, enhance access to quality healthcare, and support Malaysia's growing role as a regional medical tourism hub

Project Highlights:

Concept Description	Addition of a new tower to increase inpatient capacity and introduce new specialised services under KPJ's network

Visualisation of the Project

Project Status: Obtained Kebenaran Merancang from MBJB

Project Location: Johor Bahru

Project Details:

- Proposal to add 22 consultants' suite (Clinic Suites) at level 6 with an anticipated completion and operational commencement set in 4th quarter 2025
- The construction of a 12-Storey Annex Block with a capacity of 210 beds, with anticipated completion and operational commencement scheduled for the year 2028

Implementing Agency
- Department of Health Johor

Project Owner
- KPJ Berhad

Stakeholders
- Pejabat Tanah Daerah
- MBJB
- Malaysia Healthcare Travel Council (MHTC)

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2028

Coronation Medical Suites, Assisted living & Wellness | Project Overview

The development of Coronation Medical Suites, combining assisted living and wellness services, addresses the rising demand for integrated senior care solutions that promote both medical support and quality of life in a single continuum of care

Project Highlights:

Concept Description	Development of a hybrid facility combining senior assisted living, medical suites, and wellness services in an integrated setting

Visualisation of the Project

Project Status: Pipeline and planning stage

Project Location: Johor Bahru

Project Details:

- At present, the project scope involves the expansion of three additional floors at the hospital
- However, further details regarding the full extent of development including the number of beds, medical services to be introduced, and supporting infrastructure are still pending confirmation from the relevant stakeholders

Implementing Agency
- Department of Health Johor

Project Owner
- Johor Corporation (JCorp)

Stakeholders
- Pejabat Tanah Daerah
- Pihak Berkuasa Tempatan (PBT)
- Malaysia Healthcare Travel Council (MHTC)

Investment Required (MYR mil):

FY	Public	Private
2025	-	290
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**290**

Projected Implementation Timeframe:
- Start Date: 2024
- End Date: 2029

KPJ Pasir Gudang Hospital | Project Overview

There is an urgent need to build new hospitals to address rising patient volumes, enhance access to quality healthcare, and support Malaysia's growing role as a regional medical tourism hub

Project Highlights:

Concept Description	Development of a second block to cater to growing industrial and residential zones in Pasir Gudang, enhancing specialist access

Visualisation of the Project

Project Status: Pipeline and planning stage

Project Location: Pasir Gudang

Project Details:

- The proposal includes the construction of an additional tower to complement the existing hospital infrastructure.
- This new tower is expected to add a capacity of approximately 200 beds

Implementing Agency

- Department of Health Johor

Project Owner

- KPJ Berhad

Stakeholders

- Pejabat Tanah Daerah
- Pihak Berkuasa Tempatan (PBT)
- Malaysia Healthcare Travel Council (MHTC)

Investment Required (MYR mil):

FY	Public	Private
2025	-	200
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**200**

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2028

KPJ Johor Specialist Hospital Expansion | Project Overview

There is an urgent need to build new hospitals to address rising patient volumes, enhance access to quality healthcare, and support Malaysia's growing role as a regional medical tourism hub

Project Highlights:

Concept Description	Capacity upgrade of a leading private hospital in central Johor Bahru to accommodate growing local and cross-border patient volume

Visualisation of the Project

Project Status: Obtained Kebenaran Merancang from MBJB

Project Location: Johor Bahru

Project Details

- Construction of a 12-storey annex block with a capacity of 270 beds comprising 220 beds and two bare floors incorporated into the design to allow for future expansion of an additional 50 beds
- It is anticipated to be completed and operational by 2029
- However, further details regarding the full extent of development including the medical services to be introduced, and supporting infrastructure are still pending confirmation from the relevant stakeholders

Implementing Agency
- Department of Health Johor

Project Owner
- KPJ Berhad

Stakeholders
- Pejabat Tanah Daerah
- Pihak Berkuasa Tempatan (PBT)
- Malaysia Healthcare Travel Council (MHTC)

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2029

Expansion of KPJ Kluang | Project Overview

There is an urgent need to build new hospitals to address rising patient volumes, enhance access to quality healthcare, and support Malaysia's growing role as a regional medical tourism hub

Project Highlights:

Concept Description	Upgrading specialist capacity in eastern Johor to improve healthcare access in secondary city zones

Visualisation of the Project

Project Status: Obtained Kebenaran Merancang from MBJB

Project Location: Johor Bahru

Project Details

- The project involves the construction of a 9-storey annex block with a capacity of 100 beds, complemented by a 5-storey car park

Implementing Agency
- Department of Health Johor

Project Owner
- KPJ Berhad

Stakeholders
- Pejabat Tanah Daerah
- Pihak Berkuasa Tempatan (PBT)
- Malaysia Healthcare Travel Council (MHTC)

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2029

Columbia Asia Hospital Iskandar Puteri (Expansion) | Project Overview

There is an urgent need to build new hospitals to address rising patient volumes, enhance access to quality healthcare, and support Malaysia's growing role as a regional medical tourism hub

Project Highlights:

Concept Description	Capacity and service expansion of a key hospital in the fast-growing Iskandar Puteri township to meet rising healthcare demand

Visualisation of the Project

Project Status: Pipeline and planning stage

Project Location: Iskandar Puteri

Project Details:

- At present, the project scope involves the expansion of three additional floors at the hospital
- However, further details regarding the full extent of development including the number of beds, medical services to be introduced, and supporting infrastructure are still pending confirmation from the relevant stakeholders

Implementing Agency
- Department of Health Johor

Project Owner
- Columbia Asia

Stakeholders
- Pejabat Tanah Daerah
- Pihak Berkuasa Tempatan (PBT)
- Malaysia Healthcare Travel Council (MHTC)

Investment Required (MYR mil):

FY	Public	Private
2025	-	250
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**250**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2028

Kempas Medical Centre | Project Overview

There is an urgent need to build new hospitals to address rising patient volumes, enhance access to quality healthcare, and support Malaysia's growing role as a regional medical tourism hub

Project Highlights:

Concept Description	Expansion of services and infrastructure to strengthen specialist care delivery in the Kempas and Tampoi area

Visualisation of the Project

Project Status: Pipeline and planning stage

Project Location: Kempas, Johor Bahru

Project Details:

- At present, the project scope involves the expansion of additional 2.22 acres of land to be constructed with and addition of 200 beds
- However, further details regarding the full extent of development including the medical services to be introduced, and supporting infrastructure are still pending confirmation from the relevant stakeholders

Implementing Agency
- Department of Health Johor

Project Owner
- Kempas Medical Centre

Stakeholders
- Pejabat Tanah Daerah
- Pihak Berkuasa Tempatan (PBT)
- Malaysia Healthcare Travel Council (MHTC)

Investment Required (MYR mil):

FY	Public	Private
2025	-	200
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**200**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

Pulai Springs Hospital | Project Overview

There is an urgent need to build new hospitals to address rising patient volumes, enhance access to quality healthcare, and support Malaysia's growing role as a regional medical tourism hub

Project Highlights:

Concept Description	Establishment of a new private hospital within the Pulai Springs vicinity, aimed at affluent communities and wellness-focused patients

Visualisation of the Project

Project Status: Pipeline and planning stage

Project Location: Pulai

Project Details:

- At present, the project scope involves the construction of a new hospital with capacity of 104 beds
- However, further details regarding the full extent of development including the medical services to be introduced, and supporting infrastructure are still pending confirmation from the relevant stakeholders

Implementing Agency

- Department of Health Johor

Project Owner

- Pulai Group

Stakeholders

- Pejabat Tanah Daerah
- Pihak Berkuasa Tempatan (PBT)
- Malaysia Healthcare Travel Council (MHTC)

Investment Required (MYR mil):

FY	Public	Private
2025	-	150
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**150**

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2029

Source: IRDA, The Iskandarian

Austin Heights Specialist Hospital | Project Overview

There is an urgent need to build new hospitals to address rising patient volumes, enhance access to quality healthcare, and support Malaysia's growing role as a regional medical tourism hub

Project Highlights:

Concept Description	Development of a niche hospital in Austin Heights, offering advanced diagnostic and specialist outpatient care

Visualisation of the Project

Project Status: Pipeline and planning stage

Project Location: Johor Bahru

Project Details:

- The project involves a total investment of RM 120 million, with Phase 1 delivering 110 beds upon completion
- Phase 2, currently in the planning stage, will add an additional 100 beds, bringing the total capacity to 210 beds

Implementing Agency
- Department of Health Johor

Project Owner
- TBC

Stakeholders
- Pejabat Tanah Daerah
- Pihak Berkuasa Tempatan (PBT)
- Malaysia Healthcare Travel Council (MHTC)

Investment Required (MYR mil):

FY	Public	Private
2025	-	120
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**120**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

South Island Nursing Home (2nd Hospital) | Project Overview

Expanding nursing home infrastructure is essential to cater to Malaysia's ageing population and bridge the growing gap in long-term elderly care services

Project Highlights:

Concept Description	Construction of a second nursing home and care facility to support elderly care needs in the growing Ulu Tiram area

Visualisation of the Project

Project Status: Pipeline and planning stage

Project Location: Ulu Tiram, Johor Bahru

Project Details

- As of now, there is limited publicly available information regarding the proposed South Island Nursing Homes in Ulu Tiram, Phase 2
- Location: Ulu Tiram, Johor
- Estimated Investment: RM70 million
- Planned Capacity: 250 beds
- However, further details regarding the full extent of development including the medical services to be introduced, and supporting infrastructure are still pending confirmation from the relevant stakeholders

Implementing Agency
- Department of Health Johor

Project Owner
- South Island Healthcare Sdn. Bhd.

Stakeholders
- Pejabat Tanah Daerah
- Pihak Berkuasa Tempatan (PBT)
- Malaysia Healthcare Travel Council (MHTC)

Investment Required (MYR mil):

FY	Public	Private
2025	-	70
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**70**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

South Island Nursing Home (3rd Hospital) | Project Overview

Expanding nursing home infrastructure is essential to cater to Malaysia's ageing population and bridge the growing gap in long-term elderly care services

Project Highlights:

Concept Description	Third phase expansion of South Island's aged care services, located in Kempas to serve central Johor Bahru's elderly population

Visualisation of the Project

Project Status: Pipeline and planning stage

Project Location: Kempas, Johor Bahru

Project Details

- Estimated Investment: RM70 million
- Planned Capacity: 250 beds
- However, further details regarding the full extent of development including the medical services to be introduced, and supporting infrastructure are still pending confirmation from the relevant stakeholders

Implementing Agency
- Department of Health Johor

Project Owner
- South Island Healthcare Sdn. Bhd.

Stakeholders
- Pejabat Tanah Daerah
- Pihak Berkuasa Tempatan (PBT)
- Malaysia Healthcare Travel Council (MHTC)

Investment Required (MYR mil):

FY	Public	Private
2025	-	70
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**70**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

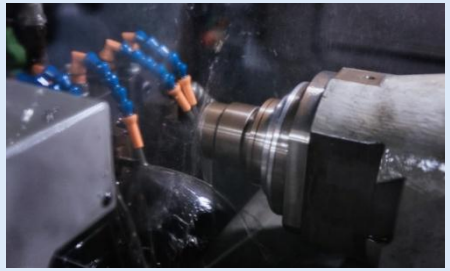
Precision Parts for Medical Devices | Project Overview

Expanding precision parts manufacturing is critical to support the high-tech medical device industry, reduce reliance on imports, and position Malaysia as a key player in the global healthcare supply chain

Project Highlights:

Concept Description	Establishment of precision engineering capabilities to strengthen local medical device supply chains and reduce import reliance

Visualisation of the Project



Project Status

- Active Planning

Project Location

- Unisteel's Johor facility is strategically located near emerging data centre hubs, such as Nusajaya Tech Park and Sedenak Tech Park, positioning it to support the growing demand for precision components in these sectors

Project Details

- This investment was received from MIDA, it is an investment on precision parts for medical devices
- The total investment is believed to meet the JETP threshold of RM 50 million, in line with the project's scale and specialised nature
- Further confirmation is required from project owner

Implementing Agency

- MIDA

Project Owner

- Unisteel Technology (M) Sdn Bhd

Stakeholders

- Medical Device Authority (MDA)
- Pihak Berkuasa Tempatan (PBT)

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2030

Sunway Medical Centre Iskandar (SMCI) | Project Overview

There is an urgent need to build new hospitals to address rising patient volumes, enhance access to quality healthcare, and support Malaysia's growing role as a regional medical tourism hub

Project Highlights:

Concept Description	Development of a flagship private hospital in Iskandar Puteri to serve regional healthcare demand and anchor medical tourism

Visualisation of the Project

Project Status

- Sunway Healthcare Group plans to apply for a hospital license by Q1 2025, with potential completion by 2029, ahead of the previously projected 2030 timeline

Project Details

- Sunway Medical Centre Iskandar (SMCI) is a planned 300-bed private hospital in Sunway City Iskandar Puteri, Johor, within the Johor-Singapore SEZ
- However, further details regarding the full extent of development including the medical services to be introduced, and supporting infrastructure are still pending confirmation from the relevant stakeholders
- Developed by Sunway Healthcare Group, it targets both local and international patients, with licensing expected by Q1 2025 and completion by 2029

Implementing Agency

- Department of Health Johor

Project Owner

- Sunway Healthcare Group

Stakeholders

- Pejabat Tanah Daerah
- Pihak Berkuasa Tempatan (PBT)
- Malaysia Healthcare Travel Council (MHTC)

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2029

Source: The Star

Energy.

Disclaimer Notes

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These projects represent part of the potential investment opportunities across eight sectors in Johor, but do not constitute the full extent of the State's recognised or emerging investment pipeline.

The project lists presented are non-exhaustive. Insights provided are limited to the scope of initiative charters contained within this report, and are shared in strict observance of the confidentiality obligations of all stakeholders.

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CCGT, Green Hydrogen and Green Ammonia Plant | Project Overview

This project supports Johor's ambition to become a regional leader in clean and low-carbon energy by anchoring power generation and green fuels within a dedicated industrial zone in Muar. It will support Malaysia's energy transition, attract foreign investment, and create jobs in the hydrogen and ammonia value chains.

Project Highlights:

Concept Description	The project comprises a 1.4 GW Combined Cycle Gas Turbine (CCGT) power plant and green hydrogen and ammonia production facilities powered by renewable energy

Visualisation of the Project

Project Status: MOU signed in January 2024. Discussions ongoing with TNB and Petronas for power purchase and gas supply agreements. Regulatory submissions in preparation.

Project Location: Muar, Johor (sea reclamation site covering 1,295 hectares)

Project Details:

- 1.4 GW CCGT plant using natural gas and hydrogen
- Production of 3,400 MT/year green hydrogen and 18,800 MT/year green ammonia
- Powered by solar and wind; ammonia targeted for export
- Supports energy-intensive users and grid flexibility
- Strategic alignment with NETR, NIMP 2030, and Johor's green economy vision

Implementing Agency
- Invest Johor

Project Owner
- Maharani Energy Gateway Sdn Bhd

Stakeholders
- CEIG, TNB, Petronas, MESTECC, MIDA, Invest Johor, local councils

Investment Required (MYR mil):

FY	Public	Private
2025	-	-
2026	-	-
2027	-	-
2028	-	-
2029	-	11,000
2030	-	-
Total	**-**	**11,000**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2029

Source: Stakeholder Engagement

KPRJ x Sembcorp Floating Solar Project | Project Overview

There is an opportunity to position Johor as a regional leader in large-scale floating solar energy, leveraging Linggiu Reservoir to support green energy needs of data centres, export potential to Singapore, and contribute to Malaysia's clean energy transition goals.

Project Highlights:

Concept Description	Development of a large-scale floating solar photovoltaic (PV) installation at Linggiu Reservoir through a partnership between KPRJ Environment and Sembcorp, with the aim of producing renewable energy for domestic and cross-border consumption.

Visualisation of the Project

Project Status: HOA signed in January 2025 to initiate pre-development studies (PDS) for technical, financial, and regulatory feasibility.

Project Location: Linggiu Reservoir, Johor (approx. 15 km from Bandar Tenggara).

Project Details:

- Floating solar plant covering up to 20% of the 55 km² Linggiu Dam surface. Estimated capacity of 1.8 GW DC / 1.3 GW AC.
- Gross Development Cost: USD 1.5 billion (approx. RM 7 billion), 50-acre battery storage facility planned adjacent to reservoir.
- Energy target: Sedenak Data Centre via CRESS scheme, potential cross-border export to Singapore.
- PDS period: January 2025 – December 2025; construction estimated to take 1 year. Future development to be undertaken via a newly formed JV company if PDS outcome is positive.
- Engagement with TNB pending to address Bandar Tenggara PMU upgrade and 55 km transmission gap.

Implementing Agency
- Invest Johor

Project Owner
- KPRJ Environment Sdn Bhd

Stakeholders
- Sembcorp Utilities, TNB, Invest Johor, PlanMalaysia, Department of Environment, Singapore Authorities

Investment Required (MYR mil):

FY	Public	Private
2025	-	100
2026	-	500
2027	-	1,200
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**1,800**

Projected Implementation Timeframe:
- Start Date: 2026
- End Date: 2029

Source: Stakeholder Engagement

Renewable Energy Zone | Project Overview

There is an opportunity to position Johor as a key regional hub for renewable energy generation and export, leveraging large-scale solar and battery storage in the Southern Johor Renewable Energy Corridor (SJREC), and catalysing new green industrial activity in Kota Tinggi and Pengerang.

Project Highlights:

Concept Description	Development of a large-scale solar photovoltaic (PV) and battery storage zone within SJREC, through a partnership between Ditrolic Energy Berhad and Perbadanan Daya Tindakan Johor (PDT), targeting both domestic use and electricity exports to Singapore.

Visualisation of the Project

Project Status: MoU signed between Ditrolic and PDT. Pre-feasibility study completed. Binding proposal submitted to Singapore EMA.

Project Location: Southern Johor Renewable Energy Corridor, spanning Pengerang to Mersing

Project Details:

- Phase 1 & 2: Total 10,100 acres identified (Plot 1: 4,600 acres, Plot 2: 5,500 acres). Estimated solar capacity: 4 GW; battery storage: 5.2 GWh
- Approximate investment: USD 6 billion across two phases. Phase 1: USD 1 billion for infrastructure (green transmission lines, interconnection to Singapore). Phase 2: USD 5 billion for solar generation and storage
- Land lease rights secured; zone spans 2,000 km² within SJREC
- Targeting SEZ flagship status for catalytic green energy-led development
- Letters of Intent secured from Singapore off-takers covering ~90% of capacity (as of Mar 2025)

Implementing Agency
- Invest Johor

Project Owner
- Ditrolic Energy Berhad

Stakeholders
- PDT, Energy Commission (Malaysia), EMA Singapore, Invest Johor, MITI, KeTSA, TNB, PlanMalaysia, MIDA

Investment Required (MYR mil):

FY	Public	Private
2025	-	500
2026	-	1,500
2027	-	2,000
2028	-	1,000
2029	-	-
2030	-	-
Total	**-**	**5,000**

Projected Implementation Timeframe:
- Start Date: 2026
- End Date: 2030

Source: Stakeholder Engagement

UEM Lestra x Hexa Renewables Solar Project | Project Overview

This project positions Johor as a renewable energy investment hub by enabling utility-scale solar and battery storage within an existing plantation estate. It supports Malaysia's green energy targets and has cross-border export potential.

Project Highlights:

Concept Description	Development of a large-scale ground-mounted solar photovoltaic (PV) and Battery Energy Storage System (BESS) project within a 718-hectare operating palm oil estate in Segamat, Johor. The project is led by Lestra Hexa JV, an incorporated joint venture.

Visualisation of the Project

Project Status: Shareholders Agreement signed in January 2024; currently finalising offtaker agreements and preparing Special Permit application for land conversion.

Project Location: Segamat, Johor (Agricultural-zoned land, 718 ha / 1,775 acres).

Project Details:

- Capacity: 860 MWp solar, 960 MWh BESS.
- Connection: 275kV double circuit LILO to PMU Bahau South & PMU Yong Peng.
- Estimated Annual Generation (P50): 1,280,000 MWh.
- Technology Partner: ITRAMAS.
- Commercial Operation Date (COD): Targeted 24 months after PPA signing.
- Permits & Zoning: Special Permit and KM (planning permission) process underway with PDT and relevant state authorities.

Implementing Agency
- Invest Johor

Project Owner
- Lestra Hexa JV

Stakeholders
- ITRAMAS, TNB, Invest Johor, PDT, PlanMalaysia, Pejabat Tanah, Local Councils

Investment Required (MYR mil):

FY	Public	Private
2025	-	300
2026	-	900
2027	-	1,000
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**2,200**

Projected Implementation Timeframe:
- Start Date: 2024
- End Date: 2026

Source: Stakeholder Engagement

Masdar Renewables Large Scale Solar Farm | Project Overview

This project strengthens Johor's position as a regional clean energy hub by catalyzing large-scale solar and battery storage projects with direct power offtake to data centers. It aligns with Malaysia's 10 GW renewable energy target and supports cross-border energy solutions.

Project Highlights:

Concept Description	Development of a large-scale utility-scale solar PV and Battery Energy Storage System (BESS) project in Johor. This initiative forms part of Masdar's 10 GW renewable energy roadmap in Malaysia, signed with MIDA.

Visualisation of the Project

Project Status: Masdar has signed an Implementation Roadmap with MIDA to deliver 10 GW of RE capacity over 10 years. Initial discussions with Johor government are ongoing. Seeking local partner.

Project Location: Johor (site identification underway). Interest in securing land for a 300–500 MW solar park with BESS integration.

Project Details:

- Initial Phase: 300–500 MW solar with battery storage
- Direct offtake potential with large data centers in Johor
- Technology: Solar PV + BESS
- Connection: Targeting proximity to key transmission nodes
- Permits & Zoning: To be pursued with state and federal entities
- Strategic intent: Part of broader 10 GW national roadmap (2025–2035)

Implementing Agency
- Invest Johor

Project Owner
- Masdar Renewables (UAE)

Stakeholders
- MIDA, Invest Johor, PDT, TNB, Energy Commission (Malaysia), data centre operators, local councils, energy regulators

Investment Required (MYR mil):

FY	Public	Private
2025	-	600
2026	-	900
2027	-	1,000
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**2,500**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2027

Source: Stakeholder Engagement

Rare Earth Oxide Production in Johor | Project Overview

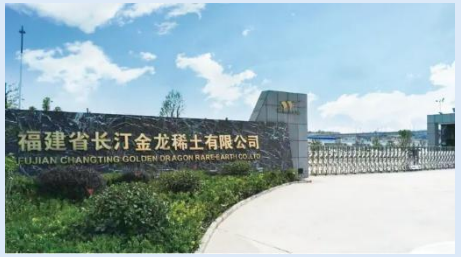
This project could support Johor's ambition to become a high-value materials hub by leveraging strategic investments into rare earth value chains. Should GDRE invest in Johor, it would catalyse technology transfer, downstream value creation, and integration into global clean energy and electronics supply chains.

Project Highlights:

Concept Description

Fujian Golden Dragon Rare-Earth Co., Ltd is a Chinese rare earth producer and subsidiary of Xiamen Tungsten Co. Ltd. This project would contribute to Malaysia's ambitions under the National Mineral Industry Transformation Plan 2021–2030, particularly in non-radioactive rare earth elements (NR-REEs)

Visualisation of the Project



Project Status: Further input required. As of now, there is no public confirmation of GDRE involvement in a project in Johor or elsewhere in Malaysia.

Project Location: Further input required. Assumed to be Johor.

Project Details:

- Rare earth oxide production facility to support clean energy and electronics industries
- Potential integration with Malaysia's mineral processing ecosystem
- Could support export to global markets and supply downstream manufacturers
- Opportunities for skill transfer and R&D collaboration
- Note: All project details subject to confirmation upon formal announcement

Implementing Agency

- Invest Johor

Project Owner

- Fujian Golden Dragon Rare-Earth Co., Ltd. (GDRE) (Unconfirmed in Malaysian context)

Stakeholders

- Xiamen Tungsten Co., Ltd.
- MIDA, Invest Johor, Ministry of Natural Resources, and Malaysia's Rare Earth Centre

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2030

Source: Stakeholder Engagement

Equalenergie Solar Farm | Project Overview

This project contributes to Johor's clean energy ambition by enabling the development of a utility-scale solar farm to supply green electricity directly to a new data centre via the CRESS programme. It supports Malaysia's RE goals and addresses grid demand growth in Johor.

Project Highlights:

Concept Description	Development of a utility-scale solar PV project to supply renewable energy directly to a data centre in Johor via the Corporate Green Energy Supply (CRESS) mechanism. Rooftop solar solutions for C&I users also offered under a separate business line.

Visualisation of the Project

Project Status: Surveying lands in Johor, Kedah and Perlis as project location. Nonetheless, the company is committed to supporting Johor's electricity demands, particularly given the recent data centre boom. Preliminary agreement secured with a data centre off-taker.

Project Location: Exploring land parcels of 700–1,000 acres inside and outside Johor

Project Details:

- Initial Phase: 200–300 MW solar farm
- Full Scale: Up to 1 GW by 2035 based on off-taker demand
- Technology: Solar PV (utility-scale)
- Connection: Close proximity to PMUs (concerns raised on grid capacity at selected sites)
- Permits & Zoning: To be pursued at federal and state levels
- Strategic Intent: Support Johor's power needs amid data centre expansion. Hopes to explore possibility of use of Johor State GLC landbanks.

Implementing Agency
- Invest Johor

Project Owner
- Equalenergie

Stakeholders
- PlanMalaysia, Invest Johor, PDT, TNB, Energy Commission, MIDA, data centre operators, local councils

Investment Required (MYR mil):

FY	Public	Private
2025	-	500
2026	-	700
2027	-	800
2028	-	500
2029	-	-
2030	-	-
Total	**-**	**2,500**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2027

Source: Stakeholder Engagement

Green Hydrogen Production & Export to Singapore | Project Overview

This project supports Johor's ambition to become a clean energy export hub by leveraging its geographic proximity to Singapore. Through cross-border pipeline infrastructure, Johor is positioned to be a key hydrogen supplier in the region, reinforcing Malaysia's energy transition targets and opening high-value green trade opportunities.

Project Highlights:

Concept Description	The initiative involves the development of a green hydrogen production facility in Johor with dedicated export infrastructure to Singapore. It aligns with NETR and Singapore's Net Zero 2050 goals, with planned integration into Senoko's power generation assets

Visualisation of the Project

Project Status: Feasibility study agreement signed between Gentari and Singapore's City Energy in October 2023. MOU with Senoko Energy signed in 2024 to explore hydrogen imports and direct usage in CCGT assets. Pipeline feasibility and regulatory studies ongoing.

Project Location: Johor (specific site undisclosed, but studies suggest proximity to Senoko Gasworks via cross-border pipeline)

Project Details:

- Green hydrogen production using renewable energy sources
- Pipeline transport to Singapore targeted for completion by 2027–2029
- Integration with Senoko's CCGT plants for emissions reduction
- Long-term supply contract under consideration (20 years)Potential GHG reduction up to 535,000 tonnes CO_2 equivalent annually
- Supports Singapore's energy security and Malaysia's export ambitions

Implementing Agency
- Invest Johor

Project Owner
- Gentari

Stakeholders
- City Energy (Singapore), Senoko Energy, PETRONAS, Invest Johor, MIDA

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2029

Source: Stakeholder Engagement

TNB Centralised Solar Park (CSP) | Project Overview

This project supports Johor's renewable energy ambitions by enabling the development of a large-scale solar park by TNB, feeding clean energy into the national grid. The project is aligned with Malaysia's RE targets and will enhance grid resilience and capacity in Johor.

Project Highlights:

Concept Description

Development of a utility-scale solar PV project by Tenaga Nasional Berhad (TNB), generating renewable energy to be fed directly into the grid. The project is not intended for cross-border export and will contribute to domestic energy security.

Visualisation of the Project

Project Status: Initial land options proposed by the Johor state government were unsuitable. PDT to propose additional options.

Project Location: 400 acres required in Johor. Northern and eastern Johor preferred due to better irradiance levels.

Project Details:

- Estimated capacity: 100 MW
- Technology: Solar PV (utility-scale)
- Site requirement: ~400 acres
- Location requirement: ≤ 8 km from nearest PMU
- Power export: To be fed into the domestic grid only
- Developer: TNB Renewable Energy (wholly owned subsidiary of TNB)
- Strategic Intent: Strengthen Johor's domestic grid capacity, growing local demand and aligns with TNB's RE agenda and serves as a key project under NETR.

Implementing Agency

- Invest Johor

Project Owner

- TNB Renewable Energy

Stakeholders

- PDT, State Government of Johor, TNB, PlanMalaysia, local councils, Energy Commission, state-owned landholders

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2030

Source: Stakeholder Engagement

Renewable Energy Industrial Park | Project Overview

This project supports Johor's ambition to become a regional clean energy hub by anchoring RE manufacturing within a dedicated industrial park in Gerbang Nusajaya. It will attract foreign investment, spur R&D, and enable downstream solar industry development.

Project Highlights:

Concept Description	Development of a 40-acre Renewable Energy Industrial Park within a 380-acre zone in Gerbang Nusajaya, Johor, through a strategic collaboration between UEM Sunrise, ITRAMAS, and CMEC. The project aims to attract solar equipment manufacturers and RE ecosystem players to support Malaysia's industrial decarbonisation goals.

Visualisation of the Project

Project Status: MOU signed in May 20245 China-based RE firms expressed interest. MOU with Gotion (Dec 2024) to develop an R&D centre. Discussions ongoing with PDT to expedite land rezoning. Full site readiness by 2027 due to zoning timeline.

Project Location: Gerbang Nusajaya, Johor (40-acre plot within a 380-acre RE park)

Project Details:

- Industrial park for RE supply chain players
- Focus on solar manufacturing, R&D, and cross-border investment
- Rezoning from residential to industrial land in progress
- Infrastructure link from Precinct 1 to 2 to be completed by end-2025
- Strategic Intent: Position Johor as an anchor for regional RE supply chain activities, with export-oriented industrial capabilities and integrated smart logistics (Precinct 3).

Implementing Agency
- Invest Johor

Project Owner
- UEM Sunrise Berhad

Stakeholders
- ITRAMAS, CMEC, PDT, PlanMalaysia, local councils, Invest Johor, Pejabat Tanah & Galian

Investment Required (MYR mil):

FY	Public	Private
2025	-	100
2026	-	500
2027	-	1,200
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**1,800**

Projected Implementation Timeframe:
- Start Date: 2026
- End Date: 2028

Source: Stakeholder Engagement

Envision Energy Wind Farm Project | Project Overview

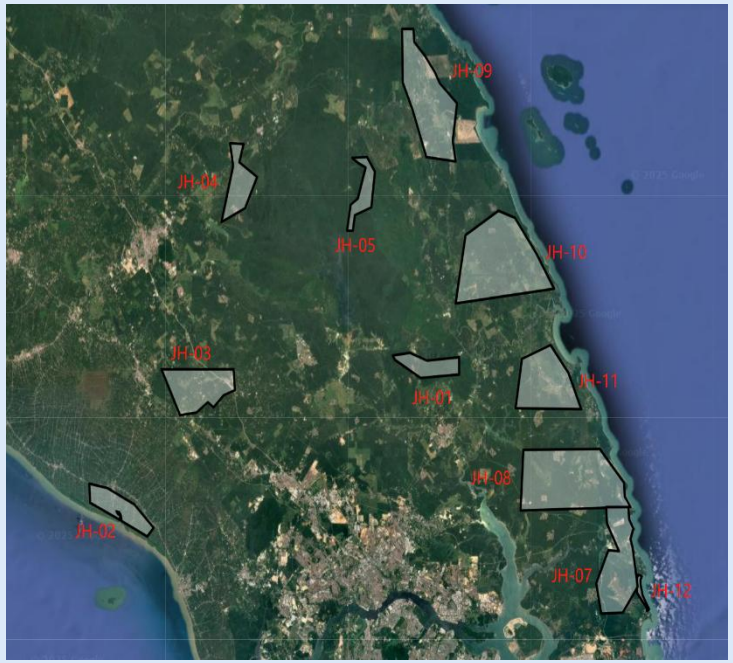
The introduction of the JS-SEZ initiative drives a greater demand for electricity. Envision seeks to meet this need with clean renewable energy by deploying low-wind-speed turbines under existing frameworks like CRESS, while also advocating for government policies and frameworks tailored specifically for wind power.

Project Highlights:

Project Description

Envision targets a total of 12 potential regions across the entire state of Johor for wind power development. Feasibility Study is required to be conducted before the confirmation of each project execution, where a Metmast is required to be constructed for every targeted 50MW of capacity.

Visualisation of the Project



A total of 12 targeted regions are preliminary selected.

Region	Phase	Capacity	FS Expected Cost	Construction Expected Cost
JH-01	1	100	0.65	130
JH-02	1	110	0.65	143
JH-09	2	120	0.65	156
JH-10	2	100	0.65	130
JH-11	3	100	0.65	130
JH-07	3	165	0.8	215
JH-08	3	100	0.65	130
JH-12	4	50	0.5	65
JH-05	4	60	0.5	78
JH-04	5	75	0.5	98
JH-03	5	200	0.95	260

Implementing Agency
- Permodalan Darul Takzim (PDT)

Project Owner
- Envision Energy with potential partners

Stakeholders
- PTG, JPNJ, JKR, PDT, BPEN, MMK

Investment Required (MYR mil):

FY	Public	Private (RM)
2025	-	0.2
2026	-	0.4
2027	-	5
2028	-	10
2029	-	20
2030	-	40
Total	**-**	**75.6**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

Source: Stakeholder Engagement

Electrical & Electronics.

Disclaimer Notes

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Plastic Injection Moulds | Project Overview

Johor must enhance its manufacturing ecosystem with high-precision tooling capabilities to support the growing demand for advanced electronics and export-oriented industries

Project Highlights:

Concept Description	This project involves the development of a high-precision plastic injection moulding facility by Flextronics to support component manufacturing across E&E and industrial segments

Visualisation of the Project

Project Status: Unknown, pending input from [Project Source]

Project Location: Kulai

Project Details:

- Establishment of a precision moulding line for producing plastic components used in consumer electronics, automotive, and industrial devices
- Integration of automation and quality control systems to ensure scalability and compliance with global client standards

Implementing Agency
- Invest Johor

Project Owner
- Flextronics Shah Alam Sdn Bhd

Stakeholders
- Majlis Perbandaran Kulai
- Utilities companies
- Land Office

Investment Required (MYR mil):

FY	Public	Private
2025	-	100
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**100**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

Portable Commercial Studio LED | Project Overview

The increasing demand for energy-efficient and adaptable lighting solutions in commercial studios highlights the need for innovative LED systems that offer both portability and high performance

Project Highlights:

Concept Description

Development and deployment of a portable, high-efficiency LED lighting system tailored for commercial studio applications, aiming to enhance lighting quality while ensuring energy savings and operational flexibility

Visualisation of the Project

Project Status: Unknown, pending input from [Project Source]

Project Location: Johor Bahru

Project Details:

- Design and manufacture of compact, durable LED lighting units suitable for various studio environments
- Integration of adjustable lighting features to cater to diverse commercial studio needs, ensuring optimal illumination and color accuracy

Implementing Agency
- Invest Johor

Project Owner
- BPW Industrial Sdn Bhd

Stakeholders
- Majlis Bandaraya Johor Bahru
- Utilities companies

Investment Required (MYR mil):

FY	Public	Private
2025	-	100
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**100**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

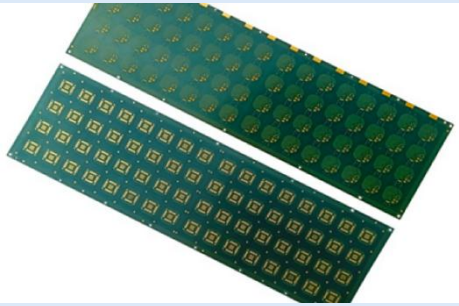
Advanced Substrate Manufacturing | Project Overview

To meet the escalating global demand for high-capacity and reliable data storage solutions, there is a critical need to enhance the manufacturing capabilities of precision substrates essential for advanced hard disk drives

Project Highlights:

Concept Description	Expansion and modernization of production facility to manufacture high-quality aluminium substrates, plated substrates, and plated polished substrates, thereby supporting the next generation of hard disk drive technologies

Visualisation of the Project



Project Status: Unknown, pending input from [Project Source]

Project Location: Pasir Gudang

Project Details:

- Scaling up the production of aluminium substrates with improved surface flatness and durability to serve as the foundational layer for magnetic disks
- Implementing advanced plating techniques to deposit uniform magnetic layers, enhancing data storage density and read/write efficiency
- Upgrading polishing processes to achieve ultra-smooth surfaces, reducing friction and improving the longevity and performance of hard disk drives

Implementing Agency

- Invest Johor

Project Owner

- WD Media (Malaysia) Sdn. Bhd

Stakeholders

- Majlis Bandaraya Pasir Gudang
- Utilities companies
- Land office

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2030

Aerospace.

Disclaimer Notes

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Senai Airport Expansion (Aerospace Hub) | Project Overview

Senai International Airport is strategically positioned within Iskandar Malaysia, offering direct connectivity to major highways and proximity to Singapore. Expanding the airport infrastructure will allow for expansion in business activities such as having a higher passenger handling capacity and increase in MRO services.

Project Highlights:

Concept Description	Transform Senai International Airport into a comprehensive aerospace hub, enhancing its capacity to support Maintenance, Repair, and Overhaul (MRO) services, cargo operations, and aviation-related industries.

Visualisation of the Project

Project Status: Feasibility study exercise

Project Location: Senai Airport, Kulai

Project Details:
- Infrastructure Development: Expand runways, taxiways, and aprons to accommodate larger aircraft and increased traffic.
- MRO Facilities: Establish state-of-the-art MRO centers to service various aircraft types.
- Aerospace Industrial Park: Create zones for aerospace manufacturing, training centers, and R&D facilities.

Implementing Agency
- MIDA

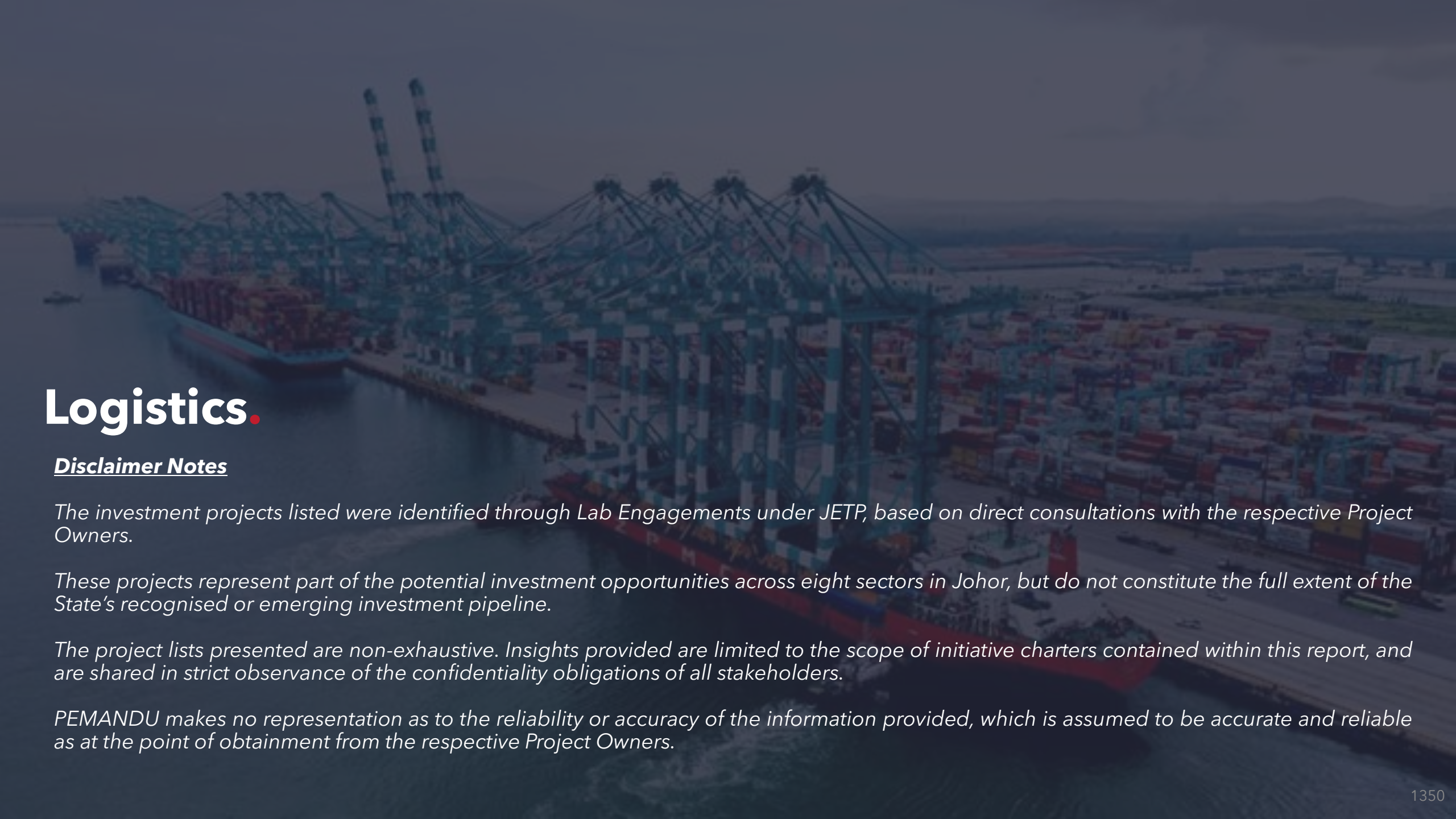
Project Owner
- Senai Airport Terminal Services Sdn Bhd

Stakeholders
- MMC Corporation Berhad
- Unit Kerjasama Awam Swasta (UKAS)

Investment Required (MYR mil):

FY	Public	Private
2025	-	3,000
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**3,000**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030



Logistics.

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PTP Free Zone 3 Access Road | Project Overview

PTP is planning to expand its Free Zone industrial area with its 3rd-phase development (to be privately funded by PTP). However, due to the high traffic volume on the existing road to the port, a new road connecting to this new development needs to be constructed. Otherwise, the development will not be viable, as it will deter investors from building their facilities due to access issues.

Project Highlights:

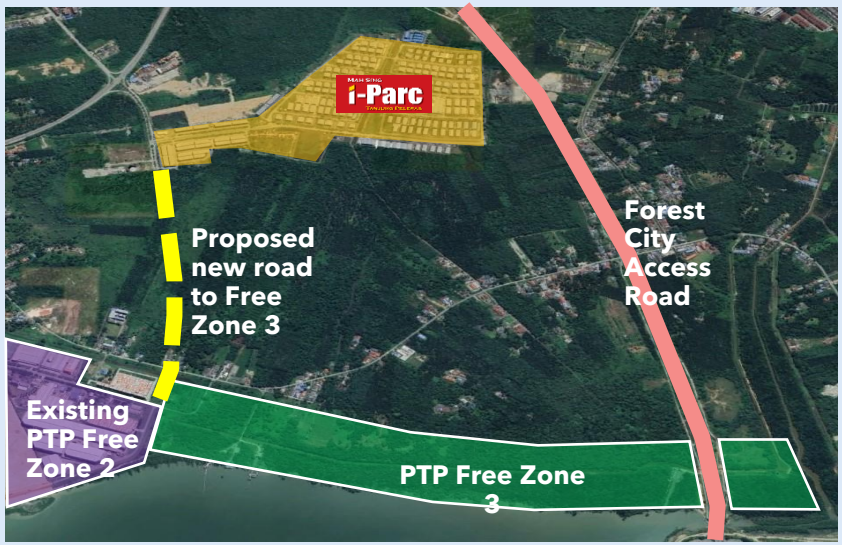
Concept Description

The construction of a new road that directly connects to the existing Tanjung Pelepas Highway will increase the attractiveness of the new Free Zone 3 at the Port of Tanjung Pelepas to local and international investors. This will alleviate congestion on the current road to the port, which is already saturated with traffic to the operations and existing Free Zone areas.

Visualisation of the Project

Scope of work for access road:

1. Land acquisition for road reserved
   i. Approximate land area of 37 acres.
   ii. Privately owned land.
   iii. Farms, houses, small shops
2. Road construction
   i. Total 1.5km
   ii. 4-lanes dual-carriageway
   iii. Junction improvement
   iv. Bridge crossing
   v. Softground
3. Cost and timeline
   i. RM83.1 million for land acquisition
   ii. RM106.9 for road construction
   iii. 2.5 years for land acquisition
   iv. 2 years for road construction



PTP's Free Zone 3 Infrastructure Development:

1. Fully funded by PTP
2. Construction of infrastructure – platform backfilling, road, drainage and utilities
3. Completion in stages from 2028 until 2030

Implementing Agency

- Ministry of Transport & Ministry of Works

Project Owner

- Lembaga Pelabuhan Johor

Stakeholders

- Majlis Bandaraya Iskandar Puteri
- Pejabat Tanah dan Galian Johor
- Jabatan Pengairan dan Saliran

Investment Required (MYR mil):

FY	Public	Private
2025	0.0	0.0
2026	16.6	0.0
2027	37.9	0.0
2028	32.5	0.0
2029	75.3	0.0
2030	22.5	0.0
2031 onwards	5.2	0.0
Total	**190.0**	**-**

Implementation Timeframe:

- Start Date: Q1 2026
- End Date: Q1 2030 (Defect Liability Period, Q1 2031)

DHL Supply Chain (Phase 2 and Phase 3)

To fulfil growing logistics demand in Johor, particularly in areas, such as, data centres, cloud businesses, automotive and technology

Project Highlights:

Concept Description	As part of DHL's overall expansion in South East Asia, this investment involves the construction of technologically advanced warehouses, providing storage and distribution services and beyond

Visualisation of the Project

Project Status: Planning

Project Location: Johor Bahru

Project Details:

- DHL is a well-known global leader in contract logistics, providing efficient end-to-end supply chain management for other growing industries in the region
- DHL Supply Chain (Phase 2 and 3) are part of DHL's EUR350mil overall expansion in South East Asia (EUR131mil allocated for Malaysia)
- To meet the growing regional demand in contract logistics, this investment involves the construction of smart warehouses for storage and distribution, supplemented by services, such as, inventory and supply chain management

Implementing Agency
- MIDA

Project Owner
- DHL

Stakeholders
- PTG

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

Dialog Terminals Langsat 3 Seraya 2

The expansion of Dialog Terminals in Langsat through the development of Seraya 2 addresses the increasing demand for independent tank storage solutions, particularly for specialty chemicals and refined products. This expansion will enhance Johor's position as a key hub for petrochemical and downstream activities, providing critical infrastructure to support regional and global trade flows

Project Highlights:

Concept Description	The project involves constructing additional storage capacity and associated infrastructure at Dialog's Langsat terminal. This expansion will focus on accommodating specialty chemicals and refined products, catering to specific customer needs, and enhancing overall operational efficiency

Visualisation of the Project

Project Status: Planning

Project Location: Tanjung Langsat

Project Details:

- Expansion of storage capacity at Dialog Terminals Langsat to handle specialty chemicals and refined products.
- Development of associated infrastructure, including pipelines, blending facilities, and jetty access.
- Focus on providing customized storage solutions to meet specific customer requirements.

Implementing Agency

- MIDA

Project Owner

- Dialog and Port of Tanjung Langsat

Stakeholders

- PTG

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2030

Shui Xing Integrated Logistics Services

The establishment of a smart warehouse and distribution centre by Shui Xing Venture in Sedenak addresses the increasing demand for efficient and technologically advanced logistics solutions. This initiative aims to capitalize on the growth of e-commerce and the need for streamlined supply chains, enhancing Johor's position as a key logistics hub in the region

Project Highlights:

Concept Description

Developing a state-of-the-art smart warehouse and distribution centre that utilizes advanced automation, data analytics, and robotics to optimize storage, handling, and distribution processes. This facility will offer comprehensive logistics services, including warehousing, order fulfillment, and last-mile delivery, to support various industries

Visualisation of the Project

Project Status: Planning

Project Location: Sedenak

Project Details:

- Construction of a smart warehouse and distribution centre equipped with advanced automation and robotics.
- Implementation of a warehouse management system (WMS) to optimize storage and retrieval processes.
- Integration of data analytics and IoT technologies to improve operational efficiency and visibility.
- Provision of comprehensive logistics services, including warehousing, order fulfillment, and last-mile delivery

Implementing Agency

- MIDA

Project Owner

- Shui Xing Group

Stakeholders

- PTG

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2030

Maersk Distribution Centre

The establishment of a Maersk logistics hub in Johor aims to leverage the strategic location of Johor to enhance its integrated logistics network. This initiative addresses the growing demand for comprehensive logistics solutions, facilitates seamless supply chain operations, and supports regional trade and distribution activities

Project Highlights:

Concept Description	The project involves developing an advanced warehouse that offers warehousing, distribution, and value-added services. This hub will integrate with Maersk's global network to provide end-to-end supply chain solutions to customers

Visualisation of the Project

Project Status: Planning

Project Location: Tanjung Pelepas

Project Details:

- Development of a large-scale logistics and distribution centre with advanced warehousing capabilities.
- Provision of value-added services, such as packaging, labeling, and consolidation.
- Integration with Maersk's global logistics network to facilitate international trade

Implementing Agency

- MIDA

Project Owner

- Maersk

Stakeholders

- PTG

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2030

Taewoong Logistics Warehouse

The presence of Taewoong Global Logistics in Johor enhances the region's capabilities in handling specialized logistics and global supply chain management. This initiative supports industries requiring specialized logistics solutions, such as automotive, electronics, and manufacturing, by providing efficient and reliable services

Project Highlights:

Concept Description	The project involves establishing a logistics hub that offers warehousing, transportation, and supply chain management services. This hub will cater to industries with complex logistics needs, ensuring seamless and efficient operations

Visualisation of the Project

Project Status: Planning

Project Location: Johor Bahru

Project Details:

- Offers advanced logistics infrastructure, ready-built and customisable warehouses, and integrated services to support global supply chains
- Leverages technology to enhance operational efficiency and support international connectivity and trade

Implementing Agency

- MIDA

Project Owner

- Taewoong Global Logistics

Stakeholders

- PTG

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2030

South East Asia Frozen Food Cold Chain Facility

The establishment of South East Asia Frozen Food in Johor addresses the growing demand for frozen food storage and distribution in the region. This initiative aims to enhance the cold chain infrastructure, ensuring the safe and efficient handling of frozen food products and supporting the food processing and retail industries

Project Highlights:

Concept Description	The project involves constructing a state-of-the-art cold storage facility that offers warehousing, freezing, and distribution services for frozen food products. This facility will comply with international food safety standards and provide reliable cold chain solutions.

Visualisation of the Project

Project Status: Planning

Project Location: Johor Bahru

Project Details:

- Construction of a modern cold storage facility with advanced temperature control systems.
- Provision of warehousing, freezing, and distribution services for frozen food products.
- Compliance with international food safety standards to ensure product integrity

Implementing Agency
- MIDA

Project Owner
- Taewoong Global Logistics

Stakeholders
- PTG

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

Infinity Logistics and Transportation

The presence of Infinity Logistics and Transport in Johor enhances the region's integrated logistics and transportation network. This initiative aims to provide comprehensive logistics solutions, including freight forwarding, transportation, and warehousing, supporting trade and distribution activities across various industries

Project Highlights:

Concept Description	The project involves establishing a logistics and transport hub that offers a full suite of logistics services. This hub will integrate with Infinity's regional network to provide seamless and efficient logistics solutions to customers

Visualisation of the Project

Project Status: Planning

Project Location: Johor Bahru

Project Details:

- Establishment of a freight village / container depot
- Facilitates storage and sorting of goods

Implementing Agency

- MIDA

Project Owner

- Infinity Logistics and Transportation

Stakeholders

- PTG

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2030

Dart Global Forwarding Warehouse Facility

Dart Global Forwarding's presence in Johor enhances the region's international freight forwarding capabilities, facilitating global trade and logistics operations. This initiative supports businesses engaged in import and export activities by providing reliable and efficient freight forwarding services, including warehousing solutions to streamline supply chains and reduce transit times

Project Highlights:

Concept Description	Establishing a freight forwarding office that offers services such as air and sea freight, customs clearance, and cargo management, alongside a dedicated warehousing facility. This integrated approach will leverage Dart's global network to provide seamless international logistics solutions with enhanced storage and distribution capabilities

Visualisation of the Project

Project Status: Planning

Project Location: Johor Bahru

Project Details:

- Establishment of a freight forwarding office with air and sea freight services.
- Provision of customs clearance and cargo management solutions.
- Development of a warehousing facility to support storage, consolidation, and distribution.
- Leveraging Dart's global network to facilitate international trade with integrated warehousing services.

Implementing Agency

- MIDA

Project Owner

- Dart Global Forwarding

Stakeholders

- PTG

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2030

Ibrahim Technopolis (IBTEC) | Project Overview

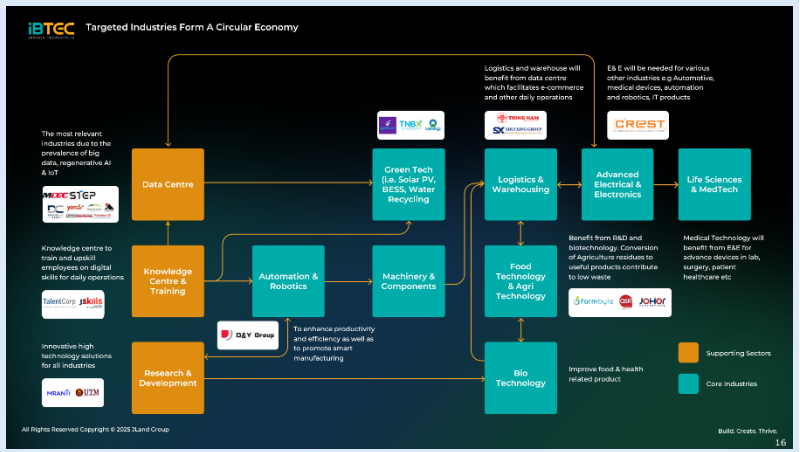
IBTEC is the largest sandbox ecosystem in Asia that unites new-age industrialists, digital pioneers, and lifelong learners in a high-tech environment that aims to supercharge growth seamlessly and sustainably.

Project Highlights:

Concept Description

IBTEC is a 7,290-acre circular city north of Iskandar Malaysia where imagineers & technopreneurs tinker, shape & scale up a circular world. Our vision goes beyond being Malaysia's first certified Low Carbon Industrial City. It's a vibrant community of symbiotic sectors that share our regenerative mindset. IBTEC thrives on the energy of its people, who bring life to every corner. That's why everything you need is designed to be only a 15-minute walk away. Think of us as a launchpad to go global with seamless connectivity to Asia, incentivised by the Malaysian Government. Be part of the movement, build your desired ecosystem and superscale growth along with your Net Zero ambitions at IBTEC, your Circle of Possibilities.

Visualisation of the Project



Tangible impacts:

- **Total Acreage: 7,290 acres (2,950 hectares)**
- **Job Creation of up to 333,000 jobs (upon the township's maturity at 2047)**
- **Generating a Gross Domestic Product (GDP) of RM37.2 billion**
- **Value-Add Multiplier of 2.64x**

Implementing Agency

- Johor Corporation

Project Owner

- JLand Group Sdn Bhd (subsidiary of Johor Corporation)

Stakeholders

- Federal Government agencies (including MIDA, MITI, MoF, KE & MDEC)
- Johor State Government agencies (including BPENJ, PLANMalaysia Johor, Majlis Perbandaran Kulai & JKR)
- Utility Providers (TNB, Ranhill SAJ & telco)

Investment Required (MYR mil):

FY	Public	Private
2025	22.4	141.7
2026	67.2	437.8
2027	77.8	389.7
2028	99.0	239.3
2029	31.8	168.7
2030	31.8	350.0
2031 onwards	245.1	3,150.0
Total	**575.1**	**4,877.2**

Implementation Timeframe:

- Start Date: 2014
- End Date: 2047

Tiong Nam Logistics Hub

Johor is rapidly emerging as a strategic logistics and industrial hub due to its proximity to Singapore, robust infrastructure, and government support. The development of a high-tech logistics hub in Sedenak will address growing demand for integrated logistics solutions, support regional trade, and contribute to Johor's economic transformation by attracting multinational businesses and enhancing supply chain efficiency

Project Highlights:

Concept Description	The project involves the joint development of a state-of-the-art logistics and industrial park on a 300-acre site in Sedenak Tech Valley by Tiong Nam Logistics Holdings and JLand Group (a Johor Corp subsidiary)

Visualisation of the Project

Project Status: Planning

Project Location: Kulai

Project Details:

- The 300-acre site will feature ready-built and customisable warehouses, factories, and commercial buildings, along with integrated logistics infrastructure
- The hub will leverage technology to enhance operational efficiency and support international connectivity and trade
- The hub will offer advanced logistics infrastructure, ready-built and customisable warehouses, and integrated services to support global supply chains

Implementing Agency
- MIDA

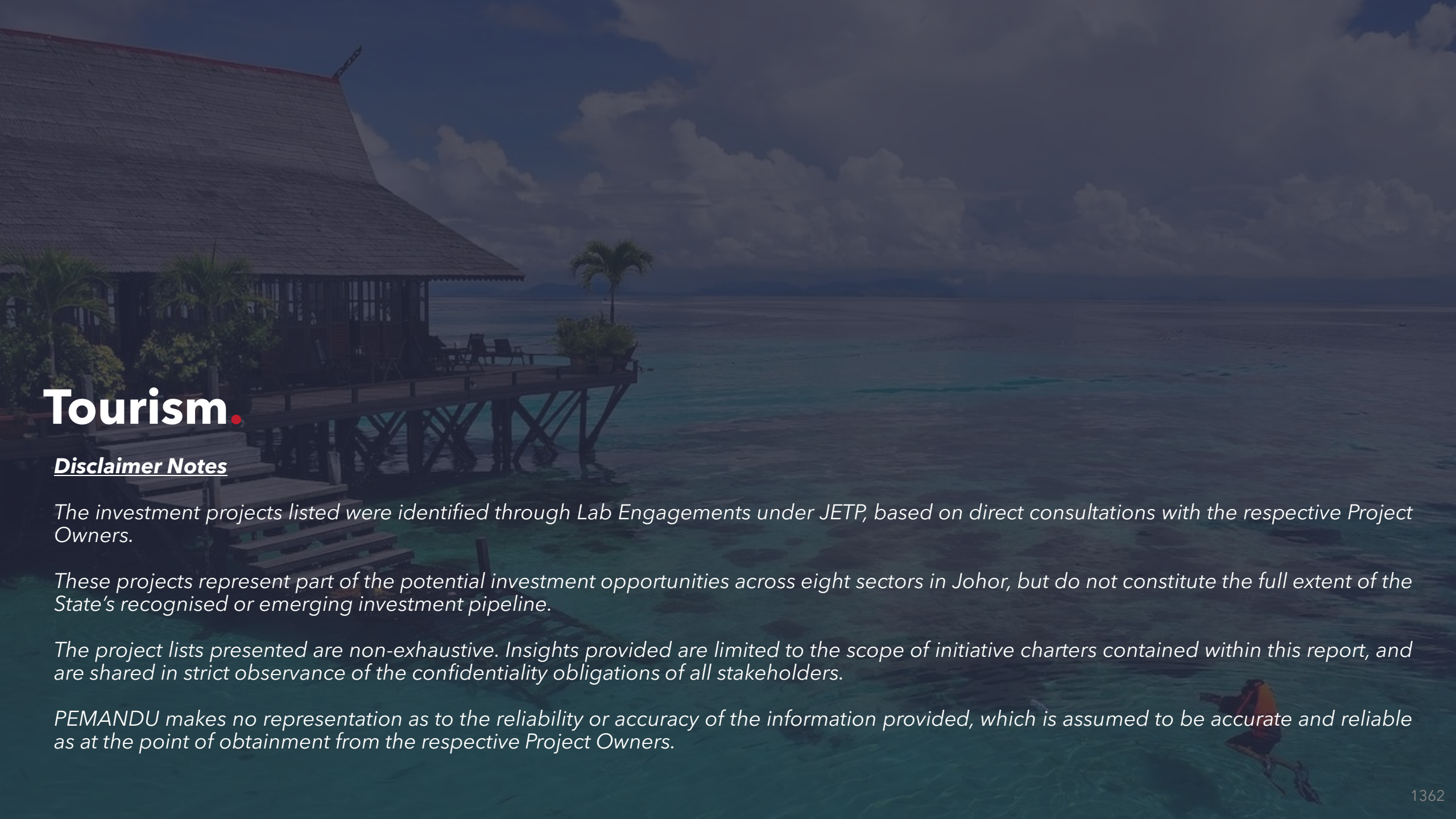
Project Owner
- Tiong Nam and JCorp

Stakeholders
- PTG

Investment Required (MYR mil):

FY	Public	Private
2025	-	TBD
2026	-	TBD
2027	-	TBD
2028	-	TBD
2029	-	TBD
2030	-	TBD
Total	**-**	**2,400**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030



Tourism.

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Sunway Puteri Hills | Project Overview

Puteri Hills consists a total of 13 unique F&B restaurant concepts, each offering a new and exciting foodie destination in Johor Bahru, with beautiful seaviews enhancing the dining experience. This development is designed as a delightful gathering spot, providing a variety of culinary experiences for all to enjoy.

Initiative Highlights:

Concept Description

Innovative dining that blends tradition with modern trends, social spaces designed for community gatherings and events, a strong focus on local tourism and support for local business, sustainability and eco-conscious design.

Visualisation of the initiative

Private projects focus on enhancing local tourism by offering a variety of unique culinary experiences, complemented by breathtaking sea views. This development serves a vibrant and inviting gathering spot, attracting both locals and tourists alike. With its diverse dining options and scenic atmosphere, it is set to become a must-visit destination in the region.

Restaurants	Food Culture	NLA (sqft)
Hock Kee	Malaysian cuisine	17,910.16
Kenny Hills Bakers	Western cuisine	5,687.00
Khunya Thai	Thai cuisine	5,503.00
Cili Kampung	Malaysian cuisine	4,872.00
Made on Money (MOM)	Western cuisine	6,958.00
Aristo	French cuisine	2,491.85
Gongju	Korean cuisine	2,491.85

This project aims for tourism increase 500,000-1 million pax and approximately 230-280 jobs by 2030.

Implementing Agency
- Nil

Project Owner
- Sunway Seafront Sdn Bhd

Stakeholders
- Khazanah Nasional Berhad
- Sunway Iskandar Sdn Bhd

Investment Required (MYR mil):

FY	Public	Private
2024	-	15.8
2025	-	28.3
2026	-	10.0
2027	-	8.0
2028	-	6.0
2029	-	4.0
2030 onwards	-	2.0
Total	**-**	**74.1**

Implementation Timeframe:
- Start Date: Q3 2024
- End Date: Q2 2030

Sunway Circuit | Project Overview

Sunway Circuit in Sunway City Iskandar Puteri is a motorsport facility located in Johor, Malaysia. It is part of the Sunway City development and is designed to cater to motorsport enthusiasts, offering a variety of driving experiences and events. The circuit will also be used for none-motorsports events such as cycling, runs, concerts, etc

Initiative Highlights:

Concept Description

The concept behind Sunway Circuit draws inspiration from renowned motorsport venues worldwide, including the Magarigawa Circuit in Japan, which is famous for its world-class lifestyle car track. Sunway Circuit is a private circuit for members, allowing members to purchase duty-free cars (must be kept within the Circuit), which adds a unique aspect to the project.

Visualisation of the initiative

Concept Design	Description
World-Class Driving Facility	Offer a high-performance driving experience for members, local and international motorsport events, and trainings.
Exciting & Technical Track Design	A combination of high-speed straights and technical corners, providing a variety of challenges for drivers.
Driving Experience & Education	A complete driving experience, including driver education, training programs and advanced driving skills workshops.
Integration of Technology & Innovation	Smart tracking systems, data analytics and car performance monitoring.
Community Engagement & Tourism	Designed as a community hub that attracts motorsport enthusiasts and tourists. This also contributes to the broader economic development of the region.

This project aims for tourism of 500,000-1 million pax and approximately 100-200 jobs by 2028.

Implementing Agency
- NIL

Project Owner
- Sunway Iskandar Development Sdn Bhd

Stakeholders
- Sunway Iskandar Development Sdn Bhd
- Kenjijaya Engineering Sdn Bhd

Investment Required (MYR mil):

FY	Public	Private
2022	-	247
2023	-	25
2024	-	25
2025	-	25
2026	-	5
2027	-	5
2028 onwards	-	5
Total	**-**	**337**

Implementation Timeframe:
- Start Date: Q1 2022
- End Date: Q4 2025

Banjaran Mangrove Resort | Project Overview

The Banjaran Mangrove Luxury Resort, located in Sunway Iskandar, is an eco-luxury resort that seamlessly integrates sustainable resort practices within a natural setting. Set amidst lush mangroves, the resort aims to offer guests an immersive experience in nature while promoting environmental conservation and awareness.

Initiative Highlights:

Concept Description

The resort's concept revolves around sustainability, wellness, and nature conservation. It features eco-friendly architecture, energy-efficient systems, and offers guests opportunities to engage in mangrove rehabilitation efforts. By blending luxury with nature, the Banjaran Mangrove Resort provides a peaceful retreat where guests can relax, rejuvenate, and connect with the environment.

Visualisation of the initiative

Banjaran Mangrove Resort is strategically designed to blend seamlessly with its natural surroundings, offering guests a peaceful retreat while emphasizing sustainability and eco-tourism. The resort's layout features a harmonious integration of green spaces, waterways, and luxurious accommodations, creating an immersive experience for visitors.

100 exclusive villa units are strategically placed along the edge of the resort, offering private and serene views of the surrounding environment.

The resort's facilities include wellness spaces that are intricately connected to nature. Guests can enjoy walking paths, gardens, and outdoor lounges designed to blend with the natural landscape. With a strong emphasis on wellness, the resort offers nature-inspired spa experiences and yoga pavilions set against the backdrop of lush greenery, promoting a sense of peace and relaxation.

Estimated visitors at 850,000-1,080,000 over the first 10-year period. Aproximately 150-200 jobs by 2028 for 1st phase with the possibility of more job opportunities as the resort expands.

Implementing Agency
- Ministry of Tourism, Arts and Culture Malaysia (MOTAC Johor)

Project Owner
- Sunway Iskandar Development Sdn Bhd

Stakeholders
- Sunway Iskandar Development Sdn Bhd

Investment Required (MYR mil):

FY	Public	Private
2025	-	10
2026	-	30
2027	-	50
2028	-	60
2029	-	10
2030	-	10
2031 onwards	-	10
Total	**-**	**180**

Implementation Timeframe:
- Start Date: Q1 2025
- End Date: Q4 2028

Ibrahim International Business District (IIBD) | Project Overview

Malaysia has seen rapid development in which competition is growing, and economic realities are changing. However, most cities face challenges related to aging infrastructure, congestion, underutilized buildings/land, and socio-economic inequality especially Johor Bahru City Centre. Johor Bahru City Centre requires rejuvenation effort to align with modern needs that will transform into dynamic, and livable city through sustainable goals.

Initiative Highlights:

Concept Description

To transform Johor Bahru Central Business District into a world-class hub of innovation, creativity, and economic growth through IIBD Rejuvenation Plan that outline a long-term strategic plan for the development of IIBD. A comprehensive plan to reimagine the traditional CBD model and create a truly dynamic ecosystem that fosters collaboration, entrepreneurship, and sustainable development.

Visualisation of the initiative

Vision

A Livable and Lovable

Mission

A vibrant, soulful rejuvenated city through sustainable living, creativity and culture inclusivity while preserving its unique characteristics

THE 5 BIG MOVES

- Enhancing Business Ecosystem
- Enhancing City's Security
- Cleaning Towards Zero Waste
- Greening and Cooling The City
- Creating Seamless Connectivity and Accessibility

END STATE

- One stop investment centre & business friendly incentives
- Springboard for local businesses
- Centre for creative, innovative & vibrant community
- Destination for world class events, arts & culture
- Safe, clean & beautiful landscape
- Well-connected for better mobility

Implementing Agency

- IIBD (Johor) Sdn Bhd ("IJSB") in collaboration with State Government/Agencies

Project Owner

- IIBD (Johor) Sdn Bhd ("IJSB")

Stakeholders

- Landowner
- Government agencies
- Business community
- Public community

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Implementation Timeframe:

- Start Date: Q2 2025
- End Date: Q4 2040

Arena Larkin

The redevelopment or enhancement of Arena Larkin aims to revitalize a key transportation and commercial hub in Johor Bahru. This initiative seeks to modernize the facilities, improve connectivity, and create a more vibrant and attractive environment for commuters, businesses, and visitors. The enhancement will likely drive economic activity and improve the overall urban experience

Project Highlights:

Concept Description

The project involves the upgrade and modernization of the Larkin Sentral area, potentially including the bus terminal, market, and surrounding commercial spaces. The focus is on creating a more integrated, efficient, and user-friendly transportation and commercial centre

Visualisation of the Project

Project Status: Planning

Project Location: Larkin Sentral

Project Details:

- Modernization of the Larkin Sentral bus terminal to improve passenger comfort and operational efficiency.
- Renovation or redevelopment of the Larkin market to enhance hygiene and attract more customers.
- Integration of retail and commercial spaces to create a more vibrant and attractive environment.
- Improvement of connectivity and traffic flow in the surrounding area

Implementing Agency

- JCorp

Project Owner

- JCorp

Stakeholders

- PTG

Investment Required (MYR mil):

FY	Public	Private
2025	-	TBD
2026	-	TBD
2027	-	TBD
2028	-	TBD
2029	-	TBD
2030	-	TBD
Total	**-**	**9,500**

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2030

Desaru Coast

Desaru Coast is developed to transform the Desaru region into a premier integrated tourism destination. This initiative aims to attract both domestic and international tourists, boost the local economy, and create employment opportunities

Project Highlights:

Concept Description

The project involves the development of a large-scale integrated resort featuring luxury hotels, golf courses, a water park, a conference centre, and retail and dining options. The goal is to create a world-class tourism destination that offers a diverse range of experiences

Visualisation of the Project

Project Status: Planning

Project Location: Desaru Coast

Project Details:

- Development of luxury hotels and resorts, including international brands such as The Westin, Hard Rock Hotel, and Anantara.
- Construction of world-class golf courses, including The Els Club.
- Establishment of the Adventure Waterpark Desaru Coast
- Development of a conference centre to attract MICE (Meetings, Incentives, Conferences, and Exhibitions) events

Implementing Agency

- Desaru Coast

Project Owner

- Desaru Coast

Stakeholders

- PTG

Investment Required (MYR mil):

FY	Public	Private
2025	-	TBD
2026	-	TBD
2027	-	TBD
2028	-	TBD
2029	-	TBD
2030	-	TBD
Total	**-**	**900**

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2030

Medini International Convention City

The Medini International Convention City (MICC) aims to establish Medini and Iskandar Puteri as a premier destination for Meetings, Incentives, Conferences, and Exhibitions (MICE). This initiative seeks to attract international events, boost tourism, and stimulate economic growth in the region

Project Highlights:

Concept Description

The project involves the development and operation of a state-of-the-art convention centre that offers a range of facilities and services for hosting large-scale events, conferences, and exhibitions. The goal is to provide a world-class venue that meets the needs of event organizers and attendees

Visualisation of the Project

Project Status: Planning

Project Location: Medini

Project Details:

- Development of a modern convention centre with flexible event spaces, meeting rooms, and exhibition halls.
- Provision of comprehensive event management services, including catering, audio-visual support, and logistics.
- Attraction of international conferences, exhibitions, and corporate events to boost tourism and business activity.
- Integration with surrounding amenities, such as hotels, retail outlets, and entertainment options, to create a vibrant event precinct

Implementing Agency

- Iskandar Investment Berhad

Project Owner

- Iskandar Investment Berhad

Stakeholders

- PTG

Investment Required (MYR mil):

FY	Public	Private
2025	-	TBD
2026	-	TBD
2027	-	TBD
2028	-	TBD
2029	-	TBD
2030	-	TBD
Total	**-**	**300**

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2030

Overall rejuvenation and development of tourism attraction sites

The overall rejuvenation and development of tourism attraction sites aim to enhance Johor's appeal as a premier tourist destination. By upgrading existing sites and developing new attractions, this initiative seeks to attract more domestic and international visitors, increase tourism revenue, and create employment opportunities

Project Highlights:

Concept Description

The project involves a comprehensive plan to identify, assess, and improve various tourism sites across Johor. This includes upgrading infrastructure, enhancing visitor experiences, and promoting the unique cultural and natural heritage of each site.

Visualisation of the Project

Project Status: Planning

Project Location: Tangkak, Johor Bahru, etc.

Project Details:

- Tourism development in Taman Negara Gunung Ledang
- Enhancing Zoo Johor (Phase 2)
- Rejuvenation of Kampung Sungai Melayu
- Establishment of Kompleks Warisan Sultan Abu Bakar
- Establishment of Taman Botani Diraja, Muzium Diraja and Bangunan Sultan Ibrahim
- Restoration works at Muzium Tokoh
- Johor Bahru development project
- Tanjung Piai development
- Recreation centre at Sungai Lebam, Kota Tinggi

Implementing Agency
- Tourism Johor

Project Owner
- Tourism Johor

Stakeholders
- PTG

Investment Required (MYR mil):

FY	Public	Private
2025	TBD	-
2026	TBD	-
2027	TBD	-
2028	TBD	-
2029	TBD	-
2030	TBD	-
Total	**49**	**-**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

Lido Boulevard Waterfront

The Lido Boulevard project aims to revitalize the Johor Bahru waterfront, creating a vibrant and attractive public space for recreation and tourism. This initiative seeks to enhance the city's appeal, attract visitors, and stimulate economic activity along the waterfront

Project Highlights:

Concept Description	The project involves the development of a scenic boulevard with pedestrian walkways, landscaping, retail outlets, and dining options. The goal is to create a lively and enjoyable environment for residents and tourists

Visualisation of the Project

Project Status: Planning

Project Location: Johor Bahru

Project Details:

- Construction of a pedestrian-friendly boulevard along the waterfront.
- Development of retail and dining outlets to attract visitors.
- Landscaping and beautification of the area to create a pleasant environment.
- Organization of events and activities to promote the boulevard as a tourist destination

Implementing Agency
- Tropicana Group

Project Owner
- Tropicana Group

Stakeholders
- PTG

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

Agriculture.

Disclaimer Notes

The investment projects listed were identified through Lab Engagements under JETP, based on direct consultations with the respective Project Owners.

These projects represent part of the potential investment opportunities across eight sectors in Johor, but do not constitute the full extent of the State's recognised or emerging investment pipeline.

The project lists presented are non-exhaustive. Insights provided are limited to the scope of initiative charters contained within this report, and are shared in strict observance of the confidentiality obligations of all stakeholders.

PEMANDU makes no representation as to the reliability or accuracy of the information provided, which is assumed to be accurate and reliable as at the point of obtainment from the respective Project Owners.

Integrated Sustainable Palm Oil Complex (ISPOC) | Project Overview

To enhance value creation, sustainability, and economic development, JPG aims to integrate its palm oil operations, aligning with the Maju Johor 2030 vision and addressing global demand for responsibly produced palm oil

Project Highlights:

Concept Description	Development of a state-of-the-art complex in Pasir Logok Estate, Sedili, encompassing a specialty oils and fats refinery, palm oil mill, kernel crushing plant, animal feed mill, and R&D centre, all operating under a circular economy model powered by renewable energy

Visualisation of the Project

Project Status: Scheduled for commissioning in the Q3 of 2026

Project Location: Kota Tinggi

Project Details:

- Establish integrated facilities to streamline palm oil processing and production
- Implement renewable energy solutions utilizing biomass and biogas by-products
- Foster research and development through a dedicated centre of excellence
- Collaborate with Fuji Oil Asia Pte. Ltd. to leverage expertise in specialty fat

Implementing Agency

- Johor State Agriculture Department

Project Owner

- Johor Plantations Group

Stakeholders

- Johor Corporation Group
- Fuji Oil Asia Pte. Ltd
- Tg. Langsat Development Sdn Bhd

Investment Required (MYR mil):

FY	Public	Private
2025	-	359
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**359**

Projected Implementation Timeframe:

- Start Date: 2025
- End Date: 2030

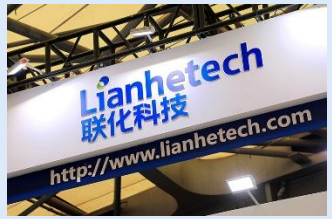
Crop Protection Project | Project Overview

Global demand for Medium Chain Triglycerides (MCTs)–widely used in food, nutraceutical, cosmetic, and pharmaceutical applications–is rising. Johor, with its palm-oil centric industrial base, is well positioned to embrace more downstream oleochemical sophistication

Project Highlights:

Concept Description	A proposed project by Apical Oils & Fats Sdn Bhd to establish a facility in Johor dedicated to producing Medium Chain Triglycerides (MCTs), derived from palm kernel oil

Visualisation of the Project



Project Status: Further input required. In November 2023, Lianhetech announced plans to invest over USD 200 million to build a new facility in Johor, Malaysia.

Project Location: Johor Bahru

Project Details:

- Product Focus: Medium Chain Triglycerides (MCTs), rich in C8 and C10 fatty acids, manufactured via fractionation or interesterification of palm kernel oil.
- Investment Type: Could be a new facility or enhancement of existing refining/oleochemical lines
- Strategic Fit: Contributes to Malaysia's push for higher-value palm-based products, enhancing industrial sophistication and export readiness
- Impact: Opens access to global markets in health, wellness, cosmetics, and pharmaceuticals by supplying premium palm-based specialty fats

Implementing Agency
- MIDA

Project Owner
- Lianhetech Malaysia Sdn Bhd

Stakeholders
- MBJB
- PTG
- Department of Environment

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

Circular Biomass | Project Overview

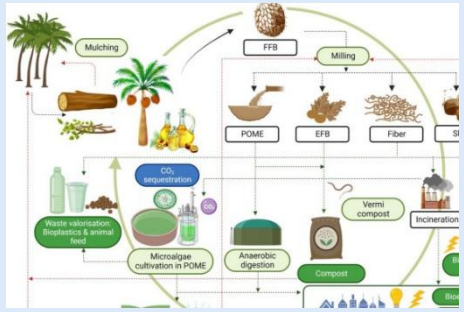
Malaysia generates over 20 million oil palm trunks (OPT) annually from replanting activities. Traditionally underutilized, these trunks present an opportunity to be transformed into high-value wood products, reducing reliance on traditional timber and promoting sustainable practices

Project Highlights:

Concept Description

Repurpose OPT into premium thermally modified palm lumber, blockboards, and engineered panels under the OnCore® brand. This initiative supports eco-friendly manufacturing and offers sustainable alternatives for the furniture and construction industries

Visualisation of the Project



Project Status: Unknown, pending input from [Project Source]

Project Location: Segamat

Project Details:

- Product Development: Manufacture of thermally modified palm lumber, blockboards, and engineered panels
- Sustainability Focus: Utilization of OPT reduces waste and lessens deforestation pressures
- Market Application: Targeting furniture, interior design, and construction sectors with sustainable wood alternatives

Implementing Agency
- Johor State Agriculture Department

Project Owner
- IOI Palm Wood Sdn. Bhd.

Stakeholders
- Majlis Perbandaran Segamat
- MPOB

Investment Required (MYR mil):

FY	Public	Private
2025	-	200
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**200**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

Integrated Coconut Processing | Project Overview

There's a growing need to enhance value addition and sustainability in the coconut industry. IOI aims to capitalize on this by developing integrated processing capabilities to meet rising domestic and international demand for coconut-based products

Project Highlights:

Concept Description	Establish an integrated coconut processing facility to produce a range of coconut-derived products, including virgin coconut oil, coconut milk, desiccated coconut, and co-products like coco coir and organic fertilizer, aligning with IOI's sustainability goals

Visualisation of the Project

Project Status: Unknown, pending input from [Project Source]

Project Location: Tangkak

Project Details:

- Product Diversification: Production of high-value coconut products such as virgin coconut oil, coconut milk, and desiccated coconut
- By-product Utilization: Processing of coconut husks and shells into co-products like coco coir, activated carbon, and organic fertilizers
- Sustainable Practices: Implementation of eco-friendly processing methods to minimize waste and environmental impact

Implementing Agency
- Johor State Agriculture, Agro-Based Industry and Rural Development Committee

Project Owner
- IOI Coconut Mill Sdn. Bhd.

Stakeholders
- Majlis Daerah Tangkak
- State Department of Agriculture

Investment Required (MYR mil):

FY	Public	Private
2025	-	100
2026	-	-
2027	-	-
2028	-	-
2029	-	-
2030	-	-
Total	**-**	**100**

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

Air Manis Agritech Development | Project Overview

The transformation of Ladang Air Manis (LAM) in Sedenak, Johor, from aging monoculture oil palm plantations into a diversified, high-tech agritech hub addresses the need for sustainable agricultural practices and economic diversification in the region

Project Highlights:

Concept Description	Development of a 2,940-acre industrial mixed-use estate focusing on high-tech manufacturing, agritech, and food-tech sectors, integrating industrial, residential, and commercial zones to foster innovation and sustainable growth

Visualisation of the Project

Project Status: Unknown, pending input from [Project Source]

Project Location: Kulai

Project Details:

- Industrial Development: Allocation of 60% of the area for industrial use, targeting high-tech manufacturing and agritech industries.
- Residential and Commercial Zones: Development of 30% residential and 10% commercial areas to support the community and workforce
- Agritech Park: Establishment of a 213-acre agritech park featuring innovation hubs, modern farming complexes, and demonstration facilities for advanced agricultural practices

Implementing Agency
- Johor State Agriculture, Agro-Based Industry and Rural Development Committee

Project Owner
- Southern Catalyst Sdn Bhd.

Stakeholders
- Majlis Daerah Kulai
- State Department of Agriculture

Investment Required (MYR mil):

FY	Public	Private
2025	*Information not disclosed for confidentiality reasons*	
2026		
2027		
2028		
2029		
2030		
Total	-	-

Projected Implementation Timeframe:
- Start Date: 2025
- End Date: 2030

Thank You .