

JICA ENERGY POLICY | 2026

Malaysia Country Report

Edmund Foo Sze Kai

June 2026



1. General Information: Country Profile & Economic Indicators

Country Profile

 **Governance**
Parliamentary Democracy
& Constitutional Monarchy

 **Geography**
330,345 sq. km in
equatorial climate zone

 **Divisions**
13 States & 3 Federal
Territories (KL, Labuan,
Putrajaya)

 **Biodiversity**
Megadiverse country with
extensive rainforests and
coastal ecosystems

Macroeconomics

 **Population (2025)**
34.2 Million
(Avg. HH Size: 3.7)

 **Real GDP (2025)**
RM 1,737.0 Billion

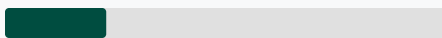
 **Real GDP (2024)**
RM 1,651.9 Billion

 **Growth Rate**
Sustained 5.2% expansion
(2024-2025)

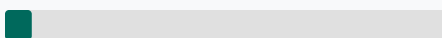
Sector Breakdown Real (GDP 2025)



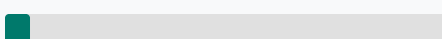
Services: 59.5%
Primary Economic Driver



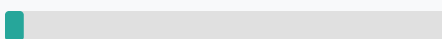
Manufacturing: 23.0%



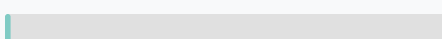
Agriculture: 6.1%



Mining & Quarrying: 5.7%



Construction: 4.3%



Import Duties: 1.3%

Sources: Current Population Estimates, Malaysia, 2025; Gross Domestic Product (GDP) 2015-2025; The Malaysian Economy in Figures 2024; Malaysia First Biennial Transparency Report (BTR1)

1. General Information: Organizational Structure Related to Energy

Key Energy-Related Ministries

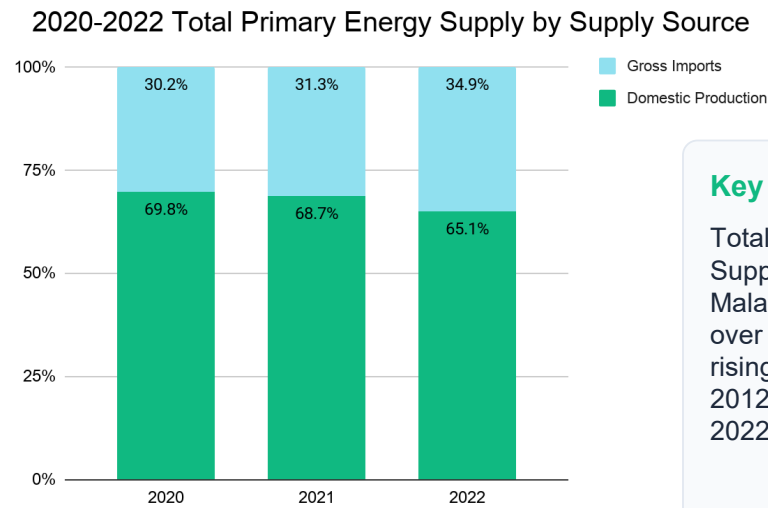
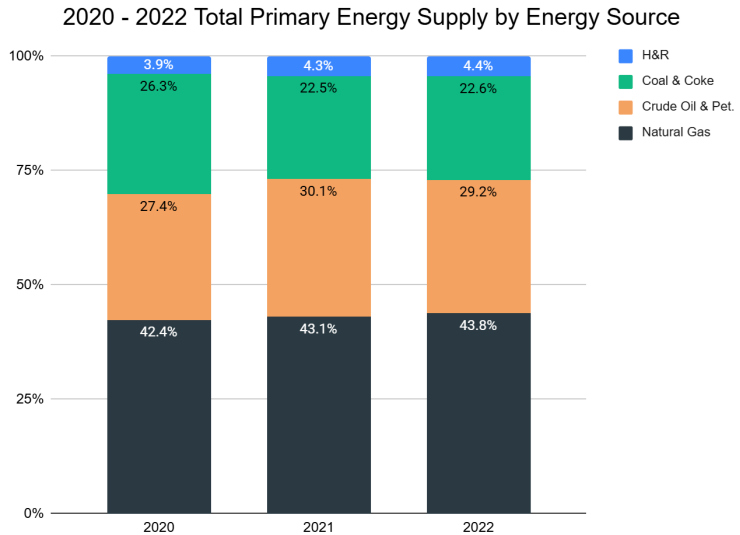
Ministries with direct energy-related responsibilities			
 Ministry of Economy	 Ministry of Energy Transition and Water Transformation	 Ministry of Plantation and Commodities (KPK)	 Ministry of Domestic Trade and Cost of Living (KPDN)
Ministries related to key final energy demand sectors		Cross-cutting influence	State-specific entities
 Ministry of Transport (MOT)	 Ministry of Housing and Local Government (KPKT)	 Ministry of Finance (MOF)	 State Economic Planning Unit (UPEN) Sabah
 Ministry of Investment, Trade and Industry (MITI)	 Ministry of Rural and Regional Development (KKDW)	 Ministry of Natural Resources and Environmental Sustainability (NRES)	 State Economic Planning Unit (UPEN) Sarawak
 Federal Territories Department (JWP)	 Ministry of Agriculture and Food Security	 Ministry of Science, Technology, and Innovation (MOSTI)	 Ministry of Utility and Telecommunication (Sarawak)
			 Ministry of Energy and Environmental Sustainability (MEESTy) Sarawak

Key Energy-Related Organisations

Power-related	Oil and gas-related	Cross-cutting influence	Electricity and piped gas
 Single Buyer (SB)	 Malaysia Petroleum Resources Corporation (MPRC)	 Malaysian Green Technology and Climate Change Corporation (MGTC)	 Suruhanjaya Tenaga Energy Commission (ST)
 Grid System Operator (GSO)		 Malaysian Investment Development Authority (MIDA)	
	Renewable Energy related		Upstream Oil and Gas
 MyPOWER CORPORATION	 Sustainable Energy Development Authority (SEDA)	 Malaysia Automotive, Robotics and IoT Institute (MARii)	 PETRONAS



2. Past Energy Demand and Supply: Primary Energy Supply by Supply Source and by Energy Source



Key Takeaway

Total Primary Energy Supply (TPES) in Malaysia **grew by 22.8%** over the past decade, rising from 85,124 ktoe in 2012 to 104,566 ktoe in 2022.

Table 1: TPES by Energy Source (ktoe)

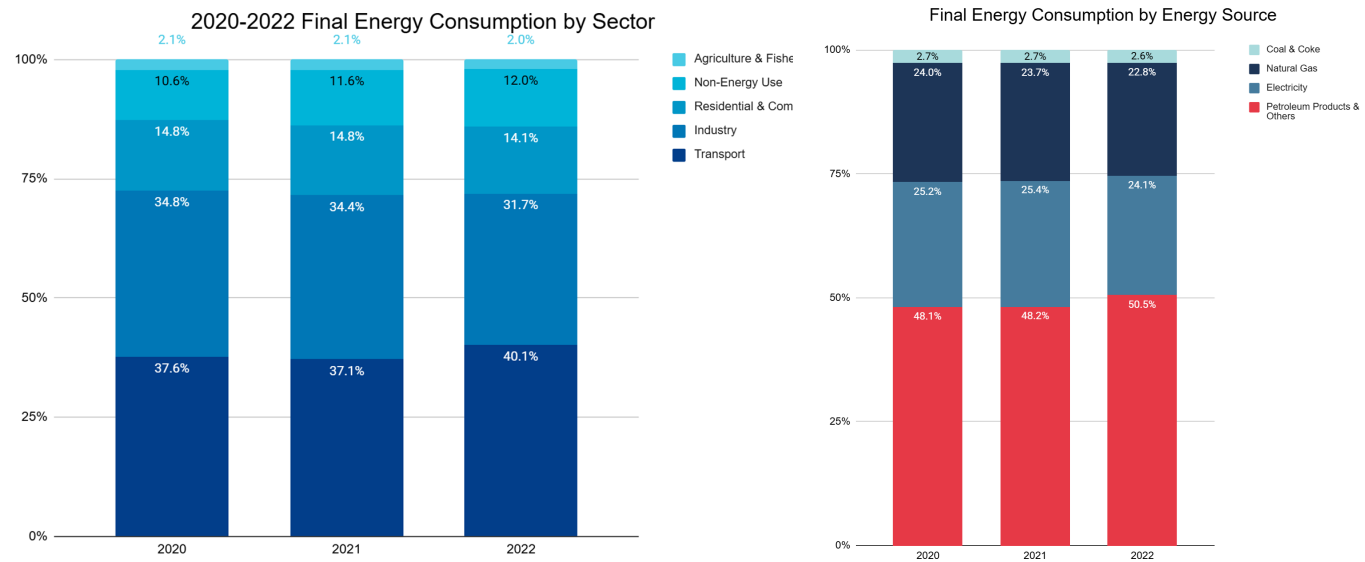
Year	Natural Gas	Crude Oil & Pet	Coal & Coke	RE
2020	39,939	25,773	24,788	3,693
2021	42,296	25,251	22,917	3,937
2022	45,834	30,483	23,655	4,594

Table 2: TPES by Supply Source (ktoe)

Year	Production	Gross Imports	Gross Exports
2020	91,245	39,442	43,117
2021	93,212	42,431	44,154
2022	111,382	59,696	53,162

Source: National Energy Balance 2022.

2. Past Energy Demand and Supply: Final Energy Consumption (FEC) by Sector and by Energy Source



Key Takeaway

Post-pandemic recovery drove a significant increase in **Transport demand**, which now accounts for **40.1%** of national consumption.

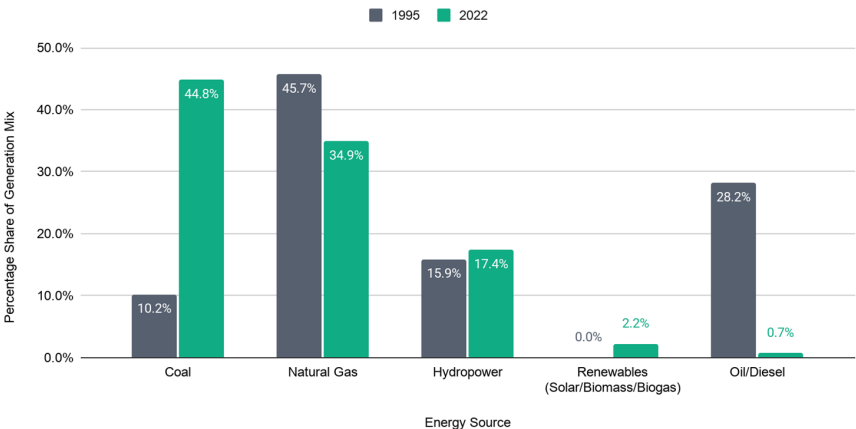
Table 3: FEC by Economic Sector (ktoe)					
Year	Transport	Industry Res. & Comm.	Non-Energy	Agri.	
2020	18,660	17,714	8,123	11,805	867
2021	18,095	19,157	8,084	10,869	1,045
2022	24,091	19,033	8,498	7,183	1,215

Table 4: FEC by Final Energy Source (ktoe)				
Year	Petroleum Prod.	Electricity	Natural Gas	Coal & Coke
2020	21,600	13,100	16,631	1,338
2021	24,731	13,311	17,815	1,392
2022	30,331	14,465	13,670	1,553

Source: National Energy Balance 2022.

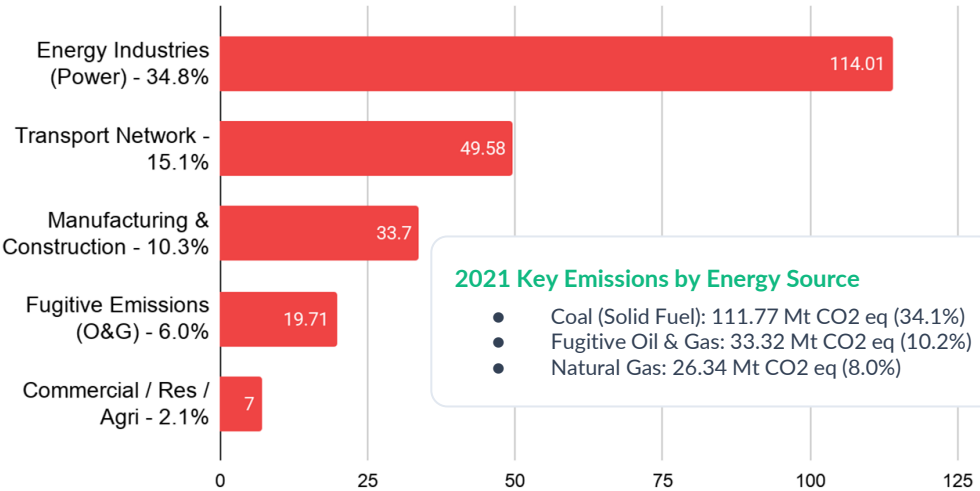
2. Past Energy Demand and Supply: Electricity Generation by Energy Source and CO2 Emission by Sector

1995 vs 2022 Electricity Generation by Energy Source



Energy Source	1995 Output (GWh)	2022 Output (GWh)
Coal	3,960	82,217
Natural Gas	17,741	64,048
Hydropower	6,172	31,932
Oil / Diesel	10,947	1,285
Renewables (Solar/Biomass)	0	4,037
TOTAL GRID MIX	38,820	183,520

CO2 Emission by Sector (Mt CO2 eq) 2021



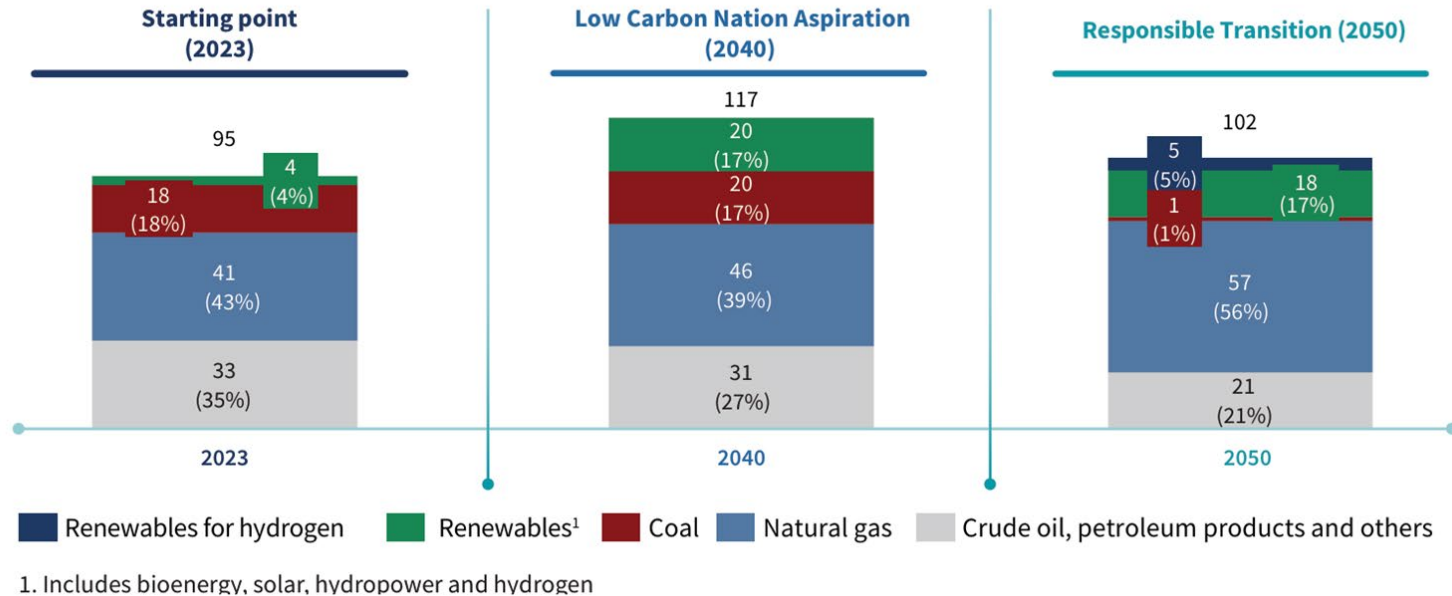
2021 Key Emissions by Energy Source

- Coal (Solid Fuel): 111.77 Mt CO2 eq (34.1%)
- Fugitive Oil & Gas: 33.32 Mt CO2 eq (10.2%)
- Natural Gas: 26.34 Mt CO2 eq (8.0%)

Strategic Insight: Over a 27-year period, Malaysia's grid generation expanded by 4.7 times (growing by 144,700 GWh). To feed this massive surge in demand, Oil was almost entirely phased out while Coal was scaled up to become the dominant baseload engine.

3. Outlook of Energy Demand and Supply: Primary Energy Supply by Energy Source

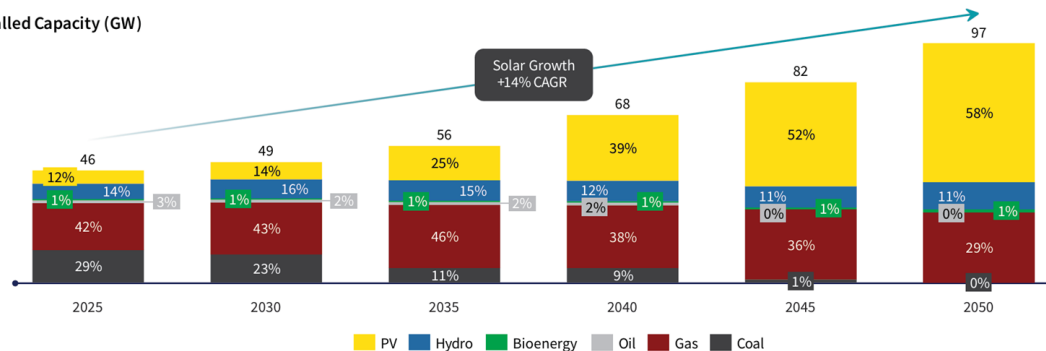
Total Primary Energy Supply (Mtoe), by energy source



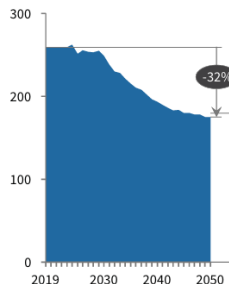
Net Importer Transition: Malaysia is projected to transition to a **net importer of natural gas** by the early 2030s (2030-2033).

3. Outlook of Energy Demand and Supply: Electricity Generation by Energy Source & CO₂ Emission by Sector and Energy Source

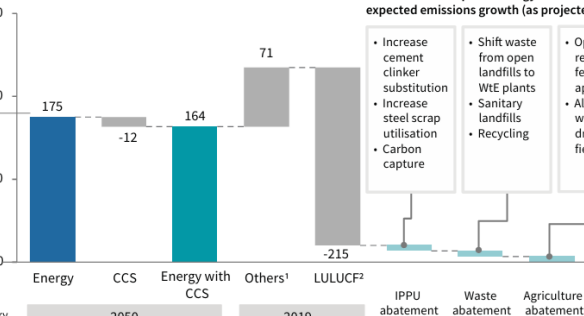
Installed Capacity (GW)



Projected GHG Emissions, 2023 - 2050 (MtCO₂eq)



Projected GHG Emissions, 2050 (MtCO₂eq)



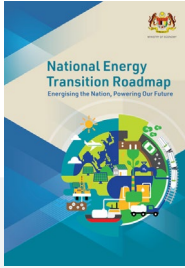
Note: Emissions pathway is estimated by multiplying primary fuel source in TPES to emissions factor by primary source. The emissions factor is sourced from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. The objective of this method is to provide directional guidance on policy decisions and is not intended as a submission to UNFCCC nor any other international bodies.

1. Includes IPPU (industrial processes and product use), waste and agriculture
2. LULUCF = land use, land-use change and forestry

Sector and Key Driver		2040 DTN Low Carbon Nation Asp.	2050 NETR Responsible Transition
EE Energy Efficiency	Industry and Commercial energy efficiency savings (%)	11%	23%
	Residential energy efficiency savings (%)	10%	20%
RE Renewable energy	Coal share of installed capacity (%)	19%	0%
	RE share of installed capacity (%)	41%	70%
HY 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
BI Bioenergy	Biofuel capacity (billion litres)	N/A	3.5
	Bioenergy power generation (GW)	N/A	1.4
GM Green Mobility	Urban public transport modal share (%)	50%	60%
	xEV (4W) share of fleet (%)	38%	80%
	E2W share of fleet (%)	N/A	80%
	Light vehicle fuel economy	N/A	~30%
	Heavy transport fuel economy	N/A	~24%
	Biofuel blending for heavy transport (%)	B30	B30
	Hydrogen penetration for heavy transport (%)	N/A	5%
	LNG penetration as alternative fuel in marine transport (%)	25%	N/A
	Green fuel penetration in marine transport (%)	N/A	40%
	SAF blending mandate by 2050 (%)	N/A	47%
CC CCUS	Number of CCUS clusters (#)	N/A	3-6
	CO ₂ storage capacity (Mtpa)	N/A	40-80

4.1 Current Energy Policy Measures

Energy Transition Roadmap, Regulatory Mandates, and Market Integration



National Energy Transition Roadmap (NETR)

Core Strategy: Malaysia's primary structural framework to transition from a traditional fossil-fuel economy to a high-value green economy.

The 6 Levers: Drives decarbonisation through 6 technology levers and 10 flagship catalyst projects.

Target 1: 70% RE installed capacity share by 2050

Target 2: No new coal power plant



UNDANG-UNDANG MALAYSIA

Akta 861

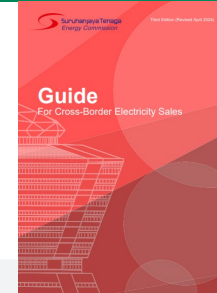
AKTA KECEKAPAN DAN KONSERVASI
TENAGA 2024

Energy Efficiency & Conservation Act (EECA) 2024

Mandatory Compliance: Effective Jan 1, 2025, making efficiency compliance legally binding.

Targeting Heavy Users: Mandates audits and Registered Energy Managers (REMs) for high-intensity consumers.

Energy Savings Goals: Regulatory tools to deliver 21% savings by 2040 and 22% by 2050.



Grid Reforms & The ASEAN Power Grid (APG)

Managing Intermittency: Prioritizes regional integration via APG to absorb intermittent solar power required by 2050.

The ENEGEM Exchange Platform: Leverages the Energy Exchange Malaysia (ENEGEM) hub to conduct cross-border green electricity transactions.

CRESS Grid Access: Allows corporations to buy green electricity directly from private renewable energy developers via open third-party grid access.

4.2 Major Difficulties and Bottlenecks Currently Faced in Formulating Energy Policies



Energy Security

- **Challenge:** Managing grid stability as coal is replaced by intermittent solar power and natural gas.
- **Requirement:** Capital-intensive upgrades to the power grid and BESS.
- **Risk:** Mitigating reliance on gas imports.



Energy Affordability

- **Funding Gap:** Financing a RM1.2–RM1.3 trillion national energy transformation by 2050.
- **Subsidy Reform:** Transitioning from blanket subsidies to targeted support.
- **Social Protection:** Ensuring affordability for low-income households and local businesses.



Energy Sustainability

- **Net-Zero 2050:** Driving aggressive carbon reduction and transport electrification.
- **"Just Transition":** Protecting vulnerable communities from socioeconomic fallout.
- **Workforce Evolution:** Retraining workers displaced from fossil-fuel sectors.

5. Subjects that I would like to learn and expectation of my superior

Ministry Expectations

Electricity Market Mechanics

Learn from Japan's energy policies and specifically the mechanics and operations of the Electricity Market.

Cost Optimization

Learn how Japan balances its energy transition with "economic viability" to keep electricity costs manageable for end-users.

Personal Expectations

Global Policy Exchange

Learn and understand the current energy situations and policies of Japan and participating countries, clarifying shared challenges.

Mastering Data & Forecasting

Participate in workshops for practical methods of projecting demand, statistical analysis, and formulating accurate energy balances.

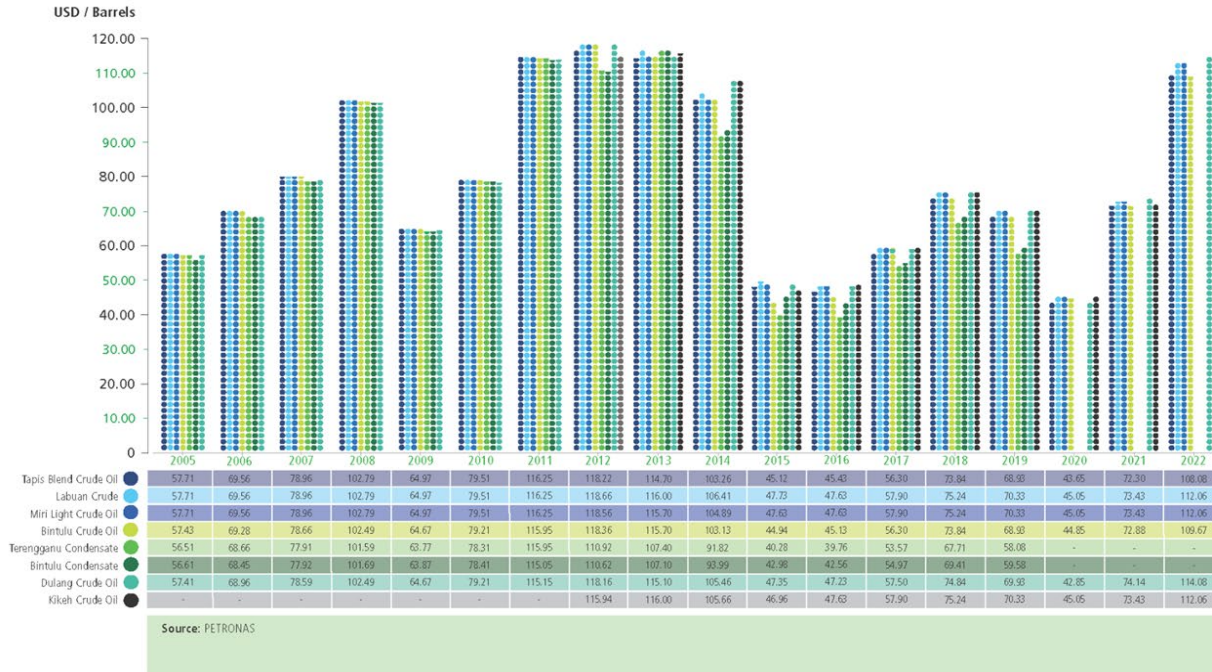
Strategic Goal: To translate these direct learnings—particularly regarding market structures and demand forecasting—into actionable, evidence-based policy recommendations for the Malaysian context.

Thank You
ありがとうございます
Terima Kasih

June 2025



Figure 11: Official Selling Prices of Malaysian Crude Oil



Source: National Energy
Balance 2022.

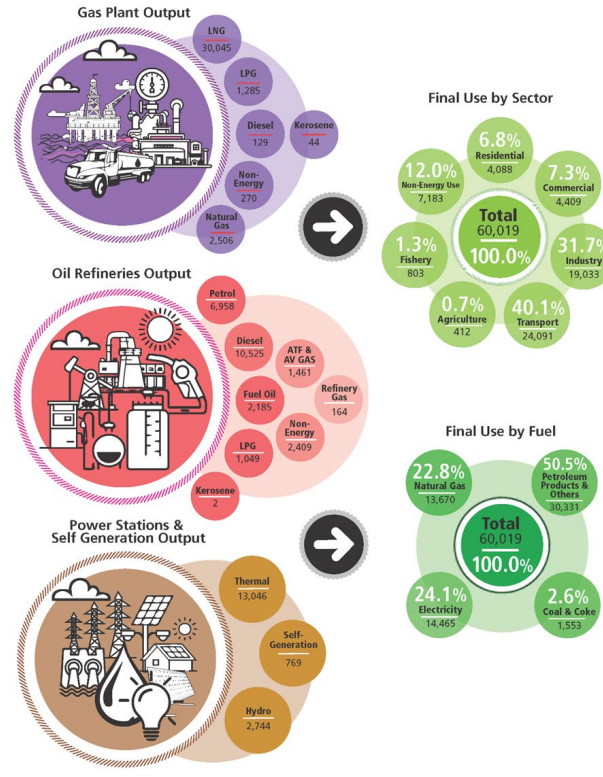
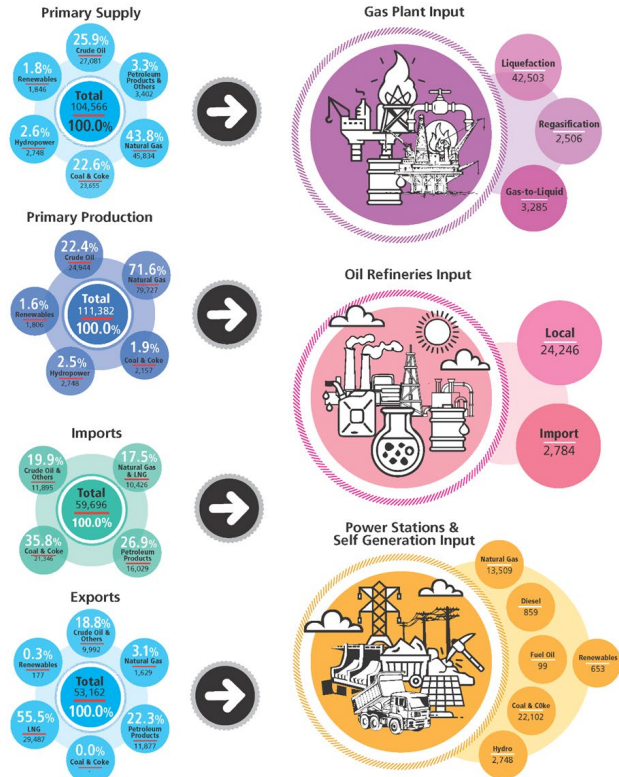
ENERGY FLOW CHART

All units in the Energy Flow Chart are in ktoe

PRIMARY SUPPLY

TRANSFORMATION

FINAL USE



Note*: Primary Supply = Primary Production - Flaring + Imports - Exports - Bunkers (+ -) Stock Change (+ -) Statistical Discrepancy

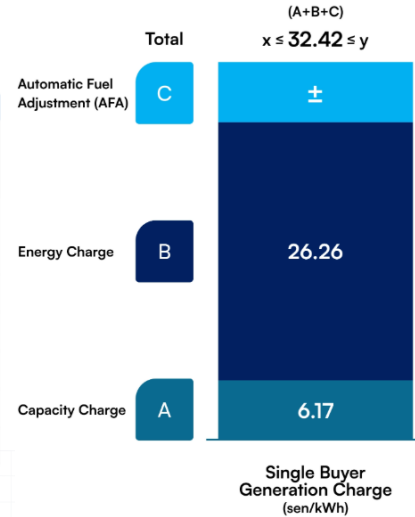
Source: National Energy Balance 2022.

The Automatic Fuel Adjustment (AFA) mechanism is expected to better manage the fuel price volatility

AFA mechanism promotes more transparency, cost-reflective, cost-efficient and reduce the timing gap in fuel price and foreign currency exchange.

	Imbalance Cost Pass-Through (ICPT)	Automatic Fuel Adjustment (AFA)
Imbalanced Cost		
Adjustment Mechanism	ICPT (±) Generation Charge	AFA (±) Generation Charge
Frequency	6-monthly	Every Month
Price Signal	Weak	Strong
Bill Impact	Significant bill shock	Low bill shock
Approval	Approved by the minister	Automatic Adjustment : ≤ 10% threshold of prevailing Generation Charge Government Approval : > 10% threshold of prevailing Generation Charge
Exemption	No	Domestic consumers who use ≤ 600kWh/month

Monthly fuel adjustment to better reflect current fuel prices



AFA is the monthly adjustment to reflect the changes in the variable component of the Energy Charge

3 major market factors that affects our Energy Charge

1. Market Coal Price (USD/MT)
2. Market LNG price (RM/mmBTU)
3. Foreign exchange rate (RM/USD)

Capacity Charge represents the cost incurred to secure the capacity needed from generators to ensure the reliability and security of the grid system

System Generation and Demand for 2025

Highest Demand
Recorded

21,049 MW

28 May 2025

Highest Energy
Recorded

442,167 MWh

Installed
Capacity

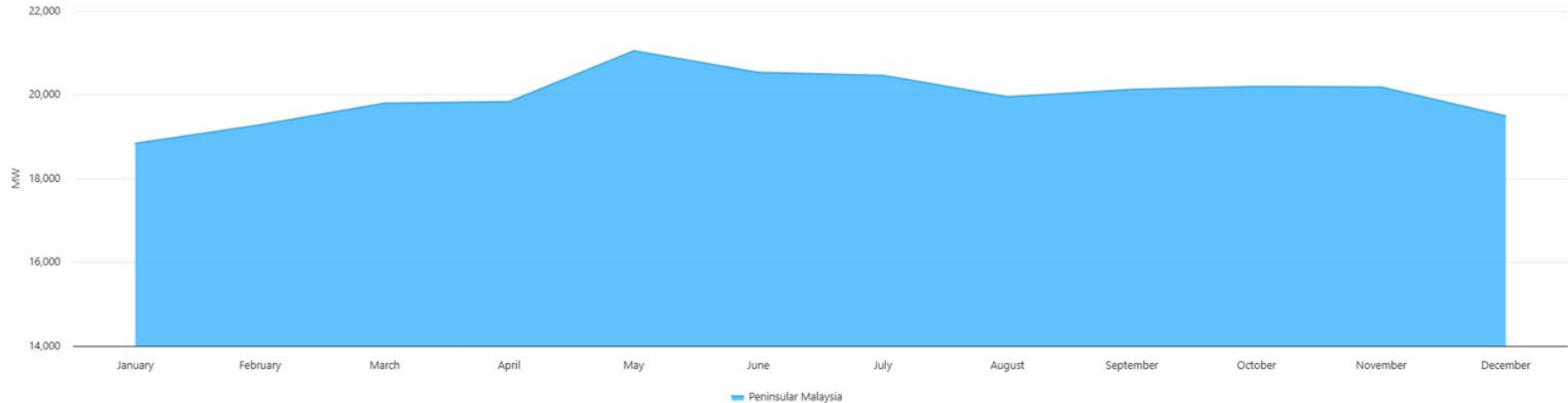
27,333 MW

Reserved
Margin

29%

For more info, visit: www.gso.org.my

Highest System Demand Profile for Peninsular Malaysia for 2025





20,285 MW

Wednesday,
3 Jun 2026 @ 15:30

Current Grid Demand



22,168 MW

Wednesday,
3 Jun 2026 @ 15:30

Current System Demand



21,469 MW

Thursday,
23 Apr 2026 @ 20:30

Highest Grid Demand Recorded



450,392 MWh

Wednesday,
20 May 2026

Highest Energy Recorded



2,842 MW

Wednesday,
3 Jun 2026 @ 15:30

Current Solar Generation

Solar Profile



0 MW

Wednesday,
3 Jun 2026 @ 15:00

Cross-Border Power Exchange

CBPE Profile

SYSTEM DEMAND PROFILE FOR PENINSULAR MALAYSIA

Wednesday, 3 June 2026

