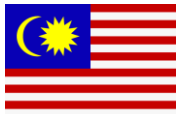
ASEANのエネルギー分野の現状・関連動向に係る調査 – 定点調査業務2025

報告書 – マレーシア



新エネルギー・産業技術総合開発機構
New Energy and Industrial Technology Development Organization

ARTHUR D LITTLE

調査項目

1. エネルギー構成・政策・監督機関
- a. 国全体のエネルギー構成
- b. エネルギー政策（マスタープラン、化石燃料選択、再生可能エネ導入予定等）
- c. エネルギー政策に係る省庁および規制当局

2. 化石エネルギー
- a. 石油、石炭、天然ガスの国内需給率と今後の予測
- b. 石油、石炭、天然ガスの輸出入先
- c. 主な油田、石炭鉱山、天然ガス田のマッピング、産出量、開発／運営事業者名
- d. 今後数年以内に開発が開始される主な油田、石炭鉱山、天然ガス田のマッピング、四総産出量、開発／運営事業者名
- e. 石炭火力発電の導入状況及び今後の導入方針
- f. 石油、石炭、天然ガスの国内販売価格

3. パイプライン（ガス・石油）
- a. 規定する法律と内容
- b. 主なガス・石油パイプライン網のマップピング、各輸送量、開発・運営事業者名
- c. 今後の政策とそれを規定する法律

4. 次世代・再生可能エネルギー
- a. 太陽、風力、地熱、バイオマス、水力、水素等の構成割合
- b. 主な太陽光、風力、地熱、水力発電事業場所のリスト（特に水力は揚水/自流/貯水式、可変式の有無情報も）とマッピング、開発者／運営事業者名
- c. 現状のバイオマス燃料の利用状況と今後の予測
- d. CCUS関連政府・民間の最新動向、主なCO2排出源、CCS貯留ポテンシャル
- e. COP30に向けたCN関連政策・技術動向（ブルーカーボン、e-fuelなど）
- f. 原子力（含むSMR）関連政府・民間の最新動向
- g. 省エネ関連政府目標および政策・制度

5. 発電事業者
- a. 参入条件を規定する法律と内容
- b. 発電事業者名とその法人形態（国営、株式会社等）、参入予定事業者名
- c. 電力自由化状況（発電、送電、配電の独占状況）
- d. 各事業者の発電量シェア
- e. 事業者に対する国からの補助金状況

6. 発電所
- a. 稼働中の主な発電所のマッピング
- b. 当該発電所の種別（石油火力、石炭火力、ガス火力等）、事業主体のリスト
- c. 発電所建設に係る問題点（土地収用の状況、地域住民のコンセンサス、燃料の調達等）整理
- d. 判明している発電所建設計画のマッピング

7. 電力品質
- a. 規定する法律と内容
- b. 電力品質の現状（停電、瞬低、電圧変動状況等）
- c. 電力品質向上に向けた主な取組状況（関連政策及び具体的事業名）

8. 送電網
- a. 規定する法律と内容
- b. 超超高電圧（UHV、500kV）・超高圧（EHV、220-275kV）・それ以下の主な送電網のマップ表示
- c. 今後の政策とそれを規定する法律
- d. 予定されている主な送電線敷設事業名

9. 電力料金
- a. 現状とそれを規定する法律
- b. 補助金投入状況
- c. 当該国での特殊事情
- d. 再生可能エネFITに関する動向

10. 電力需給状況
- a. 電力供給状況と需要状況（逼迫度）

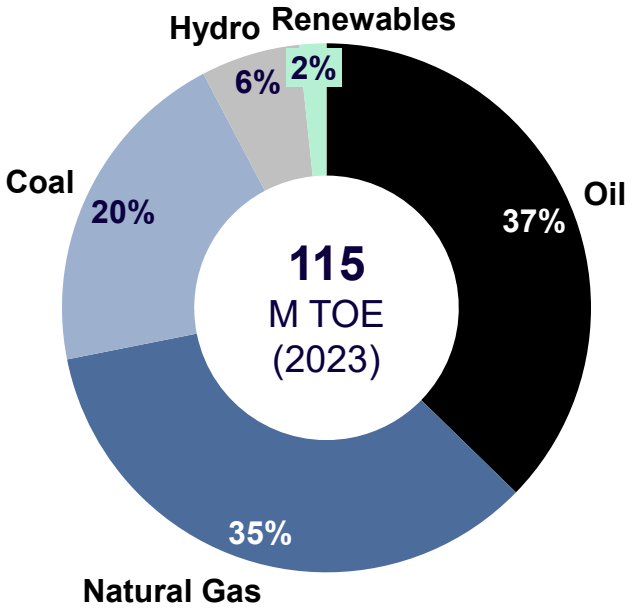
Contents

年々水力/再生可能エネルギーの比率は向上しているが、依然として90%以上は、石油/天然ガス/石炭が占める

Primary Energy Consumption
(by Source of Energy at 2023)

- Malaysia's primary energy demand reached 4.81 exajoules[1] in 2023 with 92% from fossil fuels primarily oil and natural gas

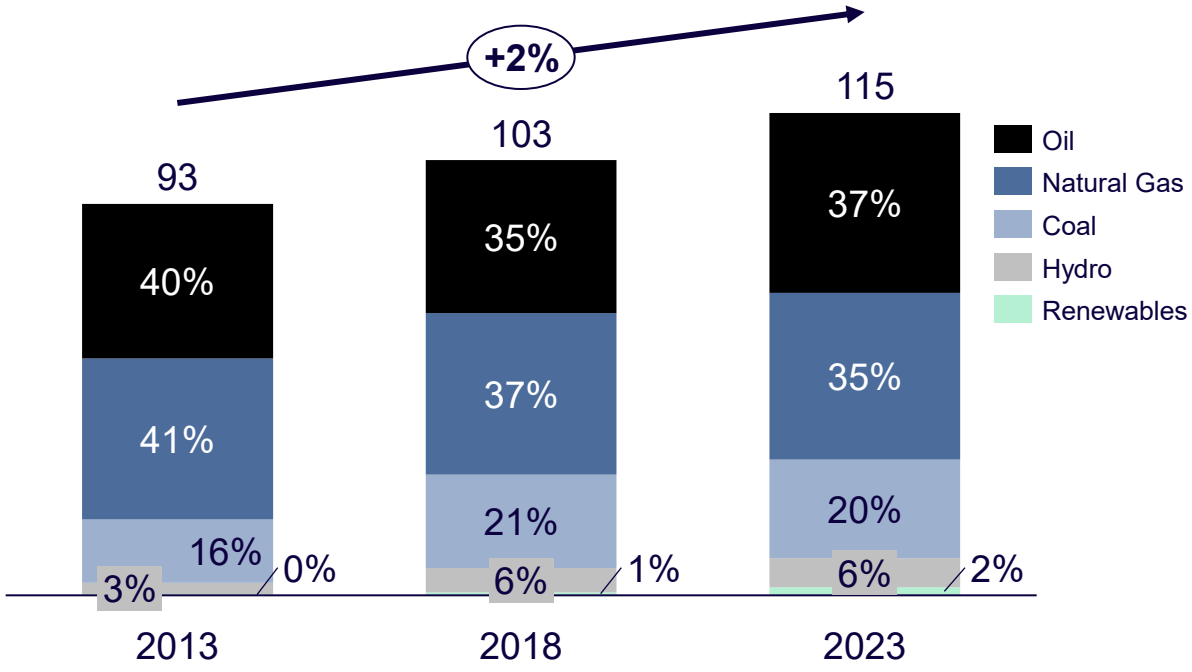
Unit: M TOE



Historical Primary Energy Consumption
(by Source of Energy)

- Fossil fuels continued to dominate Malaysia's growing energy demand from 2013 to 2023, with limited progress in renewables

Unit: M TOE



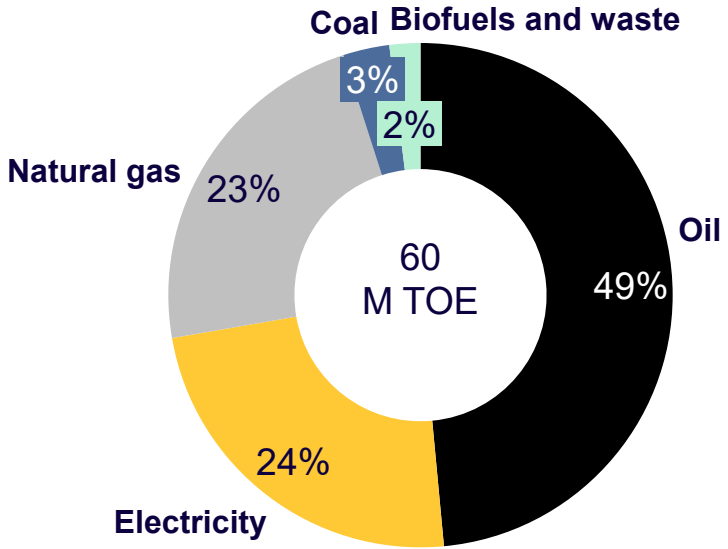
Source：EI Statistical Review of World Energy 2024
Note: 1) 1 EJ is equivalent to 23.88 MTOE

最終エネルギー消費の内訳としてソース別には石油、天然ガス、電力が全体の大部分を占めており、部門別には輸送部門と工業部門が全体の7割を占めている

Final Energy Consumption (by Source of Energy at 2022)

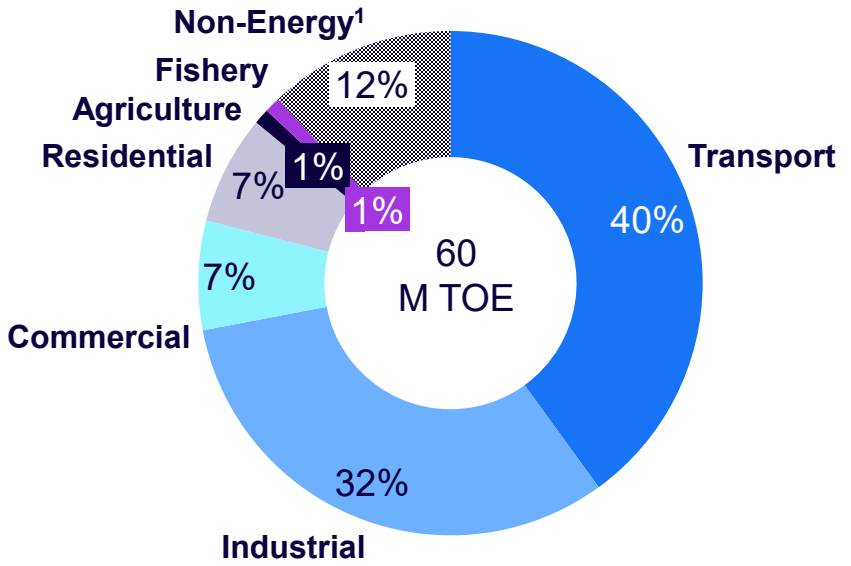
- The total final energy consumption in 2022 was 60 MTOE, with oil as the dominant energy source, accounting for 49% of the energy mix

Unit: M TOE



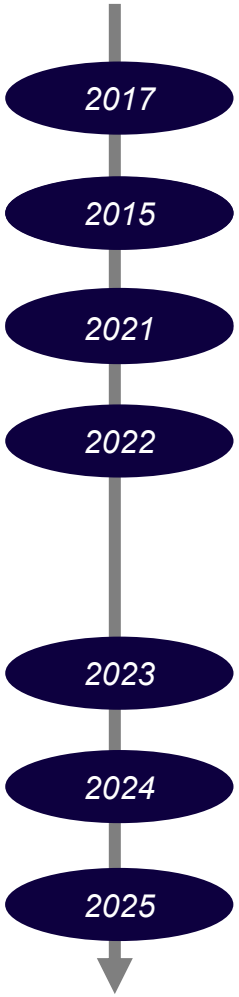
Final Energy Consumption (by Sector at 2022)

- Oil is the dominant energy source in the transport and fishing sectors, while electricity accounted for the largest share of consumption in the residential, commercial, and industry sectors



1) It covers energy products that are used as a raw material, rather than burned or consumed strictly to produce energy/heat. For example, natural gas used as feedstock for chemical manufacturing, or oil refined into petrochemical products
Source：Malaysia Energy Commission 2024

2023年以降、国家エネルギー転換ロードマップや省エネ法案、13次国家計画が公表された

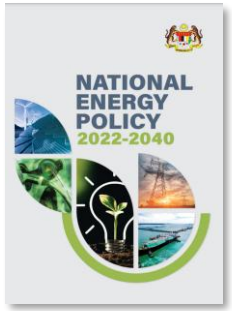


政策	政策概要
green technology master plan (GTMP)	■ It calls for the introduction of key environmental technologies into development projects in six carbon-intensive sectors, including energy. ■ Renewable energy targets (capacity basis): 2020: 20%, 2025: 23%, 2030: 30%
The 12th Malaysia Plan	■ Carbon neutrality target by 2050 with several new instruments e.g. carbon pricing and energy trading system (ETS) in addition to GHG emission reduction plan
Peninsular Malaysia Generation Development Plan (2021-2039)	■ Increase renewable energy installed capacity target in power generation to 31% by 2025 with focus on large scale hydro and solar
National Energy Policy	■ Comprehensive national energy policy in response to 12th Malaysia Plan and NDC with concrete policy ■ Set national direction to achieve a low-carbon energy system by 2050, with strategies focused on energy security, economic resilience, and environmental sustainability
Corporate Green Power Programme (CGPP)	■ Enable corporates in Peninsular Malaysia to buy solar RE via VPPAs while remaining on the utility grid ■ Quota of 800MW (originally 600MW); applies to new solar plants (5–30MW), with BESS encouraged ■ Aim to scale corporate RE adoption, align with ESG goals, and foster clean energy uptake by 2025
National Energy Transition Roadmap	■ Launched to guide Malaysia's net-zero transition by 2050 through 6 levers: EE, RE, hydrogen, bioenergy, green mobility, and CCUS ■ Set RE targets: 31% by 2025, 40% by 2035, 70% by 2050; phase out coal and scale up green investments
Energy Efficiency and Conservation Act (EECA)	■ Fully replace the EMEER 2008 (previous framework), which was repealed on January 1, 2025. ■ Support 2050 carbon neutrality and is enforced from Jan 2025 to regulate energy efficiency for high-energy users (>21,600 GJ/year), buildings, and products ■ Require Registered Energy Managers, EMS, audits, MEPS, reporting, and energy intensity labels
The 13th Malaysia Plan	■ The 13MP raises Malaysia's renewable energy share target to 35% of total installed capacity by 2030, up from 29%, backed by initiatives spanning solar, hydrogen, and waste-to-energy projects ■ The 13MP marks the revival of Malaysia's nuclear energy ambitions, targeting operational deployment by 2031

Source: Christopher & Lee Ong, Client Update: Malaysia, 2022, National Energy Transition Roadmap, Energy Efficiency and Conservation Act, The 13th Malaysia Plan

2022年に導入された国家エネルギー政策（DTN）は、その後に策定された各種政策やプログラムの包括的な枠組みとして機能

National Energy Policy 2022-2040(DTN)



Timing		2022 – 2040（2022年9月発行）
Vision		The National Energy Policy (DTN) in Malaysia aims to transition to a low-carbon future by 2040, **positioning Malaysia's energy sector as a catalyst for economic growth**, social equity, and environmental sustainability through a low-carbon transition
Key Notes	Key Targets by 2040	• **RE** in primary energy mix: increase to **17%** • **EV penetration:** 38% (from <1%) • No new coal plants • **CO_2 emissions**: -45% GHG intensity by 2030 (vs. 2005)
	Short Term Focus	• Malaysia has implemented the **Energy Efficiency and Conservation Act (EECA),** mandating energy audits, performance standards, and penalties for non-compliance • The government aims to **attract investments and scale low-carbon technologies**
	Energy-Related Benefits	• Reduce reliance on energy imports and **promotes fuel diversification**, enhancing energy independence • **Improve energy access in rural areas**, ensuring a wider reach of energy services. • **Contribute to lower CO_2 emissions** through increased renewable energy (RE) integration into the energy mix

Source：12th Malaysia Plan, National Energy Policy 2022-2040

国家エネルギー政策（DTN）の主要目標である「Low Carbon Nation Aspiration 2040」において、石炭比率の引き下げ再エネ設備容量の引き上げなどを掲げた

Low Carbon Nation Aspiration 2040

Selected targets on Low Carbon Nation Aspiration 2040 compared to 2018

Selected Targets	2018	Low Carbon Nation Aspiration 2040
1. Percentage of urban public transport modal share	20%	50%
2. Percentage of electric vehicle (EV) share	<1%	38%
3. Alternative fuel standard for heavy transport	B5	B30
4. Percentage of Liquefied Natural Gas (LNG) as alternative fuel for marine transport	0%	25%
5. Percentage of industrial and commercial energy efficiency savings	<1%	11%
6. Percentage of residential energy efficiency savings	<1%	10%
7. Total installed capacity of RE	7,597 MW	18,431 MW
8. Percentage of coal in installed capacity	31.4%	18.6%
9. Percentage of RE in TPES	7.2%	17%

Legend: Energy security, Energy affordability, Environmental sustainability

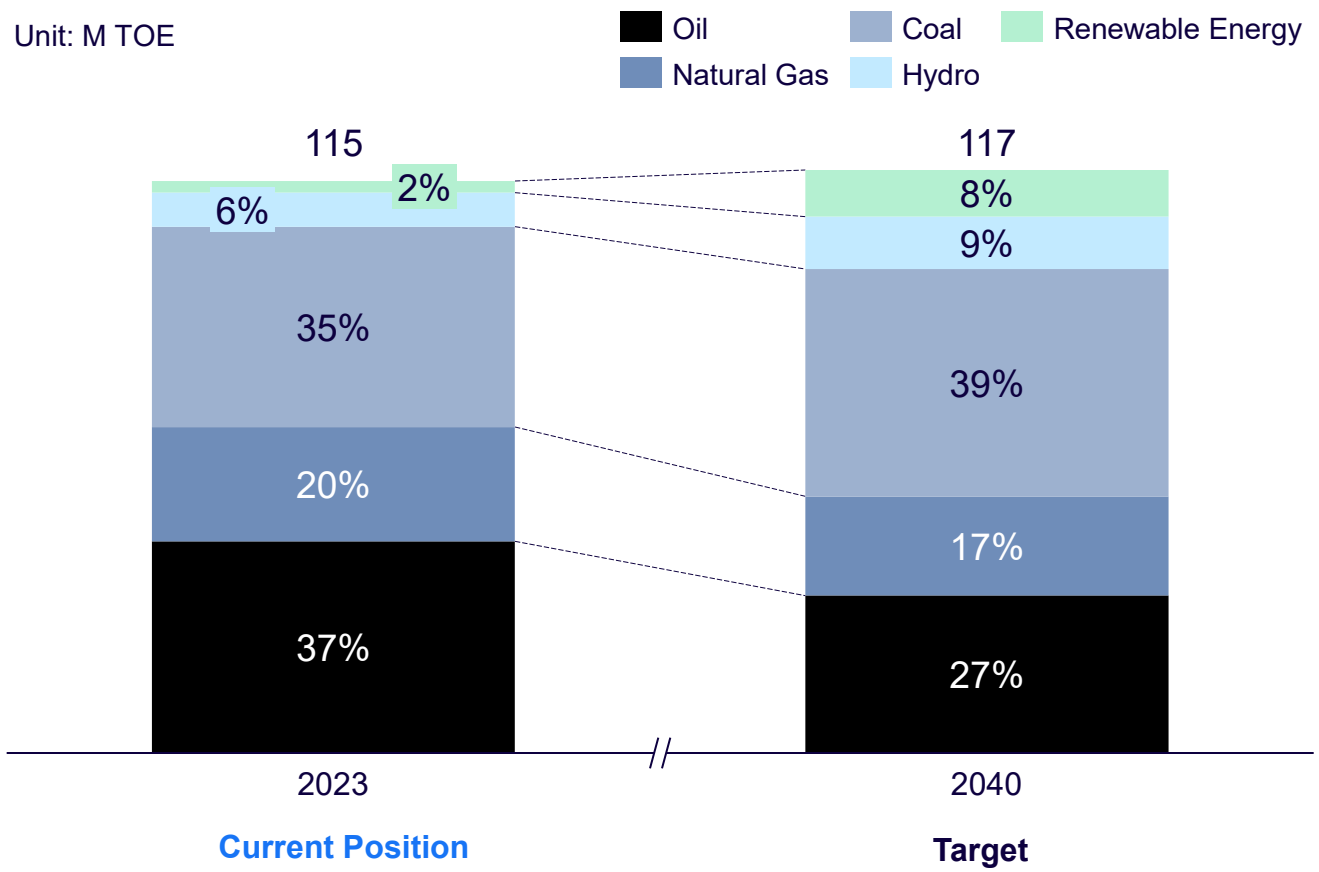
Comment

- It targets a higher level of urban public transport modal share, electric vehicle (EV) penetration, share of alternative lower carbon fuels in heavy vehicles and marine transport and enhanced energy efficiency in industrial and commercial as well as residential sectors.
- **In addition, the Aspiration entails a higher level of RE penetration in the installed capacity and total primary energy supply (TPES), with no new coal power plant.**

Source：12th Malaysia Plan, National Energy Policy 2022-2040

国家エネルギー戦略において、2040年までに1次エネルギー構成比率の17%を再エネ(RE 8%+Hydro9%)に転換することを宣言

Primary Energy Mix Target



Comments

- The **National Energy Policy (2022-2040)** in Malaysia aims to reduce reliance on fossil fuels and promote renewable energy sources
- The target is to increase the shares of solar, bioenergy, and hydropower to 4%, 4%, and 9% respectively by 2040
- To achieve this, the government has implemented policies including:
  - Long-term pipeline of **large-scale solar (LSS)** projects for domestic energy self-sufficiency and environmental sustainability.
  - **Improved use of bioenergy for power generation**, including biomass and biogas plants, with a focus on waste-to-energy projects to support cost-effective rural electrification.
  - Support for **the promotion of electric vehicles (EVs)** through investments, financing, and capability building to enhance local EV manufacturing and supply chain ecosystem.

Source： EI Statistical Review of World Energy 2024, National Energy Policy (2022-2040)

EECAは、大規模エネルギー使用者、建物所有者、製造業者に対して、全国的なエネルギー効率の向上を図るための義務的要件を定めている

Energy Efficiency and Conservation Act (EECA)

Policy Context

- **Published on 26 November 2024 and came into effect on 1 January 2025**, aiming to reduce energy waste and improve energy efficiency across Malaysia.
- The Act applies to **large energy users**, **selected buildings**, and **energy-using products** (e.g., Air conditioners, refrigerators) in Peninsular Malaysia and Labuan.

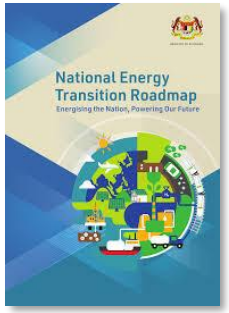
Compliance Obligations by Target Audience

Large Energy Users	Selected Building Owners	Manufacturers and Importers of Energy-Using Products
• Appoint a **Registered Energy Manager (REM)** • Develop and implement an **Energy Management System** • **Submit annual reports** on energy use and efficiency • **Conduct energy audits** regularly using certified auditors	• Apply for and display an **Energy Intensity Label** • **Meet minimum performance standards**, or submit an Energy Efficiency Improvement Plan if they fall short	• Register with the Energy Commission • Obtain **energy efficiency certificates and labels** • Comply with **Minimum Energy Performance Standards** • Comply with **national Building Energy Intensity (BEI) Labelling that is star-rated.**

Source：Energy Efficiency and Conservation Act 2024, Suruhanjaya Tenaga (Energy Commission of Malaysia)

2023年発表のNETRは、2050年に向けたエネルギー転換の道筋を示し、低炭素技術の拡大と脱化石燃料の目標を掲げている

National Energy Transition Roadmap (NETR)



Timing		• **Launch Date:** NETR flagship projects launched on **27 July 2023** • **Timeframe:** Aligned with the Twelfth Malaysia Plan (2021–2025) and the National Energy Policy (DTN) 2022–2040, the roadmap sets targets **extending to 2050**
Energy-Related Objective		• Guide Malaysia's shift **from fossil fuel-based to low-carbon energy systems**. • Contribute to net-zero GHG emissions by 2050. • Address the energy trilemma: energy security, affordability, and sustainability.
key Targets By Energy Source	Energy Efficiency	• By 2040, achieve energy savings of 21% compared to business-as-usual scenario • By 2050, achieve energy savings of 22% compared to business-as-usual scenario
	Renewable Energy	• Unlock economic opportunities through a low-carbon transition • Achieve **70% RE** installed capacity share by 2050 • No new coal power plant
	Hydrogen	• Produce up to 2.5 Mtpa **Green Hydrogen** by 2050 from RE (e.g., hydroelectric power) • Establish one **low-carbon hydrogen hub** by 2030, and an additional two hubs by 2050
	Bioenergy	• Increase biorefinery capacity to 3.5 billion litres by 2050 • Increase biomass and biogas power generation capacity to 1.4 GW by 2050

Source：National Energy Transition Roadmap

NETRのResponsible Transition (RT)シナリオは、DNTを上回る大胆かつ現実的な移行パスを示し、国内外の移行動向に即している

Targets across NETR's six energy transition levers

Legend:
⭐ = RT scenario target that is more ambitious than DNT baseline

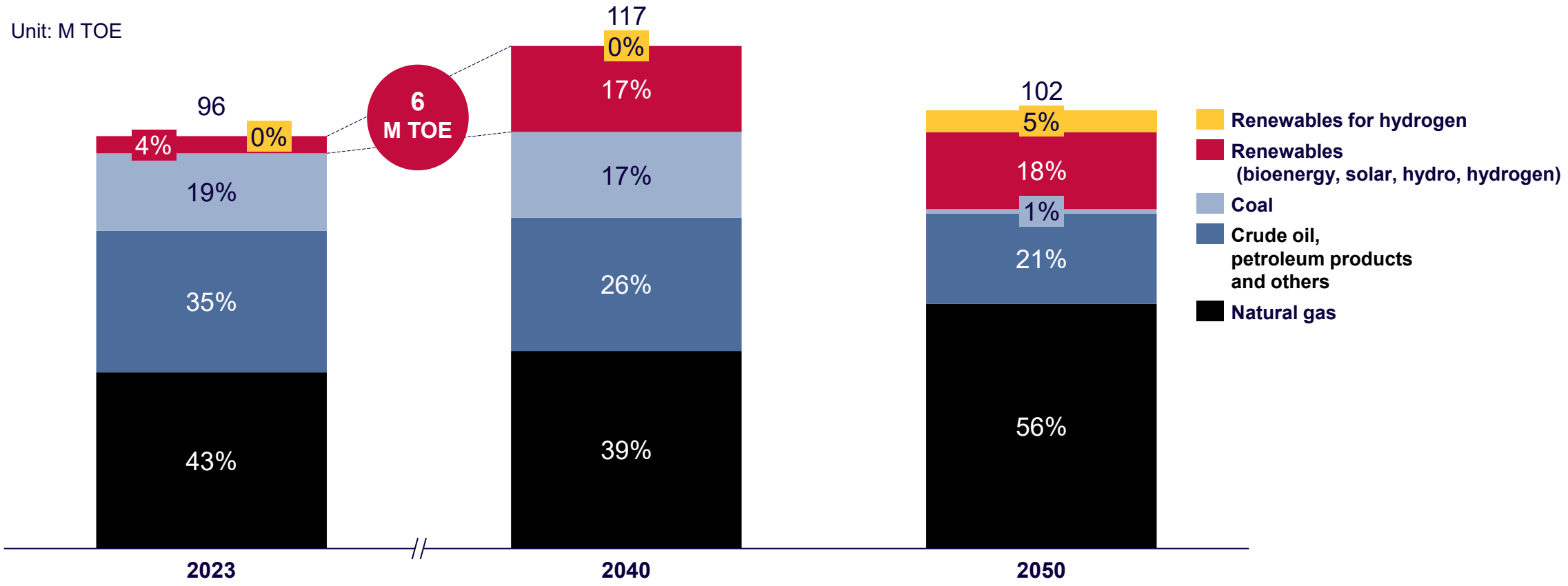
Sector and Key Driver		2040 DTN Low Carbon Nation Asp.	2050 NETR Responsible Transition
EE Energy Efficiency	Industry and Commercial energy efficiency savings (%)	11%	23% ⭐
	Residential energy efficiency savings (%)	10%	20% ⭐
RE Renewable energy	Coal share of installed capacity (%)	19%	0%
	RE share of 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

Sector and Key Driver			2040 DTN Low Carbon Nation Asp.	2050 NETR Responsible Transition
GM Green Mobility	Land	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% ⭐
	Marine	LNG penetration as alternative fuel in marine transport (%)	25%	N/A
		Green fuel penetration in marine transport (%)	N/A	40%
	Av.	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

Source：National Energy Transition Roadmap

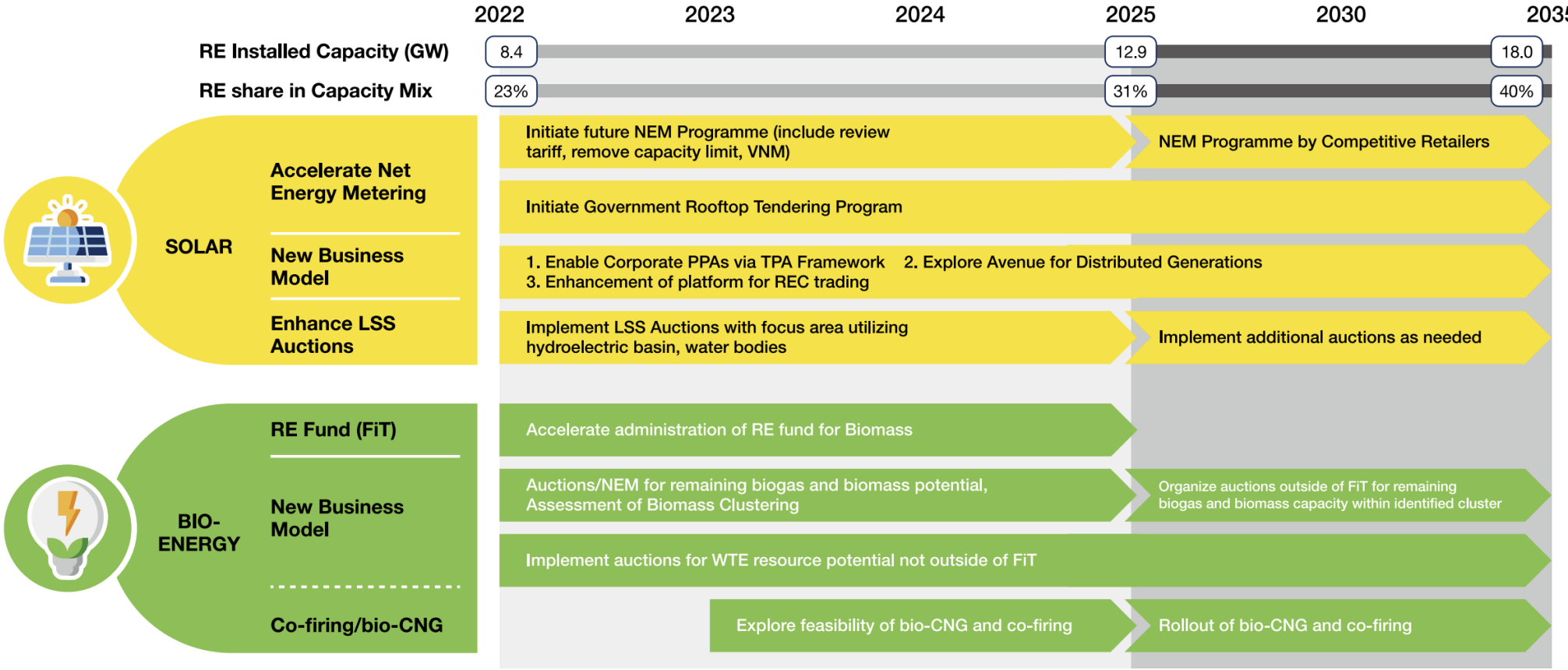
マレーシアは、2040年までに再生可能エネルギーの供給量を60Mtoe増加させ、再エネ比率を2023年の4%から2050年には22%まで引き上げることを目標としている

Malaysia's projected Total Primary Energy Supply (TPES) by 2050



Source：National Energy Transition Roadmap @2023

MyRERロードマップは、2022年から2035年にかけてマレーシアにおける太陽光およびバイオエネルギーの導入を加速させるための戦略的取り組みを示している(1/2)



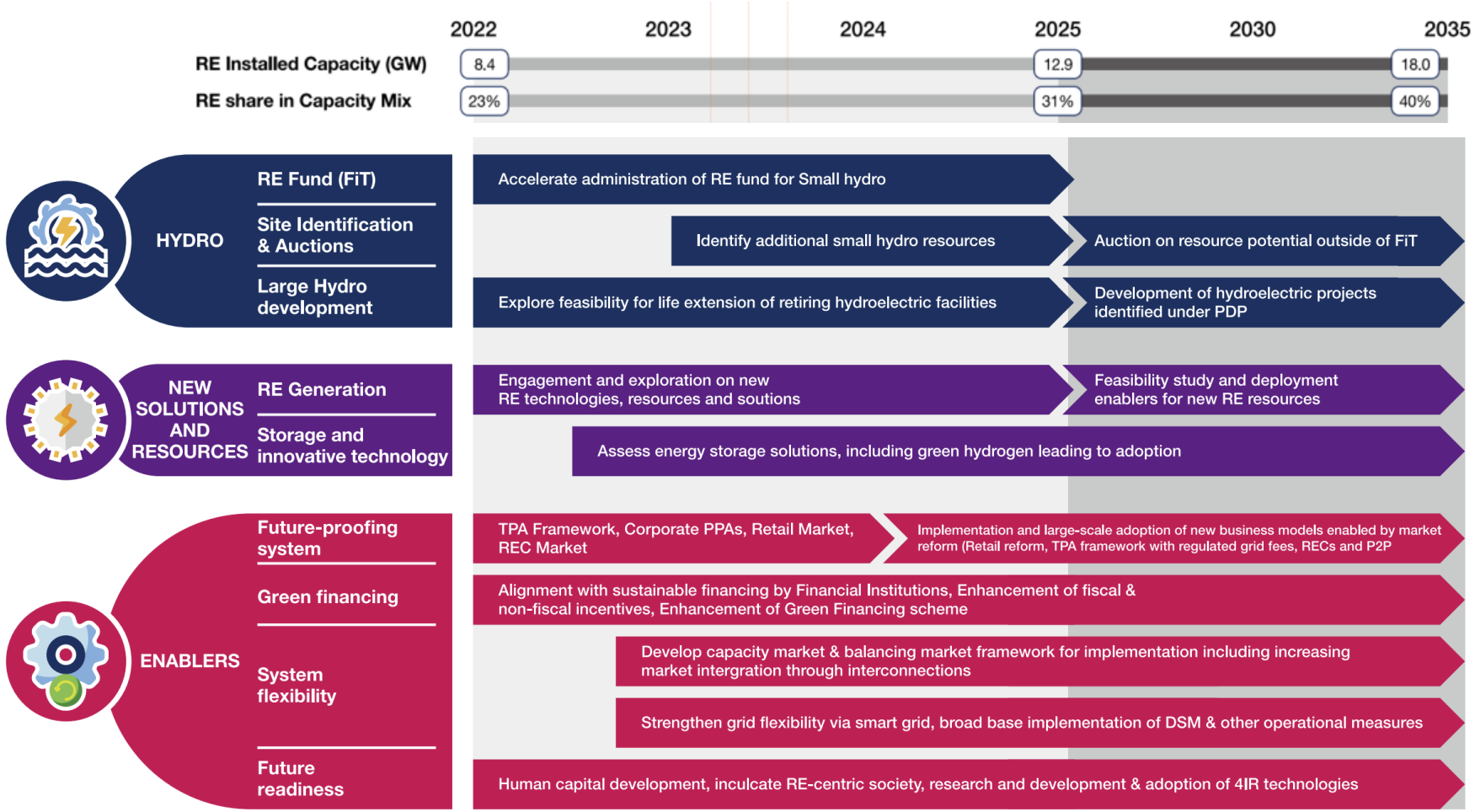
1) Net Energy Metering 2) Power purchase agreement 3) Large scale solar
Source：SEDA=Sustainable Energy Development Authority / MyRER – Renewable Energy Malaysia (seda.gov.my) @2021

MyRERロードマップは、2022年から2035年にかけてマレーシアにおける太陽光およびバイオエネルギーの導入を加速させるための戦略的取り組みを示している(2/2)

	Additional Key Actions up to 2025	Additional Key Actions up to 2035
Solar	• **Accelerate Net Energy Metering (NEM)** – Enhancement of existing NEM Programme – Accelerate NEM approval procedures – Promote awareness of NEM – Closing development & operational gap	• **Accelerate Net Energy Metering (NEM)** – Continued implementation of Government Rooftop Tendering Programme • **New Business Models** – Large scale adoption of corporate PPAs in line with market reforms • **Enhance LSS Auctions** – Auction design to align with evolving technological advances and global best practices
Bio-energy	• **RE Fund (FiT)** – Explore feasibility of biomass power plants through clustering of mills, coupled with equity participation by palm oil millers • **New Business Models** – Increase resource available for power generation through cross-ministerial effort – Conduct feasibility study for grid extension to leverage resource – Explore feasibility og NEM for bioenergy – Assessment of auction system beyond the FiT mechanism • **Tender Waste-to-Energy Plant** – Set up tendering process framework and conduct auction for WTE projects • **Explore Other Opportunities** – Conduct technology improvement study for bio-energy power generation	• **Tender Waste-to-Energy Plant** – Continue implementation of WTE plants at all viable sites • **Explore Other Opportunities** – Explore the implementation incentive mechanism for bio-CNG co-generation and biomass co-firing, depending on outcome of feasibility studies

1) Net Energy Metering 2) Power purchase agreement 3) Large scale solar
Source：SEDA=Sustainable Energy Development Authority / MyRER – Renewable Energy Malaysia (seda.gov.my) @2021

MyRERロードマップは、水力発電の拡大、新たな再生可能エネルギー技術の模索、そして再エネ拡大を支える制度基盤の強化に向けたマレーシアの戦略を示している(1/2)



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	Additional Key Actions up to 2025	Additional Key Actions up to 2035
Hydro	• **RE Fund (FiT)** – Optimize small hydro FiT – Facilitate and coordinate discussion with State authorities to expedite approval – Coordinate regulatory changes on upstream activities • **Site identifications & Auctions** – Conduct a hydro-geological study to identify additional sites beyond current resource potential • **Auctioning of future capacity** – Set up and conduct auctions for additional small hydro capacity beyond FiT	• **RE Fund (FiT)** – No new FiT quota after RE fund fully allocated • **Site identifications & Auctions** – Site study expected to be completed by 2025 • **Auctioning of future capacity** – Conduct auctions for remaining small hydro potential and sites newly identified in the study
New Initia-tives	• **Roll-out of new solutions to ensure system stability** – Assess required energy storage to avoid curtailment and ensure system stability	• **Explore new RE resources** – Explore offshore and onshore wind potential and feasibility of wind energy integration • **Roll-out of new solutions to ensure system stability** – Adopt cost competitive storage solutions in the short term and explore initiatives to develop new storage technologies (e.g. green hydrogen in the long term) – Determine and implement appropriate deployment strategies for storage systems including decentralized and centralized options

Source：SEDA=Sustainable Energy Development Authority / MyRER – Renewable Energy Malaysia (seda.gov.my) @2021

CGPPは、企業がバーチャル電力購入契約を通じて太陽光由来の再エネを調達し、電力コストの変動を抑えつつ、物理的な供給から切り離して再エネ利用を主張できる仕組み

Corporate Green Power Programme (CGPP) (1/2)

Policy Context	• **Launch Date: 7 November 2022** by Malaysia's Energy Commission • **Policy Alignment:** National Energy Policy (DTN) 2022–2040
Purpose & Mechanism	• Enables **corporate consumers (CCs)** to virtually procure renewable energy via **Virtual Power Purchase Agreements (VPPAs)** with **Solar Power Producers (SPPs).** • This virtual model facilitates RE procurement without physical delivery.

Operational Structure	• There are three (3) parties involved in the energy delivery and transaction process under CGPP:
	  • Solar Power Producer (SPP)
	  • The Corporate Consumer (CC)
	  • The Electricity Utility Company
	• Energy Flow:
	  • **SPPs export solar energy** to the Electricity Utility Company (TNB) at the System Marginal Price (SMP)
	  • **CCs continue to purchase electricity from TNB** under standard tariffs

Strategic Implications for Corporates	• **Decouple physical energy delivery from renewable energy claims** (RE100-aligned) • **Manage electricity cost** volatility via fixed-price contracts • **Enhance ESG credentials** with verifiable RE procurement.

Source：Christopher & Lee Ong, Malaysia's Corporate Green Power Programme: Virtual Power Purchase To The Fore, (2022).

CGPPでは太陽光発電事業者が電力会社に電力を供給し、企業は電力会社から電力を購入しつつ、太陽光事業者とのバーチャル契約を通じて再エネ利用証書（REC）を受取可能

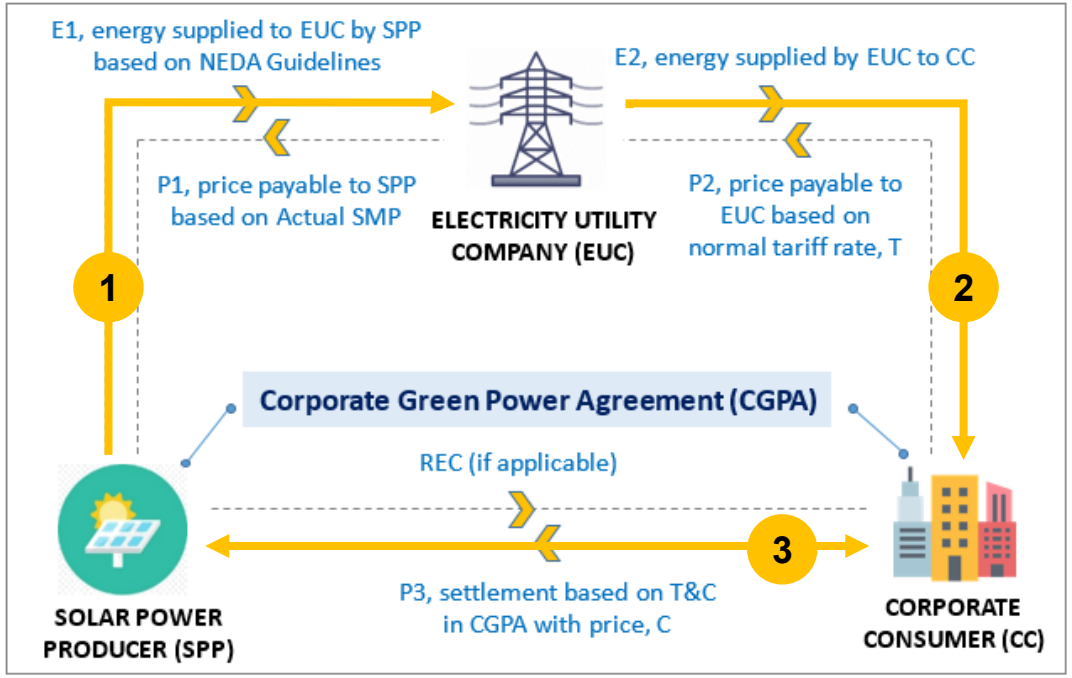
Corporate Green Power Programme (CGPP) (2/2)

How the CGPP Works:

1. Solar Producer (SPP) → Electricity Utility Company (EUC)
- The **solar power producer (SPP) supplies electricity** to the electricity utility company (EUC), such as TNB.
- The **EUC pays** the SPP based on the actual market price, known as the System Marginal Price (SMP).

2. Utility Company → Corporate Consumer (CC)
- The **EUC supplies electricity to the corporate consumer (CC)** as usual.
- The CC pays the EUC according to the standard tariff rate.

3. Virtual Agreement Between SPP and CC (CGPA)
- The SPP and the CC sign a Corporate Green Power Agreement (CGPA), which is a virtual power purchase agreement.
- Under this agreement, **the CC receives Renewable Energy Certificates (RECs) to prove use of green energy**.



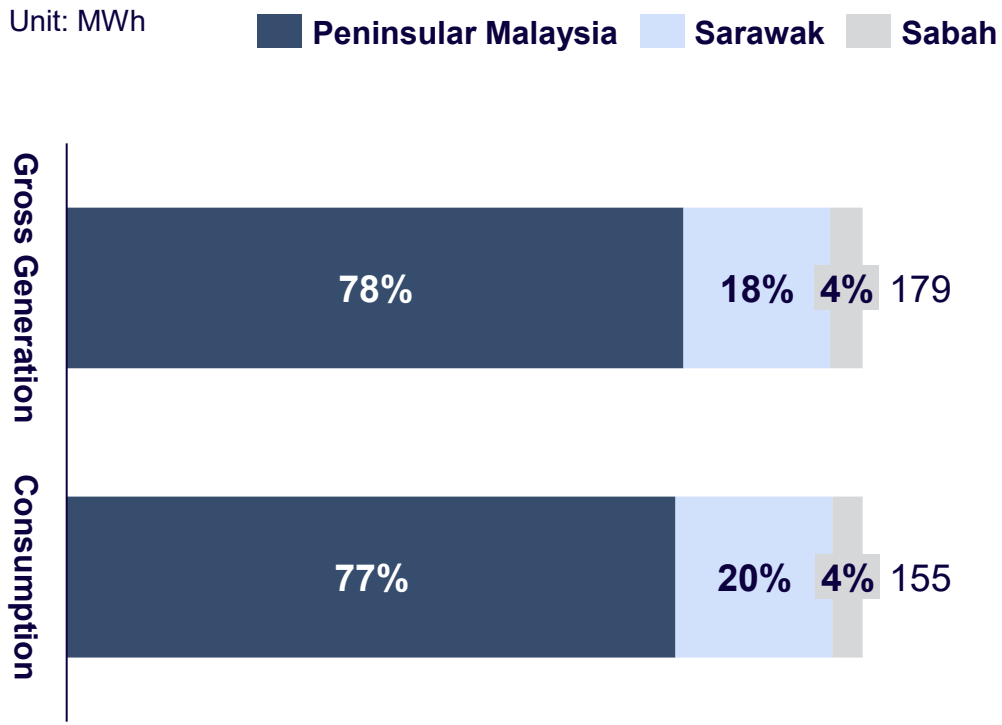
REC – Renewable Energy Certificate

Source：Single Buyer, Corporate Green Power Programme (CGPP)

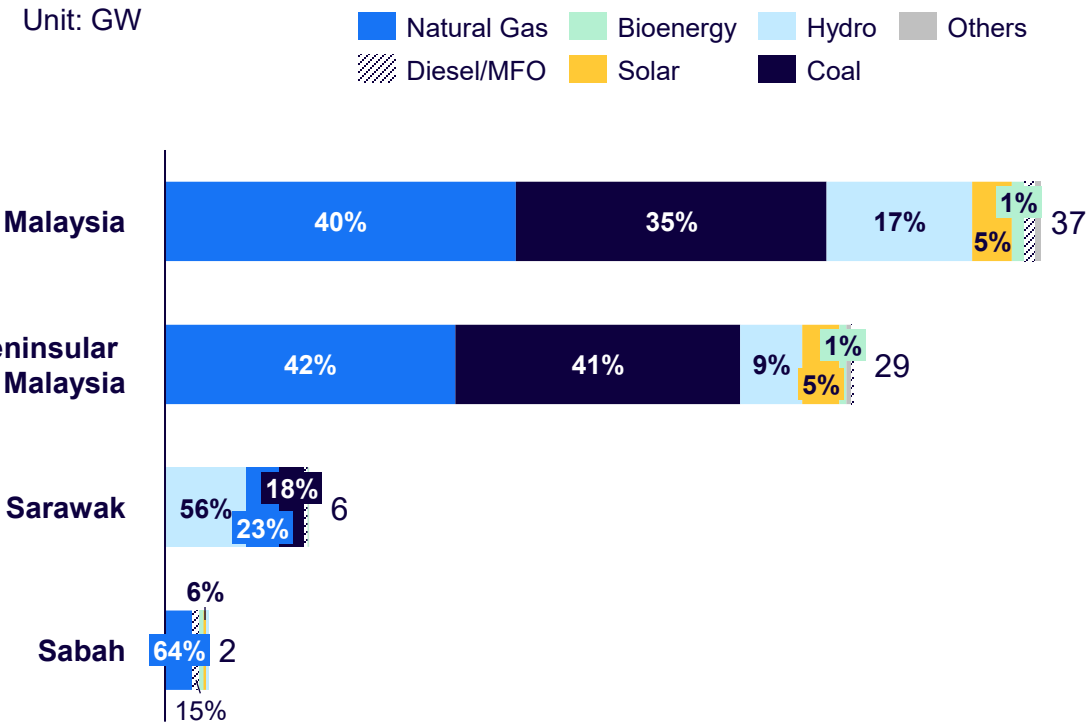
マレー半島は発電量、消費量、設備容量のいずれにおいても国内を圧倒的にリードしており、サラワク州では水力発電が、サバ州では天然ガスが主導的役割を担っている

Malaysia's Electricity Gross Generation, Consumption and Available Capacity by Region

Gross Electricity Generation and Consumption by Region (as of 2021)



Power Mix of Malaysia's Installed Capacity by Region (as of 2021)

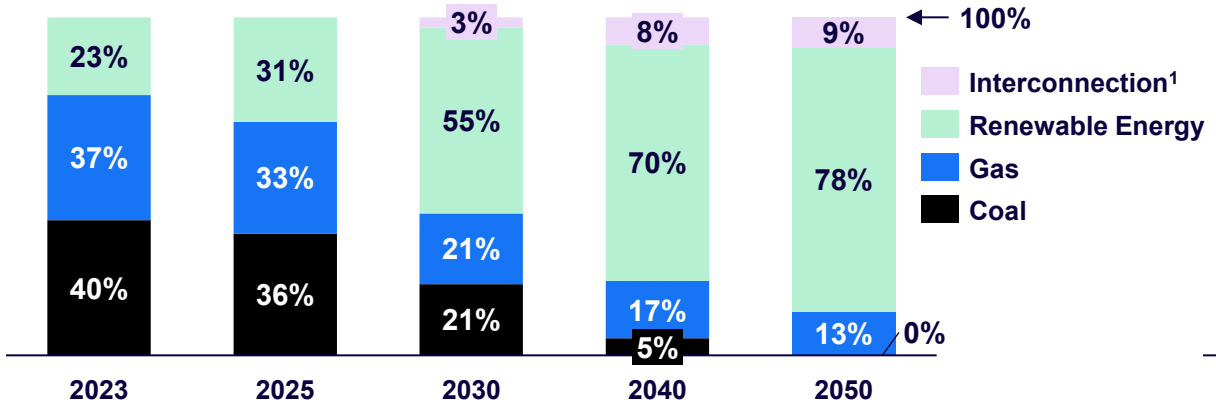


Note: Bioenergy includes biomass and biogas
Source: National_Energy_Balance_2021, Malaysia_Energy_Statistics_Handbook_2023

2050年までに、マレー半島は電力の過半数を再生可能エネルギーで賄うと見込まれているが、引き続き一部は輸入電力や化石燃料に依存する見通し

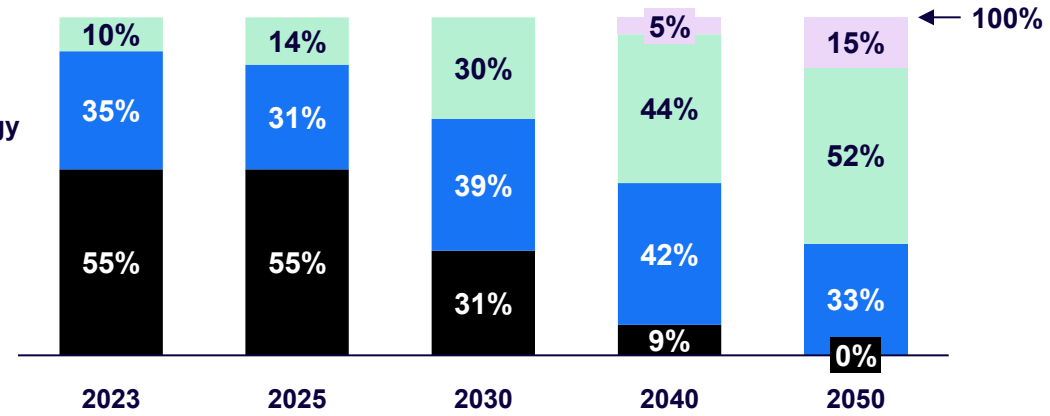
Projected Capacity and Energy Mix OF Peninsular Malaysia, 2023-2050 (%)

Projected Capacity Mix of Peninsular Malaysia (%), 2023-2050



1. **Coal:** declines steadily from **40%** in 2023 to **0%** by 2050 to reflect Malaysia's commitment to **phasing out coal**
2. **Gas:** drops from **37%** in 2023 to **13%** by 2050, reflecting a transition strategy that retains gas as a flexible or transitional fuel
3. **Renewable Energy (RE):** becomes the dominant installed capacity starting 2030, **signaling large-scale investments**

Projected Energy Mix of Peninsular Malaysia (%), 2023-2050



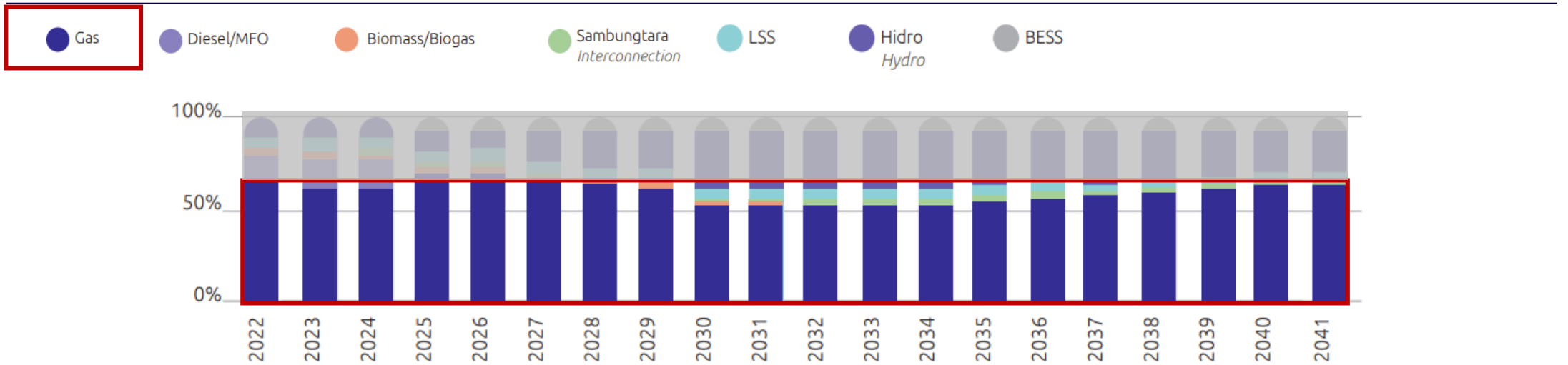
1. **Coal**: falls to 0% by 2050, indicating a complete **phase-out of coal-fired** electricity generation
2. **Gas:** while gradually being replaced by renewable energy, it will still account for one-third of the total energy consumption by 2050
3. **Renewable Energy (RE):** Crosses the 50% mark by 2050, showing a long-term trend toward decarbonization and cleaner energy sources

Interconnection rises as Malaysia expands cross-border grid links to **improve supply security, balance RE** and **enhance regional power trade**

Source : Energy Malaysia, Volume 26, 2025
Note: 1) Interconnection refers to the installed capacity that enables cross-border electricity exchange through high-voltage links with the grids of neighboring countries

サバ州の発電構成は、豊富な天然ガス資源とガスインフラの実用性により、2041年までガス中心の状態が続くと予測されている

Projected Generation Mix in Sabah, 2022 – 2041 (%)



1. **For Sabah, the generation mix remained relatively unchanged:**
- **In 2022, Natural gas-based generation accounts for 82%**
- In 2022, Diesel, Hydro and Other Sources contribute 9%, 7%, and 2%, respectively

2. Sabah generates a high proportion of its electricity from natural gas for some key reasons:
- Sabah's significant lean gas reserves (high in methane) make it well-suited for power generation and petrochemical development
- **Gas is readily accessible and supplied to power plants** via pipelines, making it the most practical and cost-effective energy source for the main grid in Sabah

3. Gas-fired generation in Sabah will dip around 2030 as the state diversifies its power mix, then rebound with added capacity for reliability and peak demand

Source: Energy Commission Annual Report 2022, Sabah Energy Roadmap and Master Plan 2040

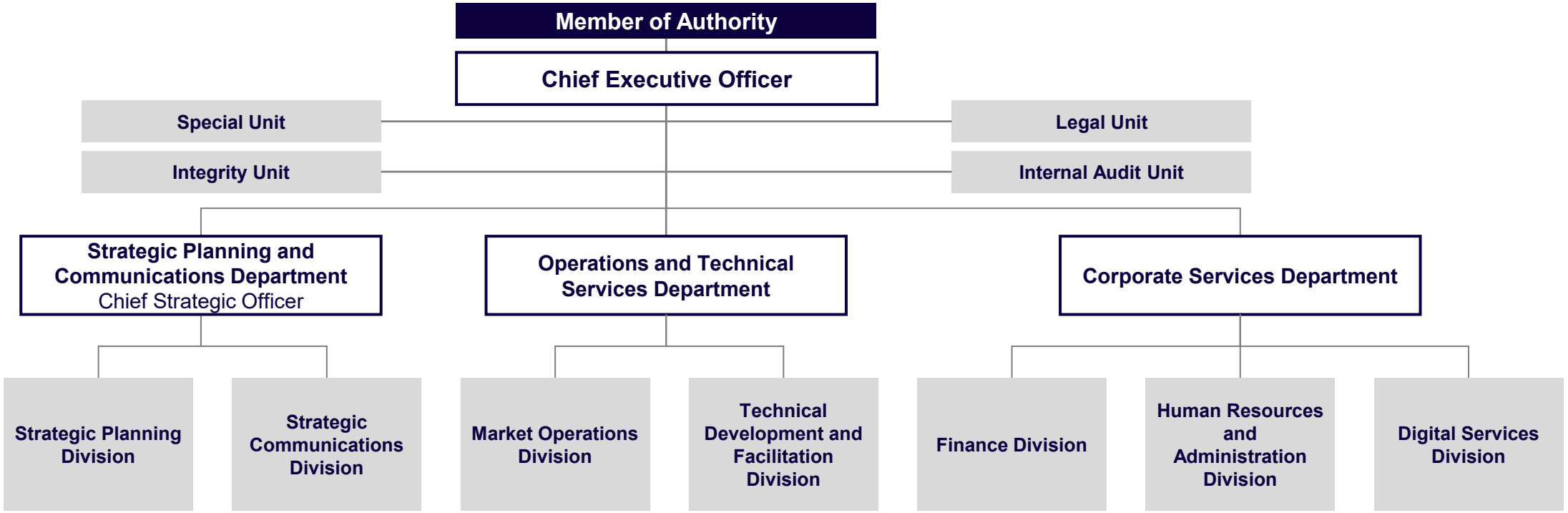
マレーシアの化石燃料ガバナンスは、政策および価格設定を担うEPU、産業規制を行うST、流通および価格統制を担当するPRDによって主導されている

Ministry	Department	Role & responsibility
Economic Planning Unit of the Prime Minister's Department	Energy Unit under the Economic Planning Unit	Sets the direction & strategies for energy policy & determines implementation with focus on oil & gas sector and privatization of the electricity supply industry i.e. IPPS. Also sets gas prices.
Ministry of Energy Transition and Water Transformation (PETRA)	Energy Commission (Suruhanjaya Tenaga, ST)	Regulates the electricity and piped gas supply industry, issues licenses, enforces technical and safety standards, and ensures reliable and affordable energy supply.
	Sustainable Energy Development Authority (SEDA)	Implements and monitors renewable energy transition policies, manages feed-in tariff (FIT) schemes, and sets renewable energy quotas.
	National Water Services Commission (SPAN)	Regulates the water supply and sewerage services industry, ensuring efficiency, sustainability, and quality standards.
Ministry of Natural Resources & Environmental Sustainability (NRES)	Department of Environment (DOE)	Enforces environmental quality laws, monitors pollution levels, and oversees environmental impact assessments (EIAs).
	Minerals and Geoscience Department Malaysia (JMG)	Manages mineral resources, conducts geological mapping, and provides geoscience technical services.
Ministry of Rural & Regional Development (KKDW/KPLB)	Majlis Amanah Rakyat (MARA)	Provides education, entrepreneurship support, and skills development for Bumiputera communities.
	Rubber Smallholders Development Authority (RISDA)	Supports smallholder rubber farmers to improve productivity and socio-economic status.
Ministry of Domestic Trade & Cost of Living (KPDN)	Enforcement Division	Ensures compliance with trade laws, combats anti-competitive practices, and enforces consumer protection regulations.
	Petroleum Regulatory Division (PRD)	Regulates and monitors the distribution and pricing of petroleum products in Malaysia.
Ministry of Investment, Trade & Industry (MITI)	Malaysian Investment Development Authority (MIDA)	Promotes and coordinates industrial development and foreign direct investment in Malaysia.
	Malaysia External Trade Development Corporation (MATRADE)	Promotes Malaysian exports through trade facilitation, export development programs, and global market access initiatives.

Source：各種二次情報よりADL作成

SEDA（持続可能エネルギー開発庁）はCEOの下に3部門を置き、複数のディビジョンと法務・監査などのユニットで構成される

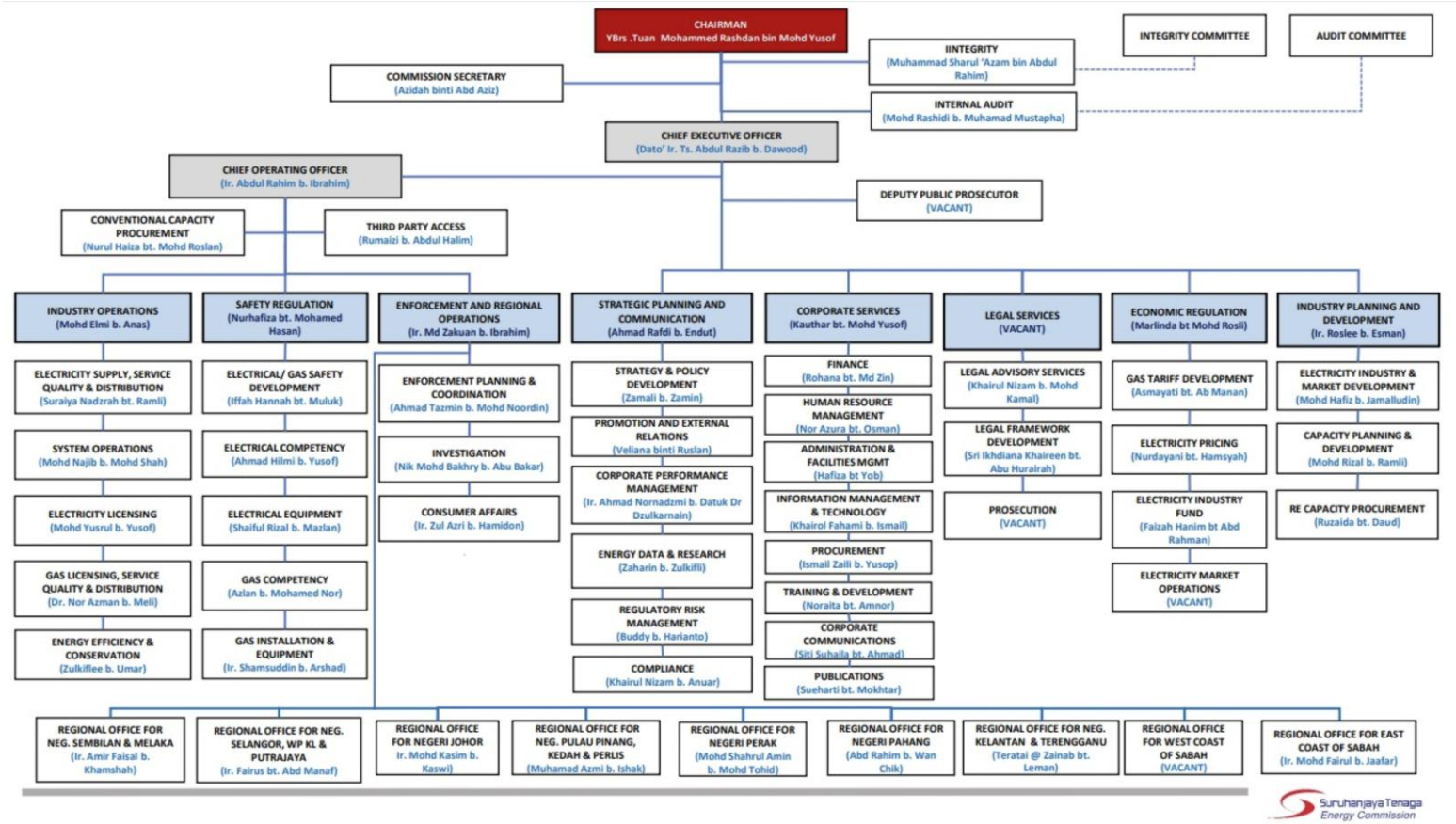
Organizational Chart of SEDA



Sustainable Energy Development Authority (SEDA) is a statutory body under Ministry of Energy Transition and Water Transformation (PETRA), primarily **responsible for supporting renewable energy policies**, including the management of the FiT fund and quota allocations.

Source：SEDA

マレーシアエネルギー委員会(Energy Commission) 組織図



The Energy Commission (ST) is an independent regulator under Ministry of Energy Transition and Water Transformation (PETRA), **overseeing electricity and gas licensing, tariff regulation, and market mechanisms.**

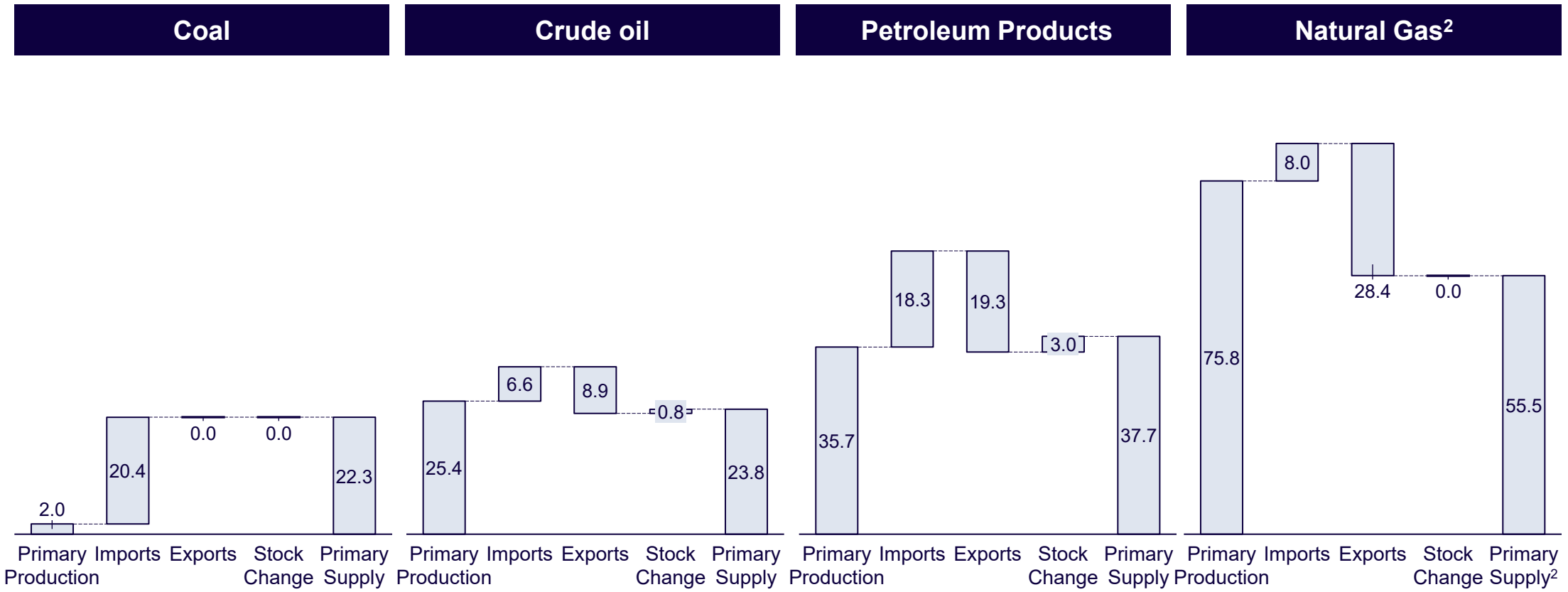
Source：Energy Commission

Contents

マレーシアの化石燃料供給は、石炭と石油製品において輸入依存が高い一方、天然ガスと原油は国内生産が中心となっている

Malaysia's Fossil Fuel Supply by Production, Imports, Exports, and Stock Change[1], 2021

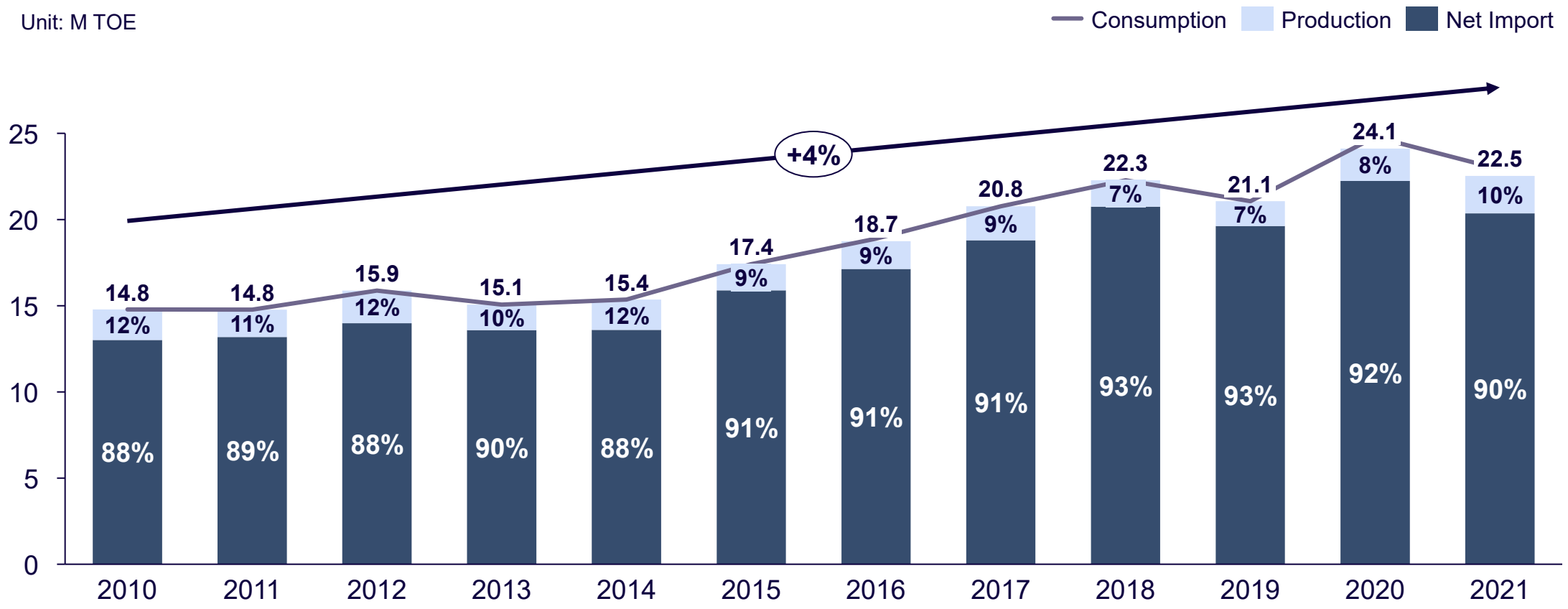
Unit: M TOE



Source: Malaysia Energy Statistics Handbook 2023, BMI, *Malaysia Oil & Gas Report 2025*
Note: 1) Stock changer refers to the difference between the amounts of fuel in stocks at the beginning and end of year and should ideally cover producers, importers and industrial consumers
2) Primary Supply of Natural Gas is reported without deducting gas flaring, reinjection, and own use

マレーシアの石炭供給および消費量は4%増加しており、純輸入が依然として供給の大部分を占め、近年では全体の90%以上を占めている

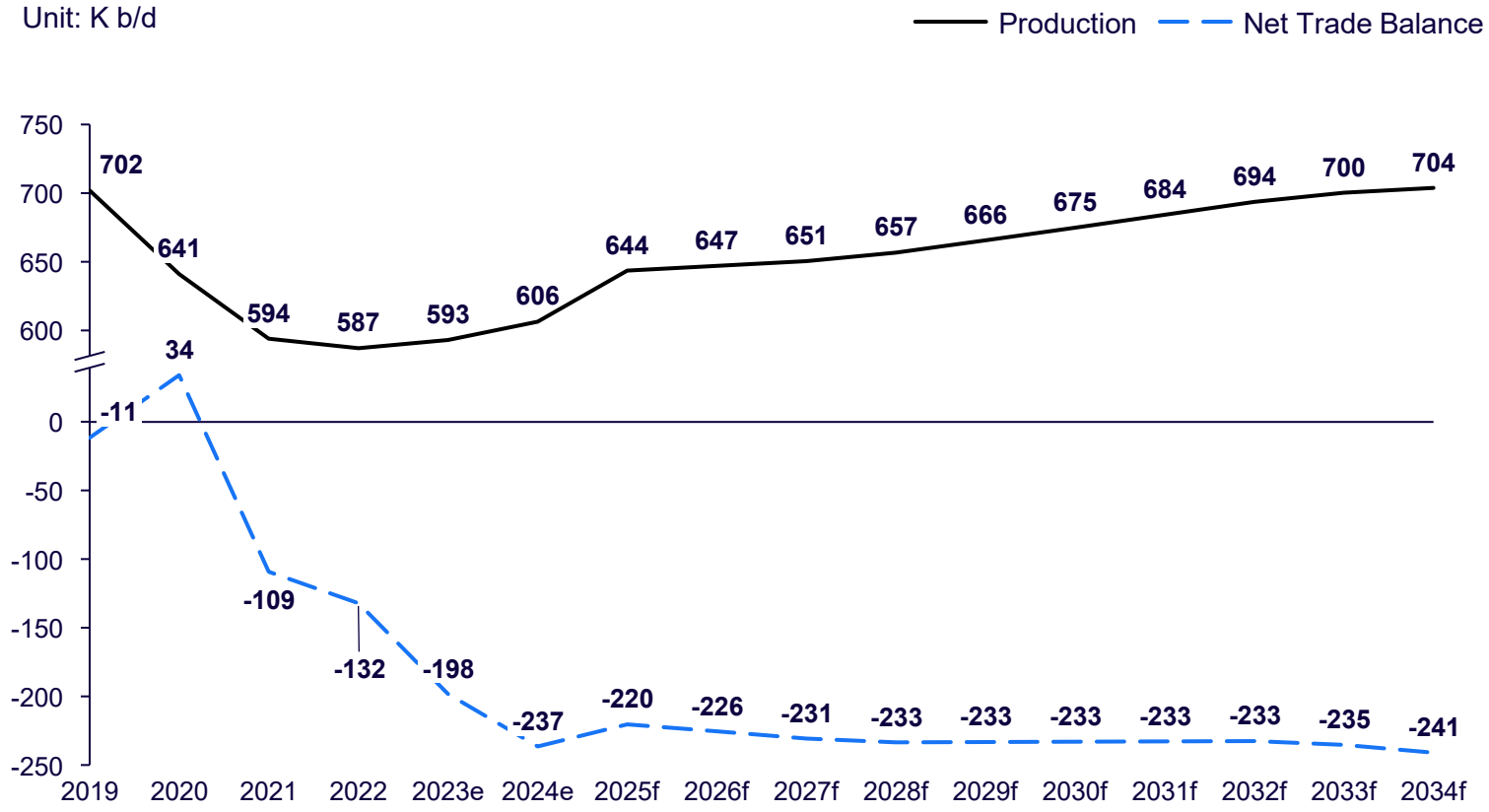
Coal Production, Trade & Consumption trends, 2010-2021



Source：National Energy Balance 2021, Malaysia Energy Statistics Handbook 2023

マレーシアの原油・石油生産は2025年に成熟油田の自然減退で一時低下するものの、その後は効率改善で安定推移する一方、石油貿易収支は縮小し輸入超過が続く見通し

Crude Oil &Other Liquids Production and Net Trade Balance, 2015-2030



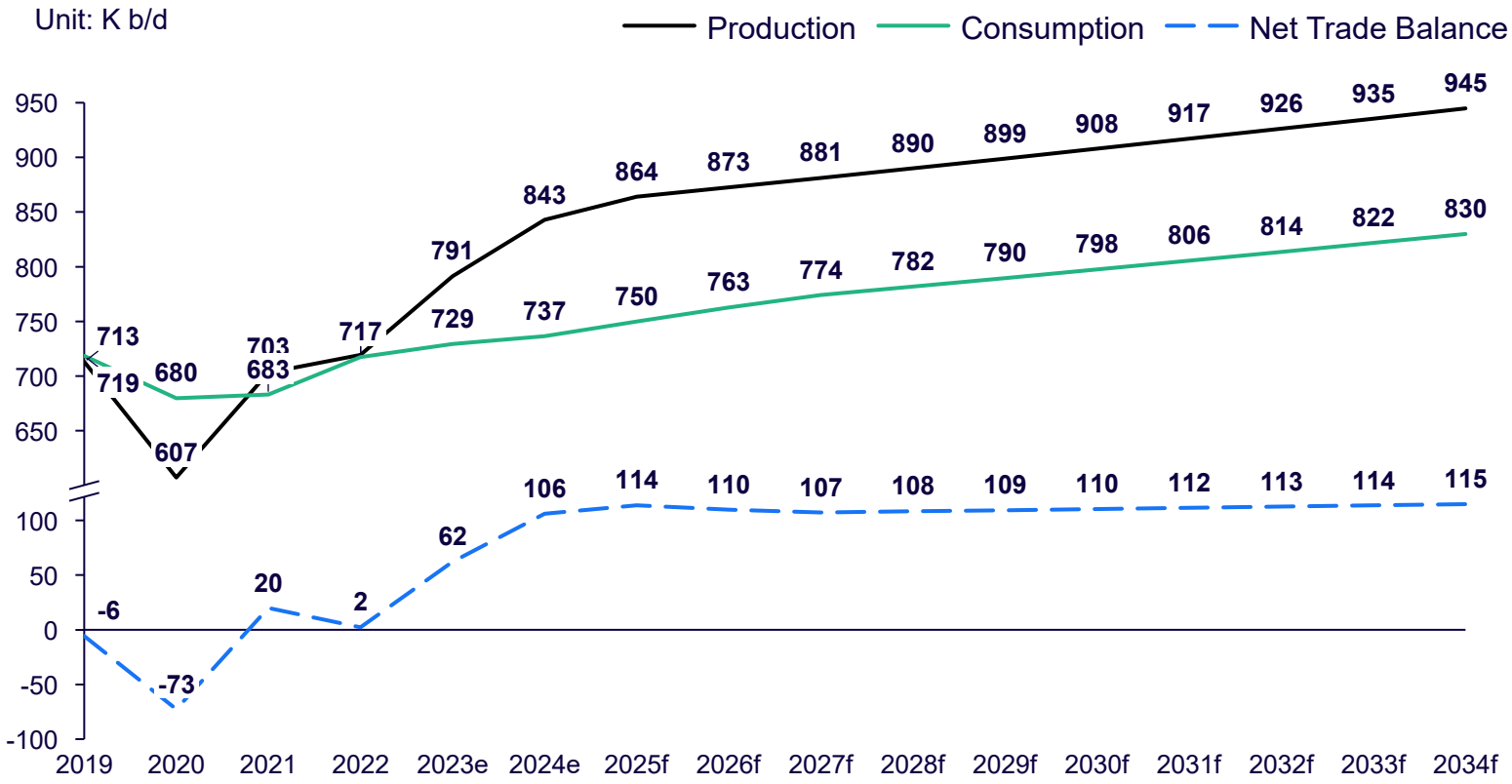
Comments

- Malaysia's **oil production remains under pressure in 2025 due to natural decline in maturing fields**—especially in offshore Peninsular Malaysia—but declines have moderated with some field performance improvements and enhanced operational efficiency.
- Malaysia's **petroleum trade surplus is shrinking**, but the nation maintains resilient overall export performance.
- In June 2025, oil and gas exports contracted, with a drop in both crude and refined petroleum shipments due to **softer global demand and lower output, while imports remained robust.**

Source：BMI, *Malaysia Oil & Gas Report* 2025年8月時点
Note: The negative net export refers to import greater than export

マレーシアの製油セクターは2021年以降大幅に拡大しており、国内生産が需要を上回るようになり、純輸出国としての地位が強化されている

Refined Petroleum Products Production, Net Trade Balance & Consumption Trends



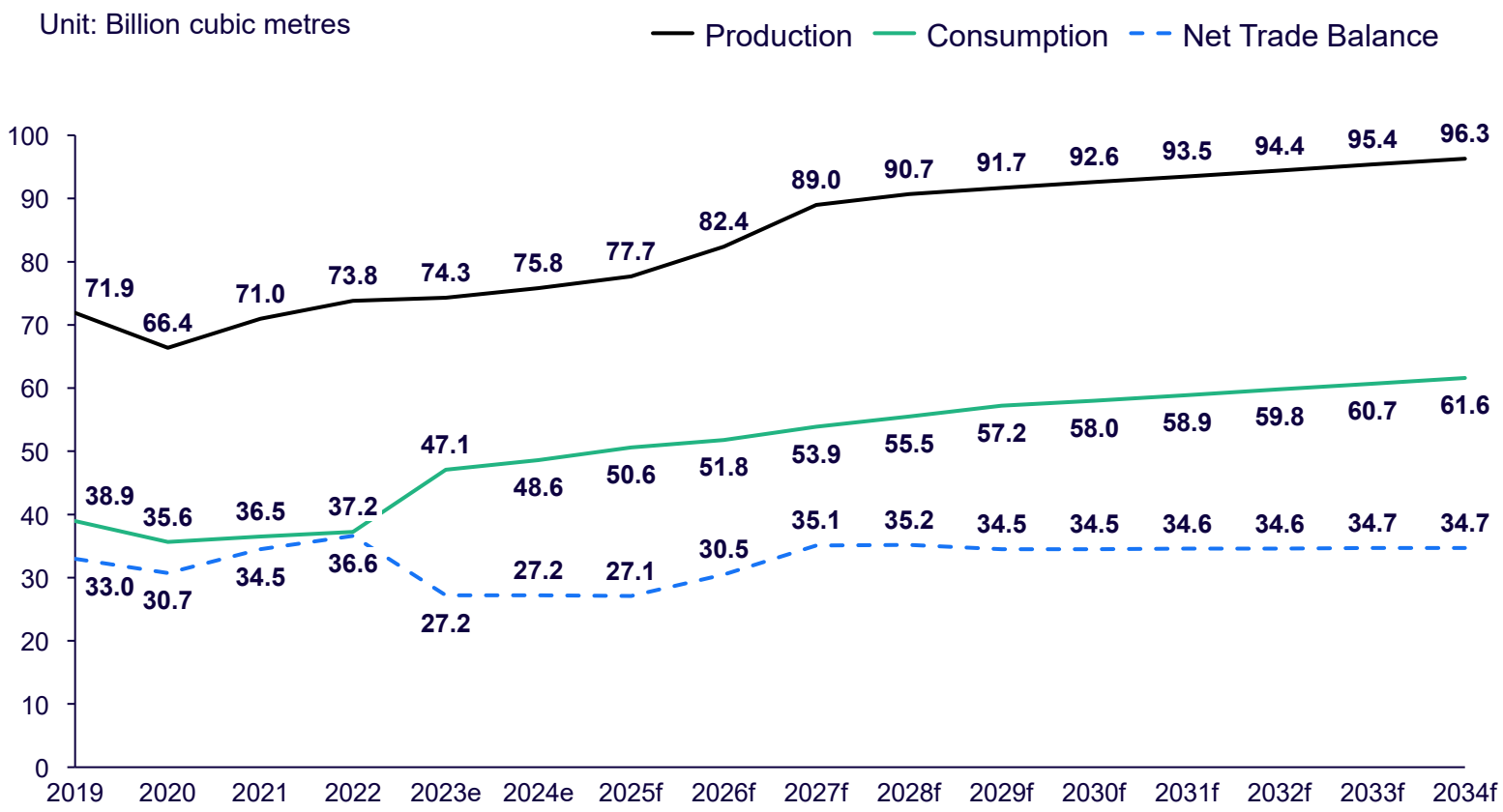
Comments

- Malaysia's **refining production capacity has expanded steadily, supported by major refinery investments in Pengerang, Klang, Sabah, and Sarawak**.
- **Increased consumption has been driven by transportation, industrial, and petrochemical sectors, as well as ongoing urbanization and vehicle growth**.
- Malaysia is **expanding oil storage and terminal capacity, capitalizing on its strategic location and Singapore's spatial constraints.** Notable new infrastructure projects are underway in Johor (Pengerang), Klang, and Sabah, supporting ambitions to become a regional oil trading and storage hub.

Source：BMI, *Malaysia Oil & Gas Report* 2025年8月時点
Note: The negative net export refers to import greater than export

マレーシアの天然ガス生産は近年緩やかに増加を続け、2025年以降は新規プロジェクトや生産回復で安定的に推移し、消費も漸増する一方で純輸出量は横ばいが見込まれている

Dry Natural Gas Products Production, Net Trade Balance & Consumption Trends



Comments

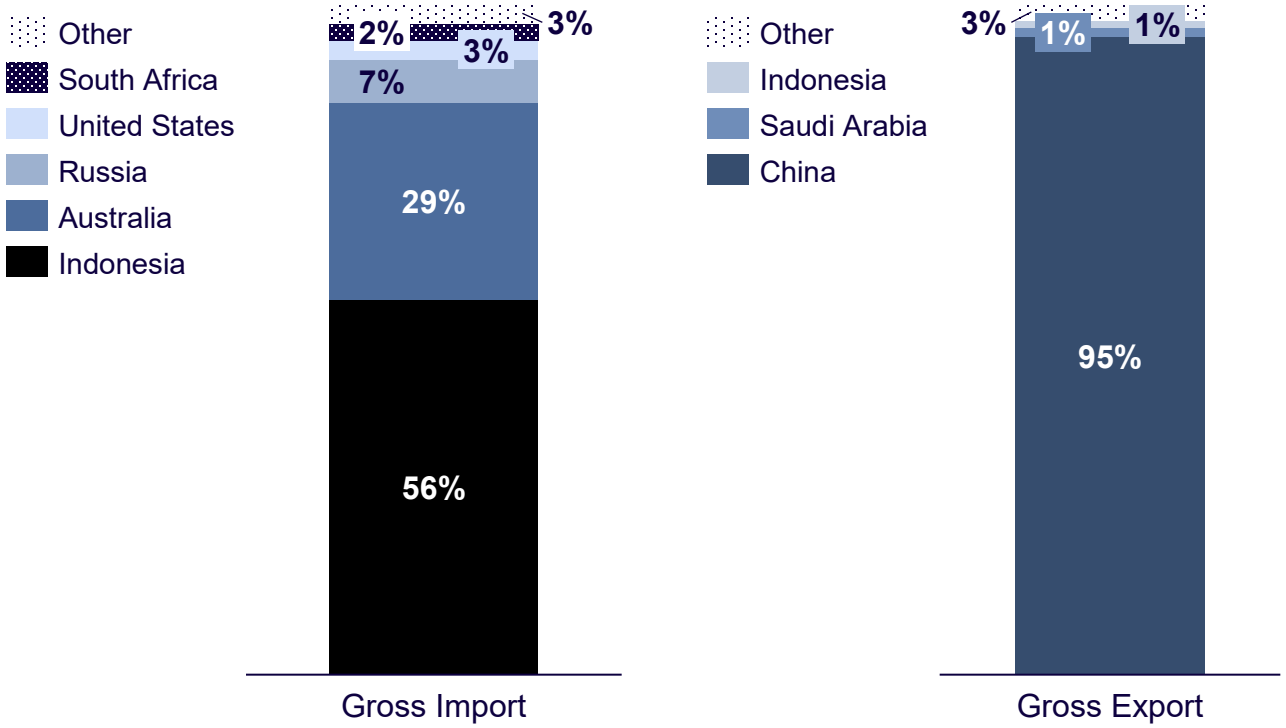
- Malaysia's natural gas production has risen over the past two decades to serve the growing domestic demand and export contracts. Recent foreign investment in deepwater and technically challenging fields, primarily in the Sarawak and Sabah states, provides impetus to maintain natural gas production levels over the next few years.
- Although production growth has slowed compared to the rapid expansion of the early 2000s, Malaysia remains a top global offshore gas producer.
- In 2025, new projects and restored output helped offset maintenance shutdowns, keeping overall production broadly stable.

Source：BMI, *Malaysia Oil & Gas Report* 2025年8月時点
Note: The negative net export refers to import greater than export

マレーシアは依然として石炭輸入に大きく依存しており、石炭の輸出は限定的で、かつ少数のアジア諸国に集中している

Coal Import & Export Partners, 2023

Unit: Million USD



Comments

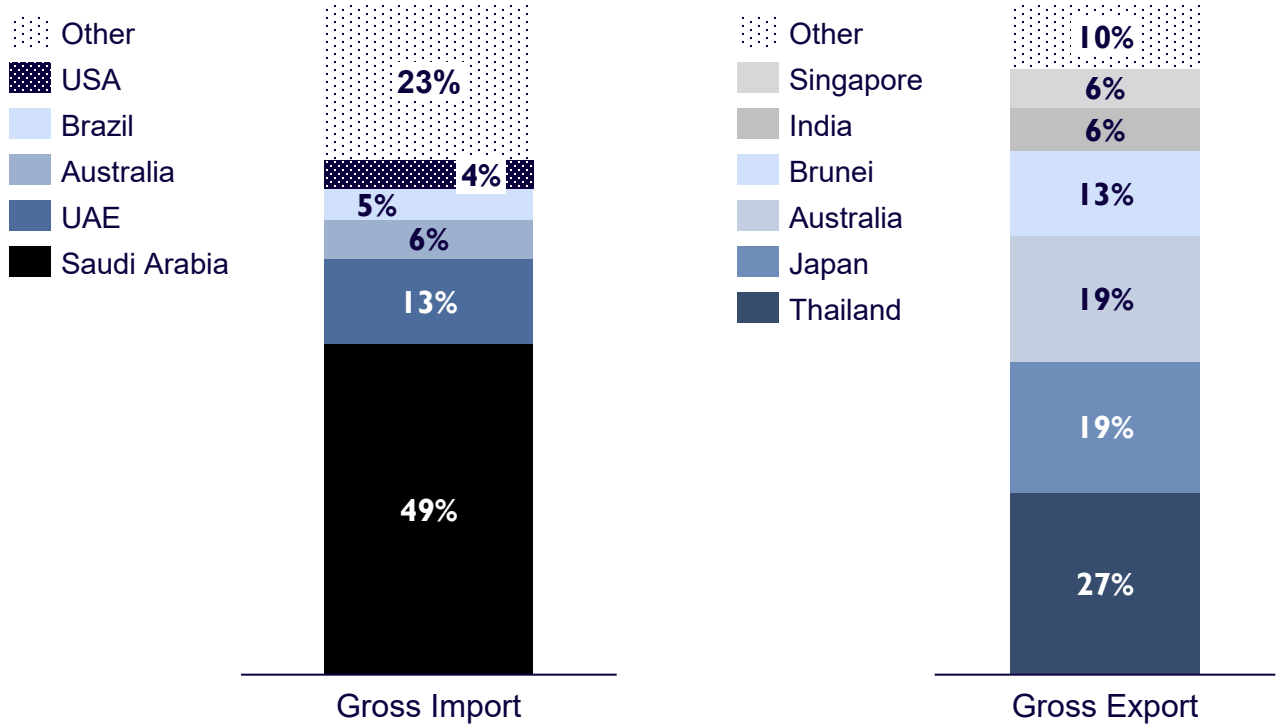
- **Malaysia imports primarily sub-bituminous and bituminous thermal coal, mainly from Indonesia (56%),** followed by Australia, 29%; Russia, 7%; South Africa, 2%; and others, 3% accumulating with the total of 4.9 billion USD.
- Coal consumption was expected to increase during the next several years because the demand for electricity was expected to increase.
- For example, coal-fired power generation accounted for a major part of the national electricity mix, driven by industrial use, data center growth, and seasonal weather patterns.
- Malaysia's coal exports remain limited relative to imports, with most exported volumes destined for a small group of Asian partners. The main export destinations are China (by far the largest), followed by countries such as Indonesia, Saudi Arabia, Thailand, Namibia, and Poland.

Source：Atlas of economic complexity (HS code: 2701 Coal)

マレーシアは原油を中国・オーストラリア・インド等に輸出している。一方で、重油は中東から輸入して国内需要(主に発電需要)に活用

Crude Oil Import & Export Partners, 2023

Unit: Billion USD



Comments

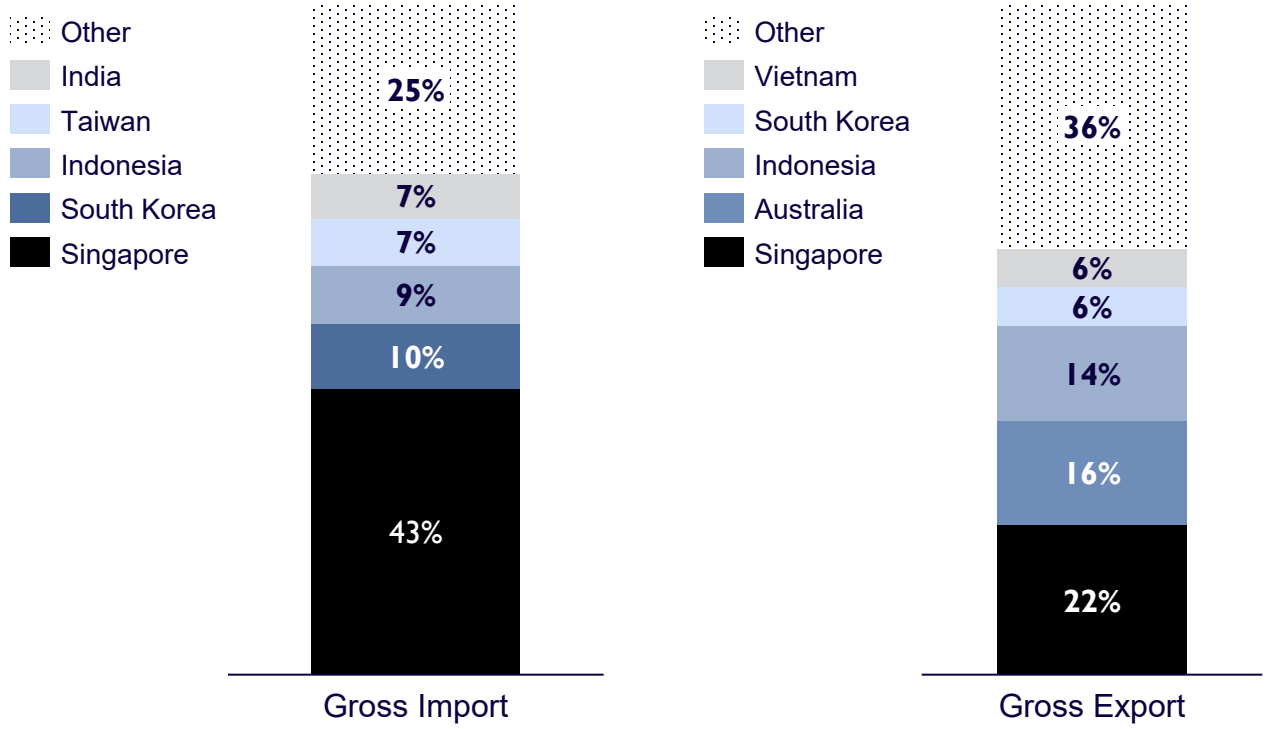
- Rapid economic growth in recent years has raised domestic energy demand and consumption of crude oil. Coupled with declining output, this has resulted in a reduction of crude oil exports.
- Though new projects help moderate the decline, more crude is now diverted for domestic energy and refined product demand.
- Malaysia exports sweet crude, which commands a premium, and imports heavier crude oils from the Middle East and other locations for refining and domestic consumption.
- Primary export destinations are China, Australia, India, and Thailand as well as Japan, Singapore and Brunei.

Source： Atlas of economic complexity (HS code: 2709 Petroleum Oils, Crude)

マレーシアの精製石油製品の貿易は、アジア各国への旺盛な輸出と、シンガポールからの輸入依存の継続によって支えられている

Refined petroleum products Import & Export Partners, 2023

Unit: Billion USD



Comments

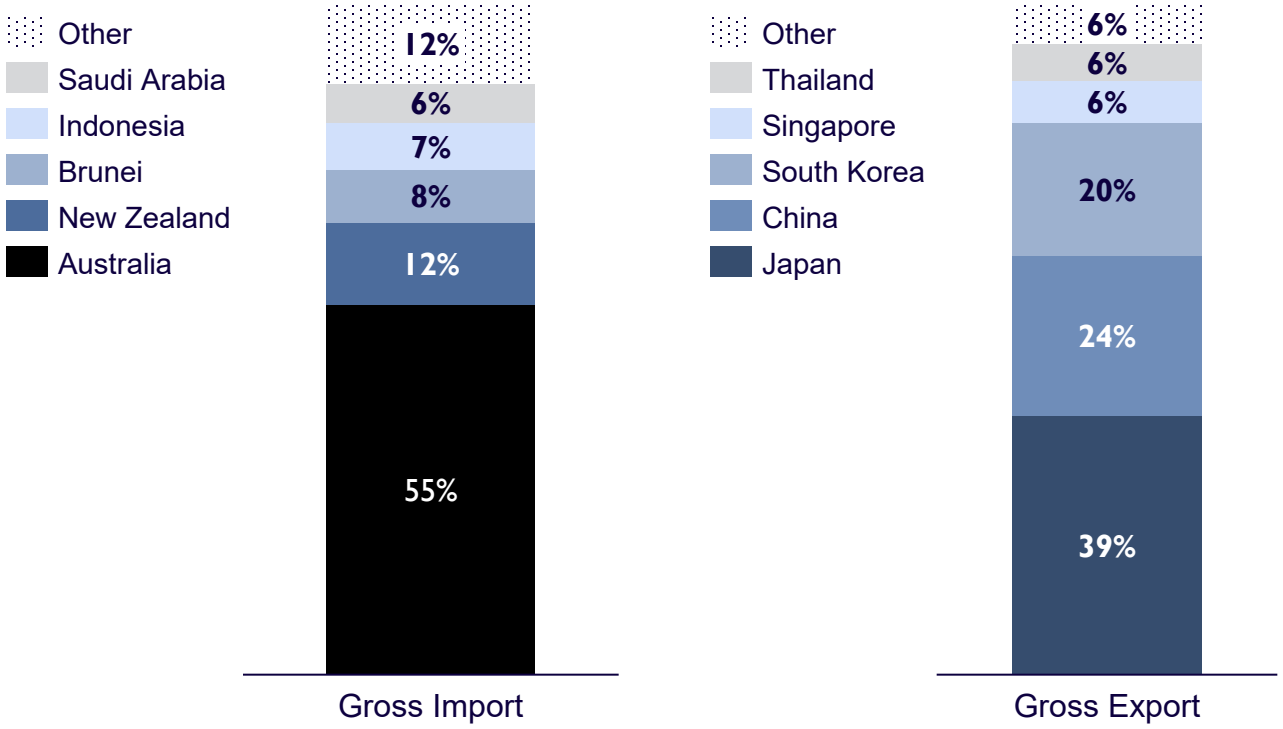
- As part of Malaysia's goal to compete with the oil refining and storage hub in Singapore, Petronas plans to build a $16 billion refining and petrochemicals integrated development project (RAPID) in Johor state at the southern tip of Peninsular Malaysia. This project includes a 300,000 bbl/d refinery, which industry expects will turn Malaysia from a net oil product importer to a net oil product exporter once it is operational.
- Additionally, the RAPID Pengerang project refinery is designed to produce gasoline and diesel that meet Euro 4 and Euro 5 fuel specifications. As a result, exports of low-sulfur fuels from the RAPID are expected to rise since the refinery is capable of producing large quantities of Euro-4 and Euro-5 fuel grades that meet stringent specifications in both domestic and international markets.
- The RAPID complex also positions Malaysia as a regional hub for petrochemical production, supplying feedstock for advanced manufacturing and supporting high-value chemical exports.

Source： Atlas of economic complexity (HS code: 2710 Petroleum Oils)

マレーシアは引き続き日本、中国、韓国への主要なLNG供給国であり、純輸出国の地位を維持する一方、需要増と供給構造変化を背景にLNG輸入インフラ拡張の基盤整備を推進

Natural Gas Import & Export Partners, 2023

Unit: Billion USD



Comments

- Malaysia has historically been a **major supplier of LNG for Japan, South Korea, and China**. Malaysia LNG has had over 30 years of experience as an established and reliable supplier in delivering LNG to these major markets.
- Japan continues to be the main buyer of natural gas from Malaysia, accounting for 39% of natural gas export in 2023, followed by China (24%), South Korea (20%).
- On the import side, Malaysia's position as a net exporter of natural gas remains unchanged. However, the country is laying groundwork to expand LNG import infrastructure, driven by demand growth on Peninsular Malaysia and structural gas supply shifts between eastern and western Malaysia.

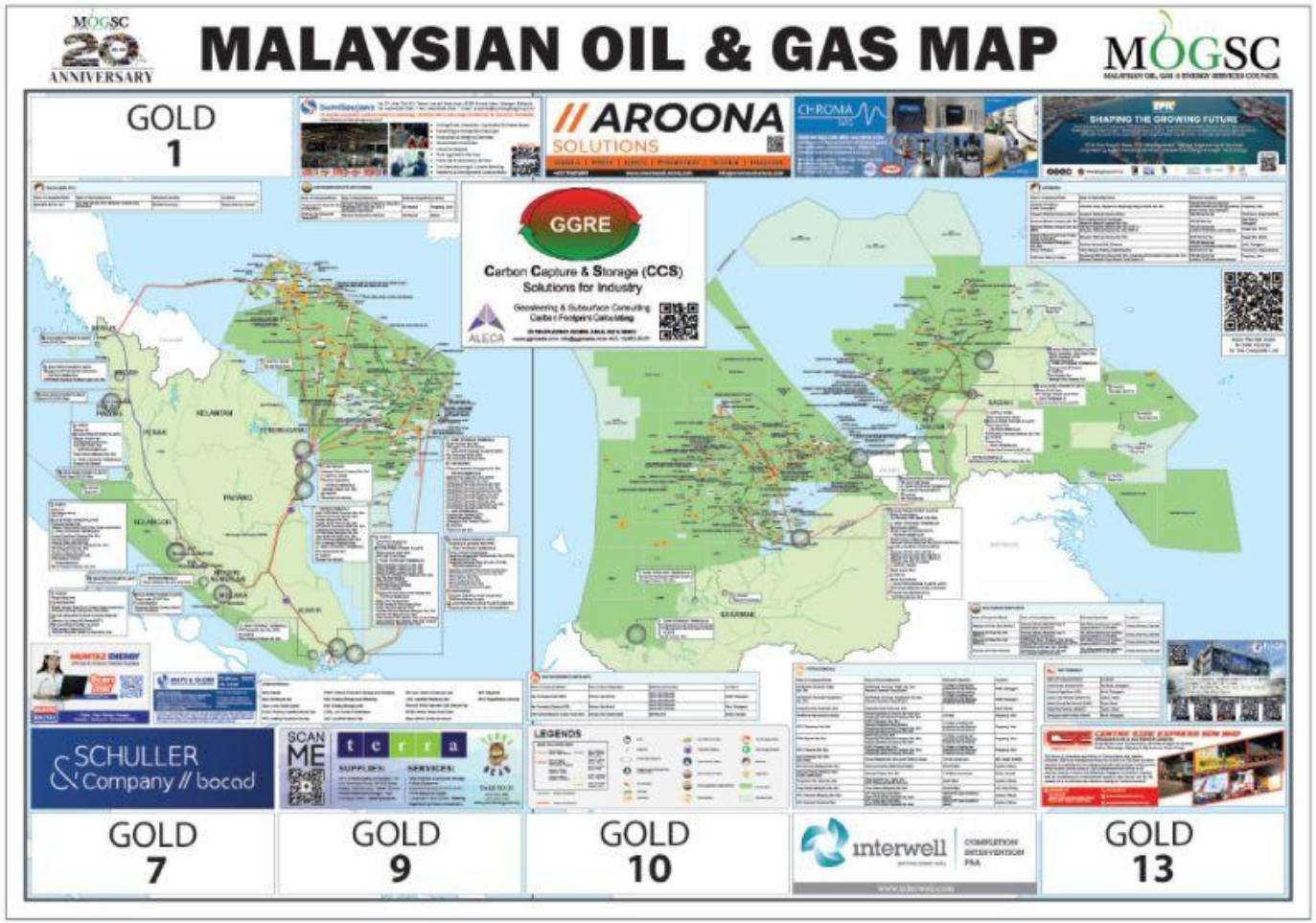
Source： Atlas of economic complexity (HS code: 2711 Petroleum Gases)

現在稼働中の主要な石油・ガスプロジェクト

No.	Name	Field Name	Companies	Completion Date (Projected)	Est. Peak Oil (b/d)	Est. Peak Gas (bcm)	Type of Project	Offshore/Onshore
1	Siakap North-Petai (SNP)	Siakap North-Petai	PTTEP, Petronas, ConocoPhillips Sabah, Shell, Pertamina	2014; Phase 2: 2021			Oil	Offshore
2	Malikai	Malikai	Shell (35%), ConocoPhillips (35%), Petronas (30%)	2017, Phase 2: 2021	60,000	0.5	Oil	Offshore
3	Block H (PFLNG Dua)	Rotan, Buluh	Petronas + partners	2021		0.28 (270MMscfd)	Gas (deepwater FLNG)	Offshore
4	Pegaga	Pegaga Gas Field	Mubadala Petroleum, Shell, Petronas	2022		5.4	Gas, Condensate	Offshore
5	Gumusut-Kakap Redev	Gumusut-Kakap	Petronas, Royal Dutch Shell, Murphy Oil	2022	135,000		Oil	Offshore
6	Kasawari	Kasawari	Petronas, Sarawak Shell, Murphy Oil	2023	45,000	2	Gas, Condensate	Offshore
7	SK330	SK330	Petronas, E&P Malaysia Venture, Petroleum Sarawak E&P	2023			Gas	Offshore

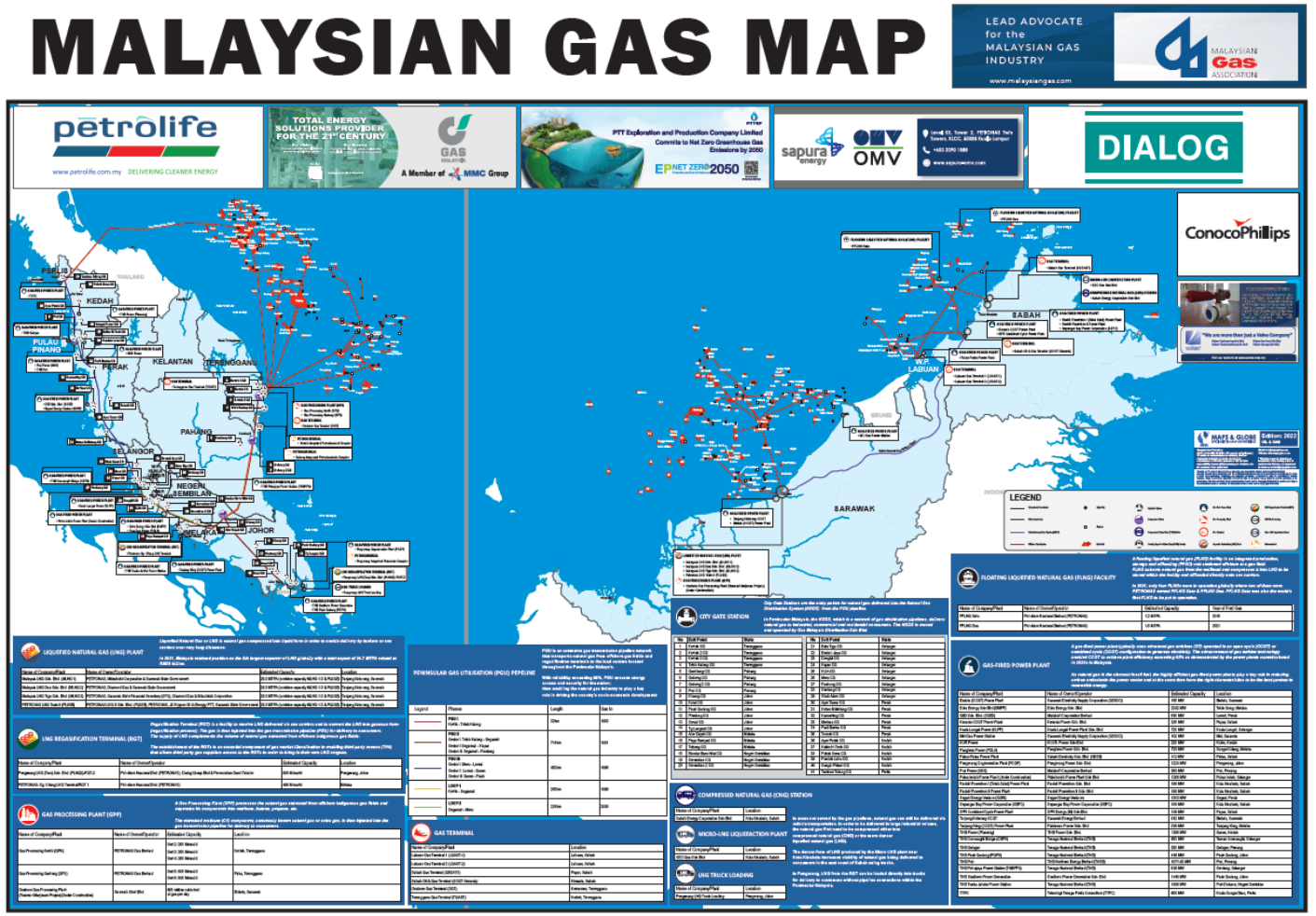
Source：PETRONAS Activity Outlook 2024-2026, Argus Media 2024, ConocoPhillips Malaysia, and etc.

（参考）マレーシアにおける石油・ガス田の地図 (1/2)



Source: The Malaysian Oil, Gas & Energy Services Council (MOGSC)

（参考）マレーシアにおけるガス田の地図 (2/2)



Source: Malaysian Gas Association @2025

上流部門の主要石油・ガスプロジェクト

No.	Name	Field Name	Companies	Completion Date (Projected)	Est. Peak Oil (b/d)	Est. Peak Gas (bcm)	Type of Project	Offshore/Onshore
1	Jerun	Jerun	SapuraOMV	2024 to 2026 (expected)	15,000		Gas, Condensate	Offshore
2	Timi	Timi	Shell	2025		3	Gas	Offshore
3	Guntong	Guntong	ExxonMobil (78%), Petronas (22%)	Commissioning			Oil, Gas	Offshore
4	Belud Cluster	Belud	Petronas, Shell	Producing			Oil, Gas	Offshore
5	Bekok Redevelopments	Bekok	Petronas	Producing			Oil, Gas	Offshore
6	Rosmari-Marjoram (Sarawak)	Rosmari, Marjoram	Shell (operator), Petronas	2026–2027		8.4 bcm (up to 22.6m³/day gas)	Gas	Offshore
7	SK301b/SK313	SK301b, SK313	TotalEnergies (operator, 50%), Petronas	Late 2020s	~113 bcm (over 4trillion cubic feet)		Gas	Offshore

Source：PETRONAS Activity Outlook 2024-2026, Argus Media 2024, ConocoPhillips Malaysia, and etc.

石炭発電における脱炭素に向けて、GTCCやアンモニア混焼等に関して日系企業-地場大手企業で協業がスタート

Status of Introduction of Coal-fired Power Generation

三菱重工-TNB (since 2023)

- (MHI) and TNB Power Generation Sdn. Bhd. (TNB Genco), a subsidiary of Tenaga Nasional Berhad, Malaysia's largest power generation company, signed a Memorandum of Understanding (MOU) to conduct research and exchange information on clean energy technologies. Memorandum of Understanding (MOU) signed with TNB Power Generation Sdn.
- The collaboration will begin with a technical feasibility study of TNB Genco's plans to install a high-efficiency gas turbine combined cycle (GTCC) with hydrogen-ready technology in Malaysia.
- In 2024, Mitsubishi Power was awarded the contract to supply a hydrogen-ready GTCC facility (500MW class, M701F gas turbine) in Sarawak. The plant is designed to co-fire up to 30% hydrogen at commercial operation, with a target opening date in 2027.
- This serves as a showcase of Japan’s clean power technology deployment, reinforcing the Asia Zero Emission Community (AZEC) strategy.

IHI-PETRONAS-TNB (since 2021)

- IHI, in collaboration with PETRONAS Gas & New Energy Sdn. Bhd. and TNB Power Generation Sdn Bhd. The feasibility study project was launched to evaluate the technology and economics of the entire supply chain, including the production of green ammonia derived from renewable energy and blue ammonia derived from natural gas, with the aim of reducing CO_2 emissions. IHI has been promoting the development of combustion technology using ammonia as fuel, and has been working on the advancement of combustion technology, including the development of an ammonia co-firing burner for coal-fired power plants that can both suppress nitrogen oxide (NOx) formation and achieve stable combustion. We are now working on the development of the world‘s first demonstration of 20% ammonia co-firing at a commercial coal-fired power plant in Japan.
- Together with Tenaga Nasional Berhad subsidiaries (TNB Research and TNB Genco), IHI and PETRONAS Hydrogen successfully carried out Malaysia’s first ammonia co-firing trial at the TNBR test rig facility in Kajang, Selangor.

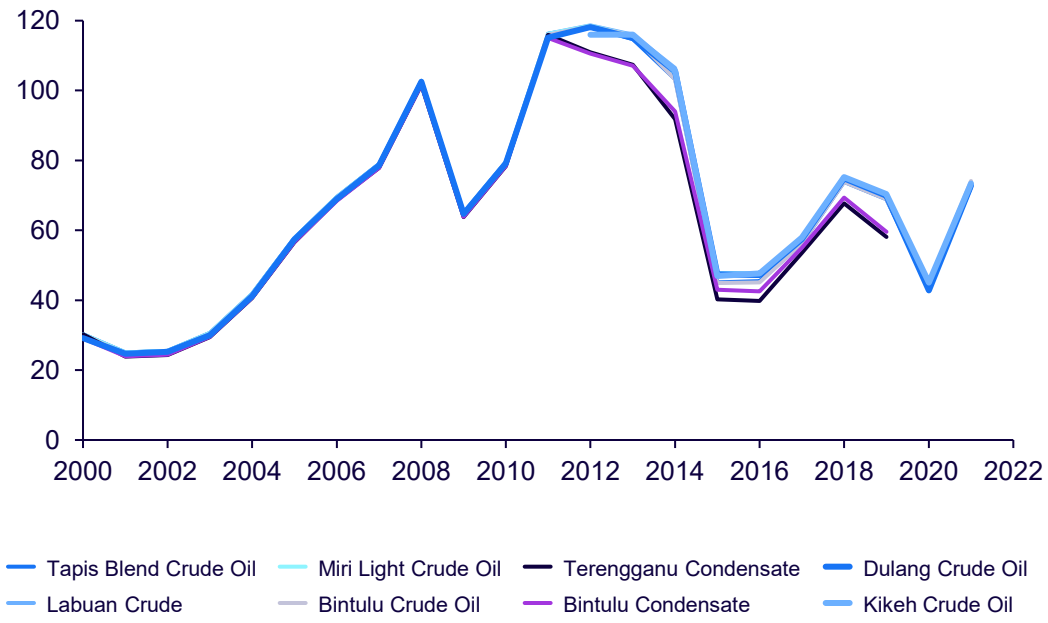
Source：S&P Global, Prime minister’s department

マレーシアの原油価格は2012年まで着実に上昇した後に下落へ転じ、RON97の小売価格もこれに連動して変動性を伴いながら同様の傾向を示している

Official Selling Price of Crude Oil

- Crude oil prices showed a long-term upward trend (+2%) with volatility, peaking around 2008, 2012 before declining post-2014

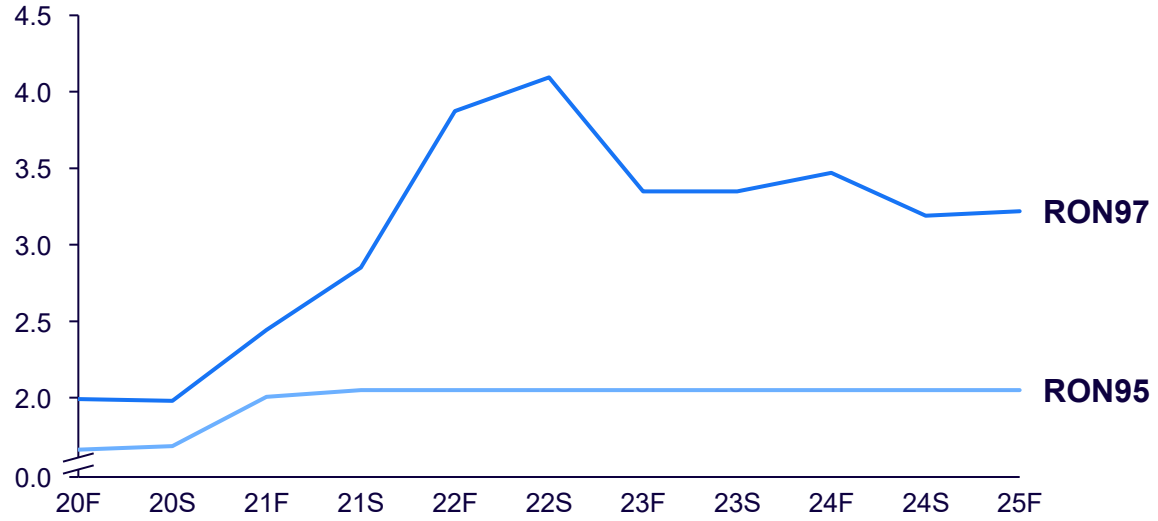
Unit: USD / Barrel



Official Selling Price of Retail Petrol Prices

- RON97 prices fluctuated with market trends, while RON95 remained stable, suggesting continued government price controls or subsidies

Unit: RM/Litter

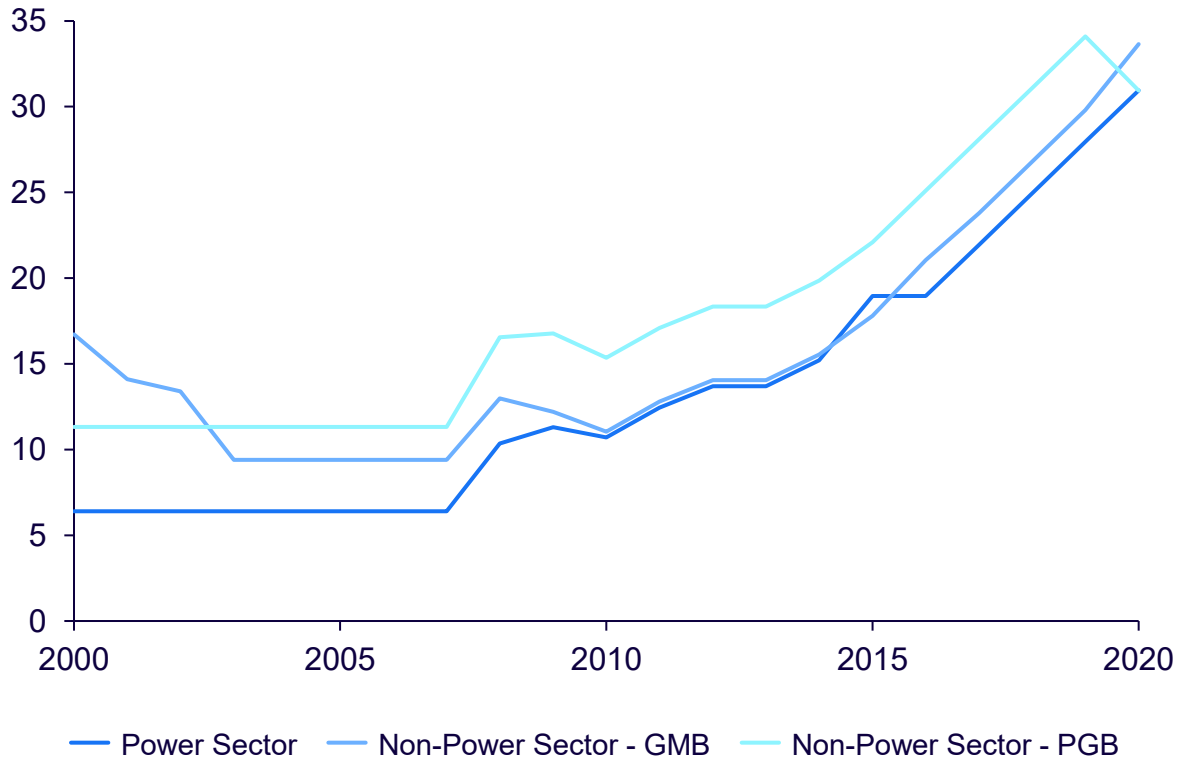


Source：Malaysia Energy Statistics Handbook 2023, data.gov.my

マレーシアの天然ガス価格は、2010年の補助金合理化プログラム導入以降補助金削減と市場価格調整が進められ、2014年以降電力・非電力部門ともに上昇を続けている

Official Selling Price of Natural Gas by Sector

Unit: RM/MMBtu



- The natural gas price have been increasing since 2014 due to several factors. One major factor is the rolled-out of **Subsidy Rationalization Program (SRP)** in 2010. As part of the SRP, the government aimed to gradually reduce subsidies on gas prices and align them with market realities.
- This meant that the prices paid by end-users for natural gas, including both power and non-power sectors, were gradually increased over time to reflect the true cost of supply.

Source：Malaysia Energy Statistics Handbook 2022 (Published in 2024), Oxford Institute for Energy Studies 2020

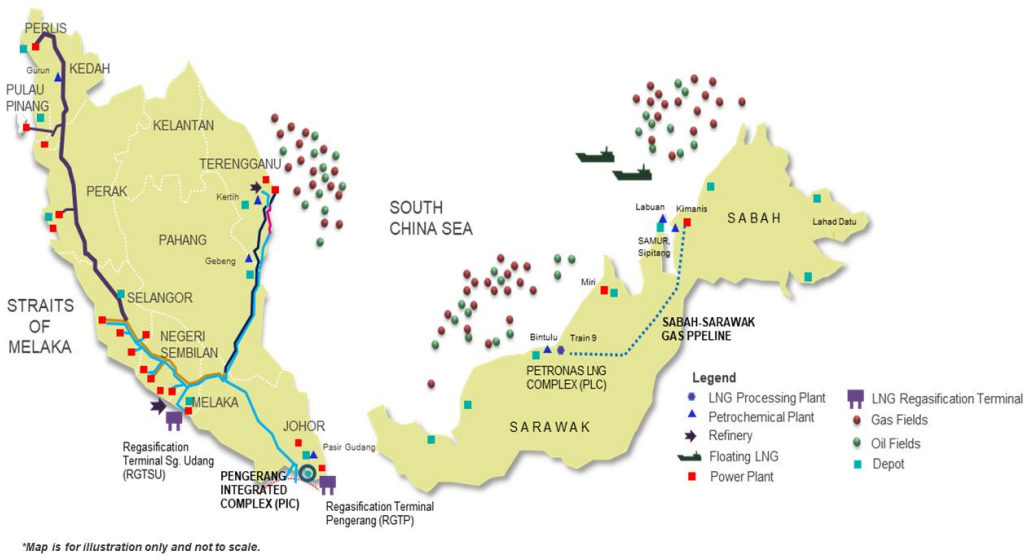
Contents

マレーシアの原油パイプラインは限られており、タピスやジャーニュの線に加え、サバ州やドゥマイ～マラッカ間の連系がある

Oil Pipeline Network

- Malaysia has a relatively limited crude oil pipeline network and uses crude oil tankers and trucks for onshore distribution. Two major crude oil pipelines in Peninsular Malaysia include:
  - Tapis pipeline, which runs from the Tapis field to the refinery in Kerteh.
  - Jerneh pipeline, which transports condensate from the Jerneh field to Kerteh.
- The crude oil pipeline network for Sabah in Borneo Malaysia connects offshore oil fields with the onshore Labuan oil terminal.
- Malaysia also has an oil products pipeline that runs from Indonesia's Dumai refinery to the Melaka refinery in Melaka, Malaysia.

Malaysia Oil & Gas Overview Map



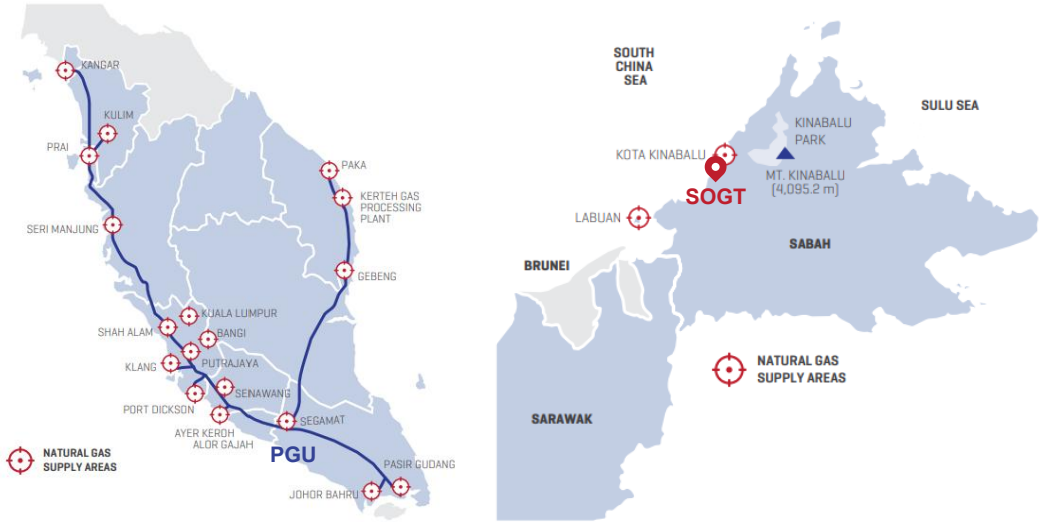
Map is for illustration only and not to scale.

Source: Energy Information Administration (EIA)

PGUプロジェクトは、タイ、インドネシア、シンガポールを結び、天然ガスの輸出（タイ、シンガポールへ）と輸入（インドネシアから）を行う

Gas Pipeline Network/Projects

- The **Peninsular Gas Utilization (PGU) project** remains Malaysia's largest domestic gas pipeline, now transporting over 2,500 MMscfd[1] and supporting both domestic and cross-border supply, with ongoing upgrades for safety and reliability (spanning 1,630 miles and capable of transporting ~1.28 Tcf/year; connected to Thailand, Indonesia, and Singapore for both imports and exports)
- As of 2025, **the Sabah–Sarawak Gas Pipeline (SSGP) is being decommissioned** due to persistent operational issues. Sabah's gas will instead fuel new onshore and floating LNG projects, redirecting its export and domestic strategies (previously transported ~270 Bcf/year over 318 miles from SOGT to Bintulu LNG terminal).
- The **Sabah Oil and Gas Terminal (SOGT) remains a critical hub**—a storage and processing terminal for gas and condensates from offshore Sabah fields—while pipeline-based long-distance Sabah–Sarawak gas transmission is gradually ending.



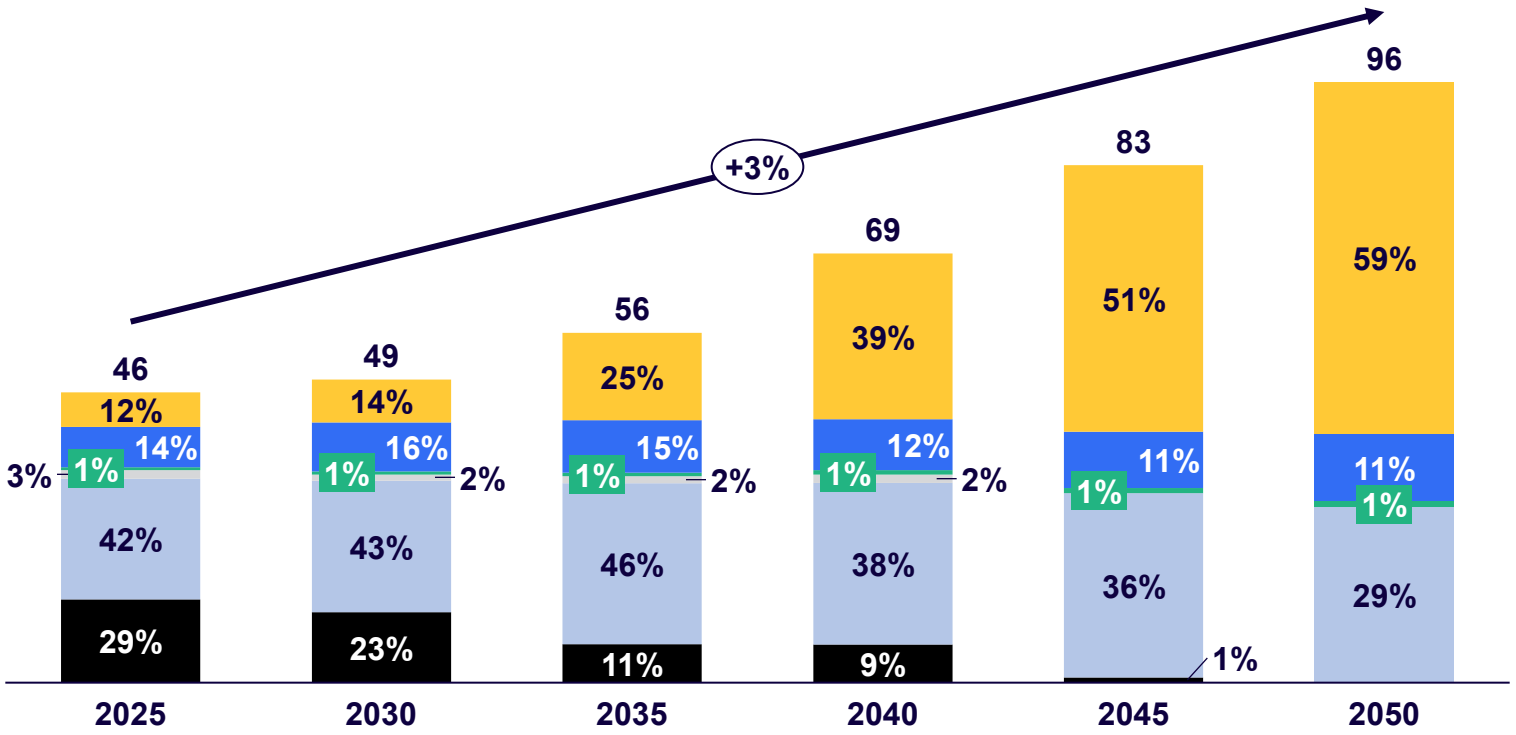
Source： Energy Information Administration (EIA),各種二次情報よりADL作成
Note: 1) MMscfd refers to Million Standard Cubic Feet per Day

Contents

マレーシアの電力システムは転換期を迎えており、2050年までに太陽光発電を中心とする再生可能エネルギーが設備容量の主導的地位を占める見通し

Projected Power System Installed Capacity Mix 2050

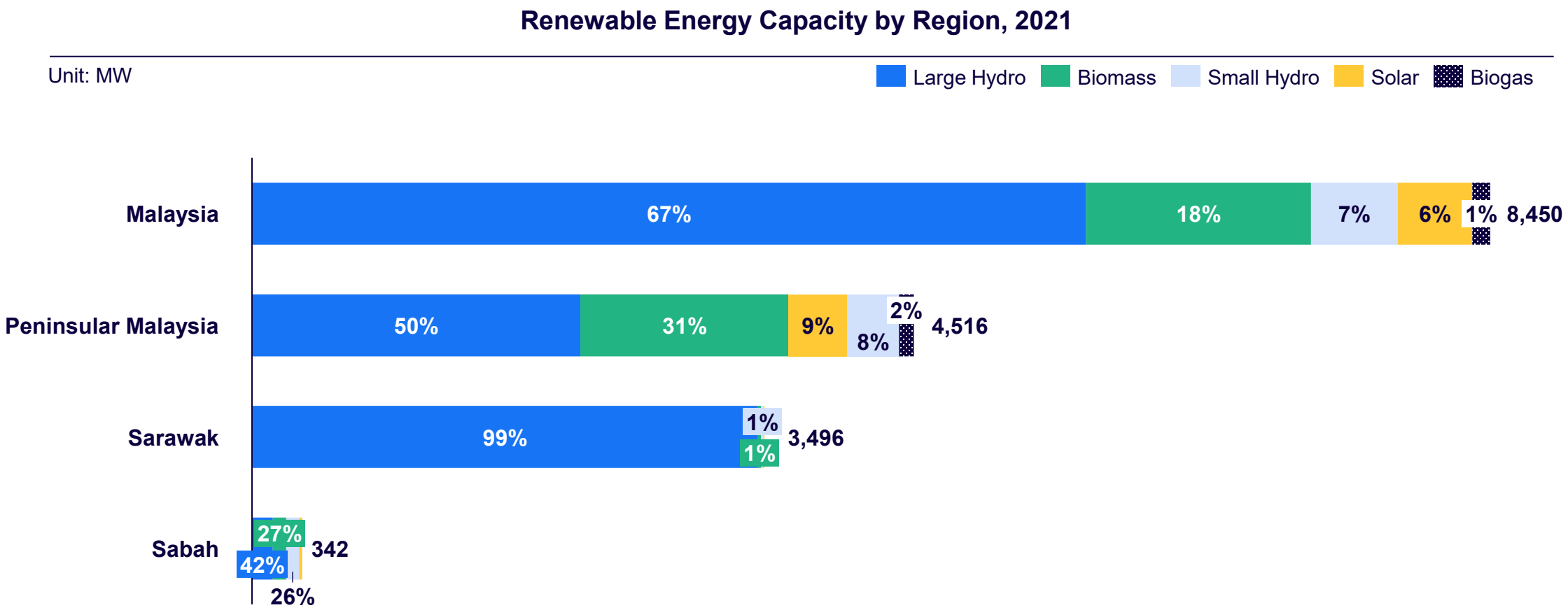
Unit: GW



CAGR 2025-2050	
PV	+10%
Hydro	+2%
Bioenergy	+3%
Oil	-100%
Gas	+2%
Coal	-100%

Source：National Energy Transition Roadmap @2023

マレーシアの再生可能エネルギーは大型水力発電が主体ですが、マレー半島およびサバ州では、よりバランスの取れたエネルギーミックスが見られる

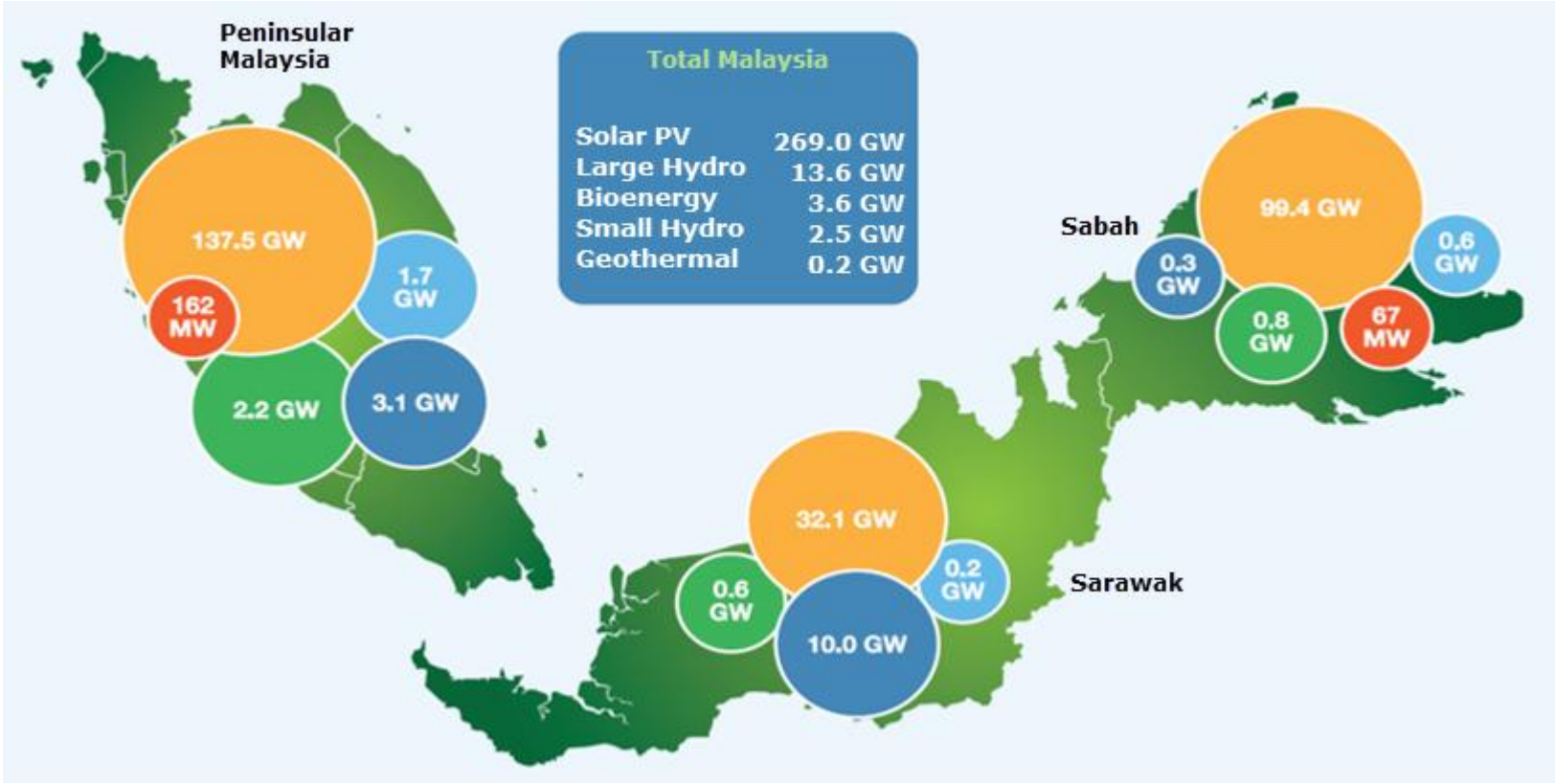


Source： MyRER – Renewable Energy Malaysia (seda.gov.my) @2021

マレーシアの再生可能エネルギー資源ポテンシャルは合計約289GWで、その大半を太陽光が占め、サラワクは大規模水力、半島マレーシアとサバは太陽光中心の構成となっている

Summary of RE Resource Potential in Malaysia

- Solar PV (includes ground mounted, rooftop and floating installation)
- Bioenergy (includes agriculture, animal and municipal & hazardous waste)
- Small hydro (system size up to 100 MW)
- Large hydro (system size > 100 MW)
- Geothermal



Source: MyRER – Renewable Energy Malaysia (seda.gov.my) @2021

稼働中の大規模太陽光発電プラント（2025 年時点）

Current Operating Solar Power Plant

No.	Plant/Project Name	Capacity (MW)	Location	Operator/Owner	Commissioned
1	**Sinar Kamiri Sg. Siput**	49	Perak	Sinar Kamiri (Mudajaya)	2018
2	**TNB Sepang Solar PV Park**	78	Selangor	TNB Sepang Solar	2018
3	**Quantum Solar Merchang (Merchang solar farm)**	66	Terengganu	Scatec Solar / ITRAMAS	2019
4	**TNB Bukit Selambau (Phase 3)**	30	Kedah	TNB	2020
5	**ENGIE TTL Kerian Solar PV Park**	136	Perak	ENGIE & TTL Energy	2022
6	**TNB Bukit Selambau Dua (TBSS2, Phase 4)**	50	Kedah	TNB Bukit Selambau Solar Dua Sdn Bhd	2023
7	**Others from LSS (LSS3/LSS4)**	30–50	Various	Various	2019–2023

Source：各種二次情報よりADL作成

マレーシアの大規模太陽光発電（LSS）プログラムは、新たな入札を通じて拡大を続けており、国家の再生可能エネルギー目標の達成を後押ししている (1/3)

Malaysia’s Large-Scale Solar (LSS) Program 1-4

Major LSS Pojects

No.	Project Name	Capacity (MW)	Location	Commissioned
1	**TNB Sepang Solar PV Park**	78	Selangor	2018
2	**Quantum Solar Merchang Solar PV Park**	66	Terengganu	2019
3	**ENGIE TTL Kerian Solar PV Park**	136	Perak	2022
4	**Suria Sungai Petani Solar PV Park**	116	Kedah	2022
5	**Ib Vogt Coara Marang Solar PV Park**	116	Terengganu	2022

Comments

- **The five solar PV sites on the right fall under the LSS1–LSS4 program:**
  - TNB Sepang Solar PV Park: LSS1 or LSS2
  - Quantum Solar Merchang Solar PV Park: LSS2
  - ENGIE TTL Kerian Solar PV Park: LSS3
  - Suria Sungai Petani Solar PV Park: LSS3.
  - Ib Vogt Coara Marang Solar PV Park: LSS4

- **Key Trends:**
  - Malaysia’s competitive LSS bidding process and ambitious national targets (70% renewable in the power mix by 2050) ensure rapid LSS expansion and investment.
  - The next wave will feature more floating solar and rural projects, with grid and environmental resilience as development priorities.

Source：TNB Engineering Corporation (TNEC), 各種二次情報よりADL作成

マレーシアの大規模太陽光発電（LSS）プログラムは、新たな入札を通じて拡大を続けており、国家の再生可能エネルギー目標の達成を後押ししている (2/3)

Malaysia's Large-Scale Solar (LSS) program 5

Four separate packages under LSS5

No.	Project Type	Quota (MW)	Generation Capacity Range (MW)	Equity Requirement
1	**Rooftop or ground-mounted**	250	1 – 10	100% Bumiputera equity
2	**Rooftop or ground-mounted**	250	10 – 30	Min 51% Bumiputera, 100% local Malaysian
3	**Rooftop or ground-mounted**	1000	30 – 500	Min 51% Bumiputera, Min 51% local Malaysian
4	**Floating solar**	500	10 – 500	Min 51% Bumiputera, Min 51% local Malaysian

Comments

- **Project Overview:**
  - In April 2024, Malaysia launched the fifth round of the Large Scale Solar programme (LSS5 or LSS PETRA), offering a total capacity of 2 GW.
  - The projects are scheduled to begin commercial operations in 2026 and 2027.
- **Deployment Priorities:**
  - LSS5 is expected to sustain solar deployment momentum, especially for RE-pure plays in 2025 and beyond.

Source：Maybank, Malaysia Renewable Energy 2025, 各種二次情報よりADL作成

マレーシアの大規模太陽光発電（LSS）プログラムは、新たな入札を通じて拡大を続けており、国家の再生可能エネルギー目標の達成を後押ししている (3/3)

Malaysia’s Large-Scale Solar (LSS) program 5

Shortlisted Companies For LSS5

No.	Company	Capacity (MW)	Location
1	**TNB Renewables Sdn Bhd**	500	Kuala Muda, Kedah
2	**Edra Power Holdings Sdn Bhd and Worldwide Holdings**	300	Selangor
3	**Gentari Sdn Bhd**	100	Kedah
4	**Ditrolic Energy Holdings Sdn Bhd**	100	Perak
5	**Samaiden Group**	99.99	Pasir Mas, Kelantan
6	**Parkland Renewable Energy Sdn Bhd**	99.99	Johor
7	**Wawasan Demi Sdn Bhd**	99.99	Perak
8	**Nusantara Suriaamas Sdn Bhd**	99.99	Selangor
9	**Conexstone Energy Sdn Bhd**	90	Melaka

Comments

- The Energy Commission (EC) has recently notified shortlisted bidders for the 2 GW LSS5 programme. **However, the EC has not disclosed the list of winning developers or the range of awarded bid prices**.
- Sector analysts expect firms with previous successful bids and strong solar industry records to capture significant allocations in LSS5.
- LSS5 represents Malaysia’s largest-ever competitive solar tender and is central to the country's goal of reaching a 70% renewable energy mix by 2050. **The awards from this round will shape the national solar landscape through to 2027 operations.**

Source：Maybank, Malaysia Renewable Energy 2025, 各種二次情報よりADL作成

マレーシアの大規模水力発電はサラワク州が中心で、全国の設備容量の半分以上を占めている。また、マレー半島にも相当な発電容量が設置されている

Installed Capacity of Major Hydro Power Stations by Region (1/3)

Installed Capacity Share by Region

Unit: MW

Breakdown of Major Hydropower Plants in Sabah and Sarawak

No.	State	Station	Installed Capacity (MW)	Total (MW)
1	Sabah	Tenom Pangi	3 x 24	72
2	Sarawak	Batang Ai	4 x 27	108
3	Sarawak	Bakun	8 x 300	2400
4	Sarawak	Murum	4 x 236	944

Source：National Energy Balance @2021
Note: Plants not in operation or under rehabilitation are excluded.

マレーシアの大規模水力発電はサラワク州が中心で、全国の設備容量の半分以上を占めている。また、マレー半島にも相当な発電容量が設置されている

Installed Capacity of Major Hydro Power Stations by Region (2/3)

Breakdown of Major Hydropower Plants in Peninsular Malaysia

No.	State	Station	Installed Capacity (MW)	Total (MW)
1	Terengganu	Stesen Janakuasa Sultan Mahmud Kenyir	4 x 100	400
2	Terengganu	Stesen Janakuasa Hulu Terengganu	2 x 125	250
3	Terengganu	Stesen Janakuasa Tembat	2 x 7.5	15
4	Perak	Stesen Janakuasa Temenggor	4 x 87	348
5	Perak	Stesen Janakuasa Bersia	3 x 24	72
6	Perak	Stesen Janakuasa Kenering	3 x 40	120
7	Perak	Chenderoh	3 x 10.7 + 1 x 8.4	40.5

Source：National Energy Balance @2021
Note: Plants not in operation or under rehabilitation are excluded.

マレーシアの大規模水力発電はサラワク州が中心で、全国の設備容量の半分以上を占めている。また、マレー半島にも相当な発電容量が設置されている

Installed Capacity of Major Hydro Power Stations by Region (3/3)

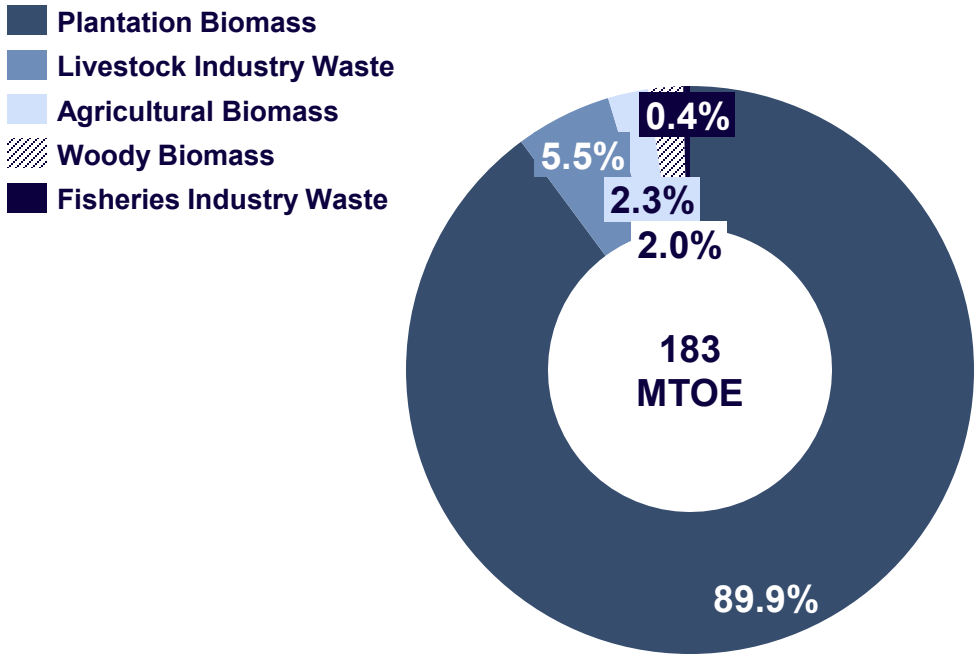
Breakdown of Major Hydropower Plants in Peninsular Malaysia

No.	State	Station	Installed Capacity (MW)	Total (MW)
8	Perak	Sg. Piah Hulu	2 x 7.3	14.6
9	Perak	Sg. Piah Hilir	2 x 27	54
10	Pahang	Stesen Janakuasa Sultan Yussuf, Jor	4 x 25	100
11	Pahang	Stesen Janakuasa Sultan Idris II, Woh	3 x 50	150
12	Pahang	Stesen Janakuasa Ulu Jelai	2 x 186	372
13	Kelantan	Pergau	4 x 150	600

Source：National Energy Balance @2021
Note: Plants not in operation or under rehabilitation are excluded.

2023年のマレーシアにおけるバイオ燃料原料の約90%はパーム油由来であり、政府は2025年までにB30導入を目指す一方、燃料補助金の段階的廃止により政策転換が進んでいる

Ratio of Biofuel Feedstock , 2023



Malaysia leverages its abundant **palm oil** supply as the primary feedstock for biofuel refining

Background Overview

- Malaysia's biofuel mandate began with the National Biofuel Policy in 2006, aimed at reducing fossil fuel dependence and promoting cleaner energy. A standard blending rate was introduced in 2008, with B7 adopted for industrial sectors by 2019, and B20 targeted for transport by 2021. The National Automotive Policy (2020) reaffirmed biodiesel as a national fuel standard, setting a target of up to B30 by 2025. To ensure commercial viability, price subsidies have also been implemented.
- **While such subsidies have historically aimed to promote economic stability and energy affordability, a major policy shift is underway:**
  - Prime Minister Anwar Ibrahim announced that **blanket subsidies for RON95 petrol will be phased out by mid-2025.**
  - This follows the partial removal of diesel subsidies in mid-2024, with targeted subsidies retained for Borneo, public transportation, and the fisheries sector.

Source：National Biomass Action Plan 2023-2030, USDA Gain Report - Malaysia Biofuel Annual 2024

バイオディーゼルのプラントとバイオガスプロジェクトの入札者一覧

Completed Biodiesel Plants in Malaysia, 2025

No.	Company	Location	Note
1	Carotino	Pasir Gudang, Johor	Launched Malaysia??s first commercial biodiesel plant in 2006.
2	Wilmar	Multiple Locations (mainly Johor)	Operates several facilities and is a major global biodiesel player.
3	Achi Jaya	Johor	Entered the sector early and maintains its presence.
4	Vance Bioenergy	Johor	Runs three plants; production up to 450,000 tonnes/year.
5	Sime Darby Biodiesel	Carey Island & Teluk Panglima Garang, Selangor	Operates two biodiesel plants in Selangor.
6	FIMA Biodiesel Sdn Bhd	Port Klang, Selangor	Actively produces biodiesel and supports renewable fuel goals.
7	KLK Bioenergy (Zoop)	Shah Alam / Port Klang	Contributes to production from Shah Alam and Port Klang.
8	Mewah Group	Pulau Indah, Selangor	Commissioned biodiesel facility in 2014; still operational.
9	Zoop Sdn Bhd	Shah Alam	Engages in biodiesel and palm oil processing from Shah Alam site.
10	Green Lubes / FGV	Kuantan Port, Pahang	Produces 250,000??260,000 tonnes/year with upgraded refining lines.
11	Mission NewEnergy	Port Kuantan, Pahang	Operates a 2nd-generation plant using advanced technology.
12	Global Bio-Diesel	Lahad Datu, Sabah	Runs one of Sabah??s earliest operational biodiesel plants.
13	Green Edible Oil	Sandakan, Sabah	Active in production; supports Sabah??s bioenergy industry.
14	SPC Biodiesel Sdn Bhd	Lahad Datu, Sabah	Plant completed, but only limited activity observed.
15	Platinum Biofuels Sdn Bhd	Seremban, Negeri Sembilan	Functional, but operates with low activity.
16	Senari Biofuels / Global Bonanza	Kuching, Sarawak	Plant completed, but output remains limited.

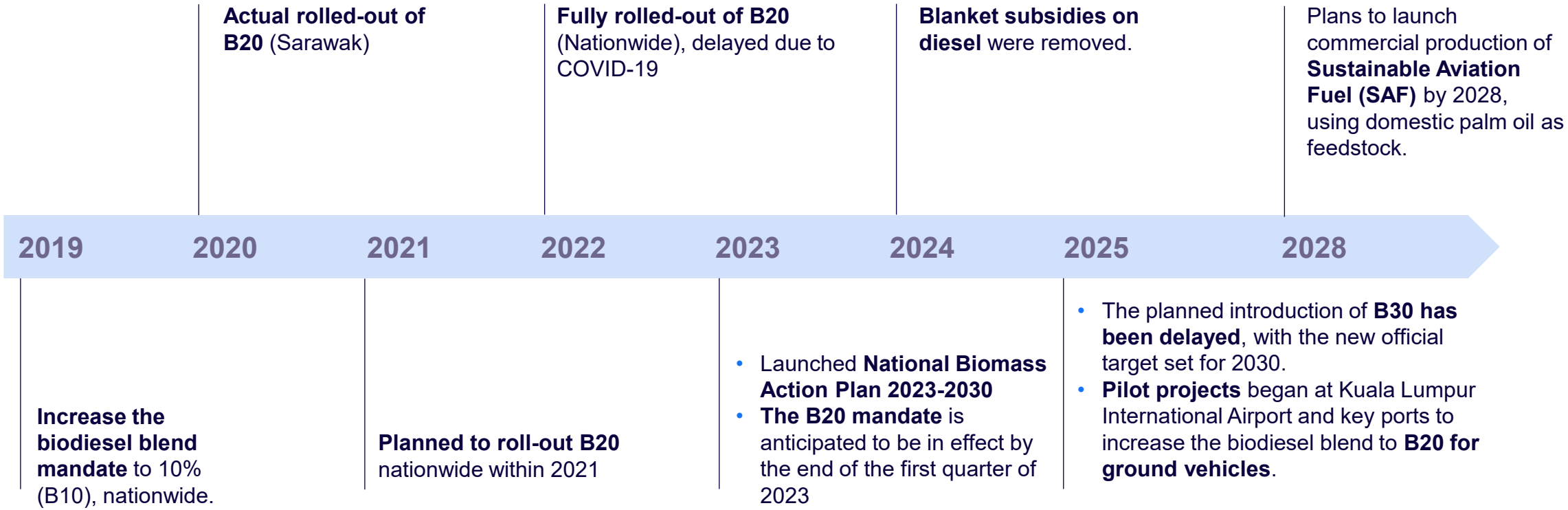
Successful Bidders of Biogas Projects, 2020

No.	Bidder	Installed Capacity (MW)
1	Bell Cenergi Bp Sdn. Bhd.	1.56
2	Cenergi Elphil Sdn. Bhd.	1.2
3	Cenergi Endah Sdn. Bhd.	1.2
4	Cenergi Fjp Sdn. Bhd.	1.5
5	Concord Green Biogas Sdn. Bhd.	2.4
6	Fermanagan Biobridge Hall Sdn. Bhd.	1.6
7	Glt Lembing Power Sdn. Bhd.	1.501
8	Glt Lestari Sdn. Bhd.	0.8
9	Green Palm Gas Sdn. Bhd.	2.4
10	Jana Landfill Sdn. Bhd.	1.067
11	Reviva Sdn. Bhd.	1.1
12	Sc Green Solutions Sdn. Bhd.	1.2
13	Southern Biogas Sdn. Bhd.	2.4
14	Strategic Euro Resources Sdn. Bhd.	1.2
15	Strategic Euro Resources Sdn. Bhd.	6
16	Teraju Sepadu Sdn. Bhd.	2.134

Source： GTE Lighting & Equipment Sdn. Bhd - *Malaysia's Biodiesel Industry in 2025,* SEDA - List of bidders who have successfully submitted their e-Bidding (Biogas)

マレーシアは段階的なバイオディーゼル戦略を採用しており、B10は全国で導入済み、B20は主要地域で試験運用中、そしてB30が長期的な目標として設定されている

Malaysia Biofuel Policy Development

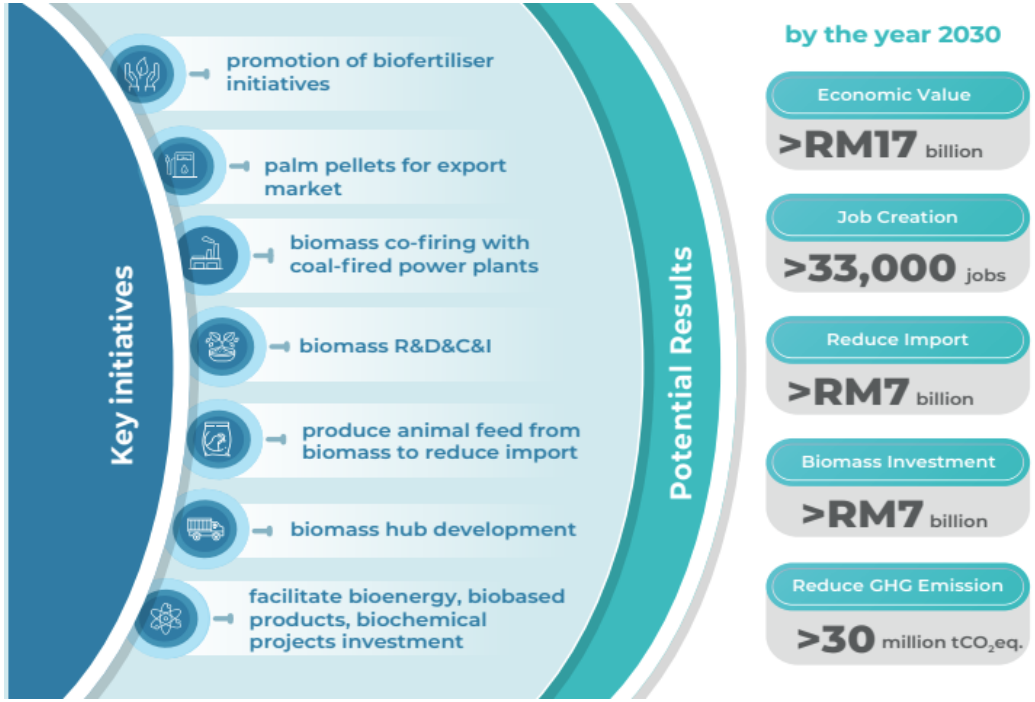


Source： USDA Gain Report - Malaysia Biofuel Annual 2024, Reuters, S&P Global, Paultan and etc

バイオマス行動計画は、バイオマスを戦略燃料と位置づけ、混焼技術の推進、生産拡大、供給チェーン強化で活用を進めている

Overview of the National Biomass Action Plan (NBAP)

In December 2023, Malaysia officially launched a comprehensive **National Biomass Action Plan 2023-2030, targeting value creation from biomass**, especially oil palm residues, and integrates sustainability, productivity, and the circular economy as key pillars.



Future Forecasts for Biomass Fuels from the NBAP

- Key Forecasts
  - **Supply Chain Enhancement:**
    - Establishment of 20 "Biomass Hubs" nationwide to streamline supply chains and encourage resource aggregation.
  - **Industrial Upgrading:**
    - Focus on converting palm and agricultural biomass into:
      - Pellets (for export and co-firing)
      - Bio-based chemicals
      - Biofuels
  - **Feedstock Programs:**
    - R&D on forest farming (e.g., bamboo) to support biomass supply chains
  - **Biomass-to-Wealth Models:**
    - Transition from raw biomass burning to value-added uses such as palm oil mill effluent (POME) and empty fruit bunches

- Biomass Co-Firing & Energy Generation Goals
  - **Coal Co-Firing Target:**
    - Goal: 70% renewable energy mix in grid supply by 2050.
  - **Bioenergy Capacity:**
    - Target to achieve up to 1.4 GW capacity in bioenergy (biomass + biogas) by 2050.

Source： National Biomass Action Plan 2023-2030

バイオ燃料は主にパーム油副産物に依存し、ごみや家畜排せつ物、ココナツ殻、ゴムや木質廃棄物も潜在資源だが、コストや技術的制約などが成長のボトルネック

Malaysia Biofuel Situation

Types of biomass		Market size (TJ)	Background	
			Growth drivers	Bottlenecks
Human	Raw garbage	83,606	• High organic matter make garbage suitable for biogas • Growing landfill pressure pushes for energy recovery	• Complex and sensitive processing technology • Limited centralized waste-to-energy facilities
Livestock	Livestock manure	40,539	• (Since it is not viewed as a key industry in Malaysia, there are few expectations for growth and there are no major drivers)	• Scale of plants are small due to lack of resources in an area.
Palm oil	Palm oil frond, trunk etc.	347,653	• Massive palm oil industry producing millions of tons of output per year (18.9 Million in 2011) which yields equally large volume of by products • Within government policy, expectations are also pointed toward the use of palm-based biomass • Since it is a large-scale industry, steady biomass production is can be expected • Gains CDM/voluntary carbon credit eligibility	• Commonly used as fertilizer • Land competition & resistance from plantation operators
	Palm oil mill effluent	53,028		• Waste consumed internally by giant palm mills • Economically gathering resources from the fields
	Palm oil Fibre and kernel shell	302,786		
	Palm oil empty fruit bunch	147,031		• Require larger than usual capex • In most cases, export to China in mat form, or to Japan & S. Korea as an ingredient for mixed fuel coal-fired power
Coconut	Coconut Husk	4,131	• No current project that utilizes coconut waste for power production • Ashes of burnt waste can be further used as fertilizer or filler in construction • Low-utilized waste with biochar potential	• Complex know how and technology required • Gathering and transportation hurdles • Resource base is shrinking gradually • Coconut shells used to make charcoal briquette
	Coconut Shell	2,052		
Woody waste	Rubber plant wood	44,257	• Mainly derived from palm oil trees and rubber plants after the end of crop cycle • Wood waste are converted to pellets and caters to the export market	• Gathering and transportation of waste products from field to plant • State policies to conserve forest and reduce logging drastically
	Forest waste, Sawmill residue	270,717		

Source： National Biomass Action Plan 2023-2030, Sustainable Energy Development Authority Malaysia, CleanBiz.Asia, UN FAO, News articles, Interviews, ADL analysis
Note: The list of biofuels presented is not exhaustive.

マレーシアではペトロナス主導でCCS推進が進められ、複数の候補地や法整備・補助制度の検討が進行中で、2025年以降に本格的な支援策が導入される見込みである

Government Trends in CCUS

CCUS事業の推進に対する動向	• Petronas, a state-owned company, takes the lead in promoting CCS • Regulations and subsidies are expected to be developed in 2023~2025. • Petronas has allocated up to RM5 billion for Carbon Capture and Storage (CCS) projects, including the expansion of infrastructure such as the Kuantan Port onshore terminal. • Seven potential CCS sites have been identified nationwide, in addition to three operational sites.
各種政策 （産業/エネルギー/環境）	• Promote industrial development around eight strategic themes centered on high-tech industries and high-value-added fields that are not related to CCS • While accelerating the introduction of renewable energy, we will continue to rely on thermal power, mainly natural gas, from the perspective of energy security and electricity costs.
規制	• Malaysia is in the process of establishing CCS-specific laws, aligning with international standards and supporting new facility launches like Kasawari.
支援策 補助金	• As of August 2025, direct government subsidies specifically for CCS have not yet been introduced. • Practical frameworks for credits and incentives are anticipated to be announced or piloted during or after 2025 as industry and government negotiations mature.

Source: ADL creation from various secondary information

Petronasが政府に対してCCS事業成立に向けた規制・補助金制度を構築するように働きかけている模様

CCS関連プレイヤー

政策意思決定者

政府

President Staff Office

CCS policy framework now guided by CCUS Bill 2025

- Malaysia Carbon Capture, Utilisation and Storage Agency
- Ministry of Energy and Natural Resources (KeTSA)
- Ministry of Environment and Water (KASA)
- Ministry of Transport
- ：

※CCSの規制は中央政府が規定するものであり、州政府による規制は策定されない方針

民間企業

内資系：PETRONAS

外資系：ExxonMobil

CCSプロジェクトにおけるパワーバランス

概要

Petronasが力を持っており、CCS事業成立に向けた規制・補助金制度を構築するように働きかけている

パワーバランス

マレーシア政府

主導プレイヤー

PETRONAS

- PetronasがCCS事業成立に向けた規制・補助金制度を構築するように働きかけ
- 未整備状況にあったクレジット制度や税額控除に支援を図るように政府に意見を提出

背景

- Petronasはマレー首相府の管轄の国営石油・ガス会社のため首相に直接意見を提出することが認められており、政策決定に強い影響力を持つ

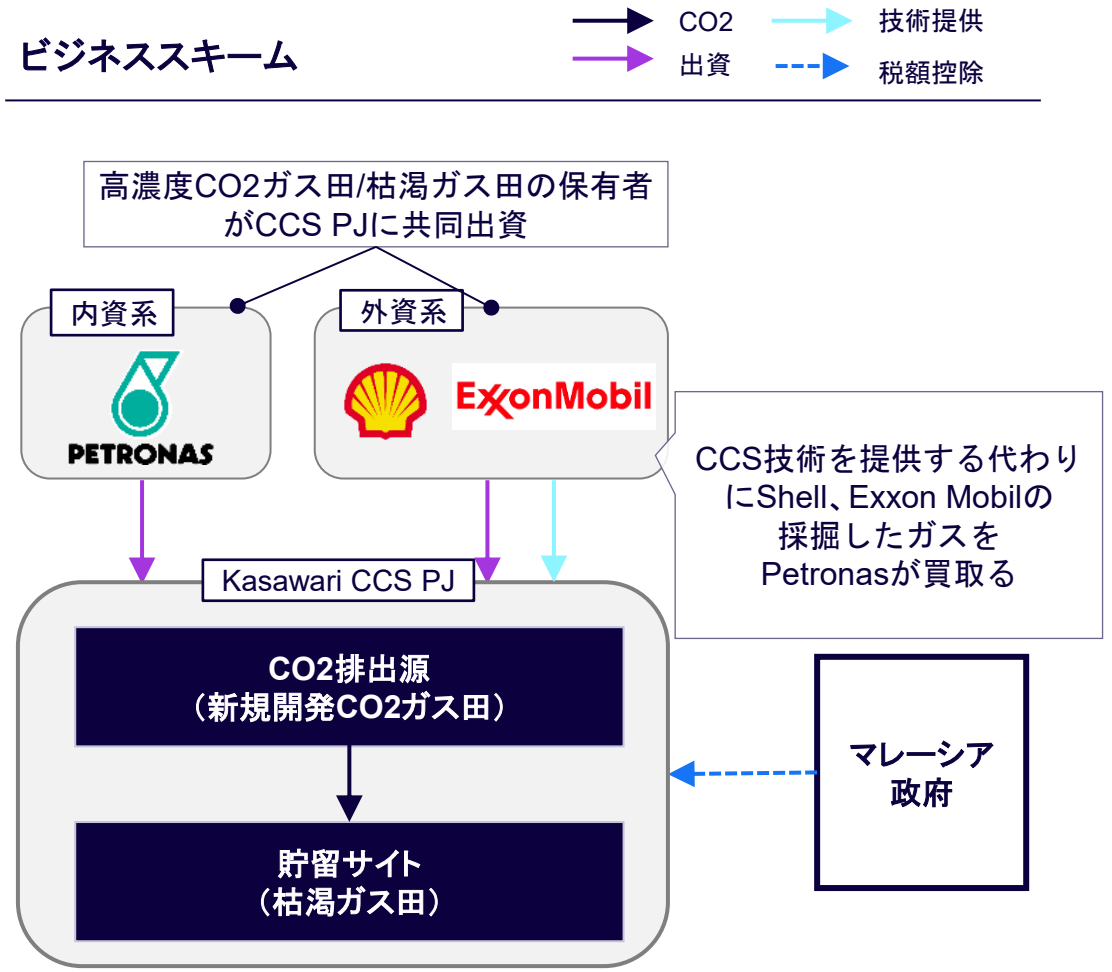
Source： Ministry of Energy HP 等よりADL作成

Kasawari CCSは新規開発のガス田から回収したCO2を枯渇したガス田に貯留。Shell、Exxon MobilがCCS技術を提供する代替として採掘したガスをPetronasが買取る方針

概要

実施主体	• Petronas • Shell • Exxon Mobil
操業開始年	• 2025 Q4
CO2 回収量	• 年間約330万トン
CO2排出源	• 高濃度CO2ガス田 (PETRONAS、Shell、Exxon Mobil社保有)
CO2活用法	• 枯渇ガス田への貯留・EGR
政府による PJへの支援	• 税額控除の適用を検討中 （CCS施設を運営する石油・ガス会社への減税）

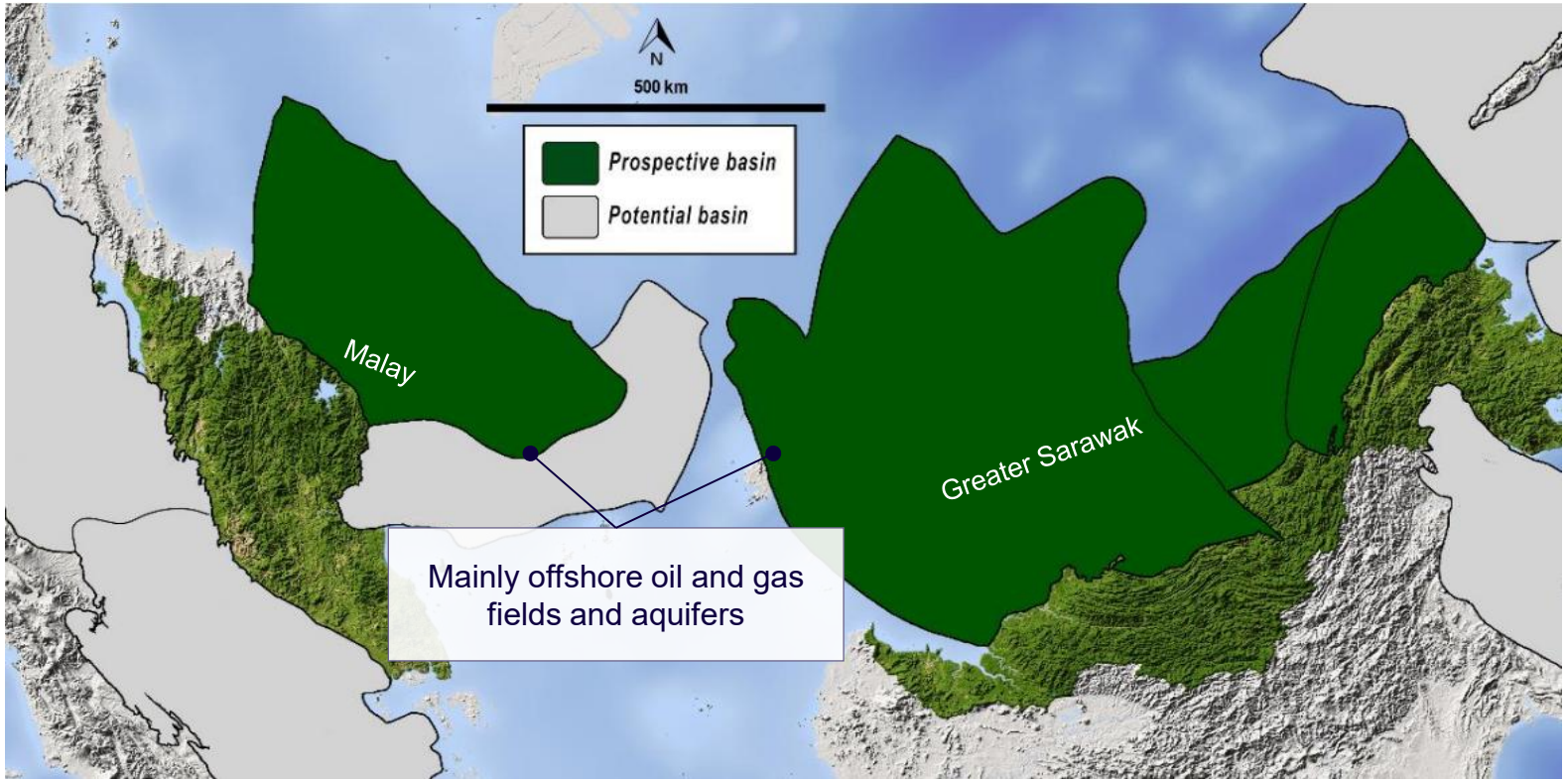
ビジネススキーム



Source： PETRONAS HP、「Petronas awards dual FEED contracts for world's largest offshore CCS project

マレーシアにはオフショアの油田・ガス田、帯水層を中心に約153GtonのCO2貯留ポテンシャルが存在

CCS potential sites in Malaysia



National Total Storage Potential

- There is a CO_2 storage potential of 153 Gt in total.
- The main storage areas are offshore oil and gas fields and aquifers.
- Major CCS-suitable storage potentials:
  - Greater Sarawak: 10 Gt
  - Malay: 15 Gt

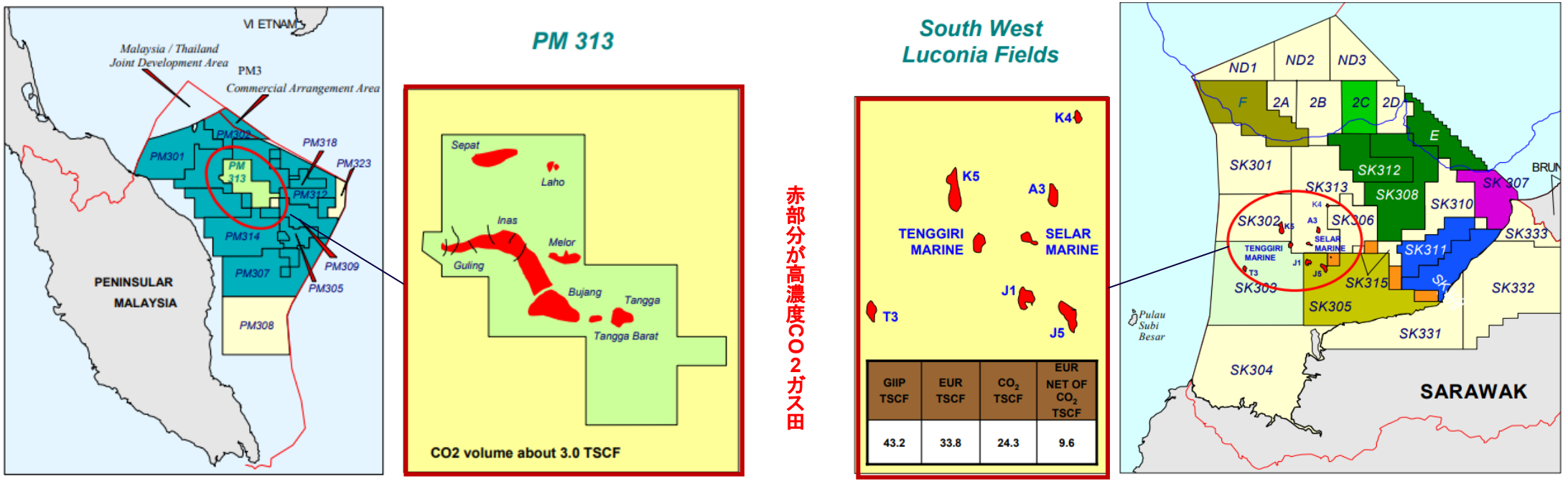
Kasawari CCS Project

- Part of the Greater Sarawak basin, positioned as one of the world's largest offshore CCS hubs
- Annual Capture Target: 3.3 million tonnes of CO_2 (≈0.0033 Gt/year)
- Lifetime Storage Capacity: 71–76 million tonnes

Source： Reccessary等よりADL作成

CO_2濃度が60～70%に達するガス田が存在するものの、長らく未開発であり、現在ようやくカサワリなどのプロジェクトが進行中で、CO_2分離・回収技術の導入が課題

マレーシアの高濃度CO2ガス田



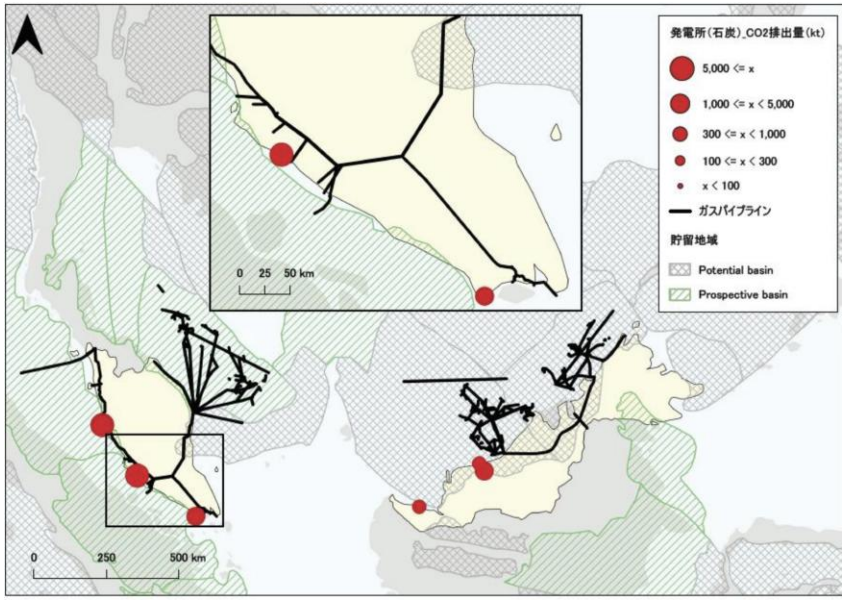
- There are gas fields with a CO2 content of nearly 60%~70%, and they have remained largely undeveloped until recently, with projects such as Kasawari now under development.
- We want to introduce CO2 separation and recovery technology from mined gas, but we have not been able to develop the technology in-house.

Source： Technical Challenges and Solutions on Natural Gas Development in Malaysia

マレーシアでは石炭火力は2040年以降新設禁止となり、天然ガス火力が再エネの変動を補いながら電力安定化と排出削減を担う形で配置されている

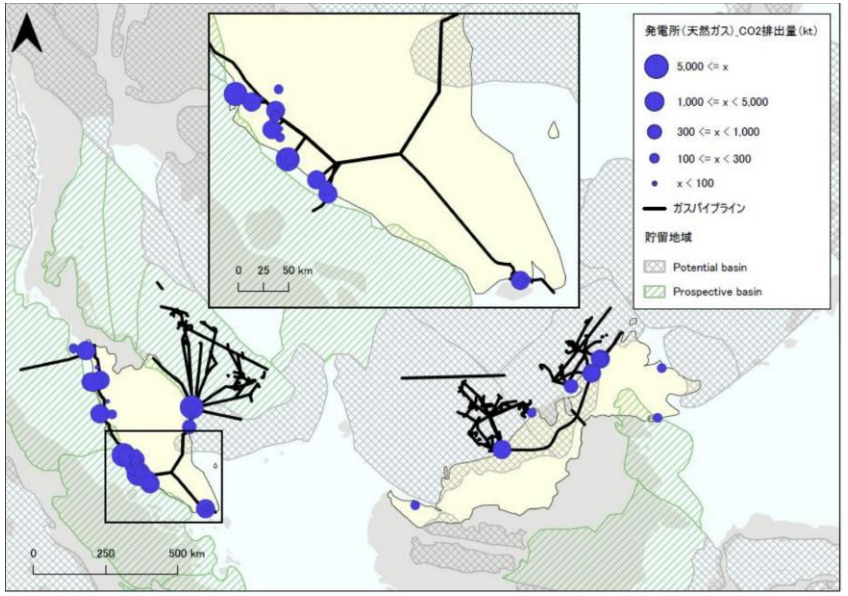
石炭火力発電×貯留地

- Coal-fired power plants are located in Sarawak in the Malay Peninsula and Borneo Peninsula. In terms of annual CO2 emissions, the scale varies from about 300 kt to more than 5,000 kt
- No new coal-fired plants will be built from 2040 onward.



天然ガス火力発電×貯留地

- Natural gas-fired power plants are distributed across the Malay Peninsula and Borneo.
- Annual CO2 emissions ranged from less than 100 kt to more than 5,000 kt, but about 30% was around 1,000 ~ 5,000 kt.
- Gas plants will help balance the intermittency of renewables and support the country’s grid during the coal phase-out.

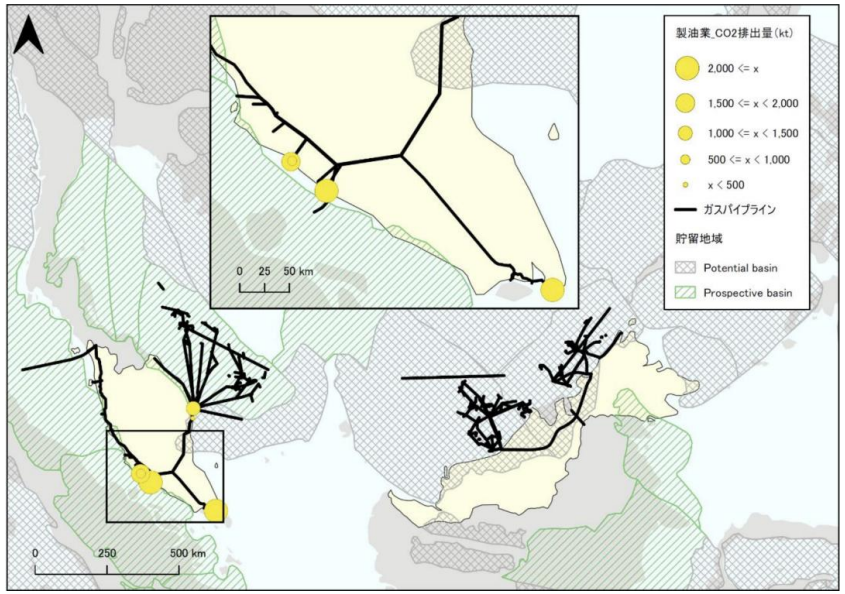


Source：令和２年度二国間クレジット取得等のためのインフ ラ整備調査事業（国際貢献定量化及びＪＣM実現可能 性調査（ＣＣＵＳ含む）、人材育成事業支援事務局及 びＣＥＦＩＡ国内事務局業務）報告書等よりADL作成

製油所が依然として主要排出源となる一方、製鉄所ではLion Groupが国内生産の過半を担いCO2を排出しつつも誘導炉導入やスクラップ利用拡大による低炭素化策を推進

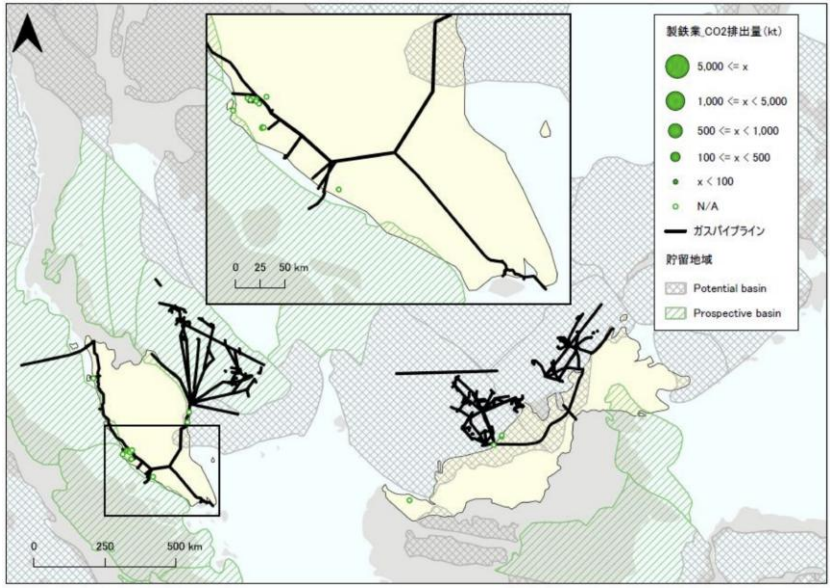
製油所・ガス×貯留地

- Refineries are distributed only in the Malay Peninsula.
- Refineries can produce a variety of annual CO2 emissions, ranging from less than 500 kt to more than 2,000 kt.
- Refineries continue to be a top industrial emission source, as Malaysia maximizes fossil fuel production to meet energy security needs.



製鉄所×貯留地

- The Lion Group accounts for more than half of Malaysia's domestic production and emits about 2,100kt of CO2 per year and has achieved reduction of 125 kt of CO2 per year.
- Emissions management now includes plans for induction furnaces and greater scrap steel recycling to further lower the carbon footprint.

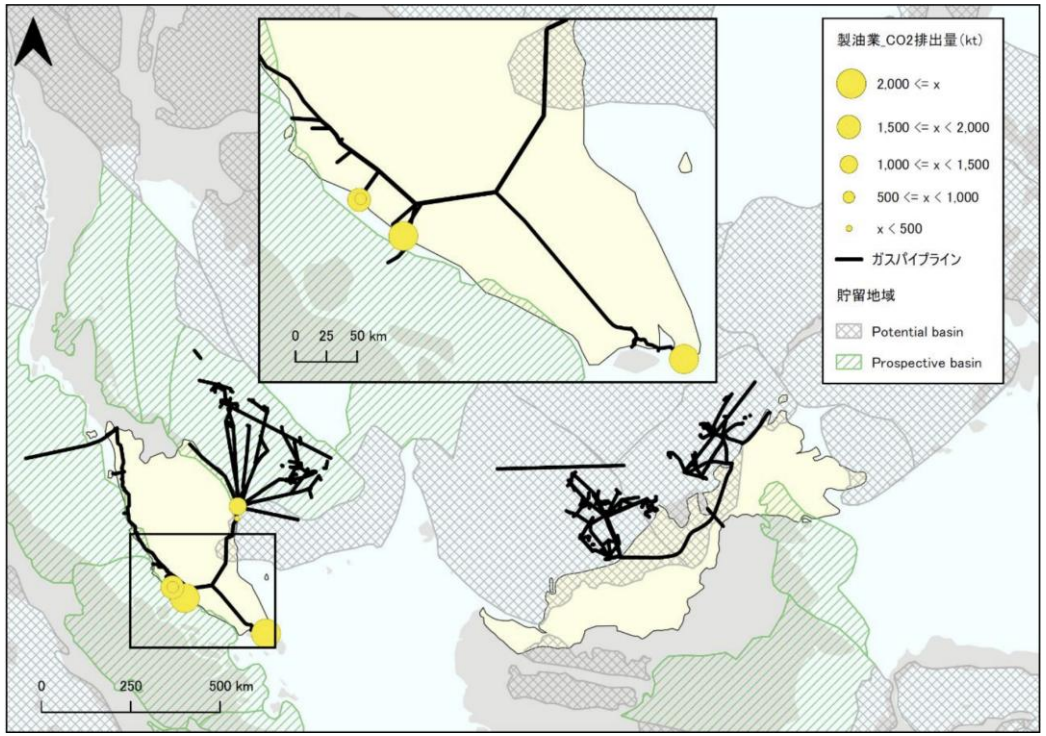


Source：令和２年度二国間クレジット取得等のためのインフラ整備調査事業（国際貢献定量化及びＪＣＭ実現可能性調査（ＣＣＵＳ含む）、人材育成事業支援事務局及びＣＥＦＩＡ国内事務局業務）報告書等よりADL作成

セメント産業は依然として主要なCO$_2$排出源。CCUSは技術的・経済的に困難とされ、廃熱回収や代替燃料・副産物リサイクル、低炭素セメント開発など代替的な脱炭素策が進展

セメント×貯留地

- As for cement plants, many companies do not disclose the size of each individual plant, but the YTL Group accounts for more than half of the cement market.
- Cement manufacturing remains one of the country's largest industrial CO_2 emission sources. While individual plant emission data is rarely published, total sector emissions remain high due to continued infrastructure growth.
- As CCUS technology is currently not considered technically or economically feasible for this sector in Malaysia, companies are instead focusing on alternative decarbonization measures:
  - Installing waste heat recovery systems
  - Adopting alternative fuels, recycling gypsum
  - Developing low-carbon cement products that incorporate supplementary materials



Source：令和２年度二国間クレジット取得等のためのインフラ整備調査事業（国際貢献定量化及びＪＣＭ実現可能性調査（ＣＣＵＳ含む）、人材育成事業支援事務局及びＣＥＦＩＡ国内事務局業務）報告書等よりADL作成

2050年CNと2030年45%削減を目標に、法制度整備や石炭フェーズアウト・再エネ拡大を進めつつ、COP30に向けNDC改訂やCCUSなど低炭素技術の実装を目指している

	Existing Measures	Future Direction in Alignment with COP30

Goal and Target	• **Long-Term Goal:**
	  − Carbon neutrality by 2050, anchored in the 12th Malaysia Plan (12MP), National Energy Transition Roadmap (NETR), and National Climate Change Policy 2.0 (NCCP 2.0).
	• **Upgraded 2030 Target:**
	  − Unconditional **45%** carbon intensity reduction from 2005 levels, covering all major sectors (previously 35%)
		• **New NDCs at COP30:**
		  − Malaysia will submit its **third NDC revision in 2025**, making all targets more ambitious and integrated across sectoral action plans, in compliance with the Paris Agreement**.**

Methods and Policy Instruments	• **Legal and Institutional Framework:**
	  − **Climate Change Act:** Malaysia will introduce a national Climate Change Act in 2025, providing **a legal mandate for decarbonization**.
	  − **Carbon Pricing:** A national policy for carbon market development and feasibility studies for a carbon tax on high-emitting sectors are underway, targeting deployment by 2026.
	• **Energy Transition Measures:**
	  − **Coal Phase-Out**
	  ▪ No new coal plants after 2040; full phase-out by 2050.
	  − **Renewable Energy Targets:**
	  ▪ 31% installed capacity by 2025; 70% by 2050.
	  − **Infrastructure Expansion:**
	  ▪ 10,000 EV charging stations by 2025.
		• **Enhanced MRV Systems:**
		  − Strengthen measurement, reporting, and verification in line with UNFCCC requirements.
		• **Nature-Based Solutions:**
		  − Implement the **National Adaptation Plan (MyNAP)** with international funding to address climate resilience, flood prevention, and coastal protection.
		• **Market Integration:**
		  − Expand participation in domestic and international carbon trading under Article 6 of the Paris Agreement.
		• **Technology Readiness:**
		  − Address feasibility and cost barriers in CCUS and low-carbon industrial processes to ensure scalability by 2030–2040

Source：National Energy Transition Roadmap, National Climate Change Policy 2.0 (NCCP 2.0), Ministry of Natural Resources & Environmental Sustainability (NRES)

マレーシアは、2050年目標の加速に向け、新たなインセンティブ導入、カーボンプライシング拡充、規制強化などでカーボンニュートラル政策を強化している

GHG Target実現に向けた政策

アメの政策	助成金	• Subsidy is provided to alternative energy sector to boost adoption and usage	• Feed in Tariff for RE • **FiT 2.0 quota** was recently opened for new applications in 2024–2025, incentivizing adoption of biogas, biomass, hydro, and solar projects
	税制優遇措置	• Tax related incentives such as reduced overall tax or tax holiday boosting overall financial viability	• Progressive vehicle taxes and incentives supporting EVs, green parking, and tax holidays remain part of pro-climate plans • **Green Investment Tax Allowance (GITA)** and incentives for EV infrastructure and manufacturing are ongoing
ムチの政策	排出権取引制度 (ETS)	• Carbon credit trading system to meet carbon credit/emission related criteria	• **Bursa Carbon Exchange**, a voluntary carbon credit trading platform, has been active since 2023. • However, a Domestic ETS is still under development and moving toward rollout as part of climate law and the 13th Malaysia Plan (expected 2026–2028)
	罰則	• Penalty imposed via higher taxes or cess to disincentivize usage	• **Carbon tax is set for rollout in 2026**, initially targeting iron, steel, and energy sectors; other trade-exposed industries may follow.
	規制	• Mandates to increase alternative energy source • Limiting new coal fire plant construction • Forced emission reporting disclosure for monitoring and control	• 31% renewable energy mix in power generation target by 2025 with limitation of new coal fire power plant • National fuel standard (gasoline and biodiesel) • **No new coal plants after 2040** and a full phase-out of coal by 2050

Source：12th Malaysia Plan, National Energy Policy 2022-2040

マレーシアは再エネ導入や省エネ推進、公共交通とEEV普及、B20/B30バイオ燃料や廃棄物リサイクル、森林保全、CCS推進などを通じて脱炭素施策を展開

産業部門	政策方針の概要
電力	• Promotion of RE usage (large scale hydropower and solar) and attractive FiT mechanism with 31% renewable energy mix in 2025 • Increase energy efficiency through National Energy Efficiency Action Plan (NEEAP) e.g. BEI labeling for machinery and factory • Green building scheme with promotion of environment-friendly construction material and certification (Infrastar, MyCrest)
輸送	• Promotion of rail-based public transport (MRT, KLIA express) in urban area (Klang Valley) • Infrastructure development to promote green mobility (walking and cycling, etc.) • Promotion of energy efficient vehicle (EEV) both ICE and xEV with national fuel economy standard • B20 biodiesel is in use in Langkawi and Labuan and is being promoted for nationwide rollout; B30 remains an aspirational 2030 target. • Promotion of NGV vehicle in public transport sector is now outdated, with policy shifting toward phasing them out.
廃棄物処理・その他	• Sustainable waste management – e.g. waste paper recycling and biogas recovery from palm oil mill • Promotion of sustainable forest management and conservation • There are many gas and oil fields in Malaysia, and CCS is a priority area.

1 – Energy usage includes energy generation and consumption e.g. from manufacturing industry
Source: Ministry of Environment and Water (KASA)

国家エネルギー戦略における注目の技術分野(1/3)
-石油/ガス・水力発電

Contents	Overall	Highlighted Technology
Oil &Gas	The oil and gas sector continues to face unique challenges, which requires technology analytics, development, adoption and commercialisation to optimize the lifespan of indigenous oil and gas resources. These include technologies for deepwater and ultra-deepwater fields, technologies to ensure economical and environmentally sustainable production in sour gas fields as well as enhanced oil recovery technology for mature fields	• Use of data analytics; artificial intelligence (AI) and machine learning (ML) • Integrated carbon capture, utilisation and storage **(CCUS)** facilities;
Hydroelectric	Hydroelectric will be a key technology focus area, driven not only by its potential as an electricity generation source but also as a key enabler towards increasing green hydrogen competitiveness.	• Technologies to enhance hydro resources as a source of energy storage • Technologies to improve the **efficiency and uptime of mini-hydro resources** • Technology developments on potential breakthrough **including restoration hydro turbine (RHT)**

Source：12th Malaysia Plan, National Energy Policy 2022-2040

国家エネルギー戦略における注目の技術分野(2/3)
-太陽光・バイオ燃料

Contents	Overall	Highlighted Technology
Solar Ecosystem	Solar energy has high potential to increase its share in the installed capacity of RE in line with rapidly decreasing levelised cost of energy (LCOE). One key focus area of technology is to further increase environmental sustainability and reduce the environmental impact of large-scale solar farms.	• Develop and adopt technologies in areas such as **floating solar.** For example, TNB and other providers launched floating solar pilots such as Kenyir Lake and Kuala Langat projects • Rooftop solar aggregation schemes (RSAS) and the Net Energy Metering (NEM) program have been extended through mid-2025, supporting widespread **rooftop solar** adoption
Bio Based Energy	Malaysia is the second-largest palm oil producer globally and has large potential to harness bioenergy from agricultural products for circular economy benefits as well as improve environmental sustainability and domestic energy security. The need to develop technologies suited to domestic bio-based resources and for scale-up and policy support for commercialization beyond pilot/project level will be critical for future competitive advantage.	• First and second generation bioenergy technologies, efforts will be given towards the objective of **driving cost-effectiveness** of energy generation on • Strategic development of third and fourth generation bioenergy

Source：12th Malaysia Plan, National Energy Policy 2022-2040

国家エネルギー戦略における注目の技術分野(2/3)
-省エネ/スマートデバイス・低炭素自動車・水素

Contents	Overall	Highlighted Technology
Energy Efficiency Smart Device	Energy efficiency technologies have been gaining significant traction with the use of digital and smart devices related to the Fourth Industrial Revolution(4IR) in residential and commercial appliances, driven by energy transition and the push for increased environmental sustainability	• Energy-efficient digital smart device • AI-enabled devices (especially in HVAC systems) are being adopted to optimize energy use and reduce emissions.
Low Carbon Mobility	Malaysia has several key foundational advantages that should be harnessed in technological development for low carbon mobility. The country has a legacy of automotive manufacturing capabilities, including partnerships with global automotive manufacturers who have vast experience in EV manufacturing	• Electric vehicles (EVs) – The government is on track to install 10,000 public EV charging stations by end-2025 • Next-generation vehicles (NxGV)
Hydrogen	Malaysia’s indigenous resources in natural gas and renewables such as hydroelectric, solar and bioenergy, positions the country effectively for the competitive production of blue and green hydrogen. The country has long-term potential to become an export hub for green hydrogen, but large-scale exports are not yet at commercial scale, with ramp-up expected after 2027.	• Electrolyser, export terminal and hydrogen transport technologies between production sites and export terminals • Long-range transport, options using carriers such as ammonia, liquid hydrogen, liquid organic hydrogen, or metal hydride

Source： 12th Malaysia Plan, National Energy Policy 2022-2040

テノン・パンギ水力発電所はサバ州電力安定化に寄与しており、今後はサラワクからの電力輸入やCCGT・新水力案件と併せて再エネ拡大と供給余力確保に位置づけられている

Case Overview - Tenom Pangi Hydroelectric Power Station

- The **Tenom Pangi Hydroelectric Power Station** was damaged by a landslide and mudslide in 2022, resulting in the loss of 66 MW capacity.
- The plant has resumed full operations, with electricity generation to the Sabah Grid restored, improving supply stability.

Strategic Importance

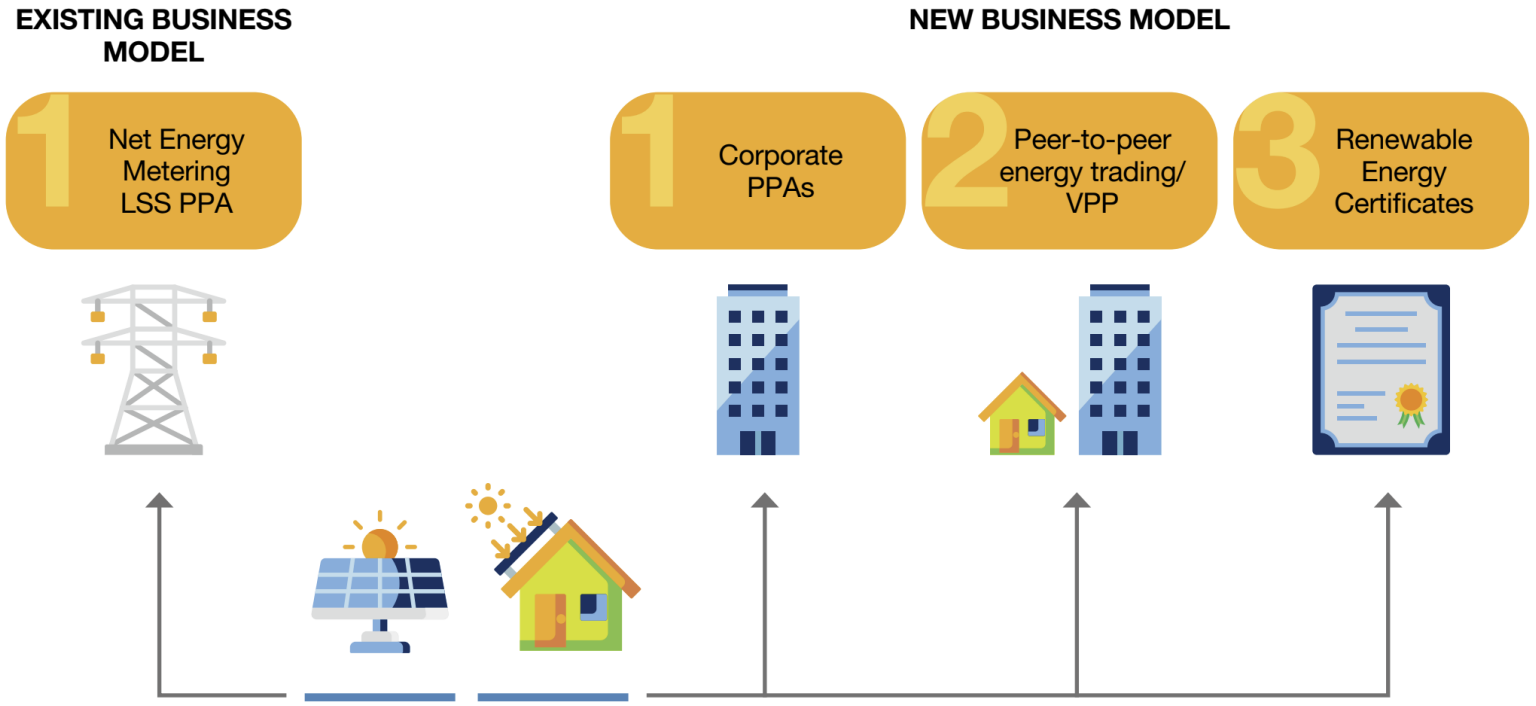
- **Economic & Social Role:**
  - Key infrastructure supporting Sabah’s development, especially rural areas.
  - Ensures access to stable electricity, crucial for positioning Sabah as a destination for investment and industry.
- **Government Alignment:**
  - Integrated into Sabah Energy Roadmap 2040 (SE-RAMP 2040) and ECOS (Sabah Energy Council) Master Plan.
  - Several renewable energy projects underway to boost Sabah’s reserve margin to 20% by 2030.

Planned Power Projects

- Importing electricity from Sarawak beginning 2026–2027.
- New 100 MW combined cycle gas turbine plant scheduled for 2026–2027.
- 120 MW Ulu Padas Hydroelectric Project, expected by 2026.

Source：Borneo Post, May 15, 2025

従来のビジネスモデル（NEMやLSS PPA）に加え、企業PPA、P2Pエネルギー取引・VPP、再エネ証書といった新しい収益源が求められている



Future
- Revised NEM rates
- Increasing competition at auctions decrease strike price

- Prosumer/Gentailer using third party rooftops
- LSS asset owner (e.g. developer or special purpose company)

Future
- Additional income streams through new business models are required

Source： MyRER – Renewable Energy Malaysia (seda.gov.my) @2021

マレーシアは、原子力導入の可能性を2030年以降に見据え、実現可能性調査、制度面での能力構築、国際的な整合性確保を通じて基盤整備を進めている

Current Status (as of Aug 2025)

Policy Position

- Nuclear is positioned as a **post-2030 baseload option** to replace retiring coal plants and meet decarbonization targets.
- Nuclear assessment is embedded in the **13th Malaysia Plan (13MP**), released in July 2025, while current NETR[1] did not commit to nuclear but left scope for further evaluation.

Institutional Framework

- **The Nuclear Energy Programme Implementation Organization (NEPIO)** has been established under the Ministry of Energy and is coordinated by MyPower Corporation.
- NEPIO's mandate covers the management of treaties, domestic regulations, human capital development, and cross-ministry capacity building.

International Alignment

- The government is working with the **International Atomic Energy Agency (IAEA)** to ensure full alignment with nuclear safety, security, and non-proliferation standards.

Future Actions

Feasibility Preparation

- **Complete feasibility study** covering technology pathways, nuclear safety, public acceptance, and environmental impact.
- **Maintain vendor-neutral evaluation** of reactor technologies and compliance options..

Regulatory Readiness

- Finalize and operationalize robust safety, regulatory, and governance frameworks before any go-decision.
- Ensure cross-ministry coordination for long-term programme delivery.

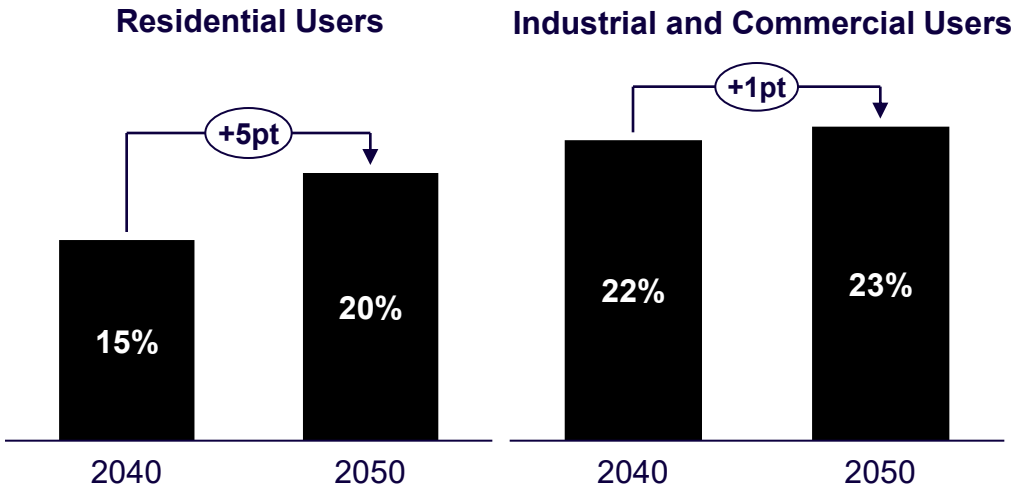
International Cooperation

- Deepen engagement with the US, France, Russia, South Korea, and China to explore technology and compliance pathways.
- Advocate for nuclear-armed states to sign and ratify the protocol.

Source: Bernama, Malaysia Eyes Nuclear Energy Post-2030; ISIS Malaysia @2025, Should Malaysia Give Nuclear Power the Green Light?,各種2次情報よりADL作成
Note: NETR refers to National Energy Transition Roadmap

NETRは、産業・商業部門に対してより厳格な省エネ目標を設定すると同時に、住宅部門にはより高い改善余地を示し、規制強化や各種施策でこれを支えている

Energy Savings Target (%)



National Energy Transition Roadmap (NETR) Proposed Targets:

- **By 2040: Achieve 21% energy savings** vs. business-as-usual (BAU), specifically:
  - Residential: 15%; Industrial & Commercial: 22%
- **By 2050: Achieve 22% energy savings** vs. BAU, specifically:
  - Residential: 20%; Industrial & Commercial: 23%

Government Policies And Initiatives

Government Policies

The **Enforcement and Regional Operations Department** takes action against those who violate the following laws and regulations:

- Electricity Supply Act 1990
- Gas Supply Act 1993
- **Energy Efficiency and Conservation Act 2024**

Key Initiatives

- **Promote public awareness** of energy-efficient appliances and **redesign 5-star labels** to highlight both monetary and technical energy savings
- **Improve existing Minimum Energy Performance Standards (MEPS)** and 5-star rating bands
- **Enforce mandatory audits** for large commercial and industrial buildings
- **Establish green building codes** for energy-intensive residential and commercial buildings and establish an **ESCO platform**[1]
- **Identify and retrofit energy-inefficient government buildings** through a medium- to long-term EE program

Source: Energy Malaysia, Volume 26, National Energy Transition Roadmap
Note: 1) An ESCO platform refers to a business model or service hub that facilitates energy efficiency projects by connecting clients with Energy Service Companies (ESCOs), financing partners, and technology providers

EECAは、エネルギー使用者、建物所有者、製造業者に対して、全国的なエネルギー効率の向上を図るための義務的要件を定めている

Energy Efficiency and Conservation Act (EECA)

Policy Context	• **Published on 26 November 2024 and came into effect on 1 January 2025**, aiming to reduce energy waste and improve energy efficiency across Malaysia. • The Act applies to **large energy users**, **selected buildings** and **energy-using products** (e.g., refrigerators, air conditioners) in Peninsular Malaysia and Labuan.		
Compliance Obligations by Target Audience	**Large Energy Users**	**Selected Building Owners**	**Manufacturers and Importers of Energy-Using Products**
	• Appoint a **Registered Energy Manager (REM)** • Develop and implement an **Energy Management System** • **Submit annual reports** on energy use and efficiency • **Conduct energy audits** regularly using certified auditors	• Apply for and display an **Energy Intensity Label** • **Meet minimum performance standards**, or submit an Energy Efficiency Improvement Plan if they fall short	• Register with the Energy Commission • Obtain **energy efficiency certificates and labels** • Comply with **Minimum Energy Performance Standards** • Comply with **national Building Energy Intensity (BEI) Labelling that is star-rated.**

Source：Energy Efficiency and Conservation Act 2024, Suruhanjaya Tenaga (Energy Commission of Malaysia)

Contents

発電事業者はEC1)から下記のライセンスを受けることが必要。ただし、定量的要請（例：電圧レベル等）についてはライセンス文書には記載が見られない模様

Supply by Licensee

- Duty to supply on request
- Exceptions to duty to supply electricity
- Power to fix tariffs
  - Licensee may levy surcharge
- Power to recover expenses
- Power to require security
  - Return of security with interest
- Special agreement with respect to supply
- Determination of dispute
- Fixing of maximum prices for reselling electricity
- Charge for supply of electricity to be ascertained by appropriate meter

Details of Duty to Supply on Request

A) Subject to the following provisions of this Part and any regulation made thereunder, a licensee shall upon being required to do so by the owner or occupier of any premises

I. give a supply of electricity to those premises; and

II. so far as may be necessary for that purpose, provide supply lines or any electrical plant or equipment.

B) Where any person requires a supply of electricity under subsection (1) he shall give to the licensee a notice specifying

I. the premises in respect of which the supply is required;

II. the day on which the supply is required to commence;

III. the maximum power which may be required at any time; and

IV. the minimum period for which the supply is required to be given.

C) Where a licensee receives from any person a notice under subsection (2) requiring him to give a supply of electricity to any premises and—

I. he has not previously given supply of electricity to those premises;

II. the giving of the supply requires the provision of supply lines or electrical equipment or plant; or

III. other circumstances exist which make it necessary or expedient for him to do so,

Source： LAWS OF MALAYSIA ELECTRICITY SUPPLY ACT 1990

マレーシアの主要国営電力会社は、半島をカバーするTNB、サラワクを担うSEB、サバとラブアンを管轄するSESBの3社で、いずれも発電・送電・配電を担っている

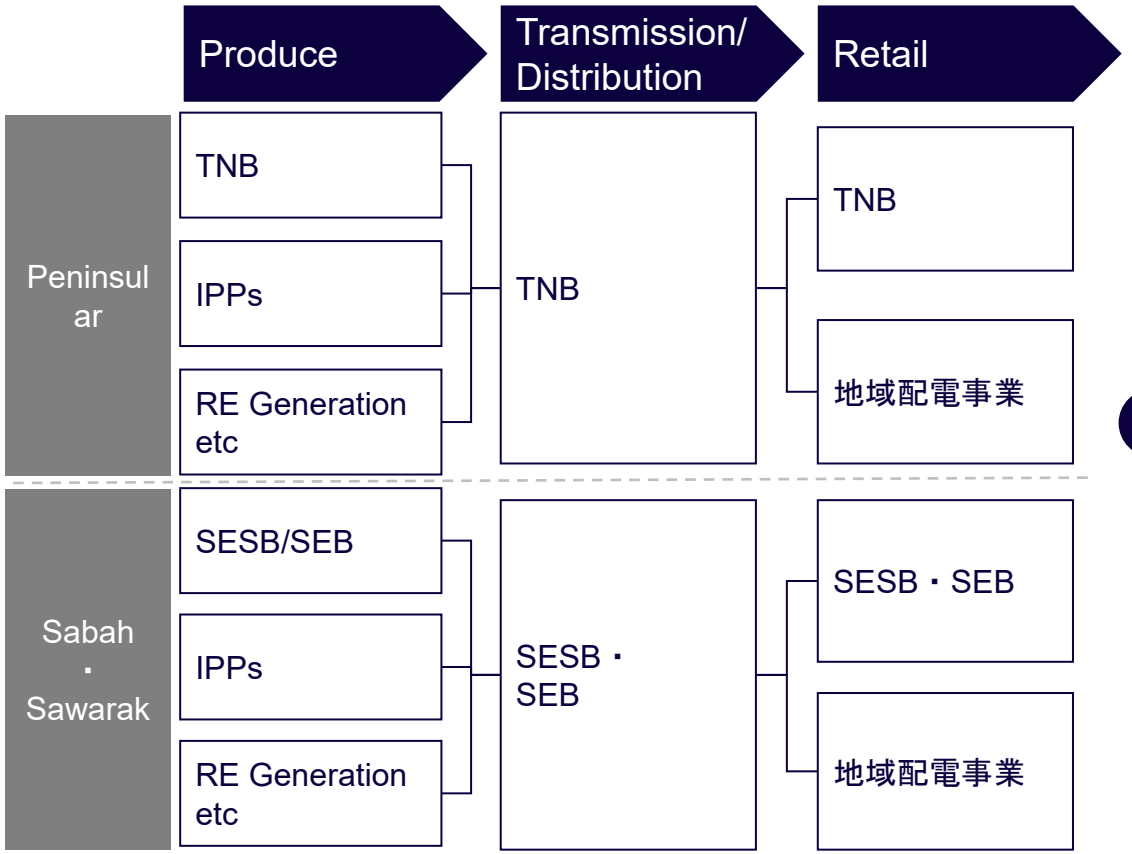
Major State-Owned Power and Utility Companies in Malaysia

No.	Company	Region(s) Covered	Core Services
1	Tenaga Nasional Berhad (TNB)	Peninsular Malaysia	Generation, transmission, distribution, retail of electricity. TNB is the dominant operator for Peninsular Malaysia, including urban and rural areas, and is expanding into EV infrastructure and renewables.
2	Sarawak Energy Berhad (SEB)	Sarawak (East Malaysia, Borneo)	Owns and operates the state’s generation, transmission, and distribution network; major hydropower provider for Sarawak and export to neighboring Kalimantan. Also advancing renewable and grid projects in Sarawak.
3	Sabah Electricity Sdn Bhd (SESB)	Sabah and Labuan (East Malaysia, Borneo)	Integrated utility for generation, transmission, and distribution in Sabah and Labuan; focus on reliability and renewable additions for North Borneo.

Source：各種二次情報よりADL作成

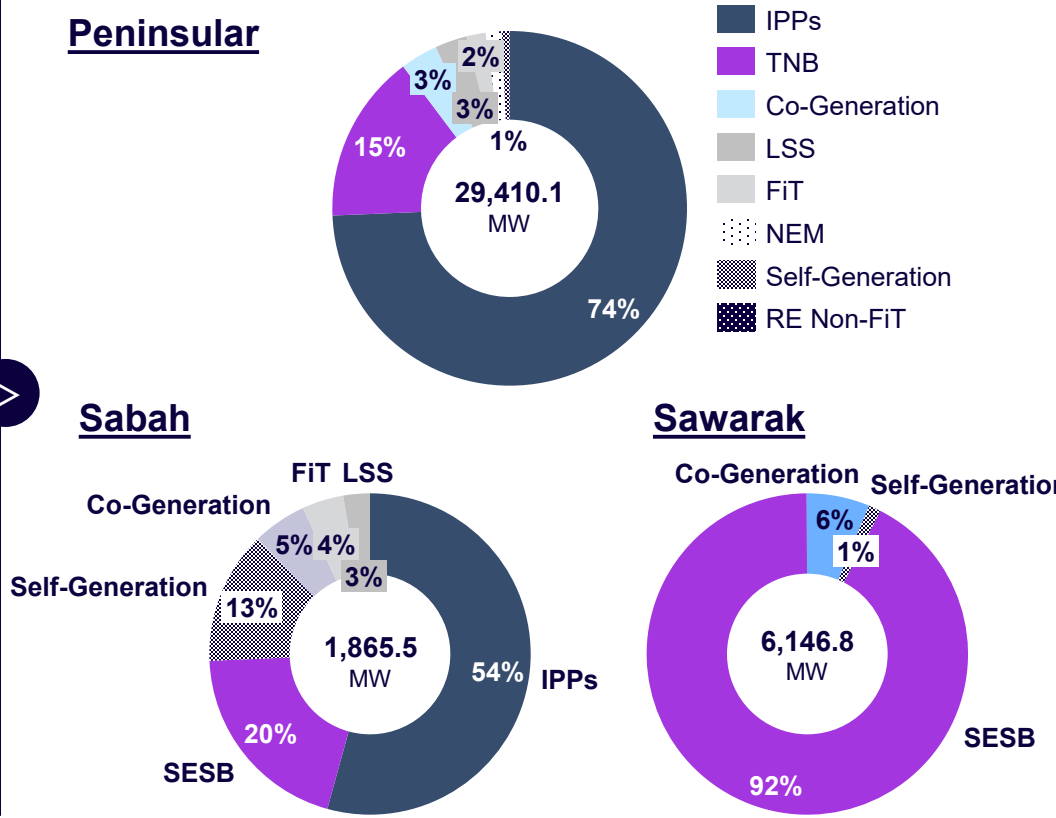
マレー半島およびサバ州では独立系発電事業者（IPP）が主要な役割を担う一方、サラワク州では州営公益事業者が依然として重要な地位を占めている

Electricity Power and Utility Companies in Malaysia



Produce Structure, 2021

Unit: MW

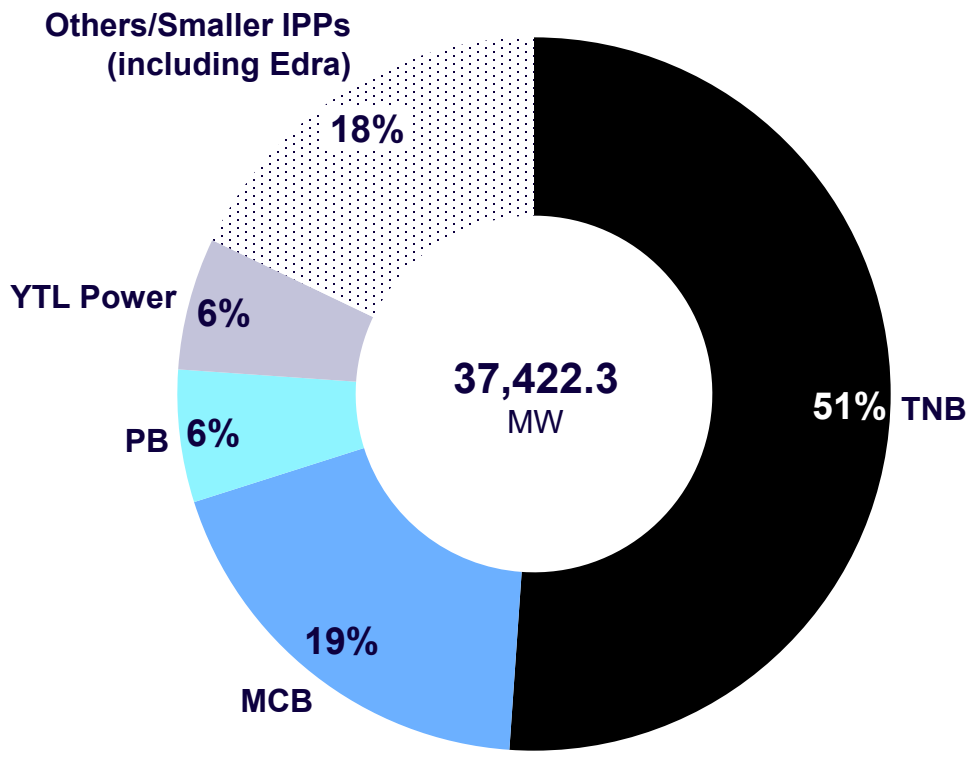


Source：Performance＆Statistical Information on the Malaysian Electricity Supply Industry, National Energy Balance 2021

マレー半島の独立系発電事業者（IPP）の中では、マラコフ社（Malakoff Bhd）が最大の市場シェアを有しています

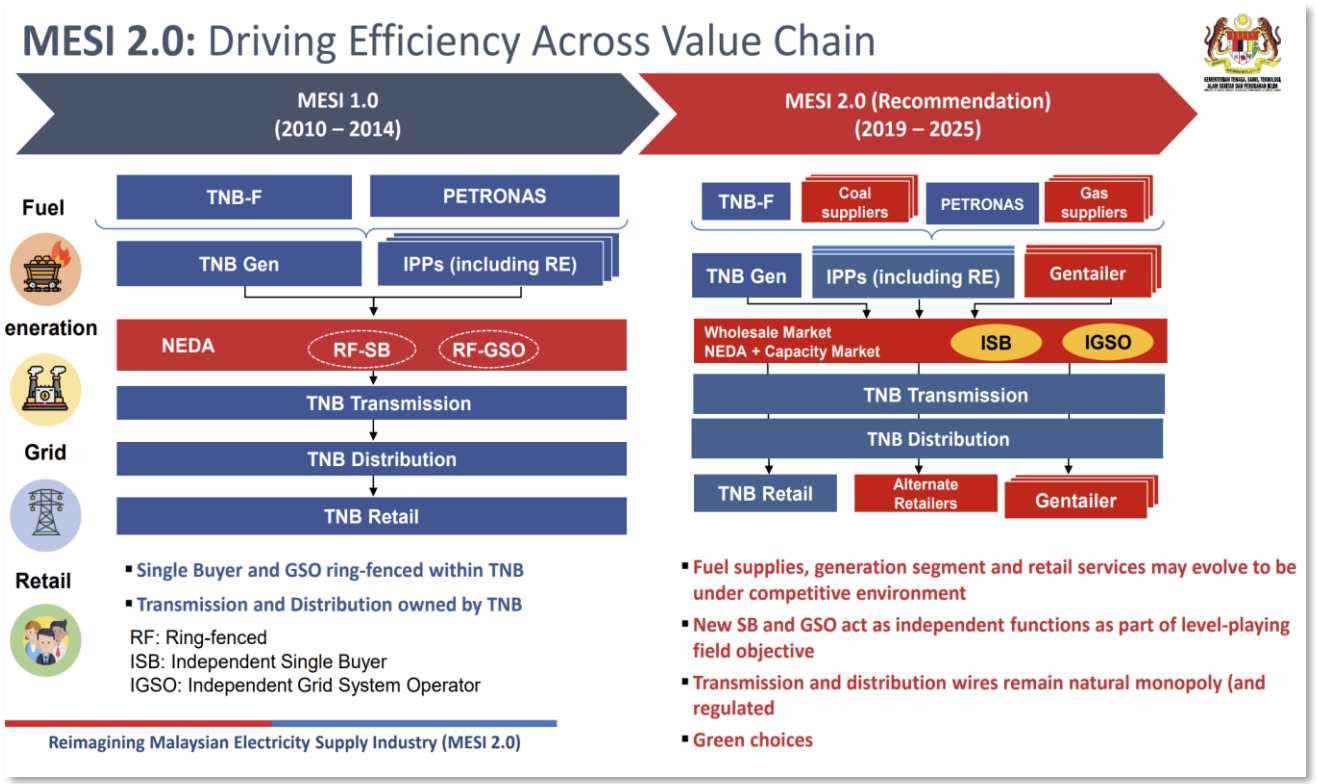
Peninsular Malaysia Power Generation Market Share by Company (2023/2024)

No.	Company	Market Share (%)	Installed Capacity (MW)
1	Tenaga Nasional Berhad (TNB)	51.1%	Approx. 16,000 MW
2	Tenaga Janamanjung Sdn Bhd	Included in TNB	Part of TNB group
3	Malakoff Corporation Berhad (MCB)	~18-19%	6,953 MW
4	Powertek Berhad (PB)	~5-6%	Not specified
5	YTL Power International Berhad	~5-6%	Not specified
6	Others/Smaller IPPs (including Edra)	~17%	Approx. 5,800 MW



Source：各種二次情報よりADL作成

電力供給産業改革（MESI 2.0）は発電資源選択や容量市場移行、再エネ普及を進めつつ送配電は規制独占を維持し、CRESS導入、企業PPA、料金改革を通じて再エネ拡大を推進



[Main reform points]
- IPP Resource Selection
- Transition to the Capacity Market
- Transmission and distribution continue to be monopolized
- Promoting green electricity

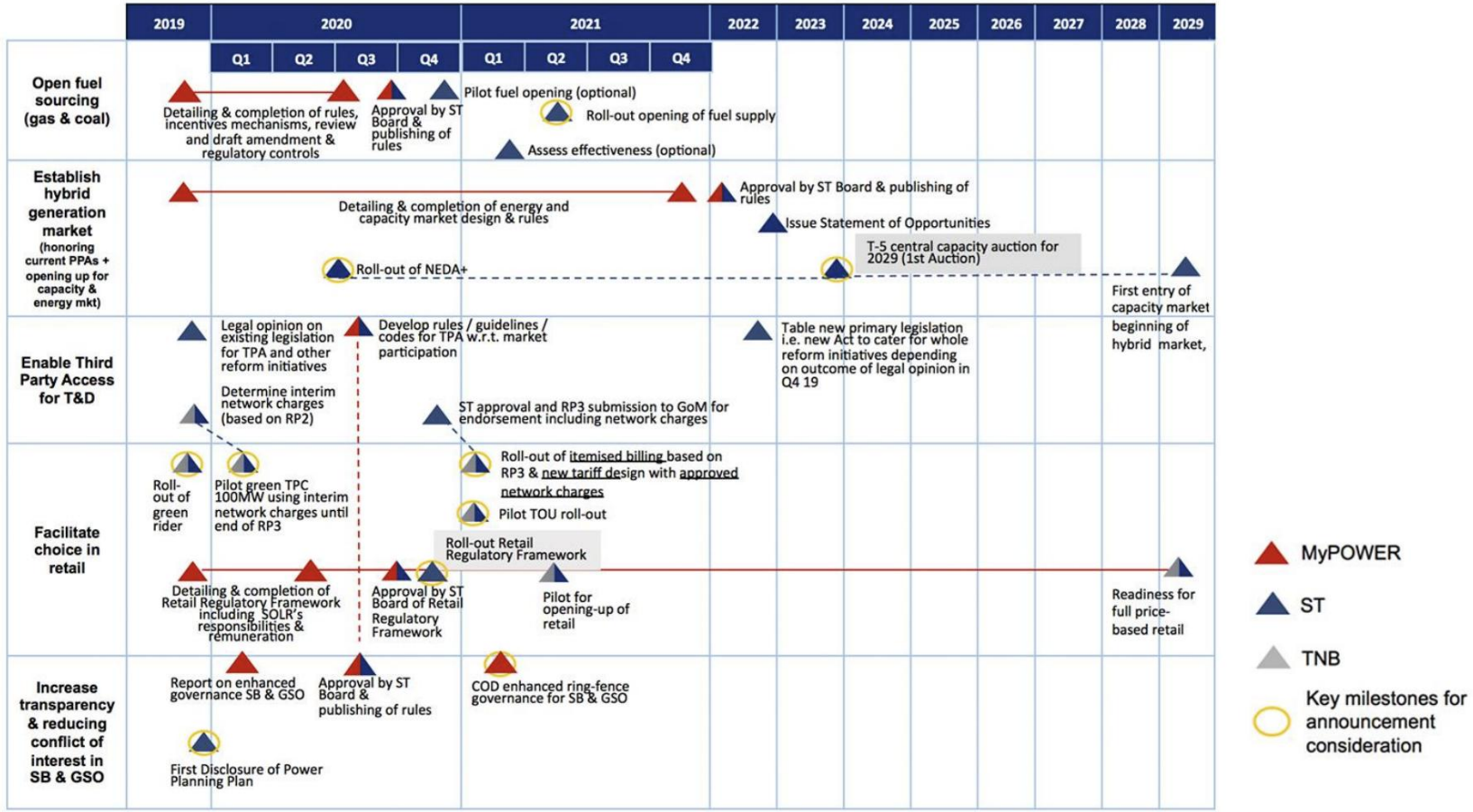
[Progress & Current Actions]
- Post-COVID reform momentum resumed in 2023.
- CRESS and related liberalization measures now advancing.
- Single Buyer carve-out in progress; spin-off planned but not yet executed.

[Key 2024+ Initiatives]
- **CRESS[1] Launch (Sept 2024):** Enables third-party direct grid access for corporate renewable electricity.
- **Corporate Access to Green Power:** Direct PPAs between large users and generators.
- **Electricity Tariff Reform:** Incentivizes renewables while ensuring fair consumer pricing.
- **National Targets:** 40% renewables by 2035; 70% by 2050.

Note: 1) CRESS refers to Corporate Renewable Energy Supply Scheme
Source：Reimaginin Malaysian Electricity Supplya Industry（MESI2.0）、一般社団法人 海外電力調査会

電力供給産業改革（MESI 2.0）は2019年以降、燃料調達の自由化、ハイブリッド市場創設、送配電への第三者参入、透明性強化を進め、2029年に容量市場の本格導入を目指す

Aggregated timeline for MESI 2.0 initiatives



Source：Reimaginin Malaysian Electricity Supplya Industry（MESI2.0）

現在、第三者アクセスやCRESS導入により部分自由化が進み、Single Buyerの独立化やTNBの発電・小売分社化、送配電規制独占維持、透明な四部構成の料金制度に移行中

Current Electricity Sector Structure (Post-MESI 2.0)

Context	• **CRESS & Third Party Access (TPA)** (launched Sep 2024) enable renewable and corporate generators to directly supply large consumers via wheeling arrangements, bypassing the Single Buyer. • Market shift from fully centralized procurement toward partial liberalization for eligible corporate buyers.

Institutional & Structural Changes	• **Single Buyer** in process of becoming fully independent from TNB; will manage the new “energy exchange.”
	• **System Operator** remains separate from generation/retail, ensuring grid stability and dispatch.
	• **TNB restructuring:**
	  − Generation → TNB Power Generation Sdn Bhd
	  − Retail → TNB Retail Sdn Bhd
	  − Transmission & distribution remain regulated monopolies under TNB subsidiaries.

Tariff Mechanism	• Updated four-part tariff segmentation: generation, transmission, customer service, and fuel cost adjustment. • Transparent cost allocation across value chain, with clearly defined service components. • Average base tariff set at 45.40 sen/kWh; fuel cost pass-through updated.

Source：各種二次情報よりADL作成

マレーシアの電力市場は卸売スポットや小売競争段階には至っておらず、現在はSingle BuyerモデルでIPPが発電を供給し、Single Buyer（TNB傘下）が調達・配分を担う仕組み

Power Market Structures in SEA

Details

- **Malaysia's electricity market has not yet fully progressed to the Wholesale Spot Market or Retail Competition stages.** Therefore, Malaysia is currently in the **Single Buyer model with IPPs** stage.
- Under this structure, the **Energy Commission (EC/ST) and the Single Buyer (a unit under TNB)** are responsible for wholesale electricity procurement and dispatch.
- Independent Power Producers (IPPs) sell electricity to the Single Buyer, which then resells it to distribution companies and ultimately to end-users.

Source：http://www.iesingapore.gov.sg/~/media/IE%20Singapore/Files/ASIR/PreConference_workshop_Sharad_Somani.pdf

マレーシアの主要発電事業者は、半島のTNB（発電容量17GW）、サラワクのSEB（31GW）、サバのSESB（1.2GW）で、それぞれ地域ごとに顧客数と最大需要を担う

Share of electricity generation by major power producers

Company Name	Total Generation Capacity	Number of customers	Maximum Demand
Tenaga Nasional Berhad	17,041 MW (2021)	9,651,065 (2021)	18,585 MW (2021)
Sarawak Energy	31,025 MW (2021)	734,936 (2021)	4,107 MW (2021)
Sabah Electricity Sdn. Bhd	1,250 MW (2021)	655,737 (2021)	1,003 MW (2021)

Source： Malaysia Energy Statistic Handbook 2022 (Published in 2024)

発電事業者は天然ガスの購買価格を低減されており、ある意味補助金を受け取っているのと同義だったが現在は天然ガスへの補助金は限定的となっている

Previous: Subsidy to electricity generators and users

- **Electricity generators are subsidized through a centrally imposed low gas price.**
  - In Peninsular Malaysia, subsidy rationalisation of gas to the power sector continues, with three price revisions:
    - MYR15.20/mmBtu (January – June 2015)
    - MYR19.70/mmBtu (July – December 2016)
    - MYR22.70/mmBtu (July – December 2017)
  - In Sabah, the gas price for the power sector is controlled at MYR6.40/mmBtu—86% lower than the average market price of MYR46.93/mmBtu (2014).
- **Electricity users are subsidized by a monthly rebate.**
  - Since 2008, the government has provided a MYR20 (USD$6.4) subsidy on monthly electricity bills to all customers of TNB, costing MYR1.303 billion (USD$335 million) from July to December 2017.
  - TNB also gives its privileged customers a 10% discount on electricity bills. This concession cost TNB MYR7.8 million (USD$2.5 million) in 2012 and is due to be extended to institutions partly funded by the government.
  - SESB receives substantial diesel and fuel oil subsidies from the government to lower the cost of electricity generation, amounting to MYR543.4 million (USD$173.3 million) in 2012.

Current: Subsidy to electricity generators and users

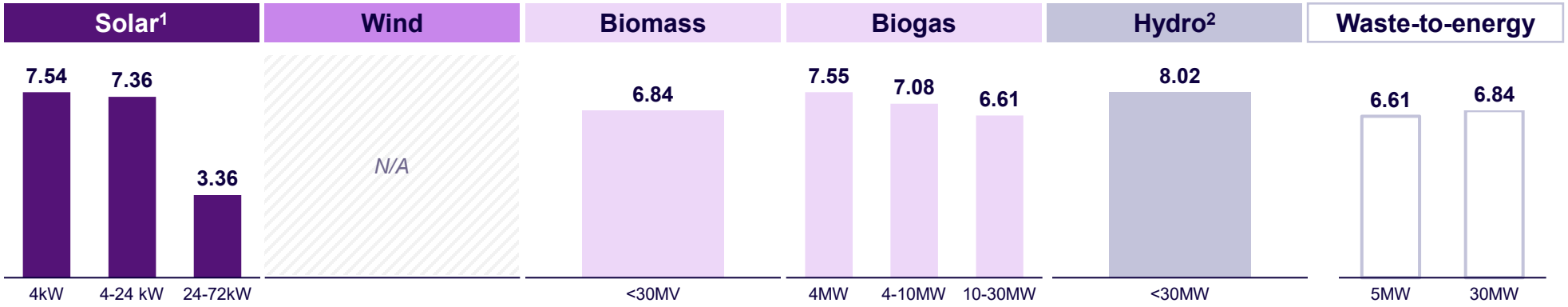
- **Subsidies for Power Generators**
  - **Natural gas price subsidies are significantly limited.** The government continues to rationalize piped gas subsidies for generators, with prices increasing closer to market levels over the last several years. Most fuel for generation (coal, imported LNG) is now procured at global market prices.
  - **Diesel and gasoline subsidies are now targeted.** Diesel prices for most users have been aligned with market rates, with targeted support only for eligible groups (public transport, logistics, fishermen).
- **Subsidies for Electricity Users**
  - **Universal monthly rebates have been removed.** Electricity subsidies are retargeted primarily at lower-consumption households.
  - **Special targeted subsidies provide monthly cash assistance or special tariffs** to groups such as public transport operators, farmers, and fishermen, instead of blanket discounts.

Source：各種二次情報よりADL作成

マレーシアの再エネ支援は、電源別FiT価格に加え、GITAによる税控除、機器輸入関税の免除、GTFPやCREAMなどの追加インセンティブを通じて投資促進を図っている

Pricing scheme (FIT price)

Unit: cents USD /kWh



Corporate tax incentives

Malaysia's **Green Investment Tax Allowance (GITA)** is now the main incentive:
- Tax allowance of 60% of qualifying capital expenditure (not 100%) for green projects, including solar and battery energy storage, for up to 5 years.
- Income tax exemption of up to 70% of statutory income applies to qualifying green tech companies.

Import duties

Exemption on machines and equipment

Additional incentives

The Green Technology Financing Scheme (GTFS) 4.0 is live until December 2025:
- Up to RM100million for producers, RM50million for users, and government guarantees up to 60% (80% for waste-related projects).
- Interest rebate is now 1.5% per annum up to 7 years

Community Renewable Energy Aggregation Mechanism (CREAM) was announced for 2025:
- It allows residential/industrial solar users to lease their rooftops for third-party solar projects.

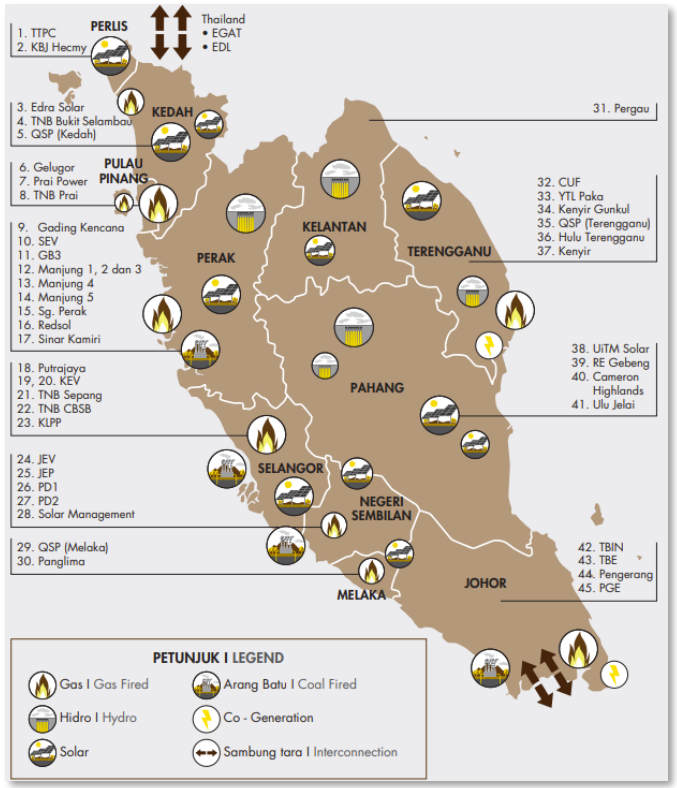
Source: SEDA(1/1/25), Tax Incentive Guidelines, ADL research
Note: 1 RM ≈ 23.6 cents USD. 1) Solar figures refer to existing FiT solar plants, which continue to receive these contracted rates for the remainder of their FiT tenure. No new rooftop PV projects are eligible for FiT and must instead participate under NEM or SELCO schemes. 2) Hydro refers to small hydro only.

Contents

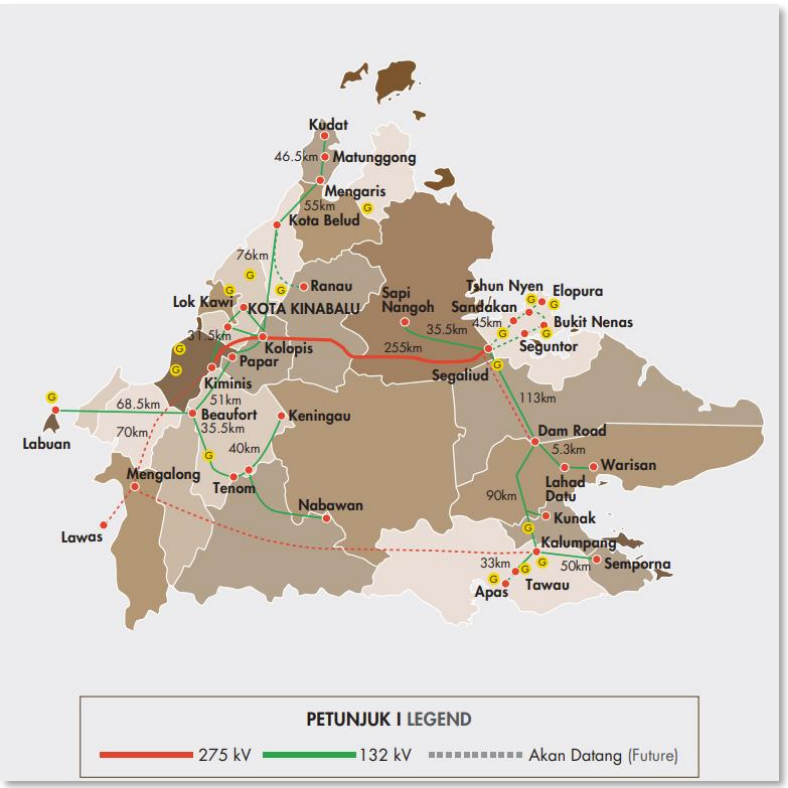
マレーシアの主要発電所はマレー半島、サバ州、サラワク州に地理的に分布しており、ガス、石炭、水力から太陽光まで多様なエネルギーミックスを反映している

Location of Major Power Stations in Malaysia by Region, 2021

Peninsular Malaysia



Sabah

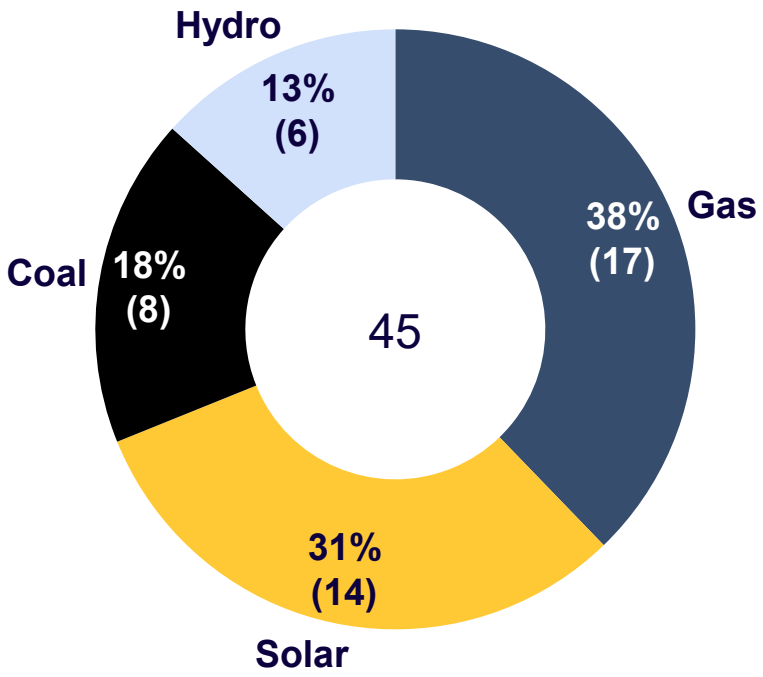


Sarawak

Source : Performance and Statistical Information on the Malaysian Electricity Supply Industry 2021

マレー半島の発電構成はガスが主体で、次いで太陽光、石炭、水力の順となっている

Type of Power Plants in Peninsular Malaysia



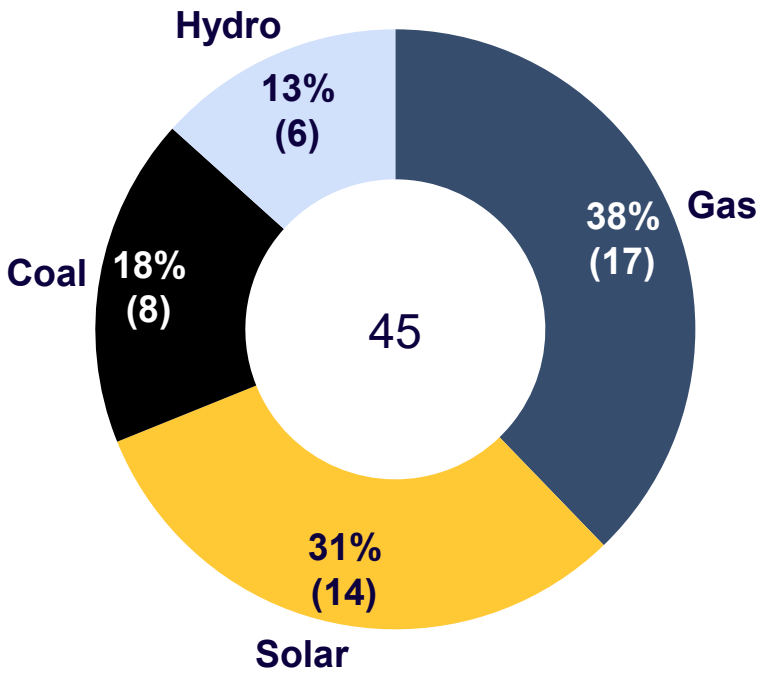
List of Power Plants in Peninsular Malaysia (1/2)

No.	Power Plant	Type
1	Manjung 1,2,3: TNB Janamanjung Sdn. Bhd. (Unit 1 to 3)	Coal
2	Manjung 4: TNB Janamanjung Sdn. Bhd. (Unit 4)	Coal
3	Manjung 5: TNB Manjung Five Sdn. Bhd.	Coal
4	KEV: Kapar Energy Ventures Sdn. Bhd. (GF2 and GF3)	Coal
5	JEV: Jimah Energy Ventures Sdn. Bhd.	Coal
6	JEP: Jimah East Power Sdn. Bhd.	Coal
7	TBin: Tanjung Bin Power Sdn. Bhd.	Coal
8	TBE: Tanjung Bin Energy Sdn. Bhd.	Coal
9	TTPC: Teknologi Tenaga Perlis Consortium Sdn. Bhd.	Gas
10	Gelogor: Gelogor Power Station	Gas
11	Prai: Power Prai Power Sdn. Bhd.	Gas
12	TNB Prai: TNB Prai Sdn. Bhd.	Gas
13	SEV: Segari Energy Ventures Sdn. Bhd.	Gas
14	GB3: GB3 Sdn. Bhd.	Gas
15	Putrajaya: Putrajaya Power Station	Gas
16	KEV: Kapar Energy Ventures Sdn. Bhd. (GF1)	Gas
17	TNB CSBS: TNB Connaught Bridge Sdn. Bhd.	Gas
18	KJPP: Kuala Langat Power Plant Sdn. Bhd.	Gas
19	PD1: Tuanku Jaafar Power Station	Gas
20	PD2: Tuanku Jaafar Power Station	Gas
21	Panglima: Panglima Power Sdn. Bhd.	Gas
22	CUF: Petronas Gas Bhd.	Gas
23	YTL Paka: YTL Power Generation Sdn. Bhd.	Gas
24	Pengerang: Pengerang Power Sdn. Bhd.	Gas
25	PGBE: TNB Pasir Gudang Energy Sdn. Bhd.	Gas

Source : Performance and Statistical Information on the Malaysian Electricity Supply Industry 2021

マレー半島の発電構成はガスが主体で、次いで太陽光、石炭、水力の順となっている

Type of Power Plants in Peninsular Malaysia



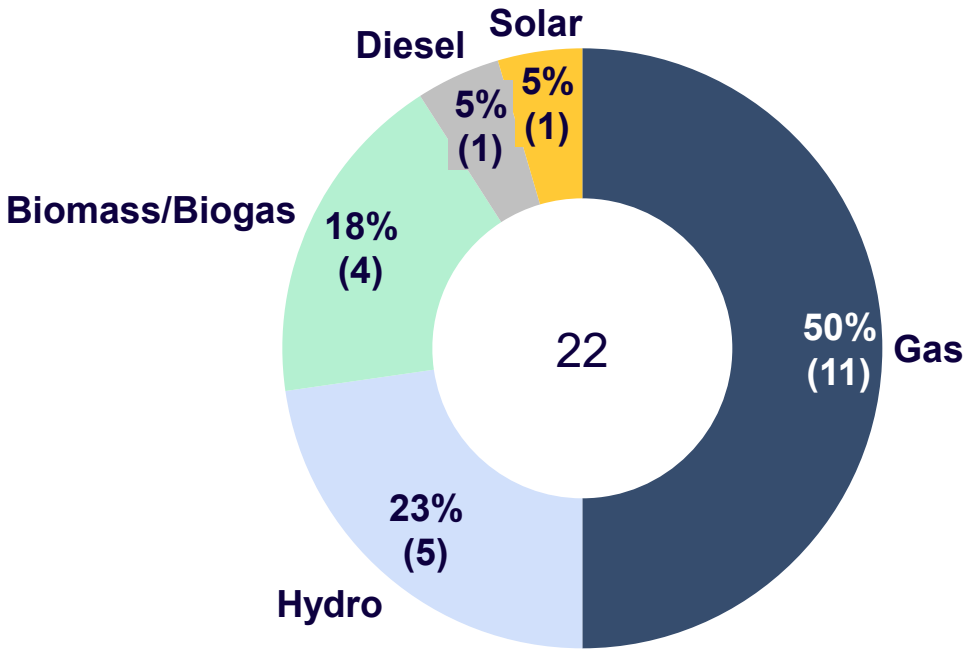
List of Power Plants in Peninsular Malaysia (2/2)

No.	Power Plant	Type
26	KBJ Hecmy: KBJ Hecmy Sdn. Bhd.	Solar
27	Edra Solar: Edra Solar Sdn. Bhd.	Solar
28	TNB Bukit Selambau: TNB Bukit Selambau Solar Sdn. Bhd.	Solar
29	QSP (Kedah): Quantum Solar Park (Kedah) Sdn. Bhd.	Solar
30	Gading Kencana: Gading Kencana Development Sdn. Bhd.	Solar
31	Redsok: Redsok Sdn. Bhd.	Solar
32	Sinar Kamiri: Sinar Kamiri Sdn. Bhd.	Solar
33	TNB Sepang: TNB Sepang Solar Sdn. Bhd.	Solar
34	Solar Management (Seremban) Sdn. Bhd.	Solar
35	QSP (Melaka): Quantum Solar Park (Melaka) Sdn. Bhd.	Solar
36	Kenyr Gunkul: Kenyr Gunkul Solar Sdn. Bhd.	Solar
37	Quantum Solar Park (Terengganu) Sdn. Bhd.	Solar
38	UiTM Solar: UiTM Solar Power Sdn. Bhd.	Solar
39	EG Behrang: EG Behrang Sdn. Bhd.	Solar
40	Sg Perak: Sungai Perak Power Station	Hydro
41	Pergau: Pergau Power Station	Hydro
42	Hulu Terengganu: Hulu Terengganu Power Station	Hydro
43	Kenyr: Sultan Mahmud Power Station	Hydro
44	Cameron Highlands: Sultan Yusuf Power Station	Hydro
45	Ulu Jelai: Ulu Jelai Power Station	Hydro

Source : Performance and Statistical Information on the Malaysian Electricity Supply Industry 2021

サバ州の発電は主にガスに依存しつつも、水力、バイオマス／バイオガス、ディーゼル、太陽光も一定割合を占める、多様性はあるもののガス主体のエネルギーミックス

Type of Power Plants in Sabah



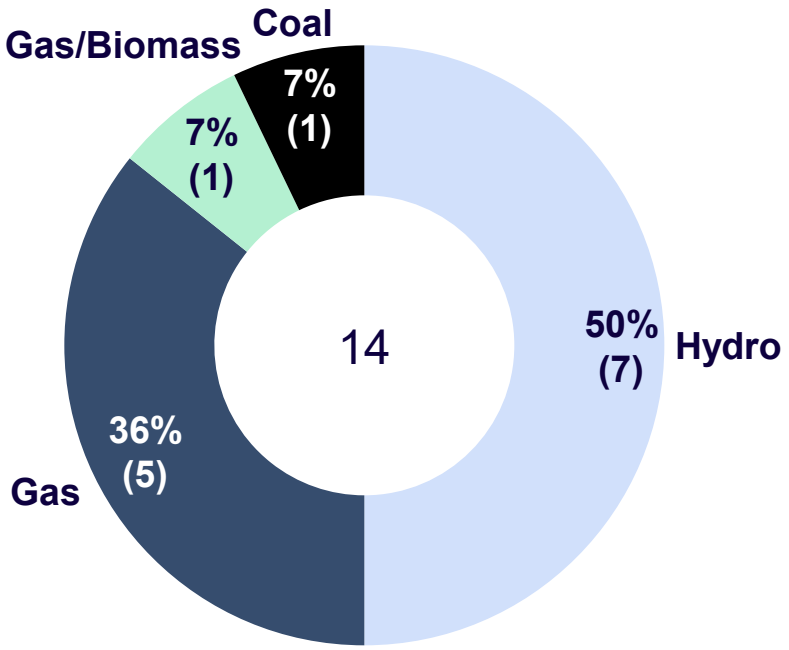
List of Power Plants in Sabah

No.	Power Plant	Type
1	Teluk Salut	Gas
2	Rugading	Gas
3	Sepanggar	Gas
4	Melawa	Gas
5	Kimanis	Gas
6	SPR	Gas
7	SJ Patau-Patau	Gas
8	Batu Sapi	Gas
9	SJ Sandakan	Gas
10	SJ Tawau	Gas
11	Kubota	Gas
12	Cash Horse	Biomass/Biogas
13	Mistral	Biomass/Biogas
14	TSH	Biomass/Biogas
15	QL	Biomass/Biogas
16	Libaran	Diesel
17	Sayap	Hydro
18	Kadamaian	Hydro
19	Pangapuyan	Hydro
20	Merotai & Bombalai	Hydro
21	Pangi	Hydro
22	Tadau LSS	Solar

Source : Sabah electricity supply industry outlook 2019

サラワク州の発電所構成は水力が主体で、次いでガスが多く、石炭およびガス／バイオマスは小規模な割合を占めている

Type of Power Plants in Sarawak



List of Power Plants in Sarawak

No.	Power Plant	Type
1	Balingian P/S	Coal
2	Miri OCGT P/S	Gas
3	Tanjung Kidurong CCGT P/S	Gas
4	Sarawak Power Generation P/S	Gas
5	Bintulu OCGT P/S	Gas
6	Sejingkat Power Corporation P/S	Gas
7	Mukah Power Generation P/S	Gas/Biomass
8	Bakun HEP	Hydro
9	Murum HEP	Hydro
10	Batang Ai HEP	Hydro
11	Kota 2 HEP	Hydro
12	Lawas P/S	Hydro
13	Limbang P/S	Hydro
14	Tunku Abdul Rahman (Biawak)	Hydro

Source : Performance and Statistical Information on the Malaysian Electricity Supply Industry 2021

2025年時点のマレーシア最大規模の発電所は、ガス焚きCCGTと石炭火力が主体で、設備容量上位20位以内に入る水力発電所は1か所のみ

List of Top 20 Power Plants in Malaysia by Capacity (2025)

No.	PPA/SLA Expiry Year	Name	Fuel	Type	Capacity (MW)
1	2042 Dec	Edra Melaka Power Plant (Block 1, 2, 3)	Gas	CCGT	2242
2	2031 Sep	Tanjung Bin Power Sdn Bhd	Coal	Thermal	2100
3	2030 Aug	TNB Janamanjung Sdn Bhd (M123)	Coal	Thermal	2070
4	2044 May	Jimah East Power Sdn Bhd	Coal	Thermal	2000
5	2029 Jul	Kapar Energy Ventures Sdn Bhd	Coal	Thermal (U3-U6)	1474
6	2042 Jan	Southern Power Generation Sdn. Bhd. (SPGP)	Gas	CCGT	1440
7	2033 Dec	Jimah Energy Ventures Sdn Bhd	Coal	Thermal	1400
8	2027 Jun	Segari Energy Ventures Sdn Bhd	Gas	CCGT	1303
9	2026 Feb	TNB Prai Sdn Bhd	Gas	CCGT	1071.43
10	2040 Mar	TNB Janamanjung Sdn Bhd (M4)	Coal	Thermal	1010
11	2042 Sep	TNB Manjung Five Sdn Bhd	Coal	Thermal	1000
12	2041 Mar	Tanjung Bin Energy Sdn Bhd	Coal	Thermal	1000
13	2023 Feb	Panglima Power Sdn Bhd	Gas	CCGT	720
14	2030 Jan	S.J Tuanku Jaafar, Port Dickson	Gas	CCGT PD2	708
15	2028 Aug	S.J Tuanku Jaafar, Port Dickson	Gas	CCGT PD1	703
16	2026 Feb	Kuala Langat Power Plant Sdn. Bhd. (KLPP)	Gas	CCGT	675
17	2024 Mar	Teknologi Tenaga Perlis Consortium Sdn Bhd	Gas	CCGT	650
18	2022 Aug	S.J Sungai Perak (under extension)	Water	Hydro	645
19	2022 Dec	GB3 Sdn Bhd	Gas	CCGT	640
20	2038 May	Pengerang Power Sdn Bhd	Gas	CCGT	600

Source : Grid System Operator 2025

マレーシアの高出力発電プロジェクト計画は大型水力発電所とガス発電所が主導しており、その大半は依然として計画段階

List of Planned Power Plants in Malaysia by Output

#	Project Name	Power Type	Companies	Capacity (MW)	Status
1	Baleh Dam, Upper Rejang Basin, Sarawak	Hydropower	Sarawak Energy Berhad (SEB)[Sponsor]{Malaysia}, Sinohydro Corporation[Construction]{Mainland China},General Electric[Construction]{United States}, Untang Jaya Sdn Bhd [Construction]{Malaysia},China Gezhouba Group Corporation (CGGC)[Construction]{Mainland China}	1,285	Under construction
2	Tadmax Combined Cycle Power Plant, Pulao Indah, Selangor	Gas	Mitsubishi[Equipment]{Japan},POSCO[Construction]{South Korea},Korea Electric Power Corporation (KEPCO)[Consultant/Project Management]{South Korea},Government of Malaysia[Sponsor]{Malaysia}, Tadmax Resources Bhd [Operator]{Malaysia},Worldwide Holdings Berhad [Sponsor]{Malaysia},Jacobs Consultancy[Consultant/Project Management]{United States}	1,200	At planning stage
3	Kedah Combined Cycle Power Plant, Kedah	Gas	Treasure Specialty Co Ltd[Sponsor]{Thailand},Ranhill[Sponsor]{Malaysia}	1,150	At planning stage
4	Tanjung Kidurong (Bintulu) Power Station Expansion, Sarawak	Gas	Sinohydro Corporation[Construction]{Mainland China},General Electric[Construction]{United States},Sarawak Energy Berhad (SEB)[Sponsor]{Malaysia}	842	Completed
5	Pelagus Dam, Sarawak	Hydropower	Hydro Tasmania[Consultant/Project Management]{Australia},Sarawak Energy Berhad (SEB)[Sponsor]{Malaysia}, Norconsult[Consultant/Project Management]{Norway}	465	At planning stage
6	Merit Pila Coal-fired Power Plant, Kapit, Sarawak	Coal	Sarawak Energy Berhad (SEB)[Sponsor]{Malaysia}	300	Abandoned
7	Bakun Hydroelectric Power Plant Extension, Sarawak	Hydropower	SMEC[Feasibility]{Australia},Sarawak Energy Berhad (SEB)[Sponsor]{Malaysia}	300	At planning stage
8	Baram 3 Hydropower Project, Sarawak	Hydropower	Sarawak Energy Berhad (SEB)[Sponsor]{Malaysia}	300	Abandoned
9	Gua Musang Hydroelectric Power Plant, Mukim Ulu Nenggiri, Jajahan Gua Musang, Kelantan	Hydropower	Tenaga Nasional Berhad [Sponsor]{Malaysia},Malaysian Ministry of Energy - Green Technology and Water (KeTTHA) [Sponsor]{Malaysia},Andritz Hydro[Equipment]{Austria}	300	Under construction
10	Trusan 2 Hydropower Project, Sarawak	Hydropower	Sarawak Energy Berhad (SEB)[Sponsor]{Malaysia}	240	At planning stage

Source: Fitch Solutions – Malaysia Power Report 2023

発電開発計画は、CCGT（水冷複合ガスタービン）、水力発電、再生可能エネルギーの設備容量拡大に重点を置き、老朽化した石炭火力発電所を段階的に廃止する方針

Generation Development Plan (2021-2030)

Year	Retiring Plants	Generation Capacity
2021	YTL Power (CCGT) (585 MW)	Edra Energy (CCGT) (3x747 MW); RE (860 MW)
2022	TNB Pasir Gudang (CCGT) (275 MW); GB3 (CCGT) (640 MW)	RE (652 MW)
2023	Panglima (CCGT) (720 MW)	RE (663 MW)
2024	SKS Prai CCGT (341 MW); TTPC (CCGT) (650 MW); TNB Gelugor (CCGT) (310 MW)	TADMAX (CCGT) (2x600 MW); RE (855 MW)
2025	TNB Putrajaya GT4 & GT5 (OCGT) (249 MW)	RE (818 MW)
2026	KLPP (CCGT) (675 MW)	THB (CCGT) (2x600 MW); RE (117 MW)
2027	Segari Energy Ventures (CCGT) (1,303 MW)	Nenggiri (Hydro) (300 MW); RE (184 MW)
2028	TNB Tuanku Jaafar PD1 (CCGT) (703 MW)	RE (192 MW)
2029	KEV Gas U1 & U2 (Thermal Gas) (578 MW); KEV Coal U3-U6 (Coal) (1,474 MW)	CCGT (1x700 MW); CCGT (1x500 MW); RE (199 MW)
2030	TNB Tuanku Jaafar PD2 (CCGT) (708 MW); TNB Janamanjung (Coal) (2,070 MW)	CCGT (4x700 MW); RE (207 MW); BESS (1x100 MW)

Generation Development Plan (2030-2039)

Year	Retiring Plants	Generation Capacity
2031	Tanjung Bin Power (Coal) (2,100 MW)	CCGT (1x700 MW); Coal (2x700 MW); BESS (1x100 MW); RE (215 MW)
2032		CCGT (1x700 MW); BESS (1x100 MW); RE (224 MW)
2033	Jimah Energy Venture (Coal) (1,400 MW)	CCGT (2x700 MW); BESS (1x100 MW); RE (232 MW)
2034		Coal (1x700 MW); BESS (1x100 MW); RE (242 MW)
2035		RE (278 MW)
2036		CCGT (1x700 MW); RE (80 MW)
2037	TNB Prai (CCGT) (1,071 MW); TNB CBPS (CCGT) (375 MW)	CCGT (1x700 MW); Coal (1x700 MW); OCGT (1x100 MW); RE (77 MW)
2038	Pengerang Power (Co-Gen) (600 MW)	CCGT (1x700 MW); RE (76 MW)
2039		CCGT (1x700 MW)

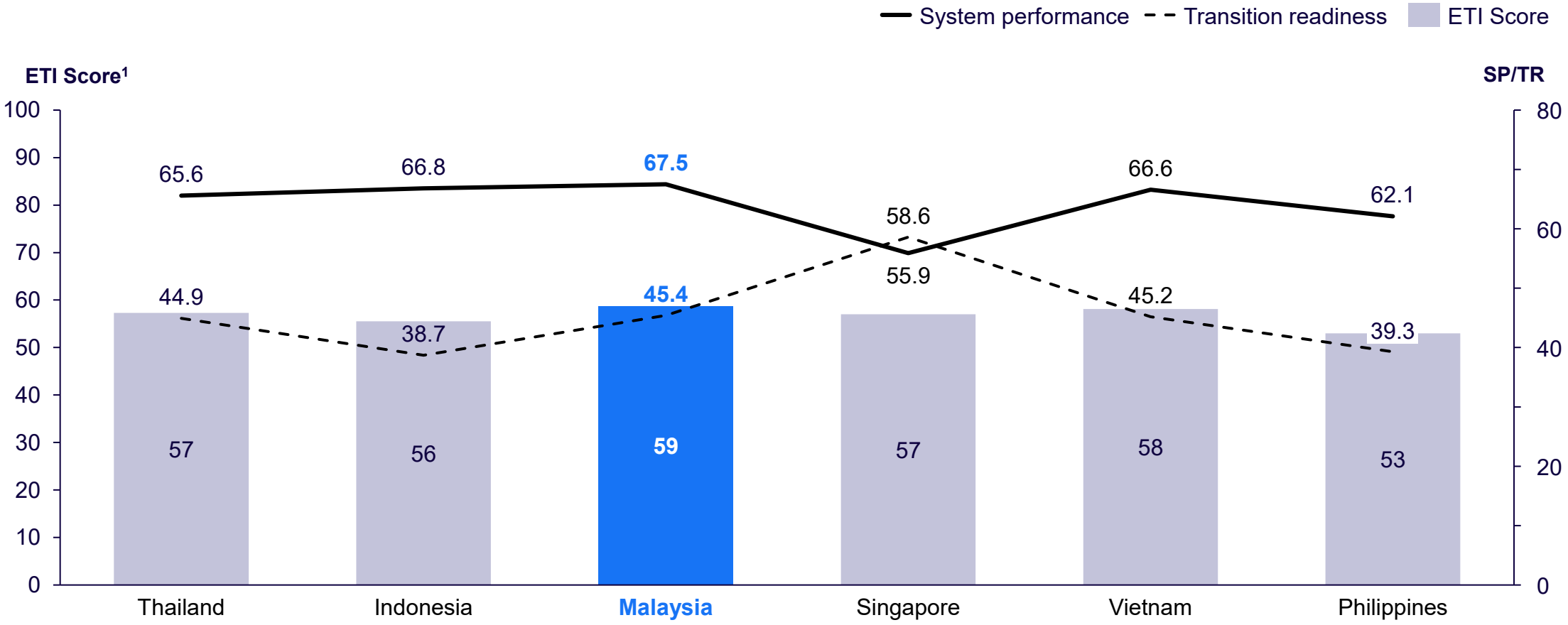
- The **Generation Development Plan (2021–2030) focuses on near- to medium-term generation transitions**, detailing specific plant retirements and immediate replacement capacity, with a strong shift from aging CCGT and coal units toward new CCGT, large-scale renewable energy (RE), and selected hydro projects.
- Moving forward, the **Generation Development Plan (2030–2039) outlines longer-term generation strategy**, marking the phase-out of remaining large coal plants and continued CCGT replacement, while embedding more battery energy storage systems (BESS) and expanding RE capacity.

Source: Report on Peninsular Malaysia Generation Development Plan 2022

Contents

マレーシアのETIスコア59は高いシステムパフォーマンスを反映していますが、クリーンエネルギー移行を加速するためにはトランジション準備度の改善が不可欠です

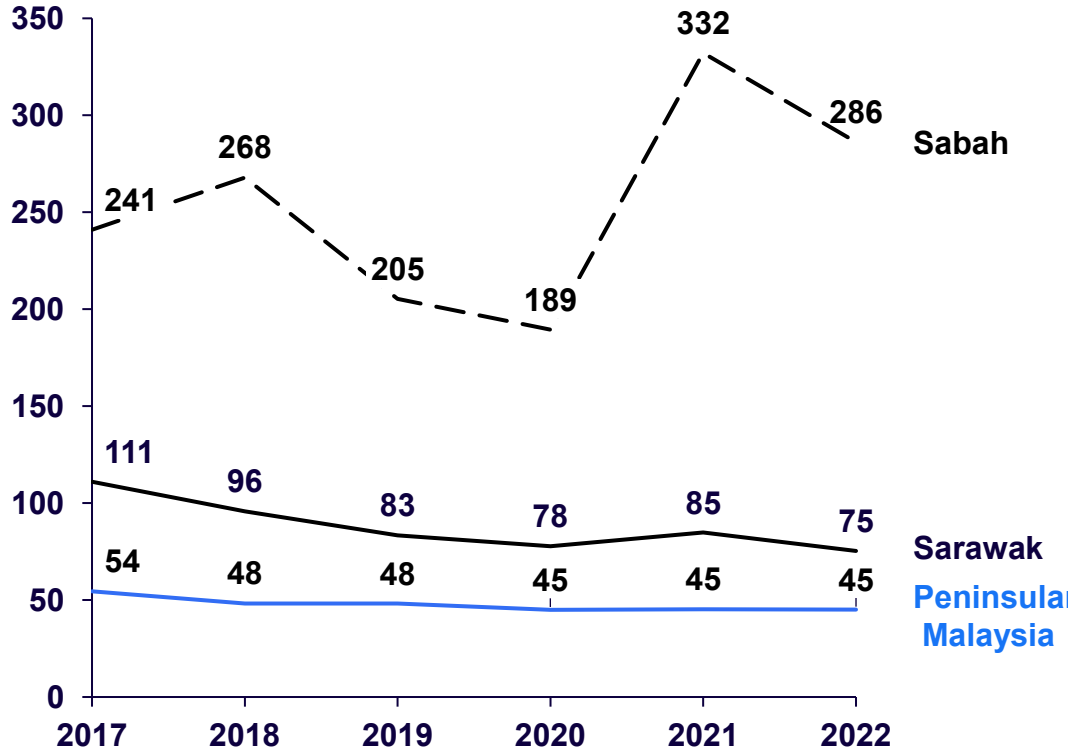
World Economic Forum's Energy Transition Index (ETI)



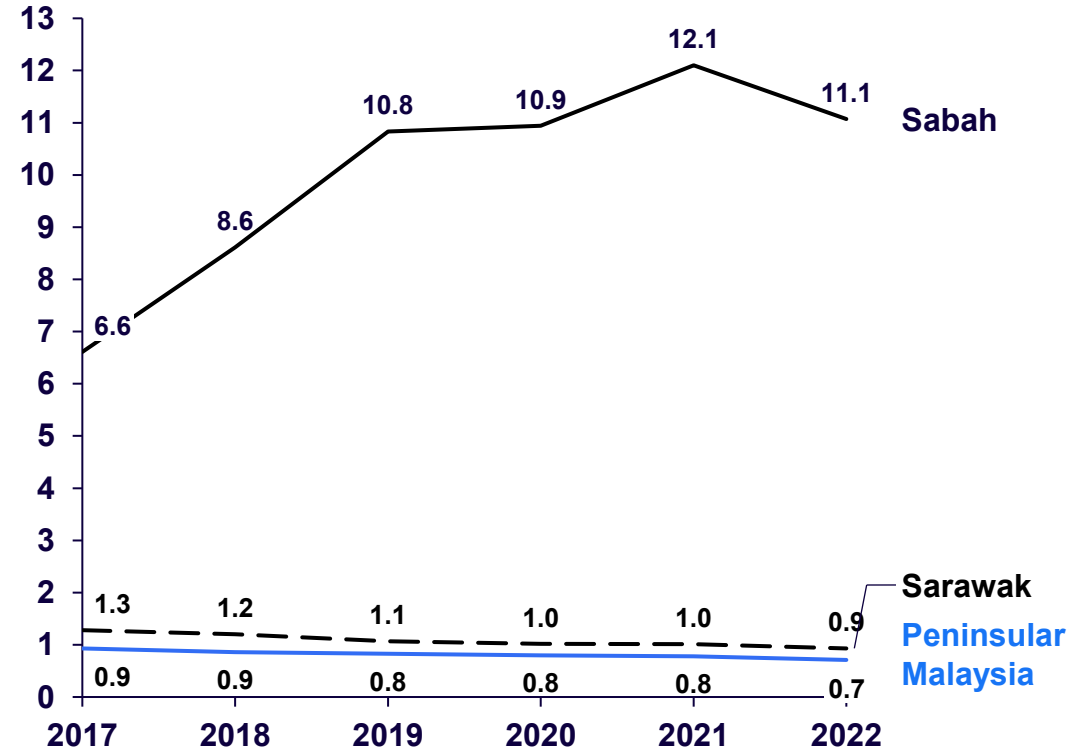
Note: 1) Energy Transition Index score consists of System Performance (60%) and Transition Readiness (40%).
Source : World Economic Forum Report, *Fostering Effective Energy Transition 2025*

2017年から2021年にかけて、マレー半島は最高水準の電力品質を維持した一方、サバ州は最も低い水準にとどまっている

System Average Interruption Duration Index (SAIDI) (Minutes/Customer/Year)



System Average Interruption Frequency Index (SAIFI) (Number of Interruptions/Customer/Year)



Malaysia achieved full electricity access for its population in 2017 and has maintained 100% coverage since then.

Source: Performance and Statistical Information on the Malaysian Electricity Supply Industry 2021

電力供給法に基づく罰則は大幅に強化されており、2025年からは無許可の国境を越えた電力取引に対して厳しい制裁が追加される (1/2)

Electricity Supply Act Key Offences and Penalties (1990, 2015 & 2025 Amendments)

Offence Category	Description	Penalties – Act 1990 (baseline)	Penalties – Act 2015 amendments
Tampering / Dangerous Equipment	Tampering with any electrical installation; manufacturing, importing, or selling equipment that endangers persons or property	Up to RM100,000 fine / ≤5 yrs imprisonment / both	Up to RM1,000,000 fine / ≤10 yrs imprisonment / both
Rash / Negligent Damage	Causing injury or property damage by rash or negligent act	Up to RM50,000 fine / ≤3 yrs / both	Up to RM100,000 fine / ≤5 yrs / both
Illegal Consumption / Meter Tampering – Domestic	Using electricity illegally, tampering with or preventing normal operation of meters	Up to RM100,000 fine / ≤3 yrs / both	**First offence:** RM1,000–50,000 fine / ≤1 yr / both **Repeat:** RM5,000–100,000 fine / ≤3 yrs / both
Illegal Consumption / Meter Tampering – Non-Domestic	Same as above, but for commercial/industrial use	Up to RM100,000 fine / ≤3 yrs / both	**First offence:** RM20,000–1,000,000 fine / ≤5 yrs / both **Repeat:** RM100,000–5,000,000 fine / ≤10 yrs / both
Operating Without Licence (Section 9)	Operating an installation without required licence	Up to RM50,000 fine + up to RM1,000/day for continuing offence	–
Unauthorised Supply from Installation	Supplying electricity without authorisation	Up to RM100,000 fine + up to RM1,000/day for continuing offence	–
Other Technical/Safety Offences	E.g., breach of licence conditions, failure to register installations, damage to public lamps, illegal wiring	RM5,000–25,000 fine and/or 1–3 yrs imprisonment depending on offence	–

Source: Electricity Supply Act 1990 (Act 447), Amendment Act A1501 (2015), and Electricity Supply (Amendment) Bill 2025

電力供給法に基づく罰則は大幅に強化されており、2025年からは無許可の国境を越えた電力取引に対して厳しい制裁が追加される (2/2)

Electricity Supply Act Key Offences and Penalties (1990, 2015 & 2025 Amendments)

Offence Category	Description	Penalties – Act 2025 updates
Import/Export of Electricity – Unlicensed	Importing or exporting electricity without a valid licence	Up to RM30,000,000 fine / ≥10 yrs imprisonment / both
Import/Export of Electricity – Licensed Breach	Licensed importer/exporter violating licence conditions	Up to RM5,000,000 fine / ≤3 yrs imprisonment / both
Regulatory Powers	New powers to issue guidelines for cross-border electricity trade and renewable “green attribute” certification	Granted to Energy Commission (Section 50C amendment)

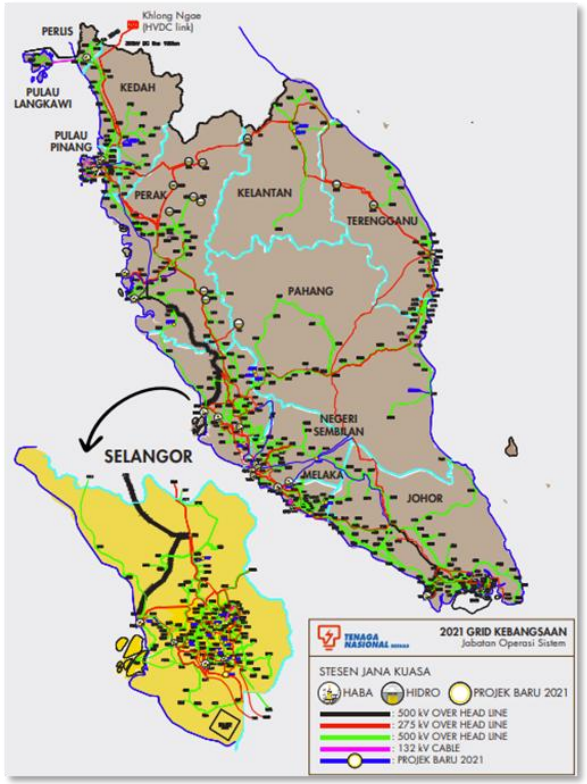
Source: Electricity Supply Act 1990 (Act 447), Amendment Act A1501 (2015), and Electricity Supply (Amendment) Bill 2025

Contents

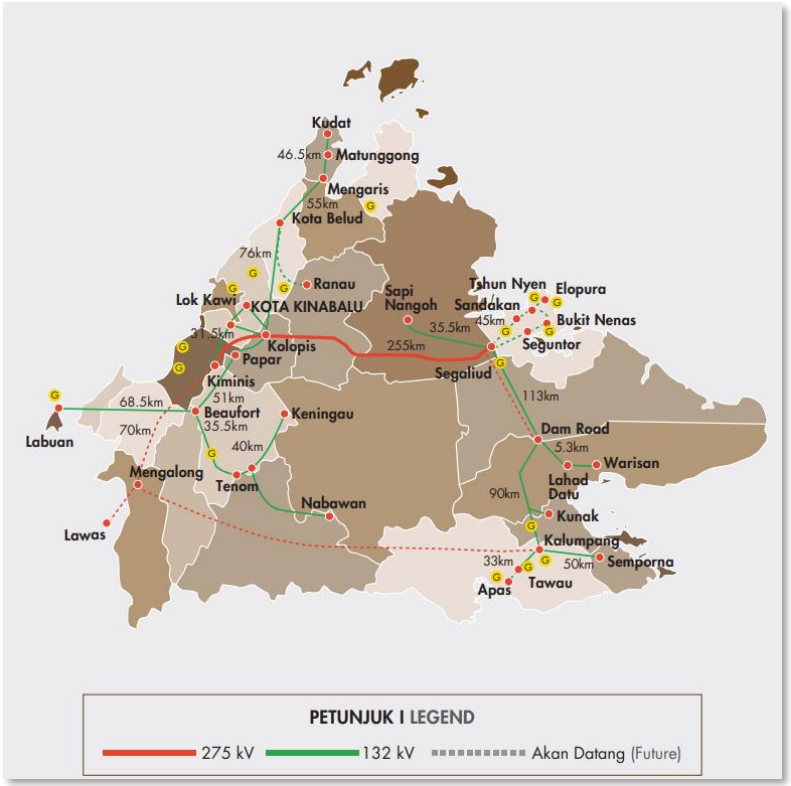
マレー半島の送電網には高容量の500kV送電線が含まれる一方、サバ州とサラワク州は500kV設備を持たない低電圧ネットワークで運用されている

Location of Electricity Transmission System in Malaysia by Region, 2021

Peninsular Malaysia



Sabah



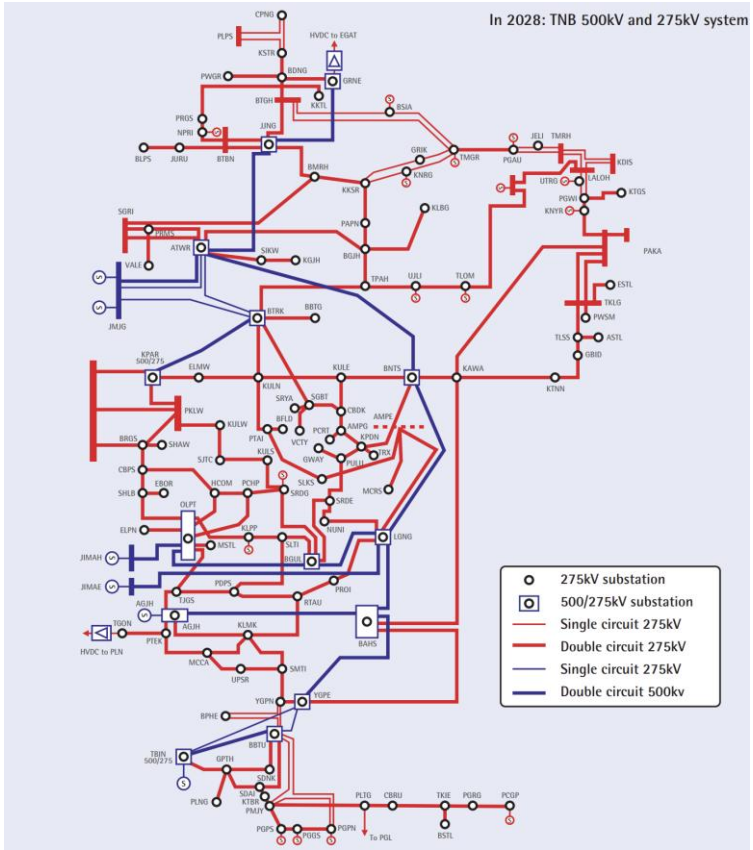
Sarawak

Source : Performance and Statistical Information on the Malaysian Electricity Supply Industry 2021

マレーシア本島では電力需要の中心である中部に向け北部/南部からの送電網を整備する計画

Five Year Plan 500 kV Grid Expansion (2018–2023)

Ten Year Plan 500 kV and 275 kV Transmission Network (2018–2028)



Source: Peninsular Malaysia Electricity Supply Industry outlook 2019

ENEGEMは、国内のグリーン電力供給を地域需要と結び付けるため、国の送電網を活用するマレーシア公式の国際再生可能電力取引プラットフォーム (1/2)

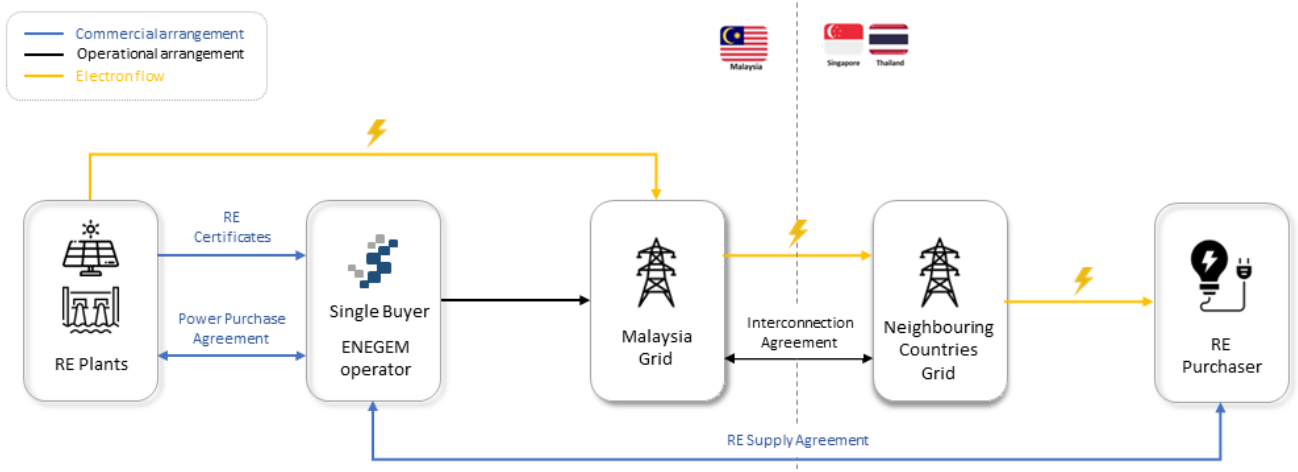
Energy Exchange Malaysia (ENEGEM)

Background and Regulatory Framework

- **Launched in October 2023** after government approval, the scheme **allows renewable energy from Malaysia to be sold to neighboring countries under the Cross-Border Electricity Sales (CBES) framework**.
- It follows the latest CBES Guide issued by the Energy Commission, ensuring **compliance with the Electricity Supply Act 1990** and related laws, and is officially **managed by Single Buyer**, the national body in charge of competitive electricity procurement.

Operational Structure

- **Renewable energy (RE) from Malaysian RE plants is sold to neighboring countries through the Single Buyer platform,** with commercial agreements covering power purchase, supply, and RE certificates[1]**.**
- **Electricity flows from RE plants through Malaysia's grid, across interconnections, and into neighboring grids before reaching RE purchasers.**



Source: Singlebuyer
Note 1) Renewable Energy Certificates (RECs) are issued to prove the electricity's green origin.

ENEGEMは、国内のグリーン電力供給を地域需要と結び付けるため、国の送電網を活用するマレーシア公式の国際再生可能電力取引プラットフォーム (2/2)

Energy Exchange Malaysia (ENEGEM)

Energy Exchange Malaysia (ENEGEM) functions as the market mechanism that enables and monetizes the use of Malaysia's grid system for cross-border renewable electricity trade.

Strategic Importance

- **Positions Malaysia as a regional hub for renewable exports**, linking surplus green electricity with demand in Singapore and other ASEAN states.
- **Pilot phase launched with a 100 MW auction** to Singapore, leveraging upgraded interconnectors; designed for significant scale-up to support the ASEAN Power Grid.
- Opens new export markets to stimulate domestic renewable generation.
- **Strengthens cross-border grid integration** and paves the way for multilateral electricity trade under ASEAN frameworks.
- **Supports market transparency and carbon integrity** via RE supply agreements and REC verification.

Source: 各種2次情報よりADL作成

AIMS III[1]で示されたマレーシアのASEANパワーグリッドにおける優先プロジェクトは、シンガポール、タイ、インドネシアなどとの国境を越えた連系強化に重点を置いている

Unit: MW

No.	Connection	Existing	Ongoing (Up to 2024)	Future	Total	AIMS III Projection 2040
1	**Peninsular Malaysia – Singapore**	525	525	TBC	1,050	1,050
2	**Thailand – Peninsular Malaysia**	380	-	TBC	380	1,043
3	**Sarawak – Peninsular Malaysia**	-	-	1,600	1,600	695
4	**Peninsular Malaysia – Sumatera**	-	-	600/ TBC	600	2,130
5	**Batam – Singapore**	-	-	3,400	3,400	-
6	**Sarawak – West Kalimantan**	230	-	-	230	777
7	**Philippines – Sabah**	-	-	500	500	196
8	**Sarawak – Brunei – Sabah (Sarawak – Brunei)**	-	TBC	TBC	TBC	TBC
9	**Sarawak – Brunei – Sabah (Sarawak – Sabah)**	-	30–50	-	30–50	177

Source: ASEAN Power Grid Interconnections Project Profiles 等各種2次情報よりADL作成
Note: 1) The AIMS III Projection data referred to the ASEAN RE Target Scenario projection of AIMS III Phase 1 and 2 (2020).

マレーシアは、送電網容量と地域間電力統合を強化するため、国内各地域および周辺国との間で高電圧送電プロジェクトを推進している(1/2)

List of The Planned Transmission Line Projects in Malaysia

No.	Region	Project Name	Size	Owner	Construction Start	Status
1	Malaysia – Indonesia	Melaka – Pekanbaru Interconnection Project, Interconnection	600 MW	• Perusahaan Listrik Negara (PT PLN)[Sponsor]{Indonesia}, • Tenaga Nasional Berhad[Sponsor]{Malaysia}		At planning stage
2	Sarawak	Backbone Transmission Project, Sarawak (Mapai - Lachau)	500 kV	• Sarawak Energy Berhad (SEB) [Sponsor] {Malaysia}, • Sinohydro Corporation[Construction]{China}, • Trenergy Inc[Construction]{Canada}, • Hunan Tengda Electric Power Construction Co. Ltd.[Construction]{China}	2019	Under construction
3	Sarawak	Backbone Transmission Project, Sarawak (Lachau - Tondong)	500 kV	• Trenergy Inc[Construction]{Canada}, • Sarawak Energy Berhad (SEB)[Sponsor]{Malaysia}, • Sinohydro Corporation[Construction]{China}	2019	Under construction
4	Sarawak	Sarawak - Brunei-Muara Interconnection Project, Interconnection	50 MW	• Sarawak Energy Berhad (SEB)[Sponsor]{Malaysia}, • Department of Electrical Services of Brunei[Sponsor]{Brunei Darussalam}		At planning stage
5	Penang, Peninsular Malaysia	Penang 275kV Cross-Sea Transmission Line Project	275 kV	• Tenaga Nasional Berhad (Malaysia)	2022	Under construction
6	Sarawak	Kapit – Mapai Transmission Line	500 kV	• Sarawak Energy Berhad (Malaysia)	2023	Under construction

Source: BMI Key Power Projects Database 等各種2次情報よりADL作成

マレーシアは、送電網容量と地域間電力統合を強化するため、国内各地域および周辺国との間で高電圧送電プロジェクトを推進している(2/2)

List of The Planned Transmission Line Projects in Malaysia

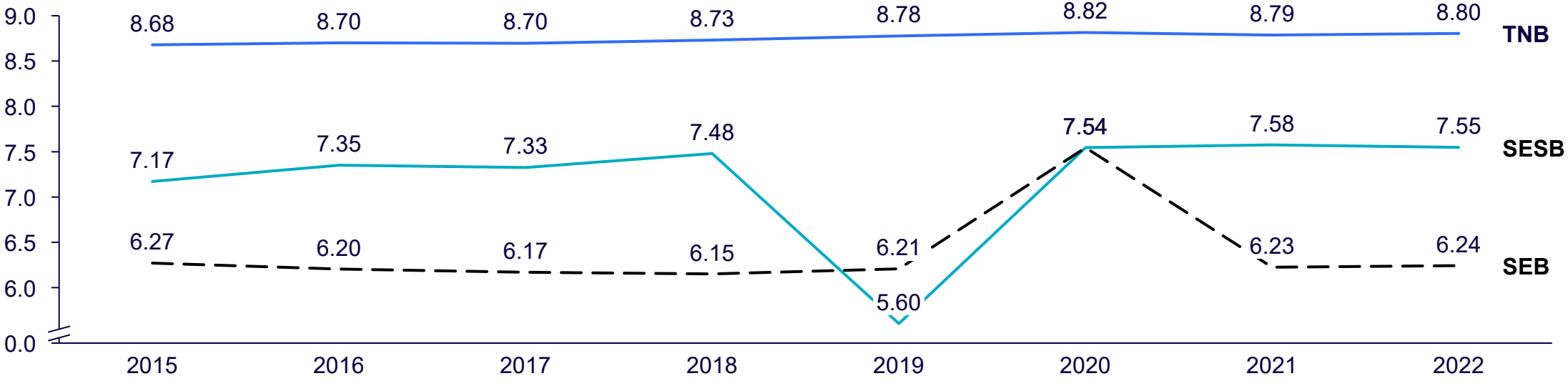
No.	Region	Project Name	Size	Owner	Construction Start	Status
7	Sabah – Sarawak	Sabah – Sarawak Interconnection (Lawas – Mengalong)	30 – 50 MW	• Sarawak Energy/Sabah Electricity (Malaysia)	2023	Under construction
8	Peninsular Malaysia	Bentong South – Lenggeng Transmission Line	500 kV	• Tenaga Nasional Berhad (Malaysia)	2024	Under construction
9	Peninsular Malaysia	Ayer Tawar – Bentong South – Lenggeng Transmission Line	500 kV	• Tenaga Nasional Berhad (Malaysia)	2024	Under construction
10	Sarawak	Baleh – Kapit Transmission Line	500 kV	• Sarawak Energy Berhad (Malaysia)	2024	Under construction
11	Peninsular Malaysia	Lenggeng – Yong Peng Transmission Line	500 kV	• Tenaga Nasional Berhad (Malaysia)		At planning stage
12	Peninsular–Sarawak	Peninsular Malaysia – Sarawak Interconnection (HVDC)	1,600 MW	• Tenaga Nasional Berhad (Peninsula), • Sarawak Energy Berhad (Sarawak)		At planning stage
13	Peninsular – Indonesia	Peninsular Malaysia – Sumatra Interconnection (HVDC)	600 MW	• Tenaga Nasional Berhad (Malaysia), • PT PLN (Indonesia)		At planning stage

Source: BMI Key Power Projects Database 等各種2次情報よりADL作成

Contents

マレーシアの電力料金は全国的に概ね安定しているものの、運営コストや産業向けの特定料金政策によって地域差が生じている

Average Electricity Selling Prices by Region (cents USD/kWh)



Comments and key findings:

- The data reflects the actual average selling price per kWh across domestic, commercial, industrial, mining, and other categories.
- **TNB (Peninsular Malaysia):** Prices are stable but consistently higher than in other regions, reflecting higher operational and infrastructure costs.
- **SEB (Sarawak):** Lowest average prices among the three supply regions, primarily due to significantly lower industrial tariffs designed to attract and retain energy-intensive industries.

Source: Malaysia Energy Statistics Handbook 2023
Note: 1 US cent/kWh ≈ 4.55 sen/kWh

各ページでは、まず全国的な料金原則を説明し、その後にマレー半島、サバ州、サラワク州で適用される具体的な料金体系をそれぞれ示している (1/2)

Tariff Adjustment and Pricing Mechanisms
(Overarching national policy and regulatory framework)

A. Automatic Fuel Adjustment (AFA)
- **Monthly fuel cost adjustments**, capped **at ±3 sen/kWh**, with Cabinet approval required for larger changes.
- **Aligns tariffs with global price movements**
- Replace the legacy ICPT system

B. KWIE (Electricity Industry Fund)
- **Cushions Automatic Fuel Adjustment (AFA) surcharges** during fuel price spikes, subject to fund availability.
- **Reduces tariff volatility** for both consumers and utilities.

C. Pricing Mechanisms
- **Usage-Based Tariffs:** Single base rate for residential users; category-specific itemized charges for businesses.
- **Efficiency Incentives:** Rebates for low-volume (<1,000 kWh/month) and off-peak usage.
- **Social Rebates:** Discounts for hardcore poor (RM40/month, e-Kasih), schools, welfare homes, and religious institutions.
- **Time-of-Use Pricing:** Optional lower rates during extended off-peak hours (e.g., 10 pm–2 pm weekdays, all-day weekends).

Source:各種2次情報よりADL作成

各ページでは、まず全国的な料金原則を説明し、その後にマレー半島、サバ州、サラワク州で適用される具体的な料金体系をそれぞれ示している (2/2)

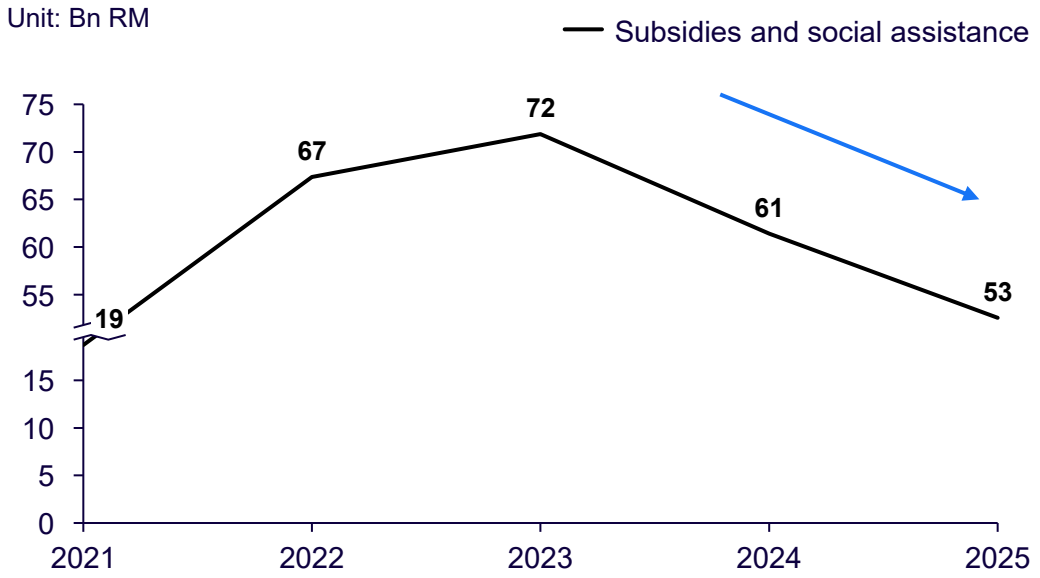
Tariff Structure that applies to Peninsular Malaysia, Sabah and Sarawak

	Peninsular Malaysia	Sabah	Sarawak
Base Tariff	• **For Domestic users**: **45.40 sen/kWh**. • **For Non-domestic users:** The base tariff is the starting rate before adding: – Itemized charges (e.g., generation, capacity) – Premiums or rebates (e.g., Green Electricity Tariff)	• **For Domestic users**: **Tiered rates** – **1–100 kWh:** 17.50 sen/kWh – **101–200 kWh:** 18.50 sen/kWh – Higher tiers increase gradually • **For Non-domestic users:** Average ~34.52 sen/kWh (with federal subsidies)	• **For Domestic users**: **Tiered rates** – **Tariffs rise from 18 sen/kWh (low use) to 31.5 sen/kWh (high use).** • **For Non-domestic users**: – **C1 Commercial**: starts at 20 sen – **C2 Demand-based:** ▪ Energy charge of 24.5 sen/kWh ▪ RM16/kW based on peak demand – **C3 Time-of-Use:** ▪ Peak hours: 24.5 sen/kWh ▪ Off-Peak hours: 13.9 sen/kWh
Itemized Billing	• Generation (energy) • Capacity • Network (TNB grid) • Retail (service/metering) • Fuel adjustment (AFA)	• Generation (energy) • Network (SESB grid) • Retail (service/metering) • Fuel cost pass-through (mechanism differs from TNB AFA, less frequent adjustment)	• Generation (energy) • Network (SEB transmission & distribution) • Retail (service/metering)
Green Electricity Tariff	• **Optional premium for RE supply:** – 5 sen/kWh (1 year) – 4 sen/kWh (2 years) – 3 sen/kWh (3 years) • Applies to all user categories	• Currently no publicly available nationwide GET scheme for Sabah • Renewable supply mostly under separate PPAs or feed-in tariff projects	• Currently no publicly available nationwide GET scheme for Sabah • Renewable supply mostly under separate PPAs or feed-in tariff projects.

Source:各種2次情報よりADL作成

マレーシアは、電力料金の一律補助から対象を絞った支援へと移行し、財政の持続可能性を高めるとともに、最も支援を必要とする層への援助に重点を置いている

Electricity Subsidy Trend, based on Government Subsidies & Social Assistance Budget



Comments:

Total **Subsidies and Social Assistance** expenditure is projected to decline by **14.5%** (from RM71.9 billion to RM61.4 billion in 2025), driven primarily by the continuation of **electricity subsidy rationalisation** and the targeted allocation of diesel subsidies to address leakages.

Electricity Subsidy Rationalisation

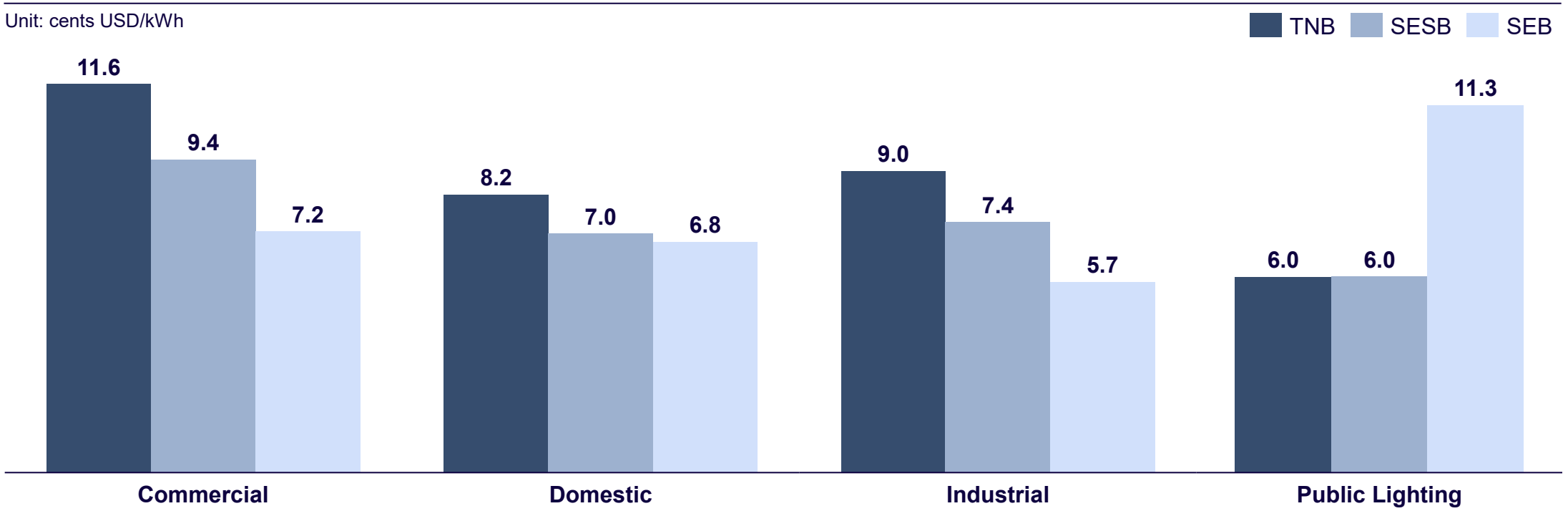
The Malaysian government is progressively rationalizing electricity subsidies as part of a broader reform of subsidies and social assistance:

- In early 2022, surging fuel and coal prices prompted Malaysia to implement electricity tariff subsidies to offset rising fuel and generation costs**.**
- **Currently, broad electricity subsidies are being replaced with a targeted structure** prioritising low and middle income households, small businesses, and vulnerable groups.
- On the other hand, **high consumption users and large businesses are moving toward market reflective prices.**
- **Fuel and generation subsidies are also being rationalised to improve fiscal sustainability** and direct resources to those most in need. For example, diesel subsidies are being redirected through the Budi MADANI programme.

Source: Federal government expenditure @2025, 各種2次情報よりADL作成

TNBの2021年小売料金は、ほとんどの区分でSESBおよびSEBを上回っていた一方、公共照明についてはSEBが顕著に高い料金を記録した

Regional Comparison of Average Retail Electricity Tariffs (2022)



Additional Information for TNB:

- In 2022, TNB uniquely reported **Mining (~5.41 cents USD/kWh)** and **Agriculture (~10.09 cents USD/kWh)** tariffs.
- The **Green Tariff appeared only in 2020** at 1.76 cents USD/kWh, highlighting a short-lived, highly subsidized green energy initiative.

Source: Malaysia Energy Statistic Handbook 2023
Note: 1 US cent/kWh ≈ 4.55 sen/kWh

企業は、割当枠があればNEMで屋上太陽光を導入し、大規模案件はLSS入札、その他再エネはFiT電子入札で申請可能

Major Solar Energy Deployment Schemes in Malaysia

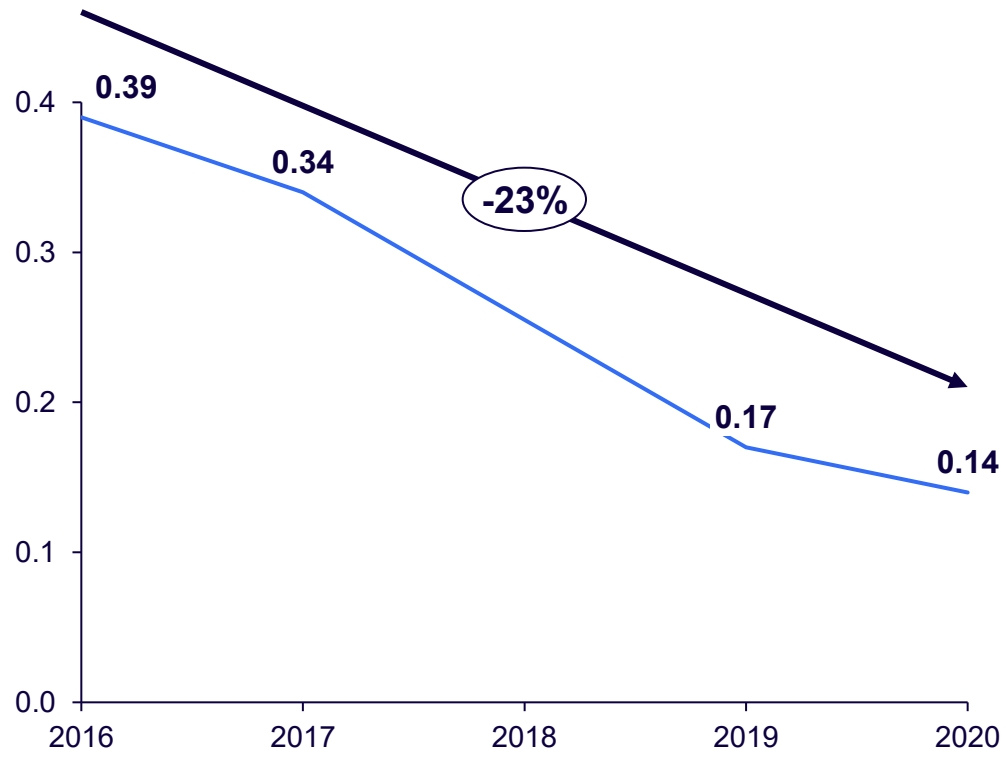
	FiT (Feed-in Tariff)	LSS (Large-Scale Solar)	NEM 3.0 (Net Energy Metering)	SELCO (Self-Consumption)
Scheme Overview	FiT refers to **fixed tariff paid for each kWh exported to the grid** for a set tenure	LSS refers to **large-scale, utility-connected solar projects.** Electricity is sold to the grid at **prices set by competitive bidding**	NEM 3.0 refers to a **rooftop solar scheme** for "prosumers" **where the electricity generated is consumed on-site first,** and any **excess is exported to the grid in exchange for bill credits**	SELCO refers to a **behind-the-meter solar setup for pure self-consumption**, where all generated electricity is used on-site and **no export to the grid is allowed**
Target Users	Developers of • **Biogas, biomass, small hydro** • **Legacy solar PV** already in FiT	**IPPs/utility-scale solar** developers	• **Residential** users • **Government** ministries, departments, and agencies • **Commercial and industrial** consumers	**Users who want solar without exporting** (or when NEM quota not available/eligible)
Commercial Mechanism	**Utility buys all exported RE at the FiT rate** under a Renewable Energy Power Purchase Agreement (REPPA)	The project developer signs a **Power Purchase Agreement (PPA)** with the off-taker to sell electricity to the grid **at the bid tariff**	Excess solar power exported to the grid earns bill credits. **The credit amount will reduce future electricity charges**.	Financial benefits come only from lowering the amount of electricity purchased from the grid
Current Status	• Implementing Agency: **SEDA** • **Active for non-solar**; No new solar PV FiT since 2016	• Implementing Agency: **Energy Commission** • LSS5, LSS5+, and LSS6 are in progress	• Implementing Agency: **SEDA, Energy Commission** • NEM 3.0 allocates **2,500MW** for rooftop solar • Credits roll over until December each year	• Implementing Agency: **Energy Commission**

Source： 各種2次情報よりADL作成

マレーシアの大規模太陽光発電入札（LSS1～LSS4）における最低入札価格は大幅に低下しており、市場競争力の高まりを反映している

Lowest Bid Prices Across Four Large-scale Solar (LSS) Rounds (LSS1–LSS4)

Unit: MYR/kWh



Overview of LSS1–LSS4

- **LSS 1** was held in 2016 for 371 MW with the lowest bid submitted at MYR **0.39/kWh**.
- **LSS 2** was held in 2017 for 526 MW with the lowest bid submitted at MYR **0.34/kWh**, a 13% reduction from LSS 1.
- **LSS 3** was held in 2019 for 490.88 MW with the lowest bid submitted at MYR **0.17/kWh**, a 50% reduction from LSS 2.
- **LSS 4** was held in 2020 for about 1,000 MW with the lowest bid at MYR **0.1399/kWh**, an 18% reduction from LSS 3.

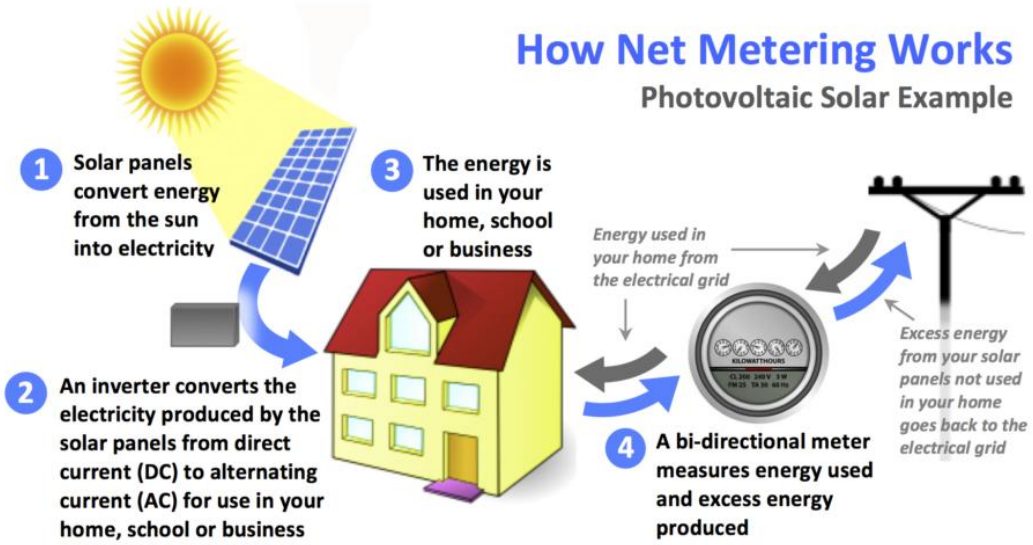
- By 2025, LSS1–4 are completed, **while LSS5, LSS5+, and LSS6 are in progress**, tendering up to 2 GW of new solar capacity.
- The **Energy Commission has not revealed the winning developers or awarded bid price range** for the 2 GW LSS5 programme.
- Latest 2025 tenders **permit ground-mounted and floating solar projects of up to 500 MW per site.**

Source：MyRER – Renewable Energy Malaysia (seda.gov.my) @2021,

NEM 3.0は明確なクレジットルールにより屋上太陽光発電の普及を加速させており、今後はSELCOが次の段階を主導する見通し

Net Energy Metering (NEM)

- As PV prices continue to fall, and electricity tariffs rise, it will make sense for more consumers to reduce their bill and hedge further increases in tariffs by installing PV on their rooftops, either on their own, or through PV leasing companies;
- Under **NEM 3.0 (2021–June 30, 2025)**, approved systems enjoy a 10-year tenure with monthly surplus. **When generation exceeds consumption, surplus energy is credited to the account and can offset future imported energy** within the rollover period (up to 12 months under NEM 3.0). Any unused credits after this period expire.
- After June 30, 2025, new applications for NEM will close, and **rooftop PV for new users will proceed under SELCO** until a successor export framework is introduced**; existing NEM users retain their current crediting terms**.
- **At higher PV penetration levels**, regulators may consider allowing utilities to **impose a fixed monthly charge on NEM consumers** to recover grid connection costs.
- Utilities can offset revenue loss from reduced sales through lower transmission and distribution (T&D) costs.



National benefits include:

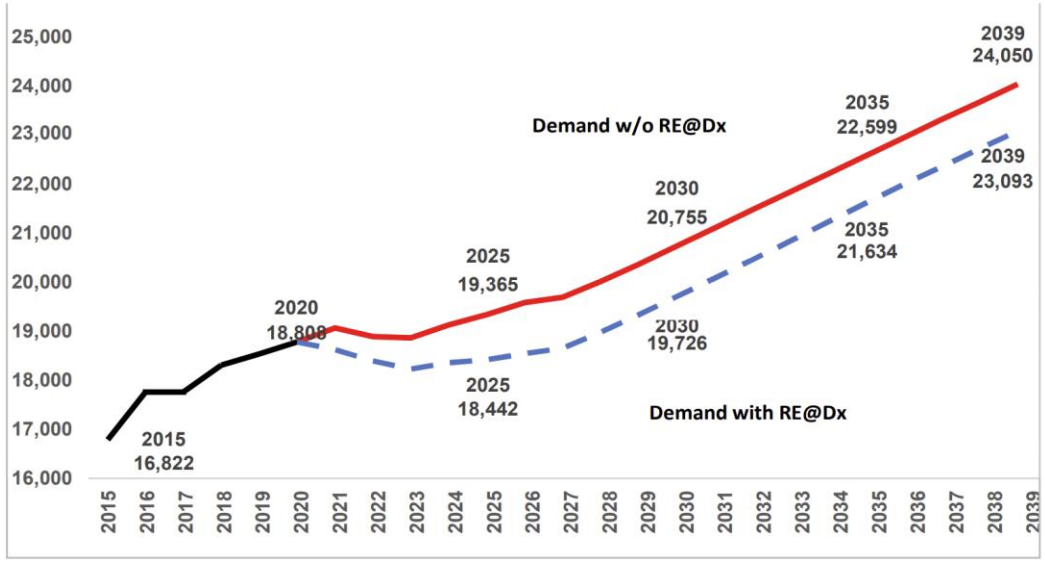
- **Reduced subsidized gas use**
- **Improved energy security**
- **Proven grid solutions** for high PV penetration

Source: Topsolar.asia, Sustainable Energy Development Authority (SEDA)

Contents

電力需要の増加に備え、需要家側の省エネ、創エネ、供給側のグリッド接続電源を拡充する

Peak Demand Forecast



The net demand is projected to grow by 0.6% p.a. for 2021–2030 and 1.8% p.a. for 2030–2039. This net demand will be used for supply planning on the transmission side.

Demand-side & Distributed Energy Management Initiatives

Demand-side Energy Management

- **Energy-efficient appliances**: Adoption of 4–5 star rated appliances and smart home technology to lower consumption.
- **Smart meters**: Empower consumers with real-time data to optimize energy usage.
- **Rooftop solar (self-consumption)**: Encourage co-generation and reduce grid dependency.

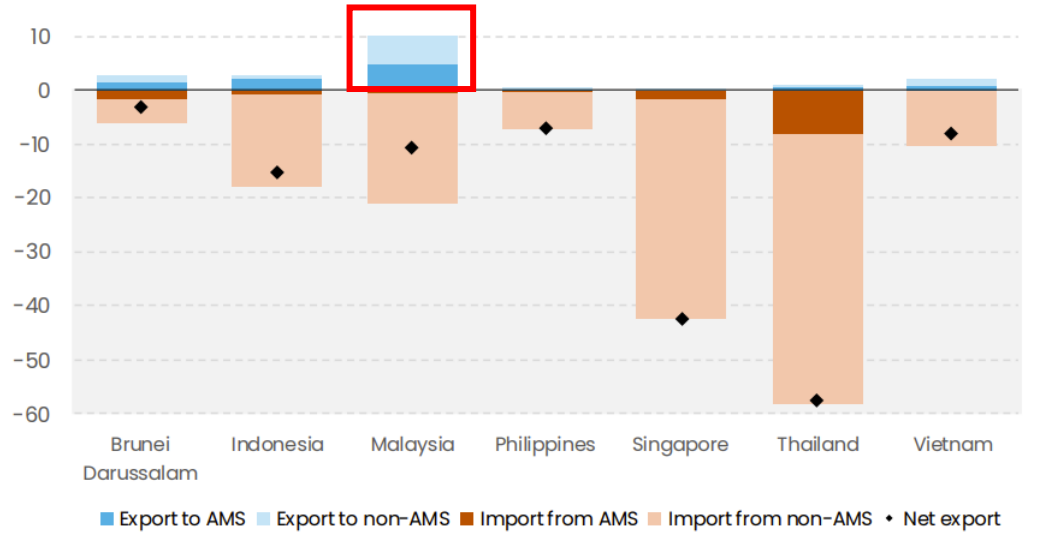
Distributed Generation

- **Biogas:** Increase capacity beyond the current 134 MW, building on growth from 4 MW in 2009.
- **Biomass Energy**: Expand utilization of animal and plant materials to increase capacity beyond the current 104.45 MW share in the energy mix.
- **Mini-hydro**: Grow mini-hydro capacity from 71 MW to the targeted 115 MW by 2024.
- **Waste-to-Energy (WTE) Systems:** Plan to set up six WTE facilities by 2025.

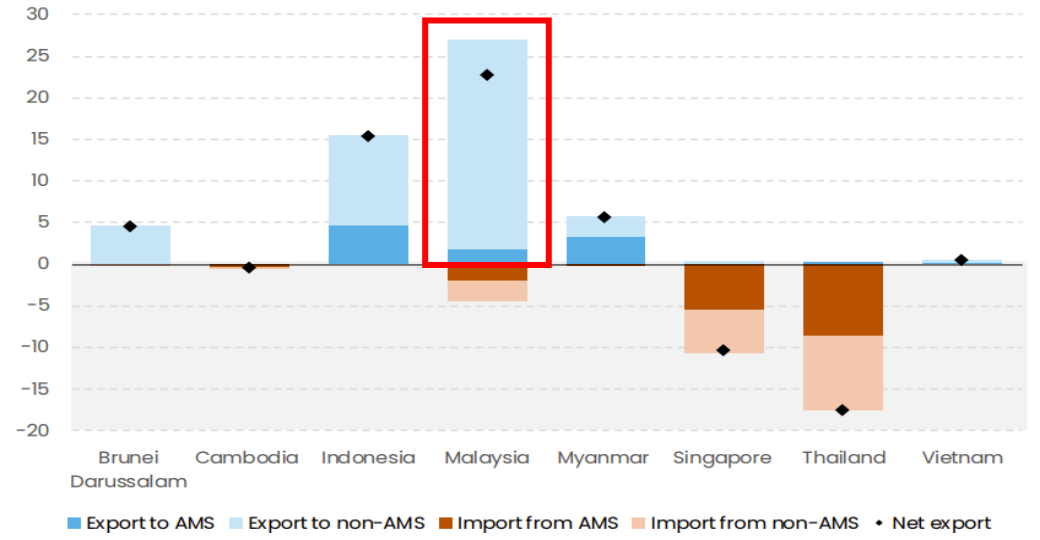
Source: Report on Peninsular Malaysia Generation Development Plan 2020

マレーシアは原油と天然ガスの純輸出量においてASEANをリードしており、域外市場へ大量に供給している

Crude Oil Net Export (Mt) by AMS[1], 2023



Natural Gas Net Export (Mt) by AMS, 2023



Malaysia retained its position as the region's **largest oil exporter**, with **10.3 Mt of crude oil exported**, primarily to Thailand, Japan, and Australia.

Malaysia remained the region's **largest natural gas exporter**, delivering **28.91 Mt,** primarily to Japan, China, and South Korea, while only 12% was exported within ASEAN.

Source: ASEAN Oil and Gas Updates 2024
Note: 1) AMS refers to ASEAN Member States

ARTHUR D LITTLE

THE DIFFERENCE