CHANDLER MORI HAMADA

MORI HAMADA

ATD LAW in association with MORI HAMADA

TNC TAYAG NGOCHUA & CHU a member firm of MORI HAMADA

REGIONAL ENERGY TRANSITION

2026 outlook

REGIONAL ENERGY TRANSITION 2026 OUTLOOK

INTRODUCTION

The Regional Energy Transition Outlook was originally initiated in the latter portion of 2025 with the aim of identifying key legal risks and opportunities in the energy transition sector across Thailand, Vietnam, the Philippines, Myanmar, Singapore, Indonesia, and Japan—jurisdictions in which Mori Hamada and its affiliated firms have long advised clients and market participants.

As of the date of publication, however, geopolitical conflicts through the Iran War, and their effect on global energy markets have, once again, come to the forefront, resulting in a shift in this outlook. Uncertainty and questions about global energy abound. Many of the underlying assumptions and views set out in this Report will inevitably need to be revisited in the event of a protracted conflict.

A considerable portion of Asia's energy needs is met by the Middle East. Singapore generally imports 70% of its oil from the Middle East. Thailand imports roughly 50-58% of its crude oil from the Middle East, and about 24% of its LNG imports from the Middle East. Vietnam imports 85% of its crude from the Middle East. According to the US Energy Information Administration, in 2024, 84% of the crude oil and 83% of the LNG that passed through the Strait of Hormuz were bound for Asia. The continuing closure of the Strait combined with the recent destruction of key natural gas facilities in South Pars and the damage to Qatar's Ras Laffan facility has the potential to upend the global LNG outlook and, in turn, ASEAN's energy and economic outlook for 2026.

In the near term, ASEAN countries will need to revisit their energy security policies with rising petrol prices, rapidly depleting reserves, and potential disruptions to supply likely to affect near term policy measures and consumer sentiment. Measures such as caps on diesel prices, travel limitations, and bans on fuel exports will likely follow.

Increases in the price of fuel will inevitably be passed on to consumers in the form of increased electricity tariffs and higher utility bills. The continuing data centre development trend in the region may further strain power generation capacity with ensuing inflationary pressures potentially dampening economic growth in the region.

The resilience and adaptability of ASEAN countries in the face of such challenges should not be underestimated. Member countries are likely to adopt a "renewed" focus on renewable energy development with accelerated scale-up in energy storage technologies which have heretofore been deemed economically inefficient. Climate change concerns may be relegated to secondary priority as countries revisit the use of coal in power generation and consider the implementation of clean coal technologies.

The challenges and opportunities for ASEAN and the region during this time are evident. As you will see from the Report, cross-border cooperation will be essential to meeting these challenges. Open and transparent discourse among policymakers, regulators, and market participants is imperative. Multilateral Agencies such as the Asian Development Bank and the World Bank will also have a significant role to play in promoting such collaboration and innovative policy initiatives. Yet again, the challenge confronting the region will be collective and concerted action overcoming national self-interest.

V. Joseph Tisuthiwongse

Co-Managing Partner

20 March 2026

CONTENTS

PART I: ASEAN-WIDE OVERVIEW AND INTEGRATION CONTEXT

Regional Energy Landscape

I. ASEAN Economic and Energy Outlook (2026)

ASEAN enters 2026 with resilient economic fundamentals but rising structural energy pressures. Regional growth continues to outpace the global average, with real GDP growth across ASEAN Member States (AMS) consistently projected at around 4–5% per annum, compared with global growth of approximately 3%.[1] This expansion is driven by manufacturing relocation, digitalisation, urbanisation, and population growth, all of which are inherently energy-intensive and place sustained upward pressure on electricity demand, fuels, and grid capacity. Data centres, electric vehicles, and the electrification of industrial processes are emerging as key structural demand drivers, particularly in regional manufacturing and digital hubs.

The transition from ASEAN Plan of Action for Energy Cooperation (APAEC) 2016–2025 to APAEC 2026–2030 marks a shift in emphasis, from ambition-setting to implementation, financing, and system integration. Formally adopted in 2025 and entered into force in January 2026, the new APAEC focus has moved decisively towards enabling infrastructure, including transmission networks, gas and LNG flexibility, and cross-border market mechanisms, as prerequisites for sustained decarbonisation and economic growth.

II. Regional Energy Demand and Supply Trends

ASEAN's primary energy demand continues to grow steadily. ASEAN accounted for approximately 11% of global energy demand growth since 2010 and is projected to contribute over 25% of growth to 2035 under current policies.[2] Oil consumption remains supported by transport demand, while natural gas plays a central role in power generation and industrial use. Despite rapid renewable energy expansion in selected AMS, fossil fuels still account for roughly 75–80% of total primary energy supply, and many thermal power plants are relatively young by international standards.

Natural gas has assumed a critical role in the transition, accounting for roughly 20-25% of ASEAN's primary energy mix, with large gaps between countries.[3] Several AMS, including Thailand, Malaysia, and Indonesia, are experiencing declining domestic gas production, increasing reliance on LNG imports, and heightened exposure to global price volatility. As of 2024, ASEAN collectively operated 11 liquefaction plants and 19 LNG regasification terminals, with additional floating storage and regasification units under development.[4] This has reinforced the importance of diversified supply sources, regional gas trade, and infrastructure such as LNG terminals, floating facilities, and pipeline interconnections. Malaysia, historically a net exporter of natural gas, became a net importer for the first time in 2025.[5]

Renewable deployment remains uneven across the region. Hydropower continues to underpin supply in mainland Southeast Asia, accounting for more than 40% of installed capacity in some AMS, while solar and wind capacity has expanded rapidly in markets such as Vietnam, the Philippines, and Thailand. However, grid congestion, intermittency management, and system balancing are continuing challenges. Energy storage deployment remains limited at scale, highlighting the continued importance of flexible gas-fired generation and demand-side responses as complements to variable renewables.

At the same time, electricity demand growth across ASEAN is becoming increasingly concentrated in urbanised and digitally advanced demand centres. Rapid expansion of data centres, advanced manufacturing, electrified transport systems, and AI-driven digital infrastructure in regional hubs such as Singapore are structurally increasing baseload and peak electricity demand. These demand centres typically face land and resource constraints that limit large-scale domestic renewable deployment, reinforcing the economic rationale for cross-border electricity trade and regional optimisation under the ASEAN Power Grid framework.

---

[1] International Monetary Fund, *World Economic Outlook: Global Economy in Flux, Prospects Remain Dim* (International Monetary Fund 2025) <https://www.imf.org/-/media/files/publications/weo/2025/october/english/text.pdf> accessed 5 February 2026.

[2] International Monetary Fund, *World Economic Outlook: Global Economy in Flux, Prospects Remain Dim* (n 1).

[3] ERIA Energy Unit, *Stabilising LNG Markets in ASEAN: Implications for Energy Security* (January 2026) <https://www.eria.org/uploads/stabilising-lng-markets-in-asean.pdf/> accessed 11 February 2026.

[4] ASEAN Centre for Energy, *Oil & Gas Updates 2025* (9 December 2025) <https://aseanenergy.org/publications/oil-gas-updates-2025> accessed 11 February 2026.

[5] T Daiss, 'Malaysia Pivots from LNG Exporter to Importer' *Gas Outlook* (2 September 2025) <https://gasoutlook.com/analysis/malaysia-pivots-from-lng-exporter-to-importer/> accessed 11 February 2026.

III. Cross-border Energy Cooperation

Cross-border cooperation is a cornerstone of ASEAN's energy strategy and has the potential to underpin needed regional energy infrastructure investment. Rather than pursuing national self-sufficiency, ASEAN prioritises regional optimisation through shared infrastructure and coordinated planning, reflecting both economic efficiency and energy security considerations.

Key regional infrastructure initiatives include:

- **ASEAN Power Grid (APG).** The APG remains ASEAN's flagship integration initiative, aimed at enabling cross-border electricity trade, improving system resilience, and facilitating renewable integration. As of 2025, nine out of eighteen priority interconnection projects identified under the ASEAN Interconnection Masterplan Study (AIMS III) were operational, providing more than 10 GW of cross-border transfer capacity. In a formal ceremony held at the EGAT Headquarters, Thailand, Malaysia, and Lao PDR officially signed the Energy Wheeling Agreement (EWA) Phase 2. This agreement implements the next stage of the Lao PDR–Thailand–Malaysia–Singapore Power Integration Project (LTMS-PIP), a pathfinder initiative launched in 2017 for the broader APG. This development marks the transition of regional power trading from a pilot study into a sophisticated, multi-directional commercial reality.

  Following the successful conclusion of Phase 1 in mid-2024, Phase 2 represents a significant scaling of both volume and technical complexity. Under the new agreement, the total capacity for cross-border electricity trading has doubled from 100 MW to 200 MW. While Phase 1 focused primarily on the unidirectional flow of hydropower from Lao PDR to Singapore, Phase 2 introduces multi-directional trade. This allows Singapore to source renewable energy not only from Lao PDR but also directly from Malaysia's surplus green energy portfolio. To facilitate this expansion, the Energy Market Authority of Singapore has extended the electricity importer licence for the project through late 2026, ensuring a stable regulatory window for all participating stakeholders.

- **Trans-ASEAN Gas Pipeline (TAGP).** The TAGP framework continues to underpin regional gas security, even as LNG trade expands. As of 2025, more than 3,600 kilometres of cross-border gas pipelines were operational, connecting Indonesia, Malaysia, Myanmar, Singapore, Thailand, and Vietnam. While future pipeline expansion faces economic and regulatory constraints, existing infrastructure continues to support bilateral and sub-regional gas flows. Gas remains central to power system balancing and transition pathways, reinforcing the TAGP's relevance alongside decarbonisation objectives.

- **Carbon and attribute trading.** Voluntary carbon markets, renewable energy certificates, and emerging attribute-trading mechanisms are gaining prominence across ASEAN. While regulatory frameworks remain fragmented, several AMS have adopted or expanded I-REC-aligned certificate schemes since 2020, supporting corporate decarbonisation and cross-border investment. ASEAN institutions increasingly recognise that harmonised standards will be critical to scaling these markets regionally.

IV. ASEAN Policy and Regulatory Alignment

ASEAN's energy transition is increasingly underpinned by a parallel process of policy coordination, regulatory alignment, and financing innovation at the regional level, including the following key items:

1. ASEAN Plan of Action for Energy Cooperation (APAEC)

APAEC 2026–2030 is the central framework for ASEAN energy cooperation. Building on earlier phases, it places greater emphasis on implementation, system integration, and enabling conditions. Priority areas include regional power interconnection, energy efficiency, renewable energy scaling, and transition-enabling infrastructure.[6]

The plan strengthens the role of the ASEAN Centre for Energy (ACE) as coordinator, data hub, and technical facilitator. It also explicitly recognises the need to mobilise private capital and multilateral finance, particularly for cross-border projects with long development timelines and complex risk profiles.

In the multi-polarised world, strengthening regional cooperation is one of the only ways to improve the purchasing power and market resilience of ASEAN nations.

[6] APAEC Drafting Committee, *ASEAN Plan of Action for Energy Cooperation (APAEC) 2026-2030* (ASEAN Centre for Energy (ACE) 2025) <https://aseanenergy.org/publications/asean-plan-of-action-for-energy-cooperation-apaec-2026-2030> accessed 11 February 2026.

2. Regional Decarbonisation and Climate Frameworks

ASEAN's decarbonisation architecture is shaped by overlapping national and regional frameworks. Nationally Determined Contributions under the Paris Agreement remain the primary climate commitments, but their implementation increasingly intersects with regional initiatives.

The Asia Zero Emission Community (AZEC), founded in 2023 by 11 member countries including 9 AMS, has emerged as a complementary platform focused on practical cooperation across power, fuels, industry, and enabling infrastructure. AZEC initiatives emphasise technology deployment, transition fuels, grid reinforcement, and cross-border collaboration, aligning closely with ASEAN's pragmatic transition philosophy. Regional frameworks generally prioritise intensity-based targets, sectoral transition strategies, and long-term net-zero aspirations rather than rigid near-term absolute caps, reflecting ASEAN's development context and continued economic growth.

3. Energy Investment and Financing Initiatives

The legal formalisation of wheeling coincides with a massive push in physical infrastructure. In early 2026, the China-Laos 500 kV cross-border power line entered its final stages of completion. While the LTMS-PIP currently utilises existing interconnections, the integration of these high-voltage backbones will significantly reduce transmission losses and increase the volume of power that can be traded.

Furthermore, the ASEAN Chairmanship in 2026 has prioritised the development of a Submarine Power Cable Framework. This is intended to address the regulatory and technical hurdles of connecting the archipelagic regions of ASEAN to the mainland grid, potentially opening up new markets for regional market leaders to export technology and expertise in grid management.

Financing, however, remains the principal constraint on ASEAN's energy transition, with cross-border projects often facing additional complexities relating to currency risk, offtake creditworthiness, regulatory asymmetry, and political risk allocation. Investment needs for generation, grids, storage, and transition fuels far exceed public budgets. In response, the region has deepened engagement with development finance institutions, export credit agencies, and private investors.

4. Role of Multilateral Cooperation and the Private Sector

In October 2025, the Asian Development Bank and the World Bank Group, together with the ASEAN Secretariat and ASEAN Centre for Energy, launched the ASEAN Power Grid Financing Initiative. This initiative aims to mobilise billions of US dollars in concessional finance, guarantees, and private capital to accelerate cross-border transmission development and address one of the principal bottlenecks to APG implementation: project bankability.

ADB committed USD 10 billion for APG over the next 10 years, while the World Bank provided an initial contribution of USD 2.5 billion under the Accelerating Sustainable Energy Transition Programme, including a USD 12.7 million seed grant to the ASEAN Centre for Energy. [7] The ASEAN Power Grid Financing Initiative represents a shift towards coordinated project pipelines and blended finance for regional infrastructure. Meanwhile, transition and sustainable finance frameworks, and green bond markets are being developed or refined across AMS to crowd in private capital.

Importantly, ASEAN financing discussions increasingly recognise gas infrastructure, LNG facilities, and grid reinforcement as transition-enabling assets rather than inconsistent with climate objectives, reflecting a sequencing-based approach to decarbonisation.

Multilateral institutions play a catalytic role through technical assistance, concessional finance, and risk-sharing mechanisms. However, private sector participation is indispensable. Independent power producers, infrastructure developers, technology providers, and corporate energy buyers are shaping demand for renewables, flexible power, and cross-border solutions.

In summary, ASEAN's integration agenda is best understood not as a single harmonised market, but as a progressively interoperable system, in which national frameworks remain distinct yet increasingly aligned through shared infrastructure, standards, investment channels, and anchor demand centres that provide stable offtake for regional renewable development.

[7] 'ADB and World Bank Group Launch the ASEAN Power Grid Financing Initiative with the ASEAN Secretariat and the ASEAN Centre for Energy (ACE)' *Association of Southeast Asian Nations* (15 October 2025) <https://asean.org/adb-and-world-bank-group-launch-the-asean-power-grid-financing-initiative-with-the-asean-secretariat-and-the-asean-centre-for-energy-ace/> accessed 11 February 2026.

PART II: THAILAND COUNTRY OVERVIEW

Macroeconomic and Socio-Economic Profile

As the second-largest economy in the Association of Southeast Asian Nations (ASEAN) by GDP, Thailand is one of the most strategically positioned energy markets in Southeast Asia. Despite facing significant macroeconomic headwinds, including a shrinking population, Asia's highest household debt ratio (nearly 90% of GDP), pressure on the manufacturing sector from cheap Chinese imports, and competition from regional rivals such as Vietnam, the country's energy policy remains intertwined with its aspirations to become the region's digital and economic hub. We have observed the energy landscape shift through rapid data centre expansion and the transition to electric mobility, leading to rising electricity demand through 2025.

In the wake of the economic downturn, the Thai interim government enters 2026 with much to do in very little time. Having cycled through three prime ministers in three years, Thailand's regulatory infrastructure has been falling behind its regional peers through 2025 in energy policy and law-making. Now that the February 2026 election has shown signs of a stable government, we expect to see the reset of its Power Development Plan and revised Net-Zero goals, the Ministry of Energy's cornerstone 'Quick Big Win' policy, and initiatives such as Third-Party Access, Direct PPAs, and Utility Green Tariff programmes treated as priority items that will bring Thailand back towards economic recovery.

To support Thailand's position as an emerging ASEAN digital hub under 'Quick Big Win', recent developments include the government's THB 31 billion infrastructure upgrade that directs the Electricity Generating Authority of Thailand (EGAT) to modernise the transmission system in the country's Eastern Economic Corridor (EEC), with a THB 3 billion investment fast-tracked specifically for transmission lines for hyperscale data centres.

National Energy Mix and Transition Targets

Thailand is recalibrating its energy strategy through the new Power Development Plan (PDP 2026), expected for release in May 2026, which adopts a 25-year horizon to 2050 aligned with its carbon neutrality commitment. Notably, the country has recently accelerated its net-zero timeline from 2065 to 2050 under its new Nationally Determined Contribution (NDC) 3.0.

Although natural gas remains central to Thailand's energy transition (in 2024, domestic sources accounted for approximately 60% of the gas supply, LNG for 29%, and Myanmar pipeline imports for 11%), progress is being made in clean energy. The 5.2 GW 'Big Lot' renewable procurement launched in 2022 is nearing completion, with remaining PPAs for large-scale wind projects expected throughout 2026. Meanwhile, the Community-Based Solar Power Generation Project aims to procure 1,500 MW from small-scale solar projects (VSPP), each not exceeding 10 MW, at a fixed Feed-in Tariff of THB 2.1679 per unit for 25 years. The Utility Green Tariff Phase 2 programme (2,180 MW of wind and solar) has also been cleared for Phase 1 development by the Energy Regulatory Commission (ERC).

Additionally, nuclear energy is re-emerging as a long-term option, with small modular reactors (SMRs) under consideration in PDP 2026. The expected allocation exceeds 1,200 MW, which will support net-zero targets by 2050. However, the price remains uncompetitive compared to other low-carbon alternatives.

Institutional Structure and Key Energy Agencies

Thailand's power mix and electricity prices are shaped by an integrated governance structure in which upstream oil and gas regulation, national energy planning, and electricity market oversight are closely interconnected. Although renewable capacity is expanding, natural gas remains the primary fuel for power generation, meaning upstream gas supply and pricing continue to have material influence on generation costs and retail tariffs.

Policy direction is set by the National Energy Policy Council (NEPC), while the Energy Policy and Planning Office (EPPO) prepares the PDP, Gas Plan, Oil Plan, and Alternative Energy Development Plan (AEDP), which together determine the generation mix and fuel structure. Upstream petroleum exploration and production are regulated by the Department of Mineral Fuels (DMF). Given the electricity sector's reliance on domestic and imported gas, DMF's oversight of gas supply directly affects power system costs.

The ERC licenses generators, regulates tariffs, and administers the fuel adjustment charge (Ft), through which changes in fuel prices are passed through to consumers. The Department of Alternative Energy Development and Efficiency (DEDE) promotes renewable energy deployment under the AEDP, while EGAT operates the transmission system and remains the dominant generator. The Metropolitan Electricity Authority (MEA) and the Provincial Electricity Authority (PEA) manage distribution and retail supply.

In practice, Thailand's electricity pricing reflects the interaction between gas regulation (DMF), energy

planning (EPPO), system operation (EGAT), tariff oversight (ERC), and renewable policy promotion (DEDE), underscoring the continued structural role of oil and gas regulation in determining the power mix and price trajectory. PTTEP continues as the national petroleum company, expanding its gas portfolio through acquisitions. Notably, the Office of Atoms for Peace (OAP), the country's nuclear licensing authority, saw improved regulatory integration following a November 2024 MOU between the ERC and the Nuclear Energy for Peace Commission.

Integration with ASEAN and Regional Energy Policies

Thailand is also positioning itself as the central hub for the ASEAN Power Grid (APG), with its transmission network serving as the APG 'backbone'. The Energy Wheeling Agreement (EWA) Phase 2 signed in 2026 designates Thailand as the wheeling partner under the Lao PDR–Thailand–Malaysia–Singapore Power Integration Project (LTMS-PIP), whose Phase 2 has doubled cross-border trading capacity from 100 MW to 200 MW and enables Singapore to source renewable energy from both Lao PDR and Malaysia. EGAT earns a wheeling charge of 3.5879 US cents per unit for power transit across its network.

Meanwhile, the China-Laos 500 kV cross-border line is nearing completion. It will reduce transmission losses and increase tradeable volumes through Thai networks, opening regional offtake opportunities for Thai renewable developers.

POLICY AND REGULATORY FRAMEWORK

National Energy Plans

Thailand's energy strategy is set out in national plans, with the most significant development being the formal reset of the nation's long-term blueprint. The draft PDP 2024–2037 has been superseded by PDP 2026, which EPPO aims to finalise by May 2026. Meanwhile, the National Oil Plan (NOP) is being revised to accommodate the accelerated 2050 net-zero deadline, rising EV adoption, data centre expansion, and the end of biofuel subsidies in 2026.

Against this shifting backdrop, Thailand's gas policy continues to rely on a pool pricing mechanism which aggregates domestic production, pipeline imports, and LNG to stabilise electricity tariffs and protect end-users from international price volatility.

Investment Incentives and Market Access

The Board of Investment (BOI) offers up to 13 years of corporate income tax exemptions for data centres with advanced liquid cooling and strict PUE standards, provided at least 50% of executives and specialists are Thai nationals within three years.

Beyond digital infrastructure, similar investment incentives are extended to emerging technologies. For Battery Energy Storage Systems (BESS), high-density battery manufacturing with cell processes qualifies for A1 privileges (eight-year tax exemption without a cap). Green hydrogen production is also eligible for A1 incentives, while hydrogen from hydrocarbons with CCS and hydrogen-fuelled power plants qualify for A2.

To complement these fiscal incentives, the Cabinet approved the 'Thailand FastPass' mechanism in late 2025, reducing licensing and approval timelines by 20% to 50% for major investment projects and thereby enabling rapid data centre scaling.

Recent Policy Highlights, Pending Legislation, and Reform Outlook

The dissolution of Parliament in December 2025 and the February 2026 election have contributed to a degree of policy uncertainty. Thailand is currently governed by a caretaker administration led by the Bhum Jai Thai Party, with 'Quick Big Win' intended to sustain momentum ahead of the general election. The same party won the election, securing a parliamentary majority and, as of the date of this report, is forming a coalition government.

Amid this political transition, the DMF intends to amend the Petroleum Act to allow concession extensions beyond the current 20+10 year limit, based on each block's remaining production potential. The Ministry of Energy is also drafting Strategic Petroleum Reserve (SPR) legislation that would require 90 days of strategic oil stocks, up from the current 25-day private-sector holding requirement. Meanwhile, the Clean Air Act, if revived, would establish Thailand's first comprehensive air-quality law based on the Polluter Pays Principle.

Notably, hydrogen and ammonia were recognised as fuels under a Ministry of Energy notification on 1 December 2025, classifying them under the Controlled Fuel Act B.E. 2542. The notification will take effect two years from its issuance.

NATURAL GAS & LNG

In 2025, Thailand's natural gas sector was marked by signs of policy shifts, with the National Energy Policy Council (NEPC) approving adjustments to the pool gas pricing structure while the country signed two new long-term LNG contracts. The national energy company PTT Exploration and Production Public Company Limited (PTTEP) continues to increase its gas portfolio through acquisition of strategic assets, like in the Malaysian-Thailand Joint Development Area, and by ramping up production on existing fields. Driven by the government policy to reduce power prices, Thailand's gas strategy will play a big role in reducing its electricity cost.

Government Policies (gas pricing, import/export)

Thailand's natural gas policy is formulated under the authority of the NEPC, with strategic planning led by the Energy Policy and Planning Office (EPPO) and operational supply oversight carried out by the Department of Mineral Fuels (DMF). Both institutions emphasise that natural gas will remain central to Thailand's energy system during its energy transition, particularly for electricity generation and system balancing.

Pricing policy continues to rely on the pool gas pricing mechanism, whereby the average gas price reflects a "pool" consisting of domestic production from the Gulf of Thailand, pipeline imports (primarily from Myanmar), and liquefied natural gas (LNG). EPPO characterises this arrangement as a deliberate policy instrument, designed to stabilise electricity tariffs and protect end-users from international fuel price volatility. The DMF's operational role includes monitoring spot LNG procurement and fuel substitution decisions to ensure that the average pool gas price remains appropriate for power generation.

Market disclosures in late 2025 suggest that the NEPC approved adjustments to the pool gas pricing structure effective from 1 January 2026, changing from the averaged single-tier, all-equal weighted average pool gas (WAPG) pricing to a two-tier pricing structure that separates Gulf gas for gas-fired power plants from WAPG [1]. This change is aimed at improving cost reflectivity and allocation across user groups, while preserving overall system stability. Analysts expect this change to raise gas prices for small power producers, the industrial sector, and NGV by approximately 3% as the WAPG price increases, and reduce the price for gas-fired power plants by approximately 10%. This way, PTT's gas separation plants, which make up approximately 17-21% of the domestic demand, will benefit from the cheaper Gulf gas (USD5-6/MMBtu), while the other 80% of consumers pay the WAPG price that incorporates the more costly pipeline imports from Myanmar (USD8-9/MMBtu) and imported LNG (USD11-12/MMBtu).

On import policy, EPPO frames LNG as a structural but marginal component of Thailand's gas system, while the DMF treats LNG primarily as a supply-security backstop. The DMF reports that Thailand has imported LNG continuously since 2011, and that LNG procurement has become indispensable for managing decline in domestic production, pipeline import uncertainty, and short-term demand fluctuations. In 2024, LNG accounted for approximately 29% of the country's total gas supply, compared with about 60% from domestic sources and 11% from pipeline imports.[2]

Recent market developments underscore LNG's role as a flexible balancing fuel. For example, amid weaker electricity demand and favourable hydrological conditions in 2025, Thailand's LNG imports declined sharply, representing one of the most significant year-on-year contractions since imports began. This reinforces the policy of using LNG for balancing and security rather than as a baseload substitute for domestic production. At the same time, Thailand has signalled interest in diversifying its long-term LNG supply, including doubling its United States LNG imports to 2.2 million tonnes between 2026-2030[3], partly linked to broader trade and geopolitical considerations.

Upstream Market

The DMF's Annual Report 2024[4] places upstream natural gas at the core of Thailand's energy security strategy, stressing that Gulf gas is consistently cheaper than imported LNG and therefore essential for containing system-wide energy costs. EPPO's planning perspective aligns with this view, and both agencies support continued emphasis on exploration

[1] Sinsadok S, *Thailand Energy: Gas Pricing Revisions (Again) Led to 3% Gas Price Increase for SPPs* (Globlex Securities Co., Ltd., 2 December 2025) <https://www.globlex.co.th/research/research_32372_1_20251202%20TH%20ENERGY_EN.pdf> accessed 7 January 2026.

[2] Energy Policy and Planning Office, 'การจัดหาก๊าซธรรมชาติ (Natural Gas Supply)' <https://public.tableau.com/app/profile/epposite/viz/3__16516649585350/sheet0> accessed 22 January 2026.

[3] Sriring O and others, 'Thailand Plans to Import More US LNG over next Five Years, Says Minister' *Reuters* (16 April 2025) <https://www.reuters.com/business/energy/thailand-plans-import-more-us-lng-over-next-5-years-says-minister-2025-04-16/> accessed 7 January 2026.

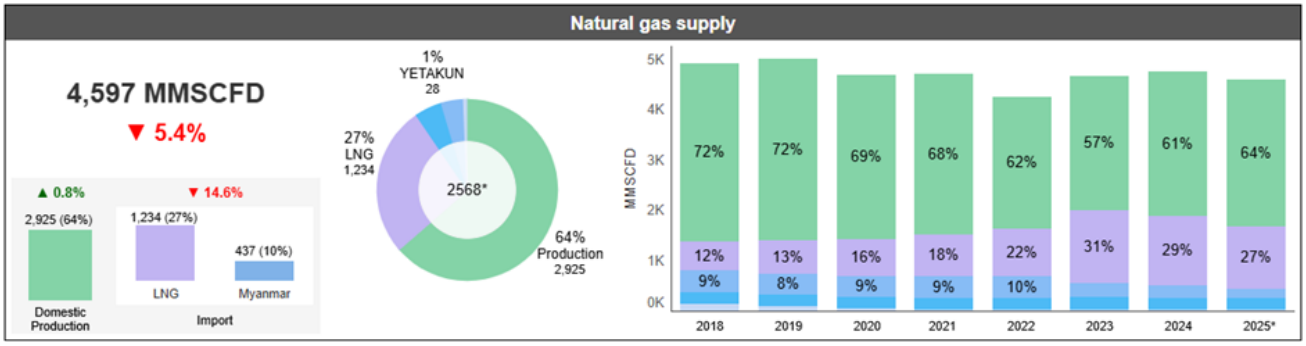
[4] Department of Mineral Fuels, *Annual Report 2024* (Department of Mineral Fuels 2025).

and production to moderate long-term LNG exposure. To this end, the DMF concluded in 2025 the 25th bidding round for nine onshore concession blocks, with winners to be announced, and has indicated an upcoming 26th round in early 2026 for deepwater blocks in the Andaman Sea (see further explanation in the Oil & Downstream section of this report). However, the DMF also cautions that without sustained upstream investment, LNG's share will inevitably rise, increasing Thailand's exposure to international price volatility.

A key development highlighted by both EPPO and the DMF in 2025 is the recovery of production at the Erawan gas field (Block G1/61), with its output reaching approximately 800 MMBtu/day. Other notable public disclosures during the year include PTTEP's completion of its acquisition of Hess's share in Block A-18 in the Malaysia-Thailand Joint Development Area, securing a further 400-500 MMBtu/day supply of Gulf gas; and the Ministry of Energy's approval of 10-year extensions to the production periods of Block B8/38 (Bualuang field), operated by Medco Energi, in August 2025, and Block B12/27 (Pailin field), operated by Chevron, in December 2025 [5] . These developments have materially improved domestic supply availability and reduced LNG call-on within the pool gas system. The DMF treats this ramp-up as evidence that timely upstream execution can deliver tangible system-wide benefits.

Mature fields, declining reserves, and extended development lead times mean that new exploration rounds remain essential, even as Thailand advances its decarbonisation objectives. EPPO's planning analysis explicitly recognises that upstream gas development and the energy transition must coexist during the medium term to maintain affordability and security of supply.

A year ago, the Thai government under the Pheu Thai Party was optimistic about unlocking petroleum resources in the Thailand-Cambodia Overlapping Claims Area, which is more than double the size of Thailand's largest Erawan field. However, given the utter breakdown in the relationship between Thailand and Cambodia towards the final quarter of 2025, which remains unresolved, and the subsequent change in the ruling party that was followed by the dissolution of Parliament in December 2025, the Thailand-Cambodia Overlapping Claims Area will likely remain out of reach for years to come.



Source: EPPO[6]

[5] 'ครม.อนุมัติต่ออายุแหล่งไพลินอีก 10 ปีสิ้นสุดต้นปี 81 (Cabinet Approves 10-Year Extension for Pailin Field, Expires Early 2038)' *MGR Online* (3 December 2025) <https://mgronline.com/business/detail/9680000115819> accessed 7 January 2026.

[6] Energy Policy and Planning Office, 'การจัดหาก๊าซธรรมชาติ (Natural Gas Supply)' (n 2).

LNG and the LNG Market

Thailand remains Southeast Asia's biggest LNG importer, with demand for LNG expected to rise as coal is being phased out as a 24-hour baseload power source. The DMF reports that LNG procurement plans are reviewed regularly to ensure that volumes sourced by each shipper align with projected demand, and that spot purchases do not unduly inflate the pool gas price. This operational oversight directly supports EPPO's policy objective of tariff stability.

On infrastructure, Thailand currently operates two LNG receiving terminals at Map Ta Phut with a combined capacity of approximately 19 million tonnes per annum. A third terminal, owned by Gulf Energy Development, is under development and expected to commence operation around 2027. The DMF emphasises that LNG infrastructure expansion must be carefully coordinated with upstream and pipeline planning to avoid excess capacity and unnecessary cost burdens.

International examples reinforce the importance of calibrated LNG infrastructure investment in Thailand. Globally, rapid expansion of liquefaction and regasification capacity may have outpaced demand growth, intensifying oversupply concerns in key markets. In Europe, for instance, LNG terminal construction has slowed, and some facilities are under-utilised amid declining gas consumption, prompting project cancellations and raising questions about over-investment risks. The Institute for Energy Economics and Financial Analysis (IEEFA) expects Europe's gas consumption and LNG imports to fall by 15% and 20%, respectively, between 2025 and 2030[7].

Regional developments and trade negotiations may further shape Thailand's LNG outlook. Due to the current level of annual imports compared with Thailand's LNG receiving capacity, strong interest has been observed from LNG exporters globally, who are seeking long-term LNG sales into Thailand in 2025. Based on international trends of oversupply, Thailand may choose to be more cautious about over-committing to long-term LNG contracts, especially when spot prices are likely to continue to decrease as more LNG projects come online globally.

The only exception seen in the past year was in June 2025, when PTT signed a 20-year term LNG purchase agreement with Glenfarne to purchase two million tonnes of LNG annually from its Alaska LNG project. This transaction appears likely to have been a direct result of the Thailand-U.S. tariff negotiations that required Thailand to reduce its trade surplus with the United States. In January 2026, Gulf announced that it had signed a 15-year long-term LNG supply agreement with ENGIE to purchase 0.8 million tonnes per year, commencing in 2028.

Outlook

Despite having adopted its new Nationally Determined Contribution (NDC) 3.0, which has moved the net-zero timeline forward from 2065 to 2050, Thailand's energy policy remains a stability-first transition, prioritising system reliability and affordability while gradually shifting towards lower-carbon alternatives. Natural gas remains indispensable to this strategy, with domestic upstream resources seen as the most effective means of cost containment and energy security. However, as domestic reserves decline and imports from traditional pipelines fall, Thailand may become increasingly reliant on LNG, which raises concerns about energy prices and supply security.

Mitigating these risks would require action on several fronts: launching new bidding rounds for petroleum concessions, revising fiscal frameworks to attract investment, managing ageing fields with remaining potential, and resolving transboundary resource negotiations with Cambodia, a matter further complicated by the escalated border tensions towards late 2025. Meanwhile, a long-term LNG strategy centred on a diversified procurement portfolio will be crucial in reducing exposure to global price volatility and providing a stable balancing fuel while Thailand pushes forward with its integration of renewable energy. Overall, a well-managed LNG position would contribute to the sector's improved visibility around long-term costs, operational stability, and system flexibility as the country continues its broader energy transition.

[7] 'Europe's LNG buildout slows amid anticipated decline in gas demand' *IEEFA* (27 February 2024) <https://ieefa.org/articles/europes-lng-buildout-slows-amid-anticipated-decline-gas-demand> accessed 8 January 2026.

OIL & DOWNSTREAM

Thailand's petroleum sector is going through a period of transition as policymakers update its long-term strategies to reflect shifting demand, emerging technologies, and the country's evolving decarbonisation goals. To support long-term supply stability while strengthening energy security and environmental performance, upstream reforms, as well as new bidding rounds and amendments to the Petroleum Act, are moving in parallel with downstream measures, cleaner fuel standards, and enhanced stockpiling requirements. The dissolution of Parliament in December 2025 and the subsequent election contribute to the uncertainty.

Looking outwards, in the wake of a turbulent January for oil prices, starting with the United States military operation in Venezuela, heightened tensions in Iran, and various financial factors leading to weakening of the USD, crude has topped $70 per barrel in late January 2026, and a net oil-importer like Thailand is likely to be impacted by these external forces as a result.

Upstream Oil

Petroleum policies

Thailand's National Oil Plan (NOP) is undergoing significant revision in 2026, as previous assumptions are reshaped by shifting global demand forecasts, rising adoption of electric vehicles (EVs), and the rapid expansion of power-hungry data centre infrastructure. With the International Energy Agency (IEA) now projecting scenarios in which oil demand may continue to grow through 2050, the Department of Energy Business (DOEB) is reassessing supply and investment strategies that were anchored to the IEA's previously projected peak around 2030. In addition to balancing energy security with increasingly complex market conditions, the new NOP aims to accommodate the recently accelerated net-zero deadline of 2050 as well as the eventual end of current subsidies on biofuels in 2026.[8]

While the timelines remain unclear, it could be assumed that the new NOP would be announced in parallel to the new Power Development Plan (PDP) draft, whose estimated completion is around the end of March, as both are part of the National Energy Plan. Once completed, the drafts will undergo public hearing, with at least two rounds expected before they can be submitted for approval.

Update on petroleum block bidding rounds

With Parliament dissolved in December 2025 and following the February 2026 election, the submission of the successful bidder in the previously announced 25th bidding round for approval by the Cabinet remains on hold, awaiting its formation and swearing-in ceremony. Consequently, the announcement timeline is expected to be no earlier than Q3/2026. This bidding round covers nine onshore blocks (L1-9/66) in central and northeastern Thailand.[9]

The DMF has also indicated that it is preparing to announce the 26th bidding round for blocks located in the Andaman Sea. However, as it is likely to announce the round before the amendment to the Petroleum Act becomes effective, the round is expected to be governed by the current regime. On the other hand, the 27th bidding round is set to be launched after the Petroleum Act has been amended. This round will encompass the remaining potential petroleum blocks available for exploration and production. The DMF anticipates that this will be one of the most significant rounds to date, as the revised Petroleum Act is expected to introduce an unlimited contract period extension scheme and enhanced incentives aimed at attracting greater investment.[10]

Nevertheless, the timeline remains unclear and potentially extended, as the amendment will need to be approved by the new Cabinet and pass through the new Parliament before being enacted. The urgency to pass this unlimited extension law is tied to the major concessions that have already exhausted their extension rights, such as Sinphuhorm onshore field, and Block B8/32 in the Gulf of Thailand, which are set to expire between 2030-2031. While the concession expirations are still a few years off, decommissioning obligations kick in within the 5 years prior to concession expiration and generally impact the commerciality of any attempts to attract new investment.

Upcoming new laws and regulations

The DMF has announced its intention to amend the Petroleum Act to allow concession periods to be extended beyond the current statutory limit of an

[8] Y Praiwan, 'Demand Shifts Result in National Oil Plan Rejig' *Bangkok Post* (17 December 2025) <https://www.bangkokpost.com/business/general/3158185> accessed January 2026.

[9] J Sawatdipong, M Pongrujikorn and T Vedchapun, *Thailand's 25th Bid Round: Unlocking Nine Onshore Blocks across Northeast and Central Thailand* (Chandler Mori Hamada Limited 2025).

[10] 'เตรียมเสนอรัฐบาลใหม่แก้ไขกฎหมายปิโตรเลียมให้จูงใจนักลงทุน ก่อนเปิดสัมปทานรอบที่ 27 ทั้งบนบกและอ่าวไทย (Petroleum Law Amendments to Be Proposed to New Govt to Incentivise Investors before 27th Bidding Round Launched for Both Onshore, Offshore)' *Energy News Center* (15 January 2025) <https://www.energynewscenter.com/เตรียมเสนอรัฐบาลใหม่แก/> accessed 28 January 2026.

initial 20-year term plus a single 10-year extension. Under the proposed framework, extensions would no longer be bound by a fixed duration but would instead be determined based on the remaining production potential of each individual block. This reform aims to prevent a recurrence of the situation faced in the Erawan field (G1/61), where the concession expired despite continued production potential due to legal constraints, resulting in a substantial reduction in Thailand's petroleum output at the time.[11]

The amendment also seeks to safeguard uninterrupted production as several strategically important concessions, such as those in the Thailand–Malaysia Joint Development Area (JDA), the Sirikit (S1), and Sinphuhorm fields, are set to expire between 2029 and 2031. Additionally, the anticipated 27th bidding round is expected to benefit from the more flexible concession regime, enhancing Thailand's competitiveness in attracting upstream investment.

Downstream Oil

Government policy on Strategic Petroleum Reserve

Thailand is advancing plans to strengthen downstream energy security through the development of a Strategic Petroleum Reserve ("SPR") framework. The Ministry of Energy is currently drafting legislation that would require the country to maintain 90 days of strategic oil stocks, a significant increase from the current 25-day reserve held through mandatory private-sector stockholding. The policy aims to align Thailand with international norms and enhance resilience during supply disruptions.[12]

Initial proposals suggest that the SPR could be structured either as a fully state-funded system or through joint investment with international partners. Responsibility for administering the reserve would depend on its legal purpose: the Energy Business Department would oversee SPR operations if focused on energy security, while the Oil Fuel Fund Office would lead if the mechanism is used to manage price stability.[13]

Refining sector transformation and clean-fuel compliance

Thailand's refining sector continues its structural transformation, driven by clean-fuel regulations and portfolio consolidation. Refiners are upgrading to meet Euro 5 standards, which have been mandatory since January 2024. Sustainable aviation fuel (SAF) production is also expanding rapidly, with a 1% blending mandate effective from January 2026. The biofuel roadmap will phase out Gasohol 91, 95, and E85 by 2027 and focus on E20 and B7 as the core road fuels, while redirecting surplus ethanol to SAF production.[14]

Upcoming new laws and regulations

The Clean Air Act is also on hold following the dissolution of Parliament. If revived, it would establish Thailand's first comprehensive air quality law based on the Polluter Pays Principle.[15] This would impose stricter emission controls and higher compliance costs on the refinery sector.

Outlook

At the time of writing, the policy environment seems to be in a state of flux. Pending the result of the election and the direction of the newly appointed Royal Thai Government, key decisions across the oil and energy sectors remain unsettled. At any rate, Thailand's oil and downstream sectors continue to face major transition, driven by ongoing regulatory reform, shifting domestic and global demand, and the country's recently accelerated decarbonisation goals. Amendments to the Petroleum Act and upcoming bidding rounds aim to sustain production and attract new upstream investment, while downstream policies seek to strengthen energy security and modernise refining operations. Rapid advancement in SAF production, alongside a restructured biofuel roadmap, highlights Thailand's push towards cleaner fuels. Looking ahead, the trajectory of environmental regulation, including the possible direction of the Clean Air Act, will further shape industry obligations and investment priorities in the years to come.

---

[11] 'เตรียมเสนอรัฐบาลใหม่แก้ไขกฎหมายปิโตรเลียมให้จูงใจนักลงทุน ก่อนเปิดสัมปทานรอบที่ 27 ทั้งบนบกและอ่าวไทย (Petroleum Law Amendments to Be Proposed to New Govt to Incentivise Investors before 27th Bidding Round Launched for Both Onshore, Offshore' (n 10).

[12] 'พลังงาน ไกล้คลอดร่างกฎหมายสำรองน้ำมันเชิงยุทธศาสตร์ 90 วัน (MOE Nears Completion on 90-Day Strategic Petroleum Reserve Law)' *Energy News Center* (20 November 2024) <https://www.energynewscenter.com/พลังงาน-ไกล้คลอดร่างกฎห/> accessed 28 January 2024.

[13] 'ถึงเวลา 'สกนช.' ปรับบทบาทครั้งใหญ่ รองรับระบบสำรองน้ำมันใหม่ SPR (OFFO to Reposition in Support of the New SPR System)' *Prachachat* (3 May 2025) <https://www.prachachat.net/breaking-news/news-1803936> accessed 28 January 2026.

[14] C Kerdyam, 'Thailand's New Biofuel Roadmap: SAF Mandate, E20/B7 Focus' *The Nation* (21 October 2025) <https://www.nationthailand.com/sustaination/40057053> accessed 28 January 2026.

[15] 'Review of the Clean Air Bill Amid Rising PM 2.5 Pollution: Passed by the House but Still Pending in the Senate' *Thairath* (15 January 2026) <https://en.thairath.co.th/news/politic/2907966> accessed 28 January 2026

EMERGING TECHNOLOGIES

Efforts to decarbonise energy systems have driven the emergence of a wide range of new and rapidly evolving technologies. These technologies are increasingly shaping the transformation of energy sectors and influencing regulatory and market frameworks. This section examines key emerging technologies, along with their potential and regulatory implications, within the context of Thailand's energy transition.

Carbon Capture and Storage and Carbon Capture, Utilisation, and Storage ("CCUS")

Overview

CCUS has increasingly become one of the key technologies supporting Thailand's efforts to reduce carbon emissions and achieve carbon neutrality by 2050. As the country advances its transition from fossil fuels to renewable energy sources, CCUS technologies, currently being piloted by the PTT Group as Thailand's national energy company, present a potential solution for managing and mitigating emissions from existing industrial activities and energy generation.

Development from Thai policies and regulatory authorities

While the legislative landscape for CCS and CCUS in Thailand remains in its developmental stage, the government has demonstrated supportive policy stance. In an effort to reduce greenhouse gas emissions, the Cabinet approved measures to promote the deployment of CCS technologies as proposed by the Ministry of Natural Resources and Environment.[16] The Cabinet has also tasked relevant regulatory agencies, including the Department of Mineral Fuels ("**DMF**"), to oversee and coordinate with other agencies in establishing a regulatory framework and developing CCUS feasibility projects, particularly in the Gulf of Thailand.

At present, CCS and CCUS activities are not expressly governed by the Petroleum Act B.E. 2514 (1971), which is the principal law governing petroleum activities. However, the DMF oversees petroleum operations, including the management of by-products such as CO_2 obtained during petroleum production. While this CO_2 may be used for Enhanced Oil Recovery (EOR), the injection of CO_2 captured from non-petroleum sources (e.g., industrial plants) into reservoirs for permanent storage is not yet regulated under the existing framework. In line with the Cabinet's initiatives, the Petroleum Act may be amended to expand the DMF's authority to regulate CCS activities and establish a distinct licensing regime for CO_2 storage. This may include separate permits for site exploration and injection operations, providing legal clarity for both petroleum operators and standalone CCS players.

Pilot projects

CCUS technologies are deployed in phases based on technological readiness and suitability for different applications. As feasibility studies continue, the Thai government is supporting the development of land and infrastructure for CCS and CCUS activities onshore and offshore. PTTEP, a major Thai energy corporation, expects to adopt offshore CCS technologies in the Gulf of Thailand in 2027 to reduce carbon emissions from its petroleum production processes.

Both the private and public sectors in Thailand are currently developing CCS and CCUS projects, including:

- **CCS Pilot Project:** PTTEP has an ongoing CCS project in the Arthit field in the Gulf of Thailand. Once operational in 2027, PTTEP expects the project to reduce CO_2 emissions from petroleum production by approximately 700,000 to 1,000,000 tonnes annually. [17]
- **CCUS Project:** Banpu has also announced plans to implement CCUS projects in the United States, with operations expected to commence within the year. This initiative forms part of Banpu's strategy to achieve Net Zero emissions, featuring its planned Barnett Zero and Cotton Cove projects.[18]
- **CCS Exploration:** Ongoing exploration is taking place in areas such as the Mae Moh mine and the Lampang Basin.[19]

[16] 'ครม. ไฟเขียวศึกษาศักยภาพ CCS Hub หนุนเทคโนโลยีดักจับ-กักเก็บคาร์บอนระดับชาติ (Cabinet Approves Study of National CCS Hub to Support Carbon Capture and Storage)' *Thansettakij* <https://www.thansettakij.com/sustainable/net-zero/648304> accessed 29 January 2026.

[17] 'การดักจับและกักเก็บคาร์บอนไดออกไซด์ (Carbon Capture and Storage)' *PTTEP* <https://www.pttep.com/th/our-company/ep-net-zero-2050/carbon-capture-and-storage> accessed 29 January 2026.

[18] 'BKV, Banpu's Subsidiary, Announces FID on Carbon Capture Project with Leading Midstream Operator' *Banpu* <https://www.banpu.com/news/bkv-banpus-subsidiary-announces-fid-on-carbon-capture-project-with-leading-midstream-operator/> accessed 29 January 2026.

[19] 'เปิดพื้นที่ กฟผ.แม่เมาะ ต้อนรับกระทรวงเศรษฐกิจการค้าและอุตสาหกรรมญี่ปุ่น ศึกษาศักยภาพการกักเก็บคาร์บอนฯ ผนึกกำลังสู่ความเป็นกลางคาร์บอนของโลก (EGAT Mae Moh Hosts Japan's METI to Study Carbon Capture and Storage Potential, Advancing Cooperation towards Global Carbon Neutrality)' *Electricity Generating Authority of Thailand* <https://www.egat.co.th/home/20230116-pre01/> accessed 29 January 2026.

- **CO_2 Utilisation Projects:** These projects aim to produce sodium bicarbonate from industrial CO_2 emissions.

Outlook

As Thailand advances its carbon neutrality agenda, CCUS represents an important element of the country's carbon neutrality strategy with ongoing pilot projects and regulatory initiatives signalling a growing trend. While significant progress has been made through pilot initiatives and policy support, further regulatory development and long-term commitment will be required to unlock the full potential of CCUS in Thailand.

Hydrogen and Ammonia

Overview

Hydrogen and ammonia markets are being developed in Thailand as part of initiatives to transition towards a sustainable energy future. Although high production costs and the lack of established infrastructure remain key challenges, there has been growing recognition and support from both businesses and the government to foster the hydrogen and ammonia industry.

Legal framework and policy direction

At the policy level, hydrogen is included in the draft PDP 2024 (the "**PDP 2024**"). From 2030, hydrogen is expected to account for up to 5% of the natural gas used in electricity generation, as it is expected to be used together with natural gas in co-generation power plants, particularly those located in Thailand's eastern region. While the PDP 2024 was returned for further review and experienced repeated delays throughout 2025, the new PDP 2026 is set to be a 25-year plan with an updated target of achieving Net Zero in 2050.[20] While EGAT has plans to develop pilot hydrogen-blending projects at six of its power project facilities, the prevailing view among many key political parties remains that the cost of hydrogen development is currently uncompetitive.[21]

Hydrogen and ammonia have recently been recognised as energy sources under Thai regulations. Pursuant to a notification issued by the Ministry of Energy on 1 December 2025 (the "**MOE Notification**"), hydrogen and ammonia fuels are classified as fuels under the Controlled Fuel Act B.E. 2542 (1999).[22] The Department of Energy Business is expected to issue additional regulations governing hydrogen- and ammonia-related businesses, including regulatory frameworks and technical and safety requirements for hydrogen storage facilities, pipeline systems, transportation tanks, and fueling stations.

The MOE Notification will come into effect two years from its date of issuance. Once effective, the MOE Notification and any subsequent notifications issued pursuant to it, as specific regulations, will apply to hydrogen- and ammonia-related businesses. Until then, laws on hazardous substances and the factory law governing industrial hydrogen production remain relevant as general laws. If classified as a Category 1 hazardous substance under the Hazardous Substance Act B.E. 2535 (1992) (as amended) (the "**Hazardous Substance Act**"), hydrogen will be regulated by the Department of Industrial Works and will not require registration or approval, but must comply with prescribed safety standards. By contrast, anhydrous ammonia (NH_3), as a Category 3 hazardous substance, requires a licence prior to production, import, export, or possession. In addition, the production of hydrogen and/or ammonia may constitute a Type 3 factory (No. 89) under the Factory Act, which requires a factory licence.

On the other hand, the manufacture of hydrogen-fuel vehicles and hydrogen production from renewable energy sources (green hydrogen) are eligible for the Board of Investment ("**BOI**") incentives. Green hydrogen production businesses are eligible for A1 incentives. Hydrogen production from hydrocarbons or fossil fuels with the use of carbon capture and storage, as well as hydrogen-fuelled power plants, is eligible for A2 incentives. However, it is important to note that current BOI incentives do not extend to ammonia production businesses.

Outlook

The use of hydrogen in conjunction with ammonia may support the development of cost-efficient clean energy technologies and the achievement of sustainability goals. Thai regulatory bodies have shown ongoing efforts to establish an appropriate legal and regulatory framework for hydrogen- and ammonia-related businesses. Although the framework remains under development, additional regulations are expected to be introduced in 2026 and 2027.

---

[20] 'ส่องความคืบหน้าแผน PDP ฉบับใหม่รับ GDP ไทย-ขยายกำลังผลิตไฟฟ้า SMR (Spotlight on Progress of the New PDP to Support Thailand's GDP and Expand SMR Power Generation Capacity)' *Thansettakij* <https://www.thansettakij.com/economy/energy/649979> accessed 29 January 2026.

[21] 'กฟผ. เร่งศึกษาเชื้อเพลิงผสมไฮโดรเจน เคลื่อนพลังงานสะอาด นำร่อง 6 โรงไฟฟ้าแนวท่อก๊าซ (EGAT Accelerates Study of Hydrogen-Blended Fuel to Drive Clean Energy, Piloting at 6 Gas-Fired Power Plants)' *Thansettakij* <https://www.thansettakij.com/sustainable/net-zero/648430> accessed 29 January 2026.

[22] 'ประกาศกระทรวงพลังงาน เรื่อง ให้ไฮโดรเจนและแอมโมเนียเป็นน้ำมันเชื้อเพลิงตามพระราชบัญญัติควบคุมน้ำมันเชื้อเพลิง พ.ศ. 2542 พ.ศ. 2568 (Notification of the Ministry of Energy on Designating Hydrogen and Ammonia as Fuels under the Fuel Oil Control Act B.E. 2542 (1999), B.E. 2568 (2025))'.

Battery Energy Storage Systems

Overview

Battery energy storage systems ("**BESS**") enable the storage of electricity generated from variable renewable energy sources and have evolved from limited initial implementation to wider deployment across public and private projects in Thailand.

Current incentives for BESS manufacturing

In November 2025, the BOI revised the criteria for investment incentives relating to the manufacture of energy storage systems as follows:[23]

- high-density battery manufacturing that includes cell processes and meets the updated technical criteria qualifies for A1 incentives, including an eight-year exemption from corporate income tax without a cap. Additionally, manufacturers are entitled to a 90% reduction in import duties on raw materials and essential materials not produced domestically, subject to annual approval for five years.
- high-density battery storage manufacturing that uses cells as materials (e.g. in modules or battery packs) and meets the updated technical criteria qualifies for A2 incentives. These include an eight-year corporate income tax exemption capped at net profits, along with the same 90% reduction in import duties for raw materials and essential materials for five years.
- high-density battery storage manufacturing that uses modules to produce battery packs and meets the updated technical criteria qualifies for A3 incentives, which include a five-year exemption from corporate income tax.
- high-density battery storage component manufacturing (i.e., cathodes, anodes, electrolytes, and separators) that meets the updated technical criteria, qualifies for A4 incentives, which include a three-year exemption from corporate income tax.

Legal framework and policy direction

Under the PDP 2024, BESS capacity is projected to reach 10,485 MW by 2035. Furthermore, the BESS framework is expected to align with EPPO's Strategic Action Plan for Battery Energy Storage Systems (2023-2032), which covers areas such as production, utilisation, legal and standards development, research and development, and personnel building, with the aim of fostering an ecosystem and stimulating demand for BESS. The plan includes transitioning power purchase agreements (PPAs) for renewable energy to more stable structures incorporating BESS, thereby enhancing the reliability of renewable energy supply. It also emphasises the development of strategic partnerships through government-to-government (G2G) and business-to-business (B2B) collaboration to drive innovation and investment in BESS manufacturing.

Outlook

Although a comprehensive legal framework is currently under development and additional regulations are anticipated, the outlook for BESS in Thailand is promising as BESS has been increasingly adopted across public projects (e.g. EGAT's and PEA's projects) [24] as well as in private projects. Government policies and strategic initiatives, together with increasing demand and the projections set out in the PDP 2024, indicate that BESS will continue to play an increasingly important role in supporting Thailand's sustainable energy transition.

DATA CENTRES AND THAILAND'S ENERGY TRANSITION

Thailand enters 2026 at a definitive turning point. If 2025 was defined by the arrival of global hyperscalers, this year is defined by the state's rapid response to the infrastructure demands they bring. The landscape has been fundamentally reshaped by the **"Quick Big Win"** strategy—a late-2025 directive from the new Ministry of Energy (MOE) under Minister Auttapol Rerkpiboon. With Thailand currently governed by a caretaker administration following the dissolution of Parliament in December 2025, these directives represent a 'Quick Big Win' mandate intended to sustain economic momentum ahead of the February 2026 general election. This shift is not merely about capacity; it is a holistic restructuring of how power is bought, how the grid is built, and how resources like water are managed to ensure Thailand's status as the regional digital hub remains sustainable.

[23] 'ประกาศคณะกรรมการส่งเสริมการลงทุน ที่ ส.8/2568 เรื่อง แก้ไขเพิ่มเติมบัญชีประเภทกิจการที่ให้การส่งเสริมการลงทุน ตามประกาศคณะกรรมการส่งเสริมการลงทุน ที่ 9/2565 (Notification of the Board of Investment No. Sor. 8/2568 on Amendment to the List of Business Categories Eligible for Investment Promotion under Notification of the Board of Investment No. 9/2565)'

[24] 'BESS: Power Reserve for Energy Security in the Renewable Energy Era' *Electricity Generating Authority of Thailand (EGAT)* <https://www.egat.co.th/home/en/bess-power-reserve-for-energy-security-in-the-renewable-energy-era/> accessed 29 January 2026.

Energy Intensity and Policy Support

As of early 2026, Thailand has positioned itself as a rapidly emerging contender for the ASEAN digital hub through the Ministry of Energy's 'Quick Big Win' policy. While currently trailing regional leaders like Singapore and Malaysia in terms of operational capacity, industry observers have noted that Thailand could potentially leapfrog competitors by strengthening infrastructure, developing talent, and implementing advanced regulatory frameworks tailored for AI workloads.[25]

Against this backdrop, the government has taken concrete steps to attract hyperscale data centre investors, including fast-tracking a 3-billion-baht infrastructure upgrade, under which the Electricity Generating Authority of Thailand (EGAT) has been directed to modernise transmission lines via the TIPE project. This initiative specifically targets expansion outside the Eastern Economic Corridor (EEC), ensuring the national grid is equipped to handle the massive power demands of AI and cloud computing while securing large-scale foreign investment.[26]

To further streamline development, the Cabinet approved the "Thailand FastPass" mechanism in late 2025. [27] This initiative is designed to unlock "bottlenecks" for major investment projects, specifically data centres, by reducing licensing and approval timelines by 20% to 50%. By significantly narrowing the gap between land acquisition and operational launch, the mechanism ensures that data centre projects can scale rapidly to meet surging global demand.[28]

The Board of Investment (BOI) has further incentivised sustainability by offering up to 13 years of corporate income tax exemptions for data centres that integrate advanced liquid cooling and maintain strict Power Usage Effectiveness (PUE) standards.[29] Notably, these incentives are now tied to domestic human capital development. To qualify, operators must adhere to a strict labour mandate: at least 50% of the facility's executives and specialists must be Thai nationals within three years of operation.[30] This policy ensures that the global technological influx translates into a permanent elevation of the local workforce's expertise in cloud and AI infrastructure.[31]

Power Procurement for Data Centres

The landscape of power procurement underwent a paradigm shift in the latter half of 2025 with the Energy Regulatory Commission (ERC) planning to implement a Direct Power Purchase Agreement (Direct PPA) pilot scheme (2,000 MW) in 2026. Under the scheme, large-scale operators can bypass the "Single Buyer" model and procure 100% renewable energy directly from private producers. [32] For the largest players, a new National Energy Policy Council (NEPC) resolution now permits data centres with demand exceeding 200 MW to become "Direct Customers" of EGAT, granting them direct access to the high-voltage transmission network for maximum reliability.[33]

According to the latest public hearing draft of the guidelines for the Direct PPA pilot scheme, entry into this 2,000 MW pilot programme would be governed by a joint application mechanism, requiring the renewable power producer and the data centre developer to approach the BOI and ERC in tandem to secure their quota. These Direct PPA pilot requirements would function as an additional, more restrictive layer on top of standard BOI promotion. As

---

[25] B Pradityont, '5 Steps Thailand Should Take Now to Leapfrog Its ASEAN Rivals in the DC Space' *ST Telemedia Global Data Centres* (18 November 2025) <https://www.sttelemediagdc.com/resources/5-steps-thailand-should-take-now-to-leapfrog-its-asean-rivals-in-the-dc-space> accessed 19 January 2026

[26] 'เดินหน้า Quick Big Win "อรรถพล"สั่ง กฟผ. ทุ่ม 3 พันล้าน รับดาต้าเซ็นเตอร์ ("Quick Big Win" Goes Forward: "Auttapol" Orders EGAT to Invest THB 3bn to Support Data Centres)' *Post Today* (21 November 2025) <https://www.posttoday.com/smart-city/733767> accessed 19 January 2026

[27] 'Thai Cabinet Approves "FastPass" to Unlock $13.7 Billion in Stalled Investment' *Nation Thailand* (24 November 2025) <https://www.nationthailand.com/business/economy/40058712> accessed 22 January 2026

[28] 'Thailand Prepares to Pilot FastPass as Part of "Quick Big Win" Effort to Improve Investor Services and Ease of Doing Business' *Thailand Board of Investment* <https://www.boi.go.th/index.php?page=press_releases_detail&topic_id=138169> accessed 19 January 2026

[29] Thailand Board of Investment, *Investment Promotion Guide 2025* (Thailand Board of Investment, September 2025) <https://www.boi.go.th/upload/content/BOI_A_Guide_EN.pdf> accessed 19 January 2026

[30] 'ประกาศคณะกรรมการส่งเสริมการลงทุน ที่ ส. 9/2568 เรื่อง แก้ไขเพิ่มเติมบัญชีประเภทกิจการที่ให้การส่งเสริมการลงทุนตามประกาศคณะกรรมการส่งเสริมการลงทุน ที่ 9/2565 (Notice of the Board of Investment No. Sor. 9/2568 Re: Amending the List of Categories of Businesses Promoted under the Notification of the Board of Investment No. 9/2565)'.

[31] 'BOI ไฟเขียว 4 โครงการ Data Center กว่าแสนล้านบาท ลุย FastPass เร่งเครื่องลงทุน-ปรับสิทธิประโยชน์ (BOI Greenlit 4 Data Center Projects Worth Over THB 100bn and Gave Go-Ahead to FastPass with Adjusted Incentives)' *Thairath* (11 November 2025) <https://www.thairath.co.th/money/tech_innovation/tech_companies/2894811> accessed 19 January 2026

[32] N Tunpaiboon, 'Direct PPA โอกาสใหม่เสริมความยั่งยืนให้ธุรกิจไทย (Direct PPA: New Opportunities for Thai Businesses to Enhance Sustainability)' *Krungsri* (29 October 2025) <https://www.krungsri.com/th/research/research-intelligence/direct-ppa-2025> accessed 19 January 2026

[33] 'กฟผ.ปีหน้าอัดงบ 2.2 หมื่นล.ขยายระบบสายส่ง (EGAT to Invest THB 22bn Next Year to Expand Transmission Systems)' *Banmuang* (5 December 2025) <https://www.banmuang.co.th/news/economy/457427> accessed 19 January 2026

of January 2026, the eligibility criteria for the pilot project remain under development by the BOI and the ERC.

While BOI status is a prerequisite, participants must also meet specific criteria, including a minimum 50 MW IT baseload, a global 100% renewable energy mandate, and status as a new investment. Simultaneously, renewable producers must offer newly developed capacity of at least 1,000 kVA that is not subject to existing government contracts.

Challenges in Grid Integration

The primary challenge for 2026 remains grid "congestion," particularly in the EEC. In response, the government has authorised an immediate THB 3 billion investment for EGAT to upgrade transmission lines in Chonburi and Rayong. This "short-term fix" is aimed at supporting an additional 1,750 MW of capacity requested by developers in the region.[34]

A long-term grid reinforcement plan totaling THB 30.5 billion has also been proposed to the Cabinet. This budget would be dedicated to enhancing grid stability and integrating the massive influx of intermittent renewable energy required to power these "energy-hungry" facilities without compromising the national power system's integrity.[35] Under the Direct PPA pilot programme, these efforts are to be funded in part by Third-Party Access (TPA) charges. Specifically, the System Security Charge (or Ancillary Service Charge) would cover essential services like spinning reserves and voltage regulation, while the Imbalance Charge would manage the 15-minute deviations between scheduled and actual power delivery.

In a recent policy discussion in 2026 between academic policymakers and representatives of Thailand's major political parties, establishing and expediting an open bid for Balancing Services procurement is one recommendation that was supported by all parties.

However, recent implementation delays for the pilot programme threaten to dampen the market's momentum; as regional competition for data centre locations intensifies, any perceived regulatory unreliability risks Thailand losing critical investment opportunities to more stable neighboring markets. Direct PPA policy working teams under ex-Prime Minster Srettha Thaveesin have publicly shared that one of the conditions set by major data centre players for the Thai government for investing in Thailand was the ability to access clean energy[36]. Thailand's delay in its delivery of this promise would negatively impact investors' confidence.

Water Supply Considerations

As liquid cooling becomes the industry standard for high-density AI racks, water consumption has emerged as a primary ESG concern. 2026 marks the commencement of the landmark 10-year agreement between Bridge Data Centres (BDC) and Eastwater Stecon Utilities (EWS), ensuring a supply of 3.3 million cubic metres of industrial-grade water annually for the EEC region. This move towards circular water management, utilising closed-loop systems to reduce freshwater intake, is expected to become a mandatory criterion for future project approvals as Thailand balances digital growth with resource preservation.[37]

In this respect, the necessary inclusion of less-sophisticated local water companies in project planning poses a significant operational challenge. Although their water supply is critical for cooling, these entities often negotiate with the leverage and approach of a traditional utility, creating contractual rigidities and potential supply-chain risks for operators who require flexible and guaranteed water access. Stakeholder and partnership management therefore becomes paramount, and project developers should carefully align the interests and risks of water supply against customer commitment.

Outlook

Looking ahead, Thailand aspires to reach a data centre market valuation of over USD 6.28 billion by 2031,[38] potentially overtaking regional competitors in planned capacity. The "Quick Big Win" phase is predicted to catalyse an investment inflow of THB 65 billion in the first phase of the Direct PPA scheme

[34] "ไฟเขียว กฟผ.ลงทุน 3 พันล้าน ปรับระบบส่งไฟฟ้ารองรับ Data Center (EGAT Greenlit to Invest THB 3bn to Upgrade Power Transmission Systems in Support of Data Centres)' *Post Today* (31 October 2025) <https://www.posttoday.com/smart-city/732515> accessed 19 January 2026

[35] "ไฟเขียว กฟผ.ลงทุน 3 พันล้าน ปรับระบบส่งไฟฟ้ารองรับ Data Center (EGAT Greenlit to Invest THB 3bn to Upgrade Power Transmission Systems in Support of Data Centres' (n 34)

[36] Y Praiwan, 'Powering up Thriving Data Centres' *Bangkok Post* (15 November 2025) <https://www.bangkokpost.com/business/general/3137846/powering-up-thriving-data-centres> accessed 19 January 2026

[37] 'Eastwater Stecon Utilities (EWS) Partners with Bridge Data Centres (BDC) for the Construction of Industrial Water Production and Distribution to Data Center Operators in Chon Buri' *Eastwater* (17 October 2025) <https://www.eastwater.com/en/updates/corporate-news/2507> accessed 19 January 2026

[38] Arizton, *The Thailand Data Center Market Size, Share, Trends, & Investments By IT Infrastructure, By Electrical Infrastructure, By Mechanical Infrastructure, By Cooling Systems, By General Construction, By Tier Standard* (January 2026) <https://www.arizton.com/market-reports/thailand-data-center-market-size> accessed 19 January 2026

alone.[39] As AI-optimised servers are projected to account for nearly 44% of total data centre power usage by 2030,[40] the focus will shift from simple connectivity to "Utility-as-a-Service" (UaaS) models, where green power and reclaimed water are delivered as a unified, sustainable package.[41]

Thailand's 2026 outlook is increasingly clouded by regulatory delays. The Direct PPA pilot, initially set for a January 2026 launch, has stalled due to a political vacuum and the transition to a caretaker government. This instability, compounded by the lack of an updated Power Development Plan (PDP), creates a "regulatory unreliability" that risks dampening investor confidence just as regional competition peaks.[42]

Although Thailand may have secured major commitments from global hyperscalers like Google and AWS, neighbouring Malaysia is aggressively positioning itself as a more stable alternative. Driven by rapid land and power availability in the Johor region,[43] Malaysia's surge illustrates the high mobility of digital capital. To protect its market share, Thailand's framework must provide more certainty; otherwise, it risks losing the critical 2026–2030 investment cycle to more decisive regional peers.

TRANSPORTATION AND ELECTRIC VEHICLES

Thailand's transportation sector is approaching a new phase in early 2026, transitioning from the rapid, retail-driven adoption of electric vehicles (EVs) seen in the preceding three years to a more structured, state-led electrification of public services. While 2025 was characterised by the proliferation of passenger EVs and initial infrastructure pilots, 2026 is defined by large-scale procurement and the formalisation of long-delayed legal frameworks. After the appointment of the new Minister of Energy (MOE) in late 2025, the final quarter of that year brought a series of regulatory updates aimed at resolving key challenges in the energy transition, particularly regarding the integration of renewable fuels in aviation and multimodal transit logistics. This report provides a focused assessment of Thailand's progress in decarbonising its public transit system and adjusting its major infrastructure ambitions in response to ongoing economic and logistical realities.

The National EV Policy Committee (EV Board), together with the BOI and the Excise Department, introduced EV 3.0 (2022-2023) and EV 3.5 (2024-2027), government incentive packages consisting of consumer subsidies, tax subsidies, and other supply chain incentives, to kick-start mass EV adoption and attract EV manufacturing to Thailand. EV 3.5 also sees a tightening of conditions and a shift in emphasis towards domestic manufacturing and supply chains through stricter enforcement of local production rules.

Key updates on Thailand's transition to electric mobility

Thailand's EV market continues to flourish with a year-on-year increase in registrations by 52% in the first half of 2025 compared to the same period in 2024. EVs now account for over 15% of all new vehicle

[39] Praiwan, 'Powering up Thriving Data Centres' (n 36)

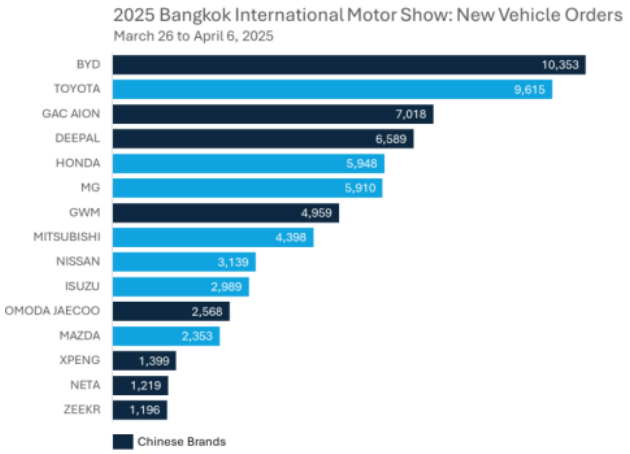
[40] 'Global Data Centre Electricity Demand Set to Double by 2030, Driven by AI' *The Nation* (30 November 2025) <https://www.nationthailand.com/business/tech/40059036> accessed 19 January 2026

[41] The transition to UaaS models in Thailand is evidenced by companies such as GreenYellow Thailand, which provides decentralised solar and cooling solutions where the provider handles the investment and operational risk, and the recent partnership between BDC and EWS.

[42] Y Praiwan, 'Renewables Expansion Facing Fresh Challenges' *Bangkok Post* (1 January 2025) <https://www.bangkokpost.com/business/general/3167059> accessed 19 January 2026

[43] 'Malaysia Data Center Market Surges Past USD 11.4 Billion as Johor Emerges Southeast Asia's New Hyperscale Power Hub' *Barchart* (13 January 2026) <https://www.barchart.com/story/news/37031080/malaysia-data-center-market-surges-past-usd-11-4-billion-as-johor-emerges-southeast-asias-new-hyperscale-power-hub-arizton> accessed 19 January 2026

registrations, the highest rate in ASEAN. [44] Throughout the value chain, 2025 saw continued growth in public charging stations and sales of chargers across all regions of the country. Investment in the EV supply chain has topped THB 137.7 billion (approx. USD 4.2 billion) as part of the expansion of Thailand's EV ecosystem under national incentive packages such as EV3 and EV 3.5.



Source: Ipsos[45]

Behind the increased numbers, however, Chinese EV companies have dealt a major blow to Japanese automakers' dominance in Thailand. In August 2025, Toyota announced its reshaping of its supply strategy in Southeast Asia, turning to Chinese component manufacturers in Thailand, its largest manufacturing hub in Southeast Asia, for its upcoming EV set to launch in 2028. [46] Other Japanese carmakers also continue their strategic collaborations with Chinese companies to launch cost-effective models, such as between Nissan and Dongfeng, and Toyota and Huawei.

The transition to electric mobility in the public sector achieved a significant milestone in late 2025, as the Bangkok Mass Transit Authority (BMTA) concluded its procurement process for a large-scale electric bus fleet. Nakhonchai Air was awarded the contract to lease 1,520 EV buses over a seven-year period, representing a total investment of THB 14.9 billion. Following negotiations that reduced the contract price by THB 8 million from the initial bid, a formal signing is expected in late January 2026, with the first vehicles scheduled for delivery by March 2027. This initiative reinforces the government's commitment to decarbonising urban transit, moving from small-scale pilots to a comprehensive fleet overhaul intended to eliminate the environmental impact of traditional internal combustion engine (ICE) buses in the Bangkok Metropolitan Area.[47]

Furthermore, the expansion of the sustainable mobility ecosystem is no longer confined to the capital. Following successful pilots in previous years, major provinces are integrating EV transit into their municipal master plans. In Chiang Mai, the Provincial Administrative Organisation (PAO) signed a memorandum of understanding in late 2025 with 11 partners to launch a dedicated clean-energy bus project.[48] Similarly, as of January 2026, Phuket has replaced its traditional *Songthaew* routes with a modern EV fleet (the Red, Yellow, and Blue lines), offering air-conditioned, low-floor accessibility, and GPS tracking through the "Phuket OneMap" app.[49]

Challenges to the EV market and Infrastructure

Despite progress in bus electrification, the broader transportation infrastructure landscape faces significant challenges, particularly concerning high-speed rail and aviation connectivity. The High-Speed Rail Link connecting three major airports (Don Mueang, Suvarnabhumi, and U-Tapao) continues to experience construction delays. As of late 2025, the project remained suspended pending contract amendments with the private partner, as the previous government lacked the authority to approve the new "build-and-pay" model proposed to address the developer's financial concerns.[50]

---

[44] 'Thailand Tops ASEAN in EV Registrations, Investment Surpasses $4 Billion' *Khaosod English* (31 July 2025) <https://www.khaosodenglish.com/news/business/2025/07/31/thailand-tops-asean-in-ev-registrations-investment-surpasses-4-billion/> accessed 19 January 2026

[45] A de Saint-Léon and others, *THAILAND AUTO TRENDS* (Ipsos, July 2025) <https://www.ipsos.com/sites/default/files/ct/publication/documents/2025-11/ipsos-pov-thailand-auto-trends-2025-the-rise-of-chinese-oems.pdf> accessed 19 January 2026

[46] T Prakash, 'Toyota Turns to Chinese Suppliers in Thailand to Cut Costs for Upcoming Electrified Model' *Piston.my* (4 August 2025) <https://www.piston.my/2025/08/04/toyota-turns-to-chinese-suppliers-in-thailand-to-cut-costs-for-upcoming-electrified-model/> accessed 19 January 2026

[47] 'The BMTA (Bangkok Mass Transit Authority) Board Approved Nakhonchai Air to Win a Contract to Lease 1.5 Thousand Electric Buses Worth 1.49 Billion Baht, Urging a Quick Closing of the Deal before the Board's Term Expires' *Money & Banking Magazine* (27 December 2025) <https://en.moneyandbanking.co.th/2025/216971/> accessed 19 January 2026

[48] 'Chiang Mai Launches Clean-Energy EV Bus Project to Ease Traffic and Cut PM2.5 Pollution' *Chiang Mai Citylife* (16 December 2025) <https://www.chiangmaicitylife.com/citynews/general/chiang-mai-launches-clean-energy-ev-bus-project-to-ease-traffic-and-cut-pm2-5-pollution/> accessed 19 January 2026

[49] K Hedrick, 'Everything You Need to Know About the New Phuket EV Bus Routes' *Mama Loves Phuket* (5 January 2026) <https://www.mamalovesphuket.com/new-phuket-ev-bus-routes/> accessed 19 January 2026

[50] '"*ไฮสปีด 3 สนามบิน" ล่าช้า ต้องรอครม. ใหม่เคาะแก้สัญญา CP* ("3-Airport High-Speed Delayed", Pending New Cabinet to Amend the Contract

Simultaneously, the Eastern Economic Corridor (EEC) aviation hub is undergoing significant reassessment. The U-Tapao International Aviation City project (EEC-UTA) has moved forward despite the high-speed rail delays, but at a substantially reduced scale. Recent studies have led to a proposal to reduce the planned capacity of the terminal from 60 million passengers per year to 20 million, with the initial phase accommodating only 3 million passengers. These adjustments reflect a more cautious outlook on regional travel demand and the logistical difficulties of connecting the EEC to Bangkok without the planned high-speed rail link. Such delays in major infrastructure projects create uncertainty for private investors in the EV charging and logistics sectors, who rely on these hubs to drive demand.[51]

Other legal and policy updates

To enable the Pheu Thai government's policy to implement a THB 20 flat metro fare across Bangkok rail transit, two significant pieces of legislation were enacted within the public transport industry:

- **Common Ticket System Management Act B.E. 2568**: Published on 27 December 2025, and effective immediately. This Act establishes a comprehensive legal framework for the centralisation of transit payments across various public transport modes, including rail, road, and water. Its primary function is to standardise technology and establish a "Central Clearing House" to manage revenue allocation and clear transactions between different transport operators.[52]
- **Railway Transport Act B.E. 2568**: It serves as the primary regulatory instrument for centralising the governance, safety, and development of Thailand's entire rail network. It establishes clear safety standards for rail operations and places regulatory oversight under the Department of Rail Transport to ensure efficient management and passenger security. The significance of this legislation is that it centralises rail transport regulation which opens up the opportunity for private sectors to share the use of the national railway infrastructure and is intended to encourage investment in rail transportation.[53]

The Railway Transport Act gives the policy committee the authority under Section 9 to set maximum fare ceilings, which is the legal hook needed to cap prices across different lines. Section 36 of the Common Ticket System Management Act establishes the common ticket fund that provides a legal venue for the state to manage revenue sharing and fare subsidies. Between these two Acts, the government would be able to realise its policy of standardising rail fares across the country. The THB 20 flat fare policy was highly anticipated to come into force towards Q3 of 2025, but as of January 2026, this implementation remains delayed.

In the aviation sector, the Department of Energy Business has officially issued standards for Sustainable Aviation Fuel (SAF) and Jet A-1 fuel, effective from 1 January 2026. The government's roadmap mandates an initial 1% SAF blend for all airlines, with a long-term target of 5-8% by 2033, positioning Thailand as a regional leader in green aviation.[54]

Outlook

Thailand's transition to electric mobility in 2026 is at a significant stage, marked by a shift from consumer-driven EV adoption to a more structured, state-led electrification of public transit. While the EV market continues its growth, significant infrastructure projects like the high-speed rail link face delays, creating uncertainty for broader economic ambitions. The simultaneous rollout of key legislation for integrated ticketing, rail transport, and sustainable aviation fuel signals an effort to build a comprehensive regulatory framework. However, the success of this transition will depend on the government's ability to navigate these infrastructure bottlenecks and effectively implement its new policies, balancing green targets with logistical and financial realities.

with CP)' *Bangkok Biz News* (12 December 2025) <https://www.bangkokbiznews.com/economics/1211875> accessed 19 January 2026

[51] 'EEC-UTA จับมือไม่รอไฮสปีด เดินหน้า "อู่ตะเภา" จบไม่ลงลดไซส์สนามบินเหลือ 20 ล้านคน/ปี (EEC-UTA Agree Not to Wait for HSR to Proceed. "Utapao" Fails to Close, Reducing Airport Capacity to 20M Passengers/Year)' *Isranews Agency* (29 November 2025) <https://www.isranews.org/article/isranews-news/143573-transport-223.html> accessed 19 January 2026

[52] พระราชบัญญัติการบริหารจัดการตั๋วร่วม พ.ศ. 2568 (Common Ticket System Management Act B.E. 2568)

[53] พระราชบัญญัติการขนส่งทางราง พ.ศ. 2568 (Railway Transport Act B.E. 2568)

[54] 'Thailand Mandates 1% SAF Blend for Jet Fuel from 1 January 2026' *The Nation* (5 January 2026) <https://www.nationthailand.com/sustaination/40060773> accessed 19 January 2026

CLIMATE CHANGE AND DECARBONISATION

Thailand Taxonomy

Thailand Taxonomy is Thailand's central classification framework for identifying and categorising environmentally sustainable economic activities. It aligns with the country's commitment to achieving net-zero greenhouse gas emissions by 2050, consistent with the Paris Agreement's goal of limiting the increase in global temperatures to 1.5°C. Thailand Taxonomy serves as a voluntary reference tool for public and private sector stakeholders, particularly those involved in sustainable finance and climate-related initiatives.

Following the publication of Thailand Taxonomy Phase 1 in June 2023 and the public consultation on Thailand Taxonomy Phase 2, the Thailand Taxonomy Steering Group for Phase 2, co-led by the Department of Climate Change (DCCE), the Bank of Thailand, the Securities and Exchange Commission, and the Stock Exchange of Thailand, published Thailand Taxonomy Phase 2 on 27 May 2025.

In addition to the energy and transport sectors which are the two sectors covered by Thailand Taxonomy Phase 1, Thailand Taxonomy Phase 2 expands the framework to four additional sectors under similar principles, i.e., agriculture (including forestry), buildings and real estate, manufacturing, and waste management. The key structural updates and criteria introduced in Thailand Taxonomy Phase 2 are as follows:

Sectoral classification	The sub-divisions of the additional sectors under Thailand Taxonomy Phase 2 are as follows: • The agriculture sector is divided into agriculture and forestry sub-sectors. The agriculture sub-sector includes plant cultivation and livestock/aquaculture production. The forestry sub-sector covers sustainable forest management, forestry plantations, as well as the conservation, restoration, and maintenance of natural forests. • The buildings and real estate sector covers, among other activities, the construction, renovation, acquisition, installation, and maintenance of all residential and commercial buildings. • The manufacturing sector includes the production of industrial materials, e.g., iron, steel, aluminium, and hydrogen, as well as other green technologies such as Carbon Capture, Utilisation, and Storage (CCUS). • The waste management sector covers the collection, management, and utilisation of waste, recycling activities, as well as the processing of communal, agricultural, and industrial waste. Each of the sectors is subject to a sectoral methodology, which involves assessing whether an activity contributes to the environmental objectives of the Taxonomy, whether decarbonisation technology (if applicable) has been implemented, and whether the activity aligns with the classification standards, including International Standard Industrial Classification of All Economic Activities (ISIC), as well as other standards, e.g., Thailand Standard Industrial Classification (TSIC).
Activities assessment - the Traffic Light System	An essential component of Thailand Taxonomy is the traffic light system, which classifies activities into green, amber, and red codes. The screening criteria are grounded in scientific references and extend to additional sectors, with specific details tailored to the nature of each activity.
Compliance with the 'Do No Significant Harm' principle (DNSH) and the Minimum Social Safeguards (MSS)	To be aligned with the Thailand Taxonomy, projects and activities must comply with the 'Do No Significant Harm (DNSH)' principle, which is intended to ensure that progress towards one environmental objective does not undermine others. While Phase 1 of the Thailand Taxonomy focuses climate change mitigation as an overarching objective for applicable sectors during its pilot phase, Phase 2 expands the framework to cover six environmental objectives: (1) climate change mitigation; (2) climate change adaptation; (3) the sustainable use and protection of marine and water resources; (4) the protection and restoration of biodiversity and ecosystems; (5) pollution prevention and control; and (6) the promotion of resource resilience and the transition to

	a circular economy. Each objective is supported by both generic DNSH requirements applicable across all sectors and sector-specific requirements tailored to particular environmental risks. In parallel, compliance with the 'Minimum Social Safeguards (MSS)' is required to ensure that taxonomy-aligned activities do not result in adverse social impacts, with operators expected to observe applicable domestic laws as well as relevant international human rights, labour, and IFC performance standards.

Implications

Thailand Taxonomy Phase 2 expands the scope of Phase 1 by introducing additional sector-specific screening criteria based on emissions profiles, while elevating the DNSH and MSS requirements to align with international standards. As a consistent reference point for sustainability-linked strategies, Thailand Taxonomy now extends beyond compliance with local laws, encouraging businesses to consider global practices, associated compliance costs, and appropriate risk management measures.

Climate Change and Decarbonisation Government Policies

Thailand's decarbonisation strategy is evolving rapidly from policy commitments towards binding legal frameworks. A key development in late 2025 was the Cabinet's approval, in principle, of the Draft Climate Change Act, positioning it as the first comprehensive statutory climate regime in Thai law. This Act formally codifies national climate objectives, including net-zero greenhouse gas emissions by 2065, into statutory obligations, with provisions requiring both public and private entities to participate in greenhouse gas management, reporting, and reduction. In parallel, recent policies indicate a growing ambition to accelerate Thailand's decarbonisation pathway towards net-zero by 2050, reflecting increasing awareness that early action is necessary to maintain economic competitiveness and align with global climate and trade expectations.

Substantively, the Act introduces several mechanisms, including a national greenhouse gas emissions database with mandatory reporting obligations; a legally authorised Emissions Trading Scheme (ETS) operating on a cap-and-trade basis with monitoring, reporting, and verification requirements; and enforcement measures for non-compliance. The draft Act also provides for a domestic Carbon Border Adjustment Mechanism (CBAM) to address carbon leakage by imposing carbon-equivalent charges on imported goods, alongside a carbon tax on greenhouse-gas-intensive goods to internalise environmental costs. In addition, the Act establishes a legal framework for carbon credits as tradable instruments and mandates the development of a national sustainability taxonomy to guide policy, investment, and financing activities in alignment with climate objectives.

On 4 November 2025, the Thai Cabinet approved, in principle, Thailand's Second Updated Nationally Determined Contribution (NDC 3.0), marking a significant acceleration of the country's climate ambition. NDC 3.0 advances Thailand's net-zero timeline by 15 years to align with the 1.5°C pathway, adopting an economy-wide emissions reduction target by 2035 and substantially increasing greenhouse gas sequestration in the Land Use, Land-Use Change, and Forestry sector (LULUCF). Under this framework, Thailand targets net greenhouse gas emissions of 152 $MtCO_2e$ by 2035, representing a 47% reduction from 2019 levels, and has prepared an investment plan to attract THB 230 billion in offshore funding to support emissions reductions of 32.8 $MtCO_2e$ in accordance with the Paris Agreement. The Department of Climate Change and Environment formally submitted NDC 3.0 to the UNFCCC on the same date, and Thailand is set to announce its enhanced commitment at COP30 in Belém, Brazil, alongside the development of sectoral action plans and a digital monitoring system to ensure transparency and effective implementation.

ETS and Carbon Pricing Developments

Thailand's foundational transition plan is to introduce a mandatory Emissions Trading System (ETS) alongside broader statutory carbon pricing mechanisms. The Draft Climate Change Act, approved in principle by the Cabinet in late 2025 and progressing through the legislative process in 2026, provides the legal basis for a cap-and-trade programme. Under this framework, entities will be subject to binding emissions caps, mandatory monitoring, reporting, and verification obligations, requirements to hold emissions allowances equivalent to their verified emissions, and specific penalties for non-compliance.

In parallel with the proposed ETS scheme, Thailand has already taken concrete legal steps on carbon pricing. In January 2025, the Thai Cabinet approved the Ministerial Regulation under the Excise Tax Act that embeds a carbon tax on oil and petroleum products within the existing excise tax framework. This carbon pricing

mechanism applies at THB 200 per tonne of CO_2 equivalent, calculated based on the greenhouse gas emission factor of each fuel product, and is integrated into current excise rates so as not to increase the retail price of fuels or impose undue burden on consumers.

While this embedded carbon tax does not independently raise excise tax burdens, it nonetheless represents Thailand's first carbon pricing instrument and serves as a transitional legal step towards a more comprehensive climate regime under the forthcoming Climate Change Act. Together, the carbon tax and the planned ETS are envisioned as forming a complementary carbon pricing framework, combining immediate carbon price signals with a longer-term tradable allowance compliance mechanism to incentivise emissions reductions in regulated sectors.

PART III: VIETNAM COUNTRY OVERVIEW

Macroeconomic and Socio-Economic Profile

Vietnam represents one of the most dynamic energy landscapes in Southeast Asia. Its energy strategy is fundamentally intertwined with its high-growth economic trajectory. The Revised National Power Development Plan VIII (**Revised PDP8**), adopted in April 2025, aligns the nation's power infrastructure with a targeted average GDP growth rate of approximately 10% per year for the 2026–2030 period. To support this rapid economic expansion and maintain global competitiveness, commercial electricity demand is projected to reach between 500.4 and 557.8 billion kWh by 2030. This necessitates a substantial expansion of the national power system, with total installed capacity expected to more than double from approximately 80 GW in late 2023 to between 183 GW and 236 GW by 2030.

The government views a reliable and sufficient power supply as essential to national defence, security, and socio-economic development, with energy identified as a key pillar of Vietnam's long-term development strategy. Vietnam is also navigating the complex challenge of balancing its economic development with its international climate commitments and aims to build a self-reliant economy transitioning towards a green, low-carbon, and circular economic model.

These considerations are among the key drivers of the ambitious transition targets and regulatory overhaul currently reshaping Vietnam's energy sector.

National Energy Mix and Transition Targets

Vietnam is implementing a fundamental shift from a fossil-fuel-dependent energy mix to a system with a significantly higher share of renewables, guided primarily by national plans and high-level directives.

Currently, the energy mix remains heavily reliant on coal, which accounts for approximately 50% of energy supply. In 2025, the Politburo mandated under its Resolution 70-NQ/TW that renewable energy reach 25–30% of total primary energy by 2030, while the Revised PDP8 targets renewable energy (excluding hydropower) to account for 28–36% of electricity generation by 2030. Vietnam's Just Energy Transition Partnership (**JETP**) commitments set a more ambitious goal of at least 47% renewable generation by 2030.

To meet these targets, Vietnam has committed to approving no new coal-fired power projects after 2030. For existing coal assets, a stringent conversion roadmap is in place: plants that have operated for 20 years must transition to biomass or ammonia co-firing, while plants that have operated for 40 years or more and for which fuel conversion is not feasible must be decommissioned. A significant development under the Revised PDP8 is the reinstatement of nuclear power as a critical baseload source, with 4,000–6,400 MW of capacity planned between 2030 and 2035. Natural gas is positioned as a "bridge fuel", although these plants are legally required to transition to hydrogen as the technology becomes commercially viable.

The ultimate long-term objective is to achieve net-zero emissions by 2050, by which time renewable energy is projected to account for 74–75% of the total mix, supported by green hydrogen production of 10–20 million tonnes per year and a complete phase-out of coal power.

Institutional Structure and Key Energy Agencies

Vietnam's energy sector operates within a centralised institutional framework dominated by state-owned enterprises (**SOEs**), although it is currently undergoing significant reforms to support the green transition and the development of a competitive market.

Policy leadership rests with the Ministry of Industry and Trade (**MOIT**), the central state authority responsible for developing and implementing national energy policies, master plans, and regulatory frameworks. Within the MOIT, the Electricity Regulatory Authority of Vietnam oversees the competitive electricity market, licensing energy activities, and electricity tariffs, while the Electricity and Renewable Energy Authority focuses on power development planning and clean energy policy.

Vietnam Electricity (**EVN**) is the state utility group responsible for electricity transmission, distribution, and a major share of power generation through its subsidiaries. EVN retains a monopoly over system operation and the construction/operation of high-voltage transmission grids, although its former monopoly on electricity trading and grid construction is being progressively liberalised under recent reforms.

The institutional landscape has further evolved with the recent restructuring of the National Load Dispatch Centre, previously operated under EVN, into the independent National Power System and Market Operation Company (**NSMO**) to ensure transparency in grid dispatch and market transactions.

Beyond the power sector, the Vietnam National Industry – Energy Group (formerly, Vietnam Oil and Gas Group) (**PVN**) is the dominant SOE responsible for petroleum investigation, upstream production and

exploration, the development of gas-to-power and LNG projects, and transition into renewable energy value chains. Coal mining and commercial coal production are primarily managed by the Vietnam National Coal and Mineral Industries Holding Corporation Limited (**Vinacomin**), which operates under the supervision of the MOIT.

Environmental and resource oversight was consolidated in early 2025 through the merger of the Ministry of Natural Resources and Environment and the Ministry of Agriculture and Rural Development into the Ministry of Agriculture and Environment. The new ministry now serves as the principal authority responsible for the granting of mineral exploration permits, the allocation of offshore sea areas for wind surveys, and coordination of the domestic carbon market.

Integration with ASEAN and Regional Energy Policies

Vietnam is proactively positioning itself to participate in regional energy connectivity, including aligning its domestic policies with the ASEAN Plan of Action for Energy Cooperation. The country participates in several regional energy initiatives, most notably the ASEAN Power Grid and the Trans-ASEAN Gas Pipeline. The Revised PDP8 also emphasises the development of renewable energy for export, targeting 5,000–10,000 MW of export capacity to regional partners such as Singapore and Malaysia by 2035. To facilitate this objective, the government is exploring subsea cable interconnections and High-Voltage Direct Current (**HVDC**) technology.

Vietnam's strategic location allows it to serve as a vital link for cross-border trade, particularly with Lao PDR and Cambodia, where several interconnection projects are already under study and construction.

Vietnam's JETP commitments are expected to accelerate renewable integration in line with broader ASEAN decarbonisation goals.

To ensure seamless regional integration, Vietnam is working to harmonise its grid codes, data-sharing procedures, and regulatory roadmaps with its neighbours.

POLICY AND REGULATORY FRAMEWORK

National Energy Plans

Vietnam's energy strategy is set out in national plans and high-level directives. The two key plans, the National Energy Master Plan (**NEMP**) and the Power Development Plan (**PDP**), cover a 10-year period with a 30-year outlook. The current NEMP, covering 2021–2030 with a vision to 2050, was formalised under Decision No. 893/QD-TTg dated 26 July 2023. It provides the overarching strategy for the exploitation, production, and storage of oil, gas, coal, and renewable energy sources.

This overarching framework is operationalised within the power sector through the Revised PDP8, approved in April 2025 under Decision No. 768/QD-TTg, which replaced the original PDP8. The Revised PDP8 sets out Vietnam's strategic roadmap for transforming its electricity sector over the coming decade, reaffirming its international commitments to reducing carbon emissions. The Revised PDP8 prioritises accelerating the shift towards renewable and new clean energy sources, developing grid infrastructure, and promoting new technologies, including energy storage.

These plans and the reform of the energy sector are supported by Resolution No. 55-NQ/TW (2020) and Resolution No. 70-NQ/TW (2025) of the Politburo that define energy security as a non-negotiable pillar of national security. The former lays the foundation for energy sector growth, while the latter builds upon it by mandating the removal of institutional and legal bottlenecks to facilitate project implementation and private sector participation. Collectively, these instruments establish a multi-dimensional roadmap for fuelling industrial expansion while advancing towards Vietnam's 2050 net-zero commitments.

Investment Incentives and Market Access

Vietnam has been reforming and modernising its foreign investment regulations and incentive regimes to attract new investment required for its continued economic growth. Under the Revised PDP8, total capital requirements for the power sector alone are estimated to exceed USD 130 billion by 2030.

Foreign investors are permitted to own up to 100% of the equity in power generation projects, except in offshore wind power projects, strategic multi-purpose hydroelectric plants and nuclear power projects. Feed-in-tariffs are no longer available for renewable power projects; however, renewable projects, especially offshore wind and those utilising new energy sources such as green hydrogen or ammonia, continue to benefit from substantial incentives. These include exemptions from, and reductions in, sea area usage fees and land use and rental fees, as well as long-term guarantees of minimum contracted electricity output. Private parties may now also invest in, construct, and operate power transmission infrastructure, activities that were previously restricted to SOEs.

Market access in the oil, gas, and coal sectors remains limited due to state monopoly policies and is generally not yet open to private investment. PVN retains the exclusive right to undertake core oil and gas activities, including exploration and field development. Although foreign parties may sign petroleum contracts to conduct oil and gas activities in Vietnam, such contracts must be concluded with PVN as the central counterparty rather than through independent market entry. Similarly, the coal sector remains closed to private market access, with mining and production primarily managed by the state-owned Vinacomin.

Recent Policy Highlights, Pending Legislation, and Reform Outlook

A number of key legislative milestones were achieved in the energy sector in 2025, most notably the entry into force of the Law on Electricity 2024 in February 2025. This landmark legislation introduces mechanisms intended to enhance project bankability, including clearer project development procedures, minimum offtake guarantee, and more flexible power purchase agreement structures. The government is considering further changes to Vietnam's energy laws.

Complementing this regime are several cornerstone implementing regulations. Decree No. 56/2025/ND-CP establishes a structured framework for the preparation and implementation of national power development plans and provincial plans, introduces a cost pass-through mechanism for gas-to-power projects and mandates competitive bidding for the selection of investors in power projects. Decree No. 57/2025/ND-CP introduces a legal framework for direct power purchase agreements (**DPPA**) between renewable energy generators and large energy consumers. Decree No. 58/2025/ND-CP introduces investment incentives and development procedures to encourage the development of renewable energy and new energy sources, with particular focus on self-produced and self-consumed rooftop solar power systems and offshore wind power projects.

A further major reform currently being piloted is the transition to a two-component electricity tariff system for large consumers. Implemented in phases from late 2025, this structure separates capacity and energy charges, with the objective of encouraging efficiency and aligning with market standards.

Looking ahead to the 2026–2030 period, Resolution No. 70-NQ/TW of the Politburo and Resolution No. 253/2025/QH15 of the National Assembly introduce "special" mechanisms to address institutional bottlenecks. These include a streamlined "adjustment and update" pathway for power planning, expanded investor-selection routes, clearer tariff-setting mechanisms for winning bids, expedited power purchase agreement (**PPA**) negotiation processes, expanded DPPA and offshore wind regimes, and dedicated frameworks for urgent oil and coal projects. Detailed implementing regulations and guidance remain pending.

Vietnam is also piloting an Emissions Trading Scheme (**ETS**) during 2025–2026, targeting high-emission sectors such as coal-fired power and cement. The government aims to establish a fully operational carbon trading platform by late 2026, which is expected to play a pivotal role in achieving Vietnam's 2050 net-zero commitments.

ELECTRICITY AND POWER GENERATION

Government Policy and Planning

Government planning for the electricity sector is currently centred on the "maximum growth" philosophy for renewable energy as outlined in the Revised PDP8. The plan targets for combined concentrated and rooftop solar capacity to reach 46–73 GW by 2030. Wind power development is also expected to be accelerated, with onshore and nearshore targets increased to 26–38 GW, while offshore wind is expected to provide up to 17 GW by 2035. To maintain grid stability, new solar projects are required to integrate battery energy storage systems (**BESS**) with a 10% capacity ratio and a two-hour duration under the Revised PDP, although implementation remains unclear.

The government is also developing a domestic Renewable Energy Certificate market alongside an ETS to facilitate greenhouse gas reductions.

In parallel, Vietnam has committed to approving no new coal projects after 2030, and the Revised PDP8 officially integrates Vietnam's JETP commitments to accelerate the phasing-out of existing assets, requiring plants that have operated for 20 years to transition to biomass or ammonia co-firing and those that have operated for 40 years or more, where fuel conversion is not feasible, to be decommissioned. To ensure stable baseload supply during this transition, the government has revived its nuclear power programme and positioned LNG as a critical "bridge fuel". These policies collectively aim to decouple economic growth from carbon emissions, aligning the power sector with the national roadmap to achieve net-zero emissions by 2050.

Renewable Energy Tenders

Vietnam is transitioning from offering generous, fixed feed-in-tariffs to a more disciplined, market-driven

investor selection mechanism based in principle on competitive bidding, focusing on transparency and cost efficiency, subject to certain exceptions (such as power projects under state monopoly, DPPA projects, emergency power projects, and certain offshore wind projects with direct investor appointment). The primary evaluation criterion for these tenders is the electricity tariff, with the winning bid setting a ceiling for the tariff under the project's power purchase agreement with EVN.

For offshore wind projects, the Law on Electricity 2024 separates the procedural survey of sea areas from the investment selection process. Survey rights are prioritised for 100% SOEs, although private and foreign investors may participate in subsequent project implementation through bidding. Foreign investors and foreign-invested enterprises investing in offshore wind power projects are subject to stricter requirements regarding experience, financial capacity, local ownership and resourcing. Exceptions to the bidding requirement are permitted in specific cases, such as emergency power projects or projects developed by SOEs, which can be directly assigned by the Prime Minister.

For renewable projects expected to commence operation by 2030, the National Assembly has introduced policies aimed at removing the administrative bottlenecks in bidding procedures under Resolution No. 253/2025/QH15. It provides that for most new renewable power projects subject to bidding regulations, the winning-bid tariff will be the final tariff under the project PPA, eliminating the need for post-bid price negotiations. It also shortens the timeline for PPA execution to only 30 days from submission of a valid dossier. Offshore wind power projects included in the power plan and scheduled for operation during 2025–2030 are exempt from the bidding requirement. Investors can be directly appointed by the Prime Minister without participating in land use rights auctions or investor selection procedures.

Transmission and Distribution Initiatives

Vietnam is developing a modern, smart transmission network to integrate its substantial renewable energy capacity and facilitate regional power trade. The Revised PDP8 outlines plans for tens of thousands of kilometres of new 500 kV and 220 kV lines, alongside the establishment of a nationwide HVDC transmission system. While the state retains a monopoly on the technical operation of the 220 kV and 500 kV grids for national security reasons, domestic and foreign investors are encouraged to invest in the construction of these projects, particularly through public-private partnership models. This shift is intended to alleviate the financial burden of developing transmissions infrastructure, particularly for variable renewable energy.

To facilitate rapid grid expansion, Resolution No. 253/2025/QH15 provides that transmission projects included in the national or provincial master plans are no longer subject to separate investment policy approval procedures. This allows developers to proceed directly to land registration and construction, helping to ensure that grid synchronisation keeps pace with the growth of renewable power sources.

A key regional focus is the development of cross-border interconnections. Vietnam is actively exploring subsea cable links to Singapore and Malaysia to export its offshore wind capacity. Domestically, priority is given to grid connection and capacity release for power sources, with more than twelve major projects identified in the latest national priority list. These efforts are essential for transforming Vietnam into a strategic regional hub within the ASEAN Power Grid while ensuring a reliable domestic supply.

Power Purchase and Third-Party Access Reforms

The recent move to permit renewable energy generators to enter into DPPAs with large energy consumers represents a significant reform. The current legal framework for DPPAs is set out in Decree No. 57/2025/ND-CP, issued by the government on 3 March 2025, which replaced the previous 2024 framework for DPPAs and, among other changes, provides greater commercial flexibility. The decree recognises two DPPA models: the off-grid or physical DPPA model, where electricity is delivered via a private connection line, and the grid-connected or virtual DPPA model, where power is delivered through the national grid. The criteria for qualification as a large consumer entitled to enter into DPPAs have been refined under Decree No. 57/2025/ND-CP. Instead of a fixed monthly consumption threshold, eligibility is now linked to a flexible minimum consumption level to be set from time to time by the MOIT based on local electricity market conditions, providing a more commercial approach to market participation.

For the on-grid DPPA model, the scope of eligible renewable generators has expanded to include biomass plants with a capacity of 10 MW or more, in addition to solar and wind projects. Pricing involves a contract for difference (**CfD**), under which a fixed strike price is agreed between consumers and generators to hedge against spot price fluctuations, while consumers continue to purchase power from the grid at retail prices.

Under the off-grid DPPA model, eligible participants include generators operating renewable energy power plants using sources including solar, wind,

ocean, geothermal, hydropower, biomass, waste and other renewable energy resources. Buyers and sellers directly negotiate DPPAs, allowing flexibility in their terms. Excess energy output from rooftop solar power systems (not exceeding 20% of actual generation) may be sold to EVN at the average market price of the preceding year as announced by the NSMO, or within industrial clusters, to local electricity retailers at a negotiated price; in either case, subject to a ceiling price.

Under Resolution No. 253/2025/QH15 on mechanisms and policies for national energy development during the 2026–2030 period, the DPPA framework has been further expanded to include power retailers operating within industrial parks, economic zones, export processing zones, high-tech parks and other similar areas. Previously, these power retailers could participate in the DPPA model only through authorisation by large power consumers. Crucially, the National Assembly has removed the pricing cap for physical DPPA arrangements via private lines and for CfD contracts under the grid-connected DPPA model, allowing buyers and sellers to negotiate electricity prices freely outside the standard state pricing framework.

Furthermore, Decree No. 58/2025/ND-CP clarifies the rules for self-consumption rooftop solar systems, allowing them to sell up to 20% of surplus generation back to the grid. For other renewable energy and new energy sources under the self-produced and self-consumed power framework, the sale of surplus electricity to the grid is capped at 10% of total generation. These reforms effectively end the monopoly over power trading and support the development of a more competitive and transparent market that enables corporate consumers to meet their green power procurement goals.

Further reform of the DPPA framework is anticipated, including, based on current draft reform proposals, the expansion of participation in DPPAs to additional categories of consumers, such as data centres, and measures aimed at making DPPAs more attractive, including increasing the cap on the sale of excess energy output from rooftop solar power systems to EVN from 20% to 50% of actual generation.

Potential Areas of New Growth

Vietnam's energy sector is increasingly shaped by emerging growth areas in decentralised generation, storage and green fuels.

A significant area of expansion is self-produced and self-consumed power. The Revised PDP8 aims for 50% of office and residential buildings to use rooftop solar power to supplement their power requirements. Installation of rooftop solar systems for self-consumption is particularly encouraged for factories in industrial zones. Battery storage integrated with these systems is gaining significant traction across the country's industrial zones as manufacturers seek to meet supply-chain sustainability requirements.

Energy storage represents a key growth area, supported by incentivised tariffs for integrated solar-BESS projects and the recent introduction of a dedicated tariff framework for standalone, centralised BESS systems

At the same time, Vietnam is prioritising new energy projects, specifically green hydrogen and ammonia. These technologies are being incorporated into the legal framework, which promotes hybrid projects combining wind- and solar-powered electricity generation with hydrogen production for both domestic consumption and industrial export.

OIL & GAS

Overview

The Vietnamese oil and gas sector remains a pillar of the national energy transition strategy, operating within the framework provided by the Petroleum Law 2022 and its implementing guidelines, under unified state management led by the MOIT. Under the Petroleum Law 2022, all hydrocarbon resources are state-owned, with PVN acting as the dominant state enterprise entitled to conduct exploration and exploitation activities. The upstream market is primarily facilitated through production sharing contracts (PSCs) executed between PVN and private investors.

Vietnam's transition pathway prioritises natural gas and LNG as lower-carbon "bridge fuels", with the Revised PDP8 reinforcing gas and LNG-to-power build-out alongside accelerated renewable deployment. Upstream gas continues to be developed under PSCs, through MOIT-and PVN-led tendering processes with defined eligibility criteria. On the LNG side, Vietnam is firmly an import market rather than an exporter, with policy and infrastructure development converging on a centralised terminal model to supply gas-to-power projects. Vietnam operationalised LNG imports in 2023, when PV GAS obtained the first eligibility certificate for LNG import/export and received the country's first LNG cargo at the Thi Vai terminal. A critical regulatory milestone is Decree No. 56/2025/ND-CP which clarifies a cost pass-through mechanism in power purchase agreements for LNG power projects to ensure recovery of all fuel costs and infrastructure investment and proposes a long-term minimum offtake guarantee, thereby improving bankability and transparency for developers. In parallel, the Revised PDP8 accelerates key LNG power projects and

import infrastructure while mandating that LNG-fired plants transition towards hydrogen co-firing, run entirely on hydrogen or adopt carbon capture and storage (CCS) technologies to align with low-carbon goals by 2050.

The downstream oil and refining market is anchored by the Dung Quat and Nghi Son refineries, which remain critical to domestic fuel supply and energy security. Petroleum trading and retail are subject to a licensing regime and price-stabilisation oversight by the MOIT/MOF, including periodic price adjustments, price caps, and import licensing and quota controls to manage volatility and ensure supply. While there is no formal monopoly in the midstream/downstream markets, market access is conditional and regulated particularly in relation to foreign investment in oil and gas distribution. The retail market remains concentrated among large domestic players, notably Petrolimex and PVOil. Only a few foreign firms have been allowed to enter the distribution market with government approval; examples include Japanese companies, Idemitsu Q8 and JX Nippon Oil.

EMERGING TECHNOLOGIES

Government Policies on New Technologies

Vietnam's approach to emerging energy technologies has moved from conceptual planning into a formalised legislative phase, focusing primarily on new clean energy sources and advanced storage solutions. The 2024 Hydrogen Energy Strategy sets a production target of up to 500,000 tonnes of hydrogen annually by 2030, with a long-term goal of up to 20 million tonnes by 2050 to serve both domestic industrial demand and regional export markets. This is reinforced by the Law on Electricity 2024, which officially categorises green hydrogen and green ammonia within its regulatory scope, prioritises hybrid projects that combine variable renewable electricity generation with fuel production, and offers significant incentives including exemptions and reductions in sea area usage and land use and rental fees, as well as long-term minimum contracted electricity output guarantees.

Equally important is the rapid scaling of energy storage. The Revised PDP8 has elevated the national target for BESS to 10,000–16,300 MW by 2030. To formalise this target, the MOIT has published a tariff framework for renewable power plants integrating BESS, and has recently developed a two-component tariff for standalone, centralised BESS systems, laying the groundwork for BESS integration and development.

DATA CENTRES AND DIGITAL ENERGY DEMAND

Energy Intensity and Policy Support

Vietnam is positioning itself as a regional hub for the digital economy, a strategic shift that is placing unprecedented pressure on national energy infrastructure. Under the Digital Infrastructure Master Plan, the government has set a vision to establish large-scale national data centres (**DCs**) and DC clusters built to green standards and aligned with regional energy planning. In parallel, the government's programme to mobilise private investment in digital infrastructure targets at least 50% of national DC capacity to be provided by green, modern, large-scale, private-sector facilities by 2030, and seeks to attract global technology firms to invest in artificial intelligence and big data DCs.

The rapid growth of artificial intelligence and big data has drastically increased the energy intensity of Vietnam's digital infrastructure, with the expected maximum electricity consumption of DCs in Vietnam reaching up to around 10.3 TWh/year by 2030, representing 1.8% – 2.0% of the total national commercial electricity output estimated under the Revised PDP8. To ensure safe, continuous and stable green power for this sector, the MOIT has issued a specialised Green Energy Development Programme for DCs. A core target of this programme is to facilitate new DCs projects that achieve international green benchmarks, specifically a Power Usage Effectiveness (**PUE**) of 1.4 or lower by 2030. After 2030, the government strives for the national average PUE across all DCs to be below this 1.4 threshold

In addition, the Cybersecurity Law 2025 mandates localisation of Vietnamese user data, reinforcing demand for green, high-capacity local infrastructure. To manage the energy requirements of DCs, policy measures emphasise access to reliable, low-carbon power and grid-integration solutions, including direct procurement pathways for renewables. Furthermore, the new Law on Digital Technology Industry 2025 offers attractive incentives for qualifying investments in artificial intelligence DCs, including a preferential tax rate.

Power Procurement for Data Centres

Ensuring a stable and sustainable power supply is the foremost challenge for DC operators in Vietnam. National and provincial energy plans are increasingly required to account for DC loads and grid interconnection needs. Leading DC facilities are expected to meet high reliability standards such as Uptime Tier 3 or ANSI/TIA 942-B Rated 3 and must

be supported by at least two independent medium-voltage substations.

To meet these technical needs while fulfilling green commitments, policy direction incentivises "self-produced and self-consumed" models (on-site solar or wind generation), combining renewable generation with BESS, alongside strengthened grid connections. Power procurement is further optimised by selecting sites in close proximity to renewable energy sources, as encouraged by national planning guidelines. Procurement pathways have also been liberalised through the DPPA mechanism, which applies to DCs qualifying as large energy consumers.

TRANSPORTATION

Key updates on Vietnam's transition to electric mobility

Vietnam's transition to electric mobility accelerated through 2024–2025 and has now entered a policy-led implementation phase focused on incentives, standards and urban restrictions to curb pollution and support rapid electric vehicle (EV) uptake. The government has waived registration fees for battery electric cars until February 2027 and will apply a 50% fee reduction for the subsequent two years, while also reducing special consumption tax on EVs, materially improving the total cost of ownership for consumers and fleet operators.

Urban centres such as Hanoi have introduced measures which encourage electric vehicle use such as a low-emission zone regime restricting petrol motorbikes by time and area within Ring Road 1 from 1 July 2026, with phased expansion in 2028 and 2030, alongside parallel green-fleet milestones for taxis and commercial two-wheelers. Meanwhile, Ho Chi Minh City has adopted a complementary approach centred on public transport decarbonisation. From 2025, all newly launched urban bus routes in Ho Chi Minh City must use electricity or other green fuels, with a target for 100% of buses to be powered by electric/green energy by 2030.

A central policy priority for 2025–2026 is the harmonisation of standards and regulations for charging infrastructure. The Ministry of Science and Technology has recently issued more than twenty national standards covering charging stations, connectors, and cables, providing a voluntary basis for research and deployment. A compulsory national technical regulation for EV charging equipment is also in the process of finalisation to harmonise safety and fire prevention requirements across stations planned nationwide. Furthermore, the Ministry of Agriculture and Environment is developing a comprehensive roadmap addressing the full life cycle of EV batteries, including disposal and recycling standards. These efforts, combined with high-capacity pilot projects and battery-swapping models for delivery fleets, are essential for reducing millions of tonnes of CO_2 emissions annually by 2030.

CLIMATE CHANGE AND DECARBONISATION

Climate Change Government Policies

Vietnam's climate governance is shaped by both international treaties and domestic regulations. Notably, Vietnam signed and ratified the Paris Agreement on climate change in 2016 and has since been updating and improving its nationally determined contributions (NDCs) and integrated them into national planning and regulatory framework. Vietnam's domestic framework is anchored in the Law on Environmental Protection 2020, which formalises the country's net-zero by 2050 objective and a more ambitious 2030 mitigation trajectory. The specific implementation mechanisms are set out in Decree 06/2022/ND-CP (as amended in 2025 by Decree No. 119/2025/ND-CP), which sets out measurement, reporting and verification (MRV) obligations and establishes a roadmap for a domestic carbon market, including emissions inventories from 2025 for facilities exceeding specified thresholds. In January 2025, the Prime Minister established a roadmap for the development of Vietnam's domestic carbon market, covering both an Emissions Trading Scheme (ETS) and a carbon crediting mechanism. The Hanoi Stock Exchange (HNX) has been designated to operate the carbon exchange, with the Ministry of Agriculture and Environment responsible for registry management and overall governance.

While Vietnam's updated 2022 targets increased ambition towards 2030, further alignment of decarbonisation pathways through sectoral plans and market instruments is planned ahead of full carbon market operation from 2029, with continued development of enabling rules, registries and capacity in 2025–2026. Collectively, these instruments are repositioning climate policy from programme design to centralised implementation through MRV obligations, sectoral decarbonisation planning and market-based compliance tools.

ETS and Carbon Pricing Developments

Vietnam has approved a phased domestic ETS as the centrepiece of its market-based decarbonisation framework. The pilot phase, launched in 2025, initially

targets the most carbon-intensive sectors – thermal power, steel, and cement – covering roughly 150 facilities that represent approximately 50% of the country's total emissions. During the 2025–2028 pilot period, emission allowances are allocated to other sectors and facilities based on sectoral intensity benchmarks. To ensure commercial flexibility, the regulatory framework permits businesses to offset up to 30% of their compliance obligations using certified domestic or international carbon credits generated after 1 January 2021.

Technical infrastructure is rapidly evolving to support an active market by late 2026, with the Hanoi Stock Exchange (HNX) assigned to operate the national carbon trading platform. This platform is operationalised under Decree No. 29/2026/ND-CP, which provides a detailed legal framework regulating the registration, domestic code issuance, transfer of ownership, custody, and settlement of greenhouse gas (GHG) emission quotas and eligible carbon credits. Under the decree, all carbon commodities must be centrally registered on the National Registration System – the real-time online GHG inventory system and national environmental database – managed by the Ministry of Agriculture and Environment before being deposited with the Vietnam Securities Depository and Clearing Corporation (VSDC) for trading. To facilitate a smooth transition during the pilot phase, the VSDC, the Vietnam Stock Exchange, and the HNX are mandated not to charge service fees until 31 December 2028.

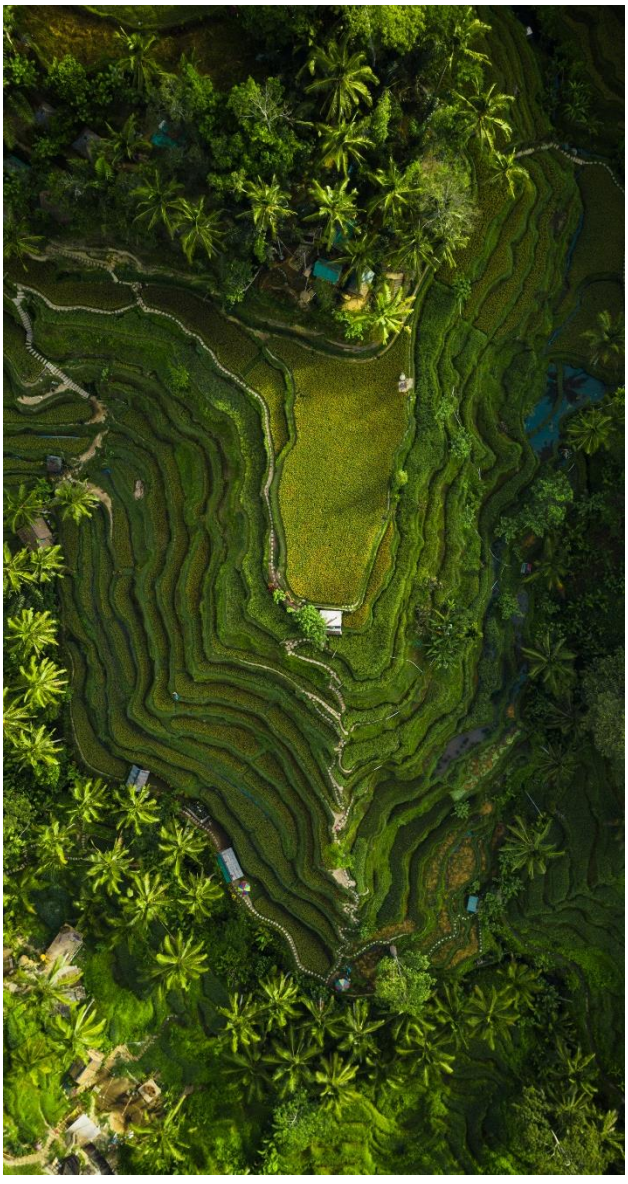
From 2029, the system is expected to transition to mandatory nationwide operation with expanded sectoral coverage and the introduction of allowance auctioning. Vietnam also aims to link its domestic exchange with international markets, prioritising a "quality-oriented" carbon market capable of facilitating high-value internationally transferred mitigation outcomes under the Paris Agreement.

FINAL THOUGHTS, OUTLOOK, AND OPPORTUNITIES

With its commitment to transitioning to clean energy and the high power demand required to fuel its economic growth, Vietnam is making continued efforts to improve its regulatory framework to become more attractive to investors in the power sector. The Revised PDP8 adopted in April 2025 sets out an ambitious framework to align the nation's power infrastructure development with a targeted average GDP growth rate of approximately 10% per year for the 2026–2030 period, requiring a massive scaling of the national power system.

To attract the investment required for this expansion, Vietnam has undertaken a series of reforms to its electricity laws, headlined by the entry into force of the Law on Electricity 2024 in February 2025. Other key reforms include the introduction of DPPAs and the recognition of self-produced and self-consumed power (particularly from rooftop solar installations). Further reforms are expected as the government seeks to improve the investment environment for power projects.

Investors are advised to closely monitor the ongoing regulatory developments in Vietnam's power sector and position themselves to take advantage of emerging investment opportunities as the applicable regulatory frameworks continue to be further developed.



PART IV: THE PHILIPPINES COUNTRY OVERVIEW

Macroeconomic and Socio-Economic Profile

The Philippines' development is shaped by its archipelagic geography of over 7,600 islands, which offers abundant natural and marine resources; it also creates challenges in connectivity and regional balance. Despite these constraints, the country has posted strong and consistent economic performance, recording a 5.4% GDP growth rate in 2024, above the Asian average,[1] placing it among the region's top performers and on track towards upper-middle-income status. This strong performance is further supported by a growing population of 112.7 million in 2024.

Against this backdrop of sustained growth and increasing urbanisation, energy demand has continued to rise as a critical enabler of economic activity and daily life. In 2023,[2] the Philippines' Total Final Energy Consumption (TFEC) reached 36.9 million tonnes of oil equivalent (MTOE), representing a 2.9% increase from 2022. The transport sector accounted for the largest share of TFEC, followed by households and industry. Other sectors, including services and agriculture, also contributed to overall electricity consumption.

To cater to this demand, the Philippines' total installed power generation capacity in 2023 stood at 28,291 MW. Of this, coal, oil, and natural gas collectively accounted for roughly 70%. Renewable energy sources comprised the remaining share, with hydropower as the largest contributor, followed by geothermal, wind, solar, and biomass. Notably, more than half of this supply (53.7%) originated from imported sources, resulting in a relatively low energy self-sufficiency level of 49.4%.

These figures show the Philippines' continued reliance on fossil fuels and imported energy amid rising energy demand, and highlight persistent vulnerabilities to external price shocks and supply disruptions. Additionally, in spite of its exposure to climate change as an archipelagic nation, the country's greenhouse gas (GHG) emissions recorded a significant increase in 2023 from 2022. Electricity generation remained the largest source of emissions, followed by the transport and industrial sectors.

Accordingly, the transition of the Philippine energy sector emerges not only as a means to achieve national resilience and ensure long-term development sustainability, but also as a strategic response to the country's structural vulnerabilities and development aspirations.

The Energy Sector and Key Energy Agencies

The Philippines' energy sector starts with the exploration, development, and extraction of primary energy resources. Traditionally, these activities covered oil, natural gas, coal, and geothermal exploration and development, which are generally subject to foreign ownership restrictions under the Constitution.

Recently, foreign participation in renewable energy sources has been liberalised, following a landmark clarification from the government in 2022 that there is no nationality requirement for businesses engaged in the exploration, development, and utilisation of these resources. As a result, entities with up to 100% foreign ownership can now engage directly in undertakings aimed at harnessing renewable energy, a significant policy shift from the previous rule, which capped foreign participation in such projects at 40%.

Moving downstream, the country's electric power industry is divided into 4 sectors: generation, transmission, distribution, and supply. The generation sector consists of power producers that convert primary energy resources into electricity ("GenCo"). The transmission sector is dominated by the National Transmission Corporation (TransCo), which operates the national grid and ensures power delivery from generators to distribution utilities. The distribution and supply sectors consist of private and public distribution utilities (DUs) and Retail Electricity Suppliers (RES), serving as the interface between the grid and end consumers. Under the amended Public Service Act, transmission and distribution of electricity are considered public utilities. Thus, entities in these sectors are subject to the Filipino nationality requirement.

Under the Electric Power Industry Reform Act (EPIRA), GenCo's have the option to supply power to customers directly, to DUs or RES, or to sell through the Wholesale Electricity Spot Market (WESM). Notably, following the implementation of EPIRA and mechanisms such as the WESM, the distribution and supply sectors have become increasingly competitive.

Key players in the sector include the Department of Energy (DOE), responsible for policy, regulation, and planning; the Energy Regulatory Commission (ERC),

[1] International Monetary Fund, *World Economic Outlook: Global Economy in Flux, Prospects Remain Dim* (International Monetary Fund 2025).

[2] Department of Energy (Philippines), *Key Energy Statistics* 2023.

which sets rates and oversees compliance; and the Philippine Electricity Market Corporation (PEMC), which manages the WESM.

National Energy Mix and Transition Targets

In order to have a guide specifically dedicated to the country's transition to renewable energy, the government launched the **National Renewable Energy Plan (NREP) 2020-2040**, a medium-term plan that sets targets and adopts a revitalised framework and roadmap to further accelerate and mainstream the country's renewable energy development and utilisation. This plan employs a whole-of-nation approach, enjoining all stakeholders to take part in its initiatives.

The NREP sets a minimum target of 35% renewable energy share in the power generation mix by 2030 and aspires to increase it to at least 50% by 2040. This target supports the key national priorities of energy security, sustainable development, climate change mitigation, capability building, and inclusive growth.

To advance this target, the country is currently implementing a suite of policy measures aimed at accelerating renewable energy deployment and enhancing power system flexibility. Central among these is the imposition of a moratorium on the development of new coal power plants starting in November 2020. Under this policy, the construction of greenfield or new coal-fired power projects is effectively prohibited.

From 2010 to 2019, two-thirds of the Philippines' added total installed capacity came from coal. [3] Despite its dominance, coal's inherent inflexibility and sensitivity to volatile demand patterns frequently caused power disruptions across the country. In May 2020 alone, coal-fired power units were responsible for 60% of these outages due to reduced demand during lockdown, as these plants are unable to operate below a minimum stable load.[4]

This policy marks a clear shift in the Philippines' energy strategy. While the policy provides for certain exemptions, applications for the construction of new power plants under these exemptions must include a clear timeline or schedule for the retirement or transition of all coal-fired power plants towards renewable energy. Existing coal plants remain operational, but also under regulated conditions. This emphasis on new renewable capacity and planned coal retirements highlights the country's commitment to a cleaner energy system.

In addition to this measure, the Philippines is implementing a broader set of policies and initiatives designed to strengthen the investment climate, address regulatory and market barriers, and accelerate the transition towards a cleaner and more resilient energy arrangement. These mechanisms are discussed in detail later in the part of this section titled *Renewable Energy Investment Enablers in the Philippines*.

The Fourth Most Attractive Emerging Market for Renewable Energy Investment

Even amid a complex and evolving energy landscape, the Philippines has shown considerable progress in creating an enabling environment for renewable energy development. The country is ranked as the fourth most attractive emerging market and second in the Asia-Pacific region for renewable energy investments, according to the 2025 edition of Bloomberg New Energy Finance (BNEF)'s *Climatescope* report, which provides insight into clean energy progress and attractiveness across 110 emerging markets, which account for four-fifths of the global population, 72% of global emissions, and 41% of the world's gross domestic product.[5]

This is the fourth year in which the Philippines has been recognised as a leading renewable energy destination. From ranking 20th in 2021, the country made a remarkable climb to 4th place in 2023, followed by a further rise to 2nd place in 2024. In this year's rankings, however, the Philippines eased back to 4th place, reflecting evolving market dynamics while still maintaining a strong and competitive international standing.

The report also noted that the country implements policies across all eight tracked categories, achieving a power score of 2.64, which is higher than the average of 2.17 in the Asia-Pacific region. It also highlights that the "Philippines maintains one of the most comprehensive renewable policy frameworks in the region, pairing auctions, net metering and fiscal incentives with rising electricity demand," further observing that the country "already stands out as the only emerging market in Asia Pacific with all major renewable-energy policies in force, including

[3] Department of Energy (Philippines), *Advisory on the Moratorium of Endorsements for Greenfield Coal-Fired Power Projects in Line with Improving the Sustainability of the Philippines' Electric Power Industry* (22 December 2020).

[4] SJ Ahmed, 'Philippines Power Sector Can Reach Resilience by 2021: COVID-19 Reveals Regulatory Weaknesses and the Need for Improved Incentives and Policies' (Institute for Energy Economics and Financial Analysis 2020) <https://ieefa.org/wp-content/uploads/2020/06/Philippines-Power-Sector-Can-Reach-Resilience-by-2021_June-2020.pdf> accessed 5 February 2026.

[5] A Teixeira and others, *Climatescope 2025: Emerging Markets Power Transition Factbook* (BloombergNEF 2025).

auctions, net-metering, fiscal incentives and long-term renewable targets."

Between 2015 and 2024, the Philippines attracted approximately $13 billion in clean energy investments, ranking among the top eight emerging economies for cumulative renewable energy investments during this period. In 2024, the country's clean energy investments reached $3.41 billion, marking an increase of around 57% from $2.17 billion in 2023.[6]

RENEWABLE ENERGY INVESTMENT ENABLERS IN THE PHILIPPINES

This section examines the legal, regulatory, and financial mechanisms that support renewable energy development in the Philippines, highlighting how the government is actively reducing barriers to entry and enhancing project bankability. It discusses the range of fiscal, non-fiscal, and market-based incentives available to investors.

Fiscal incentives

a. The Philippine Sustainable Finance Taxonomy

As demand for sustainable finance increases, market participants have called for greater uniformity and guidance in identifying sustainable investment assets and eligible economic activities. To address this, the Bangko Sentral ng Pilipinas (BSP), issued the **Philippine Sustainable Finance Taxonomy Guidelines (SFTG)** to serve as a tool to classify whether an economic activity is environmentally and socially sustainable and to guide different stakeholders in making informed investment or financing decisions.

Banks are instructed to use the SFTG when extending credit, making investment decisions, or designing sustainable financial products and services, among others. As such, it plays a critical role in strengthening the effectiveness of thematic bonds, such as green and sustainability bonds, as well as green lending, green investment funds, and other sustainable financial products.

By providing clear and standardised criteria for what qualifies as "green" or sustainable, the SFTG ensures that funds raised through these instruments are directed towards activities with genuine positive environmental and social impacts. In turn, this gives investors a clear, standardised framework for identifying which economic activities genuinely qualify as sustainable, improving investment decision-making, allowing for easier comparison across projects and markets, and significantly reducing the risk of greenwashing.

b. Renewable Energy Act

Recognizing the critical role of clean energy in achieving energy security, the Renewable Energy Act provides a comprehensive set of incentives designed to encourage the development and expansion of renewable energy projects in the Philippines, offering various benefits aimed at reducing upfront costs and improving financial viability.

Under this law, renewable energy developers certified by the DOE, in consultation with the Board of Investments (BOI), are entitled to several incentives, including a 7-year income tax holiday (ITH) with possible extensions for additional investments, and duty-free importation of renewable energy machinery, equipment, and materials for up to 10 years, subject to DOE endorsement and conditions on disposal or transfer. They also benefit from special realty tax rates capped at 1.5% of the equipment's net book value, and Net Operating Loss Carry-Over (NOLCO) deductions for losses incurred in the first 3 years, except those resulting from incentives provided.

Following the ITH period, renewable energy developers pay a reduced corporate tax rate of 10%, with mandated passing of savings to consumers through lower power rates. Projects that do not qualify for ITH may instead opt for accelerated depreciation on their tax books. The sale of power generated from renewable energy and fuels is subject to a 0% value-added tax (VAT), and developers also enjoy zero-rated VAT on local goods and services used in their operations. Additional incentives include a cash generation-based incentive for projects serving missionary electrification areas, tax exemptions on carbon credit sales, and a tax credit for purchasing domestic renewable energy equipment and materials to encourage local manufacturing and sustainability.

The foregoing incentives may also be available to a registered renewable developer of hybrid and co-generation systems utilizing both renewable energy sources and conventional energy, but only in proportion to and to the extent of the renewable energy component. Moreover, the tax exemptions and incentives for hybrid and cogeneration systems apply only to the equipment, machinery, and/or devices utilizing renewable energy resources.

[6] Teixeira and others, *Climatescope 2025* (n 5).

c. Strategic Investment Priority Plan

In 2022, the Philippines adopted the Strategic Investment Priority Plan, which classifies industries and activities considered critical to national development, and thus entitled to certain tax incentives. Under this plan, renewable energy development activities are recognised as priority sectors eligible for fiscal incentives under the CREATE Act and the CREATE More Act.

Accordingly, as an alternative to the incentives under the Renewable Energy Act, developers that are domestic market enterprises may opt to claim the benefits under these laws, including an ITH on their registered projects or activities for a period of 4 to 7 years, followed by the Enhanced Deductions Regime (ERD) for up to 10 years. Alternatively, ERD may be applied directly for a maximum period of 14 to 17 years, depending on the project's location and industry priority. Extensions may be granted for up to 5 additional years, subject to certain conditions.

Within the ERD framework, renewable energy developers may claim deductions on several operational expenses, such as depreciation allowances (10% for buildings, 20% for machinery and equipment), labour expense deduction (50%), and research and development expense deduction (100%), as well as Enhanced NOLCO for losses incurred during the first three years, carried over for five consecutive taxable years after the ITH period. Other incentives include duty-free importation of capital equipment, raw materials, spare parts, and administrative goods, as well as VAT exemption on imports and zero-rating on local purchases. Additionally, local government units may impose a maximum local tax of 2% during the ITH and ERD periods, in lieu of other local taxes and fees.

Non-fiscal incentives

To encourage investors to engage in strategic investments such as renewable energy projects, the government has introduced reforms to simplify approval processes.

a. Green Lane Initiative

One key initiative is the **Green Lane initiative**, institutionalised under EO No. 18, series of 2023, which expedites and streamlines the licensing process by designating a "Green Lane" within relevant government offices. These lanes are specifically mandated to receive and process applications for permits and licences for strategic investments, such as renewable energy projects, with clearly defined approval timelines. The Green Lanes are integrated with the **Energy Virtual One-Stop Shop (EVOSS)**, discussed below.

b. Omnibus Guidelines on the Award and Administration of RE Contracts and the Registration of RE Developers

To promote transparent and standardised regulatory processes, the DOE also issued the **Omnibus Guidelines on the Award and Administration of RE Contracts and the Registration of RE Developers** in 2024, which provide the overarching regulatory framework governing the development of renewable energy projects in the Philippines.

These guidelines set out rules and procedures for the qualification of the developers, the award and administration of renewable energy service contracts, and the rights and obligations of stakeholders throughout the project lifecycle. They cover the development of biomass, geothermal, solar, hydropower, ocean, onshore and offshore wind energy resources, as well as other renewable energy resources under new emerging technologies, including own-use projects, where electricity is generated solely to meet all or part of a developer's own energy requirements.

Under this framework, operating contracts for the development of relevant renewable energy resources are granted for a term of 25 years from the date of execution, which includes both the development and commercial stages of the activity. Renewable energy developers are also mandated to post a bond to guarantee the faithful performance of their obligations under the contracts. Notably, developers with existing contracts are allowed to apply for conversion to the new contract templates provided under the guidelines to benefit from the updated incentive arrangements.

c. Energy Virtual One-Stop Shop (EVOSS) Act

Another key component of this reform is the implementation of the **EVOSS Act** for the approval of renewable energy projects. **EVOSS** is a unified online platform where all required applications, approvals, and clearances for energy projects are processed. It was established to streamline and accelerate the permitting and approval processes for energy projects.

Under this law, energy project developers can file and monitor permit applications through the EVOSS system instead of dealing separately with national agencies and local government units. The law also imposes mandatory processing timelines on all relevant authorities, making approvals time-bound and more transparent.

Market incentives

Continued business expansion and rapid population growth saw the Philippines' having an exponential increase in energy consumption. In only two decades, the country's total installed capacity rose from 15,124 MW in 2003 to 29,706 MW in 2024,[7] reflecting the accelerated need for additional energy sources.

In addition to the fiscal and non-fiscal incentives, the government has attempted to create a market structure that is attractive to renewable energy developers. This includes the implementation of the **Feed-In Tariff (FIT) system**, which offers guaranteed payments at a fixed rate per kilowatt-hour for emerging renewable energy sources. Notable features include the use of an auction system and the **Open and Competitive Selection Process (OCSP)** to manage FIT-eligible renewable energy contracts.

In spite of all this, a key finding in a previous study still indicates that the total installed renewable energy capacity as of December 2018 remained behind the target capacity.[8]

a. Renewable Portfolio Standards

To address this deficiency as well as reducing its reliance on imports, the Philippines, by virtue of EPIRA, declared it as a state policy to ensure that energy sources and infrastructure are socially and environmentally responsible, while promoting the use of local energy.

The government introduced the **Renewable Portfolio Standards (RPS)**, a market-based policy that mandates electricity suppliers to source an agreed portion of their energy supply from eligible renewable energy resources, generally local producers. The policy is aimed at contributing to the growth of the domestic renewable energy industry. In support of this policy, the DOE then issued Department Circular Nos. DC2023-05-14 and DC2023-05-15 to prescribe guidelines governing RPS for off-grid and on-grid areas, respectively.

Under this framework, **Mandated Participants** are required to maintain a minimum share of renewable energy in their respective energy procurement and supply portfolios. This minimum requirement is determined annually by the government, and is incrementally increased over time to achieve the optimal energy mix eventually. The Mandated Participants include all DUs, all suppliers of electricity for the contestable market, [9] National Power Corporation-Small Power Utilities Groups (NPC-SPUG),[10] and new private power providers.

For on-grid areas, the annual increase in renewable energy percentage is calculated based on the target of achieving 35% renewable energy share in the country's power mix by 2030 and 50% by 2040. Starting in 2023, the minimum RPS annual percentage increment is increased from 1% to 2.52%. In off-grid areas, on the other hand, the optimal supply mix is determined per missionary area.

To promote cost-effectiveness, on-grid system Mandated Participants are required to source renewable energy for their customers through a competitive selection process. On the other hand, for off-grid Mandated Participants, the offer that will result in a higher net reduction in the Universal Charge-Missionary Electrification [11] requirement in small grids or off-grid areas will be awarded the power supply agreement.

b. Green Energy Auction Programme

To facilitate the procurement of energy from commercial renewable energy projects further, the government also introduced the **Green Energy Auction Programme (GEAP)**. This programme also aims to support the development, and increase access to financing of new projects. Notably, the programme mandates for preferential bias for renewable energy and energy from indigenous sources as well.

The GEAP consists of two components, the **Green Energy Auction (GEA)** and the **Green Energy Tariff (GET)**: The **GEA** is designed to facilitate competitive selection of renewable energy projects, thus promoting cost-efficient bidding. Qualified renewable energy plants will compete to offer renewable energy at the lowest price. The winning bidder, in turn, will execute a renewable energy purchase agreement (REPA) with TransCo, thereby formalizing the delivery of RE to the grid. The **GET**, on the other hand, is the winning bid price from the GEA, which reflects the market value of electricity as determined in a competitive process.

---

[7] Department of Energy (Philippines), *2024 Power Statistics* (5 June 2025) <https://legacy.doe.gov.ph/sites/default/files/pdf/energy_statistics/02_Summary.pdf> accessed 6 January 2026.

[8] Department of Energy (Philippines), *National Renewable Energy Programme (NREP) (2011-2030)* (2011).

[9] As defined in the EPIRA and pursuant to Retail Competition and Open Access (RCOA).

[10] Refers to the functional unit of NPC created to pursue missionary electrification function.

[11] This refers to the portion of the non-bypassable charge passed on and collected from all end-users on a monthly basis by the DUs pursuant to EPIRA, a portion of which is allocated for the provision of integrated power generation and distribution services in unserved areas and underserved not connected to the grid or within a franchise area where the distribution system is not connected to the grid.

It bears stressing that electricity consumers do share in the cost of these market incentives in part through uniform charges (in PhP/kWh), referred to as the **FIT Allowance (FIT-All)** [12] and the **GEA Allowances (GEA-All)** [13], applied directly to all billed kWh. However, to reduce the burden on end-users, the GEAP also introduced an *Opt-in Mechanism*, whereby DUs have the option to buy renewable energy directly from winning bidders of the GEAP to meet their RPS obligations, instead of buying from the grid and incurring the FIT-All and GEA-All charges.

Simulations from the Independent Electricity Market Operator of the Philippines indicate that full implementation of GEA projects could significantly lower electricity prices: in Luzon, from PHP4.95 per kilowatt hour (kWh) in 2026 to PHP0.28/kWh in 2050; in Visayas, from PHP5.28 per kWh in 2026 to PHP0.48/kWh in 2050; and in Mindanao, from PHP4.06 per kWh in 2026 to PHP0.36/kWh in 2050.[14]

To date, four rounds of GEA have been completed. The fourth round awarded a total of 10,195.49 MW for delivery between 2026 and 2029, covering technologies like ground-mounted, roof-mounted, and floating solar, onshore wind, and integrated solar with energy storage systems.[15] At the time of writing, the fifth round is now underway.

c. The Philippine RE Market

To promote flexibility and market-oriented approach in the facilitation of RPS compliance, the government established the Philippine **RE Market (REM)**, which began its full commercial operations on 26 December 2024.[16] The REM is where **RE Certificates (RECs)** are created, traded, and retired.

Under the existing guidelines,[17] (a) all on-grid and off-grid *Mandated Participants* subject to RPS requirements, (b) entities with renewable energy generation facilities registered in the WESM, and (c) entities with renewable energy generation facilities subject to RPS requirements who are operating in off-grid systems, are required to register in the REM. Other eligible power sector stakeholders may also apply for voluntary registration. Participants in the REM may be classified as **REM Generators** or **REM Trading Participants**.

For one megawatt-hour of actual metered electricity generated from renewable energy by a REM Generator, the *RE Registrar* issues one REC to the corresponding REM Trading Participant. For each compliance period, each REM Trading Participant must surrender a pre-determined number of RECs to the registrar to maintain compliance with their RPS requirements. It may also transfer its RECs to another REM Trading Participant or bank the RECs for up to three years from issuance.

Entities able to source their energy requirements from renewable sources are, therefore, incentivised to do so, as they may sell excess RECs to other participants. Conversely, those that avoid investment in renewable energy must purchase RECs from the REM to meet their RPS obligations, thus increasing costs while supporting producers with surplus renewable energy. In this way, the REM, through flexible, market-based trading mechanisms, helps enable cost-efficient compliance while encouraging investment in renewable energy generation.

d. Carbon Credits

Consistent with its commitments in the international community and its self-determined goals of addressing climate change, the Philippines has explored and adopted several approaches to reduce greenhouse gas emissions. To this end, the DOE recently issued guidelines [18] which establish the policy framework for energy sector carbon credits. This aims to provide guidance to energy stakeholders in accessing carbon finance and preparing for future carbon market mechanisms.

Within this policy mechanism and similar to the functions of RECs, the **Carbon Credit Certificate** (CCC) will serve as the DOE-recognised unit, representing 1 $MtCO_2e$ of emission reduction. These can be generated by undertaking mitigation activities that significantly reduce GHG emissions and/or energy consumption, which include voluntary early retirement of coal-fired power plants, renewable

---

[12] Energy Regulatory Commission (Philippines), *Resolution Adopting the Feed-in Tariff Rules*, ERC Resolution No. 16, s 2010, para 2.5 (12 July 2010).

13 Energy Regulatory Commission (Philippines), *Resolution Adopting the Guidelines on the Collection of the Green Energy Auction Allowance (GEA-All) and the Disbursement of the GEA-All Fund*, ERC Resolution No. 06, s 2025 (8 January 2025).

[14] T Srichomphoo, 'Renewable Energy Will Lower Electricity Prices in the Long Run – DOE' *CASE for Southeast Asia* (26 June 2025) <https://caseforsea.org/renewable-energy-will-lower-electricity-prices-in-the-long-run-doe/> accessed 5 February 2026.

[15] SJ Talavera, 'Fourth Round of Green Energy Auction Awards Top 10,159 MW, 96% of Target' *BusinessWorld* (6 November 2025) <https://www.bworldonline.com/economy/2025/11/06/710655/fourth-round-of-green-energy-auction-awards-top-10159-mw-96-of-target/> accessed 5 February 2026.

[16] Department of Energy (Philippines), *Declaration of the Full Commercial Operations of the Renewable Energy Market*, Department Circular No. DC2024-12-0031 (10 December 2024).

[17] Department of Energy (Philippines), *Adopting Amendments to the Renewable Energy Market (REM) Rules*, Department Circular No. DC2022-06-0026 (23 September 2022).

[18] Department of Energy (Philippines), *Providing the General Guidelines for the Generation, Management, and Monitoring of Carbon Credits in the Energy Sector*, Department Circular No. DC2025-09-0018 (23 September 2025).

energy development, fuel switching, hybridisation, or co-firing in power generation, switching to electric vehicles, and biofuels blending.

CCCs generated will be awarded to the entity responsible for the respective activities, and may also be traded or used in offsetting in the domestic or voluntary carbon market. They may even be traded as Internationally Transferred Mitigation Outcomes (ITMOs) in the International Compliance Market under the Paris Agreement, after undergoing authorisation processes for transfer. This framework, currently pending legislative proposals to institutionalise carbon credits trading, will provide a market-based mechanism to reduce GHG emissions.

e. Preferential Dispatch for Renewable Energy

The Wholesale Electricity Spot Market (WESM) was created to make the Philippine electricity market more competitive, efficient, and transparent through the trading of electricity based on supply and demand. Originally, generators were dispatched by cost, often favouring cheaper conventional plants. As a result, clean energy sources were generally overlooked due to their cost as well as intermittent, and often unpredictable, operations, despite their environmental and long-term benefits.

Recognizing the importance of accelerating the clean energy transition, the Renewable Energy Act and the DOE introduced the **"Must Dispatch" and "Priority Dispatch" rules** for qualified intermittent renewable energy generating units. These rules give renewable energy generators preferential treatment in the grid, ensuring their electricity is used whenever it is available, subject to certain conditions. The two are distinguished as follows:

a. "Must Dispatch" is facilitated in the WESM for qualified and registered intermittent or variable renewable-energy-based plants, according to the preference in the dispatch schedule, whenever generation is available. This category includes wind, solar, run-of-river hydro, and ocean energy power plants; and

b. "Priority Dispatch" means giving the option or preference to all qualified and renewable energy plants that are not Must Dispatch, such as biomass, geothermal, and impounding hydro plants, to enjoy preferential dispatch in the WESM.

In 2022, the DOE declared[19] all renewable energy resources as preferential dispatch generating units, assigning them either "Must Dispatch" or "Priority Dispatch" status depending on the resource. Further, system operators are required to ensure the maximum penetration of variable renewable-energy-based power plants or Must Dispatch generating units in the grid. This guaranteed grid access provides investors with greater certainty as well as reducing financial risks.

RELATED INITIATIVES SUPPORTING THE RENEWABLE ENERGY TRANSITION

This section highlights additional policies, programmes, and initiatives that support the Philippines' energy transition beyond conventional renewable energy projects. It covers workforce development through green jobs, the potential role of nuclear power, and net-metering programme.

The Philippine Green Jobs Act: Creating Opportunities in the Clean Economy

As the Philippines presses forward on its efforts towards its transition to a green economy, the promotion of green jobs becomes critical. Thus, the **Philippine Green Jobs Act of 2016** was enacted in order to align the development of human capital with environmental sustainability by fostering employment opportunities that contribute to climate resilience and environmental protection.

Green jobs refer to employment that contributes to preserving or restoring the quality of the environment, be it in the agriculture, industry, or services sector. These include jobs that help protect the ecosystem and biodiversity, reduce energy, materials and water consumption through high efficiency strategies, decarbonise the economy, and minimise or altogether avoid the generation of all forms of waste and pollution.

Under this law, enterprises generating and sustaining green jobs, as certified by the government, may claim certain incentives, such as a special deduction from the taxable income equivalent to 50% of the total expenses for skills training and research development expenses; and tax and duty free importation of capital equipment, provided that the capital equipment is actually, directly, and exclusively used in the promotion of green jobs of the business enterprise.

[19] See DOE Department Circular Nos. DC2022-10-0031 and DC2024-01-0004.

A pioneering approach, this initiative is among the first to institutionalise the labour dimensions in a policy framework on climate change issues.

The National Nuclear Energy Programme: Commercially Operational Nuclear Power Plants by 2032

In response to the 1973 oil crisis, the Philippines began constructing a nuclear power plant in Bataan, approximately 40 miles from Manila. Completed in 1984, the **Bataan Nuclear Power Plant (BNPP)** remains Southeast Asia's only nuclear power plant, though it was never commissioned due to corruption and safety concerns.

Nearly half a century after the construction of this mothballed facility, the country is once again taking concrete steps to incorporate nuclear power into its energy mix. In 2024, the government launched the country's **Nuclear Energy Roadmap**, following the **International Atomic Energy Agency (IAEA)'s Milestones Approach**.[20] This divides the nuclear development programme into three phases: preparatory considerations and feasibility (Phase 1), groundwork for contracting and regulatory frameworks (Phase 2), and implementation, construction and commissioning (Phase 3).

Significant progress has already been made during Phase 1, highlighted by Executive Order No. 164 in 2022, where the government formally committed to the introduction of nuclear power energy into the country's energy supply. Phase 2 activities are underway, including the passage of the Philippine National Nuclear Energy Safety Act in 2025, which established the Philippine Atomic Energy Regulatory Authority (PhilATOM) to oversee nuclear safety and regulation. International cooperation has also been strengthened through agreements with the United States under the 123 Agreement[21] and partnerships with South Korean firms for feasibility studies, including the potential revival of the BNPP.[22]

Looking ahead, Phase 3 is targeted for 2028 to 2033, with commercial operations expected to begin in 2032,[23] starting with at least 1,200 MW of nuclear power on the grid and plans to expand capacity further by 2050.

Empowering Consumers to Become "Prosumers" through the Net-Metering Programme

In recognition of the fact that consumers play a vital role in the country's transition towards a low-carbon economy, the Renewable Energy Act introduced the **Net-Metering Programme**. In essence, this is a scheme that allows electricity end-users to build a renewable energy facility to generate electricity primarily for their own use, and when there is unused electricity generated, to sell it to the grid. Through net metering, consumers are transformed into *"prosumers,"* actively participating in both the production and consumption of electricity.

Under the programme, end-users are allowed to install an on-site renewable energy system not exceeding 100 kW in capacity to generate electricity for their own use. Eligible technologies include wind, biomass, biogas energy systems, run-of-river micro-hydro or such other renewable energy systems capable of being installed within the qualified end-users' premises.

Under the present guidelines,[24] the net amount creditable to the end-users is calculated by subtracting the value of the user's export energy and previous month's credits, if any, from the subtotal amount for total import energy from the grid. If the result is positive, the end-user pays the DU; if negative, the DU credits the amount to the next electric bill.

Credits earned under the net-metering scheme cannot be withdrawn in cash and are maintained solely as virtual credits to offset future electricity bills. As such, participation in the programme should not be regarded as a profit-generating activity, but as a tool to enhance energy sustainability and empower consumers to contribute to the country's clean energy goals.

---

[20] 'DOE Reaffirms 2032 Target for Nuclear Power at Global Energy Forum' *Philippine Information Agency* (6 November 2025) <https://pia.gov.ph/press-release/doe-reaffirms-2032-target-for-nuclear-power-at-global-energy-forum/> accessed 5 February 2026.

[21] AL Gonzales, 'US-PH Civil Nuclear Cooperation Agreement Enters into Force' *Philippine News Agency* (9 July 2024) <https://www.pna.gov.ph/articles/1228553> accessed 5 February 2026.

[22] K Crismundo, 'PH, SoKor to Start Feasibility Study on Bataan Nuke Plant next Year' *Philippine News Agency* (7 October 2024) <https://www.pna.gov.ph/articles/1234940> accessed 5 February 2026.

[23] Department of Energy (Philippines), *Philippine Energy Plan 2023-2050, Volume III* (2025).

[24] Energy Regulatory Commission (Philippines), *Resolution Adopting the Amendments to the Rules Enabling the Net-Metering Programme for Renewable Energy*, ERC Resolution No. 15, s 2025 (27 August 2025).

RISKS, CHALLENGES, AND KEY INSIGHTS TOWARDS A SECURE AND SUSTAINABLE ENERGY FUTURE

Indeed, the Philippines faces a complex landscape in its pursuit of energy transition. While significant gains have been made in promoting renewable energy, there remains a series of risks and challenges that could slow or derail its path towards a clean, reliable, and resilient energy system.

One of the most significant challenges lies in **capital**. Renewable energy technologies require substantial investment, which poses difficulties for a developing economy. Consequently, the government is often unable to lead in renewable energy development, leaving the private sector as the primary driver of growth in this sector. **Regulatory challenges** compound these obstacles. While legislation and official issuances provide a framework for renewable energy development, a highly technical policy area such as energy is often marked by fragmented implementation, overlapping responsibilities among national and local governments, and policy inconsistencies.

Social and environmental considerations constitute additional layers of complexity. Renewable energy projects may encounter community resistance. One notable example is the BNPP, where the nearby communities have shown strong resistance and objection to its operation. Lastly, **geopolitical risks** coupled with the country's reliance on imported fossil fuels expose it to price volatility in the international market and supply disruptions. Uncertainties and geopolitical tensions often undermine international investment.

Notwithstanding these challenges, the Philippines exhibits all the key indicators assessed under the *Climatescope* report, highlighting the country's strong underlying potential for a successful transition.

Looking forward, the country's energy transition is a multidimensional endeavour requiring coordinated action across several areas. A holistic and whole-of-nation approach is vital in addressing the foregoing challenges, with its future depending on *sustained and shared commitment*. Inclusive governance and continuous stakeholder engagement remain pivotal in the nation's journey towards a greener future. By creating the right policies supported by the right investments, the Philippines, despite the obstacles that it may face along the way, can build an energy system that is sustainable and resilient, ensuring that future generations inherit a foundation for long-term prosperity.

PART V: MYANMAR COUNTRY OVERVIEW

Macroeconomic and Socio-Economic Profile

Myanmar's economy remains in a period of recovery, as it navigates a number of significant economic and socio-political challenges. The latest World Bank Myanmar Economic Monitor identifies key policy challenges Myanmar faces include:

- economic issues such as infrastructure shortfalls, particularly in energy supply, and inflation, which the World Bank estimates will remain above 20 per cent in the near term, driven in particular by high prices for non-food items and energy;
- the impact of natural disasters, including the continuing effects of the earthquake that struck Myanmar in March 2025 (which the World Bank estimates affected 16 per cent of households nationwide); and
- political issues, such as ongoing civil conflicts in parts of the country.

A state of emergency was declared in Myanmar on 1 February 2021 under Order No. 1/2021 of the Office of the President of Myanmar (Pro Tem), according to which legislative, executive and judicial powers of the government were transferred to the Commander-in-Chief of the Defence Services. The state of emergency was terminated on 31 July 2025. However, a new state of emergency was subsequently imposed in 63 townships under an ordinance issued on 31 July 2025 and was extended for a further 90 days on 29 January 2026.

Following the lifting of the national state of emergency on 31 July 2025, an election was held in three phases on 28 December 2025, 11 January 2026, and 25 January 2026. Not all seats in the Myanmar legislature were subject to the election due to ongoing civil conflict. The Union Solidarity and Development Party, which previously held power prior to the former National League for Democracy-led government, is reported to have won a majority of the contested seats. The new Government is expected to be sworn in in April at a joint sitting of the two houses of the Pyidaungsu Hluttaw (Parliament).

A particularly significant legal development for businesses in Myanmar (including those in the energy sector) involves foreign exchange measures implemented by the Central Bank of Myanmar (**CBM**). Notably, the CBM issued Notification No. 12/2022 and Directive No. 4/2022 (each dated 3 April 2022) and Directive No. 5/2022 and Directive No. 6/2022 (each dated 5 April 2022), requiring that:

- Myanmar residents (other than Myanmar government entities, certain foreign companies and those expressly exempted by the CBM) deposit earnings, capital income and borrowings and unilateral transfers denominated in foreign currency into an account with a Myanmar bank and convert those amounts into kyats at the CBM reference rate within one business day (the reference rate having been set at 2,100 kyats per US dollar since 5 August 2022);
- foreign currency held by such Myanmar residents be converted into kyats at the above-mentioned reference rate of the CBM; and
- all foreign currency remittances from Myanmar (including loan repayments) are required to obtain prior approval from the Foreign Exchange Supervisory Committee (**FESC**), formed under Order No. 28/2022 of the State Administration Council of Myanmar (**SAC**) on 4 April 2022.

The CBM has continued to amend these requirements since April 2022. Notably, on 30 December 2022, the CBM notified Myanmar banks that the FESC had determined that, for companies with foreign ownership greater than 35 per cent, banks would no longer be required to compulsorily convert foreign currency-denominated amounts held by them into kyats. On 1 January 2026, the CBM issued Notification No. 2/2026, requiring exporters to convert only 15% of their export earnings into kyats (the threshold having previously been reduced from 35% to 25% in August 2024). On 6 December 2023, the CBM also published a letter issued to banks in Myanmar confirming that it would not set exchange rates for online foreign currency trading and that banks were free to conduct foreign exchange transactions at market rates. Businesses operating in Myanmar must remain alert to such regulatory changes and their potential implications.

Targeted sanctions imposed by major Western jurisdictions (such as the USA, the EU, the UK, Canada and Australia) also remain in force in response to the state of emergency declared on 1 February 2021. Those subject to sanctions include senior military and government officials and institutions (including the SAC), state-owned enterprises, and certain private individuals and companies. In the energy sector, Myanma Oil and Gas Enterprise (**MOGE**), responsible for exploration, production and transport of oil and gas, is subject to sanctions imposed by the United States and the European Union.

As a result of these developments, foreign investment into Myanmar has remained subdued and is expected to continue to be subdued in the near term, although the country continues to present long-term potential

for investors. Some foreign investors have chosen to exit Myanmar, in certain cases through sales to new foreign investors or domestic investors seeking to purchase distressed assets at comparatively low valuations.

In addition, it has become increasingly important for all investors, including those in the energy sector, whether remaining in Myanmar, seeking to exit, or considering new investments, to conduct comprehensive due diligence to ensure that their operations in Myanmar are carried out in an ethical and appropriate manner, in compliance with applicable sanctions and Myanmar law.

National Energy Mix and Transition Targets

Myanmar has a relatively high renewable energy component in its electricity generation mix based on data from the International Energy Agency ("**IEA**"). In 2023, hydropower made up 44.2% of total electricity generation. Other major sources were natural gas (47.8%), coal (5.3%) and biofuels (1.3%). However, electricity made up only 9.3% of the total energy consumed in Myanmar. In the overall energy supply mix in Myanmar in 2023 (excluding energy which is exported or stored), IEA data indicates that biofuels and waste accounted for 49%, oil and oil products for 27.7%, natural gas for 14.53%, coal and coal products for 4.3%, hydropower for 3.6% and other renewables for 0.06%.

In July 2021, Myanmar submitted its Nationally Determined Contributions (**NDC**) under the Paris Agreement. Under these commitments, Myanmar's unconditionally targeted energy mix (to be achieved using the government's own budgetary resources) provides for renewable energy to make up 39% of national energy demand (of which 28% would be from hydropower), natural gas and LNG to make up 33%, and coal to account for 20%, with the balance supplied through interconnection. Its conditionally targeted energy mix (dependent on international support) provides for renewable energy to account for 48% of national energy demand (of which 31% would be from hydropower), natural gas and LNG to account for 33%, and coal to account for 11%, with the balance supplied through interconnection.

Myanmar's energy transition policies and targets may be further developed in the future.

Institutional Structure and Key Energy Agencies

The Myanmar Investment Commission (**MIC**), which administers the law governing foreign investment in Myanmar (the Myanmar Investment Law (Law No. 40/2016) (**MIL**)), the Directorate of Investment and Company Administration (**DICA**), which provides secretariat services to the MIC and administers the laws governing Myanmar's companies and insolvency (the Myanmar Companies Law (Law No. 29/2017) (**MCL**) and Insolvency Law (Law No. 1/2020) (**IL**)) and the Ministry of Natural Resources and Environmental Conservation (**MONREC**), which administers Myanmar's environmental laws, are relevant to all projects in Myanmar, including energy sector investments.

In addition, the CBM, established under the Central Bank of Myanmar Law (Law No 16/2013), responsible for administering foreign exchange regulations in Myanmar, is likely to be relevant to transactions in Myanmar.

In the energy sector, the Ministry of Electric Power (**MOEP**) is responsible for power projects and electricity transmission, while the Ministry of Energy (**MOE**) regulates the upstream and downstream oil and gas sector and petrochemicals. Agencies under the MOE include MOGE, the Oil and Gas Planning Department (**OGP**) responsible for policy and Myanma Petrochemical Enterprise (**MEPE**), responsible for refining and manufacturing LPG.

Certain matters may also fall within the purview of regional governments and city development committees such as the Yangon City Development Committee, for example waste and wastewater management.

Integration with ASEAN and Regional Energy Policies

As an ASEAN member, Myanmar aligns to the ASEAN Plan of Action for Energy Cooperation (APAEC), although recent progress on energy matters between Myanmar and its neighbours has been slow.

Myanmar is a party to the ASEAN Comprehensive Investment Agreement, which provides investment protection to investors from ASEAN member states, and it also provided such protections to foreign investors under the MIL.

POLICY AND REGULATORY FRAMEWORK, AND MARKET OUTLOOK

Regulatory Environment and Legal Reforms

Power projects

The World Bank Myanmar Economic Monitor notes that Myanmar continues to face significant power supply constraints, with its survey data indicating that 64% of firms experienced power outages and that businesses are increasingly relying on off-grid solutions (with 32% relying on solar power and 47%

on diesel generators). In particular, off-grid solutions have been adopted in industrial parks and special economic zones, with a focus on solar rooftop solutions.

The key laws applicable to power projects in Myanmar are the MIL, the Electricity Law (Law No. 44/2014) and the Environmental Conservation Law (Law No. 9/2012) (**ECL**) and the Environmental Impact Assessment Procedure set out in Notification No. 616/2015 issued by the then Ministry of Environmental Conservation and Forestry on dated 29 December 2015 (**EIAP**). Renewable energy projects are treated in the same manner as fossil fuel-based energy projects under the above laws.

Additional legislation may also be applicable to power projects in Myanmar. For example, projects located in a special economic zone will be subject to the Myanmar Special Economic Zone Law (Law No. 1/2014).

Foreign investment regulations

Generally, a permit will be required under the MIL from the MIC for foreign and local investments that are strategically important, capital-intensive, have a large potential impact on the environment or local community, or involve the use of state-owned land, and other designated investments. Power projects are likely to fall within these categories.

In addition, foreign investors require a permit or endorsement from the MIC in order to enter into a long-term lease of land for power projects. This is because the 1987 Transfer of Immovable Property Restriction Law (**TIPRL**) prohibits the transfer of immovable property to, or its acquisition or lease for more than one year by, "foreign-owned companies" (defined as companies that are not 50 per cent or more owned or controlled by Myanmar citizens). Notwithstanding this definition, government practice has been to interpret the term more narrowly by reference to the former 1914 Myanmar Companies Act, which defined a foreign company as a company with any foreign shareholding. While the MCL defines a foreign company as one with foreign ownership above 35 per cent, views differ regarding the extent to which the MCL has altered the operation of the TIPRL, particularly in practice. A foreign company holding a permit or endorsement from the MIC under the MIL may however obtain a land rights authorisation to lease immovable property for an initial term of up to fifty years (with two extensions of ten years each) depending on the size of the project.

On 30 March 2017, the MIC issued the Myanmar Investment Rules (Notification No. 35/2017), which set out the process for obtaining approval under the MIL.

In addition to the requirements under the MIL, Notification No. 15/2017 titled the List of Restricted Investment Activities (**Negative List**), issued by the MIC on 10 April 2017 pursuant to Section 42 of the MIL, lists the types of investments that are closed to all private sector investment, closed to foreign investment, may only be undertaken through a joint venture with a Myanmar company (in which the Myanmar company holds at least a 20 per cent shareholding), or require approval from a relevant Myanmar government ministry. Under this Notification, large-scale electrical businesses (generating more than 30 MW) and electricity generation works connected to the power system require the approval of the Ministry of Electricity and Energy (the former name of the ministry before it was divided into the MOE and the MOEP). The criteria for these approvals were updated by the MIC on 9 April 2018 but should be confirmed in the context of the approval required under the Electricity Law, described below. For other power businesses, advice should be sought on applicable foreign investment restrictions at the time of investment.

Electricity Law

The Electricity Law regulates power businesses, defined as any business relating to the exploration, construction, generation, transmission, distribution, utilisation, trading, exchange or control of electric power systems, as well as the testing of electricity and inspection of electrical businesses.

Section 11 of the Electricity Law requires those interested in undertaking an electrical business to obtain the relevant permit. The applicable permitting authority depends on the size of the power project. Under Chapter 6 of the Electricity Rules set out in Notification No. 198/2015 dated 27 October 2015, the MOEP is responsible for administering large-scale electric power businesses (defined in Section 2(z) of the Electricity Law as those generating more than 30 MW of power) and those connected to the national grid, while state and regional governments administer small- and medium-scale power businesses that are not connected to the national grid.

Environmental regulations

The ECL requires certain businesses, workplaces, factories and workshops to obtain a permit from the MONREC prior to commencing operations. The MONREC issued the EIAP under Section 42(b) of the ECL to prescribe the applicable Environmental Impact Assessment Procedures. The EIAP sets out the circumstances in which prior approval is required and the process for obtaining such approval through the conduct of an environmental impact assessment. Such approval is typically likely to be required for project-financed power projects.

We note that an environmental impact assessment may not be required for certain types of energy projects. Under Annex 1 to the EIAP, only an initial environmental examination (the lowest form of environmental impact assessment) is required for, among others, solar and waste projects with a generating capacity of 50 megawatts or more, and wind, natural gas or biogas, geothermal, integrated energy and other thermal power projects with a generating capacity of 5 to 50 megawatts.

OIL & GAS

Oil production has taken place in Myanmar for more than 1,000 years, with the first export recorded in 1854. In recent years, Myanmar's oil and gas sector has been marked by several high-profile exits by foreign investors, including Total, Chevron and Woodside. However, in June 2025, Myanmar signed an offshore PSC with Thailand's Gulf Petroleum Myanmar Company for Block M-10.

Relevant legislation in the oil and gas sector includes colonial-era statutes as well as modern legislation. However, in practice, investors generally enter into production sharing contracts (**PSCs**), performance compensation contracts, improvement of marginal recovery agreements, and reactivation agreements. The terms and conditions of these contracts govern the relevant activities, provided that they are not inconsistent with applicable law.

Key legislation of affecting this sector includes the foreign investment restrictions under the MIL and the environmental regulations under the ECL, as described above.

Under the Negative List, approval from the Ministry of Electricity and Energy (the former name of the ministry before it was divided into the MOE and MOEP) is required for a number of oil and gas activities, i.e,:

- constructing and installing offshore platforms, and importing, producing, constructing and installing related facilities;
- importing, exporting, transporting, storing, distributing and selling oil, gas and petroleum products, and constructing and operating related facilities;
- constructing refineries (or maintaining and upgrading existing refineries);
- exploring for and interpreting oil and gas by geological and geochemical methods, and importing, producing, constructing and installing related facilities;
- exploiting, producing, and testing oil and gas; transporting oil and gas through and constructing pipeline networks, and importing, producing, constructing and installing related facilities.

The criteria for these approvals were updated by the MIC on 9 April 2018 but should be confirmed with MOGE in each case.

In relation to environmental regulation, in 2019 the MONREC issued the Environmental Impact Assessment (EIA) Guidelines – Onshore and Offshore Oil and Gas Developments 2019, which regulate the preparation and submission of initial environmental examinations, environmental impact assessments, and environmental management plans, as required under the ECL. These Guidelines were developed to provide guidance to project proponents on conducting environmental impact assessments and initial environmental examinations for upstream offshore and onshore oil and gas projects. The Guidelines also assist the MONREC in reviewing these documents.

Another key piece of legislation is the State-Owned Economic Enterprises Law (under which MOGE is assigned responsibility for the exploration and production sector under PSCs with private companies).

A number of labour laws also apply in this sector. In particular, on 15 March 2019, Myanmar enacted a new Occupational Safety and Health Law (Law No. 8/2019), which applies to oil and gas, ports, communication, transport and other businesses under Section 4 of that law. However, this law has not yet been fully implemented.

In response to the exit of foreign investors involved in oil and gas production, the MOE issued Order No. 102/2024 on 28 October 2024 setting out guidelines for decommissioning such operations. Prior to this, there had been no specific laws or regulations governing abandonment and decommissioning. This Order seeks to bring decommissioning practice in Myanmar in line with regional standards, although its practical operation remains at an early stage of development.

Investment Incentives and Market Access

Under the MIL, the MIC has discretion to grant corporate income tax exemptions for periods of three, five or seven years to investments in promoted sectors, depending on the designation of the investment location under Notification No. 10/2017 issued by the MIC on 22 February 2017. The promoted sectors are set out in Notification No. 13/2017 (Classification of Promoted Sectors), issued by the MIC on 1 April 2017, and include, in particular, power projects. Investors may obtain these

exemptions by applying for an MIC permit or endorsement and submitting an application for tax incentives.

Under Section 77 of the MIL, the MIC is also authorised to grant exemptions from customs duties and other taxes on the importation of construction materials for projects for which a permit has been granted by the MIC.

In addition to the above, Myanmar has from time to time provided ad hoc incentives to encourage power production in order to meet its energy security requirements. For example, in April 2023 the Ministry of Planning and Finance issued Notification No. 30/2023 exempting customs duties on imports of certain equipment for solar power generation.

On 15 February 2023, the MIC issued Notification No. 1/2023 declaring a number of activities relating to the installation and manufacture of electric vehicles and related activities to be promoted activities for which companies may apply to the MIC for customs and other tax relief on imported machinery, equipment, instruments, machinery components, spare parts and construction material under Section 77(a) of the MIL and income tax exemptions under Section 75(c) of the MIL. The activities relating to the installation and manufacture of electric vehicles listed in this Notification include natural gas and biogas electricity generation and distribution, electricity generation and distribution from waste, combined energy (gas and heat energy) electricity generation and distribution and solar and wind energy electricity generation and distribution.

Recent Policy Highlights

A key recent policy development is the implementation of the IL, which generally entered into force on 25 March 2020. The IL was fully implemented following the issuance by the Insolvency Practitioners Regulatory Council ("**IPRC**") of Insolvency Practitioner Certificates ("**IP Certificates**") to 14 public accountants or CPAs and six advocates of the Supreme Court on 30 October 2025, registering them as insolvency practitioners under the IL.

Among those issued with an IP Certificate is Daw Khin Cho Kyi, Senior Myanmar Legal Adviser of Myanmar Legal Mori Hamada Limited. As a result, our firm is able to assist Myanmar businesses in undertaking a winding up under the IL. In January of 2026, a second group of IP Certificates were issued, bringing the total number of certified insolvency practitioners in Myanmar to 85.

Prior to this, notwithstanding the entry into force of the IL on 25 March 2020, its practical implementation had remained pending because certification of insolvency practitioners is required in order to undertake procedures under the IL that mandate the appointment of an insolvency practitioner (such as the appointment of a liquidator). As a result, a liquidation in accordance with the IL has not been available to Myanmar businesses until recently. Instead, those seeking to wind up their Myanmar businesses, including foreign investors seeking to exit investments in Myanmar, had resorted to alternative mechanisms such as selling their shares to a third party or suspending operations pending implementation of the IL. DICA, which administers the IL, had also in the past permitted certain liquidations to be undertaken other than by registered insolvency practitioners, although the legal effect of this practice remains unclear. With the full implementation of the IL through the issuance of IP Certificates, Myanmar companies can now undertake a winding up in accordance with the IL.

DATA CENTRES AND DIGITAL ENERGY DEMAND

There has been considerable optimism in recent years regarding investment in data centres in Myanmar, driven by increased mobile phone coverage. In 2017, the Myanmar Government formed a Data Economy Development Committee to support development of a digital master plan. The draft Myanmar e-Governance Master Plan 2030, published in December 2024, notes that some Myanmar ministries have developed their own data centres, but clear standards for the construction of data centres will be necessary going forward.

In terms of energy demand, as noted above, investors in data centres must ensure access to alternative power sources in addition to the national grid.

CLIMATE CHANGE AND DECARBONISATION

Myanmar formulated and adopted the Myanmar Climate Change Policy ("**MCCP**") in 2019 to provide a roadmap for addressing climate change risks. The long-term goal set out in this policy is for Myanmar to have 'achieved climate resilience and pursued a low-carbon growth pathway to support inclusive and sustainable development' by 2030. In parallel, Myanmar adopted the Myanmar Climate Change Strategy (2018-2030) to implement the MCCP.

Implementation of the MCCP has, however, been impacted by Myanmar's recent circumstances.

Myanmar's climate change policies and targets may be further developed in the future.

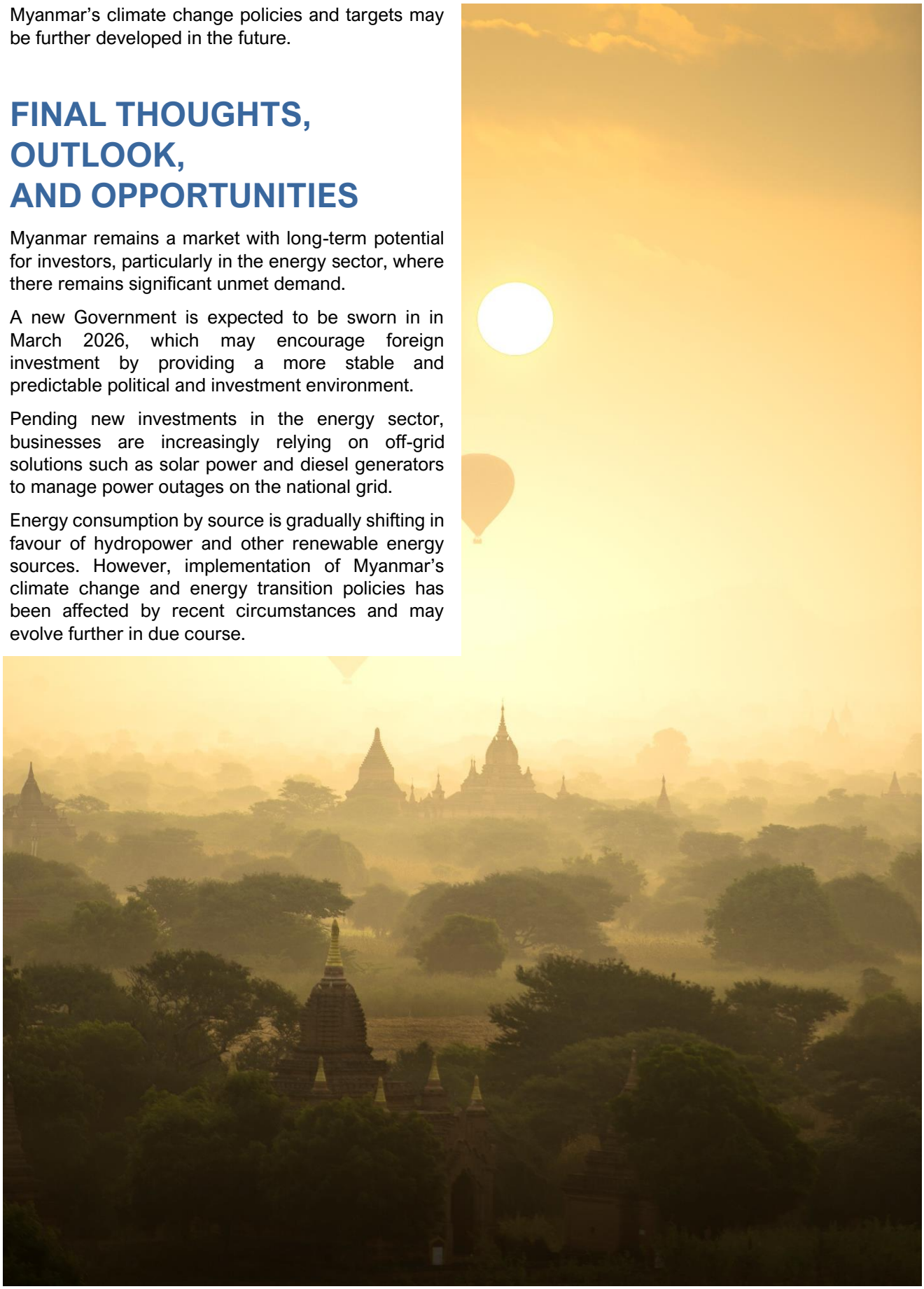
FINAL THOUGHTS, OUTLOOK, AND OPPORTUNITIES

Myanmar remains a market with long-term potential for investors, particularly in the energy sector, where there remains significant unmet demand.

A new Government is expected to be sworn in in March 2026, which may encourage foreign investment by providing a more stable and predictable political and investment environment.

Pending new investments in the energy sector, businesses are increasingly relying on off-grid solutions such as solar power and diesel generators to manage power outages on the national grid.

Energy consumption by source is gradually shifting in favour of hydropower and other renewable energy sources. However, implementation of Myanmar's climate change and energy transition policies has been affected by recent circumstances and may evolve further in due course.



PART VI: SINGAPORE COUNTRY OVERVIEW

Macroeconomic and Socio-Economic Profile

Singapore's role as a regional trade, finance and energy hub

Singapore occupies a strategic position in the global economy as a leading hub for trade, finance, and energy in Asia, underpinned by its geographic advantage, world-class physical and digital infrastructure, political stability, and open, pro-business policies. Located along major global shipping and aviation routes and within a seven-hour flight radius of key Asian economic centres, including Tokyo, Seoul, New Delhi, Bangalore, Jakarta, and Shanghai, Singapore serves as a critical gateway connecting Asia, Europe, and the Middle East. It is a preferred base for multinational corporations, traders, and financial institutions.

As a global trade and maritime hub, Singapore is the world's largest transshipment centre, facilitating the consolidation and redistribution of goods across international supply chains. In 2024, the port of Singapore handled approximately 41.12 million TEUs, with around 90% of container throughput comprising transshipment cargo. This physical connectivity is reinforced by an extensive network of 28 Free Trade Agreements (FTAs) and 98 Avoidance of Double Taxation Agreements (DTAs), complemented by Free Trade Zones (FTZs) and import GST suspension schemes that facilitate efficient entrepôt trade and cross-border flows of goods.[1]

Singapore is also a leading international financial centre and one of the world's largest foreign exchange trading hubs, accounting for approximately 11.8% of global FX turnover in 2025. Its deep banking markets, sophisticated capital markets infrastructure, and growing leadership in green and sustainable finance further reinforce its role as a financial gateway to Asia.

As for energy, Singapore functions as a regional trading and refining hub, supported by extensive storage, refining, and trading infrastructure. In 2024, Singapore exported approximately 78,031 kilotonnes of oil equivalent (Ktoe) of fuel and energy products, underscoring its continued importance in regional energy flows.[2]

Macroeconomic outlook

Singapore's near-term macroeconomic outlook remains resilient, supported by stronger-than-expected growth momentum in 2025. While growth is projected to moderate towards its longer-term trend in 2026 amid evolving external conditions, the overall trajectory remains positive. According to the *Economic Survey of Singapore 2025*, the economy expanded by 5.0% in 2025, following growth of 5.3% in 2024 and exceeding earlier projections. The growth forecast for 2026 has since been revised upwards to 2–4%.[3]

The 2025 expansion was driven primarily by robust manufacturing performance. The sector grew by 18.8% year-on-year in Q4 2025, accelerating from 5.3% in the preceding quarter. This was supported by strong output across the biomedical manufacturing, transport engineering, and electronics clusters, including sustained global demand for AI related semiconductors and server products.

Looking ahead, continued investment in advanced manufacturing, electronics, AI infrastructure, and data centres is expected to support electricity and fuel demand over the medium term, even as overall economic growth moderates. These energy-intensive activities underscore the importance of Singapore maintaining a reliable and resilient energy system.

Over the longer term, rising industrial activity and domestic consumption are expected to place increasing demands on energy-intensive utilities. National peak power demand is projected to grow at a compound annual growth rate (CAGR) of 2.4–4.8% (equivalent to an additional 2.0–4.3 GW) between 2025 and 2034.[4] In parallel, national water demand is projected to nearly double by 2065, driven by continued economic expansion and population growth.

Structural energy constraints

Singapore's energy policy is fundamentally shaped by structural constraints arising from its physical geography, lack of natural energy resources, and highly urbanised development profile. As a city-state with no domestic fossil fuel reserves, Singapore relies almost entirely on imported energy to meet its electricity, industrial, and transport needs, creating

[1] Singapore Economic Development Board, *Global Connectivity and Future-Ready Infrastructure* <https://www.edb.gov.sg/en/why-singapore/singapore-connectivity-and-infrastructure.html> accessed 20 February 2026.

[2] Singapore Department of Statistics, *Exports of Energy Products, Annual* (2 December 2025) <https://data.gov.sg/datasets/d_18e5594b38f9fd6109253ff11a786752/view> accessed 20 February 2026.

[3] A Cheng and TM Lee, *Economic Survey of Singapore 2025* (Ministry of Trade and Industry Singapore 2026).

[4] Energy Market Authority, *Electricity Demand and Supply Outlook (2025)* (2025).

exposure to external supply disruptions, price volatility, and geopolitical risk.

The power system remains dominated by natural gas, which accounted for 94% of the fuel mix in 2024, with supply historically concentrated in pipeline imports from Malaysia and Indonesia. To diversify supply and enhance energy security, Singapore has expanded its liquefied natural gas (LNG) capabilities since the commencement of commercial operations at the Jurong Island LNG terminal in 2013, enabling access to a wider range of global suppliers. However, LNG procurement also exposes the city-state's economy more directly to international gas market volatility and the broader macroeconomic sensitivity that can arise when global energy prices rise sharply.

These import-related risks are compounded by severe land and resource scarcity, which constrains the deployment of domestic renewable energy at scale. With a land area of approximately 746 km² and a population of 6.11 million as at June 2025, Singapore must carefully balance competing land uses, limiting the feasibility of land-intensive renewables such as onshore wind and utility-scale solar. As a result, the country's energy transition strategy places greater emphasis on high-density solutions, including rooftop and floating solar, energy efficiency, and non-land-intensive low-carbon alternatives, reinforcing the need for a diversified, resilient, and regionally integrated energy system.

National Energy Mix and Transition Targets

Overview of current energy mix

Singapore's energy system is underpinned by infrastructure and market governance frameworks designed to prioritise energy security, reliability, and cost competitiveness. These structural features significantly shape both its energy security strategy and long-term decarbonisation pathway.

The current energy mix is characterised by a high dependence on imported fossil fuels, particularly natural gas, and limited domestic renewable resources due to geographic constraints. In 2024, natural gas accounted for approximately 94% of the fuel mix, making it the dominant source of power generation. Other energy products such as municipal waste, biomass, and imports accounted for 2.7%, solar photovoltaic (PV) accounted for 2.1%, while coal and petroleum products made up the remaining balance. [5] This structure reflects Singapore's strategic transition away from oil-fired generation in earlier decades towards lower-emission natural gas, which produces lower carbon emissions per unit of electricity compared to other fossil fuels. Supporting this trend, the country's natural gas supply is largely imported, with liquefied natural gas (LNG) imports rising in recent years, while pipeline imports from Malaysia and Indonesia continue to play a critical role in meeting domestic demand.

Singapore has ambitions to expand both domestic low-carbon generation and imports of clean electricity as part of its long-term energy transition strategy. However, the country's renewable energy sector remains modest compared to its overall generation, with solar energy considered the most viable and widely deployed domestic renewable option. As of Q2 2025, grid-connected solar PV capacity reached approximately 1.7754 GWp, contributing around 2.5% of total electricity generation. [6] While deployment has progressed steadily, expansion potential remains constrained by land availability, and policy assessments indicate that even under maximum feasible deployment scenarios, solar energy is expected to meet no more than around 10% of projected electricity demand by 2050.

Regional electricity imports currently account for only a small share of Singapore's total electricity supply. Nevertheless, cross-border power imports form a key pillar of the city-state's future decarbonisation strategy. Singapore aims to import approximately 6 GW of low-carbon electricity from the region by 2035, which is expected to meet around one-third of national electricity demand, subject to the successful development of regional generation projects and cross-border transmission infrastructure.

Meanwhile, Singapore is exploring a number of longer-term low-carbon energy options to diversify its future energy mix and enhance system resilience, including:

- **Geothermal energy**: Singapore is assessing the potential for deep geothermal energy as a means of diversifying its limited domestic renewable energy options, with studies currently ongoing.
- **Hydrogen**: In October 2022, Singapore announced its National Hydrogen Strategy, which positions hydrogen as a potential low-carbon energy carrier to support decarbonisation across power generation, industry, and maritime transport over the longer term. Subject to technological advancements, cost competitiveness, and the availability of alternative

[5] Energy Market Authority, *Singapore Energy Statistics 2025 (Chapter 2: Energy Transformation)* (24 October 2025) <https://www.ema.gov.sg/resources/singapore-energy-statistics/chapter2> accessed 23 February 2026.

[6] Energy Market Authority, *Singapore Energy Statistics 2025 (Chapter 2: Energy Transformation)* (n 5).

energy pathways, hydrogen could supply up to 50% of the country's power needs by 2050.

With effect from 2024, all new Combined Cycle Gas Turbines (gas-powered power plants) are required to be at least 30% hydrogen-ready, with the capability to be retrofitted for operation on 100% hydrogen in the future. [7] Several such hydrogen-compatible plants have already commenced operations, with additional capacity scheduled to come online in the coming years.

- **Nuclear energy**: While no policy decision has been made to deploy nuclear energy, Singapore is building institutional, regulatory, and technical capabilities to study the feasibility and safety of potential nuclear technologies as part of its long-term energy planning. It has also initiated cooperation with the United States and France, and is exploring similar collaborative arrangements with other partners, including South Korea.

National climate and energy targets

Singapore's national climate and energy targets are anchored in a whole-of-government approach that seeks to balance decarbonisation ambitions with energy security, economic competitiveness, and climate resilience.

The Singapore Green Plan 2030

Launched in February 2021, the Singapore Green Plan 2030 is the country's overarching sustainability blueprint and is jointly spearheaded by the Ministry of Sustainability and the Environment (MSE), Ministry of Trade and Industry (MTI), Ministry of Transport (MOT), Ministry of National Development (MND) and Ministry of Education (MOE). The plan adopts a long-term perspective to 2030 and beyond, structured around five mutually reinforcing pillars:

- Pillar 1: City in Nature – focuses on integrating nature into Singapore's urban environment to enhance liveability, biodiversity, and climate resilience.

  Key targets include the development of over 130 hectares of new parks and the enhancement of 170 hectares of existing parks with more natural landscapes by 2026, alongside the planting of one million additional trees by 2030. These efforts are expected to increase nature park land area by more than 50% from 2020 levels and ensure that every household is within a 10-minute walk of a park. Looking further ahead, Singapore aims to add 1,000 hectares of green spaces by 2035.

- Pillar 2: Energy Reset – this pillar lies at the core of Singapore's climate and energy transition, focusing on cleaner energy, energy efficiency, and resilient infrastructure.

  The city-state met its 2025 target of deploying at least 1.5 GWp of solar energy capacity and 200 MWh of energy storage systems ahead of schedule, and is racing to increase solar energy deployment to at least 3 GWp by 2030. [8] That would meet approximately 3% of the nation's projected electricity demand and power up to 350,000 households, making Singapore one of the most solar-dense cities globally.

  Energy efficiency in the built environment is another major focus. By 2030, Singapore aims to green 80% of buildings (by gross floor area), require 80% of new buildings to be Super Low Energy buildings, and achieve up to 80% improvement in energy efficiency for best-in-class green buildings compared to 2005 levels. District-level initiatives, such as reducing energy consumption in existing HDB towns by 15%, support these building-level goals.

  Decarbonising transport is a core element of the Energy Reset pillar. Singapore's long-term objective is for all vehicles to operate on cleaner energy by 2040, supported by policies to encourage public transport use and accelerate the shift to cleaner-energy vehicles. New diesel car and taxi registrations are planned to cease from 2025, and all new car and taxi registrations must be of cleaner-energy models from 2030. To enable this transition, Singapore aims to deploy 60,000 electric vehicle charging points by 2030, with all HDB towns set to be EV-ready by 2025, alongside expanded fast-charging infrastructure for commercial fleets.

  At the same time, the country is advancing cleaner-energy initiatives in the aviation and maritime sectors, including targets under the Sustainable Air Hub Blueprint to achieve net-zero aviation emissions by 2050 and reduce domestic aviation emissions from airport operations by 20% by 2030 (from 2019 levels). As announced in the Budget 2026, the Government is also

[7] Ministry of Trade and Industry Singapore, *Hydrogen* (22 October 2025) <https://www.mti.gov.sg/energy-and-carbon/energy-supply/low-carbon-alternatives/hydrogen/> accessed 23 February 2026.

[8] E Tan, 'Budget 2026: Singapore Raises Solar Deployment Target to 3 GWp by 2030' *The Business Times* (12 February 2026) <https://www.businesstimes.com.sg/singapore/budget-2026-singapore-raises-solar-deployment-target-3-gwp-2030> accessed 23 February 2026.

supporting demand for sustainable aviation fuel (SAF), with a target of 1% SAF usage for flights departing Singapore this year. Efforts are likewise underway to green the maritime sector in line with the Maritime Singapore Decarbonisation Blueprint, [9] including the progressive electrification of harbour craft, the transition of port operations towards cleaner energy, and the development of Singapore as a leading multi-fuel bunkering hub for low and zero-carbon marine fuels. In this context, Singapore is partnering with industry to develop a low-carbon ammonia bunkering solution on Jurong Island. If successful, Singapore would be among the first countries globally to supply ammonia commercially as a fuel for international shipping.

Large-scale infrastructure projects also underpin the Energy Reset pillar. The Tuas Nexus, jointly developed by the National Environment Agency (NEA) and Public Utilities Board (PUB), integrates the Integrated Waste Management Facility with the Tuas Water Reclamation Plant, making it Singapore's first energy self-sufficient integrated waste and used-water treatment facility. Advanced technologies deployed at Tuas Nexus are designed to maximise energy recovery while treating both domestic and industrial used water efficiently.

- Pillar 3: Green Economy – this pillar positions sustainability as a driver of economic growth and competitiveness. Targeted incentives include the Resource Efficiency Grant for Emissions (REG(E)), administered by the Economic Development Board (EDB), which co-funds up to 50% of qualifying costs for emissions-reduction projects in manufacturing facilities and data centres. Complementing this is the Energy Efficiency Grant administered by NEA, which supports early adoption of energy-efficient technologies by co-funding up to 30% of qualifying costs until March 2027.

  Singapore is also investing heavily in innovation through the Research, Innovation and Enterprise 2030 (RIE2030) Plan, led by the National Research Foundation under the Prime Minister's Office, with S$37 billion committed from April 2026 to strengthen research capabilities and support sustainability-driven growth. Meanwhile, Enterprise Singapore (ESG) has launched the Enterprise Sustainability Programme to help local businesses build sustainability capabilities and seize opportunities in the green economy, through support for training, capability development, sustainability-driven innovation, and key enablers such as certification, advisory services, and access to green financing.

- Pillar 4: Resilient Future – this pillar seeks to strengthen Singapore's capacity to adapt to climate risks, including sea-level rise, extreme weather, supply disruptions, and rising urban heat. As a low-lying city-state, Singapore is prioritising coastal and flood resilience through the development of a Coastal–Inland Flood Model, site-specific coastal protection studies in vulnerable areas, and the evaluation of engineering and nature-based solutions such as sea walls, bunds, revetments, and mangroves. Complementing physical adaptation measures, the pillar also enhances system resilience and liveability by improving food security under the "Grow Local" strategy and mitigating the urban heat island effect through increased greenery, cool materials, climate sensor networks, and research initiatives such as Cooling Singapore 2.0.

- Pillar 5: Sustainable Living – this pillar seeks to embed low-carbon and resource-efficient practices into everyday life, supporting Singapore's transition towards a circular economy with a high rate of recycling and lower emissions profile.

  Key objectives include reducing waste sent to landfill per capita by 30% by 2030, lowering household water consumption to 130 litres per capita per day by 2030, and strengthening recycling and resource circularity through measures such as extended producer responsibility for e-waste and beverage container return schemes. Sustainable mobility is another focus, with targets to achieve a 75% public transport modal share during peak periods by 2030, expand the rail network to approximately 360 km by the early 2030s, and grow the cycling path network to around 1,300 km by 2030. Behavioural change and education underpin these efforts, with sustainability integrated across the school system and targets to achieve a two-thirds reduction in net carbon emissions from the schools sector by 2030, alongside broader initiatives to foster environmental stewardship among households, communities, and businesses.

[9] Maritime and Port Authority of Singapore, *Maritime Singapore Decarbonisation Blueprint: Working Towards 2050* <https://www.mpa.gov.sg/maritime-singapore/sustainability/maritime-singapore-decarbonisation-blueprint> accessed 24 February 2026

Net Zero Emissions by 2050

In 2022, Singapore formally committed to achieving net zero greenhouse gas emissions by 2050 as part of its long-term climate strategy, aligning national action with global climate objectives under the Paris Agreement. This commitment includes peaking emissions earlier than previously planned and reducing emissions to around 60 million tonnes of carbon dioxide equivalent ($MtCO_2e$) by 2030, followed by a sustained decline towards net zero by mid-century. In February 2025, Singapore further strengthened its climate ambition by committing to reduce greenhouse gas emissions to between 45 and 50 $MtCO_2e$ by 2035, signalling a clear and linear emissions reduction pathway consistent with its net-zero goal.[10] These intermediate milestones reflect Singapore's pragmatic approach to decarbonisation, balancing long-term ambition with the structural constraints of a small, resource-constrained island state with limited domestic renewable energy potential.

The "Four Switches" framework

Singapore will harness the "Four Switches" to progress towards a clean energy future.

Advancing Solar Deployment

Solar energy is the most scalable domestic renewable energy option for Singapore, given the country's limited land area and lack of conventional renewable resources such as hydro or wind at commercial scale. Located near the equator, Singapore benefits from relatively high solar irradiance—the Energy Market Authority (EMA) cites an average annual solar irradiance of about 1,580 kWh/m²/year, which supports the national strategy of maximising rooftop and distributed solar deployment across public housing, industrial estates, reservoirs, and other urban spaces.

Under the Singapore Green Plan 2030, Singapore initially set a target of deploying at least 2 GWp of solar capacity by 2030. Progress has been rapid. Installed solar capacity more than tripled from under 0.4 GWp in 2019 to 1.54 GWp in 2024, achieving the Singapore Green Plan 2030's interim milestone of 1.5 GWp by 2025 one year ahead of schedule. By February 2026, total installed grid-connected solar PV capacity had exceeded 2 GWp, surpassing the original 2030 target ahead of schedule, subject to continued system integration and grid stability considerations. In light of this accelerated progress, the Government has since raised its ambition, revising the 2030 solar deployment target upwards to at least 3 GWp.

Solar deployment has also become increasingly broad-based across user segments. EMA's data indicates that in Q2 2025 alone, 703 new grid-connected solar PV systems were installed, bringing the national total to 12,188 installations. Residential installations account for the largest share by number (45.5%, or 5,547 installations), followed by town councils and public housing common services (36.0%, or 4,382), the private sector (16.3%, or 1,989), and public service agencies (2.2%, or 270).[11] This distribution reflects the continued role of public housing and municipal deployment in driving scale, alongside steady growth in private-sector and residential adoption.

Regional Interconnectivity

Singapore has set a target to import up to 6 GW of low-carbon electricity by 2035, which could meet around one-third of national electricity demand. This initiative forms a core part of Singapore's ASEAN Power Grid strategy, which seeks to enable multilateral power trading by linking countries with abundant renewable resources to high energy demand markets. Through regional interconnections, electricity imports are intended to diversify Singapore's energy mix, enhance energy security, and support regional decarbonisation and economic integration.

Singapore's first renewable electricity import commenced in June 2022 under the Lao PDR–Thailand–Malaysia–Singapore Power Integration Project (LTMS-PIP), ASEAN's first multilateral cross-border electricity trading arrangement, which initially enabled up to 100 MW of hydropower imports using existing transmission infrastructure. Phase Two, launched in 2024, expanded trading capacity to up to 200 MW by enabling multidirectional power flows, including supply from Malaysia.

To scale up imports, EMA has also advanced multiple import projects. As of late 2025, EMA had granted Conditional Approvals totalling 8.35 GW of proposed low-carbon electricity imports from Australia, Cambodia, Indonesia, Sarawak (Malaysia), and Vietnam, with several Indonesian projects progressing to conditional licensing. In parallel,

[10] National Climate Change Secretariat (Singapore), *Overview of Singapore Climate Targets* (4 February 2026) <https://www.nccs.gov.sg/singapores-climate-action/singapores-climate-targets/overview/> accessed 23 February 2026.

[11] Energy Market Authority, *Number of Grid-Connected Solar Photovoltaic (PV) Installations by User Type* (28 October 2025) <https://www.ema.gov.sg/resources/statistics/number-of-grid-connected-solar-photovoltaic-installations> accessed 23 February 2026.

Singapore and Malaysia have completed an upgrade of the bilateral electricity interconnector, doubling its capacity to accommodate bidirectional power flows of up to approximately 1,000 MW, thereby significantly strengthening regional energy connectivity.[12]

Low-Carbon Alternatives for Longer-Term Decarbonisation

EMA is pursuing a portfolio of emerging low-carbon alternatives to complement solar deployment and electricity imports over the longer term, while maintaining a secure, reliable, and sustainable power system. These efforts recognise that many low-carbon technologies remain at varying stages of technological and commercial maturity and will require further development before large-scale deployment.

A key focus is hydrogen, which offers the potential to significantly reduce emissions in power generation and other hard-to-abate sectors. In this context, EMA is also studying the viability of ammonia, one of the most technologically ready hydrogen carriers with an established international supply chain. In July 2024, EMA and the Maritime and Port Authority of Singapore (MPA) shortlisted two consortia to advance proposals for low-carbon ammonia solutions on Jurong Island, supporting both power generation and bunkering.

EMA is also advancing carbon capture and storage (CCS) as a pathway to decarbonise existing thermal generation. In October 2024, EMA launched a Power Sector CCS Grant Call to co-fund site-specific feasibility studies, with a view to assessing how CCS could be deployed in the power sector and how existing natural gas infrastructure might be leveraged to reduce emissions. Alongside this initiative, the country continues to build long-term capabilities in advanced nuclear energy and deep geothermal systems, including through international nuclear cooperation agreements and consultancy studies on advanced nuclear fission technologies and geothermal resource potential.

Powering Through the Transition with Natural Gas

As Singapore advances its clean energy transition, natural gas remains central to maintaining power system reliability and affordability. Currently, around 94% of the country's electricity is generated using natural gas, which provides the dispatchable capacity needed as lower-carbon energy sources scale. Natural gas is therefore positioned as a transition fuel, supporting system stability while alternative energy options mature and are deployed at scale.

To progressively reduce emissions from gas-fired generation, EMA will introduce stricter emissions standards over time and has implemented measures to improve plant efficiency. These include the Genco Energy Efficiency Grant Call, which supports power generation companies in deploying technologies that enhance efficiency and reduce emissions. In addition, ensuring a secure and resilient gas supply remains a priority. In April 2025, Singapore GasCo was established to centralise gas procurement for the power sector, enabling economies of scale, more diversified sourcing, and longer-term contracting to enhance price stability and supply security.

In addition, Singapore is expanding its gas import infrastructure. In 2024, it was announced that Singapore LNG Corporation will develop a second LNG terminal at Jurong Port, featuring a floating storage and regasification unit with 5 million tonnes per annum of throughput capacity. Expected to be completed within this decade, the new terminal will further strengthen supply resilience and operational flexibility, reinforcing natural gas's role as a reliable backbone of the city-state's power system as the country transitions towards a more diversified and lower-carbon energy mix.

Energy Market Structure and Regulatory Framework

National Electricity Market of Singapore (NEMS)

Singapore's electricity market operates as a liberalised, competitive framework governed under the Electricity Act 2001 (the Electricity Act) and regulated by EMA. Progressively restructured since the 1990s, the market comprises a wholesale electricity market in which generation companies compete to sell electricity on a half-hourly basis through the Energy Market Company (EMC), and a retail market that allows consumers to choose among competing retailers under the Open Electricity Market initiative.[13] EMA licences market participants, sets market rules and technical codes, and oversees system planning to ensure reliable, secure, and economically efficient electricity supply.

The NEMS structure separates competitive activities (such as generation and retail) from regulated natural monopolies (including transmission and distribution). This market design supports competitive pricing, consumer choice, and long-term investment signals,

[12] Energy Market Authority, *Completion of Upgrading of the Singapore-Malaysia Electricity Interconnector* (26 October 2022) <https://www.ema.gov.sg/news-events/news/media-releases/2022/completion-of-upgrading-of-the-singapore-malaysia-electricity-interconnector> accessed 23 February 2026.

[13] Energy Market Authority, *Electricity Market* (3 September 2024) <https://www.ema.gov.sg/our-energy-story/energy-market-landscape/electricity> accessed 23 February 2026.

while contributing to broader energy transition objectives.

Gas Act Framework

Singapore's natural gas sector is governed by the Gas Act 2001 (the Gas Act), which provides the statutory framework for the importation, transportation, storage, and supply of gas, and is administered by EMA. Given that natural gas remains the backbone of Singapore's power generation mix, the Gas Act places particular emphasis on security of supply, system reliability, and fair access to critical infrastructure, while allowing market competition where feasible. EMA licenses participants across the gas value chain, including gas importers, shippers, transporters, and retailers, and regulates access to essential facilities such as gas transmission pipelines and LNG terminals to ensure safe, reliable, and non-discriminatory use.

The Gas Act framework has evolved to address energy security and transition risks, including supply concentration and price volatility. Recent legislative amendments (covered below) have strengthened EMA's regulatory powers to facilitate shared access to critical gas infrastructure, require approval for the repurposing of key gas assets, and support centralised gas procurement arrangements for the power sector.[14] These measures enhance demand aggregation, diversify supply sources, improve price and supply stability, and support long-term system planning as Singapore manages the transition towards a more diversified and lower-carbon energy system.

Integration with ASEAN and Regional Energy Policies

Singapore's energy transition is closely linked to ASEAN and broader regional energy cooperation, with regional integration playing a central role in strengthening long-term energy security, system resilience, and emissions reduction efforts.

At the regional level, Singapore's approach aligns with the ASEAN Plan of Action for Energy Cooperation (APAEC) and the vision of the ASEAN Power Grid (APG), which aims to enable multilateral electricity trading across Southeast Asia. Within this framework, the country primarily serves as a reliable demand centre and financing hub, supporting the development of renewable energy projects in neighbouring countries while helping to shape the commercial, technical, and regulatory arrangements needed for cross-border power trade.[15] Singapore's target to import up to 6 GW of low-carbon electricity by 2035 is firmly embedded within this ASEAN context, with EMA establishing licensing and regulatory regimes to ensure that electricity imports are integrated in a manner that supports system reliability, affordability, and long-term planning.

A key milestone in this regional integration is Singapore's participation in the LTMS-PIP, ASEAN's first multilateral cross-border electricity trading initiative. Since 2022, the project has enabled the import of renewable hydropower into the city-state using existing transmission infrastructure, with later phases expanding trading volumes and allowing multidirectional power flows. The LTMS-PIP serves as a practical pilot for broader APG implementation, providing insights into regulatory coordination, system operations, and cross-border risk management. Looking ahead, Singapore is expected to continue playing a leading role in ASEAN's energy transition, supporting a gradual shift from bilateral arrangements towards more integrated, market-based regional electricity trading as part of its longer-term net-zero strategy.

POLICY AND REGULATORY FRAMEWORK

National Energy Policy and Planning Framework

Singapore's national energy policy and planning framework is underpinned by a whole-of-government approach that integrates climate objectives, energy security, and economic competitiveness within a coherent institutional architecture. Clear delineation of roles across ministries and agencies enables coordinated policy formulation, implementation, and system planning in support of its energy transition.

At the strategic level, MSE sets national climate and sustainability objectives, including mitigation and adaptation priorities under the Singapore Green Plan 2030, supported by its statutory boards, including the NEA and PUB. PUB plays a central role in managing Singapore's integrated water system, including the Four National Taps, ensuring long-term supply adequacy, cost-reflective pricing, and flood risk management through planning controls and real-time monitoring. Climate policy coordination is led by the National Climate Change Secretariat (NCCS) under

[14] Energy Market Authority, *Introduction of Energy Transition Measures and Other Amendments Bill* (6 August 2024) <https://www.ema.gov.sg/news-events/news/media-releases/2024/introduction-of-energy-transition-measures-and-other-amendments-> accessed 23 February 2026.

[15] Ministry of Trade and Industry Singapore, *Low-Carbon Electricity Import* (23 October 2025) <https://www.mti.gov.sg/energy-and-carbon/energy-supply/low-carbon-electricity-import/> accessed 23 February 2026.

the Prime Minister's Office, which oversees decarbonisation strategies, emissions targets, and international climate commitments, while MTI shapes energy policy within a broader economic and industrial context, balancing decarbonisation with energy security, affordability, and competitiveness, including initiatives such as electricity imports and the "Four Switches" framework.

Policy implementation and system planning are primarily undertaken by EMA, which functions as both the economic regulator of the electricity and gas sectors and the system planner for Singapore's power system. EMA operationalises policy objectives through licensing regimes, market rules, and technical standards, and is responsible for generation adequacy, system resilience, and fuel diversification, including natural gas security and electricity imports. This market-led, regulation-backed model provides predictability for market participants while translating policy objectives into operational and investment outcomes. Sector-specific regulators such as the MPA and the Civil Aviation Authority of Singapore (CAAS) complement this framework by overseeing energy use and decarbonisation pathways within the maritime and aviation sectors, respectively.

Recent Policy Developments and Reform Outlook

The Energy Transition Measures and Other Amendments Act 2024 (the Amendment Act), gazetted on 25 October 2024, amends the Energy Market Authority of Singapore Act 2001 (the EMA Act), the Electricity Act, and the Gas Act to modernise the regulatory framework for the power sector in support of Singapore's energy transition.

The Amendment Act introduces a suite of market "guardrails" to strengthen EMA's regulatory oversight, enhance system reliability and facilitate decarbonisation. These include the establishment of the Future Energy Fund (FEF) to support low-carbon and energy security projects, powers for EMA to direct shared access to critical energy infrastructure where necessary, and requirements for regulatory approval before repurposing key electricity and gas assets to safeguard long-term planning and security. The reforms also enhance EMA's ability to recover costs associated with energy security and decarbonisation initiatives, and provide emergency powers, such as power rationing, to maintain system stability during severe supply disruptions. The Amendment Act was implemented in phases, with provisions establishing the FEF under the EMA Act coming into force on 8 November 2024, while key transitional provisions, including those relating to critical infrastructure access and cost recovery, taking effect from 1 July 2025.[16]

A further pillar of Singapore's climate strategy is the carbon tax, which provides a clear price signal to drive emissions reductions, improve energy efficiency, and catalyse investment in low-carbon solutions. The tax has been raised to S$45 per tCO_2e for 2026 and 2027, with an earlier-announced trajectory of S$50–80 per tCO_2e by 2030. As Singapore already has the highest carbon tax rate in Asia, the Government will assess the appropriate path beyond 2027 in light of international developments, balancing climate ambition with economic competitiveness.

Future Grid Capabilities Roadmap[17]

In October 2025, EMA announced new initiatives under its Future Grid Capabilities Roadmap to strengthen grid resilience and support a more diverse, low-carbon energy mix. These include the launch of a Virtual Power Plant (VPP) Regulatory Sandbox to aggregate and optimise distributed energy resources (DERs) such as rooftop solar, battery storage, and EV chargers, and an Energy Grid Grant Call to spur research, development, and deployment of advanced grid solutions.[18] In parallel, SP Group is developing a Distributed Energy Resource Management System (DERMS) to better manage the growing penetration of rooftop solar and EV charging infrastructure. Pilot projects are underway to support network planning and enable real-time coordination, with EMA exploring frameworks to facilitate secure and reliable information exchange between the DERMS platform and connected DERs.

EMA has also collaborated with the Science and Technology Policy and Plans Office (S&TPPO), and A*STAR to develop the Singapore Integrated Transport and Energy Model (SITEM), which uses advanced scenario modelling to project long-term EV charging demand and inform infrastructure planning. The second phase of SITEM will enhance model fidelity and assess the potential benefits of smart and

[16] Energy Transition Measures and Other Amendments Act 2024, Preamble.

[17] Energy Market Authority, *Singapore's Future Grid Capabilities Roadmap* (1 April 2025) <https://www.ema.gov.sg/content/dam/corporate/our-energy-story/energy-grid/EMA-Our-Energy-Story-Energy-Demand-Future-Grid-Capabilities-Roadmap.pdf.coredownload.pdf> accessed 24 February 2026.

[18] Energy Market Authority, *New Initiatives to Future-Proof Singapore's Power Grid* (27 October 2025) <https://www.ema.gov.sg/news-events/news/media-releases/2025/new-initiatives-to-future-proof-sg-power-grid> accessed 23 February 2026.

bi-directional charging, including shifting charging demand away from peak periods.

At the operational level, SP Group is strengthening grid planning and monitoring capabilities through the deployment of sensors, AI and digital tools to better forecast DER power flows, identify potential network constraints, and support timely grid upgrades, particularly in areas with high solar and EV charging penetration. Collectively, these measures are intended to enhance system flexibility, manage increasing operational complexity, and reinforce reliability as Singapore advances its energy transition.

DATA CENTRES AND DIGITAL ENERGY DEMAND

Data Centres as a Strategic and Growing Demand Segment

Data centres have become a strategic pillar of Singapore's digital economy and a rapidly growing source of electricity and water demand. Singapore is today a leading regional data centre hub, with total operational capacity exceeding 1.4 GW across 70 data centres, and data centre capacity per capita that surpasses that of Australia, China, Japan, Korea, the United Kingdom, and key regional markets such as Beijing, Hong Kong, Seoul, Sydney, and Tokyo.[19] This position is underpinned by Singapore's strong digital connectivity, including extensive subsea cable networks, as well as its low exposure to natural disaster risks, factors frequently cited by global operators as critical location advantages.

Data centres are fundamental enablers of Singapore's digital economy, which contributed 18.6% of GDP in 2024 and continues to expand rapidly. Demand for data centre capacity is being propelled by the rapid adoption of AI, cloud computing, autonomous systems, and immersive digital applications. In 2024, AI adoption rose sharply across the economy, with Information & Communications and Professional Services recording adoption rates of 35.9% and 25.7% respectively, while 73.8% of working individuals reported using AI tools at work several times a week. These trends point to sustained growth in compute-intensive workloads, reinforcing data centres' importance to the country's economic competitiveness.

Energy and Water Intensity Considerations

At the same time, data centres are highly energy- and water-intensive, posing structural challenges for a resource-constrained city-state. In 2020, 7% of Singapore's total electricity consumption was attributable to data centres, and this number is projected to reach 12% by 2030.[20] Electricity demand is significant not only for computing equipment but also for cooling, which is particularly energy-intensive in Singapore's tropical climate, where ambient temperatures typically range between 23°C and 33°C throughout the year. Water demand is similarly elevated, given its use in cooling systems, making data centres a major consumer of two critical resources central to Singapore's energy transition.

These constraints led MTI to impose a moratorium on new data centre developments in 2019, to allow the Government time to reassess how data centre growth could be managed sustainably. The moratorium was subsequently lifted following the development of a more structured policy framework aimed at balancing continued digital growth with energy and environmental constraints.

Government Policy Framework for Sustainable Data Centre Growth

Singapore's policy response is conveyed through the Green Data Centre Roadmap, led by the Infocomm Media Development Authority (IMDA) in collaboration with other agencies. The roadmap adopts a selective and sustainability-focused approach, with the Government committing to support at least 300 MW of additional data centre capacity in the near term, subject to stringent energy efficiency and sustainability requirements, and with further expansion contingent on access to green energy sources.[21]

Key policy levers focus on maximising energy efficiency at both hardware and software levels, accelerating the adoption of best-in-class technologies, and increasing the use of low-carbon energy to support future capacity growth. These objectives are reinforced through a suite of standards and certification schemes, including the Green Data Centre Standard (SS 564), first introduced in 2011

[19] Infocomm Media Development Authority, *Driving a Greener Digital Future: Singapore's Green Data Centre Roadmap* (2024) <https://www.imda.gov.sg/-/media/imda/files/how-we-can-help/green-dc-roadmap/green-dc-roadmap.pdf> accessed 23 February 2026.

[20] Infocomm Media Development Authority, *Turning the Red Dot, Green: Helping Data Centres Get Better at Staying Cool* (11 February 2025) <https://www.imda.gov.sg/resources/blog/blog-articles/2025/02/red-dot-analytics-help-data-centres-be-cool> accessed 23 February 2026.

[21] O Chia, 'Singapore to Expand Data Centre Capacity by at Least One-Third, Pushes for Green Energy Use' *The Straits Times* (30 May 2024) <https://www.straitstimes.com/tech/s-pore-to-expand-data-centre-capacity-by-at-least-one-third-pushes-for-green-energy-use> accessed 23 February 2026.

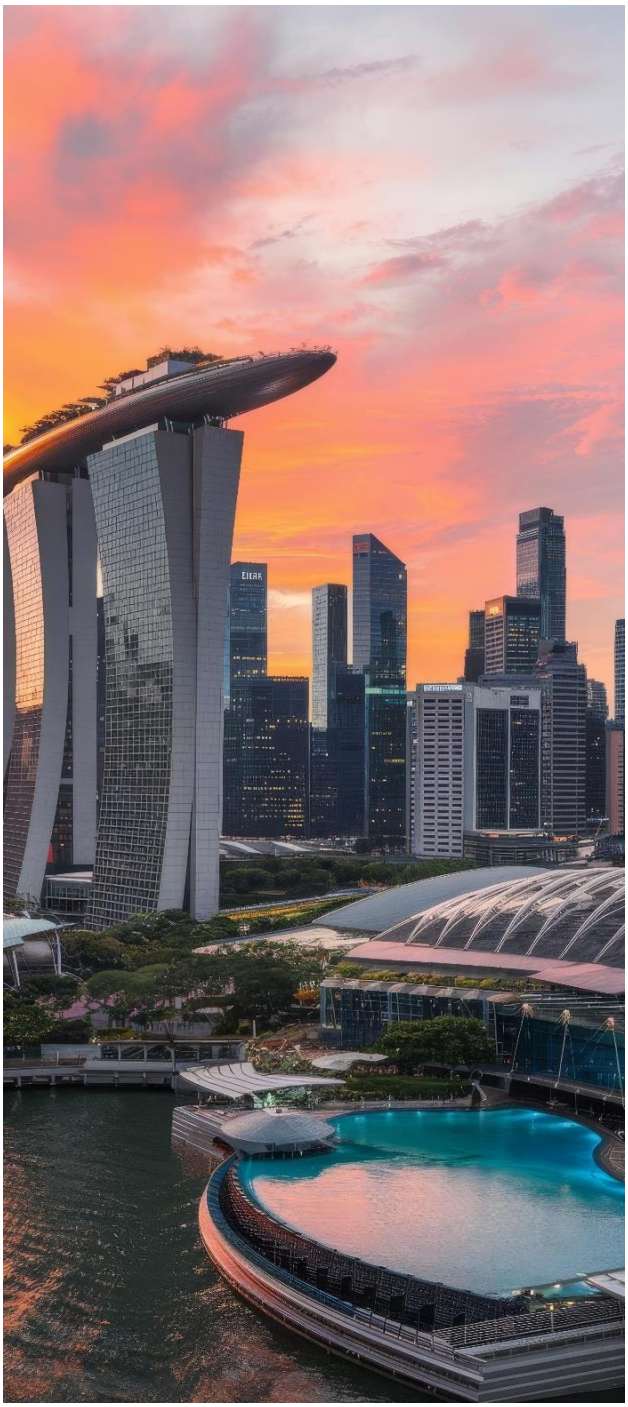
and refreshed in 2020, which provides a framework for energy-efficient and environmentally sustainable data centre design and operations. In 2025, IMDA further strengthened the policy framework with the launch of the Energy Efficiency of Data Centre IT Equipment Standard (SS 715:2025), which sets minimum performance requirements and best-practice guidance for IT equipment and system design, targeting significant reductions in IT energy consumption and complementing existing facility-level efficiency standards. In parallel, the Building and Construction Authority (BCA) and IMDA administer the Green Mark for Data Centres (GMDC) certification, which assesses performance across energy efficiency, water efficiency, sustainable construction and management, and indoor environmental quality.

Water efficiency is addressed through regulatory requirements administered by PUB. Data centres with annual water consumption of 60,000 m^3 or more must comply with Mandatory Water Efficiency Management Practices, including the installation of private water meters, regular monitoring, and submission of Water Efficiency Plans under the Public Utilities (Water Supply) Regulations. In 2021, the median Water Usage Effectiveness (WUE) of large data centres in Singapore was 2.2 m^3/MWh, and PUB and IMDA have set an aspirational target for new and existing facilities to achieve a WUE of 2.0 m^3/MWh over time.[22]

Overall, Singapore's data centre policy framework reflects a calibrated approach: recognising data centres as a strategic growth sector while tightly managing their energy and water footprint through regulation, standards, and selective capacity allocation, consistent with the country's broader energy transition and sustainability objectives.

FINAL THOUGHTS, OUTLOOK, AND OPPORTUNITIES

Singapore's energy transition is being pursued through a pragmatic, portfolio-based approach shaped by structural constraints such as import dependence, land scarcity, and a highly urbanised environment. The strategy balances energy efficiency, limited domestic renewables, regional electricity imports, and emerging low-carbon technologies, while retaining natural gas as a transition fuel to support system reliability and cost competitiveness. Looking ahead, progress will depend on continued regulatory coordination, infrastructure readiness, and regional energy integration, particularly as electricity demand grows alongside digitalisation and advanced manufacturing. Together, these factors point to a transition that will be gradual and carefully managed, with opportunities emerging alongside ongoing implementation and coordination challenges.



[22] Infocomm Media Development Authority, *Driving a Greener Digital Future: Singapore's Green Data Centre Roadmap* (n 19).

PART VII: INDONESIA COUNTRY OVERVIEW

Macroeconomic and Socio-Economic Profile

Indonesia's ambitious drive for economic growth in 2026 (especially in minerals, metals, and manufacturing) continues to sustain strong growth in energy demand. Alongside this drive, policy priorities remain focused on ensuring affordability and reliable energy supply, with conventional energy sources still playing a dominant role. Fossil fuels still supply more than 80% of primary energy, while deployment of renewables has yet to scale quickly enough to meaningfully change the overall mix.

Government spending patterns also reinforce this situation. Energy subsidies remain concentrated on fuel, Liquefied Petroleum Gas ("**LPG**"), and electricity tariffs. Households enjoy affordable LPG through cooking gas subsidies and the Domestic Market Obligation (DMO) regime supports predictable coal input costs for power generation and stable electricity tariffs. These policies help manage energy costs for consumers and industry, but renewables do not yet benefit from comparable incentives which would otherwise positively signal end-users, enterprises, and investors alike to invest more in clean energy.

National Energy Mix and Transition Targets

As of 2025, fossil fuels still dominate Indonesia's energy system. Coal, oil, and natural gas make up more than 84% of the country's primary supply, with clean energy accounting for less than 20%. This means Indonesia is still off-track from its goal of getting 23% new and renewable energy from the total energy mix by 2025, as this target has yet to be achieved at the end of 2025, recorded only at 15.75%.

Even though the updated National Energy Policy ("**KEN**") reaffirms a 19–23% New Renewable Energy target by 2030, the planned trajectory remains misaligned with global decarbonisation benchmarks. To meet the commitments countries made under the Paris Agreement, Indonesia would need around 44–60% renewable electricity by 2030, far beyond current assumptions.

In practice, renewable energy targets are often aspirational rather than operational, actionable commitments. Deployment progress depends on continued improvements in procurement cycles, grid infrastructure, and regulatory clarity, while coal phase-out efforts are evolving alongside broader policy coordination. This dynamic reflects an ongoing transition: Indonesia's main energy planning documents are adapting as the country works to rebalance its energy mix between established and emerging power sources.

Consistent progress in procurement, financing, and grid connectivity will be important for Indonesia to fully capitalise on international funding opportunities and accelerate its transition timeline. These areas represent key entry points for investors and partners seeking to support Indonesia's energy evolution.

Institutional Structure and Key Energy Agencies

Indonesia's energy governance operates through a centralised institutional structure where key ministries and state-owned entities jointly shape policy, regulation, and planning. Strategic direction is established at the policy level, with implementation involving coordination among institutions with complementary mandates, approval powers, and operational responsibilities. Enhanced coordination and alignment among government agencies presents an opportunity to further strengthen policy implementation and support the national target for energy transition, while also fulfilling energy development needs across different regions in the country.

Key players in Indonesia's energy landscape include:

- **Ministry of Energy and Mineral Resources** ("**MEMR**"): leads technical regulation across the electricity, renewable energy, and fossil-fuel sectors. It is the primary licensor and regulator for power generation, renewable-energy projects, and electricity business activities. This includes the technical and commercial frameworks governing power procurement.
- **Ministry of Finance** ("**MoF**"): controls fiscal levers, including taxation, incentives, and subsidy allocation, thereby shaping project economics, cost of capital, and end-user affordability, often independently of sectoral energy-transition objectives.
- **State Electricity Company** ("**PLN**"): Indonesia's main electricity utility provider and the centre of the system. PLN conducts the planning of new power plants and expansion of electrical grids, as well as deciding on sources for its power purchase. Its planning documents (currently coal-dominant) effectively steer the investment pipeline in the electricity sector.
- **Ministry of Environment and Forestry** ("**MoEF**"): retains authority over environmental governance, including waste management, environmental permitting, emissions control, and environmental compliance.

Other agencies also help with big-picture planning. The National Energy Council ("**DEN**") develops KEN,

while the Coordinating Ministry for Economic Affairs works to connect clean energy goals with broader economic plans.

A practical illustration of this multi-agency structure can be seen in waste-to-energy ("**WtE**") projects. Waste handling and environmental approval fall under the MoEF and regional governments, while electricity generation, tariffs, and offtake obligations are governed by the MEMR and PLN. To streamline this process, the government issued Presidential Regulation No. 109 of 2025 ("**PR 109/2025**"), which sets out a framework for coordination between these agencies to achieve end-to-end integration for the full WtE lifecycle.

The government has also established cross-agency working groups to improve alignment and accelerate results, such as the Energy Transition and Green Economy Task Force, and continues to adopt similar frameworks for integration across other sectors. These coordination mechanisms provide a pathway for investors to engage with relevant institutions and obtain clarity on project requirements, intended to support the bankability of clean energy projects.

POLICY AND REGULATORY FRAMEWORK

The 2025 Energy Policy Framework

With the intention to transition away from continued reliance on fossil fuels, Indonesia undertook a significant overhaul of its energy planning architecture in 2025. The updated framework more explicitly embeds new and renewable energy considerations across all planning layers, from long-term policy and medium-term system design to project-level procurement and standardised contractual terms.

At the top sits KEN (officially, Government Regulation No. 40 of 2025 on National Energy Policy or "**GR 40/2025**"), issued by DEN as mandated under Law No. 30 of 2007 on Energy, which establishes the country's energy direction through 2060. GR 40/2025 frames the energy transition as integral to national development, prioritizing energy security, supply diversification, and a progressive increase in new and renewable energy. It also allows five-year reviews to keep the policy aligned with evolving economic, technological, and climate conditions. Importantly, KEN requires ministries and regional governments to align their sectoral rules and programmes with these long-term objectives.

The MEMR's National Electricity General Plan 2025–2060 (known as "**RUKN**") translates these policy objectives into a practical blueprint for the power sector. RUKN covers demand projections, capacity expansion needs, transmission and distribution build-out, and pathways for higher renewable penetration. It also explains how to meet the increasing electricity demand while integrating renewables through stronger interconnections and regional balancing.

The operational layer is governed by PLN's Electricity Supply Business Plan (known as "**RUPTL**"), which specifies which power plants will be built, where, and when. Under RUPTL 2025–2034, PLN plans to add approximately 69.5 GW of new generation capacity over the decade. Of this total, around 42.6 GW (approximately 61%) is targeted to come from renewable energy sources, 10.3 GW (approximately 15%) from energy storage systems, and 16.6 GW (approximately 24%) from fossil-fuel generation, primarily gas and limited coal projects already in the pipeline.

While the early years of the plan reflect a more balanced split between fossil and renewable additions, the overall ten-year trajectory positions renewables and storage as the dominant components of new capacity growth. The practical outcome, however, will depend on execution discipline, including timely pace of procurement and grid expansion, as well as resolution of land and permitting constraints.

Completing the architecture is MEMR Regulation No. 5 of 2025 on Power Purchase Agreement ("**PPA**") Guidelines for Renewable Energy (known as "**MEMR 5/2025**"), which addresses longstanding bankability concerns by standardizing key contract terms, including how project output is measured, how risks are shared between parties, project development timelines, and requirements for achieving commercial operation. By reducing case-by-case negotiation, MEMR 5/2025 gives lenders clearer visibility into expected returns.

In addition to these, Indonesia continues to deploy conventional fiscal incentives to attract capital, e.g., tax holidays and allowances for qualifying projects, selected import-duty exemptions for renewable energy equipment, and designation as National Strategic Projects (PSN) for priority developments. Priority segments for these incentives include grid upgrades, energy storage, geothermal, and hydropower.

Taken together, the above instruments form a coherent energy planning framework for Indonesia, significantly improving clarity compared to prior years. However, the timing and scale of actual project deployment will depend on how quickly RUPTL 2025–2034 is implemented on the ground, whether grid investments keep pace with renewable additions,

and how effectively the agencies coordinate their approvals and processes.

Climate Change and Carbon Reduction Framework

Building on the energy planning framework, Indonesia also overhauled its climate governance in 2025. The centrepiece is Presidential Regulation No. 110 of 2025 concerning Implementation of Carbon Economic Value Instruments and National Greenhouse Gas Emission Control ("**PR 110/2025**"), which replaces PR 98/2021.

PR 110/2025 introduces several significant changes. It creates sectoral carbon allocations and a national carbon reserve, formalises how Indonesia will plan and implement its Nationally Determined Contributions under the Paris Agreement, and clarifies the respective roles of central and regional governments. The regulation also mandates a dual-registry system: the National Registry System for Climate Change Control ("**SRN-PPI**") tracks mitigation and adaptation activities, while the Carbon Unit Registry System ("**SRUK**") handles tradable carbon units.

For emitters, the regulation tightens compliance requirements. Companies will face carbon caps and must reduce emissions internally or use permitted carbon market mechanisms to meet their obligations, with the government ultimately intending to charge a carbon tax. The regulation also codifies rules for carbon offsetting, including provisions to safeguard against double-counting in international carbon unit transfer under Article 6 of the Paris Agreement.

For renewable energy producers, PR 110/2025 adds a potential revenue layer for all renewable projects. Once the SRUK registry and trading protocols become operational, renewable energy developers may be able to generate and sell verified emission-reduction units, both domestically and internationally, providing an additional income stream beyond mere power sales.

Renewable Energy Development Strategy: Spotlight on WtE

With the new energy and climate framework setting the scene for reforms, renewable-energy strategy was reshaped in 2025 through tighter alignment between national policy, system planning, and market instruments. Rather than treating renewables as a standalone climate initiative, the new strategy positions clean energy as an enabler of energy security, economic resilience, and industrial competitiveness.

The WtE framework under PR 109/2025 illustrates how these elements work together. The regulation serves both the energy transition and the climate agenda while streamlining the full life cycle of WtE plants by obliging regional government to provide waste feedstock, offering a fixed electricity purchase price of USD 0.20 per kilowatt-hour for 30 years and requiring PLN to purchase electricity generated from WtE plants. Moreover, it centralises investment coordination under the Danantara sovereign wealth fund, and simplifies licensing through the Online Single Submission System. The carbon set-off units generated under these WtE plants can also be sold under PR 110/2025's trading initiative.

This level of specificity, which covers the entire project lifecycle from feedstock to offtake to carbon credit trading, represents a notable improvement over the previously more fragmented approaches. This initiative also creates a replicable model for cities seeking to increase power generation while addressing both waste management and emissions at the same time.

Reform Outlook and Pending Implementation

The 2025 reforms represent the most significant restructuring of Indonesia's energy policies in years. Throughout recent years, the government of Indonesia has been designing a harmonised framework linking long-term policy (GR 40/2025), system planning (RUKN 2025-2060), project procurement (RUPTL 2025-2034), contract terms (MEMR 5/2025), carbon management (PR 110/2025), and sector-specific frameworks (PR 109/2025 for WtE). The regulatory framework creates clearer investment pathways by improving regulatory certainty and widening market access for renewable and low carbon projects.

As for 2026, the focus shifts from policy design to implementation. The key question now is how quickly and consistently the policy is applied on the ground.

For the carbon framework under PR 110/2025, derivative rules are needed to operationalise emissions trading design, offset accreditation procedures, carbon-unit classification, and corresponding adjustment calculations for international transfers. As for WtE under PR 109/2025, implementing guidance is needed on project pipeline selection, regional fee-setting for waste supply, and waste logistics arrangements.

Most importantly, RUPTL 2025–2034's critical test lies in how quickly PLN translates the RUPTL pipeline into actual tenders, contracts, and grid investments, including whether transmission and flexibility projects are delivered on schedule to support renewable additions and early coal-transition measures.

The investment outlook in Indonesia's renewables would depend on the country having clear rules and processes to accommodate fast-moving commercial activities (such as land processes), effective coordination among ministerial agencies (in addition to that between central and regional governments), as well as fiscal alignment across subsidies, incentives, and carbon pricing. The legal framework has improved significantly, but converting that improvement into scaled deployment remains the test.

Regional Energy Integration (Indonesia–Singapore MOU)

In June 2025, Indonesia and Singapore signed a series of memoranda of understanding covering cross-border electricity trade, carbon capture and storage, and the development of sustainable industrial zones. These agreements formalise and expand bilateral cooperation on renewable electricity exports. Singapore's Energy Market Authority had previously issued several conditional approvals for the import of electricity from Indonesia, and the June 2025 MOUs provide a broader intergovernmental framework to facilitate implementation, including coordination mechanisms and infrastructure planning. The cooperation is expected to involve subsea interconnection infrastructure and large-scale renewable projects, particularly solar and associated grid investments.

This development positions Indonesia not only as a domestic transition market, but also as a potential regional renewable energy supplier. It introduces an export-oriented dimension to Indonesia's clean energy strategy, linking renewable deployment with foreign direct investment, transmission build-out, and green industrial development. If implemented at scale, cross-border electricity trade could materially influence project bankability, accelerate renewable capacity additions, and reshape the long-term demand outlook embedded in national planning documents such as KEN and RUKN.

ELECTRICITY AND POWER GENERATION

Renewable Energy Tenders

Indonesia is reshaping how renewable energy projects are tendered, with a clearer focus on standardisation and investor certainty. The standardised PPA terms under MEMR 5/2025 already reduce case-by-case negotiation by providing a contractual baseline for procurement, making project revenues easier to assess and lowering financing risk across technologies.

Most utility-scale renewables are expected to be procured through competitive tenders led by PLN, in line with the project pipeline set out in RUPTL 2025–2034. The tender process, project size, and timing will differ by technology and location, depending on grid readiness and system needs which are identified in RUPTL. Hydropower and geothermal tend to involve longer development timelines, while solar and wind are more sensitive to grid availability and curtailment risk, which affects how tenders are structured.

Alongside competitive tenders for independent power producers, parallel procurement channels are also in place. WtE projects under PR 109/2025 follow a more predictable model, with guaranteed PLN offtake at fixed tariffs and simplified licensing. Notably, PR 110/2025 may further improve project economics over time, by allowing eligible projects to monetise verified emissions reductions, once the carbon registry and supporting rules are fully operational.

However, actual deal flow will depend less on policy intent and more on execution, specifically how consistently PLN carries out the RUPTL 2025–2034 pipeline, whether grid and flexibility investments are delivered on schedule, and how quickly carbon-market rules are implemented.

Transmission and Distribution Initiatives

Without adequate grid capacity, new generation projects cannot deliver power to demand centres. System reliability also suffers as variable renewables increase their share of the energy mix.

RUKN 2025–2060 identifies several priority areas for grid development. These include reinforcing the Java–Sumatra and Kalimantan interconnections, expanding 500 kV backbone networks, developing regional renewable hubs where generation and transmission are co-located, and investing in flexibility assets to support regions with high solar and hydro potential. Eastern Indonesia, where renewable resource potential is strong, but transmission capacity remains limited, is a particular focus.

The RUPTL 2025–2034 consolidates these priorities into a specific investment programme. Grid enhancement is also increasingly linked to industrial policy, as rising electricity demand from data centres, mineral smelters, and electric vehicle charging requires both generation capacity and transmission capability.

Digital grid technologies are another priority. Advanced metering, automation, and forecasting capabilities are prerequisites for integrating higher shares of variable renewables while maintaining system reliability. Energy storage integration is also being prepared, particularly in systems expected to experience high renewable penetration.

Looking ahead, several structural trends are likely. In addition to procurement potentially becoming more transparent and standardised, storage and other flexibility assets may increasingly be bundled into tenders or required as co-location conditions, while greater emphasis on regional balancing is expected as inter-island transmission expands.

Corporate Procurement Options

Indonesia's power market remains fundamentally organised around PLN as the single buyer. Direct third-party access, where corporations purchase power directly from generators without going through PLN, does not yet exist at scale. However, corporate demand for renewable energy is rising, particularly from power-intensive sectors such as data centres and mineral processing facilities facing pressure from customers and investors to decarbonise.

At the current pace and with the existing regulatory framework, business players are exploring captive power to support its activities and balance out electricity supplied from PLN with renewable energy, such as rooftop solar PVs or biofuel/biogas generators.

The government is also exploring several options to incentivise the use of renewable energy within the existing utility model. PLN's Renewable Energy Certificate programme and "Green Energy as a Service" offering large customers the chance to claim their share of renewable-backed power while remaining connected to the grid. These attribute-based solutions do not provide physical delivery of renewable electrons, but they do offer a recognised mechanism for corporate sustainability reporting. Along the same line, the carbon framework under PR 110/2025 may enable additional attribution structures by allowing emission-reduction credits to be purchased by corporate entities.

Structured procurement channels such as virtual power purchase agreements and direct power purchase agreements are currently being considered. The WtE model under PR 109/2025 illustrates the government's willingness to create sector-specific offtake arrangements for renewables with guaranteed purchase and fixed tariffs.

Although RUPTL 2025–2034 has already been formally issued, the key variable is no longer policy design but implementation. The extent to which similar procurement models emerge for other technologies or corporate buyers will depend on how consistently PLN executes the approved RUPTL pipeline in practice, including the sequencing of tenders, allocation of capacity quotas, and resolution of grid-access constraints for new market participants. Further clarity is expected through implementing measures under MEMR 5/2025 and subsequent procurement rounds that translate planning assumptions into bankable contracts.

Growth Areas and Investment Themes

The 2025 regulatory reforms create a more credible platform for several investment themes in Indonesia's power sector. The most immediate opportunities are likely to emerge in renewable energy clusters aligned with transmission upgrades and interconnection plans. RUPTL 2025–2034 clarifies geographic prioritisation and procurement volumes, positioning certain corridors as anchor hubs for industrial decarbonisation and green manufacturing zones, with likely policy support and grid access for renewable producers.

Other promising venues include:

- **WtE projects under PR 109/2025**, which offer a distinct opportunity with its replicable, fixed-tariff PLN offtake model and centralised investment coordination.
- **Corporate and behind-the-meter supply**, representing a demand-led growth channel, as data centres, industrial parks, and mineral-processing facilities increasingly seek decarbonisation pathways. The standardised contract principles under MEMR 5/2025 should reduce friction for dedicated or embedded supply arrangements.
- **Longer-dated opportunities and emerging technologies** including storage, nuclear, green hydrogen, ammonia co-firing, and advanced geothermal. These are positioned as system enablers under RUKN and could enter procurement through pilots or future tender rounds as the grid requires greater flexibility to accommodate variable renewables.

Across all themes, the common success factors remain RUPTL procurement design, transmission readiness, bankable offtake structures, financing availability, and timely issuance of implementing rules.

Business Classification Reform: KBLI 2025 Update

As of 17 December 2025, Indonesia, through Regulation of the Central Statistics Agency (*Badan Pusat Statistik*) No. 7 of 2025 on the Indonesian Standard Classification of Business Fields (KBLI), has introduced an updated business classification framework, including refinements in the electricity sector. The regulation clarifies the structural separation between electricity generation from non-renewable energy sources and electricity generation from renewable energy sources, each now classified under distinct business codes within the KBLI system.

Under the revised structure:

- KBLI 35111 now covers electricity generation specifically from non-renewable energy sources that produce emissions, including coal, oil, and gas.
- KBLI 35120 covers electricity generation from renewable energy sources, including biofuel, hydro, wind, solar photovoltaic, geothermal, tidal, and ocean energy.
- Both classifications explicitly recognise carbon credit sales conducted by electricity generators as part of their business activities.

Previously, renewable generation activities were not always distinctly separated from broader electricity-generation classifications, which occasionally created ambiguity in OSS registration and eligibility for renewable-specific incentives. The explicit recognition of renewable based generation under KBLI 35120 strengthens regulatory alignment between energy policy and business licensing architecture.

Renewable developers can now register under a dedicated renewable classification in the OSS system, minimizing misclassification risk and improving consistency between project substance, corporate documentation, and permitting. This is particularly important for project-financed IPPs and foreign investors that require clean structuring from incorporation through financial close.

The explicit recognition that electricity generators may engage in carbon credit sales also provides legal certainty as PR 110/2025 becomes operational. It confirms that emission-reduction monetisation forms part of the permitted business scope, reducing structural risk when developers participate in carbon markets. Taken together, the updated KBLI framework reinforces renewables as a distinct industry segment and strengthens the regulatory infrastructure supporting energy transition investment.

NATURAL GAS & LNG

Natural gas and liquefied natural gas ("**LNG**") play a central role in Indonesia's energy plans for the next decade. While the country works to expand renewable energy, gas serves as a practical alternative that produces fewer emissions than coal and can help meet growing electricity and industrial demand in the meantime. Historically, Indonesia has been a major LNG exporter. However, rising domestic demand, particularly for power generation, is changing that equation.

Upstream Market

Indonesia's upstream gas market is being repositioned in 2025 to stabilise domestic supply while improving investment attractiveness. The most significant change is the new MEMR Regulation No. 14 of 2025 on Cooperation in the Management of Working Area Segments to Increase Oil and Gas Production ("**MEMR 14/2025**"), which allows companies to form partnerships and joint ventures on existing gas fields within the production sharing contract (PSC) framework and without needing to wait for existing contracts to expire or be amended. This is designed to bring fresh capital and expertise into mature fields where production has declined, and to develop smaller gas deposits that might not justify standalone investment. This complements the government's recent efforts to update its profit-sharing terms[1] to make Indonesia more competitive with neighboring countries in attracting exploration investment.

These reforms come alongside encouraging exploration results. In December 2025, Italian energy company Eni announced a significant gas discovery at its Konta-1 well in East Kalimantan (Muara Bakau PSC), with preliminary estimates of 600 billion cubic feet of gas and potential upside to 1 trillion cubic feet. This reinforces the Kutei Basin as a productive gas region and supports Indonesia's medium-term supply outlook.

Indonesia's Shifting LNG Position

To keep gas affordable for strategic uses while managing the fiscal cost of subsidies, the government has introduced differentiated frameworks for different users. Industrial users in seven priority sectors now receive gas at regulated prices under a revised pricing scheme,[2] while a separate ministerial decree sets specific prices for gas used in public electricity generation.[3] The policy direction is clear: gas is being treated as a transitional fuel that supports system reliability while Indonesia scales up renewables.

For decades, Indonesia was one of the world's largest LNG exporters, shipping gas from fields in Kalimantan, Papua, and the Natuna Sea to buyers in Japan, South Korea, Singapore, as well as other Asian and

[1] MEMR Regulation No. 13 of 2024 on Gross Split Production Sharing Contracts.

[2] MEMR Decree 76.K/MG.01/MEM.M/2025 on the Second Amendment to the Decree of the Minister of Energy and Mineral Resources Number 91.K/MG.01/MEM.M/2023 regarding Certain Natural Gas Users and Certain Natural Gas Prices in the Industrial Sector.

[3] MEMR Decree 77.K/MG.01/MEM.M/2025 on the Certain Natural Gas Users and Certain Natural Gas Prices in the Sector of Electricity Supply for Public Interest (as amended).

Southeast Asian markets. However, that picture is changing rapidly. Together with the bid to increase gas production, the country is increasingly directing its output towards domestic consumption. The Special Task Force for Upstream Oil and Gas Business Activities (SKK Migas), the upstream regulator, has signaled that gas volumes will be prioritised for power generation, industrial use, and the LNG programme to replace diesel in remote areas. Export volumes will be calibrated to what remain after domestic needs are met. This represents a fundamental shift from Indonesia's historical model of maximizing export revenues towards one focused on energy security and domestic supply.

One of the notable initiatives is PLN's US$1.5 billion programme to replace diesel generators in remote, off-grid areas with cleaner, cheaper LNG. This is expected to displace around 2.3 million kilolitres of diesel annually and save approximately US$300 million in fuel costs each year. The programme targets 41 power plants with a combined capacity of over 2,100 megawatts, with operations planned for 2026-2027.

Given the declining production capacity as opposed to increasing demand, the margin is narrowing. Indonesia's contracted LNG supply is roughly 60 shipments per year, but PLN's projected requirement reached 84 shipments in 2024. Once the diesel-replacement programme is fully operational, it could add around 20–30 shipments of annual demand. If domestic production does not keep pace, Indonesia could shift from being a net exporter to a net importer of LNG sometime in the 2030s.

This shift is already visible in policy decisions. In early 2025, Indonesia redirected at least five LNG shipments that were destined for export to domestic buyers instead, and reduced pipeline gas exports to Singapore. These moves reflect the government's clear priority: domestic energy security comes first.

The transition creates both challenges and opportunities. Becoming an LNG importer would expose Indonesia to international gas price volatility and require significant investment in import infrastructure (receiving terminals, storage, and distribution networks). On the other hand, the growing domestic market creates demand for new gas production, LNG infrastructure, and the small-scale LNG distribution systems needed to serve remote areas.

OIL & DOWNSTREAM

Petroleum Policies and Bidding

Indonesia’s petroleum policy in 2025 remains anchored in the national Oil and Gas Law, with the state retaining resource ownership and sector governance split between SKK Migas and the Downstream Oil and Gas Regulatory Agency (BPH Migas). While the transition narrative under KEN 2025 is gaining ground, near-term policy emphasis remains pragmatic: focusing on stabilizing output and strengthening energy security while refinery upgrades and biofuel programmes scale.

As with LNG exploration and development, the most material upstream reform is MEMR Regulation 14/2025, which introduces formal cooperation schemes to optimise production in mature and marginal assets, accelerate investment without waiting for PSC amendment or expiry, and share risks/costs with new partners.

In parallel, Indonesia has expanded acreage release and bidding: in April 2025 the government awarded five blocks, including Gaea and Gaea II in West Papua, to a mix of international and domestic players, and officials have indicated a pipeline of approximately 60 additional blocks to be offered in coming years. This approach combines regulatory flexibility, a broader bidding inventory, and a transition posture that treats upstream oil as a declining but still critical pillar of national energy security.

Refining and Retail Market

Indonesia’s downstream oil sector in 2025 is a dual-track story, defined by an ongoing refinery expansion/upgrading agenda and sustained state intervention in retail pricing and distribution to preserve affordability.

The state-owned oil and natural gas conglomerate Pertamina’s Refining Development Master Plans (RDMP) remain the core vehicle for the refinery sector, with the Balikpapan RDMP having reached key revamp milestones and, as of early January 2026, was formally inaugurated by President Prabowo Subianto, marking a significant step towards increasing domestic refining capacity. Pertamina has also outlined the allocation of around US$48 billion to upgrade six refineries and develop an integrated refining–petrochemical complex, targeting refined-product output of around 1.5 million bpd. Strategically, these investments aim to reduce oil-product import dependence and create optionality for lower-carbon products such as SAF and higher biofuel blends. Starting April 2026, MEMR has requested private public fuel filling station (SPBU) operators to procure domestically produced diesel from Pertamina. This

instruction is in line with the government's policy to cease diesel imports amid anticipated domestic supply surplus following the operation of the Balikpapan RDMP project and the implementation of the mandatory B40 biodiesel programme.

On the retail side, policy remains interventionist through country-wide price standardisation under BBM Satu Harga ("One-Price Fuel") and tight controls on subsidised/special-assignment fuels. BPH Migas Regulation 1/2024, as amended in 2025, strengthens targeted distribution via sub-distributors in the most remote and inaccessible 3T regions (Terdepan, Terluar, and Tertinggal), including transitional provisions for existing sub-distributors through September 2025. The one-price network continues to expand (including 14 new distributors in Maluku and Papua in 2024, part of 40 new distribution points nationally), reinforcing the government's equity and stability objectives in remote markets.

Decarbonisation and quality requirements are increasingly embedded in downstream regulation. Indonesia is implementing Euro 4 fuel standards and planning upgrades towards Euro 5–type specifications. MEMR Regulation 4/2025 strengthens biofuel blending across biodiesel, bioethanol, and bio-jet fuels (building on B35/B40), supported by the palm-oil fund (BPDPKS) to subsidise biodiesel costs. Pertamina is also advancing SAF readiness via co-processed SAF trials at Cilacap using used cooking oil, and MEMR has indicated preparation of a potential mandate for 1% SAF blending for international flights from Jakarta and Bali as soon as 2026, scaling to 5% by 2034/2035.

New laws impacting the industry

Key regulatory changes reshaping Indonesia's oil and downstream landscape through 2026 include:

- **Upstream cooperation and PSC flexibility (MEMR Reg. 14/2025):** enables cooperation schemes for partial working-area management (e.g., joint operations/partnership structures) to inject capital and expertise into mature assets without waiting for PSC expiry, signaling a more flexible upstream regime.
- **Downstream infrastructure access (BPH Migas Reg. 3/2024):** updates shared-use rules for gas transportation pipelines, clarifying third-party access, capacity allocation, and shared-use principles—relevant for integrated operators and broader downstream modernisation.
- **Fuel distribution governance (BPH Migas Reg. 1/2024 as amended in 2025):** tightens requirements and timelines for sub-distributors in the remote 3T regions for certain fuels and JBKP (*Jenis BBM Khusus Penugasan* or Fuels with Specific Designation), strengthening subsidy targeting, volume accountability, and availability objectives.
- **Biofuel and SAF policy (MEMR Reg. 4/2025, UCO/POME export controls, draft SAF mandate)**: reinforces blending obligations (including ramp-up to B40) and lays groundwork for broader bioethanol/SAF adoption; parallel 2025 controls curb exports of UCO and POME to secure domestic feedstock; a draft aviation rule targets 1% SAF blending for international flights from Jakarta and Bali by 2026, rising to 5% by 2034, with implications for refinery configuration, feedstock allocation, and jet-fuel specifications.

Taken together, these new laws and regulations signal a more flexible but still state-directed upstream regime, continued political and regulatory control over retail pricing and distribution, and a rapidly evolving downstream product-specification and feedstock environment driven by biofuel and SAF policy.

EMERGING TECHNOLOGIES

Government Policies on New Technologies

Indonesia's 2025 policy repositions emerging technologies as structural tools for long-term energy security and decarbonisation. KEN 2025 and RUKN 2025–2060 recognise system-flexibility and low-carbon options, storage, hydrogen, carbon capture, and nuclear as part of the long-term mix, not just pilot projects. RUKN and RUPTL 2025–2034 signal future build-out of solar-plus-storage, flexible gas, and other new technologies within a renewables-heavy additions portfolio through 2034.

Commercially, PR 110/2025 provides the carbon-economic value framework to monetise emissions reductions via SRN-PPI and SRUK, potentially enabling these projects relying on new technologies to generate carbon credits once technical rules are issued, while the National Hydrogen and Ammonia Roadmap 2025–2060 identifies priority applications across industry, power, gas networks, and transport.

Carbon Capture and Storage and Carbon Capture, Utilisation, and Storage (CCS/CCUS)

Indonesia is rapidly moving from viewing CCS as merely a "concept" to a structured regulatory regime, with Presidential Regulation 14/2024 ("**PR 14/2024**") as the overarching framework, covering CCS in upstream and non-upstream contexts, including

permitting, storage-site approval, liability, measurement/monitoring obligations, cross-border storage, and state revenue-sharing. It works alongside two other upstream-specific instruments (MEMR Regulation 2/2023 and SKK Migas PTK-070) which provide the operational basis for both CCS/CCUS in PSC areas.

In 2024, a new implementing regulation under PR 14/2024 further detailed licensing, business models, and storage-right arrangements, reinforcing CCS as an investment priority and enabling cross-border CO_2 storage.

This means Indonesia now operates a layered CCS framework (PR 14/2024, MEMR 2/2023, SKK Migas PTK-070, and the 2025 implementing regulation) covering upstream storage, standalone CCS business models, and international CO_2 injections. Key remaining gaps are derivative rules for CCUS utilisation outside upstream and full integration of CCS-related units into the SRUK carbon registry under PR 110/2025.

Nuclear Small Modular Reactor

Nuclear, particularly Small Modular Reactor (SMR) and floating SMR, has shifted from peripheral discussion to an explicit element of Indonesia's long-term clean-energy strategy. In January 2025, a senior presidential adviser referenced plans for ~4.3 GW of nuclear capacity, including floating SMRs, as part of diversification away from coal; the Government has also indicated no new coal plants beyond the legacy pipeline, reinforcing nuclear's role as potential future firm capacity in the 2030s–2040s.

Institutionally, Indonesia is preparing the enabling framework: a Nuclear Energy Programme Implementation Organisation (NEPIO) is undergoing preparation for its establishment with the mandate to coordinate programme development, while the Nuclear Energy Regulatory Agency (BAPETEN) is adapting licensing, safety, and oversight approaches, aligned with evolving IAEA guidance. At the time of writing, no SMR-specific presidential regulation has been issued yet, but it is clear that nuclear is now on the government technology roadmap.

Battery Energy Storage Systems

The battery energy storage system (BESS) is increasingly recognised as a critical enabler for a renewables-heavy grid under RUKN 2025–2060 and the RUPTL 2025–2034, particularly to support the scale-up of variable renewables. Public reporting indicates Indonesia is targeting 17 GW of solar with storage within a broader 69.5 GW new-capacity plan by 2034.

Early projects are already underway. PLN and partners are developing a 70 MW wind + 10 MW BESS project at Tanah Laut (Kalimantan) as a proof of concept for storage-backed variable renewable energy (VRE) integration, while PLN–IBC (the Indonesia Battery Corporation) have signed an MoU for a 5 MW BESS pilot to improve renewable integration and reliability in isolated systems. However, Indonesia remains at an early stage of deployment. Regulatory treatment of storage remains transitional. Although MEMR Regulation No. 19 of 2025 on Hybrid Power Plants clarifies that batteries can be developed and operated as part of hybrid renewable plants, the regulation is yet to treat BESS as a standalone regulated asset, nor does it establish independent revenue streams for storage services, although the new RUPTL has included standalone BESS in the pipeline.

This classification gap remains the key constraint. Without clear rules on capacity remuneration, ancillary services, or standalone storage tariffs, revenue stacking remains limited. Large-scale deployment will depend on further regulatory development that would, over time, treat BESS as more than a technical add-on.

Hydrogen and Ammonia

In addition to its recognition in KEN/RUKN as "new energy", Hydrogen and ammonia have moved up Indonesia's policy agenda with the launch of the National Hydrogen and Ammonia Roadmap 2025–2060 in April 2025 (as a derivative of the National Hydrogen Strategy). The roadmap prioritises four demand sectors: industry, power generation, gas networks, and transport, while setting a phased pathway in which industrial applications lead, followed by power-sector co-firing and broader system integration.

Parallel work is underway on a Green Hydrogen Roadmap, developed with the MEMR and the Ministry of National Development Planning (Bappenas), focusing on building an investable ecosystem and positioning Indonesia as a longer-term regional supplier. However, external research indicates meaningful scale-up in ammonia co-firing and hydrogen-based industrial uses are more likely after 2040, pending cost reductions, infrastructure development, and supporting regulations.

Other notable updates

Indonesia's "next layer" of transition execution is moving from pilots to system integration. Floating solar, digital grids, and carbon-market linkage are near-term catalysts, but codification is still catching up.

Notable 2025–2026 emerging-tech and innovative-project developments include:

- **Floating solar and advanced integration**: PLN began construction of a 92 MWp floating solar project at Saguling (West Java) in October 2025, targeted to operate in 2026 and generate up to 130 GWh/year, aligned with a broader plan to add 42.6 GW of renewables by 2034. The project also serves as a platform for grid integration and potential storage coupling.
- **Digital/smart grid**: RUKN 2025–2060 and PLN briefings emphasise digital grid technologies (advanced metering, automation, forecasting) as prerequisites for higher VRE penetration. However, implementation is still largely governed through PLN technical standards and grid codes rather than dedicated regulation.
- **Carbon-market integration**: As PR 110/2025 comes into effect once technical rules are finalised, emerging technologies are expected to be recognised within SRN-PPI/SRUK, enabling carbon-credit generation and/or compliance use by obligated entities.

Overall, Indonesia's 2025 framework anchors innovation in core planning (KEN/RUKN), climate governance (PR 110/2025), and thematic roadmaps (Hydrogen & Ammonia, CCS). Going forward, investment is expected to be determined by how well and quickly implementing regulations, grid code adjustments, and procurement mechanisms can convert these pilots into bankable projects.

DATA CENTRES

Energy Intensity and Policy Support

Indonesia's data-centre segment is expected to become increasingly substantial in terms of electricity demand, driven by cloud growth, AI workloads, and hyperscale buildouts. New Jakarta projects, such as EDGNEX's 19.2 MW AI-powered facility at MT Haryono, targeting Phase 1 completion within 2026, signal a shift in load profile towards higher-density, power-intensive designs.

Policy support is largely indirect but increasingly embedded in national planning. Digital infrastructure is positioned as a strategic pillar in Indonesia's digital-economy and industrialisation agenda, and RUKN 2025–2060 / RUPTL has been calibrated to accommodate rising captive loads (such as smelters and industrial parks), with data centres being increasingly discussed as part of this trend, while at the same time, KEN 2025 and PR 110/2025 create the policy envelope under which data centres are expected to progressively decarbonise through renewable procurement, efficiency, and (over time) participation in the carbon-economic value system.

Power Procurement for Data Centres

The default model for data centre power procurement remains reliant on grid supply from PLN, since fully physical 24/7 renewable-sourced grid is not yet feasible at scale in Indonesia. However, the decarbonisation toolkit is expanding. PLN's Renewable Energy Certificate (REC) attribution programme and "Green Energy as a Service" (GEAS) are increasingly used by large customers to claim renewable-backed power.

For the foreseeable future, "green data centre" strategies are likely to rely on grid-supplied electricity combined with attribute instruments such as RECs and PLN green products. Structured PPA arrangements may emerge under MEMR 5/2025 within the PLN single-buyer model, for example through dedicated or embedded renewable supply schemes rather than fully liberalised B2B direct PPAs. Over time, additional decarbonisation value may be captured through carbon credits generated by eligible renewable power plants and registered under PR 110/2025 via SRUK. In such cases, the emission reductions originate from the generation asset rather than the data centre itself, unless the data centre directly participates in developing or financing a qualifying mitigation project.

Challenges in Grid Integration

Because many new data centres are clustering around Greater Jakarta, grid limits are becoming more serious. Future data-centre areas (like Batam) may also face direct competition for electricity with industry and households. The integration of power-hungry data centres adds large chunks of constant electricity demand, often in one place and all at once, on an already strained system.

New hyperscale sites could be built in as few as 18-36 months and often need an extra 10–20 MW quickly. Some campuses could even reach 50–100 MW. As major transmission upgrades can take longer, power lines and substations in particularly demand-intensive areas may not be ready in time to support the projects. Moreover, data centres run close to nonstop, while solar and some hydro output can change by time of day or season. Projects like the 92 MWp Saguling floating solar highlight the need for more tools to keep supply reliable.

At any rate, it is advisable for developers to explore workarounds such as locating sites near stronger parts of the grid, adding batteries or other backup systems, or seeking other 'reserved capacity' arrangements while Indonesia tries to add more

renewable energy, increase supply consistency, and fix older weak points in the grid.

Water Supply Considerations

Electricity is not the only constraint. Water availability is becoming an important issue for data centres, especially if they use water-based cooling. Some research suggests that water used in operating a 1 MW data centre could meet the daily needs of thousands of people. As water stress is already increasing in many parts of the world, with Indonesia itself facing this very issue in some areas, including parts of Java, scrutiny on water stewardship for large digital infrastructure is intensifying.

Guidance relevant to Indonesia points to the Alliance for Water Stewardship (AWS) Standard as a practical benchmark (catchment-based risk assessment, efficiency, reuse, ecosystem protection), providing operators with structured approaches to managing water-related operational and reputational risk.

As such, it can be expected in the near future that data centres may be required to meet both carbon and water metrics, while regulators and local governments may tighten disclosure and permitting requirements around water use. On the other hand, projects demonstrating high energy efficiency, low water intensity, and credible renewable sourcing may be structurally advantaged in terms of siting and approvals.

TRANSPORTATION

Key updates on Indonesia's transition to electric mobility in public transport

Indonesia is still in the early stage of switching public transport to electric vehicles, and Jakarta is doing most of the work so far. The national goals are clear: RUEN aims for 10% of urban public transport to use electric buses by 2025, with the Ministry of Transportation aiming for 90% of mass urban public transport to be electric by 2030, then 100% by 2040, and for public minibuses (angkot) to be fully electric by 2045.

While Jakarta is the main example of progress, with TransJakarta having added 200 new electric buses, bringing the fleet to around 300 by end-2024, and aiming to make its entire bus fleet electric by 2030, other cities (such as Medan, Surabaya, and Pekanbaru) are not as fortunate. In areas where electric buses exist, they are available only in small numbers and often depend on limited local budgets and pilot programmes, with payment/pricing systems that don't fully reflect long-term savings.

Without more help from the central government, the gap between what Jakarta can do and what other cities can do will likely grow, making the national 2030/2040 targets harder to reach.

Challenges to the EV market

EV growth is accelerating, but the market is still shaky—foreign-brands still dominate, sales rely heavily on government incentives (especially up to 2025), with charging and power supply limits slowing growth.

Market structure

Most EVs sold in Indonesia today are from foreign brands, especially Chinese ones. Battery EV sales jumped by more than 150% in 2024 to about 43,000 units, albeit still small compared to 865,000 conventional vehicles sold in the same year. BYD has led the market since 2024, and by October 2025 (including its Denza brand) reportedly had around 57% market share.

Government rules that allow fully imported cars to be sold first, as long as companies later commit to building locally, have helped foreign brands enter quickly, and several companies are now building or planning local production, including:

- BYD: a US$1 billion plant in Subang, which as of the first quarter of 2026, is planning to commence its production with a capacity of 150,000 vehicles per year.
- VinFast: a planned 50,000-unit assembly facility in West Java. It has also announced plans for up to 100,000 charging points.
- Other competitors include Wuling, GAC Aion, as well as talks on a possible future entry from Xiaomi.

Policy and incentive dependency

Demand is very dependent on government support. Current rules[4] set local content requirements and clarify the roles of central and local government. Tax and import-duties incentives introduced in 2024 have helped drive sales, but have since ended in 2025. Entering 2026, the continuation/replacement of broad purchase-side incentives has been under inter-ministerial discussion, which could result in demand being brought forward into the incentive

[4] See, for example, Presidential Regulation 79/2023 on Amendment to Presidential Regulation 55/2019 on Acceleration of Battery Electric Vehicles Programme for Road Transportation.

period, with a subsequent deceleration in the absence of a replacement scheme.

Infrastructure and system constraints

Charging and electricity supply are also key constraints. Even with big announcements, the number of charging stations is still far below what would be needed for widespread EV use. Cities also face local power network limits, slow permits, and coordination problems between PLN, local governments, and private charging companies.

Legal and policy updates

Key policy updates shaping the EV ecosystem:

- **Presidential Regulation 79/2023 (the main EV policy):** expands EV coverage, updates local content requirements, and sets roles for central and local government on charging, incentives, and EV ecosystem development.
- **Tax and fiscal incentives (PMK 8/2024 and 2025 follow-ups):** introduced a package of incentives including VAT borne by the Government (PPN DTP), effectively reducing VAT payable to 1% for qualifying EVs meeting local content thresholds, alongside import-duty exemption for Completely Built-Up (CBU) EVs and related luxury goods sales tax (PPnBM) relief. Most of these fiscal incentives expired at the end of 2025 and have not been extended into 2026.

  As of early 2026, the Government has indicated that automotive tax incentives for 2026 remain under discussion and have yet to be finalised; any future incentive framework would require new regulatory instruments and approval from the Ministry of Finance.
- **Import-based market entry with manufacturing commitments:** Completely-built-up (CBU) import access tied to future local production, used by multiple foreign OEMs, which allowed faster entry while factories are built.
- **Support for building an EV industry:** the government is promoting major investment plans (e.g., BYD's Subang plant; VinFast's West Java plans) as part of a strategy to build an EV manufacturing hub linked to Indonesia's nickel supply and battery investments (including the Hyundai–LG battery cell plant).
- **Public transport targets:** The Ministry of Transportation has set targets to electrify 90% of urban mass public transport fleets by 2030 and achieve full electrification by 2040, with complete electrification of all public transport services (including microbus/angkot services) by 2045. Separately, RUEN sets a target of 10% of urban public transport using electric buses by 2025. However, these targets do not yet have a solid regulatory framework, and implementation remains at an early stage.

Overall, Indonesia's EV market has strong potential. However, the discontinuation of import-based fiscal incentives at the end of 2025 (with effects from January 2026) may affect short-term demand dynamics for imported models. Market momentum will now depend more heavily on the expansion of charging networks, local electricity supply capacity, and whether automakers follow through on local production commitments.

PART VIII: JAPAN COUNTRY OVERVIEW

Macroeconomic and Socio-Economic Profile

In 2025, Japan's economy experienced a year of significant turbulence shaped by three major forces:

(i) the transition away from the near-zero interest rate policy;

(ii) the emergence of a new administration through a change in prime minister and a reconfiguration of the ruling coalition; and

(iii) an external shock stemming from tariff measures under the second Trump administration.

While the Japanese economy was affected by inflationary pressures and Trump tariffs, a gradual recovery trend was sustained, supported by continued wage growth and the successful conclusion of tariff negotiations with the United States, resulting in a historically high stock market performance. The new administration, led by Sanae Takaichi, Japan's first female prime minister, has articulated a "strong economy" vision, emphasising proactive fiscal spending and the strengthening of economic security.

From a medium- to long-term perspective, although Japan remains one of the world's largest economies as measured by GDP, it faces structural challenges stemming from a declining and ageing population. These demographic shifts are expected to have a material impact on future energy demand.

At the same time, Japan's electricity demand is projected to grow in the future, driven by the digital transformation (DX) of the economy, advancement of electrification, widespread adoption of artificial intelligence (AI), and associated rapid expansion of data centres, as well as the reshoring of semiconductor manufacturing facilities.

Japan has long faced constraints due to its limited domestic fossil fuel resources, resulting in one of the lowest primary energy self-sufficiency ratios among major advanced economies and a high dependence on imported fossil fuels. Following the Fukushima Daiichi nuclear accident, the prolonged shutdown of many nuclear power plants has further increased this high fossil fuel reliance. Furthermore, the surge in LNG prices and tightening of supply since the Russia-Ukraine War have dealt a significant blow to Japan's trade balance, highlighting vulnerabilities in the country's energy security.

Under these circumstances, in advancing the energy transition in Japan, it is necessary not only to promote decarbonisation as a countermeasure to climate change, but also, from the perspective of energy security, to promote the diversification of energy supply sources and to enhance Japan's energy self-sufficiency.

National Energy Mix and Transition Targets

The Government continues to uphold its long-term objective of achieving carbon neutrality by 2050, supported by ambitious medium-term milestones. In February 2025, the Government formulated the 7th Strategic Energy Plan, which is aligned with Japan's updated Nationally Determined Contribution (NDC) submitted to the UNFCCC Secretariat at the same time. The updated NDC represents an ambitious target consistent with the global 1.5°C goal and sets out a linear pathway towards net zero by 2050, aiming to reduce greenhouse gas emissions by 60% in FY2035 and 73% in FY2040 from FY2013 levels.

Alongside the Strategic Energy Plan, the Government also published its FY2040 Energy Supply and Demand Outlook (Energy Mix). The Outlook estimates final energy consumption at approximately 260–270 million kL and primary energy supply at approximately 420–440 million kL in FY2040, with an energy self-sufficiency ratio of around 30–40%. For electricity, total generation in FY2040 is projected at approximately 1.1–1.2 trillion kWh, with the power mix expected to comprise renewables at around 40–50% (indicative ranges: solar 23–29%, wind 4–8%, hydro 8–10%, geothermal 1–2%, biomass 5–6%), nuclear at around 20%, and conventional thermal power at around 30–40%, reflecting an approach centred on nuclear restarts and accelerated renewable deployment, while maintaining a balanced mix in light of energy supply reliability.

Institutional Structure and Key Energy Agencies

The Government positions the energy transition as a comprehensive transformation of the societal and industrial structure centred on fossil fuels into one centred on clean energy, and advances this agenda under the banner of the Green Transformation (GX).

The GX policy is coordinated on a whole-of-government basis by the Cabinet Secretariat through the GX Implementation Council, which consolidates overarching strategic directions (including revision of the GX policy of February 2025 (GX2040 Vision) and sectoral investment strategies). Under this framework, the Ministry of Economy, Trade and Industry (METI) and its agency, the Agency for Natural Resources and Energy (ANRE), play the central role in energy policy, covering electricity and gas market design, support for renewable energy deployment, fuel procurement and energy security. In parallel, the Ministry of the Environment (MOE) is responsible for formulating and

implementing the Government's comprehensive climate plan, the Plan for Global Warming Countermeasures, pursuant to the Act on Promotion of Global Warming Countermeasures, thereby helping to ensure consistency and predictability between GX and climate policy, including Japan's NDC.

From 2024 to 2025, the institutional framework for GX shifted from the design phase towards implementation. Firstly, ANRE has strengthened its capacity to connect next-generation technologies, including fusion energy, to policy development. This includes the establishment of a dedicated function for fusion energy within its organisational structure. Secondly, pursuant to the GX Promotion Act, the GX Acceleration Agency has moved into full-scale operations, using proceeds from government-issued Japan Climate Transition Bonds to provide loan guarantees and equity-type support for high-risk, early-stage private investment, thereby serving as a catalyst for decarbonisation investment, while also positioning itself as an implementing body for carbon-pricing related schemes.

Thirdly, the Organisation for Cross-regional Coordination of Transmission Operators, Japan (OCCTO) has become increasingly important, given its role in ensuring stable power system operation and promoting nationwide grid development. In addition to aggregating and coordinating national supply capacity, OCCTO plays an essential role in improving the investment environment for decarbonised power sources through the operation of the Long-term Decarbonisation Power Source Auction (LTDA) as part of Japan's capacity market framework. Finally, from an energy security perspective, the Japan Organisation for Metals and Energy Security (JOGMEC) has reinforced its support functions for securing stable LNG supply and upstream investment, underpinning policies to strengthen fuel supply chains through coordinated public–private efforts.

POLICY AND REGULATORY FRAMEWORK

Strategic Energy Plan

The 7th Strategic Energy Plan, approved by the Cabinet in February 2025, once again refines Japan's energy policy with the aim of not only securing a stable energy supply but also using decarbonisation as a catalyst to transform the economic structure and attract investment. At the core of the Plan remains the S+3E principle: placing Safety as the overriding premise, while simultaneously achieving Energy Security, Economic Efficiency, and Environment (environmental sustainability). However, the Plan places particular emphasis on responding to hard-to-predict uncertainties, including heightened geopolitical risks following Russia's invasion of Ukraine and sharp increases in demand, such as data-centre loads associated with the spread of generative AI. Against this backdrop, the Government has set an ambitious target to raise the FY2040 energy self-sufficiency ratio from the current level of around 15% to approximately 30–40%.

To meet this ambitious target, the Government formulated the GX2040 Vision, integrating energy policy with industrial policy and presenting a clearer outlook to facilitate more than JPY 150 trillion of public–private GX investment over the next decade. As a core pillar of the power mix, the Plan more clearly sets out a policy of maximising the utilisation of existing nuclear reactors, provided that the restart of reactors poses no safety concerns, alongside measures such as replacing, where it has been decided, decommissioned capacity with next-generation innovative reactors at the same sites. This provides an important signal that enhances predictability for investors who value the stability and economic efficiency of baseload power. For thermal power, the policy aims to implement emerging measures such as ammonia and hydrogen co-firing and carbon dioxide capture and storage (CCS) technologies, so that by FY2040, 30–40% of electricity demand is supplied by clean energy sources, including decarbonised thermal power.

Climate Change and Carbon Reduction Framework

Japan's climate change countermeasures and CO_2 emissions-reduction policies are primarily anchored in the Act on Promotion of Global Warming Countermeasures. Under this Act, the Government is required to formulate and periodically revise the Plan for Global Warming Countermeasures, which serves as the overarching framework for setting Japan's emissions-reduction targets (including its NDC) and for designing and implementing related policies and measures. The most recent revised Plan for Global Warming Countermeasures was approved by the Cabinet on 18 February 2025. In addition, the Act provides a scheme that requires certain business operators to calculate, report, and disclose their greenhouse gas emissions.

In parallel, Japan has enacted the Act on the Promoting Transition to the Decarbonised Growth Economic Structure (commonly referred to as the GX Promotion Act) to advance decarbonisation as a growth strategy. This Act stipulates:

(i) the formulation of a transition promotion strategy;

(ii) the issuance of Japan Climate Transition Bonds;

(iii) the collection of surcharges from fossil fuel extractors and related entities, as well as the collection of charges related to the allocation of emissions allowances to specified business operators; and

(iv) support operations by the Japan Organisation for Promoting a Smooth Transition to a Decarbonised, Growth-Oriented Economic Structure (GX Acceleration Agency).

Further, as one concrete measure under the Growth-Oriented Carbon Pricing initiative, METI intends to implement a fully operational emissions trading scheme starting in FY2026.

Alongside these framework laws, Japan also relies on a set of sector-specific statutes as key tools to drive emissions reductions across the energy, industry, buildings, and other sectors. Under the Basic Act on Energy Policy, the Government is required to establish the Basic Energy Plan as Japan's fundamental energy policy document.

On the supply side, the Act on Special Measures Concerning Promotion of Utilisation of Electricity from Renewable Energy Sources (the Renewable Energy Special Measures Act) provides the legal basis for support schemes for renewable energy deployment (including FIT/FIP), while on the demand side, the Act on Rationalisation of Energy Use and Shift to Non-fossil Energy (the Energy Conservation Act) implements a framework that requires periodic reporting by business operators above a certain scale and encourages the review of their efforts as well as the formulation of plans for energy efficiency and the shift to non-fossil fuel energy.

The move towards energy efficiency and non-fossil fuels is also promoted in the building sector under the Act on the Improvement of Energy Consumption Performance of Buildings (the Building Energy Efficiency Act) and the Energy Conservation Act.

Renewable Energy Development Strategy

The 7th Strategic Energy Plan sets clear, ambitious targets for renewable energy to account for 40–50% of the FY2040 power mix, positioning renewables as one of the main power sources in Japan's energy system. The core of this Plan is a shift in emphasis from simply accumulating installed capacity to enabling renewables to become commercially viable without subsidies through participation in competitive electricity markets and by achieving social acceptance and long-term harmonisation with local communities.

To create a framework in which renewables are integrated into the electricity markets and can earn revenue without relying on subsidies, the Government is expanding the application of competitive auctions and shifting support schemes from the Feed-in Tariff (FIT) to the Feed-in Premium (FIP), as discussed further below. This is intended to encourage renewable operators to adjust generation and storage in line with supply–demand conditions, thereby improving overall system efficiency. In addition, under the amended Act on Renewable Energy Special Measures, which entered into force in April 2024, the Government has reinforced discipline to ensure a sound and sustainable investment environment through measures such as requiring explanatory meetings for local residents and temporarily suspending FIT/FIP support for operators in violation of relevant laws and regulations.

With respect to the future direction for each power source, the Plan sets out concrete and diverse approaches to make maximum use of Japan's limited land and sea areas. For solar PV, as suitable sites decline, the Plan accelerates a shift towards rooftop and self-consumption installations using public facilities, factory roofs, car parks, and other spaces, and promotes deployment through corporate power purchase agreements (PPAs). In particular, the Plan aims to install a total of 20 GW of lightweight and flexible perovskite solar cells by 2040, while creating new installation locations such as building walls and fostering the development of a domestic supply chain. For wind power, the Plan promotes repowering and larger-scale onshore projects, as well as the development of 30-45GW of offshore wind projects by 2040 through the commercialisation of floating technologies and completion of amendments to related laws and regulations to expand projects from Japan's territorial waters into its Exclusive Economic Zone (EEZ).

As for more stable renewable power sources, efforts are being made to shorten lead times for geothermal development while reducing drilling risks and ensuring harmony within national parks. Small hydro and biomass projects are also expected to contribute to stable power supply through the utilisation of unused resources and the creation of local circular-economy models.

The Plan also indicates that, alongside the expansion of these various power sources, investment opportunities across the entire power system are growing, including in grid reinforcement and the deployment of large-scale battery storage to support variable renewables.

Regulatory Environment and Legal Reforms

Legislative and regulatory developments in Japan's energy transition have increasingly been shaped by an approach that seeks to secure stable energy

supply and economic security alongside decarbonisation. Key recent legislative developments in relation to energy transition include the following:

- **GX Decarbonised Power Source Act (enacted in 2023):** Formally titled the Act for Partial Revision of the Electricity Business Act and Other Acts for Establishing Electricity Supply Systems for Realizing a Decarbonised Society, this package of amendments revises, among others, the Electricity Business Act to establish institutional arrangements necessary both to promote the use of decarbonised power sources and to ensure a stable electricity supply.

  In particular, for nuclear power, while the maximum operating period remains capped at 60 years under the existing framework, the Act establishes a mechanism to exclude certain shutdown periods attributable to exogenous factors beyond the operator's control from the cap. In this way, depending on the nature of the shutdown, operation beyond 60 years could be permitted.

- **Hydrogen Society Promotion Act (enacted in 2024):** The formal title is the Act on the Promotion of Supply and Utilisation of Low-Carbon Hydrogen and its Derivatives for Smooth Transition to a Decarbonised, Growth-Oriented Economic Structure. The Act provides a framework to accelerate the early implementation of low-carbon hydrogen and its derivatives such as ammonia, synthetic fuels, and synthetic methane. Based on this Act, public support measures are being implemented, such as measures to address the price gap (e.g., a CfD-type scheme (Contract for Difference) designed to bridge the cost differential with fossil fuels) and support for the development of hydrogen-related hubs.

- **CCS Business Act (enacted in 2024):** The formal title is the Act on Carbon Dioxide Storage Business. The Act establishes the licensing, registration, and related institutional arrangements required to make CCS viable as a business, from the trial drilling (exploration) stage through to CO_2 storage.

- **Amendment enabling offshore wind deployment in the EEZ (enacted in 2025):** To expand the development of offshore wind projects beyond territorial waters and inland waters into Japan's Exclusive Economic Zone (EEZ), the Government enacted an amendment to the Act on Promoting the Utilisation of Sea Areas for the Development of Marine Renewable Energy Power Generation Facilities (the so-called "Renewable Energy Sea Area Utilisation Act"). The amendment shortens the Act's title to the Act on the Development of Marine Renewable Energy Power Generation Facilities and establishes a system to permit the installation of marine renewable energy power generation facilities in the EEZ.

Investment Incentives and Market Access

Japan's investment incentives framework for energy transition is centred on the Japan Climate Transition Bonds, which are intended to mobilise over JPY 150 trillion in public–private GX investment over the coming decade, with an upfront public support of JPY 20 trillion to catalyse private investment. The Government's policy intent is to channel these proceeds to high-risk, long-lead projects for which private investment is difficult to attract, and to provide a suite of de-risking and incentive measures: subsidies, tax incentives, equity investments, and debt guarantees, all to enhance predictability for first movers and accelerate deployment.

Examples of these measures include (i) the CfD scheme for low-carbon hydrogen and derivatives under the Hydrogen Society Promotion Act, (ii) risk-sharing support (including debt guarantees and equity) via the GX Acceleration Agency, and (iii) production-/sales-linked tax credits under the Strategic Sectors Domestic Production Promotion Tax System.

In addition to the above, Japan maintains various support instruments such as the Green Innovation Fund, renewable energy support schemes (FIT/FIP), and the Long-term Decarbonisation Power Source Auction (LTDA), which are discussed in later sections of this report.

As for the market itself, Japan's power generation market is liberalised, and except for the inward direct investment regulations described below, is subject to compliance with the Electricity Business Act and related technical, safety, and environmental requirements. There are generally no material licensing or nationality-based market entry restrictions specific to the development of decarbonised generation facilities, although project-specific permitting and grid-connection processes may apply. However, operators of power generation and storage facilities above a certain scale must file a prior notification before commencing operations.

Inward direct investment into Japan's energy sector is regulated primarily under the Foreign Exchange and Foreign Trade Act (FEFTA). Under FEFTA, businesses such as electricity, gas, and oil are designated as "Core Business Sectors" due to their critical importance to national security. Prior notification is generally required in cases where a

foreign investor acquires shares in a company operating in these sectors (for a listed company, acquisitions of 1% or more; for an unlisted company, any acquisition), or undertakes a business transfer or similar transaction. The foreign investor must file the notification with the Minister of Finance and the competent ministries (such as METI) and undergo screening to determine whether the investment would pose any risk to Japan's national security.

ELECTRICITY AND POWER GENERATION

Government Policy and Planning

Following the completion of legal unbundling of generation and transmission operations in 2020, Japan's reform of its electricity system has now entered a phase focused on achieving an optimal balance between decarbonisation and stable power supply.

Under the 7th Strategic Energy Plan and the related materials:

- The power sector is a cornerstone of decarbonisation, and Japan plans to expand the share of renewable energy to 40–50% by 2040, making renewables the leading power source for the first time, surpassing thermal power generation;
- At present, thermal power accounts for roughly 70% of electricity generation, while renewable energy represents just over 20%, meaning that achieving the 2040 target will require a substantial expansion of renewable energy deployment;
- Following a policy shift, the Government has removed the language calling for "reducing dependence [on nuclear power] as much as possible", and now aims to increase its share to around 20% of the electricity mix by 2040 (up from just over 5% at present);
- Thermal power generation is positioned as a transitional power source in the near to medium term, with the Government maintaining its policy of phasing out inefficient coal-fired plants while pursuing emissions reductions through measures such as fuel switching to gas and co-firing ammonia;
- Solar power is expected to become the largest single source of electricity by 2040, accounting for approximately 23–29% of total generation, which will require an approximately threefold expansion of installed capacity over the next 15 years; and
- Wind power is expected to account for 4–8% of total electricity generation by 2040, primarily driven by offshore wind, for which the Government has set capacity targets of 10 GW by 2030 and 30–45 GW by 2040.

Renewable Energy Support Schemes

- **Major Reform from FIT to FIP**

The Government has implemented a major reform to the fundamental framework for renewable energy support schemes. Under the country's feed-in tariff (FIT) scheme, electricity generated by approved developers from renewable energy sources is purchased by offtakers at fixed guaranteed prices for a fixed term (10–20 years). Offtakers under this scheme generally pass on the extra costs from purchasing renewable electricity to the end users through electricity bills.

In an effort to reduce the additional burden on households and businesses, METI has worked to shift from the FIT scheme to the FIP (feed-in premium) scheme, a more market-oriented mechanism where developers receive a premium ("supply promotion subsidy") to cover the gap between the designated "FIP price" (i.e., strike price) and the "reference price" based on the average market price. The purpose of this reform is to transfer more market risks to developers and incentivise them to make more effort to sell electricity effectively through the wholesale market or over-the-counter transactions in order to reduce the public burden of subsidising renewable energy sources.

- **Corporate PPA**

The number of corporate power purchase agreements (PPAs), including on-site, off-site, and virtual PPAs, has been increasing rapidly in Japan, driven not only by the Government's shift from the FIT system to the FIP system, but also by increased environmental awareness (as reflected by movements such as the increase in the number of RE100 members), the development of carbon credit markets, and the decreasing cost of renewable energy generation facilities. In addition, corporations have recently started to pay more attention to photovoltaic (PV) power generation in response to soaring electricity prices influenced by global energy security concerns.

The Government has also helped foster corporate PPAs by clarifying and easing relevant regulations, and by providing subsidies.

- **Marine Renewable Energy Act**

For offshore wind projects, the Port Act was amended in 2016 to create a legal framework to allow renewable energy projects to use the regulated offshore areas around certain designated ports for longer periods. In addition, the Marine Renewable Energy Act came into force in 2019 and establishes a legal framework for the long-term occupancy of offshore areas in Japan's territorial and internal waters (excluding port areas) for the development of offshore wind power projects, and provides for:

  - the designation of "promotion zones" to allow the long-term occupation of certain marine areas for the construction of offshore wind power plants;
  - a competitive bidding process for the determination of developers and the tariff/premium; and
  - a framework to accommodate stakeholder interests.

- **Long-term Decarbonised Power Source Auction**

Japan has introduced the Long-term Decarbonised Power Source Auction (LTDA) as part of its electricity market reforms to support stable investment in low-carbon and decarbonised power generation. Under this scheme, power producers that develop eligible decarbonised power sources (e.g., renewable energy, nuclear power, or thermal power with carbon reduction measures) can secure long-term revenue support through a competitive auction process.

Successful bidders are awarded long-term contracts that provide fixed or stable capacity payments over an extended period, typically up to 20 years. These payments are designed to recover capital investment costs and reduce long-term investment risk, particularly for projects with high upfront costs and long development timelines.

The auction complements Japan's capacity market by specifically targeting decarbonised power sources and aims to ensure decarbonisation as well as maintaining long-term supply adequacy, while minimising overall system costs through competition.

Third-Party Access to the Grid

Japan completed a significant legal unbundling in April 2020, separating the transmission and distribution arms of former regional monopolies into independent legal entities. Under Japan's regulated network access framework, market participants (including new renewable energy developers and battery storage operators) are now entitled to access the power grid on non-discriminatory terms, subject to applicable technical constraints and procedures. This framework is monitored and enforced by the Electricity and Gas Market Surveillance Commission (EGC), while network access operations are implemented by the relevant transmission and distribution utilities and coordinated at the cross-regional level through the Organisation for Cross-regional Coordination of Transmission Operators, Japan (OCCTO).

In an international context, Japan's model differs from the "Ownership Unbundling" model seen in some European markets (including the UK and parts of the EU), where grid assets must be under entirely separate ownership from generation or retail interests. Japan has instead opted for legal and functional separation, where grid operators may remain under the same holding company as their generation counterparts while maintaining strict operational and accounting firewalls.

Virtual Power Plant and Demand Response

Virtual Power Plants (VPPs) and Demand Response (DR) are increasingly recognised as key instruments for maintaining grid stability amid the growing penetration of renewable energy and rising uncertainty in electricity supply and demand. A VPP integrates and centrally controls distributed energy resources, such as solar generation, battery storage, electric vehicles, and flexible loads, using digital technologies so that they can operate collectively as a single power plant. DR, by contrast, involves adjusting electricity consumption in response to market signals or grid conditions.

Since the introduction of the licensing regime for aggregation business (designated wholesale electricity supply business) in April 2022, the commercial deployment of VPPs and DR has accelerated. With this regime, Japan has established electricity market frameworks, including the balancing market and the capacity market, which enable licensed aggregators to pool demand and distributed resources, and offer adjustment capacity to the system. In recent years, a wider range of resources, such as residential batteries and industrial facilities, have also begun to participate in these markets, contributing to supply–demand balancing during tighter periods.

Although the large-scale commercial deployment of VPPs remains at an early stage, the number of registered aggregators continues to grow, reflecting the steady expansion of VPP and DR-related business activities.

NATURAL GAS & LNG

Government Policies

Japan relies on imports for approximately 97.9% of its natural gas supply (FY2023), with virtually all imported gas procured in the form of liquefied natural gas (LNG). Owing to its limited domestic energy resources, Japan is one of the world's largest LNG-consuming countries, and developments in the global LNG market have a direct impact on Japan's energy security and electricity costs.

Japan's LNG supply is relatively less dependent on the Middle East compared with crude oil, but remains highly reliant on overseas sources, including suppliers in the Asia-Pacific region and the United States. Since the Great East Japan Earthquake in 2011, as well as during subsequent periods of tight power supply and demand, gas-fired power generation has played a critical role in maintaining the stability of the electricity system.

Against the backdrop of expanding renewable energy deployment and full liberalisation of the electricity retail market, future electricity demand has become increasingly uncertain. In this context, gas-fired power plants, which can be started and stopped relatively quickly and offer high operational flexibility, continue to play an important role in balancing supply and demand within the power system.

Natural gas and LNG are regarded as important energy sources during the transition period towards decarbonisation, as they emit less CO_2 than other fossil fuels. In the 7th Strategic Energy Plan, LNG-fired power generation is positioned as an essential power source for a realistic energy transition, with a certain level of new construction and replacement of gas-fired power plants anticipated. This reflects the growing electricity demand from digitalisation, including data centres.

In light of heightened geopolitical risks following Russia's invasion of Ukraine and increased competition in global LNG markets, the Government considers it essential, from the perspective of energy and economic security, that Japanese companies secure upstream interests and strengthen LNG supply chains. Natural gas has been designated as a "Specified Critical Material" under the Economic Security Promotion Act, making it subject to enhanced policy support.

The Government has identified the stable procurement of LNG as a key policy priority and is promoting measures to reinforce the entire LNG supply chain, including upstream investment, domestic resource development, and mitigation of transport-related risks. In particular, the Government is strengthening the provision of risk capital by the Japan Organisation for Metals and Energy Security (JOGMEC) to support Japanese companies' overseas investments.

Investment in and Development of Upstream Projects

As part of the efforts to reinforce risk capital support, the Government is examining enhancements to JOGMEC's equity participation schemes to facilitate medium- to long-term stable LNG supply. Following the transition of LNG projects to the production phase, measures are being considered to increase flexibility in the timing and amount of dividends received by Japanese companies, where such projects meet policy criteria related to energy security.

In cases deemed particularly important from an energy policy perspective, further incentives to encourage the acquisition of upstream interests by Japanese companies may be introduced. Factors considered relevant to energy security include, for example, projects that:

- are expected to sustain long-term development and production;
- involve long-term offtake of LNG corresponding to equity interests;
- contribute additional LNG volumes to the Japanese market;
- represent new participation by Japanese companies; and
- involve the construction of new liquefaction facilities.

Procurement of LNG

The 7th Strategic Energy Plan anticipates a degree of uncertainty in its LNG demand projections. If LNG procurement through long-term contracts were to fall short of demand, reliance on spot market purchases could increase, heightening price volatility and procurement uncertainty.

To address these risks, Japan has introduced the Strategic Buffer LNG (SBL) framework, operated primarily by JOGMEC. Under this framework, surplus LNG volumes are secured under a Government-established contractual arrangement administered by JOGMEC, allowing private operators to trade or utilise such volumes during normal times, while enabling the Government to prioritise domestic supply in the event of disruptions.

As Japan depends heavily on imported LNG, secure and stable maritime transportation is indispensable. At the same time, as international LNG trade has expanded and supply chains have grown increasingly

complex, LNG procurement has also gradually shifted from DES (Delivered Ex Ship) contracts towards FOB (Free on Board) contracts, under which Japanese buyers assume responsibility for transportation, thereby increasing their exposure to shipping and insurance risks.

In addition, heightened geopolitical tensions and international economic sanctions have raised concerns that insurance and reinsurance coverage for certain LNG shipping routes or cargoes could be restricted, potentially affecting the feasibility of physical transportation itself. In response, the Government recognises the need to establish a business environment that mitigates maritime transportation risks from both technical and financial perspectives, and is strengthening public–private cooperation, including measures to secure marine and war risk insurance.

PETROLEUM MIDSTREAM AND DOWNSTREAM INDUSTRY

Policy and Industry Landscape

The petroleum industry has long been one of Japan's core industrial sectors. In 2012, the combined revenues of the five major petroleum groups accounted for approximately 5% of Japan's GDP. However, driven by improvements in fuel efficiency, demographic decline, and the ageing of the population, domestic petroleum demand has been on a long-term downward trajectory and is not expected to increase materially going forward.

Against this background, the Government has pursued policies aimed at optimising the domestic supply structure and maintaining industrial competitiveness, primarily through the consolidation and rationalisation of refining capacity. Encouraged by the Act on Sophisticated Methods of Energy Supply Structures enacted in 2009, reductions in excess refining capacity, including refinery closures, and industry-wide restructuring were actively undertaken. As a result, the major players in the Japanese petroleum industry have consolidated into three groups, and the number of refineries has declined from a peak of 49 sites in 1984 to 19 sites as of 2025.

The current policy for the petroleum industry in Japan is no longer focused solely on adapting to declining demand; it also places strong emphasis on reducing emissions and facilitating a transition to decarbonised fuels. For refineries, this entails not only technological improvements, such as enhanced fuel efficiency and CO_2 reduction measures to be implemented in existing facilities, but also a fundamental transformation of the facilities themselves into production and receiving hubs for decarbonised fuels. In addition, by redeveloping or repurposing land, refinery sites are increasingly expected to serve as anchors for the formation of new GX industrial clusters.

In this context, the Government is positioning the petroleum industry not as a sunset industry, but as essential infrastructure to support energy security and a foundation for GX–related industrial development, with a view to integrating this otherwise declining industry into Japan's broader growth strategy.

Evolving Midstream and Retail Markets

Looking ahead, refineries and their surrounding sites are expected to evolve from conventional petroleum refining facilities into energy and materials hubs that support regional decarbonisation and play a central role in the energy transition. The current policy involves combining existing traditional petroleum refining operations with a range of new functions, including the production, supply, and storage of decarbonised fuels, low-carbon power generation, carbon capture and utilisation (CCU), and the manufacture and supply of chemical products using decarbonised energy and materials. Through such transformation, the policy aims to enable refineries to achieve both decarbonisation and business diversification.

Several major players have already begun to move in this direction. Cosmo Energy Group has constructed a sustainable aviation fuel (SAF) production plant within its Sakai Refinery in Osaka Prefecture, with an annual production capacity of 30,000 kilolitres, and commenced supply to airlines in April 2025. Idemitsu has developed biomass power generation facilities on portions of the former Keihin Refinery site in Kanagawa Prefecture and the Tokuyama Refinery site in Yamaguchi Prefecture, thereby entering the clean power generation business. ENEOS has also developed a next-generation energy supply platform on the former Shimizu Refinery site in Shizuoka Prefecture, comprising solar power generation, large-scale battery storage, and hydrogen production facilities. It began supplying clean electricity and hydrogen to local industries in June 2025.

To promote business diversification, the Government also launched the "GX Strategic Zones Programme" in 2025, aiming to foster and accelerate the development of GX industries in selected areas. Under the "industrial complex regeneration" category, which is particularly relevant to refineries, business operators with plans to leverage idle land and existing

facilities to scale up technology and expand production bases for GX-related new businesses are eligible for subsidies to support facility conversion and related infrastructure development. The initial GX Strategic Zones selection results are expected to be announced around summer 2026.

Taken together, refineries are expected to attract both public support and private investment along two parallel dimensions: the decarbonisation of facilities required to serve existing petroleum demand, and the diversification of businesses into next-generation clean energy-related fields.

By contrast, the retail market faces multiple structural challenges. Declining demand for petroleum products, labour shortages, succession issues, and ageing facilities all contribute to a steady decline in the number of service stations in Japan. While there were approximately 60,000 service stations nationwide at their peak in 1994, this number had fallen to around 27,000 by early 2025. Although the pace of this decrease has slowed in recent years, the gradual decline is expected to continue.

As a result, service station shortages are getting worse, particularly in rural areas, raising concerns over fuel delivery to elderly and rural residents and the maintenance of distribution infrastructure. In response, the Government has designated service stations as critical social infrastructure that supports daily life and economic activity, and has introduced support measures in cooperation with local governments.

Going forward, these service stations are expected to undergo business transformation and diversification, accompanied by new market entrants, business partnerships, and private investments. In addition to sustaining their operations, subsidy programmes are being expanded to promote their multifunctional transformation into hubs for EV charging (about 27,000 stations in 2025), hydrogen fueling (about 150 stations in 2025), logistics, and disaster response. Regulatory reforms have further enabled the co-location of convenience stores and laundry shops at service station sites, whose development was previously difficult under fire safety regulations. The transformation of service stations into mobility service hubs offering vehicle maintenance, insurance, and related services is also actively being explored.

EMERGING TECHNOLOGIES

Government Policies on New Technologies

The Government has positioned the realisation of Japan as a "nation built on new technologies" at the core of its national strategy, based on the view that strong scientific and technological capabilities underpin a "strong economy." In her policy speech to the Diet in October 2025, Prime Minister Takaichi emphasised that the flowering of advanced technologies is indispensable to addressing the diverse risks and societal challenges facing Japan and to expanding the overall scale of the Japanese economy.

One key support measure provided by the Government for technological development to enable the energy transition is the Green Innovation Fund (approximately JPY 2 trillion), operated through the New Energy and Industrial Technology Development Organisation (NEDO). This Fund provides continuous support (for up to 10 years) for R&D, demonstration, and societal deployment in fields where R&D is highly challenging and where long lead times to deployment are expected, including hydrogen, perovskite solar cells, and synthetic fuels (e-fuels). A key feature of this scheme is that it is not limited to mere subsidies; rather, by making support contingent on the achievement of ambitious outcome targets (KPIs), it strongly encourages private-sector risk-taking and is designed to accelerate technological breakthroughs.

Carbon Capture and Storage and Carbon Capture, Utilisation, and Storage (CCS / CCUS)

CCS (Carbon Capture and Storage) and CCUS (Carbon Capture, Utilisation, and Storage) are technologies that capture CO_2 emitted from power generation and industrial processes, such as oil refining, steelmaking, chemicals, and cement production, where decarbonisation through electrification or fuel switching alone is difficult. Within the GX policy framework, CCS is positioned as an important option for simultaneously achieving energy security, economic growth, and decarbonisation.

Japan has advanced its CCS development through a phased approach, which combines demonstration projects and institutional reforms. Key milestones include the successful large-scale CCS demonstration project in Tomakomai, Hokkaido, which achieved a cumulative CO_2 injection of approximately 300,000 tonnes by 2019, the enactment of the CCS Business Act in May 2024, and the launch of multiple advanced CCS projects since 2023. These developments have significantly clarified the pathway towards commercial CCS deployment.

In February 2025, a portion of the offshore area of Tomakomai was designated as Japan's first Designated Area for exploratory drilling to confirm geological suitability for CO_2 storage under the CCS Business Act, followed by a portion of the offshore area of Kujukuri, Chiba Prefecture, in September 2025. These designations have enabled concrete preparations for test drilling and subsequent project

development in multiple regions. While the CCS Business Act is being implemented in stages, the remaining provisions, covering CO_2 storage and pipeline transportation, are scheduled to enter into force by May 2026, completing the legal framework.

As CCS deployment becomes increasingly realistic, one key remaining challenge is the design of support mechanisms that enable smooth market entry and stable operation. In 2025, the Government published an interim summary on support measures for pipeline-based CCS projects, indicating a policy direction to bridge the gap between the costs of CCS and those of CO_2 mitigation borne by emitters, in order to secure sufficient project cash flow.

Support measures for ship-based CCS projects, involving the liquefaction and maritime transport of CO_2, are also expected to be examined at a later stage. While Japan possesses domestic geological formations suitable for CO_2 storage, overseas regions with significant storage potential exist as well. In particular, depleted oil and gas fields in nearby countries such as Malaysia, Indonesia, and Australia are recognised as promising candidates for overseas storage.

With respect to cross-border CCS, the international legal framework enabling the transboundary transport of CO_2 for sub-seabed storage is provided by the 2009 amendment to the London Protocol.[1] Japan has accepted this amendment and declared its provisional application. Furthermore, the country's export control regulations, the Export Trade Control Order, were amended in January 2026 to introduce an export authorisation regime for CO_2 transported for CCS purposes, representing a major step forward in establishing domestic legal arrangements for overseas CO_2 transport.

Against this institutional backdrop, the Government has designated multiple projects as Advanced CCS Projects and is providing ongoing support for their development as flagship initiatives, with the aim of achieving commercial CCS deployment by the early 2030s.

Next Generation Nuclear Reactors

In the 7th Strategic Energy Plan, with the objective of utilising nuclear power as a decarbonised power source, the Government sets out a policy to advance the development and deployment of next-generation advanced reactors incorporating new safety mechanisms, and to undertake concrete examination of potentially replacing existing reactors with these advanced reactors within existing sites. Prime Minister Takaichi also stated in her policy speech to the Diet that the Government would strive for the early practical adoption of next-generation advanced reactors, as well as fusion energy.

Globally, the momentum for the deployment of small modular reactors (SMRs) is growing. However, in Japan, given the geographic and political constraints that make the siting of greenfield nuclear power plants difficult, it is widely considered to be more realistic to introduce new reactor types through replacement at existing sites. Accordingly, large reactors, such as advanced light water reactors, are often viewed as preferable for their efficiency and the chance to maximise the use of existing infrastructure.

As for nuclear fusion, the Cabinet Office announced in June 2025 a revised Fusion Energy Innovation Strategy, which made explicit the goal of achieving an electricity generation demonstration by the 2030s. Following this, a task force was established to examine issues relating to the pursuit of the societal deployment of fusion.

Battery Energy Storage Systems (BESS)

In the GX2040 Vision, as revised in February 2025, the Government positions storage batteries as indispensable to the electrification of mobility and the establishment of renewable energy as a main power source, and as a critical product for achieving carbon neutrality by 2050. It sets out the following policy directions:

- In light of the outlook that 120 GWh/year of BESS manufacturing capacity can be secured through capital investment support and related measures already in place, the Government now targets 150 GWh/year by 2030, and will expand the scope of support by adding additional manufacturing equipment to the list of eligible items (storage batteries and component materials).
- The Government will strengthen resilience across the entire supply chain through measures including enhanced cooperation with like-minded countries, as well as resource-rich countries, and the promotion of reuse and recycling.
- The Government will aim to decarbonise battery manufacturing and enhance international competitiveness by supporting the establishment and strengthening of advanced manufacturing technologies enabled by DX and GX, and through the introduction of a framework to visualise CO_2 emissions during the manufacturing process. It

[1] 2009 Amendment to the Protocol of 1996 to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972.

will further improve the country's domestic manufacturing base and promote Japan-made storage batteries in global markets.

- The Government will provide support for R&D on all-solid-state batteries and for the acceleration of manufacturing technology development across the entire supply chain. This is to enable Japanese manufacturers to steadily capture the global market for next-generation batteries, targeting full-scale commercialisation around 2030.

As variable renewables expand, securing balancing capacity through BESS and pumped-storage hydropower has become an important issue. The Government is encouraging power producers to respond to market conditions, including by using battery storage to manage supply. It does this by shifting the renewable energy support scheme from the Feed-in Tariff (FIT) scheme (under which the purchaser is obliged to buy electricity at a fixed tariff whenever it is delivered) to the Feed-in Premium (FIP) scheme (which assumes that power producers sell electricity into the market).

Additionally, in recognition that BESS provides the essential balancing capacity for the integration of variable renewables, the Government has also made it eligible for the Long-term Decarbonisation Power Source Auction (LTDA). Under the LTDA, successful bidders are, in principle, granted capacity payments designed to recover fixed costs over a long-term period, generally up to 20 years.

In the first LTDA auction (FY2023), bidding in the pumped-storage hydropower / battery category significantly exceeded the procurement volume, resulting in intense competition. This indicates that batteries are attracting strong attention not only as a key to decarbonisation, but also as a business model. At the same time, in response to the concentration of bids, the auction conditions have continued to be reviewed in subsequent rounds, for example by revising procurement caps and limiting eligibility to larger batteries with longer operating durations.

Notably, so-called merchant-type battery projects (i.e., projects not relying on LTDA capacity payments) typically derive revenues from (i) arbitrage through buying and selling electricity on the Japan Electric Power Exchange (JEPX), (ii) participation in the balancing market where balancing capacity is procured via auctions (Japan's Supply–Demand Adjustment Market, operated by the Electric Power Reserve Exchange (EPRX)), and (iii) capacity revenues through bids into Japan's capacity market administered by the Organisation for Cross-regional Coordination of Transmission Operators, Japan (OCCTO).

In recent years, awarded prices in the Supply–Demand Adjustment Market have tended to be relatively high, contributing to a robust pipeline of battery projects premised on such revenue expectations. However, the Government has indicated a policy direction towards lowering price caps in the balancing market to limit the burden on electricity customers (who ultimately bear the costs) and maintain balance across markets.

The Government is supporting the deployment of increasingly anticipated long-duration energy storage (LDES) as a method to secure balancing capacity in power networks. LDES refers to facilities capable of storing and discharging energy over extended durations, including electrochemical, mechanical, thermal, and chemical approaches. Such resources can store large amounts of energy over long periods at relatively low cost and, depending on the technology, may provide system inertia (i.e., inertial response) to support the electricity system's frequency stability. In 2025, the Government expanded the scope of the LTDA to include new-build and replacement projects for LDES that perform functions comparable to pumped-storage hydropower and storage batteries.

Securing the resources required for battery manufacturing is also a key challenge. The Government's policy direction is to strengthen global supply-chain resilience, including by reducing dependence on any single country, and to promote resource circularity and secure critical minerals such as rare metals through the establishment and full operation of battery reuse and recycling systems.

Hydrogen and Ammonia

Japan has a long history of developing hydrogen-related technologies, including fuel cells, electrolysers, liquefied hydrogen transport, and hydrogen- or ammonia-fired turbines. In recent years, in particular, the Government has demonstrated strong policy support in this area by allocating a significant portion of the Green Innovation Fund to hydrogen-related projects. Hydrogen has attracted policy support not only as a form of technological advancement, but also as a key pillar of Japan's clean energy strategy. Japan was the first country to formulate a national hydrogen strategy in 2017 (revised in 2023), which sets out a long-term vision for the realisation of a "hydrogen society" by leveraging Japan's technological strengths.

In 2024, the Government enacted the ground-breaking Hydrogen Society Promotion Act. The Act enables the Ministry of Economy, Trade and Industry (METI) to implement support schemes for the development of large-scale supply chains for low-carbon hydrogen and its derivatives. Two types of

support are provided for under the Act: price-gap support (under a contract for difference (CfD) scheme) and hub development support.

The CfD scheme is designed to provide long-term revenue support to selected "first-mover" projects, both in Japan and overseas, for up to 15 years, by covering the gap between the hydrogen production and delivery costs and the sales price (generally benchmarked against fossil fuel prices). By the end of 2025, four projects (two domestic low-carbon hydrogen projects and two blue ammonia import projects from the United States) had been awarded the support, with further announcements expected in the coming months.

The hub development scheme provides capital expenditure support to infrastructure developers constructing shared facilities such as storage tanks and pipelines at designated locations. In principle, this will cover up to half of the construction costs. As of the time of writing, no successful applicants have yet been announced.

While the power sector is expected to be the primary consumer of hydrogen and ammonia, the Act also requires producers benefiting from the CfD scheme to supply these products to hard-to-abate sectors. Through these measures, Japan's early-stage low-carbon hydrogen supply chain is gradually taking shape towards 2030.

Other Emerging Technologies

- **Next-generation geothermal (supercritical geothermal, etc.)**

The Government positions next-generation geothermal technologies (e.g., supercritical geothermal resources) as a potential means of expanding the geothermal potential beyond the constraints of conventional geothermal development (e.g., resource availability and site constraints), and indicates a policy direction to support R&D and demonstration of these technologies, targeting early commercialisation by the 2030s.

As part of this policy support, NEDO is advancing R&D in accordance with its roadmap, including technology development for exploration-well drilling and geothermal assessment for supercritical geothermal resources. It is also implementing R&D programmes aimed at expanding geothermal deployment, including development in Special Zones of National Parks and Quasi-National Parks.

- **Next-generation solar cells (perovskite, etc.)**

Next-generation solar cells, particularly perovskite solar cells, are positioned as technologies that can broaden deployment opportunities to locations where conventional PV systems are difficult to install, such as building walls and rooftops with limited load-bearing capacity.

The Green Innovation Fund provides continuous support to these initiatives. METI also continues policy dialogue aimed at accelerating deployment and strengthening industrial competitiveness through public–private engagement.

- **Synthetic fuels (e-fuels / SAF / synthetic methane / green LPG)**

Synthetic fuels are positioned as a core area of carbon-recycling initiatives, serving as a decarbonisation option for sectors where electrification is challenging (including aviation and existing combustion-based applications), by utilising CO_2 as a resource.

The Green Innovation Fund is supporting the R&D efforts aimed at implementing: (1) synthetic fuels, (2) SAF, (3) synthetic methane, and (4) green LPG, including efforts to address challenges such as manufacturing cost reductions.

DATA CENTRES AND DIGITAL ENERGY DEMAND

Energy Intensity and Policy Support

Data centres are a critical component of Japan's digital infrastructure, supporting cloud computing, financial services, manufacturing, artificial intelligence (AI), and public administration. At the same time, they are among the most energy-intensive facilities. This creates significant policy challenges in a country facing electricity supply constraints, high energy costs, and ambitious decarbonisation targets.

- **Watt-Bit Collaboration**

As hyperscale and AI-driven data centres grow in size and number, ensuring timely access to grid capacity has emerged as a critical challenge. To address this issue, the Government established the Public-Private Council on Watt-Bit Collaboration. Its primary focus regarding data centres is to improve coordination on location planning, grid connection timing, and demand forecasting, thereby reducing the risk of delays caused by grid constraints.

Through this framework, policymakers seek to promote the efficient siting of data centres, encourage early-stage information sharing on large-scale projects, and support smoother grid investment decisions. The Watt-Bit collaboration is, therefore, positioned as a key mechanism to integrate data centre development into Japan's power system planning, while maintaining supply stability and supporting long-term decarbonisation objectives.

- **GX Strategic Areas and Data Centres**

The GX strategy designates certain GX Strategic Areas in order to promote decarbonisation while supporting economic growth. For data centre development, the Government aims to develop new large-scale data centre clusters in these areas, each with gigawatt-scale capacity (i.e., around 1 GW or more), within the next decade, supported by adequate grid capacity and access to low-carbon power sources. These data centre clusters are positioned not merely as standalone facilities, but as core infrastructure anchoring broader industrial clusters.

GX Strategic Areas are attractive to data centres because they offer better alignment with the power supply capacity, including access to renewable energy and potential support for grid reinforcement. By encouraging data centre development in these regions, the Government aims to reduce pressure on congested metropolitan grids while enabling low-carbon and stable power procurement.

In this context, GX Strategic Areas function as a policy tool to guide data centre siting towards locations where electricity availability, decarbonisation objectives, and regional economic revitalisation can be addressed simultaneously, supporting the sustainable growth of Japan's digital infrastructure.

- **Subsidies**

At the national level, the Government provides several subsidy programmes to support the development of data centres, focusing on regional decentralisation, energy efficiency, decarbonisation, and infrastructure resilience. These programmes are mainly administered by METI, the Ministry of Internal Affairs and Communications (MIC), and the Ministry of the Environment (MOE).

In addition, several local governments provide incentives to attract data centre investment, particularly in regional areas. These incentives may include tax reductions or subsidies for capital investment, support for renewable energy integration, and preferential treatment for facilities that achieve high energy efficiency or low-carbon standards. Such regional policies aim not only to reduce energy intensity, but also to alleviate grid congestion and promote regional economic development.

Power Procurement for Data Centres

Power procurement is a critical issue for data centres in Japan, given their large and continuous electricity demand within the country's constrained, evolving power market structure. Securing stable, cost-effective, and low-carbon electricity has become a central strategic consideration for both domestic and international data centre operators.

Traditionally, data centres in Japan have relied on long-term power purchase agreements with a major power company in the area where the facilities are located (i.e., one of the former General Electricity Utilities). These arrangements offer high reliability, which is essential for their operations, but also limited flexibility for operators in choosing energy sources. Although electricity market liberalisation has expanded retail choices, large-scale data centres still rely heavily on these major power companies for electricity supply.

Against this backdrop, renewable energy procurement has gained importance in recent years. Data centre operators and customers have started to use corporate PPAs, including virtual PPAs, to secure renewable electricity and manage carbon exposure. However, physical constraints, such as limited availability of renewable generation near urban data centres and grid congestion, often mean that renewable procurement is achieved through virtual PPAs rather than through direct physical supply. In this regard, Japan's system of non-fossil certificates also plays a significant role, allowing data centre operators and customers to claim the environmental value of low-carbon electricity.

Challenges in Grid Integration

In the context of data centres, grid integration challenges primarily stem from the scale, concentration, and rapid growth of electricity demand. Large data centres require substantial and continuous power supply, often exceeding available grid capacity, while grid reinforcement and connection upgrades typically involve long lead times.

These challenges are particularly evident in established data centre clusters, such as Inzai City in Chiba Prefecture, where competition for limited grid capacity means that securing a grid connection can take several years. Geographic concentration in metropolitan areas further exacerbates congestion and delays in grid access.

To address this issue, the Government has been examining measures within the grid connection process, such as requiring clearer evidence of project readiness, in order to better reflect the credibility and feasibility of projects, including data centre developments. This is to ensure that operators with the capability and commitment to execute projects can obtain grid connections in a timely manner, while avoiding speculative or uncertain reservations of grid capacity.

Water Supply Considerations

Data centres in Japan generally face few constraints in sourcing water, compared to energy or grid-related issues. Japan has relatively abundant water resources, well-developed municipal water infrastructure, and high reliability in water supply services, particularly in urban and industrial areas where most data centres are located. Overall, while water efficiency remains a relevant sustainability consideration, water supply does not represent a material barrier to data centre development or operation in Japan under current conditions.

TRANSPORTATION

Energy Transition in the Automotive Sector

The automotive industry is a core pillar of Japan's economy, and decarbonisation in the sector is being advanced through a multi-pathway approach.

In its Green Growth Strategy Towards Carbon Neutrality in 2050 (formulated in 2021), the Government sets out the following targets:

(i) **For passenger vehicles**: to achieve the ratio of 100% electrified vehicles (EVs, PHVs, HEVs, FCVs) in new passenger vehicle sales by 2035;

(ii) **For commercial vehicles**: to increase the ratio of electrified vehicles to 20–30% of new small commercial vehicle sales by 2030 and to reach 100% electrified vehicles and/or decarbonised-fuel vehicles by 2040, while for heavy-duty vehicles, aiming for the early rollout of 5,000 units during the 2020s; and

(iii) **For the promotion of electrified vehicles through 2040**: to set a target by 2030. The Government also places an emphasis on the decarbonisation of internal combustion engine (ICE) vehicles through the use of e-fuels.

While these targets have not been formally updated since then, decarbonisation efforts in the automotive sector have continued at both national and prefectural levels. Key initiatives are as follows:

- Fuel efficiency regulations have been revised. Under the FY2030 fuel efficiency standards, a new target has been set to improve average passenger-vehicle fuel economy to an equivalent of 25.4 km/L. This target encourages automakers to advance hybrid technologies and improve next-generation engines, contributing to emissions reductions.
- EV charging infrastructure is being expanded, including the deployment of charging networks at highway service areas and in urban locations. The Government aims to install 300,000 charging points by 2030 (including 30,000 public fast chargers), while also pursuing higher charging output.
- Various efforts have been made to expand the uptake of fuel cell vehicles (FCVs). Under the revised Basic Hydrogen Strategy (2023), targets have been set to reach 800,000 FCVs (passenger-vehicle equivalents) and to develop 1,000 hydrogen refuelling stations by 2030. While the current number of FCVs remains at only several thousand units, the Government is implementing support measures to encourage adoption in the public sector and the public transport industry, such as bus and taxi fleets, alongside efforts to apply fuel-cell technologies to commercial vehicles.

Additionally, the Government is advancing policies to introduce biofuels for automobiles. From FY2028, an early rollout of E10 (gasoline blended with 10% bioethanol) is planned, initially targeting Okinawa Prefecture and other areas. Tax relief measures are also being implemented for gasoline blended with bioethanol and biodiesel fuels, including reductions in the gasoline tax and the diesel delivery tax.

Other Transportation Sectors

Aviation: Japan has set a target for Sustainable Aviation Fuel (SAF) use by 2030, aiming to replace 10% of fuel consumption by Japanese airlines with SAF. To accelerate the shift, METI and the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) jointly established the "SAF Public–Private Council" in 2022, with participation from petroleum wholesalers and airlines. In January 2026, the council compiled a Basic Policy to Further Promote SAF Adoption, which indicated that mechanisms would be considered to enable airlines to pass on part of the cost of SAF procurement to passengers.

Shipping: In line with the International Maritime Organisation's (IMO) net-zero target for 2050, MLIT is advancing support for the development and construction of "zero-emission vessels" using fuels such as hydrogen, ammonia, and bio-LNG. Efforts are also underway to develop charging infrastructure for vessels at ports.

Railways: In urban areas, some rail lines are already operating on an effectively 100% renewable electricity basis. Railways are largely electrified, and further energy-efficiency technologies are being introduced. For certain non-electrified lines, the deployment of hydrogen fuel-cell rolling stock and battery-powered trains is also under consideration, with demonstration projects underway.

Finally, the Government is also promoting "modal shift" initiatives, encouraging a transition of freight transport currently handled by trucks and other road vehicles towards lower-emission modes such as rail and shipping.

CLIMATE CHANGE AND DECARBONISATION

Climate Change Government Policies

As discussed in the section titled "Policy and Regulatory Framework — Climate Change and Carbon Reduction Framework" above, Japan's climate change policy framework is built around the long-term objective of achieving net zero (carbon neutrality) by 2050, and is structured to advance emissions reductions while ensuring consistency between its NDC under the Paris Agreement and its domestic plans and legislation. In recent years, in addition to adopting "conventional" global-warming countermeasures as environmental policies, Japan has increasingly clarified a policy package under which decarbonisation is pursued in tandem with industrial competitiveness and investment mobilisation through GX.

ETS and Carbon Pricing Developments

Japan has had a carbon-pricing measure in the form of the Tax for Climate Change Mitigation (a carbon-tax-type charge) collected upon the purchase of fossil fuels. However, under recent GX policy, the design of Growth-Oriented Carbon Pricing has been made more concrete, including the full-scale operation of an emissions trading scheme (ETS) and the phased introduction of a fossil-fuel levy.

- **ETS: from the GX League to "full-scale operation"**

The GX2040 Vision sets out a roadmap for the development of Japan's ETS in phases:

- **Phase 1: GX League (launched in FY2023)**

  The scheme began as a framework based on voluntary commitments by participating companies, designed to impose accountability and provide incentives for emissions reductions.

- **Phase 2: Full-scale operation of the ETS (from FY2026)**

  The scheme is designed with "mandatory participation" as a core feature by bringing emitters above a certain scale into the scheme regardless of industry to ensure fairness and effectiveness. Based on government guidelines, the scheme also takes into account sectoral characteristics and pathways towards decarbonisation when determining the required levels of reductions.

  In terms of market design, the approach does not just "set a cap", but structures the market to promote GX investment. For example, the policy direction includes implementing a price corridor for allowances (price-stabilisation measures) to enhance the predictability of medium- to long-term price increases while avoiding adverse macroeconomic impacts from short-term price spikes.

  Depending on post-launch trading volumes, further measures may be considered, including strengthening the trading market (e.g., more centralised trading to facilitate appropriate price discovery) and, over time, expanding participation and introducing derivatives. At least at the outset, however, the ETS is designed primarily as a market centred on trades driven by compliance needs.

- **Paid auctioning in the power sector: phased expansion from FY2033**

After the ETS becomes fully operational, paid allowance auctions are planned to begin from FY2033. Power producers designated as being subject to auctioning will be required to obtain a portion of their allowances on a paid basis and, in exchange, to pay a government charge (a charge imposed on specified business operators).

This design aims to: (i) accelerate emissions reductions in the power sector; and (ii) enhance the predictability of the scheme during the GX transition period.

- **Fossil-fuel levy: introduction from FY2028 (as a repayment source for Japan Climate Transition Bonds)**

The GX2040 Vision explicitly sets out a policy to introduce a fossil-fuel levy from FY2028 as a uniform carbon-pricing measure applied to emissions.

The levy is designed to be imposed on the same scope as the existing Petroleum and Coal Tax. While the Government considers the potential use of exemptions or reductions to maintain international competitiveness and the availability of alternative technologies, the scheme is designed to ensure smooth and reliable implementation as a repayment source for Japan Climate Transition Bonds.

The Government has also indicated that adjustment measures will be examined in relation to the paid allowance auctions to be introduced in FY2033 to prevent double carbon-pricing burdens.

- **Credits (J-Credits / JCM) and the incorporation of removals and sinks**

Credits eligible for use under the ETS are to include J-Credits and JCM credits. In addition, the policy direction refers to the incorporation of carbon removals and sinks into the scheme (including CCS/CCU, forests, and DACCS), and development of mechanisms to ensure objectivity and accuracy (e.g., third-party verification).

- **System alignment and harmonisation with existing and local schemes**

In introducing the new ETS, overlaps may arise with existing reporting requirements under frameworks such as the Energy Conservation Act and the Global Warming Countermeasures Act. Accordingly, the policy direction includes the reduction of administrative burdens for covered business operators (e.g., simplification of procedures and system alignment) and aims to review and streamline the relationship between (i) measures to expand non-fossil power sources under the Act on Sophisticated Methods of Energy Supply Structures and (ii) measures to reduce carbon emissions imposed on emitters (including power producers) under the ETS, while taking into account the respective policy effects of each measure.

In addition, the Government has indicated that it will continue dialogue with local governments on advanced emissions trading schemes established under local ordinances, with a view to addressing their overlaps with the national scheme and ensuring consistency between national and local carbon-pricing frameworks (a key implementation issue going forward).

FINAL THOUGHTS, OUTLOOK, AND OPPORTUNITIES

Summary of Future Outlook

As a policy agenda, Japan's energy transition is being advanced to achieve decarbonisation while simultaneously strengthening its energy security and industrial competitiveness. At its core are the 7th Strategic Energy Plan and the GX2040 Vision, both approved by the Cabinet in February 2025, and the Government has indicated its intention to implement them as an integrated package.

A key assumption going forward is that domestic electricity demand could increase, driven by DX, advances in AI, new build-outs such as data centres and semiconductor factories, and electrification across the industrial and transport sectors. In scenarios where demand rises, it will become increasingly important to reinforce not only the deployment of decarbonised power sources, but also grid development and system flexibility (e.g., supply–demand balancing and storage).

Regarding the power mix, the 7th Strategic Energy Plan indicates a direction towards a significant increase in the share of renewables by 2040, while assigning nuclear power a continued role as a decarbonised power source. In this way, Japan is expected to continue a multi-track transition: advancing renewable expansion and market integration while restarting and utilising nuclear, and maintaining a role for LNG-fired power generation in the near term to ensure stable supply.

For new technologies, support schemes are being introduced to underpin the development of hydrogen and ammonia supply chains, and institutional arrangements for CCS are also expected to be advanced in stages to achieve commercial deployment.

Opportunities for Investors

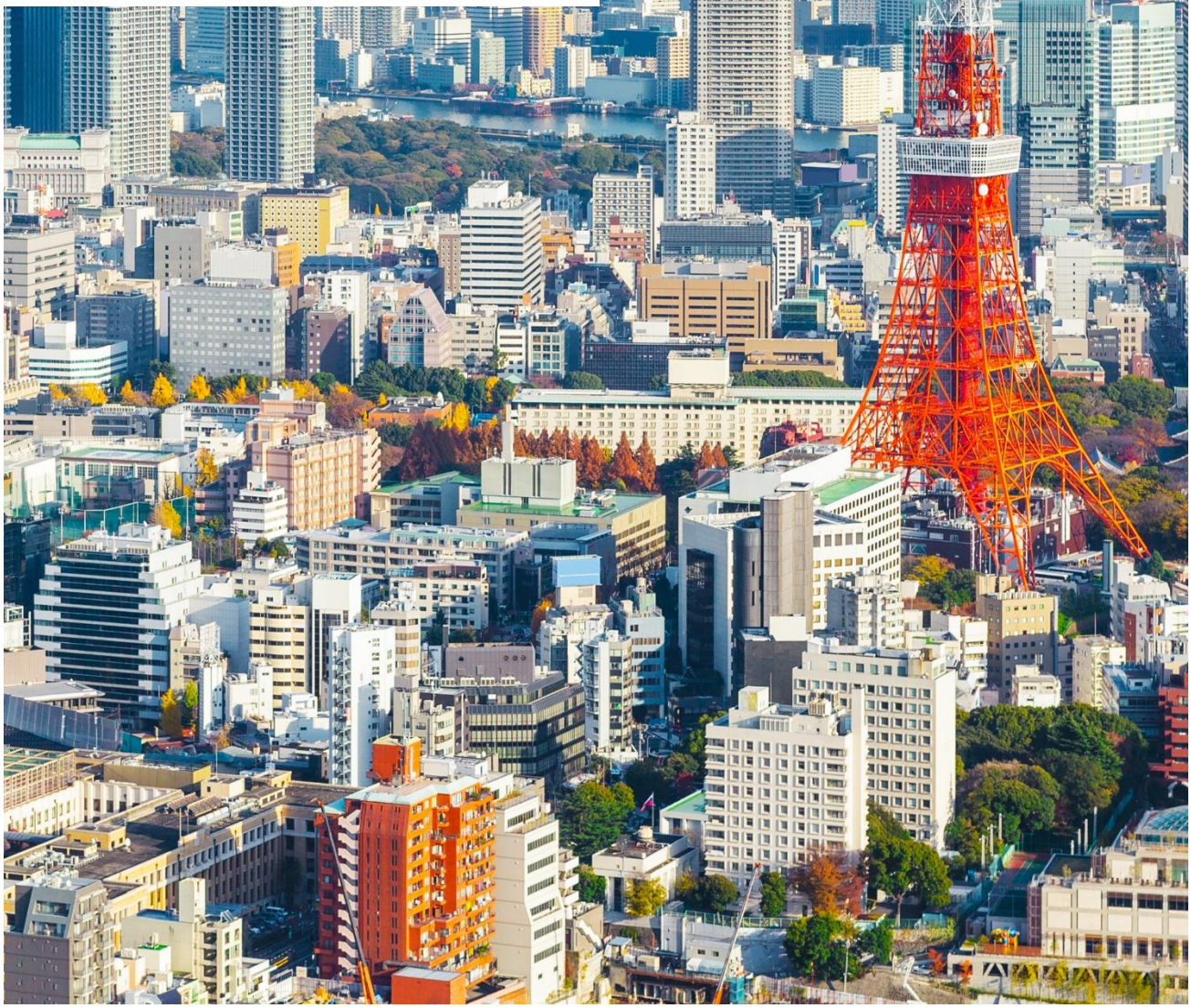
In Japan, institutional reforms and support measures are being advanced with the dual objective of decarbonisation and stable supply at the centre, creating a pipeline of potential investment opportunities. Based on the topics covered so far in this report, opportunities for investors can be summarised as follows:

- **Development of decarbonised power sources:** As renewables are increasingly integrated into the market under the FIP scheme, the use of corporate PPAs, including both off-site and on-site arrangements, is expanding. In addition, in areas where national deployment policy is closely linked to industrial policy, such as offshore wind, geothermal, and next-generation solar technologies, participation opportunities can be expected across development, supply chains, and EPC.
- **Grids and flexibility:** To support both expanding renewables and potential demand growth, the importance of BESS, balancing, DR, and VPPs is increasing. Investment opportunities can be layered not only from wholesale power trading, but also from the capacity market (main auction) and the balancing market, with an additional option of securing long-term capacity revenues through the LTDA.
- **Supply chains for low-carbon fuels:** For hydrogen and ammonia, schemes such as price-gap support (CfD-type) and support for hub development are being put in place to help launch supply chains; project formation will focus

on linking infrastructure (receiving, storage, and transportation) with demand (power generation and hard-to-abate industry).

At the same time, it is necessary for investors to carefully assess, on a project-by-project basis, both the revenue sources and practical constraints. Depending on the project, careful consideration may also be required for prior notifications and screening under the Foreign Exchange and Foreign Trade Act (FEFTA), notifications and technical/safety regulations under the Electricity Business Act, grid connection and construction timelines, permitting and environmental impact assessment, and the process of building local consensus.

In light of the foregoing, Japan is expected to continue steadily strengthening its institutional framework and support measures for the energy transition under government policy. If an appropriate scheme design and partner selection can be achieved, there should be opportunities to originate projects that may merit medium- to long-term consideration, including for overseas investors.



AUTHORS

THAILAND

Mr. Joseph Tisuthiwongse
Co-managing partner
joseph.t@morihamada.com

Ms. Sarunporn Chaianant
Partner
sarunporn.c@morihamada.com

Mr. Sooksun Popun-ngarm
Partner
sooksun.popun-ngarm@morihamada.com

Ms. Tip-apa Limvichai
Partner
tip-apa.l@morihamada.com

Ms. Monsicha Pongrujikorn
Counsel
monsicha.p@morihamada.com

Ms. Varisa Soonyakanit
Senior Associate
varisa.s@morihamada.com

Ms. Jongkotchakorn Phantophas
Associate
jongkotchakorn.p@morihamada.com

Ms. Kanchanit Horuengwetkij
Associate
kanchanit.h@morihamada.com

Mr. Supawich Nimmansomboon
Associate
supawich.n@morihamada.com

Mr. Supawin Pongthananikorn
Associate
supawin.p@morihamada.com

Mr. Thanakorn Kedjinakul
Associate
thanakorn.k@morihamada.com

VIETNAM

Ms. Ha Thi Dung
Partner
dung.ha@morihamada.com

Mr. Hiroki Kishi
Partner
hiroki.kishi@morihamada.com

Mr. Takeshi Mukawa
Partner
takeshi.mukawa@morihamada.com

Mr. Nirmalan Amirthanesan
Senior Associate
nirmalan.amirthanesan@morihamada.com

Ms. Nguyen Tra Linh
Associate
linh.nguyen@morihamada.com

THE PHILIPPINES

Ms. Patricia Cristina Ngochua
Senior Partner
patricia.ngochua@tnc-partners.com

Mr. Allan Christopher Chu
Senior Partner
allan.chu@tnc-partners.com

MYANMAR

Ms. Khin Cho Kyi
Senior Legal Advisor
kckyi@mlslyangon.com

Mr. Julian Barendse
Partner
julian.barendse@morihamada.com

Mr. Takeshi Mukawa
Partner
takeshi.mukawa@morihamada.com

Mr. Nirmalan Amirthanesan
Senior Associate
nirmalan.amirthanesan@morihamada.com

SINGAPORE

Mr. Julian Barendse
Partner
julian.barendse@morihamada.com

Mr. Brendan Lai
Associate
brendan.lai@morihamada.com

INDONESIA

Ms. Alfa Setiawati
Partner
alfa.s@morihamada.com

Mr. Ivan Tjahjadi
Associate
ivan.t@morihamada.com

Ms. Farisa Azhara
Associate
farisa.a@morihamada.com

Ms. Arneta Nanako
Associate
arneta.n@morihamada.com

Ms. Angelica Edelweis
Associate
angelica.e@morihamada.com

JAPAN

Mr. Hirohiko Tanaka
Partner
hirohiko.tanaka@morihamada.com

Ms. Mihoko Shima
Partner
mihoko.shima@morihamada.com

Mr. Shigeki Okatani
Partner
shigeki.okatani@morihamada.com

Mr. Yoshitaro Tominaga
Partner
yoshitaro.tominaga@morihamada.com

Mr. Tomohiko Adachi
Counsel
tomohiko.adachi@morihamada.com

Mr. Hiroyoshi Sanada
Associate
hiroyoshi.sanada@morihamada.com

Mori Hamada provides the highest quality services to clients across a range of legal practice areas, based on the fundamental principles of maintaining and enhancing our reputation as a leading full–service international law firm.

Mori Hamada has offices in Bangkok (Chandler Mori Hamada), Beijing, Hanoi, Ho Chi Minh City, Jakarta (ATD Law in association with Mori Hamada), Manila (strategic alliance with Tayag Ngochua & Chu), Shanghai, Singapore, Yangon, Tokyo, Fukuoka, Nagoya, Osaka, Sapporo, Kochi, Takamatsu, Yokohama, London, New York, and San Francisco.