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Integrating Natural Gas into the New ASEAN Petroleum Security Agreement:

Framework and Implementation

Economic Research Institute for ASEAN and East Asia

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Executive Summary

In October 2025, the Association of Southeast Asian Nations (ASEAN) Energy Ministers adopted the new ASEAN Petroleum Security Agreement (APSA), replacing the 2013 Agreement. A key enhancement of the revised APSA is the explicit separation of natural gas and oil – two fuels that were previously treated under a single, ambiguous definition. This clearer distinction enables the Agreement to address the unique risks, crisis dynamics, and security requirements associated with each fuel.

Strengthening the treatment of natural gas within APSA is both timely and necessary. ASEAN's demand for natural gas continues to grow, whilst domestic production is declining and proven reserves show limited expansion. These structural challenges heighten the region's exposure to supply shortfalls. At the same time, natural gas security is increasingly vulnerable to infrastructure outages, geopolitical tensions, and disruptions to maritime transport routes. In contrast to other major gas-consuming economies, such as the European Union, Japan, and the Republic of Korea, which have established comprehensive emergency co-ordination systems, strategic storage mechanisms, and co-operative procurement arrangements, ASEAN currently lacks a comparable regional framework. Expanding APSA to include natural gas therefore represents an important step towards mitigating supply shocks, reducing price volatility, and avoiding fragmented national responses during crises.

Prepared by the ASEAN Centre for Energy (ACE), as the APSA Secretariat, with support from the Economic Research Institute for ASEAN and East Asia (ERIA), this framework provides the principal template for incorporating natural gas into the new APSA and supporting its implementation. The framework recommends the following steps:

- Establish normal domestic requirements and critical shortage triggers as the baseline.
- Develop domestic natural gas demand-response plans.
- Invoke the Co-ordinated Emergency Response Mechanism.
- Enhance natural gas infrastructure and supply resilience.
- Manage demand and optimise available resources.

To sustain the momentum generated by the adoption of the new APSA, co-ordinated follow-up actions will be essential. Stakeholders should leverage the new Article 6 on the Implementation Agreement, which sets out the framework for future implementation measures; utilise the forthcoming ASEAN Plan of Action for Energy Cooperation (APAEC) 2026–2030 to deepen regional collaboration on energy security; explore funding options to support a fully operational APSA Secretariat; and reinforce political commitment to safeguarding the region's long-term energy resilience, including the security of natural gas supplies.

Background

In 2013, the Association of Southeast Asian Nations (ASEAN) renewed the ASEAN Petroleum Security Agreement (APSA) for a second 10-year term, setting its expiry for 2023. As the end date approached, ASEAN Member States held two formal Focus Group Discussions in November 2022 and January 2023. During these meetings, they agreed to extend APSA for an additional 2 years without modification as an interim measure. Relevant stakeholders and ASEAN bodies were also tasked with preparing proposals to strengthen the Agreement.

A series of Focus Group Discussions and writing workshops were subsequently conducted with the participation of the ASEAN Centre for Energy (ACE), the ASEAN Secretariat, representatives of relevant government ministries, and the ASEAN Council on Petroleum – collectively referred to as the APSA Working Group – to develop the new APSA. Throughout these discussions, the Working Group identified 10 key gaps that needed to be addressed. One major gap concerned the treatment of natural gas. The existing APSA uses an atypical definition of 'petroleum' that encompasses natural gas, even though petroleum generally refers to liquid fuels such as crude oil and refined products. As a result, natural gas and oil have been treated as a single category despite their distinct supply risks, crisis dynamics, and response requirements.

The new APSA was formally adopted at the 43rd ASEAN Ministers on Energy Meeting on 16 October 2025, pending signature by the ASEAN Member States. It introduces several significant updates, including a clearer distinction between natural gas and oil.

This report, *Integrating Natural Gas into the New ASEAN Petroleum Security Agreement: Framework and Implementation*, provides a framework for systematically incorporating natural gas into APSA and operationalising its implementation. In developing this framework, the report draws upon (i) the rationale for including natural gas in the new APSA, (ii) an overview of the new APSA and its predecessors, and (iii) international best practices in natural gas security policy.

Chapter 1

Why ASEAN Should Include Natural Gas in the New ASEAN Framework Agreement on Petroleum Security and Enforce its Implementation

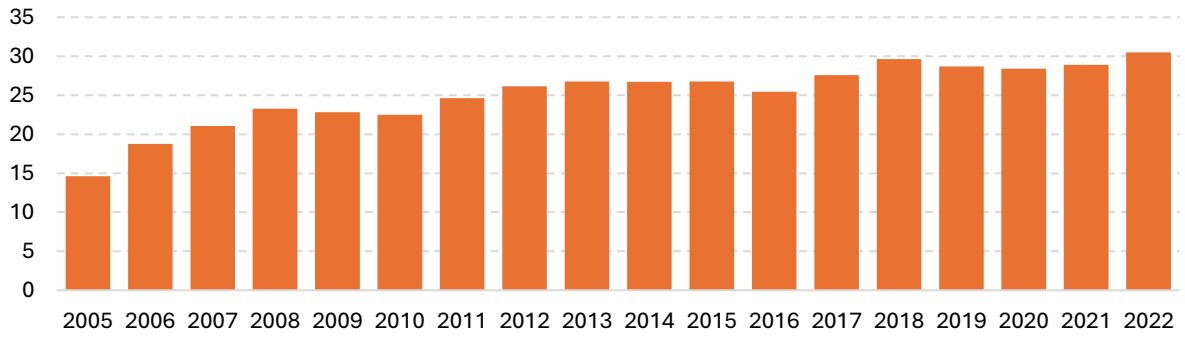
1.1. Growing Demand for Natural Gas:

ASEAN grapples with the pressing challenges of balancing rapid economic growth with sustainable energy use, and total final energy consumption continues to rise. The 8th ASEAN Energy Outlook (AEO8) projects that by 2050, energy demand in ASEAN will have grown 2.6 times from 2022 levels under the Baseline Scenario (ACE, 2024a). Historically, around 60% of the total demand has been met by fossil fuels, namely coal, oil, and natural gas.

Natural gas dominates the energy generation mix. Most of the natural gas consumed in the region is used for power generation and industrial purposes.

Figure 1: Natural Gas Demand in ASEAN

(*Mtoe*)



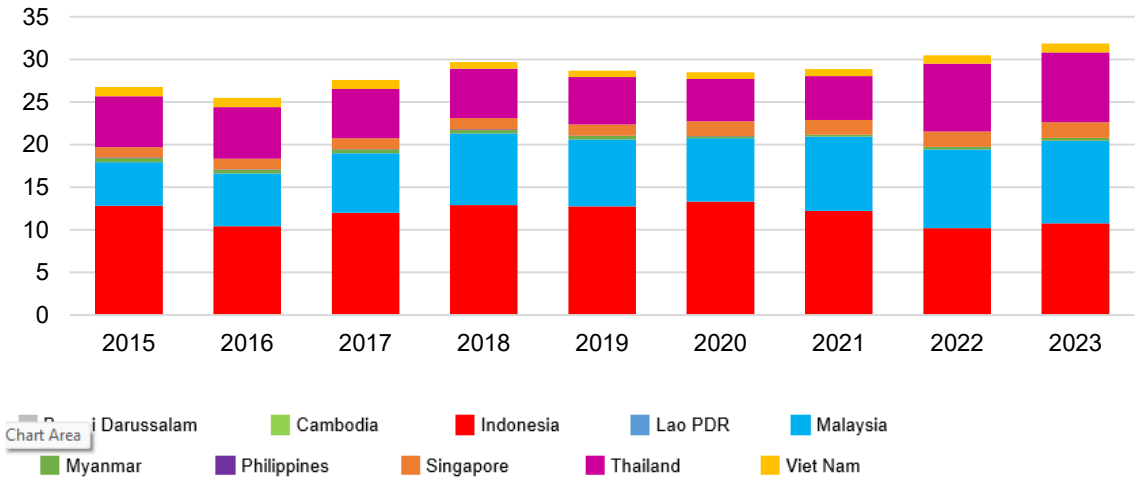
Mtoe = million tonnes of oil equivalent.

Source: ACE (2024a).

In 2022, ASEAN consumed 30.49 million tonnes of oil equivalent of natural gas (Figure 1). The ASEAN Oil and Gas Updates 2024 recorded that natural gas consumption rose by 4.56% between 2022 and 2023, with Indonesia and Malaysia recording the highest growth rates Referencesst AMS at 5.51% (Indonesia) and 5.09% (Malaysia) (ACE, 2024b) (Figure 2). Looking ahead, regional natural gas consumption is expected to reach 83.96 million tonnes of oil equivalent by 2050 under the Baseline Scenario, which is a 2.75-fold increase compared to 2022 levels. By then, natural gas is anticipated to supply more than one-fifth (22%) of Southeast Asia's total energy demand (ACE, 2024b).

Figure 2: Natural Gas Consumption in ASEAN by Member State and Year

(Mtoe)



Lao PDR = Lao People's Democratic Republic, Mtoe = millions of tonnes of oil equivalent, Myanmar = Republic of the Union of Myanmar.
Source: ACE (2024b)

Moreover, the role of natural gas as a 'bridge fuel' or 'transitional fuel' is gaining traction, due to its ability to support the transition from high-emission fossil fuels like coal to cleaner energy sources (ACE, 2025a). Natural gas offers a combination of lower greenhouse gas emissions relative to coal and oil, fewer non-carbon air pollutants, and high operational flexibility, making it indispensable in the short- to mid-term energy mix of ASEAN Member States (AMS). Under the Carbon Neutrality Scenario of AEO8, natural gas is expected to contribute 20% of Southeast Asia's total primary energy supply in 2050.

This role is reflected in national strategies across AMS, including Malaysia, Indonesia, and Viet Nam.

Malaysia: Malaysia, in the National Energy Transition Roadmap, views natural gas as critical to meet rising energy demand, particularly from the fast-growing data centre sector. By 2027, data centres are expected to consume 21% of the region's electricity, up from 7% in 2022. To meet this rising demand, Malaysia plans to increase its gas-fired power capacity by 40%–54% (adding 6–8 gigawatts by 2030) (Varadhan and Tang, 2025) as part of a broader strategy to reduce coal dependency and transition into a cleaner energy source.

Indonesia: Indonesia positions natural gas as a central component of its energy transition strategy toward Net Zero Emissions by 2060 (Indonesia Business Post, 2025). With abundant reserves and competitive pricing, natural gas is viewed as a strategic asset in the shift from fossil fuels to cleaner energy. Looking ahead from 2025 to 2029, the government plans to introduce decarbonisation regulations, expand domestic gas utilisation, and strengthen the national gas transmission and distribution networks.

Efforts are already underway, including the replacement of diesel with liquefied natural gas (LNG) in dozens of power plants (Chow and Nagoy, 2025).

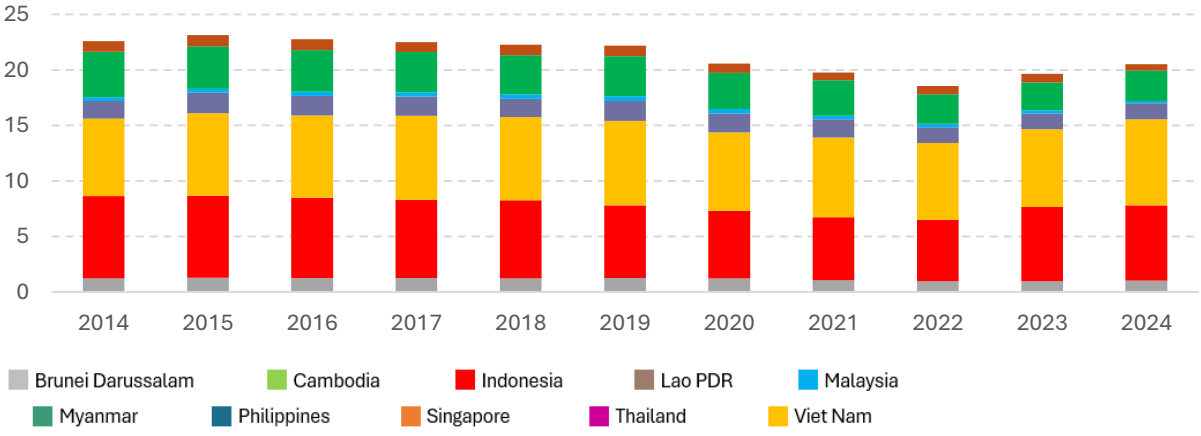
Viet Nam: Viet Nam regards natural gas, especially LNG, as a bridge between phasing out coal and adopting clean energy solutions (GEM, 2024). The country plans to increase gas-fired capacity to 38 gigawatts by 2030, raising the gas share (LNG and domestic gas) of the energy mix from 9.3% in 2022 to 25.0%. To achieve this, Viet Nam plans to build 13 LNG-fired power plants by 2030.

1.2. Decreasing Supply of Natural Gas

While demand is increasing, natural gas production across most AMS has either plateaued or declined in recent years. As shown in Figure 3, regional output began falling around 2016, with the steepest drop between 2019 and 2020, when production fell by 7.34%. Brunei Darussalam, Indonesia, Malaysia, the Republic of the Union of Myanmar, the Philippines, and Thailand have all reported varying degrees of production declines. Although some recovery has been observed since 2023, the declining trend is expected to persist in the long run due largely to ageing fields.

Figure 3: Gas Production in ASEAN by Year

(BSCFD)



BBSCFD = billion standard cubic feet per day; Lao PDR = Lao People's Democratic Republic; Myanmar = Republic of the Union of Myanmar.
Source: ACE (2024b).

This trend is reflected across several AMS, including Brunei Darussalam, Indonesia, and Malaysia.

Brunei Darussalam: Brunei Darussalam's natural gas output fell by 11% in 2023 compared to 2022 (Offshore Technology, 2024a). Major producers such as Shell,

TotalEnergies, and Brunei National Petroleum Co. reported double-digit declines. The country's gas fields are maturing, and without accelerated exploration and development, sustaining current production levels beyond the next decade will be difficult (EIA, 2017).

Indonesia: Indonesia has been experiencing a natural gas supply deficit since 2025, primarily due to the natural decline in existing fields (CNN Indonesia, 2025). New discoveries and production from emerging gas fields have not kept pace. According to the gas balance profile of Indonesia's national gas company, Perusahaan Gas Negara, the deficit is expected to worsen, reaching a shortfall of 513 million standard cubic feet per day by 2035 (CNN Indonesia, 2025).

Malaysia: Between 2015 and 2020, Malaysia's domestic gas production declined from 76.7 bi to 68.7 billion cubic metres (bcm) (Mordor Intelligence, 2024). Although there was a temporary rebound in 2021, production is expected to decline again due to ageing offshore fields, especially in the shallow waters off Peninsular Malaysia. These constraints are impacting the country's midstream gas market.

Republic of the Union of Myanmar: The Republic of the Union of Myanmar's gas production dropped by 14% in 2023 compared to 2022 (Offshore Technology, 2024b). Key producers like PTT Public Company Limited, Posco International Corporation, and Myanma Oil and Gas Enterprise all reported declining output. Over the past 5 years, production has declined at a compound annual rate of 7%, mainly due to ageing fields such as Yadana, Yetagun, and Zawtika. This decline significantly affects Thailand, which relies on the Republic of the Union of Myanmar for 25% of its gas demand.

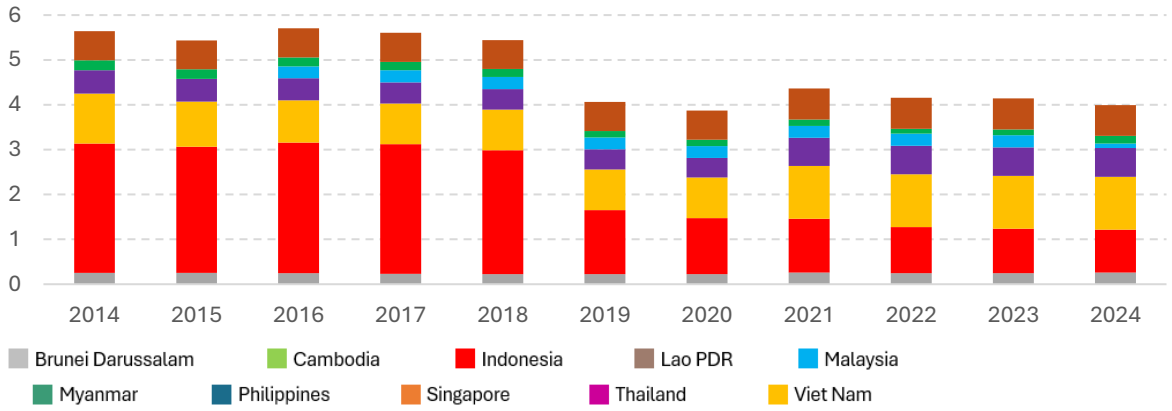
The Philippines: The Malampaya gas field, the country's only indigenous source of natural gas, began declining in 2020 after peaking in 2019 (Power Philippines, 2022). With reserves depleting and reservoir pressure dropping, the field is expected to be exhausted by 2027 (Flores, 2022). As a result, the Government of the Philippines has shifted its focus away from natural gas as a transition fuel, prioritising renewables, coal, and nuclear energy instead (Enlit Asia, 2025).

1.3. ASEAN as an Increasingly Net Natural Gas Importer

As of 2024, ASEAN holds approximately 4 trillion cubic metres of proven natural gas reserves, accounting for around 20% of the Asia-Pacific's total. As shown in Figure 4, this volume marks a significant drop from the pre-2019 levels, when the region consistently held over 5 trillion cubic metres in proven reserves.

Figure 4: Natural Gas Proven Reserve in ASEAN by Year

(trillion cubic metres)

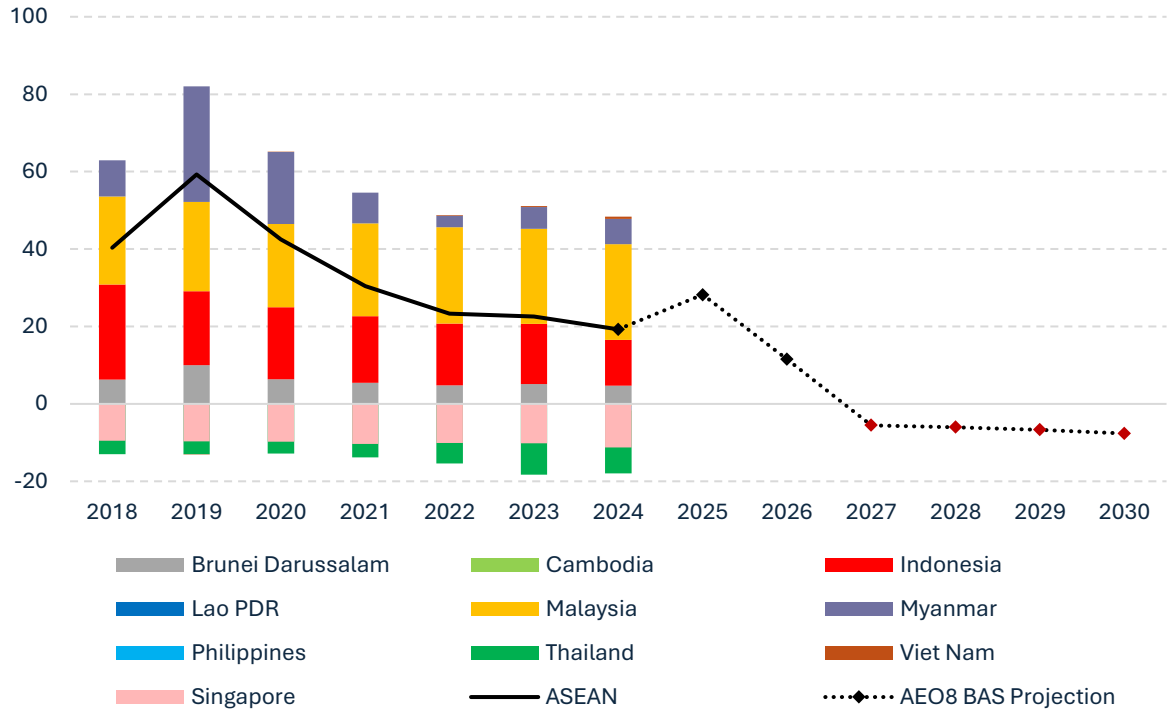


Lao PDR = Lao People's Democratic Republic, Myanmar = Republic of the Union of Myanmar.
Source: ACE (2024b).

In the region, the depleting reserves, ageing fields, and high domestic demands have led to a reduction in ASEAN export capacity. As shown in Figure 5, since peaking in 2019, ASEAN's natural gas export capacity has entered a steady decline. Correspondingly, the region's net export capacity has declined by nearly 67% from 59.3 million cubic metres in 2019 to 19.3 million cubic metres in 2024. Major exporters like Brunei Darussalam, Indonesia, and Malaysia have all seen significant drops in net export volumes, while the Philippines, Singapore, and Thailand remain consistent net importers. AEO8 projects that ASEAN will become a net importer of natural gas by 2027 (ACE, 2024a). While several major initiatives are underway to revive production and delay import dependencies, rising domestic demand and ageing fields continue to constrain supply.

Figure 5: Natural Gas Export by Year in ASEAN

(million tonnes)



AE08 BAS Projection = 8th ASEAN Energy Outlook baseline projection, Lao PDR = Lao People's Democratic Republic, Myanmar = Republic of the Union of Myanmar.
Source: ACE (2024a).

1.4. Vulnerability to Disruption in Infrastructure

1.4.1. Floating Liquefied Natural Gas Terminals

Out of 122 LNG terminals under development in Asia, 22 are floating units (floating storage and regasification units and floating storage units) (The Asset, 2024). While floating LNG import terminals are promoted as cheaper and faster alternatives to onshore facilities, they are highly sensitive to weather conditions. Even moderate wind and wave activity – classified as moderate breezes on international wind scales – can disrupt operations. Meanwhile, climate change is increasing both the frequency and severity of tropical storms and cyclones, particularly in Southeast Asia. Nearly 90% of floating projects planned in South Asia and Southeast Asia are located in countries prone to such extreme weather events, including the Philippines and Viet Nam. New terminals in the Philippines have already faced weather-related operational challenges, while unfavourable coastal conditions in Viet Nam raise concerns about the viability of floating import configurations (Reynolds and Doleman, 2024).

Learning from other Asian countries, Bangladesh's Summit LNG terminal was offline for nearly 6 months in 2024 due to structural damage from Cyclone Remal and delays in

reconnection due to rough oceanic conditions. The disruption caused $600 million[1] in economic losses plus $22 million in contractual penalties. This condition could undermine the energy security of the availability of natural gas in the region.

1.4.2. Security Threats to Strategic Facilities

In April 2025, the PETRONAS-operated Putra Heights pipeline caught fire, interrupting gas supply in several areas and impacting four power plants (Gas Processing & LNG, 2025). PETRONAS Energy & Gas Trading then procured an extra 155 million cubic feet per day (MMcf/d) of gas, boosting the total supply volume to 400 MMcf/d via the Trans Thailand–Malaysia gas pipeline system, directed towards the northern region of Peninsular Malaysia, including Bestari Jaya, Meru, and Kapar to help stabilise supply. An extra 86 MMcf/d supply to the Serdang City Gate for the Interconnected Klang Valley distribution network, a joint effort with Gas Malaysia Berhad, also added to expand the gas distribution network supply capacity. Gas Malaysia Berhad then announced that gas supply had been successfully restored to 259 out of 275 of its affected customers, and full gas supply estimation was achieved by 1 July 2025 (Gas Malaysia Berhad, 2025).

Another event occurred several months later. In September 2025, Malaysia's National Security Council sounded an extraordinary alarm after confirming credible intelligence of security threats targeting the nation's most critical energy infrastructure: the Bintulu LNG Complex in Sarawak (Defence Security Asia, 2025). Located at Tanjung Kidurong, the Bintulu LNG Complex is one of the largest single-site LNG production facilities in the world, with nine liquefaction trains producing nearly 30 million tonnes per annum.

The announcement thrusts one of the world's largest LNG export hubs into the geopolitical spotlight, underscoring its vulnerability in an era where energy facilities – particularly natural gas infrastructure – have increasingly become strategic targets amid rising global tensions. At a time when critical energy infrastructure has been attacked in Europe, the Middle East, and the Black Sea, analysts note that LNG facilities like Bintulu are increasingly viewed as potential high-value targets in grey-zone conflicts or asymmetric warfare.

Fortunately, PETRONAS, which operates the massive Bintulu LNG Complex, moved swiftly to reassure stakeholders that operations remain fully intact with no disruptions to supply.

However, this incident serves as a wake-up call for ASEAN to urgently develop a regional natural gas security mechanism, one that includes co-ordinated risk assessments, infrastructure protection strategies, and contingency planning, to safeguard energy supply against future disruptions.

[1] In this report, $ refers to United States dollar.

1.5. Vulnerability to Geopolitical Conditions

ASEAN's natural gas supply, whether through domestic production or imports, is increasingly vulnerable to geopolitical instability, both regionally and globally. This vulnerability stems from territorial disputes, investment dependencies, and exposure to volatile trade routes and supplier countries. ASEAN is not only a key global economic connector but also a strategic point where both the United States (US) and China seek to expand their influence across various dimensions (Direkudomsak, 2025).

1.5.1. Transport Vulnerability

The South China sea, stretching from Singapore and the Strait of Malacca in the southwest to the Luzon Strait in the northeast, is a vital artery for global energy trade, handling approximately 34% of global LNG trade (EIA, 2024). Any disruption, whether from military conflict, diplomatic fallout, or maritime incidents, could trigger shipping reroutes costing up to $1 million per voyage, inflating global prices and destabilising supply chains (Chhaya, 2025). ASEAN's energy security is tightly linked to freedom of navigation in this region, yet disputing maritime claims and 'grey-zone' tactics (e.g., blockades, ramming, sabotage) have escalated tensions, particularly with the Philippines and Viet Nam.

1.5.2. Production Risks

Several AMS – Brunei Darussalam, Indonesia, Malaysia, the Philippines, and Viet Nam – have offshore gas reserves located in contested zones. China's nine-dash line overlaps with many of these areas, leading to frequent confrontations (Herberg, 2016). For instance, Indonesia's Tuna gas bloc, estimated to produce 115 MMcf/d by 2027 and to generate $1.24 billion in revenue by 2035, lies within China's claimed waters (Wijaksana, 2023). Similar incidents have occurred in Malaysia and the Philippines, where Chinese vessels have obstructed exploration activities.

Viet Nam has faced repeated challenges to its offshore deepwater exploration, including joint ventures with India's Oil and Natural Gas Corporation, Russia's Gazprom, and ExxonMobil (Herberg, 2016). In 2012, China announced nine new exploration blocks that extended deep into Viet Nam's Exclusive Economic Zone, and in 2014, the Chinese deepwater rig HYSY-981 operated in Vietnamese-claimed waters for over a month, sparking violent protests and diplomatic tensions. A similar incident occurred in 2016, further highlighting the volatility of these contested zones. These disputes deter foreign investment and delay the development of deeper-water reserves, which are increasingly accessible due to technological advancements.

Despite the strategic importance of the South China Sea, the actual resource potential may be more modest than often portrayed (Herberg, 2016). According to the US Geological Survey (via Herberg, 2016), the region holds an estimated 11 billion barrels of oil and 190 trillion cubic feet of natural gas – volumes that are significant but not transformative for Asia's overall energy needs. For comparison, the Asia-Pacific region consumed 11.2 billion barrels of oil and 24 trillion cubic feet of gas in 2014 alone. Moreover, the region is

predominantly gas-prone, and exploration conditions are technically challenging and economically unfavourable. However, Chinese estimates suggest much higher resource potential – up to 125 billion barrels of oil and 500 trillion cubic feet of gas – which may partly explain the intensity of sovereignty assertions (Herberg, 2016).

1.5.3. Investment Dependencies

China's Belt and Road Initiative has become a major source of energy infrastructure financing in ASEAN, particularly in Cambodia and the Lao People's Democratic Republic (Lao PDR) (Direkudomsak, 2025). In the first half of 2025 alone, China invested $11.3 billion in Southeast Asia (Nedopil, 2025). While this accelerates infrastructure growth, it also creates strategic dependencies. While AMS may benefit from Belt and Road Initiative-backed projects, there is a risk of losing leverage in geopolitical disputes. Retaliatory actions, such as investment withdrawal or project delays, could undermine long-term energy planning.

1.5.4. Import Dependencies

Many AMS source gas from politically sensitive regions. Tensions between Israel and Iran in June 2025 have already impacted LNG markets in Asia (S&P Global Commodity Insights, 2025). Following Israeli airstrikes on Iranian nuclear facilities in June 2025, spot LNG prices in Asia surged by 5.38%, reaching $13.44/million British thermal units, the highest in 11 weeks. The Strait of Hormuz, through which 20 million barrels of oil and 11 billion cubic feet per day of LNG transit daily (20% of the global LNG), faces potential disruption. Market participants were seeking strategies to address potential disruption in Middle East supplies, including Thailand with 21% LNG import dependence from Qatar and the United Arab Emirates (Sakar, 2025). Shipping companies have issued safety alerts, and governments are conducting emergency reviews of energy security.

Regionally, the Republic of the Union of Myanmar's energy crisis illustrates how political instability directly affects regional supply (Hurley, 2024). Since the 2021 coup, Thai imports from the Republic of the Union of Myanmar's Yadana gas field have dropped by 47%. Foreign investors have exited, and currency depreciation has made LNG imports prohibitively expensive, compounding the crisis.

Chapter 2

The ASEAN Petroleum Security Agreement

2.1. The 1986 ASEAN Framework Agreement on Petroleum Security

The first ASEAN Petroleum Security Agreement was established in 1986, when ASEAN consisted of only 6 AMS (Brunei Darussalam, Indonesia, Malaysia, the Philippines, Singapore, and Thailand). The rationale was stated in the Preamble, where the Ministers considered that a petroleum security agreement amongst AMS would contribute to the strengthening of the economic resilience of individual AMS, as well as to the solidarity of ASEAN as a whole. It could also be shaped by the global oil supply crisis, including the Iran–Iraq War, and the 1990 Gulf War.

The 1986 Agreement was brief, and notably, it did not mention 'natural gas'. Containing only three articles, the Agreement described 'shortage' as a situation where an AMS suffers extreme petroleum shortage that cannot be resolved through domestic supplies. The AMS in distress then procures the needed supply through normal channels of trade to the extent that the total supply is less than 80% of the normal domestic consumption requirements.

Furthermore, the 1986 Agreement also contains a 'Guideline for the ASEAN Emergency Petroleum Sharing Scheme,' now commonly known as the 'Coordinated Emergency Response Mechanism (CERM).' Under the CERM, oil-exporting AMS are expected to supply oil from their own resources, calculated as follows.

Total crude oil production plus available imports, minus the following:

- oil already committed to long-term (traditional) buyers;
- domestic consumption;
- oil/products exported by private companies serving international markets; and
- oil/products not owned by the government.

If the resulting supply, combined with other available supplies, still leaves the distressed AMS with less than 80% of its normal domestic needs, then other AMS should try to provide an extra 10% of each type of oil/product that the exporting country controls, subject to bilateral negotiations.

2.2. The 2013 ASEAN Framework Agreement on Petroleum Security

The 1986 ASEAN Framework Agreement on Petroleum Security (APSA) was eventually updated with the 2013 APSA, now covering all 10 AMS (Timor Leste was yet to be

included). At the time of the signing, ASEAN had turned into a net oil importer. This shift is reflected in the addition of new paragraphs in the Preamble, acknowledging (i) the region's rising dependence on external petroleum supplies, and (ii) the expectation that current net exporters may soon become net importers, such as:

> *'MINDFUL that ASEAN is increasingly becoming more dependent on petroleum resources outside the region, there is a need to recognise, coordinate and rationalise these efforts, plans and programmes to enhance security of petroleum supply for ASEAN Member States.*
>
> *AWARE of the future threats and risks to the ASEAN security of petroleum supply coupled with the fact that some ASEAN Member States, which are now net oil exporters, will in the near future become net oil importers with high dependence on petroleum resources outside the region, particularly the Middle East.'* (ASEAN, 2013)

The 2013 APSA introduced significant improvements. The Agreement now contained an Article on definitions, including 'petroleum' and what constitutes a 'critical shortage.' Under the 2013 APSA, a 'critical shortage' refers to the situation when an AMS in distress experiences a shortfall of at least 10% of the normal domestic requirement (NDR) for a continuous period of at least 30 days. Secondly, the Agreement introduced structured strategic measures options that the AMS shall implement, divided into short-, medium-, and long-term measures. The CERM is categorised as a short-term measure (Table 1).

Table 1: The Short-, Medium- and Long-Term Measures under the 2013 ASEAN Framework Agreement on Petroleum Security

Short-term measures
1. Demand reduction from the normal domestic requirement
2. Coordinated Emergency Response Mechanism
Medium and long-term measures
1. ASEAN Energy co-operation, including ASEAN Power Grid, Trans-ASEAN Gas Pipeline, Regional Energy Policy and Planning, coal, renewable energy, and EE&C
2. Exploring for new petroleum resources
3. Energy diversification and improvement of energy efficiency
4. Diversification of energy supply sources (not relying on single import petroleum source)
5. Oil and gas market liberalisation
6. Individual/ joint oil stockpiling

ASEAN = Association of Southeast Asian Nations, EE&C = energy efficiency and conservation.
Source: ASEAN (2013), Article 3.

To invoke the CERM when a critical shortage arises, an AMS in distress must first implement short-term measures to reduce the demand of its NDR. If the shortage persists, the AMS in distress requests assistance under the CERM. The CERM under the 2013 APSA states that:

(i) All AMS shall endeavour to supply petroleum to the AMS in distress at the aggregate amongst equal to 10% of the NDR of the AMS in distress based on the terms and conditions to be negotiated amongst the appropriate parties in the spirit of assistance and no undue advantage shall be taken by the AMS concerned

(ii) The assistance rendered under the CERM shall be on a voluntary and commercial basis

1.6. The 2013 ASEAN Framework Agreement on Petroleum Security: Expiration and Gaps

As the APSA is only valid for a period of 10 years, it expired in 2023. Before its expiry, AMS conducted two official Focus Group Discussions (FGDs) in November 2022 and January 2023. In these FGDs, AMS agreed to extend the APSA without any adjustments for 2 years as an interim measure.

During this extension period, ASEAN bodies and relevant stakeholders were tasked with preparing improvements to the APSA. This direction aligned with the directives from the 40th and 41st ASEAN Summit, which emphasised elevating collaboration to advance new engines of growth that are critical to ASEAN's recovery and long-term resilience from multidimensional crises, including joint efforts to promote energy security. During the 41st ASEAN Ministers on Energy Meeting (AMEM), ASEAN Ministers further recognised the continuing collaborative efforts in addressing volatilities caused by supply chain disruptions from the oil and gas markets. They reaffirmed their commitment to extend the current APSA, while anticipating the drafting of a new agreement in 2024.

A series of FGDs and writing workshops were subsequently conducted, joined by the ASEAN Centre for Energy (ACE), the ASEAN Secretariat, representatives from relevant ASEAN Government Ministries, and the ASEAN Council on Petroleum. Together, this group, (the APSA Working Group), worked to formulate the new APSA. Throughout the FGD and writing workshops, the APSA Working Group identified 10 gaps that needed to be addressed in the new APSA (Table 2) (ERIA, 2015)0F[2]

[2] The 10 gaps identified were referred from the Economic Research Institute for ASEAN and East Asia's 2015 Paper on *Review of the ASEAN Petroleum Security Agreement (APSA).* The purpose of the paper was to raise key issues for the APSA-CERM Task Force to consider, which would serve as a basis for providing the recommendations the Task Force would provide to the Senior Officials on Energy in preparation for the 33rd AMEM, held in late September 2015.

Table 2: Ten Gaps in the 2013 ASEAN Framework Agreement on Petroleum Security

Main topic area	Recommendation overview	Implications for the APSA	Addressed in the new APSA
Operational bodies made to function	Bring bodies into actual existence; begin carrying out main functions; have committees meet regularly; etc.	Changes to APSA not necessary.	X
Communication links	Establish an elaborate communications protocol, including the system and tools necessary for regular information sharing in non-crisis periods.	Changes to APSA not necessary.	X
Short-term emergency measures	Each AMS should put in place short-term emergency measures, including emergency oil stocks, and contingency response plans.	Changes to APSA would not be required.	X
Co-ordinated emergency response measures	Each AMS should clarify the specific emergency measures and adopt specific plans which would allow participation in a co-ordinated action; the Secretariat assess the appropriateness of these measures.	Changes to APSA would not be required.	In the pipeline (under Article 6 Implementation of this Agreement)
Standardisation of methodology	Secretariat elaborates a clear methodology regarding calculations of baseline measures and operating procedures with ASCOPE, ACE, and ASEAN Secretariat; each AMS adopts a standard.	Changes to APSA would not be required.	In the pipeline (under Article 6 Implementation of this Agreement)
Data and information gathering	The specific data requirements necessary for the established methodology, including definitions of data points and the timeframe of regular and emergency data gathering, should be determined.	Changes to APSA not necessarily required, can be based on the willingness of AMS.	In the pipeline (under Article 6 Implementation of this Agreement)
Inclusion of natural gas	Oil emergency response policies and procedures should be treated separately from natural gas.	Would require modifying the definition of petroleum and natural gas.	✓
Designation of Secretariat	Change the designation of Secretariat under APSA, from ASCOPE Secretariat to a more	Would require amending APSA.	✓

	appropriate, dedicated and permanent body.		
Flexibility to respond to a crisis	Develop a more flexible framework for activating emergency measures than the prescribed trigger under APSA.	Would require amending APSA.	X
Voluntary based assistance	A specific commitment by all AMS to establish short-term emergency measures would significantly strengthen APSA.	Would require amending APSA.	✓

ACE = ASEAN Centre for Energy; AMS = ASEAN Member State; APSA = ASEAN Framework Agreement on Petroleum Security; ASCOPE = ASEAN Council on Petroleum; ASEAN = Association of Southeast Asian Nations.

Source: ACE analysis, based on ERIA (2015).

One of these gaps – and the focus of this report – is the need to redefine natural gas under the APSA. The 2013 APSA has an atypical definition of petroleum, in which it includes natural gas but primarily refers only to liquid fuels (i.e., crude oil and refined oil products). This definition effectively treats oil and natural gas as a single category, even though each has its distinct potential crises and requires different emergency response mechanisms. Granted that in 2013, ASEAN was still a net gas exporter. However, the region is projected to become a net gas importer by 2027, making this clarification increasingly important (ACE, 2024a).

1.7. The Newly-Adopted 2025 ASEAN Framework Agreement on Petroleum Security

The new APSA was adopted at the 43rd AMEM on 16 October 2025. However, as no AMS has signed it, the APSA has not entered into force yet. It is hereinafter referred to as the 2025 APSA, for the purpose of this report.

As indicated in Table 3, the 2025 APSA addresses several of the 10 gaps identified by the APSA Working Group. Regarding the inclusion of natural gas, the 2025 APSA introduces two major improvements:

- amending the APSA legal text definition on natural gas, to remove the association of natural gas with oil as a single product; and
- updating the CERM operating procedures to define natural gas-specific triggers, and its own producers and operations for the activation and deactivation of the mechanism.

In the 2013 APSA, the definition of natural gas is as follows:

> *'A mixture of hydrocarbons and varying quantities of non-hydrocarbons that exist either in the gaseous phase* ***or in association with Crude Oil*** *in natural*

underground reservoirs and is classified as either Associated Gas or Non-Associated Gas' (emphasis added).

Under the 2025 APSA, the definition of natural gas now does not have any associations with crude oil:

> *'Natural gas means a mixture of hydrocarbons and varying quantities of non-hydrocarbons that exist either in the gaseous or liquefied phases and includes all natural gas liquids, excluding LPG.'*

Moving beyond definitions, the 2025 APSA also explicitly calls for a separate CERM for oil and natural gas. The 2025 APSA adds a new clause on the *Implementation Agreement*, as follows:

> *'Member States shall endeavour to develop a series of measures to implement this Agreement, to be facilitated and assisted by the ASEAN Secretariat, ASEAN Centre for Energy, ASCOPE, and the appointed entities. The measures may include:*
>
> *(a) CERM for crude oil and oil products;*
>
> *(b) CERM for natural gas;*
>
> *(c) data sharing methodology and mechanisms;*
>
> *(d) localisation guideline; and*
>
> *(e) oil and natural gas infrastructure planning'* (emphasis added).

These two improvements are significant. While the existing CERM has been developed, it has only been applied to oil. No equivalent mechanism exists for natural gas, despite the fact that the CERM for natural gas can differ significantly from that of oil, both in nature and in potential crisis and appropriate measures to respond. As the 2025 APSA had just been endorsed, no detailed framework or guidance is available on how to implement the inclusion of natural gas into the 2025 APSA, in practice.

The next chapter will observe global best practices in natural gas security policies, which can serve as reference points for designing a practical and effective framework to operationalise natural gas within the 2025 APSA.

Table 3: Comparison of the 1986, 2013, and 2025 ASEAN Framework Agreements on Petroleum Security

Indicator	1986 APSA	2013 APSA	2025 APSA
Definition of petroleum	x	'Petroleum' refers to crude oils, products and natural gas in its natural condition.	No changes.
Clear separation of natural gas	x	x	Yes: • In natural gas definition, removed the word 'in association with crude oil' • In Implementation Agreement, AMS plans to develop separate CERM for natural gas, separate to oil.
Definition of shortage ('trigger')	AMS suffering from extreme petroleum shortage where total supply is less than 80% of the normal domestic consumption requirements	AMS experiencing a shortfall of at least ten 10% of the NDR for a continuous period of at least 30 days.	No changes.
CERM Mechanism	Oil-exporting ASEAN countries promise to supply oil from their own resources, calculated as: Their total crude oil production + their available imports MINUS the following: • Oil already promised to long-term (traditional) buyers • Their own domestic consumption	Before requesting assistance, AMS have to implement short-term measures to reduce the demand of its NDR. Afterwards, all AMS shall endeavour to supply petroleum to the AMS in distress at the aggregate amount equal to 10% of the NDR of the AMS in distress based on the terms and conditions to be negotiated amongst the appropriate parties in the spirit of assistance	No changes.

Indicator	1986 APSA	2013 APSA	2025 APSA
	• Oil/products exported by private companies that mainly serve international markets • Oil/products not owned by the government If this available amount plus other supplies still gives the distressed country less than 80% of its normal domestic needs, other AMS will try to provide an extra 10% of each type of oil/product that the exporting country controls. If the country needs more than 80%, anything beyond that must be negotiated directly between countries (bilateral negotiation).	and no undue advantage shall be taken by the AMS concerned;	
Institutional arrangements	x	AMEM, SOME, Coordinating Agency, Ad Hoc Industry Advisory Group, and ASCOPE as APSA Secretariat.	AMEM, SOME, APSA Working Group, Ad Hoc Industry Advisory Group, and ACE as APSA Secretariat.

AMEM = ASEAN Ministers on Energy Meeting; AMS = ASEAN Member State; APSA = ASEAN Framework Agreement on Petroleum Security ASCOPE = ASEAN Council on Petroleum; ASEAN = Association of Southeast Asian Nations, CERM = Coordinated Emergency Response Mechanism; NDR = normal daily requirement; SOME = Senior Officials on Energy.
Source: Author's own analysis.

Chapter 3

Reflecting on Global Best Practices

As noted in the previous chapter, ASEAN currently lacks a practical framework for integrating natural gas into the APSA. However, guidance can be drawn from countries and regions that have laid down policies to strengthen natural gas security. This chapter examines approaches by natural gas-consuming countries in East Asia (Japan and the Republic of Korea, henceforth 'Korea') and the European Union (EU).

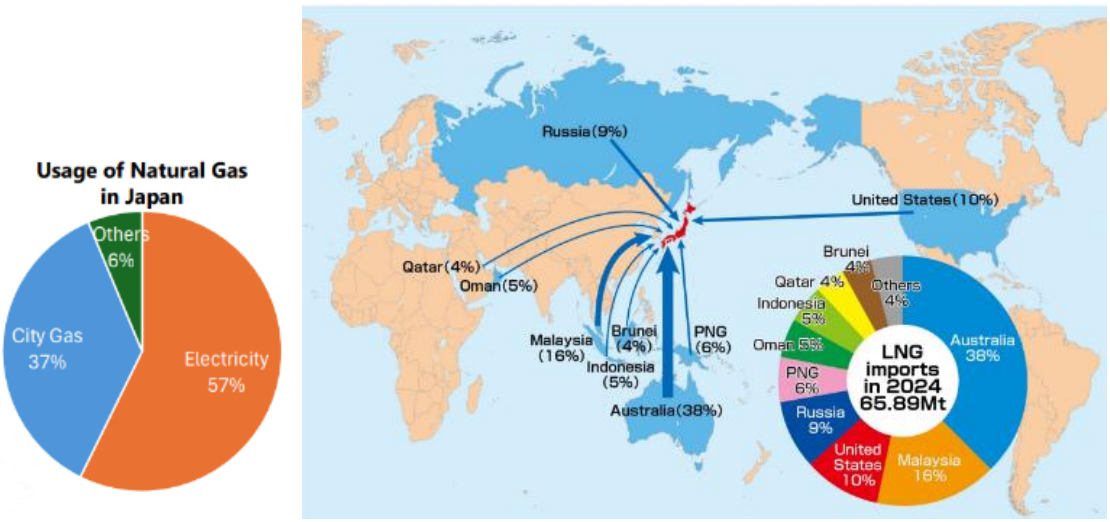
3.1. Japan

3.1.1. Natural Gas Overview

Over the past decade, Japan's natural gas share in its total energy supply increased significantly, driven by growing demand from the electricity generation sector. In 2023, electricity accounted for 57% of Japan's natural gas usage, followed by city gas at 37% (JOGMEC, 2025). The growth can also be attributed to the 2011 Great East Japanese Earthquake and Fukushima nuclear accident that resulted in the closure of all nuclear plants (IEA, 2022).

Japan now imports over 90% of its natural gas, making it the 2nd largest LNG importer globally. In 2024, LNG imports reached 65.89 million tonnes, mostly from Australia (38%), Malaysia (16%), and the US (10%) (Figure 6).

Figure 6: Usage of Natural Gas and Liquefied Natural Gas Import Sources in Japan

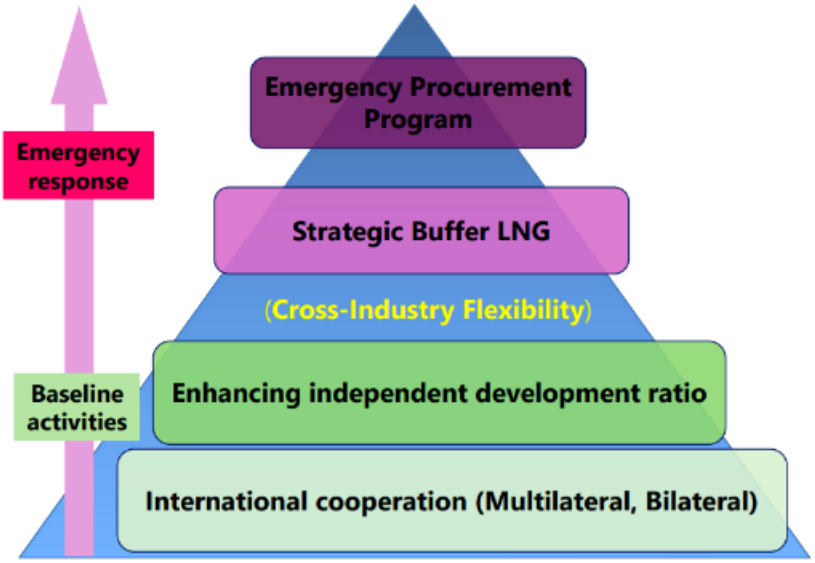


% = percent; Brunei = Brunei Darussalam, NG = liquefied natural gas; PNG = Papua New Guinea.
Source: JOGMEC (2025).

3.1.2. A Layered Approach to Securing Stable Liquefied Natural Gas

Japan adopts a two-layered approach to secure its natural gas (LNG) supply, namely (i) baseline activities (in normal times) and (ii) emergency responses, as shown in Figure 7.

Figure 7: Japan's Layered Approach to Securing Stable Liquefied Natural Gas



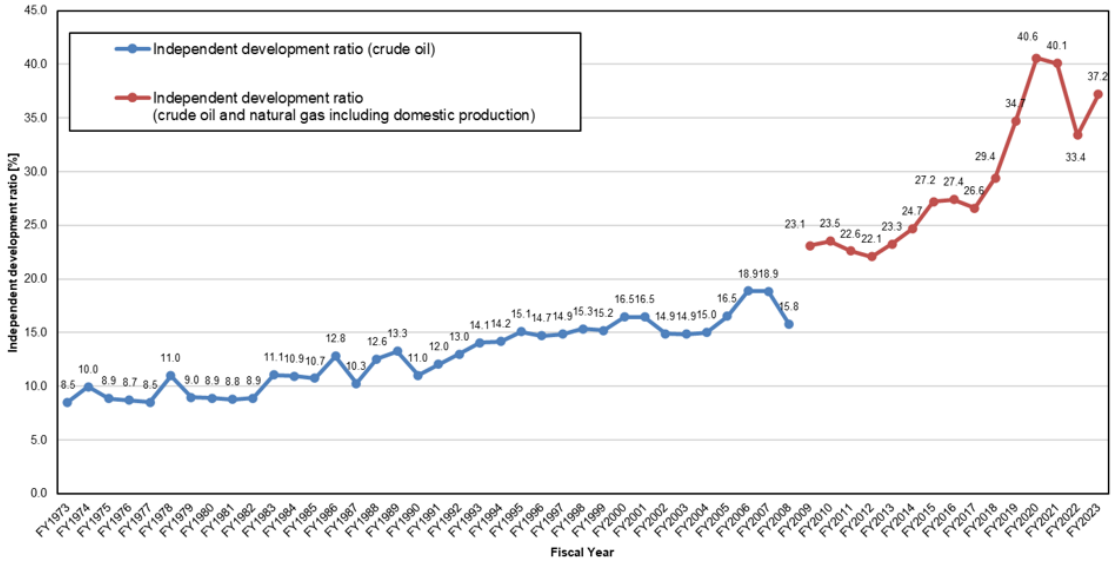
LNG = liquefied Natural Gas.
Source: JOGMEC (2025).

3.1.3. Baseline Activities in Normal Times

International Co-operation. Japan values international co-operation. This allows the country to maintain strong relationships with both producers and consumers in the region and diversify its long-term supply contract portfolio (IEA, 2022). In fact, about 80% of LNG imports are purchased under long-term contracts (JOGMEC, 2025).

Independent Development Ratio. Japan tracks its independent development ratio of oil and natural gas, which is defined as the share of oil and natural gas off-take under the control of Japanese enterprises (including domestic production) relative to the total amount of imported and domestically-produced oil and natural gas (METI, 2024) (Figure 8). The Government of Japan has been supporting Japanese companies to improve its independent development ratio, aiming to reach 50% in 2030 and 60% in 2040 (JOGMEC, 2025).

Figure 8: Japan's Oil and Gas Independent Development Ratio



% = percent; FY = fiscal year.
Source: METI (2024).

Monitoring and reporting. To monitor the independent development ratio, gas utilities are obliged to submit annual gas supply plans to the government under the *Gas Business Act* (1954). While Japan has yet to establish a national emergency strategy organisation structure for natural gas supply disruptions, the Agency for Natural Resources and Energy within the Ministry of Economy, Trade and Industry (METI) (a division in charge of natural gas emergency response) takes the leading roles in co-ordinating the necessary actions and liaising with industry, as well as monitoring the independent development ratio (IEA, 2022).

Emergency preparedness and response. To prepare for disruptions, the Japan Gas Association has developed a guideline for large-scale natural gas supply disruptions, including a framework for emergency management organisation by the city gas industry. During a supply disruption, system operators will reduce gas supplies. For instance, Tokyo Gas (the largest city gas company) would reduce its supply, except to essential consumers such as hospitals and welfare institutions. Moreover, in the event of an interruption of the city gas supply caused by an earthquake or flood, METI and the city gas industry have established a system to share information and co-operate to restore service.

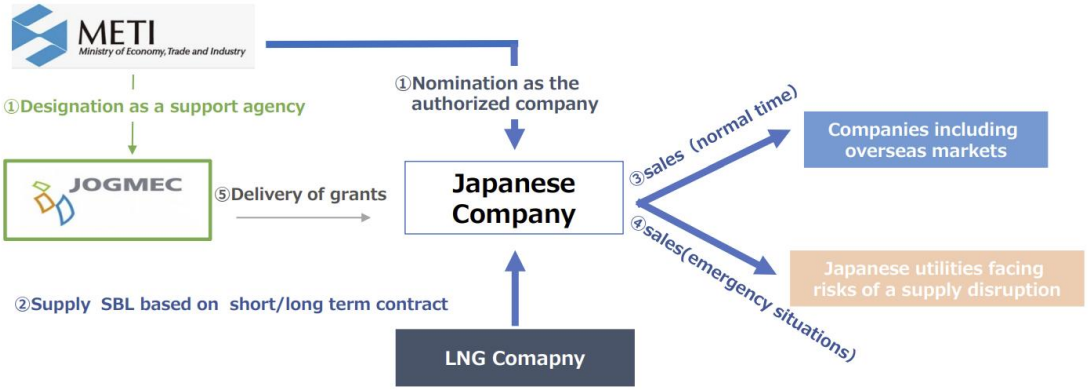
3.1.4. Emergency Responses

As shown in Figure 7, Japan has two main policy measures for its LNG emergency response mechanism: (i) the Strategic Buffer LNG (SBL) and (ii) the Emergency Procurement Programme.

Strategic Buffer Liquefied Natural Gas. Under the new Economic Security Promotion Act, METI has launched SBL with a mechanism as follows (Figure 9):

- Step 1: METI nominates a Japanese company as an authorised company to handle SBL operation and designates the Japan Organization for Metals and Energy Security (JOGMEC) as a support agency.
- Step 2: The company procures SBL through short-term and long-term contracts from LNG suppliers.
- Step 3: During normal times, the company sells the SBL to utilities/companies, including overseas markets.
- Step 4: Under an emergency situation, the company would have to sell the SBL for utilisation in Japan.
- Step 5: JOGMEC compensates for losses incurred from the emergency sales.

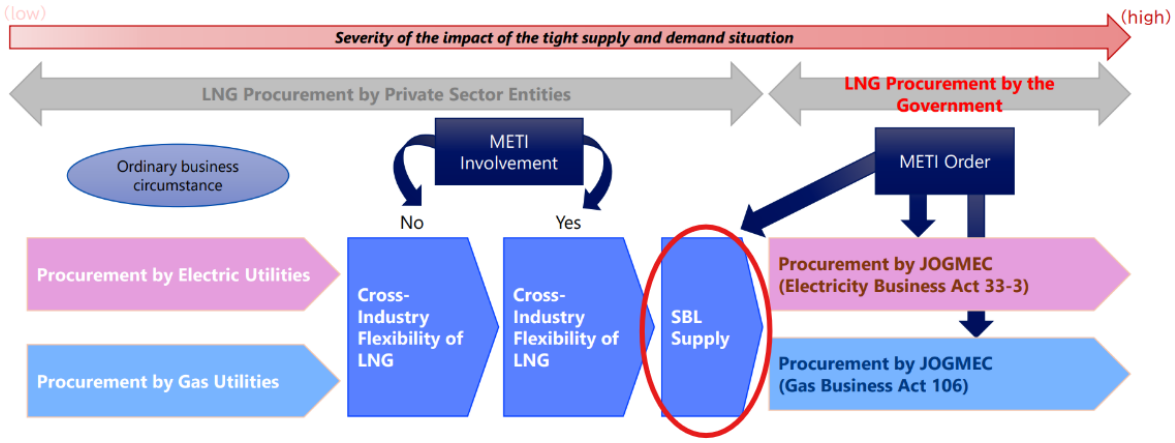
Figure 9: Strategic Buffer Liquefied Natural Gas Operation



SBL = strategic buffer liquefied natural gas.
Source: JOGMEC (2025).

Emergency Procurement Programme. The SBL also plays a role in Japan's last resort measure, namely the Emergency Procurement Programme (see the red circle in Figure 10).

Figure 10: Framework of Liquefied Natural Gas Emergency Procurement Programme



JOGMEC = Japan Organization for Metals and Energy Security, LNG = liquefied natural gas; METI = Ministry of Economy, Trade and Industry, SBL = strategic buffer liquefied natural gas.
Source: JOGMEC (2025).

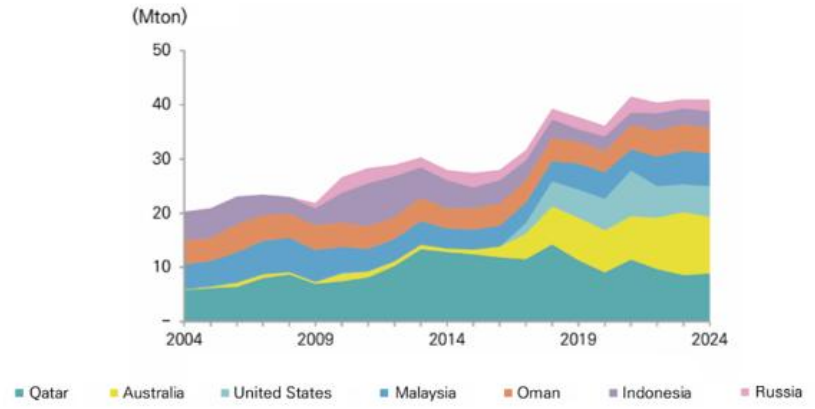
In normal times, LNG is procured by private-sector entities. If a situation arises that threatens tight supply, the private sector must first act within its own means. Cross-industry flexibility can also be invoked, in which LNG can be used by both the power and city gas sectors, enabling mutual adjustment between industries during tight supply situations. METI might also become involved only when market conditions further tighten and co-ordination or information sharing is deemed necessary (JOGMEC, 2025).

If the supply tightens, METI will order the SBL supply reserves to be released. If the situation further worsens and private-sector initiatives and co-operation are insufficient, or when released SBL alone is insufficient, the government will order JOGMEC to procure LNG in accordance with the *Electricity and Gas Business Act*. This arrangement allows for aggregated, higher volumes to be procured and for higher negotiations at the national level, as opposed to the private level.

3.2. Korea

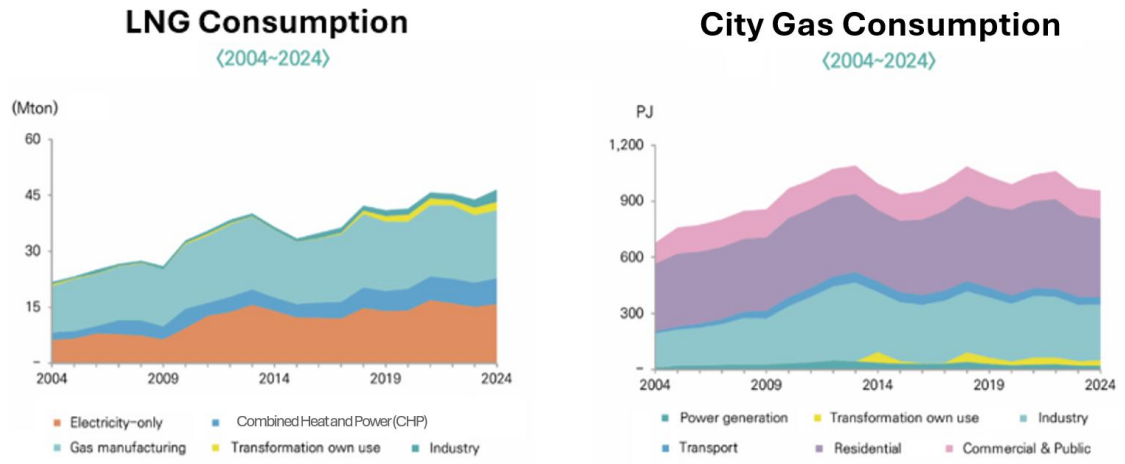
Similar to that of Japan, natural gas consumption in Korea has continued to increase for over 2 decades. In 2024, Korea was the third-largest global LNG importer, importing 46.3 million tonnes from Australia, Indonesia, Malaysia, Qatar, and the US (Figure 11) (KEEI, 2025). LNG is consumed primarily to generate electricity as a partial replacement for coal and to produce city gas (Figure 12).

Figure 11: Liquefied Natural Gas Imported by Korea



Mton = million tonnes.
Source: KEEI (2025).

Figure 12: Liquefied Natural Gas and City Gas Consumption in Korea



~ = approximately; LNG = liquefied natural gas; Mton = million tonnes; PJ = petajoule.
Source: KEEI (2025).

In response to these dynamics, Korea has developed an emergency response framework for natural gas supply disruptions. The emergency response plan adopts a gradual response measure, which depends on the severity of the crisis, demand reduction, fuel switching, and stockpiling natural gas.

When a supply disruption occurs, the Ministry of Trade, Industry and Energy (MOTIE) would lead government intervention. The Korea Gas Corporation (KOGAS), as the de facto monopoly in import, storage, transportation, and wholesale, would be responsible for determining the stage of the emergency alert system and reporting to MOTIE.

The government has established a criterion mechanism to determine whether the natural gas supply is in a 'crisis alert.' The mechanism has three indicators: (i) import/transport, (ii) production/supply, and (iii) strategic reserve volume. Meanwhile, the resource security crisis alert system consists of four stages, based on the severity of crisis indicators: attention, caution, alert, and severe (Table 4).

Table 4: Resource Security Alert System Criterion

Attention	(Import/transport) Signs of political instability or geopolitical tensions in major producing countries, or indications of instability in the gas market; Potential transport disruptions due to increased instability in transport routes. (Production/supply) Signs of disasters at storage, production, or supply facilities, or the spread of infectious diseases. (Strategic Reserve Volume) 80% or more of the obligatory quantity.
Caution	(Import/transport) Continued gas market instability caused by ongoing political unrest and geopolitical conflicts in major producing countries; Expanding instability such as congestion or blockage along transport routes. (Production/supply) A state in which the possibility of a supply and demand crisis exists due to disasters at storage, production, or supply facilities, or the spread of infectious diseases. (Strategic Reserve Volume) 60%~79% of the obligatory quantity.
Alert	(Import/transport) Partial disruption of gas production due to intensified political unrest or geopolitical conflicts in major producing countries; Partial blockade or short-term disruption of transport routes. (Production/supply) Expanded possibility of a supply and demand crisis caused by large-scale disasters at storage, production, or supply facilities, or the spread of infectious diseases. (Strategic Reserve Volume) 30%~59% of the obligatory quantity.
Severe	(Import/transport) Prolonged and intensified political instability or geopolitical conflicts in major producing countries, and large-scale accidents involving production facilities or transport vessels; Complete blockade of transport routes and long-term disruption.

	(Production/supply) A state in which a supply and demand crisis is imminent due to large-scale disasters at storage, production, or supply facilities, or the spread of infectious diseases. **(Strategic Reserve Volume)** below 30% of the obligatory quantity.

% = percent; ~ = approximately.
Source: KEEI (2025).

The Government of Korea has introduced fuel-switching contracts as a policy to encourage the use of alternative fuels instead of natural gas in the event of a natural gas supply disruption. Moreover, city gas companies are pursuing fuel-switching contracts with industries that have dual boiler facilities (MOTIE, 2018).

Two types of LNG stockpiling exist: strategic and temporary. Under strategic stockpiling, LNG stockpiling is only imposed on KOGAS. KOGAS is required to maintain the stockpile continuously, equivalent to 9 days of its average daily domestic sales volume during the relevant season (National Assembly of the Republic of Korea, n.d.). Meanwhile, under temporary stockpiling, in the event of a crisis alert, the obligation to stockpile falls not only on KOGAS but also on private companies that import LNG for their own use (National Assembly of the Republic of Korea, 2024a). When a resource security crisis reaches 'alert'/'severe' (Table 4), the MOTIE may order the release or use of stockpiled resources and may compensate the relevant entities for any resulting losses (National Assembly of the Republic of Korea, 2024b).

3.3. European Union

At the regional level, the EU is, at the time of writing this report, the only region with a clear policy package on natural gas security. This development is unsurprising, as aside from the EU's political structures, about one-quarter of all energy used in the EU comes from natural gas. Additionally, many EU countries import nearly all their supplies or are heavily reliant on a single source, making them vulnerable to disruptions along a single transport route that would threaten their natural gas supply, as evinced by the Russia–Ukraine tensions in 2022 (European Commission, n.d.a).

3.3.1. Gas Demand Curtailment

Following concerns over natural gas supply risks due to the Russia–Ukraine tensions in 2022, the EU adopted Regulation 2022/1369 (the 'Gas Demand Reduction Regulation,') to voluntarily reduce gas demand by 15% in a co-ordinated manner. This target becomes mandatory if a Union alert is declared. The voluntary measures that EU Member States integrated into their respective national emergency plans include (European Commission, 2024):

- information campaigns to raise awareness amongst consumers;

- heating and cooling limitations in e.g., public buildings;
- fuel switching and an acceleration of energy efficiency measures;
- awareness-raising campaign to stimulate a reduction of gas consumption amongst consumers;
- further funding for energy efficiency measures, for industries, district heating, and households;
- expansion of funding and auctions for renewable energy sources, as well as increased financial support for the rollout of heat pumps;
- rebates on gas and electricity bills in case of a reduction in consumption and/or higher tariffs for those who have significantly increased consumption;
- facilitation of the return to operation or extension of the lifespan of power plants to reduce gas consumption and to substitute the gas consumption of gas-fired power plants – either returning from reserve into the market or those destined to shut down – into a into reserve;
- temporary higher capacity use of ultra-high-voltage electricity grids, to facilitate the participation of certain power plants into grid reserve;
- relaxation of environmental standards to facilitate fuel switching;
- obligatory electricity consumption reduction in public buildings; and
- premiums to feed biomethane into the network, to replace natural gas.

From August 2022, when the Gas Demand Reduction Regulation entered into force, until December 2023, gas demand in the EU has dropped by 18% (ca. 101 bcm) compared to pre-crisis levels (European Commission, 2024). To monitor, EU countries must report the data on savings per sector every month to the European Commission (the Commission).

3.3.2. Emergency Preparedness, Preventive Action Plans, and Emergency Plans

The EU's framework for emergency preparedness and resilience legislates the following:

- co-operation between EU countries in regional groups to assess common supply risks through common risk assessments, and to develop joint preventive and emergency measures;
- facilitation of permanent bi-directional capacity on all cross-border interconnections between EU countries by transmission service operators, unless an exemption is granted; and
- preparation of EU-wide simulations of gas supply and infrastructure disruptions carried by the European Network for Transmission System Operators for Gas (ENTSOG) to provide a high-level overview of the major supply risks for the EU. ENTSOG is also required to undertake seasonal supply outlook investigations (European Commission, n.d.a).

To supplement this framework, the Commission published an interactive gas security supply dashboard, providing weekly information on gas imports, storage levels, transport,

and consumption in the EU (European Commission, n.d.e.). This information enables national and regional decision-makers to take swift and informed actions.

Moreover, the EU has introduced the 'Gas Security of Supply Regulation (EU)' that aims to ensure stable gas delivery to vulnerable consumers, mandating national plans and promoting regional co-ordination. Under this Regulation, EU countries are required to develop their respective preventive action plans and emergency plans that follow a common structure and contain the same key elements. The former includes measures to remove or mitigate supply risks identified in their national and common risk assessments, while the latter covers measures to mitigate the impact of a gas supply disruption. Furthermore, these countries are also required to update the plans every 4 years, including regional chapters that reflect common risks.

3.3.3. European Union Energy Platform

Similar to Japan's emergency procurement programme, where the government will take over LNG procurement to generate aggregated/greater volumes at the national level, the EU launched its Energy Platform in 2022. The platform aims to co-ordinate EU action in global markets to prevent EU countries from outbidding each other, while leveraging its political and market weight to diversify supplies effectively and introduce direct competition amongst the world's largest suppliers (European Commission, n.d.b).

To operationalise the Energy Platform, mechanisms and operational bodies are in place to pool the gas demand, co-ordinate infrastructure use, negotiate with international partners, and set up the joint purchasing mechanism (AggregateEU). To date, the platform has played a key role in diversifying supplies, increasing the efficiency of infrastructure use, and negotiating with reliable international partners, leading to the signing of a Memorandum of Understanding with, Azerbaijan, Egypt, Norway, and the US. Organising over 7 matching rounds to date, the platform aggregated more than 119 bcm of gas demand from European companies, and 191 bcm were offered by international suppliers. After comparing the most competitive offers, AggregateEU has matched nearly 100 bcm to meet European demand (European Commission, n.d.c).

3.3.4. European Union Gas Storage

In the EU, gas storage usually supplies 25%–30% of the gas used during winter, helping to reduce the need for additional imports and helping to absorb supply shocks (European Commission, n.d.d). Following the geopolitical tensions in 2022, the Gas Storage Regulation (EU/2022/1032) was introduced and remains in effect until the end of 2025, with a prolongation until the end of 2027.

The Gas Storage Regulation mandates that EU Member States ensure that the underground gas storage infrastructure in their territory is filled to at least 90%. The 90% target reflects average historical EU storage filling levels (87% in the last few years) and

is also the target used by the Transmission System Operators and the European Network of Transmission System Operators for Gas in contingency planning. Operators of storage sites should report the filling levels to their respective national authorities, and EU countries should monitor the filling levels on a monthly basis and report to the EU Commission.

A burden-sharing mechanism is also an essential element of the Regulation. Member States without storage facilities are required to ensure that gas is stored in other EU countries, corresponding to at least 15% of the annual gas consumption of the Member State without storage facilities. As an alternative, Member States without storage facilities may jointly develop a burden-sharing mechanism with one or more Member States with storage facilities, based on risk assessments that identify their needs. Whenever Member States are not interconnected or cross-border transmission is limited, the storage obligation should be reduced accordingly (European Commission, 2022).

EU Member States are responsible for taking the necessary measures to achieve the storage targets. Therefore, Member States can impose deterrent sanctions and fines on market participants, as well as offer financial incentives or compensation. The Commission will regularly review and monitor the progress of the filling targets. If there is a significant shortfall (more than 2%), the Commission will issue a warning to the Member State concerned and recommend a series of immediate measures for the Member State to implement. After 1 month from the recommendation, if the shortfall persists, the Commission will adopt a decision, as a last resort, to mandate the Member State to take measures that close the gap (such as imposing obligations on gas suppliers to store minimum volumes of gas, or requiring storage owners to tender capacities to other market participants) (European Commission, 2022).

3.4. Key Lessons Learned from Japan, Korea, and the European Union

Drawing from the best practices of Japan, Korea, and the EU, there are several major similarities and key takeaways for ASEAN to consider:

(i) A spectrum of measures is available to tackle the natural gas supply shortage emergency, depending on the severity of the crisis, ranging from demand control/ reduction to releasing the natural gas stockpile or storage.
(ii) A dedicated organisation or agency is established to oversee the security of natural gas supplies. For Japan, this is JOGMEC; for Korea, KOGAS; and for the EU, ENTSOG.
(iii) Developing and implementing a strong natural gas security policy at the national level is essential, as it lays the foundation for regional policies and mechanisms.

Building on the findings in this chapter, the next chapter will develop a framework for implementing the inclusion of natural gas in the 2025 APSA.

Chapter 4

Framework on How to Implement the Inclusion of Natural Gas in the ASEAN Framework Agreement on Petroleum Security

4.1. Baseline

ASEAN's natural gas systems operate within an environment shaped by evolving demand patterns, shifting domestic supply capacity, infrastructure vulnerabilities, and external geopolitical and market dynamics. These conditions, discussed in detail in the preceding chapter, do not in themselves trigger any emergency mechanism, rather, they represent factors that increase the likelihood of short-term supply stress and therefore warrant routine monitoring by AMS.

Monitoring such conditions allows AMS to differentiate between normal operating conditions and early signs of tightening conditions. Within this Framework, the purpose of monitoring is threefold:

(i) It supports the identification of external threats, such as disruption in infrastructure and geopolitical conditions.
(ii) It enables the assessment of domestic implications, including whether these risks are materially affecting national supply relative to the NDR.
(iii) It provides the basis for determining the appropriate response pathway.

This monitoring function forms the foundation as it enables AMS to evaluate when conditions require domestic stabilisation measures and when they may be approaching the critical shortage threshold.

4.4.1. The Normal Domestic Requirement as a Reference Benchmark

To interpret whether monitored vulnerabilities are affecting normal operating parameters or have entered a potential state of shortage, AMS require a consistent reference point for assessing supply adequacy. The NDR serves this purpose by representing the average baseline gas demand of an AMS under normal, non-emergency conditions. Its role also extends beyond emergency evaluation, supporting equitable reserve planning, and informing long-term system and infrastructure development.

Given the diverse characteristics of AMS in energy system structure, economic activity, climatic conditions, and data availability, the NDR must be defined in a manner that accommodates these differences while maintaining regional coherence. Within this Framework, the NDR is informed by long-term consumption behaviour and structural demand drivers such as seasonal patterns, weather variability, industrial cycles, economic activity, and relevant policy developments.

To reflect these underlying factors, the proposed NDR estimation methodology uses a rolling 3-year average of gas consumption, ensuring that the benchmark captures structural demand behaviour rather than temporary or fluctuations anomalies.

Baseline Consumption = $\frac{\sum \text{Monthly Gas Demand (2021–2023)}}{36 \text{ months}}$

This formula is provided solely as a conceptual example of how a 3-year rolling average might be used to approximate normal demand. It does not impose a mandatory calculation method on AMS, nor does it preclude the use of nationally appropriate approaches that better reflect domestic data availability, system characteristics, or institutional arrangements.

Using a rolling 3-year average implicitly incorporates the structural factors that shape normal gas demand in ASEAN. These include recurring seasonal influences, such as heightened cooling demand in warmer periods or reduced industrial activity during maintenance cycles, along with macroeconomic movements, weather anomalies, and irregular events such as force majeure conditions.

To ensure that assessments of supply conditions remain credible and comparable across the region, the Framework emphasises grounding NDR evaluations in real-time data from metered entry points. AMS may draw upon information from relevant parts of their domestic gas networks, including pipeline interconnections, the Trans-ASEAN Gas Pipeline (TAGP) nodes, cross-border gas flow meters, LNG terminal regasification meters, and storage withdrawal meters (if applicable). This standardised approach ensures that the 10% threshold is applied consistently, thereby maintaining transparency and credibility in the trigger assessment process.

4.4.2. Critical Shortage Triggers

A clearly defined critical shortage trigger serves as the foundation of ASEAN's emergency response architecture for natural gas. It provides a common reference point for determining when a supply disruption has escalated beyond routine market volatility and become a situation of regional concern. Under the APSA, a critical shortage is defined as a situation in which an AMS in distress experiences a shortfall of at least 10% of its NDR for a continuous period of at least 30 days.

To maintain coherence across ASEAN's emergency response mechanisms the same critical shortage definition used for petroleum should also apply to natural gas. Extending this trigger to gas enhances institutional efficiency, as the petroleum trigger is already embedded in Article 2 of the APSA. A unified trigger across both petroleum and natural gas provides a consistent basis for activation, supports streamlined regional co-ordination, and minimises implementation delays. Routine monitoring of vulnerabilities and deviations from the NDR helps AMS understand when conditions may be approaching this threshold and enabling timely preparation before a shortage becomes critical.

4.2. Short-Term Measures

Short-term measures set up the first layer of response when an AMS experiences a disruption in natural gas supply. These measures operate at the national level and complement the regional arrangements under the APSA. Their purpose within the

Framework is to stabilise domestic systems, safeguard essential services, and reduce the risk of escalation into a critical shortage.

4.2.1. Domestic Natural Gas Demand Response

Prior to invoking regional assistance, the AMS in distress must implement decisive domestic measures to mitigate the shortfall, as required by the APSA.

(i) Stock Management. The AMS should stabilise supply using available flexibility, such as adjusting domestic allocation, leveraging existing stock or storage, or activating alternative import options. While no AMS currently has formal policy for natural gas or LNG stockpiling, eight AMS have longstanding oil stockpiling arrangements that demonstrate institutional foundation for fuel security in the region. Over time, these existing structures may be expanded or adapted as natural gas becomes more central to national energy systems.

(ii) Demand Prioritisation. Since no AMS have policies on natural gas or LNG reserve or stockpiling, demand curtailment forms a second line of short-term response and supports the stabilisation of domestic systems during supply stress. Consistent with the APSA, the AMS in distress is expected to reduce the demand of its NDR before requesting assistance under the CERM.

To maintain supply resilience during short-term disruptions (0–7 days), ASEAN should adopt a flexible and tiered curtailment structure. This ensures minimal economic disruption while protecting essential services. While each country may have different sector prioritisation, the categorisation in Table 5 is likely to be similar and applicable throughout all AMS:

Table 5: Sectors Affected in Demand Prioritisation

Priority	Sector	Curtailment flexibility *(%)*	Mitigation strategy
1	Power generation	0 (Protected)	Dual-fuel backup usage
2	Hospitals, water supply	0 (Protected)	Exempt from cuts
3	Non-essential industries	10–20	Shift operations to off-peak hours
4	Commercial	Up to 15	Enforce night-time closures
5	Residential	5 (voluntary)	Public awareness campaigns for voluntary savings

% = percent.
Source: Eninrac Consulting (2025).

4.2.2. Activation of the Coordinated Emergency Response Mechanism

When domestic measures are no longer sufficient to stabilise supply during a shortfall, AMS may mobilise the CERM as the regional layer of short-term response. Under the APSA, AMS shall endeavour to supply petroleum or gas to the AMS in distress at the aggregate amount equal to 10% of the NDR of the Member State in distress based on the terms and conditions to be negotiated amongst the appropriate parties in the spirit of assistance and no undue advantage shall be taken by the AMS concerned.

Within the APSA Framework, the CERM is characterised by three core principles:

(i) Participation is voluntary.
(ii) Assistance is extended on commercial terms.
(iii) Arrangements are negotiated directly between the parties concerned.

The new APSA has revised its institutional arrangements, directly delegating the official ASEAN bodies that are best suited to operationalise the APSA. Policy direction rests with the AMEM, who shall assign the Senior Officials on Energy to carry out the functions in accordance with the CERM. To support implementation, Senior Officials on Energy convene a working group of national energy authorities responsible for facilitating emergency co-ordination and identifying the appropriate entities within each AMS to undertake response actions. The ACE, serving as the APSA Secretariat, provides analytical and operational support by collecting relevant data, assessing supply conditions, and co-ordinating communication with other operational bodies as necessary.

Within this institutional structure, the activation of the CERM is guided by a trigger mechanism. When an AMS faces a confirmed critical shortage, the Secretariat prepares an assessment and submit its findings to the Senior Officials on Energy and AMEM for consideration. If regional assistance is deemed necessary, AMEM endorses the activation of the CERM, enabling AMS to extend voluntary support to the AMS in distress.

Throughout the period in which the CERM is active, the Secretariat monitors the situation to indicate whether the magnitude of the emergency situation has changed. This continuous assessment ensures that all parties remain informed and that support remains proportionate to the needs of the situation. Once conditions stabilise and the critical shortage is resolved, the Secretariat recommends deactivation of the mechanism, after which AMEM formally concludes the emergency response.

4.3. Medium- and Long-Term Measures

The medium and long-term measures outlined in this Framework are derived from the new APSA and are intended to strengthen ASEAN's resilience beyond immediate crisis response. While short-term measures are deployed to stabilise the system during temporary stress, AMS are encouraged to advance medium and long-term actions proactively, even in the absence of emergencies, to reduce vulnerability to external threats and lower the likelihood of invoking emergency mechanisms in the future.

4.3.1. Infrastructure and Supply Enhancements

The new APSA encourages AMS to expand supply options through both domestic and voluntary joint ventures. This may include mechanisms such as joint development zones, shared exploration frameworks, and co-ordinated commercial partnerships in frontier and deepwater areas. These arrangements help unlock resource potential, reduce investment risks, and optimise the use of existing infrastructure. Several AMS have already adopted variations of joint development in overlapping or resource-rich areas, demonstrating their feasibility as long-term supply strategies.

Strengthening regional interconnectivity is another element of supply resilience. The TAGP provides a foundation for cross-border gas flows, but interconnections remain predominantly bilateral. Currently, no interconnections have involved more than two AMS. Relying solely on bilateral arrangements may pose challenges due to limited reach and vulnerability to shifting policy dynamics, potentially jeopardising energy supply agreements. Future resilience will depend on expanding the system to support multi-country linkages, systemised technical and regulatory standards, and co-ordinated planning aligned with regional demand and supply trends.

The developments on the ASEAN Power Grid (APG) can serve as a benchmark for the TAGP. The APG is a regional grid to interconnect the electricity systems of AMS, and in 2022, the APG successfully launched the Lao PDR Thailand–Malaysia–Singapore Power Interconnection Project, under which Singapore imports up to 100 MW of hydropower-sourced electricity from Lao PDR through existing networks in Thailand and Malaysia, showing co-operation involving more than two AMS (ACE, n.d). The APG continues to expand with discussions on amplifying the Lao PDR Thailand–Malaysia–Singapore Power Interconnection Project to 200 MW and plans to expand interconnections to other AMS. The progressive growth of the APG will pave the way for greater interconnection and energy security in ASEAN, in which the TAGP could follow.

Diversification of supply sources further strengthens resilience. AMS may adopt measures in diversifying the oil and gas import source or increasing the supply with more varied LNG procurement portfolios, co-ordinate infrastructure use to avoid bottlenecks, and deepen the co-operation through the TAGP network. Beyond the diversification of fossil supply, the APSA also supports diversification toward non-petroleum energy sources or reducing structural demand for natural gas. ASEAN's Renewable Energy Long-Term Roadmap serves as a blueprint to transform the region's energy transition vision into concrete action through analysing three distinct pathways: the ASEAN Policy-Aligned Scenario, which reflects current national commitments; the ASEAN Renewable Electricity Coupling Scenario, which models a co-ordinated power sector transition; and the ASEAN Shared Energy Resources Scenario, which represents a deeply integrated, market-driven, and economy-wide transformation (ACE, 2025b). Emerging options such as hydrogen, ammonia, biomethane, biogas, sustainable biofuels, and in the longer term, civilian

nuclear energy, further broaden the set of pathways available to enhance ASEAN's long-term energy security.

4.3.2. Demand and Resource Management

According to the International Energy Agency, energy efficiency remains the single largest measure to avoid energy demand. Energy efficiency can be applied to ensure more oil and gas supply is recovered in oil and gas sector operations, but for the industry and power sector that is still reliant on oil and gas, energy efficiency can also lower the oil and gas demand, thus indirectly to a supply increase. Hence, demand and resource management measures complement supply and infrastructure actions by reducing overall system stress and optimising how natural gas is used across the region.

Improving efficiency in gas-fired power plants, industrial consumers, and upstream operations reduces gas intensity and helps avoid unnecessary demand peaks. Predictive maintenance programmes, enhanced combustion efficiency, waste-heat recovery, and process optimisation can minimise operational disruptions and reduce fuel requirements, thereby lowering the risk that temporary supply deviations escalate into shortages. Beyond operational efficiency, reducing methane emissions also contributes directly to resource preservation, as avoided leakage, venting, and flaring translate into additional usable gas. ASEAN, through ACE, has developed a Methane Management Roadmap for Oil and Gas in ASEAN which can be used as a reference to examine the ways operator can reduce their methane emissions (ACE, 2025c).

Over the longer term, the deployment of carbon capture, utilisation, and storage technologies including the use of captured carbon dioxide for Enhanced Oil Recovery, provides further opportunities to improve productivity and extend the life of existing resources.

Building regional natural gas storage represents another measure that can enhance ASEAN's collective resilience. Although the APSA currently refers to joint oil stockpiling on a voluntary and commercial basis, a similar concept can be adapted for natural gas to provide a strategic buffer against seasonal fluctuations or sudden disruptions. Experience from the EU shows that co-ordinated regionals storage, supported by minimum filling levels, transparent reporting, and burden-sharing arrangements for countries without storage facilities, can play a critical role in stabilising supply during stress events (European Commission, 2022). For ASEAN, the development of shared storage facilities could leverage the TAGP network to facilitate cross-border access and movement of gas, thereby enabling a flexible and regionally integrated approach. Over time, co-ordinated storage planning and clear institutional responsibilities would support a more robust regional system that is capable of absorbing shocks and reducing the frequency of emergency measures need to be activated.

Chapter 5

Next Steps

The 2025 APSA introduces several improvements over the 2013 Agreement. In addition to the clearer inclusion of natural gas and the establishment of a dedicated Secretariat at ACE, a significant enhancement is the introduction of Article 6 on the Implementation Agreement. This article sets out the key follow-up actions that ASEAN, with support from ACE, should undertake:

(i) Coordinated Emergency Response Mechanism (CERM) for crude oil and petroleum products;
(ii) CERM for natural gas;
(iii) data-sharing methodologies and mechanisms;
(iv) localisation guidelines; and
(v) oil and natural gas infrastructure planning.

Moreover, regional energy co-operation in ASEAN is guided by the ASEAN Plan of Action for Energy Co-operation (APAEC). At the 43rd ASEAN Ministers on Energy Meeting (AMEM) in October 2025, the Ministers endorsed the APAEC 2026–2030, which provides a stronger foundation for regional co-operation on energy security. Under APAEC 2021–2025, Programme Area No. 2 on the Trans-ASEAN Gas Pipeline (TAGP) focused primarily on pipeline interconnectivity. In the new APAEC, Programme Area No. 2 has been expanded and renamed Oil and Gas Connectivity, Security, and Sustainability. One of its outcome-based strategies is to strengthen regional collaboration in the oil and gas sectors to enhance ASEAN's energy supply security. This shift is expected to generate additional co-operation initiatives on petroleum and natural gas security.

Most importantly, ASEAN Member States must demonstrate strong political commitment to addressing energy security challenges collectively before a major crisis occurs. This commitment should also extend to supporting the effective functioning of the APSA Secretariat. The Secretariat will play a critical role not only in implementing the activities outlined above, but also in monitoring oil and natural gas supply conditions across ASEAN. Adequate financial resources will be required to fulfil these responsibilities. Sustainable funding arrangements for the Secretariat should therefore be identified and supported by ASEAN Member States if the APSA is to function effectively.

In parallel, national-level policies on natural gas security should be further developed and strengthened. For example, demand-management measures are expected to be implemented before the CERM is invoked, yet robust policy frameworks for such measures remain limited in many ASEAN Member States. Similarly, the development of regional natural gas reserves or storage arrangements will require countries to establish the necessary domestic infrastructure and regulatory mechanisms. Without strong

national policies and preparedness measures, the effective implementation of the APSA's natural gas provisions will remain challenging.

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