

Chapter 1

Fast Growing LNG Market in the ASEAN Region

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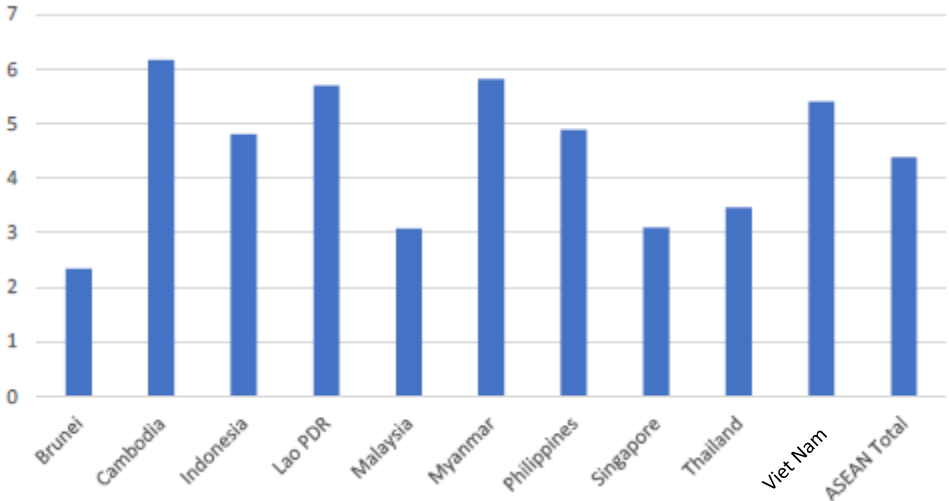
Chapter 1. Fast-growing LNG Market in the ASEAN Region

1.1. Natural Gas Outlook in the ASEAN Region

Macroeconomic outlook

The ASEAN Energy Outlook produced by ERIA forecasts the economy to continue to grow by 2050. Economic growth will increase by 4.3% from 2017 to 2050, with the gross domestic product (GDP) per capita increasing threefold – from US\$4,880/person¹ to US\$15,100/person in the same period. The population will also grow by 27%, from 636 million in 2017 to 809 million in 2050. ERIA classified GDP growth rates into three groups: low growth, middle growth, and high growth. The low-growth group comprises Brunei, Malaysia, Singapore, and Thailand; the middle-growth group, Indonesia and the Philippines; and the high-growth group consists of Cambodia, the Lao PDR, Myanmar, and Viet Nam.²

Figure 2.1. GDP Growth Rate Outlook, 2019–2050 (%)



Source: IEEJ-ERIA Workshop ‘A Flexible LNG Market and Promotion of Investment in ASEAN-Under a New Era of Price Volatility and Energy Transition’, ERIA’s presentation material.

¹ Constant 2010 price and US dollars.

² IEEJ-ERIA Workshop, ‘A Flexible LNG Market and Promotion of Investment in ASEAN – Under a New Era of Price Volatility and Energy Transition’, ERIA’s presentation on the ASEAN Energy Outlook.

Table 1.1. ASEAN Countries, by GDP Growth Rate

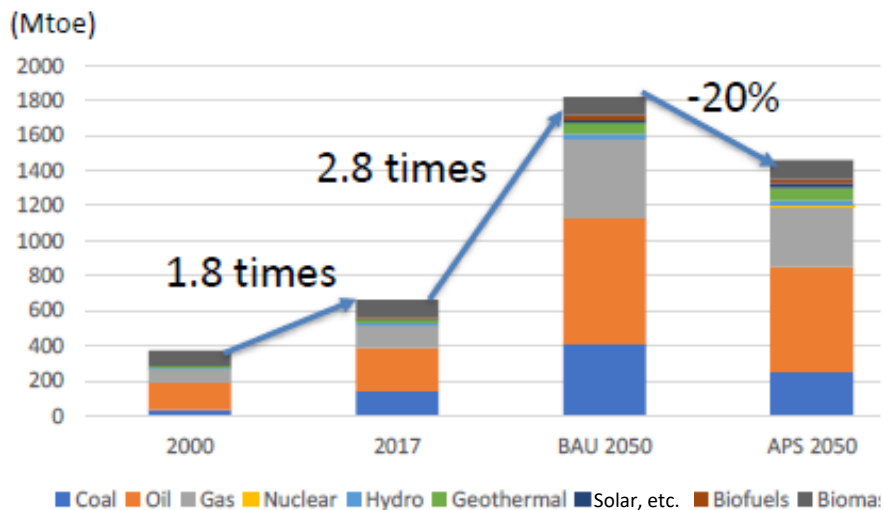
Low Growth	Middle Growth	High Growth
Brunei Malaysia Thailand Singapore	Indonesia Philippines	Cambodia Lao PDR Myanmar Viet Nam

Source: IEEJ–ERIA Workshop, ‘A Flexible LNG Market and Promotion of Investment in ASEAN – Under a New Era of Price Volatility and Energy Transition’, ERIA’s presentation on the ASEAN Energy Outlook.

Energy supply and demand outlook

Under the business-as-usual scenario (BAU), ERIA forecasted that ASEAN’s total primary energy supply (TPES) would grow by 2.8 times, from 662 million tonnes of oil equivalent (Mtoe) in 2017 to 1,822 Mtoe in 2050, along with stable economic growth. Oil and gas would still be the dominant fuel with 3.3% and 3.8% growth. The share of coal would remain the same at 22%, while oil would increase from 37% to 40%, and gas from 20% to 25%. Fossil fuels would still play a dominant role, accounting for a significant share of 87% in 2050, but a lower figure of 82% under the alternative policy scenario (APS).³ ASEAN would continuously rely on fossil fuels, especially coal and gas, for power generation and oil for transportation.

Figure 1.2. Total Primary Energy Supply Outlook in ASEAN, 2000–2050

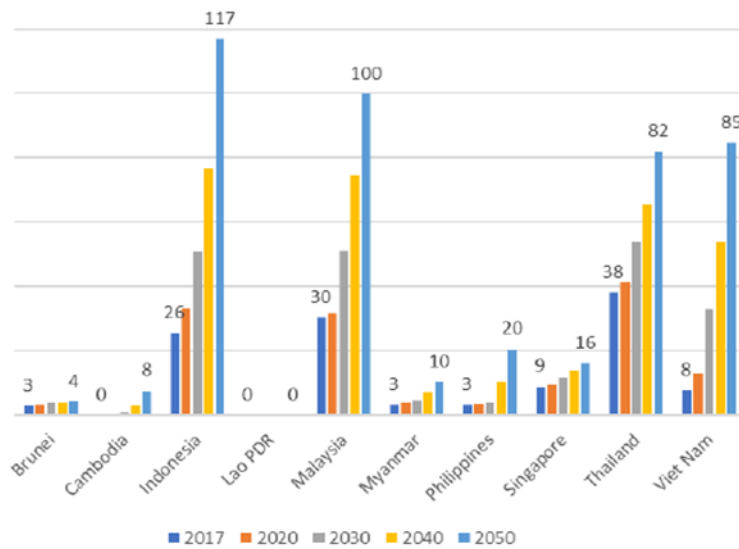


Source: IEEJ–ERIA Workshop, ‘A Flexible LNG Market and Promotion of Investment in ASEAN – Under a New Era of Price Volatility and Energy Transition’, ERIA’s presentation on ASEAN Energy Outlook.

³ The APS includes more ambitious energy-saving targets and rapid advances in low-carbon energy technologies and renewable energy.

We will see a substantial jump in natural gas supply in some ASEAN countries: Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam. Especially in Indonesia, the gas supply will jump almost fivefold from 26 Mtoe in 2020 to 117 Mtoe in 2050. Cambodia and the Lao PDR, which have never consumed natural gas, are expected to use it for power generation and transportation.⁴

Figure 1.3. Natural Gas in TFES in ASEAN, by Country, 2000–2050 (Mtoe)



TFES = total final energy supply.

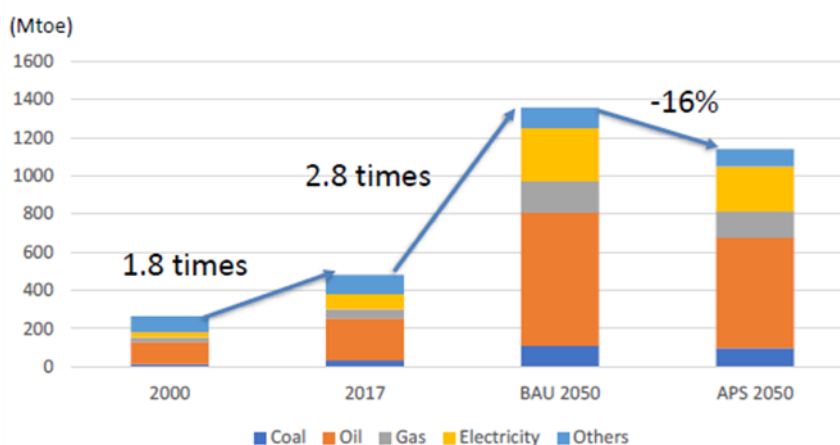
Source: IEEJ–IEF Workshop ‘The Global Future of Natural Gas in a Low Carbon World – The future of natural gas in Southeast Asia’, ERIA’s presentation material.

ASEAN’s total final energy consumption (TFEC) would grow by 2.8 times, from 480 Mtoe in 2017 to 1,138 Mtoe in 2050, along with stable economic growth. Oil and electricity would still be the dominant fuel, with electricity having the most significant increase of 3.8%, followed by gas 3.8%, and coal and oil 3.6%.⁵

⁴ IEEJ–IEF Workshop, ‘The Global Future of Natural Gas in a Low Carbon World – The Future of Natural Gas in Southeast Asia’, ERIA’s presentation on the ASEAN Energy Outlook.

⁵ IEEJ–ERIA Workshop, ‘A Flexible LNG Market and Promotion of Investment in ASEAN – Under a New Era of Price Volatility and Energy Transition’, ERIA’s presentation on the ASEAN Energy Outlook.

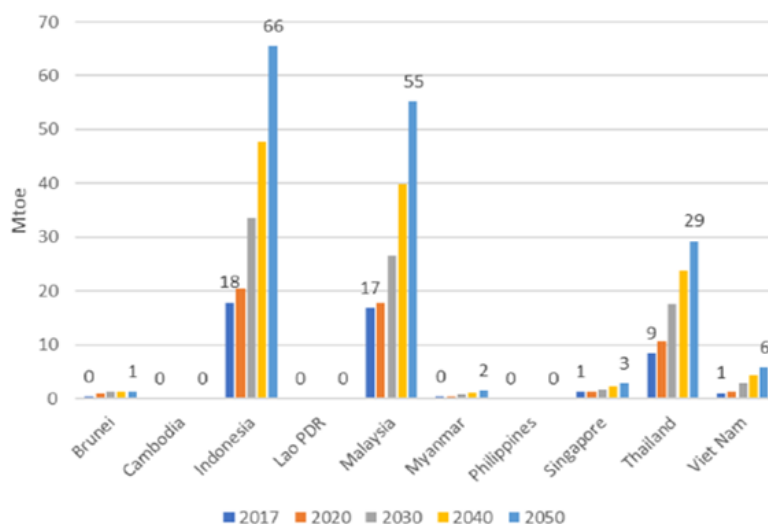
Figure 1.4. Total Final Energy Consumption in ASEAN, 2000–2050



Source: IEEJ–ERIA Workshop, ‘A Flexible LNG Market and Promotion of Investment in ASEAN – Under a New Era of Price Volatility and Energy Transition’, ERIA’s presentation on the ASEAN Energy Outlook.

The gas demand in the TFEC increases significantly in Indonesia, Malaysia, and Thailand due to the growing demand in the transport, industry, and commercial sectors. For example, the gas demand will grow 2.6-fold, from 18 Mtoe in 2017 to 66 Mtoe in 2050 in Indonesia. Viet Nam is also expected to introduce more gas use in the final energy consumption, which is mainly for the residential and commercial sectors.⁶

Figure 1.5. Natural Gas in TFEC in ASEAN, by Country, 2000–2050 (Mtoe)



TFEC = total final energy consumption.

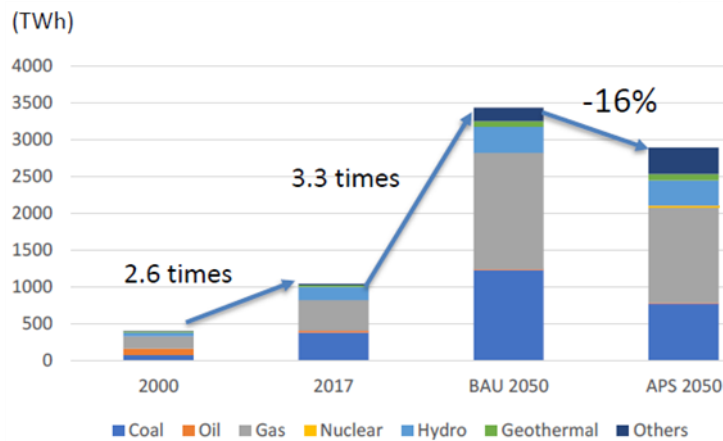
Source: IEEJ–IEF Workshop, ‘The Global Future of Natural Gas in a Low Carbon World – The Future of Natural Gas in Southeast Asia’, ERIA’s presentation on the ASEAN Energy Outlook.

⁶ IEEJ–IEF Workshop, ‘The Global Future of Natural Gas in a Low Carbon World – The Future of Natural Gas in Southeast Asia’, ERIA’s presentation material.

Gas-to-power outlook

Power generation is forecasted to grow 3.3 times from 1,041 TWh in 2017 to 3,439 TWh in 2050, with gas being the dominant fuel. In 2050, the share of gas in power generation will grow to 46%, much higher than coal-fired power generation (36%).

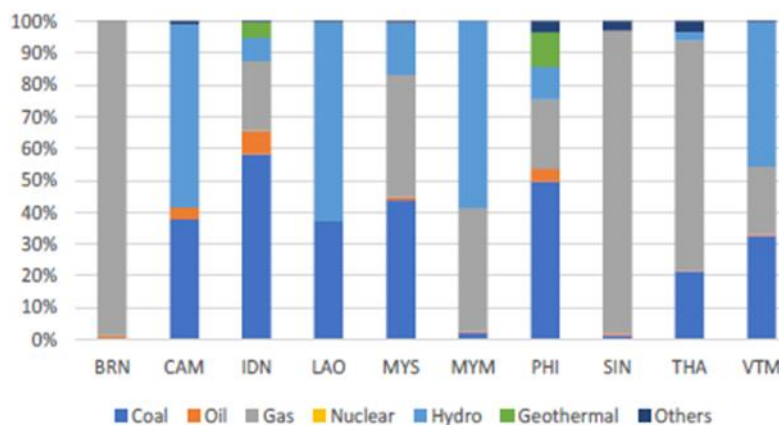
Figure 1.6. Power Generation Outlook in ASEAN Countries, 2000–2050 (Mtoe)



Source: IEEJ-ERIA Workshop 'A Flexible LNG Market and Promotion of Investment in ASEAN-Under a New Era of Price Volatility and Energy Transition', ERIA's presentation material

Brunei, Singapore, and Thailand are gas-oriented countries, more than 80% of power generation relies on natural gas. Viet Nam is expected to also be gas-oriented in 2050 under the APS with almost 60% of gas-fired power generation.

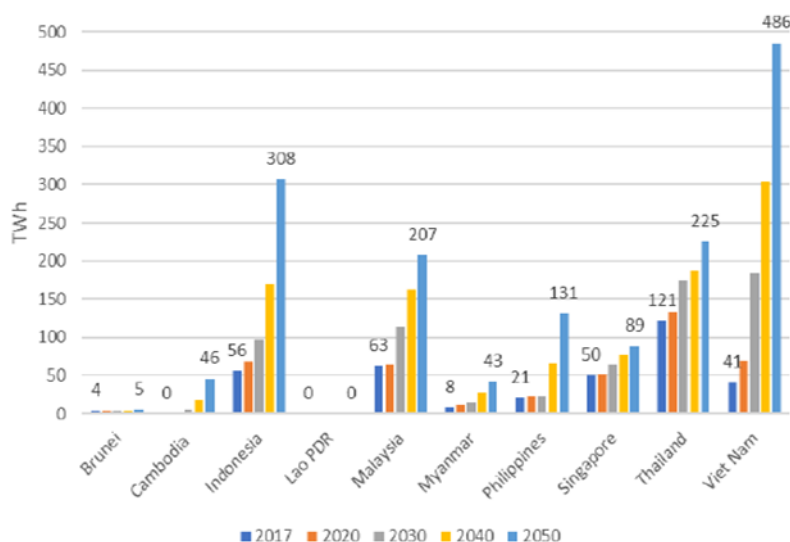
Figure 1.7. Power Generation Mix, by Country, 2017



Source: IEEJ-ERIA Workshop, 'A Flexible LNG Market and Promotion of Investment in ASEAN-Under a New Era of Price Volatility and Energy Transition', ERIA's presentation on the ASEAN Energy Outlook.

Indonesia, Malaysia, the Philippines, Thailand and Viet Nam are expected to increase natural gas use in power generation in large amounts. Viet Nam’s power sector is projected to shift drastically towards natural gas-fired generation. Gas-fired power generation is forecasted to grow by a hundredfold, from 41 TWh in 2020 to 486 TWh in 2050, due to the Viet Nam government’s aggressive policy to promote gas in power generation. This trend is in line with ASEAN’s transition to low-carbon economies.

Figure 1.8. Gas-Fired Power Generation in ASEAN, by Country, 2000–2050 (TWh)



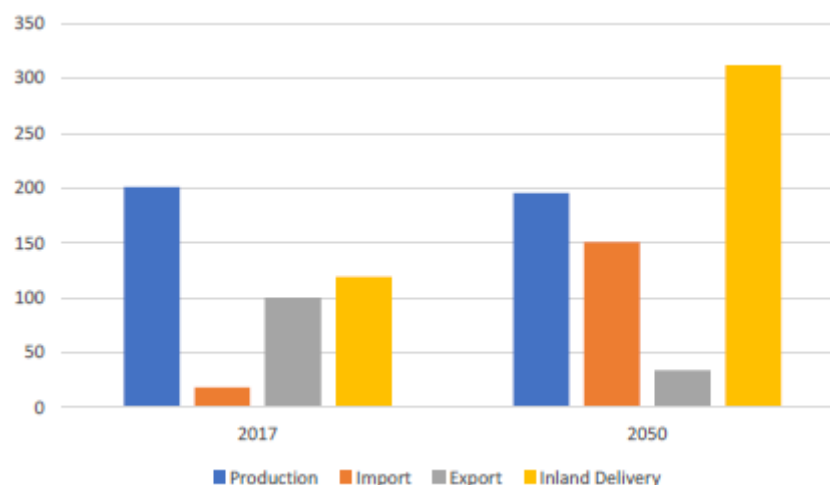
Source: IEEJ-IEF Workshop, ‘The Global Future of Natural Gas in a Low Carbon World – The Future of Natural Gas in Southeast Asia’, ERIA’s presentation on the ASEAN Energy Outlook.

Natural gas trade outlook

Although the power generation mix entirely depends on the available energy resources of ASEAN countries, shifting to gas and renewable energy by 2050 has been a clear trend. As a result, gas and LNG imports will also increase remarkably to meet the growing demand for gas-fired power generation.

By 2050, most countries in the region will become net importers of LNG to meet the growing domestic gas demand in different locations. Some ASEAN gas-exporting countries, such as Malaysia and Indonesia, are also importing LNG at the same time.

Figure 1.9. Gas Trade Balance in ASEAN, 2017 and 2050 (Mtoe)



Source: IEEJ–ERIA Workshop, ‘A Flexible LNG Market and Promotion of Investment in ASEAN – Under a New Era of Price Volatility and Energy Transition’, ERIA’s presentation on the ASEAN Energy Outlook.

Furthermore, more countries will start importing LNG. In 2020, five ASEAN countries imported LNG: Thailand (5.6 million tonnes), Indonesia (2.8 million tonnes), Singapore (3.2 million tonnes), Malaysia (2.6 million tonnes), and Myanmar (0.18 million tonnes). These constituted 14.3 million tonnes of LNG imports in ASEAN, 4% of world LNG imports (GIIGNL, 2021). The Philippines and Viet Nam are also expected to start importing LNG soon, depending on the schedule of LNG-receiving terminals and associated infrastructure development.

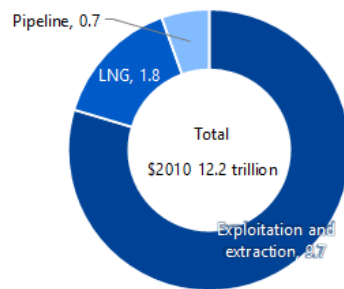
To facilitate the growth of gas use in ASEAN, countries in the region will need to invest in the infrastructure, including LNG-receiving terminals, pipelines or virtual pipelines, regasification plants, transportation, and storage facilities because LNG cannot be imported and consumed without these unique facilities. The region has 13 cross-border pipelines, with a total length of 3,631 km connecting 6 countries and 9 LNG regasification terminals in 4 countries, with a combined total capacity of around 38.75 million tonnes per annum (mtpa).⁷

Natural gas investment outlook

According to the IEEJ *Outlook 2021* (IEEJ, 2021), the natural gas investment will maintain the expansion momentum, leading production, transport, and liquefaction capacity to increase at a stable pace. Resource development will account for US\$9.7 trillion, or 80% of the total natural gas investment of US\$12.2 trillion through 2050. In addition, US\$1.8 trillion will be required in LNG-related equipment, including liquefaction facilities and tankers (IEEJ, 2021).

⁷ IEEJ–IEF Workshop, ‘The Global Future of Natural Gas in a Low Carbon World – The Future of Natural Gas in Southeast Asia’, ASCOPE’s presentation material.

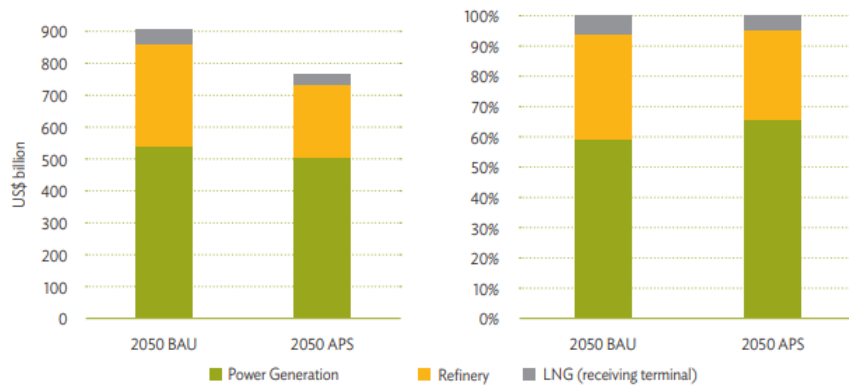
Figure 1.10. Global Natural Gas Investment in Reference Scenario, 2019–2050



Source: IEEJ (2021).

According to the ERIA energy outlook published in March 2021, the investment in LNG-receiving terminals in the ASEAN region under BAU is around US\$52 billion and US\$34 billion under the APS. Thus, the combined investments of LNG-receiving terminals, refinery, and power generation in the APS are 16% less than BAU. However, the investment in LNG-receiving terminals remains at around 5% of total investments, indicating that ASEAN will still need fossil fuel in the APS. Gas-fired power generation will be crucial.

Figure 1.11. Global Natural Gas Investment in the Reference Scenario, 2019–2050



Source: ERIA (2021).

1.2. The Role of Natural Gas in ASEAN

Gas complements renewables towards a cleaner energy system

ASEAN is a growing LNG and gas market. The LNG import in Southeast Asia grew by 32% between 2010 and 2020 and is expected to continue growing as gas demand grows. The

prospect of using natural gas in the region as a transition fuel to a cleaner energy system is optimistic.⁸

Reducing GHG emissions has become a common goal worldwide. ASEAN countries also try to reduce fossil fuel consumption and invest more in renewable energy like solar and wind to reduce their GHG emissions. However, as coal is currently still the dominant fuel in the ASEAN region and the member economies prefer to utilise the existing infrastructure for stable energy supply, it will take time to phase out these coal-fired power plants. However, despite coal being the dominant fuel in the region, building a new coal-fired power plant has become increasingly difficult even though no policy restricts coal consumption.

For example, in Thailand, a new coal-fired power plant approved by the government's power development plan (PDP) was forced to cancel the construction because of the protests by residents. Another case is that Japanese environmental organisations urged Mitsubishi Corporation to withdraw from a coal-fired power plant investment in Viet Nam.

On renewables, at the Energy Ministers Meeting of ASEAN countries, renewable energy in power generation and installed generation capacity was targeted at 23% and 35%, respectively, by 2025. However, the actual development of such renewable power generation takes time. Therefore, natural gas will play an essential role as a transition fuel and complement the intermittent renewables towards the energy transition to a low-carbon system for ASEAN countries.

For instance, Thailand's long-term PDP developed in 2018 already sees a bullish future of natural gas under three important concepts: security, economies, and environment. The plan forecasts that by 2037 natural gas will maintain a share of about 53% from 60% in 2018.

Infrastructure is the key to gas growth

Infrastructure development is the key underpinning potential LNG demand growth and promoting natural gas use in ASEAN. If sufficient infrastructure and related facilities are developed, the price volatility of natural gas can also be managed.

However, LNG-related investment is capital-intensive and involves many challenges such as investment environment, regulatory framework, LNG market demand, and electricity tariff. It is even more challenging for a country inexperienced in LNG imports like Viet Nam and the Philippines. This report explores the LNG infrastructure development in Indonesia, Myanmar, the Philippines, and Viet Nam that have just started or are about to start importing LNG.

Potential of small-scale LNG

In addition to LNG regasification terminals, some areas, such as remote islands, have no access to big infrastructure and natural gas pipeline networks. Therefore the ASEAN Council on Petroleum (ASCOPE) conducted a small-scale LNG and LNG bunkering study to explore

⁸ IEEJ-IEF Workshop, 'The Global Future of Natural Gas in a Low Carbon World – The Future of Natural Gas in Southeast Asia', Petronas's presentation material.

opportunities (ASCOPE, 2020). For example, Indonesia has a high potential of replacing the high cost of diesel generator sets in remote islands with limited connectivity.

One of Pertamina's assignments is to supply around 55 small-scale gas power plants across the country, especially in the eastern part. By 2030, ASCOPE forecasts that small-scale LNG demand in the ASEAN region will be around 10–16 mtpa: Indonesia 4.5 mtpa, the Philippines 2.3 mtpa, and Thailand 1.8 mtpa.

As for the potential of small-scale LNG for LNG bunkering in countries with many container ships to deliver cargoes, such as Indonesia, Malaysia, Singapore, and Thailand, ASCOPE forecasts demand to reach 3–5 mtpa in 2030.