

Chapter 3

Strategic Gas Pricing in Myanmar

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Chapter 3

Strategic Gas Pricing in Myanmar

1. Natural Gas and LNG in Myanmar

1.1. Myanmar's Energy and Natural Gas Markets

Myanmar is endowed with natural resources including oil, natural gas, coal, hydropower, and biomass. In 2020, Myanmar's total primary energy supply was 22.67 Mtoe, with biofuels and waste representing the dominant share of 48%, followed by oil (29%) and gas (13%). The power generation was 19.99 TWh in 2020, with hydro power (53%) and gas (35%) being the main sources.

Myanmar was self-sufficient with surface gas on the surface through 2020. However, gas production does not necessarily supply the country's requirements, with large quantities exported to Thailand and China under contracts with developers. The country's natural gas production grew to six times as large as its 2000 level by 2015, but declined by 11% since the peak in 2021. Myanmar began exporting pipeline gas to Thailand and China in 1999 and 2013, respectively.

1.2. Natural Gas Production, Infrastructure, and Consumption

Myanmar has 53 inland blocks in operation, 17 of which are operated by 12 companies, mostly international companies with significant numbers existing from the country. Offshore areas are divided into 51 blocks, 18 of which are in operation, and 24 of which are classified as deep sea.

The existing major offshore gas projects are Yadana Project, Yetagun Project, Shwe Project, and the Zawtika Project. Around three-quarters of the total gas production in the country has been exported to Thailand and China. The Yetagun Project ceased operation in April 2021 due to depletion, with operation briefly back online in the latter half of the year. Myanmar's natural gas system configuration is indicated in Figure 3.1.

Myanmar has 3,500 km of natural gas pipeline length, 45 compressed natural gas (CNG) filling stations, and over 27,000 CNG vehicles. The average domestic natural gas supply is 372 Mcf per day (in FY2021–22). Gas production, consumption, and exports of Myanmar in FY2021–22 are shown in Table 3.1.

Around 90% of total natural gas consumption in Myanmar is for power generation, with the rest used to produce CNG for vehicles, fertiliser factories, and other businesses.

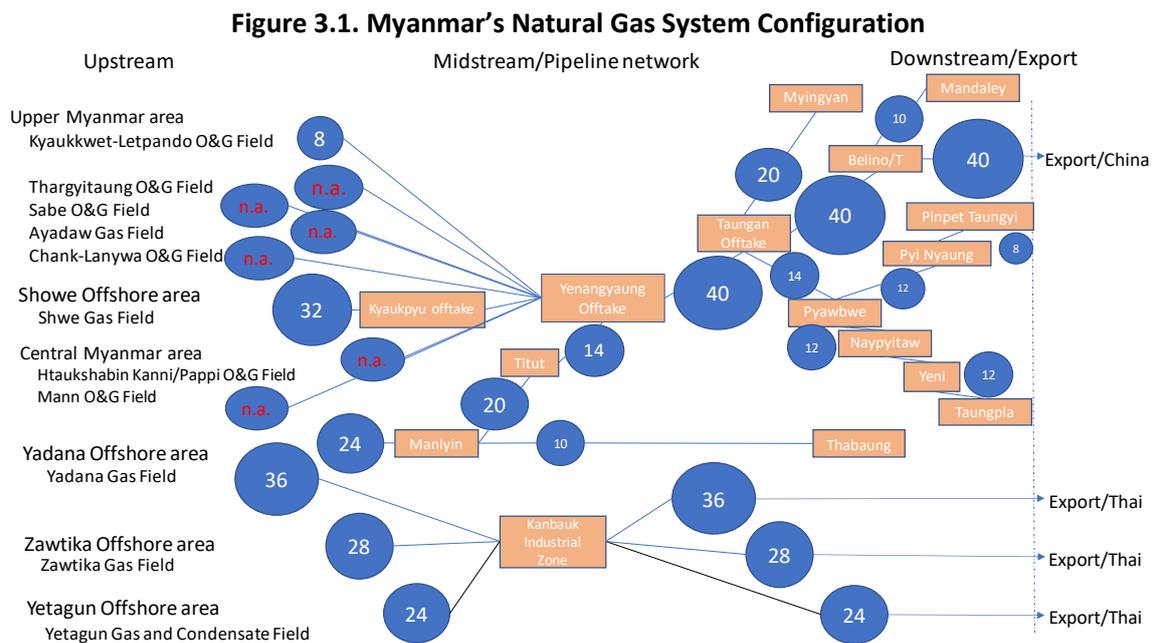
Table 3.1. FY2021–22 Gas Production, Consumption, Export (MMSCF)

Fields	Production	Domestic Consumption							Export	Own Use + Flare
		Electricity	CNG	Refinery	LPG	Industry	Fertiliser	Total Consumption		
Onshore	10,660.71	2,781.91	2,299.23	19.98	936.45	361.01	3,195.52	9,594.11	0.00	1,107.00
Offshore	603,606.88	122,767.47	2,179.50	0.00	0.00	1,242.43	23.83	126,213.23	459,459.50	15,512.28
Total	614,267.59	125,549.39	4,478.73	19.98	936.45	1,603.44	3,219.35	135,807.34	459,459.50	16,619.28

Note: MMSCF = million standard cubic feet.

Source: MOGE (2022).

The export of natural gas from Myanmar to neighbouring countries such as China and Thailand earned over \$800 million during the first 4 months of FY2022–23, as stated by the Ministry of Commerce (Global New Light of Myanmar, 2022). Most of this gas is from the Yadana, Yetagun, Shwe, and Zawtika offshore gas fields. Earlier in 2022, TotalEnergies and Chevron announced that they would pull out of the Yadana offshore gas field. Thailand’s PTT Exploration & Production (PTTEP) was reported to have taken over TotalEnergies’ stake in the field. PTTEP produces and exports natural gas to western Thailand, from the Yadana, Yetagun, and Zawtika fields. Figure 3.1 shows the configuration of Myanmar’s natural gas system.



n.a. = not available.

Source: Based on information provided by MOGE and illustrated by IEEJ (2022).

Thailand receives 80% of the production of the Yadana and Yetagun gas projects, with the remaining 20% managed by the Myanmar Oil and Gas Enterprise (MOGE).

Earlier, gas export earnings dropped by 11% year-on-year in FY2020–21. The earnings for FY2020–21 are estimated to be about \$3.1 billion, compared to \$3.5 billion in FY2019–20, according to the figures reported by the Ministry of Commerce (World Bank, 2022). Gas exports are expected to decline in the coming years as production at existing offshore areas begins to slow down and new investment developments are delayed.

Gas exports to Thailand in 2021 were 6.89 million tonnes, up 0.24% from 2020, after a declining trend in the preceding years partly caused by the slowdown in production from the Yadana and Yetagun fields. Exports from Yadana and Zawtika were higher in 2021 compared to 2020, while exports from Yetagun fell significantly.

Thailand's PTTEP is expected to operate the Yadana project after TotalEnergies' exit from it. PTTEP also operates the M-3 offshore block, a joint venture with Mitsui Oil Exploration Company, although the latter notified its intent to exit in September 2021. PTTEP is expected to acquire 100% ownership.

The major stakeholder of the Yetagun project, Petronas' subsidiaries Petronas Carigali Myanmar Inc. (PCML) and PC Myanmar (Hong Kong) Limited (PCML), announced withdrawal from the Yetagun project blocks M12, M13, and M14 in April 2022. Japan's ENEOS also decided to exit the Yetagun project in May 2022.

Australia's Woodside (2022), which discovered natural gas offshore in 2016, also reduced its presence in Myanmar, announcing in January 2022 that it had placed all business decisions in the country under review and will pull out its offshore drilling team.

The authority forecasts MOGE will earn approximately \$1.5 billion from oil and gas projects in FY2021–2022, with 50% of the country's foreign currency coming from natural gas revenues (International Trade Administration, 2022b).

1.3. LNG-to-power Policy

In recent years, rapid growth of electricity demand and variability of hydropower output have resulted in significant power shortages in Myanmar. Due to lower rainfall, water levels in the main reservoirs fell, resulting in reduced hydropower output, shifting focus to LNG as a medium-term solution to meet domestic electricity needs. LNG is expected to be the fastest solution through utilising existing gas-fired units.

At the LNG Producer-Consumer Conference 2020, Myanmar's Ministry of Electricity and Energy (MoEE) announced that the country planned to build three LNG-powered plants of 3 GW (LNG Producer-Consumer Conference, 2020). One of the projects has been awarded to a Japanese consortium in line with a government-to-government agreement. In July 2020, three Japanese companies, Marubeni Corporation, Sumitomo Corporation, and Mitsui and Co., together with Eden Group, a local conglomerate group, were granted exclusive development rights to run an LNG-to-Power Plant Project in Yangon Thilawa Special Economic Zone. The 1.25 GW and \$1.5 billion project is expected to start operating by 2025.

Myanmar's power generation strategy allows for constructing new pipelines to carry regasified LNG to other parts of the country for industrial uses, especially for fertiliser, cement, and steel production. Myanmar is looking into expanding the LNG terminal facilities to have more trades in the next stage, which will open more opportunities for producers and exporters (LNG Producer-Consumer Conference, 2020).

1.4. Power-related Infrastructure Development

Myanmar has one Thanlyin LNG floating storage unit. In May and June 2020, Myanmar received its first LNG cargos from Petronas. The cargo was shipped from Petronas LNG Complex in Bintulu, Malaysia, on Free-On-Board basis (Offshore Energy, 2020).

This floating storage unit is supposed to transfer LNG to an onshore regasification terminal,

which, in turn, is supposed to supply two power plants in Yangon, 400 MW Thaketa and 350 MW Thanlyin. These were the first facilities where Myanmar used regasified LNG as a fuel source for power generation. The LNG-to-power project was financed, constructed, and operated by CNTIC VPower, a joint venture of China National Technical Import and Export Corporation and Hong Kong's VPower Group.

LNG imported in Yangon was expected to supply another gas-fired power plant: the Thilawa, with 1.250 GW capacity. It is understood to be at the planning stage and is expected to come online by 2024. However, LNG cargoes have not been imported in the country since the second half of 2021.

Several other LNG projects are also being developed. The Ahlone LNG power plant in Yangon is Myanmar's first project that involves an onshore terminal and regasification unit. The purchase price agreement was signed between Electric Power Generation Enterprise under the MoEE and a TTCL Power Myanmar Co in January 2021. The project is expected to be completed in early 2024 and is one of the 3,000 MW LNG-to-power projects (Myanmar Times, 2021).

In May 2021, Myanmar Investment Commission approved 15 projects, including a \$2.5 billion LNG-to-power project, which would be the biggest single investment since the military takeover on 1 February 2021. The Commission did not reveal details in the press release, but some sources said the approved LNG project is likely to be the Chinese-backed Mee Lin Gyaing power project in the country's Irrawaddy Delta judging from the cost of the project. China signed a letter of intent with Myanmar's then government National League for Democracy in 2020 to speed up the project development under the Belt and Road Initiative agreement.

The Mee Lin Gyaing project, with a capacity of 1.390 GW, is developed jointly by Yunnan Provincial Energy Investment Group Co. Ltd., UREC, Zhefu Holding Group Co. Ltd. and Supreme Group. It is expected to be complete in 2023; 35% of the power produced will be distributed to Ayeyarwady Region, with the rest going to Yangon via the national grid.

The United Nations warned in April 2021 that Myanmar was approaching economic collapse (United Nations, 2021). Whether these LNG-to-power projects could develop on time depends on how the political and economic stability is restored.

To achieve the country's electrification goals, significant investment in infrastructure development and power generation will be required to increase the current installed capacity of 4.8 GW toward doubling the power capacity.

There should be opportunities for foreign companies that can provide the following support: technical expertise, consultancy, engineering, project management services, building maintenance, and the installation of power plants for oil and gas, renewables, and conventional power sectors. However, the energy sector poses challenges for foreign investors, including unsettled political and economic policies, and unclear rules and guidelines.

Only half of the country's population is connected to the national grid. According to Myanmar Information Management Unit data, 80% of rural people have no access to grid electricity (International Trade Administration, 2022a).

1.5. Power Shortage Problems

Many parts of Myanmar suffered severe power cuts in the first half of 2022. The country typically suffers more frequent electricity outages in summer due to lower supplies from hydro-power plants, but in 2022 the electricity supply situation was worse due to higher gas prices as well as damaged power lines, leading to more disruption. Some gas-fired power plants had paused operations due to higher fuel costs.

MOEE was forced to impose countrywide power cut schedules in March and acute shortages worsened after April. Available power generation capacity declined from 3,711 MW in October 2021 to 2,665 MW in March 2022, and daily output dropped from 73,137 MWh to 51,776 MWh (International Trade Administration, 2022a). Since then, MOEE has approved a hydroelectric dam proposal in Shan State, and reshuffled and restructured the energy and electricity ministerial structure.

As a result, it is going to take longer to get back on a schedule of electrifying the population. The 400 MW Thaketa and 350 MW Thanlyin LNG-fired power plants have suspended operations. Three dams in central Myanmar's Baluchaung region were taken offline due to attacks on the grid, and most of the 29 solar projects approved in 2020 for around 1 GW were cancelled.

In addition, there have been issues of non-payment of electricity bills, with 90% of bills unpaid in February–July 2021; 30%–40% are still unpaid in recent months. This non-payment is estimated to have cost the government \$1.5 billion in lost revenues over the course of 2021. Domestically produced natural gas, which is used by public buses and taxis, was supposed to buffer against international oil price volatility. However, CNG filling stations have also been hit by blackouts, and some bus services have had to reduce the frequency of their services.

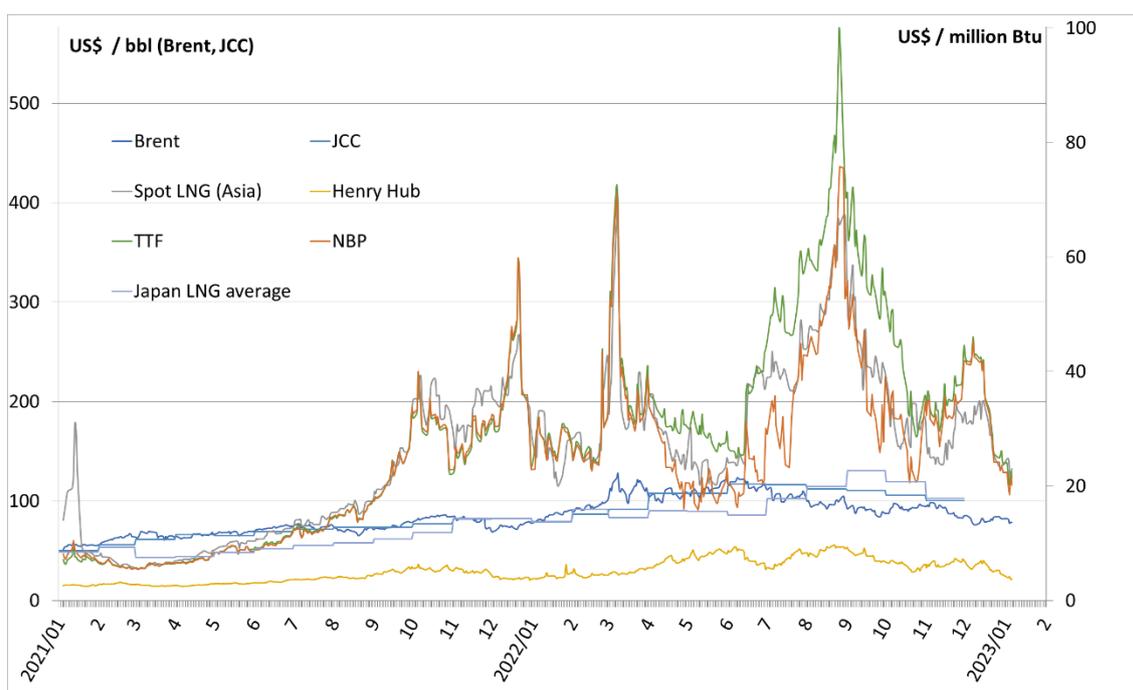
The global energy crisis will continue to keep Myanmar's domestic electric power and fuel prices volatile and more expensive.

2. Global Developments

2.1. The Most Turbulent Year of Gas Prices

In the international markets, LNG and gas prices have been the highest in the history and more expensive than crude oil since July 2021, showing unprecedented volatility. This is the main reason why Myanmar has not been able to secure LNG cargoes. Figure 3.2 depicts selected gas and LNG prices in global markets.

Figure 3.2. Selected Gas and LNG Prices in the International Markets



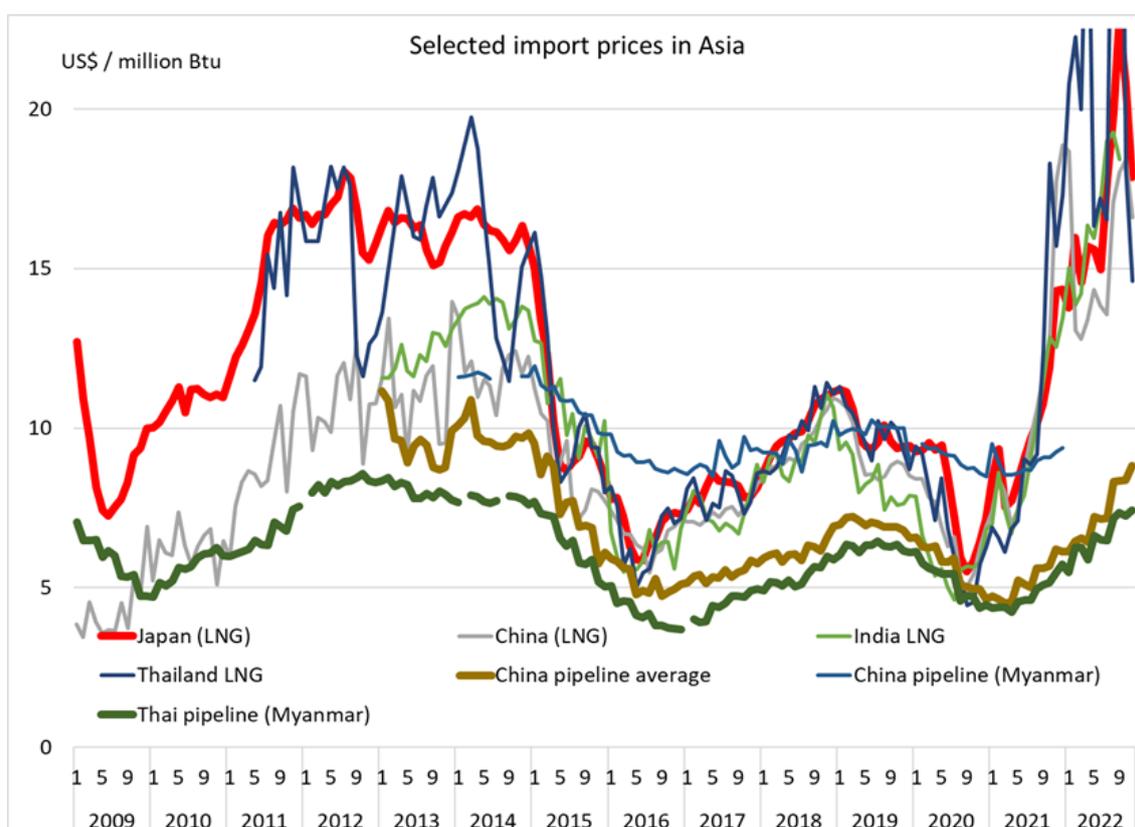
JCC = Japan Crude Cocktail, Japan's average crude oil import price, TTF = a spot gas price representing European Continent gas prices, NBP= a spot gas price representing gas prices in the United Kingdom, US\$ = United States dollar.

Source: Based on data of Customs statistics of Japan, commodity exchange marketplaces, ICIS (2022).

2.2. Some Contract Prices Provide Stability

Although spot gas and LNG prices in the international markets have demonstrated extreme volatility, notably toward the upper side, some of the contract prices have proved their stability and predictability in recent years. Figure 3.3 depicts selected import prices of gas and LNG in Asia.

Figure 3.3. Selected Import Prices of Gas and LNG in Asia



US\$ = United States dollar; Btu = British thermal unit; LNG = liquefied natural gas.

Source: Based on data of Customs statistics of importing countries (2022).

Gas prices have been shifting toward gas-on-gas competition from traditional oil linkage globally, while in Asia, linkage to oil is still dominant. In the global LNG market, increasing exports from the US have led to recent increases in gas-on-gas pricing transactions.

Potentially tradable and flexible LNG is growing, thanks to more flexible LNG contracts in recent years, as more new LNG projects are coming online in the Asia-Pacific region with buyers' equity participation and, hence, equity lifting arrangements.

More LNG sales and optimisation deals are concluded between portfolio players and Japanese and other Asian LNG buyers without destination restrictions and with different pricing conditions, potentially enabling more flexible movements of LNG cargoes.

With expected increase of the flexible portion under long-term arrangements, more parties are expected to have the ability and desire to potentially bid or offer LNG cargoes in the spot market. In fact, more players have been conducting tenders to buy or sell LNG cargoes, although some tenders do not produce outcomes that those players desire, due to different market conditions.

Lastly, but most significantly, LNG export projects in the US are enhancing flexibility in the global LNG trades, especially from 2017 with destination flexibility and the gas-indexed LNG pricing, along with notable project participation by Japanese and other Asian companies either as off-

takers, investors, or financiers. Although at this moment the Asian markets do not benefit from that flexibility, as most of flexible volumes are heading toward Europe, some extra volumes are expected to flow into the Asian markets in the coming years.

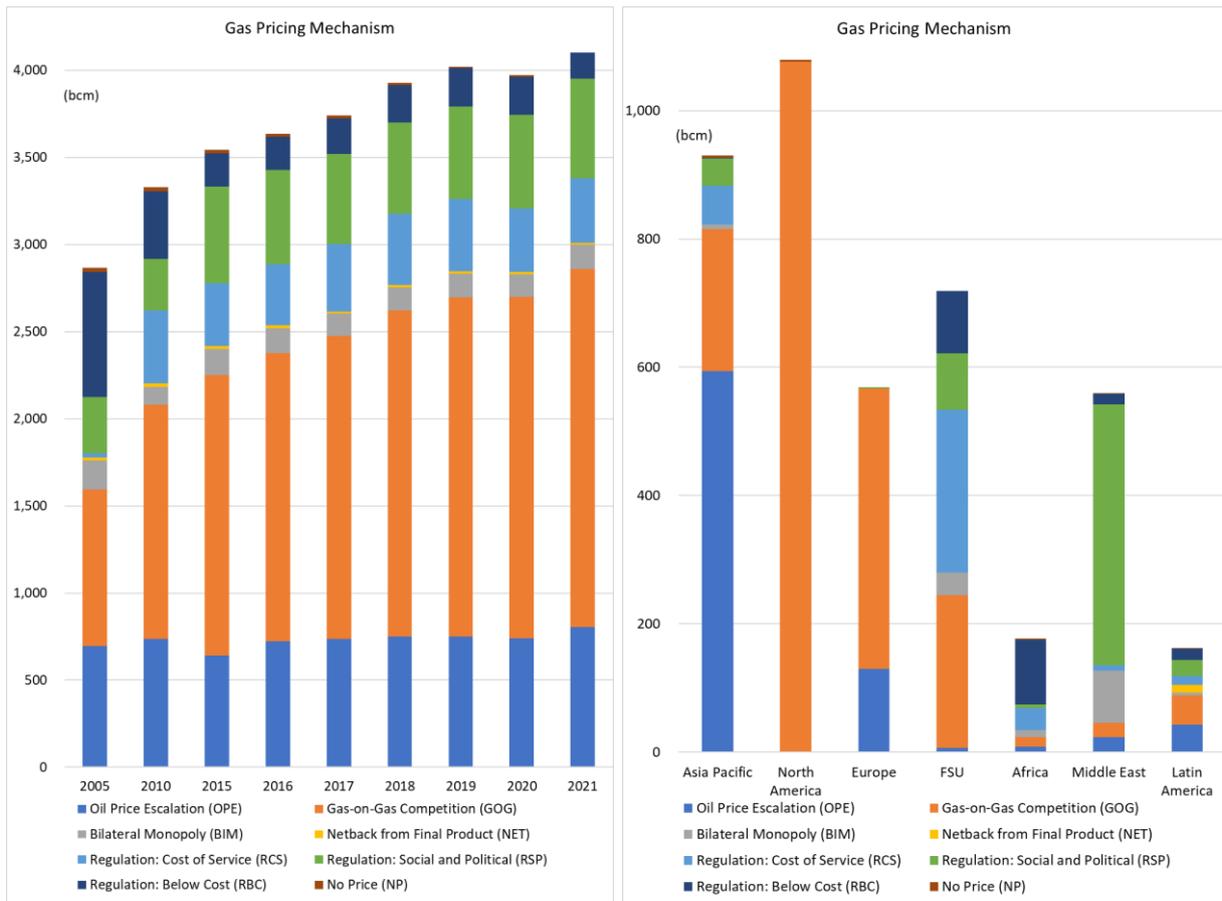
Timely and transparent customs declaration and statistics systems in Japan and other East Asian importers are expected to make future LNG markets in the Asia-Pacific region more visible.

A more comprehensive coverage of bidding and offering information (with some kind of cooperation between Price Reporting Agencies and even government agencies) with easier access by companies with less appetite for trading may lead to more reliable price formation for the spot market.

The industry does not have to solely rely on the spot market prices to establish a fair and equitable LNG price index in the region. Another potential index is the Japan LNG Cocktail (JLC), as Japan's weighted average delivered LNG price for a month. It has been possible to know the JLC for the month by the end of the following month, thanks to timely publication of the customs statistics.

There may be a risk at this moment that the JLC may still fluctuate with volatile movement of crude oil prices, as many Japanese long-term LNG import contracts are indexed with the Japan Crude Cocktail as Japan's weighted average delivered crude oil price. However, in the future, by gradually shifting long-term purchasing contracts from oil-index to JLC-index, the risk may be gradually mitigated, and the JLC-indexed price may move month by month with adjustment made by certain volumes of spot LNG transactions. Figure 3.4 depicts selected import prices of gas and liquefied natural gas in Asia.

Figure 3.4. Selected Import Prices of Gas and Liquefied Natural Gas in Asia

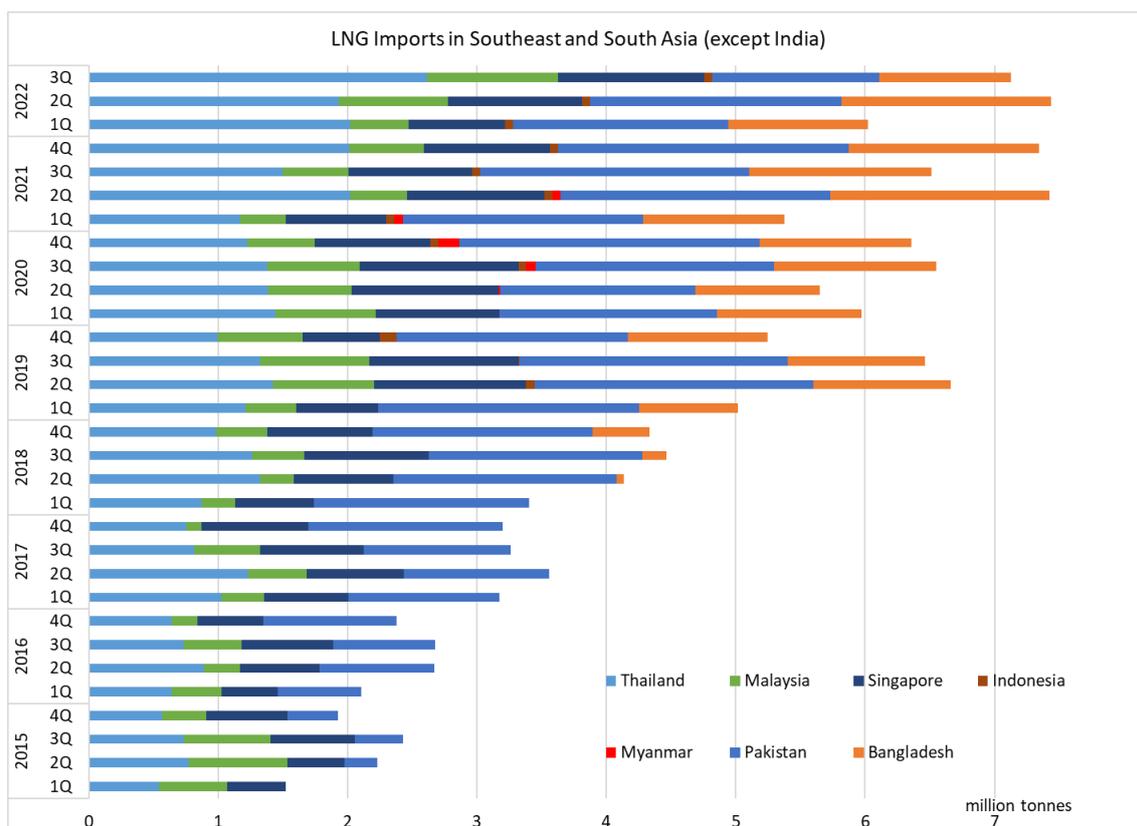


FSU = Former Soviet Union

Source: Based on Wholesale Gas Price Survey (2021), International Gas Union, <https://www.igu.org/resources/global-wholesale-gas-price-survey-2021/>

While the Asian emerging LNG markets have been growing relatively fast in recent years, they have been sensitive to the international prices and/or influenced by the fluctuations in demand in the other northern hemisphere markets. Figure 3.5 shows the LNG imports in Southeast and South Asia, except India.

Figure 3.5. LNG Imports in Southeast and South Asia (except India)



LNG = liquefied natural gas.

Source: Based on customs statistics of countries (2022).

3. Pathway Forward

3.1. In the Broader Context of an ASEAN Member

ASEAN is a key market for gas demand in the next decades. The substantial potential demand is a huge opportunity for energy infrastructure investments, but it will only materialise under the guidance of appropriate policy to promote quality infrastructure and resilience in ASEAN for sustainability. Governments should investigate the LNG infrastructure gap and place the right policy to promote the investment that will support the increasing demand of gas use. Myanmar is no exception.

Legal frameworks have been identified as one of the main challenges when developing infrastructure. Unclear or restrictive regulations could hinder investment and financing opportunities. Investors do not make investments unless there is a clear legal framework that provides sufficient incentives and return insurance. Myanmar should demonstrate clear support through offering a series of legal frameworks and clear investor guidance, and even approving an LNG terminal or gas-fired power generation project application without delays.

Leaving investment decisions in major infrastructure to market forces has been proven difficult given LNG-related infrastructure projects are capital-intensive. Concrete actions by the government are required for development of infrastructure such as LNG receiving terminals,

regasification plants, storage tanks, gas networks and pipelines or virtual pipelines.

In addition, it has been proven that the cooperation between LNG producer and consumer could also accelerate the infrastructure development. In the case of Viet Nam, several US companies such as AES and Delta Offshore Energy, engaged in the LNG-to-Power projects through financing. The cooperation does not only help facilitate the development of LNG terminals and gas-fired power plants in Viet Nam but also helps exporting from the US, while the major LNG producer seeks more markets. This is the best scenario of a win-win strategy.

In that sense, domestic gas sales pricing should incorporate levels and fluctuations of prices in the international market either directly or indirectly to introduce LNG into the domestic market in a sustainable manner, rather than as an emergency measure, as was done in 2020 and 2021.

However, stability and predictability are important to grow the consuming market. Such pricing would also attract international companies to the country's upstream sector again. It is important to pursue LNG pricing mechanisms that provide comfortable price levels for both consumers and producers.

3.2. Challenges Ahead

It would be difficult to maintain and grow domestic gas production, especially in the absence of international upstream companies, although some foreign companies are expected to stay in the operation. While demand is growing, production does not grow or declines.

It would also continue being difficult to procure supplemental LNG in the expensive and volatile international market. While LNG is expected to fill the gap, prices do not look friendly. Then importers would have to migrate higher procurement costs into the domestic energy market. Domestic gas prices should be set appropriately and strategically.

As risk management measures, fuel switching capability should be incorporated. In the uncertain environment, Myanmar should expand LNG receiving and distribution infrastructure. Myanmar needs to secure LNG Floating Storage and Regasification Units in competition with other regions.

The government needs to provide information on domestic laws and regulations concerning natural gas and electric power, current pricing policies – natural gas and electric power, current major infrastructure – including maps with the capacity data of natural gas pipelines, gas-fired and other power generation facilities, timely natural gas statistics (consumption, production, and import/export by sector, region and company) to attract more investors and potential LNG and natural gas marketers.

Information on decisions and policy measures regarding LNG imports, emergency LNG imports in recent years (since June 2020), and longer-term plans (including Thilawa), as well as natural gas utilisation plans (and past statistics) in electric power generation and industrial use would be also helpful for potential entrants into the market.