

Executive Summary

Natural gas will play very important role in Myanmar in the future. Although Myanmar has been a major producer of natural gas in Asia, the country has not fully utilised natural gas for its own uses. Thanks to the sustained economic growth that has followed the 2011 economic reform, the demand for energy and natural gas has grown significantly. Demand for natural gas in Myanmar has increased 1.4 times since 2011, the second largest demand growth after oil. The primary driver of this growth has been demand for natural gas to generate power, which accounted for 72% of total natural gas consumption in 2017. Natural gas (compressed natural gas) is also used by the transportation sector as fuel, but demand from the industrial sector is limited, and there is no residential demand as of 2017.

Natural gas demand is forecasted to grow from 457 million cubic feet per day (mmcf) in 2017 to 1,142 mmcf in 2040. Although demand from the power sector will continue to lead demand growth in the country, demand from the industrial sector and (after 2030) the residential sector is also expected to grow significantly.

Industrial demand for natural gas will be mainly observed in the Yangon and Mandalay regions. Thilawah Special Economic Zone (SEZ), in particular, is a prospective user of natural gas for manufacturing. Once the supply infrastructure is developed, city gas will become a more cost-competitive energy source than liquefied petroleum gas such as butane. Natural gas will be increasingly demanded by power plants that supply electricity to manufacturing factories in the SEZ. Because the SEZ is located close to the existing pipeline network, the cost of developing the necessary infrastructure will be limited. The investment cost of developing industrial demand in the Yangon region is estimated at \$3.5 million.

Natural gas demand from the industrial sector in the Mandalay region will be developed in several locations. To develop industrial demand in Mandalay Industrial Zone, near downtown Mandalay, a pipeline network more than 40 km long needs to be constructed. Due to the high cost of such infrastructure development, some form of public support will be required to realise the pipeline development. Another potential demand area is Myotha Industrial Park City. Located near the existing natural gas export pipeline to China, it has good access to a natural gas supply and, given the size of the area, has significant potential to develop demand in the future. The required total investment to develop industrial demand in the Mandalay region is estimated at \$24.5 million.

Residential demand will take longer to realise than industrial demand. This is because infrastructure development is more difficult in economic terms due to the small size of each demand lot. In a country like Myanmar, residential demand for natural gas is usually used for cooking, and there is no large demand for hot water unlike in northeast Asia or Europe. Residential demand for natural gas will be realised in New Yangon City (currently under consideration), Yangon, and downtown Mandalay city. Demand in both Yangon and Mandalay will be realised after 2030. Overall strong government commitment and policy implementation are necessary to create residential demand in Asia. The required investment amount for residential demand development is estimated at \$0.7 million in Yangon and \$2.5 million in Mandalay.

Demand from the transportation and fertiliser feedstock sectors will remain mostly flat. Existing fertiliser plants will continue operating and a new plant may be onstreamed once a natural gas feedstock becomes available. CNG will also be utilised as a primary fuel for public transportation in Yangon city, and demand will slowly grow in the future as the number of bus passengers increases.

On the other hand, domestic natural gas production is forecasted to decline. Two offshore fields and several onshore fields are in development, and production from these new supply sources will increase; however, such growth, even if fully realised as scheduled, will only partially offset the decline in production from existing fields. As of 2017, 75% of domestic production is exported to Thailand and China. As domestic production declines, the export volume will also need to be reduced. To make up the gap between declining supply and increasing demand, three LNG-receiving projects are being discussed. All three projects are in the south of the country and are associated with gas-fired power generation.

As the country's dependence on natural gas grows, its domestic infrastructure will need to be upgraded. Without a well-functioning pipeline network, the natural gas supply to final consumers will be unstable, leading to economic and supply security problems. The pipeline connecting Shwedaung and Magway in particular needs to be renovated urgently as it is currently out of service due to corrosion and leakage. Renovating the pipeline will restore the north-south pipeline linkage, making it possible to allocate natural gas more efficiently and improve supply security. The amount required for the renovation is estimated at \$77.4 million.

Gaps are expected to appear in Myanmar's natural gas balance around 2023. This suggests that the country will need to import LNG, reduce exports to Thailand and China, or otherwise restrain domestic demand further. Importing LNG will likely be the most realistic

option, and deploying floating storage and regasification units will make it relatively easy to import LNG to Myanmar. Myanmar may also be able to reduce natural gas exports and allocate more gas to domestic demand if Thailand and/or China agree. However, reallocating natural gas will only postpone the need to import LNG for a few years. In any case, Myanmar will need to import LNG by the early 2030s at the latest.

The Government of Myanmar should continue to play a pivotal role in developing the natural gas market. Since a market mechanism cannot fully reflect the benefits offered by natural gas, including its nature as a clean and low-carbon source of energy, the supply security advantages that it offers, and the convenience of its use, the government should provide policy support to promote the use of natural gas. Such policy actions include the following:

- (i) Create demand. Natural gas demand is created; it does not emerge automatically. The government should create initiatives to develop infrastructure and implement relevant policy arrangements such as setting an energy mix target.
- (ii) Encourage and accelerate domestic upstream development. Since domestic natural gas production is the most reliable supply source available, all projects at the development stage should be developed in a timely manner and exploration efforts should continue.
- (iii) Enhance the resilience of the pipeline network. Myanmar's pipeline network is in a vulnerable condition and may experience more interruptions due to leakages. A comprehensive review of the domestic pipeline network and renovation of critical parts of the existing network should be undertaken.
- (iv) Reform the energy pricing system. The current pricing system needs to be reformed to ensure sufficient returns from infrastructure development. Gradual but steady reform will be required.
- (v) Manage quality issues with natural gas. The allocation of high and low heat-value gas needs to be optimised after LNG is imported.
- (vi) Grow human capital to utilise LNG. Although Myanmar has extensive human resources to deal with natural gas, importing and utilising LNG requires another type of expertise. Training the country's natural gas experts will facilitate LNG imports and use in the future.

Natural gas is a very promising energy source, and there is no reason that Myanmar should forego this valuable option in developing its future energy mix. Firm commitment and proactive policy planning and implementation will lead to a 'gasified Myanmar' in the near future.