SMALL-SCALE LNG POTENTIAL IN THE ASIA PACIFIC REGION

Diego Rivera Rivota, Asia Pacific Energy Research Centre, +81 3-5144-8541, diego.rivera@aperc.ieej.or.jp

Overview
Global natural gas demand grew by 2.0% per year from 2007 to 2017, with more than half of this consumption happening in member economies of the Asia Pacific Economic Cooperation forum (APEC). APEC has some of the most active trade dynamics in the world, including three of the top five world’s exporters (Russia, the United States and Canada) and three of the world’s top five importers (Japan, China and the United States). Liquefied natural gas (LNG) is particularly important in APEC, as LNG represented 53% of total APEC imports in 2016, driven mainly by demand growth in Asia (predominantly in China).

According to the APEC Energy Demand and Supply Outlook 7th Edition, LNG imports to the APEC region will almost triple and will account for 67% of total imports in 2050. Moreover, with large additions of liquefaction capacity coming on stream (led by additions the United States, Russia and Australia), gas is projected to increase its share in most end-use sectors (electricity generation, industry, buildings, transport, etc.). However, several challenges such as regasification, storage and distribution infrastructure development remain to be met in order to materialise these prospects.

In this context, small-scale LNG (SSLNG) represents a viable alternative to supplying LNG to regions with no access to gas pipeline networks, such as outlying island or peninsulas. This is particularly relevant to the Asia Pacific region given its geography (numerous islands, peninsulas and remote demand centres) and gas demand growth potential. Amongst the main advantages of SSLNG are relatively lower initial investment costs when compared to conventional LNG infrastructure, which means that its supply can come online in a relatively short period. Additionally, SSLNG also provides more flexibility in terms of logistics and operation in contrast to piped gas. In light of these dynamics and with LNG demand and imports projected to continue growing, this study aims to explore SSLNG development and its potential growth path in the Asia Pacific region.

Methods
This study is based on data collection and analysis from relevant sources on LNG trade and dynamics, as well as small-scale development in recent years.

Future gas market trends are the results of detailed economic modelling by end-use sector, fuel, production, piped and LNG trade for the 21 APEC member economies extracted from the APEC Energy Demand and Supply Outlook 7th Edition.

This paper will comprise three case-studies of APEC member economies in which SSLNG projects have already been developed, namely – China, Indonesia and Chile; and exploring the possibility of expanding SSLNG in three regions with similar potential: Malaysia, Chinese Taipei and Viet Nam. These six countries were chosen because they share the following conditions:

- LNG imports in these countries are projected to grow.
- These remote areas have limited access to pipelines or regasification terminals and have potential demand centres such as industries, power plants or navigation hubs that currently use other fossil fuels.

Results
Small-scale liquefaction and regasification plants have been blossoming across the APEC region, with China leading growth but with projects in places as diverse as Chile and Indonesia. Three sectors are projected to receive the largest benefits of this shift from coal or oil products to natural gas: power generation, applications for industrial heaters (including mining) and the transportation sector (as LNG is projected to increase its share as both as marine and heavy-duty land fuel).

As LNG imports to these six APEC members grow through 2050, some of the additional imported volumes will require new regasification infrastructure. Since the geography of all six-case studies include either islands, peninsulas or remote areas with potential demand (mines, industry and oil-fired power plants), SSLNG could be a less expensive, more flexible and faster solution to meet increasing gas demand than expanding pipeline

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networks or developing conventional-size regasification infrastructure. As such, SSLNG has a bright future in these countries as LNG transported via either small-size vessels or trucks would provide access to natural gas in remote areas, switching away from more polluting fuels. Additionally, SSLNG development could help consolidate demand and increase the utilisation rate of existing LNG importing terminals.

While the benefits of SSLNG and switching away from other fossil fuels can outweigh the risks, attention needs to be paid to address development challenges such as a relatively higher cost per unit and a more complex value chain compared with both conventional LNG and other competing fuels like coal or diesel. Moreover, this additional cost makes SSLNG even more sensitive to international natural gas prices, an issue that is particularly relevant in Asia, where most LNG contracts are linked to crude oil prices.

Conclusions

In a context of energy transition to reduce carbon emissions and environmental impacts, natural gas has the potential to substitute for more polluting and—in some cases—more expensive fossil fuels. While in the electricity sector, natural gas is projected to have a role as a transition fuel in the medium-term, other sectors such as industry and heavy duty transport, present more challenges for decarbonisation; leaving natural gas as a more sustainable alternative to coal or oil.

However, increased use of natural gas requires the development of dedicated infrastructure such as pipelines or regasification terminals in regions without domestic production. A challenge for increasing gas demand is the development of such infrastructure, as it requires significant investment as well as long construction periods, averaging around 3.5 years.

Given that gas and LNG demand in the six selected APEC economies (China, Indonesia, Chile, Viet Nam, Chinese Taipei and Malaysia) are both projected to grow and count with demand centres without access to pipelines, SSLNG represents a unique alternative to supplying gas to insular or isolated regions. Despite challenges and uncertainties, mostly related to LNG prices, the lower investments and shorter construction periods of SSLNG provide a unique opportunity to meet the potential demand in these six APEC member economies, particularly in the transportation, industry and power generation sectors.

References

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