

The Obstacles to South Korea's Willingness to Import Shale Gas from the U.S.

By Jikhan Jeong

South Korea is an energy-poor country. To be specific, 82% of energy usage relied on energy imports in 2012. Importantly, South Korea is the second largest liquefied natural gas (LNG) importing country in the world. South Korea relies heavily on Middle Eastern countries for its LNG imports. In detail, the amount of imported LNG in 2014 was 29,713,418 tons. Of its overall imported LNG, 36% came from Qatar, 11% of it was imported from Indonesia, 10% came from Oman, and 10% of it from Malaysia. In this regard, South Korea has a strong willingness to diversify its LNG import portfolio and reduce its LNG import price in the objective of energy security. In particular, according to the announcement from the Ministry of Trade, Industry and Energy (2012), the South Korean government planned to import shale gas from the U.S., in case the oil price is more than \$80/barrel. In order to decrease dependency on a single vendor, South Korea will limit the share of imports of U.S. shale gas to 20% of its total gas imports by 2020. However, the LNG import price in South Korea is mainly linked to the Japanese Crude Cocktail (JCC). Therefore, if the oil price is less than \$80/barrel in the future, the imported price of shale gas from the U.S. will lose cost-competitiveness compared with the imported LNG price from other countries such as Qatar. In this regard, if the recent fall in oil prices continues until 2020, South Korea's motivation to import shale gas from the U.S. will likely be considerably weakened.

On the other hand, as seen in Figure 1, almost, 44% of imported LNG is used for power generation.

Therefore, the amount of power generation from LNG significantly influences South Korea's demand for imported LNG. The South Korean wholesale electricity market is a cost-based mandatory pooled system; therefore, all power plants, including LNG power plants with an installed capacity of more than 20MW, must take part in the pool and bid the total amount of power generation. The power plant's actual amount of power generation is determined by merit order and the total amount of electricity demand. However, due to an increase in the amount of bidding from base-load generation, including coal and nuclear power generation, from 349.5 billion kWh in 2014 to 362.4 billion kWh in 2015, the amount of power generation from LNG power plants decreased from 106.4 billion kWh in 2014 to 113.3 billion kWh in 2015.

In addition, the South Korean wholesale electricity market price (= System Marginal Price [SMP]) is determined by the power generation cost of marginal power plants. The LNG power plants have mostly played as marginal power plants. However, their share of this marginal power plant group decreased from 94.9% in 2014 to 90.2% in 2015. Furthermore, the LNG power plants' heat per unit price has decreased from 78,662 Won/Gcal in 2014 to 59,910 Won/Gcal in 2015 due to falling oil prices. Consecutively, SMP also decreased from 142.26 Won/kWh in 2014 to 101.76 Won/kWh in 2015. As a result, operating rates of LNG power plants and their profitability have decreased from 2014 until now. Moreover, the trend will likely continue due to the increasing share of power generation from base-load power generation and falling oil prices in the future. Furthermore, according to the 7th basic plan for long-term electricity supply and demand, the installed capacity of nuclear power will grow from 20,716MW in 2015 to 26,729MW in 2020 and that of coal will grow from 26,274MW in 2014 to 37,638MW in 2020. In the long-term view, it is possible that due to increasing the installed and operating reserve margin in South Korea's electricity market, the operating rate of LNG power generation will decrease, even if some of the unprofitable LNG power plant could be offloaded. In this case, the amount of LNG imports for power generation from the U.S. could fall.

Overall, even though South Korea has a strong motivation to import shale gas from the U.S. to diversify its LNG portfolio and weaken its energy import dependency, it is possible that South Korea's willingness to import shale gas for power generation from the U.S. could be weakened due to falling

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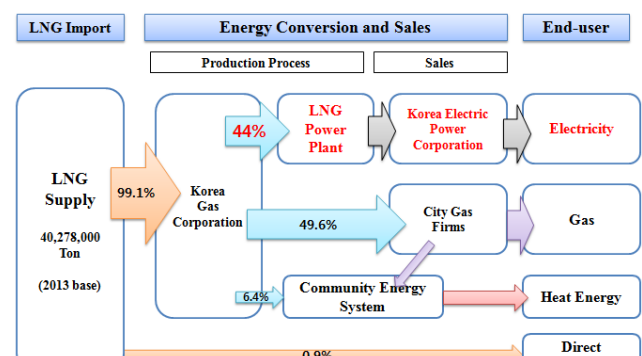


Figure 1. LNG Supply and Demand Flow in South Korea
Source: Korea Energy Economics Institute (2014)

oil prices and the decreasing operating rate of LNG power plants. Therefore, industry decision makers should closely investigate the change in the oil price and its effect on the imported LNG price in Asia. In addition, in order to promote the sale of shale gas, the U.S. should consider diverse possible scenarios suitable for different oil price levels, and when they evaluate the LNG importing countries' willingness to import shale gas for power generation from the U.S, decision makers should closely study the LNG importing countries' electricity market structure and its generation mix.

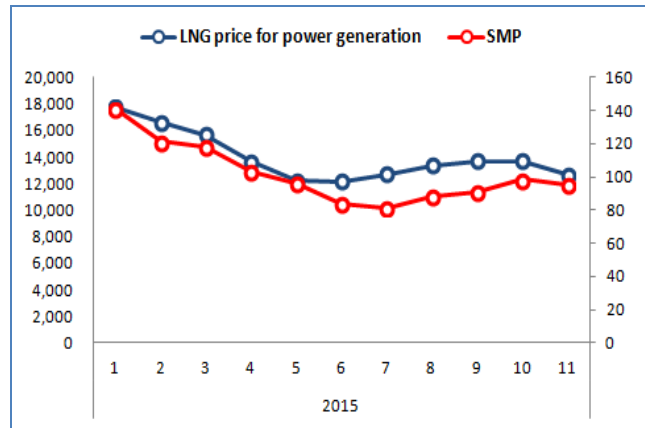


Figure 2. LNG Price for Power Generation and SMP from Sept. to Nov. in 2015.

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