



**Nascent Gas Markets in the Era of Low Oil Prices:  
The Challenges and Opportunities for Energy Security in Northeast Asia**

*Younkyoo Kim*

**YOUNKYOO KIM** is Professor in the Division of International Studies and Director of the Center for Energy Governance and Security at Hanyang University. He can be reached at <youn2302@hanyang.ac.kr >.

## **EXECUTIVE SUMMARY**

This paper examines the impact of low oil prices on the natural gas and liquefied natural gas (LNG) market in Asia and explores the market and policy conditions necessary to develop a regional trading hub.

### ***Main Argument***

At end of February 2016, the first exports of LNG from the U.S. mainland were shipped when the major shale gas company Cheniere Energy's LNG cargo left the Sabine Pass terminal in Texas. The potential large-scale entry of U.S. LNG exports into Asian markets may trigger flexible trading. Northeast Asia needs to continue its effort to promote regional cooperation and co-prosperity by building a Northeast Asian gas trading hub. Russia will seek to keep U.S. LNG in check through price negotiations. The evolution of an Asian gas hub will be influenced to a great extent by how Russia and China reconsider their energy strategies.

### ***Policy Implications***

- President Moon Jae-in's plan to reduce South Korea's use of coal and nuclear power could increase annual LNG consumption by 8 million tons more than previously anticipated, thereby heightening reliance on imports.
- As demand rises, natural gas and LNG supplies from the U.S., Australia, Russia, East Africa, and the Middle East will play an increasingly important role for countries in Asia that seek to improve supply diversification.
- The abundance of Australian and U.S. LNG will continue to exert downward pressure on Asian prices, which will likely encourage Northeast Asian buyers to seek out the most competitively priced cargoes.
- To establish a successful wholesale market and trading hub in Asia, countries in the region need to liberalize key economic sectors and ensure third-party access, supply competition, and deregulated gas prices.

Liquefied natural gas (LNG) markets in Asia are undergoing profound, structural changes, which have resulted from an ongoing global supply glut of gas and the prolonged low oil price environment that began in 2014, among other factors. Traditionally, long-term contracts, with prices based on oil indexation, formed the foundation for the growth of the natural gas and LNG market in Asia. For Asian consumers, the market is based on the Japan customs-cleared crude benchmark price.<sup>1</sup> Asian customers are subject to “destination clauses” that impose rigid requirements on supply quantities and restrictions on where LNG can be delivered. Despite some LNG exports from North America and the Pacific being more expensive, energy security and supply diversification play an important role for Asian buyers who do not want to exclusively rely on Middle Eastern suppliers. These factors combined mean that Asian buyers pay a relatively high price for LNG imports, which is referred to as the “Asian premium.”

However, the price correlation between oil and LNG is weakening, meaning that opportunities to buy LNG at low prices are growing. In the current market, importers are seeking to take advantage of their favorable position to challenge the existing long-term contract structure. The logical endpoint of the pricing and contractual changes is the creation of trading hubs in Asia.<sup>2</sup>

This paper provides an analysis of the impact of low oil prices on the LNG market in Asia and draws on existing research on natural gas and LNG trading structures specifically focusing on the Asian dimension. The goal is to examine whether the Asian LNG market, which has been characterized by long-term contracts, will experience a structural shift toward a more liquid spot market, and whether, as a result, an LNG trading hub will develop. Reflecting on global trends in

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<sup>1</sup> Howard V. Rogers and Jonathan Stern, *Challenges to JCC Pricing in Asian LNG Markets*, OIES Paper, no. 81 (Oxford: Oxford Institute for Energy Studies [OIES], 2014), 29.

<sup>2</sup> Jonathan Stern, “The New Japanese LNG Strategy: A Major Step towards Hub-Based Gas Pricing in Asia,” OIES, Oxford Energy Comment, June 2016.

the integration of gas markets, the paper finds that even if some of the first steps toward the development of a gas trading hub in Asia have been taken, there is considerable work to be done.

The first section analyzes the impact of low oil prices on global LNG supply and demand. The second section offers an overview of the LNG markets in Asia—with emphasis on Northeast Asia—and some of the pricing and contractual changes that occurred in 2009–13. The third section then examines supply and demand rebalancing in the wake of the collapse of oil prices in 2014. The final section documents some of the developments in the market that are moving toward gas trading hubs and a new price index in Asia.

### **The Rebalancing of Global Markets for Natural Gas**

In 2011–13, higher Asian LNG demand, lower European domestic production, and higher coal prices all combined to raise LNG prices, particularly in Asia. However, the global LNG market is currently oversupplied and stricken with low demand and prices, and the impact of these trends on the Asian market has been particularly disruptive.<sup>3</sup> The premium paid by Asia fell sharply in 2015 and even disappeared in 2016, while rising in Latin America and the Middle East.<sup>4</sup> Spot prices in the key Asian natural gas markets tumbled 75% from \$20 per million British thermal unit (MMBtu) in early 2014 to below \$5/MMBtu in the first half of 2016. Cheaper gas could be good news for countries like China and India, which are trying to figure out how to use less coal in their electricity sectors to curtail deadly air pollution.<sup>5</sup> Yet cheaper LNG did not entirely displace

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<sup>3</sup> Nick Cunningham, “LNG Glut Worse Than Oil,” Oilprice.com, December 12, 2015.

<sup>4</sup> Sylvie Cornot-Gandolphe, *The U.S. Natural Gas Exports: New Rules on the European Gas Landscape* (Paris: French Institute of International Relations, 2006), 36.

<sup>5</sup> Keith Johnson, “The Winners and Losers from Falling Asian Gas Prices,” *Foreign Policy*, February 19, 2015.

coal in the energy mix because coal has also become cheaper thanks to the global slump. Natural gas prices would need to fall even further for gas to be economically competitive with coal for power generation in China and India.<sup>6</sup>

The collapse of the Asian premium carries benefits for Europe. Europe has long been a second-tier market for LNG cargoes because it offered skimpier returns for gas sellers. Even so, LNG imports were still more expensive than Russian natural gas transported over land via pipeline, and many cargoes that did reach Europe were simply re-exported to Asia.<sup>7</sup> All that reinforced Europe's dependence on Russia for energy supplies, as low energy prices restricted the return of LNG and increased pipeline exports from Russia to Europe.<sup>8</sup>

*Policy Choices after Fukushima (2011–13)*

The 2011 Fukushima Daiichi disaster led policymakers in multiple countries to reconsider the role of nuclear power in their national energy mix. Immediately after the disaster, Japan decided to disable its nuclear power generation fleet, while nuclear energy programs in South Korea and other countries also experienced diminished operations. This prompted the increased use of other sources of energy, particularly a sudden surge in gas demand from Japan, South Korea, and China. This led to a widening price gap and to a tide of re-exports of LNG out of Europe. Post-Fukushima, Japanese utilities began to suffer losses due to the divergence between prices linked to Japan crude cocktail (JCC) and physical LNG cargo prices. Consumers in Asia needed to diversify their import routes and take advantage of various supply measures, such as tapping into pipeline natural gas.

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<sup>6</sup> Johnson, "The Winners and Losers from Falling Asian Gas Prices."

<sup>7</sup> Johnson, "The Winners and Losers from Falling Asian Gas Prices."

<sup>8</sup> Jude Clemente, "Six Threats for the U.S. Liquefied Natural Gas Business," *Forbes*, May 15, 2016.

Together with a stable supply of natural gas, Asian consumers aimed to lay the foundation for a more efficient market and diversification.

*An Era of Low Energy Prices (2014–16)*

The reduction of Chinese, Japanese, and South Korean demand caused by the fall in oil prices pulled down Northeast Asian LNG prices (see **Table 1**). Chinese demand was extremely important, as China is the only country in Northeast Asia that imports LNG while having its own pipeline connection and domestic gas production.<sup>9</sup>

**Table 1** Spot LNG Prices in 2013–16 (\$/MMBtu)

	Dec. 2013	Sep. 2014	Jun. 2015	Nov. 2015	May 2016	Oct. 2016	Dec. 2016
US Henry Hub	4.5	3.8	2.7	2.0	1.9	2.8	3.6
UK National Balancing Point	10.6	8.2	6.7	6.0	4.2	6.3	7.0
Platts Japan Korea Marker	17.6	12.8	7.5	7.5	4.4	6.5	9.5

Source: Compilation of data from the U.S. Energy Information Administration (EIA), <https://www.eia.gov/dnav/ng/hist/rngwhhdd.htm>; and “The BP Statistical Review of World Energy,” available at [https://ycharts.com/indicators/uk\\_heren\\_nbp\\_index\\_natural\\_gas\\_prices](https://ycharts.com/indicators/uk_heren_nbp_index_natural_gas_prices).

China’s LNG imports made a strong comeback in 2016 following the collapse of oil and gas prices in 2014. In 2016, China imported 26.1 million tons (mt) of LNG, up 32.6% year on year. In the first two months of 2017, China’s LNG imports reached 5.8 mt, up 34.9% year on year.<sup>10</sup>

<sup>9</sup> China’s gas production and demand in 2014 were 123.5 billion cubic meters (bcm) and 183.0 bcm, respectively, and imported gas accounted for 58.3 bcm. Of this gas, 31.3 bcm was imported through pipelines, and 27.0 bcm was LNG. See International Energy Agency (IEA), *The Medium-Term Gas Market Report 2016: Executive Summary* (Paris, France: OECD/IEA, 2016); and Stern, “The New Japanese LNG Strategy.”

<sup>10</sup> Xiaolin Zeng, “Resurgence in China’s LNG Imports Seen,” *Fairplay*, May 3, 2017.

Australia is currently the largest supplier of LNG to China, after surpassing Qatar in 2015. It accounted for 46% of China's imports in 2016, compared with a 19% market share in 2014.<sup>11</sup> Qatar, which tends to be a swing supplier between the Atlantic and Pacific basins, has seen its market share in China decline from 34% in 2014 to 19% in 2016.<sup>12</sup>

Japan is the world's largest LNG importer, accounting for around 35% of global demand. The common assumption is that Japan's incremental demand is either flat or negative. In fact, a Japanese government estimate projects that LNG use will fall 30% by 2030 from the 2014 peak.<sup>13</sup> The U.S. Energy Information Administration (EIA) has broken ranks with other key forecasters and predicted that Japan's gas demand will rise by nearly 1% per year. There is considerable room for even more natural gas consumption in Japan.<sup>14</sup> The Institute of Energy Economics, Japan, sees nineteen nuclear reactor restarts by March 2018. The nuclear restart program could curb LNG demand, but a number of factors go against greater reliance on nuclear energy in Japan.<sup>15</sup>

South Korea is the world's fifth-largest crude oil buyer and second-largest LNG buyer. The state-owned Korea Gas Corporation (KOGAS) has reduced its LNG intake due to weak demand

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<sup>11</sup> Zeng, "Resurgence in China's LNG Imports Seen."

<sup>12</sup> Zeng, "Resurgence in China's LNG Imports Seen."

<sup>13</sup> Jude Clemente, "Why Japan's Liquefied Natural Gas Demand Will Increase," *Forbes*, September 25, 2016.

<sup>14</sup> Clemente, "Why Japan's Liquefied Natural Gas Demand Will Increase."

<sup>15</sup> Whenever a single nuclear plant restarts in Japan, the LNG demand is reduced by 1 million tons. If the Fukushima nuclear plant were to restore its operation rate to the rate prior to the accident, global LNG demand would decrease by 17%. Before the earthquake hit Japan, the Japanese power-generation mix in 2005 consisted mainly of nuclear energy (31%), coal (26%), and water power (8%). Together, these power sources accounted for more than 60% of total power generation. Thermal power using LNG and oil made up for the remaining power generation. Post-Fukushima, the energy mix stands at nuclear power (1%), coal (30%), and water power (9%), with the remainder coming from oil and LNG. As a result, electricity bills increased by approximately 20% for households and 30% for businesses. The Japanese Ministry of Economy, Trade and Industry announced that it would reduce electricity bills through securing more than 60% of power from nuclear, coal-thermal, and water power plants, and reducing the ratio of expensive LNG and oil power generation in the long term. Clemente, "Why Japan's Liquefied Natural Gas Demand Will Increase."

amid the country's economic slowdown and mild temperatures, as well as greater use of cheaper coal and nuclear energy for power generation.<sup>16</sup> The company's LNG imports fell 13.5% year on year to 31.41 mt in 2015, from 36.33 mt in 2014, marking the second consecutive year of annual decline.<sup>17</sup> South Korea mostly imports LNG through KOGAS, the country's sole wholesaler. Private gas companies and utilities are only allowed to import LNG directly for their own power-generation purposes.

### *Rebalancing in 2017 and Beyond*

There is potential for the United States to become a major LNG supplier to China. In May 2017, the U.S. Commerce Department reached an agreement with Chinese authorities that would see Beijing give state-owned companies the green light to negotiate long-term contracts with U.S. LNG exporters.<sup>18</sup> Beijing's real goal is to break Qatar's monopoly on Asian LNG prices. Long-term contracts with U.S. firms will put pressure on the dominant suppliers to the region, such as Qatar and Australia.

About 70% of Japan's LNG supply is bought via long-term deals with destination clauses.<sup>19</sup> Such restrictions on the resale of LNG are a major problem, and Japan is pursuing a strategy to

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<sup>16</sup> "LNG Daily," S&P Global Platts, November 11, 2016.

<sup>17</sup> Most of the LNG was imported under fifteen long-term contracts and one medium-term contract in the first nine months of 2016. KOGAS has term contracts for 10.02 to 11.02 million tons (mt) per year from Qatar, 4 mt/year from Malaysia, 4.0 mt/year from Oman, 3.5 mt/year from Australia, 1.7 mt/year from Indonesia, 1.5 mt/year from Russia's Sakhalin, and 1 mt/year from Brunei, among others. KOGAS also plans to import 2.8 mt/year from the Sabine Pass terminal in Louisiana under a twenty-year contract beginning in 2017. "LNG Daily," S&P Global Platts, November 11, 2016.

<sup>18</sup> Tom DiChristopher, "Trump Just Gave China a 'Sledgehammer' to Smash the LNG Monopoly," CNBC, May 19, 2017.

<sup>19</sup> Clemente, "Why Japan's Liquefied Natural Gas Demand Will Increase."



lower LNG procurement costs and move away from oil indexation.

Regarding South Korea, one study finds that “nuclear power’s contribution to South Korea’s mix has fallen from 40% to 30% over the last 10 years, as plants have been decommissioned over safety issues. To make up for the fall, the contribution of coal has shot up to 40%. The country operates 53 coal-power plants, and plans to build another 20 in the next five years.”<sup>20</sup> Air pollution was one of the key campaign issues for newly elected president Moon Jae-in. On his fifth day in power, Moon announced that South Korea will temporarily shutter ten coal power plants, with plans to shut them down completely within his five-year term.<sup>21</sup> Moon has also proposed canceling lifetime extensions for nuclear plants and abandoning plans for new ones, en route to zero nuclear power in the country by 2040.

This policy shift could reverse the trend of declining demand for LNG. Under the new policies, South Korea may need to import around 8 mt more annually by 2025 than was previously estimated.<sup>22</sup> Following years of stagnant growth in LNG demand, Platts forecasts steady growth in South Korea’s consumption from 2019 onward, reaching 37.3 mt by 2022, although still below the record 39.0 mt imported in 2013.<sup>23</sup> If Moon implements policies that shift away from nuclear energy production and coal, South Korea will become increasingly dependent on natural gas transported from Russia through North Korea and on imports of LNG. That situation would have rippling effects for both the energy industry and world geopolitics.<sup>24</sup>

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<sup>20</sup> Akshat Rathi, “On His Fifth Day in Power, South Korea’s New President Shut Down 10 Big Coal-Power Plants,” Quartz, May 15, 2017.

<sup>21</sup> Rathi, “On His Fifth Day in Power.”

<sup>22</sup> “Political Shake-Up in S. Korea May Boost Demand for LNG,” *Gulf Times*, May 20, 2017.

<sup>23</sup> Charles Lee, “South Korea Headed for LNG Import Boost after Election,” Platts, May 7, 2017.

<sup>24</sup> Rod Adams, “Republic of Korea May Decide to Reign In Its World-Class Nuclear Industry,” *Forbes*, April 12,

## **LNG Exports from the United States and Beyond**

The Sabine Pass terminal exported its first cargo on February 24, 2016. After that shipment, only 4.2 bcm (3.0 mt) of U.S. LNG was exported in 2016, with capacity limited to Sabine Pass trains 1 and 2. Cheniere has averaged about one shipment every four days.<sup>25</sup> Shipments have been accelerating in 2017, however. Cheniere announced the departure of the one hundredth LNG cargo from its Sabine Pass facility in April 2017. In total, cargoes have been delivered to eighteen countries on five continents.<sup>26</sup> Cheniere also announced on March 31 the substantial completion of train 3 of the Sabine Pass project. The first delivery from train 3 will occur in early July 2017 to KOGAS.<sup>27</sup> A total of 89 bcm (65 mt) of committed new U.S. export supply is due online by 2021, with the greatest volumes scheduled for 2018–19.<sup>28</sup>

Flow decisions for U.S. export contracts are driven by netback global spot price signals. In 2016, most U.S. LNG exports went to customers in the Western Hemisphere.<sup>29</sup> Latin America is a natural first destination for U.S. cargoes, as short shipping distances reduce netback costs. Since September 2016, Asian spot LNG prices have increased by 80% for six months. In early January

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2017.

<sup>25</sup> “LNG: Cheniere Announces 100th Cargo Shipment,” EnerCom, Oil and Gas 360, April 3, 2017.

<sup>26</sup> “LNG: Cheniere Announces 100th Cargo Shipment.”

<sup>27</sup> Each train has a designed capacity of just under 600 million cubic feet per day, giving the facility a capacity of 3.55 billion cubic feet per day. A total of six trains will be built in the Sabine Pass facility. In addition to the release of train 3, trains 1 and 2 are currently operational. Train 4 is in the commissioning process, and train 5 is under construction. Train 6, the final train planned, is fully permitted and is currently being commercialized. See “LNG: Cheniere Announces 100th Cargo Shipment;” and Harry Weber and Chris Pederson, “South Korea’s KoGas in talks with Cheniere for more LNG supply, says CEO,” Platts, June 26, 2017.

<sup>28</sup> David Stokes and Olly Spinks, “U.S. Export Flows, the Supply Glut and Europe,” Timera Energy, March 13, 2017.

<sup>29</sup> Susan Sakmar, “U.S. LNG Exports: Where Did They Go?” OilPrice.com, September 28, 2016; and Stokes and Spinks, “U.S. Export Flows.”

2017, spot gas prices in Asia spiked to a near two-year high of \$9.75/MMBtu due to cold weather and a problem at the Gorgon LNG export terminal in western Australia.<sup>30</sup> The sharp jump in Asian spot prices saw an associated jump in U.S. export volumes to Asia.<sup>31</sup>

A relatively low volume of U.S. exports has landed in Europe to date. Asian gas prices have since collapsed by around 18% due in part to the return to service of the first liquefaction train at Gorgon. U.S. LNG exporters shifted their focus from Asia to Southern Europe as cold weather and problems with Algerian gas supply drove European prices higher. Gas prices in Europe were at their highest premiums to U.S. prices in February 2017.

Historically, Asia has pulled flexible cargoes from Europe in times of market tightness. The \$5.4 billion expansion of the Panama Canal will increase competition in the United States to ship LNG to Asia. U.S. exports will benefit substantially from shorter travel time and lower costs for shipments from the Gulf Coast to Asian markets.<sup>32</sup> The EIA estimates that U.S. LNG traffic through the canal could exceed 550 vessels annually, or 1–2 vessels per day, by 2021.<sup>33</sup>

The United States agreed to continue to export LNG to China based on the May 2017 announcement by the U.S. Commerce Department of a U.S.-China 100-day action plan.<sup>34</sup> Five Asian countries (Japan, South Korea, China, India, and Taiwan) accounted for 68% of global LNG imports in 2015. In 2016, higher imports into China and India more than offset declines in LNG

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<sup>30</sup> Susan Sakmar, “Can U.S. LNG Compete with Qatar, Australia?” OilPrice.com, May 18, 2017.

<sup>31</sup> Scott DiSavino, “U.S. LNG Exports Shift to Europe from Asia,” Reuters, January 24, 2017.

<sup>32</sup> Bill Loveless, “New Panama Canal a Big Boon for LNG Exports,” *USA Today*, July 3, 2016.

<sup>33</sup> U.S. Energy Information Administration (EIA), “Expanded Panama Canal Reduces Travel Time for Shipments of U.S. LNG to Asian Markets,” June 30, 2016, <http://www.eia.gov/todayinenergy/detail.cfm?id=26892>.

<sup>34</sup> Sakmar, “Can U.S. LNG Compete with Qatar, Australia?”

consumption in the established markets of Japan and South Korea.<sup>35</sup> According to Wood Mackenzie, by 2030, Chinese LNG demand is expected to reach 75 mt/year, triple 2016 imports.<sup>36</sup> In August 2016, Cheniere shipped a U.S. LNG cargo to China via Royal Dutch Shell’s Maran Gas Apollonia. This was noteworthy because it was the first LNG tanker to transit the expanded Panama Canal. As of March 2017, Cheniere had shipped ten LNG cargoes to China.<sup>37</sup>

Japan imported approximately 210,000 tons of LNG from the United States in January 2017. The first shipment carried 70,000 tons of fracked LNG to Chubu Electric Power’s Joetsu thermal natural gas power plant in Japan’s Niigata Prefecture, in central Japan, the first of a planned 700,000 tons of LNG imports to Japan this year.<sup>38</sup> Another 70,000 tons went to Tokyo Electric Power’s Futtsu thermal power station in Chiba, just east of Tokyo. The remaining 70,000 tons were taken to Kansai Electric Power’s Sakai LNG terminal in Osaka, in western Japan.<sup>39</sup>

According to a Reuters report, SK E&S, belonging to the South Korean conglomerate SK Group, imported 66,000 tons of U.S. shale gas from Cheniere Energy’s Sabine Pass LNG export terminal in Louisiana. SK E&S is scheduled to import 2.2 mt a year of U.S.-originated LNG from 2019 through 2039.<sup>40</sup> KOGAS is also expected to import 2.8 mt a year of LNG processed by

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<sup>35</sup> Sakmar, “Can U.S. LNG Compete with Qatar, Australia?”

<sup>36</sup> Sakmar, “Can U.S. LNG Compete with Qatar, Australia?”

<sup>37</sup> Sakmar, “Can U.S. LNG Compete with Qatar, Australia?”

<sup>38</sup> Andrew Follett, “Japan Buys First Shipment of Natural Gas from U.S. Fracking,” *Daily Caller*, January 9, 2017.

<sup>39</sup> Hirofumi Matsuo, “Japanese Importers Do Double Take on Not-So-Cheap U.S. Shale Gas,” *Nikkei Asian Review*, March 11, 2017.

<sup>40</sup> Jane Chung, “SK E&S Imports South Korea’s First U.S. Shale Gas Spot Cargo,” *Reuters*, January 20, 2017.

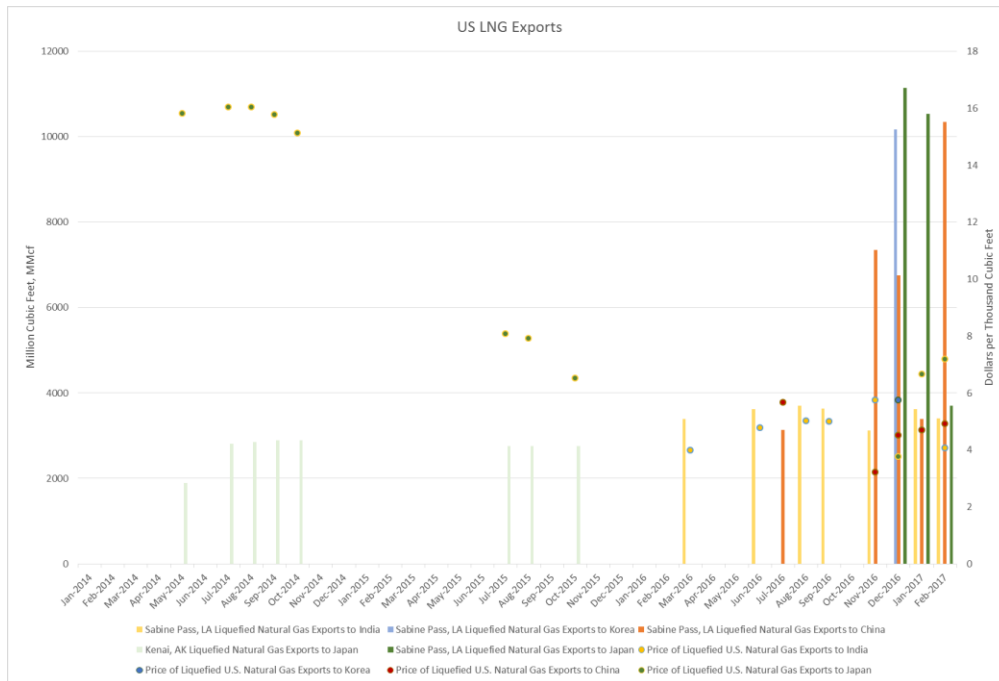
Cheniere Energy under a twenty-year supply deal that begins in 2017. The first cargo should arrive in July 2017.<sup>41</sup>

Large supplies of natural gas coming from the United States, Australia, Russia, East Africa, and the Middle East will play an important role in coming years, with demand expected to pick up after 2020 as countries reduce their reliance on coal. The global LNG market is projected to increase by 50% between 2015 and 2020 to nearly 20 billion cubic feet per day. By 2020, the United States is set to become the world's third-largest LNG producer after Australia and Qatar (see **Figure 1**).

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<sup>41</sup> Chung, "SK E&S Imports South Korea's First U.S. Shale Gas Spot Cargo."

**Figure 1** U.S. LNG Exports



Source: EIA, “U.S. Natural Gas Exports and Re-Exports by Country,” [https://www.eia.gov/dnav/ng/ng\\_move\\_expc\\_s1\\_m.htm](https://www.eia.gov/dnav/ng/ng_move_expc_s1_m.htm).

The fortunes of U.S. LNG in Asia will depend on its competitiveness versus other global alternatives such as LNG supplies from Qatar and Australia and potential pipeline supply from Russia. Australia and Qatar sell all of their LNG exports on long-term contracts to power utilities in Japan, South Korea, China, and Taiwan. Other new LNG supplies from Southeast Asia, Africa, and Russia could give buyers even more flexibility. The competitiveness of U.S. LNG will be determined by oil and Henry Hub prices. Lower oil prices and higher Henry Hub prices would render U.S. LNG exports uneconomical versus oil-linked JCC LNG in Asia. Specifically, shipping LNG to China, Japan, and South Korea from the U.S. Gulf Coast would be inefficient if oil prices fall below \$80 and Henry Hub prices rise above \$4.

Qatar has been the main supplier of LNG to Northeast Asia through a mix of spot, short-, medium-, and long-term supply contracts, accounting for around 20% of all imports to the region since 2011. Australian supply made up around 9% of total Northeast Asian imports from 2011 to

2014, but this jumped to 14% in 2015.<sup>42</sup> Australia overtook its Middle Eastern rival in 2016, sending 30.7 mt/year to China, Japan, South Korea, and Taiwan combined in January–October, compared with Qatar’s 28.2 mt. Australian imports increased by 75% over the same period in 2015, while Qatari imports declined by around 1.4%.<sup>43</sup> Western Australia’s LNG projects are located relatively close to Northeast Asian buyers (8 days), comparing favorably to the shipping distances from Qatar (11–14 days).

The recent boost in Australian imports has come from contracts between Northeast Asian buyers and the 8.5 mt/year Queensland Curtis, 7.8 mt/year Gladstone, 9 mt/year Australia Pacific, and 15.6 mt/year Gorgon plants, which have all gone online since January 2015. Japan, South Korea, and China had already been importing Australian LNG from the 3.7 mt/year Darwin, 16.3 mt/year North West Shelf, and 4.3 mt/year Pluto LNG plants under long-term contracts. According to the International Group of Liquefied Natural Gas Importers, 26% of Asia’s LNG imports and 21% of Australia’s LNG exports in 2015 were through spot and short-term trade (a contract duration of four or fewer years).<sup>44</sup>

South Korea is the largest importer of Qatari LNG, importing around 12.5 mt in 2015 (roughly 8% of its total purchases), and has long-term contracts totaling around 9 mt/year with state-owned RasGas. Japanese buyers, led by top importer JERA, are pushing for cheaper LNG, shorter-term contracts, and destination flexibility for long-term contracts, as they expect to be oversupplied and want the ability to sell or divert their term cargoes. This could come at the expense of long-term Qatari contracts. The crucial period for Japan’s and South Korea’s imports

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<sup>42</sup> “Australia Ups NE Asia LNG Share,” *Hellenic Shipping News Worldwide*, December 28, 2016.

<sup>43</sup> “Australia Ups NE Asia LNG Share.”

<sup>44</sup> “Australia Ups NE Asia LNG Share.”

of Qatari LNG is 2020–23, when contracts will start to expire. All the term contracts are not expected to be renewed, especially given that the Qatari contracts are among both countries' most expensive supplies. The abundance of Australian and U.S. LNG will continue to exert downward pressure on Asian prices. This lower-price, high-supply environment will likely encourage Northeast Asian buyers to seek out the most competitively priced cargoes.

As a result of these new market conditions, Qatar is succumbing to buyers' demands for more contractual terms. In this respect, it appears to be following a similar strategy to the one Saudi Arabia has employed in the oil market by pushing its massive export facilities beyond capacity to protect market share from Australia and the United States. In 2015, RasGas agreed to cut the price of a contract with India's Petronet LNG to \$6–\$7/MMBtu, roughly 50% lower than the price of \$12–\$13 that the sides had agreed on earlier. State-owned Qatargas also signed a five-year LNG contract with Petronas LNG UK in October 2016 that is indicative of Qatar's strategy to offer more flexible terms in a bid to protect its market share. Qatar is deepening its presence in Europe to diversify its market beyond Asia. In addition, in April 2017, it announced that it would end its self-imposed moratorium on the development of the North Field (Qatar's name for South Pars, which is shared with Iran). The decision comes after Qatar was surpassed by Australia as the top exporter to Northeast Asia in 2016 and is intended to increase the country's market share.<sup>45</sup>

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<sup>45</sup> Howard Rogers, "Qatar Lifts Its LNG Moratorium," OIES, Oxford Energy Comment, April 2017.



## **Challenges Facing Natural Gas Market Integration and Trade Structures in Northeast Asia**

For Northeast Asia at large, lower oil prices have had a sizable impact on natural gas markets. Although lower oil prices have made oil-indexed contracts desirable in the short term, both companies and governments want to encourage gas-on-gas competition to create a more stable LNG market in the future. Lower oil prices may have diminished Asian gas buyers' urgency to diversify away from oil indexation, but they have not removed the fundamental need to establish an alternative pricing mechanism that better reflects gas market fundamentals. Although demand for LNG is decreasing, it is likely to increase in the future as the international community responds to climate change by emphasizing energy sources that allow for greater reductions in greenhouse gas emissions. Therefore, efforts should be made to improve the fairness and efficiency of the LNG market, and now is the perfect time to address the structural problems that are holding the market back.<sup>46</sup>

Overall, the LNG industry is bracing itself for a buyer's market. Buyers are using their newfound leverage to revise contracts and renegotiate prices. The potential for international gas markets to rebalance in line with changing market dynamics is premised on the liquidity of regional gas trading hubs and the implementation of reforms. The future trajectory of global gas markets will depend on the scale of reforms to increase the transparency and efficiency of markets, including through the creation of gas trading hubs in Asia.

With this context in mind, several fundamental challenges need to be overcome to develop an Asian LNG hub and a standardized pricing mechanism.

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<sup>46</sup> Younkyoo Kim, "Rethinking Energy Security in Northeast Asia under Low Oil Prices: A South Korean Perspective," National Bureau of Asian Research (NBR), Pacific Energy Summit, Brief, June 21, 2016.

*Shifting Away from Oil Indexation*

The divide between LNG sellers and buyers in Asia has been growing. Importers of LNG have been pushing for greater benefits amid the surplus, signing new, cheaper contracts that give them more flexible terms. On the other hand, exporters have tried to preserve long-term supply deals written in their favor during tighter markets.

The fifth LNG Producer-Consumer Conference was held on November 24, 2016, in Tokyo, and attended by more than one thousand company executives and government officials, as well as analysts, from more than 32 LNG-producing and -consuming countries. Yuji Kakimi, president of JERA, a joint venture set up by Tokyo Electric Power and Chubu Electric Power, announced plans to reduce the amount of gas it purchases on long-term contracts. Most of Asia's purchases "are bound up in long-term contracts, with fixed volumes, caps on price fluctuations, and clauses restricting the destination to a single port or buyer."<sup>47</sup> In addition, "suppliers are worried that buyers could seek arbitration to renegotiate contracts," as occurred in Europe in the late 2000s.<sup>48</sup>

CME Group notes that the "oil price linkage was introduced in the 1970s when oil was the main competing fuel to natural gas in Japanese power generation."<sup>49</sup> The supply of LNG, in the case of South Korea, Japan, China, and Taiwan, was dominated by long-term (20–25 years) take-or-pay contracts that linked the price of gas to that of oil. The "share of oil-indexed gas (both LNG and pipeline) in East Asia was 88%, much higher than the global average of 65%."<sup>50</sup> The

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<sup>47</sup> Mark Tay, "LNG Sellers, Asian Buyers Spar as Contract Fight Brews amid Supply Glut," Reuters, June 1, 2017, <http://in.reuters.com/article/asia-lng-singapore-legal-idINKBN18R1CS>.

<sup>48</sup> Tay, "LNG Sellers, Asian Buyers Spar as Contract Fight Brews amid Supply Glut."

<sup>49</sup> CME Group, "LNG: Stepping Up to the Asia Supply Boom," April 21, 2016. <http://www.cmegroup.com/education/featured-reports/lng-stepping-up-to-the-asia-supply-boom.html>.

<sup>50</sup> Xunpeng Shi and Hari Malamakkavu Padinjare Variam, "Gas and LNG Trading Hubs, Hub Indexation and Destination Flexibility in East Asia," *Energy Policy* 96 (2016): 587; and Stern, "The New Japanese LNG

disadvantage of this system is that it keeps Asian gas prices much higher than in other parts of the world. In recent years, “high crude oil prices resulted in increases in LNG import prices.”<sup>51</sup> Low oil prices have weakened the argument that oil-price indexing is disadvantageous for customers. Nevertheless, “Asian buyers may be reluctant to go back to JCC-only price indexation even with strong price review provisions in future contracts.”<sup>52</sup> It is also true that Asian buyers will continue entering into long-term contracts to diversify and mitigate risks that cannot be addressed in spot trades.

### *Destination Flexibility*

In March 2017, KOGAS announced that it had signed a memorandum of understanding with Japan’s JERA and the China National Offshore Oil Corporation to exchange information and cooperate in the joint procurement of LNG.<sup>53</sup> Under the agreement, the buyers aim to “extract concessions from producers that would give them supply flexibility, such as having the right to re-sell imports to third parties.”<sup>54</sup> Japan and China seem to have different priorities in LNG contract negotiations. LNG buyers and policymakers in Japan prioritize issues with flexibility above price.<sup>55</sup> Whereas in Japan destination flexibility is taken to be much more important than hub

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Strategy.”

<sup>51</sup> “Natural Gas Prices in Asia Mainly Linked to Crude Oil, but Use of Spot Indexes Increases,” EIA, September 29, 2015.

<sup>52</sup> “Despite Low Prices, Asian LNG Buyers May Not Go for JCC-Only Price Indexation,” *Natural Gas World*, August 9, 2016.

<sup>53</sup> Jane Chung, Yuka Obayashi, and Oleg Vukmanovic, “World’s Top LNG Buyers Form Alliance to Push for Flexible Contracts,” Reuters, March 23, 2017.

<sup>54</sup> Chung, Obayashi, and Vukmanovic, “World’s Top LNG Buyers Form Alliance.”

<sup>55</sup> Noel Tomnay, “LNG Forum Poll—Japan,” June 1, 2016.

indexation, in China they are equally important due to pipeline imports.<sup>56</sup> Japan will be overcontracted in 2017–21, resulting in oversupply in the Japanese gas market and the need for operational flexibility for better trading opportunities, which are prevented under the destination restriction clauses. In November 2016, the Japanese Fair Trade Commission “launched a formal investigation into the destination clauses within the LNG supply contracts signed by the country’s LNG importers.”<sup>57</sup> If the destination clauses are removed, this would lead to a growth in trading and optimization of LNG cargoes. In May 2016, the Japanese Ministry of Economy, Trade and Industry published a strategy paper for LNG market development with the aim of creating a flexible market and developing an LNG trading hub in Japan. The paper states that the easing and elimination of destination clauses is indispensable for achieving a flexible and liquid market.<sup>58</sup>

#### *Trading Hubs and a New Price Index in Asia*

Much has been written about natural gas trading hubs and price index developments in Asia.<sup>59</sup> Japan, Singapore, and China are taking the lead in establishing an Asian gas hub. They still face obstacles, such as the lack of liquidity, transparency, and third-party access.

A competitive national or regional market needs to be developed to set a reliable gas price for the region.<sup>60</sup> One notable feature of Asian gas markets, especially when compared with the

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<sup>56</sup> Shi and Variam, “Gas and LNG Trading Hubs,” 588.

<sup>57</sup> “Report: Japan’s Trade Commission Starts LNG Destination Clauses Inquiry,” LNG World News, <http://www.lngworldnews.com/report-japans-trade-commission-starts-lng-destination-clauses-inquiry>.

<sup>58</sup> Stern, “The New Japanese LNG Strategy.”

<sup>59</sup> EIA, “Perspectives on the Development of LNG Market Hubs in the Asia Pacific Region,” March 2017.

<sup>60</sup> Anne-Sophie Corbeau et al., “Asian Quest for LNG in a Globalising Market,” OECD/ IEA, 2014, 38; and Warner Ten Kate, Laszlo Varro, and Anne-Sophie Corbeau, “Developing a Natural Gas Hub in Asia: Obstacles and Opportunities,” OECD/IEA, 2013.

markets of North America and Europe, is the almost total absence of competition as an organizing principle.<sup>61</sup> The first prerequisite for the development of a liberalized wholesale market and a successful trading hub is to ensure that the industrial, commercial, and residential sectors are fully liberalized. The creation of hubs such as the Henry Hub in the United States in 1988 and the National Balancing Point in the United Kingdom in 1996 occurred after deregulation of those countries' natural gas markets and included third-party access, competition among suppliers, and deregulation of gas prices. These forms of market transparency create competition between suppliers and encourage the end-user to demand more competitive pricing.<sup>62</sup> Contracts should be standardized so that the terms and conditions are harmonized, but this must exclude the delivery period, quantity, and price.<sup>63</sup>

Regulatory changes are happening in many Asian countries, most notably in China and Japan, and Singapore is on track to meet the conditions necessary to create a liquid and transparent trading hub. There is still considerable work to be done in other countries in the region in terms of wholesale price deregulation and third-party access to pipelines and LNG import infrastructure.<sup>64</sup>

Market liquidity is a real problem. The amount of pure spot trading is small relative to the size of the market, with only one or two cargoes per day. The volume of pipeline interconnection is not large enough either.<sup>65</sup> The EIA concludes that market preconditions “do not currently exist

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<sup>61</sup> Peter Hughes and Daniel Muthmann, “Gas in Asia: From Regional Premium to Global Commodity?” NBR, Pacific Energy Summit, Working Paper, 2015; and Kim, “Rethinking Energy Security in Northeast Asia under Low Oil Prices.”

<sup>62</sup> Patrick Heather, *The Evolution of European Traded Gas Hubs*, OIES Paper, no. 104 (Oxford: OIES, 2015), 5.

<sup>63</sup> Heather, *The Evolution of European Traded Gas Hubs*.

<sup>64</sup> Corbeau et al., “Asian Quest for LNG in a Globalising Market,” 107.

<sup>65</sup> EIA, “Perspectives on the Development of LNG Market Hubs,” 36.

to allow Japan, China, or Singapore to be fully liberalized markets where natural gas prices are efficiently and transparently determined by supply and demand.”<sup>66</sup>

Singapore is the most likely country to establish a successful gas trading hub in Asia.<sup>67</sup> It has liberalized electricity and gas markets; a good legal, fiscal, and financial reputation; and experience in developing an oil trading hub.<sup>68</sup> The country also has pipeline connections with Malaysia and Indonesia and Asia’s first open-access LNG terminal, which started operating in 2013. However, Singapore’s gas market has a capacity of less than 10 bcm, and its expansion potential in terms of LNG-receiving terminals and storage capacity is uncertain.<sup>69</sup>

For Japan to become an energy trading hub, it needs to reduce government intervention, enable third-party access, and effectively unbundle energy from the transportation sector. The Ministry of Economy, Trade and Industry’s initiative to set up a future gas market is an encouraging sign, but liberalization of the wholesale gas market is required, specifically for third-party access to LNG terminals and pipelines.<sup>70</sup>

China boasts domestic LNG production and plans to have pipeline imports from Turkmenistan, Myanmar, and Russia by 2020. However, there is no third-party access to pipelines or LNG infrastructure, and the gas industry is dominated by three national oil companies. The

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<sup>66</sup> EIA, “Perspectives on the Development of LNG Market Hubs,” 4.

<sup>67</sup> Corbeau, “Developing a Natural Gas Hub in Asia”; and Rogers and Stern, *Challenges to JCC Pricing in Asian LNG Markets*, 38.

<sup>68</sup> Shi and Variam, “Gas and LNG Trading Hubs.”

<sup>69</sup> Rogers and Stern, *Challenges to JCC Pricing in Asian LNG Markets*, 41.

<sup>70</sup> Rogers and Stern, *Challenges to JCC Pricing in Asian LNG Markets*, 40.

International Energy Agency thus foresees obstacles to establishing a liquid spot market, despite the fact that small quantities of LNG are already being traded in Shanghai.<sup>71</sup>

Trading hubs provide clear and transparent price and volume reporting.<sup>72</sup> Several price indexes have been developed to track LNG trade in Asia. These include the Japan Monthly LNG Spot Index tallied by Japan’s Ministry of Economy, Trade and Industry; the East Asian Index tracked by ICIS Heren; the Platts Japan and Korea Marker, tracking the price of LNG delivered to Japan and Korea; the Singapore Exchange LNG Index compiled by SGX LNG Index Group; and the Argus Far East Index.<sup>73</sup> Current LNG indices in Asia face a number of challenges. Compared to pipeline-based price index development, LNG-based prices lack depth, exhibit volatility, and can be influenced by the significant time gap between contracting and delivery, as well as by the limited interconnectivity in LNG import terminals. The pipeline model, by contrast, relies on continuous flows of gas, daily scheduling of receipts and deliveries, and homogeneity of product (compared with different LNG cargo specifications).

## **Conclusion**

Despite the current slowdown of Asian LNG demand, Asia is likely to continue to drive the development of the global LNG market. Going forward, for LNG demand to expand, well-functioning markets are necessary. To develop well-functioning, liberalized natural gas and LNG markets, governments need to facilitate industry deregulation. This will allow third-party access

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<sup>71</sup> Anne-Sophie Corbeau, Rami Shabaneh, and Sammy Six, “Shaking Up the LNG Scene,” King Abdullah Petroleum Studies and Research Center, 2016, 13–14.

<sup>72</sup> EIA, “Perspectives on the Development of LNG Market Hubs,” 1.

<sup>73</sup> EIA, “Perspectives on the Development of LNG Market Hubs,” 41; and Rogers and Stern, *Challenges to JCC Pricing in Asian LNG Markets*, 34.

and competition to take hold and establish a transparent trading hub. Trading hubs enable a price indexation that truly reflects the dynamics of supply and demand.

Low oil prices are hastening the possibility of stronger regional cooperation and greater co-prosperity through the development of a gas trading hub in Northeast Asia. These aligning factors mean that the growth of gas trading hubs in Asia is likely to become a reality.



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*The Asia-Pacific has reached a unique moment in its energy security outlook. As a result of the commercial viability of new supplies, the region's changing energy demand, and breakthroughs in technology, conversations are no longer dominated by concerns over tight markets and high prices. Within this context, strengthening transregional energy cooperation could contribute to bolstering regional trade, geopolitical alliances, and the development of clean energy. However, stakeholders have disagreed on the specific tactics, policies, and tools that will help nations meet their energy and environmental security goals. Maximizing the benefits of this era of economic growth and energy abundance will require dedicated leadership and innovative policies.*

**A Collaboration between the National Bureau of Asian Research (NBR) and the Center for Energy Governance and Security (EGS) of Hanyang University**

To explore these issues, NBR and EGS have partnered to examine options for policymakers to increase transregional cooperation and achieve energy security goals. Activities include working papers and policy briefs, roundtables and workshops, and private briefings. The partnership between NBR and EGS aims to enhance conversation around the shared interests of energy security in the Asia-Pacific and better incorporate specific considerations for the United States, South Korea, and other countries into ongoing dialogues.

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EGS conducts dynamic research on today's global energy issues while bringing together groups of energy experts from the United States and major countries in the Asia-Pacific (South Korea, China, Japan, Singapore, and Australia). Furthermore, building upon a comprehensive network base from all three sectors (government, business, and academia), global energy governance, energy security, and region-specific issues of significance to the region will be actively explored and discussed.

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