



CRA Insights: Energy

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December 2019

LNG market trends – Asian LNG market development

In this second of a series of papers on developments in the global LNG industry, we explore the development of Asian-traded LNG markets. We draw on lessons from the development of European-traded natural gas markets and a comparable commodities market, and discuss possible factors to consider when assessing the development of a traded market. We then assess the current status of Asian LNG markets with respect to the criteria identified. Finally, we indicate possible pathways for the development of a mature Asian-traded LNG market.

Traded market development

Europe provides interesting insights on the development pathways for a liquid-traded gas market in Asia, despite fundamental structural differences between the two markets.

Well-developed and liquid-traded natural gas markets have existed since the 1990s in the US and UK. In the US, the Henry Hub pricing point is the benchmark for natural gas pricing. It is a deep, liquid market that acts as a benchmark for pricing in the US and internationally, with prices benchmarked from the Henry Hub location according to transportation costs.¹ Henry Hub is at the intersection between multiple pipelines, so it qualifies as both a physical and financial trading point.

In the UK, a virtual hub model is used. Market participants sell gas at the virtual national balancing point (NBP). Established as a fully functioning traded gas market in the 1990s, NBP prices are recognized as the benchmark for gas pricing.

In continental Europe, market liberalization was slower. The widespread development of liquid, competitive, and transparent trading of natural gas did not occur until the 2008/09 financial crisis. In particular, market developments meant that the specific national-traded gas markets increased both in liquidity and their influence on other, less developed traded-gas markets throughout Europe. This precipitated a wave of price reviews in import contracts for pipeline and LNG supplies. As a result, we have seen a rapid change in import price-setting mechanisms, from oil-indexation to indexation based on traded-gas pricing.

¹ Thierry Bros and Patrick Heather estimated a churn rate of 53.9 for Henry Hub. See “Quarterly Gas Review Analysis of Prices and Recent Events,” Issue 5, March 2019, The Oxford Institute for Energy Studies.

The factors underlying the increasing maturity of continental European traded-gas markets are widely documented. Based on our experience in the European natural gas industry, we identify the following five factors to consider when assessing the maturity of a market:

1. **Traded volumes.** Transparent reporting of traded volumes supports reliable pricing information. The ratio of traded to physical volumes (the churn rate) is an indicator of the number of times a unit of gas is exchanged before it is finally consumed. It is a common measure of market liquidity.
2. **Traded products.** A market should have a range of products available for sale and purchase to become commonly used for trading and risk management.
3. **Market access.** Third party access (TPA) to infrastructure (e.g., unused pipeline and LNG terminal capacity) was crucial in allowing European participants access to the market, particularly for smaller players. Competition, and therefore liquidity, cannot increase if this condition is not fulfilled. For example, in Italy, ENI dominated pipeline imports prior to TPA requirements. The routes through which gas came into the Italian market were opened to competition, and price signals spread from more established traded markets to the less competitive Italian market.
4. **Market participants.** The presence of physical and non-physical players supports high-traded volumes and various traded products.
5. **Price transparency.** Price transparency increases trust in the market to reflect actual market value of traded products.

The path to maturity will also be affected by changes in global markets. In Europe, four factors that led to the improvement of these metrics, stand out:

- Decreased demand;
- Increased availability of LNG;
- A supportive regulatory environment, both upstream and downstream; and
- Third-party access regimes.

The path to liquidity can also be assessed against other commodities. However, we explore here the lessons the LNG market can learn from the oil market.

While there are significant technological differences in how LNG and crude oil are shipped, the development of a liquid global crude oil market may provide insights as to how the LNG market will evolve in the Pacific Basin. From the birth of the modern crude oil market up to the 1970s, the market was largely defined by within-company exchanges and bilateral agreements. Now oil is a truly global commodity, traded on a global pool and priced based on fundamental supply and demand rather than agreements between two parties. The tipping point in the market's development was after the oil crisis of 1979. Diversity in oil supply, primarily from non-OPEC producers, and a desire to reduce exposure to volatile spot prices for both producers and consumers led to an overall increase in the appetite for futures contracts for crude oil.

Traded LNG in the Asia-Pacific region

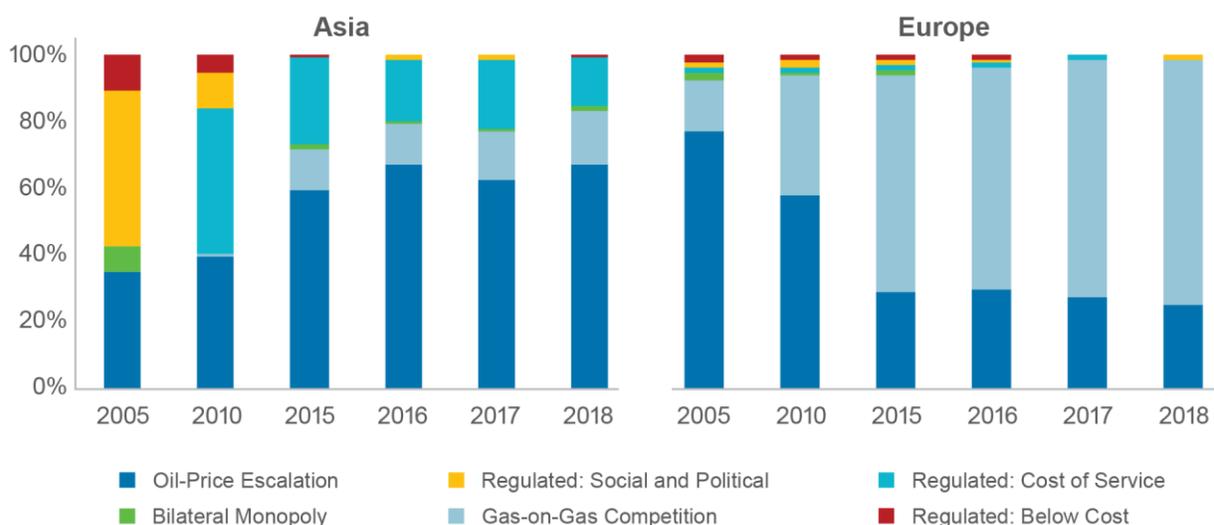
In our previous *Insights*, we showed that the global trend of decreasing LNG contract size and duration is not universal. In particular, it does not hold in the Asia-Pacific region where both size and duration of LNG agreements have remained relatively stable over the last decade. However, a large volume of current contracts will expire by 2030. This opens up interesting possibilities for future Asia-Pacific LNG contracting.

We believe the future of Asian LNG will be dependent on where the Asian market is with respect to some or all of the five factors identified above.

Volumes of trade in Japan/Korea Marker (JKM) products have increased significantly in the last couple of years. Thierry Bros and Patrick Heather, as part of the Oxford Institute for Energy Studies Quarterly Gas Review, Issue 5, show that the volumes of trade in JKM swaps in 2018 were more than three times higher than 2017.² While this is encouraging, when translated into an estimated churn rate, the authors find a churn rate for JKM in 2018 of 0.2 (compared to a churn rate of 16.7 for TTF and of 53.9 for Henry Hub), qualifying JKM as illiquid. There is still significant progress to be made. However, as JKM is adopted as a price marker in mid- and long-term contracts and used as a pricing point by LNG traders, its use should continue to grow.

Asian gas prices are still primarily indexed to oil, whereas in Europe and the US, markets are almost entirely market priced. In Europe and America, LNG has been market priced since around 2013 and the 1990s, respectively.

Figure 1: Price formation in Europe and Asia, 2018



Source: CRA analysis of International Gas Union (IGU) data

The growth of natural gas demand in the Pacific Basin is a critical driver in the development of a liquid LNG market.

LNG shipments into Asia are not a new phenomenon. Japan has accepted LNG shipments from around the world since the mid-1900s, but the market is seeing a shift away from bilateral agreements between Asian utilities and LNG export facilities. One major impediment to development of the LNG market is the technical complexity associated with shipping LNG. LNG must be kept cold (colder than approximately -163°C), otherwise the molecules will phase shift from a liquid to a gas. This process requires a large amount of energy. Shippers cannot let LNG vessels sit idle like crude oil unless they

² See supra note 1.

are willing to boil off some of the natural gas in the cargo. Therefore, many transactions are agreed upon prior to loading, creating a relatively illiquid market.

Another hurdle to developing the Asian LNG market and the global LNG market more generally, is that historically there was not sufficient supply to meet all demand for LNG, in addition to constraints arising from the lack of flexibility in the shipping market. The LNG market is not set up to handle short notice vessel availability. Further, many Asian utilities or oil and gas companies either signed long-term supply agreements or took an equity stake in new export facilities to build infrastructure. These agreements generally locked the consumer into long-term contracts (often longer than 15 years) to purchase LNG at a certain rate. As these long-term contracts roll off in the next 15 years, there will be enough supply to meet demand and suppliers will likely be able to compete on cost of LNG. This could lead to rapid development of a liquid market for LNG in the Pacific Basin and globally.

Development pathways for a mature Asian-traded LNG market

There are multiple obstacles to the development of a mature Asian-traded LNG market.

Figure 2: Japan Gas Infrastructure



The Asia-Pacific region is often characterized as having strong demand for LNG, particularly in China and South Korea, but less so in Japan. However, Japan may drive the growth of a regional-traded LNG market, due to its size and the diverse market participants. One potential issue, however, is the lack of infrastructure to link LNG deliveries to Central Japan. See Figure 2.

The pathway to competitive price-setting will be important to the growth of Asian-traded LNG. While JKM is used as a pricing point by some market participants, discussions remain as to whether JKM will be the liquid price benchmark in Asia. Singapore, Japan, or China are all seeking to establish a pricing benchmark.

In Table 1 we summarize our views on the different pathways to achieve a competitive traded LNG market in Asia.

Source: Center on Global Energy Policy, Mike Fulwood, Asian LNG Trading Hubs: Myth or Reality, May 2018

Table 1: Pathways to a mature market

	No Competition	Wholesale Competition	National LNG Market	Asian LNG Market	International LNG Market
Liquefaction	Equity LNG or LTC	Equity LNG or LTC	Equity LNG or LTC	Equity LNG or LTC	LNG sold free on board (FOB) at competitive prices <ul style="list-style-type: none"> • Third parties able to purchase cargos FOB or make use of spare loading slots • Small number of highly correlated regional LNG price benchmarks
Shipping	Shipping to destination	Shipping to destination	Shipping to destination	LNG market <ul style="list-style-type: none"> • LNG traded at an assumed physical location with premium/discount depending on actual trade location 	
Regasification	Dedicated capacity	Dedicated capacity	LNG traded in tank <ul style="list-style-type: none"> • Mechanism for sharing of tanks storage and in-tank purchase of LNG 	TPA regime and LNG traded in tank <ul style="list-style-type: none"> • Third party access to unloading slots, LNG storage and regas capacity • Mechanism for sharing of tanks storage and in-tank purchase of LNG 	
Wholesale Market	No market or limited competition	Competitive traded market <ul style="list-style-type: none"> • Liberalization of national gas market introducing competitive wholesale market 			
Final User	Regulated or pass-through prices	Competitive pricing <ul style="list-style-type: none"> • Pricing set by competition between gas/power companies 			

Downstream competition

As in Europe, downstream competition will be increased by market liberalization. Japan has made first steps towards market liberalization, although barriers still remain in South Korea and China. Political pressure for lower end-user gas prices may create a tipping point to achieve downstream competition. This was the case in Japan where historically LNG buyers were able to pass-through LNG purchase prices to their customers. When LNG prices increased dramatically following the Fukushima disaster, this mechanism shielded many Japanese LNG buyers from immediate harm. Political pressure to reduce end-user prices drove a lot of the subsequent buyer behavior towards non-oil indexed contracts that were viewed as cheaper than existing JCC-linked contracts.

Market facilitation

For downstream competition to have an effect on international LNG prices, access to Asia-Pacific markets will need to be facilitated. As shown in European-traded natural gas markets, third-party access is an important factor in allowing both an increase in competition and a spread of international pricing signals. In the case of Asian LNG, the lack of access to import infrastructure is an obstacle to increased access to national markets. Third-party access to markets could take a number of forms:

- Formal TPA to gas pipeline networks (which could be a challenge due to fragmented domestic pipeline networks in, for example, Japan and South Korea)
- Mechanisms for trading of LNG in-tank at regasification terminals
- Formal TPA mechanisms for access to unused unloading slots, with corresponding access to LNG storage and regasification services.

Singapore has taken the lead in developing such services in the Asian market, providing robust multi-user terminals, in-tank trading, and reload services. TPA can be difficult to effectively implement due to low margins and operational challenges, but in markets dominated by LNG imports, it is an important step for the development of competition.

Robust pricing benchmark

For competition to spread from national to international markets a robust pricing benchmark has to be available to market participants. As noted above, the JKM shows significant promise in this regard while other regional benchmarks have struggled to produce the same level of support that is currently being shown to JKM. For example, the Singapore SLNG was recently discontinued due to low participation. Comparatively, JKM is now used by traders to price mid to long-term contracts in the region. While the discontinuation of SLNG could be seen as a symptom of a lack of appetite for a reliable pricing benchmark in the region, it is more likely an indication that JKM is on its way to become the primary benchmark for Asian spot trading

Equity offtake

LNG sales from specific liquefaction projects are currently dominated by companies with long-term contract quantities or equity offtake. If, as in Europe, increased competition leads to a decrease in these companies' ability to sell volumes, it may open room for sale of FOB LNG on a cargo-by-cargo basis (or, if LNG ship constraint issues can be solved, sale of unused loading slots). This would allow liquefaction capacity holders to avoid shutting in LNG.

Conclusion

The trading of LNG in Asia has grown, but significant growth is needed to have a mature Asian-traded LNG market. Drawing on lessons from the development of European-traded natural gas markets, there are a number of pathways through which this growth could occur. An increase in downstream wholesale gas market competition, an increase in availability and use of TPA, robust pricing benchmarks and less reliance on long-term contracting may all factor into the growth of an Asian-traded LNG market. In all of these cases, more market participants will help to increase competition and the reliability of pricing signals.

Many of the significant LNG importing countries in Asia have been dominated by a small number of powerful importers. However, the number of parties directly purchasing LNG in Asia is increasing. There is room for further growth in active market participants. As noted in our previous [Insights on LNG trends](#), a significant amount of forecast LNG demand is currently uncontracted. Importers such as Korea Gas Corporation (KOGAS) have contracts set to expire, and there is pressure for other smaller South Korean utilities to be allowed to enter the market.

In Europe, it took a combination of significant market factors to reach the point at which market competition rapidly increased and traded natural gas markets matured and became the benchmark for pricing of gas throughout the market. The expiration of long-term contracts held by dominant

incumbents for significant volumes of imports may be the tipping point to grow an Asian-traded LNG market. Provided the contracts are not replaced with similar long-term contracts, the market may open up for more, and smaller, importers and traders.

In our next paper, we will discuss the unique set of challenges that will be created by an increase in smaller LNG buyers

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