

## A new phase of the global LNG market development - Rapid expansion of production capacity and uncertain demand prospects -

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### Introduction

The global LNG market is undergoing a structural shift. Unprecedented expansion of the global LNG production capacity is underway, although the expected demand growth does not seem to realise for several years, which is completely different from the previous expansion phases in the global LNG market. The traditional pattern of the LNG market, where LNG production facilities were constructed according to expected long-term growth of demand, was not necessarily applicable at the current expansion phase. The situation has huge implications on the market developments.

People call it differently. The International Energy Agency (IEA) says a second natural gas revolution is driven by LNG<sup>1</sup>. Kapsarc (King Abdullah Petroleum Studies and Research Center) and OIES (Oxford Institute for Energy Studies) has titled their great book "LNG Markets in Transition: The great reconfiguration<sup>2</sup>". The author of this paper has also made several statements on the greatest changes in the LNG market in the history. Some of the elements are summarised in Table 1.

This paper discusses the following items to understand the historical and recent trends and implications to the future of the LNG industry:

- ✓ The shale revolution and its implications on the global LNG market and mutual interference between the two;
- ✓ Important issues and challenges in the current LNG industry and matters appearing in the statistics;
- ✓ Expansions and shifts in LNG supply sources;
- ✓ New LNG importing countries;
- ✓ Reducing gaps between regional prices and globalisation of the market; and
- ✓ Japan's *Strategic Energy Plan* and *LNG Market Strategy*.

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<sup>1</sup> The World Energy Outlook 2016 Presentation, IEA, November 2016.

<sup>2</sup> Anne-Sophie Corbeau of Kapsarc and David Ledesma of OIES published "LNG Markets in Transition: The great reconfiguration" in August 2016.

**Table 1: The global LNG market is undergoing a structural shift**

	Until 2000's	From the latter half of 2010's
LNG supply sources	Developed mainly in Southeast Asia, Oceania, Middle East and Africa	Major expansion in Australia and the United States The United States remains as the largest consumer of gas in the world and becomes one of the largest LNG exporters in the world
LNG consuming markets	Developed in industrial nations in North Asia and Europe, followed by India and China	Market saturation in traditional importers and new markets emerging in Latin America, Southeast Asia, the Middle East and Africa
Status of LNG	Premium energy and natural gas supply source	A major driving force to expand new natural gas demand (including newly emerging markets and emerging demand sectors)
Value-chain structure	Vertically-integrated simple line value chain to promote projects	Diversified and more complicated value-chains through portfolio supply, tenders, and commodity traders
Project development	Vertically-integrated project development from gas field to liquefaction facilities	Diversified to include brownfield, backfill, and medium-scale development
Sale practice	Relatively rigid and inflexible	More flexible, including relaxation of destination restrictions
Pricing conditions	Mostly linked to crude oil prices	More diversified ways to determine prices

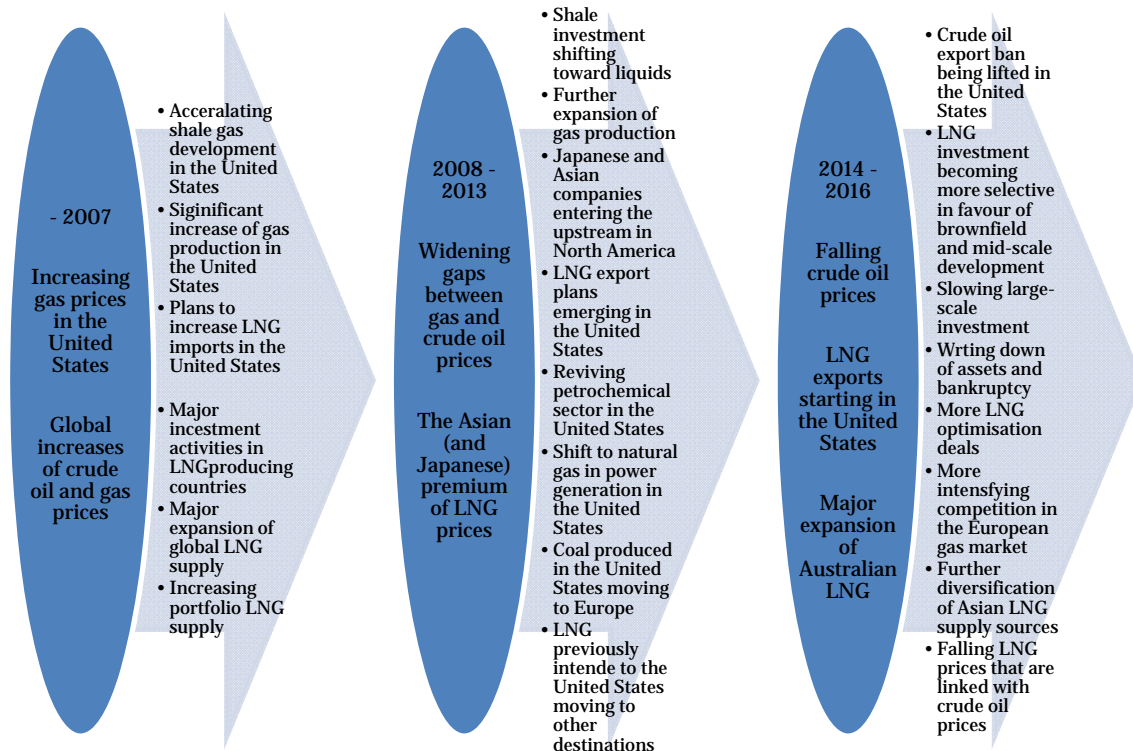
✓ **The shale revolution and its implications on the global LNG market and mutual interference between the two**

The shale revolution in the United States has had significance in changing the global gas and LNG markets, in addition to the revolution's physical feature of enabling gas and crude oil production from source rocks, leading to huge expansion of supply.

The ten-year period of the revolution can be divided into the following three sub-periods, considering the interaction with the global LNG market:

- The preparatory period of the revolution until 2007;
- The rapid increase in gas production from 2008; and
- The significant increase in crude oil production and LNG exports after 2014.

**Figure 1: The shale revolution and interaction with the LNG market**



Just before the revolution, the gas industry both inside and outside of the United States accelerated development activities, responding to higher gas prices in the United States. LNG producing countries invested to expand capacity aiming at exporting large amount of LNG to the United States. But at the same time gas producers in the United States successfully increased gas production more quickly than LNG producers.

Producers in the United States, after seeing falling dry-gas prices in the country, shifted their focus onto more liquid production trying to take advantage of dry-gas / liquid price gaps. LNG export projects - rather than import projects - have been developed in the country to take advantage of low domestic gas prices. Then the massive investment made in liquid hydrocarbon production resulting in increasing production in later years exerts downward pressure on crude oil prices, also leading to lower crude-oil linked LNG prices in the global LNG market.

✓ **Important issues and challenges in the LNG industry and matters appearing in the statistics**

Some of the most important topics of the global LNG market in 2016 - 2017 are described below.

Unprecedented expansion of liquefaction capacity continues in Australia and the

United States. How well these new facilities will perform is of course an important issue. The next big question is how and where those huge volumes are going to be absorbed and how competitive those volumes are.

While many observers and players simply describe the market as "oversupplied", the reality goes on slightly differently. There is certainly more availability of LNG supply in the market but still majority of LNG cargoes are loaded based on actual deals with certain destinations. As a result there have been more buy and sell tenders these days, particularly on the buy sides, anticipating more cargoes can be procured more competitively through such processes. Then there are more reliability issues caused by fluid natures of such practices (cancellations or deferred shipments), as well as some disappointing performance by some liquefaction projects.

LNG prices around the world continue being low and volatile, even though the industry is undergoing an unprecedented expansion in its history. Hence the notorious Asian (and Japanese) premium has apparently eased, at least for the moment.

New markets in South Asia and the Middle East further attract attentions in the market as the incremental sources of LNG demand. Egypt and Pakistan are particularly active in purchase tenders for their FSRUs (floating storage and regasification vessels). More new players are expected to join in the next couple of years.

Japan is still struggling to restart reactors, and this continues being one of the most uncertain factors in the country's (as well as the world's) LNG demand, which makes the call for more flexibility in the LNG market even more important. The call for more flexibility in LNG transactions is one of the main drivers of the *LNG Market Strategy* published by the Japanese government in May 2016. As the Japanese government and major industry players made this call in their respective arenas, the call has developed into an internationally unified one.

There were notable numbers in statistics in the LNG market in 2015.

The total volume traded between countries grew by 2.5% to 245 million tonnes in 2015, less than expected, despite the fact that four new trains started production in Australia and Indonesia in the year<sup>3</sup>, as offset by declining production in the Atlantic basin producers. However, the total production in the world is expected to grow by another 6% - 10% in 2016 to reach a record high of 260 - 270 million tonnes, thanks to major new trains in Australia and the United States, slightly offset by below-expectation performance by some new trains and yet further declining productions in some Atlantic basin producers.

While North Asia (Japan, Korea, China and Chinese Taipei) imported 4% less (at 153 million tonnes) and paid 38% less than the previous year (USD 80 billion) in 2015, the

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<sup>3</sup> Two trains at Queensland Curtis LNG (QCLNG), Train 1 at GLNG, and Donggi-Senoro.

region is expected to import 3 million tonnes more and pay yet almost 30% less in 2016.

Egypt, Pakistan and Jordan started LNG imports in 2015, and especially Egypt and Pakistan continue being focus of the incremental LNG sales in 2016. More countries are joining the importers' club in 2016 including Jamaica, Columbia, Malta, Ghana and Gibraltar, although actual commercial imports may not start in those countries in the year.

Especially after 2010, newly emerging importing countries have taken advantage of abundant and cheap supply to increase LNG imports. Imports thorough FSRUs were already more than 20 million tonnes in 2015, nearly 10% of the total imports in the world. The share of such facilities is expected to rise further in the next several years.

Spot and short-term contract volumes<sup>4</sup> did not grow in 2015 at 68 million tonnes representing 28% of the total traded volumes. These volumes have been considered as an indicator of flexibility of the LNG market.

However, due to the ongoing structural shifts in the market, even without growth of such spot and short-term volumes, there have been other flexible elements gradually incorporated into contract transactions, including greater flexibility in cargo destinations and portfolio sales arrangements. An LNG seller may procure cargoes on short-term basis to cover its long-term selling commitment. Sometimes an LNG buyer may sell its cargoes bought under a long-term contract in the spot market.

Japan also reduced such spot and short-term purchases in 2015, after steadily increasing them since the nuclear crisis in 2011. During the last six years the buyers in the country made significant changes in their LNG procurement activities, incorporating more flexible elements. In the next couple of years the buyers may not buy a lot of spot and short-term LNG, but may sell more cargoes on spot and short-term basis.

During the past six years the gravity of the global LNG market shifted heavier toward the east of Suez. The east LNG market represents three quarters of the total LNG imports as of 2015, compared to 60% in 2010, as mentioned earlier. Especially Europe has reduced its share although the region slightly regained volumes in 2015 and 2016. As a result, the division between the east and west is expected to stay at 3:1 in 2016.

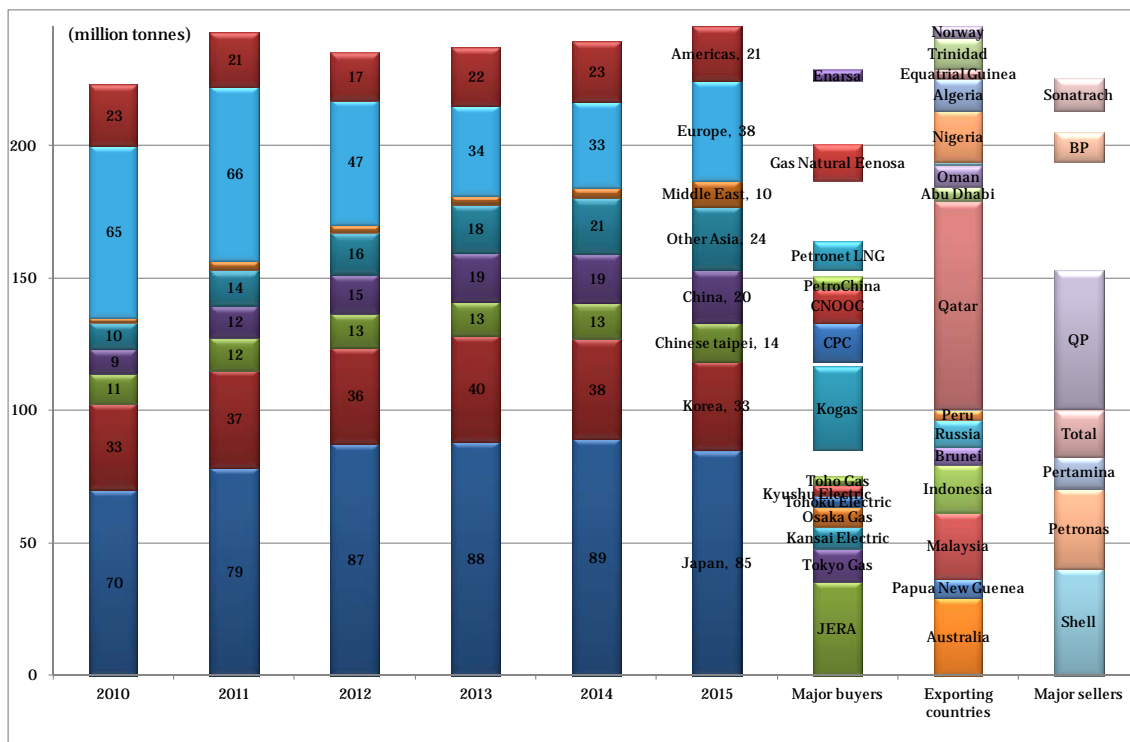
As the expanded Panama Canal opened and the United States started LNG exports in 2016, the division between the east and west will depend on future arbitrage opportunities created by movements of prices in the different regions.

Qatar, which has represented one third of the global supply until 2015, is expected to reduce its share slightly in 2016 despite a modest increase in production, as Australia increases its production significantly.

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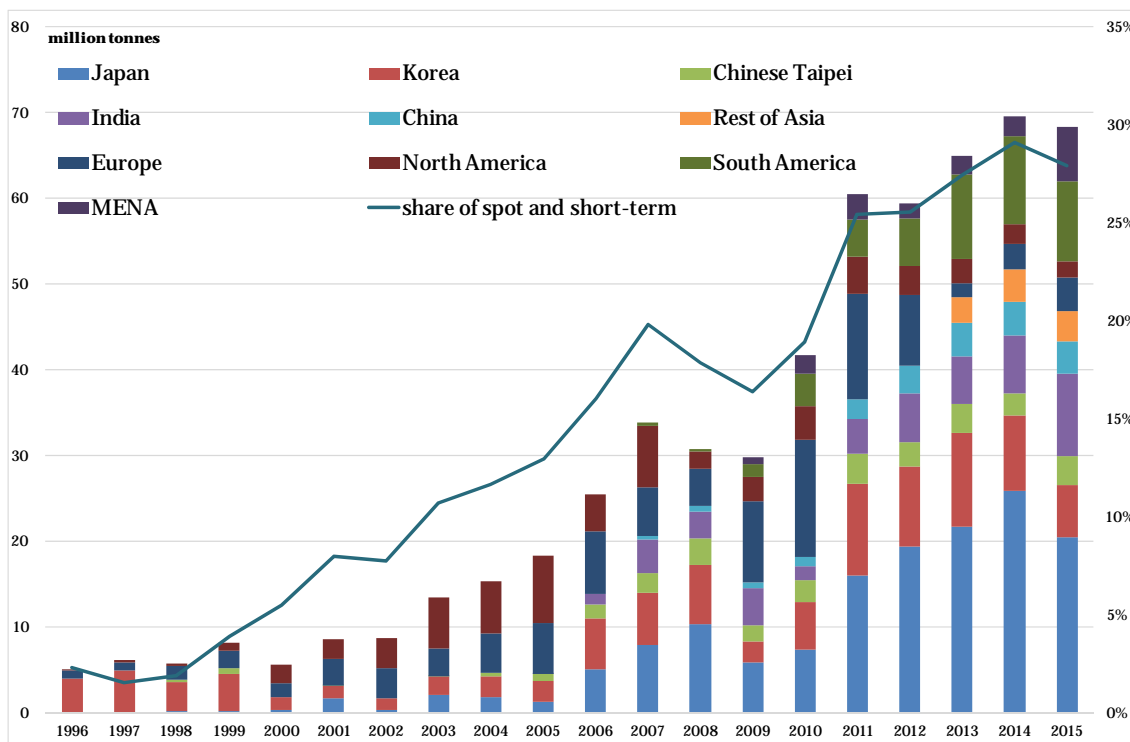
<sup>4</sup> \* Short-term trade denotes trades under contracts of duration of four years or less, defined by the GIIGNL.

**Figure 2: LNG importing regions and major buyers and sellers**



(Source) Trade statistics, GIIGNL, company announcements, and author's estimate.

**Figure 3: Spot and short-term LNG imports by country**



(Source) GIIGNL, trade statistics, and author's estimate.

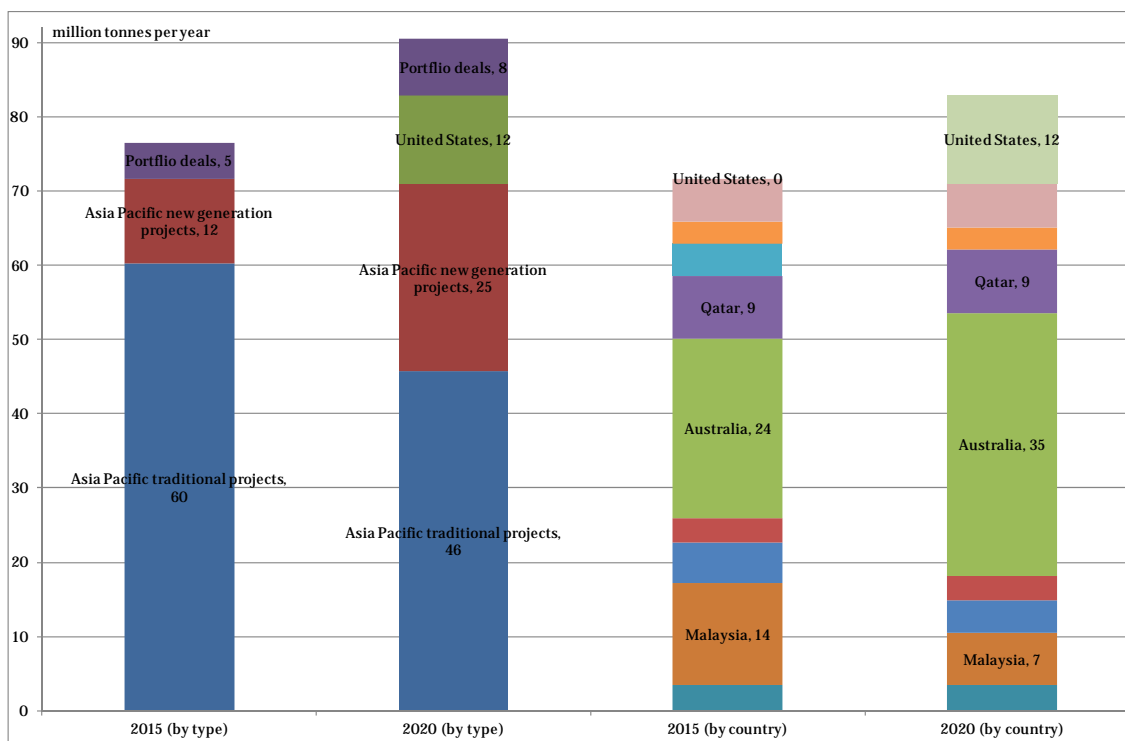
✓ **Expansions and shifts in LNG supply sources;**

As significant expansion of LNG production capacity is underway in the Asia Pacific region, mainly from Australia, Japan's LNG supply sources are undergoing a major shift in recent years and more are expected in the next couple of years. Investment decisions on those projects were made in the period of robust LNG prices (from 2011 to 2012) when the industry expected to see steady growth of LNG demand in later years which has turned out to be slower than those expectations.

**Table 2: LNG projects starting in 2014 onward in Asia Pacific**

	Project	Start year	Capacity (million tonnes)
Australia	QCLNG	2014	8.5
	GLNG	2015	7.8
	APLNG	2016	9
	Gorgon	2016	15.6
	Wheatstone	2017	8.9
	Ichthys	2017	8.9
	Prelude	2017	3.6
Indonesia	Donggi Senoro	2015	2
	Tangguh Train 3	2020	3.8

**Figure 4: LNG contracts held by Japanese importers in 2015 and 2020**



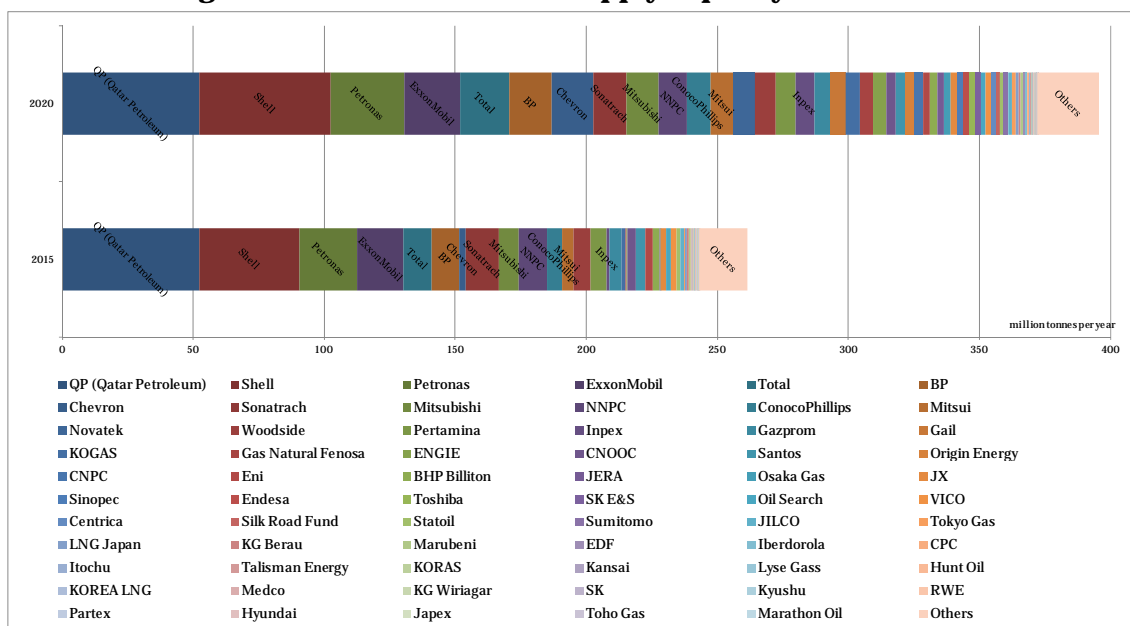
(Source) Company announcements and author's estimate.

The chart (Figure 4) compares Japan's LNG contract portfolios for the years 2015 and 2020. Bars on the left side classify contracts into those from traditional projects in the Asia Pacific region, new generation projects in the same region (starting operation in 2014 and thereafter which in general supposed to be more flexible than older ones), projects in the United States and so-called portfolio deals<sup>5</sup>. Bars on the right side classify contracts by supplying countries. The left-side bars are longer by the size of portfolio deals in respective years.

In the next five years a generation shift is expected in the Asia Pacific supply sources, with additions of projects from the United States and more portfolio deals, leading to even greater flexibility.

At the same time the total procured volumes for 2020 have already surpassed 85 million tonnes, leaving little room to additionally procure spot and short-term volumes. Supply sources are expected to shift to Australia and the United States, decreasing the share of Southeast Asia.

**Figure 5: Control over LNG supply capacity in the world**



(Note) For those projects where project companies and/or equity participants have controls over marketing, capacity is allocated on the basis of equity participation. For those projects where portfolio players control offtake and marketing, capacity is allocated to those portfolio players. For example, volumes are allocated to those parties who have committed to take all volumes from those projects in Equatorial Guinea and Cameroon, and those parties who have capacity reservations at those projects in the United States. On the other hand for those existing projects that had performances significantly below their nameplate capacity in 2015, the same levels of capacity is assumed for 2020. For example in the chart no numbers are incorporated for Angola and Egypt for 2020, and Indonesia's Bontang and Yemen are assumed to have similar production numbers in 2020 as in 2015, even though reality may be significantly different from those.

(Source) Company announcements, media reports, and author's estimate.

<sup>5</sup> A seller committing to sales without designating supply sources, providing cargoes from the seller's portfolio, from different supply sources.



The chart above (Figure 5) compares who control how much of LNG supply capacity for 2015 and 2020. In the past the LNG industry was dominated by a small number of big players, including the biggest of international oil companies (IOCs) and national oil companies (NOCs) of big gas producing countries. These days while those big players have been still increasing their clouts, more and more other parties are gaining shares albeit minority ones.

**Table 3: LNG projects starting in 2016 onward in the United States**

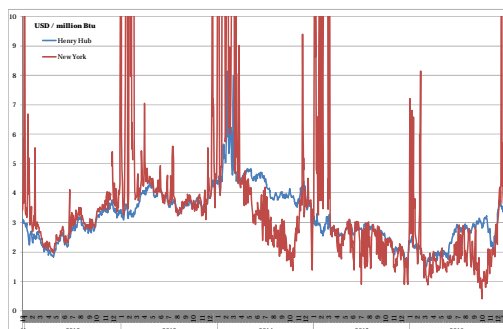
	Project	Start	Capacity (million tonnes)
Operation / construction	Sabine Pass 1 - 5	2016	22.5
Japan oriented projects	Cove Point	2017	5
	Cameron	2018	13.5
	Freeport	2018	13.2
Other under construction	Corpus Christi 1 - 2	2019	9

Among numerous LNG export projects drawn on board in the United States, only five projects and fourteen liquefaction trains are either in operation or under construction. Among them, three projects have been made possible by Japanese companies' involvement as equity investors, capacity holders, or offtakers. That means when LNG exports become one of the key elements in the gas industry in the United States, the Japanese market will be an indispensable item for the gas industry in the United States.

**[Box] A major regional shift in the United States gas market**

Even within the natural gas market in the United States, another major shift is underway. Due to the rapid increase in gas production in the Marcellus and Utica Shale areas in the Northeast, spot gas prices in the region are now sustainably lower than those of traditionally producing regions in the South, except for the severe winter days (Figure 6). This is another phenomenon to indicate that the shale revolution is still ongoing.

**Figure 6: Evolution of spot gas prices in the United States**



(Source) Based on the data Energy Information Administration, United States, 2016.

✓ **New LNG importing countries**

Partly thanks to lower LNG prices, even more importing countries are emerging.

In 2015, Egypt, Jordan and Pakistan started LNG imports, all using FSRUs. While Egypt has been an LNG exporter since 2005, the country halted LNG exports in 2014 due to shortage of feedgas supply caused by surging domestic gas consumption and slower gas field development.

The country installed two FSRUs in April and September 2015 respectively. The country procures LNG imports through commodity traders and portfolio players without designated production sources.

In 2016 it is estimated to have imported about 6 million tonnes while exporting a few cargoes from one of its liquefaction plants. Meanwhile it cancelled a tender for a third FSRU in December 2016 while it reviews the need of this.

Jordan also started LNG imports in May 2015 and is estimated to have imported more than 3 million tonnes in 2016.

Pakistan started imports at its first FSRU in April 2015 and a second FSRU is expected to be installed in early 2017. The country is estimated to have imported more than 2.5 million tonnes in 2016.

In addition to short-term purchasing tenders, the country has two long-term contracts from Qatar totalling 5 million tonnes per year.

Although several new importing countries have installed FSRUs or FSUs (floating storage units) in 2016, including Jamaica, Colombia, Malta, Ghana, and Gibraltar, significant volumes have not yet arrived at those destinations.

While bulk of cargoes to those new importers have been procured in the spot and short-term LNG market, helped by ample supply and lower commodity prices, commodity traders have increased their roles in LNG transactions.

✓ **Reducing gaps between regional prices and globalisation of the market**

Gaps between regional gas prices in the world in general have been smaller for the last two years compared with the period of the Asian premium from 2011 to 2014, thanks to lower oil and gas prices in the last two years.

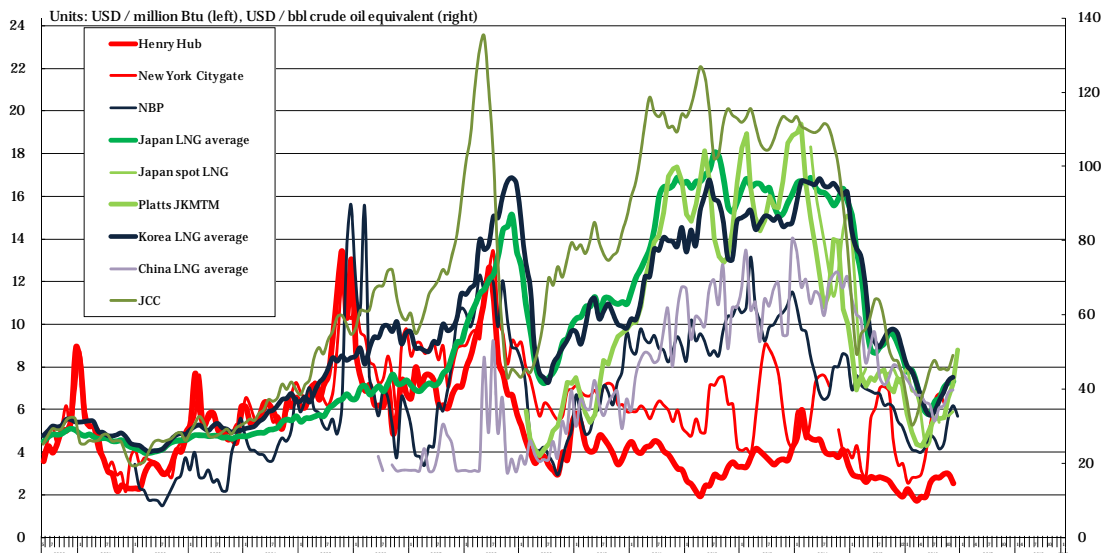
Fluctuations of crude oil and gas prices are always a reminder of the need to move away from crude oil linkage in LNG pricing.

As the crude oil prices were generally on the rise during the latter half of the year 2016, Japan's LNG import prices hit the bottom in July 2016.

As many observers expect, when crude oil prices go up, and in turn crude linked LNG prices go up, while other types of gas prices, including spot LNG prices, do not rise

much in 2017, many LNG users are expected to renew their interest to decouple the two.

**Figure 7: Evolution of regional gas prices in the world**



(Source) Trade statistics, Energy Information Administration, ICE, Platts data.

Besides, during the first half of 2016, the two commodity prices showed a clear contrast with each other: relatively steady rise of crude oil prices from USD 30 / bbl at the beginning of the year to USD 50 in the middle of the year and a low and narrow band of spot gas prices of USD 4.5 - 6.5 / million Btu for NBP and Platts JKM™.

That means gaps were widening between LNG contract prices linked with crude oil prices and other spot gas prices. The period was a typical one that shows the necessity of delinking LNG contracts prices with crude oil prices.

The divergence of crude oil and gas prices in modern days first happened in the early days of the shale gas revolution in the United States, as much quicker growth of dry gas production than other hydrocarbon production in the early days pulled down prices of gas alone much quicker.

Then counting on relatively higher prices of liquid fuels, development of natural gas liquids (NGLs) and tight oil advanced and prices of crude oil and other liquid components also went down to reduce the price differences.

Similar types of gaps may happen in 2017 as the global crude oil market moves toward rebalancing and the gas market is expected to continue being relaxed in the year.

Prices and outlooks have significant impacts on LNG investment decisions, as evidenced in the recent history.

### **Japan's *Strategic Energy Plan* and *LNG Market Strategy***

The Japanese government has been active in promoting a fair, equitable and stable LNG market, particularly on the back of the country's increasing dependence on LNG and expensive prices of LNG from 2011 to 2014. The government keeps dialogues with LNG producing countries and discusses LNG market issues at diplomatic arenas with other energy consuming nations. The government has hosted the annual LNG Producer-Consumer Conference since 2012, to promote better communication between various LNG countries and companies.

Japan's current *Strategic Energy Plan*, adopted by the cabinet in April 2014, states several principles for the stable procurement of energy sources, including LNG.

Chapter 3, Section 1 states "comprehensive policy measures to stable resource procurement." It says:

- "Strengthening of partnerships with new resource supply countries and promotion of upstream participation by Japanese companies"  
"In order to accelerate upstream participation by Japanese companies, the Japanese government takes the initiative in resource diplomacy and enhances risk money capability of the JOGMEC (Japan Oil, Gas and Metals National Corporation), aiming at increasing the share of resource production under Japanese own control." (Page 29, *The Strategic Energy Plan* (Japanese), April 2014)
- "Improving resource procurement conditions to reduce energy costs"  
"In order to ensure better negotiating positions not only for pricing but also for contract flexibility and upstream stakes, players sometimes need to consider full value-chain partnerships of LNG business, not necessarily limited to traditional buyer consortium arrangements. In order to promote such partnerships, the Japanese government takes the initiative in improving LNG business environment to enable more flexible arrangements, including abolishment of destination restrictive clauses in FOB contracts." (Pages 29 - 30, *The Strategic Energy Plan* (Japanese), April 2014)

Japan's *LNG Market Strategy*, announced by the government in May 2016, has three basic elements:

- Enhancement of tradability: frameworks that enable smooth transactions of LNG;
- Price discovery mechanism reflecting supply and demand: pricing indices that reflect LNG's own supply and demand fundamentals; and

- Open and sufficient infrastructure: sufficient capacity that can be used by market players with indiscriminate access conditions

In the following two and half pages, the author expresses his ideas on how these principles can be implemented, which means the following contents are not specifically mentioned in the "*Strategy*" itself.

The first item implies better contract conditions, including relaxing traditionally inflexible elements in LNG contracts, as under the current conditions of the LNG markets the priority (for market players including both sellers and buyers) lies on more flexible arrangement to allow LNG to be absorbed in the market. By removing unnecessary and obsolete trading practices, more parties can be involved in the LNG market.

The discussions on the "Price Discovery" issue have been focused on spot transactions, more specifically front-month cargo transactions, as well as alternative pricing mechanisms for long-term contracts (that better reflect the supply-demand balance of the LNG market, rather than the balance of the crude oil market).

A perfect solution for every party concerned has not been found yet. But at least the following principles are identified:

- Better spot prices reflecting fundamentals, at least, of the spot LNG market;
- Better long-term contracts prices with different indices;
- Better crude oil-linked LNG prices with lower slopes to mitigate impacts of fluctuation in crude oil prices.

Due to physical limitations of the size of the spot LNG market (at this moment around 30% of the total LNG volumes are traded under spot transactions or contracts less than four years) and limited liquidity in it (a few cargoes a day at most), any indices from it will always be hard to be called a benchmark to indicate fundamentals of the LNG market as a whole. Perhaps the indices can be regarded as an indicator of supply and demand fundamentals of the spot LNG market as a marginal component of the LNG market as a whole.

Then if players want to utilise such an index from the spot LNG market to determine contract prices, the index can be used to partially determine the final price or can be used in conjunction with other indices (including JCC, other gas hub indices, etc.).

At the same time, it is no longer only actual and proposed spot transactions that reflect spot market fundamentals. Although traditionally transactions in the spot and short-term market have been considered as an indicator of flexibility of the LNG market, these days more long-term contracts incorporate flexibility that enable secondary sales of cargoes. If information regarding the cargoes for such potential secondary sales can be accurately assessed and incorporated, a better index can emerge.

Turning to the transparency of the LNG market information, the governments of the four importers in North Asia<sup>6</sup> publish more information on their LNG imports than their counterparts in other regions. By the end of following month of the actual imports, customs authorities disclose volumes and amounts of imports, which enable calculation of prices. Some LNG buyers may already consider using such an average price of the actual imports in the previous month (In Japanese case, it is so called "JLC") as part of pricing. In other words, this is one of the different indices that can be used for better long-term contracts prices.

**[Box] The difference between JCC and JLC based pricing**  
 A typical JCC-linked pricing is expressed as follows:  
 $P = a \times JCC + b$   
 It can be also viewed as follows:  
 $P_n = P_{n-1} + a \times (JCC_n - JCC_{n-1})$   
 In other words, this can be viewed as a mechanism to adjust the price from the previous month with the changes in crude oil prices.  
 If the JLC is used as an index, assuming there are elements of crude-oil price linkage and spot prices in the total LNG mix in the country, the JLC price for the month (n) is effectively expressed as follows:  
 $JLC_n = A \times JLC_{n-1} + B \times P_{n-1} + C \times \text{spot } P_{n-1}$   
 (A + B + C = 1, A, B, and C are positive numbers or 0, and the share of JLC-linked, JCC-linked and spot LNG volumes, respectively. P still means the JCC-linked price.)  
**[Hypothetical example 1]**

	Share	Month (n-1)	Month (n)	Month (n+1)
JLC	45%	USD 7	<b>USD 7.125</b>	<b>USD 8.156</b>
JCC-linked	45%	USD 7.5	USD 9	
Spot LNG	10%	USD 6	USD 9	

If the shares of respective volumes are assumed as the above example, and prices are assumed for the month (n-1), the JLC price for the next month (n) is theoretically calculated as the above. Even both the JCC-linked and spot LNG prices fluctuated in the month (n), the fluctuation of the JLC price for the month (n+1) is smaller than those of the JCC-linked and spot LNG prices for the month (n).  
 This can be viewed as a mechanism to adjust the price from the previous month with the changes in crude-oil linked prices and spot LNG prices.  
 As the share of crude-oil linked prices declines (and the JLC linkage increases), the mechanism would function as an index that reflects demand and supply fundamentals in the LNG market appropriately (meaning that if the spot LNG represents X% of the total LNG market, the spot market element in the JLC linked pricing will only represent X%).

Although this arrangement still has to assume risks of fluctuation of crude oil prices with still remaining crude-oil linkage, this can be still viewed as effective hybrid pricing, incorporating crude-oil linked and spot pricing elements in the mix. If the base price level<sup>7</sup> is appropriate, by gradually shifting remaining crude-oil linked pricing to the JLC linked one, the JLC index will eventually become one as weighted average of long-term contract

<sup>6</sup> Japan, Korea, China and Chinese Taipei.

<sup>7</sup> "The base price" here means an absolute level of the price at the start of the contract. Any price formulae are mechanisms to adjust this with certain variables, in some cases price indices, oil price fluctuations, and gas price fluctuations.

and spot prices, to be adjusted monthly.

This idea may be confusing, as it looks like "a snake eating its own tail". But going back to basic of a commodity price, this is just a pricing arrangement where the price is to be adjusted from a base price (to be set at an appropriate level) with a marginal spot market element, which can be viewed a reasonable one.

There will still remain the timeliness and time lag issues. Assuming the current pattern of trade statistics disclosures, the JLC index from the cargo deliveries in the preceding month (instead of this month) would be applied to the cargoes to be delivered in the next month. However, there have been time lags in the crude-oil linked pricing, too. So long as customs declarations are made immediately after cargo discharges, by applying the latest IT technologies, this time lag can be somehow shortened.

"Open Infrastructure" meaning sufficient capacity that can be used by market players with indiscriminate access conditions, is viewed as an important condition of a well-functioning gas market.

TPA (third-party access) to LNG receiving terminals has been one of the focal points of planned gas sector reforms in Japan. It is essential to reflect the specific nature of the Japanese gas market, which is quite different from the European market where LNG consists of only one-tenth of the total gas supply, in implementation of the scheme. On the contrary in Japan, almost all gas supply comes from imported LNG. Hence, gas supply is mostly dependent on LNG receiving terminals. The value of investment in such facilities should be respected accordingly.

Even in Europe, newly built LNG terminals after 2000 have been exempted from EU's TPA rules. Although certain rules are applied to secondary capacity access, the basic idea is to respect rights of primary users, who are assuming risks of such facility investment.

In the United States, following the Hackberry decision in 2002 and the Energy Policy Act of 2005, LNG import terminals are not deemed as transportation facilities but as gas production facilities and are exempted from TPA rules.

**As Japan and the world have changed significantly during the last six years,** general public and politicians have been significantly more interested in energy and LNG issues since 2011.

During the period the Japan's energy system as a whole has acquired some resilience by diversifying energy sources (including renewable energy sources) and LNG supply sources, although it is still suffering from vulnerability from slow recovery of nuclear operating capacity and high dependence on fossil fuels. Different companies have advanced plans to construct LNG infrastructure facilities and gas-fired power generation capacity.

That means Japan can use more LNG if it has more competitive advantages.

Those companies who have been involved in the LNG business have become more proactive and some of them have also been changing their business models.

The Japanese businesses and companies, who suffered from expensive energy prices only a few years ago, have also suffered from the collapse of commodity prices as well because of more proactive involvement in the value chain.

In that sense the current LNG market cannot be simply described as a "buyers' market". It is true that a buyer may claim more advantageous conditions in a purchase negotiation. However, during the current major structural shift in the LNG market, some traditional buyers have entered into the upstream side of the business to become part of suppliers and developers leading to changing business models. Thus a simple division of buyers and sellers is not necessarily applicable anymore.

### **Conclusion: The LNG market continues evolutions**

As the Japanese LNG users (electric power and city gas companies, and other energy companies) are entering into each others' business areas encouraged by market opening policies, in parallel with changing and diversifying pricing conditions in the global LNG market, there have been both needs and opportunities to improve LNG procurement conditions.

Flexibility of the LNG value chain should be enhanced and pursued in both LNG supply in the global LNG market and energy delivery systems in the domestic market. In order to ensure a better negotiating position in procurement in the global LNG market, a company should acquire a resilient energy system in its domestic market. Flexibility that enables the company to forgo unfavourable procurement conditions and increase consumption when procurement conditions are favourable will lead to a more advantageous negotiating position. Such flexible measures in the future could include alternative gas imports (pipeline gas), larger domestic gas production (including methane hydrates), more alternative energy sources, and redundant LNG facilities (terminal capacity and gas-fired power generation capacity).

Japan and North Asia should take advantage of their position as the largest LNG buyers in the world to advance their initiatives to establish a fair and equitable LNG market.

(Reference) Government and company announcements, Reuters, Bloomberg, Cedigaz News Report, The LNG Industry GIIGNL Annual Report 2016.

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