



JAPAN'S OIL AND LNG PRICE EVOLUTION ON THE PATH TO TRANSPARENCY

OIL AND LNG SPECIAL REPORT WITH FOREWORD BY THE INSTITUTE OF ENERGY ECONOMICS, JAPAN

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FOREWORD FOR S&P GLOBAL PLATTS SPECIAL REPORT

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Transparency of the pricing in the Japanese oil market continues to be one of the most discussed issues in the industry.

About ten years ago, the pricing was quite “transparent” as the Japanese major oil companies (Motouri) adopted the crude oil import CIF price (JCC) as a benchmark of wholesale price to retailers.

A change in the pricing system was required in autumn 2008 when international oil prices became very volatile and Motouri's wholesale price could not catch up the fluctuation of international price moves. CIF prices were announced monthly with one or two month time lag of the actual import, but the retail market reacted far quicker than Motouri decision of next prices.

In a bid to reflect the new situation, Motouri has introduced weekly price fixing system, based on the spot oil product prices in Japan. At this moment, however, not all of the industry circles necessarily accept the system, and further works to find out better solution are still required.

One of the differences and challenges in the Japanese market is the lack of open oil spot market in Japan, in comparison with the cases in US and Europe. Sound development of the oil market and establishment of a reliable price reporting system can be an answer to the current situation.

As for LNG market in Asia, pricing is approaching a major turning point. Asia's LNG contract prices have been linked with oil prices for decades. The linkage was in general accepted as a reasonable practice until around 2008 although percentages of linkage, i.e., the “slope” in the pricing equation, had been always contentious issues. However, since then, LNG buyers realized that it would be structurally difficult to reduce widening regional price gaps if they continue relying on the linkage.

LNG buyers have been trying to obtain better terms and conditions, by diversifying supply sources, contract terms and pricing methodologies. They also want to improve restrictive clauses in contracts to make procurement more flexible so that they can be more resilient in the more variable end-use market environment. These buyers' efforts were accelerated in the face of the widening gaps in regional LNG/gas prices, which was then called as “Asian premium.”

At the height of the Asian premium of LNG prices in 2013, concepts of Asia's LNG trading hub emerged as a way to introduce fair and reasonable LNG pricing. The main cause of the unfavorable LNG prices for Japanese and Asian buyers has been thought to be the lack of its own pricing system that can reflect supply and demand balance of LNG in the region and the lack of an actively traded market. The prevailing market conditions of stagnant demand growth and overwhelming supply availability emerged as a new ingredient for exploring new pricing system for both buyers and sellers of LNG.

This Platts special report discusses those pricing issues and initiatives in a comprehensive manner.

EXECUTIVE SUMMARY

- Japan's oil industry is at crossroads and the time is right for Japan to put in place transparent pricing mechanisms as it strives to make a place for itself in a new energy landscape characterized by falling domestic demand and refining sector restructuring.
- Japan's petroleum industry is calling for a more transparent formation of spot oil products price benchmarks. A number of Japanese refiners have said that they believe the country's current spot benchmark price does not always converge with the tradable value of the product that they see in the market.
- In response to the apparent need for transparent oil products price benchmarks in Japan, S&P Global Platts re-launched waterborne domestic oil products price assessments after a gap of nearly 11 years on April 25, 2016. Platts intends to next publish Japanese truck rack oil products price assessments by the end of 2016.
- Platts has been following oil product markets closely around the world for many years, particularly in three key regions: The US Gulf Coast, Amsterdam/Rotterdam/Antwerp and Singapore. Those three regions have each taught Platts different things, and the lessons the company has learned there can help as it works with the Japanese industry on assessments in the domestic market.
- Platts' strengths have been developed through focusing on liquid oil markets around the world and it continues to broaden its focus to take in the full range of international oil markets. Japan's domestic oil product trade remains liquid, despite falling domestic demand and some consolidation.
- When Platts looks at Japan it pulls together these experiences of other liquid oil markets, but is also learning anew from the Japanese market itself. And hopefully the value Platts brings to the market is greater clarity on these areas, and greater clarity on the full physical value of a particular fuel in a particular location.
- The LNG market started to observe a delinking in the relationship between the long-term contract price tied to crude oil, and spot price since 2014. Platts' Japan Korea Marker (JKM) LNG spot prices, started to fall ahead of declines in oil price.
- Platts has observed an increase in participation in the JKM swaps market and the degree of sophistication in trades. This, the company believes reflects a quickly maturing LNG market and the commoditizing of LNG.
- Platts believes Japan's plan to create a LNG trading hub and establish the Asia LNG index cannot come at a better time. The global LNG market is expected to be well supplied with a number of new projects coming online. By 2020, a total of 151.1 million mt/year of LNG liquefaction capacity will be added to push up the global supply to 426 million mt/year, against expected global demand of 372.7 million mt/year.

- A period of oversupply until the early 2020s along with an oversupply of shipping tonnage, increased flexibility and increased participation of traders is expected to create an increase in spot market activity.
- Liberalization and deregulation of the energy markets is progressing in Japan, and the number of market participants is growing. Competition is expected to increase in the downstream power and gas markets as a result of liberalization and this is prompting Japanese market participants to pursue more competitive purchasing strategies including the diversification of price indexation for LNG. This creates an increased need for a robust pricing mechanism that reflects the supply/demand fundamentals of LNG in the region.
- Platts JKM has already been adopted as a price reference in contracts, both within Japan itself and more broadly in Asia as well as in the global context (Mexico, Brazil, India, etc), indicating the confidence the market has already placed in Platts' experience of and approach to LNG pricing.

INTRODUCTION

Japan's petroleum industry is at crossroads.

The industry is possibly facing the biggest reorganization of its refining sector in the last decade.

Depending on how the reorganization takes shape, the emerging refining landscape could not only impact the structure of the oil products market, but also oil how products are valued in Japan.

The recent drop in oil prices has significantly damaged Japanese oil refiners' earnings performance, stemming primarily from losses in inventory valuation, according to S&P Global Ratings analysts Chizuko Satsukawa and Hiroki Shibata.

Refiners' profitability remains thin and volatile in the currently oversupplied market and amid somewhat unclear pricing mechanism, Satsukawa and Shibata said.

Japan is also looking at the possibility of creating an LNG trading hub when needs for an Asia gas index are increasing, as

the correlation between LNG spot price and oil-linked price is weakening with substantial amount of LNG from new projects hitting the market.

Japanese LNG buyers also see the need for a spot index that properly reflects Asian demand and supply. Buyers are looking for alternatives to oil-linked formula for their LNG contracts. As the Japanese market progresses on the path to liberalization and deregulation, the pressures associated with competitive procurement are prompting Japanese utilities to diversify their pricing exposure to include both hub-indexed and spot-indexed LNG.

In this special report, Platts looks at the ongoing changes in Japan's refining sector, potential development of new spot oil products price benchmarks, and the possible development of a spot LNG price benchmark.

REFINING REORGANIZATION

In the face of continuous decline in domestic oil demand, local refiners are in the middle of sweeping reorganization, which could result in a leaner refining landscape once all the integrations have moved ahead in April 2017.

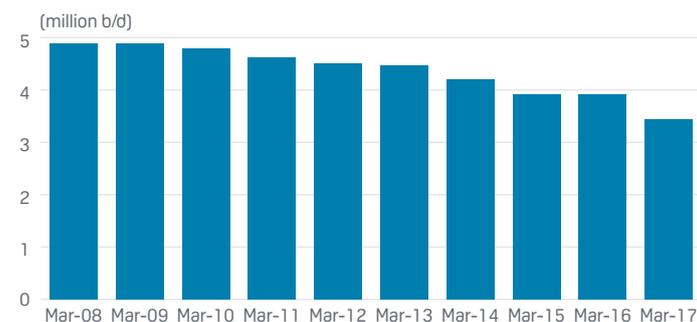
JX Holdings, the parent of largest refiner JX Nippon Oil & Energy, and TonenGeneral are to integrate in April 2017, while Idemitsu Kosan and Showa Shell are also slated to merge under a new company on April 1 next year.

Both integrations are subject to securing approvals from Japan's Fair Trade Commission and the Idemitsu Kosan-Showa Shell merger is facing strong opposition from Idemitsu Kosan's founding family.

It is not immediately clear how this merger will pan out, but should it proceed, the two refining groups would have a combined capacity of around 3 million b/d and could dominate roughly 80% of the 920,000 b/d domestic gasoline market. Gasoline accounts for roughly a third of Japan's 3.1 million b/d oil products demand.

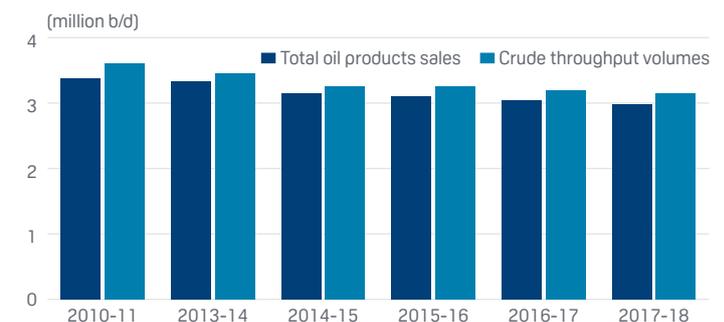
The refining integration may also shrink the size of Japan's non-branded, or spot, gasoline market as integrated refiners will likely optimize their refining and distribution centers to maximize efficiency and profits. Non-branded distributors

JAPAN'S REFINING CAPACITY



Source: Petroleum Association of Japan, Platts

JAPAN'S OIL PRODUCTS DEMAND, CRUDE THROUGHPUT



Source: Institute of Energy Economics, Japan

typically secure the fuel from the spot market and from traders, instead of from virtual affiliations to certain refiners.

Spot barrels will not likely completely disappear from the domestic market as refiners will always have spot barrels arising from a planned or unplanned mismatch in supply and demand.

The country's non-branded gasoline market was estimated to be at 18.4%, compared with 81.4% for branded supplies, in fiscal 2015-16 (April-March), according to Japan's Ministry of Economy, Trade and Industry.

From a credit quality perspective, S&P Global Ratings thinks the refining integration is positive for the sector in the mid to long term because it could meaningfully improve refiners' profitability and cash flow through reducing oversupply and marketing competition.

But at the same time, there could be possible restructuring costs and damage to their financial soundness in the short term, according to Satsukawa and Shibata.

DECLINING OIL DEMAND, CAPACITY

Having peaked at 245.97 million kiloliters (4.24 million b/d) in fiscal year 1999-2000 (April-March), Japan's overall oil products demand has since been on a downward trend.

Gasoil demand peaked at 46.06 million kl (793,721 b/d) in fiscal 1996-97 and gasoline demand peaked at 61.48 million kl (1.06 million b/d) in fiscal 2004-05.

Japan had 38 refineries with a total capacity of 5.35 million b/d as of end March 2000, but after a spate of closures and restructuring, capacity now stands at 3.82 million b/d across 22 refineries. It is expected to fall further to 3.45 million b/d by end March 2017 as refiners cut a further 370,000 b/d of crude distillation capacity to comply with regulations.

Under regulations issued by METI in July 2014, refiners are required to raise their residue cracking ratio to an average 50% of their capacity by the end of March 2017, from 45% at the end of March 2014. Refiners can achieve this by either adding more secondary units or cutting their nameplate crude distillation capacity and all will likely opt for the latter.

Japan's oil products demand meanwhile is forecast to drop to its lowest level in 47 years in fiscal 2016-17 due mainly to lower naphtha consumption and fuel oil demand for thermal power generation, the Institute of Energy Economics, Japan said on July 25.

The country's oil products demand is forecast to fall 2.5% year on year to 176.1 million kiloliters (3.03 million b/d) in fiscal 2016-17, below the 180 million-kl mark for the first time in 47 years.

IEEJ's forecast is based on its assumption that Japan's seven nuclear reactors will be restarted to generate 19.8 billion kWh of power in the current fiscal year ending March 31, 2017.

Japan's demand for gasoline, which accounts for roughly 30% of oil products demand, is forecast to be flat year on year at 53.1 million kl (915,037 b/d) in fiscal 2016-17, while the country's gasoil demand is forecast to rise 0.2% year on year to 33.7 million kl (580,729 b/d), the IEEJ said.

OIL PRICE EVOLUTION

As Japan's oil industry reorganizes itself in the face of declining domestic demand, it has started looking at ways to boost transparency in the way domestic oil products prices are set.

At the core of Japan's refined oil products markets lies the relationship between the value of products trading in the spot market, and the wholesale value of those products as they are supplied for retail consumption at the racks.

More transparency is being sought at both levels, to help industry better measure the forces that drive this relationship.

Refiners are looking at changing the way in which they set the weekly wholesale price for oil products supplied to their branded distributors and are looking for a new spot price benchmark that can be used as a basis for their wholesale price.

A number of Japanese refiners have told Platts that the country's current spot benchmark price for oil products is based on a non-transparent assessment process and have called for more transparent alternatives.

One Japanese refiner said: "It is important for oil products price benchmarks to reasonably reflect domestic and overseas demand and supply situation and be set in a transparent manner."

The way wholesale oil products prices are set in Japan has evolved over the years, but METI and the industry believe there is still plenty of room for improvement.

The first major change in the way refiners set their wholesale prices was made in October 2008 when the frequency and basis of the pricing was altered.

Refiners moved away from monthly to weekly pricing and switched from using CIF crude import price as a pricing basis to using quotes by local price reporting agency RIM Intelligence and oil products futures on the Tokyo Commodity Exchange.

Changes in the wholesale pricing mechanism in 2008 benefited refiners as prices became reflective of more prompt oil products market values on a weekly basis, rather than reflecting months-old crude import costs on a CIF basis.

The mechanism also helped oil products distributors as they were able to have a better grasp of their costs and could forecast wholesale prices by looking at RIM Intelligence's spot benchmark prices.

The pricing system functioned effectively for a few years but challenges have emerged. Some refiners say they believe that RIM's domestic oil products price assessments did not always converge with the tradable value that they were seeing in the market. Some have also questioned the transparency of its price assessment process.

They also felt that their refining margins were being squeezed with the domestic oil products benchmark price being lower than their crude costs on some occasions.

The margin squeeze may well have been caused by surplus domestic refining capacity in Japan at the time, but this prompted them to change the wholesale pricing mechanism in 2014.

In 2014, refiners adopted a new pricing mechanism that took into account movements in international crude benchmarks such as Dubai and overseas oil products benchmark prices rather than solely being indexed to domestic oil products assessments published by RIM.

The exact formula for calculating the wholesale price has never been made public by the refiners.

The opaqueness of this mechanism has increasingly come under criticism as prices have become difficult to track.

A recent research conducted by the Oil Information Center at the IEEJ showed a wide differential between refiners' wholesale prices and RIM's benchmark prices since 2014 when the pricing mechanism was changed. The research, which was submitted to METI in March, also noted that Japanese refiners' wholesale prices were distinctively higher than Japan's CIF crude import price, retail price and RIM's spot waterborne and truck prices after fiscal 2014-15. It noted that even when crude prices fell from late 2014, wholesale product prices stayed higher.

Another criticism facing the current wholesale pricing mechanism surrounds retroactive adjustments made by some refiners to weekly prices, which influence the monthly wholesale price especially when world oil prices are volatile.

According to Japan's Fair Trade Commission, if retroactive revisions of wholesale price are conducted on a constant basis, it can make trade conditions non-transparent and such practices could impact service stations' cost of doing business.

In a report issued in July, METI echoed the same, saying that with refiners' wholesale prices effectively being the "official quotation" for the market, revisions not only distort the market mechanism, but also tarnish distributors' business. METI said that setting wholesale prices based on market conditions and clarifying criteria in the event of revisions should help distributors.

POLICY MOVES

METI initiated a series of policy discussions in February this year covering issues related to oil pricing mechanism in Japan.

The ministry aims to conclude its series of relevant policy discussions in early 2017.

METI in its report issued in July said that the credibility of Japan's current domestic benchmarks published by a local price reporting agency has been questioned. It noted that the country's "spot truck prices have as a norm been priced below spot waterborne prices," when in fact economics suggest that the relationship should be the reverse.

Generally, waterborne prices, which are based on trades between refiners and trading houses of larger lots loaded on vessels, should be lower than truck prices, which are based on trades of smaller lots, it said.

In its report METI said that it is essential to bolster a fair, transparent and highly reliable wholesale pricing mechanism by establishing sound trade practices among the various market participants — refiners, distributors and trading houses — and stimulate competition between price reporting agencies and a public exchange.

As part of its policy development, METI has urged refiners to be transparent in their pricing process and clarify their criteria with distributors and trading houses when revising wholesale prices on a retroactive basis, while the government will look at how it should set guidelines for wholesale trades.

In order to establish a spot price benchmark, which appropriately reflects the demand and supply situation, and is highly trusted by market participants in Japan, METI urged price reporting agencies to comply with the International Organization of Securities Commissions (IOSCO) Principles for Oil Price Reporting Agencies.

It has also called for stimulating competitions between PRAs in the domestic market versus the current dominance by RIM and is considering supportive policies to activate the use of oil products futures on the Tokyo Commodity Exchange.

The IOSCO Principles for Oil Price Reporting Agencies, published in October 2012, are aimed at improving the functioning and oversight of PRAs — of which Platts is one — and enhancing the reliability of oil price assessments referenced in derivative contracts.

Independent reviews by Ernst & Young in 2013, 2014, and 2015 confirmed that Platts' governance and controls framework, policies and editorial practices are of the highest standard and align with IOSCO's Principles for Oil Price Reporting Agencies.

METI also called for refiners to link their wholesale pricing mechanism to highly reliable benchmarks to ensure that their prices are more reflective of domestic market conditions and to prevent constant revisions of their wholesale prices.

Petroleum Association of Japan President Yasushi Kimura has urged METI policy makers to take note that the wholesale pricing mechanism should be decided independently by refiners based on their relationship with clients.

Kimura, however, has said that having multiple oil products benchmarks would give more options for both sellers and buyers.

In a Platts survey of Japanese oil industry sources, all sellers and buyers in the domestic market agreed on a need for “fair” and “transparent” formation of oil products benchmarks, which is easily accessible and repeatable. But views were mixed on the approach and adoption of oil products benchmarks.

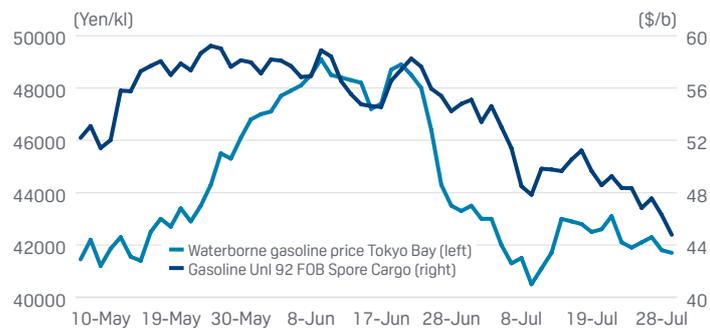
Historically, Japanese oil refining companies have prioritized securing market share over profitability in the mature domestic market. S&P Global Ratings believes that transparent pricing would benefit refiners because transparent pricing should help moderate excessive price competition at the retail level and improve refiners' laser thin margins and cash flow, the analysts said.

MOVES BY PLATTS, TOCOM

In response to the apparent need for transparent oil products benchmarks in Japan, Platts re-launched new domestic oil products price assessments after a gap of nearly 11 years on April 25, 2016, starting with spot waterborne price assessments.

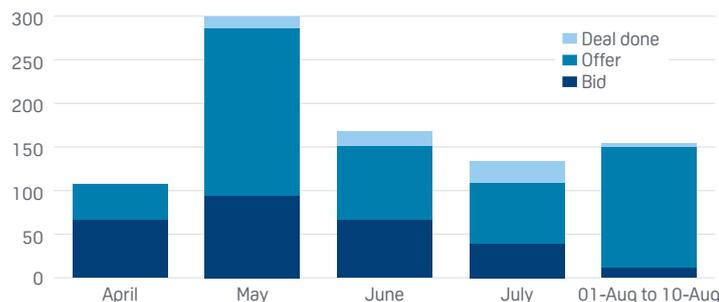
Platts assesses FOB prices of 89 RON gasoline, 10 ppm sulfur gasoil, kerosene and low sulfur and high sulfur A-fuel oil (a blend of gasoil and fuel oil in a 90:10 ratio) in Tokyo Bay, Chukyo in central Japan and Hanshin in the west via its Market on Close assessment process.

PLATTS JAPAN DOMESTIC GASOLINE VS FOB SINGAPORE GASOLINE ASSESSMENTS



Source: Platts

NUMBER OF BIDS, OFFERS AND DEALS IN THE PLATTS JAPAN MOC



Source: Platts

Through the MOC assessment process, Platts considers market information gathered throughout the normal trading day, and publishes such information throughout the day. Platts analyzes all published information in determining its final published price assessments.

Following the re-launch of waterborne assessments, Platts saw an uptick in the number of market participants during the MOC assessment process in May, when oil products prices were also supported by rising crude oil prices, weakening of the Yen against the US dollar, and unexpected refinery glitches on top of the country's refinery turnaround reason.

Over May-July, the number of deals done during the Platts MOC assessment process rose to 26 in July, up from 17 in June and 14 in May. Platts' waterborne gasoline prices in Tokyo Bay jumped 10.9% from the end of April to Yen 43,162/kl (\$63/barrel) at the end of May.

In June, Platts' average waterborne gasoline price in Tokyo Bay rose 9.4% month on month to Yen 47,205/kl, supported by increased spot purchases by refiners due to scheduled and unexpected shutdowns of refining units.

The price slid 10.7% month on month to an average Yen 42,145/kl in July due mainly to lower international crude benchmarks, coupled with more supplies into the market after the country's refinery turnaround season peaked in June.

A close look at Platts' waterborne gasoline price in Tokyo Bay and Mean of Platts Singapore 92 RON gasoline assessments shows the two prices followed a similar trend over May-July but the daily domestic assessments were primarily reflective of Japan's demand and supply situation.

Platts intends to publish Japanese truck rack oil products price assessments by the end of 2016, following a period of consultation with market participants.

In April, Tokyo Commodity Exchange President and CEO Takamichi Hamada said that the exchange has decided to use Platts' Japan oil products prices for new balance-month contracts for gasoline, gasoil and kerosene that it plans to introduce by the end of March 2017.

Under this plan, Tocom intends to launch new balance-month futures in January-March 2017 for gasoline, gasoil and kerosene waterborne and truck contracts linking to Platts' monthly average prices.

Currently, Tocom has six forward-month forward contracts for waterborne gasoline, kerosene and gasoil for Tokyo, and truck gasoline and kerosene for Chukyo in central Japan.

JCC-LINKED LNG PRICE AND THE JAPAN KOREA MARKER

Oil-linked formula and long-term commitments have been key components of LNG contracts in Japan since around 1985. Oil

was the competing fuel to natural gas and large-scale financing associated with LNG liquefaction projects commanded commitment of nearly 20 years.

Price formula often adopted among Japanese buyers has been indexed to a basket of crude imported to Japan called the Japan Crude Cocktail (JCC) plus a constant to reflect freight and other costs.

Platts began assessing LNG spot price, Japan Korea Marker, on February 2, 2009. The price was then assessed at \$7/MMBtu and remained well below oil-linked long-term LNG prices until March 2011 when the Fukushima nuclear disaster drove Japanese power utilities into the spot market to fill their additional demand and drove up spot prices.

Japan's LNG imports steadily grew and in 2014, they reached 88.5 million mt, of which spot and short-term LNG accounted for 30%, according to data from the Japan's Ministry of Finance and GIIGNL (International Group of LNG Importers).

Until early 2014, the decision to buy additional spot LNG volumes was closely tied to long-term contract prices. Higher spot prices encouraged buyers to take more volumes under their term contracts through the upward quantity tolerance clause and vice versa. But seasonal swings in demand and supply would occasionally push spot prices sharply lower or higher than long-term prices. This in turn resulted in a strong correlation between JKM and long-term LNG prices.

As Asian LNG commanded lofty prices against gas prices in Europe and the United States, this created opportunities for arbitrage trades. Reloads from European markets grew to a record 6.4 million mt in 2014 from a mere 0.1 million mt in 2010, according to GIIGNL.

Platts JKM averaged \$16.21/MMBtu in 2013, against an average of \$10.42/MMBtu for UK's National Balancing Point (NBP). With the average shipping cost of around \$3/MMBtu from Europe to Asia, the gap between two basins offered healthy margins to entice traders and spur reloads, according to the data from Platts Analytics' Eclipse Energy.

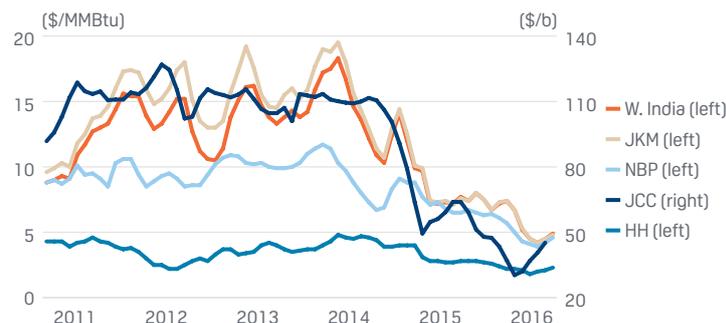
LNG INDEX DIVERSIFICATION

Concerns about high LNG prices prompted calls for diversification of supply sources as well as price indexes and reduce sensitivity to crude oil prices. More investments in upstream projects and further flexibility in LNG contracts such as removal of destination clause were also urged by the industry and discussed at annual LNG Producer Consumer conferences in Japan.

Against this backdrop, Japanese LNG buyers signed a series of agreements to buy US LNG during 2013 and 2014 as they aimed to add Henry Hub pricing to their portfolios.

The total LNG volumes Japanese buyers contracted with such US projects as Cameron LNG, Cove Point LNG, Freeport LNG, Sabine Pass amounted to about 17 million mt, representing 20% of Japan's imported volume in 2015.

MONTHLY PRICE COMPARISON



Source: Platts Analytics' Eclipse Energy

US LNG cargoes are destination free and expansion of Panama Canal also raised expectations for shorter voyage days and cheaper shipping costs.

Meanwhile other hub indexes such as NBP also gained traction and the use of spot price indexations also emerged. Since 2011 a number of short-term contracts have been signed using spot indexation either in full or as a component in hybrid contracts. For example, in November 2014, Chubu Electric signed the short-term sales and purchase agreement with France-based GDF Suez for around 20 cargoes of LNG with an indexation of around 10% to JKM prices over a fixed period of time.

DECOUPLING OF OIL AND GAS

In February 2014, Platts JKM hit a record high of \$20.20/MMBtu (\$117.44/barrel) and started its continuous descent. The fall in JKM began ahead of the decline in oil price that broke below \$100/b in the fall of 2014. This was the beginning of a delinking in the relationship between long-term contract prices tied to crude oil, and the spot LNG market. Platts JKM dropped by half to end 2014 at \$10.025/MMBtu (\$58.28/barrel).

The decline of Platts JKM was largely attributed to a fundamental supply and demand imbalance in the spot market. It was closely tied to additional supplies coming with the startup of new projects in the region, notably Papua New Guinea LNG project and a slowing down of economies in the Asia region.

In 2015, Platts JKM traded in a tight range between \$6.50/MMBtu and \$8.20/MMBtu (\$37.79-\$47.67/barrel). Sapping demand from buyers who were grappling with high inventories and growing supplies from new projects including Australia's Queensland Curtis LNG project moderated the previously volatile tone of the spot market.

The sharp and rapid fall in oil prices also highlighted the time lag between changes in oil prices and their consequent impact on spot and term LNG prices.

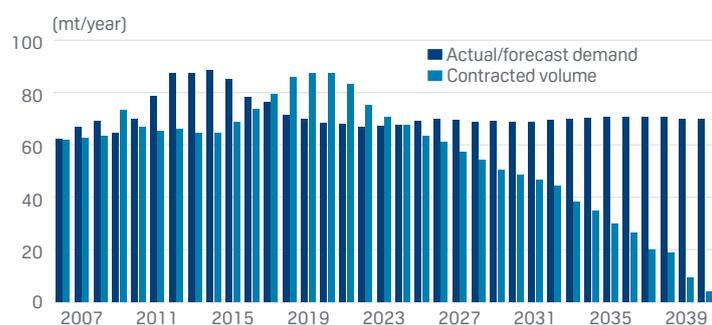
Most LNG long-term contracts in Japan are also linked to trailing three-month average JCC prices. JCC broke below \$50/b in February and started recovering in March. LNG imported prices in Japan, on the other hand, continued to drop and hit its low of

\$449.38/mt or \$8.64/MMBtu in June before rebounding in July, the data showed.

As Japanese electric and gas utilities face on-going deregulation, decoupling of oil and gas is likely to benefit them by helping diversify LNG procurement sources and possibly providing greater negotiation power against oil and gas companies, according to S&P Global Ratings.

Nevertheless, it may take long for the spot LNG market to fully develop and function because Japanese LNG buyers place greater importance on stable energy supplies and tend to prefer long-term supply contracts, Satsukawa and Shibata said.

JAPAN'S LNG DEMAND VERSUS CONTRACT VOLUME



Source: Platts Analytics' Eclipse Energy, Japan's Ministry of Finance

LNG SURPLUS AND DEREGULATION

As more new LNG projects came online in Asia and filled the demand in the region, trade volumes flowing from the Atlantic and Middle East to Asia shrank, narrowing price differences between the basins substantially.

Volumes from the Atlantic Basin to Asia dropped 20% year on year to 16.5 million mt in 2015, according to data from Platts Analytics.

Meanwhile, demand from Japanese buyers continued to slip as energy-saving practices have widely taken root and renewables gained currency. Furthermore, it has become apparent that Japanese buyers have over committed LNG long-term contracts. They are now expected to have extra LNG in hand as early as 2017 and that surplus is likely to last until 2023, Platts Analytics estimates.

Japan's LNG demand is forecast to fall to 68.5 million mt in 2020 against 87.5 million mt of contracted volume, leaving around 19 million mt of LNG in excess, according to Platts Analytics. The forecast assumes that a total of 16 nuclear reactors would restart by October 2022 and Japan would see 0.33% per year growth in power demand.

The prospects of excess volume comes to the fore as Japan pushes for deregulation of domestic power and gas retail markets, opening up power grids and gas pipelines.

METI has also compiled an action plan for creating a LNG trading hub by early 2020s and laying needed infrastructure such as third party access to LNG terminals, connecting pipeline networks and building underground storage facilities.

The plan also noted that pricing options including assessments by international price reporting agencies and LNG trading platforms were also discussed as it seeks to implement an index that reflect Japanese as well as Asian demand and supply.

LNG SPOT INDEX AND HUB

Establishing a LNG trading hub and adopting an index that reflect Asia's LNG fundamentals perhaps cannot come at a better time for Japan.

The LNG market is expected to be awash with supplies with new projects are due to start up in the next several years. Deregulation measures are being implemented and the number of players is increasing with the liberalization of the downstream power and gas markets.

Japanese utilities are likely to get more price conscious as competition in downstream markets heats up. Hedging needs could also grow, and financial tools such as swaps or futures will play a key role to facilitate spot trades.

Opportunities to diversify price indexes are also expected to arise as sizable amounts of long-term LNG contracts start to roll off in the early 2020s. Between 2020 and 2025, long term contracts worth around 26 million mt/year are expected to expire with 7 million mt/year of contracts with Qatar due in expire in 2021, according to data from GIIGNL.

But it will be not be a walk in the park.

If Japan plans to create a physical hub, open access to terminals and storage sites would be essential to set up a place where LNG can change ownership.

Under this scheme, sellers have to have the means to access the specific geographical location and capacities to secure buyers, who should also have ways to access that location regardless of where they are based.

The Japanese government has set up legal schemes to ensure third party access, requiring terminal operators to disclose information on tank and berth use. The new law is expected to take effect from April 2017.

Japan currently has 35 LNG terminals with a total tank capacity of around 18 million cubic meters, but the use has been limited to incumbent utilities and how much capacity will be actually available for newcomers remains to be seen.

It's also unclear if there will be enough liquidity and participation from domestic and foreign players once the hub is created.

Platts Analytics' Bentek Energy forecasts Henry Hub prices to rise to around \$4/MMBtu by 2020 from current level of around \$2/MMBtu, and higher Henry Hub prices would present challenges for those trying to sell US LNG into Asia.

Also, while Japan will likely have excess LNG in the coming years, it is not clear how much of that will be destination-free and if these cargoes can be resold.

Japan's gas pipeline networks are not fully connected, making it difficult for now to create a virtual hub where sellers or buyers can inject or extract gas at any point of the entire system.

Balancing security of supply and creation of a competitive market could also present a challenge. Data release and operational information would have to come through in a timely manner to ensure transparency in the hub.

But most of all, Japan will likely have to work against time. A lack of new LNG projects securing final investment decisions (FID) in recent years could lead to tight supply again once demand catches up.

It will take time for Japanese market players to position themselves and adopt changes that come with liberalization steps. Caution will linger and uncertainties will stay.

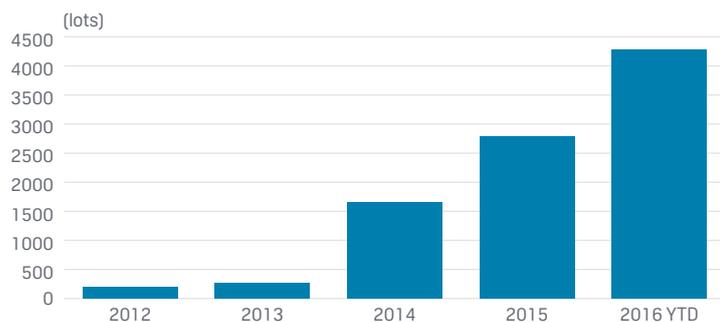
LNG SPOT MARKET IN TRANSITION

Meanwhile, the LNG spot market is steadily developing with a number of new projects starting up and new players entering the market.

By 2020, a total of 151.1 million mt/year of LNG liquefaction capacity will be added to push up the global supply to 426 million mt/year, against expected global demand of 372.7 million mt/year. With approximately 60 million mt/year of destination-free volumes set to hit the market from the US, the potential for a significant uplift in spot market liquidity is not insignificant.

The technology of FSRU (Floating Storage Regasification Unit) has made access to the LNG market more affordable, and allowed countries to quickly gain access to the market. Middle

PLATTS JKM SWAPS CLEARED THROUGH ICE



1 lot = 10,000 MMBtu

Source: ICE data

Eastern and South Asian countries including Egypt, Jordan and Pakistan began importing LNG over the last few years, scooping up cargoes at competitive prices.

And countries like Pakistan and Egypt were able to gain access to the global LNG market without the typical long-term contracts, which underpin a land-based terminal. While Pakistan has since signed contracts to ensure stability of supply in the long-term, the FSRU option does appear to be an attractive selection for price sensitive buyers with unclear long-term plans for LNG in their energy mix.

This year, demand and supply for prompt cargoes has manifested in the form of tenders. Around 100 buy and sell tenders have been launched from January till the end of July, looking for more than 350 cargoes to be bought or sold under a single cargo, strip or short-term deal.

As the majority of buy tenders have been awarded to traders, this has supported the spot market, as traders look to optimize cargo location, as well as cover their short positions.

As in any commodity market, reliable pricing is the key for the development of functioning spot markets. The increase of participation and the degree of sophistication seen in the JKM swaps market reflects a quickly maturing LNG market, and the commoditizing of LNG.

From January to July this year, 4,279 lots of JKM swaps were cleared through ICE, jumping from 2,791 lots cleared for the whole 2015 calendar year.

Of note though is not only the growth in liquidity in absolute terms, but also the growth in liquidity across the forward curve with trading going out as far as the end of calendar year 2017 as of July.

Meanwhile, the emergence of spread trading, both across time periods and to other markets such as the UK's NBP points to further signs of market maturity.

PLATTS' APPROACH

Platts' core values are transparency and independence. When Platts looks at commodity markets around the world, the focus is on assessing fair market value — the value that any normal market participant could achieve if they went out into the market themselves on a given day.

Platts is not interested in publishing price assessments that reflect just suppliers, or just buyers, or any other special interest in the market. And the company strongly believes that transparency in the price reporting process is essential so that all stakeholders can understand why a Platts assessment is where it is on any given day.

Platts has developed these core principles over many decades, and they have led the company to develop a variety of

processes that aim to ensure that its assessments are robust and reflective of actual market value.

Platts has been following oil products markets closely around the world for many years, particularly in three key regions — the US Gulf Coast, Amsterdam/Rotterdam/Antwerp and Singapore.

The three regions have very active oil markets, and a significant volume of spot physical trades are reported to Platts every day through its Market on Close assessment process.

The three regions have each taught the company different things, and the lessons Platts has learnt there can help as it works with the Japanese industry on assessing the domestic Japanese market.

Platts knows that in all oil markets physical performance is an essential part of oil trade and price discovery and it also knows that one trade does not define a whole market.

When Platts looks at Japan, it pulls together these experiences of other liquid oil markets, but it is also learning anew from the Japanese market itself. And hopefully the value Platts brings to the market is greater clarity on the full physical value of a particular fuel in a particular location.

Platts does not have any interest in the prices it publishes, which is to say Platts does not benefit from the price being higher or lower. Platts concern is that the published price is representative of the actual market.

For the reasons outlined above, Platts believes that it has a unique offering for the Japanese market.

Japan's domestic oil product trade remains liquid, despite falling domestic demand and some consolidation. There is also an increased commitment from the Japanese oil industry to transparency and market-based solutions. So the markets in Japan fit very naturally alongside the markets that Platts analyzes around the world.

Separately, with the LNG spot market poised to experience even greater commoditization and liquidity and increasing calls for diversification of indexation and a need for indices which reflect

market fundamentals in Asia, Platts is uniquely placed to provide a robust price discovery mechanism for the LNG market in Japan, which already forms the core of the Platts JKM assessment.

Platts JKM has already been adopted as a price reference in contracts, both within Japan itself and more broadly in Asia as well as in the global context (Mexico, Brazil, India, etc), indicating the confidence the market has already placed in Platts' experience of and approach to LNG pricing.

Platts has already adopted the IOSCO Principles for Oil Price Reporting Agencies for its price assessment processes for the JKM and successfully passed an independent assurance review conducted by Ernst & Young. As this nascent market goes through a process of maturation Platts will continue to evolve its processes in this market to reflect increased liquidity, participation and sophistication.

One such example is a proposal to migrate the existing price discovery process for JKM (using a survey approach) to align it more closely with the processes Platts employs across more sophisticated and developed markets such as crude oil and oil product markets. Such an approach will increase the level of transparency available to market participants, improve the quality of inputs that are used in the price discovery process and better reflect the principle that price is a function of time.

In parallel, Platts continues to monitor activity in the burgeoning JKM swaps market which continues to grow both in size and sophistication. Platts will extend its assessments of this market to provide greater price transparency in the forward market reflecting the growth in forward trading activity in the financial market and an increased appetite for hedging against spot market instruments.

Meanwhile, Platts is also keeping a close eye on the downstream markets in Japan with a view to supporting price transparency in the domestic power and gas markets as they go through the process of liberalization and deregulation.

Platts will continue to work with market participants and regulators in Japan to provide price discovery solutions which reflect current trading practices and promote transparency across individual commodity markets building on over 100 years of experience.

S&P Global Platts

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