Japan's new challenge and possible solutions in LNG procurement activities in the wake of less availability of nuclear power capacity

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Summary

The Fukushima Daiichi nuclear disaster triggered by the Great East Japan Earthquake and ensuing prolonged shutdowns of other reactors have caused electric power capacity shortages all around the country. As LNG-fired power generation has never been as important as it is today as a backup power source, demand for LNG has surged and its prices stayed high for several months before coming down in June 2012. Given the expected even more important roles of LNG in years to come, it would be increasingly more important for Japan's national interest to procure LNG with more competitive pricing terms and in a stable manner.

This paper discusses possible measures to reduce LNG procurement prices:
(1) bundled procurement among LNG buyers (Section 5);
(2) government supports to LNG project development (Section 6); and
(3) pipeline gas imports (Section 7).

As none of the measures would directly lead to lower prices, it would not be easy to reverse the recent general upward trend in LNG pricing. Assuming risks and limitations of those measures, LNG buyers should develop proactive purchasing strategies to avoid excessive and unnecessary price rise under the current market conditions that appear to be more favourable to LNG sellers.

1. Introduction

LNG demand for power generation has significantly increased after the Great East Japan Earthquake as LNG-fired power generation has been playing a major role to replace the lost nuclear power with ensuing prolonged shutdowns of nuclear reactors around the country. Japan imported 83.18 million tonnes[1] of LNG in fiscal 2011, up 18% year-on-year. Japan is now the largest importer of LNG, as well as total gas (including both pipeline gas and LNG).

LNG prices were also on the rise in the fiscal year. Thus Asian LNG prices at this moment carry a significant premium over gas prices in the United States and Europe and the gap has been widening since March 2011 - *the Asian premium*.

If energy security is defined as the ability to secure adequate volumes of energy supply to support people's daily life, economic and social activities, and national defence and so on, at

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1 This paper uses 'tonne' to indicate 'metric ton'.

acceptable prices, the current situation is calling for stronger energy security especially in terms of LNG pricing.

Possible measures for this purpose include those to secure more supply at reasonable prices and those to reduce consumption. This paper looks at the former measures, focusing on aggregated LNG procurement activities between buyers, the government's supports to LNG project development, and natural gas imports via pipeline. Before those measures, the following three sections briefly look at the current status of Japanese and global gas prices, as well as shifting market trends.

2. Prices are on the rise along with volumes

According to the Japan's customs statistics, the monthly average prices of Japan's LNG imports climbed from USD 13.08 / million Btu in April 2011 to USD 16.68 in March 2012. Assuming that the majority, or 80% - 90%, of Japan's LNG imports are delivered under long-term contracts, the average price of the total imports is thought to be very close to the average of imports under long-term contracts.

Meanwhile, the rise of spot LNG prices was more significant than that of the average import price. According to assessments published by Platts and Energy Intelligence, assessed spot prices rose from around USD 9 for January 2011 delivery to USD 11 for April delivery, and USD 17 for November delivery, before returning down to USD 15 for March 2012 delivery.

Turning to European and American gas markets from January to December 2011, prices were USD 3 - 4 at Henry Hub in the United States, USD 8 - 9 at National Balancing Point (NBP) in the United Kingdom, and USD 10 - 14 delivered ex-ship (DES) at LNG import terminals in Spain, which was the largest importer of LNG in Europe until 2010. Thus Asian LNG prices at this moment carry a significant premium over gas prices in the United States and Europe - *the Asian premium*.

As a result, the amount paid for LNG imports grew by eye-popping 52% from JPY 3.5 trillion in fiscal 2010 to JPY 5.4 trillion (USD 60 billion) in fiscal 2011. In addition to the 18% volumetric increase, a 30% increase in the annual average JPY denominated price (a 41% increase in the USD denominated price) over the previous fiscal year contributed to the significant increase in paid amounts.

The gross payment for the LNG imports represented more than 1% of the nation's estimated GDP for the fiscal year 2011 of JPY 468 trillion for the first time in modern history. Foreign currency exchange rates also make differences in the amounts. If the rates in the fiscal year had been similar to those in the fiscal year 2008, the total amount paid for LNG imports would have been as large as JPY 6.5 - 7 trillion[2].

The increasing payment for LNG imports represents a significant exhaustion of national

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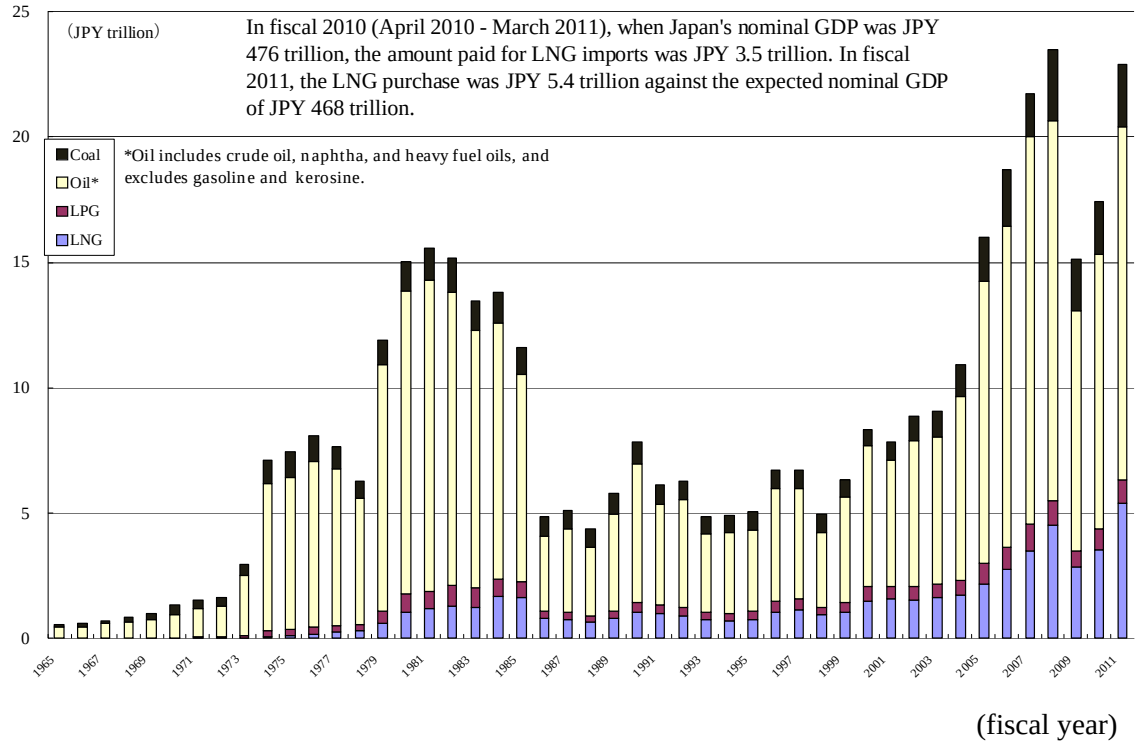
[2] The foreign exchange rates applicable to imports into Japan ranged JPY 76 - 83 / USD in fiscal 2011 compared to JPY 90 - 109 / USD in fiscal 2008.

wealth. If volumes imported through pipelines - that China has been steadily increasing and Korea[3] has been mulling to introduce from Russia - are to be delivered to those countries at cheaper prices than LNG, there could be a *Japan Premium*.

Figure 2-1: Amount paid for fossil fuel imports in Japan



(Source) Japan's customs statistics

3. The nature of the Asian and Japanese premiums

Reduction of price levels is urgently needed given the significant impact on the nation's economy. However, measures could not be appropriate if they were based on preoccupations and misunderstandings such as "Japan's LNG has been always the most expensive in the world," "Prices are high as the gas is delivered in the form of LNG," and "Japan's LNG prices are structurally expensive as they are linked to oil prices."

Firstly, when in news articles prices are compared between different regions in the world and Japan's prices are described as certain times more expensive than those in the United States, Henry Hub prices often represent the United States and are compared with Japan's LNG import prices. However, as the Henry Hub is a hub in a gas producing region in the United States, wholesale prices in major consuming regions should also be looked at.

The chart on the later page (Figure 3-1) also includes prices at the New York City Gate in addition to those at the Henry Hub. This indicates the latest price in the United States of USD 5

3 Republic of Korea

rather than USD 2 to compare with the Japanese price.

Although oil-linked pricing is often viewed as a structural reason of high prices, Japanese LNG prices were mostly less expensive than gas prices in the United States including those at Henry Hub from 2002 to 2007. Therefore, accusing Japanese electric power and gas companies of lack of efforts to reduce purchasing prices is unjustifiable.

The pricing system linked with oil does not necessarily create the widening gaps, but gas prices in the United States have rapidly come down since 2008 due to the shale gas revolution. The challenge is how to reflect the new reality in the current and future pricing in a timely manner.

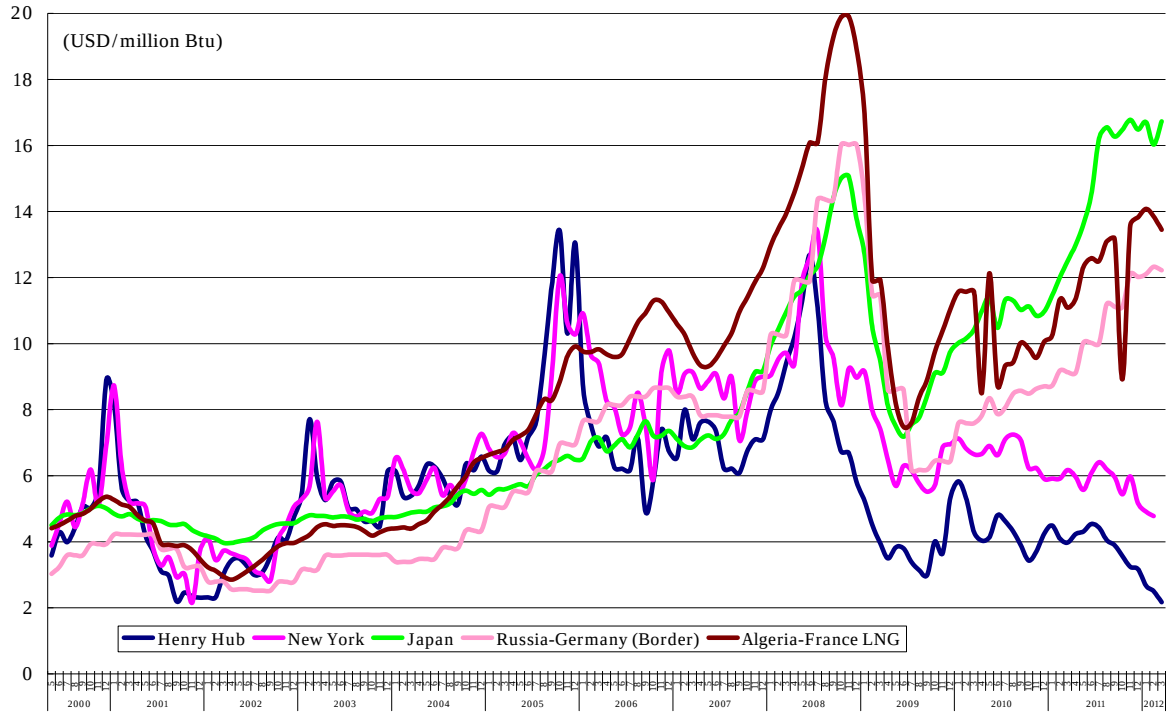
Many gas sale and purchase agreements include price re-opening clauses (although only once in several years) to be activated responding to changing market environments. The question is how to argue effectively that the current situation represents changes in market environments that justify renegotiation of pricing terms in existing contracts. Buyers should make efforts to establish price formulae that could reflect changing environments in the global market, including those in other regional markets and to specifically incorporate such changes as a trigger of renegotiation.

It should be noted that this could be a double-edged sword as any reverse situation could also lead to the necessity to renegotiate for less favourable terms and conditions to buyers.

While hub trading activities are increasing in Europe, pricing over there is also in transition and oil-linked long-term contracts still play a major role. At this moment it is not yet clear to what extent hub-pricing will be incorporated into long-term contract pricing.

The chart (Figure 3-1) also includes Russian gas at the German border as a representative of European pipeline gas and Algerian LNG delivered at ports in France as a representative of European LNG. The chart shows that Algerian LNG has not been significantly less expensive than Japan's LNG, as well.

Figure 3-1: Prices in different regional markets around the world - some representative prices in the first decade of the 21st century



(Source) Customs statistics of countries, Energy Information Administration (EIA) of the United States, Energy Intelligence

4. Shifting sources of supply to the Japanese market

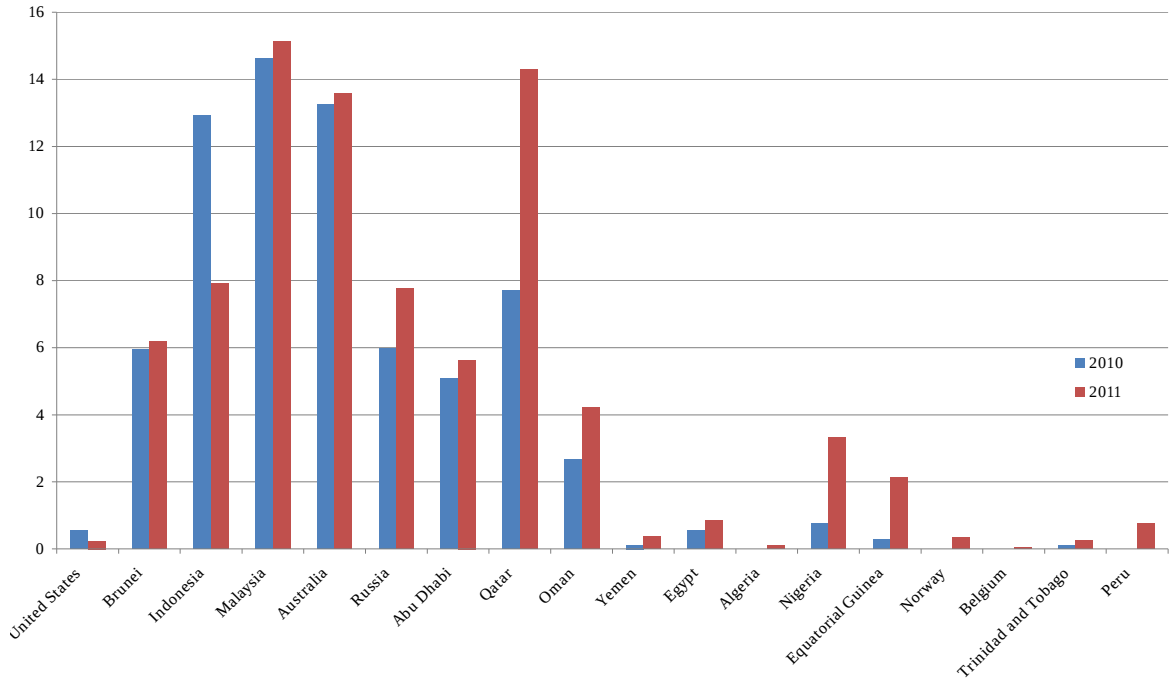
In addition to the 18% increase to 83.18 million tonnes in fiscal 2011 from 70.56 million tonnes in the previous year, the composition of supply sources also changed markedly.

Out of the increase of 12.62 million tonnes, more than half, or 6.58 million tonnes, was delivered from Qatar. While there was an exceptionally notable decrease of supply from Indonesia due to expiry of several long-term supply contracts in late fiscal 2010, Russia and Malaysia increased deliveries to Japan.

In addition to Qatar, African producers in Nigeria and Equatorial Guinea also supplied remarkably more LNG to Japan. Due to declining LNG import demand in the United States caused by increasing domestic gas production and slowing growth of LNG imports in Europe caused by slumping overall gas demand, some portion of growing supply sources targeting the Atlantic basin markets inevitably became flexible ones to flow to the Pacific LNG markets represented by Japan.

Amounts paid by Japan for LNG to individual exporting countries multiplied by increasing volumes and higher prices across the board, except for Indonesia, whose exports decreased significantly but received amounts did not decrease as much thanks to much higher prices.

Figure 4-1 LNG imports by source in fiscal 2010 and 2011



(Source) Japan's customs statistics

5. Bundling LNG procurement activities among buyers

The argument that aggregation of LNG procurement into a single channel would be an effective path to stable and strategic LNG procurement is based on suspicion that Japan does not have a strong bargaining position even though it is the largest importer in the world as the nation's electric power and gas companies individually procure LNG.

While it is true that Japan has never nationally-unitised LNG procurement activities under one umbrella as Korea has done, Japan's LNG purchases used to be more or less bundled before partial liberalisation of electric power and gas markets in early 2000s. When an economically viable grassroots LNG export project was planned or proposed, a consortium of electric power and/or gas companies used to be formed to support the projects as foundation buyers.

This formula was to aggregate a critical mass of demand to justify large-scale development of an LNG supply project, rather than to strengthen bargaining position of buyers. In fact the very first contract to supply LNG to Japan had Tokyo Electric Power and Tokyo Gas as buyers, who had different peak seasons in the year and saw benefit of the joint purchase.

However, as liberalisation was gradually introduced into Japan's electric power and city gas markets, such a consortium of buyers became outdated. That was because individual buyers did not necessarily find it advantageous to procure LNG under identical terms and conditions - especially pricing terms with other compatriot buyers, as they had done before market liberalisation.

While typically a power generator emphasises flexibility of delivery rather than competitive pricing, a gas company tends to prefer lower prices. That is because the position of LNG is

different for them: it is just one among multiple fuel sources for a power generator while a gas company is almost entirely dependent on LNG for its gas sources .

It was also true that buyers had become tired with time-consuming process and its cost of consensus-building within a consortium, while individual buyers' preferences were diversified.

Another factor was even more important - as the international LNG market was in general more favourable to buyers in the early 2000s when buyers' consorta became out of fashion, disaggregated purchasing did not necessarily lead to higher or disadvantageous prices.

In the late 2000s when the LNG market progressively became more favourable to sellers, more critics began questioning effectiveness of the disaggregated purchasing. At the same time, effective aggregation was happening in the form of partial discharge of a cargo at a smaller terminal or resale shipment from a larger buyer to a smaller gas company.

However, in the wake of the Great East Japan Earthquake and an ensuing surge of LNG demand leading to the expanding Asian premium of LNG prices, the latest argument calls for aggregation of purchasing activities between larger buyers into one umbrella just as Koreans do.

But it should be noted that aggregation of purchasing activities may not necessarily lead to actual reduction of LNG price levels. Indeed, aggregation is likely to enhance buyers' bargaining position. With diversified priorities maintained among buyers from flexible delivery terms to lowering price levels, negotiations with sellers may not be necessarily concentrated on competitive pricing.

Furthermore, Japanese LNG import prices have not been always higher than those in Korea and Chinese Taipei where purchasing activities have been bundled under one umbrella in their respective markets.

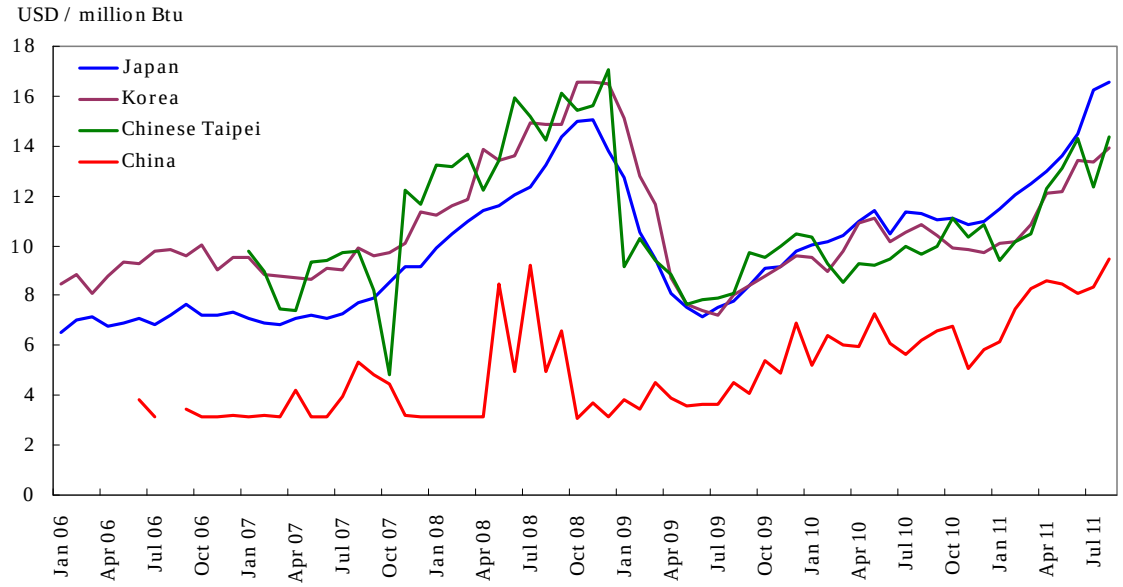
In China where until recently purchasing activities were mostly bundled under one umbrella, LNG prices have been significantly lower than those in Japan, Korea and Chinese Taipei. But this is simply because prices under two long-term contracts that represent majority of current imports are exceptionally low, reflecting the buyer-favourable market environment of the days when those contracts were concluded, rather than the fact that purchases are bundled.

Prices that were negotiated under recent long-term contracts are similarly higher. At the same time, Japan also has several long-term contracts with more competitive prices.

Therefore, **aggregation of purchases does not have a clear correlation with price reduction**. In other words, it is not easy to acquire favourable pricing conditions - favourable enough to reverse the prevailing market trends, although at least it may be possible to mitigate pressures that could lead to unnecessary price increases.

When in fact buyers proceed to bundling purchasing activities, they should unify their priorities to the maximum extent to establish a strategically formidable procurement regime.

Figure 5-1: LNG import prices in Northeast Asia



(Source) Compiled by the authors with data from customs statistics and Energy Intelligence

6. The government's supports to LNG production projects

The idea to have Japanese buyers be involved in LNG production projects and gain the Japanese government-backed financial support to the projects is based on expectations that a buyer's proactive involvement could lead to active influence toward lowering purchasing prices. A similar model has been common in Japanese companies' involvement in oil development projects.

As a matter of fact, Japanese companies have a long history of LNG export project investment. Mitsubishi Corporation has an equity stake in the Brunei LNG project that went online in 1972 and a Japanese consortium JILCO (Japan Indonesia LNG Company Limited) has 15% stakes in Indonesia's Bontang and Arun LNG respectively. JILCO's original shareholders, in turn, included the initial buyers from the projects - Kansai Electric Power, Chubu Electric Power, Kyushu Electric Power, Osaka Gas, Toho Gas, and Nippon Steel as well as Tokyo Electric Power, Tokyo Gas, Nissho Iwai (current Sojitz), Itochu, Sumitomo Corporation, Tomen (current Toyota Tsusho), Marubeni, Mitsui and Company, Mitsubishi Corporation, and the Industrial Bank of Japan (current Mizuho Corporate Bank).

Since then Japanese companies have participated in many of those projects from which Japanese buyers have long-term purchasing commitments and the Japanese government has typically provided indirect financial supports through JOGMEC[4] and the Japan Bank for International Cooperation (JBIC)[5].

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4 Japan Oil, Gas and Metals National Corporation. Formerly through JNOC (Japan National Oil Corporation).

5 Formerly through the Export and Import Bank of Japan.

With the exception of the Bontang and Arun plants, it was not until the 2000s that Japanese electric power and gas companies participated directly in LNG liquefaction and upstream segments of the business. As competition is fiercer in the electric power and city gas markets and stable and strategic LNG procurement is more important, Japanese electric power and gas companies are participating in more LNG production projects.

Upstream and liquefaction participation helps advance LNG projects and in turn is effective in securing certain LNG volumes. In particular LNG projects in early days would have been difficult to materialise without Japanese supports.

Even with solid commitment to the upstream and liquefaction segments, risks of supply disruptions caused by bad weather or accidents, as well as resource policy changes, could be unavoidable, however. Therefore, upstream and liquefaction equity participation does not necessarily guarantee volumetric fulfilment for the entire project life.

Meanwhile there has not been established positive correlation between upstream involvement and lower prices. At least in the past cases, prevailing market conditions and future prospects at the time of contracting are thought to have influenced much on determining pricing terms.

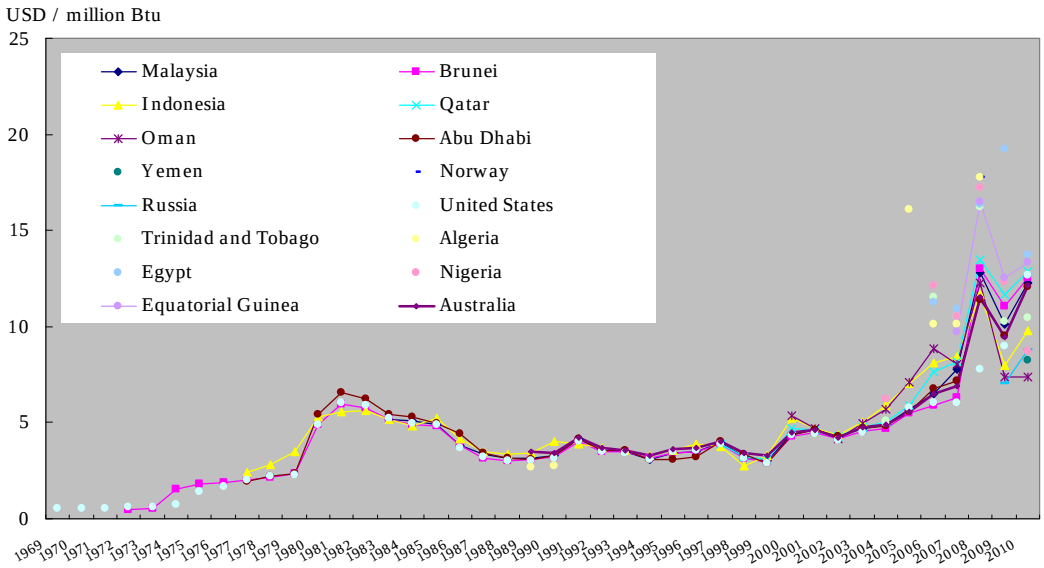
Upstream involvement is expected to provide natural hedging. However, in order to cover the entire price fluctuation risk, the equity LNG sale volume as a seller should match the purchasing volume as a buyer, which is not practically possible as the investment would be too big and state-owned oil companies tend to retain more than half of the project.

Partly because of the above, those countries that do not have state-owned companies, including Australia, the United States, and Canada, could be more favourable targets for Japanese companies to make upstream participation. Information obtained through upstream and liquefaction participation should theoretically improve negotiating position of the relevant buyer in pricing talks with the project, as imbalance of information would be mitigated.

In short, **upstream and liquefaction participation is not a silver bullet to reduce prices.** On the contrary, wrong selection of a project to invest in could lead to huge losses caused by resource policy changes in the host country and lack of competitive LNG commodity prices.

Therefore, it is very important for Japanese companies and the government to closely work together to analyse risks and cost competitiveness of individual projects in depth when providing the Japanese government's support to the project.

Figure 6-1: LNG import prices in Japan by supply source



(Note) Supply sources with Japanese equity participation are expressed in lines and those without are expressed in dots without lines.
(Source) Japan's customs statistics

7. Imports of pipeline gas

As Japan's LNG import surges, potential gas pipelines to Northeast Asia attract more attention - partly due to a slightly biased recognition that LNG is always more expensive than pipeline gas. After China has started pipeline gas imports from Turkmenistan in late 2009, Kazakhstan, Uzbekistan and Myanmar are also expected to start deliveries to China in the near future.

Delivered prices of Turkmen gas to China are estimated to be around USD 12 per million Btu at the Beijing city gate, including inland transportation, and lower than Japan's LNG prices.

As China has introduced pipeline gas imports following LNG to meet increasing domestic gas demand, pipeline gas imports have been steadily increasing. This is partly because pipeline gaa at least for the moment is more competitive than LNG in terms of prices.

Chinese LNG buyers are suspected to leverage their position as a pipeline gas buyer in their LNG price negotiations.

Korea is also considering importing Russian gas through a pipeline traversing North Korea[6]. Although the proposed pipeline is accompanied with high risks of transiting through North Korea, it would be no wonder that Korean LNG buyers want to use the pipeline as a card in their LNG price negotiations.

If Japan is to import pipeline gas, the most reasonably suspected exporter would be Russia. Although Russian pipeline gas imports to Japan have been considered since the Soviet Union era in

6 Democratic People's Republic of Korea.

the 1970s, they have never materialised due to economic and political reasons.

Any arguments that pipeline gas is always cheaper and LNG is more expensive are incorrect as the economics of gas supply vary depending on various other factors. But if any specific pipeline gas import proposal seems to have economic viability and could have any positive implication on other LNG price negotiations, Japan should not exclude the possibility of pipeline gas imports.

In continental Europe it was only after buyers had alternative supply sources – including LNG imports – to pipeline gas imports, that buyers managed to successfully introduce partial links to spot gas prices away from the traditional total linkage to oil, leading to lowering price levels. In other words, LNG is used to lower pipeline gas prices. It should be also noted that the economic slump and consequential sluggish gas demand has been a decisive factor of the recent developments.

Japan may be able to take advantage of potential pipeline gas options in negotiating LNG prices. As Japan's transmission pipeline grid has to be enhanced in order to accommodate pipeline gas imports, advance in infrastructure building is also expected, thanks to any pipeline import initiatives. As indicated above, it should be noted that a pipeline through the Korean Peninsula inevitably would be accompanied with a huge transit risk. It would be also not so easy to diversify supply sources of pipeline gas, compared to LNG.

Table 7-1 Possible solutions discussed in this paper

Measures	Shortcomings
Bundling procurement activities - buyers consortium; secondary marketing to smaller buyers	Aggregation of purchases does not have a clear correlation with price reduction.
Governmental supports to LNG production projects	Upstream and liquefaction participation is not a silver bullet to reduce prices.
Pipeline gas imports	Pipeline gas may not be always cheap. Difficult to diversify supply sources. Potential geopolitical risks.

8. Conclusion

The Fukushima Daiichi Nuclear Power Plant accident triggered by the Great East Japan Earthquake and the ensuing prolonged nuclear shutdowns have increased immediate LNG demand significantly and been raising short-term LNG prices. As the role of natural gas (LNG) in Japan is expected to be larger in the future, stable procurement of LNG with more competitive pricing terms and conditions will be more important for Japan's national interest.

This paper has discussed measures to reduce LNG procurement prices including bundled purchasing, the government supports to development of LNG production projects, and pipeline gas imports. None of them can easily lead to immediate reduction of LNG prices and it is not easy to

reverse the prevailing market trends.

At the end of the day, larger demand and smaller supply tend to put more or less upward pressure on prices with some time lag, if any. However, as tightening and loosening of demand and supply balance move in a cycle, the current market conditions that are favourable to sellers will eventually come to an end.

Although the Asian premium is a big headache for Japan, new LNG projects development are accelerated in North America, Australia, Russia, East Africa and Iraq. Those projects with economic viability will be eventually materialised as supply sources to Japan.

There are also factors that could reduce LNG demand including additional restart of Japanese nuclear power plants and economic slowdowns around the globe especially in Europe. It is not more sophisticated procurement strategies but those factors affecting volumes of supply and demand that dictate market trends.

Therefore, in order to minimise unnecessary price rises in the current market conditions that are more favourable to sellers and to take appropriate measures in the downward phase in a price shifting cycle, LNG buyers should shore up strategic LNG procurement based on proper recognition of risks and limits of bundled purchasing, the government supports to the development of LNG production projects, and pipeline gas imports.

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