

## **The Changing World LNG Market and its Impact on Japan Diversified Market Structure and the Challenges Faced by Japan**

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### **<Research Objectives>**

The world demand for LNG is on the rise because of its use for power generation with CCGT (Combined Cycle Gas Turbine) application, relatively high environmental benefits, and declining supply costs. In particular, the demand is expected to surge in the Atlantic market as exports to the U.S., where natural gas prices have stayed higher level, are increasing rapidly. With this as a backdrop, the world LNG market is showing signs of dramatic changes.

LNG, which was a very special commodity when it was first introduced to the market, has become a major source of energy, with a total of 13 countries exporting and another 13 countries importing it as of 2005. More recently, Russia, Norway, Equatorial Guinea, and Yemen have started exporting this energy product, while the U.K. has resumed its imports. In addition, China, Canada and Mexico are likely to join the ranks of importing nations.

This report provides an overview and analysis of (1) world LNG market conditions, (2) changes in LNG contract conditions, and (3) the current LNG pricing systems, thereby shedding light on the possible impacts of these factors on Japanese businesses and as well as on the challenges to be addressed in the future.<sup>1</sup>

### **<Key Conclusions>**

1. In the short to medium term, supply and demand is seemed to balance out in the Asia-Pacific market, while the Atlantic market is increasingly tight due to a surge in imports into the U.S. – which is strengthening the presence of Qatar as a major supply source. As a result, the dependence of the world LNG market on the Middle East supply will increase further. The diversification of supply sources is thus imperative to stabilize the market.
2. A shortage of supply due to malfunctions of LNG output from Indonesia raises keen concerns about the Asian market; it serves as a lesson about the long-observed risks associated with trying to ensure stable supply through take-or-pay long-term contracts, the most common form of purchasing LNG. In the wake of deregulation of the world power and gas market, there has been a growing demand to reduce market prices and increase the flexibility in supply contracts, while the importance of ensuring “stable supply” reliability is gaining renewed prominence among buyers. Stable supply can be ensured in part through coordination and cooperation between suppliers and users. As the example of the European market shows, LNG importers in Asia may cooperate with one another in easing regulations on export destinations to be better prepared to deal with short supply situations.
3. The Asia-Pacific, European Continental, and the U.S./U.K markets will follow their own pricing systems, which may approximate one other but are unlikely to be standardized globally. As for the current Asia-Pacific pricing system, which is linked with the Japanese Crude Cocktail (JCC) and incorporates the “S curve” factor, minor revisions can be expected, such as changes in the reference oil price and the sensitivity to oil prices (the

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<sup>1</sup> This report is in line with the “Survey of the Development and Promotion of Natural Gas” commissioned by the Petroleum and Natural Gas Division of the Ministry of Economy, Trade and Industry (2004): “The Asia-Pacific and Atlantic LNG Markets” and “Changes in LNG Contract Conditions.”

degree of impact of oil price fluctuations, etc.). With oil prices hovering near record levels, the Western market is likely to take into account links to competitive fuel sources and adjustments associated with price fluctuations (S curve). The current Asia-Pacific pricing system, for that matter, deserves a certain amount of credit.

4. Japan's LNG industry, which created the world LNG market and has been playing a leading role in its development over the past three decades, is devising a range of strategies. Its approaches to the LNG value chain, for example, have expanded to include not only downstream operations but also middle and upstream operations (e.g., natural gas production, liquefaction and transportation), while becoming increasingly complex. At the same time, it appears poised to extend its commercial reach into Asian countries including China and India. Under these circumstances, more players entering the growing LNG market, increasingly diversified and complex transactions, and progress in deregulation are expected to offer new business opportunities to Japanese companies engaged in the LNG business.

### <Background>

#### (1) **Changes in the World LNG Market and Security of Supply**

The demand in the Atlantic market is increasing due to a surge in imports into the U.S. – which is strengthening the presence of Qatar in the world LNG market in terms of a bigger supplier. New contracts for LNG exports to the U.S. represent almost 60 million tons a year, of which only 8 million tons will be supposed to come from the Asia-Pacific region. Their impact on the Asia-Pacific LNG market, which is estimated at 84 million tons a year, will thus be rather limited for the time being (see Fig.1, Table 1 and Fig. 2)<sup>2</sup>.

In terms of the LNG supply routes from the Middle East (including Qatar) to each destination in the Atlantic market, it seems probable that the Suez Canal, the Strait of Gibraltar and the Cape of Good Hope will be bottlenecks in securing sea-lanes. As in the case of oil, therefore, the security of LNG supply needs to be examined from a new perspective.

In diversifying its supply sources (countries) over the long term, for example, Japan should reinforce its relationships with emerging LNG exporters including Russia and Iran as well as with other prospective exporters.

#### (2) **Increasing Importance of Regional Cooperation Among LNG Importers in Asia**

A surplus in LNG supply, if any, goes to the U.S. market (where spot prices remain high all year round) as long as there is a means of transportation, under current situation. Because of this, coupled with the supply shortage from Indonesia, the Asian LNG market is increasingly tight (see Fig. 3).

The present situation in the Asian natural gas market is that LNG supply through international PL is extremely limited and that production is hard to keep up with the growth in demand in the region; the market is therefore dependent on imports from other regions of the world as a form of LNG. Take-or-pay long-term contracts are thus essential in ensuring security of supply<sup>3</sup>. The lesson this time, however, is the importance of regional cooperation among importers when the actual delivery is not met with the contractual determined amount.

As this issue can be addressed through coordination and cooperation between suppliers and users, demolishing of the destination clause should be discussed with a priority. If this limitations work as a disincentive to prospective buyers, they will then act as a factor

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<sup>2</sup> This is not the case when emergency procurement takes place (like the recent case in Japan) or when the U.S. Henry Hub price takes a plunge.

<sup>3</sup> While the shortage is reportedly due to a failure in gas production, aging LNG facilities are also a concern – and should be seen as a warning about security of supply.

hampering the growth of the market (i.e., a disadvantage for sellers); they need to be examined from the broader perspective of promoting the LNG market as they may also work as a disincentive to both existing buyers, who plan to expand LNG purchasing, and new small-scale buyers, who are poised to make inroads into the market.

**(3) Future of the LNG Pricing System in the Asian Market**

The Asia-Pacific, European Continental, and the U.S./U.K markets will follow their own pricing systems, which may tend to approximate one another but are unlikely to be standardized globally. As for the current Asia-Pacific pricing system, which is linked with the Japanese Crude Cocktail (JCC), minor revisions can be expected, such as changes in the reference oil price and the sensitivity to oil prices (the degree of impact of oil price fluctuations, etc.).

On the other hand, there is a need to address the strong demand for lower prices. It is therefore recommended that a procurement consortium be established by not only power and gas companies (LNG buyers) but also with the participation of domestic upstream operators, as this would have the effect of maximizing lot sizes and enhancing purchasing power.

With natural gas prices remaining at record levels in the U.S. market for quite some time, buyers are beginning to call for stable prices, links to competitive fuel sources and adjustments to deal with price fluctuations (S curve). Thus the current Asia-Pacific pricing system deserves a certain amount of credit (see Fig. 4).

The majority of LNG trade will probably be based on long-term contracts in the Asian market, which, however, could be influenced significantly by the ups and downs in the U.S. market. This will also result in an increase in flexible transactions such as spot trading.

**(4) Development of New LNG Business by Japanese Companies**

An increase in the number of players of various backgrounds in the growing LNG market, increasingly diversified and complex transactions, and progress in deregulation are changing the LNG business of conventional players in Japan (traditional LNG buyers). At the same time, Japan's LNG industry, which created the world LNG market and has been playing a leading role in its development, is beginning to address the issues in the LNG market in a variety of ways.

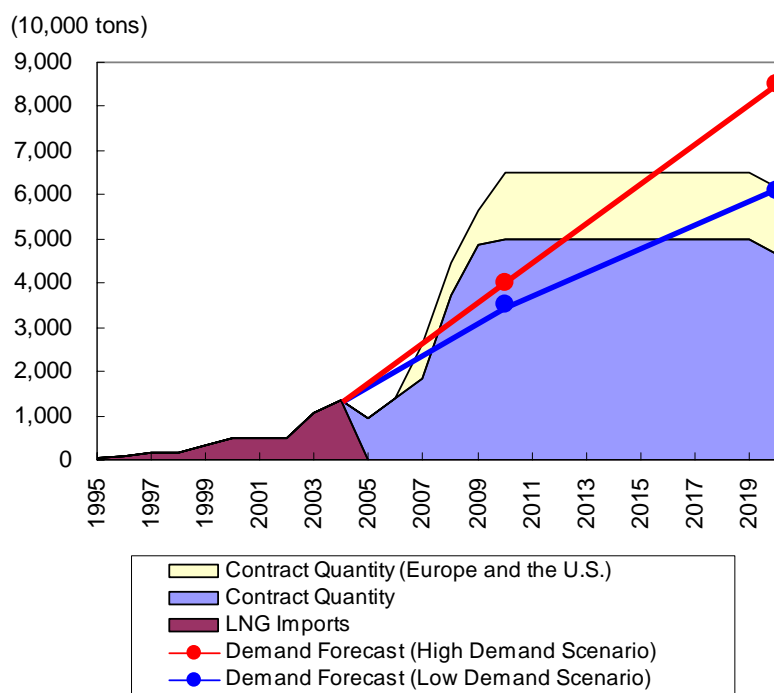
In going up into upstream operations (mining production and liquefaction of natural gas), development projects need to be explored with upstream operators and LPG-related companies (depending on the composition of gas), with the option of forming joint projects in mind.

Japan's LNG industry should offer technical assistance to prospective LNG importers in Asia (India, China, etc.), taking advantage of its expertise and experience in the LNG business accumulated over the past three decades. Specifically, it should take part in or launch gas and power generation projects in these areas. One such option is to participate in projects to construct for LNG import terminals in Asia, or to act as a foreign buyer to develop demand in the country it is operating in.

As far as LNG is concerned, the Japanese market still accounts for about 50% of the world market in a situation where demand is on the rise in the Atlantic area. Japanese buyers, therefore, continue to hold the key to ensuring security of LNG supply in the global marketplace. Accordingly, they should extend their reach into the growing overseas market to capture business opportunities.

<References>

Fig. 1 U.S. LNG Demand Forecast

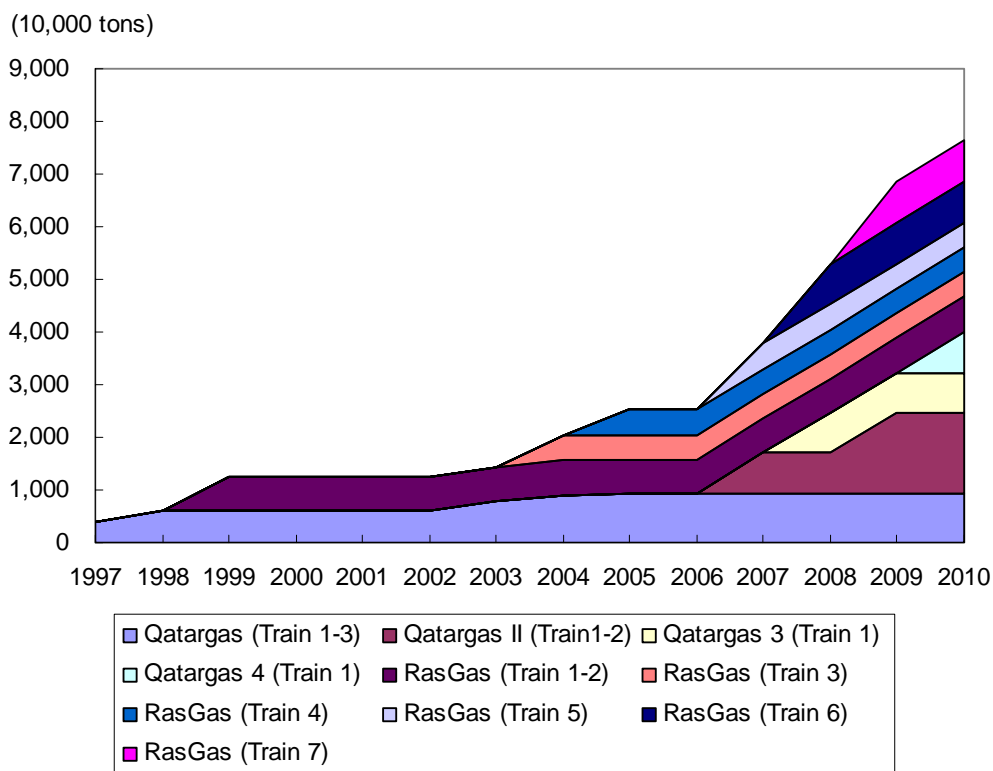


(Source) Websites of Cedigaz, Gas Strategies, and other companies

Table 1 New LNG Supply Contract with the U.S. (Source) Websites of each companies, etc.

Exporter	Project Name	Project Owners	Destination	Contract Period (Year)	Contract Quantity (10,000 tons/year)	Buyer
Nigeria	Nigeria LNG (Train 4-5)	NNPC, Shell, Total, ENI	The U.S.	2005-2025 (20 years)	110	Shell
			The U.S.	2005-2025 (20 years)	220	BG
	Nigeria LNG (Train 6)	NNPC, Shell, Total, ENI	Europe, The U.S.	2007-2027 (20 years)	90	Total
			Spain, The U.S., Mexico	2007-2027 (20 years)	140	Shell
Egypt	Egyptian LNG (Train 2)	EGAS, EGPC, BG, Petronas etc.	The U.S., Italy	2006~	360	BG
Equatorial Guinea	Alba LNG	Marathon, GEPetrol	The U.S.	2007-2024 (17 years)	340	BG
Norway	Snohvit	Petro, Statoil, Total, GdF etc.	The U.S.	2007~	175	Statoil
Russia	Sakhalin II	Shell, Mitsui & Co., Mitsubishi Corporation	Mexico, The U.S.	2008-2028 (20 years)	185	Shell
Qatar	RasGas (Train 6-7)	QP, ExxonMobil	The U.S.	2008-2033 (25 years)	1,560	ExxonMobil
	Qatargas II (Train 2)	QP, ExxonMobil, Total	Europe, The U.S.	2009-2034 (25 years)	520	Total
	Qatargas 3	QP, ConocoPhillips	The U.S.	2009~	750	ConocoPhillips
	Qatargas 4	QP, Shell	Europe, The U.S.	2010-2012~	780	Shell
Oman	Qalhat LNG	The Omani Government, Oman LNG etc.	The U.S.	2006-2021 (15 years)	80	Mitsubishi Corporation
Indonesia	Tangguh	BP, MI Berau, CNOOC etc.	Mexico, The U.S.	2008-2028 (20 years)	370	Sempra
Australia	Gorgon	ChevronTexaco, Shell, ExxonMobil	Mexico, The U.S.	2010~	250	Shell
Total					5,930	

Fig. 2 Incremental LNG Production in Qatar



Source: Websites of the parties concerned

Fig. 3 Supply Shortage from Indonesia

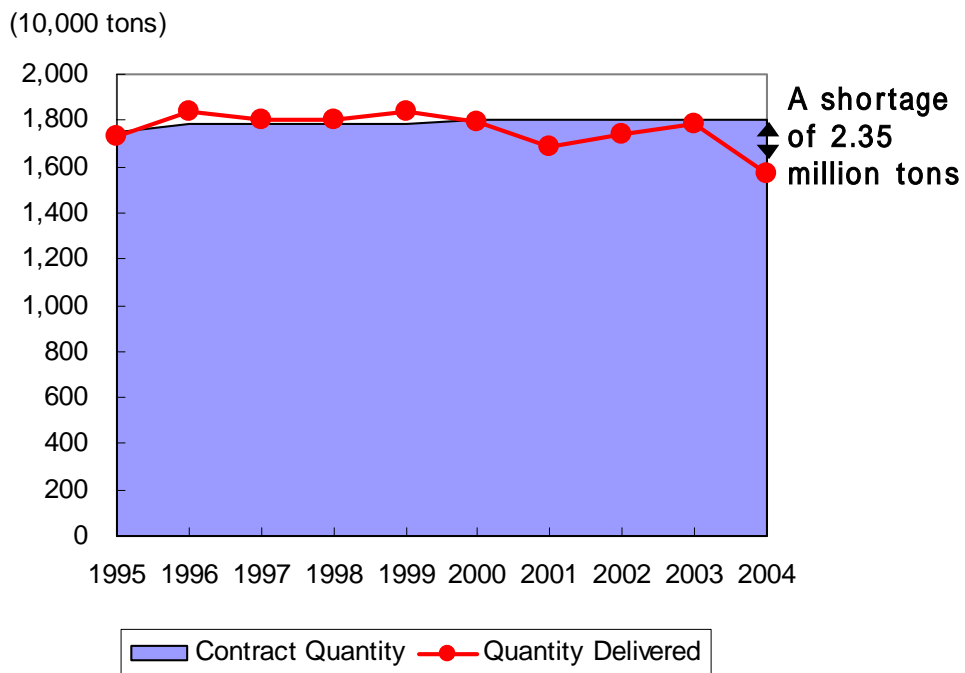
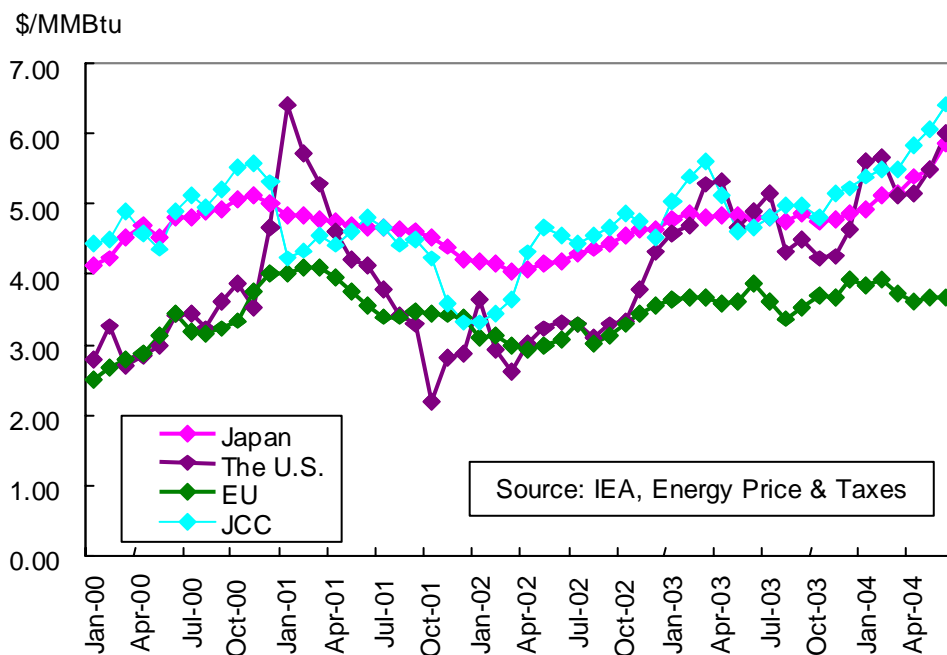


Fig. 4 LNG Prices



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