

The Japanese Gas Market and Its Contributions to Northeast Asia

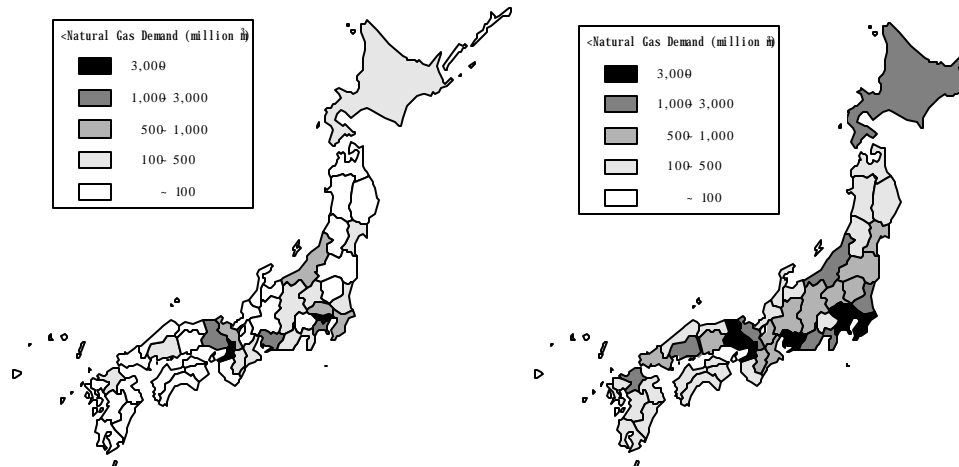
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INTRODUCTION

One of the most important options for Japan's energy policy in the twenty-first century is the promotion of natural gas utilization in parallel with the development of a nationwide trunkline as its basic infrastructure. From the latter half of the eighteenth century to the first half of the twentieth century, coal as a solid fuel played a leading role in the energy sector. In the latter half of the twentieth century, however, that role was taken over by oil as a liquid fuel. The twenty-first century could be described as the age of gaseous fuels. Some energy specialists say that natural gas will take the lead in the first half of this century and, after that, hydrogen fuel will follow. Under these circumstances, the nationwide trunkline can be seen as the basic energy infrastructure for transporting natural gas and eventually hydrogen.

However, in Japan, many gas utilities have monopolized their own regional supply areas, because the trunklines that connect each supply area have not been developed, nor has a comprehensive master plan been proposed. In short, Japan has a potential huge market but has not yet developed any large-scale gas transportation industry.

The development of a nationwide trunkline will expand the opportunities for natural gas utilization throughout the country (Figure 1). Currently, natural gas demands are concentrated in three major urban areas—Tokyo, Nagoya, and Kansai—where most LNG terminals are located, and in such regions as Niigata, which has indigenous gas reserves. The regional imbalance of gas pipeline density causes such limited distribution of demand. Therefore, it is necessary to expand opportunities for natural gas utilization and to create new wholesale and retail industries, including competitive markets, throughout the country. For these purposes, it is indispensable to develop effective means of transporting both vaporized gas and imported pipeline gas to each consuming area; the former will be supplied from LNG terminals and the latter from areas in eastern Russia, such



as Sakhalin, Irkutsk, and the Sakha Republic, where exports of natural gas are expected to start by 2010.

Figure 1. Distribution of natural gas demand in Japan in 1995 (left-hand map) and in 2020 (right-hand map)

Source: Mitsubishi Research Institute, Inc.

CHARACTERISTICS OF THE JAPANESE GAS MARKET

The characteristics of the present Japanese gas market can be summarized as follows:

- high price structure
- major role of LNG
- neighboring supply source
- poor pipeline infrastructure
- no integrated gas market
- progress of deregulation.

High Price Structure

As shown in Figure 2, gas prices in Japan are distinctly higher than those of the main OECD countries. They are three times higher for household use, two times for industrial use, and 1.2 to 1.5 times for power generation.

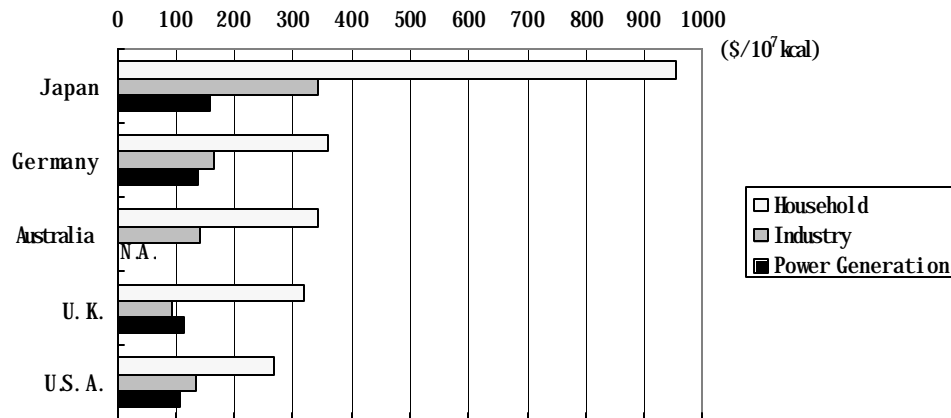


Figure 2. Natural gas prices in selected countries, 1997 (based on PPP price)

Source: OECD, *Energy Prices and Taxes*, 1999.

Major Role of LNG

Natural gas accounted for 13% of Japan's primary energy supply in 1999—a lower share than in the United States and Europe (Table 1).

Table 1. Shares of primary energy supply in Japan, Asia, the U.S. and Europe 1999 (%)

Area	Oil	Natural Gas	Coal	Nuclear Power	Other
Japan	51	13	18	16	2
Asian region	41	11	40	6	2
United States	40	25	25	9	1
Europe	42	22	19	14	3

Source: BP statistics.

Note: The Asian region includes Japan and Oceania.

Japan is a big importer of LNG, and LNG accounts for 96% of its total natural gas supply. The remaining 4% comes from domestic gas reserves. In 1998, 49.5 million tons of LNG were imported, 72% of which was used for electric power generation. However, these imports are directly consumed at the larger power plants in the coastal areas and are not yet supplied to local gas consumers through domestic pipelines.

Poor Pipeline Infrastructure

Of the remaining LNG imports, 27% is for city gas: 11% for household use, 4% for commercial use, 10% for industrial use, and 2% for other uses. The balance of 1% is used by the large-scale steel manufacturers through direct purchases (Figure 3).

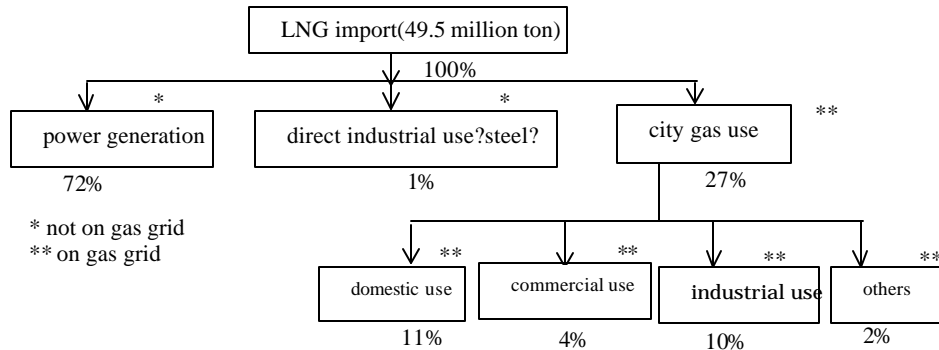


Figure 3. Consumption of LNG in Japan by end use, 1998

Neighboring Supply Source

LNG has been a major concern in terms of Japan's energy security. Although Japan has made every effort to reduce its heavy dependence on Middle East oil since the first energy crisis of 1973, it is still more than 85% dependent on the Middle East. From an energy security viewpoint, the urgent task is to shift primary energy consumption from oil to other sources. Natural gas is expected to contribute to the diversification of energy supply sources and a reduction of dependence on Middle East oil, since there are vast natural gas reserves in eastern Russia, especially Sakhalin, Irkutsk, and West Siberia, in addition to Southeast Asian countries.

An integrated international pipeline plan has been proposed, in which Russia, as a gas supplier, is connected with Japan, South Korea, and China, as gas consumers (Figure 4).

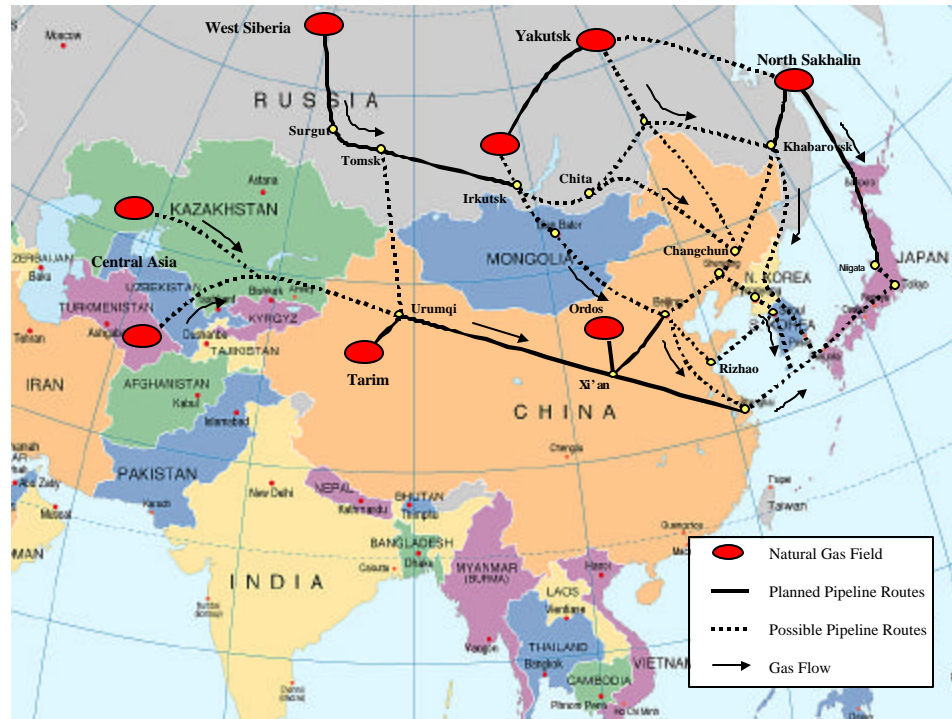


Figure 4. International pipeline network in Northeast Asia

Source: Northeast Asian Gas and Pipeline Forum (AGPF), "A Long-term Vision for a Natural Gas Trunkline in Northeast Asia," September 2000.

Although there are more than 20 LNG terminals in Japan at present, there is no pipeline to interconnect them. Natural gas is mainly supplied within the service area of each city gas company that imports LNG or buys indigenous natural gas. In short, Japan has not yet developed a system of LNG terminals and nationwide gas supply through long-distance pipeline connections.

No Integrated Gas Market

In Japan, there should be a gas market, but in its present state, the market is divided into many areas, each of which is covered by an independent electric or city gas utility. Therefore up to now, larger utilities have been purchasing LNG through long-term, take-or-pay contracts. In other words, Japan has not yet developed an integrated gas wholesale market and industry.

Progress of Deregulation

The Japanese government is now promoting liberalization of the energy industries. For the electric power and gas industries, partial deregulation was introduced in 2000, and discussions about further deregulation for the year 2003 have just been started (Table 2).

Table 2. Deregulation schedule of electric power and gas industries in Japan

Industry	In 2000	In 2003	After 2003
Electric power	regulated	partially deregulated	further deregulation
		? liberalization of extra high tension power ? transmission by third party	
Natural gas	regulated	partially deregulated	further deregulation
		? liberalization of large volume supply ? PA to the pipeline	

In the Japanese gas market, there are two current issues. The first is to construct trunklines and consequently to create a competitive gas wholesale market. The second is to promote further deregulation in the electric power and gas industries.