The Gas Industry in Japan

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The structure of the Japanese gas industry is characterized by the large number of distribution companies involved. As a result of limited reserves and geographical constraints, the gas production and transmission sectors have not been significantly developed.

Following deregulation in the US and UK, the process of liberalization began in the Japanese gas market in March 1995. As a result the gas supply market to large-volume users --those with minimum annual consumption of 2 million cubic meters-- was liberalized. To promote management efficiency, a new gas rate system based on existing total-cost analysis was introduced and guidelines for pipeline access were also published. Amendments to the Electricity Industry Law have resulted in partial liberalization of the wholesale electricity market, creating new opportunities for gas companies.

These and other regulatory changes will require some reorganization of Japanese gas industry structure and gas company management styles.
THE GAS INDUSTRY IN JAPAN

Hideo Taki

Osaka Gas Co., Ltd.
Chapter 1: Energy demand and supply

Demand

First, I would like to review recent trends in Japan's energy supply and demand. The Japanese economy has made a moderate recovery since it bottom in October 1993. Under these improved conditions, the energy demand for 1994 showed a high growth reflecting high-level productive activities and the record-breaking hot summer even though GDP still remained at low levels.

The total primary energy supply in 1994 recorded a high growth rate of 4.9%, especially true for nuclear power (+8.0%) and oil (+6.3%). This is the second highest growth rate after that of 1988 which was recorded at 5.5%. In fact since 1988 there has been a gradual decline in annual growth rate. Natural gas consumption increased by about 6.1%. (Refer to Table 1) As a result, the share of oil is still 56% of the total.

<table>
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<th>Fiscal year</th>
<th>86/73</th>
<th>87</th>
<th>88</th>
<th>89</th>
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<td>4.9</td>
<td>5.5</td>
<td>3.6</td>
<td>4.2</td>
<td>2.8</td>
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<td>4.4</td>
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<td>5.7</td>
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<td>4.6</td>
<td>11.6</td>
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Source: Sogo Enerugi Tokei (Energy Statistics) (1995.3)

The final energy consumption also showed a 3.7% growth compared with that of the previous year. About 50% of this growth was affected by the increased energy use in the industrial sector. The transportation sector and residential/commercial sectors
contributed 30% and 20%, respectively. Although both electricity (+6.7%) and oil (+3.7%) consumption increased, city gas remained at a very low-level of growth (+1.6%). This is partly because of the record-breaking hot summer and drought, the influence of the Hanshin-Awaji earthquake of January 1995 and very high growth (+8.0%) in 1993. (Refer to Table 2)

Table 2: Final Energy Consumption (annual growth)

<table>
<thead>
<tr>
<th>Fiscal year</th>
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<th>87</th>
<th>88</th>
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<td>2.3</td>
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<td>4.7</td>
</tr>
<tr>
<td>Oil</td>
<td>-1.8</td>
<td>4.2</td>
<td>5.8</td>
<td>2.8</td>
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<td>0.3</td>
<td>3.4</td>
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<tr>
<td>Electricity</td>
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<td>1.0</td>
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<tr>
<td>City gas</td>
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<td>5.4</td>
<td>8.0</td>
<td>1.6</td>
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</table>

Source: Sogo Enerugi Tokei (Energy Statistics) (1995.3)

The share of city gas in the final energy consumption figures accounts for only 5.5% in 1994 while oil and electricity accounts for 61% and 21%, respectively. Because of this small share and poor development of gas pipeline networks, the Japanese gas industry is still in a pre-matured stage.

City gas demand

The volume of gas sales is steadily increasing and recorded 19 bcm in 1993 which is 8.0% increase compared with that of in 1992. This is strongly supported by continuous
growth in the industrial sector which has an annual increase in the volume of sales which usually exceeds 10%. Although the growth rate has became less rapid, it still maintained a high 8.4% rate growth thanks to new demand represented by the introduction of cogeneration systems. City gas use in the residential sector, on the other hand, decreased by 6.6%. Osaka Gas experienced a 5 to 10% reduction in gas sales due to the effects of the Hanshin-Awaji earthquake.

However, partly due to the Hanshin-Awaji earthquake which hit the Kansai area in January 1995 and partly due to extremely hot weather in the summer of 1994, gas sales increased by only 1.6% in the fiscal year of 1994.

For reasons of energy-efficiency, and because of the restrictions on the electricity supply and difficulty of building large new power plant near centers of demand, the construction of small power generation plants with gas-fired cogeneration is expected. Gas utilities will pay more attention to the development of cogeneration systems, especially for commercial customers.

Gas air-conditioning systems contribute to the efficient operation of gas supply facilities by creating new off-peak demand and, as a result, leveling of annual and daily load curves. They also help to level out electricity demand peaks.

In the residential market, where gas has had an excellent reputation as an economical and convenient fuel for household facilities, especially for cooking, it has started to compete seriously with electricity. The share of gas use in the market which has been decreasing year by year, accounting for less than 50% of the total since 1990. On the other hand,
the percentage of gas use in the industrial sector exceeds 30% from a base of only 5.8% in 1970. (Refer to Figure 1)

The development of vehicles running on natural gas is still at a preliminary stage, with only about 250 vehicles and 6 filling stations throughout Japan as of January 1994. However, with the increasing concern for environmental protection, and keen support from both government and the gas industry, 200,000 natural gas vehicles are expected to be in use by 2000.

Figure 1: Gas Sales by Markets

According to the Long-term Energy Supply/Demand Outlook (LTESDO) of June 1994, gas consumption is expected to rise by an annual average of 4.3% to the year 2000, and from then until 2010 by 3.6% per year.
Natural gas demand

Approximately 55-56 bcm of natural gas was consumed in 1993: about 75% of this was burned for power generation companies and the remaining 25% was used as a feedstock for city gas. Natural gas accounted for only 11% of primary energy consumption in 1994. This natural gas is currently only available in and around major cities like Tokyo, Osaka, and Nagoya, where LNG is unloaded. Its share has increased steadily from only 1.5% in 1973, and natural gas is widely recognized as one of the principal alternative fuels to oil, especially after the Gulf crisis of 1990. In May 1992 the Advisory Committee for Energy to MITI (the Ministry of International Trade and Industry) produced an interim report. This report commented on the extensive use of natural gas as a principal energy source.

According to the LTESDO of June 1990, natural gas demand was forecast to increase from 46 bcm in 1988 to 63 bcm in 2000 and 79 bcm in 2010. This LTESDO was revised in 1994 and forecasts for the years 2000 and 2010 have been increased. Predictions are now for approximately 73 bcm in 2000 and 80-83 bcm in 2010.

One thing to note here is that the demand for natural gas for power generation is forecast to level off between the years 2000 and 2010. This is because of the unfavorable environment which is expected for developing new LNG sources, the shifting back to other fuels due to the higher prices of natural gas, and the higher efficiency of gas-fired combined cycle power plants with lower gas consumption. On the other hand, the demand for natural gas for city gas distribution is forecast to grow steadily. The outlook indicates a 3.7% annual growth through the year 2000, and a 3% growth between 2000 and 2010.
According to the outlook, the total primary energy supply is expected to grow at about 1% annually through the year 2010. Figure 2 shows an expected balance of primary energy in the outlook. A major increase in nuclear power generation is expected after 2000. It is based on the assumption that difficulties faced in construction of nuclear power plants will ease after 2000 and that the availability factor will be increased by shorter maintenance time.

![Figure 2: Balance of Primary Energy](image)

Chapter 2: The history and structure of the gas industry

The history of the development of gas utilities

Natural gas was discovered in Japan before 1645 and used locally for residential purposes only. The manufacture of gas for lighting began in 1872. However, because of limited reserves and geographical constraints (Japan being a group of largely mountainous islands), the gas production and transmission sectors were not significantly developed. Instead, gas was both manufactured and sold locally to densely populated areas in the center of towns. In other words, it was a business concerned with carrying feedstock to the area of consumption, manufacturing gas and distributing it to the local consumers.

There is a sharp contrast between the histories of the gas and electricity businesses. The state-owned Nihon Hatsu-soden company, which dealt with electrical power generation and transmission, was established during the Second World War, and was divided into nine power generation companies after the war. The period of state ownership saw the establishment of electricity transmission grids extending from the north to south of the country.

The structure of the gas industry

Under the Gas Utility Industry Law, there are two gas businesses; the general gas business (the city gas business) and the simplified gas business (the gas business for small residential areas using simple gas production facilities). There are also liquefied petroleum gas suppliers whose customers consist principally of domestic users and some small businesses.

The structure of Japanese gas industry is characterized by the large number of distribution companies. As of March 1995 there were 243 gas utility companies in Japan, of which
172 were private companies and the remainder were operated by municipalities. Each company has its own monopoly supply area, but there are very few interconnecting pipelines in between. More than 23 million customers use gas supplied by all the gas supply companies together. The major gas utilities, Tokyo Gas, Osaka Gas, and Toho Gas accounted for more than 75% of the total gas sales and supply about 65% of customers.

The calorific value and the specific gravity of gas supplies vary from region to region and as a result there are 13 different kinds of gas in Japan. This is not only inconvenient for consumers, who need to adapt their gas appliances when they move between areas; it also means that the gas industry cannot benefit from economies of scale in respect to imported gas. The integration of gas types is therefore a high priority task for the Japanese gas utilities.

Feedstocks

Until the mid-1950s coal had been the main feedstock for gas manufacturing; it was replaced by oil and then by natural gas. About 95% of natural gas is imported in the form of Liquefied Natural Gas (LNG) and only 5% is domestically produced. As of 1992 a total of 110 city gas utilities were using natural gas (including both LNG and indigenous natural gas). Forty-five companies use LNG and 80 companies (including 15 companies who use LNG as well) use indigenous natural gas. Natural gas accounts for 78% of gas feedstocks. The three major gas utilities have already finished conversion to natural gas within their service area. (Refer to Figure 3)

Indigenous natural gas is produced in the northern parts of Japan's main island Honshu,
Figure 3: Gas Supply by Gas Utility Companies in Japan

Source: Advisory Committee for Energy, Interim Report, May 1992
for instance in the Niigata and Akita prefectures, but owing to poor geology the recoverable reserves are not significant. In 1992, Japan imported about 96% of its total natural gas consumption.

Sources

Natural gas is imported in the form of LNG by a consortium of electricity and city gas Utilities. Japan is the largest LNG importer in the world and has long experience of the business. LNG was first imported from Alaska in 1969 by the Tokyo Electric Power Company and Tokyo Gas Company.

Sources of LNG are now diversified between mainly Pacific basin countries such as Alaska, Australia, Brunei, Indonesia and Malaysia. Indonesia is the largest supplier to Japan, accounting for 47% of imports in 1992. The Asia-Pacific region is rich in natural gas reserves and there have not been any significant political trade disputes so far. As a result, there have been no supply problems with LNG deliveries to Japan.

According to the recent demand and supply forecasts, existing contracts will be able to meet increasing demand in the Asia-Pacific region until 2000. However, after 2010, many existing commercially attractive natural gas fields are likely to be depleted and importers will be forced to gain access to more remote and expensive gas fields, in regions that are potentially politically unstable. In such a situation, importers wishing to acquire favorable trading partners may need to take the initiative in locating future sources of supply.
Security of gas supply

Natural gas trade by pipeline and LNG have different advantages and disadvantages, and a comparison in terms of security of supply is not a simple matter. Japan has paid a great deal of attention to various aspect of LNG security: technical (safety design of LNG receiving terminals, etc.), political (contracts with politically stable countries) and commercial (long-term contracts).

Importing natural gas as LNG itself assures security of supply because of the nature of LNG contracts, whereby, for instance, specific sellers and buyers are directly linked and a huge investment is needed.

In addition to the diversification of import sources and contracts, Japanese companies consider that the following options would improve security of supply:

- Technical and financial cooperation between sellers and buyers;
- Development of gas storage;
- Arrangement of gas interchange between domestic utilities;
- Development of a national transmission pipeline;
- Participation in upstream businesses.

Studies have been carried out on measures to counter both short-term and long-term interruption of supply and on the interchange of gas between domestic utilities. Gas utilities are engaged in the development and manufacture of Substitute Natural Gas (SNG) in order to diversify gas feedstocks and to cope with unusual demand fluctuations.

Recently, Osaka Gas Company, one of the major city gas utilities, has participated in
upstream investment. For example, it has obtained concession rights for natural gas exploration and production in Indonesia, and established a company building and operating LNG tankers for its own use.

Transmission pipelines

Natural gas use in Japan started as a fuel for power generation and a gas-making feedstock. In addition to the geographical constraints, there was no need for large-scale gas transmission pipelines to connect gas distribution companies because of the differences in gas types that they manufacture.

Although natural gas pipelines do exist, they do not extend very far. The exception is the Tokyo ('Teiseki') pipeline, which was completed in 1962, and is about 300 km in length. (Refer to Figure 2) It carries indigenous natural gas produced in Niigata prefecture to 32 gas utilities, and is owned by the Teikoku Oil Company, one of the major indigenous natural gas and oil producers and a gas wholesale company.

The Advisory Committee for Energy pointed out the need to improve the gas supply infrastructure in May 1992. The Committee recommended the construction of national gas transmission pipelines, emphasizing, as a first stage, the need for a transmission pipeline connecting three major cities (Tokyo, Nagoya and Osaka), the territories of the three major gas utility companies, and the LNG terminals which they operate.

The development of such a gas transmission pipeline would enable delivery of natural gas to the local consumers who were previously unable to use gas owing to the lack of infrastructure. It will also help to alleviate problems of electricity supply by supplying
fuel gas for on-site power generation plants. As a result it will provide extensive opportunities for increased natural gas use.

The Japan Gas Association (JGA) announced its plan on national pipelines in March 1993. It entailed the construction of a 1,200 km pipeline from Tokyo to Osaka through Nagoya, starting in 2000 and to be completed by 2010, requiring an investment of about US$9 billion. According to the report by JGA, therefore, extending the use of natural gas will go a long way towards achieving the country's energy policy goals in the context of environmental protection and efficient use of energy. JGA implied that other utilities and public organizations also needed to participate in the construction of this infrastructure, under the initiative of gas utilities.

Participation in upstream businesses

In Japan participation by distribution companies in the gas production business was not common. Transmission did not exist as a separate business. There has as yet been no participation by gas distribution companies in upstream business. As well as weighing up the possible risks and returns, Japanese gas distribution companies always worry about whether participation in the upstream business is acceptable, given that they are public utilities. However, involvement in the upstream and transportation businesses will provide these companies with useful information to ensure security of supply of gas feedstock and also to develop management skills with the aid of experienced partners.

Safety concerns

Japanese gas utilities have worked hard to prevent disruption of gas supply by earthquakes through the development of sophisticated engineering and information technologies in the
distribution system. In order to reassure the public about the safety of gas, several systems and appliances have been developed that will absorb shocks and movements caused by earthquakes and prevent accidents even when consumers are at fault.

Activities of gas utilities
The activities of the gas utility company extend from the import and regasification of LNG, manufacture and distribution of gas and the maintenance of gas distribution facilities and appliances, to various services associated with gas use. Their efforts contribute to the creation of more comfortable communities and private life, and in the case of some major companies range from recommendations for energy efficiency in urban developments, to advising potential consumers on home improvement schemes designed to achieve a better quality of life.
Chapter 3: Gas industry regulation

General

The regulation to the gas industry dates back from the original Gas Utility Industry Law in 1923. The Japanese gas industry is regulated by the Gas Utility Industry Law. This law gives MITI a broad authority to supervise and regulate the commencement of a gas utility business, the suspension and closure of its operations, the fixing of gas tariffs, the terms and conditions of gas supply, and so on. Under this law, gas utility companies have been granted a monopoly position in their specified service area. In order to avoid the undesirable conditions of a monopoly and to ensure the continuous stability of businesses, the law regulates the structure of the industry by entry regulation and the prices. Its basic framework is in common with that of in the industries which are assured a local monopoly.

In spite of the major differences between gas utilities in the scale of business, demand, supply and management structure, the regulation is implemented uniform basis. Government has made it clear that the Gas Utility Industry Law is aimed at minimum level regulation and that the law should be implemented for medium and small companies in a simplified manner.

City gas business is locally oriented and supplies indispensable energy for people's daily lives. Its scale of business is determined by the level of development of the area and its geographical extension. Whatever the size of its business, it is essential to the people of the area. The current structure of the industry and the number of companies are spontaneous results of operating gas businesses in ways that are an efficient fit for market conditions at each area level. Gas businesses are established according to the characteristics of demand. As urbanized areas of cities are not connected each other in
Japan, it is natural that the number of gas utility companies increases accordingly. Compared with the electricity industry, the gas industry is smaller in the scale but greater number.

Pricing

Prices charged by Japanese gas companies to their customers have so far been worked out and approved by MITI on the basis of adding a rate of return over total operating costs which include feedstock, labor, operation and maintenance. This system of a full analysis of costs and expenses was used until the end of December 1995.

Compared with other developed countries, gas prices in Japan are seen by many to be high. Table 3 shows gas prices for residential consumers in major countries. Figures are converted relative to exchange rates and purchasing power. The monthly bill of a Japanese household consuming 50 m3 (550 Mcal) per month is approximately double that of an equivalent household in the US. This is because Japan’s gas industry is overwhelmingly dependent upon imports, the manufacturing process is quite expensive, and storage costs are high. Therefore, to make comparisons with gas prices in other developed countries is misleading. So, instead of using international yard sticks, MITI has decided to concentrate on creating Japanese comparisons.

Japanese gas tariffs use two systems; one is a general tariff and the other is a load-managing contract tariff. The general tariff is charged to general customers when gas companies supply gas to groups of customers with different loads and it is clear that the total load balance is improved by increasing the percentage of better demand. The load-managing contract tariff system is operated in order to reduce gas costs by developing a large demand with further better load, flattening the potential load fluctuation as much as
There is a significant difference in the level of costs and prices between gas utilities in Japan. They are due to the difference of supply structure such as the demand structure, source materials for gas feedstock and weak pressure to further competition. This is because the degree of competition in the residential market which medium or small gas companies rely on more is not as severe as those in the industrial and commercial market. It is necessary that regulation systems be established which will encourage further competition on medium and small gas companies.

<table>
<thead>
<tr>
<th>Table 3: Comparison of gas prices (residential use) (Yen/m3)</th>
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<td>Relative to:</td>
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<td>Exch. rates (94.9 Ave.)</td>
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<td>Purch. power (OECD93Ave)</td>
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Gas prices represent prices per m3 of a household consuming 50m3 per month
Companies referred: Tokyo Gas(Japan), Brooklyn Union(US), British Gas(UK), Hamburg Gas(Germany), Gaz de France(France)
Source: Advisory Committee for Energy, Interim Report, 1992
The Regulation of associated businesses (Associated business : business other than gas business run by gas utilities)

So far, the Japanese gas industry has, in the main, focused on a single business sphere - gas distribution. This is because gas utilities have been regulated and limited to business in this sector alone. Under the Gas Utility Industry Law, utilities have to receive authorization from MITI when they want to run businesses other than gas businesses.

However, there are a few exceptions to this rule. These exceptions allow gas utilities to operate businesses such as those which sell the by-products of gas manufacturing, gas meter repair and maintenance, and the selling gas of appliances, all without the need for MITI authorization. This is because these businesses are seen as having a close relationship with the gas business and therefore allowing gas utilities to operate in these areas contributes to sound management. As gas utilities are not regulated in their investment in subsidiary companies, they run several associated businesses other than gas business outside of the Gas Utility Industry Law. These businesses include selling of gas appliances, related gas piping work, building management, the operation of restaurants, development of computer software, and real estate businesses.
Chapter 4: Deregulation in the gas and the electricity industries

Deregulation in the gas supply to large-volume users

The central issue in the course of the revision of the law was the deregulation in the gas supply to large-volume users. Recent environmental restrictions and technological innovations have fueled demand for city gas by large-volume users in the industrial and commercial sectors (This share of the total gas sales rose from 34% in 1972 to 52% in 1992.) Large-volume users are generally in a position to easily switch to other fuels such as heavy oil and LPG (Liquefied Petroleum Gas) and have the power to negotiate price with gas suppliers. As such, they seek supply and rate setting conditions that are in line with other fuel suppliers. Specifically, they demand the right to negotiate rates and receive supplies outside the service area.

Taking into account such developments, the Urban Heat and Energy Subcommittee of the Advisory Committee for Energy to MITI compiled a report including a proposal for deregulation of gas supply for industrial customers. MITI prepared a draft amendment of the Gas Utility Industry Law for the ordinary session of the Diet in Spring 1994. An amendment to the Gas Utility Industry Law was passed, and came into effect in March 1995.

Generally speaking, under the previous law, gas companies were only allowed to supply gas to consumers, large scale or not, within their service area and at tariff levels authorized by MITI. Potential users outside these service area were not able to use gas. Further restrictions meant that these large users were not generally allowed to buy gas from any company other than the authorized gas company.
Major changes have taken place which mean that the gas company is able to offer its own tariff levels for supplying large users within its service area. This company is also able to supply large (industrial) users outside its service area and again can propose its own prices. Another major change is that, for the first time, a non-gas company is able to supply gas to large users in any area and on a non-regulated price basis. This means that a franchise of utility monopoly may disappear. In other words, gas utility companies are free to sell to any consumer and in turn they are at risk of losing their own consumers to competitors, since consumers are free to select their suppliers as they wish.

While reviewing the regulation on gas supply to large users, various challenges emerged which prevented the gas industry from drafting unified proposals. For example, what should the threshold be for large users? As there are 243 gas utilities in Japan, it was not easy to reach an agreement with all the conflicting interests between large and medium to small gas utilities.

Eventually, it was defined as those using more than 2 million cubic meters annually. About 430 consumers meet this threshold at present, comprising about 21% of the total gas consumption in Japan. This threshold was originally proposed at one million cubic meters but there was a strong opposition from competing fuel industries, especially LPG dealers, who were afraid of losing their market share.

By establishing flexible tariff setting taking account of conditions of gas use, it is generally thought that both large-users and small users will benefit. According to the Urban Heat and Energy Subcommittee of the Advisory Committee for Energy, large industrial users were thought to have more energy options. Small users were thought to benefit indirectly
through lower unit costs per demand through the economy of scale resulting from expanded demand from industrial users. Competition with other fuels by deregulation in large-users market was expected to encourage gas companies to make efforts for more efficient management and as a result bring total unit cost reduction.

On the other hand, there was a fear that the tariffs of large users might be set at the risk of a negative effect on small users. In order to ensure that there is no adverse impact on the small volume users, in this respect, the revised Gas Utility Industry Law required the following procedures:

a: Large- and small-volume users must be clearly demarcated and managed accordingly in the accounting process.

b: Rate revisions on the small-volume users are not accepted to compensate for deterioration in the large-volume user’s sector.

c: Each fiscal year, MITI assess the accounts of large-volume demand, and examine the results to see whether the gap between projected and actual demand is not too large.

d: Supplies to large-volume users outside the service area needs to be authorized by MITI.

The Urban Heat and Energy Subcommittee of the Advisory Committee for Energy to MITI also pointed out that small users would not be in a position that they can easily change fuels and that they do not have the power to negotiate with gas utility companies. The Subcommittee, therefore, thought that it was necessary to protect small users by defining gas utilities’ service areas with supply obligation and tariff
regulation. As a result, government approval is still necessary for any gas supply to medium and small users across the border of a gas company's existing service area. This is because the government has to ensure that local gas companies maintain their social obligations and that the interest of medium and small users within the service area should not be harmed by the deregulation in the large user supply area.

This deregulation will make natural gas available to more users, in line with national energy policy of Japan.

New gas rate system
In launching the reform review process in 1994, the Economic Planning Agency pointed out that Japanese utility companies charge prices which are seen by many as too high, at least when compared to prices elsewhere in the world. With the progressive appreciation of the Yen, public interests in ways of tariff setting for public services and lower gas prices increased. Under these circumstances, the Urban Heat and Energy Subcommittee of the Advisory Committee for Energy to MITI have discussed several issues on gas related to utility tariffs since October 1994. Several possibilities for changing the system for price setting have been examined. Three possible candidates were considered: the 'price cap', the 'yardstick', and performance-based regulation (PBR). The interim report of the Subcommittee recommending the introduction of a new gas rate system which sets a target for efficient management and a so-called Yardstick-type assessment. This was published in July 1995.

Following a framework of a new rate system, comprehensive discussions have been taken
place. The new gas rate system was introduced as of January 1996, which was intended to further promote increased management efficiency. Management efficiency is voluntarily initiated and pursued by individual gas utilities. Based on the existing total-cost analysis, the new system incorporates the following factors:

a: Gas companies declare their own targets for making their operations more efficient and institute a process for clarifying these targets to customers.  
b: MITI conducts reasonable evaluations to ensure that these targets lead to appropriate tariff levels, and then these targets will be reflected in the tariff setting process. The evaluations are based on a yardstick approach and consists of the following two steps.

1st step: individual review -on management plans and performance
2nd step: comparative review -by grouping similar companies

c: Introduction of the purchased gas cost adjustment clause.

That is, gas rates to be applied under the new system will be reviewed not only by a conventional individual evaluation but also by a ‘Yardstick’ approach in which a comparative review is conducted among companies with similar characteristics. Prior to the comparison, 243 gas utilities are categorized into several groups according to their similarity for evaluation purposes and the different target ranges which are to be established. The similarities are judged by such factors as company size, form of management (private or public company), and raw material sources (LNG or
manufactured gas) were taken into consideration.

Through comparative review among the companies in the same group, efficiency improvement efforts are evaluated, and according to the results, different degrees of rate modification are granted to individual companies. This is expected to promote indirect competition among companies.

After a great deal of discussion, 243 gas companies were divided into 16 groups. Groups can be regrouped if necessary.

**Annual evaluation**
In order to verify the efforts at efficiency improvement, companies are required to make an annual evaluation on the financial status and degree of efficiency improvement, and the results will be published.

**Purchased gas cost adjustment clause**
A purchased gas cost adjustment clause has been introduced to all the rate classes including the residential rate in order to directly reflect to the rates in the fluctuations of gas costs caused by the changes in exchange rate and crude oil prices.

New gas tariffs were proposed by 8 gas companies and evaluated by MITI based on the new system. MITI required a 2.02% cut in the average from the previous tariff levels while the proposed one from gas companies was a 1.25% cut in the average from the previous one. Some companies requested a price rise, but only one company received a price increase approval as a result of the evaluation. The new rate of return was modified to 5.34% from
the existing 7.2%.

Pipeline access
A guideline for pipeline access was published in July 1995. Following the report of the Urban and Heat Energy Committee of the Advisory Committee for Energy to MITI recommending a deregulation of entry into the large industrial users market in January 1994. The guideline was published to promote pipeline access so long as it does not prevent the fulfillment of supply obligation of gas utilities. This transportation service is to encourage the participation of new entrants in the large user market. Unlike in the US and UK, pipeline network development in Japan has been very limited and most of the pipelines are for distribution purposes. Therefore, the guideline only stipulates some basic principles that are considered to be necessary to ensure transparency in contract procedures and not to prevent new entrants from participating in the market.

Gas is transported from plants to users by decreasing supply pressures at pressure regulator stations. Pipelines networks are so well accommodated as to meet gas pressures. As gas distribution pipelines in which gas is carried by low pressure are not suitable for gas transit in terms of excess capacity and that potential large users are expected to receive gas supply by medium pressure, pipelines with higher than the level of medium pressure are included in the possible facilities. The transportation service is not obligated to gas utilities, but contracted under negotiation. This service, when it is implemented, is categorized in the Gas Utility Industry Law as an associated business.

Deregulation in the electricity industry
What is happening in the electricity industry? Several problems have emerged in the
electricity supply system in Japan and they required more flexible electricity markets. As a result, an amendment to the Electricity Industry Law was passed and came into effect in January 1996.

Major problems are as follows:

Electricity demand has been and is expected to grow in future, especially in the residential market. The largest demand for growth will take place in the air-conditioning market in summer. It will make the summer peak of electricity use sharper and the load factor worse. The lead time required for the construction of large power plants is becoming longer and the locations tend to be further away from areas of consumption. The difference of electricity prices between Japan and other developed countries has also drawn much public attention.

The report of the Urban and Heat Energy Committee of the Advisory Committee for Energy to MITI on electricity issues reflected the above problems and recommended an introduction of further competition into the electricity market, especially into the power generation sector. It recommended the establishment of a wholesale electricity market through extended use of cogeneration systems, fuel cells and solar powers. Direct supply to users from non-utility generators were also recommended.

Firstly this abolished the complicated licensing procedures and demanding conditions so far required when an IPP (Independent Power Producer) wants to sell electricity to a local electricity company. In addition steel, oil, chemical and other industrial companies can sell electricity to their local electricity company. This means the creation of new opportunities for gas companies because a significant part of these IPPs are expected to be
fueled by gas.

Further changes mean that within limited areas, non-utility generators can enter the electricity retailing business if they have government approval. A typical example is an urban area which is being developed. Here, a private company can install cogeneration plants, and then supply electricity directly to end users. These cogeneration plants are also able to supply thermal energy for heating and cooling which can be provided to the entire area. Since a cogeneration plant generates thermal energy together with electricity, its total energy efficiency is as high as 80%.

One of the purposes of the deregulation in the electricity industry is to promote this type of highly efficient energy supply project, and the conditions for market entry by non-utility generators are expected to be minimal.

Chapter 5: Concluding remarks

As I described before, the Japanese gas industry is characterized by three major and a large number of small scale gas distribution companies. Compared with many gas industries in the US and Western Europe, it is about to enter a new phase of transition and changes from local supply monopoly. As in other countries, deregulation will lead to changes in industry structure and management styles in each gas company. Natural gas used to be considered merely as an oil substitute in the national energy policy. However, because of its environmental advantages and high efficiency, it is now expected to play a greater role as one of the Japan's principal energy sources. The gas industry will have to consider, in this context, many important issues such as the contribution to a stable gas supply and demand balance in Asia, the development of new gas supply sources, new types of LNG trade, and gas import by pipelines.