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GASEX2006 Country Report  
- City Gas Industry in Japan -

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This report summarizes Japan's city gas industry according to the following three topics:

1. Japan's National Energy Policies
2. Current Situation and Challenges of Japan's City Gas Industry
3. Countermeasures by City Gas Utilities

1. Japan's National Energy Policies

(1) Current energy situation

a) Soaring energy prices

The structure of the world's energy supply and demand is changing. It is pointed out that a rapid increase in energy demand in fast-growing Asian countries could tighten its supply in the world.

There are an increasing number of global factors that may cause turmoil in the energy market such as political instability in the Middle East typified by the war against Iraq, the nuclear development issue in Iran, and the threat of terrorism.

Due to such factors, crude oil prices are soaring. And since LNG bound for East Asia closely reflects crude oil prices, the price of LNG is also showing a rising trend.

b) Response to the Kyoto Protocol

From 2008 to 2012, Japan is obligated to reduce its greenhouse gas (GHG) emissions as promised under the Kyoto Protocol by 6% relative to 1990, the standard year. Nevertheless, carbon dioxide (CO<sub>2</sub>) emissions are rising due mainly to the increases of

new office buildings, electrical appliances such as computers, and so on in the business, residential and transportation sectors.

Japan has to reduce its emissions of GHGs by 14% including actual emission increases, and this issue has become urgent.

## (2) Current national energy policies in Japan

In response to this situation, Japan is establishing new national energy policies.

At a meeting in June 2006, the Cabinet decided “the New National Energy Strategy.” This strategy was established with reference to other countries’ – such as the United States’- reviews of their existing energy strategies. It is a long-term strategy covering until 2030.

The Japanese government also intends to review “the Basic Plan for Energy Supply and Demand” in October 2006. This is a medium-term plan covering 10 years and is drawn up every three years by the national government based on the law.

These policies share the same two objectives:

- a) Establishment of energy security
- b) Promotion of energy savings

These two issues are high-priority for Japan, which depends on imports for most of its energy needs.

## (3) Importance of natural gas

Natural gas reserves are widespread in various regions not only in the Middle East, and natural gas has lowest GHG emissions among other fossil fuels. Japan mainly imports LNG from Asia-Pacific region and does not much depend on Middle East. Therefore, Japan’s national energy policies rank natural gas as very important energy for Japan.

According to “the Long-Term Energy Demand and Supply Outlook,” released by the Japanese government in March 2005, natural gas is expected to increase its share from 14% in Y2000 to 18% in Y2030 – standard case, while oil and coal decrease their shares from 47 to 38%, and from 18 to 17% respectively.

Japan's city gas industry is trying to create a best mix of energy by promoting natural gas which is environmentally friendly and can be stably supplied. This will strengthen energy security and energy saving, which are important to Japan's national energy policies.

## 2. Current Situation and Challenges of Japan's City Gas Industry

### (1) Market trend

The sales volume of city gas (preliminary figures) in \*FY 2005 was 32.5 billion m<sup>3</sup>, at the result of consecutive increasing for 28 years. (\*FY: from April 1 to March 31) By sector, sales volume increased over the previous fiscal year by 11.3% for industrial use due to the development of new demand and the steady continuation of existing applications, by 3.8% for commercial use, and by 4.9% for residential use due to the cold winter. The number of customers for city gas was about 27.8 million, an increase of 1.1% compared with the previous fiscal year.

As of the end of June 2006, Japan had 210 city gas utilities because of developments including the consolidation of municipalities and transfer of operations to private utilities. This was 17 less than in our report at GASEX 2004.

Most city gas utilities distribute natural gas, which accounted for 94.4% of the gas source in FY 2005 (including indigenous natural gas).

### (2) Progress of regulatory reform in the city gas industry

#### a) Current status of regulatory reform in the city gas industry

In Japan's energy industry, regulatory reforms have been implemented since the 1990s starting with the oil industry. In the city gas industry, the transportation service has been introduced and the scope of retail deregulation has been expanded in stages since 1995.

As of June 30, gas supply to customers whose contract gas usage is 0.5 million m<sup>3</sup>/year and over has been deregulated, and 21 new entrants now supply gas to 108 large volume customers. The new entrants include gas pipeline companies, oil companies, electric power companies, general trading companies, and iron and steel manufacturing companies. New entrants' share of supply in this deregulated market amounted to 8.0% as of March 1, 2006.

#### b) Contents to be revised in 2007

As the fourth regulatory reform, the revised Gas Industry Law will become effective in April 2007.

The scope of deregulation is to be expanded to the category of customers whose contract usage is 100,000 m<sup>3</sup>/year and over, which includes small factories and office buildings. This would amount to the deregulation of nearly 60% of the city gas demand.

#### c) Further deregulation

In addition, the authorities aim to discuss what kind of problems should be cleared concerning the full liberalization including residential customers whose contract usage is less than 100,000 m<sup>3</sup>/year during FY 2006.

### (3) Challenges --- Inter-energy competition

As regulatory reforms progress, city gas utilities must constantly compete with new entrants in the deregulated gas market, and in some areas, competitions have started among the existing city gas utilities. These regulatory reforms are accelerating conventional competition with the electric power and oil industries. City gas utilities are directly competing with other energy utilities in the energy fields such as kitchens, hot-water supply, heating and electricity for residential use as well as in the fields of air-conditioning, heating and electricity for industrial and commercial use.

City gas utilities contend against the surroundings of fierce competition through measures as follows.

### 3. Countermeasures by City Gas Utilities

#### (1) Market cultivation

For a further expansion of the demand for natural gas, the city gas industry is working to cultivate markets through the diffusion of gas cogeneration systems, residential high-efficiency water heaters, etc.

#### a) Natural-gas cogeneration system

The city gas industry is promoting natural gas cogeneration systems. A national goal is 4.98 GW in 2010. In FY 2005, the number of installed systems was 25,641 systems, an increase of 86.2% over the previous year, and installed capacity reached approximately 3.59GW, up 14.9%.

The big increase in this number was driven by the extensive installation of “Eco-Will,” a 1kW gas engine cogeneration system for residential use.

#### i) Eco-Will

“Eco-Will” is a small capacity cogeneration system for residential use that generates 1 kW of electricity with a small gas engine. Water is heated by exhaust heat recovered from the engine and stored in a water tank. Using the stored hot water for hot water supply and space heating greatly helps to save energy; the energy utilization rate of the entire system is approximately 85%. Altogether, 28,300 systems were installed in FY 2005, and the city gas industry’s target is 235,000 systems by 2010.

#### ii) Residential fuel cell cogeneration

Since 1999, the Japan Gas Association has been promoting R&D of Polymer Electrolyte Fuel Cells (PEFC), which also attracts automobile manufacturers, and Solid Oxide Fuel Cells (SOFC), which generates electricity more efficiently. The Japanese government supports this activity.

In April 2005, Tokyo Gas Co., Ltd. marketed the world’s first residential PEFC cogeneration system and launched commercial sales based on leases. Other city gas utilities are in the middle of the demonstrations.

The national government aims to introduce fuel cells with a total capacity of 2.2 GW by 2010 including 1.2 GW for residential use. Some issues with respect to cost and durability remain to be overcome, so the city gas industry has set the year 2008 as a goal for full-scale installation and is striving to solve the problems in cooperation with city gas utilities and fuel cell manufacturers.

#### b) Residential high-efficiency water heater

##### Eco-Jozu

“Eco-Jozu” is a water heater that recovers latent heat. This name “Eco-Jozu” has standardized in Japan. “Jozu” means clever or skillful in Japanese. Eco-Jozu has increased thermal efficiency up to 95% by maximizing the recovery of exhaust heat that could not be used before. The total number of installed Eco-Jozu systems in FY 2005 was 236 thousand, and the city gas industry’s target is 3.5 million systems

installed by 2010.

Since both Eco-Will and Eco-Jozu can help prevent global warming, the national government subsidizes the purchase of these systems.

#### c) Gas air conditioning

The installed capacity of absorption-type and heat pump-type gas air-conditioning systems was 11.1 million refrigerant tones (RT) in FY 2004, a 5% increase over the previous year, and amounted to a 22.3% share of the entire air-conditioning capacity nationwide excluding residential use.

Absorption-type cooling and heating systems came into widespread use in large buildings, and gas engine heat pump-type systems are popular in medium and small buildings. In addition, these cooling and heating systems are becoming highly energy efficient according to each system.

Some estimate that each RT of installed gas air conditioning capacity cuts the peak demand for power in summertime by about 9 GW which nearly equals to the capacity of nine nuclear power stations. Gas air conditioners are therefore doing much to curtail seasonal fluctuation in the power load.

#### d) Natural gas vehicle

The Japanese government ranks natural gas vehicles (NGV) along with electric ones as clean energy vehicles because of their clean exhaust emissions.

Since 1990, the Japan Gas Association has been engaged in activities aimed at bringing NGVs to the level of the practical operation while backing the development of technology for natural gas refueling units, expanded establishment of refueling stations, and other infrastructural elements as well as calling for the deregulations related to refueling stations and tanks.

As of the end of 2005, Japan had a total of 27,605 NGVs in operation, and 311 rapid refueling stations.

### (2) Establishment of supply safety

The city gas industry is also working to improve the safety of city gas usage to enable customers to use it with complete confidence.

#### a) Improvement of anti-earthquake measures

The city gas industry is taking various anti-earthquake measures. These include measures for facilities, emergency countermeasures, and measures for recovery.

Measures for facilities include installing polyethylene gas pipes and gas meters with safety devices that will automatically shut off the gas flow when there is a gas leak or when an earthquake occurs. As emergency countermeasures, gas supply areas are divided into blocks to minimize gas supply disruption. Meanwhile, a recovery system has been established so that the city gas industry can fully cope with a large-scale disaster, thereby ensuring safety. Incidentally, the adoption rate of the meters with safety devices in FY 2005 reached 99.4%.

#### b) Standardization of safety devices

To eliminate fatal accidents as close to zero as possible by the year 2010, the city gas industry is standardizing safety-devices for gas equipment. The adoption rate of gas equipment with built-in safety-devices in FY 2005 was as follows: the adoption rate of gas stove burners with built-in safety-devices that automatically turn off the gas in case of flame failure was 94.4%, and that of small water heaters with a device to prevent incomplete combustion prevention function was 97.4%.

### 4. Challenges of Japan's Natural Gas Business

In Japan, natural gas demand is currently stable but demand is expected to increase in the future. Stable demand in gas-consuming countries will encourage production and investment in gas-producing countries.

Japan's city gas industry would like to broaden its communication links on technological matters with gas-consuming countries in the western Pacific through meetings such as the one here today, to exchange technical ideas on how to expand demand and save energy. We also wish to build stronger relations with gas-producing countries based on long-term contracts as we have done so far.

Finally, Japan's city gas industry is committed to ensuring stable demand through efforts such as demand expansion and energy saving as this report outlined.