# <sup>1</sup> Gas Segment



manner, from import to transmission, storage, distribution and sales.

#### Special Qualities of Natural Gas

Compared to other fossil fuels, natural gas has a much smaller impact on the environment. In addition, natural gas reserves are more abundant than those of crude oil and, unlike crude oil, are not concentrated in specific geographical locations.

In particular, because of its environmental advantages, demand for natural gas as an energy resource that is friendlier to the environment is expected to increase in the future, reflecting the public's increasing concerns and heightened awareness regarding the environment.

#### Deregulation in the Natural Gas Sector

Retail sales of natural gas in Japan began to be deregulated in 1995. Since then, the extent of retail deregulation has steadily increased, resulting in the deregulation of the natural gas sector. In April 2007, deregulation was extended to customers with gas contract volumes of 100,000 m<sup>3</sup>/year or more. Measured by sales volume, approximately 60% of the natural gas sector is now deregulated.

#### The Osaka Gas Business Area

More than

500kW

More than

50kW

40%

63%

2004

2005

2007

Gas sales by volume of the Osaka Gas Group are approximately 8.4 billion m<sup>3</sup>, representing about 30% of gas sales nationwide. The number of Osaka Gas customers amounts to approximately 6.8 million, accounting for about 25% of such customers nationwide. Our supply area is in the Kansai region of 77 cities and 29 towns comprising Osaka, Kyoto and 4 prefectures. Approximately 57,200 km of gas pipelines cover an area of 3,169 km<sup>2</sup>. In October 2006, we completed the construction of the Shiga Line of the Kinki Trunk Line gas pipeline (a pipeline of about 46 km between Kusatsu city and Taga Town, both in Shiga Prefecture), thereby establishing the infrastructure to meet the increase in gas demand in the Shiga district. In addition, in the eastern side of our supply area we are building, in cooperation with Chubu Electric Power and for

#### **Reserve/Production Ratios for Natural Gas and Oil**



#### **Emissions of Combustion Products From Fossil Fuels** (Coal = 100)

	<b>CO</b> <sub>2</sub>	SOx	NOx
Coal	100	100	100
Oil	80	68	71
Natural gas	57	0	20~37

Source: Report relating to field tests on technology for measuring air pollution caused by thermal power plants (March 1990, The Institute of Applied Energy); IEA (International Energy Agency) Natural Gas Prospects to 2010 (1986)

the purpose of improving the stability of the supply of gas, the Mie-Shiga Line (a pipeline of about 60 km between the town of Taga in Shiga Prefecture and Yokkaichi City in Mie Prefecture, scheduled to be completed around 2010). On the western side of our supply area we are investigating the construction of a gas pipeline from Himeji City to Okayama City. Looking ahead, these actions are steadily expanding our supply area and strengthening our supply infrastructure.

companies only)

pipelines made

fully mandatory

Third party access to

\_\_\_\_

Targeted

Large commercial

facilities, hotels, etc.

Small and medium-sized

hotels, supermarkets, etc.

factories, hospitals, business

#### Past and Future Developments **Electric Power Sector** Natural Gas Sector Main Facilities Share of Share of Scope of Scope of Main points national national Main points Liberalization Liberalization sales volume sales volume Introduction of third Introduction of IPP and Large factories and party access to 2 million m<sup>3</sup> 1995 fuel cost adjustment 44% office buildings or more per vear pipelines and fuel cost system adjustment system Third party access Creation of retail power 1999/ More than 1 million m<sup>3</sup> to pipelines made 26% 49% generation and 2000 2,000kW or more per year mandatory (major four supply business

### Deregulation Timeline in the Electric Power and Natural Gas Sectors

Abolishment of

zone-based transmission

tariff (pancake pricing)

Creation of wholesale

electric power market

Source: Denki Shimbun's "Description of Electric Power Liberalization and New Systems" and 2002 Urban Thermal Energy Committee materials

500 thousand m<sup>3</sup>

or more per year

100 thousand m<sup>3</sup>

or more per year

52%

59%

# 1 Gas Segment

Being able to use energy as efficiently as possible is important for the environment and the economy. We will maintain our competitive edge against other types of energy by providing optimal mixed energy solutions tailored to individual customers.

#### **Residential Gas Marketing**

The Osaka Gas Group develops products from the customer's point of view that are environmentally friendly, economical, and can provide customers with a more comfortable, convenient and safe lifestyle by using gas. We are dedicated to promoting the further popularization and use of such products as the residential gas cogeneration system ECOWILL, a separate bathroom heater-drier system with a mist sauna for health and comfort, and gas stoves for everyday cooking.

As a revolutionary new product that generates electricity while supplying hot water and heating, ECOWILL controls overall lighting and heating costs. Its efficiency and ease of use has earned it high praise from customers. During the fiscal year under review, sales reached 12,500 units for a cumulative total of 33,800 units over three fiscal years.

Our mist sauna products, such as MIST KAWACK which features a mist sauna attached to a bathroom heater-drier system, turn the bathroom into a sauna by nebulizing hot water into a fine mist. These products have been well received in the market since we launched them in April 2004 in response to the heightened interest in health and beauty in recent years. Sales in fiscal 2007 totaled 53,000 units, up 70% from the previous fiscal year.

We expanded our range of glass-top built-in gas stoves, which are popular for their design and ease of cleaning, thereby achieving robust sales. At the same time, we again increased the safety of products in our lineup. We completed equipping all the burners on all models of our glass-top built-in gas stoves with sensors to prevent overheating of deep-frying oil and gas leaks due to the gas supply being left on after the flame has been extinguished. In addition, we plan to equip all the burners on all models of our builtin gas stoves with these safety sensors by March 2008.

Among other efforts to comprehensively meet the needs of customers, and in response to rising awareness concerning crime prevention, Osaka Gas collaborated with a subsidiary to provide various services such as I-rusu, an Internet-based home security service. In response to the obligation to provide 24-hour ventilating equipment in residences, in December 2006 we launched AIRCURE, a residential-use continuous central exchange system that uses gas-heated water to regulate humidity.

Regarding gas rates, in November 2006 we lowered gas rates for residential and small commercial customer segments by an average of 2.33% and revised gas tariffs with our *Gas Toku Plan* that offered greater discounts and changes in applicable conditions. These revisions mean that we are providing our customers with a system of gas rates that are both easy to understand and easy to apply.



Backed by technological know-how, Osaka Gas' energy consulting capability is one of its greatest strengths. That capability encourages customers to bring their problems to us, after which we provide an optimal combination of products and systems developed to solve their specific problem.

#### Non-residential Gas Marketing

Natural gas plays a crucial role as a principal energy source for a wide variety of industries, including steel, metals, chemicals, and machinery. Demand for natural gas is increasing as it compares favorably to other primary energies in terms of energy conservation, space conservation, and cleanliness. Osaka Gas promotes detailed solutionbased marketing activities based on a firm grasp of customer needs and strong technologies.

In industrial-use gas sales, we are developing new demand in the use of natural gas as thermal energy for furnaces and boilers by taking advantage of unique technologies and engineering prowess that we have developed over many years in areas such as natural gas combustion technologies tailored to manufacturing processes and the Only One Burner systems tailored to specific needs in different industries' business styles. Natural gas is increasingly used in cooling processes and clean rooms, and cogeneration systems, able to generate both heat and electricity simultaneously, realize substantial energy savings in factory operations, and their utilization is increasing.

Gas sales to the commercial, public and medical sectors are increasing primarily because of the use of gas air conditioners and cogeneration systems. Gas absorption air-conditioning systems have become the dominant technology for air-conditioning in large buildings, while gas heat pump air-conditioning systems are becoming increasingly popular in small and medium-sized buildings because they offer the convenience of individual climate control. As a result of their popularity, gas heat pump air-conditioning systems are contributing to increased demand for natural gas.

In April 2006, we introduced High Power Excel, a commercial use gas heat pump air conditioner that can generate electricity while cooling and heating air and supply it to the building. Cogeneration systems are popular with large- and small-scale customers, ranging from major commercial facilities to hospitals, hotels, and retail stores. Our Gene-Light Series of compact cogeneration systems for small and medium-sized office buildings and shops has been very popular since its launch in fiscal 1999. To date, more than 2,000 customers have installed the Gene-Light Series. Among other products, we are increasing our marketing of commercial-use kitchen air-conditioning systems using the product name Suzuchu that provide cool and comfortable working conditions in a kitchen environment.



The Gene-Light Series of compact cogeneration systems for small and medium-sized office buildings and shops has been well received.



Suzuchu enables cool comfortable kitchens by reducing the heat generated through cooking to levels such that equipment surfaces are cool enough to be touched.

# 1 Gas Segment

### **Cogeneration Systems (CGS)**

Installed on the customer's premises, cogeneration systems recover heat emitted from power generation and use it for air-conditioning and thermal applications. Energy usage efficiency improves up to approximately the 70%–90% level with the use of cogeneration systems, as exhaust heat can be effectively utilized, and there is minimal transmission loss because electricity is generated on-site.

## Strengths of Osaka Gas Cogeneration Systems

- (1) We have developed a highly efficient power generation system. Compared with the average efficiency of approximately 40% at existing thermal power plants, our advanced cogeneration systems achieve power generation efficiency of around 43%. As a result, there are an increasing number of customers enjoying the cost benefits of introducing Osaka Gas cogeneration systems.
- (2) Our maintenance system, which includes the remote monitoring system Echo Line, leads the industry in service and maintenance quality.
- (3) We offer a variety of financing schemes enabling us to meet such diverse customer needs as avoiding ownership of capital assets or requiring preset rate fluctuations for changes in fuel costs.
- (4) For franchise chain owners with stores located outside our service area, we meet customer needs through our

subsidiary Cogeneration Technology Service Co., Ltd., which is in charge of cogeneration operations outside our service area.

(5) In addition to supplying natural gas as a fuel, Osaka Gas also provides a wide variety of cogeneration systems, including engines that use biogas as fuel and agricultural systems that supply CO<sub>2</sub> to plants.

Based on these strengths, the Osaka Gas Group has delivered cogeneration systems with a total generation capacity of approximately 1,470 MW.

# Cumulative Capacities of Gas Cogeneration Systems and Gas Air Conditioning Systems Installed





### General View of Natural Gas Cogeneration

Note: Power generation efficiency is calculated using fiscal 2003 results (LHV standard).

Source: The Japan Gas Association, "Gas Cogeneration Systems"

We are not only positioned in natural gas upstream operations, we are also actively pursuing LNG trading and transportation, and natural resource development businesses based on new concepts.

## LNG Procurement, Natural Gas Transport and Development Businesses

In the natural gas market worldwide, rising prices and a tight relationship between demand and supply continue, and natural gas procurement plays an increasingly important role in the energy industry. Osaka Gas tries to secure stable procurement and maintain price competitiveness in the energy business through such policies as diversifying LNG supplies, flexibly operating our fleet of LNG carriers and shifting to new contracts that offer us better conditions.

In addition, the Company is branching out to LNG transportation and resource development businesses to expand its business upstream in the natural gas value chain.

In our natural gas transportation business, we increase the transparency of transportation costs and reduce them by having our own LNG carriers for the transportation of LNG we have purchased. We also aim to earn revenues by utilizing spare capacity of LNG vessels to transport LNG for other companies, and by trading. Including the carrier LNG Dream which newly went into service in September 2006, we have four LNG carriers and plan to increase the fleet to six carriers by the fiscal year ending March 2010. Our main areas of activity in the natural resource development business are our existing participation in development of offshore natural gas fields in Northern Australia, our investment in a gas-producing field in Indonesia, and our investment in Idemitsu Snorre Oil Development Co., Ltd., which owns an interest in a North Sea oil field. We are expanding the energy resource development business by focusing on the following three business categories: participation throughout LNG projects from the early stages; participation in projects as an LNG purchaser and minority shareholder (including participation in only liquefaction projects); and acquisition of interests in oil and gas fields with limited commercialization risk because they are already in production or about to be developed.



A North Sea oilfield drilling platform (Photo: Idemitsu Snorre Oil Development Co., Ltd.)

Note: Procurement of gas for supply purposes is included in the natural gas segment, while energy resource development and LNG transport are included in the LPG, Electricity, and Other Energies segment.



### World's major nations with natural gas reserves and suppliers to Osaka Gas