OSAKA GAS GROUP

2006
OSAKA GAS GROUP
CSR REPORT

Editorial Policy

1. Group Management Principles
- three elements of the Value Creation Management

The report has been compiled to cover three of the four elements of the company's principles of management; value for customers, society, and employees. For the company's activities for enhancing value for shareholders, please refer to the annual report.

2. Reporting on the Osaka Gas Group

The report covers information relevant to environment-related activities of the group, particularly those of the consolidated subsidiaries.

3. Ensuring credibility

In order to ensure credibility of the report, we have incorporated third-party reviews that include evaluation and recommendations.

4. Reference to various guidelines

We have referred to the "Environmental Reporting Guidelines" (2003 Edition) of the Ministry of the Environment and the "Sustainability Reporting Guidelines 2002" of the Global Reporting Initiative (GRI) in compiling this Report.

5. Change to CSR Report

The title of the report has been changed to "Osaka Gas Group CSR Report" with a view to enrich its contents on activities related to social responsibilities of the group. Six feature stories have been included to focus on the group's commitment to enhancing value for customers.

Scope of this Report

1. Boundary

(1) The Osaka Gas Group and its subsidiaries
Notation is made in the case of items being limited to Osaka Gas Co., Ltd. alone.

(2) Environmental performance data have been compiled for a total of Osaka Gas Co., Ltd. and 81 subsidiaries.
(Excluding overseas companies or tenant companies for which data is difficult to gather.)

■ Calculation range of subsidiaries

Business Type		Subsidiaries
Osaka Gas	Core Company	
Pipeline B.U.	—	OG Road Co., Ltd. and 4 companies
Residential Energy B.U.	—	Osaka Gas Housing Equipment Co., Ltd. and 10 companies
Commercial & Industrial Energy B.U.	—	Gas and Power Investment Co., Ltd. and 13 companies
—	Liquid Gas Co., Ltd.	Liquid Gas Co., Ltd. and 11 companies
—	Nissho Petroleum Gas Corp.	Nissho Propane Sekiyu Corp. and 9 companies
—	Urbanex Inc.	Urbanex Co., Ltd. and 5 companies
—	OGIS Research. Institute Co., Ltd.	OGIS Research Institute Co., Ltd. and 2 companies
—	Osaka Gas Chemicals Co., Ltd.	Osaka Gas Chemicals Co., Ltd. and 4 companies
Head Office	—	OG Sports Co., Ltd. and 14 companies
TOTAL		81 companies

*Osaka Gas Customer Relations Co., Ltd data is included under Osaka Gas for account collection and regular safety patrols activities.

2. Reporting Period

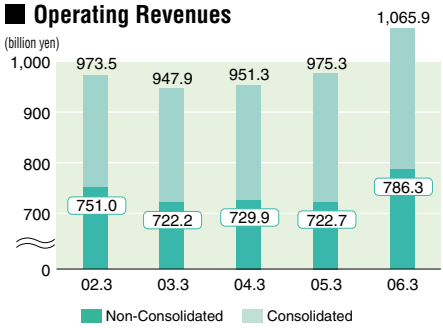
April 1, 2005 - March 31, 2006
In this report, “FY2006” or “06.3” covers the period from April 1, 2005 to March 31, 2006.

Profile of Osaka Gas Group

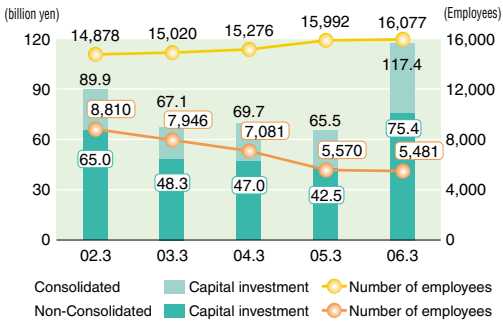
Corporate Profile (as of March 31, 2006)

Head office	4-1-2, Hiranomachi, Chuo-ku, Osaka 541-0046, Japan
Capital	132,166 million yen
Major Business Fields	(1) Manufacture, delivery and sale of gas
	(2) Delivery and sale of LPG
	(3) Generation, delivery and sale of electrical power
	(4) Sale of gas appliances
	(5) Installation of housepipes
Number of customers	6,758,000
Amount of gas sold	8,448 million m³ (FY2006) Note: Equivalent to 45 MJ/m³
Number of employees	5,481
Listed exchange market	Tokyo, Osaka, Nagoya

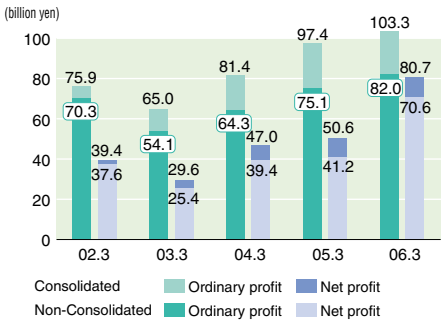
Operating Revenues



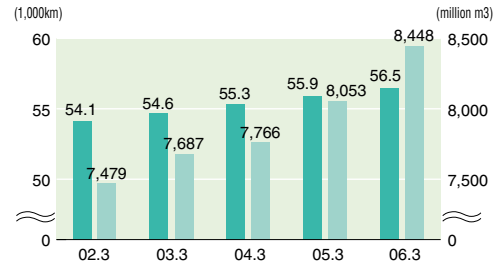
Capital Investment and Number of Employees



Ordinary Profit and Net Income



Total Length of Gas Pipeline and Amount of Gas Sold



Non-Consolidated Total length of gas pipelines Amount of gas sold
Note: Equivalent to 45 MJ/m3

Service Area

Kinki Trunk Line - Shiga Line
Kyoto
Kinki Trunk Line - No.2 West Line
Keiji Office (KRP Gas Building)
Shiga Office
Kinki Trunk Line - No.3 West Line
Shiga
Himeji Office (Himeji Gas Building)
Kinki Trunk Line - Keiji Line
Kinki Trunk Line - No.2 West Line
Hyogo
Hokubu Office
Shiga
Shiga-higashi Sales Office
Keihan Office
Lake Biwa
Kinki Trunk Line - Himeji Line
Takasago Line
Head Office Osaka Gas Building
Mie-Shiga Pipe Line
Hyogo Office (Kobe Gas Building)
Nara Office
Himeji LNG Terminal
Osaka
Tobu Office
Mie
Nara
Isewan
Hyogo Office (Port Island Office)
Osaka Office (Dome City Gas Building)
Nanbu Office (Sakai Gas Building)
Kinki Trunk Line - Bay Line
Senboku LNG Terminal I
Kinki Trunk Line - No.2 East Line
Senboku LNG Terminal II
Kinki Trunk Line - No.1 East Line
KIX
Wakayama
Wakayama Office (Wakayama Gas Building)

Note

- Major Trunk Line (installed)
- Major Trunk Line (planned/under construction)
- Major Pipeline (installed)
- Headquarters, Office, etc.
- Research installed
- LNG Terminal
- Gas Holder

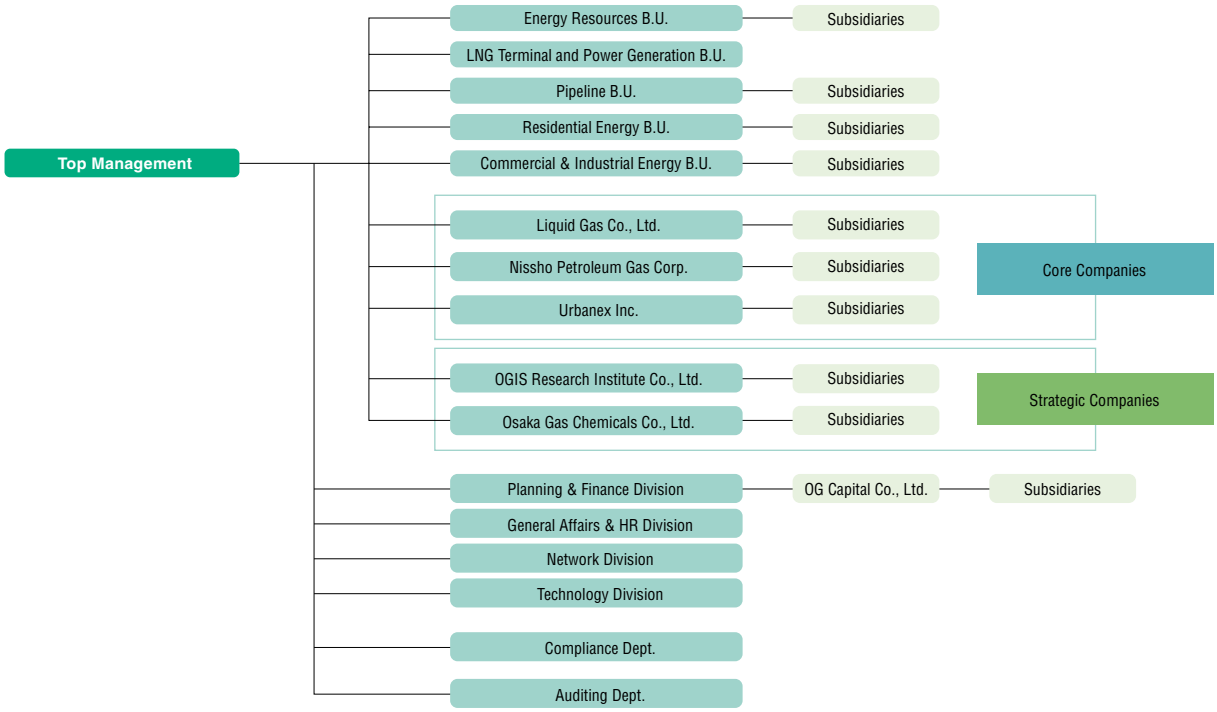
(as of June 30, 2006)

Delivery Area

- Osaka Area
- South Area
- Northeast Area
- Hyogo Area
- Keiji Area

(as of March 31, 2006)

Osaka Gas Group Management Structure



Core Companies: Core companies that pursue energy business with maximum synergies and aim for growth

Strategic Companies: Core companies that target profitable areas outside the group, and aim to contribute to the group

Osaka Gas Group CSR Report 2006

URL

For your reference, please visit our website:
http://www.osakagas.co.jp/indexe.htm

For our environmental and social activities:
http://www.osakagas.co.jp/kankyo_e/index.htm

President's Message & Highlights

Management for

society, and employees, through fair and transparent business activities.

Specifically, we target making contribution in providing customers and businesses with comfortable lifestyles and business prosperity through reliable and safe supply of our products and services as well as our commitment to the environment and the community; improving our value for shareholders; providing employees with opportunities to grow through work. It is our belief that the pursuit of the management of creating value in a balanced manner comprises the basis to furthering our corporate social responsibilities.

In April 2006, we established the Osaka Gas Group CSR Charter as our basic philosophy on CSR and revised the Code of Conduct for the management and employees of the group reflecting the spirit of the charter. On the basis of the charter, we have reorganized our internal organizations on CSR including the CSR Promotion Council and the CSR Committee. Within the new framework, we will fortify our activities on enhancing our CSR activities.

Value Creation Management and corporate social responsibilities

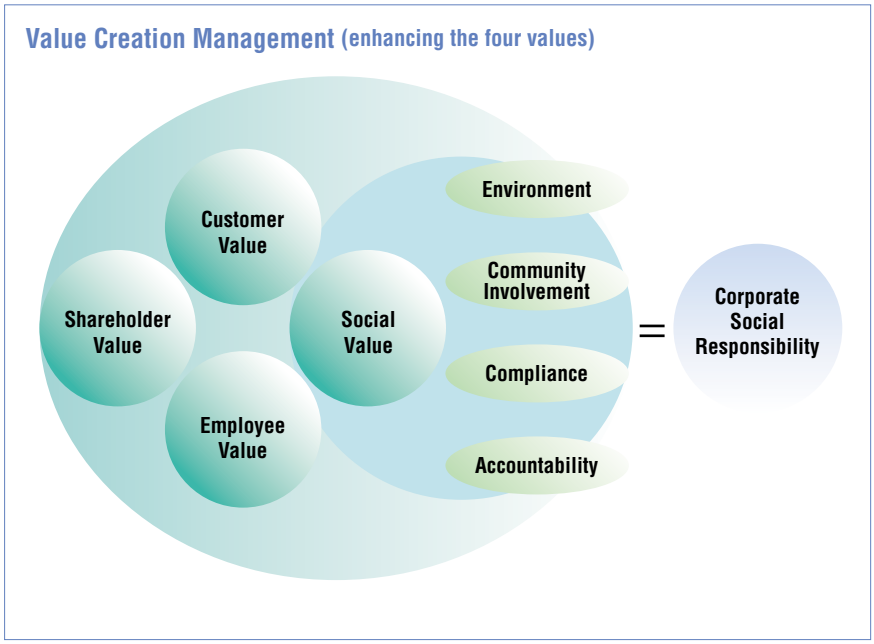
Against the backdrop of overall deregulation of industries and increased level of freedom in their business activities, Japanese enterprises find themselves in the marketplace with an increasing diversity and global business orientation. As the pubic awareness on the global environmental issues heightens, people's expectations are also mounting for businesses to positively assume their corporate social responsibilities. At the same time, business practices are under increasing public scrutiny and that enterprises are expected to conduct their activities in a fair and transparent manner while complying with laws and regulations.

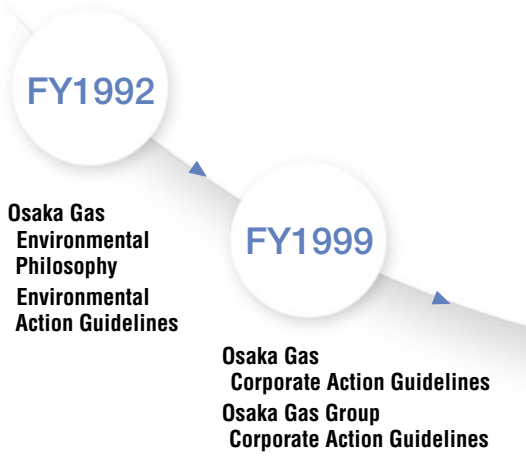
To clearly define our principles in conducting business, the Osaka Gas Group established the Corporate Action Guidelines and the Code of Conduct in FY1999 and FY2000, respectively, and it has conducted its businesses on the basis of these guidelines to gain recognition of the society. In 2005, the centennial year of its operations, Osaka Gas stipulated the 'Value Creation Management' as the basic objective of its business activities with a goal of maximizing its value for customers as well as for enhancing value for its stakeholders, namely shareholders,

Strengthening compliance

To be a good corporate citizen with a strong commitment to corporate social responsibilities, our compliance with applicable laws and regulations are an essential element in our corporate activities. Our perspectives on compliance go far beyond to include responsible actions and accountability through which we intend to build a relationship of trust with society.

Despite our group-wide efforts to achieve full compliance in our business activities, it was revealed recently that there had been some inappropriate actions within our group related to anti-monopoly regulations during the past fiscal year. Bearing in mind that our compliance is the prerequisite of our activities as a public utility, we intend to





enhancing CSR to be a Corporate Group of Choice

strengthen our compliance so that no such inappropriate action recurs.

Environmental actions

For the Osaka Group having energy businesses at its core, our environmental activities are a direct translation of our business activities. With such views in the background, we will be committed to making positive contribution to the environment through promotion of natural gas, the fossil fuel with least environmental impacts, not to mention our efforts to reduce impacts on the environment resulting from our production and marketing activities. It is a fact, however, that the use of natural gas generates CO_2. To address the problem, Osaka Gas will continue its work to develop higher efficiency gas equipment and systems in order to reduce customer's environmental impacts by their consumption of natural gas. A good case in point is natural gas-fired cogeneration system which generates electricity and simultaneously utilizes the waste heat. Such efforts help reduce the impacts of our products and services on the environment, and subsequently result not only in enhancing our value for society but also in improving value for customers. These activities are fundamental to CSR actions of an energy enterprise.

Communication with community

The Osaka Gas Group, with its activities deeply rooted to the local community, has long been engaged in closely communicating with its customers and community enhancement activities. As part of our interaction with the communities, we regularly hold facility visits and tours as well meetings as designed to develop the community's better understanding about our businesses and to use such opportunities to listen to their voices. Another part of our community activities is the "Small Light Campaign" initiated in 1981. The program has built up during the past 25 years a number of achievements through their volunteer activities. We will continue our commitment to the community as a good corporate citizen to make positive contribution to the community for realizing a caring and fulfilling society through open-minded interaction with the community.

To become a corporate group of choice

Our CSR activities have been pursued on our self-judgment, not out of obligations. It is a natural outcome of our practice of pursuing the management of creating value. Our commitment to CSR and our principle of creating value for stakeholders should result in the choice of the Osaka Gas Group for the supply of products and services for customers and society. To that end, we will strive to attain our objectives of CSR and to monitor our activities from the customers' perspectives. We would conduct reviews of our actions from such standpoints and revise them as necessary.

The Environmental and Social Action Report of the Osaka Gas Group has been changed to CSR Report for the purpose of clearly defining the commitment of the group. I hope the report would be of interest to you and I look forward to your comments.

芝野博文

Hirofumi Shibano
President
Osaka Gas Co., Ltd.

FY2000

Osaka Gas Management Principle "Value Creation Management"

FY2000

Osaka Gas Group Code of Conduct

FY2004

Osaka Gas Group Environmental Activities Philosophy
Environmental Activities Policy

FY2005

Osaka Gas Group Management Principle "Value creation Management"
-Customer Value
-Shareholder Value
-Social Value
-Employee Value

FY2007

Osaka Gas Group CSR Charter
CSR Organaization

Perspectives on Corporate Governance

The Osaka Gas Group, targeting to maximize its corporate value, pursues the 'value creation management' to enhance its value for all its stakeholders including customers, shareholders, society, and employees, through fair and transparent business activities. The group endeavors to further its managerial integrity through strengthened corporate governance in order to be responsible for its activities under changing business environment.

Status of Corporate Governance

1. Organization

At Osaka Gas, based on our clearly defined set of company regulations, important decisions are only made after being carefully scrutinized by the Executive Board, which is comprised of executive directors with a wide range of expertise, and full discussion by the Board of Directors. Handling matters important to the whole Group, the Board of Directors makes accurate and speedy business decisions and works to improve oversight of the operations of the entire Group.

Osaka Gas has a corporate auditor system which oversees legality of business execution by the management. Of the four auditors, two of them are outside auditors and two are internal. In addition, the Auditors' Office composed of full-time staff members not under the direct control of the directors has been established to support the auditors and thus to improve the audit system. The two outside auditors do not have any special personal, capital, or business relationship with Osaka Gas, nor do they have any other interest in the Company, thus preserving their impartiality.

On June 29, 2006, in a meeting of the Board of Directors following the ordinary general meeting of shareholders, we decided to reform our management structure. Specifically, we substantially reduced the number of directors, significantly improving the process of decision-making by the Board of Directors. At the same time, we introduced an operating officer system. By concentrating the efforts of the Board of Directors on management decisions rather than business execution, and on monitoring and oversight of business operations, we have further revitalized the role of the Board of Directors, increasing management efficiency and enhancing business oversight.

2. Status of internal controlling system

Within Osaka Gas, we have the Auditing Department which oversees, based on its annual audit plans, fairness and efficiency of business activities of the company. It advises and makes recommendations to respective divisions within the company as necessary.

Each business unit within the company has its own auditor whose authorities are entrusted from the management. Each auditor's role and responsibilities are clearly defined in the internal regulations, thus strengthening the internal controlling functions on the operational level.

In terms of compliance, we have the CSR Promotion Council which is comprised of members including the top management. The Compliance Department is a body within the company to oversee legal compliance of our business activities.

In April 2006, we have integrated the Corporate Action Guideline of Osaka Gas and the Osaka Gas Group and established the Osaka Gas Group CSR Charter. With the Charter and the Code of Conduct, we have been working to penetrate the compliance activities to the executives and employees of Osaka Gas and the Group. Our compliance program is directed not only to legal and regulatory compliance but also good moral and ethical conduct in our business activities.

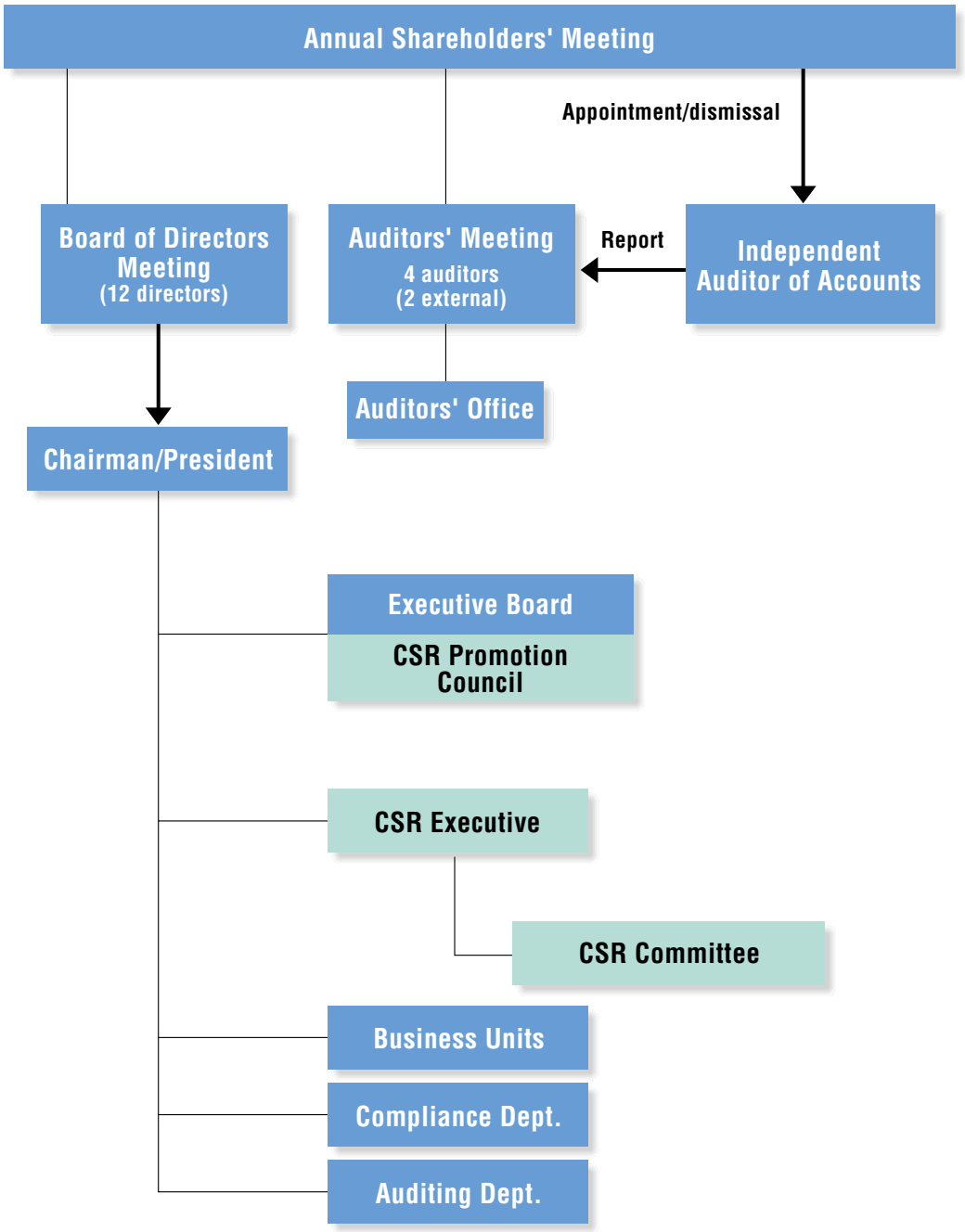
On June 29, 2006, we appointed CSR Executive to oversee the entire CSR activities of the Group. We also launched the CSR Committee comprised of the members of the management and external members. The committee is the body for promoting CSR activities of the Group. By having Auditing Department and the Compliance Department, not affiliated to operational divisions, we ensure internal controlling functions in order to improve corporate governance.

3. Status of internal auditing, auditors, and independent auditors

For independent auditing of accounts, Osaka Gas retains KPMG Azsa & Co.

The Auditing Dept., auditors, and independent auditors meet to discuss annual audit plans and other reports and they meet for information exchange as necessary, thereby working in cooperation for effective auditing work.

Corporate Governance Organization



The Osaka Gas Group CSR Charter

The Osaka Gas Group, with its highest managerial priority placed on maximizing value for its customers, seeks to create value for all its stakeholders including shareholders, society, and employees through fair and transparent business practices. We believe that the pursuit of 'value creation management' results in fulfilling corporate social responsibilities of the group.

In order for the Osaka Gas Group to fulfill its full corporate social responsibilities and to achieve its sustainable development, we hereby set forth the Charter as the guiding principle for the management and the employees of the Group to observe in their conduct of business.

The management of the Osaka Gas Group, its subsidiaries and affiliates, and managers of respective divisions, are determined to implement the spirit of the charter in their business initiatives.

Should any infringement of the charter occur, the management acts immediately to identify and resolve problems, and to take strict corrective actions.

I. Creating value for customers

The Osaka Gas Group is committed to making its positive contribution to realizing higher level of comfort and development of business activities of its customers. The group intends to achieve this objective through its provision of reliable and safe supply of natural gas and other energy services with improved level of services for its customers. We also seek to grow together with customers and society at large by pursuing opportunities for further growth of our businesses and creating new products and services to enhance our value for customers.

II. Contributing to harmonizing with environment and to realizing a sustainable society

Addressing the issues of the environment both at regional and global levels is of paramount importance for the Osaka Gas Group which is engaged in wide-ranging energy services. The Group, being seriously aware of the impacts of its business activities on the environment, seeks to harmonize its businesses with the environment and to realize efficient utilization of energy resources, thereby contributing to achieving a sustainable society.

III. Being a good corporate citizen contributing to society

The Osaka Gas Group, as a good corporate citizen, strives to maintain communication with society and the communities it serves. Through proactive disclosure of information and improved managerial transparency, we intend to establish favorable relationship with citizens and to make our positive contribution to healthy development of society.

IV. Complying with laws and regulations and respect for human rights

The management's and the employees' compliance with laws and regulations forms a basis of gaining society's trust. Our perspectives on compliance goes beyond legal and regulatory boundaries to include decent conduct expected of all citizens. Based on our respect for human rights, we intend to maintain equitable relationship with our customers, business partners, and other parties.

V. Management policy of human growth

The Osaka Gas Group strives to become a group of enterprises to realize growth of its employees through work by ensuring employment opportunities and respecting employees' individuality and initiative. With discipline and self-motivation, we will charge ourselves with the task of creating new value for customers, shareholders and society. The group and its employees, through mutual trust and decency, strive to achieve sound growth of enterprises within the group.

Code of Conduct of the Osaka Gas Group

The Code of Conduct of the Osaka Gas Group was set forth in February 2002 as a set of criteria for actions of all executives and employees of the Osaka Gas Group.

I. Code of Conduct as a good corporate citizen

1. Respect for human rights
2. Consideration to protecting the environment

II. Code of Conduct in production and supply activities

3. Responsibilities as energy supplier and other business provider
4. Ensuring safety of products and services

III. Code of conduct in business transactions

5. Compliance with anti-monopoly laws
6. Fair trade practice
7. Customer interaction
8. Associating with business partners

IV. Code of conduct in information management

9. Use of information and its disclosure
10. Management of information systems
11. Management of intellectual properties

V. Code of conduct in workplace

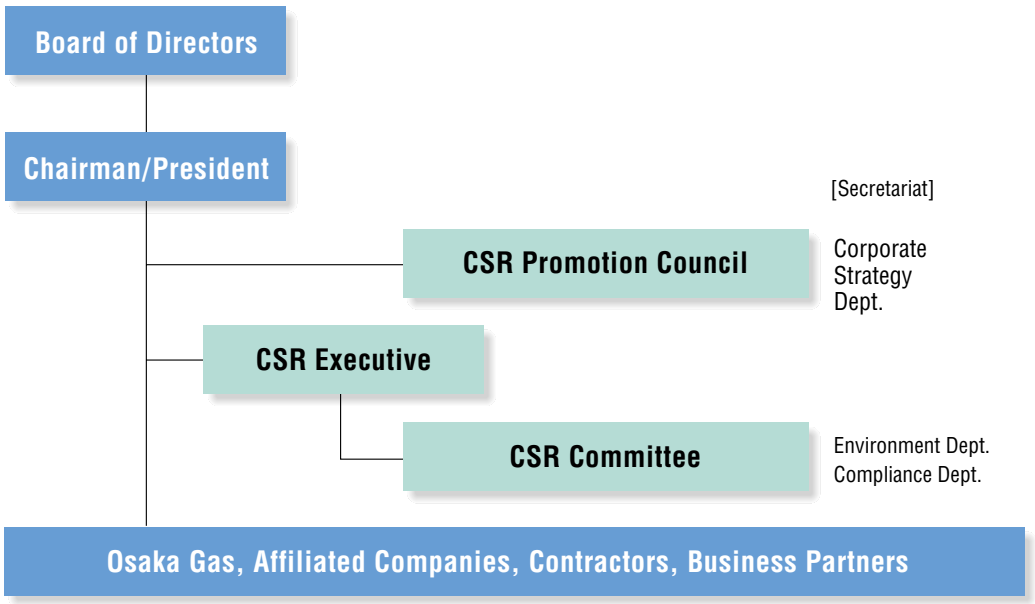
12. Creating comfortable work environment
13. Employment and compensation

VI. Code of conduct in working with society

14. Dealing with anti-social forces, prohibiting favors and benefits
15. Appropriate payment of taxes

CSR Organization

The Osaka Gas, upon establishing its CSR Charter, restructured its organization for CSR. The CSR Promotion Council, under the supervision of President of Osaka Gas, deliberates CSR plans and reports its results of activities. CSR plans include those items related to the environment, compliance, community contributions, human rights, and employment. From the viewpoint of promoting overall CSR activities in an integrated manner, we established the CSR Committee to coordinate and promote CSR activities across the entire Osaka Gas Group. The committee is composed of executives of Osaka Gas, the top management of the core companies, representatives of the labor union, and other external members.



Pursuing Efficient Energy Utilization

～Dissemination of cogeneration～

Using energy in a most efficient manner is a key to preventing the global warming. One such effective instrument is gas-fired cogeneration system which generates electricity using natural gas for generation and recovering its waste heat for thermal applications. Osaka Gas has been aggressively marketing gas cogeneration.

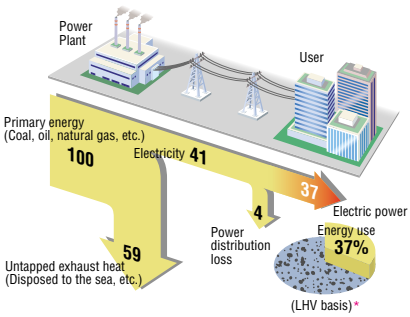
Cogeneration～Effective tool against global warming～

The Basic Energy Plan adopted by the Cabinet in October 2003 is the government's official plan for future supply and utilization of energy. A focal point of the plan is 'building distributed energy systems' by means of cogeneration and other systems. This emphasis has been made from the viewpoints of improving energy efficiency and promoting new energy supply sources in dealing with global warming. The government's plans for achieving targets of the Kyoto Protocol as determined by the Cabinet also clearly defined the need for achieving greater energy efficiency and energy conservation while reducing CO_2 emission, shift to natural gas, development and dissemination of high efficiency equipment, together with broader introduction of gas-fired cogeneration systems. The plan projects the total installed capacity of cogeneration of 4,980 MW with total reduced volume of CO_2 emission by 11.4 million tons.

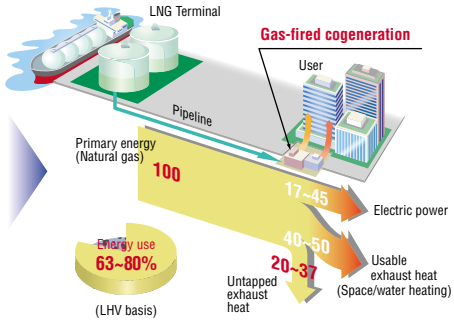
Clean and energy-efficient gas-fired cogeneration systems

Gas cogeneration system is a highly energy-efficient system. Using natural gas as a fuel to drive engines, turbines, and potentially fuel cells in the future, to generate electricity and simultaneously recover waste heat for thermal applications such as cooling, water heating and steam on the customer's premises. Compared with average large thermal power plants which discard about 60% of its energy input, cogeneration system utilizes about 63 to 80% of the primary energy input. With a progress in R&D, we have seen the commercialization of cogeneration systems with higher generation efficiency than average large centralized power stations. They not only realize substantial energy conservation but contribute significantly to reducing CO_2 emissions.

■ Conventional thermal power system



■ Natural gas-fired cogeneration system

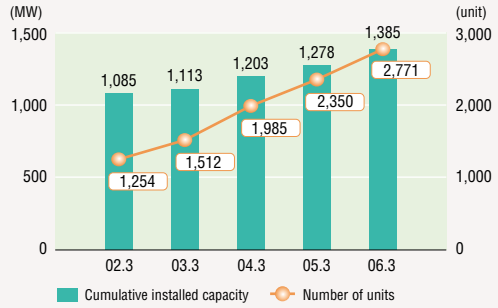


* Thermal efficiency on LHV (lower heating value) basis. total calorific value of a fuel minus latent heat of water vapor.

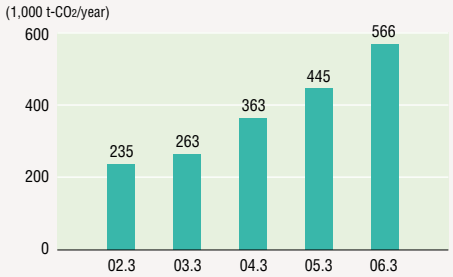
Performance Report

Installed capacity of cogeneration systems and amount of reduced CO_2 emission at the user's site

■ Cumulative Capacity and Number of Gas Cogeneration Systems Installed



■ CO_2 Emission Reduction through Cogeneration (compared with Business-as-usual emission based on FY1999)



Note 1: Amount of CO_2 emission reduced due to installation of cogeneration systems that would have otherwise increased due to rise in the volume of gas sales between FY1999 and FY2007

Note 2: Emission factor of CO_2 by power generation (0.69kg-CO_2/kWh) is based on average emission factor of thermal power plants (The factor presented by the sub committee of the Central Environment Council)

Customer's comments - Fuji Oil Co., Ltd.

Achieved CO_2 reduction of 8.8% over 1990 levels

Teruji Sunagawa
Utilities Group Leader
Utilities Group,
Utilities Department
Safety & Environment
Headquarters
Fuji Oil Co,. Ltd.

Our company manufactures peptide and soy protein that are attracting attention as functional foods, together with oils,baking and confectionary materials. We are particularly strong in processing raw materials for chocolate-making, having the share of over 60% in the Japanese market. Since starting business in 1950, we have worked relentlessly to manufacture safe, high quality and tasty foodstuffs while reducing manufacturing costs. Among our challenges, we have constantly worked on improving efficiency of operations, reducing energy consumption, and achieving clean and environment-friendly operations. As a solution to these challenges, we have introduced natural gas-fired cogeneration systems. The first system was introduced as a replacement to an oil-fired boiler at our largest production site. Use of cogeneration system was particularly attractive to us as a manufacturer having numerous production lines where steam demand is greater than that of electricity. With the installation of the first unit of 5.3 MW in 1994, the number has increased to 5 with the total capacity of 28.45 MW. They supply about 94% of the total electricity requirements at our factories.

Looking at the energy balance of our cogeneration systems, of the 100 of the primary energy input, 31% is recovered as electricity and 50 to 60% as steam. The greatest advantage we enjoy by such a high efficiency of our energy systems is the reduced emissions of CO_2 by about 10% in FY2006 over FY1991 which is the base year in the Kyoto Protocol. Given our substantial rise in output of products during the last 16 years, I believe it is a significant reduction of CO_2 emission.

Other benefits include SOx-free and low NOx emission qualities that give us a good public image as a food manufacturing company. In terms of electricity costs, we have seen only a small rise despite a substantial increase in demand since 1994. This is because of lower utility power costs by 20 to 30% as a result of installing cogeneration. In the operation of the cogeneration systems, we enjoy a quick load following characteristics in supplying both electricity and steam together with shorter start-up time of 15 to 20 minutes compared with 5 to 6 hours of fuel oil boilers.

From account representative of Osaka Gas

We propose new ideas to explore maximum potentials

Tsuneo Yoshino
Commercial and Industrial Energy Business Unit

Fuji Oil introduced cogeneration systems to reduce the environmental impacts of its activities and to improve their work environment. With the cogeneration systems, the company has reduced significantly their purchase of commercial power and, as a result, lowered their CO_2 emission considerably. With their reduced purchase of electricity from the power utility combined with their switching of fuel from fuel oil to natural gas, they reduced CO_2 emissions by 16% compared with FY1991. This is because power demand fluctuations on the grid are usually met by controlling output of thermal power plants. The company enjoys other benefits.

I want to intensify my marketing activities to my potential customers for cogeneration systems and other gas applications that could be of benefit to them.

Mr. Makoto Akai
Senior Researcher
National Institute of Advanced Industrial
Science and Technology

Good public relations activities essential

Natural gas emits lower level of CO_2 among fossil fuels on the thermal equivalent basis. Its expanded use is an effective solution to the global warming. But, it is also true that natural gas is a limited energy resource which needs to be utilized in an efficient manner. Recent technological advances in cogeneration of achieving higher generation efficiency are extremely promising. To maximize such benefits, we need to select and operate energy system that meets requirements on the demand side. In this sense, it should prove important for gas companies, as local services companies committed to customers, to employ long-term perspectives to maintain good public relations activities directed to their customers not only in terms of short-term economics of energy utilization, but also in energy security and global environmental protection. In this way, I believe, new technologies for efficient energy utilization can be realized over the long-term.

Meeting Energy Needs of Customers

～Osaka Gas as a multi-energy services company～

Osaka Gas offers its customers a mix of energy services, gas, electricity by gas cogeneration systems, and electricity, depending on their needs. Our ability to provide these services to respond to their needs enhances our value for customers. We are now particularly focused on building electricity business with the construction of the Senboku Power Plant.

Electricity business as a second core energy business

In the highly deregulated and competitive energy market in Japan, Osaka Gas has been working strenuously to provide its customers with the supply of gas, electricity, LPG, and thermal energy, according to their needs and in a way to achieve an appropriate balance of supplies. We are a multi-energy services provider with strengths in a number of ways. Electricity business is a focal point in our business which is backed by our abilities in generation, marketing, and customer networking. To make it a second core business, we are developing our capabilities in full swing. As part of our activities, we are building a 1,109 MW gas-turbine combined cycle power station at Senboku LNG Terminals, scheduled to become operational in phases after April 2009. The facility features the state-of-the-art, combined cycle systems having the highest level of efficiency and the lowest environmental impacts among average thermal plants in Japan.

Senboku Power Plant and its environmental considerations

The Senboku Power Plant to be built in the two LNG terminals of Osaka Gas in the south of Osaka will consist of 4 plants; two at each of the two terminals.

The locations of the plants have been chosen out of our considerations to fully utilizing the existing infrastructure including fuel supply and utilities and to minimizing environmental impacts associated with construction work.

We have taken into account a number of environmental actions in the planning of the plant. Naturally, use of natural gas as a fuel has advantages in emissions. It will be completely free of sulfurous oxides and soot. Also, NOx emissions will be minimum by using low-NOx combustor. Denitration equipment will remove NOx contents in the exhaust and that its environmental impacts would be smaller by having tall smoke stacks over 100 meters.

The high-efficiency CCGT plant will also be advantageous in terms of CO_2 emissions compared with other fossil fuel-fired thermal plants. With the lower level of CO_2 emissions per kilowatt-hour electricity generated, our power plant would contribute considerably to reducing CO_2 emissions.

Greenery is another part of the project. We will plant trees, particularly those species local to the area to form greenery on the plant premises.

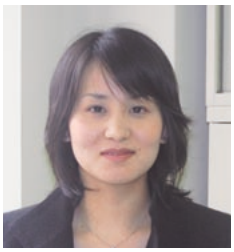
With all the features of the power generation plant, we will be able to build a power generation project friendly to the environment.

The construction work is scheduled to start this year and the plant will start commercial operation in stages from April 2009.

Artist's impression of power plants (red-lined)

Environmental assessment ~ process of incorporating opinions of stakeholders ~

The Senboku Power Plant is the first large-scale power generation project for Osaka Gas. Because of the thermal plant exceeding 150 MW in capacity, the plant is subjected to environmental assessment regulations. In the assessment process, we are required to conduct the status survey for one year on all the potentially affected items of the environment; air, water, noise, and vibration. Using the results of the survey, we project and evaluate the project' s potential impacts on the environment. After starting the assessment process in December 2002, we went through governments' examination of our projection and evaluation methods and we completed the whole assessment process in March this year. I believe it was meaningful to listen to the opinions of local residents in the examination process together with the guidance and advice from government authorities. Those comments helped to enrich our project particularly in implementing environmental actions towards the realization of the power plant project.



Yumi Sugano
LNG Terminal and
Power Generation B.U.

Other electricity businesses

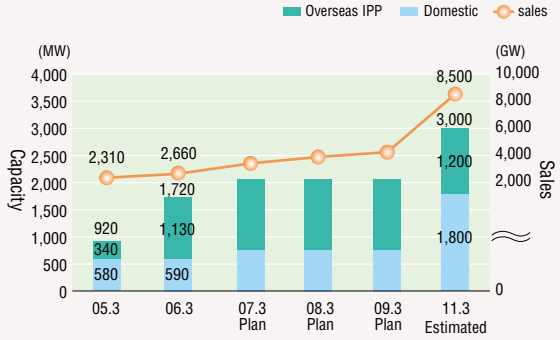
Osaka Gas has been building its electricity business in two fields; power retailing and wholesaling (IPP business). For retailing of electricity, we have our own generation facilities of 18 MW at Senboku LNG Terminal and 50 MW at Himeji Terminal. Also, as additional sources of electricity, we have a business scheme of purchasing excess power from our customers' cogeneration system. For IPP business in the domestic market, our subsidiary Gas & Power Investment owns three plants with the total capacity of 450 MW all of which are sold to the local electric utility. In March 2006, Hayama Wind Power (51% owned by Sojitz and 49% by GPI) started its wind power generation having the total capacity of 20 MW. It is the company's first renewable power project. In the overseas IPP business, we have the total net ownership of 1,130 MW of power plants most of which are gas-fired combined cycle plants.

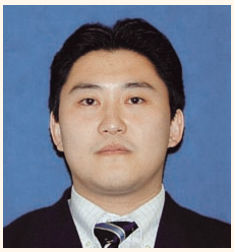
Hayama Wind Power

Targets of electricity business

In addition to the Senboku Power Plant project, Osaka Gas continues to build generation capacity including large scale cogeneration systems. Some of which are based on the excess power purchase scheme. Towards the year 2010, we have the target electricity generation capacity of 3,000 MW of which 1,800 MW in the domestic market and 1,200 MW in other countries. Total electricity sales volume in the domestic market is expected to be 8,500 GWh.

Trend of generation capacity and power sales





Expectations on a new power station

Mr. Junichi Ogasawara
Leader, Gas & Electricity Group
Strategy and Industry Unit
The Institute of Energy Economics, Japan

High expectations have been held on Senboku Natural Gas Power Stations in a number of ways for its contribution to Japan's energy policy. First is its contribution to addressing the global environmental problems. With a low CO_2 emission power station, it helps to lower CO_2 emissions, a benefit for the whole power industry. Secondly, it contributes to a stable supply of power through its good load-following characteristics. The plant could be a supplier of 'value-added power' with such excellent features together with smaller power loss due to its proximity to market. Thirdly, the plant helps achieve efficient energy utilization. With the launching of the power exchange market in Japan in 2005 and the establishment of the market environment for greater competition in electricity wholesaling, the power station holds high promises for successful operation in the new market environment. With these points in the background, we would be watching the development of a new power station with great expectations.

Developing Energy-efficient Systems

～Two types of fuel cell gaining attention～

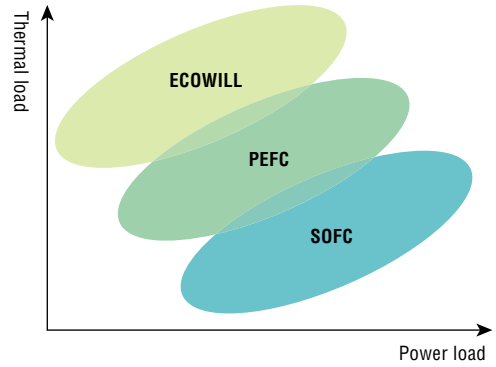
Gas-fired cogeneration systems simultaneously generate electricity and thermal energy which is recovered as hot water. Among different cogeneration systems, we already have commercialized 'ECOWILL', the engine-driven cogeneration system for households. In addition, Osaka Gas has been actively developing fuel cells that are more efficient.

Fuel cells: Generating electricity by hydrogen and oxygen

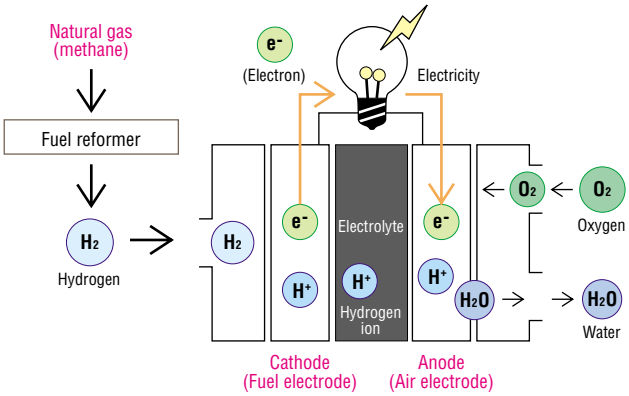
Fuel cell generates electricity by chemically reacting hydrogen obtained by reforming natural gas and oxygen in the air. Heat generated in this process is used to make hot water. Unlike conventional thermal power generation of transforming combustion energy to drive turbine and generate electricity, there is less energy loss because in the chemical reaction process of fuel cell, there is no energy loss of converting combustion energy into rotation movement. Because of this feature, fuel cell is superlative in an extremely low level of noise and vibration and practically no harmful emission.

Fuel cells are different by types of electrolyte materials used. Phosphoric acid fuel cells were first developed and over 400 units of this type were used around the world for commercial and industrial uses. Now, our attention is focused on new types of fuel cell. One, polymer electrolyte fuel cell (PEFC) is fit for household use because it's more compact and easier to install, and the other, solid-oxide fuel cell (SOFC), has higher generation efficiency. Osaka Gas has been working on these systems. When developed and commercialized, the energy-efficient and environment-friendly fuel cells would help to realize a society with distributed energy systems. We are working to help realize that kind of society.

■Three types of cogeneration system



■Principle of fuel cell



Features of PEFC

Using polymer membrane as an electrolyte, PEFC features high energy conversion efficiency, and the use of heat recovered in the generation process. Compared with conventional processes, the system achieves reduction of energy consumption by 25% and CO_2 emission by 40%, the characteristics that heighten public attention as environment-friendly systems.

In the R&D of a 1kW PEFC system, Osaka Gas has been engaged in developing a fuel processor with a world-class performance and a waste-heat recovery system with self-learning control functions. Working closely with fuel cell manufacturers, we have conducted various tests and demonstrations to evaluate reliability and durability as well as cost reduction prior to commercialization.

As part of our work, we have participated in the large-scale demonstration and verification tests of PEFCs sponsored by NEDO* since FY2006 in which 28 units have been installed in actual houses. We will be actively taking part in the second-phase and future government-assisted undertakings for achieving greater durability and further reducing costs.

* New Energy and Industry Technology Development Organization

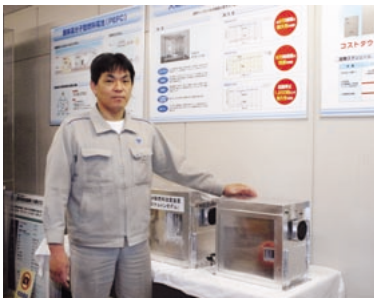
Field test

Commercialization of PEFC in FY2009 in sight ~ Developing PEFC ~

PEFC has been developed primarily by leading automobile manufacturers in the world as a mobile power source. Its operating temperature of 70 to 80 degrees Celsius, which is lower than other types, features the system's quick start-up compared with others together with its smaller size. With these advantages in the background, Osaka Gas has worked with cell manufacturers since 1999 for a development of household-use fuel cell. Our R&D targets include energy conversion efficiency of 35%*, 15 points higher than engine-driven cogeneration systems, as well as a unit price of about 1 million yen in FY2009.

In our development activities, we have focused on the reforming of high-purity hydrogen from natural gas. A major technical challenge has been found in removing carbon monoxide generated in the process of fuel reforming which deteriorates the cell. Through our R&D activities using our expertise accumulated through our experience of gas manufacturing from coal and oil, we have succeeded in developing catalysts that dramatically reduce carbon monoxide contents from 5,000 ppm to less than 1 ppm. With the development of the catalysts, we have cleared the hurdle of the generation efficiency of 35%.

But the problems are far from over. Because household equipment should be free of regular maintenance unlike those for industrial use, we should achieve the durability of the fuel cells of 10 years or 90,000 hours of operation without maintenance. Products without such durability have no commercial value. This is equal to the durability 18 times higher than regular automobiles as 100,000 kilometers is equivalent to 5,000 hours of driving. During the past several years, PEFC has been developed as part of the government-sponsored R&D project and our engineers have been working in cooperation with other companies to achieve the target durability of 90,000 hours. By working jointly, we have succeeded in identifying factors that deteriorate parts and making improvements on them. Now the operating hours of PEFC have exceeded 40,000 hours and our goal of achieving the target durability is already in sight.



Seisaku Higashiguchi
Residential Cogeneration Development Dept.

Since joining the company, I have been involved in the development of PEFC. The fuel cell technologies have become an important part of my career. Through the work, I want to contribute to my company's commitment to improving the environment.

To achieve an apex in the efficiency of fuel cells ~ Developing SOFC ~

In parallel with PEFC, Osaka Gas has been engaged in the development of solid oxide fuel cell (SOFC) that has a potential of achieving higher efficiency than PEFC. To take advantage of this feature, we have been developing systems suited to households and apartments with lower thermal energy requirements. By setting a target efficiency of 45%*, a point much higher than PEFC's 35%*, we have been working to develop a system with higher electrical efficiency and capabilities for more efficient thermal energy utilization compared with commercial power.

The reason we are persistent about electrical efficiency is that we want to achieve a maximum level of economics of energy utilization by shifting energy output to power generation by SOFC while recovering smaller amount of waste heat for making hot water. Using waste heat as the energy source for water heating is a by-product of the generation process. Heated water stored in a tank helps to use energy more efficiently. SOFC, with its higher electrical efficiency, generates only half of thermal energy of that of PEFC and 1/5 of engine-driven systems. Higher electrical efficiency enable the system to be operated continuously with effective use of waste heat for heating water which is stored in a compact storage tank making it possible for installation in a condominium.

In FY2006, we started verification tests by installing the fuel cells in households and during the year we recorded a daily average electrical efficiency of 44.1%, considerably higher than the average efficiency of 40% at conventional thermal power plants supplying electricity to the grid. Use of waste heat from fuel cells also proved very effective in energy saving. We have been working with Kyocera since April 2004 and focusing our activities on improving the durability in order to realize our planned market introduction in FY2009. Because of its highest efficiency among all types of fuel cell regardless of power output, R&D has been conducted actively on a global level. We will accelerate our efforts towards commercialization so that a day will soon come when many households will be using SOFC.

Minoru Suzuki
Energy Technology Laboratories

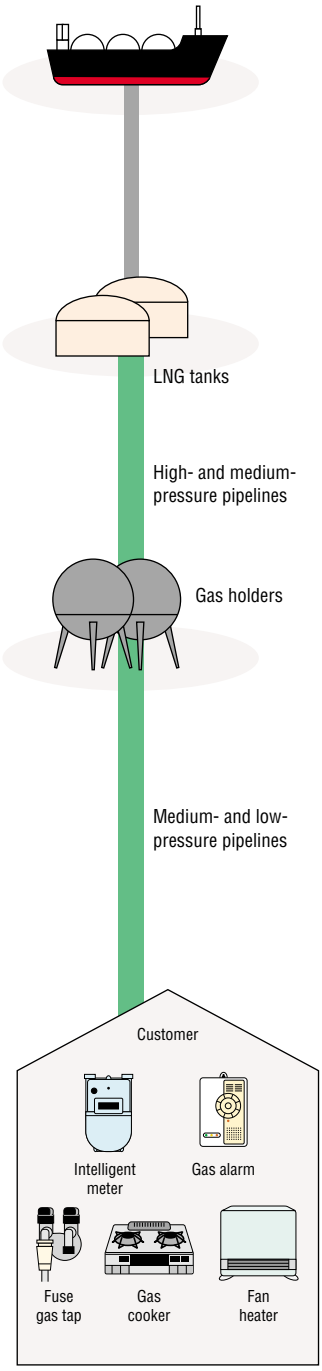
* : thermal efficiency on LHV (lower heating value) basis, total calorific value of a fuel minus latent heat of water vapor.

Safe and Stable Supply of Gas

～Renewal of emergency response system and thorough implementation of drills～

As a gas utility, our most important mission is to supply gas to our customers safely and reliably around the clock. In order for our customers to use gas with a complete peace of mind, we are constantly upgrading our gas supply systems, emergency response and safety systems.

Ensuring stable supply ～Safety and emergency response systems～



● Procurement

Osaka Gas has long-term contracts with 6 LNG producing countries for ensuring long-term stability of LNG supply. These diversified sources of supply coupled with our acquisition of interests in gas fields and ownership of LNG carriers help to achieve uninterrupted supply.

● LNG handling/regasification

Preventive actions, early detection of problems, and disaster prevention

At the LNG receiving terminals of Osaka Gas, various actions are taken to achieve maximum level of safe and reliable operations; preventive work to maintain sturdy facilities resistant to disasters such as earthquakes, early detection and monitoring systems against problems such as leakage, and emergency systems to prevent spreading of problems.

● Gas supply

Upgrading of pipelines

Gas distribution facilities are upgraded constantly in a planned manner on the basis of medium- and long-term gas demand projections.

Round-the-clock monitoring of gas supply

To ensure safe and reliable supply of gas to our 6.7 million customers, we maintain the round-the-clock monitoring system.To be fully prepared against natural disasters such as earthquakes, we are developing and disseminating pipes resistant to earthquakes. As part of our infrastructure to deal with problems in case of disasters, we have a company-wide private radio network for effective emergency communication, and network isolation and shut-off systems to suspend gas supply and to prevent secondary accidents.

● Customer safety

Gas appliances with safety features

In order to realize safe use of gas in households, we have been disseminating various safety devices. For safe gas supply in the home, we have intelligent meters, gas fuse, and gas leak alarms. For safe use of gas, a number of new safety features have been installed on gas appliances such as flame failure sensors, over-heat prevention devices on cookers to prevent oil fire, incomplete combustion prevention device, and emergency shut-off device activated in case of toppling of space heaters.

Safety inspection

Once every three years, we visit each and every customer to conduct inspection of housepipes and air-intake and vent of gas water heaters in order to ensure safe use of gas.

Emergency response system ~ shift to broad area/integrated organization ~

To meet more accurately to emergency response and dispatching needs, we upgraded our conventional system by integrating the response and dispatching bases into a centralized location. In the new system, both emergency calls/enquiries and dispatching work is handled centrally at the head office. Prior to its launching, studies for the integration was started in November 2004. As of May 14, 2006, the emergency work has been centrally integrated to the Central Distribution Control and Command Center at the head office to take care of the whole Osaka metropolitan region.

In the new organization, an experienced dispatcher gives command on all emergency actions from enquiry reception to dispatching. By integrating the information and command, we can improve the work associated with emergency dispatching by reducing the time required for travel to reach the scene. The new system is supported by our enquiry reception/emergency dispatching system. Each emergency vehicle is equipped with a GPS navigation system and a mobile PC. By using the system, a driver of the vehicle can drive in the unfamiliar neighborhood and move to take a quick action upon arrival. Also, digital map and pipeline information can be sent directly to the vehicle while it is receiving the hand-written command directly from the central command.

The emergency response/dispatching activities in other regions in the whole service area will be centralized towards September 2006. Our commitment to safety and reliability of gas operations will remain the same and our system will continue to evolve to fulfill our mission of safe and reliable gas supply.

Naoki Yano
General Safety & Distribution Control Dept.
Pipeline Business Unit

Towards higher earthquake preparedness

After experiencing the 1995 earthquake, Osaka Gas started working on a new 5-year anti-earthquake program and completed it in 2001. The new program is focused on three points; first is the higher preparedness in improving anti-seismic performance of facilities, and two, emergency action plans to prevent secondary accidents, and third, actions to restore service after an earthquake. Though the program still maintains a high standard of preparedness, we have implemented some new actions following the enactment of new regulations foreseeing potential major earthquakes in July 2003.

Yoshiaki Miyanaga
General Safety & Distribution Control Dept.
Pipeline Business Unit

Osaka Gas periodically conducts an earthquake drill involving gas distribution facilities and personnel. In a new drill scheme introduced in 2004, participants are not notified in advance a level of damage. They are required to take actions on unknown status of earthquake damages. By conducting such a drill which requires concentration on the part of participants, analyses are carried out to review and to identify problems associated with earthquakes and to build new action programs.

Assuming possible major earthquakes in nearby regions of the service are, we are working to fortify our facilities' resistance particularly to tsunami. We will also utilize the intranet to share information on the site dedicated to disaster information.

Our anti-earthquake activities are an on-going effort and we will continue to focus on our actions to minimize potential damages to our facilities and to increase our level of preparedness against them through drills and other initiatives.

Earthquake drill

Organization for Protection of Customer Information and Use of IT

Of the enormous amount of information handled by the Osaka Gas Group, customer information requires our special attention. The group uses its various resources to secure information and to protect privacy of customers.

Our approaches to protecting information
~ Organization, human resources, systems, technologies ~

Makoto Nonogaki
General Affairs Dept.

In the gas supply business to our 6.7 million customers, we handle enormous amount of customer information including their names, addresses, gas consumption volume, appliance servicing records, etc. Osaka Gas has been fully aware of the importance of customer information and has implemented rules to appropriately handle and manage information. With advances in IT, we are particularly concerned about greater risks associated with leakage of information. With the enactment of the Personal Information Protection Law in April 2005, we are required be more cautious about our handling of personal information. We have, accordingly, reviewed our internal rules and manuals for implementation of our rules for information management.

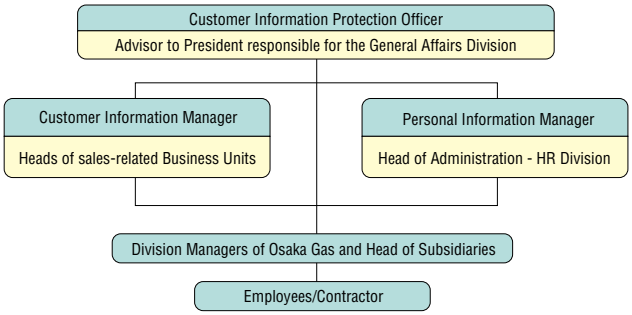
As the first step in our work, we disclosed our privacy policy and established the group-wide organization. The policy sets out rules of handling personal information on customers and shareholders and it contains regulations on management, disclosure, and use of personal information on the basis of the law. The policy has been posted on our website since March 2005 and it has been distributed in print to all our customers.

We have also taken actions for specific rules to encompass the entire group of Osaka Gas; group-wide rules for organization for information management, education of employees through e-learning and other means, protection of information against illicit access and theft through control of access to buildings, technical rule for improving security of information through restricting access.

We have taken positive steps to raise the employees' and the management's awareness as well as standardizing work processes related to information management, together with reducing factors for human error and supervising of work conducted by contractors. Implementation of our activities is reviewed voluntarily within the organization. The Auditing Department also strictly monitors the results of actions.

We are also working closely with two of our subsidiaries, contracted by Osaka Gas, that are associated with customer information; Kansai Business Information in customer service enquiries and OGIS in operating our IT system, in order to establish our internal certification system.

■ Organization for protecting personal information



Despite our activities, we experienced unexpected release of customer information as shown below. In order to prevent recurrence of these incidences, we will conduct a thorough review and will implement actions, including mobile use of information, supervision of contractors, enlightenment activities for front-line employees, etc.

■ Incidences related to release/loss of customer information

Date	Incidence	Information lost
July, 2005	Loss of memory card used on a mobile terminal for facility survey work	Customer information - 513 customers
September, 2005	Loss of receipt of gas bills at contractor's	Customer information - 26 customers
December, 2005	Release of internal electronic data at contractor'	Customer information - 23 customers
March, 2006	Theft of bag containing information	Customer information - 101 customers

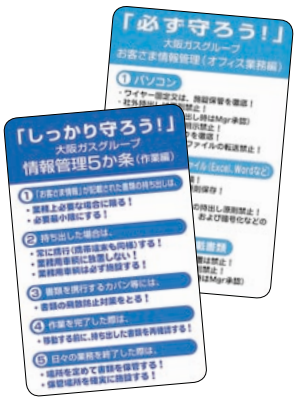
Nurturing a culture for protecting customer information

Shingo Ogino
Customer Relations Dept.
Residential Energy Business Unit

For general household customers, we handed out to new customers the Gas Safety Manual containing our rules for use of customer information. Starting in March 2005, we launched a toll-free telephone number for enquiries on disclosure of customer information. By dedicating a single telephone contact, we have established an appropriate system for enquiries. The Customer Information Handling Manual, first established in 1991 based on the industry guidelines has been updated and the most recent revision was made in April on the basis of the Personal Information Protection Law of April 2005.

Our privacy policy cannot be achieved without establishing a culture within our group for protection of personal information. To that end, all the members of the group need to share both the same consciousness and knowledge. For this purpose, our manuals need to be digested and to be translated into actions and work processes. As a tool for this purpose, we prepared a booklet on privacy with illustrations and easy-to-understand materials for employees to learned and for them to be kept at work. A similar card has been prepared by our residential sales workforce for them to be used in their daily work. For supervision of our contractors, we periodically conduct a voluntary assessment of these companies by our Residential Sales Department.

Personal Information Booklet



Card on Personal Information Rules

Strengthening security of information ~ Continuous process in the field of IT ~

Information technology was first introduced to Osaka Gas for its application to billing activities. Now, use of IT has spread to the entire company having more than 10,000 terminals each containing vital information. Naturally, we have used IT to improve the security of information. In our IT strategy, improving security and reducing costs have been the two focal points and we have implemented actions to standardize IT infrastructure and to integrate the data into the computer center by reviewing the entire systems and security management levels of information.

In the areas of software, we have taken actions in four key fields; establishing rules, strengthening follow-up system, fortifying system and operation, and education and training. Establishing rules called for rules and guidelines for the use of the network, follow-up system for improving security based on risk assessment. For strengthening system and operation, we have introduced security system for computer terminal by using smart cards as well as use of anti-virus software for all the terminals. External auditing is conducted to find loopholes in the server open to outside accesses. In order to facilitate understanding by employees, we have given e-learning opportunities for all the employees on security.

By putting into practice our ideas on security of information, we have achieved higher levels in managing security of information. We are, however, not satisfied with these achievements as IT is a fast-growing field and we are not allowed to be complacent with our achievement. We will continue our work to improve a higher level of security of information.

User identification for higher PC security

Incorporating Customers' Voice into Management

~ Listen-and-Interact Activity ~

For Osaka Gas, a public utility, customers' comments and reactions are an essential element in making our business and managerial focuses. We use various opportunities to listen to what our customers think about us and work to incorporate it into our operations.

Use of IT for improving services ~our Customer Center and Hello Service ~

The company's slogan of 'Service First' has long been a prevailing work principle for the entire group not only limited to those divisions related to customer service. Since 1990 under the leadership of the chief service officer, we have implemented a number of new initiatives to improve the level of customer service across the company. The 'service first' tradition has taken root deeply in our utility operations and now it comprises a part of our corporate culture.

Statistically, we have about 20 million contacts with customers in a given year. Of these enormous contacts, customers' call made to our Customer Centers number over 3.7 million. The Customer Center, a focal point of customers' enquiries, was established in 1986 as a one-stop contact point for customers for their queries. In 1987, we upgraded the system using communication networks to link all our affiliates and contractors for speedy and reliable services. This service, named 'Hello Service', has been implemented across the entire service area. Between 1999 and 2001, the Customer Center network underwent a major improvement for integration into two locations together with upgrading of information and communication systems. Under the new system, more speedy reactions, reduction of human error, and smaller time allotments for visiting service became possible.

Customers' voice for improving service ~C-VOICE ~

Calls received at Customer Centers vary in their contents; comments, questions, requests, complaints, problems, appreciation, etc. Many of them indicate that there is room for changes for improvement in our services. C-VOICE is a system of putting together those calls that require our attention into a database. Attached with index and notes for actions, the information is shared via the intranet. By sharing the information both by the management and employees alike, it enhances corporate actions to meet customers' expectations.

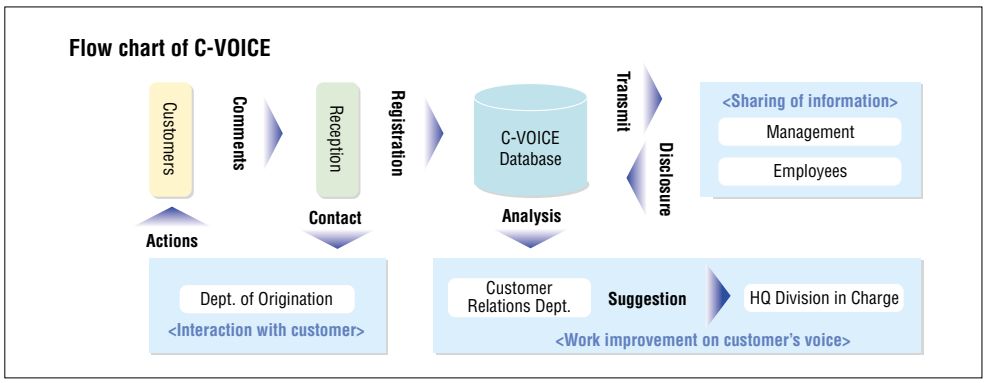
Through the database, we can often identify human errors in the process of interaction with customers which resulted in complaints. By changing the work process in which employees are alerted of any potential risks, we can reduce elements of human errors. Customers' voice provides us with suggestions for improving the work process. Going over the database for the past three years, one can see that the customers' complaints reduced in number and their appreciation increased.

A good example of the use of C-VOICE is an addition of information to those residential customers on large-volume tariffs indicating the amount of their energy saving compared with the general tariff. Another example is found in an improvement in the preparedness of our contractors for appliance servicing to meet their servicing requests on the day of the customers' calls. When we go through the C-VOICE with awareness for improvement, we can identify through those incidences which we can work on to improve the level of customer satisfaction. We will continue our use of the system to further our work on upgrading our customer service.

Akihito Fujita
Customer Relations Dept.
Residential Energy Business Unit

■ **Customer enquiries in C-VOICE**

	04.3	05.3	06.3
Complaints	464	274	227
Comments, requests	7,015	5,774	4,925
Appreciation	1,513	1,688	2,307



Kansai Federation of Consumers' Associations

Dialogue with opinion leaders and consumer groups

While the business environment of the energy industry changes as a result of environmental problems and energy market deregulation, what the society expects of us becomes increasingly diverse and complicated. Under these circumstances, leaders of consumer groups and NPOs/NGOs are important opinion leaders who provide us with informative suggestions and comments. As part of our activities to enhance dialogue with these people, we regularly hold meetings and discussions with the federation of consumer groups. On an annual basis, our executives and those leaders meet to exchange views on their concerns.

In these sessions, we have increasing number of questions raised on environmental protection and compliance that are reflective of the public concern over the social responsibilities of corporate enterprises. One such important question concerns energy market deregulation, whether or not the changing market landscape of the energy industry brings benefit to consumers over the long term.

To those tough comments and questions, we should react positively to live up to their expectations. They are in essence could be an important asset in considering our businesses. As a housewife myself, sometimes their concerns are the same as those of mine.

We are also working closely with the local communities. In each regional division, we have officers and community relations groups to directly interact with the local community. Through these interactions with customers, community groups, and NGOs/NPOs, we receive important suggestions and recommendations that are addressed to the management of a utility. Both the management and employees of the company need to seriously consider those points in order for us to remain a reliable business enterprise in the years to come.

Junko Hashimoto
Customer Relations Dept.
Residential Energy Business Unit

Osaka Gas, as a public utility, should always incorporate those opinions from the community into its business activities and strive to maintain a posture of listening to all the voices of our customers. A single opinion could potentially change the company for the better. As a person engaged in customer relations, I want to interact with broader range of people from senior citizens to small children.

Mr. Hideo Iida
Secretary Genaral
Osaka Board of Consumer Organizations

Creating new dimension of value for customers

Many businesses have contact points for receiving customers' complaints and opinions on their products and services. Customers' voices project facets of products different from those seen by businesses. What lies behind those customers' voices is for businesses to identify, a test for companies in their ability to use their capabilities. In this sense, C-VOICE is a new undertaking implemented by Osaka Gas whose effective use of the program we very much look forward to.

When a problem associated with a product occurs, a manufacturer or marketing company publishes a public notice on newspapers. A survey once showed that consumers complain about those notices, saying that, (1) characters in the notice are too small to read, (2) title of the notice fails to specify the extent of seriousness of the problem, (3) a degree of danger cannot be known, etc. This is evidence that the company's message did not get across to its consumers.

It is no easy task to incorporate consumers' voices in the management of an enterprise, but if the company fails to do so, its management may suffer even more serious consequences. For Osaka Gas whose operation has entered into a second century with their policy of 'value creation management,' it is their social responsibility to raise a level of value for stakeholders to a new dimension.

For the Benefits of All Our Customers

Gas Rates for Households

To provide its customers with better economy in the use of gas, Osaka Gas has a variety of rates for various applications of natural gas. This is part of the company's on-going efforts to reduce costs of gas operations through enhanced utilization of its gas infrastructure.

A wide range of rate schedules are available for residential customers of Osaka Gas. They include; a special rate for users of gas floor heating systems, a cogeneration rate for users of ECOWILL, a residential gas air-conditioning rate, and a special discount rate for customers with the combined use of floor heating, bathroom heater/dryer, and gas cookers. Customers on these rates number over 350,000. In July 2005, a new rate was introduced exclusively for the use of the latent heat recovery type high-efficiency water heater called Eco-Jozu.

For commercial and industrial customers, various contract tariffs are available for different applications of natural gas.

For Residential Gas Customers

Natural Gas for Comfortable Lifestyles

The four benefits natural gas, i.e. environmental friendliness, economy, comfort, and safety is delivered to customers through gas appliances and new gas applications for homes.

Osaka Gas delivers the three modern conveniences of natural gas.

ガスがあるから暮らし自由自在
ウィズガス

Modern lifestyles with gas

Four benefits of natural gas

● Environment-friendly

Natural gas is an energy form friendly to the environment. Through such higher efficiency gas equipment as ECOWILL cogeneration systems and Eco-Jozu latent heat recovery boiler, it helps to reduce the environmental impacts of energy utilization.

● Economy

Osaka Gas provides its customers with better economy of natural gas use through economical rates with considerable cost savings.

● Comfort

Gas floor heating systems, Mist Sauna, and modern cookers bring higher levels of comfort in people's lives.

● Safety

Various safety devices on gas appliances help ensure safety in the use of gas. Other services for households include internet-linked home security service.

Three modern conveniences of gas

● Cooking

Gas cooking appliances for rich culinary activities in the home include cookers, rice cookers, ovens, etc. with good energy performance and controllability.

Various gas appliances for enjoyable cooking

● Power generation

ECOWILL cogeneration system generates electricity in an environment-friendly way in a household. (Refer to page 46 for details)

● Home esthetics

Mist Sauna creates a pleasant environment for esthetics and relaxation in the bath.

Mist Sauna KAWACK

For Improved Customer Service

Servicing of gas appliances

Osaka Gas targets customer satisfaction in gas appliance servicing and repair within a day after making a house visit. To that end, we have worked to streamline operations including technical skill training, staffing of engineers, logistics of parts delivery, etc. We have achieved 90% of our '1-day service guarantee' target in FY2006.

Customer enquiry reception

Since April 2005, Osaka Gas has implemented longer customer enquiry reception and work implementation program for appliance servicing. Now, servicing request receiving by 3 pm is completed during that day.

Enquiry reception at Call Center

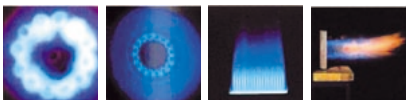
Home Security Services

Using an internet connection provided by NTT, Osaka Gas Security Services operates a home security service. Safety in the home is ensured around the clock.

For commercial and industrial customers

Expanded Use of Natural Gas

Osaka Gas develops various new applications of natural gas such as burners and furnaces that are friendly to the environment and energy efficient. These systems help switch user of fuel oil to natural gas. Other innovations include gas cooling and air-conditioning equipment, natural gas vehicles, and other environment-friendly uses of natural gas.



Custom-made gas burners for industrial customers

Solution-marketing for Natural Gas

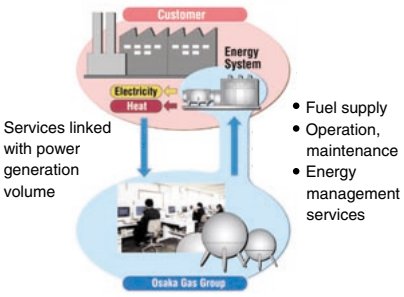
The Osaka Gas Group provides solutions to its customers' energy needs through R&D and engineering services for commercial and industrial customers.

To facilitate the use of gas through lower initial costs, we have developed an innovative energy service called 'EcoWave' which features lower investment with leasing and energy services provided by the gas company. There are some 450 customers who take advantage of such services. We also have remote controlling and operation services for cogeneration and other equipment. They are popular among those customers who want to reduce their burner in operation and management of energy equipment.

Enhancing reliability of gas utilization is another focal point in serving our industrial customers. We provide our customers with tailor-made services for maintenance and repair to ensure uninterrupted operation of their energy equipment.

We will continue our commitment to better serve our customers by employing our resources including engineering, IT, finance, maintenance, and safety management skills, in order to achieve energy and cost saving of our customers.

■ **EcoWave**
(Power Generation-linked Energy Service)



Customer Value

Promoting Compliance

Code of Conduct of the Osaka Gas Group

Being a public utility, Osaka Gas set forth the Osaka Gas' Corporate Code of Conduct and the Code of Conduct of Affiliated Companies in October 1998 in order to define its missions and its business activities for the customers and the communities it serves. In February 2002, the codes were developed into the Code of Conduct to encompass the executives and employees of the entire Osaka Gas Group.

The Code is the basis of business activities applied to Osaka Gas and all its affiliates and it is composed of 15 items including, respect for human rights, considerations for environmental protection, ensuring safety of products and services, and fair trade practices. It is revised upon establishment of the CSR Charter of the Osaka Gas Group in April 2006.

Distribution and notification of the Charter/Code of Conduct and compliance case study to all employees

Organization for Compliance

As the body for overseeing the compliance of the entire Osaka Gas Group, we have the CSR Committee (chaired by the CSR Executive) which consists of executive of Osaka Gas, delegates of core companies and the labor union, and other external members. Positioning compliance as a basis and prerequisites of CSR, the committee supervises the status of the compliance of the Osaka Gas Group.

As the operating division of compliance, we established the Compliance Department in April 2003 and it is responsible for education/training, communications, revision of the code, internal notification, and other activities for the Group.

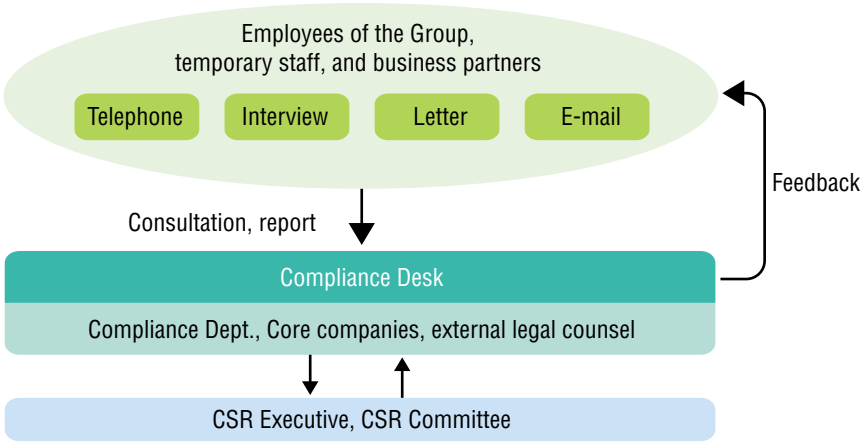
Within each division of Osaka Gas and subsidiaries we have a compliance delegate and a representative who act as liaisons in implementation of compliance-related activities.

* Refer to page 10 for CSR management structure

Compliance Desk (Internal notification system)

As an internal notification system, we established the Compliance Desk in FY2004 which handles notification from employees. Annually, about 30 cases have been notified. Upon receipt, they are examined, and when necessary, and thoroughly investigated. The results are made into corrective and preventive actions.

With the enactment of laws on protection of privacy of notifying parties in April 2006, Osaka Gas acted accordingly to enhance the privacy of those notifying or reporting compliance-related problems and complaints. Also the scope of accommodating notices/reports was broadened to include the business partners of the Osaka Gas Group, and a contact person for compliance was appointed at each core company of the group.



Internal Training/Education

Educational activities are conducted to develop awareness on compliance at all levels of employees. During the previous year, over 8,000 employees took part in educational sessions, thus completing the program for all employees of the group. These activities will be continued.

■ **Results of compliance education/training during the past three years**

Employee types	Types of classes	Participants		
		04.3	05.3	06.3
Management	Seminars by external specialists	160	150	170
Manager, supervisors	E-learning, group studies	1,643	224	811
Compliance representatives	Group studies	69	—	110
Regular employees	Group studies	73	6,389	8,084

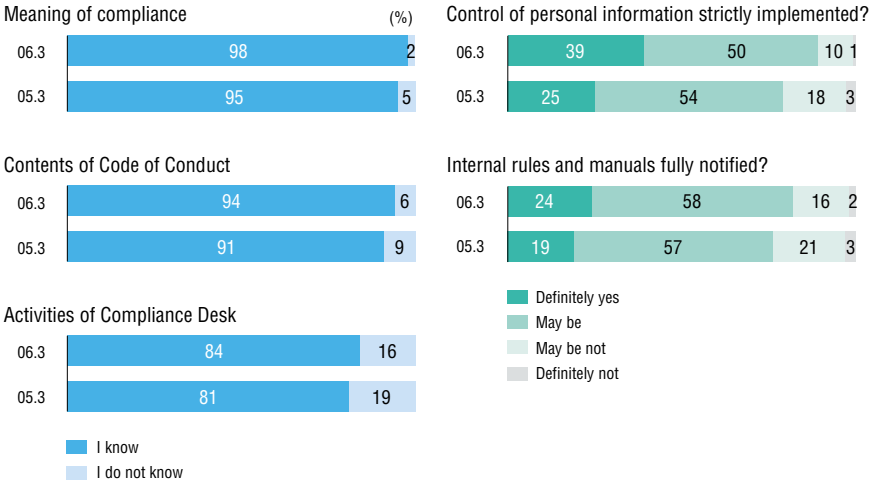
Internal Questionnaire

In order to assess the status of compliance and to identify issues for future actions, a questionnaire/survey is conducted once a year and participated by 4,000 employees of the Group chosen randomly. Responses were made anonymously on 80% of the questions.

In the third survey conducted in FY2006, more than 90% of the respondents were aware of the compliance and the Code of Conduct, and more than 80% of them knew about the Compliance Desk.

On the questions related to compliance activities in their workplace, higher percentage of the respondents exhibited their higher awareness on compliance. All these activities need to be a continuous process and that efforts will be made to further the employees knowledge and awareness about corporate and employees' compliance actions.

■ **Results of Internal Survey (excerpt)**



Inappropriate conduct related to Eco-Station construction contracts

It was recently revealed that there had been some actions by a subsidiary within the group allegedly violating the Anti-Monopoly Regulations between 2002 and 2005 in relation to the contract work for construction of Eco-Station, a natural gas filling station for vehicles.

As a group of enterprises committed to strengthening the compliance with a view of compliance as the prerequisite for business activities, the Osaka Gas Group deeply regrets such inappropriate actions and would never condone them.

We will fully cooperate with the Fair Trade Commission in their investigation of the case. We are determined to take actions to prevent a recurrence including withdrawal from the contract work in question, review of the work process, and education on compliance directed to all the employees within the subsidiary. Furthermore, across the entire Osaka Gas Group, we will implement the following; a full review of compliance within the management, full penetration of the Corporate Code of Conduct for the Group, and a thorough check of the work processes of the group on the basis of the Code.

We will face squarely the challenges arising from the problem and bear in mind once again that we would not be able to gain trust of the society without implementing full compliance. We are determined that we will strengthen our compliance so that such a misconduct would not recur.

Contributing to harmonizing with environment and to realizing a sustainable society (From the Osaka Gas Group CSR Charter)

Addressing the issues of the environment both at regional and global levels is of paramount importance for the Osaka Gas Group which is engaged in wide-ranging energy services. The Group, being seriously aware of the impacts of its business activities on the environment, seeks to harmonize its businesses with the environment and to realize efficient utilization of energy resources, thereby contributing to achieving a sustainable society.

Osaka Gas Group Environmental Activities Policy

I. Reducing Environmental Impacts of Our Business	We aim to reduce the environmental impacts of our business activities. To this end, Osaka Gas Group will strengthen its environmental management system and promote internal activities aimed at saving energy and natural resources.
II. Reducing Environmental Impacts of Our Products and Services	By offering environmentally-friendly natural gas, and our products and services which contribute to reduce environmental impact, we are making our efforts in partnership with our customers to achieve environmental impact reduction. To this end, we will strive to develop energy-saving systems which contribute to environmental conservation.
III. Contributing to Environmental Conservation Locally, Nationally and Internationally	Osaka Gas Group aims to take an active part in environmental conservation activities in areas wherever we conduct business, both in and outside Japan.

Organizing for Environmental Conservation

Structure and Roles

The CSR Committee organizes and promotes CSR issues across the Osaka Gas Group. The Committee deliberates and follows up group's Environmental Activities. Beneath the Committee, Committee on Energy and the Global Environment is held to propose, implement and follow up on specific measures and targets, while there are also bodies to encourage environmental activities in all organizational units.

* See page 10 for the Organization Chart.

■ Structure of Environmental Conservation Promotion within Individual Organizations

Environmental Management Systems (EMSs) Implementation

Osaka Gas's ISO Certification Acquisition Status

Osaka Gas's ISO 14001 Certification Acquisition Status has progressed as shown in the table at right. Three business units gained certification in FY2006 (Pipeline Business Unit, Residential Energy Business Unit and Commercial & Industrial Energy Business Unit), and now the entire company is covered by seven EMSs.

We aim eventually to integrate all the EMSs across the company.

■ ISO14001 Certification in Osaka Gas Co., Ltd.

Department	Date
LNG Terminal & Power Generation Business Unit	Oct. 1997
Engineering Department (Construction sector)	Mar. 2001
Head Office Building	Sep. 2001
Energy Technology Laboratories	Jul. 2002
Pipeline Business Unit	May 2005
Commercial & Industrial Energy Business Unit	Feb. 2006
Residential Energy Business Unit	Mar. 2006

Status of EMSs Implementation in Group Companies

Externally certified EMSs such as ISO14001, Eco-Action 21 and KES, or the Osaka Gas EMS independently accredited by Osaka Gas will be introduced by FY2009 in our group companies in order to vigorously expand effective and integrated environmental activities across the Osaka Gas group. For core companies, the introduction will be completed in FY2007.

■ Introduction of EMSs in Osaka Gas Group

	Already introduced	To be introduced in FY2007
ISO14001	12 companies	9 companies
Eco-Action 21	—	1 company
KES	2 companies	—
Osaka Gas EMS	1 company	7 companies

Osaka Gas Environmental Management Indicators (Gas Business)

Developing Indicators with Major Environmental Impacts Converted into Monetary Values

Osaka Gas established Environmental Management Indicators in FY2004 and has been using them since then. We have been calculating the volumes of each of the significant environmental impacts and the monetary value of reductions in environmental impacts since the base year, FY1999 to provide integrated indicators of our progress in improving the environment as we conduct our business and the development of our environmental management. Given the nature of our business, for our Environmental Management Indicators we calculate the important environmental impacts that we and our customers generated (CO_2, finally disposed amount of excavated soil, finally disposed amount of industrial and general wastes, NOx and COD*) and the monetary value of the reductions in these impacts, and to follow up the results.

We have two criteria for our Environmental Management Indicators: Criterion I is the reduction in the environmental impact of our business activities, and Criterion II is our contribution to our customers reducing their environmental impacts. There are three indicators for Criterion I: Environmental Management Efficiency, Monetary Value of Environmental Impact Reductions and Environmental Impact Reduction Efficiency, in Business Activities. There are two indicators for Criterion II: Monetary Value of Environmental Impact Reductions and Environmental Impact Reduction Efficiency. We set target levels for each figure according to the FY2006 Medium-Term Environmental Targets and achieved them all. As for Environmental Management Efficiency, we are following up on the level of environmental impact per gas sales amount. This is calculated by dividing the monetary environmental impact value by the amount of gas sold. The lower the figure, the greater the reduction in the environmental impact per gas sales amount.

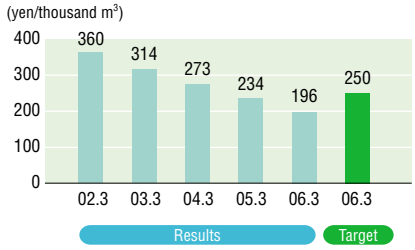
* Chemical oxygen demand. A high value indicates a high level of pollutants in water.

Indicators for Criterion I: Reducing Environmental Impacts of Our Business Activities

Environmental Management Efficiency (yen/thousand m³)

Environmental impact of business activities converted into monetary value

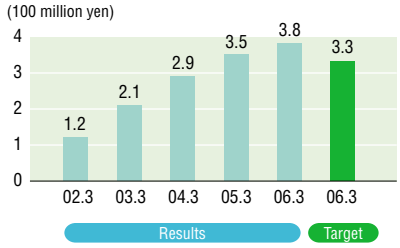
$$= \frac{CO_2 + NOx + COD + Waste + \text{excavated soil}}{\text{Amount of gas sold}}$$



Monetary Value of Environmental Impact Reductions *2 in Business Activities (100 million yen)

Reduction of Environmental impact of business activities converted into monetary value

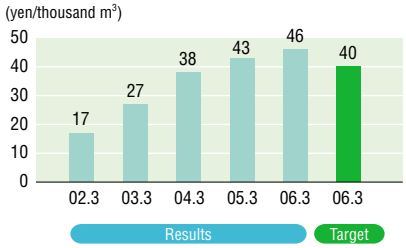
$$= CO_2 + NOx + COD + Waste$$



Environmental Impact Reduction Efficiency in Business Activities (yen/thousand m³)

Reduction of Environmental impact of business activities converted into monetary value

$$= \frac{CO_2 + NOx + COD + Waste}{\text{Amount of gas sold}}$$

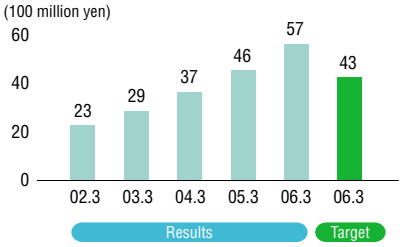


Indicators for Criterion II: Contribution to our customers reducing their environmental impacts

Monetary Value of Environmental Impact Reductions (100 million yen)

$$= CO_2$$

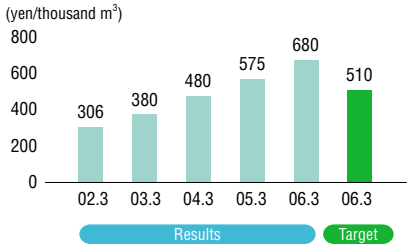
Monetary Value of CO_2 reduction by customers



Environmental Impact Reduction Efficiency (yen/thousand m³)

$$= \frac{CO_2}{\text{Amount of gas sold}}$$

Monetary Value of CO_2 reduction by customers



FY2006 Medium-Term Environmental Targets and Results

In striving for the early achievement of the FY2011 Environmental Targets established in FY2001, Osaka Gas set up FY2006 Medium-Term Environmental Targets in FY2004. Of these medium-term goals, 34 targets include 24 quantitative ones. 32 targets had been achieved ahead of schedule by the end of FY2006.

Objectives	Measures/Metrics			FY2006
I. Reducing Environmental Impacts of Our Business				
Promotion of energy-conservation in our gas operations	The amount of CO_2 emission per cubic meter of gas sales *1		P.36	(1) 25g-CO_2/m^3 (FY1999) ➜ less than 19g-CO_2/m^3
NOx emission reduction	Natural gas vehicles rate within the company		P.47	(2) 19% (FY1999) ➜ higher than 50%
Reducing & recycling of excavated soil	Finally disposed amount of excavated soil		P.38	(3) Approximately 380,000 tons (FY1999) ➜ less than
	Excavated soil recycling rate		P.38	(4) Recycling rate*2 42.2% (FY1999) ➜ more than 69%
Recycling of used gas pipes	Recycling rate of used polyethylene pipes		P.38	(5) Maintain 100% and improve the internal reuse rate
Promotion of Green Purchasing and Distribution	Improve the rate of Green Products in stationeries purchasing		P.40	(6) From 52% (FY2001) ➜ more than 70%
	Expansion of Green Distribution		P.40	(7) Request our business partners to convert their
Reducing & recycling of general/industrial wastes	**LNG terminals**	Aiming for zero emission	P.39	(8) Final disposal (industrial/general): 230 tons (FY1999) ➜
	Offices and Laboratories	Amount of general wastes and recycling rate	P.39	(9) Final disposal: approximately 1,000 tons (FY1999) ➜ Recycling rate: 43%(FY1999) ➜ more than 75%
		Amount of industrial wastes and recycling rate	P.39	(10) Final disposal: approximately 4,400 tons (FY1999) ➜ Recycling rate: 55% (FY1999) ➜ more than 80%
Improvement of environmental management systems	Acquisition of ISO14001 certification		P.27	(11) Company-wide efforts should be made towards

*1 The CO_2 emission of grid power consumption was calculated based on the questionnaires from 139 main partner companies. Please refer to page 40 for disposed of is approximately 0 tons. *5 Includes 953 tons of used gas

II. Reducing Environmental Impacts of Our Products and Services				
Dissemination of natural gas and energy-saving systems	Reducing CO_2 emission at the customers' end		P.44	(12) Reduce the amount of increment of CO_2 emission during FY2006 by 20%, as compared with FY1999 gas cogeneration and air conditioning systems
	Facilitation of customers' Energy-saving			(13) Reduce the amount of energy consumption during FY2006 by 6%, as compared with FY1999 gas cogeneration and air conditioning systems
Development of high-efficiency technology for gas appliances and systems	Improvement of efficiency for gas engine cogeneration		P.44	(14) Commercialize 6,000 kW models with 13% with FY1999 level (generating efficiency 38% ➜
				(15) Commercialize high-efficiency Miller cycle (380- efficiency as compared with FY1999 level
	Improve efficiency of air conditioners		P.45	(16) Commercialize large-type gas absorption-type 60% increased efficiency as compared with
				(17) Commercialize GHP with 50% increased efficiency
	Improve efficiency of water heaters for household use		P.46	(18) Develop condensing devices with 16% increased
				(19) Expand product variations of the above-stated new adoption of a bath water heater
				(20) Commercialize compact water heater model with with FY1999 level
	Cogeneration for household use		P.46	(21) Commercialize cogeneration system for household
Dissemination of low NOx devices	Commercialize low NOx dryer			(22) Commercialize ultra-low NOx (less than 15 ppm)
	Commercialize low NOx boiler			(23) Commercialize hot water boiler (200,000-500,000 FY1999 level (60 ppm ➜ less than 40 ppm)
Dissemination of natural gas vehicles	Establishment of filling stations		P.47	(24) 44 locations (FY2002) ➜ 90 locations
Eco Design of gas appliances	Household use		P.47	(25) Miniaturize and lighten ceiling-installation-type
				(26) Continue and disseminate the less packaging
Recovery and recycling of used gas appliances	Improvement of recovery rate			(27) As a group-wide effort, improve the recovery rate
	Improvement of recycling rate			(28) More than 80% for appliances collected through
III. Contributing to Environmental Conservation Locally, Nationally and Internationally				
Environmental contribution nationally and internationally	Dissemination of environmental technologies		P.50~52	(29) Disseminate technology for wet catalyst oxidation system
				(30) Disseminate afforestation technology with the VAM materials
	Reducing the environmental impact in public facilities			(31) Disseminate unused energy utilization system for
Develop new environmental technologies	Technology to process hazardous materials		P.52	(32) Develop and commercialize the dioxin processing
Environmental contribution to local communities	Ecological actions of employees		P.53~55	(33) Continue the activities in communities where our
	Environmental education activities			(34) Hold environmental classes at schools and

Targets	Achievements in FY2006	Results
(25% reduction)	17.2g-CO_2/m^3	○
	46.3%	×
70,000 tons (approximately 80% reduction)	50,000 t	○
	77.5%	○
	Recycling rate: 100%, internal reuse rate: 100%	○
	88%	○
distribution/sales vehicles to low-pollution types	85 companies using low-emission vehicles *3	○
less than 25 tons*4 (approximately 90% reduction)	4 tons (industrial 3 tons, general 1 ton)	○
less than 500 tons.	Final disposal: 176 tons Recycling rate: 84%	○
less than 1,760 tons (60% reduction).	Final disposal: 1,148 tons *5 Recycling rate: 87%	○
acquiring ISO 14001 certification in FY2006	Company-wide certification achieved	○

average emission factor for all types of power source (See page 36). *2 Recycling rate of excavated soil = [Amount of utilized soil for gas pipe construction] / [Amount of excavated soil] *3 We received valid replies to "low-emission vehicles." *4 25t is the 2.4% of the finally disposed amount of 1,027 tons in FY1994, the largest number during the 1990's. The figure includes the residue from recycling. When not included, the final amount appliances and equipment installed in housing

corresponding to the increase of city gas sales level, through the dissemination and promotion of	29.6%	○
corresponding to the increase of city gas sales level, through the dissemination and promotion of	8.4%	○
increased generating efficiency as compared more than 43%)	Commercialized 6,000 kW model with 44% generation efficiency	○
1,000 kW) models with 20% increased generating (generating efficiency 35% ➜ more than 42%)	Commercialized 380 kW long-stroke Miller cycle model with generating efficiency of 41.5%	○
chiller/heater (more than 100 RT) models with FY1999 level (COP 1.0 ➜ 1.6)*6	Commercialized large COP 1.6 absorption type chiller/heater	○
as compared with FY1999 level (COP 1.0 ➜ 1.5)	Commercialized COP 1.5 GHP	○
heating efficiency as compared with FY1999 level	Commercialized 95% heating efficiency condensing (latent heat recovery-type) space/water heater	○
devices, water heater (1 model ➜ 3 models),	Commercialized 14 models of water heater and one model of bath water heater	○
7% increased heating efficiency as compared	Heating efficiency of 83.5% or above achieved in compact water heater	○
use	ECOWILL on sale	○
direct heating laundry dryer for business use	Commercialized industrial-use clothes dryer with less than 10 ppm NOx emission	○
kcal) with 33% reduced NOx as compared with	Commercialized boiler with less than 30 ppm NOx	○
	75 locations	×
bathroom heater/dryer	40% smaller type as compared with FY2000 type on sale	○
	Ongoing	○
of 90%	93%	○
our recovery system	83%	○

*6 Coefficient of Performance

process and waste hydrochloric acid recycling	Joint venture sales company in China sold first catalytic wet oxidation process (Guangzhou, China) and accepted another order (Malaysia)	○
fungi, and commercialize the antibiotic microbial	The implementation of VAM fungi application technology in Indonesia is in process after the technology transfer to Indonesian government in FY2004	○
garbage incineration and water treatment plants	Biogas cogeneration sales reached approximately 21,000 kW (19 units at 11 locations) (cumulative since FY2002)	○
technology	Developed a filter to absorb 99% of dioxins in FY2003 Dioxin removal units containing the filters on sale	○
business offices are located	located Ongoing promotion	○
educational events in our company facilities	Ongoing promotion	○

FY2009 and FY2011 Environmental Targets

Osaka Gas established its long-term business plan "Vision 2010" in FY2000, under which the company promotes the Value Creation Management. A new medium-term business plan, "Design 2008", was issued in FY2006 for the period from FY2007 to FY2009, following "Innovation 100" from FY2004 to FY2006.

Objectives	Measures/Metrics	FY2009
Osaka Gas		
I. Reducing Environmental Impacts of Our Business		
Improvement of Environmental Management Efficiency	Environmental Management Efficiency (Monetary value of environmental impact per gas sales) (¥/1,000 m^3) *1	190 (62% reduction from the
Reduction in CO_2 emissions from our gas business	Amount of CO_2 emission per cubic meter of gas sales (g-CO_2/m^3)	15.4 g-CO_2/m^3 (28% reduction
Recycling of excavated soil	Recycling rate of excavated soil *2	75% or more
Reducing & recycling of general/industrial wastes generated from gas business	Zero emission in LNG terminals *3	Maintain the final disposal
	Amount of general wastes and recycling rate at offices and laboratories	Recycling rate: 90% or more, (90% reduction from the level
	Amount of industrial wastes and recycling rate at offices and laboratories *4	Recycling rate: 95% or more, (85% reduction from the level
II. Reducing Environmental Impacts of Our Products and Services		
Dissemination of natural gas and energy-saving systems	Reducing CO_2 emission at customers' *5	2.15 million t-CO_2 (compared
Promotion of technology development	Efficiency of household and other cogeneration systems	Further improvement
Recycling of used gas appliances	Recycling rate	90% or more
III. Contributing to Environmental Conservation Locally, Nationally and Internationally		
Promoting environmental communications	Ecological actions of employees	Joint environmental activities
	Environmental education activities	Hold environmental seminars
Developing and spreading new environmental technologies (apart from gas appliances and systems)	Disseminating environmental technologies nationally and internationally	· Dissemination of compact hydro-
	Promoting the introduction of renewable energy	· Develop techniques for generat-
		· Develop involvement in the wind
Osaka Gas Group		
[Affiliated companies]		
Controlling CO_2 emission from business activities	Reducing CO_2 emissions from businesses other than power generation and heating supply	Reduce CO_2 emissions per sales
Introduction of Environmental Management Systems (EMSs)	Acquiring ISO14001 and Eco Action 21 certification etc, or introducing Osaka Gas's own version of EMS *8	Acquire/introduce at all affiliated
[Electricity generation business]		
Controlling CO_2 emission	CO_2 emissions per amount of power generated	————

*1 See page 28 for details *2 Recycling rate of excavated soil

The new targets cover the Osaka Gas Group as a whole. There are 17 targets, including ten quantitative ones, which Osaka Gas Group will strive to achieve in FY2009 and in FY2011.

Targets	FY2011 Targets
level in FY2001)	185 (63% reduction from the level in FY2001)
from the level in FY2001)	15.1 g-CO_2/m^3 (30% reduction from the level in FY2001)
	75% or more
amount to nearly zero	Maintain the final disposal amount to nearly zero
amount of final disposal:100 tons or less in FY2001)	Recycling rate: 90% or more, amount of final disposal:100 tons or less (90% reduction from the level in FY2001)
amount of final disposal: 180 tons or less in FY2001)	Recycling rate: 95% or more, amount of final disposal: 180 tons or less (85% reduction from the level in FY2001)

= (Amount of utilized soil for gas pipe construction)/(Amount of excavated soil) *3 Emissions generated to be less than 3% *4 Excludes used gas appliances and residential installations

with FY1999 level)	2.5 million t-CO_2 (compared with FY1999 level)
	Further improvement
	90% or more

*5 See page 44 for details

with local bodies at branch office
and events using company facilities, and support the environmental education in schools (dispatching employees as speakers, etc)
gen production equipmen't, *6 new catalyst technology for flue gas treatment *7 and adsorptive storage of digester gas
ing methane from biomass and wastes
power generation business

*6 See page 50 for details *7 See page 52 for details

by 3.5% as compared with FY2005 level	Reduce CO_2 emissions per sales by 4.5% as compared with FY2005 level
companies *9	————

*8 Osaka Gas EMS based on Eco Action 21 *9 Affiliates within Japan with 11 or more employees

	70 or less (with emissions per kWh for FY2005 as 100)

Note: Target CO_2 emissions and reductions values are calculated with the coefficient for purchased electricity, 0.69 kg-CO_2/kWh

Environmental Impacts of Our Gas Business in FY2006

Value Chain

Overseas

At the mining sites of natural gas fields and liquefaction facilities

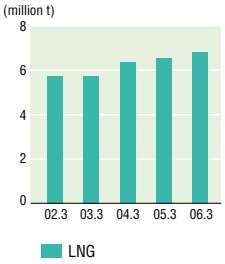
- Natural gas, which is of minor environmental impact, is used as fuel for electric power at the mining sites.
- Reducing environmental impact by improving generating efficiency through implementing waste heat recovery

In the shipping

- Natural gas is used as the fuel for shipping.

LNG Imports

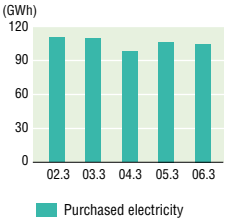
6.79 million t



Japan

Energy and Water

Purchased electricity ··· 104.44 GWh
Gas ····· 13,220,000 m³
Water ····· 1,100,000 m³



In-house Generated Power by Cryogenic 60.80 GWh

In-house Generated Power by Gas Pressure 23.66 GWh

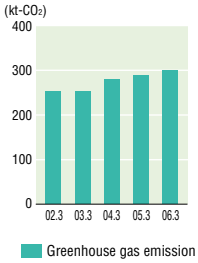
INPUT

Drilling in Natural Gas fields

OUTPUT

Emissions

Greenhouse gases ····· 300kt-CO_2

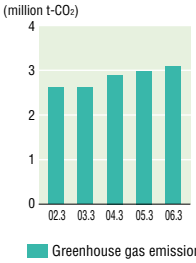


Liquefaction Plants

OUTPUT

Emissions

Greenhouse gases ····· 3092kt-CO_2

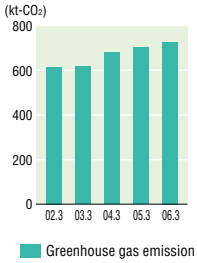


LNG Tanker Transportation

OUTPUT

Emissions

Greenhouse gases ····· 729kt-CO_2

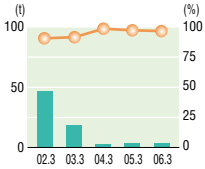


LNG Terminals (Production)

OUTPUT

Waste

Generation
General waste ···· 28t Industrial waste ···· 115t
Final Disposal
General waste ····· 1t Industrial waste ····· 3t
Recycling Rate
General waste ···· 96% Industrial waste ···· 98%



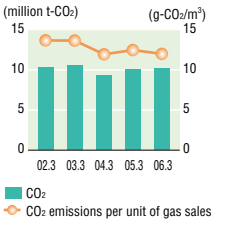
OUTPUT

Emissions

CO_2 ····· 102,000 t-CO_2

CO_2 emissions per unit of gas sales ····· 12.1g-CO_2/m³

NOx ····· 6.8t



To Tackle Global Warming: The Efforts of Osaka Gas

Being aware that global warming is one of the greatest challenges facing the energy industry, Osaka Gas has dealt with the problem in the following ways, and will continue to enhance its efforts in this area.

1) Promotion of the natural gas

Natural gas produces less CO_2 when burnt than any of the other fossil fuels. It produces virtually no SOx, which is the cause of air pollution and acid rain, and it produces less NOx. We are striving to encourage the use of natural gas to counter global warming.

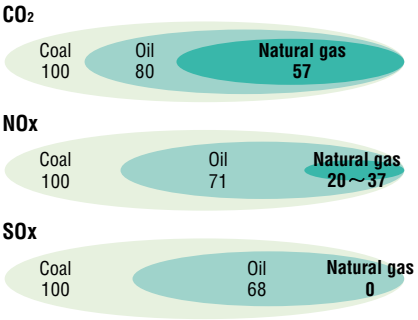
2) Reducing CO_2 emission from our business activities

We vigorously pursue policies to reduce energy consumption in our city gas manufacturing and other facilities in order to cut the levels of CO_2 emissions from our business activities. Osaka Gas completed ISO14001 certification in FY2006 and is pushing on with actions on that basis.

3) Reducing CO_2 emission at the customers' end

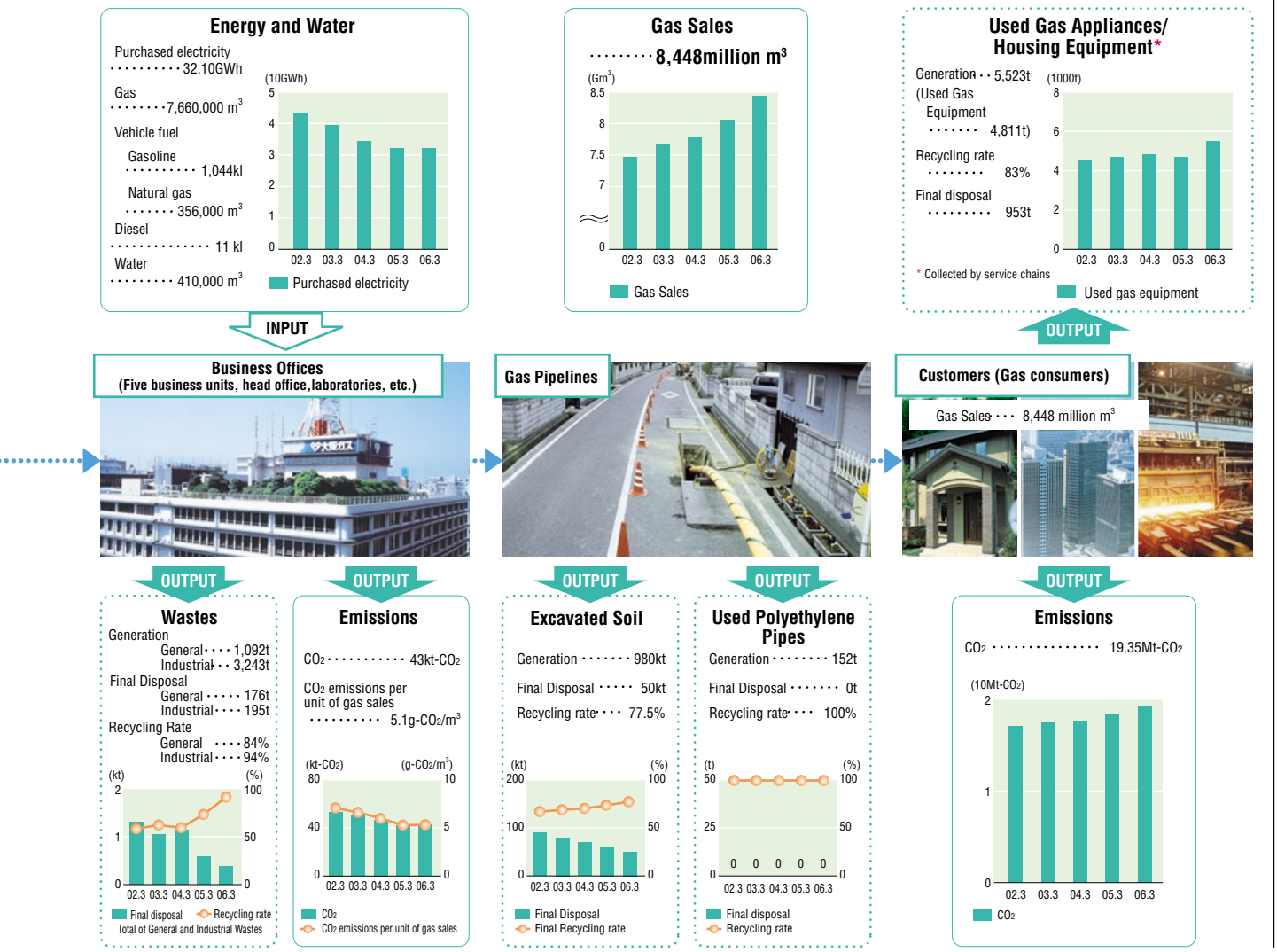
We strive to reduce CO_2 emission by our customers by developing and popularizing energy-efficient appliances and systems.

■ Comparison of Fossil Fuel Combustion Emissions (Coal: 100)



Sources:
·IEA (International Energy Agency). (1986.) Natural Gas Prospects to 2010
·The Institute of Applied Energy. (March,1990). Report on Thermal Power Plant Atmospheric Impact Assessment Technology Demonstration Surveys.

Note: Energy Consumption Waste LNG Gas



Quality of the Gas Osaka Gas supplies

Note: Figures applied from March 2003

Heat Value (HHV)

45.0MJ/m^{3}N (10,750kcal/m^{3}N)

Physical and Chemical Properties

Appearance, etc: A colorless gas with a characteristic odor
Specific gravity: 0.638 (air=1)
Combustion range: 5-15vol%

Effects on the Human Body

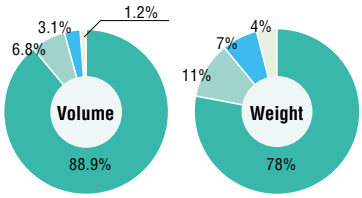
If the gas is inhaled at high concentrations for an extended period of time, it can have harmful effects on the human body, such as suffocation due to a lack of oxygen supply.

CO_2 Emission Coefficient in Combustion

50.9g-CO_2/MJ (2.29kg-CO_2/m^{3}N)

Chemical Composition

- Methane (CH_4)
- Ethane (C_2H_6)
- Propane (C_3H_8)
- Butane (C_4H_{10})



LCA*1 Comparison of GHG Emissions among Fossil Fuels

The table below compares total greenhouse gas emissions (specifically CO_2 and methane, expressed in CO_2 equivalent), from drilling to combustion, for various fossil fuels.

Comparison of Greenhouse Gas Emissions

(g-CO_2/MJ, HHV)

Fuel	Coal	Oil	LPG	LNG	City Gas
Production	4.58	4.06	4.94	9.17	8.69
Transportation	1.71	0.79	1.80	1.97	1.61
Equipment	0.11	0.08	0.11	0.04	0.38 *2
Combustion	88.53	68.33	59.85	49.40	51.23
Total	94.93	73.26	66.70	60.58	61.91
Ratio	153	118	108	98	100

*1 LCA (Life Cycle Assessment): A comprehensive quantification method of survey, analysis and evaluation of the amount of environmental impacts of products and services. The assessment covers all the related process from resource extraction to waste disposal including transportation, consumption and recycle, for the products and services.

*2 The figures for gas equipment include the amount from the overseas production sites to gas pipeline construction sites.

Sources:
- Coal, oil, LPG: The Institute of Energy Economics, Japan (August,1999). Life Cycle Inventory Analysis of Fossil Energies in Japan (figures converted to g-CO_2/MJ as 1 cal=4.18605J)
- LNG and city gas: Proceedings of the 20th Conference of Energy, Economy and Environment (January, 2005) Future Forecast for Life Cycle Greenhouse Gas Emissions of LNG and City Gas 13A

Osaka Gas Environmental Accounting (Gas Business)

Result for FY2006

The environmental accounting in FY2006 showed investments of ¥340 million, expenses including depreciation cost of ¥3.84 billion (1), and Internal Economic Benefits of ¥5.23 billion (2). With the Social Benefits of Environmental Conservation at ¥2.16 billion (3), the total benefits were ¥3.55 billion ((2)+(3)-(1)).

Investments were roughly even with the preceding year, but total expenses decreased by ¥490 million over the previous year, due to a review of greening maintenance at our LNG terminals and reduction of works for soil modification.

There was a slight decrease in Internal Economic Benefits in comparison with last year due to depreciation of cost reductions through reduction and reuse of excavated soil.

Environmental Conservation Cost

(million yen)

Items		Contents	Investment 05.3	Investment 06.3	Expenses 05.3	Expenses 06.3
In-company Activities	Global Environment	Energy saving, Ozone layer protection measures	209	157	594	607
	Pollution Prevention	Prevention of air and water pollution	0	11	101	131
	Resources Recycling	Excavated soil reduction, waste reduction	10	15	210	239
	Environmental Management	Green purchasing, environmental education, EMS	0	1	215	373
	Others	Greening at plants, soil surveys and modification	0	0	870	484
Environmental Impact Reduction at Customers	R&D	Environmental impact reduction technologies and products	139	151	1,718	1,601
	Recycling of Used Gas Appliances	Logistic related costs	0	0	139	140
Philanthropic Activities (Voluntary greening, environmental advertising, environmental information disclosure, etc.)			2	6	480	265
Total			360	341	4,327	3,840 (1)

Internal Economic Benefits

(million yen)

Economic Benefits		05.3	06.3
Cost reduction effect	Savings through reduction of excavated soil disposal	5,892	4,946
	Sales of valuable resource (LNG cryogenic energy)	246	244
	Savings through energy saving investments	−65	42
Total		6,073	5,232 (2)

Environmental Conservation Results

		Per output Unit	Per output 05.3	Per output 06.3	Total amount Unit	Total amount 05.3	Total amount 06.3	Reduction *2 Unit	Reduction 05.3	Reduction 06.3
In-company Activities	NOx (LNG Terminals)	mg/m³	0.76	0.81	t	6.14	6.83	t	27.72	29.58
	COD (LNG Terminals)	mg/m³	0.27	0.23	t	2.17	1.91	t	10.26	9.74
	CO_2 (LNG Terminals)*1	g-CO_2/m³	12.57	12.12	1,000t-CO_2	101	102	1,000t-CO_2	22	27
	CO_2 (Other sites)*1	g-CO_2/m³	5.24	5.09	1,000t-CO_2	42	43	1,000t-CO_2	32	34
	Final disposal of excavated soil	t/km	65	52	1,000t	60	50	1,000t	81	80
	Final disposal of industrial waste	g/m³	0.18	0.14	t	1,414	1,151	t	4,027	4,594
	Final disposal of general waste	g/m³	0.02	0.02	t	185	177	t	1,047	1,091
Environmental Impact Reduction at Customers	CO_2 emission reduction							1,000t-CO_2	1,314	1,631
	CO_2 emission reduction through gas appliances recycling							t-CO_2	3,258	3,325
	Gas appliances recycling rate							%	82	83

Note : The amount of gas sales in FY2006 was 8,448 million m³ (8,053 million m³ in FY2005 Based on 45MJ/m³).
The total length of new gas pipelines installed in FY2006 was 961 km (925 km in FY2005.)
*1 CO_2 emissions associated with purchased electricity are calculated using the average coefficient of thermal power plants.
*2 Calculation of Environmental impact reductions: · For NOx and COD, the amount of reduction was calculated with reference to legal emission and effluent levels.
· For CO_2, industrial and general wastes, the amount of reduction was calculated using the data of FY1999 as the base year.
· For excavated soil, the amount of reduction in landfill disposal was calculated based on the amount of reduction in excavated soil and the amount of soil recycled.

Social Benefits of Environmental Conservation

In FY2002, we began evaluating the monetary value of the social benefits accruing from the reductions in total environmental impacts. We calculated the monetary value of the reduction in total excavated soil using a unit determined by the Contingent Valuation Method (CVM). (In the CVM, we calculate the value of environmental conservation activities by surveying residents about how much they would be willing to pay for certain environmental conservation benefits). We define the monetary benefit of environmental conservation as this unit multiplied by the amount of reductions. For other environmental impacts, we have suitable units for the monetary value of environmental values on the basis of some researches into the costs of environmental damage etc. We have calculated monetary values for the environmental conservation benefits by multiplying these units by the reductions in the individual environmental loads of Osaka Gas.

The social benefits of our environmental conservation efforts in FY2006 were worth ¥2.16 billion for the year, up ¥40 million on the previous year, due to greater reductions in CO_2 emissions.

Social Benefits of Environmental Conservationby Osaka Gas Business Activities

(million yen)

Reduced environmental impacts	05.3	06.3
Disposed soil	1780	1780
CO_2	190	210
Others	150	170
Total	2120	2160 (3)

"Others" above

(million yen)

	05.3	06.3
NOx	10.0	10.6
COD	15.4	14.6
Industrial wastes	123.4	140.7
General wastes	3.2	3.4
Total	152.0	169.3

Major Environmental Impact by Osaka Gas Group

		Emissions			Industrial waste		General waste		Excavated soil Final Disposal (1,000t)	Water consumption ($10km^3$)
		CO_2 (1,000 t)	CH_4 (t)	NOx (t)	Generation (t)	Final Disposal (t)	Generation (t)	Final Disposal (t)		
2004.3	Osaka Gas	171	69	16	11,054	2,246	1,367	372	70	158
	Affiliates	1,534	–	135	57,727	8,983	1,369	1,112	–	560
	Total	1,705	69	151	68,781	11,229	2,736	1,484	70	718
2005.3	Osaka Gas	253	57	29	9,327	1,414	973	185	60	153
	Affiliates	1,758	–	153	67,328	7,716	1,039	678	–	582
	Total	2,010	57	182	76,655	9,130	2,212	863	60	735
2006.3	Osaka Gas	260	59	17	8,881	1,151	1,120	177	50	151
	Affiliates	1,966	–	452	75,447	7,869	1,086	850	–	525
	Total	2,226	59	469	84,328	9,020	2,206	1,027	50	675

*1 The Osaka Gas data includes the power generation and district heating business figures.
*2 Affiliates' data shows totals for the last 3 years for 81 companies, excluding overseas operations and for tenants where data is difficult to collect.
The number of the companies surveyed differs by year and item. Please see Page 42 for more detail.
*3 CO_2 emission of purchased electricity was calculated with 0,69kg-CO_2/kwh.
*4 The Osaka Gas share of industrial wastes includes used gas appliances and residential gas equipment.
*5 Water consumption is the total of potable and industrial water supplies.

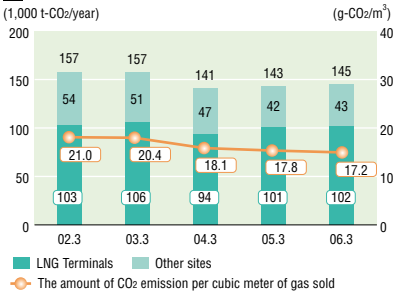
Osaka Gas Reducing Emissions of Greenhouse Gases

CO_2 Emissions in the Gas Business

CO_2 emissions from the Osaka Gas gas business in FY2006 totalled 145,000 tons, of which LNG terminals accounted for 102,000 t and other sites 43,000 tons. CO_2 emissions per gas sales were 17.2g CO_2/m^3, which achieved the FY2006 Medium-Term Targets of 19g CO_2/m^3. We will continue to strive to reduce our CO_2 emissions by promoting energy-saving policies and actions in our business activities.

* CO_2 emission factor for electricity: 0.69kg CO_2/kWh for thermal power generation (from July 2001 Target Achieved Scenario Subcommittee Interim Summary, Global Environmental Committee of Central Environmental Council)

■ CO_2 Emissions from overall Gas Business



Note: Osaka Gas places great importance on correctly assessing the benefits of reducing its purchases of electricity under its energy-saving policy; it uses the coefficient of thermal power generation in calculating CO_2 emissions of purchased power. The following table shows total CO_2 emissions and per unit emissions calculated using an average emission factor for all types of power source (0.36kg-CO_2/kWh) for refereuce. (See page 37.)

year	02.3	03.3	04.3	05.3	06.3
CO_2 emission(kt-CO_2/year)	106	108	97	98	100
CO_2 per gas sales(g-CO_2/m^3)	14.2	14.0	12.5	12.1	11.9

CO_2 Emissions from Other Businesses

CO_2 emissions from thermal supply business

Electricity sales (1,000 kWh)	Thermal sales (GJ)	CO_2 emissions (t-CO_2)
6,533	145,670	13,497

Note 1: Osaka Gas operates at 7 locations. It also provides thermal energy to neighboring factories.
Note 2: Electricity sales is electricity used in common place of housing, generated with cogeneration.

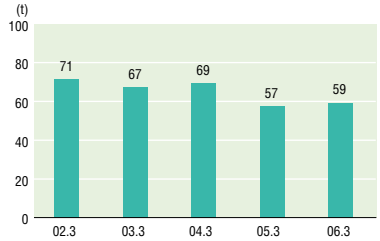
CO_2 emissions from power generation business

Electricity sales (1,000 kWh)	CO_2 emissions (t-CO_2)
234,275	101,488

GHG other than CO_2 Emissions

Methane (CH_4) is another greenhouse gas emitted in LNG terminals. Most methane is emitted by the instruments used to measure the quality of gas. We are striving to reduce CH_4 emissions by changing over to instruments that emit less CH_4 and by increasing our CH_4 recovery rate.

■ Methane emissions

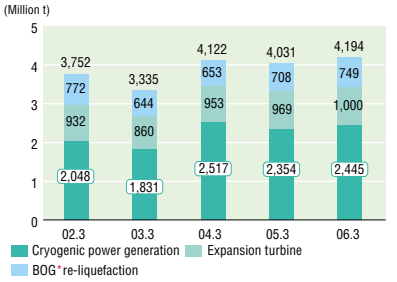


Reducing Emissions of Greenhouse Gases

Measures at LNG Terminals

Osaka Gas is reducing the purchased electricity and CO_2 emissions, by generating electricity through effective use of LNG cryogenics and the gas pressure energy in the process of gasification, and through using high efficient gas turbine combined cycle generators fuelled by natural gas.

■ Use of LNG Cryogenics



* BOG: Boil-off gas; generated when LNG vaporizes in a tank

Measures at Offices

Osaka Gas also strives to reduce CO_2 emissions from offices by promoting down to earth energy-saving activities at the individual employee level. In addition, we improve equipment by replacing it with more energy-efficient appliances.

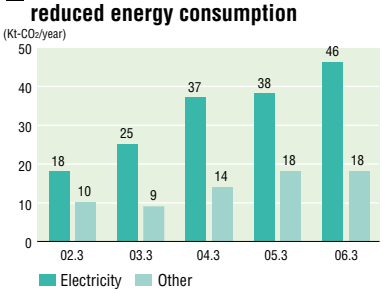
Reduction of CO_2 Emissions by Efforts against Global Warming

As the graph at right shows, we have been regularly reducing our CO_2 emissions caused by energy consumption, through electricity generation at LNG terminals and energy-saving initiatives in offices. In FY2006, we reduced the CO_2 emissions by around 46,000 t through reduction in purchased electricity and by around 18,000 t through reductions in fuel consumption.

Note 1: The graph shows the estimated reduction in CO_2 emissions calculated as the difference between actual emission data and virtual ones where no measures had been taken since the base year, FY1999. The emission factor of thermal power generation is used for the purchased electricity in order to accurately evaluate its reduction.

Note 2: CO_2 emissions cofficient for purchased electricity: 0.69kg CO_2/kWh (Ministry of Environment, July 2001)

■ Reductions in CO_2 emissions due to reduced energy consumption



Calculating the reduction in CO_2 emissions related to electricity use

1. Two approaches to the CO_2 emission factor

(1) The emission factor of thermal power generation: Amount of CO_2 emitted when 1 kWh of electricity is generated in a thermal power station

The emission factor of thermal power generation

$$= \frac{\text{CO}_2\text{ emissions of thermal power generation}}{\text{Electricity generation by thermal power generation}}$$

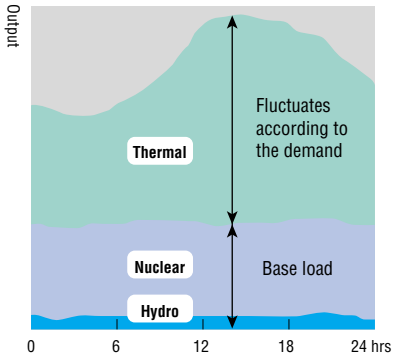
(2) Average emission factor for all types of power source: Uses the average value for all forms of power generation, such as thermal, nuclear and hydro

Average emission factor for all types of power source

$$= \frac{\text{CO}_2\text{ emissions by all power generation: nuclear, hydro and thermal (= CO}_2\text{ emissions by thermal power generation)}}{\text{Electricity generation by nuclear, hydro and thermal power generation*}}$$

*Nuclear and hydro power generations do not emit CO_2

■ Electricity generation curve



2. Reduction in CO_2 emissions due to decrease in electricity use

(1) Thermal power generation will be reduced when electricity usage declines.

Most electricity in Japan is supplied by nuclear, hydro and thermal power stations. Nuclear power stations operate virtually continuously, except when shut down for regular inspections. The hydro power generation in a year is determined by the rainfall. Consequently, thermal power can be regarded as the source of power that varies in total from year to year according to fluctuations in demand for electricity. So, the variation in power generation during a year due to reduced electricity consumption is referred to as "marginal power sources".

(2) Using coefficient of thermal power generation is the right way to calculate reductions in CO_2 emissions

- When calculating the reduction in CO_2 emissions due to decreased electricity consumption, it is appropriate to use the emission factor of thermal power generation which fluctuates according to the demand.

Reduction in CO_2 emissions (kg-CO_2)
= The emission factor of thermal power generation (kg-CO_2/kWh) x Reduction in use of electricity (kWh)

Coefficients Used in this Report

The emission factor of thermal power generation

0.69kg-CO_2/kWh

Average emission factor for all types of power source

0.36kg-CO_2/kWh

(Ministry of Environment, July 2001)

Reducing Resource Consumption and Promoting Recycled Materials Use

Curbing the generation of excavated soil from gas pipe works and promoting reuse

■ Reduced and Recycled Amount of Excavated Soil

		02.3	03.3	04.3	05.3	06.3
A. Estimated amount generated by conventional method	(10 k tons)	194	184	193	189	183
B. Reduced amount	(10 k tons)	77	72	80	82	85
C. Generated amount (=A-B)	(10 k tons)	117	112	113	107	98
D. Recycled amount	(10 k tons)	79	78	80	79	76
E. Recycling rate *1 (=D/C)	(%)	67.4	69.6	70.7	73.8	77.5
F. Utilized amount *2	(10 k tons)	29	26	26	21	18
G. Final disposal amount (=C-D-F)	(10 k tons)	9	8	7	6	5

*1 Rate of recycled into improved soil and recycled roadbed material in Osaka Gas Group.
*2 Utilized amount is used for farmland development etc., outside of Osaka Gas Group.

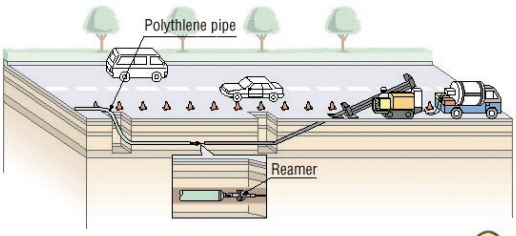
Curbing the Generation of Excavated Soil

Osaka Gas succeeded in curbing excavated soil to 850,000 tons by promoting the application of pipe replacement methods that do not require excavation (such as the Bore More Method, Compact Pipe Jacking Method and Pipe Splitter Method), as well as shallow pipe installation.

[Promotion of Shallow Pipe Installation]
On March 31, 1999, the government issued a directive allowing gas companies to promote shallow pipe installation. This facilitated Osaka Gas to curb the amount of both excavated and backfill soil. In FY2007, we received approvals for shallow pipe installation from 99% of the municipal governments in the supply area, and moved forward with these methods.

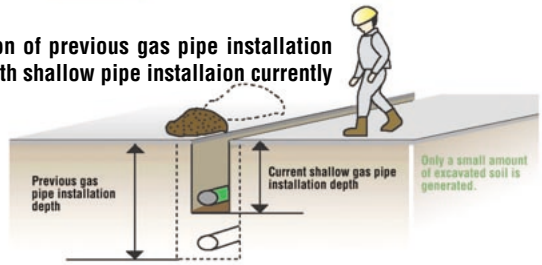
■ Replacing Pipes without Excavation: The Bore More Method

This method makes it possible to lay new polyethylene piping without excavation.



A mud jetstream is injected, and the rod is inserted into the ground. The polyethylene pipe is laid as the rod is pulled backward.

■ Comparison of previous gas pipe installation method with shallow pipe installaion currently in use

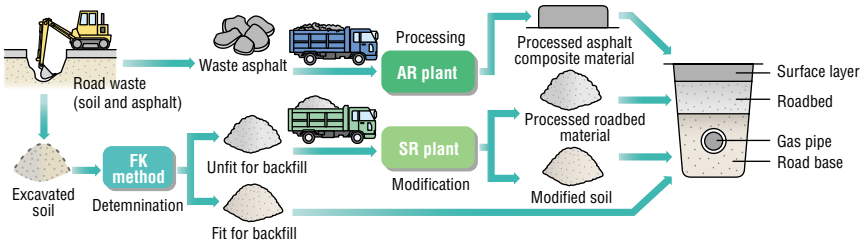


Reuse of Excavated Soil

Excavation for gas pipes causes large emissions of soil and waste asphalt. Since FY1984, Osaka Gas and its affiliates have been operating a comprehensive soil and asphalt recycling system. We are striving to expand the use of the "FK Method" and "SR (recycled soil)". As a result, the recycling rate has reached 77.5%. If limited to soil, the SR application rate reached 60% (58% in the previous year) and the FK application as 29% (27% in the previous year), achieving a recycling rate of 89%.

■ Comprehensive Soil and Asphalt Recycling System

This system divides road waste into waste asphalt and excavated soil, reusing the former as asphalt and the latter as either regenerated roadbed material or improved soil.



● **FK method**
A simple sieving method for determining if the excavated soil is fit for backfilling. It examines the water content and particle conditions of the soil. Its use on the field is subject to approval of the local government.

● **SR plant**
(excavated soil processing)
A plant for modifying the excavated soil into backfill soil (road base material) and roadbed material.

● **AR plant**
(asphalt regeneration)
A plant for processing waste asphalt into asphalt composite material for road paving.

Recycling of Used Gas Pipes

Osaka Gas is pressing ahead with the use of polyethylene (PE) gas pipes, as they are not severely affected in the ground by uneven settlement and earthquakes. Waste from working with PE pipes is recycled as post markers to indicate the positions of supply pipes.

■ PE Pipe Recycling Rate

		02.3	03.3	04.3	05.3	06.3
Amount wasted	(t)	140	133	153	157	152
Amount recycled	(t)	140	133	153	157	152
Recycling rate	(%)	100	100	100	100	100

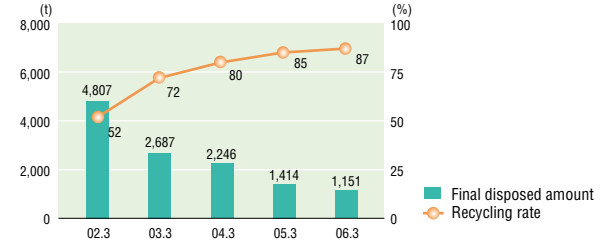
Industrial Waste Reduction and Recyling

The volume of industrial waste of gas business total (including service chain) was down and the recycling rate was up in FY2006, with the results that the final disposal amount was reduced.

The waste generation was around 450t decrease because the replacement of old gas pipes was winding down, and the debris generation also fell.

In addition, the Osaka Gas building and three other offices achieved zero emissions with the recycling rate of 97% or more, a new waste management contractor was assigned for debris and the recycling rate for waste oil was improved, which lifted the recycling rate for the gas business total from 85% to 87%, and for Osaka Gas itself from 89% to 94%.

Industrial Waste Disposal and Recycling Rate (Gas Business total)



Industrial Waste and Its Recycling Status

(t/year)

Waste type	Items in detail	Generated (a)		Recycled (b)		Finally disposed (a-b)		Recycling rate (b/a)	
		05.3	06.3	05.3	06.3	05.3	06.3	05.3	06.3
Sludge	Wastewater sludge	54	60	23	17	31	43	43%	29%
Waste oil	Lubricant oil	186	134	154	123	32	11	83%	91%
Waste plastics	PE pipe scraps, insulator	704	838	624	750	80	88	89%	89%
Metals	Used gas pipes	726	718	692	700	34	17	95%	98%
Glass, Concrete, Ceramics	Used fluorescent lamps	16	20	14	7	2	13	88%	34%
Debris	Waste asphalt and concrete	1,986	1,504	1,848	1,488	138	15	93%	99%
Others		164	84	76	75	88	9	46%	89%
Osaka Gas Total		3,836	3,358	3,431	3,160	405	198	89%	94%
Breakdown	LNG terminals	202	115	199	112	3	3	99%	98%
	Offices and laboratories	732	634	489	489	243	145	67%	77%
	Customers *1	2,902	2,609	2,743	2,559	159	50	95%	98%
Service Chain	Used gas appliances	5,491	5,523	4,482	4,570	1,009	953	82%	83%
Gas Business Total		9,327	8,881	7,913	7,730	1,414	1,151	85%	87%

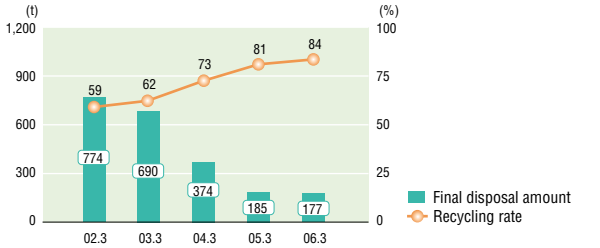
*1 This is debris, pipe scrap, PE pipe scrap, and other waste generated during installations at customers' sites.

General Waste Reduction and Recycling

In FY2006 we redoubled our efforts at general waste separation throughout the company, with the companywide acquisition of ISO 14001. As a result, our year-on-year recycling rate broadly increased, from 81% to 84%. We are now aiming for our FY2009 goal of a recycling rate of 90%, and will work even harder on waste separation.

In FY2006, the Osaka Gas Building, our head office, and three other offices reached zero emissions. While the general waste generation overall increased due to an increase in the use of copy paper, the final disposal amount was reduced as a result of our efforts for separation.

General Waste Disposal and Recycling Rate (Osaka Gas)



General Waste and Its Recycling Status

(t/year)

Waste type		Generated (a)		Recycled (b)		Finally disposed (a-b)		Recycling rate (b/a)	
		05.3	06.3	05.3	06.3	05.3	06.3	05.3	06.3
Paper	Paper (copy paper)	246	323	235	313	11	9	96%	97%
	Newspapers	74	76	74	76	0	0	100%	100%
	Magazines	91	125	91	125	0	0	100%	100%
	Corrugated cardboard	190	208	185	208	5	0	97%	100%
	Confidential documents	89	81	89	81	0	0	100%	100%
	Others	14	32	11	10	3	22	79%	31%
Total paper		704	843	685	812	19	32	97%	96%
Cans		9	9	9	9	0	0	100%	98%
Bottles		11	14	10	14	1	0	91%	99%
Kitchen wastes		97	117	67	82	30	35	69%	70%
Plastics		19	26	16	23	3	3	84%	88%
Others		133	110	1	4	132	106	1%	3%
General waste total		973	1,120	788	943	185	177	81%	84%
Break down	LNG terminals	39	28	38	27	1	1	97%	96%
	Offices and laboratories	934	1,092	750	916	184	176	80%	84%

* The total figures are not egual to the sum in each item, since figures less than ton have been rounded down.

Using Less Water

We are carrying on with our progressive water-saving campaign. But we used more clean water in LNG terminals, because the cold snap last winter forced us to continue to blow water through the pipes to prevent them from freezing for longer than usual.

Water Consumption

(10,000 m^3)

		05.3	06.3
LNG terminals	Clean water	7.4	8.4
	Industrial water	102.8	101.6
	Sea water	42,257	41,782
Other sites	Clean water	42.4	40.9

Promoting Green Purchasing and Green Distribution

Green Purchasing

Promoting Green Purchasing

Osaka Gas issued "Green Purchasing Guidelines" in FY2001, and revised it in FY2006. The Guidelines encourage staff to become involved in purchasing products and installation contracts with less environmental impact while optimizing quality, price and delivery date of the purchasing of products, installation contracts and services etc.

Our total green purchasing amount for FY2006 was around ¥1.27 billion (up 13% year-on-year), while green purchasing rate for stationeries increased to 88%.

We established a green purchasing target rate for areas designated under the Green Purchasing Law, and plan to bring it up to roughly 100% for nearly all areas by the end of FY2011.

While the Green Purchasing Guidelines are applied to Osaka Gas Co., Ltd., we aim to encourage and promote awareness among our affiliates as well. We plan to strengthen the effort throughout the Osaka Gas Group.

Green Partner Initiative

In FY2006, we launched our "Green Partner Initiative" to evaluate environmental efforts, such as EMS acquisition, by the trading partners from which we purchase pipe materials. We look into the involvement of our partners in environmental issues, and list as "Green Partners" those who meet a certain standard. We encourage those who are not yet listed to join the "Eco-Action 21 Associate Greening Program" set up the Osaka Gas Group and our contractors, to try to see that all our partners are eventually registered.

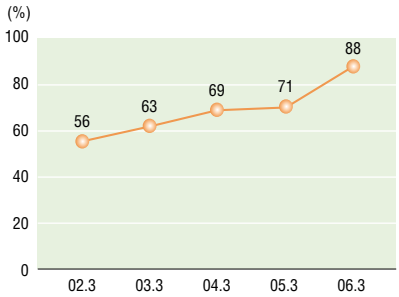
Osaka Gas Green Partners Initiative Logo

Received the Green Purchasing Award

Following an assessment of the efforts of Osaka Gas to date, we received the award for excellence at the Green Purchasing Network (GPN) 8th Green Purchasing Awards held in February 2006.

Receiving the award for excellence of 8th Green Purchasing Awards

Trends of the Rate of Green Products in Stationeries Purchasing



We purchase marker posts made of used PE pipe from a recycler and use them to indicate the locations of gas pipes.

Green Purchasing Rate: Targets and Results (monetary basis)

Field	FY2006 Results	FY2011 targets
Copy paper	100%	100%
Stationeries	88%	100%
OA Equipment	100%	100%
Work uniforms	100%	100%
Printed materials	91%	100%
Gas piping workds	Use as much recycled soil and asphalt as possible to fill in	Ongoing
	Ensure that each specification states measures to reduce noise and vibration etc	Ongoing
	Purchase marker posts made from recycled PE pipe	Ongoing

Green Distribution

Osaka Gas has been promoting "Green Distribution" from a comparatively early period, and established a "Green Distribution Policy" in December 2001. "Green Distribution" means taking actions to reduce emissions of atmospheric pollutants in the region by using "Low-Emission Vehicles"* for distribution and business operations. Osaka Gas is actively seeking cooperation among affiliates and trading partners to use "Low-Emission Vehicles" in distribution to Osaka Gas business sites.

* "Low-Emission Vehicles" are natural gas-powered vehicles, electric vehicles, hybrids, methanol-powered vehicles, and highly fuel efficiency, low-exhaust certified vehicles (vehicles for which a lower vehicle tax rate is applied because of their low environmental impact), as well as fuel cell vehicles.

A Natural Gas Vehicle

Environmental Education for Employees

Reaching Out to All Employees

In order to raise employee awareness of environment, Osaka Gas conducts at least one environmental education activity each year, for each department and each level. We also hold "In-House Environmental Activities Case Study Meeting" and "Environmental Symposium" at least once a year. Our environmental awareness activities also include the annual awards by the President.

Environmental training for new recruits

Conducted in every April
(attended by 60 in FY2006)

Sustainability Report 2005 reading sessions

Held at six offices, primarily for managers and supervisors

■ Environmental awards by the President (For FY2006)

Content	Organization
Contributions to reducing greenhouse gas emissions by EMS activities	LNG Terminal & Power Generation B.U.
Site environmental assessment, publication and risk management of former coal gas plant sites	General Affairs Dept, Engineering Dept, LNG Terminal & Power Generation B.U. Residential Energy B.U., Commercial & Industrial Energy B.U.
Development of biogas system	Energy Technology Labo.

Environmental Symposium

Sustainability Report 2005 reading session

Soil and Ground Water Conservation

Voluntary Efforts Against Soil and Groundwater Contamination

Between 2001 and 2004, Osaka Gas conducted a series of voluntary investigations of former plant sites for coal gas production in order to determine environmental risks to soil and groundwater, and to determine what action was required. In cases in which contamination was discovered, reports were filed with the government agencies in charge and proper risk control measures under the guidance of the government agencies were taken for environmental improvement.

Asbestos Management

Measures for Asbestos Management

Osaka Gas makes strenuous efforts to reduce the use of asbestos in its business activities (producing and supplying gas). No asbestos will be used in any new equipments or installations from March 2006. Asbestos materials used in existing equipments are moulded and is not exposed, and therefore there is virtually no possibility of it being dispersed under normal conditions. It will be appropriately dealt with when the equipment is replaced. Sprayed asbestos in buildings will be removed according to a plan. No sprayed asbestos is used in open areas such as showrooms to which our customers come. While the packing in some gas appliances sold in the past did contain asbestos, it will not be released under normal use because it is moulded and is not exposed.

Chemical Substance Management

Measures for Chemical Substance Management

Measures for Chemical Substance Management

Osaka Gas has the following guidelines for managing chemicals:

1. Compliance with laws and regulations concerning the use of chemical substances
2. Reduction of use of chemical substances in the course of our environmental management activities
3. Disclosure of information on chemical substance management in this report and on our website

PCB Management

Our PCB wastes are properly stored according to the law. We intend to follow the treatment program of the Japan Environmental Safety Corporation to dispose of these wastes.

■ Substances Subject to Reporting, under the PRTR Law.* (FY2006) (Osaka Gas)

(t)

Item	Handled	Released	Transferred
Xylene	8.4	8.4	0
Toluene	5.0	5.0	0

Note: Above figures are aggregated values based on the PRTR Law.

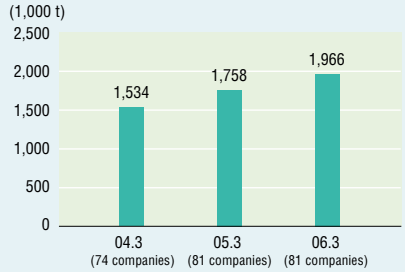
* The PRTR Law was announced in 1999. Businesses are required to report the emission or transfer when more than a specified amount of any of 354 substances is handled.

Efforts at Affiliated Companies I

Primary Environmental Impact of Affiliated Companies

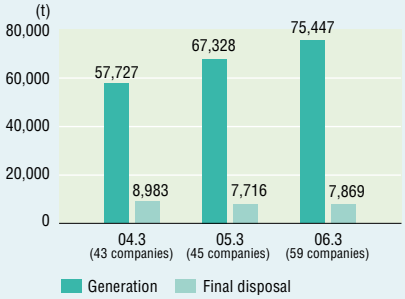
CO_2 Emissions

CO_2 emissions by our affiliates in FY2006 totalled 1,966kt. One of the reasons why the amount increased from the previous year is, we started the operation of some cogenerations at customers' sites to buy back the surplus electricity to sell in FY2006. The customers greatly reduced their CO_2 emissions from purchased electricity.



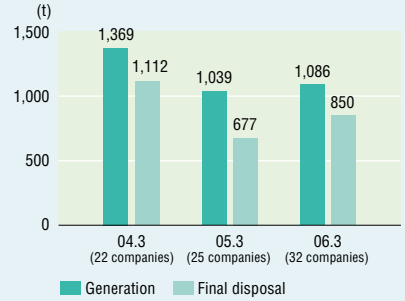
Industrial Waste Reduction and Recycling

In FY2006, our affiliates finally disposed 7,869t of industrial wastes. While the waste generation increased, the recycling rate has risen year by year, from 84% in FY2004, to 89% in FY2005 and 90% in FY2006, with the result that the final disposal amount has fallen. We are further facilitating the move by encouraging the introduction of EMS at our affiliates.



General Waste Reduction and Recycling

In FY2006, our affiliates finally disposed 850t of general wastes. The final disposal amount increased in FY2006 after we brought affiliates into the system that had low recycling rates. We will reduce the environmental impact by encouraging the introduction of EMS at our affiliates.



Substances Subject to Reporting, under the PRTR Law (FY2006)

Osaka Gas Group complies with all laws and ordinances, and environmental rules concerning the use of chemical substances. The PRTR Report for Osaka Gas Affiliates in FY2006 is as shown in the table at right.

(t)

Item	Handled	Released	Transferred
Toluene	357	0	0
Benzene	13	1	0
Isopropyl alcohol	3	0	0
Water-soluble zinc compounds	265	0	2

EMSs Implementation

	Certified	To be certified in FY2007
ISO14001	Liquid Gas*, CRYO-AIR*, AD'ALL, KRI, Gas and Power Investment*, Nagano Propane Gas, Osaka Rinkai Energy Service Corporation, Cold Air Products, O.N.E., Osaka Gas Chemicals*, Minabe Chemical Industries, OG Autoservice	Kinpai, Kinpai Corporation, Kinpai Engineering, Kinpai Renotech, Living Maintenance Service Osaka, Living Maintenance Service Hokuto, ENETEC Osaka, Osaka Gas Total Facilities, Japan EnviroChemicals
Eco-Action 21	—	OG Road
KES	Enetech Kyoto, Liquid Gas Kyoto	—
Osaka Gas EMS	OGIS Research Institute	Nissho Petroleum Gas, Liquid Gas, Urbanex, OG Capital, Osaka Gas Chemicals, SYSTEM ANSWER, Ube Information Systems

*Partially certified

OGIS Research Institute Co., Ltd. (OGIS-RI): **First company to achieve Osaka Gas EMS (OGEMS) Certification**

OGIS-RI began to apply OGEMS in April 2005, and following an inspection by the Osaka Gas Environment Department in November, in December became the first company to achieve OGEMS Certification. A new governing structure was established which placed President as its leader to push forward environmental activities. EMS Training in OGEMS has been conducted for all employees in a total of 50 sessions attended by over 1,200. The Institute has set up targets for reductions in CO_2 emissions, copy paper and wastes and for Green Purchasing, and has greatly exceeded them for reductions in the amount of general wastes generated and the proportion of wastes recycled, and in cutting the use of copy paper.

OGEMS was also introduced in March 2006 at two OGIS-RI Group companies, Ube Information Systems and System Answer. The Group will continue to reduce the environmental impacts.

Separate collection of general wastes

URL See the company's web page for further details
http://www.ogis-ri.co.jp/english

OG Auto Service Co., Ltd. (OGAS): **Wins the Prize for Green Purchasing at Osaka Environmental Awards 2006**

OGAS received the prize for Green Purchasing at Osaka Environmental Awards 2006. This award honours individuals, organizations and businesses that have made outstanding contributions to the environment, and is made by the Osaka Prefectural Environmental Council, chaired by the Governor of Osaka, Fusae Ota. The award recognized the efforts of OGAS over many years to encourage the use of natural gas-powered vehicles (NGVs).

OGAS was a founding member of the NGV development project established in 1989 by Osaka Gas, and has been actively involved in development, dissemination and maintenance of NGVs ever since. OGAS plays a central role in dissemination and maintenance of NGVs in the Kinki region: OGAS currently leases around half the 3,000 odd NGVs (light and compact trucks and passenger vehicles) operating in the region and 60% of the NGV maintenance factories in the region are under the direction of OGAS.

Osaka Environmental Awards ceremony

URL See the company's web page for further details
http://www2.ogas.co.jp/mycar

Cogen Techno Service Co., Ltd.: **Holds short courses on proper disposal of industrial wastes**

Maintenance work on cogeneration systems generates various types of industrial wastes: lubricants, cleaning rags and liquid and plastic wastes. Maintenance is contracted out to the equipment manufacturers and service companies, and the company instructs them on the Osaka Gas standards for the proper disposal of industrial wastes. In July 2005, the company held short courses on the proper disposal of industrial wastes for the cogeneration equipment manufacturers and service companies, to provide information in a timely way on this issue and changes to the law, and to ensure that they dispose of industrial wastes properly. The Environmental Department of Osaka Gas provided the speakers, and the subjects included "Methods to dispose industrial wastes", "Preparing contract documents and issuing manifests" and "Recent changes to the law" etc. Twenty individual from thirteen companies attended.

URL See the company's web page for further details
http://www.cogene.co.jp

Nakayama Nagoya Joint Power Generation Co., Ltd.: **Recycles 100% of fly ash**

The Nakayama Nagoya Plant of Nakayama Nagoya Joint Power Generation Co., Ltd is located on the Chita Peninsula in Aichi Prefecture. It is a 149,000 kW coal-fired generator, and began supplying power to Chubu Electric Power in April 2000. The generator is designed to minimize the environmental impact, and uses the latest environmental technologies. The plant uses high calorific value, low ash content coal as fuel, in order to minimize the fly ash generation after the burning of the coal. All the fly ash that is generated is used as a raw material for cement production and so forth, and so makes a useful contribution to resource recycling.

Nakayama Nagoya Plant

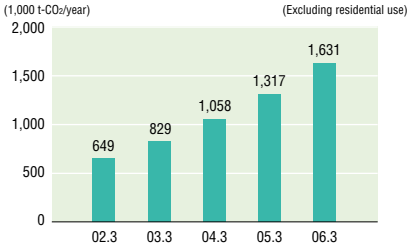
CO_2 Emission Reduction at Customer Sites

Achievements in CO_2 Emissions Reduction

Osaka Gas strives to reduce CO_2 emissions by our customers by offering high efficiency equipment and systems such as cogeneration systems, gas air conditionders and high-performance industrial furnaces. The amount of CO_2 emission reduced through the use of these systems and equipment was around 1,600,000 t in FY2006, compared to the emission where those preventive measures have not been implemented since FY1999.

* The method of calculation was changed in a more realistic manner using measured values.

■ CO_2 Emission Reduction
(compared with Business-as-usual emission based on FY1999)



Development of Energy-Saving Equipment and Systems

Promoting Natural Gas Cogeneration Systems

The Osaka Gas Group puts great effort into spreading our natural gas cogeneration systems, which provide much greater energy savings and reduce CO_2 emission. We have recently been pressing forward with the installation of high-efficiency, small-scale generators that are capable of generating power on a par with an average large-scale power plant.

Note) Please see page 11 for details of natural gas cogeneration systems.

■ Gene-Light


Aisin 6 kW


Sanyo 8 kW


Yanmar 5 kW


Yanmar 25 kW

■ High-efficiency Gas Engine (GE)


Jenbacher GE


Mitsubishi Heavy Industries Miller-cycle GE

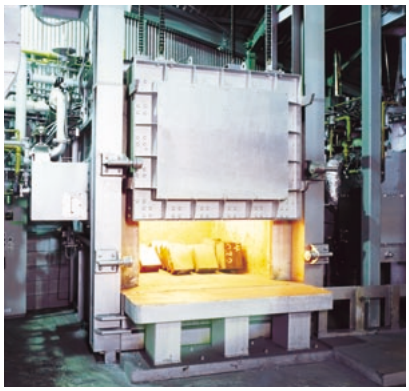
Introduction of cogeneration to a water filtration plants

Cogeneration systems are being installed at water filtration plants for the purpose of a precaution against natural disasters, the environmental preservation, the economy of the plant operation, and to meet the greater power demand for advanced purification process. The introduction of this system makes the filtration plant economically efficient and environment-friendly with the capability of supplying electricity to the plant, making efficient use of waste heat for heating the slurry (thin mud sediments), drying the mud, and cooling the ozone generator. These systems are now in use at two of the Osaka prefectural water filtration plants and one of the Hanshin water supply authority's water filtration plants.


Murano Osaka prefectural water filtration plant

High Performance Industrial Furnaces

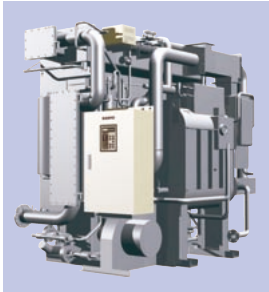
We are making advances in our development of the “Regenerative Burner” industrial furnace, which has realized tremendous energy savings. “Regenerative Burner” effectively utilizes the exhaust heat recovered and contained in the heat storage material within the burner to preheat the combustion air. This system provides a maximum 50% energy savings. The government also provides incentives for installation of high performance furnaces at small and medium businesses.


Regenerative Burner

Gas Air Conditioning Systems

Gas absorption-type chiller/heater

Gas absorption-type chiller/heaters are air conditioners that do not use CFCs or CFC substitutes. Currently, the development of this system is accelerated and successfully advancing. This system has been selected as Green Models that meet the criteria for Absorption-Type Green System jointly established by Osaka Gas, Tokyo Gas Co., Ltd and Toho Gas Co., Ltd, and we are making efforts to popularize them.

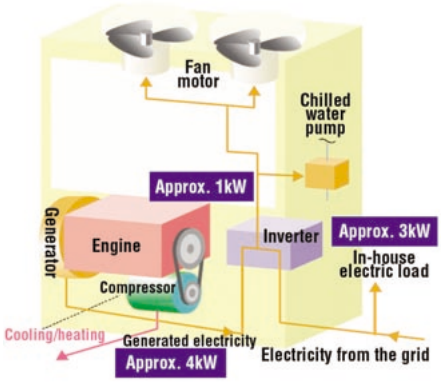


Sanyo gas absorption-type chiller/heater F-WE Series

Gas Engine Heat Pumps (GHPs)

GHPs are highly efficient air conditioners, in which a compressor is driven by a gas engine. We launched an ultra-high efficiency unit with a coefficient of performance (COP) of 1.5 in April 2005. In April 2006, we launched the High Power Excel GHP unit, which consumes no electricity itself, but has a generator function that supplies power to the building in which it is installed. Electricity generated on the air conditioning is able to meet all the power required by the outdoor unit and also to supply power required in the building. This feature makes the High Power Excel even more energy-saving than older models of GHP.

High Power Excel GHP unit



High Power Excel unit

Energy Saving Consulting Services

Energy-Saving Diagnostics

Osaka Gas provides energy-saving diagnostics consulting services to reduce the energy consumption in offices, plants and elsewhere. These services include a suggestion of energy saving systems and an installation of those systems. We also provide new services for owners of cogeneration systems and air conditioners such as remote diagnostics which is additional remote monitoring systems using wireless data transmission networks and the Internet.

Upgrading Technology

Osaka Gas has developed pipe drag-reducing additive, Eco Micelles to reduce friction in the water pipes in central air conditioning units. Surfactants consisting of rod-like aggregates of molecules (micelles) reduce friction. In the thin pipes in a heat exchanger, they dissolve and improve heat exchange efficiency, which leads to greater reduction of the transport (pumping) energy required for the flow of cooling/heating water through the pipes.

Energy saving diagnostics

Residential Equipment and Systems

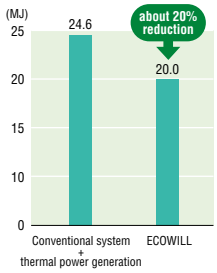
ECOWILL

ECOWILL is a residential gas engine cogeneration system capable of generating 1kW. It was developed by Osaka Gas for single-family homes, which consume comparatively large amounts of energy and also has space for the housing of a cogeneration system. While ECOWILL itself is small, it achieves an impressive energy utilization rate of 85%, about the same rate as large gas cogeneration systems. This is because it employs exhaust heat transfer equipment with a high heat recovery rate, in addition to recovering heat from the engine itself. ECOWILL can provide approximately 30% of the power use and most of the hot water and air conditioning demand (including an under floor heating system) of a typical family of four in a single-family home.

Receiving the FY2006 Environmental Minister's Award for activities to prevent global warming (technical development and commercialization division)

Primary Energy Consumption

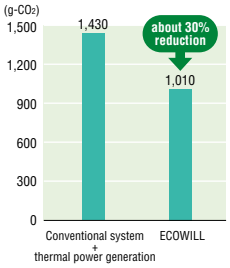
(Compared to energy consumption by ECOWILL 1 kWh)



Primary energy equivalent:
Electricity 9.97MJ/kWh
Gas 45MJ/m^3
Hot water heating efficiency:80%

CO_2 Emissions

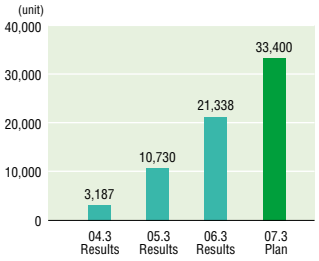
(Compared to energy consumption by ECOWILL 1 kWh)



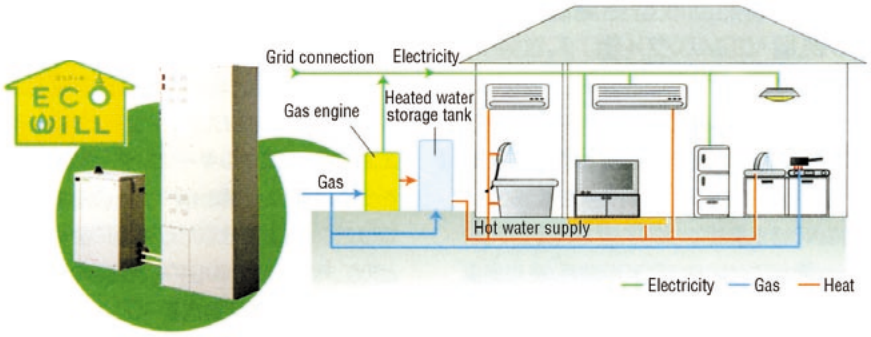
* CO_2 emissions factor: Electricity 0.69kg-CO_2/kWh (Source: Interim Report by the sub committee of the Central Environment Council, July 2001)
Gas 2.29kg-CO_2/m^3(our company data)

ECOWILL Use in Osaka Gas Area

(cumulative total)



Household Gas Cogeneration System (ECOWILL)



Space/Water Heaters

The world's first latent heat recovery-type hot water heater for residential use, the "Prior Eco", went on sale in June 2000. It has been widely praised for its environmental contributions, such as CO_2 reduction through high thermal efficiency, and garnered the "Energy Conservation Grand Prix Award (Award of the Minister of Economy, Trade and Industry)" in FY2001. Model 2 in the series, with improved thermal efficiency of 95% for water heating and 89% for space heating, went on sale in October 2002. In addition, beginning in April 2005 we renamed it as "Eco-Jozu", in order to promote better nationwide distribution.

Buyers of Eco-Jozu systems receive the government subsidies as part of the activities to encourage the installation of high efficiency energy systems in homes and other buildings.

Gas Cookers

Due to the development on ingenuity of the burner design, optimization of the height of the pan supports and other technology, sales ratios for cookers meeting the FY2007 Energy Conservation Law standards were 91.8% for tabletop cookers and 88.6% for built-in cookers. Through our further development on optimization of in-cooker design, the percentages sold of cookers meeting the 2008 Energy Conservation Law standards were 43.5% for tabletop cookers and 30.9% for built-in cookers.

Eco-Jozu

Glass-top built-in gas cooker

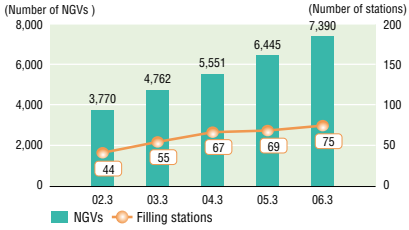
Promoting Natural Gas Vehicles

Promoting the Use of NGVs both Inside and Outside the Company

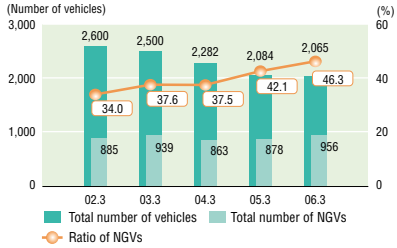
Natural Gas Vehicles (NGVs) are clean vehicles that run on natural gas, and Osaka Gas has been promoting the spread of their use. At the end of March 2006, the number of NGVs in the Kansai Region had reached a cumulative total of 7,390 (27,605 nationwide), with 75 natural gas filling stations (311,nationwide). We have gradually been switching over to NGVs for our company vehicles as well.

Osaka Gas has assisted with the "Urban Eco-Car Movement Top Runner Declaration by Kyoto City", and has declared that all its commercial vehicles in the Kyoto area are being switched to run on natural gas. Within the Osaka Gas group, we have gradually been switching over to NGVs for our company vehicles.

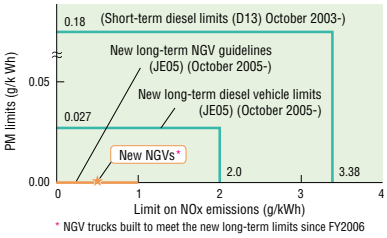
NGV Use in the Kansai Region (cumulative total)



Introduction of NGVs at Osaka Gas



Regulations on exhaust emissions from natural gas trucks and performances



* NGV trucks built to meet the new long-term limits since FY2006

The new long-term limits are among the strictest standards in the world. They require reductions of 85% in particulate matter (PM) and 40% in nitrogen oxides (NOx) over the then new short-term limits. The new limits were applied from October 1, 2005 and NGV easily meet the new requirements. They have the performance to meet the post-new long-term limits due to come into force in 2009.

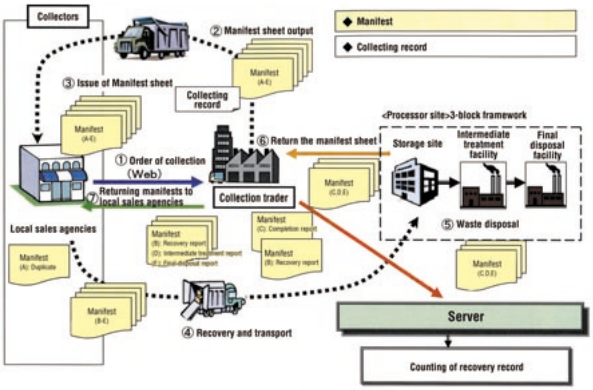
- Zero black smoke emissions
- Zero sulphur dioxides (SOx) emissions
- NOx emissions are 1/4 of new long-term limits for diesel vehicles
- Meet the requirements of the post-new long-term limits

Promotion of Resource Recycling

Used Gas Appliance and Industrial Waste Collection/Recycle Management System

Following a review by Osaka Gas of our used gas appliance recovery and recycling system which has been running since 1977, we developed a recycle management system, which commenced in February 2004. This system uses the Internet to promptly contract out industrial wastes and then check that they have been disposed of properly. The system will also be consistently used to ensure the proper disposal of the wastes generated along with the sale and installation of gas appliances.

Mechanism of e-cycle



Activities of Household Electrical Appliance Recycling Law

Under the Household Electrical Appliance Recycling Law (Specified Household Electrical Appliance Reuse Law) that came into force in April 2001, we also make efforts to dispose of residential gas air conditioners properly as well. In FY2006, we recycled 82% of the gross weight of recoveries (while the Law requires only 60%).

Number of unit recycled	6,035
Weight disposed of through recycling (gross weight recovered)	271t
Weight recycled	223t
Recycling rate	82%

Efforts on Eco-Design

Compliance with Chemical Substances Control Laws

Regulations on the sale of electrical appliances that contain chemical substances (RoHS) came into force in Europe in July 2006, to prevent pollution from the spread of toxic substances. At the same time, regulations on the labelling for contained chemicals (J-Moss) will come into force in Japan for seven types of household electrical appliance, including refrigerators. Osaka Gas is working through the Japan Gas Association to encourage gas appliance manufacturers to reduce their use of harmful substances in the same way as for electrical appliances.

Efforts at Affiliated Companies II

Gas and Power Investment Co., Ltd.: **Promotion of ESCO Business**

Gas and Power Investment Co., Ltd. (GPI) has been engaged in the ESCO business *1 since 1998. In that time, it has handled twelve Shared ESCO *2 contracts, eight Guaranteed ESCO *3 contracts and 40 energy saving surveys. GPI has saved around 8,000kl (crude oil equivalent) of energy, and reduce CO_2 emissions by around 24,000t-CO_2, making a great contribution to energy saving and preventing global warming.

In FY2006, The employment of ESCO business at often-visited sites, such as the Osaka Prefectural Office and the Kishiwada Racetrack, contributes to raise its profile.

*1 ESCO (Energy Service Company) business involves the provision of comprehensive energy-saving services to clients, with GPI receiving a portion of the energy savings as its payment.

*2 Equipment remains the property of the ESCO, with the ESCO procuring the equipment without the client making any initial investment

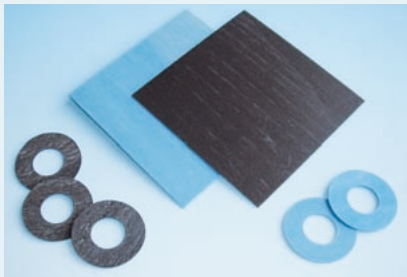
*3 Equipment is the property of the client, with the client procuring it, and the initial fee being a bundled charge including the energy saving

Osaka Prefectural Office

URL See the company's website for further information
http://www.gasandpower.co.jp/

Osaka Gas Chemicals Co., Ltd.: **Environmental Conservation through Carbon Fiber**

Osaka Gas Chemicals has long been involved in the protection and improvement of the environment through the manufacture and sale of activated carbon fiber and related products for domestic water and air purifiers and for pollutant filters for industry. Recently, Osaka Gas Chemicals' all-purpose carbon fibers have attracted a great deal of attention as substitutes for asbestos, which is to be phased out entirely in 2008. All-purpose carbon fibers are high-performance materials developed for a broad range of applications, as sound-proofing, construction materials and additive for compounding resins. Asbestos is still used in the gaskets (packing) for joints in pipes in industrial plants. Osaka Gas Chemicals contributes to improve the environment through replacing those with harmless all-purpose carbon fiber. Demand for the fiber as an asbestos substitute will grow in future.



Applications for all-purpose carbon fibre (asbestos substitute)

URL See the company's website for further information
http://www.ogc.co.jp/

Osaka Gas Engineering Co., Ltd.: **Contributing to preventing air pollution through emission treatment equipment**

Osaka Gas Engineering (OGE) is involved in many areas of environmental technology. One of these is regenerative emission treatment equipment, which eliminates odor and volatile organic compounds (VOCs) found in the emission from printing and coating lines. This equipment employs combustion and heat transfer processes developed by OGE for treatment of emission that contain silicone resins and other substances. The system is a radical departure which render pre-treatment unnecessary and delivers greater energy saving. Eighteen units are already in use around Japan. Through making efforts for further introduction of this unit, OGE aims to contribute to the 30% reduction in VOC emissions targeted by the amended Air Pollution Control Law (came into force on 1st of April, 2006).

VOC treatment equipment

URL See the company's website for further information
http://www.oge.co.jp/

Osaka Gas Information System Research Institute Co., Ltd. (OGIS-RI): **Promoting the PC Recycling Services**

A wide range of legal measures related to the environment have been introduced in recent years. The enforcement of the Fundamental Law for Establishing a Sound Material-Cycle Society amended Personal Computer Recycling Law in 2003 encouraged business to make effort for the environment. The waste reduction, the efficient use of resources, and the tight management of information security are very important issues for businesses since the Privacy Law came into force in 2005.

This prompted the PCR Department of OGIS-RI to set up the iNETVASS-R* OGIS Recycling Service, which has been designed to operate the reuse business buying redundant IT equipment from Osaka Gas and other business clients, deleting the data and cleaning the equipment and then shipping it to secondhand markets.

This business recycles PCs and other IT equipment that once would have been treated as waste to markets for used equipment and so contributes to encouraging recycling activities by the Osaka Gas Group and other businesses.

Recycling PCs

URL See the company's website for further information
http://www.ogis-ri.co.jp

* iNETVASS-R is the collective term for the e-infrastructure management solutions (recycling) business of OGIS-RI

Apriti Sesamo Co., Ltd.: **Holding Eco-Cooking® classes**

Apriti Sesamo holds Eco-Cooking classes for housewives and children.

[Eco-Cooking for housewives]
At the Eco-Cooking classes, participants (mainly housewives) can learn the tips for shopping, efficient use of food, and environment-friendly cooking and cleaning up while enjoying cooking.
(FY2006: 19 classes held, attendance 474)

* "Eco-Cooking" is a registered trademark of Tokyo Gas Co., Ltd.

[Eco-Cooking for kids]
At one of the three courses in the Kids' Chef Club cooking classes, the children learn that understanding food is part of the environment conservation. This class provides the children with an opportunity to think the environmental issues that they feel in their everyday lives and things they can act.
(FY2006: 40 classes held, attendance 1,073)

Kids' Chef Club cooking class

URL See the company's website for further information
http://www.og-cookingschool.com

Japan EnviroChemicals, Ltd.: **Contributing to building a better environment for living through Activated Carbon Business and Preservatives Business**

Japan EnviroChemicals supplies products that serve to solve environmental problems and build a better environment. The theme of the company's business is "Dedicate ourselves to create more comfortable living environment".

[Activated Carbon Business]
Japan EnviroChemicals has established its leadership in the domestic activated carbon businesses, with the largest share of the Japanese market. Shirasagi, the activated carbon, has established itself as a trusted brand over the last 70 years. Activated carbon from Japan EnviroChemicals finds an enormous range of applications: for bleaching and refining in the foodstuffs and pharmaceuticals industries, for refining and separating gases in the chemical industry, and for recovering solvents, treating emissions, cleaning effluent, and eliminating harmful substances at water and sewage treatment plants. In the area of protecting the atmospheric environment, the Shirasagi DO series of activated carbon products is used throughout the garbage incineration industry in Japan for its superior performance in absorbing dioxins. Shirasagi PRAC is a safety net against the dispersal of PCBs: it is used extensively by businesses throughout Japan to prevent the pollution of the environment.

[Preservatives Business]
The preservatives business has developed a suite of products to protect wooden building and products against microorganisms such as mould and bacteria, and also against termites. Xyladecor high-performance timber preservative paint offers long-term protection for timber structures. It has been in use for over 35 years in important cultural assets, shrines and temples through to ordinary homes, and is Japan's top-selling brand, with a 50% market share.

Xyladecor contributes to preventing global warming by continuing to prevent the release into the atmosphere of CO_2 that has been fixed by photosynthesis, and also by reducing consumption and waste of new timber and limiting unnecessary deforestation.

JR Izumo Station building – preservative used

URL See the company's website for further information
http://www.jechem.co.jp

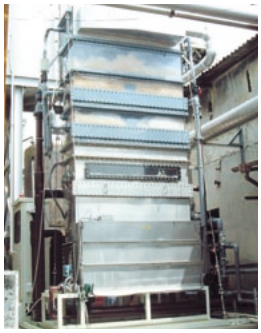
Development of Environmental Technologies

The Osaka Gas Group conducts business spanning both energy (focusing on gas) and non-energy areas. We possess a vast array of environmental technologies within our lines of business, such as CO_2 reduction, disposal/effective use of waste, resource recycling, afforestation, and hydrogen energy technologies. The Osaka Gas Group will continue to contribute proactively to the development, deployment, and dissemination of superior environmental technologies at the local, national, and international levels.

Environmental Technologies Employing the Special Characteristics of Natural Gas

Development of Tri-generation

"Tri-generation" means making use of an engine's exhaust in addition to electricity and heat (steam and hot water). We currently engage in the development of industrial and agricultural-use tri-generation. Industrial tri-generation uses the CO_2 in cogeneration exhaust to neutralize alkaline wastewater. As the result of the field test at the textile plant, it was proved that the system achieved the reduction of CO_2 emissions as well as substantial amount of sulfuric acid, which had been used as the neutralizing agent. In agricultural tri-generation, the CO_2 from cogeneration exhaust can be used to promote plant photosynthesis, which increases crop yields. Its use is therefore currently being tested in rose greenhouses and lettuce greenhouses.



Industrial tri-generation

Hydrogen Technology

One of the hallmarks of hydrogen, which is garnering a lot of attention as the next generation clean energy source, is that it can be manufactured from a variety of raw materials. Of these, natural gas is being highly acknowledged as clean, highly efficient, and low-cost source of hydrogen.

Development of Hydrogen Filling Stations

Osaka Gas is currently engaging in hydrogen filling station technology development for supplying hydrogen fuel for the Fuel Cell Vehicle (FCV) we are hoping to make a reality. Our national hydrogen filling station project continued in FY2006 with safety testing and research concerning leaking and other issues, as well as with durability testing of equipment for producing hydrogen from natural gas.

Filling hydrogen to FCV

Commercialization of Compact Hydrogen Production Equipment

Osaka Gas together with Liquid Gas Co., Ltd and Osaka Gas Engineering Co., Ltd has produced the HYSERVE commercial hydrogen generator, 50% cheaper and 50% smaller than our previous model. HYSERVE 100* was used in the hydrogen filling station built at the EXPO 2005 AICHI, JAPAN as a national project in FY2006. This provided practical experience in supplying hydrogen fuel to a hybrid fuel-battery bus.

* The figure indicates the capacity of hydrogen converted from natural gas (Nm3/h) of the unit.

HYSERVE 30* set up in the hydrogen filling station in the Osaka Gas field lab.

Using New Energy and Biogas

Cogeneration Technologies Using Biogas Electricity

Biogas is generated at sewage treatment facilities, food processing plants, animal waste treatment facilities, and other similar venues. Osaka Gas is developing biogas cogeneration of which biogas engine generates electricity at a high efficiency rate of roughly 37%. At the end of March in 2007, we expect the cumulative generation will reach to 21,000kW*. We are also looking into the possibility of using biogas in natural gas vehicles.

* Accumulation since FY2002

Biogas engine

Biogas Cogeneration to Treat Noxious Effluents

It is possible to effectively treat the biogas (principally methane) that is generated when noxious effluents from industries such as food processing are treated (by causing microorganisms to break down the organic matter while isolated from the air). Osaka Gas has developed cogeneration systems capable of both the treatment of noxious effluents, such as very oily effluents from the seafood processing, ham and dairy food industries that used to be hard to treat, and the generation of biogas. We have run continuous treatment tests on actual effluents in a 2t per day pilot plant to confirm that the effluent can be effectively treated and the volumes of biogas that are generated.

Pilot plant for the noxious effluents treatment and the biogas generation

Development of System Using Waste Heat from Gas Engines to Solubilize Garbage

In recent years, methane fermentation systems that recover energy from wastes such as biomass, and particularly raw garbage, have attracted interest as a way of preventing global warming. Osaka Gas has developed technology to use the waste heat from gas engines to solubilize raw garbage. This reduces the final volume of waste by half and as a result halves the cost of running the methane fermentation unit, and also increases the amount of energy recovered by around 1.2 times. Validation tests are under way in conjunction with local government and universities.

Combustible garbage recovered by local government authorities

Methane fermentation sludge (Solubilizing microorganisms)

80 deg. C solubilizing tank (100L)

Biogas conversion
- Halves final wastes
- 20% increase in biogas

Development of System to Efficiently Use Biogas Based on Gas Adsorption Technology

Osaka Gas has commercialized a biogas refining system using adsorption technology that is highly effective in eliminating the siloxanes that affect the performance of combustion engines. We have also commercialized adsorption type biogas tanks that can store the same amounts of biogas as conventional low pressure tanks, but in one-twentieth the volume. We are also involved in using this technology to develop systems to make use biogas, such as adsorption type fuel tanks for biogas-powered motor vehicles.

Gas-powered motorbike using Osaka Gas adsorption type biogas tank
(Manufacturer's prototype)

Air Pollution Control Technology

Commercialization of Catalytic Desulfurization Technology to Treat Flue GasesTreat Flue Gases

We have established OMviro Co., Ltd. with Mitsubishi Heavy Industries, Ltd. to manufacture and sell desulfurizing catalysts using activated carbon fibers (ACFs) to treat flue gases. These catalysts make use of microscopic nano-structures on the surfaces of the ACFs to inexpensively eliminate toxic SO_2 and at the same time the hard to remove SO_3 mist from flue gases. We delivered flue gas treatment units using these catalysts to customers in 2005, and confirmed that the flue gases at the stack outlets had been effectively treated to levels of not more than 1 ppm.

Demonstration unit of ACF emissions treatment at Mitsubishi Heavy Industries Nagasaki works

Development of Denitrification Catalysts Using Activated Carbon Fibers

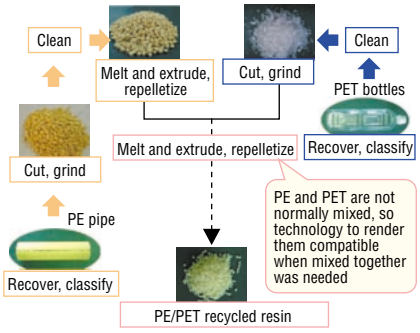
The catalysts that used to reduce NOx (nitrogen oxides) required high temperatures for the reactions, and could not eliminate NOx from low temperature emissions. We have developed catalysts that remove NOx using activated carbon fibers (ACFs) at ambient temperatures (around 15°C to 50°C) and at the exhaust emission temperatures after the waste heat recovered (around 100°C to 150°C). These catalysts are undergoing proving tests on the sides of main roads and in underground car parking in Fukuoka Prefecture.

Test unit in underground carpark (Fukuoka Prefecture)

Other Environmental Technologies

Development of Composite Recycled Resins Using PET Bottle and PE Gas Pipe Wastes

With the growing awareness of the need for recycling in recent years, we have continued with the development of high value-added composite recycled resins using technology that allows us to mix and render compatible PET bottle and PE gas pipe wastes. These new resins are used for the base casings of table-top cookers and the clear folders in which the guidebook for safety use of gas is supplied to new customer. We have also proved the technology to convert polylactic acid and other plant-derived resins to improved resins with good heat resistance and impact strength.



Contributing to Society through Afforestation Project in Australia

The first tree planting project by a Japanese gas company has been running since 2001 in Australia. A total area of 1,000 ha is to be planted at a rate of 100 ha per year. By 2005, the area planted had reached 500 ha. This project not only provides raw materials for papermaking in Japan, but the CO_2 fixing effect of grazing land is magnified by planting trees. The survey bodies verify the ongoing maintenance of the plantings. The project makes a broader contribution to society by lending recreation areas for local events.

Planted trees growing strongly

Contributions to Local Communities

As a corporate citizen, the Osaka Gas Group seeks to contribute through its business activities to realize a society in which everyone can lead comfortable and rewarding life.

Community Activities

Our corporate volunteer program, "The Small Light Campaign", was inaugurated in 1981 (the International Year of Disabled Persons). We have engaged in a variety of activities through this campaign over the past 25 years, which forms the base of the Osaka Gas Group's social contribution activities. We are devoted to issues such as youth education, welfare, and environmental awareness.

Our Activities "The Small Light Campaign"

- Youth education support
- Support for the elderly
- Support for handicapped self-sustaining
- Encouragement of environmental awareness
- Promotion of culture in the Kansai Region
- Voluntary activities by employees

Children's Theater
We invite children from child welfare facilities to musicals with the theme, "Love, Dreams, and Courage" (1987~)

Helping the elderly go out
We support an NPO to assist the elderly, who tend to have few chances to get out of the house, to go out and enjoy the scenery of the seasons. (1996~)

25th Anniversary of "Small Light Campaign"

Support for community-based organizations
"Small Light Campaign" celebrated its 25th anniversary in 2006 by donating to youth education support activities of citizen groups. Twenty-one groups were selected after deliberation and assisted with a total of ¥10 million. In principle, the Campaign relies on contributions from our employees.

Midosuji Neighborly Bazaar
Handmade items from cooperative handicapped facilities are on display for sale at this charity bazaar held in front of our Osaka Gas Building as part of our efforts to deepen understanding of the handicapped in our community. (2000~)

Clean & Walk
This is a cleanup activity that we hold annually together with everyone in the local community, with the goal of "helping to keep our community clean". (1985~)

Forest Conservation: "The Osaka Gas Forest"

Osaka Gas has teamed up with the Osaka Gas Labor Union for forest conservation through the "Company Forest /Union Forest" promoted by Wakayama Prefecture. In March 2005, 100 employees participated in planting 2,600 broadleaf (quercus serrata, sawtooth oak, zelkova, mountain cherry, etc.) seedlings in the forests (1 ha) near the Kumano ancient road in the Kii Mountain area. We will work to get the cooperation of the Nakahechicho Forest Association for efforts toward nurturing the trees (cutting the grass around them, etc.).

Employees carefully digging and planting each seedling, one by one

Children's Emergency Call Campaign for gas piping work sites

Osaka Gas assists and takes part in the local Children's Emergency Call Campaign. Gas piping work sites have now been signposted as Children's Emergency Call sites. This ensures safety for children by making emergency calls to the police immediately in case of need.

The Southern Pipeline Department began to run the scheme in October 2005, and as at April 1, 2006, all of our gas piping work sites in Osaka and Nara Prefectures are included.

Gas piping work site with Children's Emergency Call signposted

Celebrating our 100th anniversary activities

On October 19, 2005, Osaka Gas celebrated its centenary. Activities were held to show the gratefulness to the community in all the regional offices in commemoration of the occasion.

LNG Dream tanker project

The artist Jimmy Onishi and 40 children chosen from among the public worked together to create giant artworks depicting their dreams on a tanker transporting the clean, environmentally friendly energy source, natural gas. The LNG tanker made a maiden voyage in September 2006.


Jimmy Onishi and the children painting in the Gas Science Museum in August 2005


Image of the LNG Tanker, LNG Dream

Gaslights donation

We have presented two gaslights for the Nagahama Railway Square in Nagahama (September 2005), three for the Yonbancho Square in Hikone (April 2006) and eight for the Himeji City Museum of Art (April 2006).

We will also present 30 gaslights for the Sankyubashisuji in Osaka (in FY2007 or later).


Gaslight presented to the Himeji City Museum of Art

Donation of glass top cookers etc

Glass top cookers and other high performance, convenient gas appliances have been presented to community centers and private cooking schools etc.
(473 glass top table-top cookers presented to 120 sites)

Osaka Gas Group Welfare Foundation

In our 80th anniversary year, 1985, Osaka Gas and its affiliates got together to establish the Osaka Gas Group Welfare Foundation. The Foundation is involved assisting the elderly (helping local welfare activities and helping surveys and research) and in health promotional activities such as Health Meetings, Health Classes and Walking Events in the local area. Each year, around 11,000 elderly people participate in these health promotional activities in the six prefecture.


Body Talk


Makkoho Exercise

Osaka Gas Foundation of International Cultural Exchange

The Osaka Gas Foundation of International Cultural Exchange was established in September 1992 for the support of education in natural gas producing countries. It provides educational materials, R&D, scholarships, and training. Over the past 14 years support has been given in approximately 280 regions and schools.

Elementary school (Indonesia) which received educational materials

Terbuka University (Indonesia) received multimedia training materials

Support for Environmental Education

Osaka Gas makes available its Gas Science Museum (at the Senboku LNG Terminal) and its Himeji Gas Energy Hall (at the Himeji LNG Terminal) for school excursions, principally for elementary and junior high school students. We also visit and provide lectures on environmental and energy issues at schools and universities. We take part in local community events at all our sites to raise awareness of the environment by showing the way to conserve energy.

Environmental Education Results (FY2006)

	Elementary school	Junior high school	High school / vocational school	Adults / other	Total
Gas Science Museum	34,194	2,215	955	17,577	54,941
Himeji Gas Energy Hall	6,575	261	422	7,795	15,053
Others	335	783	100	1,254	2,472
Total	41,104	3,259	1,477	26,626	72,466

● Gas Science Museum

The museum was opened in October 1982 as a general science museum for gas and energy. It was the first such museum opened in Japan.

Children enjoying a quiz, and learning about global environmental issues and natural gas

● Himeji Gas Energy Hall

Having fun learning about the planet, science, and energy, with “the global environment and natural gas” as the basic concept.

Learning by enjoying quizzes and games about the global environment and science

● Providing Lectures at Schools

Eco Angel Seminars

A program in which students in certain number of groups taking part in games and considering how to cut their CO_2 emissions and take account of global environmental issues

Seminar on environmentally friendly ramen making

This program teaches children the connections between their everyday lives and environmental and energy issues through making ramen that the children love.

Corporate Information Disclosure

Our Information Disclosure Policy and Publication Materials

Osaka Gas releases information in a timely and appropriate way to ensure that our customers and shareholders have a correct understanding of the Group. To do this, we use the news media and Internet as well as various forms of advertising and briefings. Our basic policy on disclosure are that we should make the operation of our business even more transparent so that we will be recognized and assessed as open to society.

We publish Corporate Profile for a general audience, the Annual Report and Business Report containing detailed data for shareholders and investors. In addition, we have issued an Environmental Report since our first in 1994. We changed the name of the report to the Sustainability Report in 2005, and added information about our work in society. The 2006 edition has been renamed the CSR Report, to focus on our CSR. These are all available from our Web site.

Exhibitions and Seminars

Every year, the Osaka Gas Group publishes details of its environmental activities at meetings and seminars held by learned societies and business and industrial groups and so on.

We also strive to present the Group's environmental activities through participation in exhibitions such as New Earth 2005 and local environmental events and by providing lecturers on the environment.

New Earth 2005

Showrooms

Osaka Gas has established and runs showrooms in many areas to offer ideas on house building and homemaking in general, to provide information on energy and living, and to hold cooking classes to enhance the two-way flow of communications between us and our customers.

We opened our DILIPA residential showroom at the Banpaku Koen in Suita in November 1991. It is a comprehensive residential living showroom where visitors can see, touch and experience.

DILIPA residential showroom

Stakeholder Dialogue with Kokubu Seminar, Kobe University

Osaka Gas is always looking for opportunities for exchanges of views with others. One opportunity came in December 2005, when we invited 12 students from the Katsuhiko Kokubu Seminar, Graduate School of Business Administration, Kobe University to our Senboku Terminal. This gave them the opportunity to see the environmental management at our LNG terminal at first hand, and there was a lively exchange of views on the direction of the company's environmental policy.

The students suggested that the Web site should carry more information and provide a more in-depth introduction to natural gas, that there should be more information in our CSR report on the company's contributions to society and employment, and they also offered some practical suggestions including use of more appealing photographs.

We will take these views into account as we work to improve our operations in future.

Exchange views with the students of Kokubu Seminar, Kobe University

URL For a report by the Kokubu Seminar, go to the following address:
http://www.b.kobe-u.ac.jp/kokubu/stakeholder.html

Creating Comfortable Work Environment

The Osaka Gas Group maintains a policy of practicing fair and equal employment, respecting employees' individuality and self-control, and making it possible for them to grow through their work. We strive to create a personnel system that values every employee regardless, and that can accommodate a diversity of values and lifestyles in order to boost employees' motivation.

Osaka Gas follows a results-oriented, individual decision promoting, highly transparent and flexible personnel system to ensure transparent and impartial evaluation and treatment. We regularly survey the opinions of employees and reflect the results in personnel policies.

Employment Efforts

Employment Policy

We are fair and impartial in hiring in consideration of appropriate match of the qualifications and work style of the individual to the required abilities and working conditions of the business.

Osaka Gas seeks individuals with the following qualities, "High motivations and abilities to make proper judgments", "Ability to seek self-improvement through work" and "Having sprit of overcoming professional challenges".

Creating equal employment opportunities

Osaka Gas observe the spirit of the Equal Employment Opportunity Law by providing a childcare/nursing leave scheme for both male and female staff, and we have put in place gender-blind hiring, treatment, duties and training systems.

Employment Status

(As at end March 2006; excludes staff on loan to subsidiaries and other organizations)
Staff numbers: 5,481
(Of which, males 4,737, and females 744)
Average age: 41.7
Average continuous years of service: 20.3
(April 1, 2006)
Number of new graduate hired: 123 (of which, 110 males and 13 females)

Hiring of the mentally and physically challenged

We make proactive efforts to hire the challenged. We also have made efforts toward a more barrier-free workplace.

Percentage of challenged employees at Osaka Gas

As of April 2006, 2.36% (legal rate 1.8%)

Employing aging population

We follow the spirit of the amended Law concerning Stabilization of Employment of Older Persons. We have introduced a system of ongoing employment for people of 60 or over, and we strive to ensure employment for aging population.

"Second Life" support and re-hiring system

We have established a Career Development Center in our Personnel Department to support "Second life" of our employees. We have a system of part-time employment for those employees who have reached retirement age but wish to be reemployed, and meet our requirements. We are also currently raising the upper age limit in stages for employees to 65.

Human Resource Development

Human Resource Development Policies

Our position on employee training and skills development is that we develop "high-value personnel" that will bring competitive advantage to the Osaka Gas Group.

We strive to build systems that wil support career development based on a philosophy of individual choices and individual responsibility in order to train up self-starting personnel who can act on their own initiative. We also offer swift and deliberate training for imaginative and innovative personnel (leaders).

Training system

We have developed various staff training programs under our training system, with "Stage by Stage Training" based upon duties and qualifications, "Management Training" for supervisors, "Leader Training" and etc.

We began a new series of enhanced training for managers in FY2006, "Power-up Training for Managers", to be taken by all managers.

Assistance for Self-Learning

All Group employees are encouraged to volunteer for "Challenge Seminar Training". We also encourage employees to take distance learning course that is run twice a year.

Results for FY2006

"Challenge Seminar Training"
28 courses held, total of 792 participants
Numbers of application for distance learning course:
Spring classes: 617, Autumn classes: 323

Job Posting System

Anyone in the Osaka Gas Group can apply for available job.

FY2006 results: 31 applied, 10 appointed

Creating Comfortable Environment

Work and Life – standing for human rights

In seeking to create a work environment in which employees can work without anxiety, Osaka Gas established the "Labour and Management Promotion Committee" to deal with "working hours" and "supporting the balance between work and family life".

Employees are also called on to respect human rights as a criterion for being a good corporate citizen. We have established a Company-wide Human Rights Awareness Raising Committee to promote human rights throughout the Osaka Gas Group. The committee secretariat is the Human Rights Awareness Center in the Osaka Gas Personnel Department.

Childcare/Nursing Leave System

Osaka Gas has a system of "Childcare Leave" for both female and male employees which can be taken up to the end of the month in which a child has its third birthday, and "Nursing Leave" which can be taken for up to a total of 366 days. We have established a support plan and a guidebook for employees, "Support for Raising the Next Generation".

Human rights education & training courses

Osaka Gas provides training on human rights, designed for all company employees, as well as programs within each organization conducted by Human Rights Awareness promotion leaders from the various divisions. From members of the board to newly employed people, each level has a human rights training and education program.

■ Numbers of staff taking childcare/nursing leave (Number of employees)

	02.3	03.3	04.3	05.3	06.3
Childcare Leave	42	46	35	38	31
Nursing Leave	3	2	1	5	0

■ Human rights training (FY2006)

	Month held	Attendance
Board of Directors	December	12
Managers and supervisors	June, July, November, January	139
Regular employees	August, October, November, January, February	391
New recruits	April, March	96

Health and Safety

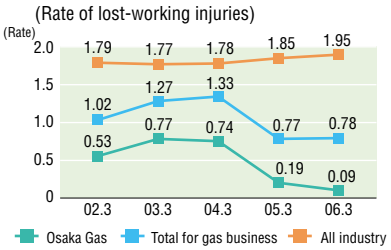
Health and Safety Management Organization

We and our affiliates engage in proactive safety and health activities with the goal of ensuring the safety and health of our employees. We observe all the workplace health and safety legislation and regulations, and we have on our own initiative produced "Rules on Health and Safety Management" and other manuals which we follow. Our "Health and Safety Management Organization" plays an important role in the implementation of our policies.

Safety activities

Osaka Gas evaluates its safety work in its workplaces on the basis of an accident index that quantifies the level of industrial accidents, using our own formula. In addition, employees must obtain our own internal driving permit before they can operate company vehicles.

■ Rate of industrial accidents occurrence
(Rate of lost-working injuries)



Promoting health

We provide individualized advice for employees over the age of 35 based on testing, conducted at clinics for early detection and prevention. We also make concentrated efforts in the area of mental health.

Dialog between the president and employees

Since FY2005, the president has made regular visits to major operational and front-line offices of Osaka Gas for a direct dialog with employees. This is part of the management's policy of positioning employees as stakeholders of the company. Using these opportunities, both the top management and employees exchange ideas and share managerial issues. During the past year, there were 11 meetings held in total with the participation of 522 employees.

There were positive responses from the participants who felt that they could identify themselves with the president's awareness and felt more familiar with the management's perspectives and visions.

Third Party Reviews

Evaluation and Comments on Environmental Management and Activities

To: Osaka Gas Co., Ltd.

July 18, 2006

From: Institute for Environmental Management Accounting

Katsuhiko Kokubu
(Professor at Kobe University/Director of IEMA)

Eriko Nashioka
(Director of IEMA/Certified Public Accountant)

1. Purpose of the Review

As a third party not involved with the business of Osaka Gas Co., Ltd., we evaluated the social and environmental performance described in the "CSR Report 2006," which Osaka Gas Co., Ltd. prepared, and hereby express our opinions, for the purpose of ensuring its credibility.

2. Procedures

In order to develop our understanding on the planning and implementation process of the social and environmental activities of the company, as well as the evaluation of its performance and utilization of its data, we interviewed Mr. Katsumi Makino, Managing Director and CSR Executive, and put questions to persons in charge at the headquarter office. We conducted sampling checks using procedures partly based on those in financial auditing where necessary to determine whether work is being performed accordingly to compile data for disclosure at Osaka Pipeline Department and OGIS-RI.

3. Conclusions

The results of the company's environmental management were quite well, with almost all Medium-Term targets achieved by March, 2005, and higher targets have been set for FY2009. It should be specifically noted that the new targets are not for only Osaka Gas Co., Ltd. but also for its affiliates. We strongly approve of the planned simultaneous introduction of Environmental Management systems to all group companies to develop the Environmental Management to a new dimension. Although Osaka Gas Environmental Management Indicators are quite unique, we believe that a more effective management system could be developed if they are not treated simply as indicators of results after the fact, but if new forward indicators are established and more broadly adopted at affiliated companies. Osaka Gas has not yet reached the stage of managing other CSR issues through setting targets, but it would be expected that Osaka Gas could take its CSR activities to a more practical level for the whole group by declaring that it would take the lead in playing an effective role in the region, and by setting out defined numerical targets. In compliance activities, we would like to see ongoing disclosure of information in the process of improvement. In addition, no significant errors were found in the calculation of the environmental performance data over the range that we examined by the procedures described.

Significant Performance Matters

1. Characteristic Environmental Activities (Osaka Pipeline Dept)

As an energy business, constant efforts have been made to ensure safety and reliability in gas supply. They also recognize the importance of protecting the environment, and engaging as far as possible with activities in this area while maintaining the safety and stability of energy supplies. When replacing gas pipes, the department is using polyethylene in place of steel pipes, and is making great efforts to reduce the amount of excavated soil generated by the work, and to recycle most of it. We note that Osaka Gas is making efforts to use all recycled materials as far as it is possible. We believe that the department is making valuable efforts to protect the environment.

2. Strengthening the group-wide involvement (OGIS-RI)

While the level of environmental management in Osaka Gas itself is very high, we have the impression that it is still at an initial stage in group companies. They should now focus on the efforts of the overall group since consolidated data is becoming common as companies' policy of information disclosure. We feel the group needs to increase its efforts as a group. The group has already put in place policies calling for the whole group to obtain some form of EMS and to operate under it: once this process is complete, we would expect a higher level of environmental protection for the entire group. The smaller companies have begun to use the in-house Osaka Gas EMS (OGEMS), with the support of Osaka Gas. OGEMS requires a high level of commitment, and OGIS-RI which has gained OGEMS shows great enthusiasm for reaching the same level of activity as Osaka Gas itself. While group company involvement is still at an early stage, we expect it to grow in future.

To Enhance Customer Value

Osaka Gas is making efforts to reflect customer views in its management in order to enhance Customer Value. This is most evident in its work on communications, through "C-VOICE" and its informal dialogue sessions with the Kansai Federation of Consumers' Associations. We expect Osaka Gas to be even more responsive in future through the PDCA cycle and proactive disclosure of feedback and so on.

CSR Report

The title of the report has been changed to "CSR Report" with the 2006 edition. This is intended to further expand disclosure. Osaka Gas has done very well in bringing their message, "CSR by achieving Value Creation Management" before its readers, with its content structure by the Four Values and special feature on Customer Value. We would like to see yet more employee related information disclosed to achieve balance in the Four Values.

The Osaka Gas Group commissioned a "qualitative evaluation or advice type" third party review, including a simplified quantitative verification, by the Institute for Environmental Management Accounting.

The Institute confined its review to how we planned and implemented our social and environmental activities, and our systems for collecting environmental performance data, and offered its opinions on these points. The review checked our head office divisions, and also the on-site activities of our Osaka Pipeline Department and of OGIS-RI, which gained Osaka Gas EMS certification in December 2005.

● **Interview between Professor Kokubu and Mr Makino, our CSR Executive**

Professor Katsuhiko Kokubu, Graduate School of Business Administration, Kobe University

Katsumi Makino, Managing Director and CSR Executive, Osaka Gas Co., Ltd.

● **On-site inspection at Osaka Pipeline Department**

● **Inspection at OGIS-RI**

Our Response to Suggestions and Opinions

Opinion	Our Response
A number of the FY2006 Medium-Term targets had already been met in FY2005. Were the targets subject to any review?	We did not do any particular review because the FY2006 targets were for the final year of the Medium-Term plan. In the new medium-term plan, "Design 2008"issued in Autumn 2005, we have taken the results into account and set higher targets.
There are fewer pages in 2005 than in the 2004 edition, and the descriptions are inadequate in places.	We provide detailed information about the more technical issues on the Web in order to make these items easier to follow. We aim to continue to make the Report easier to read by placing some material on the Web.
What management systems has the Osaka Gas Group put in place to carry out environmental activities?	Osaka Gas received company-wide ISO14001 certification in FY2006. We plan to integrate the current seven EMSs for greater efficiency. Our affiliates will introduce EMSs such as ISO14001 and Eco-Action 21 and the Osaka Gas EMS by FY2009.
The Report does not cover corporate governance.	The 2006 edition coveres corporate governance.
You are not yet at the stage of setting targets and managing towards them for non-environmental aspects of CSR. I would like to see you pursuing CSR with quantitative targets in these areas.	We collect data on non-environmental CSR, but we do not set targets for it. We will look at this in future.

Editor's Postscript

Osaka Gas issued its first "Environmental Report" in 1994. Since then, we have reviewed the contents of the reports in the light of changing times, and we have moved from a purely environmental focus to now cover social issues as well. We have changed the title to "CSR Report" this year to try to show more clearly the responsibilities of the companies in the Osaka Gas Group.

The Osaka Gas Group believes that the basis of CSR is the pursuit of "Value Creation Management", which accentuates the balance among the four values, "Customer Value", "Shareholder Value", "Social Value" and "Employee Value". We have compiled this report giving most prominence to "Customer Value". In that context, we carry comments by customers and staff to show how we contribute to society through our business activities.

These are still early days for our CSR Reports, but we will not back away from the title. We expect to carry more information in future reports.

Thank you all very much for your invaluable opinions and thoughts.

September 2006
Environment Dept, Osaka Gas Co., Ltd.

The picture on the front cover is an image of the "LNG Dream", one of the world's largest LNG tankers, commissioned in September 2006. Jimmy Onishi, Japanese painter, and 40 children did the four paintings on the sides of the tanks under the Natural Gas Dream Tanker Project, as part of the centenary celebrations for Osaka Gas.

OSAKA GAS GROUP

Osaka Gas Group CSR Report 2006

The CSR Committee, Osaka Gas Co., Ltd.
Published in September 2006

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This brochure is printed on recycled paper with highly biodegradable soy ink that allows easy recycling of printed matter.