OSAKA GAS GROUP

2004

OSAKA GAS GROUP

Environmental and Social Action Report

For the year ended March 31, 2004

Environmental and Social Action of Osaka Gas Group

Environmental Action

Social Action

TOPICS

p.8 Established Group-wide Environmental and Social Action Philosophy

p.9–10 Formulated Osaka Gas Group Environmental Management Promotion Plan

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p.36–39 Good Progress in the Development of Energy-efficient Equipment

p.56 Reception of the Prize for Excellence in the Environmental Reporting Awards

WWW Visit our website

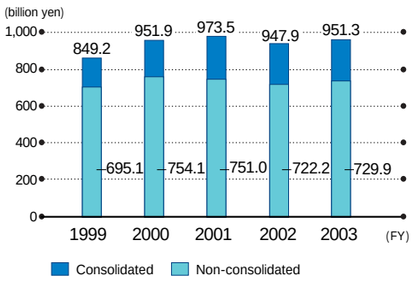
More details about the contents of this report, data, etc. are available on our web site
http://www.osakagas.co.jp/kankyo_e/

New Newly added items
Upgraded Significantly enriched items

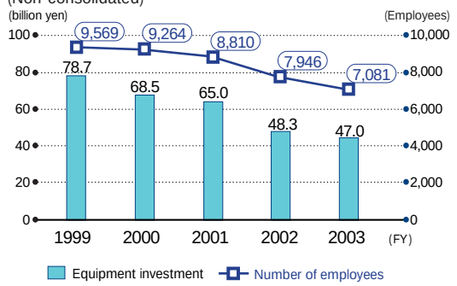
Corporate Profile
(as of March 31, 2004)

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. Sale of gas appliances and works incidental to sale of gas appliances 3. Installation of housepipes
Number of customers	6,634,000 (Number of gas meters installed)
Amount of gas sold	7,766 million m^3 (FY2003) Note: Equivalent to 45 MJ/m^3
Number of employees	7,081 (Including associate directors and part-time employees and excluding those loaned to group companies and others)
Listed exchange market	Tokyo, Osaka, Nagoya

Net Sales

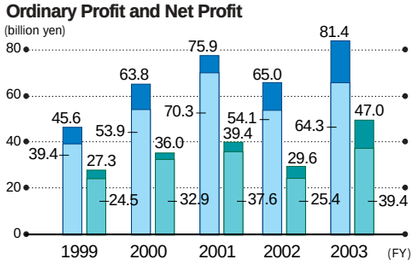


Capital Investment and Number of Employees
(Non-consolidated)

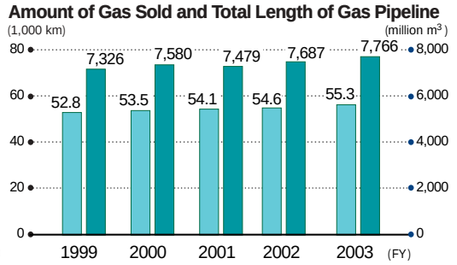


Note: Including employees being loaned to other companies before FY2000.

Ordinary Profit and Net Profit

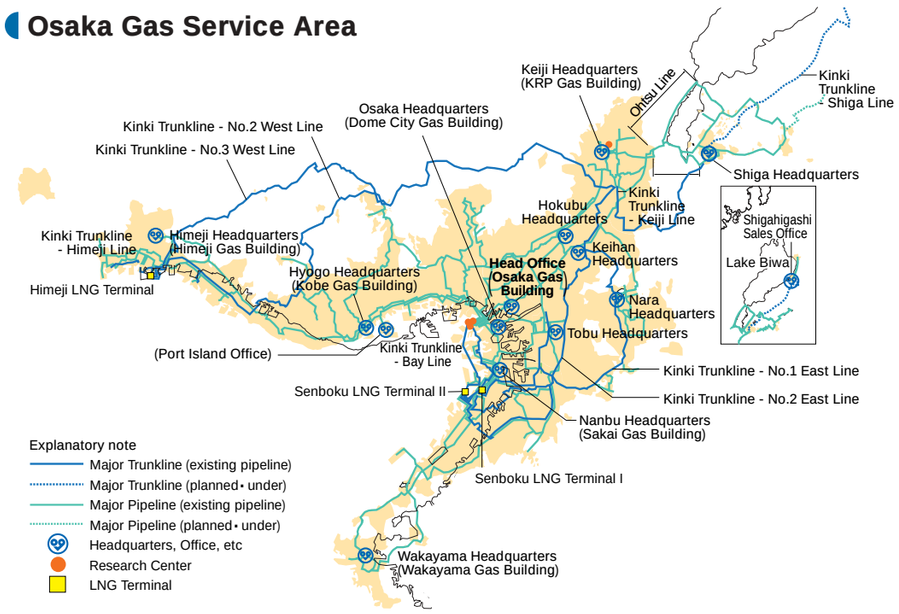


Amount of Gas Sold and Total Length of Gas Pipeline



Note: Equivalent to 45 MJ/m^3

Osaka Gas Service Area



Osaka Gas Group's Business Operations

Osaka Gas
Gas Operations, Power Business, District Heating and Cooling Business, International Business, etc.

Energy Business
Multiple Energy Supply beyond Kansai Area

Nissho Petroleum Gas
LPG (Liquefied Petroleum Gas)

Liquid Gas Group
Industrial Gas/Fuel Gas Business

Non-Energy Business
Growth and Development of 5 Business Area

Osaka Gas Chemicals Group
Coke/Chemicals/ Carbon Fibers

OG Capital Group
Engineering/ Residential Services

OGIS Research Institute Group
Information Communication Business

Urbanex Group
Urban Development

Kinrei
Food/Restaurant

Osaka Gas Group organization chart

(Osaka Gas Co., Ltd., Subsidiaries and Affiliates)
(●Energy Business ○Non-Energy Business)

Shareholder's Meeting
Corporate Auditors/ Board of Corporate Auditors
Board of Directors
Corporate Auditors Office
Chairman/President/ Executive Vice President
Executive Board

Restructuring of the Osaka Gas Group

Osaka Gas with its five regional business headquarters was restructured in April 2003. The new structure now has five business units covering the company's natural gas value chain: Energy Resources, LNG Terminal and Power Generation, Pipeline, Residential Energy, and Commercial and Industrial Energy. At Group Head Office, we reorganized the functions into five support/shared divisions. The Affiliated companies have also been reorganized from 10 fields (G10) into eight fields (G8), with a core company in each respective field.

Osaka Gas Co., Ltd.
Head Office
- Strategy & Finance Div.
- Communication & HR Div.
- Administration & General Affairs Div.
- Technology Div.
- Tokyo Div.

Osaka Gas Co., Ltd.
G1 Business Units, Subsidiaries and Affiliates 50 companies
- ● Energy Resources B.U. 8 companies
- ● LNG Terminal and Power Generation B.U.
- ● Pipeline B.U. 5 companies
- ● Residential Energy B.U. 16 companies
- ● Commercial & Industrial Energy B.U. 17 companies
- ● Group's Head Office 4 companies

(As of July 1, 2004)

Osaka Gas Group
Core Companies, Subsidiaries and Affiliates 74 companies
- ● **G2** Liquid Gas Co., Ltd. 14 companies
- ● **G3** Nissho Petroleum Gas Corp. 18 companies
- ○ **G4** Urbanex, Inc. 10 companies
- ○ **G5** Kinrei Corporation 1 company
- ○ **G6** OGIS Research Institute Co., Ltd. 5 companies
- ○ **G7** Osaka Gas Chemicals Co., Ltd. 7 companies
- ○ **G8** OG Capital Co., Ltd. 19 companies

INNOVATION CENTENNIAL, FY2003-2005 Medium-Term Management Plans

The Osaka Gas Group is shifting from a conventional energy business that focuses mainly on local gas services to a wide-ranging, diversified business.

We are also working to boost competitiveness and profitability of our non-energy businesses centered around our core companies.

We are undergoing four major management shifts.

- **A shift from a focus on business in the Kansai region to business in a broader area outside the region.**
- **A shift from Osaka Gas dominant management to consolidated management of affiliates with core companies.**
- **A shift from a vertically integrated business model from raw materials procurement to retail sales, to value chain unit business model with five business units aimed at improving the competitiveness and profitability.**
- **From business focusing on gas to a multiple energy business that includes electricity and LPG.**

Scope of the Report

"Gas Business" As Used in This Report

The Osaka Gas Group consists of Osaka Gas Co., Ltd. and its 120 subsidiaries and affiliated companies (as of the end of March 2004). These companies operate in two fields, namely, the energy business and the non-energy business.

The "gas business" as used in this booklet refers to the three major operations of Osaka Gas: 1. Manufacture, delivery and sale of gas, 2. sale of gas appliances and works incidental to sale of gas appliances, and 3. installation of housepipes.

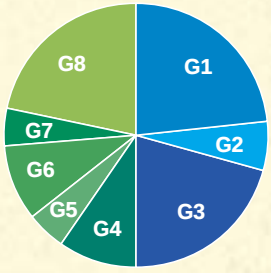
Consolidated sales of Osaka Gas Co., Ltd. in FY2003 (ended March 2004) were approximately ¥951.3 billion.

Non-consolidated sales were approximately ¥729.9 billion, which included sales of "gas (See 1. above)" worth ¥572.1 billion, or 78.4%, and "gas appliances and installation works (See 2 & 3 above)" worth ¥131.8 billion. Together, these two components accounted for 96.4% of the total sales of Osaka Gas, and 74.0% of the consolidated sales. As these figures indicate, the "gas business" constitutes the core of Osaka Gas Group's operations.

77 Companies Out of 120 Are Consolidated Subsidiaries

(As of March 31, 2004)

Sales Ratio of 120 Subsidiaries and Affiliates by Business Category



Energy Business

G1	Business units related to Gas operations	23.3%
G2	Liquid Gas Group	6.0%
G3	Nissho Petroleum Gas Group	20.7%

Non-Energy Business

G4	Urbanex Group	9.6%
G5	Kinrei Co., Ltd.	4.8%
G6	OGIS Research Institute Group	9.3%
G7	Osaka Gas Chemicals Group	4.6%
G8	OG Capital Group	21.7%

Editorial Policy

The Environmental and Social Action Report for the Entire Osaka Gas Group

1. The Environmental and Social Action Report 2004 mainly focuses on the gas business of Osaka Gas, the core business of the Group. It also covers the affiliates and subsidiaries of Osaka Gas.
2. Following the policy statements by the top management, each chapter presents the management's perspectives on respective business divisions of the company. At the same time, the highlights of the year's activities have been presented to help readers understand the notable results.
3. Explanations on technologies and products have been presented in an easy-to-understand manner.
4. For the purpose of fairness, we asked various external parties for their reviews and comments that are presented in (pp. 60-62).
   We asked six scholars and experts for their opinions on the environmental action and information disclosure by Osaka Gas. In addition, we requested a review from Institute of Environmental Management Accounting (IEMA). We value their observations for future improvement of our actions and reports.
5. This report was prepared with an emphasis on the efforts of Osaka Gas and its affiliate companies in FY2003 (April 1, 2003 - March 31, 2004) by taking into consideration the Environmental Report Guidelines (2003 Edition/2000 Edition), published by the Ministry of the Environment, and the 2002 Sustainability Reporting Guidelines, published by the GRI (Global Reporting Initiative).

* More detailed information, such as site-specific data, is presented on our Web site. The entire report is also available. (See the back cover for our Web site address.) In addition, we separately published Osaka Gas Eco-note, a compact and easy-to-understand summary that contains excerpts from this report. (Japanese only)

Environmental Action Report

Report based on gas business operations of Osaka Gas Co., Ltd.

The environmental action report contained in this report pertains mainly to the gas business of Osaka Gas. Actions of affiliated companies are discussed on separate pages (pp. 31, 32, 42-44).

In the report, "Osaka Gas" refers to the core gas business while "Osaka Gas Group" collectively refers to the affiliates or subsidiaries of the group. When a specific mention is made about an affiliate, its name is used.

Social Action Report

Reference made to both the gas company and affiliates in the Group

In referring to those responsibilities as a public utility such as safety, stable supply, customer service, etc., the report includes those activities which Osaka Gas implemented in cooperation with its contractors, service chain stores (or local sales agencies) and other affiliates.

On human rights, employment, and social contributions, the report covers the entire Osaka Gas Group as we believe that these subjects are commonly shared values of the group.

Period under review: April 1, 2003 - March 31, 2004

* FY2003 corresponds to the fiscal year from April 1, 2003 to March 31, 2004 in this report.

The next edition is scheduled for publication in August 2005.

Calculation range of affiliates for the data listed on page 20 and 32 (total of 53 consolidated companies)

(1) 31 affiliates which have plants

OG Road Co., Ltd.	Hokuriku Nissho Propane Co., Ltd. *
Nabari Kintetsu Gas Co., Ltd.	Nissho Gas Energy Corp.
Gas and Power Investment Co., Ltd.	Mie Gas Terminal Co., Ltd.
Ashiyahama Energy Service Co., Ltd.	Ehime Nissho Propane Co., Ltd.
Rokko Island Energy Service Co., Ltd.	Kochi Nissho Propane Corp.
Osaka Rinkai Energy Service Co., Ltd.	Kinrei Corporation
Liquid Gas Co., Ltd.	Osaka Gas Chemicals Co., Ltd.
Sanshin Gas Engineering Co., Ltd.	DONAC Co., Ltd.
Liquid Gas Kyoto Co., Ltd.	AD'ALL Co., Ltd.
Cold Air Products Co., Ltd.	Full Fine Co., Ltd.
CRYO-AIR Co., Ltd.	OG Auto Service Co., Ltd.
Nissho Propane Sekiyu Corp.	Techno Green Co., Ltd.
Nissei Co., Ltd.	Gas and Power Co., Ltd.
Homma Fuel Corp.	Nakayama Joint Power Generation Co., Ltd.
Nissho Iwai Gas Co., Ltd.	Nakayama Nagoya Joint Power Generation Co., Ltd.
Nagano Propane Gas Co., Ltd.	

* Hokuriku Nissho Propane Co., Ltd. was sold off on July 30, 2004, and is no longer an affiliate.

(2) 22 affiliates with more than 50 employees which do not have plants

Kinpai Co., Ltd.	Enetech Kyoto Co., Ltd.
Living Maintenance Service Hokuto Co., Ltd.	Urbanex Service Co., Ltd.
Living Maintenance Service Osaka Co., Ltd.	Kyoto Research Park Co., Ltd.
Rakuyo Gas Center Co., Ltd.	Serendi Co., Ltd.
Gakuenmae Gas Center Co., Ltd.	OGIS Research Institute Co., Ltd.
Kuzuha Gas Living Co., Ltd.	Osaka Gas Engineering Co., Ltd.
Hello Co., Ltd.	KRI, Inc.
O.N.E Co., Ltd.	Osaka Gas Housing Equipment Co., Ltd.
Takenaka Maiko Service Shop Co., Ltd.	Kansai Business Information, Inc.
Hearts Co., Ltd.	Osaka Gas Security Service Co., Ltd.
Cogeneration Technology Service Co., Ltd.	Active Life Inc.

* Companies written in bold letters are newly added.
* Affiliates whose data were not available for some reasons such as shared buildings, were excluded from calculation.
* Companies names are the ones as of July 2004.

To Become an Energy Company of Choice

Foreword

Global issues call for global actions. Addressing the issues of the environment is a challenge common to mankind. It requires the concerted efforts of countries, businesses, and individuals alike, to put forward their wisdoms to solve those enormous problems facing the global community. Businesses, accounting for the majority of both manufacturing and consumption, should play their positive roles in easing the impacts deriving from their activities on the environment. As a corporate citizen, Osaka Gas places a high priority on its environmental actions as part of its corporate strategy to enhance its value for the society, as well as for its customers and shareholders.

Osaka Gas and the environment — towards sustainable development

Osaka Gas has served the communities in its service territory through supply of natural gas. Though it is the most environmentally benign form of energy among all fossil fuels, it is not free from emission of carbon dioxide. As a supplier of natural gas, a principal energy source essential to the economy and people's lives, we recognize that it is of utmost importance to realize its utilization in the most efficient manner. It is a mission for a provider of energy services to achieve this objective through an optimum balance of securing a stable supply, achieving environmental compatibility and contributing to sustainable economic development.

Viewing the enormous challenges from economic and environmental perspectives, a solution should lie in the development of highly efficient energy utilization technologies. A good case in point is cogeneration. Fueled by natural gas, cogeneration systems that generate electricity while effectively utilizing their waste heat for thermal applications have enabled us to achieve an overall energy utilization efficiency of 70 to 80%. Adding to their conventional applications for industries and businesses, the scope of cogeneration has been expanded to household since the market introduction of ECOWILL, home-use cogeneration system in 2003. With its superb environmental and economic features, ECOWILL has gained a favorable market acceptance. We will continue our efforts to develop energy-efficient and cost-effective energy equipment and systems including commercialization of fuel cells in the future.

Role of natural gas

To realize an environment-friendly society, it should be essential to establish an overall efficient system to supply and utilize energies in an economical manner. Such a society could be partly realized through shifting the electricity supply from central power generation stations to dispersed generation systems. This is an area where natural gas can make a positive contribution with its superlative characteristics of abundance in availability in numerous locations around the world and its ease of transportation. It is an essential source of energy in realizing dispersed energy supply systems.

There are, of course, other environmentally benign energy sources including renewables and nuclear energy. Each of these sources has its own drawbacks including lower economics for renewables and safety and waste disposal issues for nuclear. Natural gas, on the other hand, provides us with a practical and realistic solution to future energy supply. To build an energy-efficient and economical energy supply system, natural gas is an essential form of energy. It is precisely the mission for a gas supplier to fulfill its duty to realize the maximum level of utilization of this important energy source.

To be a reliable energy company of choice

Besides those related to the environment, businesses have other responsibilities they need to fulfill through their activities. They include legal compliance, community contribution, providing employees with good working environment. Osaka Gas, as an energy supply and services company, is committed to providing its customers with safe and reliable energy services. These commitments are inseparable parts of its corporate social responsibilities. Through fulfillment of our responsibilities, we intend to work even harder to become an energy company of choice. Our commitment encompasses the whole corporate group of businesses of Osaka Gas so that the value of the whole group will be further enhanced.

In closing

This year's report has been prepared through careful review of its contents for greater reliability and enrichment by having evaluation and comments from environmental organizations, specialists and stakeholders, on our environmental management and information gathering systems. We will continue our close interactions of these parties for further improvement of our activities.

We look forward to your continued support and encouragement.

Hirofumi Shibano
President, Osaka Gas Co., Ltd.

芝野博文

Osaka Gas Group aims

“the Sustainable Development”

Environmental actions
We contribute to society through our business activities and our activities to improve the environment at our customers’ homes and businesses.

Social activities
We undertake social activities mainly in the areas of welfare, regional cooperation, environmental conservation and international affairs.

Information disclosure and legal compliance
We promote information disclosure and legal compliance by improving our internal regulations and our internal awareness-raising activities.

Gas rates and their options
We make efforts to reduce gas rates and to provide various options.

Service standards
We endeavor to increase our customers’ satisfaction by providing new call centers with wide regional coverage.

Safety standards
We strive to maintain “zero serious accidents” status at our major facilities and to further improve the safety of our customers’ equipment.

Value for Society

Long-Term Vision 2010
Value Creation Management Plans

Value for Customers

Value for Shareholders

Ordinary profit
Osaka Gas: 80.0 billion yen
Consolidated: 100.0 billion yen

Net income
Osaka Gas: 48.5 billion yen
Consolidated: 57.5 billion yen

Return on equity (ROE)
Osaka Gas: 10.3%
Consolidated: 10.0%

Return on assets (ROA)
Osaka Gas: 4.4%
Consolidated: 4.1%

Free cash flow
Osaka Gas: 71.0 billion yen
Consolidated: 85.0 billion yen

Note: FY2005 Target

2005 Medium-Term Environmental Targets (Established in 2003) ⟷ Medium-Term Management Plan “INNOVATION CENTENNIAL” (Established in 2003)

Osaka Gas Group Code of Conduct (Established in 2000)

Environmental Management Indicators (Formulated in 2002, introduced in 2003)

2010 Environmental Targets (Established in 2000) ⟷ Long-Term Management Plan “Vision 2010” (Established in 1999)

Osaka Gas Corporate Action Standards
Osaka Gas Group Corporate Action Standards
(Established in 1998)

2001 Medium-Term Environmental Plan (Established in 1998)

Triennial Medium-Term Management Plan

Osaka Gas Environmental Action Guidelines
Osaka Gas Environmental Philosophy
(Formulated in 1992)

Environment

Develop and implement environmental actions based on our own philosophy

Economy

Fair and appropriate distribution and return of profits into the future

Society

Fair and decent business practice as a corporate citizen and a gas utility

Corporate Social Responsibility

Taking Environmental and Social Actions Encompassing the Group

Perspectives on the environment

As a leading energy business, Osaka Gas has held a view that its business activities are inherently linked with the environment. Through the supply of natural gas, the energy source most benign on the environment of all fossil fuels, Osaka Gas plays a role of providing energy services essential to today's society.

Our environmental commitment has taken positive steps over the years through formulation of proactive plans and targets, including establishment of the Osaka Gas Environmental Philosophy and Osaka Gas Environmental Action Guidelines in 1992 as well as the long-term Environmental Targets towards 2010 and Medium-Term Targets for 2005 in 1999. In the Medium-Term Targets, we specifically stated in quantitative terms CO_2 emission targets per cubic meter of gas sold and other benchmark figures. We have since then aggressively charged ourselves to achieve these goals.

Results of environmental actions during the past year

We are proud to report that we have achieved the CO_2 emission targets as stipulated in the 2005 goals two years in advance. Steady progress was also made in other fields including reduction of resources consumption, implementing further recycling of wastes, and easing environmental impacts deriving from our business activities.

Notable achievements in our contribution to the environment have been made through installation of cogeneration systems which greatly help increasing overall energy utilization efficiency. The total installed capacity in the service area of Osaka Gas has reached 1,213MW, accounting for about 42% of the entire gas-fired cogeneration capacity in the country. The scope of potential of cogeneration has been further expanded as a result of the market introduction of home-use cogeneration system 'ECOWILL' in March 2003. During the past year, more than 3,000 units were sold, well beyond our target sales of 2,000 units.

The activities of Osaka Gas went far beyond our conventional business fields, including fortified ESCO businesses in the domestic market, transfer of our environmental technologies to other countries such as China and Indonesia, development of 'Tri-Generation' — a new application of cogeneration which utilizes CO_2 emission from the equipment, development of hydrogen storage and utilization — the ultimate energy application in the future, and other areas.

The "Environmental Management Indicators", a new approach in our environmental performance assessment, was introduced during the year under review. On the basis of the new benchmark, the Environmental Manegement Efficiency, we achieved considerable progress in reducing CO_2 emission, excavated soil, industrial wastes, and others generated through our business activities, to reach 3.7m^3/yen, steadily approaching the 2005 target mark of 4.0. Similarly, the monetary value of environmental impact reductions has progressed steadily through increased installation of high-efficiency gas equipment and systems. Towards achievement of our targets, further efforts will be made to encompass our activities throughout the company.

Environmental Actions in the whole Osaka Gas Group

The business fields of the Osaka Gas Group are divided into two; the energy business sector which includes supply of gas, electricity, and LPG, and the non-energy sector covering such fields as real estate, foods, IT, materials, and consumers services. To build onto the Environmental Principles and Environmental Action Guidelines by clarifying our group-wide environmental commitments, we adopted this past March the Environmental and Social Action Philosophy and the Environmental Action Guidelines for the entire Osaka Gas Group.

Furthermore, we intend to formulate a new medium-term environmental targets for the three year period between 2004 and 2007, going in line with the review of the current Innovation Centennial, the medium-term business plans of the entire group. In the new targets, we plan to establish aggressive environmental targets for the group with specific targets in key review items such as energy consumption, waste management and other points.

As a tool for implementing our environmental actions in each company of the group, we will introduce environmental management systems such as ISO 14001 by 2010. Among the members of the group, some 10 affiliates have already acquired 14001 certification, and we intend to introduce the same management system for the remainder of the group in the same time frame.

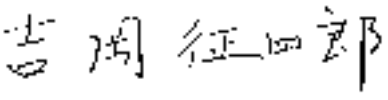
Fulfilling social responsibilities of the Group

In 2000, we formulated the Osaka Gas Code of Conduct as a guideline for executives and employees alike to guide their actions. Not only restricting ourselves to legal compliance, we intend to have our people to fulfill their professional responsibilities in a fair and appropriate manner. To this end, an education program was designed to enhance the aware of our employees.

Osaka Gas has also been an active participant in a number of community and charitable activities through employees' active engagement in these activities. Besides these, Osaka Gas as a public utility, has maintained a high profile in health and safety of the workplace. Naturally, ensuring safety and higher level of customer service has also been a fundamental element in our gas operations.

All our activities on our environmental and social fronts have been pursued as essential facets in the corporate social responsibilities of a business concern. Moreover, they have been positioned within the Group not as restrictive factors, but rather as important strategic orientations of the Osaka Gas Group. We are committed to further our activities not only across the group but also on the level of individual employees.

Seishiro Yoshioka
Executive Vice President,
Chairman, the Committee on Energy and the Global Environment



Osaka Gas Group's

Environmental and Social Action Philosophy

Osaka Gas Group Environmental and Social Action Philosophy

Environmental conservation at both local and global levels is an extremely important mission for Osaka Gas Group. Bearing in mind that all of its business activities are closely related to the environment, the Osaka Gas Group pursues harmony with the environment and realizes the efficient use of energy and resources through its business activities. In this way, Osaka Gas Group will contribute to the sustainable development of society.

Osaka Gas Group Environmental Action Guidelines

Ⅰ Reducing Environmental Impacts from Our Business Activities

We aim to reduce the environmental impacts from 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 Contributing to Environmental Impact Reduction with 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 Overseas

Osaka Gas Group aims to take an active part in environmental conservation activities in areas wherever we conduct business, both in and outside Japan.

(Revised in March 2004)

See page 9, for more details about environmental management system

Osaka Gas Group Code of Conduct

Ⅰ As a Good Corporate Citizen;

Respect for human rights
Pursue environmental conservation

Ⅱ In Gas Supply Activities;

Fulfill duties as a gas company
Ensure safety of products

Ⅲ In Business Transactions;

Ensure compliance with anti-monopoly laws
Execute fair transactions with business partners

Ⅳ As an Information Management;

Handle information properly in its disclosure and publication, as well as intellectual property

Ⅴ In the Workplace

Create a worry-free work environment and fair and equal employment conditions

Ⅵ As Social Actions

Prohibit associations with anti-social groups
Pay taxes fairly

(Revised in April 2004)

See page 50, for more details

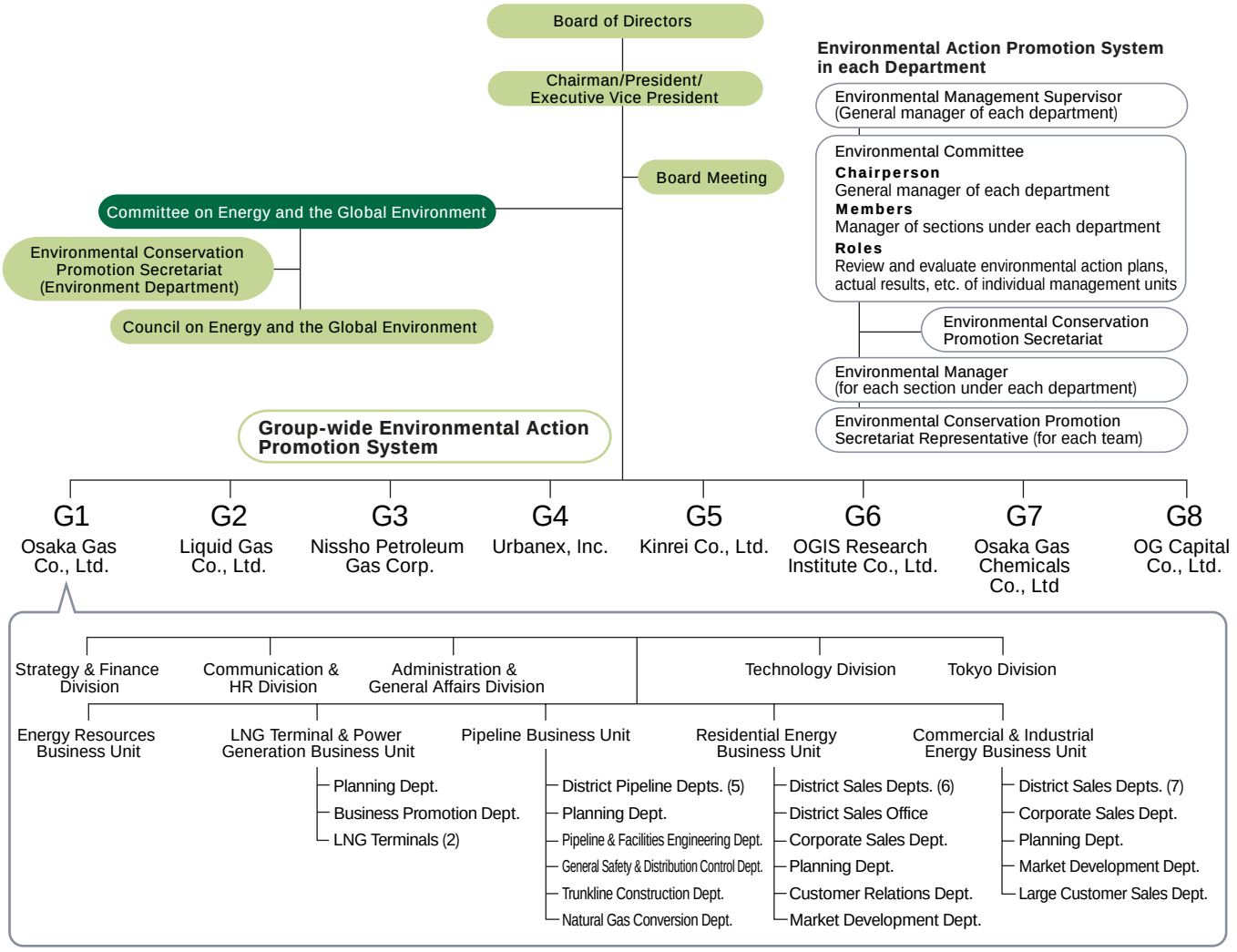
Promotion of environmental activities of Osaka Gas Group

1. Each company determines its own policy in accordance with the Group's philosophy formulated in FY2004
2. Each company sets targets of major environmental items
3. Establish EMS by FY2010

Environmental Management System

Osaka Gas Group Environmental Action Promotion System

Under the leadership of the “Committee on Energy and the Global Environment” headed by the executive vice president, the Osaka Gas Group plans, implements and follows up on environmental actions based on our basic environmental philosophy and Environmental Action Guidelines. The committee is comprised of Osaka Gas board members and the presidents of Osaka Gas Group companies (from G2 to G8). The system promotes company-wide actions that will contribute to environmental conservation.



Committee on Energy and the Global Environment

Chairperson	Executive Vice President
Members	Executive board members and General Managers of relevant departments and Presidents of core affiliates
Secretariat	Environment Department
Roles	Set up and review the basic policies and measures of integrated company-wide environmental activities

Council on Energy and the Global Environment

Chairperson	General Manager of Environment Department
Members	Managers of relevant departments, managers of general affairs divisions in core affiliates
Secretariat	Environment Department
Roles	Deliberation on integrated company-wide environmental activities

Osaka Gas Aims at Acquiring Company-wide Certification of ISO 14001 by FY2005. All Group Member Companies Plan to Construct the EMS by FY2010.

The State of ISO 14001 Certification Acquisition within Osaka Gas

Responding to the reorganization in FY2003

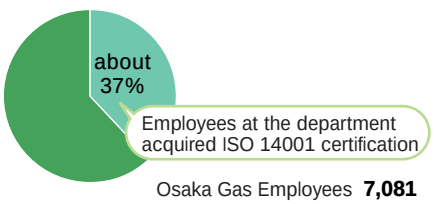
As the table on the right shows, Osaka Gas has pressed forward with the acquisition of ISO 14001 certification.

In FY2003, the company changed its conventional organizational structure that consisted of such groups as the Gas Resources Dept., Production Dept., Transmission Dept., District Business Headquarters, and Corporate Sales Dept and so on. The new organization adopted value chain units, starting with natural gas feedstock (upstream) and extending all the way to sales and services to customers (downstream). As a result, five new business units were born. They are the Energy Resources Business Unit, the LNG Terminal & Power Generation Business Unit, the Pipeline Business Unit, the Residential Energy Business Unit, and the Commercial & Industrial Energy Business Unit.

Corresponding to this organizational change, the environmental management system (EMS) used by the old Transmission Dept. and the Osaka Business Headquarters was reorganized to be used as the EMS for the Residential Energy Business Unit, the Commercial & Industrial Energy Business Unit, and the Pipeline Business Unit.

Approximately 37% of the 7,081 employees of Osaka Gas in FY2003 belonged to business units that had acquired ISO 14001 certification.

Number of Osaka Gas employees at the department that acquired ISO 14001 and its percentage to total employees



Osaka Gas Employees **7,081**

ISO 14001 certified departments in Osaka Gas

Acquired Department	Date
Production Department	Oct. 1997
Engineering Department (Construction sector)	Mar. 2001
Senri Energy Center *	Mar. 2001
Transmission Department	Jun. 2001
Head Office Building	Sep. 2001
Osaka Business Headquarters	Mar. 2002
Research and Development Department (Kyoto Office)	Jul. 2002
Osaka Commercial & Industrial Energy Sales Dept.	Jan. 2004

* Currently operated by Gas and Power Investment Co., Ltd.

Acquisition Plan of ISO 14001 Certificate

By the early FY2005, Osaka Gas aims to acquire company-wide certification of ISO 14001.

In this acquiring process, we plan to incorporate the old district headquarters other than Osaka district which have not acquired certification yet, into the EMS of Residential Energy Business Unit, the Commercial & Industrial Energy Business Unit, and the Pipeline Business Unit. We will have seven EMS's covering all the company.

Company-Wide EMS's

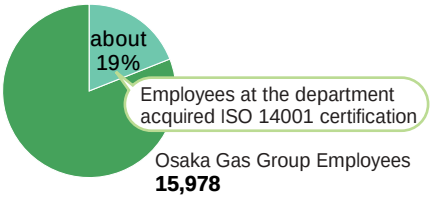
Head Office Building EMS
LNG Terminal and Power Generation Business Unit EMS
Engineering Dept. EMS
Energy Technology Laboratory EMS
Pipeline Business Unit EMS
Residential Energy Business Unit EMS
Commercial & Industrial Energy Business Unit EMS

The State of EMS Introduction among the Group Companies

Amidst rising interest in environmental issues, "management strategies that heed the environment" are quickly becoming one of the selection criteria for survival of corporations in the 21st century. Just one misstep in an environmental issue can easily inflict serious damage to not just the company but the entire group of companies. As observed in the trends among global corporations and government offices in favor of green procurement practices, acquisition of certification in environmental management is becoming one of the conditions for business trades. Osaka Gas is pressing forward with a goal to acquire ISO 14001 certification by FY2005. Additionally, each company in the group plans to adopt an environmental management system by FY2010 based on belief that we, as a group, have to be actively engaged in environmental conservation efforts that are effective and consistent as a whole.

Each company in the group will plan to choose among conventional ISO 14001, other type of EMS certified by third parties (such as Eco Action 21), and Osaka Gas Group's original EMS, by taking into consideration the respective environmental impact, environmental risks, and operational necessities of each company by FY2010.

Number of Osaka Gas Group employees at the sites that acquired ISO 14001 and its percentage to total employees



Osaka Gas Group Employees **15,978**

ISO 14001 certified companies in Osaka Gas Group

	Acquired Company	Date
G1	Gas and Power Investment Co., Ltd.	Mar. 2001
	Osaka Rinkai Energy Service Co., Ltd.	Jan. 2003
	O.N.E. Co., Ltd.	Mar. 2004
G2	Liquid Gas Co., Ltd. *	Oct. 1997
	CRYO-AIR Co., Ltd. *	Oct. 1997
	Kinki Ekitan Co., Ltd. *	Oct. 1997
	Cold Air Products Co., Ltd.	Jan. 2002
G3	Nagano Propane Gas Co., Ltd.	Sep. 2001
G5	Kinrei Co., Ltd.	Oct. 2001
G7	Osaka Gas Chemicals Co., Ltd.	Apr. 2004
	AD'ALL Co., Ltd.	Apr. 1999
G8	KRI, Inc.	Sep. 2000

* Plant of each company acquired ISO 14001 in one body with Production Department of Osaka Gas.

Violations of Laws Concerning the Environment and Penalties

During FY2003, there were no violations or penalties in connection with environment-related laws.

Environmental Management Indicators

Not only the “Prevention of Warming (CO2 Emission Control)”,
But also the “Prevention of Air Pollution (NOx)”, and
The “Prevention of Water Contamination (COD)”, and
“Waste Reduction (waste)”, and
“Reduction of Excavated Soil (excavated soil)”
are all “important themes” for a gas company.

Calculated in monetary values, and disclosed in indicators

Converting major environmental impacts into monetary values and developing indicators

Osaka Gas established Environmental Management Indicators in FY2003 to monitor the progress of the total environmental actions more easily and to make it utilized for environmental improvement. Although there are a wide variety of environmental impacts, we have represented the progress of environmental improvements in our business activities in a single index to disclose and evaluate the progress of environmentally sustainable management. We convert each environmental impact and its reduction from the base year (FY1998) into monetary values.

We specified the indicators in consideration of the characteristics of our business activities. The target figures are set for major environmental impacts made by our business activities and customers (CO_2, disposed amount of excavated soil, industrial wastes, general wastes, NOx and COD), based on the 2005 Medium-Term Environmental Targets.

As for indicators of the reduction of the environmental impacts from our own business activities, we specified the following three: “Environmental Management Efficiency,” “Monetary Value of Environmental Impact Reductions in Company Operations” and “Environmental Impact Reduction Efficiency in Company Operations.”

For contribution to environmental impact reduction with our products and services, we specified the following two: “Monetary Value of Environmental Impact Reductions by Customers” and “Environmental Impact Reduction Efficiency by Customers.”

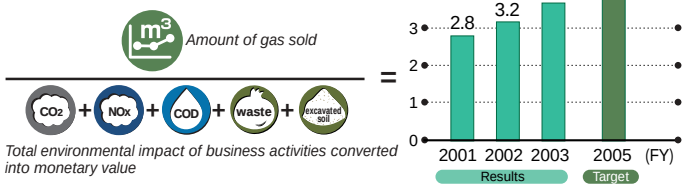
For all indicators, larger numerical figures show that Osaka Gas has been effective in undertaking environmental actions and in reducing environmental impacts in business activities. In this report, we converted and revised the figures of the targets and the past performance disclosed in the report published in 2003 with a new unit of gas calorie (45 MJ/m^3), which is effective from FY2003.

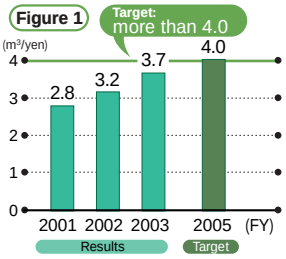
Guideline 1

Reducing Environmental Impacts from Our Business Activities

Environmental Management Efficiency (m³/yen)

Figure 1 — Target: more than 4.0



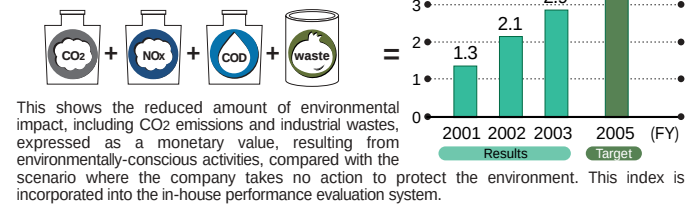


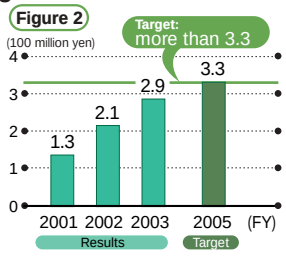
This is the amount of gas sold in a given fiscal year divided by the monetary value of the total environmental impact of business activities such as CO_2 emissions, excavated soil, and general/industrial wastes*1. For this index, the amount of gas is appropriate to represent our business activities because net sales are influenced by fluctuations in gas prices.

Monetary Value of Environmental Impact Reductions in Company Operations *2

(100 million yen) Utilized for performance evaluation system

Figure 2 — Target: more than 3.3

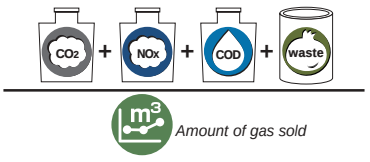


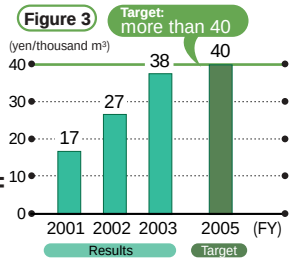


This shows the reduced amount of environmental impact, including CO_2 emissions and industrial wastes, expressed as a monetary value, resulting from environmentally-conscious activities, compared with the scenario where the company takes no action to protect the environment. This index is incorporated into the in-house performance evaluation system.

Environmental Impact Reduction Efficiency in Company Operations (yen/thousand m³)

Figure 3 — Target: more than 40





This is the index of monetary value of environmental impact reductions in business activities, divided by the amount of gas sold in the fiscal year.

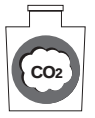
Guideline 2

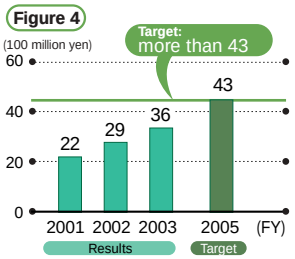
Contributing to Environmental Impact Reduction with Our Products and Services

Monetary Value of Environmental Impact Reductions by Customers (100 million yen)

Utilized for performance evaluation system

Figure 4 — Target: more than 43

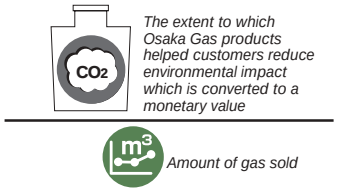


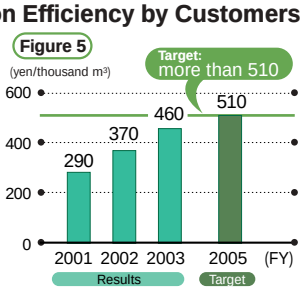


The monetary value of environmental impact reductions indicate to what extent new, energy-efficient *3 Osaka Gas equipment and systems help customers reduce their CO_2 emissions compared with previous equipment and systems. This index is incorporated into the in-house performance evaluation system.

Environmental Impact Reduction Efficiency by Customers (yen/thousand m³)

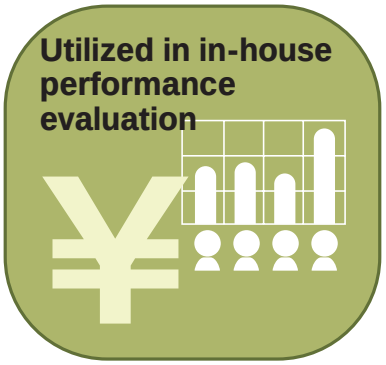
Figure 5 — Target: more than 510



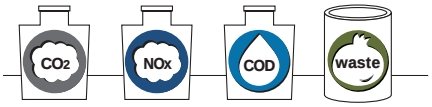


This is the index of monetary value of environmental impact reductions by customers, divided by the amount of gas sold in the fiscal year.

*1 Monetary value is calculated with reliable unit value of each item
*2 Amount of reduction compared to the base year, 1998
*3 Amount of reduction compared to the base year, 1998



The Monetary Value of Environmental Impact
Reductions in Company Operations



The Monetary Value of Environmental Impact
Reductions by Customers

Review of FY2003 results

The "Environmental Management Efficiency" (See Figure 1) in Guideline 1 grew 16% from a year earlier to 3.7 m^3/yen, due to a large decrease in the amount of environmental impact as a whole (12% drop from the last year), in addition to a small increase in the gas sales volume (1% increase over the previous year). The increase was attributed to substantial reductions achieved in industrial wastes (16% decrease), excavated soil to be disposed (12% decrease) and CO_2 (11% decrease).

The "Monetary Value of Environmental Impact Reductions in Company Operations" (See Figure 2) increased 38% over the preceding year, to ¥290 million. The "Environmental Impact Reduction Efficiency in Company Operations" (See Figure 3) grew 41 % over the previous year, to ¥38 /thuosand m^3. Major reasons for the increase were a 60% increase in the reduction of CO_2 emissions and a 19% increase in the reduction of industrial wastes relative to the base year (FY1998). We strive to achieve further reductions in CO_2 emissions and in waste management in our operations, and tackle the challenge of meeting the 2005 goals, set for the three indicators of Guideline 1.

The Monetary Value of Environmental Impact Reductions by Customers in Guideline 2 (See Figure 4) amounted to ¥3.6 billion, a 24% increase over the preceding year. Aggressive selling of energy saving systems, such as cogeneration systems and boilers, in an effort to curb the environmental impact exerted by our customers was the major reason for the increase.

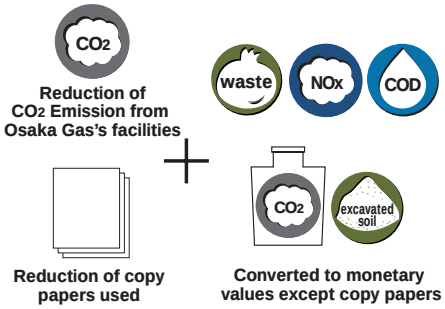
The Environmental Impact Reduction Efficiency by Customers (See Figure 5), which is calculated by dividing the Monetary Value of Environmental Impact Reductions by Customers with gas sales volumes, also rose 24% over the preceding year, to ¥460 /thousand m^3. With the volume of new energy saving system introductions to our customers projected to continue to grow steadily, the targets set for the two indicators of Guideline 2 are expected to be fully achievable in FY2005.

Incorporating environmental management indicators into the performance evaluation

Osaka Gas has an in-house Performance Evaluation System for assessing annual business performance in each division. In FY1999, a new assessment item was introduced: an indicator for measuring the reduction of the environmental impact of business activities. This item will help us determine whether all employees have achieved their targets for reducing CO_2 emissions from energy consumption (electricity, gas, gasoline for vehicles, etc.) and the amount of paper used for in-house copying.

With the aim of further reductions, from FY2003, Osaka Gas set specific monetary value targets aimed at reducing the environmental impact of business activities under Guideline 1 for each division (Figure 2). Under Guideline 2 as well, the company set targets for the sales department to reduce the CO2 emissions of our customers through new energy-efficient equipment and systems (Figure 4). The company incorporated these targets into its business performance evaluations.

These indicators now enable Osaka Gas to evaluate the reduction in overall environmental impact, not limited to energy consumption and the amount of paper used for in-house copying. Osaka Gas evaluates its reduction in environmental impact such as NOx, COD in wastewater, amount of wastes, excavated soil from gas pipeline construction process, and also the reduction of environmental impact of our products such as CO_2 emissions at customer sites. Environmental Management Indicators work as incentives to promote overall environmentally-conscious activities which enable to effectively reduce the environmental impacts of Osaka Gas business.



Voices of Employees on In-house Performance Evaluation Using Environmental Management Indicators

Takao Yamagishi
Administration & Training Team
Planning Dept., Pipeline Business Unit
Osaka Gas Co., Ltd.

Meeting Next Year's Goals

Last fiscal year (before the organizational change), the Pipeline Business Unit made efforts to improve the environmental performance by promoting the wide use of various trenchless methods and recycling of excavated soil in the operation of our pipeline department in five district headquarters. In our mainstay operations, we received evaluation that we were pleased with. On the office work side, however, our evaluation fell short of the initial goals in spite of the efforts we made to reduce paper, wastes and energy. One of the reasons was that we had not adequately sorted out wastes and lacked the accuracy of measuring their volumes. As a result, our corrective action did not result very well. To make improvements next year, each district has been furnished with containers for sorting wastes and scales so that data will be accurately captured. Furthermore, we hope to expand ISO 14001, which has been introduced to only a small number of internal organizations so far, to the entire Pipeline Business Unit in FY2004. With these actions, we hope to effectively operate the environmental management system and ensure that we meet the environmental performance evaluation targets in FY2004.

Tomoko Sasaki
Operations Planning Team, Business Promotion Dept.
LNG Terminal & Power Generation Business Unit
Osaka Gas Co., Ltd.

Targeting to Score Perfect for Two Years in a Row

Our group was the only one in the entire company to earn the perfect score in the performance evaluation last year. Our business unit has gas manufacturing plants that place impact on the environment. For this reason, our plants began to use the LNG cold utilizing power generation system in order to reduce CO_2 and NOx long before performance evaluation system was established. In addition, we installed a power generator that burns clean natural gas at our Senboku LNG Terminal in July 2002, and another at our Himeji LNG Terminal this June. The electricity generated by these generators is used at the terminals to reduce the volumes of purchased electricity. By so doing, they contribute toward CO_2 reductions. We also switched to "paperless meetings" utilizing electrical devices for data sharing. As a staff member, I analyze various data from production groups and monitor them closely. I hope that we will earn the perfect score in our evaluation.

Environmental Accounting

Results for FY2003

(¥3.5 billion Surplus of Environmental Accounting, ¥6.1 billion in Internal Economic Benefits and ¥2.1 billion in Environmental Conservation Effects)

The environmental accounting in FY2003 showed investments worth ¥350 million, expenses including depreciation cost of ¥4.7 billion (1), and internal economic benefits of ¥6.1 billion (2). With the social effects of environmental conservation valued in monetary terms at ¥2.1 billion (3), the total effects were ¥3.5 billion(2 + 3 - 1). As of breakdowns, investments were essentially even with the preceding year. Total expenses decreased ¥1.1 billion from the levels of the preceding year, thanks to a fall in the cost of soil nvestigation on company-owned land, and the selectivity and narrow focus that were applied to research and development themes. The decrease was slightly offset by a small increase in global environmental conservation costs. Internal economic benefits achieved a ¥400 million increase in total as cost reductions expanded as the result of recycling of excavated soil.

Environmental Conservation Cost

(million yen)

Items		Contents	Investment FY2002	Investment FY2003	Expenses FY2002	Expenses FY2003
Internal Efforts	Global Environment	Equipment investment and maintenance, personnel, etc. for energy-saving, etc.	42	153	660	911
	Pollution Prevention	Equipment investment and maintenance, personnel, etc. for prevention of air pollution, etc.	5	12	117	108
	Recycling Resources	Equipment investment and maintenance, personnel, etc. for excavated soil reduction and recycling, etc.	72	39	407	344
	Environmental Management	Green purchasing, environmental education, EMS construction, etc.	0	2	227	219
	Others	Tree planting at plants, soil surveys and countermeasures, environmental conservation subsidies, etc.	1	8	1,763 *1	594 *2
Environmental Impact Reduction at Customers	Environmental R&D	R&D of environmental impact reduction technologies, environmentally-friendly products, etc.	156	129	1,827	1,711
	Recycling of Used Gas Equipment	Recovery and recycling of used gas equipment, container, packages, etc.	0	0	154	203
Philanthoropic Activities (voluntary tree planting, environmental advertising, environmental information disclosure, etc.)			119	6	633	595
Total			395	349	5,788	4,685 *3 1

*1 Includes about 1.4 billion yen for soil surveys and measures on land owned by Osaka Gas and elsewhere
*2 Includes about 300 million yen for soil surveys and measures on land owned by Osaka Gas and elsewhere
*3 Includes 456 million yen for depreciation

Internal Economic Benefits

(million yen)

Economic Benefits		FY2002	FY2003
Cost reduction effect	Savings through reduction of excavated soil disposal	5,237	5,737
	Savings through energy-saving investments	230	118
	Sales of marketable articles (LNG cryogenic energy)	240	244
Total		5,707	6,099 2

Environmental Conservation Benefits

		Level of environmental impact Unit	FY2002	FY2003	Total environmental impact Unit	FY2002	FY2003	Reductions in environmental impacts *2 Unit	FY2002	FY2003
Internal Efforts Osaka Gas	NOx (LNG Terminals)	mg/m^3	1.9	2.0	t	15.0	15.6	t	34.6	27.3
	COD (LNG Terminals)	mg/m^3	0.27	0.29	t	2.04	2.26	t	5.6	10.2
	CO_2 (LNG Terminals) *1	g-CO_2/m^3	13.77	12.05	1,000t-CO_2	106	94	1,000t-CO_2	12	25
	CO_2 (Other sites) *1	g-CO_2/m^3	6.66	6.05	1,000t-CO_2	51	47	1,000t-CO_2	19	24
	Final disposal of excavated soil	t/km	89	72	1,000t	80	70	1000t	75	80
	Disposal of industrial waste	g/m^3	0.35	0.29	t	2,687	2,246	t	2,537	3,029
	Disposal of general waste	g/m^3	0.09	0.08	t	690	647	t	461	544
Environmental Impact Reduction at Customers	CO_2 emission reduction	——	——	——	——	——	——	1,000t-CO_2	816	1,016
	CO_2 emission reduction through gas equipment recycling	——	——	——	——	——	——	t-CO_2	3,267	3,306
	Gas equipment recovery rate	——	——	——	——	——	——	%	94	93

Note: The amount of gas sold in FY2003 was 7,766 million m^3 and 7,687 million m^3 in FY2002 (Based on 45MJ/m^3). The total length of new gas pipelines installed in FY2003 was 973 km and 900 km in FY2002.

*1 CO_2 emissions associated with purchased electricity are calculated using the average coefficient of thermal power plants. See page 22 for further details about this method of calculation. See page 21 for values calculated using the average coefficient of total power plants.

*2 Calculation of Environmental impact reductions
- For NOx and COD, the amount of reduction was calculated with reference to legal emission levels
- For CO_2, industrial wastes and general wastes, the amount of reduction was calculated using the data of FY1998 as the base year. The improvement amount of "Level of environmental impact" from FY1998 is multiplied by the amount of business activity (amount of gas sold) in the present period
- 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

Calculating the Monetary Value of Environmental Social Benefits

In FY2001, we began evaluating the monetary value of the social benefits accruing from the reductions in total environmental impacts achieved by our environmental conservation activities.

We calculated the monetary value of the reduction in total excavated soil using a unit value of 22,128 yen per ton 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).

With regard to the calculation of the monetary value of environmental impact items other than excavated soil disposal, we determined external benefits by reviewing research data on environmental damage costs both in Japan and abroad, and by evaluating case studies involving valuation of the natural environment. We then used relevant data to estimate the monetary value of the social benefits deriving from our efforts to reduce the environmental impacts of our business activities. The combined total value of these benefits amounted to 2.1 billion yen, 0.2 billion yen higher than from the previous year because of a decrease in the amount of excavated soil disposed of in landfills.

Monetary Evaluation of Social Benefits of Environmental Conservation by Osaka Gas Business Activities (billion yen)

	FY2002	FY2003
Final disposed of excavated soil	1.66	1.77
CO_2	0.12	0.17
Other	0.1	0.12
Total	**1.88**	**2.06** 3

Monetary Evaluation for Other Items

(million yen)

	FY2002	FY2003
NOx	12.5	9.8
COD	8.4	15.3
Industrial wastes	77.7	92.8
General wastes	1.4	1.7
Total	**100**	**119.6**

Future Efforts

As part of our efforts to promote environmentally sustainable management, we will continue to look for ways to apply the results of our environmental accounts to improve environmental management. We plan to work toward implementation of a consolidated environmental accounting with its subsidiaries and affiliates.

Measures to reduce greenhouse gases produce benefits valued at approximately 100 million yen

We calculated the monetary value of the environmental benefits derived from measures instituted by Osaka Gas to reduce greenhouse gases as follows:

Net Environmental Benefits = Monetary Value of Reduction in CO_2 Emissions by Osaka Gas + Internal Economic Benefits − Environmental Expenses* (not including investments)

(million yen)

FY2002	15	123	138	246
FY2003	105	172	128	195

* Cumulative total of Cogeneration facilities, Boilers, Natural gas vehicles, and cryogenic power generators (excluding personnel cost)

The CO_2 emission reduction in company operations increased from the levels of FY2002, and the net environmental profit from the measures against global warming amounted to ¥105 million in FY2003 (compared with ¥15 million in FY2002).

The Method of Environmental Accounting Calculations

(1) Standards and Guidelines

Governing Standards: Osaka Gas prepared environmental accounting according to the *Guidelines for Implementing Environmental Accounting in the City Gas Industries, FY2000 edition* (published by the Japan Gas Association). *Developing an Environmental Accounting System* (Year 2000 Report) issued by the Ministry of the Environment.

(2) Scope

Osaka Gas Co., Ltd.

(3) Period under review

April 1, 2003-March 31, 2004

Also, since FY2000, in order to attain more precision of our environmental accounting and less loads of our calculating procedures, we have developed and implemented a computer system linked with our financial accounting system.

With a change in the calorific content of delivered gas, starting in March 2003, the 2002 figures were restated in this and subsequent reports.

Item Classification and Content

(1) Environmental Conservation Cost Items

The totals shown include only the amount spent for environmental conservation purposes (using a calculation of difference method).

For items in which the expenses for environmental purposes alone were difficult to assess, we calculated the relative costs using an "environmental ratio," which was established for the purpose of determining the degree of association with environmental actions.

Investments: Calculations include the proportion of fixed assets acquired during the period under review that contribute to environmental improvement.

Expenses: Calculations include depreciation, personnel and other expenses incurred for environmental purposes.

We calculated depreciation expenses for fixed assets acquired after FY1997 (with the exception of previously acquired fixed assets consisting of large-scale equipment at manufacturing plants, etc.) using the legal durable years for equipment. We calculated personnel expenses using standard unit costs.

(2) Environmental Benefit Items

Items include both environmental conservation benefits (quantitative benefits), the internal economic benefits (cost-saving benefits) achieved in a way like reduced energy consumption, and the social benefits arising from the company's activities to conserve the environment.

1. Three kinds of environmental conservation benefits were calculated for each item:
   - Environmental impact levels (per m^3 of gas sold)
   - Total environmental impact
   - Reduction in environmental impacts

a) Environmental impact reduction in Osaka Gas business operations
- For NOx and COD, we calculated the reduced amounts compared to legal emission levels.
- For CO_2, industrial wastes and general wastes, we calculated the amount of reduction using FY1998 as the base year. The difference between the base discharge unit (discharge per m^3 of gas sold) in the present period and that in the base year was multiplied by the amount of business activity (amount of gas sold) in the present period.
- For excavated soil disposal, the amount of reduction in marine landfill disposal was calculated based on the amount of reduction in excavated soil and the amount of soil recycled.

b) Environmental impact reduction on the customer side

This represents the amount of environmental impact reduction for the period under review due to promotion of the use of natural gas and energy-saving systems and devices, compare with the level in FY1998 as the base year.

2. Internal economic benefits

We calculated cost-saving benefits that could be determined accurately from actual figures from our own operations. We also determined environmental conservation benefits (quantitative benefits) and internal economic benefits from reduced energy consumption, etc. (cost-saving benefits).

3. Monetary Valuation of Environmental Conservation Benefits

Computations were based on the CVM (contingent valuation method), and available research results on the cost of environmental damage, etc.

Medium-Term Environmental Targets and Results in FY2003

In striving for early achievement of its 2010 Environmental Targets, Osaka Gas has established specific 2005 Medium-Term Environmental Targets for implementation in FY2003. Among these medium-term goals, 34 targets, including 24 quantitative ones, have been established in our efforts to promote environmental activities. As of FY2003, 20 targets have been achieved.

Objectives	Measures	2005 Medium-Term Environmental Targets	Achievements During FY2003	Results	2010 Environmental Targets
I. Reducing environmental impacts from our business activities					
Promotion of energy-conservation strategies in order to reduce CO_2 emission in our gas operations	The amount of CO_2 emission per cubic meter of gas sold ★1 P.21	① 25g-CO_2/m^3 (FY1998) ★2 →**less than 19g-CO_2/m^3 (25% reduction)**	**18g-CO_2/m^3**	○	In our efforts to achieve **19g-CO_2/m^3**, the CO_2 emission unit within our business operations should be reduced by 25% as compared with FY1998 (25g-CO_2/m^3)
NOx emission control	Introduction of natural gas vehicles within the company P.40	② 19% (FY1998) →**introduction rate higher than 50%**	**37.5%**		Increase the number of natural gas vehicles within the company to **1,760** by FY2010, up from 562 as of the end of FY1998 ★3
Control of the generation of soil excavation due to gas pipe construction, and promotion of excavated soil recycling	Final disposed amount of excavated soil P.24	③ Approximately 380,000 tons (FY1998)→**less than 70,000 tons (approximately 80% reduction)**	**70,000 tons**	○	The final disposed amount of excavated soil should be reduced to **100,000 tons**, which is an approximately 75% reduction as compared to FY1998 (380,000 tons; expected amount at this time is 50,000 tons)
	Promotion of excavated soil recycling P.24	④ Recycling rate ★4 42.2% (FY1998) →**more than 69%**	**70.7%**	○	————
Recycling of gas pipe materials	Recycling rate of waste polyethylene pipe P.24	⑤ Maintain 100% recycling rate, and improve internal utilization rate of recycled waste polyethylene pipe products	Recycling rate **100%** Internal utilization rate **95%**	○	Recycling rate of waste polyethylene pipes should be **100%** from FY2001
Promotion of Green Purchasing and Distribution	Expansion of Green Purchasing P.27	⑥ Improve the ratio of the monetary amount for purchasing environmentally friendly products from 52% (FY2000) → **more than 70%** (ratio against the total monetary amount contracted based on unit price)	**69.2%** (100% recycled papers are used from FY1998)		Materials/equipment and construction must comply with specified standards **100%** Recycled paper must be used
	Expansion of Green Distribution P.27	⑦ Request our business partners to convert their distribution/sales vehicles to low-pollution vehicles	**129 partners** use low-pollution vehicles ★5		————
Reduction of industrial waste and improvement of recycling rate (general waste/industrial waste)	LNG terminals: Aiming for zero emissions P.25	⑧ Final disposed (industrial/general) 230 tons (FY1998) →**less than 25 tons** ★6 **(approximately 90% reduction)**	**3 tons** (1 ton: Industrial waste 2 tons: General waste)	○	Final disposed amount of waste (industrial/general) should be reduced to **less than 25 tons** ★6, which is an approximately 90% reduction compared to FY1998 (230 tons)
	Other than LNG terminals: Reduction of general waste and recycling rate P.26	⑨ Final disposed amount approximately 1,000 tons (FY1998)→less than 500 tons **(50% reduction)** Recycling rate 43% (FY1998)→ **more than 75% reduction**	Final disposed amount **646 tons** Recycling rate **65%**		Final disposed amount should be reduced to **less than 100 tons**, which is a 90% reduction from FY1998 (approximately 1,000 tons)
	Other than LNG terminals: Reduction of industrial waste and recycling rate P.25	⑩ Final disposed amount approximately 4,400 tons (FY1998)→less than 1,760 tons **(60% reduction)** Recycling rate 55% (FY1998)→ **more than 80% reduction** ★ Including 500 tons of waste gas equipment	Final disposed amount **2,245 tons** Recycling rate **79%**		————
Improvement and fulfillment of environmental management system	Acquire ISO14001 certification P.10	⑪ Company-wide efforts should be made towards acquiring ISO 14001 certification at an early stage before FY2005	————		Company-wide obtainment of certification
II. Contributing to environmental impact reduction with our products and services					
Dissemination and promotion of natural gas and energy-saving systems and devices	Controlling CO_2 emission at the customers' end P.35	⑫ Reduce the amount of increment of CO_2 emission corresponding to the increase of city gas sold during FY2005 by **20%**, as compared to FY1998, through the dissemination and promotion of gas cogeneration and air conditioning systems	**30.4%**	○	Reduce the amount of increase of CO_2 emission corresponding to the increase of gas sold during FY2010 by **20%**, as compared to FY1998, through the dissemination and promotion of gas cogeneration and air conditioning systems
	Energy-saving at the customers' end P.35	⑬ Reduce the amount of energy consumption corresponding to the increase of city gas sold during FY2005 by **6%**, as compared to FY1998, through the dissemination and promotion of gas cogeneration and air conditioning systems	**8.9%**	○	Reduce the amount of energy consumption corresponding to the increase of gas sold during FY2010 by **6%**, as compared to FY1998, through the dissemination and promotion of gas cogeneration and air conditioning systems
Development of high-efficiency technology for gas devices and systems	Improvement of efficiency for gas engine cogeneration P.36	⑭ Commercialize large-type (6,000 kW) models with 13% increased generating efficiency as compared with FY1998 (generating efficiency 38% → **more than 43%**) ⑮ Commercialize high-efficiency miller cycle gas cogeneration (380-1,000 kW) models with 20% increased generating efficiency as compared with FY1998 (generating efficiency 35% → **more than 42%**)	Commercialize large-type model with **44%** increased generating efficiency (6,000 kW) Commercialize Miller cycle cogeneration model with **40.8%** increased generating efficiency	○	Develop a model with **20% increased** CGS generating efficiency as compared with the current efficiency rate
	Improve efficiency of air conditioners P.37	⑯ Commercialize large-type gas absorption-type cooler/heater (more than 100 RT) models with 60% increased efficiency as compared with FY1998 (COP 1.0 →**1.6**) ★ ⑰ Commercialize GHP with 50% increased efficiency as compared with FY1998 (COP 1.0 → **1.5**)	Commercialize double-effect absorption-type cooler/heater with COP **1.35** <HHV> cooling efficiency for the first time in the world Commercialize triple-effect absorption-type cooler/heater with COP **1.49** <HHV> Standardizing high-efficiency GHP of COP **1.3** <HHV> (maximum 1.34)		Develop models with **more than 50%** increased efficiency, and more than 40% reduced NOx value, as compared with current rates
	Field of water heaters for household use P.39	⑱ Develop condensing devices with 16% increased heating efficiency as compared with FY1998 (heating efficiency 80% → **93%**) ⑲ Expand product variations of the above-stated devices • hot water heater (1 model →**3 models**) • new initiation of bath water heater product type ⑳ Commercialize compact water heater model with 7% increased heating efficiency as compared with FY1998 (approximately 75% heating efficiency at standard combustion conditions →**secure more than 80%**)	Commercialize condensing hot water heater with heating efficiency **95%** With the commercialization of the equipment above, our product line up for condensing hot water heater has expanded to **5 models** Commercialize condensing bath water heater with heating efficiency of **95%** Achieving more than **80%** of heating efficiency with compact water heater	○ ○ ○	Develop water heater models for household and business use, with **10% increased** heating efficiency as compared with the current efficiency rate
	Field of cogeneration for household use P.38-39	㉑ Commercialize cogeneration system for household use	Commercialize ECOWILL gas cogeneration system for household use	○	Promote the development of highly efficient, low NOx cogeneration models
Promotion of technological development to reduce NOx and other pollutant gases, and dissemination and promotion of low NOx devices	Commercialize low NOx dryer	㉒ Commercialize new ultra-low NOx (**less than 15 ppm**) direct fired laundry dryer for business use	Commercialize direct hot blast-type tumbler with less than **10 ppm**	○	————
	Commercialize low NOx boiler	㉓ Commercialize low NOx hot water boiler (200,000–500,000 kcal) with 33% reduced NOx as compared with FY1998 rate (60 ppm **less than 40 ppm**)	Commercialize low NOx hot water boiler with less than **30 ppm**	○	————
Dissemination and promotion of natural gas vehicles	Establishment of filling stations P.40	㉔ 44 locations (FY2001) →**90 locations**	Reached to **67 locations**		————
Eco Design for gas devices, etc.	Field for household use P.41	㉕ Miniaturize and lighten ceiling-installation-type bathroom heater/dryer (**40%** reduction as compared with FY2000 rate, to be marketed in FY2003) ㉖ Expand and continue shrink packaging	Reducing **40%** cubic capacity compared with FY2000 Expansion continued	○	Promotion of Eco Design
Recovery and recycling of gas devices and systems	Improvement of recovery rate P.41	㉗ As an Osaka Gas group-wide effort, maintain and improve our **more than 90%** recovery rate for used gas devices	Achieving **93%**	○	Maintain and improve the recovery rate at **more than 90%**
	Improvement of recycling rate P.41	㉘ Improve the recycling rate to **more than 80%** for primary devices recovered through our recovery system	Promoting		————
III. Contributing to environmental conservation locally, nationally and overseas					
Environmental contribution domestically and internationally P.46	Dissemination of environmental technologies	㉙ Disseminate technology for wet catalyst oxidation process and waste hydrochloric acid recycling system	The transfer of technology for the catalyst oxidation process to China reached the business stage	○	Discover energy-saving and environmental projects, provide technological assistance
		㉚ Disseminate afforestation technology with the utilization of VAM fungi, and develop and market antibiotic microbial material	Implementing a project that uses afforestation technology with the utilization of VAM fungi, in cooperation with an Indonesian governmental organization	○	
	Contribution to reduction of environmental impact in public facilities	㉛ Disseminate unused energy utilization system for garbage incineration plants and water treatment plants	Sales achievement for biogas, cogeneration, etc. reached approximately 5,700 kW (6 units at 5 locations)	○	
Develop new technology to contribute to environmental improvement P.47-48	Technology to process hazardous materials	㉜ Develop and market dioxin processing technology	Developing a filter capable of absorbing and removing 99% of dioxin; marketing the removal device co-developed with its manufacturer	○	————
Environmental contribution to local communities P.54-55	Promotion of step-by-step measures to improve the environment	㉝ Continue and further environmental activities in communities in which our business offices are located	Continuously promoted		Continue and further environmental activities in communities in which our business offices are located
	Promotion of educational activities related to the environment	㉞ Hold environmental classes and educational events utilizing our company facilities, and provide assistance to environmental education	Continuously promoted		

★1 The amount of CO_2 emission derived from the purchase of electric power was calculated based on the average coefficient of thermal power generation (See page 22). See page 21 for the figures based on the average coefficient of electricity.
★2 Calculation unit is equivalent to 46MJ/m^3

★3 All automobiles except for those required for emergency services should be replaced 100% by those utilizing natural gas
★4 Recycling utilization rate of excavated soil = amount of recycled material utilized for gas pipe construction ÷ the amount of excavated soil produced during gas pipe construction
★5 Results from questionnaires given to 443 companies that do at least 5 million yen business annually with Osaka Gas.
Note that the low-pollution vehicle is the LEV-6. (See page 27)

★6 This value is less than 2.4% of the final disposed amount of 1,027 tons in FY1993, which was the largest final disposed amount during the 1990s. The final disposed amount goal value of less than 25 tons includes the residue from recycling. When this is not included, the final disposed amount is approximately 0 tons.

★ COP: index to express energy efficiency (coefficient of performance)

Environmental Impacts of Our Gas Supply Business in FY2003

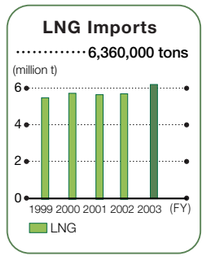
Overseas

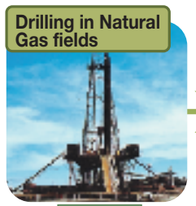
Example of efforts at the mining sites of natural gas fields and liquefaction facilities

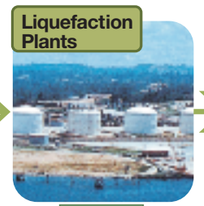
- Natural gas, which is of minor environmental impact, is used as fuel for electric power at the mining sites.
- Reducing environmental impact per power generation unit by improving generation efficiency through implementing waste heat recovery
- When the mined natural gas contains carbon dioxide, it is extracted and pumped into the underground.

Example of efforts in the shipping

- Natural gas is often used as the fuel for shipping.







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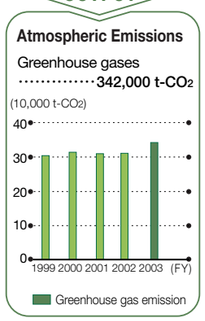
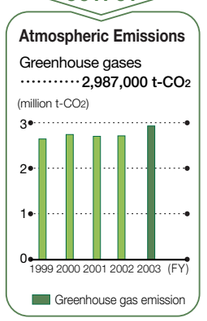
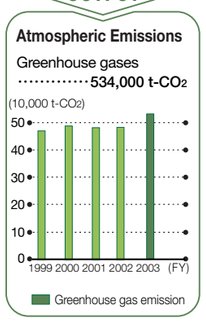
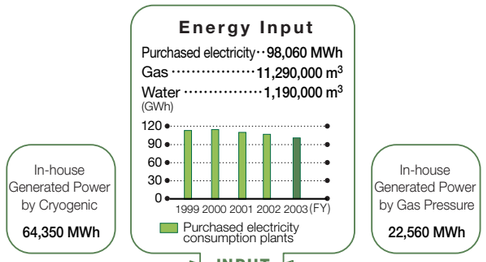






Japan

Explanatory note: Energy (solid) / Waste (dashed) / LNG / Gas



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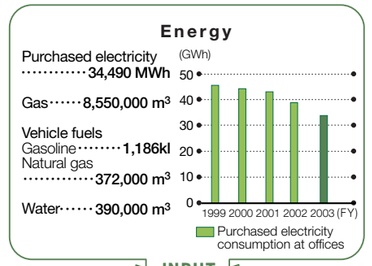

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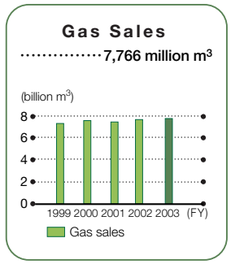

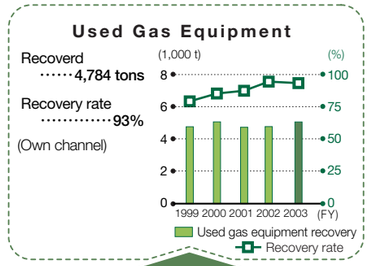

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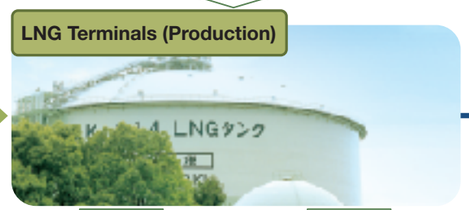

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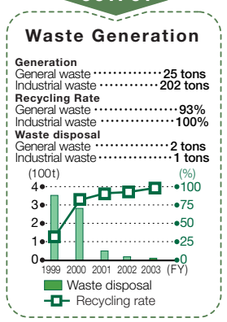
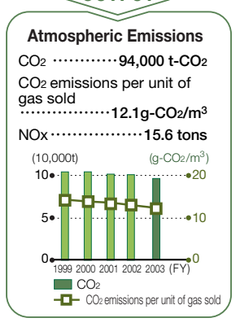
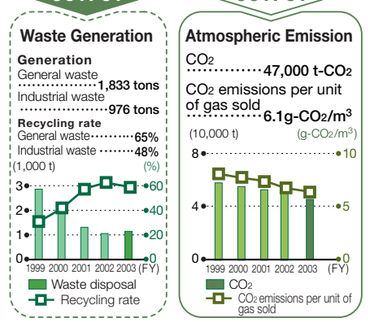
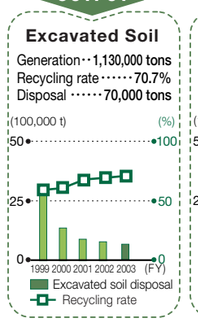
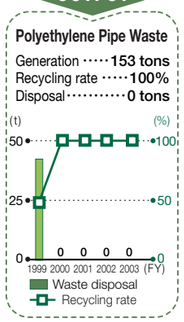
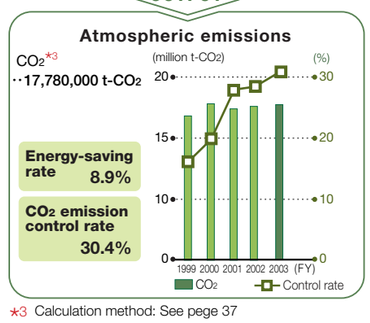












*3 Calculation method: See pege 37

Note: See page 26 and 28 for industrial water and clean water discharge. No SOx is emitted. (See "Natural gas — A Clean Energy Source")
Reference: Total amount of greenhouse gas emissions in Japan=1,314 million t-CO2 (FY1999); Energy-related CO2 emissions = 1,160 million t-CO2 (FY2000)

Natural Gas — A Clean Energy Source

Global Environmental Conservation and Natural Gas

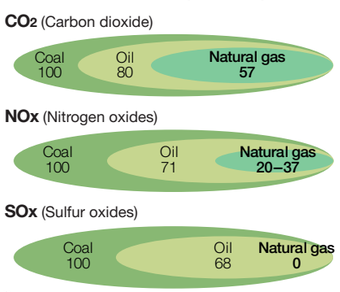
The energy demand is increasing in parallel with the rising standard of living and the progress of society. Expanding levels of development, mass production and consumption increase environmental impacts and problems, such as global warming, ozone layer depletion, acid rain and global desertification, all of which are growing in their severity.

The gas, supplied by Osaka Gas is a natural gas with low environmental impact. The major component of natural gas is methane (CH_4) and generates the least carbon dioxide (CO_2) among fossil fuels in combustion because methane has a ratio of carbon to hydrogen that is least in the fossil fuels.

In addition, natural gas is imported to Japan in liquefied form. Sulfur compounds are removed in the liquefaction process, which is why it emits less SOx than other fossil fuels do. Subsequently, natural gas emits less nitrogen oxides (NOx) and little sulfur dioxide (SOx), which cause acid rain or photochemical smog.

Natural gas is 'clean energy' that contributes to the conservation of both the local- and global- environment.

Comparison of Fossile Fuel Combustion Emissions (Coal: 100)



Sources:
- IEA (International Energy Agency) Natural Gas Prospects to 2010 (1986)
- Report on Thermal power plant Atmospheric Impact Assessment Technology Demonstration Surveys, March 1990, Energy Engineering Research Center

Properties of the Gas Osaka Gas supplies

Note: Figures applied from March 2003

Heat Value

Gross calorific value 45.0MJ/m^3N (10,750kcal/m^3N)

Physical and Chemical Properties

Appearance, etc.	Specific gravity	Combustion range
A coloress gas having a characteristic odor	0.638 (air=1)	5-15 vol%

Effects on the Human Body

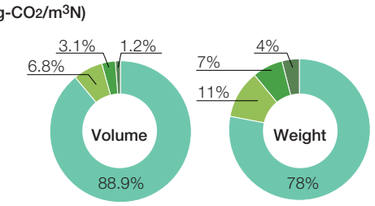
If the gas is inhaled at high concentrations for an extended period of time, it can have harmful effects on the human body, such as suffocation due to a lack of oxygen supply.

CO_2 Emission Coefficient in Combustion

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

Ingredients and Composition

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



Comparison of Greenhouse Gas Emissions among Fossil Fuels as Determined by LCA

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 as determined by the life cycle assessment (LCA*1) method.

Comparison of Greenhouse Gas Emissions (g-CO_2/1,000kcal)

Ingredients	Coal	Oil	LPG	LNG	Gas	
Production	19.18	17.01	21.60	40.77	38.43	Drilling 3.85 Liquefaction 33.55 Manufacturing 1.03
Transportation	7.15	3.30	7.52	7.77	6.01	
Equipment	0.48	0.33	0.48	0.51	2.16	*2
Unit at time of fuel combustion	370.59	286.04	250.54	206.76	214.10	
Total	397.40	306.68	280.14	255.81	260.70	
Ratio	152	118	107	98	100	

Note: Converted from g-C/Mcal to g-CO_2/Mcal, based on a report of the the Institute of Energy Economics, Japan (August/1999)

*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.

Reducing Environmental Impacts from Our Business Activities

Realizing the magnitude of the impact that business activities have on the enviroment, Osaka Gas Group establish the goal of impact reduction and address to achieve it. We strengthen our environmental management system for promoting conservation of natural resources and energy at Osaka Gas Group.

A Massive Reduction in Environmental Impact through Continuous Execution of Environmental Management Action

The LNG Terminal and Power Generation Business Unit is engaged in two types of operations: manufacture of city gas and power generation. The city gas manufacturing division obtained ISO 14001 certification in 1997 as the first group within Osaka Gas. With the start of the power generation operation, the certification was obtained also by the power generation division in 2003, which further reinforced the dedication of the business unit toward environmental conservation.

Major accomplishments have been made as the business unit has built up action for improvement that aims to further reduce environmental impact and prevent the pollution of the surrounding environment. For example, expanded use of LNG cryogenic energy and fuel usage reductions led to an approximately 21% decrease in the CO_2 emissions per $1m^3$ gas manufactured in FY2003 from the levels of FY1998. We were also able to attain our zero emission goal three years ahead of the target year.

The goal of the business unit is to win the trust and support of our customers and other stakeholders, and construct an even stronger relationship with them by establishing the environmental action guidelines for the business unit and continuing to implement environmental action in accordance with Osaka Gas Group Environmental Philosophy.

Hideaki Nagata
Managing Director
Head, LNG Terminal & Power Generation Business Unit

2003-2004 Environmental Action Highlights

CO_2 emission reduced by approximately 30% with introduction of a gas combined-cycle power generation system at our plant

Gas combined-cycle-power generation systems, or highly efficient natural gas-fueled electricity generation systems, were installed in our LNG terminals.The electricity generated from them effectively reduces CO_2 emissions in the LNG terminals by approximately 30% compared with corresponding CO_2 amount to satisfy the same demand with purchasing electricity only.

Refer to page 22

Efforts for reducing excavated soil achieved the target

Roads have to be excavated to bury gas pipelines, thus generating soil including waste asphalt. To minimize the generation of excavated soil and to maximize reuse are important environmental actions for a gas supplier.

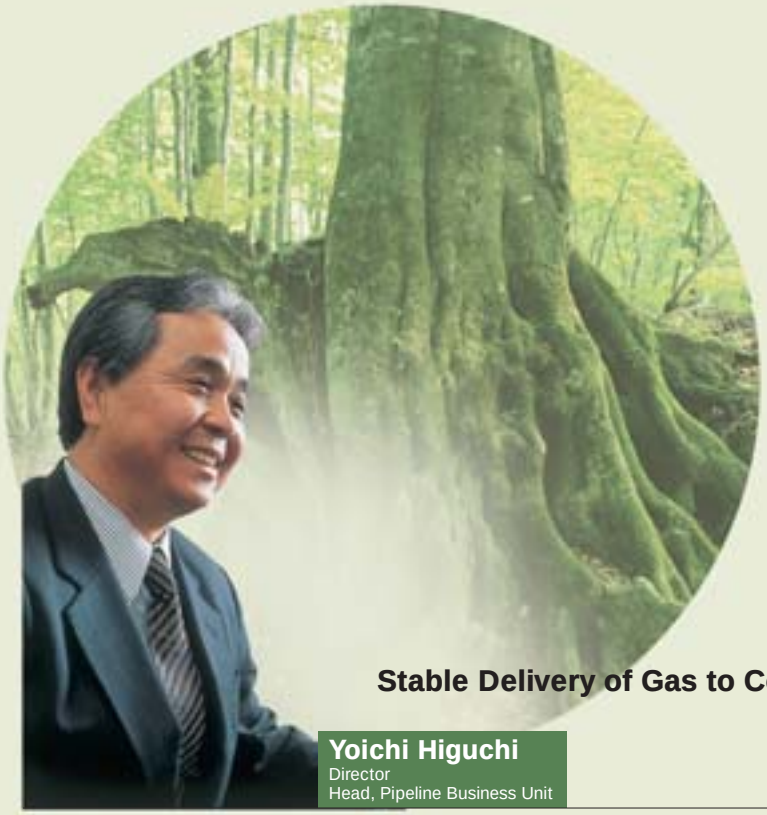
Osaka Gas has promoted a method that minimizes the generation of excavated soil, as well as expedited its reuse by developing a Comprehensive Road Waste Recycling System.

Refer to page 24

Major Environmental Impact by Osaka Gas Group (Osaka Gas and 53 affiliated companies)

		CO_2 (1,000 t)	Industrial waste (1,000 t)	Genaral waste (t)	Excavated soil disposal (1,000 t)	Water consumption (10,000 m^3)
FY2001	Osaka Gas *	172	10	1,877	90	138
	Affiliated companies	380	25	236	—	149
	Total	553	35	2,113	90	287
FY2002	Osaka Gas *	188	10	1,809	80	153
	Affiliated companies	500	24	364	—	205
	Total	688	34	2,173	80	358
FY2003	Osaka Gas *	171	11	1,857	70	158
	Affiliated companies	1,569	56	1,200	—	341
	Total	1,740	67	3,057	70	499

Note1: Osaka Gas's amount of industrial waste includes used gas equipment recovered from customers.
Note2: Water consumption amount comprises clean water and industrial water.
Note3: CO_2 associated with Osaka Gas's sold electricity to CRYO-AIR Co., Ltd. is included in Affiliated companies' amount.
Note4: In FY2003, Nakayama Joint Power Generation Co., Ltd. and Nakayama Nagoya Joint Power Generation Co., Ltd., both of which are IPP (Independent Power Producer), joined our Affiliated companies.
Note5: Company names representing "Affiliated companies" are listed on Page 4.
* The data covers Gas Business, District Heating & Cooling Business and Power Generating Business.



Stable Delivery of Gas to Communities in Harmony with the Environment

Yoichi Higuchi
Director
Head, Pipeline Business Unit

The Pipeline Business Unit is engaged in the task of providing stable supply of city gas from our gas plants through gas pipelines to customers in the Kansai region, and of ensuring security.

These operations contribute to the growth of communities on one hand, while also impacting on the communities and the global environment, as seen in the digging of roads to lay gas pipes.

In pipe laying works, there are such problems as those relating to dirt that is excavated and reuse of it to back-fill. But we are promoting such construction techniques needing less digging of roads, and those that bury pipes at a shallow depth while ensuring safety. Furthermore, we aggressively use the system to reuse soil and asphalt in an effort to reduce environmental impact.

The Pipeline Business Unit obtained ISO 14001 certification in 2001 in order to maintain the effectiveness of our environmental conservation action. Following a subsequent reorganization, the organization that operates the environmental management system was expanded twice. Since the second half of FY2003, ISO 14001 certification covers the entire Pipeline Business Unit. We will continue to operate in harmony with the environment.

FY2003
Amount of excavated soil 1.13 million tons
Amount of disposal 70,000 tons
Recycling rate 70.7%
Achieved Medium-term Goal

Osaka Gas Chemicals Acquired ISO 14001

Osaka Gas Chemicals acquired ISO 9001 certification in 2003 and ISO 14001 in April 2004. Environment-related laws the company should observe amount to twenty and cover a fairly broad spectrum. Included are the Pollutant Release and Transfer Register (PRTR) Law defining the obligation to notify the amount of benzene, toluene, etc. used and the Air Pollution Control Law requiring observation and measurement of NOx. The company has prepared an updated check sheet on Laws and Regulations and always confirms the compliance with them.

Refer to page 31

1. Emission Control of Greenhouse Gases and Nitrogen Oxides (NOx)

Key Points and Future Directions

CO_2 emissions from the gas supply business* marked 18g-CO_2/m^3. We have already achieved Medium-Term Goals (19g-CO_2/m^3 or less). We are comitted to further reductions.

* CO_2 emissions per unit of gas sold

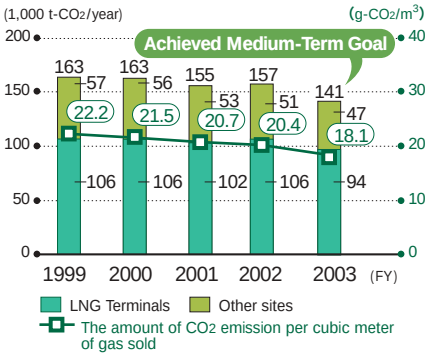
In FY2003, although the amount of gas sold has increased by 1% (year-on-year), our CO_2 emissions have decreased by 10.5%, from about 157,035 tons to 140,576 tons.

These figures show that the ratio of CO_2 emission to the amount of gas sold has decreased by 11.4% over the previous year to 18.10 g-CO_2/m^3. The ratios reviewed by division are 12.05 g-CO_2/m^3 for the production division which decreased by 11.6%. The figure for other divisions also decreased by 8.1%.

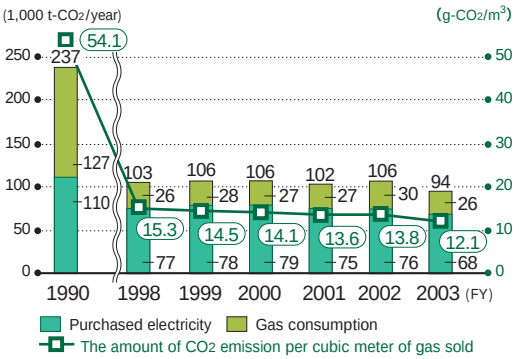
When comparing the CO_2 emissions for this past year for the production division of 93,559 tons with emissions in 1990 (237,000 tons), we observe a decrease of 60.5%. That attributes to, in the production division the use of LNG cryogenic energy using power generation and a reduction of purchased electricity.

For other divisions it was due to the result of combining and discontinuing of offices through reorganization. Each facility sets new goals each year, and environmental goals are one of the area of achievement that are assessed in the internal evaluation system, resulting in close management of energy consumption.

CO_2 Emissions from overall Gas Business

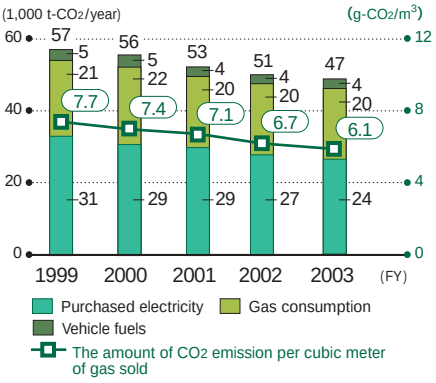


CO_2 Emissions from LNG Terminals



Note: The major reduction in carbon dioxide emissions from 1990 to 1998 is explained by the elimination of coke furnaces associated with the introduction of natural gas as raw material

CO_2 Emissions from Other Sites



Five-year Transition in CO_2 Emissions

Description	Item		FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Ratio to FY1998
Purchased electricity consumption	LNG Terminals	(1,000 kWh)	114,212	115,635	117,694	110,184	109,397	98,064	85.9 %
	Other sites	(1,000 kWh)	48,182	45,544	44,188	43,081	39,408	34,488	71.6
	Total	(1,000 kWh)	162,394	161,179	161,882	153,265	148,805	132,552	81.6
Gas consumption	LNG Terminals	(1,000 m^3)	11,309	12,216	11,748	11,903	13,239	11,286	99.8
	Other sites	(1,000 m^3)	10,783	9,220	9,562	8,521	8,665	8,549	79.3
	Total	(1,000 m^3)	22,092	21,435	21,310	20,423	21,904	19,835	89.8
Vehicle fuel consumption	Gasoline	(1,000 liters)	1,794	1,701	1,645	1,516	1,366	1,186	66.1
	Diesel oil	(1,000 liters)	25	38	18	18	24	16	62.9
	Natural gas	(1,000 m^3)	162	254	295	342	358	372	230.0
CO_2 emissions *	LNG Terminals	(t-CO_2)	103,156 (68,816)	106,196 (71,428)	106,476 (71,089)	101,772 (68,644)	105,867 (69,766)	93,559 (61,197)	90.7 (88.9)
	Other sites	(t-CO_2)	61,896 (47,409)	56,553 (42,859)	56,369 (43,083)	53,022 (40,069)	51,168 (38,163)	47,017 (35,636)	76.0 (75.2)
	Total	(t-CO_2)	165,052 (116,226)	162,749 (114,287)	162,845 (114,172)	154,794 (108,713)	157,035 (107,929)	140,576 (96,833)	85.2 (83.3)
Gas sold		(millon m^3)	6,757	7,326	7,580	7,479	7,687	7,766	114.9
CO_2 emissions per cubic meter of gas sold *	LNG Terminals	(g-CO_2/m^3)	15.27 (10.18)	14.50 (9.75)	14.05 (9.38)	13.61 (9.18)	13.77 (9.08)	12.05 (7.88)	78.9 (77.4)
	Other sites	(g-CO_2/m^3)	9.16 (7.02)	7.72 (5.85)	7.44 (5.68)	7.09 (5.36)	6.66 (4.96)	6.05 (4.59)	66.1 (65.4)
	Total	(g-CO_2/m^3)	24.43 (17.20)	22.22 (15.60)	21.48 (15.06)	20.70 (14.54)	20.43 (14.04)	18.10 (12.47)	74.1 (72.5)

* CO_2 Emissions Calculation

1. Before FY2001: CO_2 emissions associated with purchased electricity were calculated using the supply side CO_2 emission coefficient (0.6747 kg-CO_2/kWh), which was calculated by the average thermal power coefficient for FY1996 (Source: The Federation of Electric Power Companies of Japan) and the integrated loss factor from supply to demand. For details, see page 22. Figures in parentheses, provided as references, were calculated using the supply side CO_2 emission coefficient (0.374 kg-CO_2/kWh) calculated similarly by the average coefficient for all power sources
2. Since FY2002: We used the average coefficient for thermal power generation (0.69 kg-CO_2/kWh) from the Interim Report by the Research Working Group of Ministry of Environment for the Protocol of Attaining Targets in the Global Environmental Department of the Central Environmental Council issued in July 2001. For details, see page 22. The values calculated by use of the average coefficient for all types of electric sources (0.36 kg-CO_2/kWh) are shown in parentheses
3. Methods for calculating CO_2 emissions from other types of energy amount: The coefficients of carbon dioxide emissions for other types of calculations are given by *the Guidelines for the Establishment of Plans for Promotion of Regional Measures against Global Warming* (August, 1993) of the Ministry of Environment
4. Figures of gas consumption and those of vehicle fuel consumption (natural gas) were calculated in 45 MJ/m^3.

Measures at LNG Terminals

CO_2 Emission Reductions

Reducing the Purchased Electricity

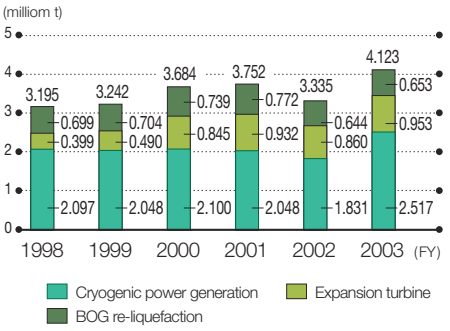
Osaka Gas generates electricity by effectively utilizing LNG cryogenic energy and gas pressure energy and etc (86.9 GWh from all plants) and makes efforts to reduce electricity demand. Thus, we are reducing the purchase of power from electricity suppliers and reducing CO_2 emissions. Examples:

1. LNG cryogenic power generation
   Generates electricity by utilizing cryogenic energy of LNG with a temperature of -160°C in the process of evaporation. (See the diagram below.)
2. Gas pressure power generation using expansion turbines
   LNG expands up to approximately 600 times by volume in the gasification process. Osaka Gas utilizes this energy to generate power.
3. Liquefaction of BOG (Boil-off Gas) using LNG cryogenic energy
   A portion of LNG stored in a tank evaporates to become boil-off gas (BOG) by heat input from the surrounding environment. The gas is liquefied again by the cryogenic temperature of LNG, reducing electricity consumption compared with the conventional method of compressing gas. Use of LNG cryogenic energy is increasing.

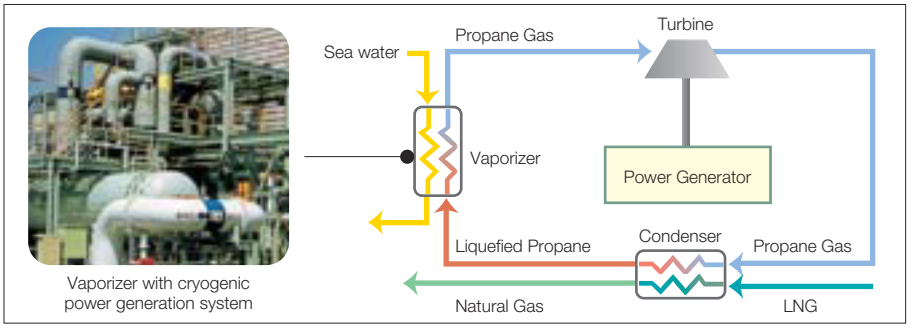
The company introduced highly effective gas combined-cycle power generation systems.

The electricity generated from them effectively reduces CO_2 emissions in the LNG terminals by approximately 30% compared with corresponding CO_2 amount to satisfy the same demand with purchasing electricity only. (For the calculation method, see the column below.)

Use of LNG Cryogenic Power



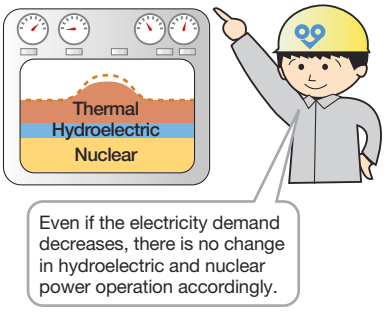
LNG Cryogenic Power Generation System



Vaporizer with cryogenic power generation system

Reducing Gas Consumption

Gas is internally consumed in the steam boilers and other gas production process. Operating the boiler tactfully successfully reduces CO_2 emissions while the steam demand reduced.



Calculation of CO_2 Emission from Purchased Electricity

The following formula is used to calculate CO_2 emissions resulting from purchased electricity.

CO_2 emissions from the use of electricity	=	Purchased electricity	×	CO_2 emission coefficient of electricity
kg-CO_2/year		kWh/year		kg-CO_2/kWh

The CO_2 emission coefficient of electricity is the amount of CO_2 emitted at a power plant per unit of energy that the plant generates, for example, 1 kWh. This coefficient is often calculated as the average value of all electric sources, including thermal power generation, hydro power generation and nuclear power generation (the average coefficient for all types of electric sources). This method, however, is not appropriate for evaluating the effects of reduced amount of purchased power. In order to evaluate the effect of these measures correctly, it is necessary to use the coefficient of the electricity from energy sources being affected by this effect. They are determined to be thermal power generation for the following reasons:

1. Nuclear power generation is used to its maximum capacity, and, except for during regular inspections, plants consistently generate power constantly.
2. Hydro power generation is also used to its maximum capacity, and annual power production is mainly dependent on the amount of rainfall.
3. The government estimates that there will be no major changes in the supply and demand of nuclear and hydroelectric power even if measures for global warming including energy conservation and/or the development of new energy, are taken.

Because of the importance of correctly evaluating the effect of our emission-reduction measures, we chose to utilize the thermal power generation coefficient stated below to calculate CO_2 emission figures that we will use to help reduce CO_2 emissions. This report, therefore, shows the figures using this calculation. (Note that the annual emission values in this report include CO_2 emission calculated using the average coefficient of all types of power generation. This is a reference to help manage inventory.)

Coefficient Used in This Report

Coefficient for evaluating projects reducing the electricity demand:
Coefficient of Thermal power generation

- **Before FY2001** (Source: the demand side value for FY1996)
  0.6747kg-CO_2/kWh
  FY2002 and after
  0.69kg-CO_2/kWh*

Coefficient for measuring the demand:
Average coefficient of all types of power generation

- **Before FY2001** (Source: the demand side value for FY1996)
  0.374kg-CO_2/kWh
  FY2002 and after
  0.36kg-CO_2/kWh*

* Source: Interim Report by the Research Working Group of Ministry of Environment, July 2001

1. Emission Control of Greenhouse Gases and Nitrogen Oxides (NOx)

Reduction measures on GHG other than CO_2, and NOx

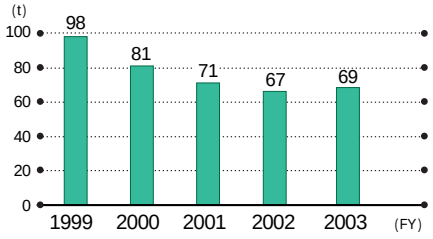
CH_4 (Methane)

Most of the volume of greenhouse gases, other than CO_2, that the Osaka Gas plants emit is methane (CH_4) mostly from the equipment analyzing the gas quality.

We are endeavoring to reduce its emission by changing the existing equipment to one with less emission and also recovering emitted CH_4.

As a result of this effort, CH_4 emission was reduced by 30% from 98 tons in FY1999 to 69 tons in FY2003.

Methane Emissions



SF_6 (Sulfur hexafluoride)

Osaka Gas uses 2.6 tons of SF_6 as insulation gas in the switches of electrical equipment at LNG terminals. There is no leaking of it because it is hermetically sealed.

HCFC (Hydrochlorofluorocarbon)

Osaka Gas stores a small quantity of HCFC, which is used as a refrigerant for a LNG vaporizer in the production process. Emission to the air is minimized by enhancing the daily leakage control and recovery of it .

NOx

Osaka Gas makes efforts to reduce NOx* emissions through effective operation with reduced steam in the gas production process.

* NOx stands for nitrogen oxides, air pollutants that may cause photo-chemical smog and acid rain.

Measures to Reduce GHG in Other Sites

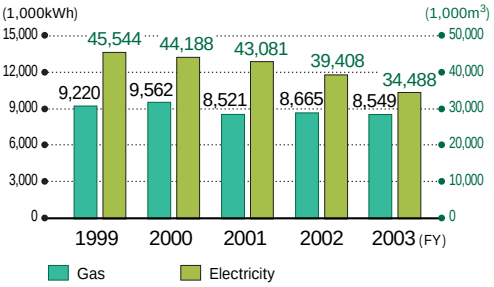
9% decrease in CO_2 emissions from FY2003

Osaka Gas also works to reduce the amount of CO_2 emissions from offices and other sites. In each office and site, we are making concerted efforts to reduce power demand. The following examples illustrate our efforts:

① Improve and upgrade facilities and equipment to reduce the amount of electricity and gas demand;
② Remove unnecessary lighting and turn off lights at lunchtime break, and other times when they are not needed;
③ Turn off air conditioning during lunchtime break; keep air conditioning off for longer periods of the year; and when in use, operate it moderately (28ºC in summer and 18-21ºC in winter) to reduce the gas demand;
④ Promote the use of public transportation such as subways. Reduce the number of company cars and the amount of gasoline used, by encouraging employees to practice idling stops and to drive at fuel-efficient speeds.

Such energy conservation efforts, combined with the integration and closure of business centers in FY2003, allowed us to achieve dramatic results; our purchased electricity were down 12.5% from the preceding year, and CO_2 emissions were cut by 24% from the levels of FY1998 (base year).

Energy Consumption (excluding LNG Terminals)



Example

Energy Conservation System at Sakai Gas Building

Completed in September 2003, Sakai Gas Building (in Sakai City, Osaka) was built with an objective of promoting energy conservation and reducing environmental impact while caring economy. It embodies three concepts: "reduction of energy use by installing effective energy systems", "improvement of energy efficiency in running the system" and " harmonization with nature in urban areas."

For example, power is generated by a cogeneration system. Highly efficient use of energy can be observed, for instance, in the utilization of waste heat for air cooling or heating in the building, as well as for heating water.

Another example is the utilization of natural energy sources, such as wind, sun light and rain water, for curtailing energy use and CO_2 emissions.


Sakai Gas Building

Furthermore, Sakai Gas Building provides a mechanism to conserve energy naturally. It aims to provide "comfortable air conditioning even with 28ºC in summer." To attain this, ceiling fans were installed to provide an air flow. Another feature is the adoption of the BEMS (Building Energy and Environment Management System), which reflects data concerning the indoor heat environment and the results of resident surveys on the energy saving measures and comfort level controls of the air conditioning system.

CO_2 Emissions from Other Businesses (FY2003)

See page 22, for CO_2 emissions calculating method.

CO_2 emissions from thermal supply business

Electricity sales (1,000 kWh)	Thermal sales (MJ)	Purchased electricity (1,000 kWh)	Gas consumption (1,000 m^3)	CO_2 emissions (t-CO_2)
8,661	471,974	4,432	5,164	14,884

Note: Osaka Gas operates at 8 locations.

CO_2 emissions from power generation business

Electricity sales (1,000 kWh)	Gas consumption (1,000 m^3)	CO_2 emissions (t-CO_2)
32,935	6,775	15,515

2. Reducing Resource Consumption and Promoting Recycled Resource Use

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

Key Points and Future Directions

70.7% of excavated soil from gas pipe works is reused, while 70 thousand tons disposed. Medium-term goals are met but further reduction efforts will be continued.

Excavated soil from gas pipe works during FY2003 amounted to 1.13 million tons, a 10 thousand ton increase from the preceding year. Of this volume, 800 thousand tons were reused, and 260 thousand tons were added to agricultural land to raise height. As the result of such purposeful uses, the disposal volume stood at 70 thousand tons, a 10 thousand-ton decrease from the previous year. The reuse and recycling rate was 70.7%, an improvement from the 69% in the preceding year. Osaka Gas had set its medium-term goals of not more than 70 thousand tons for the disposal volume, and 69% or above for the reuse rate. These goals have thus been met. From now on, we will continue to strive to curb the generation of excavated soil and increase its reuse and recycling.

Five-year Transition of the Performance

	FY1999	FY2000	FY2001	FY2002	FY2003
Estimated amount generated by conventional method (10,000 tons)	187	177	194	184	193
Reduced amount (10,000 tons)	30	62*	77*	72*	80*
Generated amount (10,000 tons)	157	115	117	112	113
Recycled amount (10,000 tons)	80	71	79	78	80
Recycling rate (%)	51.0	61.4	67.4	69.6	70.7
Utilized amount (10,000 tons)	46	30	29	26	26
Disposal amount (10,000 tons)	31	14	9	8	7

Note: Recycled amount means back-filled amount of excavated soil and asphalt.
* The figures for FY2000 and after include reductions through shallow laying of service pipes and back-filling works.

Reduction of Excavated Soil

Promotion of new construction techniques enables an 800 thousand-ton decrease from the amounts generated by conventional methods

Roads have to be excavated during conventional gas pipeline construction, thus generating soil containing waste asphalt.

To reduce this, Osaka Gas is increasing the use of trenchless methods (such as the Bore-more method, the compact-pipe-jacking method and the pipe splitter method), which do not require excavation to install the polyethylene (PE) pipes. We also use the shallow-pipe-laying method to install gas pipes at shallower depths.

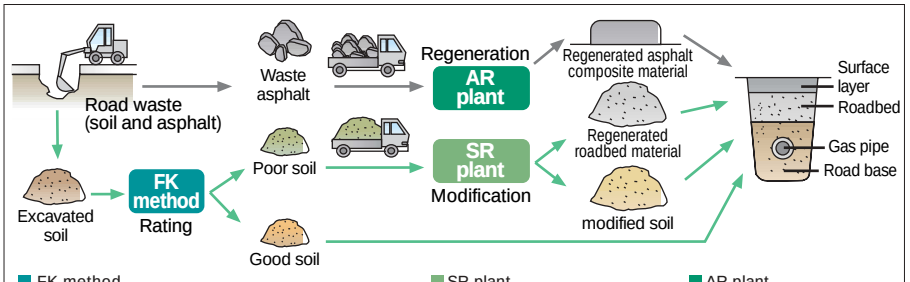
Shallow burying approved by 99% of local governments on a cumulative basis

Until recently gas pipes were required to be buried at the depth of 1.2 meters from the road surface. As the result of various tests and studies that verified safety, in addition to instruction issued by the Ministry of Construction dated March 31, 1999, we became able to bury pipes at a shallower depth. As the shallow-pipe-laying method requires smaller excavation widths, less excavation and less soil for back-filling, Osaka Gas has been using this method whenever possible since then. In FY2003, we obtained approval from 99% of the local governments in our service area for use of the shallow-pipe-laying method.

By adopting such trenchless and shallow burying construction techniques, Osaka Gas was able to reduce the volume of excavated soil in the FY2003 by 800 thousand tons from the amounts produced by conventional techniques. The reduction was 80 thousand tons greater than in the preceding year.

Comprehensive Road Waste 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 regeneration)
A plant for modifying and regenerating excavated soil into backfill soil (road base material) and roadbed material.

■ AR plant (asphalt regeneration)
A plant for regenerating waste asphalt into asphalt composite material for road paving.

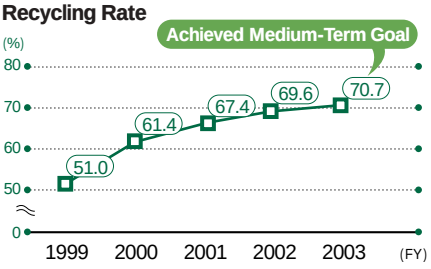
Reuse of Excavated Soil

Since 1983, Osaka Gas and its affiliates have been operating a comprehensive soil and asphalt recycling system.

Osaka Gas Group of companies has been working to expand the districts in which the "FK method" can be used. The FK method enables on-site determination of whether or not excavated soil can be filled back. In addition, we are striving to expand the use of "SR Soil" which is amended soil that had been excavated.

During FY2003, the SR application rate of back-filling soil was 56% (compared with 57% in the preceding year) and the FK method was applied in 28% of the cases (compared with 26%), resulting in an improvement in the reuse and recycling rate of excavation debris and soil, to 70.7% (and 84% as for soil alone).

Recycling Rate



Recycling of used gas pipes

Osaka Gas uses polyethylene (PE) gas pipes. Wastes from construction projects are reused as pipe indication posts for locating buried gas supply pipes, thus continuously achieving a 100% recycling rate since 2000.

Pipe indicator made from waste PE pipe

PE Pipe Recycling Rate

	FY1999	FY2000	FY2001	FY2002	FY2003
Amount wasted (t)	90	105	140	133	153
Amount recycled (t)	45	105	140	133	153
Recycling rate (%)	50	100	100	100	100

2. Reducing Resource Consumption and Promoting Recycled Resource Use

Curbing the generation of excavated soil in gas-pipe works and promotiong reuse

Key Points and Future Directions

All business departments achieved 80% recycling of industrial wastes. Continued future improvement aimed.

In spite of the fact that industrial waste volume increased, Osaka Gas as a whole was able to recycle 80% of the volume (an increase from 72% in FY2002), thanks to 100% recycling at our plants and 82% recycling of industrial wastes collected at our customers (an increase from 73% in FY2002).

As for general wastes, the disposal volume decreased (from 690 tons in FY2002 to 646 tons) and the recycling rate improved (from 62% to 65%), as the result of sorting, development of new recycling uses, and an addition of recycling to the in-house performance valuation items (see page 12).

We will continue to reduce the waste disposal volumes through such means as expanded recycling uses.

Reducing and Recycling of Industrial Wastes

In FY2003, the volume of industrial wastes of Osaka Gas increased 13.8% from the 2002 levels, to 11,054 tons. However, the recycling rate improved 8 percentage points, to 80%, thanks to a 24.6% increase in the volume of recycled wastes, which amounted to 8,808 tons.

With a rise in the volume of works performed on customers' aged pipes, the volume of metal scrap and debris generation grew. Nonetheless, we were able to raise the recycling rate as we manage to recycle nearly 100% of such wastes.

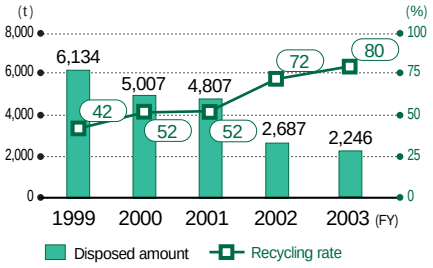
In order to continue to keep the recycling rate at or above 80% in the future, we will work on expanding recycling uses for the items that have especially poor recycling rates.

Industry Waste Generated and Its Recycling Status (t/year)

Waste type	Content details	Generated (a)		Recycled (b)		Disposed (a-b)		Recycling rate (b/a)	
		FY2002	FY2003	FY2002	FY2003	FY2002	FY2003	FY2002	FY2003
Sludge	Wastewater mud	43	69	13	33	30	36	30%	48%
Waste oil	Lubricant oil and cleaning oil	63	62	58	38	5	24	93%	61%
Waste plastics	PE pipe scraps and insulator	707	931	345	754	361	177	49%	81%
Metals	Used gas equipment *	4,728	4,784	4,255	4,306	473	478	90%	90%
	Pipe scraps, etc.	538	1,637	496	1,552	42	85	92%	95%
Glass and ceramics scraps	Glass wool, used fluorescent lamps, etc.	299	192	56	1	243	191	19%	1%
Debris	Waste asphalt and concrete	1,508	1,814	1,366	1,766	141	48	91%	97%
Lumber scraps	Waste construction lumber, etc.	1,520	1,008	274	214	1,246	794	18%	21%
Others	Waste construction materials and others	346	557	200	144	146	413	58%	30%
Total		9,751	11,054	7,064	8,808	2,687	2,246	72%	80%
Breakdown	LNG terminals	226	202	212	201	14	1	94%	100%
	Other sites	1,000	976	621	464	379	512	62%	48%
	Customers	8,525	9,876	6,231	8,143	2,294	1,733	73%	82%

* This represents the amount of used gas equipment recovered from customers when new equipment is sold by Osaka Gas

Industrial Waste Disposal and Recycling Rate



Measures for Zero Emissons

Achieved zero emissions at LNG Terminals

In the LNG Terminal & Power Generation Business Unit of Osaka Gas, we are promoting a reduction in the waste disposal amount (put in a landfill) by reducing the volume and recycling.

There are two types of recycling. One is material recycling, which promotes the reuse of industrial wastes as raw material for other products. The other is thermal recycling, which utilizes the heat energy generated through the combustion of burnable wastes.

In FY2002, we have achieved our company's standards* for Zero Waste Emission from LNG terminals.

Goals and Performances of Disposed Amount (t/year)

	FY1993 (results)	FY1998 (results)	FY2002 (results)	FY2003 (results)	FY2005 (goals)	FY2010 (goals)
Waste from LNG Terminals (industrial and general)	1,027	230	19	3	less than 25 t *	less than 25 t *

Crashed stone storage site

Reducing General Wastes and Recycling

Incorporating disposal reductions into parameters of in-house performance evaluation

At Osaka Gas, we endeavor to reduce general wastes and improve recycling rates by developing recycling uses and by sorting wastes before disposal. Starting in FY2003, disposal reductions became one of the items of our performance evaluation program.

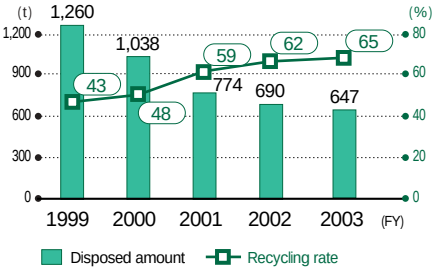
As a result, the disposal volume dropped approximately 6%, to 647 tons in spite of a small increase in the volume of wastes from FY2002 levels, to 1,857 tons.

Our goal concerning General Wastes is to achieve our medium-term (up through FY 2005) environmental target of “500 tons or less.”

General Waste and Its Recycling Status (t/year)

Waste type		Generated (a)		Recycled (b)		Disposed (a-b)		Recycling rate (b/a)	
		FY2002	FY2003	FY2002	FY2003	FY2002	FY2003	FY2002	FY2003
Papers	Paper (copy paper)	427	227	323	214	104	13	76%	94%
	Newspapers	126	141	125	90	1	51	99%	64%
	Magazines	110	71	106	62	4	9	97%	87%
	Corrugated cardboard	290	287	274	277	16	10	94%	97%
	Confidential documents	170	147	144	75	26	72	85%	51%
	Waste paper and others	239	143	13	51	226	92	5%	36%
Total paper		1,362	1,016	985	769	377	247	72%	76%
Cans		14	17	12	13	3	4	82%	76%
Bottles		13	14	11	14	2	0	86%	100%
Kitchen wastes		295	299	82	183	213	116	28%	61%
Plastics		28	187	24	135	4	52	86%	72%
Others		98	324	6	97	92	227	6%	30%
General waste total		1,809	1, 857	1,119	1,210	690	647	62%	65%

General Waste Disposal and Recycling Rate



Using Less Water

Clean water consumption in offices (excluding plants) cut by 14% from FY2002

Clean water consumption at headquarter and regional offices amounted to 394,000 m^3 in FY2003 representing a reduction of 14% from FY2002. The biggest element in this reduction was the reorganization, while consistent water-saving efforts also contributed to the results. This water-saving activity is a part of the corporate environmental management activities.

Water Consumption ($10,000\ m^3$)

		FY2002	FY2003
LNG terminals	Clean water	8.5	7.9
	Industrial water	102.2	110.9
	Sea water	41,747.3	41,358.2
Other sites	Clean water	45.5	39.4

Reduction of Paper Use

Less than half the levels of 1998 usage

For many years, Osaka Gas has been tackling the task of reducing the usage of such paper as copy paper, vouchers and slips that are used within the company and those that are issued to customers and suppliers, as well as computer paper. Reduction of copy paper use, in particular, has been given symbolic importance. In FY1999, its usage reduction became one of the items that are used to evaluate the performance of individual organizations.

As a consequence, paper usage decreased 14.0% in FY2003 compared with the 2002 levels on a weight basis, to 300 tons. This amounted to approximately 46% of the usage levels of FY1998, the base year.

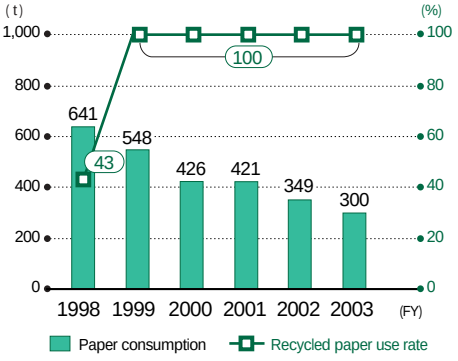
Reducing the paper-consumption in the Information and Communications Systems Dept.

One of the examples distinguishing FY2003 was the “reduction of paper consuming jobs” in the Information and Communications Systems Dept. This was introduced as part of the “Business Style Change” campaign in association with operational efficiency improvement. At meetings and discussion sessions, people brought in their laptops and used large screen monitors and projectors so as to eliminate printed matters as much as possible.

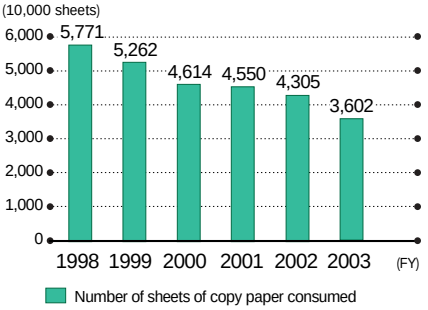
The result of this effort was a major reduction in the number of pages of paper used per employee from 4,700 sheets in FY2002 to 1,000 sheets in FY2003, in addition to labor savings associated with printing and copying.

Paperless meeting

Paper Consumption and Recycled Paper Use Rate



Copy Paper Consumption



3. Promoting Green Purchasing/Procurement and Green Distribution

● Key Points and Future Directions

Green purchases account for 69.2% of stationary and fitting supply of Osaka Gas. We will work to establish a program to evaluate the environmental actions of suppliers and contractors in the future.

Purchases of green (environmentally friendly) items by Osaka Gas rose approximately ¥20 million above the levels of the preceding year, to approximately ¥180 million. Combined with printed matter, the total amounted to ¥1.18 billion. Among stationery and fitting items, 691 items were registered as green items. Purchases of green items accounted for 69.2% of total stationary and fitting purchases, edging remarkably close to the target of 70%. In the future, we will start working toward establishing a program to evaluate the environmental actions of our suppliers and contractors.

In regards to Green Distribution, we will request our business partners to use low-pollution vehicles, and at the same time we will promote the introduction of natural-gas vehicles within our company and our affiliated companies (See page 40).

Green Purchasing/ Procurement

In May 2000, Osaka Gas established its "Green Purchasing Guidelines." Since then, we have collaborated with our business partners in promoting the purchase of not only goods but also services that generate as little environmental impact as possible, while making certain that these goods and services also offer the optimum quality, price and delivery time.

Green purchasing ratio of stationery and furniture supplies expanded to 69.2%

- Substantial expansion of Green Purchasing for stationery and furniture supplies up to 69.2%
- Use of 100% recycled copier paper (with a degree of whiteness at 70%) since 1999
- Use of non-pulp-based or recycled paper for printing since 2001
- Use of fabrics derived from 100% recycled PET bottle for work uniform since 2000

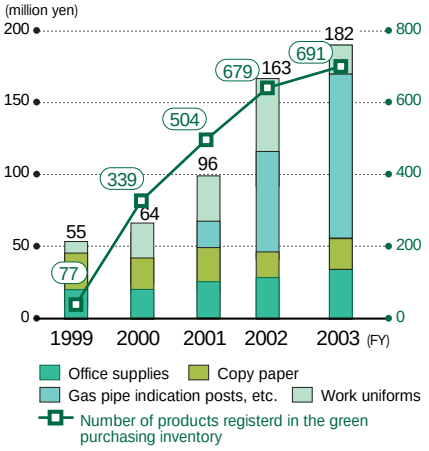
Also in our construction sites

- We give priority to recycled (and amended) soil and recycled asphalt for back-filling the roads.
- Our specifications submitted to contractors require measures to reduce environmental impact, such as noise and vibration, during construction.

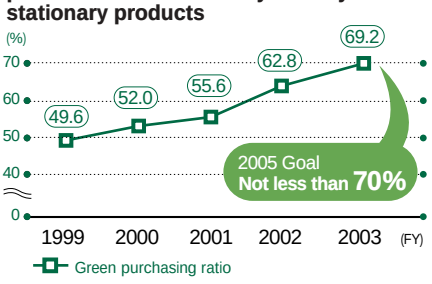
Scope of application of the "Green Procurement Guidelines"

These guidelines cover goods, including stationery and office goods, fixtures, furniture, OA equipment, printing, piping materials, and materials and machinery for construction, in addition to such services as pipe laying, and mechanical, electrical, civil engineering and construction works.

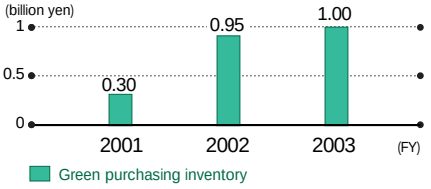
Amount of money spent to Green Purchasing products and number of registered Green Purchasing products



Amount of money spent to purchase environmentally friendly stationary products



Number of Green Purchasing inventory products of the printed material



Pipe indication tape made from waste PE pipe

Meeting the Challenge of Green Distribution

"Green Distribution" is the focus of Osaka Gas's measures to control air pollution that is caused by NOx (nitrogen oxides) and SPM (suspended particulate matter), which is released in exhaust gas from automobiles and diesel cars.

"Green Distribution" means using "low pollution vehicles" that place only small impact on the environment for distributing goods so as to limit the release of air pollutants in communities. We have asked the companies in our group and our business partners to collaborate with us in using low pollution vehicles. (Please refer to page 40 for information on our company's work in this area.)

Low-pollution LNG vehicle

Osaka Gas Green Distribution Policy

Osaka Gas adopted the following green distribution policy in December 2001, and has made progress with green distribution in the Kansai district.

1. Vehicles owned by Osaka Gas
   To replace all replaceable vehicles with low-pollution ones, such as natural gas vehicles, by 2010.
2. Regarding vehicles used by our affiliated companies, for the Gas Group (Local Sales Agencies and Construction Companies) and for our business partners' distribution to our operational offices
   We request their voluntary cooperation in the use of low-pollution vehicles* depending on their respective circumstances.

Start date for guidelines application
January 10, 2002

* Low-pollution vehicles refer to natural gas vehicles, electric vehicles, hybrid electric vehicles, methanol vehicles, or vehicles certified as having low levels of fuel consumption and emissions (vehicle types for which automobile taxes are reduced due to their low environmental impact status) and new-generation vehicles of lower pollution level, such as electric fuel battery vehicles.

4. Control of Chemical Substances

Key Points and Future Directions

Osaka Gas releases very small amount of chemical substance to the environment. We will continue to work toward establishing thorough controls and discharge reduction of chemical substances.

By replacing coal and petroleum with LNG as the resource of city gas in 1990, Osaka Gas dramatically reduced the amount of chemical substances of by-products, released to the environment while manufacturing and supplying the city gas. Nonetheless, we aim for further reductions and endeavor to control chemical substances in accordance with the following policies:

1. Compliance with laws and environmental regulations concerning the use of chemical substances.
2. Risk assessment of chemical substances in the environmental management activities, such as ISO (evaluation from the environmental aspect), and establishment of a emission reduction plan.
3. Disclosure of information on chemical substance controls in this report and on the company website.

Efforts for Environmental Release of Specified Chemicals

Substances subject to the PRTR law

The PRTR (Pollutant Release and Transfer Register) is a mechanism to compile, as well as report and publish, data concerning the volumes of designated chemical substances that are released and transferred to the environment since the enactment of the PRTR law in Japan, corporations are required to report the volumes of designated chemical substances that they release and transfer. The following table summarizes the statistics that Osaka Gas filed in FY2003.

Substances Subject to Reporting under the PRTR Law (FY2003) (t)

Name	Handled annually	Released (atmospheric)	Transferred
Xylene	12.2	12.2	0
Toluene	4.2	4.2	0
Cyclohexylamine	2.6	0	0

* The PRTR law covers 354 substances. The minimum reporting volume is 1 ton (0.5 ton for specified substances) from FY2003.

Most of these substances are solvents for painting. We will examine to reduce these chemicals, and aim for zero emissions in the future same as wastes.

Compliance with the chlorofluorocarbon recovery and destruction law

The Chlorofluorocarbon Recovery and Destruction Law was enforced in April 2002. The law promotes recovery and proper destruction of chlorofluorocarbons. When released to the atmosphere, chlorofluorocarbons contribute to the destruction of the ozone layer and global warming.

At Osaka Gas, disposal of automobile air conditioners, freezers and commercial vehicles is the area that is covered by the law. We hire legally registered contractors to recover chlorofluorocarbons properly. Furthermore, we check the outcome of the recovery with manifest control. About Gas Heat Pump Systems to sell, there is a system that designated contractors recover the CFCs when disposed.

Compliance with the dioxin special measures law

Dioxin is a highly toxic substance. Much of it is said to be generated when garbage and industrial wastes are incinerated. In 1999, the Dioxin Special Measures Law was enacted. Even before the enactment of the law, Osaka Gas had shut down all of its incinerators that had a capacity of 50 kg/h or higher. Consequently, we do not own any facilities that are subject to the law.

Control of PCB related wastes

In compliance with the PCB Special Measures Law, which was enacted in 2001, Osaka Gas controls PCB (polychlorinated biphenyl) wastes properly and submit reports of its storage status to the prefectural government.

The PCB wastes that we have in storage are scheduled to be destructed at a public facility that is planned to be constructed in Maishima in Osaka city by the Japan Environmental Safety Corporation.

PCB was once used in electric appliance parts but its manufacture, use and import was banned in 1974 as a general rule, due to its health hazardous nature. Because of the difficulty of destruction of PCB, storage of PCB in compliance with law is mandated.

Numbers of PCB-containing Discarded Items in Storage (Excluding Those Stored by Affiliate Companies).

Waste PCBs in Storage by Osaka Gas (Excluding storage by affiliates)

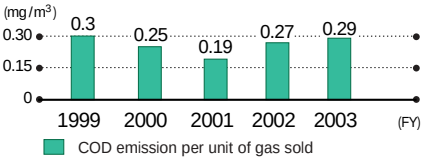
Condensers	Fluorescent lamp stabilizers
about 200	about 4,000

Note: Estimated PCB content: approximately 1.5 tons

5. Control of Wastewater

Osaka Gas' LNG terminals have been implementing a heat exchange method that utilizes ocean water heat in the process of evaporating LNG of -160ºC. This method only reduces the temperature of the ocean water used, and it does not produce nor emit any environmentally impacting substances. Furthermore, domestic wastewater categorized as general wastewater is drained after being properly processed in the wastewater treatment equipment located at our plant ; therefore, the emission of environmentally impacting substances is strictly controlled.

COD emission per unit of Gas Sold



Note: The increase in FY2002 is associated with the increase in industrial water use

Wastewater Discharged from Plants

Item	Discharged
Amount of wastewater discharged	about 1.2 million tons
pH	7.8~8.2
Chemical Oxygen Demand (COD)	2.2 tons
Suspended substances (SS)	4.8 tons
Total nitrogen (T-N)	0.85 tons
Total phosphorus (T-P)	0.13 tons

6. Soil and Ground Water Conservation

Voluntary Program against Soil and Ground Water Contamination

With the implementation of the Soil Contamination Countermeasures Law in February 2003, concerns about soil contamination are growing.

In FY2001, ahead of the effective date of the law, Osaka Gas commenced a series of voluntary surveys, led by a specialized group named the Business Site Land Environment Project. The group determines environmental risks and, when discovering contamination, reports to government agencies in charge, and takes proper risk control measures under the guidance of the government agencies so as to improve the environment.

The possibility of soil and groundwater contamination exists at former plant sites where coal was used as the main resource for gas production.

The investigations will be scheduled to be completed by FY2004.

Procedure of investigations and result of FY2003

After conducting a record review of the production equipment and location of the operation, we investigate the surface soil and ground water. If we discover contamination, we run a boring test to determine the scope of the contamination.

The chart below shows the results of the tests performed in FY2003 of 3 (former) sites where tests exceeded our standards.

At the three former plant sites where investigations were conducted during FY2003, some substances were found to exceed the standard values as shown in the table at the bottom. However, there is no risks of direct ingestion or contact with the contamination substances as the surface is covered with asphalt pavement at all locations. Our investigation found that groundwater in the areas surrounding the sites meets the standards. Based on this finding, we conclude that there is no impact on the neighboring environment.

Environmental risk control

In order to control risks in the future, we take the following measures:

① Measures to Improve Soil Environment
Additional covering of surface with uncontaminated soil, asphalt pavement, etc. (Example: Former site of Kanzakigawa plant*)
Excavation and removal of the core of contaminated soil (Example: Former site of Wakayama plant)
Cleansing of the core area of contaminated soil with the application of the gas suction method and biotechnology. (Example: Former sites of Iwasaki and Torishima plants*)

② Reinforcement of Site Control (at all former plant sites)
When we decide to convert these sites for different purposes in the future, we will comply with all relevant laws and regulations to prevent the dispersion of pollution. Furthermore, we will monitor groundwater when necessary.

* The results of the investigations conducted at the former sites of Kanzakigawa, Iwasaki and Torishima plants were reported in FY2002.

Plant Site Land Investigation Results

Analytical results *1		Acceptance criteria *2	Former plant sites		
			Wakayama (Wakayama city)	Fukiai (Kobe city)	Kishiwada (Kishiwada city)
Amount of solution (mg/l)	Cyanides *3	Not detected *4	6.7	-	-
	Benzene	0.01	1.0	-	-
	Mercury	0.0005	-	-	0.029
	Lead	0.01	-	0.24	0.14
Concentration in soil (mg/kg)	Lead	150	-	2,400	-
Date of publication			Dec. 3, 2003	Dec. 18, 2003	Jan. 28, 2004

*1 Substances whose quantity exceeded the standards are listed. No substance in groundwater was found to exceed the standards.
*2 Standards: Standards established by the Soil Contamination Countermeasures Law.
*3 Cyanides: Most of the cyanides found in the soil at the former sites of our company's gas manufacturing plants that used coal as the raw material is ferricyanide complex. "Basic Knowledge of Water Quality Surveys" (Published by Kinki Engineering Office of the Kinki Regional Construction Bureau; February 1996) states that metal cyanide complexes have relatively low toxicity, and that ferricyanide complex, in particular, is nearly harmless.
*4 Not detected: The analytical results are below the determination limit (0.1 mg/l).

Estimated Causes of Contamination

In the purification process of manufacturing coal gas, cyanides and benzene are generated. Also, coal as a raw material could have included traces of lead, mercury and other heavy metals. It seems that these chemicals infiltrate into soil with war damage, natural disasters, equipment failures and other causes. We supply gas using LNG today, so there is no possibility of these contaminations.

Development of Soil Environment Conservation Technology and Practical Use of it

The "Electrolytic Flotation Method" and the "Activated Carbon Method," treating contaminated wastewater in a simple process with low cost

While working on environmental risk controls of its own operations on one hand, Osaka Gas is also studying various themes to lower the cost of soil management technology and working to put such technology to practical use. In FY2002, the Ministry of the Environment adopted our technology "Indirect Heating Thermal Desorption System" and "Soil Classification Washing Method" as Low-cost, Low-impact Soil Contamination Removal Technology. They have received high evaluation from academic experts.

During FY2003, we put to practical use the "electrolytic flotation method" and the "activated carbon method," which treat wastewater containing contaminants generated from various construction works.

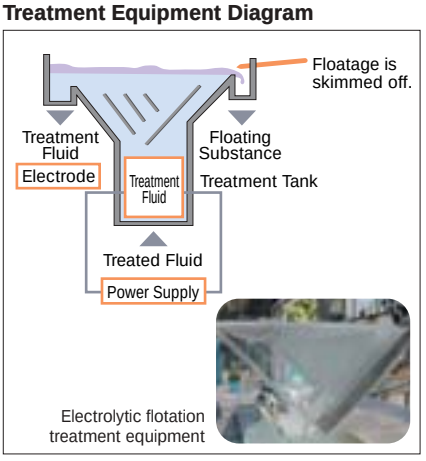
The "electrolytic flotation method" is a technology that makes cyanides, heavy metals, oils and suspended matter float to the top with the force of minute air bubbles when electricity is passed between two electrodes.

The "activated carbon method" is a process technology that recovers cyanides in wastewater to be absorbed by the activated carbon.

These technology made it possible to treat wastewater at small-scale construction site and with wildly fluctuating concentration of contaminants, at low cost.

Looking ahead, we will continue to promote these technology jointly with Osaka Gas Engineering Co., Ltd.

Treatment Equipment Diagram



7. Environmental Training and Education of Employees

Reaching Out to All Employees

Osaka Gas conducts a variety of environmental training and educational activities to raise the awareness of individual employees about environmental conservation and ensure their dedication to the cause.

One example is that employees receive environmental training at least once a year at business locations, that acquired ISO 14001 certification. In addition, information about the environment is disseminated to every employee through the intranet. Furthermore, environmental training is provided to all employees, based on their job classes, as part of the systematic career development program run by the Human Resource Department so as to ensure that employees' awareness is raised.

Environmental training

By Job Ranks, and Giving Guidance on CSR

Osaka Gas provides environmental training to new employees and newly-appointed managers (caps, chiefs, and managers) as part of the career development training program run by the Human Resource Department. The training seminars are geared toward individual job classes.

At these environmental trainings, we pick various topics, namely global environmental issues in general, Osaka Gas's environmental actions, including the company's Environmental Action Guidelines, environmental management system, and individual actions and their results. In addition, a lecture is given on corporate social responsibility as well, which are the latest topics of discussions. Through these training seminars, we hope to raise the awareness of our employees as engaged in an energy business.

Environmental Training of Employees

System of Environmental Training Seminars in FY2003

Environmental Training of Newly-appointed Managers
↑ Implemented in July and November 2003

Environmental Training of Newly-appointed Caps
↑ Implemented in June and December 2003

Environmental Training of New Employees
Implemented in April 2003

* Existing Environmental Training of Manager and Environmental Training of Chief is integrated into Environmental Training of Managers.

Environmental education

Environmental Symposium

Since June is specified as Environmental Month in Japan, on June 11, 2003, Osaka Gas held an environmental symposium entitled "Business and Eco-friendly Management" at a hall on the third floor of the Head Office Building, inviting general public.

Following the keynote lecture by Professor Takashi Gunjima of Faculty of Economics, Doshisha University, a discussion was held on corporate management and eco-friendly measures.

Keynote lecture	**Takashi Gunjima** Professor, Faculty of Economics, Doshisha University
Panel Member	**Teruo Narita** Ricoh Co., Ltd.
	Kyoichi Bessho Sagawa Express Co., Ltd.
	Toshihiko Goto Environmental Auditing Research Group
	Yurika Ayukawa The World Wide Fund for Nature Japan
Chairman	**Koichi Fujino** Environment Department, Osaka Gas Co., Ltd.

President's Awards for Environmental Activities

Since FY1993, Osaka Gas has been giving President's Awards for Environmental Activities. The awards are given to acknowledge the significance and accomplishments of the activities and praise the employees for notable contribution toward the environmental conservation either at a community level or on a global scale in their respective fields, such as business activities or technological development.

In FY2003, the following two awards were given:

The President's Awards for Environmental Activities in FY2003 (October 17, 2003)

Category	Organization	Description
Business Operation	Kyoto Office of the R&D Dept. for acquisition of ISO 14001 certification	R&D Dept.
	Early attainment of zero emission through thermal recycling and material recycling promotion	Senboku LNG Terminal, Himeji LNG Terminal, Production Dept.

Internal Environmental Action Case Study Meeting

As part of the in-house environmental awareness raising program, Osaka Gas held the "Fifth Osaka Gas Environmental Action Case Study Meeting" at a hall on the third floor of the Head Office on November 11, 2003.

Following the lecture on servicizing by Dr. Akihiro Amano, director of Kansai Research Center, Institute for Global Environmental Strategies, presentations were provided by three of our departments and one of our affiliates.

Dissemination of Environmental Information to Employees

Using intranet and company newsletters, we distribute various types of environmental information so as to raise the employees' awareness of the environment and encourage them to take environmental action. In addition, we distribute information concerning environmental laws and regulations in a timely manner so as to ensure that all employees comply with them.

Intranet

Environment-related ordinances of municipalities within Osaka Gas service area, details of legal amendments, other environment-related topics and in-house events related to environmental conservation.

Intranet "Environmental website"

Coverage in the Company Newsletter

We discuss topics that are related to the environment, including each employee's volunteer action on this regard. Although not regularly, we publish special issues on the environment in an effort to educate our employees and share information with them.

In FY2003, we published an 11 page-long feature in our March issue, focusing on the theme of "What We Can Do To Protect the Environment".

Company Newsletter "Gaslight"

Efforts of Affiliated Companies I

(Reducing Environmental Impacts from Our Business Activities)

O.N.E. Co., Ltd.

The First to Acquire ISO 14001 Certification among Local Sales Agencies

There are 147 Osaka Gas Service Shops or local sales agencies in the six prefectures of Kansai region. They sell, install and maintain home gas equipment, in addition to offering housing improvement services.

O.N.E. Co., Ltd. is one of these companies and was the first local sales agency to acquire the ISO 14001 certification in March 2004.

The company had been involved in environmental management since long before acquiring the certification. Employees listed all aspects of their individual work responsibilities related to the environment. After examining the environmental impact of all such aspects, they selected tasks and set a medium-term goal to be attained in FY2006.

1. Reduction of paper consumption by 66 thousand sheets (on an equivalent A4 size basis) over the four-year period.
2. Reduction of total electricity usage by 13 thousand kWh over the four year period.
3. Reduction of gasoline usage by four thousand liters over the four year period.
4. Reduction in half of the generation of noise, vibrations and dust at work sites over the four years period.

Annual targets were set with respect to each of the four goals and efforts were made to meet the targets. As a result, the targets were cleared with respect to all four goals in FY2003.

The company plans to continue to work aggressively to conserve the environment in the future and targets to become a corporation that wins the trust of the community.

An air pressure check on a tire to reduce gasoline usage.

An environmental control supervisor holding an ISO registration certificate.

Osaka Gas Chemicals Co., Ltd.

Always Ensuring Compliance with Laws and Regulations

Torishima Carbon Material Center of Osaka Gas Chemicals has developed coal tar adjustment technologies since it was Torishima Manufacturing Plant of old Osaka Gas. Applying and expanding these technologies, the company manufactures negative-electrode material (MCMB) that is used in secondary lithium batteries, using coal tar imported from Shanghai Pudong Gas Manufacturing Co., Ltd. as a raw material.

The company has always paid close attention to the environment and safety because of its use of various types of combustible matter, as well as its heavy energy use. The company obtained ISO 9001 certification in 2003, and ISO 14001 certification in April of 2004.

There are as many as 20 wide-ranging environment-related laws that the company must comply with. Included among them are the Law for the Promotion of Controls on Chemical Substances, which mandates reporting of the amounts of benzene and toluene usage, and the Air Pollution Control Law, which requires monitoring and measurement of NOx and other substances. To meet such requirements, the company has created the Latest Legal Requirement Check Sheet and ensures the company's compliance with laws and regulations at all times.

Needless to say, the company also promotes energy saving, resource saving and reduction of wastes.

With a rapid global proliferation of personal computers and cell phones, the improvement of electric energy storage capacity of batteries is needed. The company believes that improving the battery capacity of MCMB will help conserve the global environment, and is engaged in development, working jointly with the Advanced Material Business Promotion Dept, Osaka Gas.

Torishima Carbon Material Center

Gas and Power Investment Co., Ltd.

District Heating and Cooling Business

Gas and Power Investment Co., Ltd. has 16 energy centers in the Kansai area and offers district heating and cooling services. The company enhances efficiency in energy saving, promotes highly efficient operation and utilization of cogeneration systems to reduce CO_2 emissions, thus to contribute to the global environment conservation.

Senri Energy Center started operation as the first energy center in Japan. It acquired ISO 14001 certification in March 2001 and was awarded the Excellence in Energy Management (Heat category) by the head of the Kansai Bureau of Economy, Trade and Industry in February 2004. It became a model of energy saving plant in the country.

Power Generating Business

Gas and Power Investment Co., Ltd. operates three power plants in the 150,000 kW class as an Independent Power Producer. Two of them are fueled with gas, typically clean energy, and each adopts a highly-efficient gas turbine combined cycle generation and a gas pressure power recovery generation. Nitrogen oxide (NOx) emissions are strictly controlled to a level less than the environmental standard with denitration equipments. The other is a coal-fired power plant. It is equipped with state-of-the-art electrostatic precipitators and flue gas desulfurizers to minimize the environmental impact. In the retail electricity business, we installed natural gas cogeneration systems at customers' sites. In combination with the use of exhaust heat and generated power, we offer high energy efficiency with low environmental impact.

* IPP business: Electricity wholesale trading to the power companies.
(IPP means Independent Power Producer)

Torishima Energy Center (IPP business)

Kinrei Corporation

Promoting Resource Reuse, Recycling, and Working to Reduce Wastes

Kinrei Corporation is engaged in the production and sale of frozen foods, and the restaurant industry. Its two plants in Tsukuba and Senboku, where frozen foods are produced, obtained ISO 14001 certification in October 2001. The company presses forward with efforts to reduce environmental impacts.

One of the key objectives of Kinrei has been recycling of resources and reducing wastes. The company has always used a professional contractor to recover sludge that is generated in the wastewater treatment process, and has the sludge turned into animal feed. In addition, Kinrei took steps in FY2003 to utilize waste plastics as thermal recycling resources, and offer food wastes that are generated in the production process to hog farmers as feed. These steps enabled the company to achieve in FY2003 the target of reducing wastes by 10% from the levels of FY1999, the base year.

Additionally, at its offices, lights are turned down during lunch hours and upon leaving a room, lighting fixtures are replaced with higher efficiency models. At the factory, improvement of efficiency at production facilities is carried out in an effort to enhance energy usage efficiency.

We will continue to take these steps steadily while trying to reach even higher targets.

Kinrei Tsukuba Plant

Liquid Gas Co., Ltd.

Promoting Energy Savings with the Use of LNG Cryogenic Energy

The Liquid Gas group is engaged in a variety of business operations in two fields: industrial gas and fuel gas.

In the industrial gas field, Cold Air Products Co., Ltd. and CRYO-AIR Co., Ltd. operate air separation businesses (manufacture and sale of liquefied oxygen, liquefied nitrogen and liquefied algon), whereas Kinki Ekitan Co., Ltd. and Osaka Tansan Co., Ltd. operate manufacturing and sale of liquefied carbon dioxide and dry ice). These businesses utilize cryogenic energy of LNG.

In this field, dramatic energy and cost reductions are achieved by using cryogenic energy of LNG in the manufacturing process as energy consumption is cut in half in comparison with the conventional electricity using method.

The production share of the Liquid Gas group in the Kinki region is approximately 40% in the liquefied oxygen and liquefied nitrogen markets, and approximately 30% in the liquefied carbon dioxide market. We will press forward with energy saving efforts. In addition, Liquid Gas Co., Ltd. makes a contribution to the society with the application of new technologies. The company is engaged in the low-temperature pulverization of resins that are difficult to pulverize at room temperature and foods that are prone to quality deterioration at room temperature by taking advantage of the extreme low temperature of liquefied nitrogen (-196 ºC).

Cryo-Air's air-separation Facility

Environmental Impact by Affiliated Companies*/ PRTR Substances Handled by Osaka Gas Group

* See page 4, for scope of report on affiliated companies.

Environmental Impact

	Power 1,000 kWh	Gas 1,000 m^3	Other fuels GJ	CO_2 emissions 1,000 t	Water 1,000 m^3	Copy paper 1,000 sheets	Industrial waste 1,000 t	General waste 1,000 t	Companies Number	Total sales million yen
FY2001	266,474	84,833	102,951	380	1,492	21,700	24.9	0.2	37	192,000
FY2002	294,019	126,172	113,979	500	2,054	22,952	24	0.4	39	207,500
FY2003	307,114	185,725	10,591,651	1,569	3,406	33,858	56	1.2	53	239,100

Note 1: Gas consumption amount is calculated in 45 MJ/m^3.
Note 2: "Other fuels" comprises Coal, Propane gas, Kerosene and Diesel Oil.
Note 3: In FY2003, Nakayama Joint Power Generation Co., Ltd. and Nakayama Nagoya Joint Power Generation Co., Ltd., both of which are IPP (Independent Power Producer) joined our Affiliated companies.

Chemical Substance

See page 4, for calculation range. (t)

		Xylene			Toluene			Benzene			Asbestos			HCFC-22			HCFC-141b			Cyclohexylamine		
		Handled annually	Released	Transferred	Handled annually	Released	Transferred	Handled annually	Released	Transferred	Handled annually	Released	Transferred	Handled annually	Released	Transferred	Handled annually	Released	Transferred	Handled annually	Released	Transferred
FY2001	Osaka Gas										0.8	—	0.8	6.7	6.7	—						
	Affiliated Companies				85.8	13.2	—	21.5	6.7	—												
	Total				85.8	13.2	—	21.5	6.7	—	0.8	—	0.8	6.7	6.7	—						
FY2002	Osaka Gas	4.7	4.7	—	1.7	1.7	—							2.7	2.7	—	4.0	4.0	—	2.0	—	—
	Affiliated Companies				80.4	7.6	—	19.2	5.5	—												
	Total	4.7	4.7	—	82.1	9.3	—	19.2	5.5	—	—	—	—	2.7	2.7	—	4.0	4.0	—	2.0	—	—
FY2003	Osaka Gas	12.2	12.2	—	4.2	4.2	—													2.6	—	—
	Affiliated Companies				487.0	46.0	350.0	33.0	17.0	—												
	Total	12.2	12.2	—	491.2	50.2	350.0	33.0	17.0	—										2.6	—	—

Note: Each data is the sum of reported amount required by the PRTR law. For FY2001, the minimum annual volume was set at 5 t (or 0.5 t for specified Class 1 designated chemical substances) or more. For FY2002 and subsequent fiscal years, the minimum annual volume was set at 1 t (or 0.5 t for specified Class 1 designated chemical substances) or more.

Contributing to Environmental Impact Reduction with Our Products and Services

We provide customers with natural gas, relatively benign fossil fuel to the environment, and products that contribute toward environmental impact reductions.
In addition, we develop technologies and systems that help reduce environmental impact at factories, office buildings and housing. We also promote resource recycling at the same time.

Contributing Toward Pleasant Living and Conservation of the Environment with ECOWILL

The Residential Energy Business Unit takes an active role in the environmental impact reducing action in the course of its business operation, including the reduction of energy use and recycling of wastes at its business offices. Moreover, the unit takes an initiative in the energy reduction and recycling at customers' homes.

The company has always endeavored to improve the efficiency of various types of home gas appliances so as to help customers reduce their energy consumption. "ECOWILL," a home gas cogeneration system that was launched in March 2003, realizes massive energy savings and reduction of CO_2 emissions by utilizing the heat that is released by power generation to serve hot water and heat the space to the fullest. A number of customers are already using ECOWILL.

We are also promoting proper disposal of wastes and improvement of recycling rates by reviewing the used gas appliance recovery and recycling system, and developing and introducing "e-cycle" system in 2003.

Looking ahead, we intend to aggressively contribute toward environmental conservation and ensure customer satisfaction through our business operations.

Yukihiro Endo
Senior Managing Director
Head, Residential Energy Business Unit

2003-2004 Environmental Action Highlights

3,181 ECOWILL sold in the first year, largely exceeding the target

In March 2003, an epoch-making household gas cogeneration system called ECOWILL was put on the market, taking the lead even in the world. The sales totaled 3,181 units, which was approximately 150% of the original target set for the first year.

Refer to page 38

For practical application of Fuel Cells, an operation test was implemented to evaluate durability

Among all fuel cells, practical application of the polymer electrolyte fuel cell (PEFC) is highly expected as a household cogeneration system or alternative automobile engine. High power generation efficiency of more than 35% (LHV*) is assumed even for small-sized fuel cells. Osaka Gas is developing a PEFC cogeneration system collaborating with four other manufacturers.

* LHV (low heat value): Heating value after deducting latent heat of steam from complete combustion of gas (lower heating value standards). In this case, 31.5% in high heat value (HHV) .

Refer to page 39

The Commercial & Industrial Energy Business Unit serves customers who use energy for business and industrial purposes. We strive to lower environmental impact especially through the increased use of cogeneration systems.

In recent years, we have not only concentrated our efforts on improving the power generation efficiency of the systems themselves but also have endeavored to increase the use of cogeneration systems by developing “Gene-Lite,” a small-scale system with generation capacity of 9.9 kW, and by offering an optional scheme, which enables customers with high thermal demand to sell surplus electric power.

As the result of these activities, our cumulative installed capacity reached 1.2 million kW in FY2003.

In addition, the Commercial & Industrial Energy Business Unit offers to our customers energy management services named “Web ECHO LINE SYSTEM,” which enables customers to minimize their energy consumption through remote monitoring of facility operation and energy usage. We intend to continue to promote energy reductions from our systems and services.

Contributing to the Promotion of Energy Savings through Dissemination of Cogeneration Systems

Takashi Nabari
Managing Director
Head, Commercial & Industrial Energy Business Unit

Osaka Gas leads the gas industry in accumulated capacity of installed cogeneration systems

As a highly efficient energy system, gas cogeneration significantly contributes to minimization of CO_2 emissions. It is used by a large number of customers for industrial, business, including medical use. The accumulated capacity of the installed equipment in our business area totaled 1.217 million kW at the end of FY2003. This is the largest figure in the gas industry in Japan.

Refer to page 36

Gas and Power Investment Co., Ltd. Promotes ESCO Business or comprehensive energy saving services

ESCO stands for energy service company and offers energy saving services. The Japanese government regards it as one of the largest pillars of energy saving measures. Gas and Power Investment Co., Ltd. offers this service to 17 sites at the end of FY2003.

Refer to page 42

1. Contribution to Environmental Impact Reduction at Customer Sites

Key Points and Future Directions

Targets met —Energy conservation of 1,076 Tcal and a CO_2 emission reduction of 1,016 thousand t-CO_2 achieved at Osaka Gas customer locations. Efforts continued to develop and expand the use of high efficiency equipment and systems

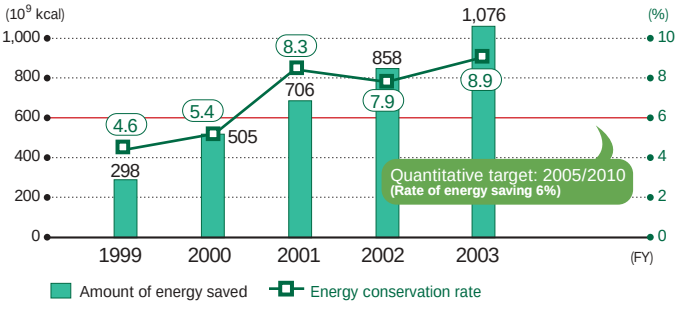
Osaka Gas is active in encouraging the increased use of natural gas, which releases the least amount of CO_2 among all fossil fuels, cogeneration systems and other high-efficient equipment and systems for industrial, business and home uses.

With these, we promote energy savings at customer sites and contribute toward reduction of CO_2 emissions.

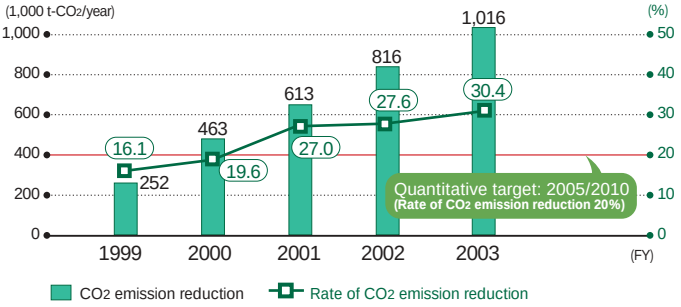
In FY2003, the amount of actual energy savings grew 1.0 percentage point over the preceding year, to 8.9% while CO_2 reductions reached 30.4%, enabling us to move a step closer to our medium-term environmental goals, set for FY2005. In the future, we will endeavor to further improve the efficiency of cogeneration and other gas equipment and systems while at the same time promote the increased use of natural gas.

Rate of Energy Saving and CO_2 Emission Reduction (Base year: FY1998)

Amount of Saved Energy/Rate of Energy Saving (compared with FY1998)



CO_2 Emission Reduction/Rate of CO_2 Emission Reduction (compared with FY1998)



Rate of energy saving

$$= \frac{\text{A Energy saved}}{\text{A Energy saved} + \text{B Incremental gas sales}} \times 100\ (\%)$$

A Energy saved

This is the amount of energy saved resulting from the introduction of energy-saving equipment and systems, such as cogeneration, industrial and air conditioning systems, which were installed between FY1998 and the year in question.

B Incremental gas sales

This is the amount of energy, equivalent, to the incremental amount of gas sold between FY1998 and the year in question.

Rate of CO_2 emission reduction

$$= \frac{\text{C } CO_2 \text{ emission reduction}}{\text{C } CO_2 \text{ emission reduction} + \text{D } CO_2 \text{ emissions from gas sold}} \times 100\ (\%)$$

C CO_2 emission reduction

The amount of CO_2 reduction resulting from the introduction of energy-saving equipment and systems, such as cogeneration, industrial and air conditioning systems, which were installed between FY1998 and the year in question.

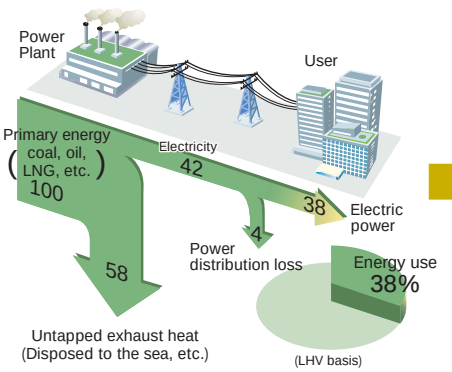
D CO_2 emissions from gas sold

The amount of CO_2 emissions, equivalent to the incremental amount of gas sold between FY1998 and the year in question.

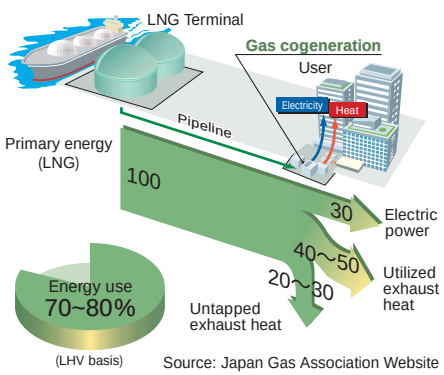
Gas Cogeneration Sysytem

Not only do cogeneration systems generate electrical power using gas engines and gas turbines fueled with natural gas, but they also exhaust heat, which can be efficiently used for air conditioning, hot water and industrial steam supply. In this way, this system enables us to save a significant amount of energy by sufficiently utilizing energy. Up to about 70-80% of energy input can be utilized efficiently.

Conventional Thermal Power Generation



Gas Cogeneration System



Source: Japan Gas Association Website

2. Promotion of the Use of Energy-Saving Systems and Equipments

Key Points and Future Directions

Cogeneration systems reach 1,213 thousand kW in cumulative installed capacity, a 92-thousand kW increase. Efforts continued to promote their use in both commercial and residential fields.

Osaka Gas is committed to improving the efficiency of various equipment and systems in order to draw out the merits of natural gas to the maximum extent possible, to reduce energy consumption and environmental impact. Some of the most prominent examples of our efforts can be seen in the improved efficiency of cogeneration systems, gas air conditioning (GHP or gas heat pumps and gas absorption-type chiller/heater), and industrial furnaces and home equipment (water heaters and burners).

In FY2003, the cumulative number of cogeneration units installed reached 2,004, an increase of 418 over the preceding year. As a result, CO_2 emission reductions achieved by the cogeneration systems that were installed in 1999 and subsequent years amounted to approximately 360 thousand t-CO_2 over the levels of FY1998 (base year).

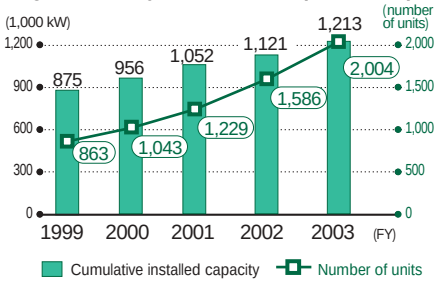
We will promote the increased use of these high efficiency equipment and systems, and resource economizing and recycling of used materials as well.

Natural Gas Cogeneration System

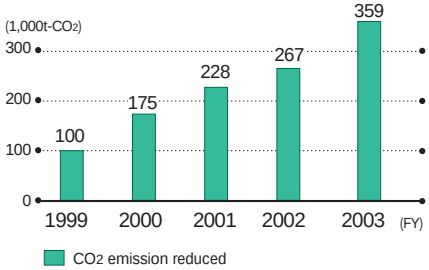
The system achieving massive energy savings by using waste heat

Not only generating electrical power with gas engines or gas turbines using natural gas as fuel, but the system also exhaust heat, which is efficiently used for air conditioning, hot water and industrial steam supply and other purposes. In this way, it saves a significant amount of energy by utilizing both electrical and thermal energy, using exhaust heat appropriately. Up to about 70-80% of energy input can be consumed efficiently. In the "New Energy Law," which promotes the use of alternative energy sources instead of petroleum, the government too demonstrates its commitment to the promotion of natural gas cogeneration systems.

Cumulative Capacity and Number of Gas Cogeneration Systems Installed (Osaka Gas)



CO_2 Emission Reduction through Cogeneration (Compared with FY1998)

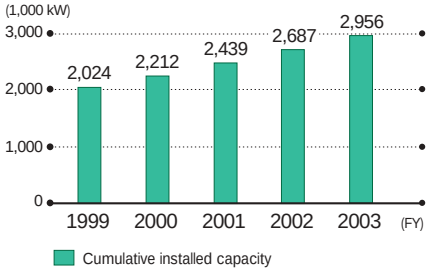


Osaka Gas's cumulative installed capacity the highest in the city gas industry

Natural gas cogeneration systems are used mainly by customers in the industrial sector, as well as those in the commercial and medical fields. The cumulative installed capacity in the Osaka Gas area (which stood at 1,213 thousand kW as of the end of FY2003) accounts for approximately 40% of the national total.

We have also pressed forward with the improvement of gas engine efficiency. The power generation efficiency, which was around 30% during the initial stage of the commercialization, now ranges between 40% (300 kW class) and 43% (6,000 kW class) based on the LHV standards.

Cumulative Capacity of Gas Cogeneration System Installed (Japan)



High-efficient Gas Engine (GE)

Jenbacher GE

Mitsubishi Heavy Industries Miller-cycle GE

Promotion of micro gas engine-driven "Gene-Light Series" of cogeneration systems

Osaka Gas developed a micro gas engine with the generation capacity of 9.8 kW in 1998, and has promoted "Gene-Light Series," a cogeneration system. Today, we have a variety of models, ranging from 5 kW to 22 kW, and the total number of installed units exceeds 1,000.

Starting in FY2003, a government subsidy became available to the purchasers of models that are smaller than 10 kW when they are combined with a hot water storage tank and sold as gas engine water heaters.

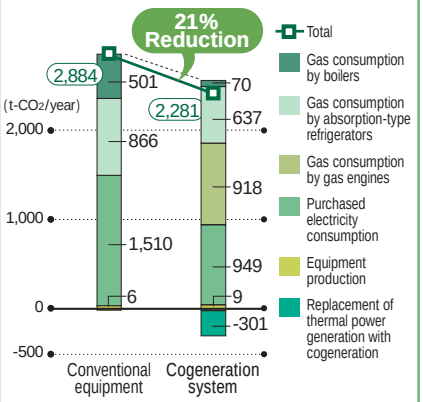
Aisin 6 kW

Sanyo 8 kW

Yanmar 5 kW

Yanmar 9.9 kW

LCA Evaluation of CO_2 Emissions



Source: University of Tokyo, LCA Evaluation of Exhaust Heat and Natural Energy Exploitability with Gas Equipment, Proceedings of the 19th Meeting of the Japan Society of Energy and Resources (2000).

2. Promotion of the Use of Energy-Saving Systems and Equipments

In the Commercial & the Industrial Fields

The Highest Cooling Efficiency in the World of a Gas Absorption-type Water Heater/Chiller

Gas absorption-type water heater/chillers that supply chilled water and hot water for air cooling and heating are air conditioning systems that use water as a coolant instead of chlorofluorocarbon gas or hydrochlorofluorocarbons. They are used widely in large buildings because of their high energy consumption reduction and cost reduction effects.

Osaka Gas is committed to promoting "Green Models" (models which have excellent capabilities and functions relating to environmental impact reductions), which were chosen in accordance with a program we jointly established with Tokyo Gas Co., Ltd. and Toho Gas Co., Ltd. Currently, we are promoting a model that achieved the cooling efficiency (COP*1) of 1.35, which is the highest among all double effect models*2 in the world.

*1 COP (Co efficient of Performance): an indicator of energy efficiency. Shown as the cooling capacity (W) divided by the energy input (W). The bigger the figure, the higher is the efficiency.

*2 Dual-effect models: machines whose efficiency is improved with the utilization of the condensation heat. In single-effect model, the condensation heat was dumped in cooling water.

Gas Absorption-Type Cooler/Heater with COP 1.35

Sanyo gas absorption type cooler/heater F-WE Series

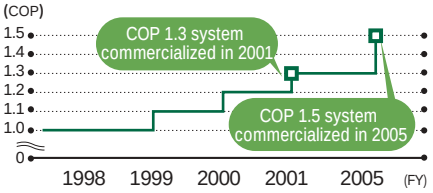
Hitachi gas absorption type cooler/heater EX Series

Improving the Efficiency of Gas Engine Heat Pump Air Conditioners

Gas engine heat pump air conditioner provides warm and cool air, with a compressor run by a gas engine.

In FY2003, Osaka Gas developed "HIGHPOWER MULTI series" with a power generating function, and targets to commercialize a gas engine heat pump air conditioner with a COP of 1.5 in FY2005.

Improvement of GHP Efficiency



Technology Proposals for the Promotion of Energy Conservation

Consulting on "Energy Conservation"

Japan's energy consumption is on a rising trend. Increases at offices and commercial facilities are being regarded as problematic.The Law Regarding the Rationalization of Energy Use, which was revised in April 2003, tightened regulation on large business buildings.

Osaka Gas gives "energy conservation," consulting services to business buildings and factories. Based on the examination of energy use, we offer support regarding energy conserving techniques, in the form of suggestions and their implementations.

Measurement

Commencement of Energy Conservation Control Support, Using a Remote Monitoring System

Osaka Gas launched in 2003 "Sky Remote," a system that can monitor gas heat pumps and "Gene-Light Series"(see page 36) from a remote location. It checks on the operating status of facilities over the wireless and Internet, and permits scheduling of regular maintenance at the optimal timing. In addition, Osaka Gas began to offer services that make available accumulated energy use data, making it possible, for example, for a head office to gather and control information on chain stores.

With regard to medium- and large-scale cogeneration, a plan is under way to promote such new services as remote energy conservation analysis, by updating the Web Echo Line Systems, an existing remote monitoring system.

Echo Line Monitoring Center

Promotion of Energy Conservation with Pipe Friction Reduction Technology

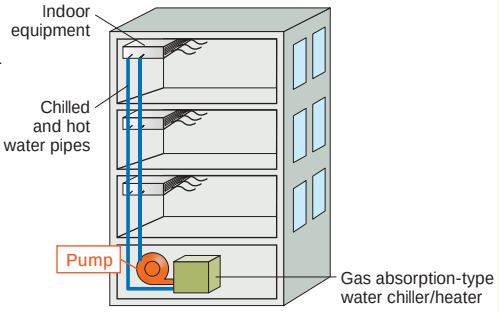
In a "gas absorption-type air conditioning system," chilled water and hot water produced by an absorption-type chiller/heater, are pumped out through the pipe, and sent to an indoor heat exchanger. In a "gas cogeneration system," water heated by waste heat is pumped through the pipe and carried to heat-using facilities.

On both two systems, high energy consumption of pump pressing has been a long-standing problem, awaiting a solution. When a specific surfactant is added to water, frictional resistance between water and pipe is drastically reduced. Taking note of this characteristic, Osaka Gas developed a technology for practical use in 2002 that is applied to reduce energy consumption associated with the pump operation.

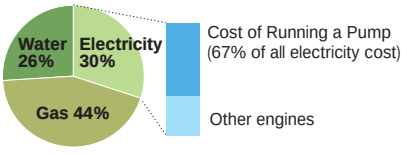
Using this technology, energy consumption by pumping can be reduced up to 50%.

In the future, we intend to make this technology widely adopted, and develop energy systems with less environmental impacts.

Chilled and hot water delivered by a gas absorption-type air conditioning system



Breakdown of the Running Cost of Gas Absorption-type Air Conditioning System



Note: The running cost was measured under the following conditions:

Cooling load	1,055 kW (300RT)
Heating load	844 kW
Annual hours of air conditioner operation	3,600 h/year
Cost of gas	Type 1 summer agreement for an air conditioner
Cost of electricity	High voltage for business use
Cost of water	¥450/m³

Residential Equipment and Systems

ECOWILL, a Home Cogeneration System (A Recipient of the Energy Conservation Grand Prix Award)

ECOWILL is a residential gas engine cogeneration system that Osaka Gas developed for detached houses. It uses a gas engine with power generation of 1kW. Power generated on site and waste heat is enough to satisfy the demand of electricity, hot water and space heating.

Because it effectively uses waste heat, a by-product of power generation for heating water and space, ECOWILL lowers energy use per 1 kWh of power by approximately 20%, from what it would cost to run conventional gas hot water generators for room heating with purchased electricity. Additionally, it reduces CO_2 emissions by about 30% because it burns natural gas, which is a clean energy source.

ECOWILL won the Energy Conservation Grand Prix Award in 2003 (Energy Conservation Center Chairman's Award).

High Energy Utilization Rate

"ECOWILL" is designed for residential use and yet achieves an impressive energy utilization rate of 85%*, about the same rate of large gas cogeneration systems.

As for a typical family comprising four members, it can serve approximately 30% of power use and most of hot water and air conditioning demand including under floor heating system.

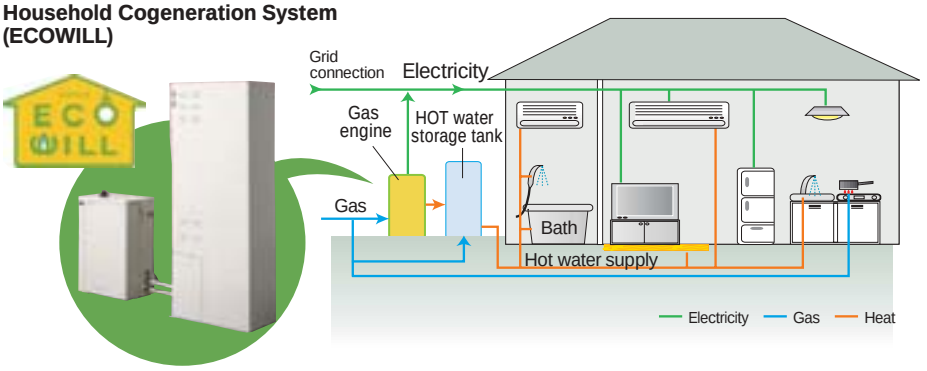
It comes equipped with a control system that learns the patterns of hot water and heating uses, and selects the time zone with the highest energy conservation effects to automatically generate power.

* Energy utilization rate of 85%: Sum of generation efficiency of approximately 20% and waste heat use efficiency of 65% (LHV standards).

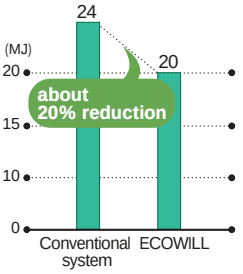
Taking Steps Toward a Nationwide Proliferation

ECOWILL was launched in March 2003 as the first of its kind in the world. Its sales exceeded the initial projection by 50% in the initial year and reached 3,181 units. We intend to respond to our customers' expectations by further improving its environmental friendliness and economy, and actively promote the product nationwide.

Household Cogeneration System (ECOWILL)

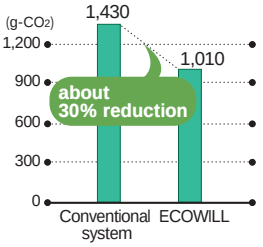


Primary Energy Consumption



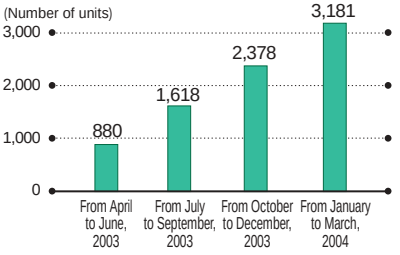
Compared to energy consumption by ECOWILL 1 kWh

CO_2 Emission

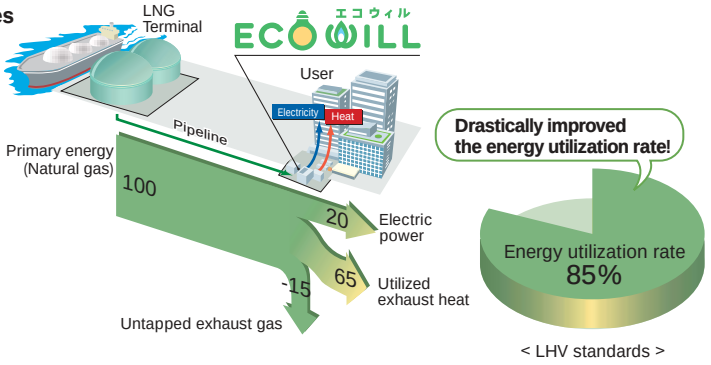


Compared to CO_2 emission by ECOWILL 1 kWh

ECOWILL Use in Japan (cumulative total)



ECOWILL Improves Energy Utilization Rate to 85%



< LHV standards >

Voice

Voice of the User

As I thought about my children, I wanted to conserve the environment even in small ways. "ECOWILL" is the best option for me.

Kimura Family
Nishinomiya, Hyogo

The Kimuras are a family of five. Mr. & Mrs. Kimura remarked that they looked into ECOWILL because they wanted to contribute to the future environment for the sake of their two daughters. "We listened to the person who developed ECOWILL at a sales promotion exhibition and thought it made sense. I had a neighbor who had an ECOWILL installed. He recommended it to me, so I decided to have one too," says Mr. Kimura.

Mrs. Kimura especially likes the "Nook," under floor heating system. "Nook heats the entire room so we hardly need any additional heating. We used to use an electric bathroom dryer-heater where we lived before. The gas powered one is so much more powerful and easier to use." Her energy bills are lower than before. "We would like to continue to enjoy pleasant living while being conscious of energy conservation."

2. Promotion of the Use of Energy-Saving Systems and Equipments

Lighter and more compact latent heat recovery-type hot water heaters for residential use

Hot water and space heating account for a large part of total energy consumption at home. Raising the thermal efficiency of water heaters contributes greatly to reduction of energy consumption and CO_2 emissions.

In September 2003, Osaka Gas launched "Prior Eco," a latent heat recovery-type hot water heater for home use that is lighter and more compact than conventional models. Its thermal efficiency is about 95% when supplying hot water, and approximately 89% when heating space. This series received the "Energy Conservation Grand Prix Award (Award of the Minister of Economy, Trade and Industry)".

Our future plans include development of models with easy drainage (of oil and water that collect inside the unit) and efforts to increase its acceptance by consumers.

Prior ECO

"Energy Conservation Grand Prix Award" won for development of higher efficient gas burners

In FY2003, Osaka Gas received the "Energy Conservation Grand Prix Award (Energy Conservation Center Chairman's Award" for the second time for our development of gas burners for residential use. High efficiency was achieved by shortening the distance between pots and burners, and placing flames as close to the center as possible, which raised energy consumption efficiency to 56% and energy conservation standards attainment rate to 101%.

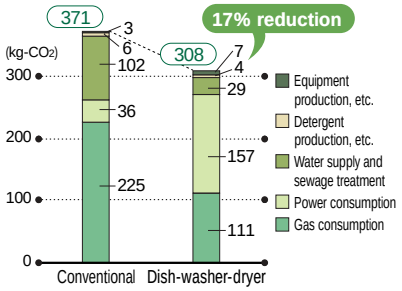
High efficient burners* account for 94% of the total sales of table-top burners (83% in the preceding year) and 87% of the total sales of built-in burners (95% in the preceding year). We will promote the improvement of efficiency further.

* Burners with thermal efficiency of 50% or higher.

High-efficiency gas cooking stove

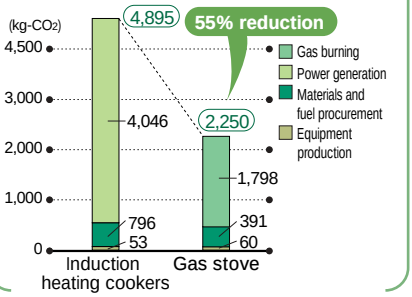
CO_2 Emissions Reduction Effects of Products

Comparison of LCA Evaluation of CO_2 Emissions



Source: Osaka Gas, A Study of LCA Evaluation of City Gas Systems, Proceedings of 8th Assembly of the Japan Institute of Energy.

Comparison of LCA Evaluation of CO_2 Emissions

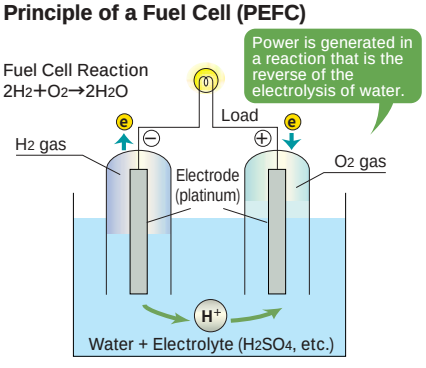


Development of a Polymer Electrolyte Fuel Cell (PEFC) Cogeneration System

1. What is a fuel cell?

A fuel cell is a chemical power generator that uses a reaction that is the reverse of the electrolysis of water; it generates water and electricity by making hydrogen and oxygen react. Fuel cells are characterized by high generation efficiency and cleanliness because power is generated directly from a chemical process instead of a conventional mechanical process, in which fuel is burned and the heat from the burning is used to move a motor that turns a generator. Polymer electrolyte fuel cells (PEFCs) receive special attention because of their high efficiency in spite of their small sizes, which make them ideal for residential cogeneration systems and replacements for automobile engines.

Principle of a Fuel Cell (PEFC)



2. Development by Osaka Gas

PEFC can be expected to attain high generation efficiency of 35% (LHV*) or above even with small output. For this reason, Osaka Gas has been developing the residential PEFC cogeneration systems in the 1 kW class (700 W - 1 kW) with the targeted commercialization in FY2005.

Applying the refining technology (which produces hydrogen from natural gas) that our company has expertise in, we have developed fuel refining devices (producing hydrogen from natural gas and LPG) that are small, low-cost, and are equipped with world-class capabilities, and promoted system development. We license our technologies to domestic and foreign makers.

Since the last fiscal year, we have been developing PEFC Cogeneration System jointly with four manufacturers (EBARA BALLARD, SANYO Electric, Matsushita Electric Industrial and Toshiba IFC). Prototypes are being run on a field test basis at the "Experimental Residential Complex NEXT 21" (in Tennouji district of Osaka) and in employee houses to evaluate their performance, reliability and durability. Furthermore, we are developing waste heat recovery units for fuel cells, which encompass software development, so as to apply the control functions introduced in ECOWILL to achieve better energy conservation.

In the meantime, we set up durability assessment test facilities to test the fuel cell stacks, which are the core part of such cells. We evaluate the cell stacks of domestic and foreign fuel cell manufacturers. We analyze and evaluate the causes of deterioration, and develop deterioration resistant techniques. With these steps, we promote product development that is firmly rooted in basic technologies.

By mobilizing all such technologies that Osaka Gas has, we aim to move PEFC cogeneration systems to commercial production as quickly as possible.

* LHV: Heating value after deducting latent heat of steam from complete combustion of gas (lower heating value standards). 31.5% in a scale of HHV (higher heating value standards) in this case.

3. Promoting Natural Gas Vehicles

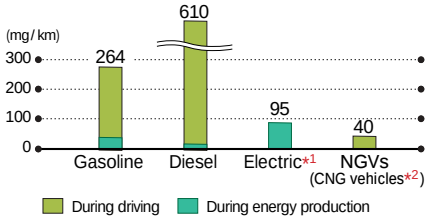
Environmental Features of Natural Gas Vehicles

Nearly Zero SOx and SPM emissions. Low NOx and CO_2 emissions.

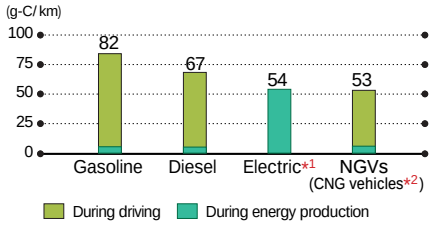
Natural Gas Vehicles (NGVs) are vehicles that are structurally very similar to conventional vehicles but burn natural gas (City Gas).

Osaka Gas has been promoting the environmentally friendly natural gas vehicles (NGVs), which emit almost no SOx (sulfur oxides), and SPM (suspended particulate matter), and comparatively less NOx and CO_2.

NOx emission (with a vehicle total weight of 1.5 tons)



CO_2 emission (with a vehicle total weight of 1.5 tons)



Source: Extracted from Proposals for Mass-Diffusion of Low-Pollution Vehicles (1994) by the Environmental information Center

*1 Calculated with the Thermal Power Generation Source Unit for the Metropolitan Areas.
*2 CNG means Compressed Natural Gas.

LNG Gas Filling Station

Promoting NGVs among Government Offices and Private Corporations

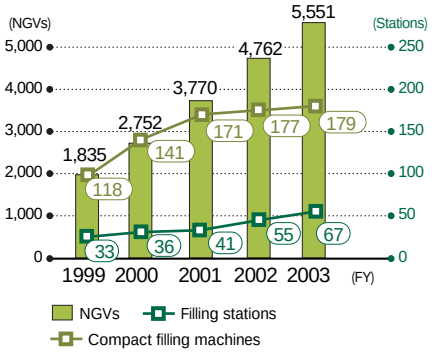
NGVs are being driven as practical vehicles in all kinds, including buses, trucks and automobiles. The government of Japan has set a target for NGVs at one million by FY2010. National and local governments are showing an initiative in the purchase of NGVs. The atmosphere is set for the purchase of low pollution cars nationwide as green deliveries are promoted and subsidy programs are being created and expanded.

Osaka Gas Group too plans to take aggressive steps toward the promotion and wide use of NGVs.

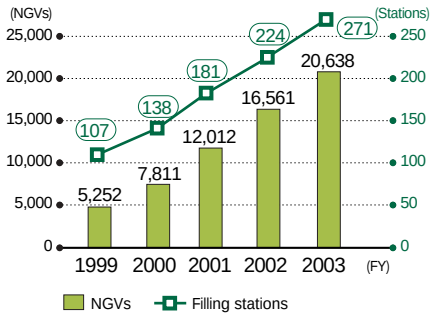
By the end of March 2003, 5,551 NGVs were being driven in the Kansai district (and 20,638 NGVs nationwide). A cumulative total of 67 natural gas filling stations (and 271 pumps nationwide) have been installed.

NGV Use in Kansai Region and in Japan

NGV Use in the Kansai Region (cumulative total)



NGV Use in Japan (cumulative total)



Introduction of NGVs at Osaka Gas

Group as a whole also using NGVs increasingly

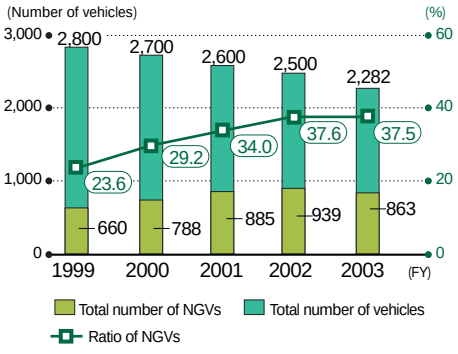
Osaka Gas is gradually replacing its conventional vehicles with NGVs. The introduction of 115 NGVs in FY2003 brought the total to 863, accounting for 37.5% of all Osaka Gas vehicles.

In addition to the cumulative total of 863 NGVs as of the end of FY2003, 124 NGVs were transferred to Osaka Gas Customer Relations Co., Ltd. set up in FY2003 as a wholly owned subsidiary of Osaka Gas, and to Osaka Gas Security Service Co., Ltd. When these vehicles are included, the cumulative total rises to 987 vehicles, an increase of 48 vehicles over the preceding year.

Osaka Gas Group as a whole introduced 1,037 NGVs, which accounted for 24% of the total.

Regarding gas filling stations where NGVs are refueled, 12 stations were constructed in FY2003, raising the cumulative total to 67 stations. With these additions, a convenient service system is being expanded.

Introduction of NGVs at Osaka Gas



NGV in various businesses

Retailer's truck

Commercial truck

Publicly owned bus

Garbage truck

Forklift

4. Promotion of Resource Recycling

Development and Introduction of "e-cycle," a Waste Collection/ Disposal Control System

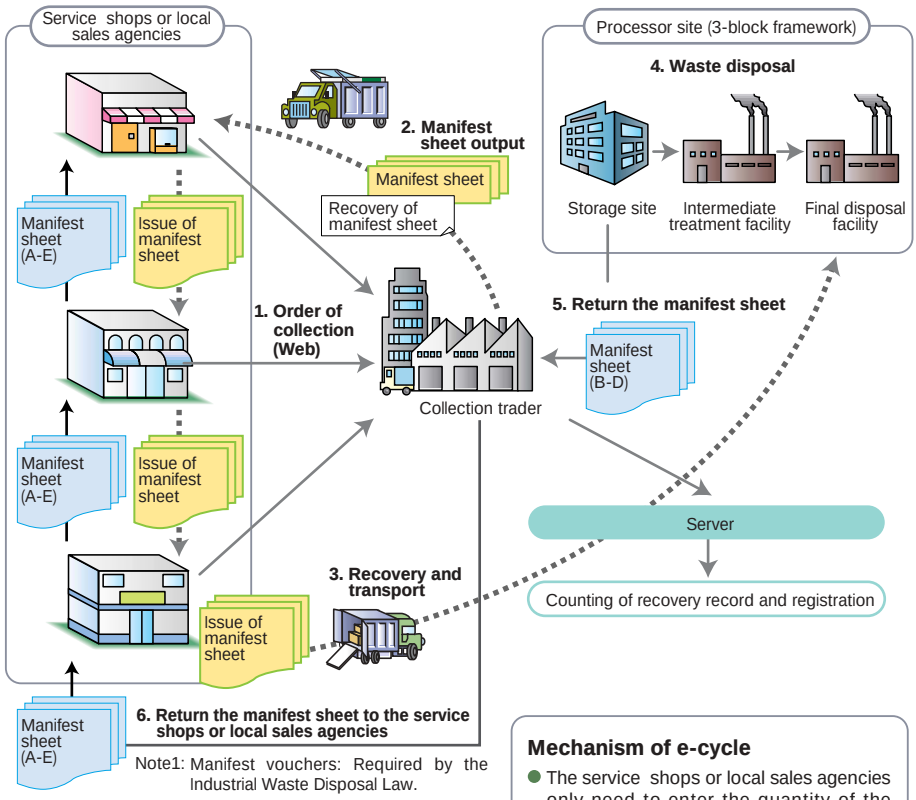
An information system speeds up collection and disposal

Osaka Gas re-examined its collection and recycling system for used gas appliances implemented in 1977 and developed "e-cycle," which was introduced in February 2003. "e-cycle" is an information system for speedily outsourcing the industrial waste recovery and subsequent verification of the proper disposal control over the Internet.

We hope to properly dispose of all wastes resulting from the eventual outcome of sale and installation of gas appliances by ensuring that this system will be commonly used.

Furthermore, we began to recover and dispose of debris, bathtubs, and remodeling scraps of housing in April 2004.

Mechanism of e-cycle



Note1: Manifest vouchers: Required by the Industrial Waste Disposal Law.
Note2: Recovery vouchers: Used to verify the number of units collected.

Mechanism of e-cycle

- The service shops or local sales agencies only need to enter the quantity of the waste (such as table top burners) on a specialized screen on Internet.
- Professional waste disposers collect the waste in accordance with the input information, and haul it to the disposal site.
- All manifests (legal certificates) will be issued. Disposal status can be verified on line.

Recovery Rate of Major Gas Equipment (Based on the number of units, excluding gas leak alarms)

(1) Weight and number of units recovered

Item	Weight (t)	Number
Equipment	4,784	352,000
Styrofoam	45	15,235 packs
Corrugated cardboard	138	19,998 packs

(2) Recovery rate (based on number of units)

Item	Results
1. Discarded major household equipment*	377,000
2. Recovered via the Osaka Gas route	352,000
3. Recovery rate (2÷1)	93.2%

* Number of units assumed to have been discarded in association with the installation of new gas equipment by Osaka Gas.

5. Eco Designing

Extensive use of the "Eco Design Manual"

Three companies, consisting of Osaka Gas Co., Ltd., Tokyo Gas Co., Ltd. and Toho Gas Co., Ltd., published the "Eco Design Manual" in 1995 to improve environmental efficiency at all stages of product life cycles, starting with raw material excavation, production, usage or consumption, recycling and ultimately ending with disposal.

Revisions have been made to reflect the revised Recycling Law, etc. In FY2003, the "submission of thermal efficiency figures" for appliances that are covered by the law was upgraded to the "requirement" level from the "confirmation" level as the law went into effect. By promoting Eco Designing, we have made improvements in reducing the size and weight of home gas appliances, as well as their reuse and recycling.

Reducing the size of appliances and resource conservation

kawakku (The model at right has half the volume)

One of the objectives of Eco Designing is resource curtailment in appliances. For example, Kawakku, bathroom heater/dryer that was sold in FY2003 had approximately half the volume of the same capacity model that was sold in 1995.

Additionally, Osaka Gas is working to reduce the size and weight of many other appliances, including hot water generators for room heating and hot water supply.

Eco-flexible pipes

Osaka Gas has been developing an eco-friendly material for flexible gas pipe cover to replace polyvinyl chloride. We are working towards practical application of this polyolefin resin-based material free of toxic halogen.

Eco-flexible pipes

Efforts of Affiliated Companies II

(Contributing to Environmental Impact Reduction with Our Products and Services)

Gas and Power Investment Co., Ltd.

Comprehensive ESCO Services

ESCO stands for Energy Service Company, and is positioned by the Japanese government as one of the pillars of its energy conservation measures. ESCO provide comprehensive energy conservation-related services at buildings and factories.

In the Osaka Gas Group, Gas and Power Investment conducts this business. The company provides a wide range of services, including analysis of energy efficiency, proposal of energy conservation measures, design and construction of energy conserving facilities, and maintenance.

An Example at a Large Commercial Facility

Panjo Shopping Center

Inverter control room (Panjo Shopping Center)

As of FY2003, the company provided ESCO services at 17 facilities. One of the examples of the ESCO operations that commenced in FY2003 is Panjo Shopping Center, located within the Osaka Gas's district cooling and heating area in Senboku ward, Sakai city. The shared saving method* was adopted for the first time at a large commercial complex in Japan. The services will be provided for ten years with a subsidy from NEDO (New Energy and Industrial Technology Development Organization).

The following are the major energy conservation measures that are implemented:

1. Inverter controls on ventilating fans.
2. Inverter controls on hot water circulation pumps.
3. Reduction of transport power of air ventilation fans in the electricity room and the air conditioning machine room with the use of temperature control.
4. Use of energy conserving lights.
5. Insulation of steam lines.
6. Reduction of electricity demand with installation of dedicated pumps for stores that are open outside of regular hours.

As the result of implementing these measures, both the energy reduction rate and the CO_2 reduction rate were approximately 8.7%.

Gas and Power Investment plans to further expand its ESCO business by taking advantage of government subsidies and employing mainly the shared saving method.

* Shared Saving Method: In this method, the ESCO business operator does the fundraising for the business, and owns related facilities. An alternative is the guaranteed saving method, in which clients procure funds.

Osaka Gas Engineering Co., Ltd.

Constructing the First Facility in Japan to Treat Waste Water, Using a Catalytic Process

Wet Catalyst Oxdation Process Plant

Osaka Gas has developed technologies to convert industrial wastewater to water that is almost as clean as drinking water (Catalytic Wet Oxidation OG-CWO Process*) by applying catalyst technologies that the company has accumulated in the process of producing city gas from coal and naphtha. Because the facility is compact and provides advanced wastewater treatment, it reduces cost and conserves energy.

In December 2003, a decision was made to install the first wastewater treatment plant in Japan that adopts this technology (220 m^3/day) at a chemical synthesis plant. Osaka Gas Engineering is charged with its design and construction. A plant capable of treating high concentration organic matter is scheduled to start up in November 2004.

In the future, we hope to press forward with technology development to expand this technology to raw garbage drainage treatment systems, and promote its use at various plants, factories, yards, large condominiums, and communities.

* Catalytic Wet Oxidation OG-CWO Process: A process that breaks down pollutants in wastewater like nitrogen compounds of ammonia and organic matters by oxidizing and turning them into CO_2 and nitrogen in a catalytic action. The process removes pollutants to the levels harmless to the environment.

OG Road Co., Ltd.

Recycling Excavated Soil and Asphalt

OG Road is engaged in recycling of excavated soil, as well as asphalt and concrete debris, that is generated by road works to lay pipes.

Excavated soil is commingled with asphalt and concrete debris, and thus cannot be reused without proper processing. The soil is processed at a plant and recycled into improved soil and recycled roadbed material.

The company has these plants at four locations, consisting of Hokko, Senri, Kobe and Sakai, and also has a soil stockyard in Shijonawate. Outside of these areas, use of improved soil has been promoted by introducing a "mobile soil recycling unit," which is a small recycling plant on a four-ton truck, since April 1999.

As the result of this move, the company was able to recycle approximately 8 million tons of soil, an equivalent of three times the size of Osaka Dome, between the start of its operation in April 1983 and March 2004.

Furthermore, the company has been manufacturing and selling "recycled asphalt" that is made by processed waste asphalt at Hokko plant since June 1984. By utilizing recycling plants, excavated soil and waste materials that are generated from construction works are put to effective use as restoration materials instead of being dumped at landfills. This eliminates the need for stripping mountains to produce mountain soil, and aggregate for asphalt compound, and thus greatly contributes toward the conservation of natural environment.

As restoration materials become available for use just as soon as soil and waste materials are processed, it helps to reduce the use of trucks to transport the soil in the conventional method.

Excavation Soil Recycling Plant

Efforts of Affiliated Companies Ⅱ
(Contributing to Environmental Impact Reduction with Our Products and Services)

OGIC Co., Ltd.

Recycling of OA Equipment

One of the core business areas of OGIC is leasing of such OA equipment as personal computers, research machinery and gas appliances. The company also makes strenuous efforts to reuse and recycle various types of equipment once their lease terms expire.

In FY2003, the company, jointly with a steel trading company, introduced on a trial basis a process that converts metal wastes to valuable resources. In the future, we plan to be actively engaged in the recycling business, including this process, and aims to raise the resource-recycling rate.

Packing of used equipment

Carry out of used equipment

KRI, Inc.

Advanced and Leading-edge Technology Research Services

KRI, Inc. is engaged in the business of contributing to the conservation of global environment by providing various types of research services.

Both the company's head office and its Kyoto office, where the research service group is located, obtained ISO 14001 certification in September 2000. KRI works to develop technologies for environmental conservation, including those on cryogenic energy utilization of LNG. LNG, with its extremely low temperature of -162ºC prior to gasification and distribution, has energy potentials for a number of applications. We are currently working on improving efficiency of cryogenic power generation and developing technologies for efficient freezing.

We are also conducting research to generate energy, such as hydrogen gas, from discarded plant resources, such as grass, wood and paper, by using high-temperature high-pressure water (supercritical water). The research involves the production of hydrogen gas, a clean energy source, converted from solar energy that was absorbed by plants.

In addition, we are conducting research to extract lignin, a substance found in plants, using high-temperature high-pressure water (sub-supercritical water) to manufacture 100% plant-derived plastics. The 100% plant-derived plastics have the feel of wood, and hold high hopes as substitutes for petroleum-derived plastics.

A speaker made with 100% plant-derived plastics that are manufactured from lignin found in plants. (This research is an international joint research project aided by NEDO.)

Techno Green Co., Ltd.

Chemical-free Fertilizers and Natural Environment Studies

Techno Green Co., Ltd. is engaged in business operations that contribute to environmental conservation through environment-related technologies utilizing the potentials of animals, plants and microorganisms.

One example is microbial materials facilitating plants to absorb water and nutrients and beat the damage of repeated cultivation. These are sold for agricultural and gardening use. In addition, we developed and sell a "Greening Mat (Zero Mat)," a mat that is seeded with native plants and trees, which grow with the help of microorganisms without any chemical fertilizers.

Furthermore, our staffs are professionally trained to conduct studies of natural environment, animals and plants. They diagnose local natural conditions, protect and propagate living creatures that are in danger of extinction, and release fish back to the streams that they came from. We also plan, design and build green spaces in various parks, city biotopes, and natural cohabitation facilities, and maintain, control and monitor them. We also propose environmental learning programs. Through such involvement, we support diverse activities concerning natural environment.

Furthermore, we propose recycling methods that meet the needs of our customers, such as disposal of raw garbage, its conversion to animal feed and compost, and contribute toward the construction of resource recycling systems.

Before the installation of Zero Mats

100 days after the installation of Zero Mats

OG Auto Service Co., Ltd.

Making Natural Gas Vehicles and Other Low Pollution Cars Popular

In July 1989, OG Auto Services converted gasoline-fueled cars into natural gas vehicles (NGV) with the help of Mitsubishi Motors Corporation. With this as a turning point, the company began to be engaged in the leasing of NGVs. Initially, almost all leases were made to Osaka Gas. Gradually, leasing to other corporations picked up, and as of the end of March 2004, 726 vehicles were leased to other corporations. In June 2001, we delivered a "natural gas-fueled Crown" for the governor of Osaka prefecture.

Starting in 1998, the dealer maintenance shops (run by another company), where NGV tanks can be rechecked, were expanded with a rise in NGVs. The company proivides other car dealers with technical know-how in the maintenance of NGVs. OG Auto Service was the first in Osaka prefecture to be qualified as a NGV tank re-check maintenance shop in January 2000. It then began to perform tank checks for maintenance shops.

To expand the network of NGV maintenance shops, OG Auto Service cooperates with automobile maintenance associations in various districts in the Kansai region by sending maintenance specialists to give lectures. Since September 2003, OG Auto Service began to run CEV* leasing operations in cooperation with the city of Osaka and OGIC Co., Ltd. As a contractor, the company now provides maintenance services for low pollution vehicles, including NGVs and hybrid cars, and presses forward with business operations that contribute toward environmental conservation.

* CEV: Clean Energy Vehicle. The government provides support for greater introduction of low-emission, environmentally-friendly trucks.

Natural gas vehicle

Cogeneration Technology Service Co., Ltd.

Marketing Osaka Gas' Experience on Cogeneration Systems across Japan

Cogen Techno Service was incorporated in June 2001 with equity participation of ten companies, including a city gas company, a trading firm and an engineering company, when a division of Osaka Gas that had handled the design, installation and maintenance of cogeneration systems spun off as a separate company.

While worldwide efforts are under way to curb global warming, cogeneration systems, which are decentralized power generation systems, are receiving attention as they reduce CO_2 emissions and conserve energy.

Over the past 20 years, Osaka Gas has promoted cogeneration systems to customers in all types of industries, ranging from large industrial factories to public bathhouses and restaurants. With a desire to make further contributions to the increased use of cogeneration systems nationwide and by disseminating the know-how that we have acquired, we make proposals on waste heat treatment technologies, technologies to switch fuel to natural gas, and technologies concerning anticipated maintenance. These technology proposals won the approval of many, and the introduction of cogeneration systems is progressing steadily.

Cogeneration remote monitoring center

Gasnet Co., Ltd.

Sale of Chlorofluorocarbon Gas Recovery Equipment, and destruction of CFC

Gasnet Co., Ltd. sells chlorofluorocarbon gas recovery equipment, and also performs operations relating to recovery of chlorofluorocarbon gas and its disposal by destruction.

Release of chlorofluorocarbon gases that is used in equipment to the atmosphere must be controlled in order to protect the ozone layer and prevent global warming. For this reason, the "Chlorofluorocarbon Recovery and Destruction Law" was enacted to mandate proper recovery and destruction of certain types of chlorofluorocarbons, particularly CFC (R-12, etc.), HCFC (R-22, etc.) and HFC (R-134a, etc.), that had been used for commercial equipment such as freezers and others including automobile air-conditioners.

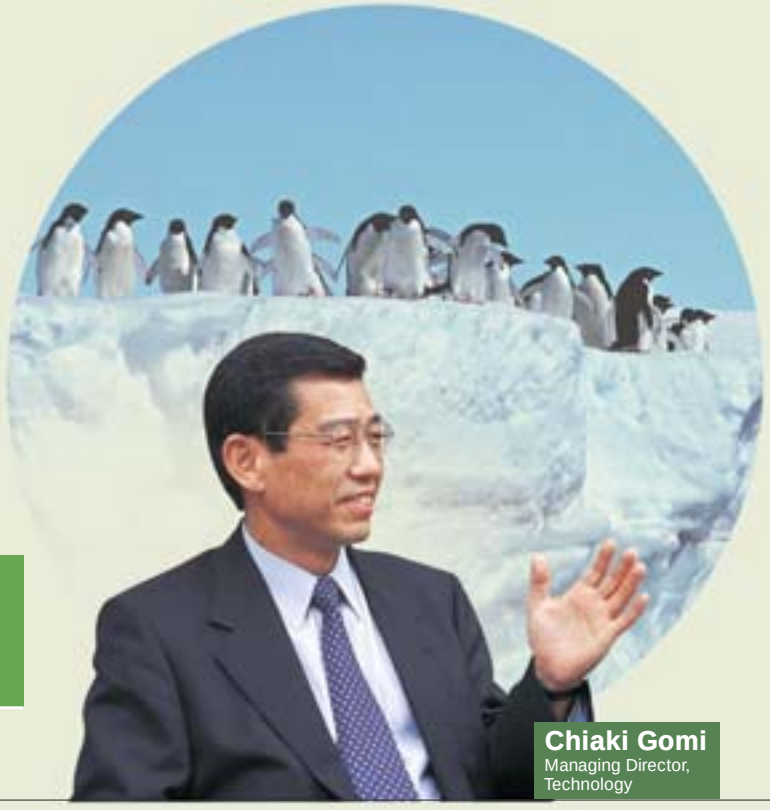
Because Gasnet also sells chlorofluorocarbon gases, the company began to tackle this issue long ago. It sells chlorofluorocarbon recovery equipment and serves as a link between customers and contractors that provide gas destruction and disposal (including recycling) services. Moreover, the company is registered as a Class 1 chlorofluorocarbon recovery business operator.

Environmental Businesses by Osaka Gas Affiliates

Company name	Environmental Business in Each Domain	Address
Apriti Sesamo Co., Ltd. http://www.og-cookingschool.com/index.htm	Offering environmentally friendly cooking methods	4-1-2, Hiranomachi, Chuo-ku, Osaka 541-0046, Japan phone: +81-6-6205-4609 fax: +81-6-6204-5096
OG Road Co., Ltd. http://www.og-group.or.jp/ogroad	Reuse of waste asphalt, waste concrete, and excavated soil as modified soil, crushed stone, or asphalt composite material	1-4-132, Hokko, Konohana-ku, Osaka 554-0033, Japan phone: +81-6-6468-4175 fax: +81-6-6468-6550
Cogeneration Technology Service Co., Ltd. http://www.cogene.co.jp/	Provision of an environmentally friendly on-site power generation system	2-37, 3-chome Minami, Chiyozaki, Nishi-ku, Osaka 550-0023, Japan phone: +81-6-6584-8853 fax: +81-6-6584-8854
Gas and Power Co., Ltd. http://www.og-group.or.jp/gandp/	ESCO business for energy-saving and environmental conservation planning for buildings and plants	4-4-11, Awajimachi, Chuo-ku, Osaka 541-0047, Japan phone: +81-6-6205-4557 fax: +81-6-6205-4703
Kyoto Research Park Co., Ltd. http://www.krp.co.jp/	Support for environmental businesses in industry and academia, holding seminars	134, Chudoji Minamimachi, Shimogyo-ku, Kyoto 660-8813, Japan phone: +81-75-322-7800 fax: +81-75-322-5348
Osaka Gas Engineering Co., Ltd. http://www.oge.co.jp	Environmentally-friendly technologies such as sludge processing, water processing, soil purification, and special gas cogeneration systems that use gas from thermal decomposition of garbage	1-4-100, Hokko, Konohana-ku, Osaka 554-0033, Japan phone: +81-6-4804-2600 fax: +81-6-4804-2601
KRI Inc. http://www.kri-inc.jp	Environmentally-related research on contract, technology- and management-related consulting services	134, Chudoji Minamimachi, Shimogyo-ku, Kyoto 660-8813, Japan phone: +81-75-322-6830 fax: +81-75-322-6820
OG Auto Service Co., Ltd. http://www.ogas.co.jp/index.htm	Leasing of low-pollution vehicles, mainly NGVs	5-11-151, Torishima, Konohana-ku, Osaka 554-0051, Japan phone: +81-6-6462-9701 fax: +81-6-6462-9820
OGIC Co., Ltd. http://www.gas-ogic.co.jp/	Reuse and recycling of used PCs and peripherals that can no longer be leased	3-3-9, Azuchimachi, Chuo-ku, Osaka 541-0052, Japan phone: +81-6-6264-3003 fax: +81-6-6264-3000
Techno Green Co., Ltd. http://www.tec-green.jp/	Greening with non-chemical fertilizers, soil improvement using micro-organisms, monitoring of ecosystems, and other environmental technologies	Osaka Gas Senboku 2 Terminal Facility, 3-1, Takasago, Takaishi-city, Osaka 592-0001, Japan phone: +81-72-268-0276 fax: +81-72-268-1566
Osaka Gas Chemicals Co., Ltd. http://www.ogc.co.jp/	Development, manufacturing and marketing of products that contribute to environmental conservation, such as carbon adsorbents	3-6-14, Bingo-machi, Chuo-ku, Osaka 541-0051, Japan phone: +81-6-6262-3427 fax: +81-6-6262-5599
Taiyo Kasei Co., Ltd.	Sale of diatomaceous soil, painting and coating work, sale of products made from recycled PET bottles	3-6-35, Jusohonmachi, Yodogawa-ku, Osaka 532-0024, Japan phone: +81-6-6304-2775 fax: +81-6-6304-2884
Gasnet Co., Ltd.	Sale of fluorocarbons recovery devices, recovery and treatment of fluorocarbons	4-5-9, Kawaramachi, Chuo-ku, Osaka 541-0048, Japan phone: +81-6-6204-5055 fax: +81-6-6204-5056
Kansai Business Information, Inc. http://www.kbinfo.com/	Consulting for environmentally-related survey/research, assistance in acquiring ISO certification	3-4-9, Bingo-machi, Chuo-ku, Osaka 541-0051, Japan phone: +81-6-6228-3301 fax: +81-6-6228-3302
Enetech Osaka Co., Ltd.	Sale and installation of environmentally friendly gas air conditioning equipment and cogeneration systems	3-10-12, Sangenyahigasi, Taisho-ku, Osaka 551-0002, Japan phone: +81-6-6556-4395 fax: +81-6-6556-4556
Enetech Kyoto Co., Ltd.	Sale and installation of environmentally friendly gas air conditioning equipment and cogeneration systems	74, Minamiishidamachi, Higashikujo, Minami-ku, Kyoto 601-8033, Japan phone: +81-75-693-6530 fax: +81-75-693-6535

Contributing to Environmental Conservation Locally, Nationally and Overseas

Osaka Gas Group is actively involved in improving the environment in communities where we do business, and also elsewhere in Japan and abroad. We promote applications of environmental technologies that we have developed in Japan while transferring them to foreign countries for the global environmental conservation.



Chiaki Gomi
Managing Director, Technology

New Technology Development to Tackle the Energy and Environmental Problems

Taking part in the conservation of our environment in our communities, even in and outside of our country is an important social mission of our company. Technology Division is pressing forward in the field of environmental conservation with a belief that technology must play a key role.

Osaka Gas has a large assortment of environmental conservation technologies in various fields ranging from gas production, transportation, delivery and retail. The areas covered by these technologies are diverse, and include resource recycling, waste treatment, and tree planting. “PET bottle/PE pipe waste composite technology,” “Catalyst technologies for flue-gas desulfurization and waste water treatment” and “Application of VAM fungi for reforestation of devastated lands” are some of the examples. We actively contribute toward environmental conservation within and outside of Japan through the operations of our company and companies in our group.

Furthermore, we regard hydrogen-related technologies as important environmental conservation technologies in the next generation. For hydrogen energy is expected to disseminate in near future.

We are therefore working to develop hydrogen-related technologies in a wide range of fields, including basic safety technology that will be required for the introduction and expanded application of hydrogen energy, as well as production and storage technologies.

2003-2004 Environmental Action Highlights

Conducting R&D and Safety Tests on Hydrogen-Related Technologies

Applying our proprietary technologies regarding carbon material synthesis, Osaka Gas has been developing since 1998 carbon nanotubes (CNT), a representative of nanotechnology. The new material absorbs and stores a large number of hydrogen atoms.

Furthermore, in FY2003 we conducted an actual-scale study on basic properties of hydrogen with respect to high-pressure hydrogen leakage and explosion for the purpose of obtaining safety evaluation data on hydrogen stations at such locations as natural gas modified hydrogen station (Torishima, Konohana-ward, Osaka). Such data would be indispensable for possible deregulation.

Refer to page 48

1. Activities Overseas

China

A plant starts up with our wastewater treatment technology

In China, environmental regulations are steadily strengthened. The country is in need of technologies to treat industrial and residential wastewater to an advanced level.

Between FY1997 and FY2001, Osaka Gas made technology transfers to Yunnan High Technology Environment Protection Engineering Company (YHC), located in the Yunnan Province, with the "Catalytic Wet Oxidation OG-CWO Process," which is a wastewater treatment system (See page 42). YHC pressed forward with the plant design and construction work, and the manufacture of catalyst. The plant is now in operation. In connection with this technology transfer, Osaka Gas was conferred an International Science and Technology Award by the city of Kunming, Yunnan Province. In addition, with technology transfers from our company, a petrochemical plant is scheduled to open in the Guandong Province in 2004, and a plant is scheduled to start up at the wastewater treatment center in the city of Kunming in 2005.

We will continue to work with YHC to promote our wastewater treatment technologies in China, and at the same time in other countries as well.

International Science and Technology Award/ Yunnan, China

Petrochemical wastewater treatment plant (under construction)

Malaysia

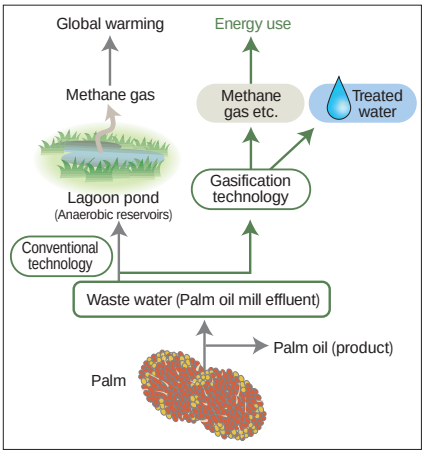
Studying the business of reducing greenhouse gases

Clean Development Mechanism (CDM*) is one of the means of attaining the national targets of reducing the emissions of greenhouse gases. Osaka Gas is in the process of studying CDM business in Malaysia, using our own wastewater treatment technologies to reduce greenhouse gas emission.

In the production of palm oil, which is a core industry in Malaysia, wastewater (palm oil mill effluent) is discharged to lagoon (anaerobic reservoirs) without adequate treatment, causing methane gas resulting from natural decomposition to be released to the atmosphere. To solve this problem, Osaka Gas is conducting research jointly with Malaysia University of Science and Technology and other institutions to reduce greenhouse gas emissions with our thermal treatment and fermentation technologies to recover the gas derived in the process as energy source.

* CDM (Clean Development Mechanism):
This system was established in the Kyoto Protocol of the COP3 (the 3rd Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change), held in Kyoto in 1997. When an developed country invests its funds and technologies in a developing country to run a venture to reduce greenhouse gas emissions (or increase the absorption of such gases), it earns the emission rights with respect to all or part of the volume of reductions in emissions (or absorption) to be the result of the venture. The developed country can apply the earned volume for the attainment of its reduction target.

Greenhouse Gas Reduction by Gasification of Palm Oil Mill Effluent



Philippine

A feasibility study of natural gas business conducted

In the Philippines, use of domestically-produced natural gas has been promoted as a national project since 2001.

For two years starting in 2000, Osaka Gas, together with another corporation, cooperated in designing the country's long-term gas master plan, and suggested combining domestically-produced natural gas with imported LNG. We also confirmed the fact that the use of natural gas improves atmosphere and is helpful for environmental conservation.

In 2002, Japan External Trade Organization (JETRO) awarded us a contract through Osaka Gas Engineering Co., Ltd. to conduct a business feasibility study regarding the "Bataan LNG Terminal and Pipeline Project" jointly with two other companies. The report of the study completed in February 2003 was submitted to the Department of Energy of the Philippines and the Philippine National Oil and Exploratory Corporation (PNOCEC).

In this study, environment impact assessment of the project was conducted, based on both the "Guidelines for Confirmation of Environmental and Social Considerations" of Japan Bank for International Cooperation and the Philippine Environmental Laws with the help of local consultants. The results of the assessment were incorporated in the report.

Australia

Forestation project launched in 2001

Osaka Gas has been involved in a forestation project since 2001, which aims at planting 1,000 hectares of eucalyptus trees in Australia in 30-years. We started this project in cooperation with Mitsui & Co., Ltd. as the first of its kind by a Japanese City Gas company, through the establishment of a local corporation, Eco Tree Farm Pty. Ltd. The project has planted in a total of approximately 300 hectares.

Although the main purpose of this project is to obtain raw material for paper, as forests absorb CO_2, planting and preservation of them is expected to effectively mitigate global warming, too.

Planted eucalyptus tree

Indonesia

VAM fungi application technology

VAM fungi are microorganisms that grow on plant roots and promote the growth of the plants. Jointly with an Indonesian government, we developed a reforestation technology using VAM fungi for tropical devastated lands with acid soil.

So far, we have conducted on-site evaluations over 18 hectares at eight locations. We have confirmed the effects of VAM fungi; more specifically, the initial growth rate of acacia and eucalyptus was tripled, survival fraction after planting was doubled. Furthermore, we developed a technology, to mass-produce VAM fungi suitable for the region.

2. Development of New Technologies Other than Gas Appliances and Systems

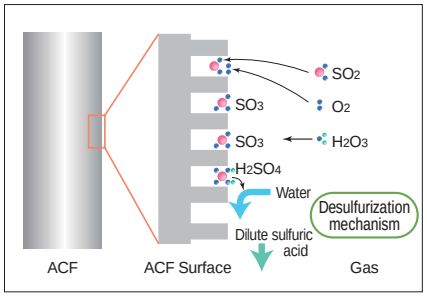
A new catalyst technology to treat flue gas

Jointly with Kyusyu University and Mitsubishi Heavy Industries, Ltd., Osaka Gas successfully developed a catalyst with activated carbon fiber (ACF*) for comprehensive treatment of flue gas. OMviro Co., Ltd., a joint venture with Mitsubishi Heavy Industries, was established on February 2, 2004 to manufacture and sell the catalyst.

The catalyst continuously recovers harmful SO_2 in flue gas by converting it to H_2SO_4 (sulfuric acid), using minute nano structures on the surface of ACF. H_2SO_4 is easily removed from the ACF surface by pouring a small amount of water. It is therefore possible to dramatically lower the power demands and maintenance costs from what conventional flue gas treatment methods cost.

* ACF (Activated Carbon Fiber, Pitch-based activated carbon fiber): Activated carbon in the form of fibers that is made from coal pitch fibers after a special thermal treatment process. It has excellent adsorbent properties, and is used as water filtration equipment elements and air filter adsorbents.

Desulfurization Catalyst Technology



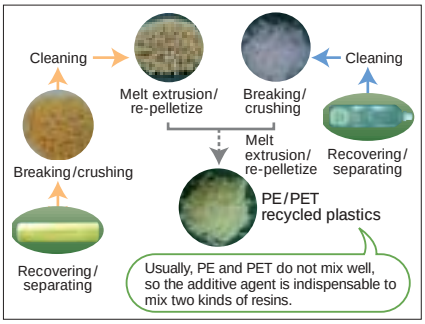
Plastic folders made from PET bottle and PE pipe wastes

When it comes to recycling, PET bottles are ahead of other types of plastics. But their uses have been limited to mainly fiber because the recycled resin has inferior forming characteristics and impact resistance.

Osaka Gas has worked on the recycling of waste PE pipes (polyethylene pipes) discarded from gas works, and pressed forward with the development of a compound of waste PE pipes and waste PET bottles. Traditionally, creating a compound of PET and PE was viewed as a difficult task because of their different molecular structures. In FY2001, we developed a technology to create a compound with additives without lowering the "formability of PE" and the "rigidity of PET."

The recycled plastic compound produced with this technology can be used to make sheets and films, which were difficult to make before. Since November 2003, we have been processing this compound into plastic folders, which are used to hold printed materials that we hand out to our customers.

PET Bottle Waste



Cogeneration technology utilizing biogas

Biogas is generated in food processing plants, sewage treatment plants, kitchen scraps/city waste processing facilities and livestock excretion processing facilities. Osaka Gas has been promoting the development of biogas cogeneration system technology, which efficiently converts these gases into electricity.

Currently, 5,700 kW of converted electricity has been derived and operated in good condition at 6 units in 5 locations. During the current fiscal year, 1,000 kW of biogas-based generation will start up at a sewage treatment plant in addition to 2,000 kW at a food processing plant. Waste-derived refined gas is scheduled to start generating 9,300 kW at a waste treatment facility too.

This system utilizes a gas engine made by Jenbacher, with a generating efficiency of 37%, which is equivalent to a power plant. By efficiently utilizing waste heat of power generation for warming the biogas generating device and for buildings' air conditioning, the system's overall energy efficiency can be increased to a level close to 80%.

Absorption-type biogas storage technology

The current usage rate of biogas which receives heavy attention as a new energy source, is said to be approximately less than 50%. The reason for the low usage rate is that the development of storage-related technology lags behind compared with the technology that enables effective use of the gas, such as power generation. The mismatch between the size of demand and the storage capacity is one of the major hindrances to the effective use of the gas.

The conventional storage method was to store gas under low pressure, which permitted storage of only as much gas as the size of the storage tanks can accommodate. This method needed enormous storage space. Osaka Gas has developed a low-cost storage method to store biogas in a compact space. Using this method, gas is stored in a tank that is packed with an absorbent, which absorbs the gas. In a verification test conducted at a sewage treatment plant, the new method was found to improve the storage volume 20 folds and reduce facility cost.

Development of melting process to reduce the volume of incinerated ash from urban garbage and sewage sludge

Much of incinerated ash that is generated from incineration at urban waste incineration plants and sewage treatment plants is disposed of at landfills. This has created problems, such as a shortage of dump yards and toxic substances contained in incinerated ash. Osaka Gas is developing a technology to melt incinerated ash by using City Gas to reduce its volume to 1/2 —1/3 of its original volume, and at the same time make it harmless.

We have already completed the construction of a City Gas-fueled melting furnace that melts 2 tons of incinerated ash a day. We achieved a 20% volume reduction compared with our company's earlier technology. We are also pressing forward with research to improve the efficiency of furnaces by developing optimal burners and computer simulation technology.

Additionally, we are verifying other excellent features of City Gas-burning incinerated ash melting furnaces, including the chemical recycling of waste plastics by melting, elimination of toxicity from slag, improvement of recovery rate of useful metals, and reduction of acid gas emissions.

Dry distillation by gasification

Osaka Gas, in cooperation with a boiler-manufacturer, is developing a system that aims at recovering energy from plastic products without generating any harmful substances. This thermally decomposed gas is mixed with City Gas and used as boiler fuel. Furthermore, it is possible to reduce dioxin emissions to below 1/17,000 of the regulation level.

Utilization of biomass (plant-derived resources) as a substitute for fossil resources is promoted in this way. This system is also capable of extracting energy from wood biomass, which is yet to be utilized. Currently, we are developing a system that is suitable also for small-scale processing of about 1 t/day.

Gasification/Dry distillation Device

Development of "Tri-generation" for industrial and agricultural applications

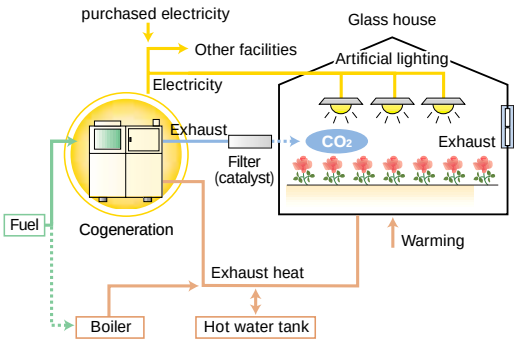
"Tri-generation*" means the system utilizing CO_2 in exhaust gas in addition to electricity and heat from cogeneration. Osaka Gas is developing Tri-generation system for industrial and agricultural applications.

Alkaline wastewater from textile plants, etc. is generally treated with sulfuric acid to neutralize. Osaka Gas developed a gas-liquid contactor that neutralizes wastewater with CO_2 contained in exhaust gas from cogeneration system.

Tri-generation for agricultural use has already been put to practical use in such European countries as Holland. In FY2004, Osaka Gas and Tsukuba city will commence verification tests to make Tri-generation suitable for Japan. This involves using "electricity" for artificial lighting in greenhouses, "heat" for heating and cooling the greenhouses, and CO_2 for photosynthesis of plants.

* Tri-generation: a term coined by Osaka Gas as three elements (electricity, heat and CO_2) are generated.

Trigeneration System for Agricultual Use



Leading the Way toward the Hydrogen Fueled Era

Carbon nanotubes, a promising candidate for hydrogen storage

Although hydrogen has been recognized as a clean energy for the next generation, it also has problems related to effective storage and transportation.

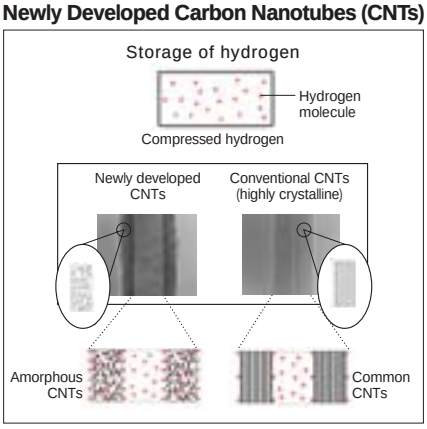
Since 1998, Osaka Gas, utilizing its unique technology of carbon synthesizing, has been developing a new material that could potentially solve these problems by adsorbing more hydrogen, focusing on Carbon Nanotubes (CNTs), a representative of nanotechnology.

In 2002, we successfully developed wholly innovative type of CNTs. The walls of conventional CNTs are structured with graphite (crystals in which carbon molecules connected on a plane are laminated), while our new CNTs are structured with amorphous materials (non-crystal materials).

Presently, we are developing CNTs, which possess a hydrogen-adsorbing capacity of from 1 to 3 weight percentage (adsorbing from 1 to 3 grams of hydrogen with 100 grams of CNTs under room temperature and a hydrogen pressure of 10 MPa).

This technology is expected to promote the efficient storage and transportation of hydrogen, and to contribute to the greater use of hydrogen as an energy. Osaka Gas will continuously improve hydrogen-adsorbing capacity of CNTs.

Newly Developed Carbon Nanotubes (CNTs)



Development of DME* reforming system for fuel cell vehicles

DME (dimethyl ether), which can be synthesized from natural gas and other materials, is receiving attention as a new energy source that is clean and highly efficient. A research group, led by Osaka Gas, has been working to develop a DME reforming system for fuel cell vehicles as one of the DME application technologies. The two key points of the system are (1) a DME reforming catalyst that has high activity and high selectivity, and (2) a system that is made to be compact and highly efficient by high speed removal of heat generated by a CO remover and heat recovery.

This research was sponsored by the Japan Oil, Gas and Metals National Corporation (JOGMEC) for its possible contribution to the national energy shift to focus on natural gas. The research is conducted from FY2003 to FY2006.

* DME (Dimethyl Ether. The chemical formula is CH_3-O-CH_3.): it can be manufactured from natural gas, biomass, coal, etc.

Commercialization of Compact Hydrogen Producing Equipment

Osaka Gas has been working to make the equipment to produce hydrogen from natural gas, smaller in size and at lower cost. We have succeeded in creating a hydrogen producing equipment (HYSERVE) which is a 50% reduction in terms of both size and cost (compared with conventional models of our company).

In FY2003, HYSERVE 30 with a hydrogen producing capacity of 30 Nm^3*/h was commercialized. We received orders for four units in the initial year.

From now on, we will develop an equipment with capacity of over 100 Nm^3/h, and aim to expand from the industrial hydrogen market to hydrogen stations.

* Nm^3: a unit indicating m^3 at 0ºC under the 1atm

Compact hydrogen production device, HYSERVE 30

Development of Hydrogen Refuelling Stations for Automobiles

Osaka Gas is working to develop technologies for hydrogen refueling stations, to supply hydrogen to fuel cell vehicles (FCV), ultimate clean cars whose commercialization is awaited with great anticipation.

In FY2003, we conducted an actual-scale study on basic properties of hydrogen with respect to high-pressure hydrogen leakage and explosion. This was done so to collect safety evaluation data on hydrogen refueling stations at such locations as natural gas reformed hydrogen station (Torishima, Konohana-ward, Osaka) in connection with a national project (NEDO). The research results will be used for government to set up new regulations.

We have also commenced development work to make practicable the equipment producing hydrogen from natural gas by conducting durability tests and load leveling tests. At a PR event held in cooperation with Osaka FCV Forum* to publicize fuel cell vehicles, we demonstrated our current development accomplishments by fueling vehicles with hydrogen, reformed from natural gas.

Filling hydrogen into Daihatsu FCV

* Osaka FCV Forum: established in September 2003 for the purpose of promoting fuel cell vehicles (FCV) and set up by government entities, the Prefectural Government of Osaka and the City of Osaka, and private corporations.

Living Up to Our Social Responsibility

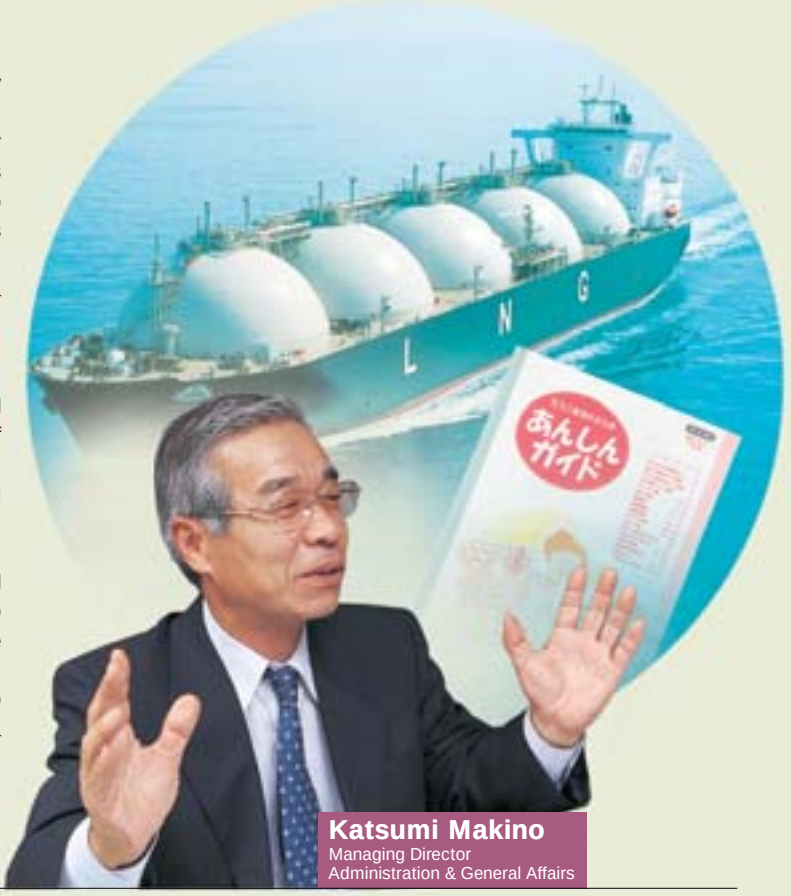
Osaka Gas provides energy services that are indispensable for people's lives and business activities.
Through these services, our goal is to ensure growth of business together with the prosperity of the community.
We recognize our social responsibilities as a good corporate citizen and strive to achieve our mission through safe and stable supply of energy with enhanced quality of services.
This section on our social responsibility touches upon five categories, which include the various social aspects (compliance, human rights, labor safety and health) that a company is expected to perform and those that are essential to an energy services provider.
The report highlights the "social actions" of Osaka Gas as an energy company, and it includes items (compliance, customer safety measures, Everyone's Environmental Effort Campaign) implemented throughout the entire group.

Social Actions as Part of the Corporate Strategy and Efforts for Improvement

In addition to sales and profits, "Corporate Social Responsibility (CSR)," such as environmental and social actions, compliance, human rights, and employment, bears greater importance as criteria for evaluating corporate performance. Not only price of goods and services but also company's environmental action and compliance are taken into account in the customer's choice of products. Failure to meet this requirement forces the companies out of the market. In this manner, CSR is becoming a prerequisite for a company to be accepted as a member of society.

Under its corporate philosophy of "Value Creation Management," Osaka Gas has constantly strived to enhance value for customers, shareholders, and society. Enhancing environmental action, social contribution, and compliance as elements of improving social value of the company, we have established "Environmental and Social Action Philosophy/Guideline" and "Osaka Gas Group Code of Conduct," and we have implemented our actions positively.

With renewed efforts in CSR by various international bodies, businesses need to be prepared to address broader social responsibilities. The Osaka Gas Group believes that it is essential to constantly upgrade its awareness and to implement actions to meet the changing needs of its customers and society. With our commitment on CSR as part of management strategies in the background, we need to translate our objectives into actions by each employee within the Osaka Gas Group.



Katsumi Makino
Managing Director
Administration & General Affairs

2003-2004 Social Action Highlights

Educational Assistance for Children in Natural Gas-Producing Countries

The Osaka Gas Foundation of International Cultural Exchange assists educational institutions in countries that produce natural gas with programs, such as providing educational equipment and scholarships for high school and university students. The foundation's activities are currently directed to Indonesia and Malaysia.

Refer to page 54

Osaka Gas received the Grand Prize of 7th Annual Japanese Environmental Reporting Awards (Minister of Environment Award)

The Environmental and Social Action Report 2003 of Osaka Gas received the Grand Prize of 7th Annual Japanese Environmental Reporting Awards (Minister of Environment Award) in January 2004.

Refer to page 56

I. To Become a Company of Choice for Customers, Shareholders, and Local Community

Key Points and Future Directions

Highlights of the year
- **Compliance training given to 1,700 managers and supervisors**
- **Launching of internal reporting system on compliance**
- **Amended Osaka Gas Group Code of Conduct**

Future actions
- **Continued efforts for awareness raising within the company**
- **Positive disclosure of information for improving transparency**

Amendment of Osaka Gas Group Code of Conduct

In February 2000, the Osaka Gas Group Code of Conduct, which objectified the Osaka Gas Corporate Action standards and Osaka Gas Group Corporate Action standards established in April 1998, was established. This code is a basic guideline for actions of the Osaka Gas Group officers and employees, consisting of 14 items, such as human rights, environmental conservation, ensuring the safety of products, and response to customers.

We amended the code in April 2004, adding an item for "Use of Information Systems" for proper handling of information both inside and outside the company.

Osaka Gas Group Code of Conduct

Ⅰ. As a good corporate citizen
1. Respect for human rights
2. Consideration for the environment

Ⅱ. In gas supply activities
3. Responsibility of a gas company
4. Ensuring safety of products

Ⅲ. Business transaction
5. Compliance with Anti-Monopoly Law
6. Fair trade practice
7. Working with customers
8. Relations with trading partners and other related parties

Ⅳ. Information management
9. Information handling and disclosure
10. Handling information systems
11. Handling intellectual property

Ⅴ. In the workplace
12. Creating a comfortable work environment
13. Employment and benefits

Ⅵ. Social actions
14. Countering anti-social groups, prohibiting facilitation and payments
15. Fair tax payment

Compliance (Compliance with the law)

Enlightenment of group employees

Osaka Gas set up a Compliance Committee and the Compliance Department to oversee all compliance activities and appointed Compliance Promoters for each organization and affiliate of Osaka Gas in April 2003. We began the Consultation/Reporting System, which is a hotline, to consolidate the systems and made additional progress in compliance.

In addition, we expanded compliance training activities for our employees. We have held presentation/discussion sessions to practice precise and fair corporate activities and implant compliance in corporate management every year since FY2001. In FY2003, the Osaka Gas Group held compliance training for approximately 1,700 managers. These managers reconfirmed the significance of compliance and committed to establish a workplace with all employees united on self-righteousness and openness.

As a result of the activities mentioned above, the Group will confirm the degree of compliance implanted in Group employees, and take action for better compliance by conducting surveys for group employees.

Enhancement of in-house auditing functions for risk management

To improve risk management including compliance, the Osaka Gas Group regards internal auditing as an instrument for enhancing internal control systems.

The Osaka Gas Auditing Department audits not only each division of the company but also each group company. Moreover, the internal auditors have been appointed in five business units of Osaka Gas, as well as in the seven core companies of the group. Osaka Gas cooperates with the Auditing Department to enhance group-wide auditing functions.

Fair Trade

In its trade practices with business partners, Osaka Gas has the following rules as stated in its Purchase Activity Guidelines; 1) openness; 2) fairness; 3) compliance with the law; and 4) mutual trust. In selecting a supplier, Osaka Gas makes a comprehensive evaluation based on a variety of factors including the quality, price, and reliability of the products and their delivery, after-sales service, compatibility with existing facilities, and the supplier's financial status.

Information Disclosure

Osaka Gas actively works to make information available to stakeholders including customers, shareholders, and communities, following internal disclosure rules. We provide information such as management policies, targets and financial data, as well as product/service information through various media including web sites and press conferences. To become a company of choice for customers, shareholders, and communities, Osaka Gas intends to lead the energy industry as a leader committed to enhancing its corporate accountability through disclosure of information.

Protection of Customer Information

The Osaka Gas Group handles enormous amount of customer information, ranging from individuals to businesses. For handling of such valuable information, Osaka Gas strictly follows the Act for Protection of Computer Processed Personal Data and has created its Customer Information Protection Rules based on guidelines from the Ministry of Economy, Trade and Industry and the Japan Gas Association, for proper operations and management.

Within the group, administrators have been assigned for managing customer information for proper handling and prevention of the leakage of customer information.

II. Safe and Stable Gas Supply

Key Points and Future Directions

Osaka Gas works to ensure a stable LNG supply system, prepares for earthquakes, and promotes disaster measures.

Establishing a Stable LNG Supply System

Decentralizing the sources and preparing for emergency

LNG Tanker (JAMAL)

Osaka Gas currently imports about 6.3 million tons of LNG (liquefied natural gas) per year, which is the source of natural gas distributed to its customers. To ensure a stable supply, we import LNG from diversified sources on long-term contracts with six nations, including Qatar and Oman, with whom trade began in recent years.

In order to strengthen its reliability of natural gas supply, Osaka Gas has broadened its scope of business into upstream sectors of the natural gas chain through acquisition of concession rights in natural gas fields and joint ownership of LNG tankers with other companies.

For our gas field interests, we have a stake in a producing gas field in Indonesia and equity shareholding in some Australian fields under development.

As for LNG tankers, unlike the conventional practice of sellers to arrange LNG transportation, Osaka Gas jointly owns 3 LNG carriers with other companies and another one under construction. This is to ensure greater flexibility in LNG transportation.

To meet possible operational contingencies of LNG terminals and LNG carriers, Osaka Gas has LNG back-up supply arrangements with other LNG buyers and it maintains a sufficient level of LNG stockpiling to ensure a reliable supply.

Improvement of pipeline infrastructure to meet demand

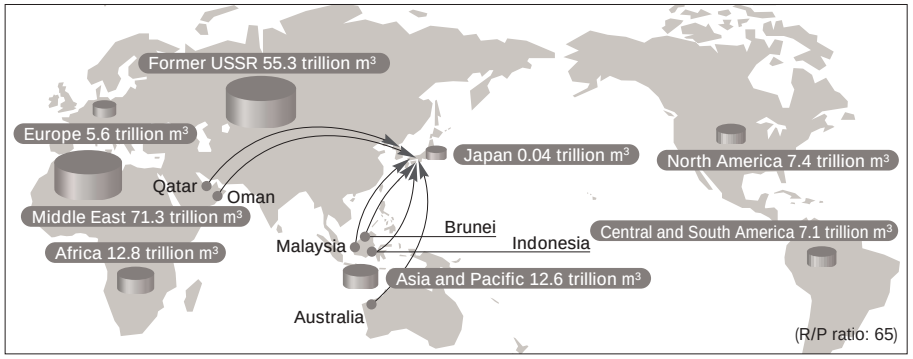
To meet rising demand for natural gas and to ensure reliable supply, Osaka Gas constantly upgrades its pipeline infrastructure based on supply plans and medium- to long-term demand forecasts. We are now constructing a new high-pressure gas pipeline to meet growing demand in the Shiga District (to be completed in FY2007). Similarly, we are also responding positively to greater market demand by improving medium- and low-pressure pipelines. (See “Curbing the generation of excavated soil from gas pipe works and promoting reuse” on page 24)

Shield machine (Shiga line)

Amount of LNG Import of Osaka Gas (10,000 t)

Supplier	Amount of import
Brunei	77
Indonesia	313
West Australia	80
Malaysia	69
Qatar	30
Oman	68

Comfirmed Reserves of Natural Gas by Region (2003)



Source: Oil and Gas Journal

Actions for Higher Levels of Safety
(LNG handling - Supply - Utilization)

Prevention, early detection and containment of disasters

At LNG terminals, we maintain the round-the-clock alert on disasters such as earthquake in order to prevent damages on the community and the environment.

Prevention measures against disasters through equipment building

Osaka Gas works to prevent gas leaks as much as possible in the event of disasters by designing and building LNG-related facilities to withstand these disasters. We verified the seismic-resistance of these facilities at the time of the Great Hanshin-Awaji Earthquake of 1995.

Early detection by detectors and monitoring system

We have installed various kinds of detectors at major points inside the complex for early detection in the event of LNG leakage. Should any leakage occur, it is detected immediately at the central control room capable of remotely monitoring the situation with TV cameras.

Containment measures with various facilities

To prevent spreading of leaked gas and to minimize fire hazards, we have water curtain systems and sprinklers. Dikes are outfitted with high-expansion foam generators to contain leaked LNG.

Three-part safety measures: Facilities, systems, and people

Osaka Gas strives for the complete implementation of computer systems to run and monitor facilities, and it provides training to the operators who oversee them.

Around-the-clock monitoring* and patrols are conducted to predict and detect problems early.

Furthermore, computer-simulated disaster training is given to operators to deal with any possible emergencies. In addition, firefighting drills and trainings are conducted by involving adjacent businesses to ensure a high level of safety.

* To predict abnormal conditions and take action before such abnormal conditions occur by inspecting, recording and controlling the temperature, pressure and flow rates of equipment.

Hello Service
(Osaka Gas service for billing, repairs, and other services)

Management of uninterrupted gas supply

Osaka Gas delivers gas from its LNG terminals to more than 6.5 million customers through approximately 55,000 kilometers of gas pipelines. The Distribution Control Center at the head office and the Back-up Center in Kyoto monitor and control gas supply throughout the company's service areas. In case of leakage of gas, the district dispatch center responds instantaneously through its 48 safety depots.

To prevent damage from an earthquake, we developed a variety of technologies including quake-resistant gas pipes and in-house radio communication systems using satellites. Moreover, in case of damage to pipelines, to prevent secondary disasters, we have employed emergency gas supply shut-off systems.

Safety measures for gas facilities at customer sites

Osaka Gas, as a public utility, is committed to ensure maximum level of safety in using gas. To that end, we have installed microcomputer-controlled meters at all our residential customers and we promote the installation of gas leak alarms and gas appliances with safety devices.

The meters feature such safety functions as gas shut-off in case of excessive and continuous gas flow due to gas hose disconnection and misuse of appliances. Gas leak detectors give audible alarms in the event of gas leaks.

Gas appliances with safety devices feature such functions as over-heating prevention and flame failure prevention.

Our safety-related activities have been implemented to add onto the mandatory gas safety inspection as required by law conducted at every customer once every three years.

Microcomputer-controlled meter

Enhancement of measures and training for an earthquake

It has been prognosticated that there exists a danger of major earthquakes hitting our region over the medium to long-term. A potential earthquake occurring in the offshore Wakayama region (south of the service territory) could cause unprecedented tsunami damages. Osaka Gas, assuming the two different types of earthquakes, implemented the company-wide drills. These were made by utilizing the company's disaster prevention and anti-earthquake manuals as part of the company's efforts to improve its preparedness against earthquakes. Through these activities, the effectiveness of our high-levels of preparedness has been verified.

Osaka Gas will continue to address these potential natural disasters in close cooperation with both regional and national governments, complying with such legislation as Eastern Nankai and Nankai Earthquakes Disaster Prevention Measure Special Law.

Earthquake training held in September, 2003

Emergency vehicle

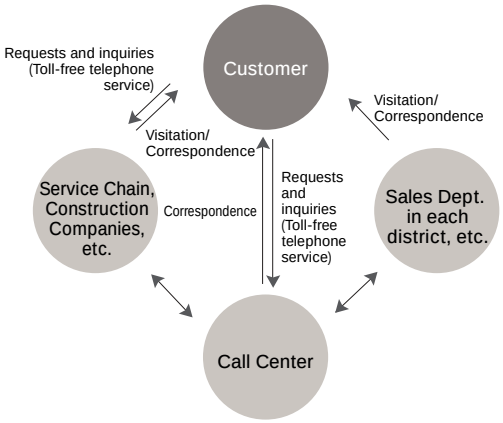
Response through networks including our agents

Osaka Gas has operated the Hello Service to respond to customers' requests and inquiries quickly and properly. This service involves the use of an information network called "Hello Network" that covers service chains (local sales agencies). Using this system, we quickly respond to the requests and inquiries. In addition, for gas appliance repair, we provide our customers with an option for choosing a time zone for a service visit*.

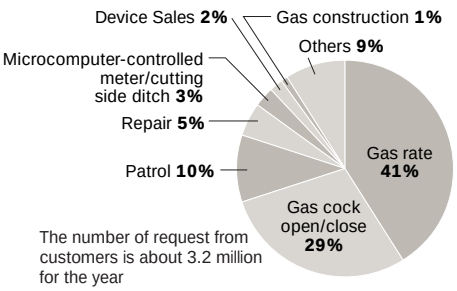
Finally, we establish our own system for collecting customers opinions throughout the organization for fundamental improvement of our business.

* The district safety center responds to more urgent cases such as gas leaks.

Our Service Chain System



Breakdown of Requests and Inquires at Call Center



The number of request from customers is about 3.2 million for the year

Ⅲ. Contributing to Local Communities as a Good Corporate Citizen

Community Activities

Aiming to be "A Corporation Closely Connected with the Community"

Our self-awareness as a corporate citizen

For more than 6.6 million residential customers in the Kansai region where is the second largest economic zone in Japan, the Osaka Gas Group provides natural gas. We also pursue electric-power services and variety of businesses that serve these customers. Each of these activities is closely connected to the daily lives of the citizens. For this reason we believe that it is even more essential that we, as a corporate citizen, maintain self-awareness and act as a responsible member of the local community.

To this end, Osaka Gas Group has been trying to reflect opinions and requests received through community interactions on its business. In addition, caring for our communities and a desire to develop in tandem with them, we have been continuing a number of social programs that have for many years contributed to these local communities.

The reason we do all this is that we value the human close bond with the people in our communities. By contributing to people's happiness through our business, we hope to develop as a corporate group that has the understanding and support of our stakeholders, especially our customers and shareholders. It is our belief that being valued as an upright and trustworthy company builds a firm base for long-term business development.

Contributing toward a better society

Considering the numerous unfortunate corporate incidents that have come to light in recent years, there is no room left for doubt that severe social criticism has become a major factor that can undermine a company's business foundation. Against the background of these recurring incidents, the nature of corporations is being rigorously questioned in terms of their corporate social responsibility (CSR). In addition to such fundamental aspects as legal compliance, environmental preservation and accountability, strong expectations are growing from society that corporations should contribute to society, not only in economically, but also by taking the initiative to deal with and help solve a range of social issues.

The Osaka Gas Group approach

For many years, in addition to taking a leading role in community activities and events, we have promoted a corporate volunteer program based on employee initiative known as "Small Light Campaign". We have arranged an internal structure to support these activities, and have been contributing to the local community in the welfare and environmental issues.

We have established the Osaka Gas Group Welfare Foundation to promote senior-citizens welfare and research programs, and the Osaka Gas Foundation of International Cultural Exchange to support education in natural gas-producing countries and help develop relationships. These two foundations are actively pursuing a number of projects to contribute to society.

The Osaka Gas Group intends to step up its efforts even further to fulfill its responsibilities as a good corporate citizen.

Corporate volunteer programs The Small Light Campaign

In the course of the history of the Small Light Campaign that Osaka Gas started in 1981 (the International Year of Disabled Persons), Osaka Gas has been actively involved in community activities wishing to be a corporation that progresses forward in concert with the community. We run this campaign as a corporate volunteer program that values voluntary involvement of our employees.

We conduct a wide range of activities, including visits to child welfare facilities. Our company's Better Citizenship Development Office serves as the administrative office for this campaign.

Visits to child welfare facilities by a volunteer drama troop

Community activities

As a corporate citizen, Osaka Gas conducts activities to maintain a dialogue with local citizens and customers (community public relations activities through holding opinion forums) and to contribute to local societies (community activities). We pursue these programs mainly through our local branch offices.

Community public relations activities include excursion trip to our corporate facilities and panel discussions that deepen understanding toward Osaka Gas and the Group. These activities also enable us to reflect opinions and requests in our business operations. We also visit local governments, consumer groups, and economic organizations to introduce our operations and management conditions. In response to requests, we also host lectures and other presentations.

Community activities include cooperation and participation in community events, exhibitions, exchanges with customers, and activities to introduce our efforts toward environmental preservation and community contribution. Also, with the humanitarian donations made by employees through our "Small Light" campaign, we conduct activities to donate wheelchairs and other equipment requested by social welfare facilities.

Donations attributed to "Small Light" campaign to Toyonaka City

Examples of the Small Light Campaign

- Community clean-up
- Charity concerts
- Donation of sweets made by employees to child welfare facilities
- Sign language and Braille classes
- Assistance to senior and disabled citizens for errands and outings
- Providing assistance in selling goods that are made by the disabled at welfare workshops
- Visits made by members of company clubs and volunteer drama troops to welfare facillities
- Invitation of children from child facilities to musical performances

Assistance for welfare service and health promotion programs for senior citizens

Osaka Gas Group Welfare Foundation

On the 80th anniversary of the founding of Osaka Gas in 1985, and in appreciation for our customers, we established the Osaka Gas Group Welfare Foundation. We have since been working on two projects involving senior citizens.

In our Assistance program, we are supporting community-based programs and social participation support activities aimed at senior citizens, along with research and studies aimed at enhancing their qualify of life and maintaining and improving their health.

In our Keeping Fit Program, we are pursuing activities that help senior citizens stay healthy and lead fulfilling lives. These include health classes and workshops, healthy cooking lessons, walking events, and other activities to improve the life of senior citizens.

Walk trolley with lots of participants

Educational assistance for children in natural gas-producing countries

Osaka Gas Foundation of International Cultural Exchange

Commemorating the completion of conversion to natural gas, Osaka Gas established the Foundation of International Cultural Exchange in 1992 to develop relationships with countries that produce natural gas.

With its focus on assisting educational institutions, the foundation's programs include the following: (1) providing educational equipment, (2) assistance for research on natural gas and environmental technology, (3) scholarships for high school and university students, and (4) financial assistance in training of engineers and researchers. The Foundation's activities are currently directed to Indonesia and Malaysia.

Elementary school students in Indonesia

Environmental education for children and students

We have the Gas Science Museum (in the Senboku LNG Terminal) and the Himeji Gas Energy Hall (in the Himeji LNG Terminal) intended for school field trips. For schools that have difficulty arranging excursion trips, these centers provide "delivery service of the class" which employees give lectures and perform experiments at schools upon request. In addition, we offer junior and senior high schools assistance with environmental education.

Environmental Education Record (FY2003)

		Number of schools	Number of students
1. Elementary & Junior High School Field Trip		512	40,853
2. Online Schools (Gas Science Museum)		121	—
3. Gas Science Museum Delivery Service of the class		38	40,853
4. Environmental Education at Schools	junior high school	3	530
	high school	6	2,050

Sample activities

Environmental Education at Junior High and High School

We actively provide supports for environmental education by teaching at schools.

In FY2003, we gave environmental lectures on three occasions at junior-high schools (to a total of 530 students), and six occasions at high schools (to a total of 2,050 students). In addition, we offered three seminars to teachers (numbering 70). The curriculum centered on "global environmental issues and the effective use of energy."

Environmental education at junior high-school

Field Trips for Elementary and Junior High School Students

At Gas Science Museum in Senboku Terminal, and the Gas Energy Hall in Himeji Terminal provide school children and others in the community to learn about energy and the global environment through hands-on exhibits, films and bus tours of Osaka Gas' LNG terminals.

Cryogenic experiment

Gas Science Museum

Delivery Service of the Class

Osaka Gas employees visit elementary and junior high schools and give lectures and scientific demonstrations. Students learn about energy and the environment with workbooks and worksheets, and experiments with liquid nitrogen and fuel cells.

Class at a school

Gas Science Museum

Online School

At Osaka Gas' online school, students can learn about energy and environment before and after visiting the Gas Science Museum which broadens their knowledge.

Website (Japanese only)

http://www.gaskagakukan.net/

Osaka Gas energy and environmental education booklets

Ⅲ. Contributing to Local Communities as a Good Corporate Citizen

Everyone's Environmental Effort Campaign

We initiated the Everyone's Environmental Effort Campaign with the idea that it was important for each employee to be engaged in environmental issues that affect his or her own life as a member of the local community. Osaka Gas employees go out of the workplace and into the community to work with citizens on preserving the environment. Below we introduce some highlights of FY2003.

Examples of company-wide activities

Parents and children in a nature-observation and educational project workshop

In March 2004, with the cooperation of a non-profit organization, we conducted an educational workshop in Osaka's Expo Park for elementary schoolchildren and their parents involving nature observation and handicraft class using natural materials. We were gratified to note that the workshop received very positive reviews from participants.

Natural handcraft school

Eco-cooking Classes

In October 2003 and February 2004, we held "Eco-cooking classes," a cooking class that heeds the environment, at Osaka Gas Cooking School at Yodoyabashi, Osaka city. At the classes, the effective use of energy and food ingredients were introduced and approximately 120 people from Osaka Gas and three neighboring corporations attended. The classes raised the environmental awareness of the participants while they enjoyed getting to know one another.

Eco-cooking class
(Cooking School Yodoyabashi)

Cleaning up neighborhoods while enjoying history

Motivated by a desire to help cleaning up the neighborhood, every year we conduct a Clean-up Campaign in a different area. On November 1, 2003, 105 people joined in a clean-up walk from the Osaka City Hall to Osaka Castle Park along the Ohkawa River. Adding the charm of a historical walking tour, volunteers enjoyed working as they listened to historian volunteers give interpretive lectures.

Clean up activity
(around the Osaka castle)

Osaka Gas' branch offices taking part in local activities

Keiji Sales Dept.

2003 Kyoto Environmental Festival

In December 2003, this event was held with the theme, "Start a green life for the environment." The Division introduced a cogeneration system for residential use and fuel cells, as well as an environmentally-friendly dishwasher and clothes dryer at its booth, and made presentations with an environmental advertising panel.

Kyoto Environmental Festival 2003

Hokuto Sales Dept.

Settsu Gorge Cleanup Hike

In cooperation with Takatsuki City's Environmental Beautification Promotion Day, the Division held a clean-up campaign in Settsu Gorge Park on November 30, 2003. An annual act of support for the city's environmental program, this year's campaign attracted 25 employees and family members to pick up trash, much to the satisfaction of area hikers.

Clean up in Settsu Gorge Park

Hyogo Sales Dept.

Participated in a Local Environmental Festival

In October 2003, the department participated in an environmental event held near the Himeji Castle. Under our own theme of "Natural Gas and Co-generation System", we put on display ECOWILL home-use cogeneration system and fuel cells units under development which proved popular among the participants.

Clean Energy Messe

Energy Technology Laboratories and Advanced Material Business Promotion Dept.

Cleanup Campaign

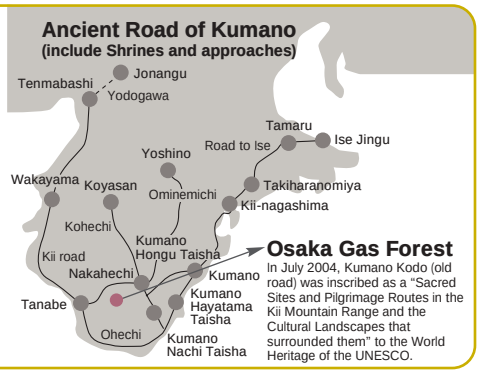
These divisions conducted a Cleanup Campaign in June and the annual cleanup walk in November 2003. More than 200 employees joined in collecting trash in teams and collected along 6 routes in the vicinity of the Osaka Gas site at lunch break.

Forest Conservation Program — Osaka Gas Forest

Forests are indispensable assets that provide us with numerous benefits, including the prevention of global warming, access to water resources and prevention of floods.

Osaka Gas endorses the "Corporate Forests" concept of the prefecture of Wakayama as a way to alleviate environmental concerns through forest preservation. The company will reforest and preserve a part of the mountain in Nakahechi-cho, Wakayama as "Osaka Gas Forest".

Working together with Osaka Gas Labor Union, we plan to plant conifer tree seedlings and grow a forest so as to preserve forest land.



Ⅳ. Communication with Stakeholders

Information Disclosure

Detailed information on environmental web site

On our web site entitled "Environmental and Social Actions", Osaka Gas widely disclose Osaka Gas Group's environmental and social actions.

Detailed Information and data not given in this publication are available in "Additional Data". Environmental education materials for children, ideas for energy conservation, etc. are also presented.

Website
http://www.osakagas.co.jp/kankyo_e/

Round table discussion with Kansai Consumer Group Network Committee

As part of Osaka Gas's community public relations and opinion forums, which aim to gather customer feedback to incorporate into our business, we annually hold a round table discussion with the Kansai Consumer Group Network Committee.

Both sides discuss a wide range of topics such as business plans, company performance, accident prevention and service through exchange of views on environmental issues, efficiency of management, and liberalization of energy business.

The FY2003 meeting took place on October 3 at Osaka Gas head office.

Meeting with the committee

Reception of the Prize for Excellence in the Environmental Reporting Awards

Since 1994, Osaka Gas has published annually its environmental report. Starting in 2003, the social reporting criteria were strengthened, and our report was renamed the Environment and Social Action Report. With the backing of the Ministry of the Environment, Osaka Gas was selected for the Grand Prize (also known as the Environmental Minister's Award) in the Seventh Annual Environmental Reporting Awards.

Certificate for the Grand Prize in the Seventh Annual Environmental Reporting Awards, sponsored by the Ministry of the Environment

Circulation of the Environmental Report (Number of volumes)

FY	Japanese	English	Digest
2000	8,500	1,500	—
2001	7,000	1,500	7,000
2002	10,000	1,500	10,000
2003	10,000	1,000	10,000
2004	10,000	1,000	10,000

Making the Most of Facilities and Opportunities

Participation in exhibitions and lectures

Every year, Osaka Gas presents its environmental efforts at seminars and lecture meetings sponsored by academic societies, economic federations and industry groups.

We also inform the general public of our environmental policies by participating in and sending environmental education specialists to exhibitions and other environmental events.

Osaka Gas booth

Gas Science Museum and Himeji Gas Energy Hall

Built as Japan's first science museum specializing in energy and natural gas, the Gas Science Museum and the Himeji Gas Energy Hall where people can learn about the earth's environment and natural gas, enjoyed hosting more than 70,000 visitors in FY2003.

Number of Visitors

	FY2002	FY2003
Gas Science Museum	71,343	56,241
Gas Energy Hall	24,033	18,346

Gas Science Museum
Opened in October 1982 as Japan's first museum for gas and energy science
Senboku 2 LNG Terminal, 3-1, Takasago, Takaishi-City, Osaka, 592-0001 Japan
Phone: +81-72-268-0071

Gas Energy Hall
Various exhibits are presented to enable visitors to enjoy learning about earth, science and energy
Himeji Terminal, 1, Nadahama, Shirahama-cho, Himeji-City, Hyogo, 672-8024 Japan
Phone: +81-792-46-1908

DILIPA, general show-room of gas equipment

At DILIPA, visitors can see, touch, and experience the latest gas appliances and systems designed to make their lifestyles more comfortable and convenient.

Number of Visitors

	FY2003
DILIPA	381,038

DILIPA
Opened: Nobember 1991
Senri Expo Park, Suita-City
Phone: +81-6-6878-8061

V. Employee Satisfaction at Work

Personnel System Fostering Personal Growth

"Management for Personal Growth" the fundamental philosophy

Osaka Gas acts under the fundamental philosophy of "Management for Personal Growth", for we believe that corporate activities become energetic when its employees achieve personal growth through their work in a corporation by finding their jobs and lives to be meaningful and rewarding. We create a personnel system that is capable of responding to diverse value systems and life styles of employees, and a supportive environment in which all employees feel valued.

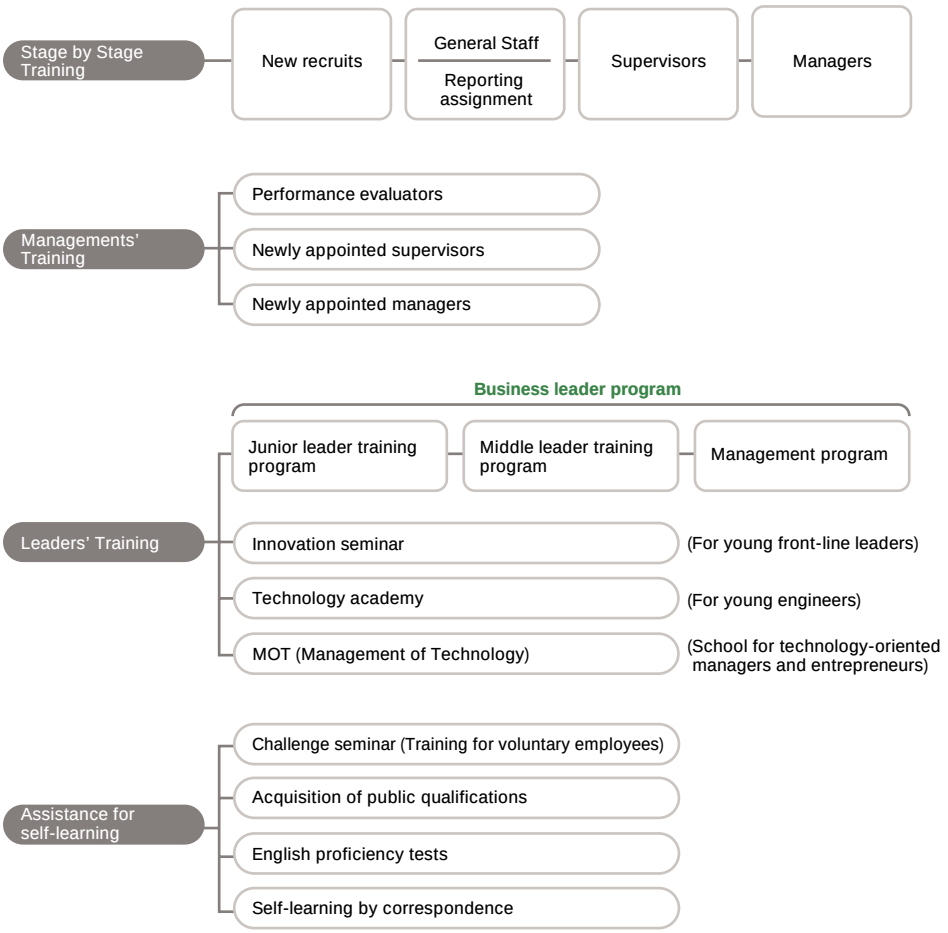
Fostering Employee Development

Osaka Gas works to foster employee development by helping our people become professionals who can get the job done and contribute to profits.

To foster the development of people who can think and act on their own, we are building a system that helps employees become career-minded individuals who can make their own choices and take individual responsibility.

We also have programs for quickly and systematically training employees to be the next generation of creative leaders.

Training System for Human Resources Development

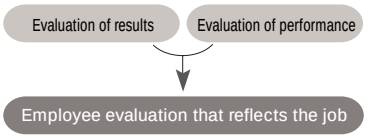


Osaka Gas Personnel System

Phylosophy of the System

1. Emphasize employee results
2. Let employees make their own decisions
3. Maintain high level of transparency
4. Give employees flexibility

Evaluation and Benefits



Personnel System

Personnel Development Holiday System
Employees can take holidays to do volunteer work or obtain a work-related license for a period of up to 4 years.

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

OG Venture System
We accept ideas and offer support for new business ventures.

Utilization of Personnel System (Number of cases)

	FY2001	FY2002	FY2003
Job Posting System (number of positions filled)	14	45	50

Self-Development Support

Challenge Seminars
(Training open to applicants)
25 courses
Total of 496 participants


Challange Seminar

Correspondence courses

Spring session	641 classes
Autumn session	281 classes

Human Rights Awareness

Towards cultivating and establishing a culture that values human rights

In the "Osaka Gas Group Code of Conduct," a principle of behavior as good corporate citizens, we expect our employees to respect human rights. Also, as awareness of human rights has increased in society, a keen sensitivity to human rights are expected in the conduct of corporate activities. In order to respond to these expectations, in addition to a fundamental understanding of human rights issues in general, we are taking steps to study new human rights challenges so that we can nurture and firmly establish a corporate culture that values the rights of individuals.

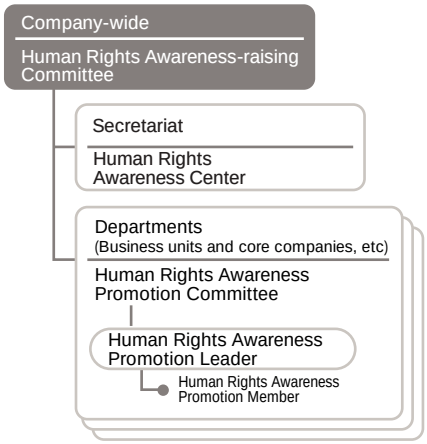
A structure for promoting human rights

The Human Rights Awareness Center that we established in our Human Resources Department is the secretariat and origin of the Company-wide Human Rights Awareness Raising Committee. This Center is charged with human-rights promotion activities for the Osaka Gas Group as a whole. Furthermore, each division and core group company has its own Human Rights Awareness Promotion Committee that plans and undertakes activities.

Human Rights Awareness-raising Promotion System

1. Reinforce and Enrich Our Human Rights Awareness-raising system
2. Enhanse Human Rights Awareness-raising workshop
3. Train and Improve Skills of Human Rights Awareness Promotion Leaders and Others in Charge of Human Rights Affairs
4. Gather and Provide Human Rights Information

Human Rights Awareness-raising System



Preventing sexual harassment

Osaka Gas is fostering a work environment that is free of sexual harassment. To this end, we have established a sexual harassment consultation section in the Personnel Department, and each division has a person to coordinate activities for preventing and identifying problems and implementing actions.

We also train newly appointed managers, provide sexual harassment education in each workplace using educational videos and we check the effectiveness of our sexual harassment consultation efforts every 6 months.

Sexual harassment education

Human rights education & training courses

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

Education on Human Rights (FY2003)

Level of employee	Date	Participants
Executives	Dec.	11
Managers	Jun., Jul., Aug.,Oct., Nov.	297
Employees	Oct., Jan., Feb., Mar.	853
New employees	Apr.	73

A human rights education session

Ensuring a Good Balance between Work and Family

The Family-Friendly Corporate Award

Family-friendly corporations are those that have various systems that allow employees to strike an ideal balance between work and child-raising or nursing care, and employees can freely choose various leaves and flexible working hours.

Japan's Ministry of Health and Labour started giving the Family-Friendly Corporate Award in 1999 to recognize such family-friendly organizations and to encourage more Japanese firms to introduce these systems.

Child-raising leave system of Osaka Gas

Child-raising leave system

- **Child-care Leave System**
  An employee may take a leave till the end of month in which his/her child's turns three years old.
- **Half-day Work for Child-care**
  Until the day before a child turns 3 years old, an employee may shorten his/her work day by 3.5 hours a day.
- **Short-time Work for Child-care**
  Until the day before a child turns 3 years old, an employee may shorten his/her work hours by 30 minutes at a time, twice per day.
- **Time Off to Care for a Sick Child**
  Absences may be claimed to care for a sick child up to five days per year.

Nursing Care Leave System

- **Leaves for the Care of a Sick Family Member**
  A leave of up to 1 year may be taken.
- **Shortened Work Hours for the Care of a Sick Family Member**
  Work hours may be shortened by 3 hours per day.

Benefit programs relating to childcare and the care of sick family members

- Partial assistance for day care expenses
- Partial assistance for the expenses incurred for home care workers and baby sitters
- Partial assistance for the expenses incurred for nursing care.

Utilization of the Systems (Number of cases)

	FY2001	FY2002	FY2003
Child care leave system	42	45	35
Nurcing care leave system	3	22	1

V. Employee Satisfaction at Work

Employment

We employ fair and impartial hiring practices, working to match employees' aptitude and working styles with the job requirements we are looking to fill.

Osaka Gas Employees

As of March 31, 2003	
Number of Employees	7,081 Male: 5,237 Female: 1,844
Average Age	42.8
Average Years of Service	18.6
As of April 1, 2004	
Number of New Graduates Hired	82 Male: 73 Female: 9

Hiring the mentally and physically challenged

Osaka Gas does its utmost to hire the mentally and physically challenged throughout the year. Besides hiring the legal quota, we also work to create an environment conducive to employees' special needs.

Re-hiring system

For employees who wish to continue working after their retirement at 60, we have a system that allows those who satisfy certain work requirements to continue working part-time until 63 years old.

Creating equal employment opportunities

In the spirit of the Equal Employment Opportunity Law, Osaka Gas advocates equal employment, benefits, duties and training, regardless of gender. Our childcare leave system, which is open to both male and female employees, is an example of how we are working to change with the times and create a fair and impartial workplace.

Safety and Health

Organization for control of safety and health

Osaka Gas, in cooperation with its affiliates, actively work for occupational safety and health with the objective of ensuring that employees enjoy a safe and healthy working environment. As well as complying with relevant occupational safety and health laws, we have created our own manuals, such as "Health and Safety Rules" and "The Manual on Driving Company Vehicles", and put them into practice. Our Labor Safety and Health Control Organization plays a leading role in the implementation of these programs.

Efforts on safety programs

Osaka Gas has devised its own accident index for calculating the degree of labor accidents. We use this index to assess the safety level of our facilities.

With more than 2,500 company vehicles, the prevention and reduction of traffic accidents is one of our top priorities. In addition to government-issued driving license, we require our drivers to obtain an internal driver's license. We grant this license only to individuals who have completed practical training and awareness education courses at our Driver Training Center, and the license is renewable every 5 years by completing refresher courses. We implement re-training program for employees who have been involved in an accident to ensure that the same thing does not happen again.

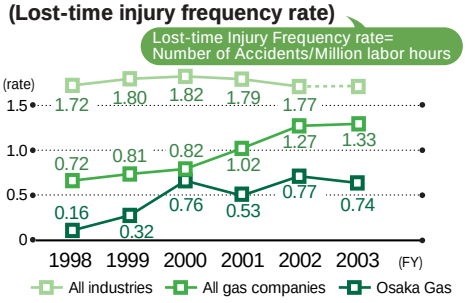
Promoting mental and physical health

Osaka Gas works to maintain and improve the physical and mental health of our workforce in accordance with the Ministry of Health and Labour's "Total Health Promotion Plan". Striving to achieve a "fulfilling and lively workplace", in order to provide early detection and prevention of deseases among our employees 35 years and older, we provide individualized guidance based on the results of physical exams. Following the principle that we are responsible for our own health, Osaka Gas developed "Walk 10,000 steps Daily" program to eliminate obesity and health awareness-raising activities focusing on the dangers of smoking and alcohol.

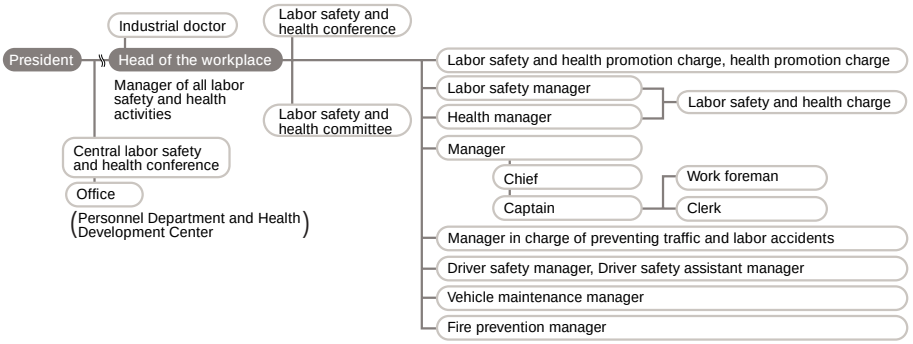
To ensure employees' mental well-being, all newly appointed managers are required to take training for helping employees maintain mental health care.

Measuring vital functions during a medical check-up

Ratio of Labor Accidents (Lost-time injury frequency rate)



Labor Safety and Health Control Organization



Third Party Review

There are two kinds of third-party reviews on environmental report:
(1) those for qualitative evaluation or advice, and (2) those for quantitative verification.
This time, we have gathered opinions from six experts according to each major for type (1) review. For (2) type of reviews, we asked Institute of Environmental Management Accounting (IEMA) to examine our report focusing on the status of environmental management system utilization, environmental impact data and environmental accounting data collection system, and express its opinion based on the results.
We also placed our company's views on those opinions in response.

Vice President interview

Screening

To: Osaka Gas Co., Ltd.

IEMA

Katsuhiko Kokubu
Institute of Environmental Management Accounting
Professor, Graduate School of Business Administration, Kobe University

Eriko Nashioka
Director/C.P.A.

1. Purpose of the Reviewing

As a third party not involved with the business of Osaka Gas Co., Ltd., we evaluated the environmental performance described in the "Environmental and Social Action Report 2004," which Osaka Gas Co., Ltd. prepared, and hereby express our opinion on it, for the purpose of improving its credibility.

2. Procedures

In order to ensure the reliability of information that is presented in the "Environmental and Social Action Report 2004," it was necessary for us to deepen our understanding of how environmental actions are planned and implemented, and environmental performance, which is the result of such actions and the basis of the disclosed information, is evaluated internally. To accomplish this goal, we interviewed Mr. Hironori Yamada, Vice President* (and the executive in charge of environmental affairs), as well as questioned persons in charge and made on-site inspections. With respect to the responses and results, we examined whether actual steps were implemented as intended by the systems in place by reviewing supporting documents, starting with original vouchers and tracing a flow when necessary, and by applying techniques commonly used in financial audits.

In order to construct our opinion, we made visits to the head office and the Himeji LNG Terminal.

* As of May 28, 2004

3. Results

As a public utility that supplies energy, Osaka Gas strongly recognizes its public nature and responsibility for environmental preservation. Under the leadership of its top executives, the company has succeeded in making this awareness reach all corners of its business management through dedicated efforts. The environmental conservation actions and social actions of Osaka Gas represent part of such efforts and are propelled in tandem with the primary objective of the company's business, which is to supply energy that makes as little environmental impact as possible. In addition, introduction of innovative actions in the management strategy, such as environmental management indicators and environmental conscious corporate performance evaluation, is highly commendable. Regarding environmental conservation actions, however, further effects can be achieved in the future by pressing forward with increased systematic compilation of environmental information and more progressive utilization of it, including environmental accounting. As for social actions, the task ahead is to find a way to establish a mechanism to actively reflect the opinions of major stakeholders of Osaka Gas, representing its employees and local residents, on corporate action.

Regarding Environmental Performance

1. Wastes

Individual employees meticulously sort wastes, showing the company's broadly supported dedication to the reduction of wastes and promotion of recycling. Nonetheless, some business locations show high ratio of Thermal Recycling. In order to raise the ratio of Material Recycling in the future, it will be necessary to re-examine the current waste disposal procedures.

2. Energy

A variety of energy saving measures is taken in recognizing the particularity of the company as an energy supplier. High levels of awareness about environmental conservation actions were found throughout the company as they recognize the fact that sale of natural gas, the company's mainstay, contributes to environmental conservation. It must be pointed out, however, that room still remains for improvement of the effectiveness of the ties between the companywide high level awareness of environmental protection and the actual environmental conservation actions. (For example, systematic budgeting is yet to be employed in environmental conservation.) We expect that the effectiveness will be improved with the adoption of a management approach that delves into the financial aspect too.

3. Environmental Accounting

With respect to environmental accounting, it deserves a special mention that the company converts the effects of environmental protection actions into monetary terms, and incorporates the information in the corporate performance evaluation system. However, the system is not fully computerized, and basic data input is still handled manually. By computerizing the system and incorporating such data in daily operations, the company will be able to use accurate information on a timely basis, and achieve even greater effectiveness.

Regarding the "Environmental and Social Action Report 2004"

The report is heavy on data, and as such can be said to be highly useful in terms of corporate evaluation. On the other hand, disclosed information is homogenous, making it difficult to find orders of priority. There is thus room for improvement with respect to the quality of message to readers. Moreover, there must be information that is of special significance because of the company's role as a highly public enterprise that supplies energy. It is therefore hoped that the report will be presented with a thought to the company's special character.

Third-Party Opinions Expressed by Six Experts

About Global Warming Prevention Actions

Mie Asaoka

President, Kiko Network

Some practical suggestions toward Osaka Gas

One of the significance of an environmental report is to facilitate the publishing company itself to set a target, assess the progress, and evaluate its performance while paying attention to consumers' concerns and market circumstances. I would like to pay my deep respect to Osaka Gas for meeting many of its medium-term environmental targets, in FY2003, the targets which were set for FY2005

Regarding measures on equipment, the fact that the company used the HHV standards as indicator for the COP of air conditioners this year, in response to the criticism from the electric power industry, is commendable. The company might as well consider using the HHV for fuel cell efficiency for the sake of standardization.

A shift of fuels toward natural gas pushes measures against global warming in the years ahead. As a long-term goal, the transition of transportation from LNG to methane hydrate form should be studied to reduce immense energy losses that are experienced in the process of gas liquefaction in the upstream. I also hope that company to be creative with marketing mechanisms like DSM or Demand Side Management, to increase sales by promoting energy savings, namely gas consumption volume reductions.

Hot water supply and air heating systems for household use are increasing its complexity. It has been said that the inlet to gas-burning flash water heaters cannot be connected to solar water heaters because the safety sensor overreacts to the warmth. That is a problem to be tackled.

About the Energy-saving Technologies

Minoru Mizuno

Professor
Department of Environmental Engineering
Faculty of Engineering
Graduate School of Osaka University

Have a viewpoint from the demand-side

Cities, where high-density activities take place, need resource supply from outside. There is also a need for a waste disposal system to refrain from environmental problems. Environmental measures around 30 years ago, were limited to adjustment in the disposal systems. The environment protecting issues were left to those who were engaged in disposal treatment, and resource suppliers' only concern was maintaining stable supply. But today in the world with global environmental problems, supply and disposal are no longer separate. Construction of a resource economizing system with low environmental impact should be aimed at by perceiving supply and disposal as a metabolic system with consumption at its center just like in a living organism. In an energy system, too, ideas that originate on the demand side, including those about energy saving, will likely play a key role in the future in contrast to the viewpoint of supply side that has been relevant. Osaka Gas deserves high marks, as this tendency is clearly visible in its actions. In an energy system, however, there is a concept of disposal in connection with incinerated wastes. There is no such concept with respect to large quantities of waste heat, which is the outcome of energy consumption. Waste heat is one cause of heat island effect that is in urgent need of action. It is hoped that this problem will also be addressed adequately.

About Green Purchasing and Procurement

Kazuya Kojitani

Department Manager
Environmental Management
Kokuyo Business Service Co., Ltd

Green procurement is in implemented successfully

Osaka Gas Group gave clear descriptions of its stance on green purchasing and procurement in its Environmental Targets for FY2010 and has been steadily making progress in accordance with its Guide to Green Procurement. Even greater effects can be expected in the years ahead as the group involves its business customers in the campaign. From the point of comparability, I would like to suggest that the group considers the areas that are specified by the Law on Promoting Green Purchasing when describing the fields that it has been working in and the results of the work, and clearly identifies its targets and the percentages of accomplishment. As a provider of energy, the company is engaged in a variety of activities and is active in supplying energy-saving equipment and systems that contribute toward reducing environmental impact. Needless to say, such involvement contributes toward not only lowering environmental impact on the global environment but also greatly improving cost benefits and environmental awareness of the company's customers. Today, businesses are required to practice environment-oriented management. I believe that Osaka Gas is one of the leading environmentally-conscious corporations.

From the Customers' Point of View

Hideo Iida

All Osaka Consumers' Association Liaison Group

Take a positive action toward 'social value creation'

Gas energy is becoming an essential not just for the life of the nation but to move society forward. For this reason, a safe and stable supply is needed, and distributing system with full security measures is necessary. That is why the obligation is imposed on the business people who bear responsibility for these matters. Positive actions to meet demands from such users and fulfill social responsibilities are written in the Osaka Gas Environmental and social Action Report.

These days the compliance of enterprises is again being questioned. Incidents have occurred one after another in which business people who have given little attention to safety and security have decided to give priority to short-term profits, and ousted as a result of their capacity limitation. If errors are made with respect to users or customers, such business may be compelled to withdraw from the market. Every enterprise is challenged about their stance toward this issue.

Gas energy conveys an image of green. However, the image has nothing to do with the true nature. The most important thing is activities in the business. Actions and practices are the crucial factors.

For Osaka Gas, endeavoring to further elevate its own meaning for existence through creation of social value is needed.

About Social Actions

Noboru Hayase

Executive Director
Osaka Voluntary Action Center

Nurture the sense of citizenship among the employees

Many of today's so-called "corporate scandals" occur in circumstances where employees are trapped in the corporate value system, whose only goal is to "improve the company's business results" and lose the "conscientiousness of good citizens." Today, such scandals are brought to light in such forms as whistle-blowing. In some cases, the result is a threat to the survival of the accused corporation. Therefore, in order to raise the social value of the corporation and lower management risk, company should foster the employees' "sociality as a citizen" more than ever.

I recognize Osaka Gas to be a corporation which began to tackle the challenge of nurturing citizenship awareness among its employees very early on. The "Small Lights" campaign, which is mentioned in this report, commenced in 1981, good ten years before the 1990s when a foreign word "philanthropy" began to be heard and companies suddenly began to support employees' volunteer actions in a boom. Interest in CSR is rising today. It is my hope that the company will expand the various types of actions that are described in this report, and continue to maintain its status in the forefront of corporate citizenship.

About the Communication with Stakeholders

Yuriko Nakao

Graduate School of Policy Studies,
Kwansei Gakuin University

Clarify the philosophy of its Social Actions

Environmental reports (sustainability reports) take on the role of communication tools to connect businesses to stakeholders. "Environmental and Social Action Report" of Osaka Gas is eminent in this regard. It provides the column "Key Points and Future Directions" for each environmental item. It also discloses various activities like internal utilization of "Environmental Management Indicators" and contains the article on the voices of customers using "ECOWILL". Those contents facilitate readers to know Osaka Gas's activities from various angles. Diagrams and photographs are interposed to be easy to read in information about a safe and stable gas supply, social service activities for the region, employment, human rights issues and the like. However, even though comprehensive content on these efforts is disclosed, one gets the impression that "why" Osaka Gas is working on social action is insufficiently conveyed. I think it is important that various readers understand Osaka Gas activities' philosophy. I hope Osaka Gas will explain its principle to fulfill the social responsibility as a corporate citizen.

Our Response to Suggestions and Opinions

(1) Regarding the Third Party Review Written by the Institute of Environmental Management Accounting (IEMA)

Opinion	Our Response
Systematic budget control should be exercised. Environmental accounting should be incorporated into routine operations so that accurate information can be used on a timely basis.	Regarding environmental control, we will examine the ways to expand its internal applications, including budget controls. In addition, we will work to have the environmental accounting information system taking root in all parts of the company so that data are used effectively.
With respect to wastes, a study needs to be conducted to further raise the material recycling rates.	With respect to recycling of wastes, we are working on material recycling and thermal recycling. We will make efforts to maximize the parts that are recycled for materials.
With respect to social action, how to introduce a specific mechanism to reflect the opinions of stakeholders on the company's management should be discussed.	We have some mechanisms to collect stakeholders' opinions. For example, the C-VOICE system (See page 52) in the company intranet is to share the opinions from our customers among all employees, including the management. Moreover, we explain our business operations to Kansai Consumer Group Network Committee (See page 56) and other community members, and seek their suggestions. Moreover, we will study ways to increase opportunities to hear from our stakeholders and examine possible ways to utilize their opinions and suggestions.
The order of priority regarding the information disclosed in the Environmental and Social Action Report is not clear. Improvement is desired in the layout that takes into consideration the unique nature of the company.	Recognizing our role as an energy provider to support the lives of people and industries in our communities, we send out information to a wide range of stakeholders. In the future, we will determine what types of information are needed most, and endeavor to disseminate useful information.

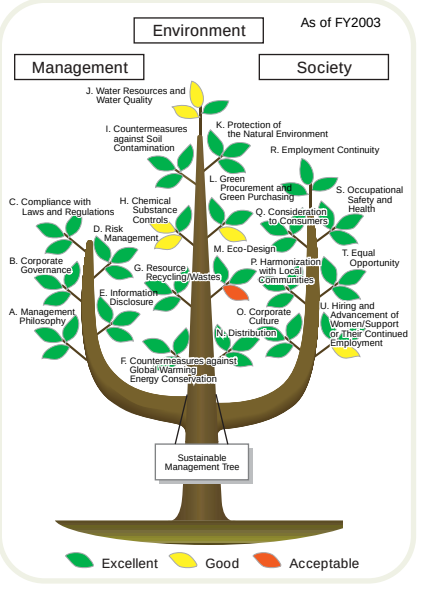
(2) Regarding the Opinions Expressed by Six Experts

Opinion	Our Response
Shouldn't fuel cell COP be also expressed in HHV(High Heat Value) standard?	For each heat value figure, we will specify either LHV or HHV in the Environmental Action Report to avoid confusion.
I hope that a goal is set to change the import system by replacing LNG transportation with methane hydrate transportation.	We recognize methane hydrate transportation to be one of the candidates for future energy transportation methods, and are in the process of gathering information regarding its trend. At the present time, methane hydrate is still in the research phase in every sphere, to manufacture from natural gas, to store and to transport.
I hold expectations for the company to be inventive and devise a mechanism to increase sales by promoting energy conservation (conservation of gas consumption).	We hope to see an increase in the number of customers who choose city gas over electricity or petroleum as the result of their appreciation for our energy saving appliances and systems. We also operate ESCO business to conduct energy conservation services.
I hear that an inlet to gas-burning flash water heaters cannot be connected to solar water heaters because the safety sensor overreacts to the warmth. That is a problem to be tackled.	We think this is caused by the fact that gas-burning flash water heater heats the hot water supplied by a solar water heater, causing the water to be too hot and the safety device to be triggered. We already developed products that dealt with this phenomenon. The products are on the market and we inform customers about this problem and the equipment with countermeasures by product catalogue.
Thinking from the demand side perspective (and especially the perspective of energy conservation) will be quite important from now on. I hope that the company will pay adequate attention to the issues concerning massive waste heat that results from energy consumption.	As our company's Environmental Action Guidelines Ⅱ "Contributing to Environmental Impact Reduction with Our Products and Services." Indicates, we have always endeavored to conserve energy and curb CO_2 emissions at customers. More recently, in particular, we have concentrated our efforts on expanding the introduction of cogeneration, which uses up as much thermal energy as possible, to home use. To solve the problem of massive waste heat as was pointed out, we intend to vigorously raise the energy efficiency of appliances and systems, and at the same time study as many ways to utilize waste heat.
I understand that steady progress is being achieved in accordance with the Green Procurement Guidelines. I would like the company to consider the fields that are specified by the Law on Promoting Green Purchasing and present goals, rates of accomplishment, etc. in such a way as to make the figures comparable.	The Law on Promoting Green Purchasing specifies items in 13 fields. Our company uses about 700 registered Green Purchasing items, and compiles the total purchasing amount of these items. As pointed out, We will look into changing the way we compile the number of registered Green Purchasing items and their purchase amounts so that they are presented more in line with the fields specified by the law.
Osaka Gas, by its action and practice, should continue to raise its social value and affirm its meaning of existence.	Through our environmental action, social contribution, and thorough compliance with law, Osaka Gas, as well as its Group of companies, will continue to work to boost our social value.
I hope to see Osaka Gas continue to be the forefront of corporate citizenship by expanding its various programs to raise the awareness of its employees.	We hope to accurately determine customer needs and social trends, and fulfill our social responsibility by focusing our social actions in needed fields. We will build a good relationship with stakeholders on a face-to-face basis.
Regarding Osaka Gas's social action, I get an impression that the report discloses everything that the company tackles but that it is not communicated adequately as to why Osaka Gas engages itself in social action.	In this report, we tried to communicate our approaches to social issues and our backgrounds in "Community Activities" (page 53), "Personnel System Fostering Personal Growth" (page 57) and "Human Rights Awareness" (page 58).

Evaluation Results of the Environmental Management Rating

The objectives of this rating program by Sustainable Management Rating Institute (SMRI) are to (1) promote active private-sector involvement in environmental issues, (2) evaluate fair and honest corporations, and (3) offer common standards to various stakeholders for a sustainable global environment. Our top management was interviewed in three areas, consisting of "management", "environment" and "society", stretching over 21 items that contained 189 questions. The results are shown in the table at right. The items evaluated to be inadequate in our efforts and our corrective actions are shown in the table.

Area	Item	An Example of Corrective Actions
Environment	1. Targeted control of chemical substances	● Establishment of targets for each item will be considered when the next "Medium-term Environmental Targets" will be set
	2. Targets concerning water resources and waste water quality	● Chemical substances in gas appliances will be examined as part of our efforts on Eco-designs
	3. Efforts on Eco-designs	
	4. Percentage of certified suppliers of green procurement and purchasing	● With regard to items that we continuously purchase, such as piping materials, we intend to evaluate our suppliers' environmental efforts
Society	5. Hiring and advancement of women, and support for their continued employment	● We actively provide programs to support continued employment of female workers, including an extension of child care leaves (to three years)



History of Environmental Activities/Comparative Table

History of Osaka Gas Environmental Activities

FY	Activities
1989	Environmental Management Department, previously part of our production sector, reorganized into the Environment Department.
1990	Committee on Energy and the Global Environment established. /Set up the Department Managers' Conference on NOx Reduction within the company./Osaka Gas received Environment Agency Secretary-General's Award in 17th Environmental Awards for a coke bed process for melting and recycling sewage sludge.
1992	Osaka Gas Environmental Philosophy and Osaka Gas Environmental Action Guidelines established.
1993	Action plans for each department formulated. Company-wide paper usage reduction activity started /A companywide drive to reduce paper usage reduction commences. / The Gas Appliance Assessment Guidelines completed. [Japan Gas Association and Japan Industrial Association of Gas and Kerosene Appliances]/Futuristic experimental housing complex, NEXT 21, completed.
1994	Osaka Gas received MITI Minister Prize in Third Global Environmental Award Grand Prix. Osaka Gas Environmental Report 1993 published.
1995	Great Hanshin-Awaji Earthquake occurred. Decision reached after 17 years in Nishi-Yodogawa pollution case. Environmental lectures held open to the public.
1996	Osaka Gas received MITI Minister Prize for a recovery and recycling system for used gas equipment. Osaka Gas received Japan Builders Association Award Special Prize for NEXT 21 housing complex.
1997	Production Department acquired ISO 14001 certification.
1998	Revised Environmental Action Guidelines. Osaka Gas received the second Environmental Report Award for Excellence in Reporting for its Environmental Report 1998.
1999	Environmental performance incorporated into internal performance evaluation system. Osaka Gas received Environmental Report Award Grand Prix for Excellence in Reporting for its Environmental Report 1999. (Sponsored by Ministry of the Environment) Osaka Gas received Energy-Conservation Grand Prix for a 9.8 kW cogeneration system.
2000	Green Distribution Policy established. FY2010 Environmental Goals established. Osaka Gas received Japan Gas Association Technology Grand Prix for Ex Prior Eco high-efficient gas hot water heater. Osaka Gas received Gold Prize from Pacific Basin Economic Council for its environmental action.
2001	Green Distribution Policy formulated. 2005 Medium-Term Environmental Goals established. Osaka Gas received the fifth Environmental Report Award for Excellence in Reporting for its Environmental Report 2001. (sponsored by Toyo Keizai Inc.).
2002	Osaka Gas received METI Minister Prize for reusing speakers for gas leak alarms. Osaka Gas received the sixth Environmental Report Grand Prix for Outstanding Reporting for Environmental Report 2002 (sponsored by Ministry of the Environment).
2003	ECOWILL, a cogeneration system for home use, won the Energy Conservation Center Chairman's Award./ The Environmental and Social Action Report 2003 won the following award: • The 7th Environmental Report Grand Prix Award (with the backing of the Ministry of the Environment) Osaka Gas became a member of the WBCSD (World Business Council for Sustainable Development)

Comparative Table with MoE Environmental Reporting Guidelines (FY2003)

Area		Title		Osaka Gas's Report
No.	Area	No.	Title	Page
1.	Basic headings	**1.**	CEO's statement	5, 7
		2.	Foundation of reporting	4
		3.	Summary of the nature of the business	2–4
2.	Summery of policies, targets, and achievements	**4.**	Environmental Policies	8
		5.	Summary of targets and achievements	15, 16
		6.	Material balance	17, 18
		7.	Summary of environmental accounting	13, 14
3.	State of environmental management	**8.**	Environmental management system	9, 10
		9.	Supply chain management	10
		10.	Research and development of technologies	36–39, 47, 48
		11.	Environmental information disclosure	50, 53–56
		12.	Compliance with environmental regulations	10
		13.	Social contribution related to environment	53–55
4.	State of activities for reduction of environmental burdens	**14.**	Energy input	17, 18, 19–32
		15.	Material input	17, 18, 19–32
		16.	Water supply	26
		17.	GHG emissions	21–23
		18.	Chemical substances	28
		19.	Amount of production	2, 21, 23
		20.	Wastes	24–26
		21.	Wastewater	28
		22.	Distribution	21, 27, 40
		23.	Green purchasing	27
		24.	Environmental goods and services	36–44
5.	State of social activities	**25.**	State of social activities	49–59

Editor's Postscript

We had a warm winter, and cherry blossoms bloomed earlier than usual. Temperatures have stayed high. Could it possibly be a manifestation of global warming? As a member of the energy company, I am somewhat concerned these days.

Until last time, we published a report that mainly described the environmental actions of Osaka Gas by itself. Starting with this report, we have shifted our attention to the activities of consolidated Osaka Gas Group. Information volume is still limited at this time but we will gradually expand and enrich the content.

The Law concerning the Promotion of Eco-friendly Business Activity of Specified Business Operators by Facilitating their Environmental Information Disclosure was enacted in the last Diet session. As this represents, voices seeking improved reliability of environmental reports through external review are being heard louder every day. We have operated with the motto of sincerity and endeavored to disclose information that can be relied upon. To boost the reliability of our report even more, we subjected this year's report to a simplified external review.

We also adopted a new approach to the third party opinions, and asked professionals in different fields to express their comments in their respective fields of specialty.

We aimed to create a report that diverse groups of readers would find easy to read. We incorporated the universal design and included a number of graphs. At the same time, we tried to reduce paper consumption by making full use of the Web.

Every time, we strive to make as good a report as we can by brushing up. I would be grateful if you give us your candid opinions about our report.

July, 2004

Ritsuo Sakurai
General Manager,
Environment Dept.

OSAKA GAS

Environmental and Social Action Report 2004

The Committee on Energy and
the Global Environment, Osaka Gas Co., Ltd.
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The Environmental and Social Action Report is posted on our website. For more extensive data, see the additional data on the Osaka Gas environmental website at the following address:

http://www.osakagas.co.jp/kankyo_e/

GPN Green Purchasing Network
Osaka Gas promotes Green Purchasing

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