Contributing to the Resource-Recycling Society

Principle and Outline

With the aim of creating a recycling-oriented society, the Daigas Group strives to minimize waste emissions through efficient use of resources throughout its business activity value chain and through resource recycling by means of promoting the 3R + Renewable efforts. The Group also strives to conserve water through appropriate use of water and wastewater management.

More Specifically, Daigas Group is thoroughly implementing the 3Rs (reduce, reuse, recycle), cutting its resource consumption and waste generation, and endeavoring to reuse and recycle used resources. We are recycling resources throughout our business activity value chain by such means as striving for zero emissions at LNG terminals, reusing gas meters, recycling gas pipe materials, reusing excavated soil from gas pipe installation, and recycling used gas equipment.

Consumption of Resources by Daigas Group

Recycling of used gas pipes

The polyethylene (PE) pipes waste material generated at work sites is mainly used as covers to protect gas pipes and as post markers to indicate the location of supply pipes. In FY2023.3, 137 tons of polyethylene (PE) pipe waste was generated and all was reused. Metal pipes, such as steel and cast-iron pipes, are sold to electric furnace manufacturers and recycling companies, who use them as raw materials for products.

Reusing of gas meters

To measure the amount of gas used by customers, Osaka Gas has installed approximately 7.4 million gas meters. Under the Japanese Measurement Law, these devices must be replaced every 10 years.*1

After 10 years in use, gas meters are repaired (taken apart, inspected, and fixed) to make them perform as well as new ones. They are then installed at customer sites. In the past, this type of repair was conducted a third time to give the gas meters a total lifespan of 40 years. After conducting evaluations including durability tests*2 jointly with the gas meter manufacturers, we came to a decision that these gas meters can be used another 20 years if twice of additional repairs are conducted. Based on the result, the Company has decided to increase the maintenance of gas meters by two times since FY2010, and to use them for 60 years.

As a component material, around 2 kg*3 of aluminum is used in each gas meter body. Reusing gas meter reduce 80%*4 of CO_2 emissions, that includes CO_2 emission that would have been emitted in the process of casting a new gas meter body, giving a cumulative total reduction of 85,000 tons over the next 20 years, compared with producing new meters.

*1 Replacement of meters: Some exceptions apply. (Meters from #25 or higher need to be replaced every seven years)
*2 Durability test: Cyclic tests, accelerated temperature tests, etc.
*3 Calculation of aluminum use: A body of gas meter contains approximately 2 kg (average of from #2.5 to #6) of aluminum.
*4 Calculation of CO_2 emissions: Calculated with new meters also using regenerated aluminum.

Electronic issuance of a manifest certifying waste disposal via the Daigas Group's e-Cycle system

The Daigas Group operates a proprietary "e-Cycle" system that links appliance sales agents, collection and transportation companies, and disposal companies via the Internet. This system enables prompt confirmation of "manifests," which certify that used equipment collected by sales agents has been appropriately handled by the shipping companies and the disposal companies.

The manifest is electronically issued, as the Daigas Group's e-Cycle system is connected to the Japan Industrial Waste Information Center (JWNET) through the EDI.*

* EDI
EDI stands for electronic data interchange. Electronic data are exchanged between the JWNET and Osaka Gas's e-Cycle system.

Compliance with the Home Appliance Recycling Law

The Daigas Group appropriately disposes of gas air conditioners for household use and clothes dryers, covered by the Home Appliance Recycling Law, in line with the law. In FY2023.3, about 111 tons of gas air conditioners for household use were collected, and 91% of them were recycled, higher than the minimum mandatory recycling rate of 80%. The amount of clothes dryers collected during the same year came to about 19 tons, 90% of which was recycled, far above the mandatory recycling rate of 82%.

Air Conditioners

	FY2019.3	FY2020.3	FY2021.3	FY2022.3	FY2023.3
Number of units recycled (units)	4,728	4,348	3,656	2,921	2,755
Gross weight recovered (t)	195 t	177 t	147 t	118 t	111 t
Weight recycled (t)	178 t	161 t	134 t	107 t	101 t
Recycling rate	91%	91%	90%	90%	91%

Clothes Dryers

	FY2019.3	FY2020.3	FY2021.3	FY2022.3	FY2023.3
Number of units recycled (units)	591	476	523	393	445
Gross weight recovered (t)	24 t	19 t	21 t	16 t	19 t
Weight recycled (t)	21 t	17 t	19 t	15 t	17 t
Recycling rate	88%	88%	89%	90%	90%

Compliance with the Act on Promotion of Recycling of Plastic Resources

The Daigas Group promotes resource recycling efforts through the promotion of the 3Rs (reduce, reuse, and recycle) plus renewable with the aim of creating a recycling-oriented society.

With regard to plastic resources, we are actively implementing material recycling in our business supply chain, including 100% recycling of waste polyethylene (PE) pipes, which are gas pipe materials, and recycling of resin used for gas alarms.

We will also continue our efforts to minimize the amount of landfill waste and other waste finally disposed of by effectively utilizing waste from other plastic products as thermal energy by, for example, converting it into refuse paper & plastic fuel (RPF).

Appropriate Use and Discharge of Water Resources

Water is not a primary material among the products handled by the Daigas Group. We recognize that the use of water does not pose a major business risk for our Group. However, the Group controls water discharge after using drinking water, industrial-use water, groundwater and seawater. At power plants, core facilities for its electricity business, the Group uses industrial water as a coolant in a steam turbine condenser, and vaporizes it inside the cooling tower. Drinking water, industrial-use water and groundwater are also used at LNG terminals, power plants and offices, and discharged. Seawater is mainly used for vaporization of LNG at city gas plants and for cooling in steam turbine condensers at some power plants. We discharge the seawater to the sea without consuming it or affecting its composition. In discharging water, we have conducted water quality inspections in line with relevant laws, ordinances and agreements with local municipalities, and there were no violations. The Group sees water as a limited natural resource. We will continue to use water adequately, control its discharge strictly, and promote water saving.

Osaka Gas has pleased to announce that we have been recognized for leadership in corporate transparency and performance on water security by global environmental non-profit CDP, achieving a place on the CDP A List for the second consecutive year.

Amount of water intake in FY2023.3

General water, industrial water	10,800 thousand m^3
Underground water	3,463 thousand m^3
Seawater	534,660 thousand m^3

Amount of water discharge in FY2023.3

Sewer	581 thousand m^3
River	3,089 thousand m^3
Sea	536,070 thousand m^3

Efforts to reduce water use

The Daigas Group is working together with business partners and customers to reduce water consumption.

In its employee activities at offices, the Group strives to conserve water and addresses the challenge of reducing the amount of water it uses.

Making use of its technological capabilities cultivated in the gas business, Daigas Energy Co., Ltd., a wholly owned subsidiary of Osaka Gas, provides customers with water purification and treatment services, including cooling water chemical services, to reduce water consumption.

Chemical substance management

Legal compliance and proper management

There are very few hazardous chemicals handled by the Daigas Group during the processing and supply of natural gas. The Group will continue to manage and reduce the amount of chemicals it uses under the policies shown below.

■ Daigas Group Chemical Substance Management Principles

1. We comply with laws and environmental regulations concerning the use of chemical substances.
2. We use ISO 14001-compliant and other environmental management activities to step up management and decrease emissions of chemical substances.
3. We disclose information on chemical substance management mainly on our website.

Soil and groundwater conservation

Information Disclosure on the Inspection Results of the Former Plant Sites

Inspecting soil and groundwater on former coal gas production sites

In compliance with relevant laws and regulations, Osaka Gas has checked the possibility of soil pollution at former coal gas production sites by measuring the amount of specified chemical substances contained in the soil and groundwater taken from the sites and assessing their impact on the sites and surrounding areas. The results of the surveys have been disclosed and response measures have been implemented where necessary. For example, when chemical substances (mainly cyanide compounds and benzene) in excess of the maximum amount allowed under the Soil Contamination Countermeasures Law were found, the incidents were reported to administrative authorities and adequate measures, including removal and cleaning the problematic soil, were taken promptly. Before changing the form of land, we conducted surveys based on relevant laws and regulations, followed by implementing appropriate response measures, including disposing of the contaminated soil and on-site containment of the soil. We have issued press releases regarding the results of investigations and the response measures, all of which have already been implemented. We will continue to take necessary measures based on the Soil Contamination Countermeasures Law.

Management of asbestos

The status of asbestos use at major facilities and buildings of the Group, and in its gas equipment, is given below.

Gas manufacturing and supply facilities	Gas equipment, combustion equipment	Daigas Group's buildings
Asbestos is not used in new facilities. The asbestos used in existing facilities as installed does not disperse into the air. When these facilities are serviced or reclaimed, nonasbestos material will be used in place of asbestos.	Asbestos is not used in new gas equipment or combustion equipment. Some of the gas equipment sold in the past used asbestos in gaskets or the like, which does not disperse into the air under ordinary conditions of use.	Measures to systematically eliminate spray-on asbestos insulation in buildings have been completed. Showrooms and other open spaces visited by customers do not use spray-on asbestos.

Management of waste containing PCBs

Proper management and disposal of PCBs in line with government policy

Every company in the Daigas Group manages and disposes of waste containing PCBs in accordance with Japan's Act on Special Measures for Promotion of Proper Treatment of Polychlorinated Biphenyl (PCB) (PCB Special Measures Act). All capacitors and transformers with a high density of PCBs over 10 kg were disposed of by FY2013.3. All ballasts and other equipment that contain PCBs were also disposed of by the statutory processing deadline. Low-density PCBs have been consigned to approved decontamination facilities since FY2014.3 in a systematic process of disposal.

Going forward, we will continue to store and dispose of PCBs properly, in accordance with the government's disposal schedule and policies.

Gas appliance eco-design

Conform with all laws and take the environment into consideration, such as by restricting the use of chemical substances

July 2006 was the start of the RoHS Directive, which restricts the use of specified substances, such as lead and cadmium, in appliances. Also in July 2006, in Japan the revised Law for the Promotion of Effective Utilization of Resources went into effect, obligating companies to label products as containing the six substances of the RoHS Directive according to J-MOSS, the JIS standard for the labeling of electrical and electronic products containing chemical substances.

In line with the measures propelled in the automobiles and home appliances sectors, we are working together with gas appliance manufacturers on the development of environmentally-friendly gas appliances and its labeling. The Daigas Group currently does not manufacture or sell gas appliances containing any of the specified substances that require labeling under J-MOSS. The Group abides by Japanese regulations on chemical substances (the Law Concerning the Examination and Regulation of Manufacture, etc. of Chemical Substances, and the Law for the PRTR and Promotion of Chemical Management). We also engage in independent evaluations of chemical management according to the RoHS Directive and are working to reduce chemical substances outlined therein.