

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 FY2025.3, 119 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 FY2010.3, 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 CO₂ emissions, that includes CO₂ 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 CO₂ 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 FY2025.3, about 87 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 18 tons, 91% of which was recycled, far above the mandatory recycling rate of 82%.

■ Air Conditioners

	FY2021.3	FY2022.3	FY2023.3	FY2024.3	FY2025.3
Number of units recycled (units)	3,656	2,921	2,755	2,645	2,180
Gross weight recovered (t)	147	118	111	106	87
Weight recycled (t)	134	107	101	97	76
Recycling rate (%)	90	90	91	91	91

■ Clothes Dryers

	FY2021.3	FY2022.3	FY2023.3	FY2024.3	FY2025.3
Number of units recycled (units)	523	393	445	408	425
Gross weight recovered (t)	21	16	19	17	18
Weight recycled (t)	19	15	17	15	16
Recycling rate (%)	89	90	90	91	91

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.

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).

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 specific hazardous 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 Group abides by Japanese regulations on chemical substances (the Act on the Regulation of Manufacture and Evaluation of Chemical Substances, and the Act on the Assessment of Releases of Specified Chemical Substances in the Environment and the Promotion of Management Improvement). We also engage in independent evaluations of chemical management according to the RoHS Directive and are working to reduce chemical substances outlined therein.

Collaborating with Other Companies to Reduce Waste and Resource Use and Prevent Pollution

Environmentally Conscious Procurement

The Daigas Group aims to contribute to the development of a sustainable society and believes that environmental and social consideration is important in procurement. We have established the Daigas Group Procurement Policy, and are promoting purchasing activities based on the Daigas Group Environmental Policy.

Considering the balance between economic conditions and the reduction of environmental impact, we are promoting green purchasing that prioritizes the purchase of products and services with the lowest possible environmental impact throughout their product life cycle, from resource extraction to waste disposal, from business operators who strive to reduce their environmental impact.

■ Main examples

By replacing the plastic folder opening packs (distributed 557,500 packs/year) that are provided when gas is opened at customers' homes with paper folders, we have reduced approximately 13 tons of plastic.

Before change



After change



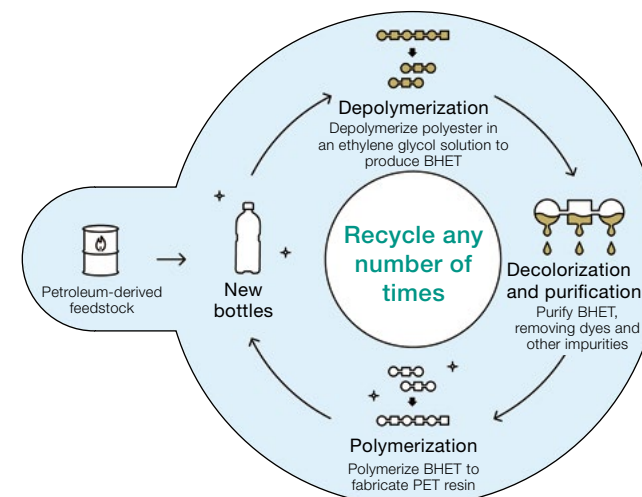
Developing new circular economy-related businesses with a partner

In December 2023, Osaka Gas entered into a capital and business alliance with JEPLAN, INC., which engages in businesses related to technologies for chemically recycling polyethylene terephthalate, a raw material for plastic bottles and other goods.

JEPLAN, INC. is one of the few companies in the world that has commercialized the horizontal recycling of plastic bottles to plastic bottles and polyester clothing to polyester clothing, using its proprietary PET chemical recycling technologies.

The Daigas Group will take advantage of its strong network and work to promote the recycling of plastic bottles and clothing in the Kansai area. The Group will also work on the reduction of costs and CO₂ emissions in the chemical recycling process with its energy-related solutions. Both companies will take advantage of their respective strengths and aim to contribute to the creation of new value and the promotion of a circular economy.

■ Recycling to make bottles from bottles



Source: "Making bottles from bottles" from JEPLAN, INC.'s website