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## Environmental Impact throughout the Daigas Group Value Chain

### Main materials and fuels

Amount of LNG procured	<b>6,121 thousand tons</b>
	The figure above includes the amounts of the items listed below: <ul style="list-style-type: none"> <li>● Materials of city gas</li> <li>● Fuels at LNG terminals</li> <li>● Fuels for power generation by Group companies</li> </ul>
LPG used for calorific adjustment of city gas	<b>231 thousand tons</b>

### Procurement of materials and fuels (Business activities by companies outside the Group)

<b>LNG, natural gas</b> City gas use/power generation use/marketing use	<b>LPG</b> City gas use/marketing use
<b>Coal, biomass</b> Power generation use	<b>Other purchased goods</b> Materials/consumable goods/capital goods/gas equipment for sale/electricity/gasoline and others

### Amount of energy used

City gas	<b>1,382 million m<sup>3</sup></b> (including gas whose calorific value has yet to be adjusted)
Purchased electricity	<b>494 million kWh</b>
Other energy sources	<b>11,516 TJ</b>

### Amount of vehicle fuel used

Gasoline	<b>1,494 kl</b>
City gas	<b>24 thousand m<sup>3</sup></b>
Diesel	<b>801 kl</b>
LPG	<b>4 thousand m<sup>3</sup></b>

### Business activities by Osaka Gas

City gas production/supply	Business office
Power generation	Heat supply
LBS business	Others*

\* Engineering/energy services/renovation/maintenance service/R&D etc.

### Sales, waste disposal (Business activities by companies outside the Group)

Commuting, business trips	Waste disposal
Product shipment	Leasing of assets
Outlets providing sales support to Osaka Gas	

### Sales volume of main products

Gas	<b>6,845 million m<sup>3</sup></b>
Electricity	<b>15,883 million kWh</b>

### Use at customer site

City gas	Gas appliances
Electricity	Chemical products
LNG	Services

### GHG (scope 3\*1)

	Emissions (1,000 t-CO <sub>2</sub> e)
LNG, natural gas	3,386
LPG, coal, biomass	179
Other procurement items	1,062
<b>Total</b>	<b>4,627</b>

### GHG (scope 1 and 2)

	Emissions (1,000 t-CO <sub>2</sub> e)	
	Scope 1	Scope 2
City gas production	34	82
Business office (including supply)	15	16
Power generation	4,011	20
Heat supply	56	34
LBS and others	325	173
<b>Total</b>	<b>4,441</b>	<b>324</b>

### GHG (scope 3\*2)

Emissions (1,000 t-CO <sub>2</sub> e)
<b>97</b>

GHG emissions due to energy consumption arising from various activities, including commuting of employees, business trips, transportation of products, business activities at outlets that provide sales support to Osaka Gas, disposal of own waste, disposal of product waste, and leasing of assets.

### GHG (scope 3\*3)

	Emissions (1,000 t-CO <sub>2</sub> e)
Combustion of city gas	15,219
Combustion of LNG	923
<b>Total</b>	<b>16,143</b>

Companies subject to the calculation of GHG emissions: 69 companies in total, including Osaka Gas Co., Ltd., 2 overseas subsidiaries and 66 companies among 159 consolidated subsidiaries, are subject to calculation of GHG emissions. Those housed in office buildings as tenants and whose environmental data are difficult to grasp and whose environmental effects are minimal and overseas companies, except two companies, are not subject to such calculation.

Please refer to □□ P.035 for CO<sub>2</sub> emission factors used.

### Waste

	Generated	Recycled
General waste	1,007 t	96%
Industrial waste	105,439 t	97%
Excavated soil	566,000 t	100%
PE pipe	126 t	100%
Used gas appliances recovered	1,498 t	86%

### Amount of water intake and water discharge Stated on □□ P.058

#### Breakdown of Scope 3 categories

\*1 Category 1-4 (purchased products, capital goods, fuel procurement, upstream transportation)

\*2 Category 5-7, 9, 12-14 (waste, business trips, commuting, leased assets, product shipment, end-of-life treatment of sold products, franchises)

\*3 Category 11 (use of sold products)

## Calculation of environmental impacts in the value chain on [P.034](#)

### ■ CO<sub>2</sub> emission factors used (GHG scopes 1 and 2)

- Electricity: 0.65 kg-CO<sub>2</sub>/kWh (Average emission factor of thermal power plants in FY2014.3, stipulated in the Plan for Global Warming Countermeasures issued by the government in 2021)
- City gas: 2.29 kg-CO<sub>2</sub>/m<sup>3</sup> (based on Osaka Gas data)
- Others: Factors listed under the Law Concerning the Promotion of Measures to Cope with Global Warming

### ■ Sources of emission factors used for calculating CO<sub>2</sub> emissions (GHG scope 3)

- Production and transmission of city gas: “Life cycle evaluation of city gas” on the website of the Japan Gas Association
- Production and shipment of LNG: Calculation of life cycle greenhouse gas emissions of LNG and City Gas 13A (papers presented at research presentation meetings of the 35th Meeting of the Japan Society of Energy and Resources, June 2016)
- Production and shipment of LPG and coal: Future forecast for life cycle greenhouse gas emissions of LNG and City Gas 13A (Energy and Resources, Vol. 28, No. 2, March 2007)
- Other main emission factors: Emission factors for calculating supply-chain greenhouse gas emissions, etc. (Database Ver. 3.3) published in March 2023 by the Ministry of Environment

### LCA comparison of GHG emissions by fossil fuel (CO<sub>2</sub> equivalents)

The chart below uses life cycle assessment (LCA<sup>\*1</sup>) to show a comparison of fossil fuel greenhouse gas emissions (as carbon dioxide equivalents), covering all processes from production to combustion. LNG is the cleanest energy of all fossil fuels in terms of GHG emissions.

### ■ Greenhouse Gas Emissions Comparison (g-CO<sub>2</sub>/MJ, Total Calorific Value)

	Coal <sup>*2</sup>	Oil <sup>*2</sup>	LPG <sup>*2</sup>	LNG <sup>*2</sup>	City gas 13A <sup>*3</sup>
Production	4.58	4.06	4.94	8.62	7.63
Transport	1.71	0.79	1.80	1.83	1.48
Domestic manufacturing	–	–	–	–	0.49
Infrastructure	0.11	0.08	0.11	0.05	0.34
Combustion	88.53	68.33	59.85	49.40	50.96
Total	94.93	73.26	66.70	59.90	60.90
Ratio	160	122	111	100	–

\*1 LCA

Life Cycle Assessment. A comprehensive quantitative method of survey, analysis, and evaluation for best assessing the amount of environmental impact of products and services. The assessment covers all processes related to products and services from resource extraction to waste disposal including production, transportation, consumption, recycling, and disposal.

\*2 Source

Future Forecast for Life Cycle Greenhouse Gas Emissions of LNG and City Gas 13A (Energy and Resources, Vol. 28, No. 2, March, 2007)

\*3 Source

Emission factors related to the production and transportation of city gas: “City Gas’s Life Cycle Assessment” on the Japan Gas Association’s website. However, for domestic manufacturing, the figures are based on the Company’s emissions in FY2024.3.

## Environmental Accounting

### FY2024.3 results of environmental accounting

In FY2001.3, we introduced environmental accounting, which we see as an important tool for quantifying environmental costs and economic benefits toward more efficient environmental activities and continuous enhancement of our environmental performance. Regarding environmental conservation costs for FY2024.3, environmental investment increased from the previous fiscal year mainly due to an increase in environmental R&D-related investment, while expenses decreased from the previous fiscal year mainly due to a decrease in the amount of green purchasing. In terms of internal economic effects, cost reduction progressed due to reducing and recycling excavated soil.

We will continue to follow up on our environmental initiatives in monetary terms to ensure efficient environmental investment and expenses.

#### (1) Environmental conservation costs

Environmental conservation costs item			Investment (million yen)			Expense (million yen)		
Details			FY2022.3	FY2023.3	FY2024.3	FY2022.3	FY2023.3	FY2024.3
In-house activities	Global environment	Capital investment in and management and labor costs incurred by energy conservation, efficient energy use, the protection of the ozone layer, etc.	216	48	68	577	597	493
	Pollution prevention	Capital investment in and management and labor costs incurred by the prevention of air, water, and noise pollution	54	6	5	49	31	33
	Resource recycling	Capital investment in and management and labor costs incurred by the reduction and recycling of excavated soil, waste management, etc.	0	2	0	32	20	21
	Environmental management	Costs of green purchasing, environmental education, the development of environmental management systems, the operation of environmental organizations, etc.	0	0	0	8,927	4,320	4,265
	Other	Greening at plants, environmental preservation grants, etc.	3	2	7	50	15	18
Environmental impact reduction at customers' sites	Environmental R&D	Cost of researching and developing technologies for environmental impact reduction, environmentally sustainable products, etc.	127	128	174	328	156	136
Environmental impact reduction by recycling	Recycling of used gas appliances	Cost of collecting and recycling sold gas appliances, their packaging, etc.	0	0	0	47	37	16
Social contribution activities			1	22	0	7	115	138
Total			400	208	253	10,018	5,291	5,119

#### (2) Internal economic benefits

	Economic benefits (million yen)		
	FY2022.3	FY2023.3	FY2024.3
Saving from reducing and recycling excavated soil	1,847	1,836	2,585
Sales of valuable resources (LNG cold heat)	169	195	218
Saving from conserving energy, resources, etc.	128	-940	-69
Total	2,143	1,091	2,734

## (3) Environmental conservation results

	Impact per output			Total amount			Reduction		
	Unit	FY2023.3	FY2024.3	Unit	FY2023.3	FY2024.3	Unit	FY2023.3	FY2024.3
NOx emissions from LNG terminals in the city gas business	mg/m <sup>3</sup>	2.35	2.53	t	16.01	16.55	t	94.18	101.05
COD at all LNG terminals	mg/m <sup>3</sup>	0.40	0.40	t	2.72	2.60	t	9.55	8.66
CO <sub>2</sub> emissions from LNG terminals	g-CO <sub>2</sub> /m <sup>3</sup>	16.25	17.37	1,000 t-CO <sub>2</sub>	116.30	115.43	1,000 t-CO <sub>2</sub>	0.00	0.00
CO <sub>2</sub> emissions from other sites	g-CO <sub>2</sub> /m <sup>3</sup>	4.35	4.68	1,000 t-CO <sub>2</sub>	31.15	31.07	1,000 t-CO <sub>2</sub>	34.41	29.80
Excavated soil for final disposal	t/km	0.00	0.00	1,000 t	0.65	0.63	1,000 t	22.20	39.90
General waste for disposal	g/m <sup>3</sup>	0.00	0.00	t	11.15	11.11	t	1,062.40	985.79
Industrial waste for disposal (including used gas appliances)	g/m <sup>3</sup>	0.03	0.03	t	223.64	218.67	t	1,238.76	1,213.28

## (4) Social benefits of environmental conservation efforts (monetary value)

	FY2022.3 monetary value (million yen)	FY2023.3 monetary value (million yen)	FY2024.3 monetary value (million yen)
NOx emissions from LNG terminals in the city gas business	14	34	36
COD at all LNG terminals	13	14	13
CO <sub>2</sub> emissions from LNG terminals	0	0	0
CO <sub>2</sub> emissions from other sites	120	121	105
Excavated soil for final disposal	447	491	883
General waste for disposal	3	3	3
Industrial waste for disposal (including used gas appliances)	103	38	37
<b>Total</b>	<b>700</b>	<b>702</b>	<b>1,077</b>