Verified by a third party A third-party verification has been conducted by Bureau Veritas Japan Co., Ltd.

Environmental Impact throughout the Daigas Group Value Chain

Main materials and fuels

Amount of LNG procured	6,488 thousand tons The figure above includes the amounts of the items listed below: ● Materials of city gas ● Fuels at LNG terminals ● Fuels for power generation by Group companies
LPG used for calorific adjustment of city gas	210 thousand tons

Amount of energy used

City gas	1,232 million m³ (including gas whose calorific value has yet to be adjusted)
Purchased electricity	493 million kWh
Other energy sources	13,568 TJ

Amount of vehicle fuel used

Gasoline	1,553 kl
City gas	31 thousand m³
Diesel	699 kl
LPG	4 thousand m³

Sales volume of main products

Gas	6,845 million m³
Electricity	15,883 million kWh

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

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

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

Use at customer site

- City gas
- Gas appliances
- Electricity
- Chemical products
- LNG
- Services

GHG (scope 3*1)

	Emissions (1,000 t-CO_2e)
LNG, natural gas	3,362
LPG, coal, biomass	192
Other procurement items	1,051
Total	4,606

GHG (scope 1 and 2)

	Emissions (1,000 t-CO_2e)	
	Scope 1	Scope 2
City gas production	34	82
Business office (including supply)	16	15
Power generation	3,869	21
Heat supply	56	34
LBS and others	431	172
Total	4,406	324

GHG (scope 3*2)

Emissions (1,000 t-CO_2e)
99

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_2e)
Combustion of city gas	15,675
Combustion of LNG	867
Total	16,542

Waste

	Generated	Recycled
General waste	1,103 t	96%
Industrial waste	101,654 t	96%
Excavated soil	580,000 t	100%
PE pipe	137 t	100%
Used gas appliances recovered	1,569 t	86%

Amount of water intake and water discharge Stated on P.49

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)

Companies subject to the calculation of GHG emissions: 63 companies in total, including Osaka Gas Co., Ltd. and 62 companies among 154 consolidated subsidiaries. Those housed in office buildings as tenants and whose environmental data are difficult to grasp and whose environmental effects are minimal are not subject to such calculation. Also excluded from the calculation are overseas companies, except two companies.

Please refer to P.35 for CO_2 emission factors used.

Calculation of environmental impacts in the value chain P.34

■ CO_2 emission factors used (GHG scopes 1 and 2)

- Electricity: 0.65 kg-CO_2/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_2/m^3 (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_2 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_2 equivalents)

The chart below uses life cycle assessment (LCA*1) 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_2/MJ, Total Calorific Value)

	Coal*2	Oil*2	LPG*2	LNG*2	City gas 13A*3
Production	4.58	4.06	4.94	8.62	7.57
Transport	1.71	0.79	1.80	1.83	1.48
Domestic manufacturing	–	–	–	–	0.48
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	60.83
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 FY2023.3.