

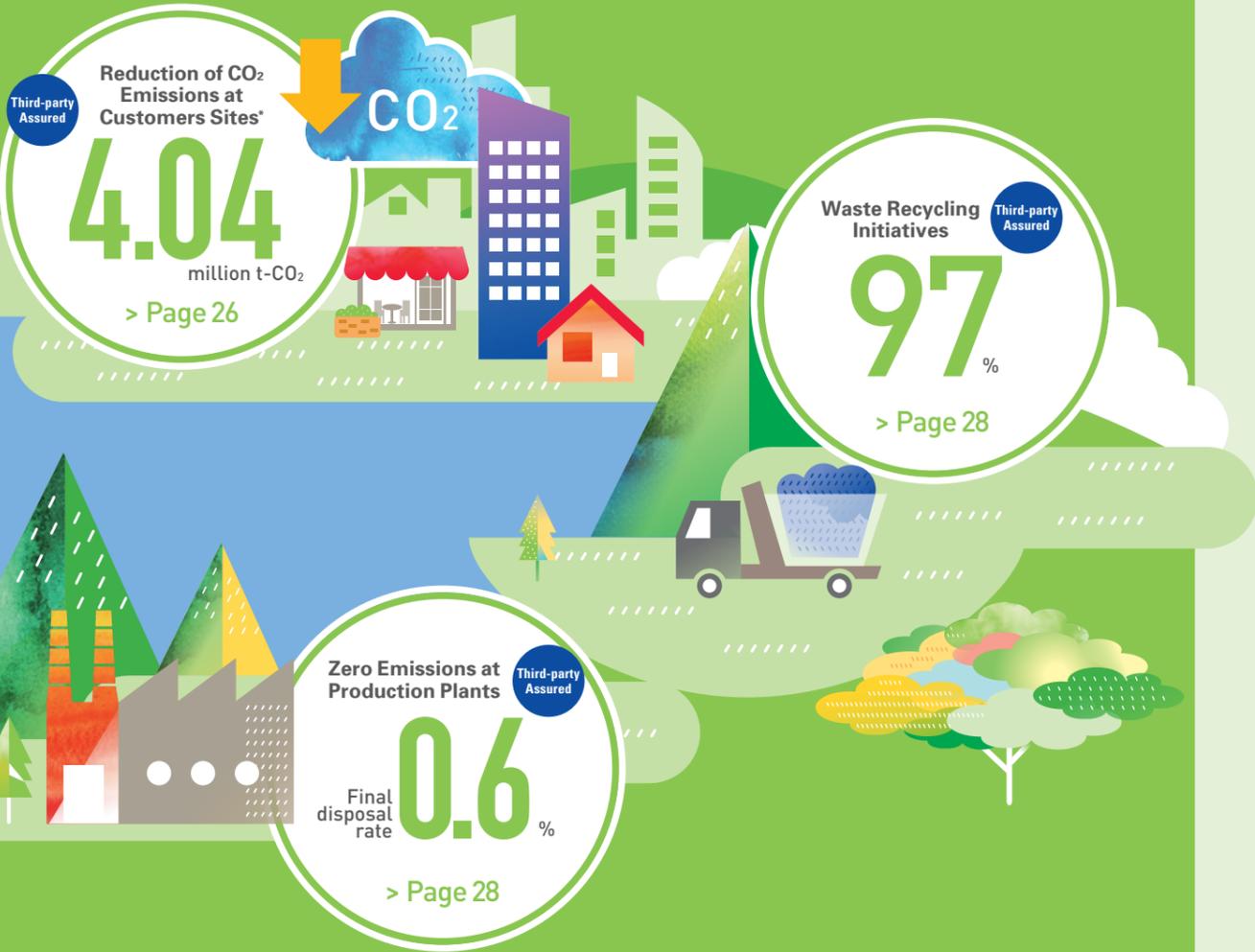
Key CSR Activity

2

Contribution to the Environment

Since LNG (liquefied natural gas) was introduced to Japan in 1969, the Tokyo Gas Group has worked to deploy the use of environmentally friendly natural gas.

We will continue to seek solutions to environmental issues as a total energy group from now on.



*Reduction in CO₂ emissions based on fiscal 2011. (Figures for the Tokyo Gas Group are as of the end March 2018)

External Evaluation

Rated A- by CDP Climate Change Report 2017

CDP is a registered charity that formulates strategies and collects data on climate change in collaboration with institutional investors. Tokyo Gas has received an A-, the Leadership level.



SNAM Sustainability Index 2018

For seven consecutive years we have been selected to the index, which is composed by Sompo Japan Nipponkoa Asset Management Co., Ltd. based on the results of a corporate survey on ESG.

Cogeneration Award 2017

Consumer use category: Chairman's Award
 Industrial use category: Award for Excellence
 Technological development category: Chairman's Award, Special Award



Basic Policy on the Environment

The Tokyo Gas Group pursues environmental management through a concerted effort and has established its Environmental Principle based on its Management Philosophy and Corporate Action Philosophy, and its Environmental Sustainability Guidelines to define concrete initiatives and quantitative targets.

● Environmental Principle

[Philosophy]

The Tokyo Gas Group will promote more sustainable ways of energy use to contribute to the protection of regional and global environments as well as to the sustainable development of society.

[Principles]

1. Reduction of the Environmental Impact of Customers' Energy Use
2. Reduction of the Total Environmental Impact of Tokyo Gas's Business Operations
3. Strengthening of Environmental Partnerships with the Local and International Communities
4. Promotion of Green Technology R&D Programs
5. Biodiversity Conservation and Sustainable Use
6. Compliance with Environmental Law and Fulfillment of Social Responsibilities

● Environmental Sustainability Guidelines

- Climate change countermeasures
- Promotion of resource saving and recycling
- Promotion of biodiversity conservation
- Promotion of environmental communication
- Promotion of the development of environmental technologies



● Promotion of Environmental Management

The Tokyo Gas Group has practiced effective and efficient environmental management under the leadership of top management since establishing its Group-wide environmental management system (EMS) in 2005 to comply with the ISO 14001. In fiscal 2017, we made the transition to the 2015 version of ISO 14001 in order to remain legally compliant and continuously reduce the environmental impact of our business activities.

The Tokyo Gas Group was not cited for any violations or fines with respect to environmental laws and regulations in fiscal 2017. As for chemical substances, we managed them in accordance with applicable laws and regulations while reducing emissions.

● Measures to Counter Environmental Risks

The Tokyo Gas Group has integrated its business management with an enterprise risk management system so that it can review risks and monitor the status of implementing and improving our response on an annual basis.

With respect to risks related to climate change, we are pursuing a two-sided response: mitigation to reduce greenhouse gas emissions across our LNG value chain and adaptation by working on preventive measures against flooding caused by extreme weather. In view of the growing risks related to water, we have been conducting comprehensive evaluations and analyses of current and future risks since fiscal 2016.

With respect to soil contamination caused by past gas business activities, we conduct voluntary investigations, disclose the results and respond to related matters promptly.

CSR at the Tokyo Gas Group
Enhancement of Energy Security
Contribution to the Environment
Contribution to Local Communities
Respect for Human Rights
Promotion of Compliance
Enhancement of People-Centered Management Base

Climate Change Countermeasures

The Tokyo Gas Group is endeavoring to reduce CO₂ emissions across its entire LNG value chain to develop a low-carbon society by setting guidelines for climate change, not only for our business activity stage but also for the customer site stage, where CO₂ emissions are relatively large.

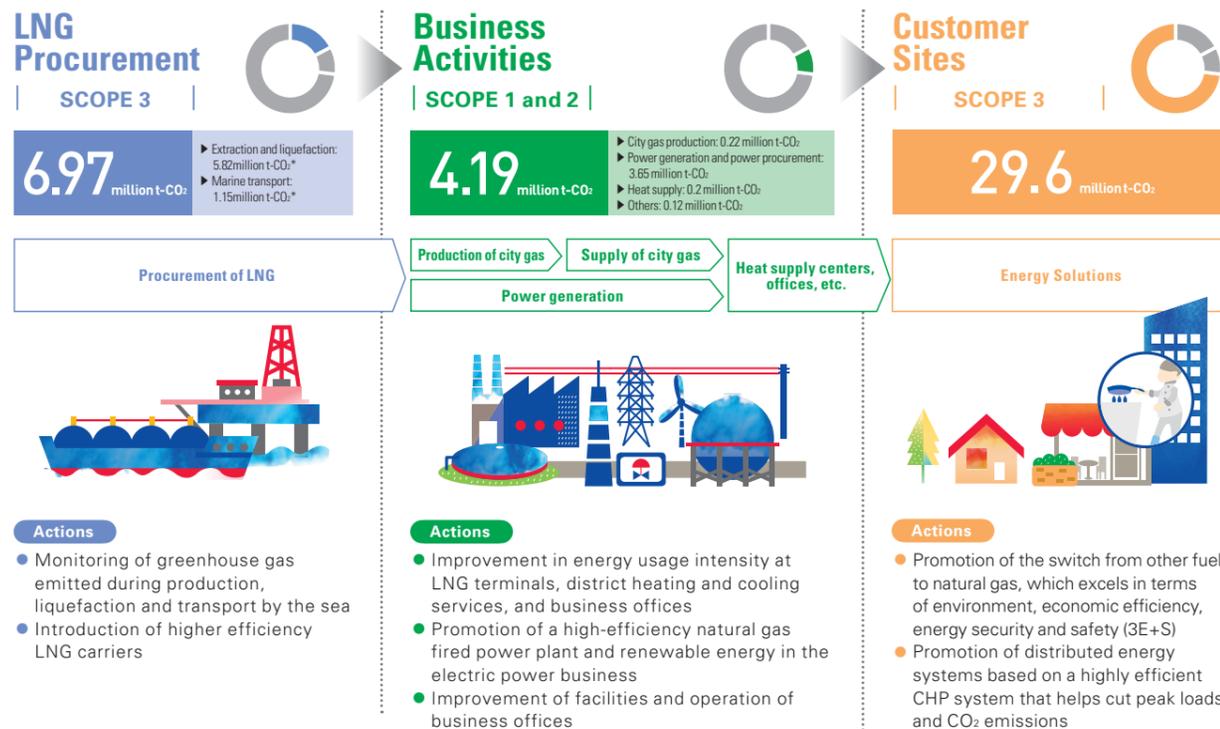
In light of the Paris Agreement adopted at the COP21 conference as well as movements against climate change in Japan, we have been actively pursuing low-carbon initiatives. These include implementing a wider use of natural gas, which has a lower CO₂ emission factor, developing and expanding Smart Energy Networks

(SENs) that combined heat and power (CHP) systems and other highly efficient equipment with advanced energy management and embracing digitization technologies and innovation.

In our electric power business, we will develop an optimal power source portfolio with eco-friendly natural gas-fired power plants, renewable energy and so on. Furthermore, in our overseas business we will deploy technologies that excel in reducing CO₂ emissions and energy consumption across our LNG value chain as a contribution to global efforts to address climate change.

Greenhouse Gas Emissions along the LNG Value Chain Third-party Assured

The Tokyo Gas Group's greenhouse gas emissions in fiscal 2017 were approximately 40 million t-CO₂. (for SCOPE 3 data, only major categories were calculated)



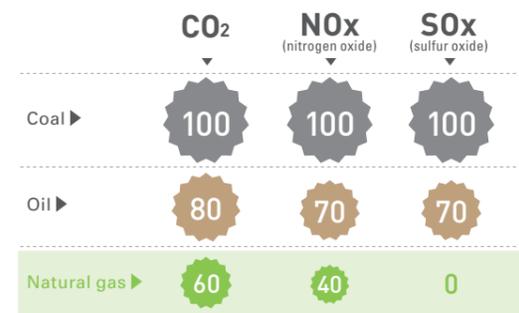
SCOPE 1: Business's own direct emissions of greenhouse gases.
 SCOPE 2: Indirect emissions from consumption of electricity, heat, and steam supplied by others.
 SCOPE 3: Indirect emissions other than covered in SCOPE 2 (emissions by other parties involved with business's activities).

*Source: "Study of Life Cycle Greenhouse Gas Emissions of LNG and City Gas 13A" (Proceedings of the annual meeting of Japan Society of Energy and Resources 35, pp. 23-26, 2016)

Environmental Advantages of Natural Gas

Natural gas is primarily composed of methane (CH₄), which contains a smaller proportion of carbon atoms in its molecule compared to oil or coal. Moreover, it characteristically produces the least CO₂ among fossil fuels when burned. Also, since sulfur compounds and impurities are deeply removed during the liquefaction process, natural gas produces almost no SO_x, which makes it the most environmentally sound fossil fuel.

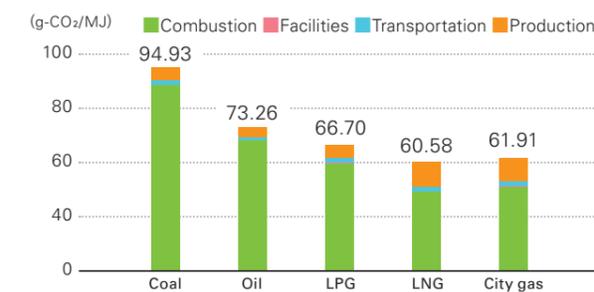
Comparison of Emissions during Combustion (Coal = 100)



Source: Agency for Natural Resources and Energy, Energy White Paper 2013

Environmental Advantages of City Gas in Terms of Lifecycle CO₂ Emissions

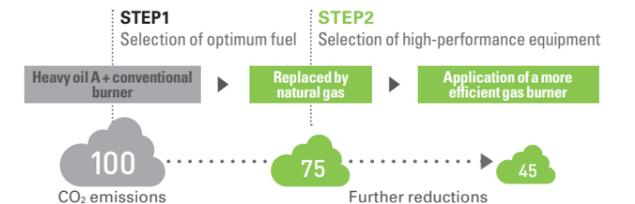
Greenhouse gases are released not only when fossil fuels are burned but also when they are extracted, processed and transported. Therefore, it is important to take into account emissions throughout the fossil fuel lifecycle. From the lifecycle perspective, natural gas generates the lowest CO₂ emissions of any fossil fuel and city gas generates extremely low energy loss during its manufacturing and supply.



Source: "Future Forecast for Life Cycle Greenhouse Gas Emissions of LNG and City Gas 13A" (Japan Society of Energy and Resources, presentation report 28 (2), pp. 51-56, 2007)

Switching to Natural Gas and More Sophisticated Use

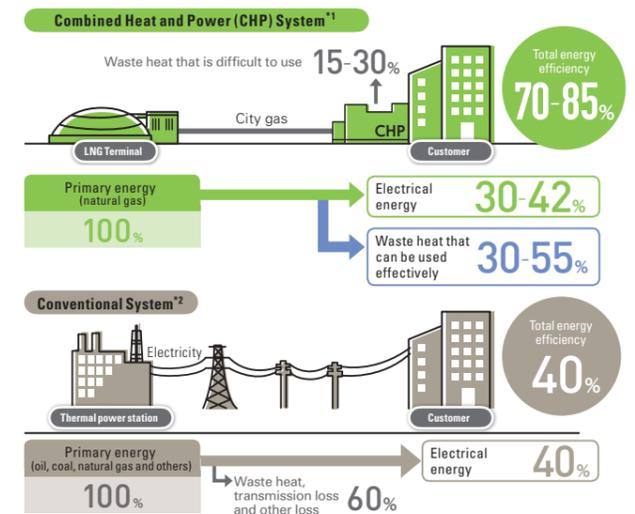
Emissions of CO₂ are dramatically reduced by switching away from the use of fuels such as oil and LPG to natural gas and by supplying natural gas to power plants. Emissions can be further reduced by installing more efficient industrial burners and furnaces when switching fuels.



Popularizing CHP Systems

CHP systems are distributed energy systems fueled by city gas to produce electricity at the customer's site, utilizing the heat generated for cooling, heating, hot water and steam as well. Thus, the system achieves high total energy efficiency, which contributes to energy saving and CO₂ emission reduction, by wasting less energy in the process.

Combination with renewable energy sources having unstable output is another value of the CHP systems. And the system can serve as the core component of the Smart Energy Network, thus significantly contributing to the realization of a low-carbon society.



*1 This chart shows an example of energy efficiency by a CHP system on an LHV basis.
 *2 On an LHV basis, the thermal efficiency of thermal power plants and total loss were calculated based on actual operation data for fiscal 2003 at nine electric power companies and electricity wholesalers (Energy Efficiency Standards Subcommittee, September 2005).

Promotion of Resource Saving and Recycling

Third-party Assured

The Tokyo Gas Group strives to create a recycling-based society by implementing its Guidelines for Promoting Resource Saving and Recycling and rigorously practicing the 3Rs of reduction, reuse, and recycling of waste across the Group. Specifically, we seek to achieve zero waste emissions at production sites, reduce the amount of soil excavated during gas pipeline construction, reuse old gas meters and recycle used gas pipes at every stage of our business activities.



Used polyethylene (PE) gas pipes are collected for recycling into items such as the tags attached to customers' gas meters that explain how to restart meters in case of an earthquake.

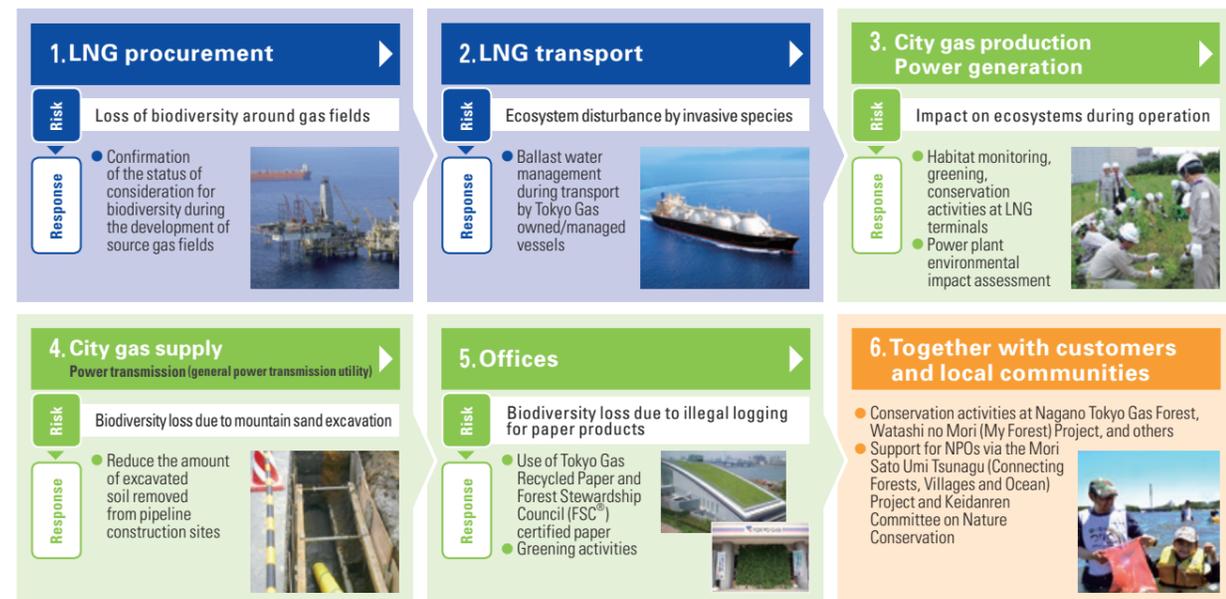
Reduce	Reuse	Recycle	
General waste reduced 113 tons Year-on-Year	Reuse gas meters 392 thousand gas meters	Recycling rate for used gas pipes (PE, steel and cast-iron pipes) 100 %	Volume of Tokyo Gas Recycled Paper 247 tons

Promotion of Biodiversity Conservation

The Tokyo Gas Group endeavors to secure biodiversity and achieve coexistence with nature by setting its Guidelines for Promoting Biodiversity Conservation, monitoring the impact of its business activities on the environment along the LNG value chain, and taking steps

to reduce its impact on ecosystems. Moreover, we engage in conservation activities in forests and satoyama woodlands near populated areas and the sea with our customers and local communities as activities aimed at contributing to the environment and society.

Impacts on Biodiversity and Responses along the LNG Value Chain



Promotion of Environmental Technologies Development

Infrastructure Improvement for Hydrogen Supply

To reduce carbon emissions in the transportation sector, Tokyo Gas is building and operating hydrogen stations (hydrogen ST) to promote the wider use of fuel cell vehicles powered by hydrogen. We have already opened three hydrogen stations—Nerima Hydrogen ST, Senju Hydrogen ST in Tokyo, and Urawa Hydrogen ST in Saitama Prefecture—as our contribution to the development of the hydrogen society.

In February 2018, we jointly established Japan H₂ mobility, LLC (JHyM) with ten other companies, including infrastructure businesses, automobile makers and financial investors, with the aim of accelerating the pace of developing hydrogen stations. This world-first collaboration will pursue an initiative for the strategic development and efficient operation of hydrogen stations. Tokyo Gas will construct and operate hydrogen stations as an infrastructure company in collaboration with JHyM.



Establishment of Japan H₂ mobility, LLC

Contributing to the Creation of a Low-carbon Society through Innovation

The Tokyo Gas Group has consistently developed technologies for reducing energy consumption and CO₂ emissions. However, to further bolster efforts to create a low-carbon society, we must move beyond our proprietary technologies and embrace innovative ideas and technologies from around the world. To that end, we are promoting open innovation style research and development. In fiscal 2017, we set up two specialized companies in the United States, Acario Investment One LLC and Acario Innovation LLC, and began investing in venture capital firms and venture businesses that specialize in energy technologies. We will seek closer collaboration with startup ventures and companies that have innovative business models toward meeting the demands of a low-carbon society.

Technological Innovations in Combined Heat and Power (CHP) Systems

CHP systems have led to growing expectations from customers from the perspectives of environment, energy saving and BCPs (business continuity plans). These systems have the potential to spread once further enhancements are made to economic efficiency and energy security.

Technologies for enhancing thermal efficiency and achieving precise control of combustion have led to significant improvements in the power generation efficiency of gas engines used in CHP systems. Large-scale gas engines with a capacity of 5,000 kW or higher now boast power generation efficiency approaching 50%, while the majority of medium-class gas engines with 300 kW to 1,000 kW capacity now offer efficiency ratios of 40% or higher. In April 2017, we launched our 1,000 kW-class CHP system GS16R2, which offers improved performance compared to the preceding model. It achieves a power generation efficiency of 42.5%, a total efficiency of 80.1%, and enjoys robust sales.

In future, such systems are expected to be capable of an even higher power generation efficiency by introducing solid oxide fuel cells (SOFCs) that operate in higher temperatures. Tokyo Gas has evaluated the durability and effects on reducing energy consumption and CO₂ emissions demonstrated by commercial SOFC systems during actual operation and have confirmed the energy conservation effects at these sites. Using these results, we are currently promoting sales of the 3 kW-class SOFC system we commercialized in June 2017, which features a power generation efficiency of 52.0% and total efficiency of 90.0%.

Power Generation Efficiency of CHP Systems

