

Environmental Management

Basic Approach

MGC recognizes that curbing, and adapting to, climate change and other environmental problems are important issues that have a significant impact on business operations. At the same time, we realize they also represent business opportunities, and so here too we are engaged in a variety

of activities aimed at “creating value to share with society.”

In an effort to reduce environmental impact associated with business activity, in April 2018 we established the MGC Group Declaration on Environmental Sustainability, and are currently at work putting it into practice.

MGC Group Declaration on Environmental Sustainability

The Mitsubishi Gas Chemical Group shall help communities develop more sustainably in the future by taking actions aimed at maintaining a healthy global environment, including initiatives for tackling climate change, promoting community-based recycling, and protecting biodiversity.

1. We shall strive to procure energy, raw materials, water, and other resources in a manner that minimizes environmental impact, and promote the efficient use of such resources.
2. We shall implement measures to reduce the environmental impact of greenhouse gases and other environmental pollutants.
3. We shall reduce waste through recycling and other initiatives, and properly manage and dispose of the waste we produce.
4. We shall promote the development and widespread use of products and technology that reduce environmental impact or help restore damaged ecosystems.
5. We shall fully comply with international rules and the environmental regulations of countries in which we operate.
6. We shall promptly and properly disclose information regarding our environmental initiatives and proactively engage with our communities.
7. We shall strive to raise awareness of environmental issues through education.

Research into Environmental Impact Reduction Technologies

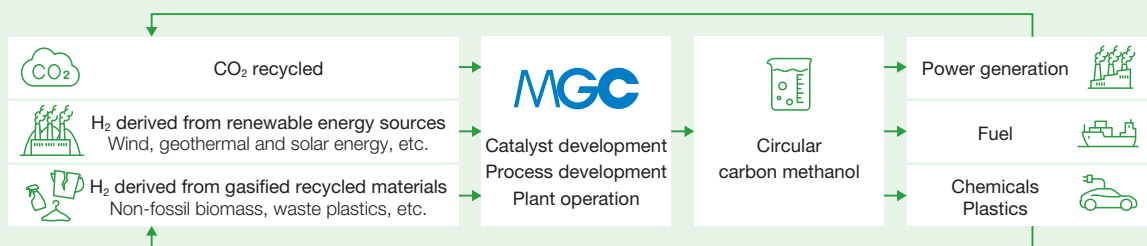
MGC is advancing research into carbon recycling, which makes effective use of CO₂ as a chemical raw material, as a viable technology for reducing environmental impact.

MGC was quick to begin working on development of methanol production technology using CO₂ and hydrogen as raw materials. Going forward, we will be launching methanol production using the methanol pilot facility at the Niigata Plant. At the same time, we will advance our efforts aimed at achieving a decarbonized society through Circular Carbon Methanol (CCM) Production, in which CO₂ emissions, waste plastics, etc. are converted into methanol, recycling them for use as chemicals or fuel and in power generation.

Leveraging our knowledge regarding polycarbonate resin research and manufacturing, in which we are developing a business, we are working with Tohoku University, Nippon Steel Corporation and Nippon Steel Engineering to develop technology for synthesizing polycarbonate resin intermediates using CO₂. In fiscal 2020, we worked on the New Energy and Industrial Technology Development Organization (NEDO) Leading Research Program to develop technology for directly synthesizing dialkyl carbonate, a polycarbonate resin intermediate, from CO₂, and found that it has the potential to reduce CO₂ emissions compared to existing processes. In 2021, we plan to consider scaling up the process in preparation for implementing the technology.

Initiatives Under CCM Production

MGC has set forth CCM Production, which enables environmental recycling through the reuse of CO₂ emissions from power plants, waste plastic and other materials in the form of methanol. By encouraging cross-industry cooperation, we will contribute to achieving a decarbonized and recycling-oriented society. Specifically, in addition to granting licenses for technology to synthesize methanol from CO₂ emissions and various gases, we offer comprehensive proposals covering operation and maintenance technical support services and methanol-related product transactions. As we advance these efforts at cross-industry cooperation and public-private collaboration based on reducing CO₂ emissions and recycling resources, MGC aims to bring innovation to established industrial structures and economic society that will promote new growth.



Response to Climate Change (Disclosure Based on TCFD Recommendations)

Tackling climate change is a major challenge that calls for initiatives on a global scale if we are to achieve a sustainable society. MGC recognizes that solving energy and climate change problems is an important challenge, and is working to solve these issues from the perspective of both climate change mitigation and climate change adaptation.

Specifically, MGC has formulated targets for reducing Scope 1 and 2^{*1} GHG emissions and is working toward their steady reduction. At the same time, MGC is proactively disclosing information on Scope 3^{*2} GHG emissions and is taking action to reduce them in collaboration with its suppliers. MGC is also working to improve energy efficiency and the carbon cycle of raw materials, and to promote energy transition toward the goal of achieving a zero-carbon society by 2050. MGC will also contribute to solving energy and climate change challenges through business operations by deploying innovative process technologies and factoring whole-lifecycle GHG emissions into its design and development processes.

In May 2019, MGC also declared its support for the Task Force on Climate-related Financial Disclosures (TCFD). MGC has assessed the risks and opportunities climate change represents for the Group, and we are working to strengthen resilience through scenario analysis while also engaging in sound dialogue with our stakeholders.

In March 2021, MGC announced a new objective for achieving carbon neutrality by 2050 with the goal of limiting the increase in average temperature to below 2°C. MGC encourages the development of energy systems to achieve carbon neutrality, and aims to expand the range of products conducive to carbon neutrality.

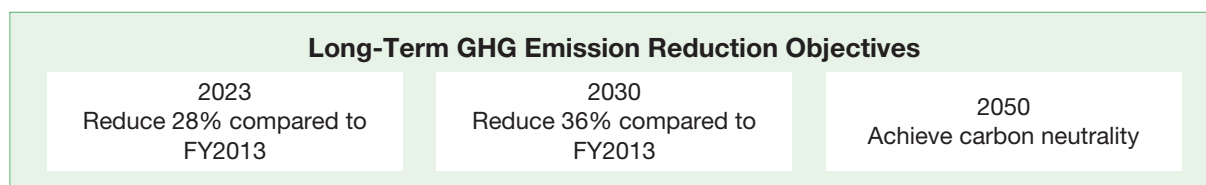
*1 Scope 1 emissions are GHG emissions directly generated by MGC. Scope 2 emissions are indirect GHG emissions associated with the use of energy (mainly electric power) purchased from external suppliers.

*2 Scope 3 emissions are indirect GHG emissions generated in supply chains through organizational activities such as raw material sourcing, manufacturing, distribution, sales, and waste disposal.

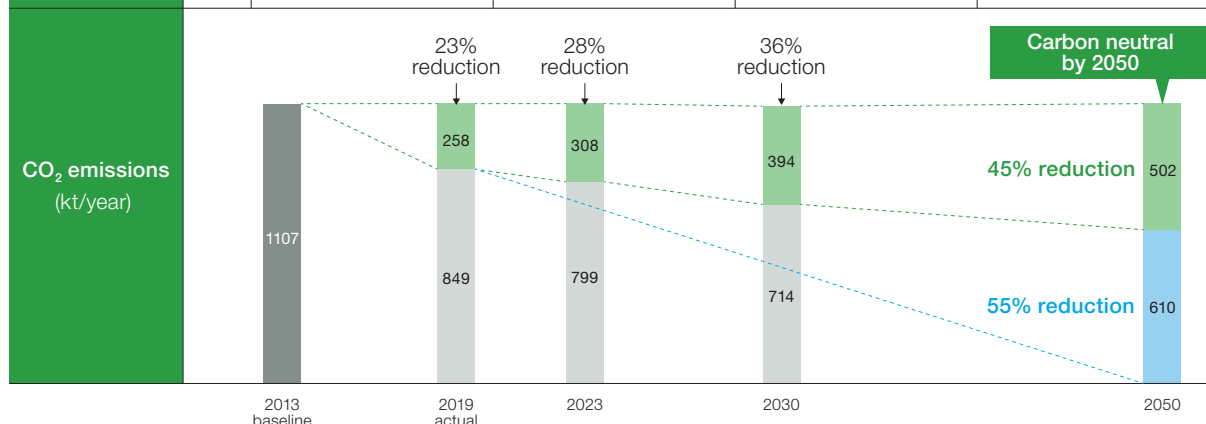
MGC's Roadmap toward Its Ultimate Goal of Carbon Neutrality by 2050

MGC has established long-term objectives for reducing GHG emissions as it works toward achieving carbon neutrality by 2050. To achieve these objectives, MGC has established key performance indicators (KPIs) for GHG emissions and GHG emissions intensity. We are moving

forward with short-, medium- and long-term emissions reduction strategies that include promoting energy-saving activities, deployment of renewable energy, and the circular carbon methanol concept.



	Scope	2013–2019	2020–2023	2024–2030	2031–2050
Main initiatives (CO ₂ reduction)	1	<ul style="list-style-type: none"> Improve energy efficiency Reconfigure business portfolio 258kt in total	<ul style="list-style-type: none"> Improve energy efficiency 16kt Stop using heavy oil 13kt Reconfigure business portfolio Deploy new energy systems/CCUS, switch feedstocks (R&D/collaboration) 610kt in total 	<ul style="list-style-type: none"> Improve energy efficiency 28kt 	<ul style="list-style-type: none"> Improve energy efficiency 40kt
	2	—	<ul style="list-style-type: none"> Source 10% of energy from renewables 14kt Use transitional energy 10kt 	<ul style="list-style-type: none"> Source 50% of energy from renewables 55kt 	<ul style="list-style-type: none"> Source 100% of energy from renewables 69kt



Risks and Opportunities behind Strategy Formulation

Assumptions behind Scenario Analysis for Fiscal 2020

- Target: 2030
- Scenario: Temperature rise (4C°: Continuation of current oil and coal-dependent economic activity; 2C°: Advance climate change countermeasures)
- Analysis subjects: Hydrogen peroxide (Kashima Plant, Yokkaichi Plant*³, Yamakita Plant) and MX-Nylon (Niigata Plant) businesses
- Conduct quantitative assessment of financial impact of risks and opportunities in existing business portfolio and draft response strategy

*³ Including the Saga Plant

Climate Change Risks and Opportunities

Risks Opportunities

Transition Risks and Opportunities (2°C scenario)	<input type="checkbox"/> Soaring raw fuel prices <input type="checkbox"/> Deployment of environmentally-friendly equipment <input type="checkbox"/> Introduction of carbon tax <hr/> <input type="checkbox"/> Growing market for eco-friendly products <input type="checkbox"/> Increasing demand for non-edible plant-derived chemicals <input type="checkbox"/> Reduced costs for renewable energy	[Primary Responses] <ul style="list-style-type: none"> • Further improve energy use efficiency and develop decarbonization processes • Expand deployment of renewable energy • Decarbonize raw fuels • Develop decarbonized products
Physical Risks (4°C scenario)	<input type="checkbox"/> Impact of increasingly severe natural disasters on plant operations <input type="checkbox"/> Fragmented supply chains	<ul style="list-style-type: none"> • Strengthening BCP

Risk Management (Introduction of Internal Carbon Pricing System)

MGC has identified key issues (materiality) related to the environment, society and corporate governance, and manages risk through cross-company materiality management. One material issue that has been identified as extremely important from the perspective of stakeholders and MGC itself is a proactive response to environmental problems. MGC intends to take the initiative on this issue, a requirement for the Company's survival

and ongoing activity.

To gain a quantitative understanding of climate change risks, in April 2021 MGC introduced an internal carbon pricing system. In capital investment plans involving an increase or decrease in CO₂ emissions, the cost or effect of applying and converting the internal carbon price (10,000 yen/MT-CO₂ equivalent) will be used to help make investment decisions, and encourage the creation of technologies and products that promote CO₂ emission reductions and contribute to building a low-carbon society.

Monitoring by CSR Council

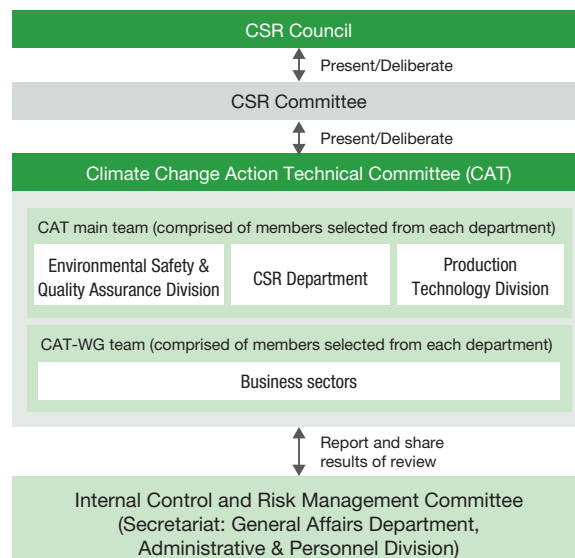
The CSR Council, composed of Directors and chaired by the President, deliberates and makes decisions on addressing climate change risk and other CSR key issues. The participation of corporate sector heads on the CSR Committee, an advisory body to the CSR Council, ensures CSR key issues are adequately deliberated.

To develop a response to climate change, MGC has established the Climate Change Action Technical Committee (CAT), a CSR Expert Committee, as an advisory body to the CSR Committee. As the administrative office for dealing with TCFD and CDP disclosures, the CAT promotes cross-business initiatives.

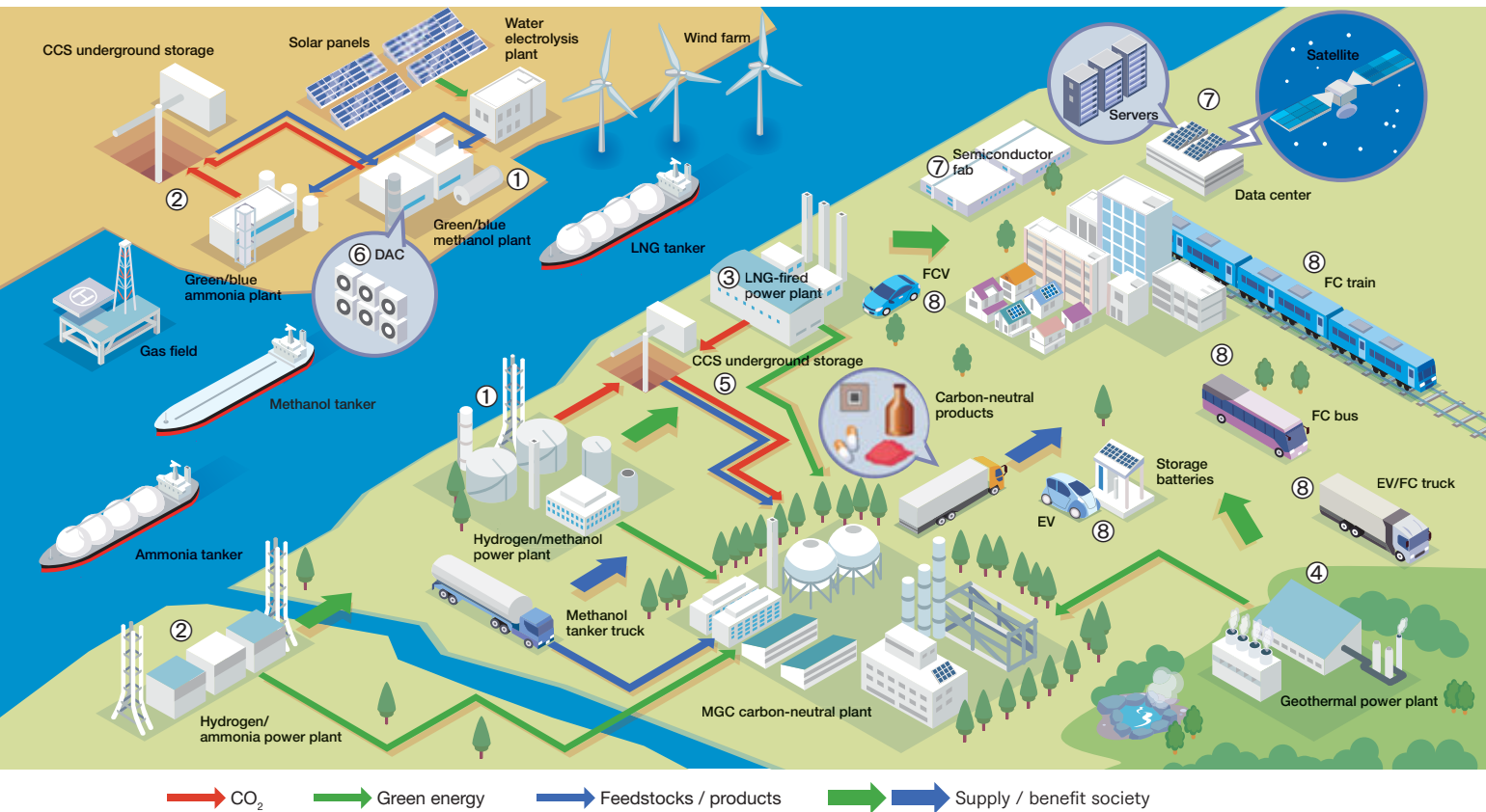
Long-term objectives for reducing GHG emissions have been incorporated in the Medium-Term Management Plan, with management taking a leading role in their implementation.

 For details on the CSR promotion system, please refer to page 40.

Climate Change Governance Structure



MGC's Vision of Carbon-Neutral World Circa 2050



Carbon-Neutral Energy Systems, CO₂ Usage

① Methanol energy system

Methanol produced from captured CO₂ and renewable energy hydrogen (Hydrogen carrier/CO₂-free fuel)



Methanol pilot facility (Niigata Plant)

② Ammonia energy system

Ammonia produced from renewable energy hydrogen, etc. (Hydrogen carrier/CO₂-free fuel)

③ LNG-fired power plant + CCS

Carbon-free power plant combining high-efficiency, low-CO₂ emitting power plant and CC(U)S

④ Geothermal power plant

Renewable energy power plant



Wasabizawa Geothermal Power Station

⑤ e.g. Production of polycarbonate feedstock from CO₂ (CCUS)

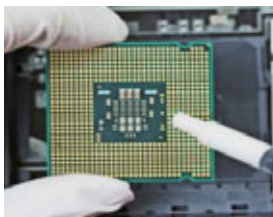
Technology for CO₂ capture and storage, and for using CO₂ as a raw material in polycarbonate resin production. Contribute through CO₂ consumption technology in the form of green plastics

⑥ Specialty amines (DAC absorbents)

CO₂ absorbents for DAC (direct capture and storage of CO₂ from the air)

Products Conducive to Carbon Neutrality

⑦ BT materials, electronic chemicals (energy control systems)



BT materials



Super-pure hydrogen peroxide

⑧ Solid-state batteries (EVs), fuel cells (FCVs), polycarbonates/polyacetals (lighter-weight auto bodies), optical materials (more efficient driving with automated-driving sensing devices)



Optical materials



Fuel cells

Addressing Water Resource Risks

MGC uses large quantities of water, both as a raw material for chemical products and for various other purposes, including steam-heating and cooling in chemical manufacturing processes, product refining and cleaning containers.

To sustainably use water resources essential to manufacturing chemicals, MGC manages a variety of risks. Specifically, MGC monitors its actual water consumption and uses water efficiently by measuring its withdrawal, discharge, usage and recycling. In drawing from water sources, MGC restricts its intake to permitted quantities in accordance with applicable laws or agreements with municipalities. Additionally, MGC discharges wastewater into rivers, the sea or other public water bodies in compliance with effluent standards after treating it to filter out identified pollutants. Data on these forms of water-related environmental impact are presented in detail on our website.

Additionally, MGC maintains a sanitary water-use environment at all its sites to provide its workforce with access to properly functioning, safely managed sanitary facilities (wash service).

From a business continuity standpoint, MGC has identified production downtime due to drought or flooding of production facilities as a water-related risk, and has formulated business continuity plans (BCPs) that address this risk while implementing measures to mitigate it. None of the areas in which MGC's plants are located has experienced either adverse impact on production activities due to water stress or conflicts with stakeholders regarding use of water resources. Going forward, MGC will evaluate water-related risks and opportunities based on its scenario for temperature increases due to climate change.

Meanwhile, MGC sees opportunities in businesses that provide solutions for issues surrounding coolant water used in its air conditioning equipment and cooling systems. Such solutions include water treatment agents that maintain healthy coolant water quality by killing disease-causing legionella bacteria, and a comprehensive water treatment system service offered through affiliate Dia Aqua Solutions Co., Inc.

Going forward, MGC will set qualitative and quantitative targets for efficient water usage to more effectively conserve water resources.

Reduction of Industrial Waste

MGC Group companies are working to reduce industrial waste by encouraging the 3Rs (reduce, reuse and recycle), and by ensuring proper waste treatment in compliance with laws and regulations.

Participation in the Plastic Recycling Business

In November 2020, MGC gained a stake in R Plus Japan, a joint venture funded by companies comprising the plastics value chain, marking the start of our efforts in the business of recycling used plastics.

Working with U.S.-based biochemical venture Anellotech, R Plus Japan is developing a low environmental impact, efficient technology for recycling used plastics. Aiming to implement the technology by 2027, the company is building a cross-industry alliance encompassing sorting and processing of collected plastics, monomer production, polymer production, packaging and container manufacturing, trading companies, food and beverage manufacturers, and others.

Biodiversity Conservation



MGC works to ensure proper management of its chemical products based on Responsible Care, and to mitigate climate change by improving energy efficiency and reducing greenhouse gas emissions. In so

doing, we strive to maintain a rich natural environment amenable to living things, and to conserve biodiversity. We also contribute to sustainable development by developing technology and promoting the use of products known to be eco-friendly.

Each of our workplaces engages in practices that contribute to greater biodiversity in everyday life. These include helping to maintain forest reserves around our plants, a movement to bring flowers into the workplace, and addressing the marine plastic problem by participating in clean-up of rivers and harbors adjacent to our sites.

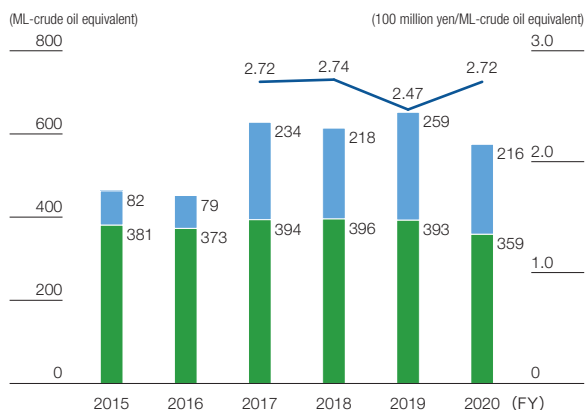
MGC also supports the objectives of the Declaration of Biodiversity by Keidanren, and in 2009 we signed on to join its Promotion Partners. In 2014, we joined the Keidanren Committee on Nature Conservation, and are advancing efforts to conserve biodiversity and otherwise protect the natural environment. We also participate in the "Bookcase for Biodiversity," a donation program implemented by the Japan Committee for UNDB (United Nations Decade of Biodiversity), and made two donations in 2020.

Environmental Data



Please refer to the Sustainability website for details on the environmental data.
<https://www.mgc.co.jp/eng/csr/environment/report/index.html>

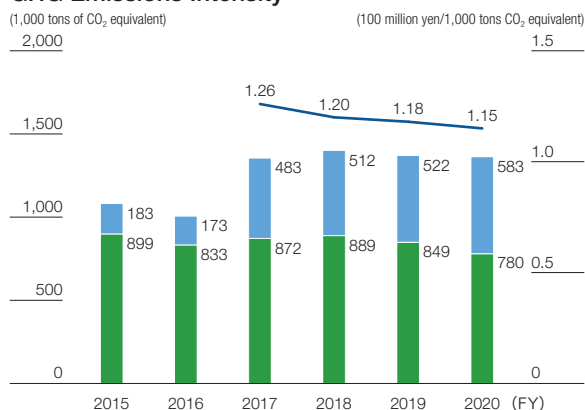
Energy Use / Estimated Value-added Energy Intensity



Energy use (left axis): ■ MGC (non-consolidated) ■ Consolidated subsidiaries
 — Estimated value-added intensity (right axis)

Note: Overseas consolidated subsidiaries are recorded for FY2017 and later.

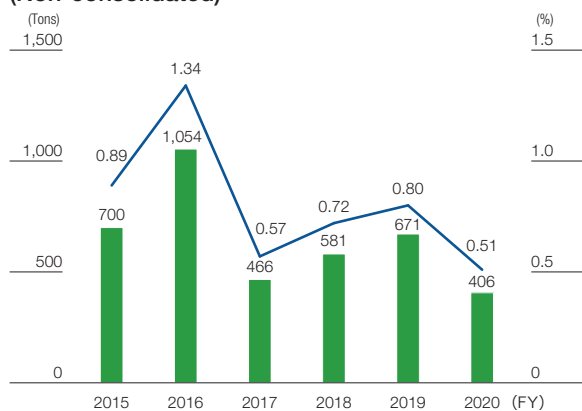
GHG Emissions / Estimated Value-added GHG Emissions Intensity



GHG emissions (left axis): ■ MGC (non-consolidated) ■ Consolidated subsidiaries
 — Estimated value-added intensity (right axis)

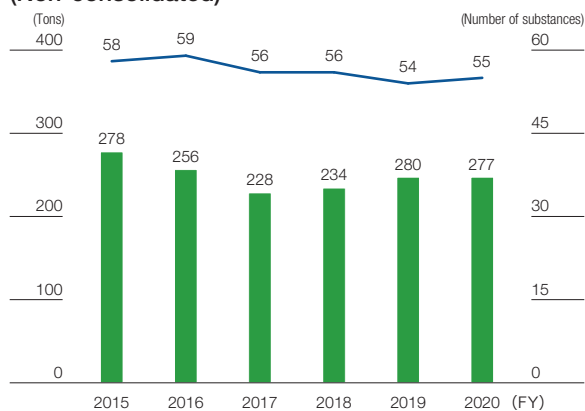
Note: Overseas consolidated subsidiaries are recorded for FY2017 and later.

Final Disposal Volume and Zero Emission Rate (Non-consolidated)



■ Final disposal volume (left axis)
 — Zero emission rate (right axis)

Volume of Emissions Subject to PRTR Law (Non-consolidated)



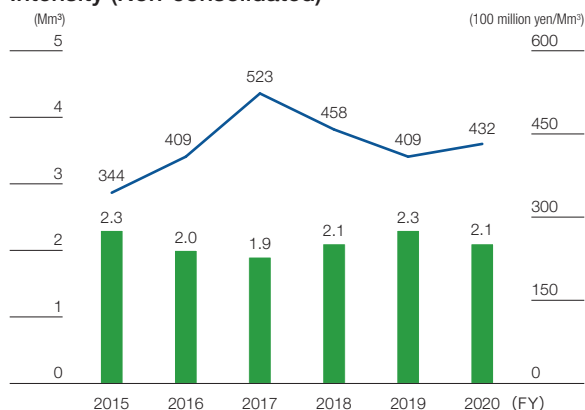
■ Emissions (left axis)
 — Number of substances subject to PRTR Law (right axis)

Water Intake / Intensity of Estimated Value-added Intensity (Non-consolidated)



■ Water intake (left axis)
 — Estimated value-added intensity (right axis)

Water Usage / Intensity of Estimated Value-added Intensity (Non-consolidated)



■ Water usage (left axis)
 — Estimated value-added intensity (right axis)