

Research and Development

Strategic Points (FY2022)	<ul style="list-style-type: none"> Establishment and operation of a research theme evaluation system using scoring. Objectively prioritize evaluation of all research themes, and accelerate research and development by dramatically shifting research resources to themes with high evaluations. Establish strategic research areas with consideration for suitability to the Company and growth potential to create new products and new businesses, focus research resources and promote metabolism of exploration of themes. Create a DX promotion system and education system aimed at further acceleration of research activity. The goal of the Intellectual Infrastructure Center is to realize an IP landscape*1 supporting the formulation of research strategy.
Relevant Materiality	<ul style="list-style-type: none"> Promotion of innovative R&D

*1 Management strategy emphasizing intellectual property. It indicates an overview of current conditions and future prospects concerning the Company's market position in light of research and development trends within the industry and technical information on individual patents.

Research and Development Strategy

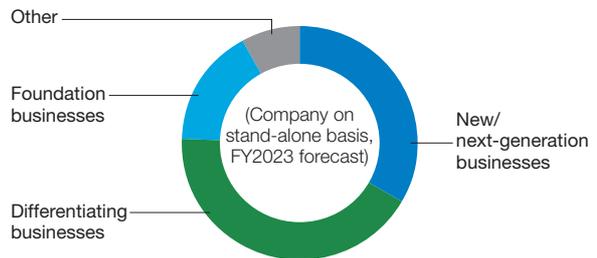
A major objective of the Medium-Term Management Plan, Grow UP 2023, is further increasing our competitive advantage through the creation of differentiating technologies and the expansion of differentiating businesses to shift to a profit structure resilient to change in the external environment. In order to achieve this Group objective, the research division needs to maximize return on investment, meaning that it should increase the efficiency of its investment in research activities. To begin with, we introduced objective research evaluation indices for determining the priority of research themes in fiscal 2020. Over the three years of the Medium-Term Management Plan, we are concentrating management resources on high-priority themes according to these indicators.

While working closely with business sectors responsible for product development, we aim to obtain results commensurate with investment within the

period specified for each theme, as well as expand our differentiating businesses.

Furthermore, when all research organizations were unified in April 2020, the Research & Development Division took the lead in strategically establishing new research themes based on expansion of our business portfolio and future growth areas (see figure below).

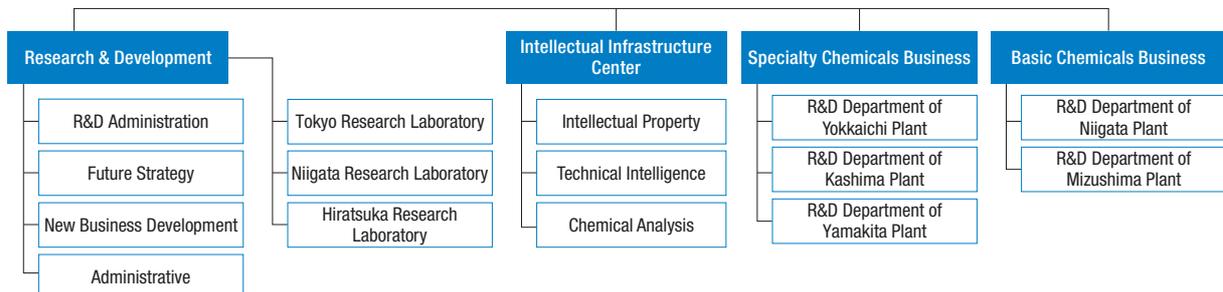
Breakdown of R&D Expenditures



Key Points for Setting Research Themes

	1. Business Portfolio Target Area	2. High Suitability to the Company	3. Future Growth Areas
Type A: Theme in Growth Area of Existing Business Priority injection of resources driving future growth	←—————→		
Type B: Theme in Growth Area Outside Existing Business Development of new markets such as contributing to a sustainable society	←————→		←————→
Type C: Theme with Commensurate Return on Investment in Existing Business Expansion of existing business through detailed response for each product	←————→		

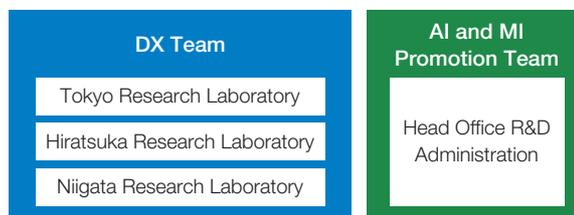
Research and Development System



Acceleration of Utilization of Digital Technology

In April 2021, we established a dedicated AI and MI promotion team within the Research & Development Division, and a DX Teams performing dedicated analysis of computational chemistry and data science in three laboratories to strengthen the system for promoting DX. The DX Team applies DX technology to many research themes and is effective in accelerating research and development. The AI and MI promotion team is contributing to the spread of data science by creating a data science education system. Eventually, we will establish a working environment in which all researchers are able to utilize the latest digital tools as needed. In addition, the DX Technical

Exchange Meeting was launched for Group companies in fiscal 2022. Through this DX Technology Exchange Meeting, we will promote the deployment of DX technology throughout the entire Group.



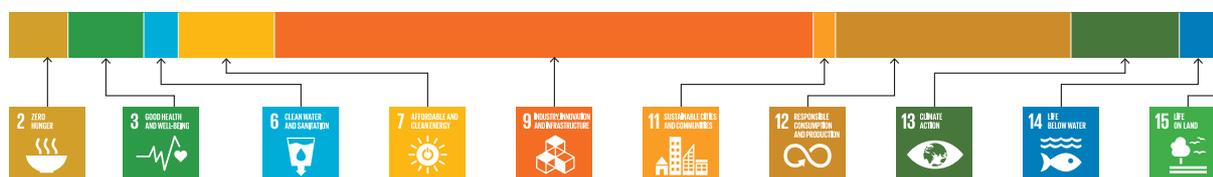
Intellectual Property Strategy

The importance of intellectual property (patents, knowledge and general know-how) is increasing as chemical manufacturers pursue sustained growth. In April 2021, MGC established the Intellectual Infrastructure Center to utilize DX to strategically accumulate and establish rights for intellectual property, and moreover to deploy it throughout the Group. In order to transform intellectual property management through DX and bring about the transition from conventional basic patent administration operations to data-driven intellectual property operations, the Intellectual Property Department, which formulates and implements strategy on intellectual property, and the Technical Intelligence Department, which handles the utilization of digital technology and technical studies pertaining to intellectual property, have been established within the Center.

Operations involving collecting and analyzing vast quantities of intellectual property data, such as patents, literature, and public releases from rival companies, are characterized by a high degree of compatibility with AI.

MGC combines AI with existing tools and the analytical skills of analysts, with the aim of realizing a strategic IP landscape. For example, to effectively utilize the intellectual property information MGC has accumulated to date, we first create an overview using AI and associate it with general information before classifying it into proprietary categories and performing analysis. It is expected to have effects such as matching the needs of society with the technology and resources (seeds) of MGC, potential competitive analysis and highly accurate customer analysis, and discovery of new applications for existing products. In addition, the following overview showing MGC's patent value from the perspective of SDGs clearly shows that we have a wide range of technology corresponding to the various targets set for SDGs. In the near future, we believe that AI will quantitatively indicate the suitability of our research fields and themes including SDGs, and support the formulation of research strategies, thereby contributing to the MGC Group's Mission of "creating value to share with society."

Total Patent Value (Patent Asset Index™) of the MGC Group Identified from the Perspective of SDGs (As of December 31, 2022)



➡ Please refer to page 15 for the changes in MGC's total patent value.

Promotion of Research and Development Addressing Climate Change Problems

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, and succeeded in methanol production using the methanol pilot facility at the Niigata Plant. At the same time, we are proceeding with 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. In 2022, we successfully converted CO₂ recovered from waste incineration exhaust gas into methanol for the first time in Japan.

Leveraging our knowledge regarding polycarbonate research and manufacturing, in which we are developing a business, we are working with Tohoku University, Osaka

Metropolitan University, NIPPON STEEL CORPORATION and Nippon Steel Engineering Co., Ltd. to develop technology for synthesizing polycarbonate intermediates using CO₂. Since fiscal 2021, this has been adopted as “Green Innovation Fund Project / Development of Technology for Producing Raw Materials for Plastics Using CO₂ and/or Other Sources / Development of Technology for Producing Functional Chemicals from CO₂ / Development of Technology for Manufacturing Functional Plastic Materials Using CO₂ as Raw Material” and we are engaged in resolving issues aimed at the industrialization

of processes for synthesizing polycarbonate from CO₂. In fiscal 2022, we reduced the heat consumed in lab experiments and also began construction of a bench plant.

Progress of KPIs in FY2022

13%
of R&D expenditures

R&D investments devoted to solving climate change problems

The fiscal 2030 targets have already been reached due to progress in research themes adopted as Green Innovation Fund Projects.

⇒ Please refer to “Development of Products and Technologies Conducive to Decarbonization” on page 18 for details on research themes.

Progress of Green Innovation Fund Projects

Synthesis of Methanol from CO₂

We are jointly developing a methanol synthesis process utilizing a separation membrane with Mitsubishi Chemical, and MGC is handling catalyst optimization (only MGC) and development of reactor and process (jointly with Mitsubishi Chemical Corporation). In the current initial phase, we are proceeding with acquisition of basic data using compact testing equipment, and process evaluation and cost estimation based on simulations. In fiscal 2022, we created a membrane reaction simulation model, and we have established an environment for proceeding with equipment design for bench testing scheduled for fiscal 2025.

Project overview	Development for commercialization of chemical raw material production using artificial photosynthesis*2 Development of new membrane-assisted reactive separation process with aim of significant improvement of reaction efficiency
Implementation structure	Mitsubishi Chemical Corporation (the contact company), MGC, Japan Technological Research Association of Artificial Photosynthetic Chemical Process (ARPCHEM)
Project duration	Fiscal 2021–Fiscal 2028 (8 years)
Project images	<div style="display: flex; justify-content: space-around;"> <div style="width: 45%;"> <p>Existing process</p> <p>CO₂/H₂ → High pressure, Low inversion rate → MeOH</p> <p>Recycling (large cycle)</p> <ul style="list-style-type: none"> At present, synthetic gas CO₂/H₂ materials are mainly used With CO₂/H₂ materials, reaction efficiency is poor even under high-pressure conditions, necessitating recycling a large volume of unreacted material (high construction costs and variable costs) Catalyst deactivation due to byproduct water vapor also an issue </div> <div style="width: 45%;"> <p>Membrane-assisted reactive separation process</p> <p>CO₂/H₂ or CO/H₂ → Lower pressure, Improved conversion → MeOH</p> <p>Membrane reactor (catalyst + membrane), No recycling</p> <ul style="list-style-type: none"> Reaction efficiency greatly improved by selectively extracting products using zeolite membrane This enables lower reaction pressure, and reduction or elimination of recycling of unreacted materials (lower construction costs and variable costs) </div> </div>

*2 Chemical material made from CO₂ and green hydrogen obtained by using solar energy to decompose water with a photocatalyst

Manufacturing of Polycarbonates from CO₂

We are researching an innovative soluble polycarbonate manufacturing process that has high environmental compatibility and is highly effective for reducing carbon by using cerium oxide as a catalyst and 2-cyanopyridine (2-CP) as a dehydrating agent to synthesize dialkyl carbonate from carbon dioxide and alcohol, and using this as an intermediate for DPC synthesis. In fiscal 2022, we examined the reduction of energy consumption in the DRC synthesis process and the dehydrating agent recycling process, and found the potential to significantly reduce energy consumption through a technological breakthrough, achieving the GHG emission reduction target in the Green Innovation Fund Project in the laboratory research phase. We are currently proceeding with work to establish bench plant equipment to scale up and verify the laboratory test results.

Project overview	Development of technology for manufacturing functional plastic materials using CO ₂ as raw material
Implementation structure	Tosoh (the contact company), MGC
Project duration	Fiscal 2021–Fiscal 2028 (8 years)
Project illustration	

Production and Environment

Strategic Points (FY2022)

- Steady execution of the SMART-MGC DX promotion project. Promote the introduction of digital technology through the two aspects of SMART-FACTORY aiming for stable plant operation and enhancement of operations, and SMART-OFFICE aimed at streamlining the supply chain.
- Implement a large-scale survey of all business partners concerning purchased materials. Promote building environmentally friendly and safe supply chains through regular monitoring.
- Continuous improvements through companywide responsible care (RC) based on the RC Medium-term Plan*1 and annual plans.

Relevant Materiality

- Promotion of socially responsible sourcing
- Occupational safety and health / Process safety and disaster prevention
- Highly energy- and resource-efficient production
- Chemical/product quality and safety assurance
- Proactive response to environmental problems

*1 RC Medium-term Plan 2023 (2021-2023) https://www.mgc.co.jp/eng/csr/environment/rc_plan.html

Promotion of SMART-FACTORY

MGC aims to balance ensuring safety, the foundation of its production activities, with environmental protection and efficient production. We are constantly pursuing our targets for all of these by raising the level of technical capability of employees engaged in production activities, and by keeping facilities (hardware) and systems (software) up to date.

We have endeavored to ensure the safety and stability of production activities through the technical improvement of processes and facilities, and will focus on initiatives aimed at the realization of SMART-FACTORY to promote the utilization of DX technologies such as sensors, systems and mobile devices to realize an even higher level of stability.

In fiscal 2022, in order to engage in highly efficient production saving resources and energy, we utilized digital data on production equipment accumulated in the data management systems we have introduced. Furthermore, we conducted trials of quality forecasting and anomaly sign detection systems and operational support and work support systems using AI, and are gradually implementing them. We have been able to reduce the workload in inspection operations by around 50% in the visual inspection system for corrosion of pipes in plants by applying "Human

in the Loop Machine Learning," which commenced operation in the Niigata Plant in January 2022. At present, we are engaging in further improving accuracy while operating the system, and also expanding the scope of application. In addition, we have continuously reviewed the introduction of new devices, such as equipment inspections by drones and the utilization of smart glasses and tablets in the workplace. Data on plant operation is being used to build a SMART-FACTORY database and connect systems with the aim of coordinating with SMART-OFFICE for optimizing supply chains.

By utilizing such new technologies, we aim to prevent accidents and other problems, and improve the efficiency of routine operations, in addition to supplementing people's senses and judgment to realize a higher level of stable plant operation.

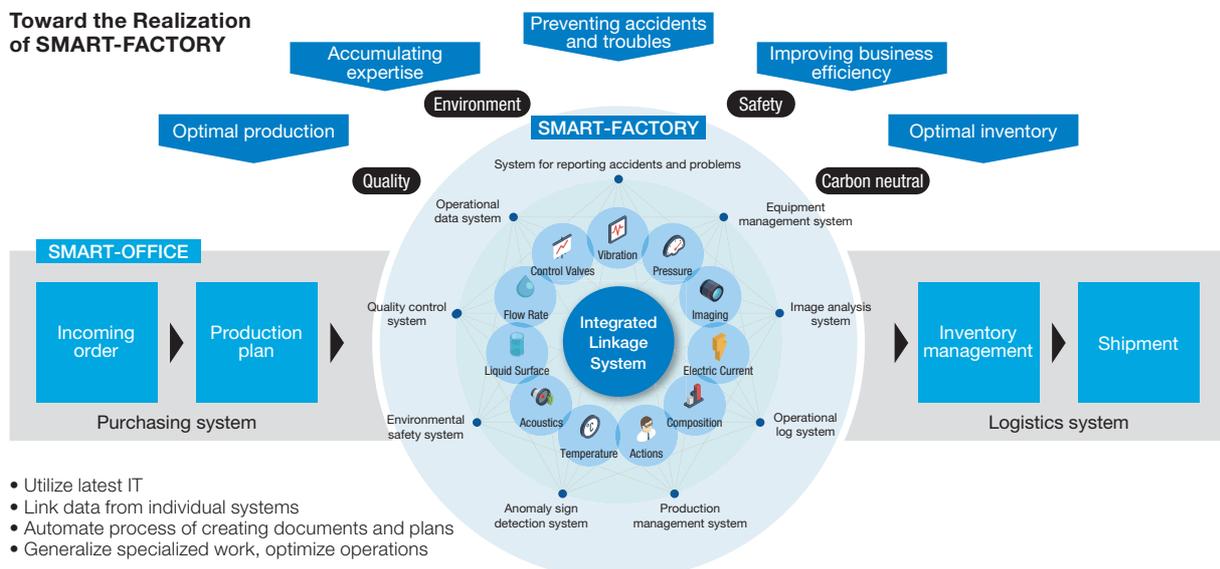
Progress of KPIs in FY2022

8.6% reduction

GHG emissions intensity (compared to fiscal 2013, non-consolidated)

Deteriorated from the previous fiscal year due to fluctuation in the production volume of specific products. We will continue with efforts to curb energy consumption such as energy saving.

Toward the Realization of SMART-FACTORY



CSR Procurement

Please refer to the Sustainability website for details on CSR procurement. <https://www.mgc.co.jp/eng/csr/society/procurement.html>

MGC has positioned improvement of the CSR level in areas such as the environment, labor conditions, and human rights throughout the entire supply chain, from raw material procurement to manufacturing and sales, as one of our management materiality priorities.

With the understanding and cooperation of our business partners, MGC shares its requirements through the “Basic Concepts Related to Raw Material Procurement Activities” and “Mitsubishi Gas Chemical CSR Procurement Guidelines” to promote CSR procurement.

In order to build a supply chain that complies with

laws and regulations while taking environmental and safety concerns into account, with regard to important raw materials we conduct surveys of our suppliers using the CSR Procurement Self-Assessment Tool (SAQ) created by the Supply Chain Working Group of the Global Compact Network Japan. The survey began in fiscal 2020, and we have received responses from 191 companies as of fiscal 2022. We have started asking our suppliers to respond to the SAQ when beginning new transactions, and we will continue to further promote CSR activities in the supply chain in the future.

Occupational Safety and Health / Process Safety and Disaster Prevention

Please refer to the Sustainability website for details on the promotion system and initiatives. <https://www.mgc.co.jp/eng/csr/society/safety/performance.html>

Based on our Safety Philosophy that “ensuring safety is the top priority of our business activities,” MGC formulated Safety Principles and takes active measures to achieve zero accidents and zero occupational injuries among both MGC employees and the employees of our partners.

With regard to occupational health and safety, as well as process safety and disaster prevention, each business site implements autonomous maintenance activities under its own initiatives, and we are continuing company-wide LINK safety activities commenced in fiscal 2021 to strengthen and promote improvement activities.

LINK Activities are used to foster safety management perspectives at a workplace level through case studies, with people in charge of safety practices in the workplace serving as leaders.

Furthermore, although said activities were centered on the manufacturing sector in the past, the scope has been expanded to process safety and disaster prevention when

conducting research and ensuring safety in construction, filling and cargo handling work. Moreover, we are implementing process risk assessments through HAZOP*2 in all plants to extract and identify risks. In addition, we implement quantitative assessments according to the MGC Group process safety and disaster prevention guidelines. We also utilize RC audits of each plant along with environment and safety audits of Group companies to assess the gap between the ideal level and the current state, leading to the resolution of issues in an effort to create a positive spiral in the safety management system.

*2 An acronym for Hazard and Operability Studies, a technique for identifying risks for complex processes and equipment

Progress of KPIs in FY2022	
1 Serious occupational accident	0 Serious accidents
The Serious occupational accident is related to work, and we are engaged in displaying signs in hazardous areas in the workplace and strengthening hazard prediction before performing work.	

Quality Assurance and Chemical Management

Please refer to the Sustainability website for details. Quality Assurance <https://www.mgc.co.jp/eng/csr/society/safety/quality.html> Chemical Substance Management <https://www.mgc.co.jp/eng/csr/society/safety/initiatives.html>

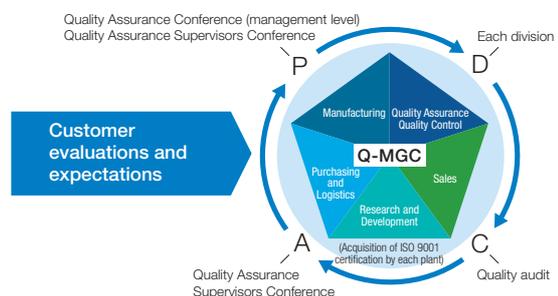
MGC promotes companywide quality assurance activities (Q-MGC) throughout supply chains under the MGC Group Basic Policy on Quality in order to provide products and services with a high level of safety and reliability.

In fiscal 2022, the quality assurance activity plan that had been formulated for the entire company was also drawn up in each division in an effort to deepen Q-MGC activities. The MGC Group Quality Management Promotion Meeting established to create a groupwide risk management system shares Q-MGC through quality management promotion meetings, quality personnel liaison meetings and quality audits. Furthermore, we conducted support for the creation of safety data sheets (SDSs) and education and operational support on security trade control for Group companies to create a chemical management and export control system appropriate for the Group as a whole.

Going forward, we will actively proceed with the implementation of IT and automation in operations through

the introduction of previously implemented LIMS*3, the use of a delivery specification database and an automated SDS creation system, in addition to performing continuous risk evaluation and management of MGC products through support for domestic and overseas chemical management laws and the use of a regional information-gathering system.

*3 An acronym for Laboratory Information Management System



Proactive Response to Environmental Problems

Please refer to the Sustainability Data Book for environmental data.
<https://www.mgc.co.jp/eng/csr/esg.html>

MGC recognizes that curbing, and adapting to, climate change, preserving biodiversity and other environmental problems are important issues that have a significant impact on business operations. At the same time, we realize that 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.”

MGC has established the target of reducing GHG emissions by 28% from fiscal 2013 by fiscal 2023, as it works toward achieving carbon neutrality by 2050. Specific reduction measures include the promotion of energy-saving activities, discontinuing the use of heavy oil in our in-house power generation facilities and boilers, reducing the GHG emission factors of purchased power and introducing renewable energy. Furthermore, to reduce the environmental impact of business activities, we are promoting the efficient use of resources such as energy, raw materials, and water, and engaging in the reduction and appropriate management and disposal of waste. In addition, we are actively engaged in the development of products and technology that reduce environmental impact or help restore damaged ecosystems.

Progress of KPIs in FY2022

34%
reduction

GHG emissions (compared to fiscal 2013, non-consolidated)

We are steadily implementing measures such as the introduction of renewable energy. In fiscal 2022, partial reconfiguration of the business portfolio also had an impact.

Introduction of Renewable Energy

MGC is promoting the introduction of renewable energy by making lower emission factors than at present a condition of purchases to reduce the GHG emission factors of purchased power, and part of the electric power purchased by plants was switched to renewable energy from fiscal 2022. The introduction of renewable energy as 10% of purchased power by fiscal 2023 has been established as a KPI in the RC Medium-term Plan 2023, and we are proceeding with implementation.

Progress of KPIs in FY2022

19%

Renewable energy as a percentage of electric power purchased (non-consolidated)

We introduced renewable energy or effectively implemented the shift to renewable energy through the utilization of non-fossil certificates in three business sites. We reached our target.

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.

The RC Medium-term Plan 2023 sets a target of keeping MGC’s zero waste emission rate to 0.3% or lower. We are proceeding with fractional recovery of waste and also focusing on the reduction of waste from prototypes, etc. We are endeavoring not to produce unintended waste caused by operating anomalies through the continuation of

stable operation of equipment in production sites.

MGC is also participating in the plastic recycling business. Working with U.S.-based biochemical venture Anellotech, Inc., R Plus Japan, Ltd., in which MGC has a stake, is developing a low-environmental-impact, efficient technology for recycling used plastics.

Progress of KPIs in FY2022

0.25%

Zero waste emission rate (non-consolidated)

We reduced final disposal through the promotion of the 3Rs for waste at each business site. We reached our target.

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.

The RC Medium-term Plan 2023 sets a target of a water reuse rate of 95% or more to promote the effective use of water resources. Furthermore, in order to facilitate more efficient use, we are engaged in stable operation by anticipating risks such as the occurrence of water discharge due to sudden equipment stoppages.

To identify water risks, we conducted business site hearings and document-based investigations at domestic manufacturing sites, and document-based screenings of overseas sites. Although no problematic risks were discovered as a result, we will continue to conduct investigations as needed in the future.

Biodiversity Conservation

To maintain a rich natural environment amenable to living things, and to conserve biodiversity, MGC engages in practices that contribute to greater biodiversity in everyday life in each of our workplaces. These include helping to maintain forest reserves around our plants and a movement to plant flowers at our worksites, and participating in cleanup of rivers and harbors adjacent to our sites.

The establishment of a biotope is being planned at the Niigata Plant. We will work with not only employees but also residents and other groups active in the region, with the aim of providing learning opportunities for greater understanding of not only the nature but also the history and culture of the region. We will continue to conduct studies on the surrounding natural environment and living organisms to create a place facilitating the experience of the appeal of biodiversity with local communities.

Response to Climate Change (Disclosure Based on TCFD Recommendations)

Please refer to the Sustainability Data Book for environmental data.
<https://www.mgc.co.jp/eng/csr/esg.html>

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 adaptation.

Specifically, MGC has formulated targets for reducing Scope 1 and 2^{*4} GHG emissions and is working toward their steady reduction. At the same time, MGC is proactively disclosing information on Scope 3^{*5} 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 is now endeavoring

to strengthen resilience through scenario analysis while also engaging in sound dialogue with stakeholders. In fiscal 2022, we implemented new scenario analysis on the optical materials and oxygen absorbers businesses.

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, and expanded the scope to the entire Group in March 2022. MGC encourages the development of energy systems to achieve carbon neutrality, while aiming to expand the range of products conducive to carbon neutrality.

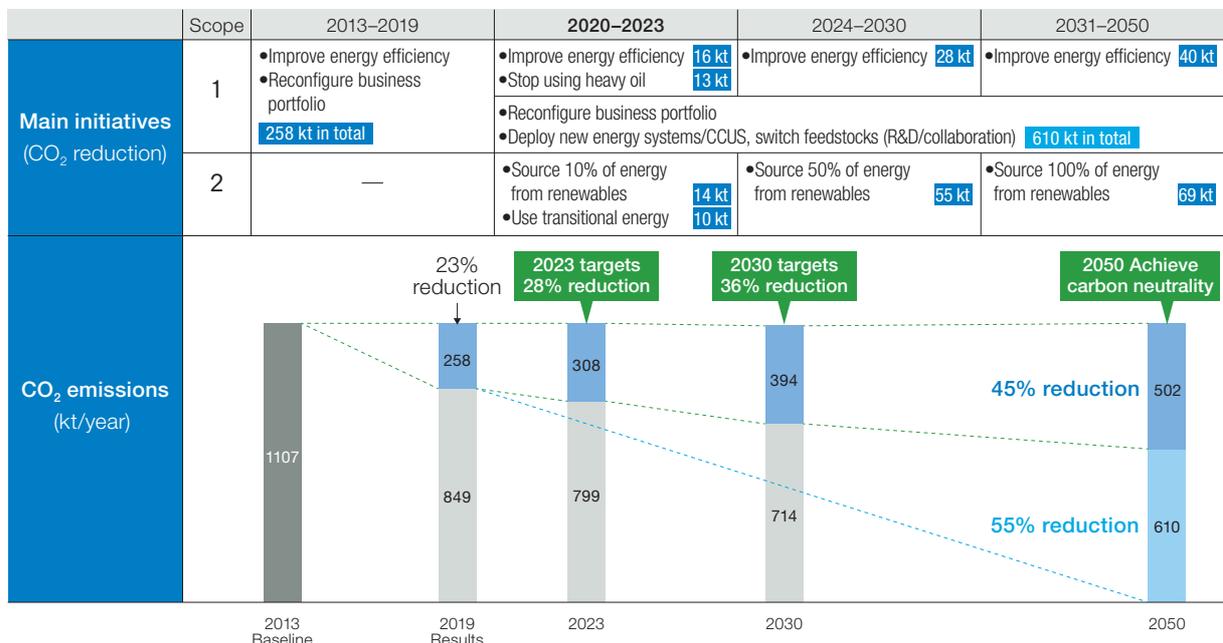
*4 Scope 1 emissions are GHG emissions directly generated by MGC; Scope 2 emissions are indirect GHG emissions associated with use of energy (mainly electric power) purchased from external suppliers

*5 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

Long-Term GHG Emission Reduction Objectives of the MGC Group



MGC's Roadmap toward Its Ultimate Goal of Carbon Neutrality by 2050 (Non-consolidated)



Physical Risks: Impact on Business Sites Due to Increased Severity of Climate Damage (Flooding, Storm Surge, Drought)

Assumptions behind Scenario Analysis

- Evaluation points: Mid-century and end of century
- Scenario: Temperature rise (4°C: Continuation of current oil and coal-dependent economic activity; 2°C: Advance climate change countermeasures)
- Analysis subjects: 11 MGC sites; 34 domestic Group company sites; 20 overseas Group company sites
- We assessed flood, storm surge and drought hazards on five levels against current level (baseline), and confirmed number of sites where hazard level is highest at middle and end of century when applying 2°C and 4°C scenarios
- External reference information: Flood Hazard Map, WRI Aqueduct Floods, JRC Flood Hazard Map for World, WRI Water Risk Atlas, IPCC AR5, etc.

Evaluation Results (Scope: 65 Locations in Japan and Overseas)

	Number of sites evaluated as highly hazardous				
	Baseline	2°C scenario		4°C scenario	
		Mid-century	End of century	Mid-century	End of century
Flood risk	2	2	2	2	3
Storm surge risk	0	1*6	1*6	1	1
Drought risk	0	1	1	1	2

*6 Substituted with forecasts based on RCP 4.5 due to constraints on external information

Policies and Initiatives Going Forward

Based on these results, we will conduct a more detailed analysis on the sites evaluated as highly hazardous, and also strengthen BCP, while proceeding with measures such as developing multiple manufacturing sites, buildup of inventory, and reduction of equipment stoppage risk.

Newly Implemented Scenario Analysis (Fiscal 2022)

Transition Risks and Opportunities

Assumptions behind Scenario Analysis

- Evaluation points: 2030, 2050
- Scenario: Increased temperature
 - Main external information referred to in decarbonization scenario (below 2°C)
 - IEA WEO 2021 SDS (World gradually reducing emissions to keep global increase in average temperature to less than 1.5°C)
 - SSP1 (Rapid development progressing on low-income countries, global economic inequality being resolved, and technological development advancing rapidly)
 - Main external information referred to in baseline scenario (4°C)
 - IEA WEO 2021 STEPS (World in which average temperature increases by approximately 2.6°C in around 2100 due to course of emissions according to plans announced by each country at present)
 - SSP2 (Growth anticipated to between that of SSP3 – with little international cooperation, little investment in technological development, and slow economic growth – and that of SSP1 scenario of decarbonization)
- Analysis scope: Optical materials and oxygen absorbers businesses
- Conduct quantitative assessment of financial impact of risks and opportunities in existing business portfolio and draft response strategy

Evaluation Results

	Risks and Opportunities (■ Risks ● Opportunities)	Main Initiatives
Risks and opportunities in decarbonization scenario	<ul style="list-style-type: none"> ● Increased demand for high-value-added products due to high economic growth compared to the baseline scenario ● Increased functionality of electronic devices ● Changes in food culture such as the use of meat alternatives using plant-based materials ■ Strict regulations such as decarbonization 	<ul style="list-style-type: none"> • Expansion of product lineup supporting high-value-added products • Expansion of research and development, and implementation of cross-value innovation • Reduction of weight through development of highly refractive products
Risks and opportunities in baseline scenario	<ul style="list-style-type: none"> ● Significant increase in population compared to the decarbonization scenario ■ ● Decrease in agricultural land area and decrease in production due to progress of warming ■ Low economic growth compared to the decarbonization scenario due to lack of international cooperation and inhibition of technological development ■ Increased fossil fuel prices 	<ul style="list-style-type: none"> • Acceleration of market development in emerging countries • Acceleration of market development in long-term food storage applications • Expansion of research and development, and implementation of cross-value innovation • Reduction of size and weight of products, adoption of environmentally friendly materials

Please refer to Corporate Report 2021 for details on scenario analysis of the hydrogen peroxide and MX-Nylon businesses implemented in fiscal 2020, and MGC Report 2022 for details on scenario analysis of the polycarbonate and MXDA businesses implemented in fiscal 2021.
 Corporate Report 2021 https://www.mgc.co.jp/eng/ir/files/MGC_eCorporateReport2021.pdf
 MGC Report 2022 https://www.mgc.co.jp/eng/ir/files/MGC_Report2022e.pdf

Climate Change Risk Governance and Risk Management

MGC deliberates and makes decisions on addressing climate change risk and other sustainability key issues in the Sustainability Promotion Council, chaired by the President and primarily made up of all directors, including outside directors, with Audit & Supervisory Board members also attending. Important matters deliberated upon in the Sustainability Promotion Council are decided by the Board of Directors. The participation of corporate sector heads in the Sustainability Promotion Committee, an advisory body to the Sustainability Promotion Council, ensures key sustainability issues are adequately considered.

To develop a response to climate change, MGC has established the Carbon Neutrality Promotion Technical Committee, a sustainability promotion expert committee, as an advisory body to the Sustainability Promotion Committee. As the administrative office for dealing with TCFD and CDP

disclosures, the Carbon Neutrality Promotion Technical Committee promotes cross-business initiatives.

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

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.