

Environment

Reporting in Line with the TCFD Recommendations

The Mitsubishi Chemical Group is working to enhance its climate change-related measures in areas such as environmental impact reduction, driving energy-saving activities, promoting renewable energy use, and adding to the range of products that contribute to GHG emission reduction. Through these measures and progressive enhancement of information disclosure, we are targeting an increase in our corporate value.

Governance

At the MCG Group, we have identified GHG reduction, environmental impact reduction, and circular economy as the climate change-related material issues (▶ Page 58) to be addressed. We have also set metrics and targets to measure progress with these initiatives (▶ Pages 59–61).

Monitoring of progress toward the target values takes place through routine monitoring and the steady implementation of related measures conducted by the Sustainability Committee, which consists of the MCG

president as a chairperson and other members, including MCG corporate executive officers.

Director remuneration

The performance-based remuneration of corporate executive officers is determined and paid based on the degree of achievement of the targets for each fiscal year. In addition to economic efficiency and innovation, the evaluation factors in the KAITEKI Value evaluation, which includes indices relating to improvement in sustainability, and individual performance evaluations. In fiscal 2022, the indices relating to sustainability, which are a part of the evaluation indices for the performance-linked remuneration evaluation, were selected as factors that should receive particular focus by the corporate executive officers from among the KAITEKI Value evaluation, which includes GHG emission reduction. For details, refer to the section titled “Director and Officer Remuneration” under Governance (▶ Page 85).

Strategy and risk management

Climate change-related risk

In accordance with the Company’s stance on scenario analysis, MCG is evaluating the impact of climate change that is expected in the years up to 2030.

We evaluated transition risks based mainly on the SDS scenario of the International Energy Agency (IEA) and other factors. As a result, we recognized risks with a particularly high impact, including an increase in the carbon tax burden and a rise in response to climate change in the stock market.

In addition, reflecting the results of evaluations, physical risk is recognized as an operational loss due to abnormal weather, mainly in accordance with the RCP8.5 scenario promoted by the Intergovernmental Panel on Climate Change (IPCC).

MCG plans to take proper measures to deal with these risks and also continue to grasp their conditions.

Overview of risks based on scenarios (Risks with particularly high impact)

Category	Risk recognized	Outline of risk based on the scenario*1	Impact on MCG	Impact*2	Response to potential risk
Policy/ legal regulation	Rise in carbon prices	Increase in operating costs due to higher carbon prices. 1.5°C–2°C	Rise in operating costs	++	Reduce GHG emissions in line with our basic policy for achieving carbon neutrality
Market	Regulation of the usage of plastic products	Decrease in virgin demand for petrochemicals as plastic recovery rates increase. 1.5°C–2°C	Decreased demand for petrochemical products	+	Focus on businesses that contribute to achieving carbon neutrality
Reputation	Rise of climate action in stock markets	As institutional investors focus on climate change, market capitalization declines due to inadequate responses. 1.5°C–2°C	Decrease in market capitalization	+	Enhance disclosure and engagement on sustainability, including climate change
Physical	Operational losses due to extreme weather	Increased flood risk in Asia will have a greater impact on factory operations. 4°C	Loss of sales and loss of assets such as manufacturing facilities and inventories due to the shutdown of coastal factories due to disaster damage	+	Measures to prepare for major natural disasters to minimize damage and ensure business continuity

*1 See the WEO SDS scenario, etc., for 1.5°C to 2°C and the IPCC RCP8.5 scenario, etc., for 4°C.

The SDS scenario is consistent with the IEA’s Paris Agreement goal of keeping global average temperature increase well below 2°C above pre-industrial levels and pursuing efforts to limit it to 1.5°C.

The RCP8.5 scenario is a scenario by the IPCC in which no additional mitigation measures for climate change are taken and the average global temperature at the end of the 21st century is likely to increase by about 4°C above pre-industrial levels.

*2 Quantitative evaluation results for impact by “Impact on the MCG” are indicated as large: ++ and medium: +.

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Transition plan

The MCG Group set a new target for a 29% reduction in GHG emissions by fiscal 2030 compared to fiscal 2019, and a further reduction to net zero in 2050 to achieve carbon neutrality. We plan to reduce GHG emissions in line with the roadmap.

In addition to streamlining the manufacturing process and implementing energy conversion, going forward, our portfolio management will include a carbon-neutral perspective, which will enable us to remain competitive in a society that is in transition to carbon neutrality.

Business opportunities related to climate change

As set out in our new management policy, we will also devote resources to businesses that contribute to realizing carbon neutrality based on portfolio management with a focus on growth, performance, and sustainability.

We will progressively expand the business scale and strengthen the profitability of specific focus businesses that offer climate change-related business opportunities, including lighter mobility materials, vehicle-mounted battery materials, bioplastics, and carbon fiber and composite materials.

In the medium-term management plan, announced in February 2023, we aim to raise the percentage of sales revenue from sustainability-related products, including products that contribute to climate change measures, to 20% by fiscal 2025.

Process of risk identification, evaluation, and management

Portfolio management

As announced in the new management policy, MCG has designated carbon neutrality as a selection criterion for its focus businesses. Incorporating a carbon-neutral perspective, our portfolio management will focus on growth markets where we have a competitive advantage.

Risk management

The MCG Group, based on the “One Company, One Team” concept introduced from fiscal 2022, transitioned to a Group-wide integrated management structure, and in tandem with this, introduced enterprise risk management (ERM) (▶ Page 86), as a risk management scheme for integrated risk management pertaining to MCG Group's business activities. Moving ahead, we plan to implement integrated risk management concerning the Group's business activities related to priority issues from the perspective of materiality to promote the minimization of losses and adequate risk-taking from a Company-wide perspective.

Metrics and targets

Among the management indices (MOS Indices) set to measure progress with material issues, we set a medium-term target for the GHG emission reduction rate, and plan to evaluate the progress made annually.

Scope 1–3 GHG emissions

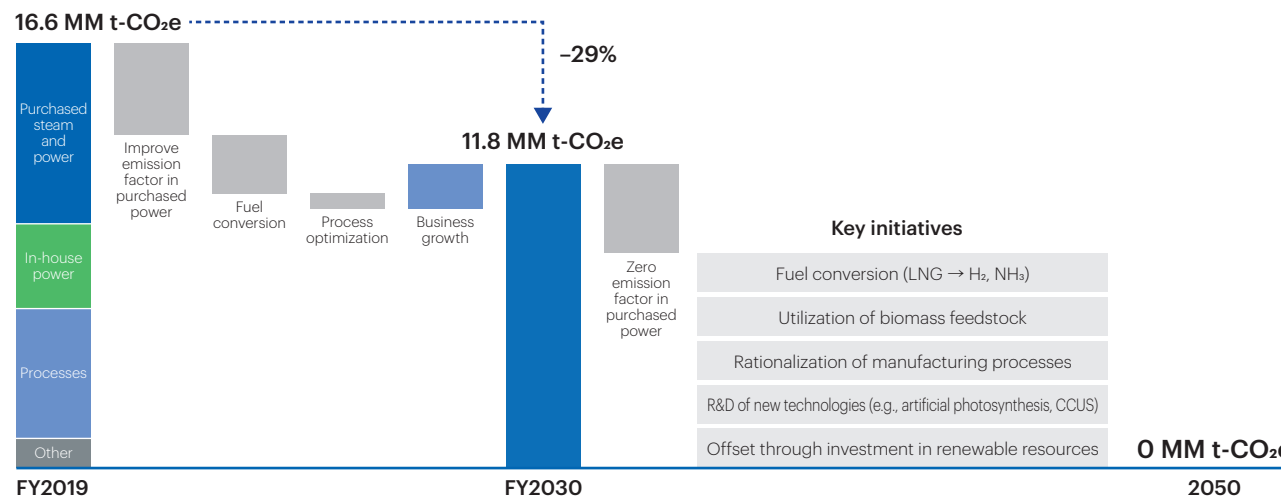
Please see GHG emissions in “Non-Financial Highlights” (▶ Page 99) for the performance in fiscal 2022. We have received independent assurance for GHG emissions, and are working to disclose highly reliable information.

[Report in Line with the Recommendations of the TCFD](#)

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Carbon neutrality by 2050

Our GHG emissions (Scope 1 + Scope 2)



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Progress toward Carbon Neutrality and a Circular Economy

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The Mitsubishi Chemical Group is working toward carbon neutrality in 2050 through initiatives to apply proprietary technologies and renewable energy and step up collaborations with its partners to reduce GHG emissions and contribute to sustainable resource and energy recycling.

In-house initiatives

GHG reductions

In the Performance Polymers division, we have achieved a remarkable 44% reduction in Scope 1 and Scope 2 GHG emissions in Europe in fiscal 2022 compared to fiscal 2019. This was realized through strategic relocation initiatives and the transition to green electricity. We are planning to expand the number of sites that run on renewable electricity even further.

The Engineering Shapes and Solutions (ES&S) division has made notable strides in the use of renewable energy, electrification, and consolidation of key assets. In Europe, eight out of nine sites have successfully transitioned to renewable energy as well as all sites in the Americas. The renewable energy transition contributed to a 50% CO₂e reduction compared to fiscal 2019. Electrification of key processes in the Scranton facility reduced the site carbon footprint by using MCG Group internally developed technology.

For our ALPOLIC brand, we have achieved an impressive 20% reduction in GHG emissions per m² of ALPOLIC composite panels at our Wiesbaden site since 2017. We achieved this through a combination of measures such as increasing the insulation of heating ovens and optimizing temperature control in production stages.

Circular economy

In our Performance Polymers division, we launched recycled and bio-based product grades for slush, PVC and TPE compounds (mass-balance approach) and have obtained ISCC+ certification for our French production sites. Our 3D printing solutions now encompass recycled and bio-based options for FGF and filaments. We are the supplier of bio-based PVC compounds for a soccer ball made only from renewable materials which is available in all French Ligue 1 soccer club shops.

Our SoarnoL EVOH resins (with an ethylene content ≥ 29mol%) can be considered as recycling compatible for PE film recycling. In combination with Soaresin RG500, it can be considered as valuable material for PE film recycling, as confirmed by independent European test laboratory Institute cyclos-HTP GmbH. ES&S launched Statera in fiscal 2022 in the EMEA and Americas Region: a sustainable brand program that drives CE with target markets in Europe, the United States, and Canada. Statera encompasses a sustainable product portfolio, quantified LCA data, regulatory compliance documentation, extensive waste take back programs, and the CORACAL Carbon Footprint calculator tool for customers in Europe and the United States.

ALPOLIC has introduced a special grade (R75) that contains 75% recycled aluminum content, contributing to the circular economy.

MCG Americas has collaborated with Arizona State University and The Global KAITEKI Center in a circular economy project in the mobility market.

Awards and recognitions

We are also delighted to announce the recognition we have received for our sustainability achievements. Our achievements show our commitment to reduce GHG emissions and advance solutions within our industry.

Additional awards and recognitions

Awards and achievements	Business or product recognized
Prestigious Italian Oscar dell'Imballaggio award for Best Packaging	Taghleef Industries, to which we supply packaging solutions
NRG Energy's Excellence in Energy award in the Sustainability category	ES&S business (United States)
Selected as a finalist in the Plastics Recycling Awards Europe 2023	ES&S business (Europe)
Texas Chemistry Council's Sustained Excellence in Caring award	SoarnoL
Third-party certifications for Responsible Care® Management Systems and RC 14001:2015.	ES&S, PC/MMA, SoarnoL, Gelest, and Polyester Film (MFA) divisions in the United States
One of three finalists in the Crystal Cabin Awards in the Sustainable Cabin category	Carbon Fiber "Biopreg" material

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Collaboration with external partners

World Economic Forum's R&D Hub for Plastic Waste Processing

In April 2023, the MCG Group signed an R&D collaboration agreement with TNO, an independent Dutch research organization, as the only Japanese founding member of the R&D Hub for Plastic Waste Processing (R&D Hub).

The R&D Hub is a joint R&D project to investigate plastic recycling that was launched by the Low-Carbon Emitting Technologies (LCET) initiative of the World Economic Forum (WEF). The members of the LCET initiative are TNO and seven global chemical companies: the MCG Group, BASF, Covestro, Dow, SABIC, Solvay, and LyondellBasell.

The LCET initiative and the R&D Hub represent the first attempts worldwide for the chemicals industry to achieve carbon neutrality and realize a circular future through global collaboration and joint development across companies. Our participation in this groundbreaking initiative may allow the MCG Group to acquire technologies to support future circular and low-carbon business. It also demonstrates our commitment to domestic and overseas programs to realize KAITEKI.



After the signing of the agreement with the seven founding members and TNO (April 2023, Antwerp, Belgium)

Joint research to safeguard the global commons

Since April 2021, MCC and the Center for Global Commons (CGC), established by the University of Tokyo, have been engaged in joint research with the aim of formulating sustainable business models for the chemical industry from the perspective of effective use and recycling of resources.

In September 2022, the CGC published a new report, "Planet Positive Chemicals," outlining the results from this joint research project on the role of the chemical industry in safeguarding the global commons (i.e., the global environmental system upon which the sustainable development of humankind is founded). The report explores how the chemical industry can operate within planetary boundaries and aim to achieve sustainable societies and economies by playing an important role in supporting other sectors and consumers, on top of reducing its own environmental impacts.

The report provides a detailed view of the future pathways toward carbon neutrality, taking a system-wide view of the likely demand for chemicals and exploring the industry's GHG emissions along its entire value chain. The MCG Group will share the report's conclusions right across society and work to build wide-ranging partnerships and collaborative relationships to develop a sustainable chemical industry.

[Planet Positive Chemicals Report Released from Joint Research for the Conservation of the Global Commons with the University of Tokyo](#)

Participation in the Decarbonization × Reconstruction Town Development Platform

The MCG Group is participating in the Decarbonization × Reconstruction Town Development Platform established in March 2023, with the Ministry of the Environment as its secretariat. The goal is to both decarbonize and

reconstruct/revitalize communities in 12 municipalities in Fukushima Prefecture that were affected by the Great East Japan Earthquake and the nuclear accident at the Fukushima Daiichi nuclear power plant, and to form a distinctive regional circular and ecological sphere in which the environment, economy, and society thrive while making the most of local resources. The initiative aims to cooperate with private companies inside and outside the region over a long period of time with common goals and shared recognition.

Collaboration with local governments is essential to achieve carbon neutrality. Through its participation in the platform, the MCG Group aims to reduce GHG emissions from plants, branches, and research laboratories and establish resource recycling models for industries such as agriculture, forestry, and livestock, while developing models for collaboration with local governments at the prefectural and city level.