Mitsubishi Chemical Group Corporation - Climate Change 2023

C0. Introduction

C0.1

(C0.1) Give a general description and introduction to your organization.

Mitsubishi Chemical Group Corporation (MCG) was established in October 2005.

Mitsubishi Chemical Corporation (merged with MCG's other operating companies, Mitsubishi Plastics, Inc. and Mitsubishi Rayon Co., Ltd. in April 2017), Mitsubishi Tanabe Pharma Corporation, Life Science Institute, Inc., which was established in April 2014 to provide cutting-edge, high-quality solutions that contribute broadly to human health, and Nippon Sanso Holdings Corporation, which joined MCG in November 2014 are MCG's four core operating companies.

MCG is engaged in five main businesses: electronics applications, design materials, healthcare, chemicals, and polymers.

In April 2022, MCG shifted from a structure in which the holding company and operating companies operated separately to one in which the entire group operates together under the concept of "One Company, One Team".

In line with this change, the company name was changed from "Mitsubishi Chemical Holdings Corporation" to "Mitsubishi Chemical Group Corporation" on July 1, 2022.

C0.2

(C0.2) State the start and end date of the year for which you are reporting data and indicate whether you will be providing emissions data for past reporting years.

Reporting year

Start date
April 1 2022

End date
March 31 2023

Indicate if you are providing emissions data for past reporting years
No

Select the number of past reporting years you will be providing Scope 1 emissions data for
<Not Applicable>

Select the number of past reporting years you will be providing Scope 2 emissions data for
<Not Applicable>

Select the number of past reporting years you will be providing Scope 3 emissions data for
<Not Applicable>

C0.3

(C0.3) Select the countries/areas in which you operate.
China
Indonesia
Japan
United States of America

C0.4

(C0.4) Select the currency used for all financial information disclosed throughout your response.
JPY

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your chosen approach for consolidating your GHG inventory.
Financial control

C-CH0.7

(C-CH0.7) Which part of the chemicals value chain does your organization operate in?

Row 1

Bulk organic chemicals
Lower olefins (cracking)
Aromatics
Ethylene oxide & Ethylene glycol
Ethanol
Polymers

Bulk inorganic chemicals
Carbon black
Hydrogen
Oxygen
Other industrial gasses

Other chemicals
Specialty chemicals
Specialty organic chemicals

C-OG0.7

(C-OG0.7) Which part of the oil and gas value chain and other areas does your organization operate in?

Row 1

Oil and gas value chain
Chemicals

Other divisions

C0.8

(C0.8) Does your organization have an ISIN code or another unique identifier (e.g., Ticker, CUSIP, etc.)?

Indicate whether you are able to provide a unique identifier for your organization	Provide your unique identifier
Yes, an ISIN code	JP3897700005

C1. Governance

C1.1

(C1.1) Is there board-level oversight of climate-related issues within your organization?
Yes

C1.1a

(C1.1a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual or committee	Responsibilities for climate-related issues
Chief Executive Officer (CEO)	We consider the management and improvement of environmental indicators, including climate change, as important elements of environmental management. As a member of the Board of Directors, the CEO is responsible for reporting to the Board on the management and improvement of environmental indicators, including climate change, and regularly reports on the progress of strategy development, goal setting, and environmental protection activities. In the reporting year, the Board of Directors has decided that our sustainability-related products (climate change, circular economy, food supply, water conservation, etc.) should be 20% of our sales revenue by 2025.

C1.1b

(C1.1b) Provide further details on the board's oversight of climate-related issues.

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Scope of board-level oversight	Please explain
Scheduled – all meetings	Reviewing and guiding annual budgets Overseeing major capital expenditures Overseeing acquisitions, mergers, and divestitures Overseeing and guiding employee incentives Reviewing and guiding strategy Overseeing and guiding the development of a transition plan Monitoring the implementation of a transition plan Overseeing and guiding scenario analysis Overseeing the setting of corporate targets Monitoring progress towards corporate targets Reviewing and guiding the risk management process	<Not Applicable>	In order to enhance management transparency and fairness and strengthen the management oversight function, our company introduced the Nominating Committee System in FY2015. The Board of Directors is positioned to formulate basic management policies and supervise overall management, while decision-making and execution by executive officers, who are responsible for business execution, are separated from the Board of Directors. To strengthen the supervisory function of the Board of Directors, the majority of directors do not concurrently serve as executive officers, and the CEO, who also serves as a director, is responsible for supervising the execution of issues closely related to climate change. The Board of Directors is also the deliberative and decision-making body for the mid- to long-term management plan, as well as for all ESG-related KPIs and target setting, including climate change measures.

C1.1d

(C1.1d) Does your organization have at least one board member with competence on climate-related issues?

	Board member(s) have competence on climate-related issues	Criteria used to assess competence of board member(s) on climate-related issues	Primary reason for no board-level competence on climate-related issues	Explain why your organization does not have at least one board member with competence on climate-related issues and any plans to address board-level competence in the future
Row 1	Yes	One of our executive officer approves our annual response to the CDP and is fully aware of its contents. In addition, another executive officer has been appointed as the chairman of Japan Chemical Industry Association (JCIA) since last year. JCIA is committed to communicating the value of innovation and enhancing its presence so that the chemical industry can lead as a solution provider toward achieving carbon neutrality in 2050. Therefore, we value them both as individuals who are well versed in climate change-related issues.	<Not Applicable>	<Not Applicable>

C1.2

(C1.2) Provide the highest management-level position(s) or committee(s) with responsibility for climate-related issues.

Position or committee
Chief Executive Officer (CEO)

Climate-related responsibilities of this position
Managing climate-related acquisitions, mergers, and divestitures
Providing climate-related employee incentives
Developing a climate transition plan
Implementing a climate transition plan
Integrating climate-related issues into the strategy
Conducting climate-related scenario analysis
Setting climate-related corporate targets
Monitoring progress against climate-related corporate targets
Assessing climate-related risks and opportunities
Managing climate-related risks and opportunities

Coverage of responsibilities
<Not Applicable>

Reporting line
CEO reporting line

Frequency of reporting to the board on climate-related issues via this reporting line
Half-yearly

Please explain
For our purpose of "We lead with innovative solutions to achieve KAITEKI, the well-being of people and the planet", the Mitsubishi Chemical Group is conducting corporate activities with sustainability as one of the core elements of our management.

We have established the Sustainability Committee, which is chaired by the Chief Executive Officer (CEO) and consists of executive officers, to deliberate on the group's sustainability policies and related matters, in addition to monitoring and overseeing various sustainability activities, including climate change-related measures.

The deliberations and decisions made by the Sustainability Committee are regularly reported to the Board of Directors.

The MCG group has established a risk management system based on an organizational management system that emphasizes the "One Company, One Team" management line. The MCG Group ERM Committee is chaired by the CEO, who is the Chief ERM Officer based on the "ERM Basic Regulations," and is composed of the Primary Supervising Officers (Vice Presidents) in charge of their respective risk category areas.

The ERM Committee deliberates and decides on the status of management of major risks and risk management policies that affect the entire MCG Group, including climate change risks and opportunities, which form the basis for deliberation and decision-making on sustainability policies, etc. And the committee reports the details of these decisions to the Board of Directors as necessary.

Therefore, the CEO is ultimately responsible for climate change-related matters as he is the chairperson of the Sustainability Committee and the ERM Committee.

C1.3

(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?

	Provide incentives for the management of climate-related issues	Comment
Row 1	Yes	

C1.3a

(C1.3a) Provide further details on the incentives provided for the management of climate-related issues (do not include the names of individuals).

Entitled to incentive
Board/Executive board

Type of incentive
Monetary reward

Incentive(s)
Bonus – set figure

Performance indicator(s)
Achievement of climate transition plan KPI
Progress towards a climate-related target
Achievement of a climate-related target

Incentive plan(s) this incentive is linked to
Short-Term Incentive Plan

Further details of incentive(s)
The reduction of GHG emissions is part of our original MOS (Management of sustainability) index, and is used to evaluate the progress of "Management aiming to improve sustainability," one of our management principles.
Performance and progress are evaluated annually. The results of this evaluation affect the salary levels of the relevant directors and executive officers.

Explain how this incentive contributes to the implementation of your organization's climate commitments and/or climate transition plan
It will contribute to the reduction of GHG emissions. The remuneration system is designed to strongly emphasize the integrated practice of the three KAITEKI management axes, Management of Sustainability (MOS), Management of Technology (MOT), and Management of Economics (MOE), to realize our vision of KAITEKI.

C2. Risks and opportunities

C2.1

(C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?
Yes

C2.1a

(C2.1a) How does your organization define short-, medium- and long-term time horizons?

	From (years)	To (years)	Comment
Short-term	0	2	This is a time line of urgent issues that require immediate action.
Medium-term	2	10	This is a time frame for issues to be included in the mid-term management plan. Our medium-term management plan (updated every five years) fits this perspective.
Long-term	10	30	This is a time frame for issues that need to be addressed over a longer time span than the mid-term plan. In the mid-term management plan formulated in FY 2019, we adopted an approach of back casting and planning for the ideal state of society and MCG in 2050. For this reason, we have designated 2050 as a key base year for our long-term strategy.

C2.1b

(C2.1b) How does your organization define substantive financial or strategic impact on your business?

We define a significant financial impact as one that has a financial impact of 5% of operating income (approximately 10 billion yen) or more. We also define significant strategic impacts as items that are difficult to translate into monetary terms and are material to our company (e.g., impact on long-term business strategy or damage to reputation). This definition is also applied to impacts from climate-related risks and opportunities.

C2.2

(C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.

Value chain stage(s) covered
Direct operations
Upstream
Downstream

Risk management process
Integrated into multi-disciplinary company-wide risk management process

Frequency of assessment
More than once a year

Time horizon(s) covered
Short-term
Medium-term
Long-term

Description of process
The MCG Group has established a risk management system based on an organizational management system that emphasizes the "One Company, One Team" management line. The MCG Group ERM Committee is chaired by the MCG President, who is the Chief ERM Officer based on the "ERM Basic Regulations," and is composed of the Primary Supervising Officers (Vice Presidents) in charge of their respective risk category areas.

The ERM Committee deliberates and decides on the status of management of Material Risks and risk management policies that affect the entire MCG Group, including climate change risks and opportunities as the basis for deliberative decisions on sustainability policies and other matters. The committee reports the details of these decisions to the Board of Directors as necessary. The ERM Committee is held twice a year in principle and is also held if necessary.
In each organization connected to the ERM Committee, Person responsible for ERM, Manager of ERM, and Person in charge of ERM are assigned to each business group and function to promote ERM. The following is a detailed description of the ERM promotion process.

[Identification and evaluation]
MCG Group ERM selects risk categories of concern based on the internal environment, such as business type and business characteristics, and the external environment, such as political and social conditions in each country, and it identifies possible individual risks in each risk category. The Responsible Division under the supervision of a Primary Supervising Officer is established for each risk category to select individual risks and develop risk scenarios for each risk including climate change. The Responsible Division assesses individual risks based on risk scenarios.

The risk assessment is conducted using a common set of risk assessment indicators for the MCG Group to evaluate risk in terms of impact and likelihood of occurrence. This risk assessment covers not only our group but also the entire value chain, including upstream and downstream, and is conducted from short-, medium-, and long-term perspectives. The impact is evaluated not only based on financial factors, but also on non-financial factors such as human life, reputation, management plans, business goals/plans, human capital, and social impact.
The frequency of risk assessment is twice a year (the same as the number of meetings of the ERM Committee), and additional assessments may be made as necessary. The MCG Group ERM Committee determines the MCG Group Material Risks to be addressed in the next fiscal year, taking into consideration the risk management matrix created based on the results of the risk assessment.

[Response and management]
The Manager of ERM formulates an action plan (RM Plan) to be implemented by the organization in the next fiscal year based on the risk response measures formulated by the Primary Supervising Officer (Responsible Division), and reports to the Person responsible for ERM. The Responsible Division monitors the implementation of risk response measures in each organization based on the progress of the RM Plan, reports to the ERM Committee, and directs additional measures as necessary.

C2.2a

(C2.2a) Which risk types are considered in your organization's climate-related risk assessments?

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	We are examining the risk of increased costs due to current emission regulations in major countries. Current regulations are limited to a carbon tax in Japan, which accounts for 70% of our GHG emissions, and the level of regulation does not have a strong impact on our business or finances. However, in China, Singapore, and the EU, there are concerns about the impact of emissions trading schemes on our business. Therefore, our risk assessment process covers the financial impact of the schemes in these countries. Specifically, we quantitatively compare our sales and operating income in each region to the increased regulatory costs associated with energy usage, identify areas where the impact cannot be ignored, and consider countermeasures.
Emerging regulation	Relevant, always included	We collect information on regulatory trends in various countries (including future projections) to assess the risk of higher product prices due to carbon pricing and emission controls. With the implementation of the Paris Agreement, it is expected that greenhouse gas emission regulations will be further tightened worldwide. For us (whose main products are petrochemicals and industrial gases, which have a large carbon load during production), the introduction of carbon pricing and emission regulations is expected to not only significantly increase production costs, but also decrease demand due to higher product prices. Furthermore, the Roadmap to Zero GHG Emissions by 2050 calls for zero GHG emissions throughout the product lifecycle, from raw material production to disposal. We are beginning to address this challenge through innovation in our products and their manufacturing processes.
Technology	Relevant, always included	We use life cycle assessment to quantitatively evaluate the economic benefits of reducing greenhouse gas emissions from research and development. Chemicals that emit large amounts of GHGs during production may be at a disadvantage compared to other materials with comparable functions in terms of global warming mitigation. If we are unable to reduce the lifecycle GHG emissions of our products through innovation, or if reductions in lifecycle carbon load increase the competitiveness of competing non-chemical materials, we believe this poses a significant risk to our company. In particular, many of our products are made from petroleum and coal, which unavoidably have a large life cycle carbon load, which is a challenge for us. On the other hand, if we can develop products with low greenhouse gas emissions, we will have the opportunity to differentiate ourselves from our competitors and be chosen by more customers. Therefore, our risk assessment also evaluates the financial impact of the progress of such R&D activities. Through life cycle analysis of carbon emissions, we also qualitatively assess the risk of loss of existing products and the potential for new product expansion, which is an important reference for prioritizing investments in technology and product development. We focus on the development of new materials such as plastics that utilize non-fossil resources, energy conversion and storage devices that promote the efficient use of renewable energy, and lightweight mobility that takes advantage of the properties of functional materials.
Legal	Relevant, sometimes included	In our risk assessment, we consider the potential financial impact of failing to reduce large greenhouse gas emissions. Failure to reduce mass emissions of greenhouse gases could be considered a crime of over-emission and new litigation risk. This has already been the case in the past for other environmentally hazardous substances, which can lead to litigation if not addressed responsibly. It is appropriate to recognize that our petrochemical business has three sites in Japan that emit more than 1 million tons of greenhouse gases, and that such risk exists. Therefore, our risk assessment process includes the potential financial impact of such litigation. At this time, there is little potential for litigation in Japan due to high greenhouse gas emissions, but we have investigated litigation trends overseas and have found this to be a relevant risk. In addition, our risk assessment includes studies that assess the history of litigation due to past pollution problems and it also recognized that litigation due to large emissions is a relevant risk.
Market	Relevant, always included	We are assessing the economic impact of the risk of scaling down or shutting down our operations in high carbon-impact chemicals. The increase in the carbon tax will inevitably increase the price of our main chemical products, such as naphtha cracker derivatives, which have a high carbon load, and their market competitiveness as products is inferior to competing materials with a low carbon load, such as paper, natural fibers, and wood, raising the risk of business downsizing or shutting down. Therefore, during the risk assessment process, we evaluate the financial impact of these market changes. To this end, we conduct carbon life cycle analysis for most of our products, evaluating not only production costs, but also the cost of purchased raw materials and disposal costs after use in terms of carbon pricing.
Reputation	Relevant, always included	Our company considers risks such as product boycotts and underinvestment in its risk assessment. Among manufacturing industries, the chemical industry is the second largest GHG emitter after steel, and our company, with its large scale of operations, is also a notable emitter. We are the largest emitter in the chemical industry in Japan and one of the largest GHG emitters globally. As climate change is increasingly recognized as a serious global environmental issue and companies with high emissions are seen as having a negative impact on the climate, product boycotts and investment cuts against companies with high emissions may become more frequent in the near future. In addition, bad reputation has a non-negligible negative impact on employment and employee morale. Therefore, our risk assessment process evaluates the financial impact of reputational risk in the chemical industry. Specifically, we research and analyze the strategies of other companies in the chemical industry and leading companies in other industries with regard to global warming countermeasures to gather knowledge about their impact and expertise.
Acute physical	Relevant, always included	We consider the risk of adverse economic impact on our facilities and operations due to wind and flood damage in our risk assessments. Many of our chemical plants use large amounts of water and are located near oceans and rivers. Facilities near small and medium-sized rivers in Japan are particularly vulnerable to flood damage caused by sudden rises in water levels due to torrential rains. Therefore, if the frequency of wind and flood damage increases due to an increase in extreme weather events caused by climate change, there is an increased risk of serious damage to facilities and operations, resulting in adverse financial impacts. Therefore, in our risk assessment process, we evaluate the financial impact of acute physical risks from extreme weather events. This acute physical risk from extreme weather events, whether or not climate change is involved, has been thoroughly reviewed in the past for our major locations.
Chronic physical	Relevant, always included	We consider risks such as reduced operating rates due to global warming in our risk assessment process. As average temperatures rise due to global warming, chemical plants, which generate large amounts of heat from reactions, will become harsh working environments for workers. In addition, rising water temperatures will increase risks such as insufficient cooling water capacity and reduced operating rates. Based on these considerations, our risk assessment evaluates the financial impact of worsening working conditions and increased operational constraints associated with rising average temperatures. This is a serious issue for our company, which has many manufacturing sites in Japan with high summer temperatures.

C2.3

(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.3a

(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.

Identifier

Risk 1

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Current regulation	Carbon pricing mechanisms

Primary potential financial impact

Increased indirect (operating) costs

Climate risk type mapped to traditional financial services industry risk classification

<Not Applicable>

Company-specific description

In Japan, a global warming tax was introduced in 2012 to mitigate global warming. In addition, as a result of the agreement reached at COP21 in 2016, there is a growing possibility that the tax rate will be raised in the future. Chemical industry, which is MCG's core business, is a major greenhouse gas (GHG) emitter, and if the carbon tax burden increases due to tighter regulations, it could have a negative impact on corporate profits.

Therefore, to estimate the impact on MCG, we conducted a risk assessment using the WEO2020 SDS scenario (1.65°C increase). According to this scenario, carbon prices

will increase approximately twice as much in 2025 as in 2019 and three to four times as much in 2040 as in 2019.The global warming-related tax burden in 2019 is more than 1 billion yen for all domestic businesses. Adding fuel costs, which are expected to increase in the future, the burden is expected to increase by 8-10 billion yen in 2040, which we view as a significant financial impact (more than 5% of operating income, more than 10 billion yen).

Time horizon
Short-term

Likelihood
Virtually certain

Magnitude of impact
Medium-low

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
10000000000

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact figure
The overall tax burden related to global warming in 2019 is over 1 billion yen for all Japanese operations. In the future, the tax rate could be raised to the lowest tax rate in the EU countries.
In that case, the current Japanese tax rate would be 10 times higher than the current tax rate, and we have estimated the potential economic impact based on this assumption.
[2019 tax burden 1 billion yen x 10 = 10 billion yen].

Cost of response to risk
10000000000

Description of response and explanation of cost calculation
[Situation]
More than 80% of MCG's energy consumption occurs at its plants in Japan, and as of FY2019, our total CO2 emissions (Scope 1+2) were 16,629 (thousand t-CO2e). In addition, as of 2019, the overall tax burden related to global warming has already exceeded 1 billion yen for all domestic operations. Given these circumstances, a further increase in the carbon tax in the future could have a significant financial impact on our business.

[Issues]
It is important to reduce CO2 emissions from our operations.

[Action]
In 2021, we established a policy to achieve carbon neutrality by 2050, with the goal of a 29% global reduction by 2030 (compared to fiscal 2019), and have set medium-term energy conservation and GHG emission reduction targets for each of our business sites. As a specific reduction plan, MCG Hiroshima Plant's in-house power generation facility used coal-fired boilers to generate and supply electricity and steam. Since CO2 emissions from boiler use accounted for approximately 90% of the plant's emissions, we have been studying fuels that would contribute to CO2 reduction since 2008. In fiscal 2019, we achieved a reduction of 4,700 tons per year in coal-fired boilers through the full-scale mixed combustion of biomass fuels using wood waste.

[Result]
In 2022, our multiple GHG emission reduction projects have resulted in a total reduction of approximately 42,000 tons of GHG emissions.

[Calculation method/Breakdown of costs]
Our company will invest approximately 100 billion yen by 2030 to achieve carbon neutrality by 2050, with 10 billion yen as short-term expenses for risk response.

Comment

Identifier
Risk 2

Where in the value chain does the risk driver occur?
Direct operations

Risk type & Primary climate-related risk driver

Acute physical	Flood (coastal, fluvial, pluvial, groundwater)

Primary potential financial impact
Decreased revenues due to reduced production capacity

Climate risk type mapped to traditional financial services industry risk classification
<Not Applicable>

Company-specific description
MCG has conducted risk assessments based on the IPCC RCP2.6 scenario (2°C increase) and RCP8.5 scenario (4°C increase), and in Asia, the main region of operation, the risk may increase by a factor of 1.5 and 1.8 respectively for the period 2080-2100. Thus, there is a risk of an increase in plant shutdowns due to flooding and other extreme weather events that occur as a result of climate change.

Because most of the raw materials and products are transported by sea, MCG's large petrochemical complexes, including the Ibaraki and Okayama Plants, are all located in coastal areas. Those large petrochemical complexes operate continuously 24 hours a day and manufacture many products, with annual plant shipments exceeding several hundred billion yen. In particular, large petrochemical complexes such as Kashima, Mizushima-Okayama, and Ibaraki each have annual shipments in excess of 100

billion yen. Therefore, even if a disaster causes a shutdown of a few weeks or months, the loss would be enormous. Assuming a one-month shutdown due to a disaster, the loss would be 8 billion yen, or 16.8% of MCG's 47.5 billion yen in operating income in 2020. Therefore, flooding caused by a major typhoon or the suspension of marine transportation could have a significant impact on MCG's business and sales.

Time horizon
Short-term

Likelihood
More likely than not

Magnitude of impact
Medium-low

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
8000000000

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact figure
Large petrochemical complexes such as Okayama and Ibaraki manufacture large volumes of products continuously, 24 hours a day, 365 days a year, with annual plant shipments exceeding 100 billion yen. The financial impact is expected to be a loss of 8 billion yen, or 16.8% of MCG's 47.5 billion yen in operating income in 2020, assuming a one-month shutdown of operations due to the disaster.

Cost of response to risk
1000000000

Description of response and explanation of cost calculation
[Situation]
We have industrial complexes in coastal area of Setouchi and Ibaraki. There is a risk of plant shutdowns due to submergence of large facilities, raw materials, products, and electrical system, as well as the possibility of logistical stagnation due to submerged trunk roads. These have significant financial impacts on our business.

[Issue]
In order to avoid the financial impact caused by the suspension of factory operations due to flooding, we need to formulate a BCP for each location in response to extreme weather conditions, and conduct periodic inspections and develop an emergency system according to local conditions.

[Action]
Based on our natural disaster risk management framework through 2020-2021, priorities for disaster countermeasures were determined. With regard to extreme weather events caused by climate change, MCG has strengthened its preventive measures against floods and droughts.

As a specific example, for disasters such as flooding, we reinforced drainage facilities, installed levees, and raised the ground to prevent flooding. In addition, we have increased the allowable volume of rainwater and wastewater after oil-water separation, dust removal, and other treatments.

MCG is also taking various measures to prevent the spread of damage from accidents and natural disasters. For example, in 2020, MCG conducted environmental audits for six operation sites, one research institute, and three group companies. The audits confirmed and evaluated activities in terms of compliance with environmental laws and PDCA for environmental conservation activities, and provided guidance for 25 necessary improvements.

[Result]
As of FY2022, more than 80% of MCG's major plants in Japan have completed measures against natural disasters. To ensure a stable supply, MCG will continue to invest in flood countermeasures such as reinforcement of drainage facilities, levees, and fill. In addition, we are further enhancing our business continuity plan based on our experience with major past disasters, to minimize damage and ensure business continuity.

[Calculation method/Breakdown of costs]
Approximately 1 billion yen paid for flooding countermeasures such as reinforcement of drainage facilities, installation of levees, and ground fill, as described above, will be used as risk response costs.

Comment

Identifier
Risk 3

Where in the value chain does the risk driver occur?
Downstream

Risk type & Primary climate-related risk driver

Emerging regulation	Mandates on and regulation of existing products and services

Primary potential financial impact
Decreased revenues due to reduced demand for products and services

Climate risk type mapped to traditional financial services industry risk classification
<Not Applicable>

Company-specific description
According to the WEO2020 SDS scenario (1.65°C increase), the plastic recovery rate is predicted to increase and reach 27% in 2030 from 17% in 2019.
This increase in the plastic recovery rate means that an increasing percentage of the raw materials used in the manufacture of plastic products will be recycled raw materials. MCG manufactures plastic products and sells basic materials as part of its business, and an increase in the percentage of recycled plastic will reduce demand for our basic materials. The increase in the percentage of recycled plastics will simply result in a 10-20% decrease in our sales and cracker operating rates.

Since our sales of basic materials are several hundred billion yen, we estimate that this will result in a decrease in sales of several tens of billions of yen. Therefore, although we are taking measures to address global warming, we are at risk of losing market share if this trend continues.

Time horizon
Short-term

Likelihood
Likely

Magnitude of impact
Medium-high

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
140000000000

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact figure
According to the SDS scenario, the plastic recovery rate will increase from 17% in 2019 to 27% in 2030. An increase in the plastic recovery rate means that an increasing percentage of the raw materials used in the manufacture of plastic products will be recycled raw materials. This will result in a decrease in demand for our basic raw materials and a simply 10-20% decrease in our sales and cracker operating rates. Since the FY2020 sales of the products that are expected to be affected are approximately 700 billion yen, we have estimated a financial impact of 140 billion yen, assuming a 20% decrease in sales.

Cost of response to risk
100000000000

Description of response and explanation of cost calculation
[Status]
The future increase in the plastic recovery rate means that an increasing percentage of the raw materials used in the manufacture of plastic products will be recycled raw materials.
This will result in a decrease in demand for our basic raw materials and a simple 10-20% decrease in sales and cracker utilization rates.

[Issue]
MCG needs to focus on developing and expanding the introduction of environmentally friendly biomass and biodegradable plastics (bioplastics).

[Action/Results]
In response, MCG developed the plastic BioPBS™. This is a step toward the efficient use of resources while replacing petroleum, an exhaustible resource as the raw material for plastics, with biomass raw materials, a renewable resource.

In addition, by making the material biodegradable while taking advantage of the characteristics of plastics, it can be easily decomposed in the environment and contribute to reducing the environmental impacts. Further research and development is underway to make all PBS materials, including 1,4-butanediol, plant-derived in the future.

MCG is also aiming to achieve even higher biodegradability, and hopes to achieve the SDGs of "ensuring sustainable production and consumption patterns" at a higher level.

To achieve this goal, MCG is making concerted efforts in research and development, establishment of production technology, assurance of required quality, market development, and global sales expansion.

For bioplastics (BioPBS™), PTT MCC Biochem Co., Ltd., a joint venture between PTT Global Chemical Public Company Limited (formerly known as Petroleum Authority of Thailand) and MCG, has been manufacturing and selling the product since 2017. It is currently deployed in applications such as agricultural mulch film, paper cups and straws, and coffee capsules.

[Calculation method/Breakdown of costs]
We expect sales in the resource recycling field to reach 500 billion yen by 2030. We expect to invest 100 billion yen/year in resource recycling as risk management expenses. This includes investments in chemical recycling of PET and other materials, and material recycling of carbon fiber and high-performance films.

Comment

C2.4

(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?
Yes

C2.4a

(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.

Identifier
Opp1

Where in the value chain does the opportunity occur?

Downstream

Opportunity type
Products and services

Primary climate-related opportunity driver
Development and/or expansion of low emission goods and services

Primary potential financial impact
Increased revenues resulting from increased demand for products and services

Company-specific description
Tighter environmental laws and regulations will increase carbon-related energy costs, which will increase demand for products with lower GHG emissions. We use the WEO2020 SDS scenario (1.65°C increase) to plan our investments. According to this scenario, investments in batteries, power grids, and energy efficiency are expected to increase by about 1.5 times their current levels by 2030. For the MCG Group, these products fall under the growth business "GHG reduction" and are largely classified under the functional products segment, a critical segment responsible for 29% of sales revenue within MCG in FY2021. MCG manufactures many materials that are essential for making energy-saving products. Examples include lithium battery components for EVs and hybrid cars; carbon fiber, which is essential for optimal weight reduction of wind turbine rotor blades and hydrogen fuel storage tanks; bio-based engineering plastics made from plant-derived raw materials; bio-polyester, which uses non-depleting resources and is biodegradable; and polyvinyl alcohol, which is biodegradable and provides a high barrier.

We believe that the creation of appropriate business models for low-carbon products has the potential to address the needs of a decarbonized society and create important business opportunities. Therefore, we aim to expand sales of these products from 70 billion yen in FY2020 to 350 billion yen in FY2030.

Time horizon
Short-term

Likelihood
Very likely

Magnitude of impact
High

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
350000000000

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact figure
The goal is to expand sales of "low-carbon new energy" products from 70 billion yen in FY2020 to 350 billion yen in FY2030, which corresponds to about 5% of the overall sales target. This was set as the financial impact amount. The items are lithium battery materials, electronic materials, and organic solar cells.

Cost to realize opportunity
30000000000

Strategy to realize opportunity and explanation of cost calculation
[Situation]
We are developing low-carbon products such as lithium-ion batteries and carbon fiber composite materials, and we recognize the opportunity to increase demand for our products in the event that carbon taxes and other regulations are further tightened in the future.

[Issue]
We need to develop products that contribute to GHG reduction and expand our product lineup.

[Action]
We have decided to manage "new energy" products (lithium battery materials, optoelectronic materials, and organic solar cells) as products with low GHG emissions independently from other electronic application products since 2017. The development of next-generation battery materials is being accelerated using open innovation in collaboration with LIBTEC.
These products in the GHG reduction category are being evaluated for their contribution to CO2 emissions reduction using carbon life cycle analysis.
In addition, MCG is currently working with Toyota Tsusho Corporation to study the commercialization of plant-derived ethylene, propylene, and their derivatives from sugarcane-derived and other bioethanol, with the aim of starting production and sales in FY2025.

[Results]
In the actual development of lithium battery materials, we have succeeded in developing a new anode material for lithium batteries that has high output characteristics and low expansion, contributing to longer battery life and a 60% reduction in CO2 emissions during manufacturing.
In addition, DURABIO, a bio-based engineering plastic made from plant-derived raw materials, has been highly evaluated as an automobile interior material for its properties such as impact resistance and chemical resistance, and is being used in various automobile parts, including Toyota Motor Corporation's MIRAI.

[Cost calculation method/Breakdown]
The cost of realizing this opportunity is calculated based on R&D investment in low-carbon products; the majority of the 30 billion yen in R&D investment in FY 2018 is in the area of functional products. The breakdown is 14 billion yen for high-performance films and 16 billion yen for others.
Cost to realize the opportunity: 14 billion yen invested in high-functional films + 16 billion yen invested in others = 30 billion yen invested in R&D in the functional products area.

Comment

Identifier
Opp2

Where in the value chain does the opportunity occur?
Downstream

Opportunity type
Products and services

Primary climate-related opportunity driver
Development of climate adaptation, resilience and insurance risk solutions

Primary potential financial impact
Increased revenues resulting from increased demand for products and services

Company-specific description
Due to the effects of extreme weather conditions associated with climate change, the world's available water resources are becoming increasingly limited.
As a chemical manufacturer, MCG wants to contribute to the water circulating society. As a manufacturer of chemicals for water purification, MCG can provide various products and services in the field of water-related solutions, such as water treatment membrane components and ion exchange resins.

We believe that we can offer a variety of products and services in the field of solutions related to food and water, and have positioned the "food and water" field as a growth business and plan to aggressively promote these businesses. As an example, MCG provides polyvinylidene fluoride membranes (Sterapore, hollow fiber membranes) for various filtration applications such as separation, purification, and concentration in wastewater, sewage, and water treatment, turning groundwater and other types of water into safe and reliable drinking water through advanced membrane filtration treatment.

MCG has been working to solve these problems for more than 20 years. Focusing on groundwater, which accounts for 0.76% of the earth's surface, our company has developed a decentralized water treatment and water supply system to provide safe and reliable water. Today, our company supplies the water necessary for people's daily lives not only in Japan but also overseas. Specifically, we aim to expand company-wide sales from the current 150 billion yen to 600 billion yen by 2030 through "development of decentralized food and water systems" and "development of products that can be stored for long periods of time".

Time horizon
Short-term

Likelihood
Very likely

Magnitude of impact
High

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
330000000000

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact figure
In FY2030, we aim to increase sales in the "Environmental and Life Solutions" field (including agribusiness, construction materials, etc.), which includes the water membrane separation business, from 165 billion yen in FY2020 to 330 billion yen, equivalent to about 5% of our overall sales target. This is the amount of financial impact. Items include water treatment equipment and hollow fiber membrane products.

Cost to realize opportunity
10500000000

Strategy to realize opportunity and explanation of cost calculation
[Situation]
Due to the effects of extreme weather conditions associated with climate change, the world's available water resources are becoming increasingly limited. Therefore, in regions of the world where freshwater is scarce, the effective use of water resources through water reuse is also becoming increasingly important.

[Issue]
We aim to expand sales from the current 150 billion yen to 600 billion yen by 2030 through the "development of distributed food and water systems" and "development of products that can be stored for long periods of time".

[Action]
MCG is focusing on strengthening its distributed water supply and water treatment-related services by utilizing its total water treatment technology from drinking water to wastewater through separation materials such as filtration membranes and ion exchange resins. In April 2019, MCG's wholly owned subsidiary, Wellthy Corporation, was integrated into Mitsubishi Chemical Aqua Solutions Corporation (MCAS).

Through the business integration, MCG has established a one-stop system to provide a variety of water treatment-related proposals, from drinking water to wastewater. One specific product example is the Sterapore-7000 Series (PE membrane) module specification, which provides polyvinylidene fluoride membranes (Sterapore, hollow fiber membranes) for various filtration applications such as separation, purification, and concentration of wastewater, sewage, and water treatment. Compared to other membrane treatment methods, this product enables more compact equipment and reduces energy consumption by reducing the footprint of the membrane and the amount of aeration.

[Results]
Water treatment systems employing "STERAPORE™" are widely used in the treatment of domestic and industrial wastewater, with more than 5,000 installations in Japan and overseas.

[Cost calculation method/Breakdown]
MCG has invested approximately 10 billion yen in research and development in the area of water treatment solutions. To realize this opportunity, MCG invests approximately 10 billion yen in R&D in the field of water treatment solutions. In addition, MCG has made an initial investment of 500 million yen in MCAS, and 10.5 billion yen is spent to realize the opportunity.

Comment

Identifier
Opp3

Where in the value chain does the opportunity occur?
Downstream

Opportunity type
Products and services

Primary climate-related opportunity driver
Development and/or expansion of low emission goods and services

Primary potential financial impact
Increased revenues resulting from increased demand for products and services

Company-specific description
According to EUBP (European Bioplastics), global bioplastic production capacity is expected to triple over the next five years from 2.41 million tons (2021) to 7.59 million tons.
The market for environmentally friendly plastic products is expanding due to growing calls to reduce the use of plastics, triggered by the introduction of a plastic bag fee starting in the summer of 2020, as well as the 2018 Ocean Plastic Charter.

Therefore, we believe that the development and sale of biobased plastics that do not depend on petroleum and biodegradable plastics that have a small environmental impact at the time of disposal will lead to increased sales.

We have developed and are selling DURABIO and BENEBiOL, biomass plastics, and Bio-PBS™, a plant-derived biodegradable plastic. We have developed and patented Bio-PBS™ in-house. Therefore, we aim to contribute to environmental friendliness and increase our market share by significantly expanding our business, which is currently expanding its market in the food and agricultural fields, in the future. Our current goal is to achieve sales of 30 billion yen in fiscal 2030.

Time horizon
Short-term

Likelihood
Likely

Magnitude of impact
Medium-high

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
30000000000

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact figure
We aim to achieve sales of approximately 30 billion yen, or about 6% of our target of 500 billion yen for the entire resource recycling field in 2030. Our products are biodegradable plastics such as BioPBS.

Cost to realize opportunity
100000000000

Strategy to realize opportunity and explanation of cost calculation
[Status]
Plastic products emit a large amount of CO2 at the manufacturing stage and have a high environmental impact. Therefore, demand for technologies that emit less CO2 has been increasing in recent years.

[Issue]
Therefore, we need to research and develop products with low CO2 emissions. Plastic products in particular have a large environmental impact, so it is necessary to develop technologies that enable the manufacture of plastic products with low carbon emissions.

[Action]
Succinic acid and 1,4-butanediol, the main raw materials of PBS, are generally manufactured from petroleum, but MCG has developed BioPBS™, the world's first product that converts the raw material succinic acid from petroleum to plant-derived and can be decomposed into CO2 and water by the action of microbes.

MCG also develops, manufactures, and sells compounds that add new functions to BioPBS™ by taking advantage of its excellent compatibility and biodegradability. In addition to being highly biodegradable at room temperature, the excellent heat resistance, flexibility, and low-temperature adhesion properties of BioPBS™ are used in paper cup laminating materials, food-related products such as coffee capsules, cutlery, and straws, consumer products such as plastic bags and shopping bags, and mulch films for agricultural use.

[Result]
BioPBS™ used as agricultural mulch film can be simply plowed into the field after harvest and the film will naturally decompose, eliminating the need for collection work and contributing greatly to labor savings and waste reduction in agricultural work. The agricultural mulch film project using BioPBS™ has been selected for the "Demonstration Project for Establishing a Recycling System for Plastics and Other Resources to Support a Decarbonized Society" to be conducted by the Ministry of the Environment in 2019.

[Cost calculation method/Breakdown]
The entire resource recycling area, including bio- and chemical-businesses, is expected to invest 100 billion yen/year.
This includes investment in chemical recycling of PET and other materials, as well as material recycling of carbon fiber and high-performance films. Approximately 10% (10 billion yen) of this amount will be allocated to bio-PBS and biodegradable plastics.

Comment

C3. Business Strategy

C3.1

(C3.1) Does your organization's strategy include a climate transition plan that aligns with a 1.5°C world?

Row 1

Climate transition plan
Yes, we have a climate transition plan which aligns with a 1.5°C world

Publicly available climate transition plan
Yes

Mechanism by which feedback is collected from shareholders on your climate transition plan
We do not have a feedback mechanism in place, but we plan to introduce one within the next two years

Description of feedback mechanism
<Not Applicable>

Frequency of feedback collection
<Not Applicable>

Attach any relevant documents which detail your climate transition plan (optional)
MCG_20211020cnjpn.pdf
MCG_20211020cneng.pdf

Explain why your organization does not have a climate transition plan that aligns with a 1.5°C world and any plans to develop one in the future
<Not Applicable>

Explain why climate-related risks and opportunities have not influenced your strategy
<Not Applicable>

C3.2

(C3.2) Does your organization use climate-related scenario analysis to inform its strategy?

	Use of climate-related scenario analysis to inform strategy	Primary reason why your organization does not use climate-related scenario analysis to inform its strategy	Explain why your organization does not use climate-related scenario analysis to inform its strategy and any plans to use it in the future
Row 1	Yes, qualitative and quantitative	<Not Applicable>	<Not Applicable>

C3.2a

(C3.2a) Provide details of your organization's use of climate-related scenario analysis.

Climate-related scenario	Scenario analysis coverage	Temperature alignment of scenario	Parameters, assumptions, analytical choices
Transition scenarios: IEA SDS	Company-wide	<Not Applicable>	What we have positioned as [parameters] are carbon price, manufacturing cost, demand, and growth potential of new business areas toward 2030. Assuming that existing products continue to be manufactured until 2040 while emitting large amounts of GHG, the SDS scenario analysis revealed that an increase in the carbon price (estimated at $140 / tCO2 by SDS) would increase the manufacturing cost burden by approximately 130 billion yen. We have a unique concept of "KAITEKI (Happiness)," which proposes not only solutions to environmental and social problems, but also sustainable development of society and the Earth. We believe that our purpose is to solve human, social, and global problems and to work toward a sustainable future. As an [analytical choice], we have formulated "KAITEKI Vision 30 (KV-30)" by back casting from our social vision and corporate stance for 2050, based on social and technological trends, to clarify our group vision and goals for 2030. In considering this vision, it was an extremely important activity to develop a vision of the future in 2050 based on scenarios in the future analysis of the global environment, including climate change. As a company with many energy-intensive products, we have many migration risks to consider. Therefore, at the time of the 2019 study, we selected the IEA SDS. Based on this scenario, we evaluated the potential for higher production costs and lower demand associated with the decarbonization of existing products, as well as the growth potential of new business areas for the year 2030. For our analysis, we selected all of our current businesses and all of the regions of the world to which they relate.
Physical climate scenarios: RCP 2.6	Company-wide	<Not Applicable>	What we have positioned as [parameters] are carbon price, manufacturing cost, demand, and growth potential of new business areas toward 2030. Assuming that existing products continue to be manufactured until 2040 while emitting large amounts of GHG, the SDS scenario analysis revealed that an increase in the carbon price (estimated at $140 / tCO2 by SDS) would increase the manufacturing cost burden by approximately 130 billion yen. We have a unique concept of "KAITEKI (Happiness)", which proposes not only solutions to environmental and social problems but also sustainable development of society and the Earth. We believe that our company's purpose is to solve human, social, and global problems and achieve a sustainable future. As an [analytical choice], we have formulated "KAITEKI Vision 30 (KV-30)" by back casting from our social vision and corporate stance for 2050, based on social and technological trends, to clarify our group vision and goals for 2030. In developing this vision, it was an extremely important activity to create a vision of the future in 2050 based on scenarios in our analysis of the future of the global environment, including climate change. We selected these scenarios because we assumed that various events resulting from climate change would affect our existing and new operations as major risks and opportunities. Actually, we evaluated the IPCC physical risk scenarios, and two scenarios, RCP2.6 and RCP8.5, according to TCFD recommendations. This is to allow for a more multifaceted evaluation.
Physical climate scenarios: RCP 8.5	Company-wide	<Not Applicable>	What we have positioned as [parameters] are disasters and increased operating costs due to increased energy use. We believe that it is necessary to provide solutions that contribute to ensuring business continuity and disaster prevention and mitigation due to the severity of extreme weather events, not to strengthen regulations and policies due to the effects of climate change. We are committed to our group's unique concept of "KAITEKI (Happiness)," which proposes not only solutions to environmental and social problems, but also sustainable development of society and the Earth. Under the vision of realizing KAITEKI, we believe that our company's purpose is to solve human, social, and global problems and achieve a sustainable future. As an [analytical choice], we have formulated "KAITEKI Vision 30 (KV-30)" by back casting from our social vision and corporate stance for 2050, based on social and technological trends, to clarify our group vision and goals for 2030. In developing this vision, it was an extremely important activity to create a vision of the future in 2050 based on scenarios in our analysis of the future of the global environment, including climate change. We selected this scenario because we assumed that various events resulting from climate change would affect our existing and new operations as major risks and opportunities. Actually, we evaluated the IPCC physical risk scenarios, and the two scenarios, RCP2.6 and RCP8.5, according to TCFD recommendations. This is to allow for a more multifaceted evaluation.

C3.2b

(C3.2b) Provide details of the focal questions your organization seeks to address by using climate-related scenario analysis, and summarize the results with respect to these questions.

Row 1

Focal questions

MCG used scenario analysis with reference to SDS scenarios to envision possible future events, and identified businesses that are likely to shape the future performance of our group based on our group's prediction. In accordance with our basic medium to long term management strategy, 'KAITEKI Vision 30', MCG also identified the risks of failing to address social issues, including climate change. Those risks are classified into three major categories: loss of corporate and brand value (Risk 1), loss or shrinkage of existing business (Risk 2), and loss of new growth opportunities (Risk 3).

[Particularly high-impact climate change risks]
(1) How to respond to the decrease in demand for virgin petrochemical products due to the increase in the plastic recovery rate from the regulation of plastic product usage.
(2) How to respond to the emergence of risks to existing businesses due to increased costs associated with social issues such as the introduction of a carbon tax.
(3) How can factories located in coastal areas prepare for and mitigate the loss of sales in the event of operational losses due to extreme weather disasters such as flooding?

Results of the climate-related scenario analysis with respect to the focal questions

As a result, the loss of corporate and brand value (Risk 1) is expected to result in a decrease in stock value of 230 billion yen and a decrease in operating income of 20 billion yen. The risk of losing or shrinking existing business (Risk 2) is expected to have a risk of 410 billion yen decrease in operating income and 160 billion yen deterioration in the balance sheet. Similarly, the risk of losing new growth opportunities (Risk 3) is expected to reduce operating income by 220 billion yen.

In the climate change related risks, we recognized that following risks have significant impacts on our company.
(1) The decrease in virgin demand for petrochemical products due to an increase in the plastic recovery rate as a result of regulation on the usage of plastic products
(2) The emergence of risks to existing businesses due to increased costs associated with social issues such as the introduction of carbon taxes
(3) The decrease in sales when factories located in coastal areas lose operations due to extreme weather events such as flooding

As an example of actions related to the results of the scenario analysis, we have decided in July 2021 to invest in a facility, where waste plastics are liquefied into oils, to correspond to the declining demand for virgin petrochemical products due to the spread of recycled plastics.

We have decided to build the chemical recycling facility in our Ibaraki plant, the largest one in Japan on a commercial basis, as a joint project with ENEOS Corporation, with a liquefying capacity of waste plastics into oils of 20,000 ton/year. We plan to begin operations in fiscal 2023.

As a company involved in the plastics manufacturing supply chain, we have set contributing to the formation of a recycling-oriented society as one of our themes, and we are currently studying chemical recycling technologies. We also aim to expand into the resource-recycling field by providing a stable supply of bio-based plastics that do not depend on petroleum and biodegradable plastics that have low environmental impacts when disposed.

C3.3

(C3.3) Describe where and how climate-related risks and opportunities have influenced your strategy.

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Yes	[Situation] The market for environmentally friendly plastics is expanding due to increasing demand for environmentally friendly plastics as a result of the growing demand to reduce plastic use against the backdrop of the 2018 Ocean Plastics Charter and other initiatives, and the increase in demand for environmentally friendly plastics following the introduction of a plastic bag fee that began in 2020. Therefore, we believe there is an opportunity to increase sales through the sale of such products. [Issue] Therefore, we have formulated our mid to long term management plan "KAITEKI Vision 30（KV30）" and set a goal to contribute to the promotion of the circular economy through the development of technologies and business models for material and chemical recycling and the provision of bioplastics as part of our sustainability management efforts. The goal is to contribute to the promotion of the circular economy through the development of material recycling and chemical recycling technologies, business models, and the provision of bioplastics. [Actions] As an example, we are working to add new functions to BioPBS™, an originating biodegradable plastic developed by our company that is characterized by its low impact on the natural environment, and to expand the applications for which it can be deployed. We also aim to expand our business by replacing products that have a greater environmental impact with product of low environmental impact, such as products made from sustainable materials or recycled existing plastics. [Result] By prioritizing products that reduce GHG emissions throughout the value chain and products that reduce GHG emissions through carbon recycling as future "growth" businesses, we are targeting sales of 500 billion yen in the carbon recycling field in 2030, which is 9% of our sales target of 6 trillion yen. We will continue to invest in this area as we expect this sales to grow substantially after 2030.
Supply chain and/or value chain	Yes	[Situation] In recent years, tighter environmental laws and regulations have been considered. While carbon taxes and other regulations risk are increasing carbon-related energy costs, opportunities exist for increased demand for products with lower GHG emissions. [Issue] To expand our business with products that reduce GHG emissions across the value chain and transform our business into one that provides solutions to societal challenges, including solving environmental problems, we need to build new relationships with our suppliers and customers. Recognizing the importance of this, we conducted a 2DS analysis to embody the strengths of the opportunity. We focused on Life Cycle Assessment (LCA) as an important communication tool to strengthen this relationship. To this end, we formulated "KAITEKI Vision 30（KV30）" and set the goal of evolving our sustainability management efforts from conventional LCA, which assesses the environmental impact of products, to a higher level of LCA, which assesses the entire value chain, including its impact on society. [Action] In the Mitsubishi Chemical Group Product Stewardship Policy, we are committed to managing our products throughout their life cycle (development, procurement, production, distribution, sales, use, and disposal/recycling) in order to minimize the impact of our products on the natural environment. To promote communication with our business partners, we distribute CSR procurement guidelines and monitor their implementation. [Results] By continuing these efforts, we expect to realize the establishment of a model to solve environmental problems together with other stakeholders in the value chain by 2025.
Investment in R&D	Yes	With the ongoing transformation of business portfolios and the shift to solution businesses that enhance social value, it is necessary to create evaluation indicators that include these perspectives in judging the importance of R&D and in making investment decisions. The importance of this has been recognized even through scenario analysis in order to fully realize the strengths of the opportunity, but until now we have not set such indicators. Currently, in order to achieve carbon neutrality with virtually zero GHG emissions by 2050, we are considering subsidies for R&D and capital investment toward carbon neutrality (we expect to invest approximately 100 billion yen by 2030 to achieve the above carbon neutrality goal).
Operations	Yes	[Situation] According to the SDS scenario, carbon prices will double in 2025 from 2019 levels and increase 3-4 times in 2040 from 2019 levels. [Issue] Existing processes that emit a large amount of GHGs for manufacturing are identified by the scenario analysis as having significant financial risks associated with increased overhead costs, and the challenge is to reduce the carbon tax burden through GHG reductions. Therefore, we formulated "KAITEKI Vision 30（KV30）" and set a goal to reduce our environmental impact by working on GHG reduction and effective utilization throughout the entire value chain as part of our sustainability management efforts. [Action] Specifically, we are promoting the improvement of logistics efficiency, including the optimization of product shape and packaging, such as increasing transportation lot size and modal shift to rail transportation, to reduce GHG emissions from logistics. In addition, to reduce GHG emissions from sales activities, we are actively introducing hybrid vehicles for our sales cars. [Result] Through ongoing efforts to reduce GHG global emissions in our business activities, we expect to achieve a 29% reduction in GHG emissions in fiscal 2030 (compared to fiscal 2019).

C3.4

(C3.4) Describe where and how climate-related risks and opportunities have influenced your financial planning.

	Financial planning elements that have been influenced	Description of influence
Row 1	Revenues	[Status] Caused by regulation of charge for plastic shopping bags that began in the summer of 2020, the bioplastic market is expanding due to the growing demand to reduce the use of plastics against the backdrop of the 2018 Ocean Plastics Charter and other initiatives, as well as the increasing demand for environmental friendly plastics. We therefore identify an opportunity to increase sales through the sale of environmental friendly plastic products. [Issue] Based on the IEA 2DS, we reviewed various economic forecasts from the IEA and other sources for the year 2030 and analyzed risks based on current operations around the world (actual results for 2017). Based on the results of analysis, we formulated "KAITEKI Vision 30（KV30）" and set a goal to contribute to the promotion of the circular economy through the development of technologies and business models for material and chemical recycling as a sustainability management initiative and the provision of bioplastics. [Actions] As an example, we are adding new functions to BioPBS™, an originating biodegradable plastic developed by our company that is characterized by its low impact on the natural environment, and we seek for expansion of its development. [Result] We will prioritize products that reduce GHG emissions throughout the value chain and products that reduce GHG emissions through carbon recycling as future "growth" businesses, with the goal of increasing share of these priority businesses in total sales from 25% in 2018 to 70% by 2030.

C3.5

(C3.5) In your organization's financial accounting, do you identify spending/revenue that is aligned with your organization's climate transition?

	Identification of spending/revenue that is aligned with your organization's climate transition	Indicate the level at which you identify the alignment of your spending/revenue with a sustainable finance taxonomy
Row 1	Yes, we identify alignment with our climate transition plan	<Not Applicable>

C3.5a

(C3.5a) Quantify the percentage share of your spending/revenue that is aligned with your organization's climate transition.

Financial Metric
Revenue/Turnover

Type of alignment being reported for this financial metric
Alignment with our climate transition plan

Taxonomy under which information is being reported
<Not Applicable>

Objective under which alignment is being reported
<Not Applicable>

Amount of selected financial metric that is aligned in the reporting year (unit currency as selected in C0.4)

Percentage share of selected financial metric aligned in the reporting year (%)
11

Percentage share of selected financial metric planned to align in 2025 (%)

Percentage share of selected financial metric planned to align in 2030 (%)

Describe the methodology used to identify spending/revenue that is aligned
We have five materialities identified in the formulation of our mid-term management plan: reduction of environmental impact, circular economy, life cycle assessment, contribution to the community, and conservation of biodiversity. As a specific target for these issues, we have set the percentage of revenue from sales of products that contribute to the Circular Economy and climate change action at 12% in FY2022.

C4. Targets and performance

C4.1

(C4.1) Did you have an emissions target that was active in the reporting year?
Absolute target

C4.1a

(C4.1a) Provide details of your absolute emissions target(s) and progress made against those targets.

Target reference number
Abs 1

Is this a science-based target?
No, but we anticipate setting one in the next two years

Target ambition
<Not Applicable>

Year target was set
2020

Target coverage
Company-wide

Scope(s)
Scope 1
Scope 2

Scope 2 accounting method
Market-based

Scope 3 category(ies)
<Not Applicable>

Base year
2019

Base year Scope 1 emissions covered by target (metric tons CO2e)

8455000

Base year Scope 2 emissions covered by target (metric tons CO2e)
8174000

Base year Scope 3, Category 1: Purchased goods and services emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 2: Capital goods emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 4: Upstream transportation and distribution emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 5: Waste generated in operations emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 6: Business travel emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 7: Employee commuting emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 8: Upstream leased assets emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 9: Downstream transportation and distribution emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 10: Processing of sold products emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 11: Use of sold products emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 12: End-of-life treatment of sold products emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 13: Downstream leased assets emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 14: Franchises emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 15: Investments emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Other (upstream) emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Other (downstream) emissions covered by target (metric tons CO2e)
<Not Applicable>

Base year total Scope 3 emissions covered by target (metric tons CO2e)
<Not Applicable>

Total base year emissions covered by target in all selected Scopes (metric tons CO2e)
16629000

Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1
100

Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2
100

Base year Scope 3, Category 1: Purchased goods and services emissions covered by target as % of total base year emissions in Scope 3, Category 1: Purchased goods and services (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 2: Capital goods emissions covered by target as % of total base year emissions in Scope 3, Category 2: Capital goods (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions covered by target as % of total base year emissions in Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 4: Upstream transportation and distribution covered by target as % of total base year emissions in Scope 3, Category 4: Upstream transportation and distribution (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 5: Waste generated in operations emissions covered by target as % of total base year emissions in Scope 3, Category 5: Waste generated in operations (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 6: Business travel emissions covered by target as % of total base year emissions in Scope 3, Category 6: Business travel (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 7: Employee commuting covered by target as % of total base year emissions in Scope 3, Category 7: Employee commuting (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 8: Upstream leased assets emissions covered by target as % of total base year emissions in Scope 3, Category 8: Upstream leased assets (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 9: Downstream transportation and distribution emissions covered by target as % of total base year emissions in Scope 3, Category 9: Downstream transportation and distribution (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 10: Processing of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 10: Processing of sold products (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 11: Use of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 11: Use of sold products (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 12: End-of-life treatment of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 12: End-of-life treatment of sold products (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 13: Downstream leased assets emissions covered by target as % of total base year emissions in Scope 3, Category 13: Downstream leased assets (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 14: Franchises emissions covered by target as % of total base year emissions in Scope 3, Category 14: Franchises (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Category 15: Investments emissions covered by target as % of total base year emissions in Scope 3, Category 15: Investments (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Other (upstream) emissions covered by target as % of total base year emissions in Scope 3, Other (upstream) (metric tons CO2e)
<Not Applicable>

Base year Scope 3, Other (downstream) emissions covered by target as % of total base year emissions in Scope 3, Other (downstream) (metric tons CO2e)
<Not Applicable>

Base year total Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)
<Not Applicable>

Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes
100

Target year
2030

Targeted reduction from base year (%)
29

Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]

Scope 1 emissions in reporting year covered by target (metric tons CO2e)
6611000

Scope 2 emissions in reporting year covered by target (metric tons CO2e)
7563000

Scope 3, Category 1: Purchased goods and services emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 2: Capital goods emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 4: Upstream transportation and distribution emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 5: Waste generated in operations emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 6: Business travel emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 7: Employee commuting emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 8: Upstream leased assets emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 9: Downstream transportation and distribution emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 10: Processing of sold products emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 11: Use of sold products emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 12: End-of-life treatment of sold products emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 13: Downstream leased assets emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 14: Franchises emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Category 15: Investments emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Other (upstream) emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Scope 3, Other (downstream) emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Total Scope 3 emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)
14174000

Does this target cover any land-related emissions?
No, it does not cover any land-related emissions (e.g. non-FLAG SBT)

% of target achieved relative to base year [auto-calculated]

Target status in reporting year
Underway

Please explain target coverage and identify any exclusions
Our target is Scope 1+2 for assessable MCG operations. We cover the entire world, with a current coverage rate of 97%. Almost all operations are covered, excluding a few overseas companies.

Plan for achieving target, and progress made to the end of the reporting year
We will reduce global GHG emissions by 29% (compared to FY 2019) by FY 2030 by streamlining manufacturing processes, converting fuels for in-house power generation, and other reductions (external factors) assuming that the CO2 emission coefficient based on the power source composition in each country and region in FY 2030 will decrease.

List the emissions reduction initiatives which contributed most to achieving this target
<Not Applicable>

C4.2

(C4.2) Did you have any other climate-related targets that were active in the reporting year?
Net-zero target(s)

C4.2c

(C4.2c) Provide details of your net-zero target(s).

Target reference number
NZ1

Target coverage
Company-wide

Absolute/intensity emission target(s) linked to this net-zero target
Abs1

Target year for achieving net zero
2050

Is this a science-based target?
No, but we anticipate setting one in the next two years

Please explain target coverage and identify any exclusions
Based on the following conditions (external factors) achieved by the initiatives of governments, institutions, and companies in each country, we will achieve virtually zero GHG emissions by 2050, including continued rationalization of manufacturing processes, implementation of innovations such as the use of biomass feedstock and CO2 as feedstock, and carbon offsets through afforestation and other measures.

Conditions
1. CO2-free electricity supply
2. Establishment of supply chains and price reduction for hydrogen, ammonia, etc.
3. Subsidies for R&D and capital investment toward carbon neutrality

Do you intend to neutralize any unabated emissions with permanent carbon removals at the target year?
Yes

Planned milestones and/or near-term investments for neutralization at target year
Carbon offset

Planned actions to mitigate emissions beyond your value chain (optional)
Mitsubishi Chemical Corporation (MCC), the main operating company of the MCG Group, has set the following goals and is working on its business and R&D activities with the aim of achieving carbon neutrality by 2050.

1. Reduction target of GHG emissions
MCC will set the following GHG emission reduction targets (Scope 1 and Scope 2) for the MCC Group by FY2030.
Global: 32% or more compared to FY 2019
Japan: Reduction of 43% or more compared to FY 2013

2. Reinforcement of efforts to achieve targets
(1) Implementation of energy conversion
We aim to shift away from coal-fired power generation by promoting the use of renewable energy, LNG, and other power generation sources with lower environmental impact at domestic offices and plants by FY2030.

(2) Introduction of internal carbon price system
In order to achieve both GHG emission reductions and business growth, an internal carbon price system will be introduced in the first half of FY2022, which will evaluate not only Scope 1 and Scope 2 emissions, but also the contribution to reductions, and will be used as one of the indicators for capital investment decisions. In the future, the system will be expanded to include R&D investment decisions, and will also be used as an indicator for business portfolio strategy.
The system motivates emission reductions by setting a carbon price within the company and converting GHG emissions into a monetary value.

(3) Reinforcement of Life Cycle Assessment Implementation System
We establish a system to promptly calculate carbon footprint* for all products produced at MCC's domestic offices and factories during the first half of FY2022. We accelerate efforts to reduce GHG emissions throughout the entire product chain by promoting digitization and education for employees and speedy calculation.
*GHG emissions from raw materials to product manufacturing.

C-OG4.2d

(C-OG4.2d) Indicate which targets reported in C4.1a/b incorporate methane emissions, or if you do not have a methane-specific emissions reduction target for your oil and gas activities, please explain why not and forecast how your methane emissions will change over the next five years.

C4.3

(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.
Yes

C4.3a

(C4.3a) Identify the total number of initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	141	
To be implemented*	191	834000
Implementation commenced*	42	35000
Implemented*	63	42000
Not to be implemented	27	

C4.3b

(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
6000

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (market-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
160000000

Investment required (unit currency – as specified in C0.4)
5000000000

Payback period
>25 years

Estimated lifetime of the initiative
>30 years

Comment
Electric power equipment such as air separation equipment, pumps, and blowers were replaced with high-efficiency models to reduce externally purchased electricity (Scope 2). The figures are the cumulative total of 23 activities conducted in FY2022.

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
22000

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (market-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
450000000

Investment required (unit currency – as specified in C0.4)
9000000000

Payback period
16-20 years

Estimated lifetime of the initiative
16-20 years

Comment
Process analysis pointed out equipment bottlenecks and energy efficiency losses to optimize operations. This leads to minimized energy consumption and GHG emissions per required production volume. Figures are cumulative totals for 20 activities conducted in FY2022.

Initiative category & Initiative type

Energy efficiency in production processes	Waste heat recovery

Estimated annual CO2e savings (metric tonnes CO2e)
1200

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 2 (market-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
45000000

Investment required (unit currency – as specified in C0.4)
1000000000

Payback period
21-25 years

Estimated lifetime of the initiative
21-30 years

Comment
Facility modifications improved heat transfer efficiency and enhanced heat recovery, resulting in reduction of steam purchases (Scope 2). Figures are cumulative totals for six activities implemented in FY2022.

Initiative category & Initiative type

Energy efficiency in buildings	Lighting

Estimated annual CO2e savings (metric tonnes CO2e)
300

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (market-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
22000000

Investment required (unit currency – as specified in C0.4)
110000000

Payback period
4-10 years

Estimated lifetime of the initiative
16-20 years

Comment
Lighting in the plant was replaced with LED lighting. The figures are the cumulative total of 12 activities conducted in FY2022.

Initiative category & Initiative type

Energy efficiency in buildings	Other, please specify (Business optimization through consolidation of buildings and business locations within the business site)

Estimated annual CO2e savings (metric tonnes CO2e)
12500

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (market-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
270000000

Investment required (unit currency – as specified in C0.4)
0

Payback period
No payback

Estimated lifetime of the initiative
>30 years

Comment
We reduced externally purchased electricity (Scope 2) by suspending the use of buildings due to building consolidation and closing offices due to the reorganization of bases.

C4.3c

(C4.3c) What methods do you use to drive investment in emissions reduction activities?

Method	Comment
Dedicated budget for energy efficiency	We considered various energy-saving projects for manufacturing plants, and determined which to invest in from business environment and cost-effectiveness points of view.
Dedicated budget for low-carbon product R&D	We spent about 27.6 billion yen in FY2012 on R&D for Performance Products division including the development of low-GHG emission-related technologies such as LEDs, organic-PV, Li battery for HEV/EV, etc.

C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products?

Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products.

Level of aggregation

Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon

Other, please specify (Addressing the Avoided Emissions Challenge- Chemicals sector)

Type of product(s) or service(s)

Lighting	Conventional LED

Description of product(s) or service(s)

LED substrates and phosphors for solid-state lighting are recognized as our low-carbon products. Reducing power consumption by replacing incandescent lamps commonly used in homes and offices could lead to a reduction in Scope 2 emissions.

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)

Yes

Methodology used to calculate avoided emissions

Addressing the Avoided Emissions Challenge- Chemicals sector

Life cycle stage(s) covered for the low-carbon product(s) or services(s)

Use stage

Functional unit used

Long life because of semiconductor, brightness equivalent to incandescent bulbs, and high efficiency lighting fixtures because they light up brighter with less power.

Reference product/service or baseline scenario used

It is based on incandescent lamps, which were most commonly produced before the production of LED substrates and phosphors.

Life cycle stage(s) covered for the reference product/service or baseline scenario

Use stage

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario

7

Explain your calculation of avoided emissions, including any assumptions

We compared the energy consumption of an incandescent bulb of equivalent brightness with that of an LED bulb, assuming that 100 bulbs were turned on for 8 hours a day, every day, for one year (365 days).
0.036[kWh] x 100 bulbs x 8 hours x 365 days = 10512[kWh] for an incandescent bulb with 36W power consumption (Panasonic LW100V36W 40W type)
In the case of an LED bulb (Panasonic LDA6L-H-E17/BH/S_3) with 6.4W power consumption, 0.0064[kWh] x 100 pieces x 8 hours x 365 days = 1868.8[kWh].
Taking these differences, 10512[kWh]-1868.8[kWh]=8643.2[kWh]
If all this electricity was generated by coal-fired power generation, CO2 emissions would be 0.867[kg-CO2/kWh]×8643.2[kWh]=7.494 [tons-CO2].

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year

1

C-OG4.6

(C-OG4.6) Describe your organization's efforts to reduce methane emissions from your activities.

C-OG4.7

(C-OG4.7) Does your organization conduct leak detection and repair (LDAR) or use other methods to find and fix fugitive methane emissions from oil and gas production activities?

C-OG4.8

(C-OG4.8) If flaring is relevant to your oil and gas production activities, describe your organization's efforts to reduce flaring, including any flaring reduction targets.

C5. Emissions methodology

C5.1

(C5.1) Is this your first year of reporting emissions data to CDP?
No

C5.1a

(C5.1a) Has your organization undergone any structural changes in the reporting year, or are any previous structural changes being accounted for in this disclosure of emissions data?

Row 1

Has there been a structural change?
No

Name of organization(s) acquired, divested from, or merged with
<Not Applicable>

Details of structural change(s), including completion dates
<Not Applicable>

C5.1b

(C5.1b) Has your emissions accounting methodology, boundary, and/or reporting year definition changed in the reporting year?

	Change(s) in methodology, boundary, and/or reporting year definition?	Details of methodology, boundary, and/or reporting year definition change(s)
Row 1	No	<Not Applicable>

C5.2

(C5.2) Provide your base year and base year emissions.

Scope 1

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
8455000

Comment

Scope 2 (location-based)

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
8174000

Comment

Scope 2 (market-based)

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
8174000

Comment

Scope 3 category 1: Purchased goods and services

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
16440000

Comment

Scope 3 category 2: Capital goods

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
660000

Comment

Scope 3 category 3: Fuel-and-energy-related activities (not included in Scope 1 or 2)

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
1900000

Comment

Scope 3 category 4: Upstream transportation and distribution

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
880000

Comment

Scope 3 category 5: Waste generated in operations

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
100000

Comment

Scope 3 category 6: Business travel

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
80000

Comment

Scope 3 category 7: Employee commuting

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
120000

Comment

Scope 3 category 8: Upstream leased assets

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
0

Comment

Scope 3 category 9: Downstream transportation and distribution

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
0

Comment

Scope 3 category 10: Processing of sold products

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
0

Comment

Scope 3 category 11: Use of sold products

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
21630000

Comment

Scope 3 category 12: End of life treatment of sold products

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
8570000

Comment

Scope 3 category 13: Downstream leased assets

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
0

Comment

Scope 3 category 14: Franchises

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
0

Comment

Scope 3 category 15: Investments

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
1440000

Comment

Scope 3: Other (upstream)

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
0

Comment

Scope 3: Other (downstream)

Base year start
April 1 2019

Base year end
March 31 2020

Base year emissions (metric tons CO2e)
0

Comment

C5.3

(C5.3) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.
Japan Ministry of the Environment, Law Concerning the Promotion of the Measures to Cope with Global Warming, Superseded by Revision of the Act on Promotion of Global Warming Countermeasures (2005 Amendment)
Other, please specify (WBCSD :Guidance for Chemical sector)

C6. Emissions data

C6.1

(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?

Reporting year

Gross global Scope 1 emissions (metric tons CO2e)
6611000

Start date
<Not Applicable>

End date
<Not Applicable>

Comment
We cover the entire world. The current coverage rate is 97%, which we consider to be a kind of limit. Since the values not included are insignificant, we consider the impact to be small.

C6.2

(C6.2) Describe your organization's approach to reporting Scope 2 emissions.

Row 1

Scope 2, location-based
We are reporting a Scope 2, location-based figure

Scope 2, market-based
We are reporting a Scope 2, market-based figure

Comment

C6.3

(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO2e?

Reporting year

Scope 2, location-based
7563000

Scope 2, market-based (if applicable)
7563000

Start date
<Not Applicable>

End date
<Not Applicable>

Comment
We cover the entire world. The current coverage rate is 97%, which we consider to be a kind of limit. Since the values not included are insignificant, we consider the impact to be small.

C6.4

(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1, Scope 2 or Scope 3 emissions that are within your selected reporting boundary which are not included in your disclosure?
Yes

C6.4a

(C6.4a) Provide details of the sources of Scope 1, Scope 2, or Scope 3 emissions that are within your selected reporting boundary which are not included in your disclosure.

Source of excluded emissions
Several overseas companies

Scope(s) or Scope 3 category(ies)
Scope 1
Scope 2 (location-based)
Scope 2 (market-based)

Relevance of Scope 1 emissions from this source
Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source
Emissions are not relevant

Relevance of market-based Scope 2 emissions from this source
Emissions are not relevant

Relevance of Scope 3 emissions from this source
<Not Applicable>

Date of completion of acquisition or merger
<Not Applicable>

Estimated percentage of total Scope 1+2 emissions this excluded source represents
3

Estimated percentage of total Scope 3 emissions this excluded source represents
<Not Applicable>

Explain why this source is excluded
Regarding Scope 1 and 2, we cover the entire world, with a current coverage rate of 97%. Since the coverage is almost complete, the impact is considered to be small.
Regarding Scope 3, MCG is a heavy chemical industry, and there are production sites involved in enormous GHG emissions and non-manufacturing sites with almost no GHG emissions, and the latter are completely insignificant in the Scope 3 assessment.
Therefore, for the items disclosed in Scope 3, the coverage rate can be regarded as practically 100% by the current calculation method.

Explain how you estimated the percentage of emissions this excluded source represents
For sites with unknown Scope 1 and 2 emissions, emissions are estimated by assuming that their emissions are equivalent to those of sites with similar production volumes. The impact on the overall MCG emissions is assessed from the sum of these emissions.

C6.5

(C6.5) Account for your organization's gross global Scope 3 emissions, disclosing and explaining any exclusions.

Purchased goods and services

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
18320000

Emissions calculation methodology
Spend-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
The calculation is based on the "Corporate Value Chain (Scope 3) Accounting and Reporting Standard" by the GHG Protocol and the "Guidance for Accounting & Reporting Corporate GHG Emissions in the Chemical Sector Value Chain" by WBCSD.

(1) Purchasing data: We collected detailed purchasing data from MCC and monetary data from MTPC and NSHC; MCC, MTPC, and NSHC are our core operating companies.
(2) EMISSION FACTORS (EFs): For the purchase volume data, EFs were selected from Database for CFP program in Japan or IDEA.
(3) Calculation of emissions: GHG emissions were calculated by multiplying the purchased products and services (quantity and value) by the appropriate emission amount.

Capital goods

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
810000

Emissions calculation methodology
Spend-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
The total capital expenditures of MCHC Gr in FY2016 were obtained from internal financial data.
GHG emissions were calculated by multiplying EF (#06-0000) for capital expenditures in the chemical industry sector; EF was selected from the GLIO (global link input output model) EF database.

Fuel-and-energy-related activities (not included in Scope 1 or 2)

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
2480000

Emissions calculation methodology
Fuel-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
We adopted a method based on the "Corporate Value Chain (Scope 3) Accounting and Reporting Standard" (GHG Protocol).
Emissions were calculated from (A) upstream emissions of purchased fuel and (B) upstream emissions of purchased electricity and steam.
For energy purchased in Japan, transmission and distribution losses (C) were not included because they were aggregated under Scope 2.
Upstream emissions of fuel, electricity, and steam are those constructed under the CFP program in Japan and do not include purchased electricity at facilities outside of Japan.
For purchased electricity at overseas facilities, EFs (fuel composition and T&D losses) are calculated with the EFs for T&D losses from Technical Paper : Electricity-specific emission factors for grid electricity (Brander A. et.al. , Ecometrica (2011)).

Upstream transportation and distribution

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
270000

Emissions calculation methodology
Spend-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Since most of the downstream domestic transportation in Japan is borne by the group companies, it is reported under Category 4.
This method is based on the "Corporate Value Chain (Scope 3) Accounting and Reporting Standard" (GHG Protocol).
1) Large volume (>50,000 tons/year) imports of coal, oils and fats, etc. to Japan. Naphtha and other items that involve transportation are excluded.
2) Export of coke and petrochemical products from Japan (product sales) 3) Distribution in Japan of raw materials purchased and products sold by MCHC.; 1）For the above trade, emissions were calculated using the following procedure after ascertaining the volume and the import and export destinations. 2）For the transport distance and emission factor for marine transportation, we used the data collected by the CFP program in Japan.
3) Emissions from logistics in Japan were calculated in accordance with the Law Concerning the Promotion of the Measures to Cope with Global Warming.

Waste generated in operations

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
70000

Emissions calculation methodology
Waste-type-specific method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Calculations are based on the GHG Protocol Scope 3 Emissions Calculation Technical Guidance. The amount of waste generated by the Mitsubishi Chemical Group (MCG) was calculated from the total amount of internal waste identified in the environmental performance database. For the upstream EFs of waste inclination, landfill, and recycling, we used the database established by the CFP system in Japan.

Business travel

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
30000

Emissions calculation methodology
Spend-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Since we did not collect accurate cost data, we assumed 1% of total revenue for FY2016 for this cost. (EF was taken from the EF database "Embedded Energy and Emission Intensity Data for Japan Using Input-Output Tables (3EID)" for "Rail passenger service.")

Employee commuting

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
120000

Emissions calculation methodology
Spend-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Domestic residence of employees working at 17 major facilities (covering 32% of the Japanese workforce) was classified by prefecture. Average means of transportation and distances were estimated from the Census of Japan's actual commuting conditions. GHG emissions from public transportation were estimated using EFs registered in the CFP database. GHG emissions from commuting by car were calculated by multiplying the gasoline mileage and distance traveled data from the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) with the gasoline EF in the CFP database.
Since the number of working days is 240 days per year, we extrapolated the result to estimate the overall GHG emissions from commuting. For overseas, the calculation was made according to "Guidance for Calculating and Reporting Corporate Greenhouse Gas Emissions in the Chemical Industry Value Chain, Category 7: Employee Commuting," assuming 100% commuting by car, average distance of 30 km/travel, 440 trips/employee/year, and EF of 230 g-CO2e/km. The number of employees in Japan and overseas is from MCHC's 2016 Annual Report. The composition of employees is approximately 2/3 in Japan and 1/3 overseas.

Upstream leased assets

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Expenses for leased assets are less than 0.1% of net sales and are not material to our company. Therefore, this item is not included in the evaluation.

Downstream transportation and distribution

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Most of the downstream transportation in Japan is performed by group companies and is reported in Category 4. Although emissions from downstream transportation from overseas operations are not calculated, they are not considered relevant since they account for only about 40% of overseas sales and emissions from upstream transportation (Category 4) account for less than 2% of total Scope 3 emissions.

Processing of sold products

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
As stated in the Guidance for Accounting & Reporting Corporate GHG Emissions in the Chemical Sector Value Chain issued by the WBCSD, chemical companies are not required to report Scope 3, Category 10 emissions due to the diversity of applications and customer structures and the difficulty in obtaining reliable figures.

Use of sold products

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
16750000

Emissions calculation methodology
Methodology for direct use phase emissions, please specify (Calculated by multiplying each emission factor according to the type of energy used.)

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
The "Guidance for Accounting and Reporting Corporate Greenhouse Gas Emissions in the Chemical Sector Value Chain" requires the chemical sector to report at least two types of emissions in this category (1. combustion fuels, 2. products that contain or form greenhouse gases emitted during use, such as refrigeration and fertilizer leaks/emissions).

As the former category, we tabulated the fuels sold, including coke, COG gas, and propane, and multiplied the emission factors for these fuels. As the latter category, we estimated the electricity consumption of air separation units (ASUs) and dry ice (both at our core operating company, NSHC).
For ASUs, we assumed a useful life of 15 years and included their electricity consumption in our GHG emissions.

End of life treatment of sold products

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
8490000

Emissions calculation methodology
Waste-type-specific method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
This is based on the WBCSD's "Guidance for Accounting & Reporting Corporate GHG Emissions in the Chemical Sector Value Chain".
(1) Products: Carbon content of petrochemical products sold domestically and internationally was totaled.
(2) Scenarios: Two scenarios were developed for the treatment of used products.
1. end-of-life product scenario in Japan. Polymers: 22% recycled, 10% landfilled, 68% incinerated, based on data from the Society for Promotion of Plastic Processing. Other chemicals: 40% were estimated to be emitted as VOCs and 60% incinerated.
2. End-of-life scenario outside Japan: 80% landfilled and 20% incinerated according to WBCSD guidelines.
(3) EF: In the case of landfill, it was assumed that 50% of the contained carbon is converted to CO2 (GWP=1) and 50% to methane (GWP=25) (however, if the product sold is durable plastic, the default factor is zero). In the absence of data, we assumed a carbon content of 80%.

Downstream leased assets

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
As the leased assets account for less than 0.2% of total assets and not material, the description is omitted.

Franchises

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Since MCG has no franchise business, this item is not applicable.

Investments

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
1460000

Emissions calculation methodology
Investment-specific method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
98

Please explain
GHG emissions data for each company in which the Mitsubishi Chemical Group invests was collected from the parent company. GHG emissions from investments are calculated by multiplying the collected GHG emissions with the investment ratio and summing the results.

Other (upstream)

Evaluation status

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain

Other (downstream)

Evaluation status

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain

C6.7

(C6.7) Are carbon dioxide emissions from biogenic carbon relevant to your organization?
Yes

C6.7a

(C6.7a) Provide the emissions from biogenic carbon relevant to your organization in metric tons CO2.

	CO2 emissions from biogenic carbon (metric tons CO2)	Comment
Row 1	45000	

C6.10

(C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

Intensity figure
0.000003

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)
14174000

Metric denominator
unit total revenue

Metric denominator: Unit total
4635000000000

Scope 2 figure used
Market-based

% change from previous year
24

Direction of change
Decreased

Reason(s) for change
Change in output

Please explain
In FY2022, emissions decreased mainly due to lower production. On the other hand, sales value increased by about 15% compared to FY2021. This is thought to be due to the fact that some business segments conducted price revision under the effect of rising fuel and raw material prices. As a result, the emission intensity decreased by 24%.

C-OG6.12

(C-OG6.12) Provide the intensity figures for Scope 1 emissions (metric tons CO2e) per unit of hydrocarbon category.

C-OG6.13

(C-OG6.13) Report your methane emissions as percentages of natural gas and hydrocarbon production or throughput.

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?
Yes

C7.1a

(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used greenhouse warming potential (GWP).

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	6525000	IPCC Second Assessment Report (SAR - 100 year)
N2O	60200	IPCC Second Assessment Report (SAR - 100 year)
CH4	17600	IPCC Second Assessment Report (SAR - 100 year)
HFCs	10200	IPCC Second Assessment Report (SAR - 100 year)
SF6	200	IPCC Second Assessment Report (SAR - 100 year)
PFCs	600	IPCC Second Assessment Report (SAR - 100 year)

C-OG7.1b

(C-OG7.1b) Break down your total gross global Scope 1 emissions from oil and gas value chain production activities by greenhouse gas type.

C7.2

(C7.2) Break down your total gross global Scope 1 emissions by country/area/region.

Country/area/region	Scope 1 emissions (metric tons CO2e)
Japan	4899000
China	143000
North America	1130000
Europe	79000
Asia, Australasia, Middle East and Africa	360000

C7.3

(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.

By business division

C7.3a

(C7.3a) Break down your total gross global Scope 1 emissions by business division.

Business division	Scope 1 emissions (metric ton CO2e)
Chemicals	4529000
Industrial gas	1039000
Health care	24000
Coke	1019000

C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4

(C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4) Break down your organization's total gross global Scope 1 emissions by sector production activity in metric tons CO2e.

	Gross Scope 1 emissions, metric tons CO2e	Net Scope 1 emissions , metric tons CO2e	Comment
Cement production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Chemicals production activities	5569000	<Not Applicable>	
Coal production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Electric utility activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Metals and mining production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (upstream)		<Not Applicable>	
Oil and gas production activities (midstream)		<Not Applicable>	
Oil and gas production activities (downstream)		<Not Applicable>	
Steel production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport OEM activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport services activities	<Not Applicable>	<Not Applicable>	<Not Applicable>

C7.5

(C7.5) Break down your total gross global Scope 2 emissions by country/area/region.

Country/area/region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Japan	4194000	4194000
China	215000	215000
North America	1213000	1213000
Europe	915000	915000
Other, please specify (Asia, Australasia, Middle East and Africa)	1026000	1026000

C7.6

(C7.6) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.

By business division

C7.6a

(C7.6a) Break down your total gross global Scope 2 emissions by business division.

Business division	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Chemicals	2681000	2681000
Industrial Gas	4542000	4542000
Health Care	44000	44000
Coke	295000	295000

C7.7

(C7.7) Is your organization able to break down your emissions data for any of the subsidiaries included in your CDP response?

No

C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7

(C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7) Break down your organization's total gross global Scope 2 emissions by sector production activity in metric tons CO2e.

	Scope 2, location-based, metric tons CO2e	Scope 2, market-based (if applicable), metric tons CO2e	Comment
Cement production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Chemicals production activities	7223000	7223000	
Coal production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Metals and mining production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (upstream)			
Oil and gas production activities (midstream)			
Oil and gas production activities (downstream)			
Steel production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport OEM activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport services activities	<Not Applicable>	<Not Applicable>	<Not Applicable>

C-CH7.8

(C-CH7.8) Disclose the percentage of your organization's Scope 3, Category 1 emissions by purchased chemical feedstock.

Purchased feedstock	Percentage of Scope 3, Category 1 tCO2e from purchased feedstock	Explain calculation methodology
High Value Chemicals (Steam cracking)	10.2	Emission factors are selected from databases for CFP program in Japan or IDEA to calculate emissions.
Aromatics extraction	5.4	Emission factors are selected from databases for CFP program in Japan or IDEA to calculate emissions.
Butadiene (C4 sep.)	2.1	Emission factors are selected from databases for CFP program in Japan or IDEA to calculate emissions.
Other (please specify) (Acetone)	2.5	Emission factors are selected from databases for CFP program in Japan or IDEA to calculate emissions.
Naphtha	6.1	Emission factors are selected from databases for CFP program in Japan or IDEA to calculate emissions.
Methanol	2.1	Emission factors are selected from databases for CFP program in Japan or IDEA to calculate emissions.
Other (please specify) (Terephthalic acid)	1.1	Emission factors are selected from databases for CFP program in Japan or IDEA to calculate emissions.
Other (please specify) (Butyl alcohol)	3.1	Emission factors are selected from databases for CFP program in Japan or IDEA to calculate emissions.
Other (please specify) (Hydrogen cyanide)	1.4	Emission factors are selected from databases for CFP program in Japan or IDEA to calculate emissions.
Other (please specify) (Polycarbonate resin)	1.8	Emission factors are selected from databases for CFP program in Japan or IDEA to calculate emissions.
Coal	6.1	Emission factors are selected from databases for CFP program in Japan or IDEA to calculate emissions.

C-CH7.8a

(C-CH7.8a) Disclose sales of products that are greenhouse gases.

	Sales, metric tons	Comment
Carbon dioxide (CO2)	445000	
Methane (CH4)	0	
Nitrous oxide (N2O)	0	
Hydrofluorocarbons (HFC)	0	
Perfluorocarbons (PFC)	0	
Sulphur hexafluoride (SF6)	0	
Nitrogen trifluoride (NF3)	0	

C7.9

(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?

Decreased

C7.9a

(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined), and for each of them specify how your emissions compare to the previous year.

	Change in emissions (metric tons CO2e)	Direction of change in emissions	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	0	No change	0	In FY2022, energy use decreased in line with the overall decrease in production. The ratio of renewable energy use to overall energy use has not changed significantly from the previous year.
Other emissions reduction activities	42000	Decreased	0.26	The reduction of GHG emissions through emission reduction activities totaled 42,000 tons. Based on the total of 16,079,000 tons of Scope 1 and 2 emissions in FY2021, the reduction rate is calculated as 42,000/16,079,000 = 0.26%. The main reduction activities included replacing power equipment such as air separation equipment, pumps, and blowers with high-efficiency models, which reduced purchased electricity, and optimizing operating conditions by identifying equipment bottlenecks and loss of energy efficiencies through process analysis.
Divestment		<Not Applicable>		
Acquisitions		<Not Applicable>		
Mergers		<Not Applicable>		
Change in output		<Not Applicable>		
Change in methodology		<Not Applicable>		
Change in boundary		<Not Applicable>		
Change in physical operating conditions		<Not Applicable>		
Unidentified		<Not Applicable>		
Other		<Not Applicable>		

C7.9b

(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?

Market-based

C8. Energy

C8.1

(C8.1) What percentage of your total operational spend in the reporting year was on energy?

More than 5% but less than or equal to 10%

C8.2

(C8.2) Select which energy-related activities your organization has undertaken.

	Indicate whether your organization undertook this energy-related activity in the reporting year
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	Yes
Consumption of purchased or acquired steam	Yes
Consumption of purchased or acquired cooling	Yes
Generation of electricity, heat, steam, or cooling	Yes

C8.2a

(C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	HHV (higher heating value)	127000	24510000	24637000
Consumption of purchased or acquired electricity	<Not Applicable>	192000	14173000	14365000
Consumption of purchased or acquired heat	<Not Applicable>	0	1800	1800
Consumption of purchased or acquired steam	<Not Applicable>	0	4430000	4430000
Consumption of purchased or acquired cooling	<Not Applicable>	0	288000	288000
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	4600	<Not Applicable>	4600
Total energy consumption	<Not Applicable>	323600	43402800	43726400

C-CH8.2a

(C-CH8.2a) Report your organization's energy consumption totals (excluding feedstocks) for chemical production activities in MWh.

Consumption of fuel (excluding feedstocks)

Heating value

HHV (higher heating value)

MWh consumed from renewable sources inside chemical sector boundary

127000

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

11683000

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

7641000

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

19451000

Consumption of purchased or acquired electricity

Heating value

<Not Applicable>

MWh consumed from renewable sources inside chemical sector boundary

188000

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

13671000

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

0

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

13859000

Consumption of purchased or acquired heat

Heating value
<Not Applicable>

MWh consumed from renewable sources inside chemical sector boundary
0

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)
1800

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary
0

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary
1800

Consumption of purchased or acquired steam

Heating value
<Not Applicable>

MWh consumed from renewable sources inside chemical sector boundary
0

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)
3872000

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary
0

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary
3872000

Consumption of purchased or acquired cooling

Heating value
<Not Applicable>

MWh consumed from renewable sources inside chemical sector boundary
0

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)
288000

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary
0

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary
288000

Consumption of self-generated non-fuel renewable energy

Heating value
<Not Applicable>

MWh consumed from renewable sources inside chemical sector boundary
4600

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)
0

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary
0

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary
4600

Total energy consumption

Heating value
<Not Applicable>

MWh consumed from renewable sources inside chemical sector boundary
319600

MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)
29515800

MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary
7641000

Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary
37476400

C8.2b

(C8.2b) Select the applications of your organization's consumption of fuel.

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	No
Consumption of fuel for the generation of heat	Yes
Consumption of fuel for the generation of steam	Yes
Consumption of fuel for the generation of cooling	Yes
Consumption of fuel for co-generation or tri-generation	Yes

C8.2c

(C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.

Sustainable biomass

Heating value
HHV

Total fuel MWh consumed by the organization
0

MWh fuel consumed for self-generation of electricity
<Not Applicable>

MWh fuel consumed for self-generation of heat
0

MWh fuel consumed for self-generation of steam
0

MWh fuel consumed for self-generation of cooling
0

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Comment

Other biomass

Heating value
HHV

Total fuel MWh consumed by the organization
0

MWh fuel consumed for self-generation of electricity
<Not Applicable>

MWh fuel consumed for self-generation of heat
0

MWh fuel consumed for self-generation of steam
0

MWh fuel consumed for self-generation of cooling
0

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Comment

Other renewable fuels (e.g. renewable hydrogen)

Heating value
HHV

Total fuel MWh consumed by the organization
0

MWh fuel consumed for self-generation of electricity
<Not Applicable>

MWh fuel consumed for self-generation of heat
0

MWh fuel consumed for self-generation of steam
0

MWh fuel consumed for self-generation of cooling
0

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Comment

Coal

Heating value
HHV

Total fuel MWh consumed by the organization
3089000

MWh fuel consumed for self-generation of electricity
<Not Applicable>

MWh fuel consumed for self-generation of heat
0

MWh fuel consumed for self-generation of steam
0

MWh fuel consumed for self-generation of cooling
0

MWh fuel consumed for self- cogeneration or self-trigeneration
3089000

Comment

Oil

Heating value
HHV

Total fuel MWh consumed by the organization
2836000

MWh fuel consumed for self-generation of electricity
<Not Applicable>

MWh fuel consumed for self-generation of heat
143000

MWh fuel consumed for self-generation of steam
202000

MWh fuel consumed for self-generation of cooling
0

MWh fuel consumed for self- cogeneration or self-trigeneration
2490000

Comment

Gas

Heating value
HHV

Total fuel MWh consumed by the organization
5751000

MWh fuel consumed for self-generation of electricity
<Not Applicable>

MWh fuel consumed for self-generation of heat
1228000

MWh fuel consumed for self-generation of steam
4523000

MWh fuel consumed for self-generation of cooling
0

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Comment

Other non-renewable fuels (e.g. non-renewable hydrogen)

Heating value
HHV

Total fuel MWh consumed by the organization
12703000

MWh fuel consumed for self-generation of electricity
<Not Applicable>

MWh fuel consumed for self-generation of heat
11261000

MWh fuel consumed for self-generation of steam
677000

MWh fuel consumed for self-generation of cooling
126000

MWh fuel consumed for self- cogeneration or self-trigeneration
640000

Comment

Total fuel

Heating value
HHV

Total fuel MWh consumed by the organization
24379000

MWh fuel consumed for self-generation of electricity
<Not Applicable>

MWh fuel consumed for self-generation of heat
12632000

MWh fuel consumed for self-generation of steam
5402000

MWh fuel consumed for self-generation of cooling
126000

MWh fuel consumed for self- cogeneration or self-trigeneration
6219000

Comment

C8.2d

(C8.2d) Provide details on the electricity, heat, steam, and cooling your organization has generated and consumed in the reporting year.

	Total Gross generation (MWh)	Generation that is consumed by the organization (MWh)	Gross generation from renewable sources (MWh)	Generation from renewable sources that is consumed by the organization (MWh)
Electricity	2046000	1758000	4600	4600
Heat	12380000	12380000	0	0
Steam	8600000	7924000	127000	127000
Cooling	96000	95000	0	0

C-CH8.2d

(C-CH8.2d) Provide details on electricity, heat, steam, and cooling your organization has generated and consumed for chemical production activities.

Electricity

Total gross generation inside chemicals sector boundary (MWh)
2046000

Generation that is consumed inside chemicals sector boundary (MWh)
1758000

Generation from renewable sources inside chemical sector boundary (MWh)
4600

Generation from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary (MWh)
0

Heat

Total gross generation inside chemicals sector boundary (MWh)
7428000

Generation that is consumed inside chemicals sector boundary (MWh)
7428000

Generation from renewable sources inside chemical sector boundary (MWh)
0

Generation from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary (MWh)
6622000

Steam

Total gross generation inside chemicals sector boundary (MWh)
8514000

Generation that is consumed inside chemicals sector boundary (MWh)
7838000

Generation from renewable sources inside chemical sector boundary (MWh)
127000

Generation from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary (MWh)
982000

Cooling

Total gross generation inside chemicals sector boundary (MWh)
96000

Generation that is consumed inside chemicals sector boundary (MWh)
95000

Generation from renewable sources inside chemical sector boundary (MWh)
0

Generation from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary (MWh)
0

C8.2e

(C8.2e) Provide details on the electricity, heat, steam, and/or cooling amounts that were accounted for at a zero or near-zero emission factor in the market-based Scope 2 figure reported in C6.3.

Country/area of low-carbon energy consumption
United States of America

Sourcing method
Purchase from an on-site installation owned by a third party (on-site PPA)

Energy carrier
Electricity

Low-carbon technology type
Wind

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)
18004

Tracking instrument used
Contract

Country/area of origin (generation) of the low-carbon energy or energy attribute
United States of America

Are you able to report the commissioning or re-powering year of the energy generation facility?
Yes

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2006

Comment

C8.2g

(C8.2g) Provide a breakdown by country/area of your non-fuel energy consumption in the reporting year.

Country/area
Japan

Consumption of purchased electricity (MWh)
6141000

Consumption of self-generated electricity (MWh)
1716000

Is this electricity consumption excluded from your RE100 commitment?
<Not Applicable>

Consumption of purchased heat, steam, and cooling (MWh)
3300000

Consumption of self-generated heat, steam, and cooling (MWh)
13733000

Total non-fuel energy consumption (MWh) [Auto-calculated]

C-CH8.3

(C-CH8.3) Does your organization consume fuels as feedstocks for chemical production activities?
Yes

C-CH8.3a

(C-CH8.3a) Disclose details on your organization's consumption of fuels as feedstocks for chemical production activities.

Fuels used as feedstocks
Coal

Total consumption
5590

Total consumption unit
thousand metric tons

Inherent carbon dioxide emission factor of feedstock, metric tons CO2 per consumption unit
2330

Heating value of feedstock, MWh per consumption unit
7139

Heating value
HHV

Comment

Fuels used as feedstocks
Naphtha

Total consumption
3274

Total consumption unit
million liters

Inherent carbon dioxide emission factor of feedstock, metric tons CO2 per consumption unit
2240

Heating value of feedstock, MWh per consumption unit
9333

Heating value
HHV

Comment

Fuels used as feedstocks
Natural gas

Total consumption
14

Total consumption unit
thousand metric tons

Inherent carbon dioxide emission factor of feedstock, metric tons CO2 per consumption unit
2700

Heating value of feedstock, MWh per consumption unit
15167

Heating value
HHV

Comment

C-CH8.3b

(C-CH8.3b) State the percentage, by mass, of primary resource from which your chemical feedstocks derive.

	Percentage of total chemical feedstock (%)
Oil	36.88
Natural Gas	0.15
Coal	62.97
Biomass	0
Waste (non-biomass)	0
Fossil fuel (where coal, gas, oil cannot be distinguished)	0
Unknown source or unable to disaggregate	0

C9. Additional metrics

C9.1

(C9.1) Provide any additional climate-related metrics relevant to your business.

Description
Other, please specify (Energy usage efficiency)

Metric value
0.32

Metric numerator
Energy consumption (crude oil equivalent)

Metric denominator (intensity metric only)
Production volume index corrected for energy load

% change from previous year
4

Direction of change
Increased

Please explain
Our target boundary is our manufacturing sites of the chemical and functional chemical fields in Japan , which account for about 65% of our total energy consumption. We aim to improve energy efficiency by 1% each year, with a 4% increase in FY2022 compared to the previous year. Overall production volume decreased in FY2022. Some of our sites had plant shutdown periods due to periodic repairs, etc., which resulted in the larger decrease in production volume compared to the decrease in energy consumption, thus worsening efficiency.

C-CH9.3a

(C-CH9.3a) Provide details on your organization's chemical products.

Output product
Other, please specify (Nitrogen gas)

Production (metric tons)
8587000

Capacity (metric tons)
8587000

Direct emissions intensity (metric tons CO2e per metric ton of product)
0

Electricity intensity (MWh per metric ton of product)
0.244

Steam intensity (MWh per metric ton of product)
0

Steam/ heat recovered (MWh per metric ton of product)
0

Comment
The direct emissions (Scope 1) and steam use in the production of nitrogen gas by air separation units (ASUs) are very small, so the answer is "0".

Output product
Other, please specify (Liquid nitrogen)

Production (metric tons)
3861000

Capacity (metric tons)
3861000

Direct emissions intensity (metric tons CO2e per metric ton of product)
0

Electricity intensity (MWh per metric ton of product)
0.789

Steam intensity (MWh per metric ton of product)
0

Steam/ heat recovered (MWh per metric ton of product)
0

Comment
In the production of liquid nitrogen by air separation unit (ASU), direct emissions (Scope 1) and steam use are very low, so the answer is "0".

Output product
Other, please specify (Oxygen gas)

Production (metric tons)
7769000

Capacity (metric tons)

7769000

Direct emissions intensity (metric tons CO2e per metric ton of product)
0

Electricity intensity (MWh per metric ton of product)
0.235

Steam intensity (MWh per metric ton of product)
0

Steam/ heat recovered (MWh per metric ton of product)
0

Comment
The direct emissions (Scope 1) and steam use in the production of oxygen gas by air separation units (ASUs) are very low, so the answer is "0".

Output product
Other, please specify (Liquid oxygen)

Production (metric tons)
1750000

Capacity (metric tons)
1750000

Direct emissions intensity (metric tons CO2e per metric ton of product)
0

Electricity intensity (MWh per metric ton of product)
0.77

Steam intensity (MWh per metric ton of product)
0

Steam/ heat recovered (MWh per metric ton of product)
0

Comment
The direct emissions (Scope 1) and steam use in the production of liquid oxygen by air separation units (ASUs) are very low, so the answer is "0".

Output product
Other, please specify (Argon gas + Liquefied argon)

Production (metric tons)
420000

Capacity (metric tons)
420000

Direct emissions intensity (metric tons CO2e per metric ton of product)
0

Electricity intensity (MWh per metric ton of product)
1.122

Steam intensity (MWh per metric ton of product)
0

Steam/ heat recovered (MWh per metric ton of product)
0

Comment
The direct emissions (Scope 1) and steam use in the production of argon by air separation units (ASUs) are very low, so the answer is "0".

C-OG9.3e

(C-OG9.3e) Please disclose your chemicals production in the reporting year in thousand metric tons.

Product	Production, Thousand metric tons	Capacity, Thousand metric tons

C-OG9.5a/C-CO9.5a

(C-OG9.5a/C-CO9.5a) Break down, by fossil fuel expansion activity, your organization's CAPEX in the reporting year and CAPEX planned over the next 5 years.

	CAPEX in the reporting year for this expansion activity (unit currency as selected in C0.4)	CAPEX in the reporting year for this expansion activity as % of total CAPEX in the reporting year	CAPEX planned over the next 5 years for this expansion activity as % of total CAPEX planned over the next 5 years	Explain your CAPEX calculations, including any assumptions
Exploration of new oil fields				
Exploration of new natural gas fields				
Expansion of existing oil fields				
Expansion of existing natural gas fields				
Development of new coal mines	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Expansion of existing coal mines	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>

C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6

(C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6) Does your organization invest in research and development (R&D) of low-carbon products or services related to your sector activities?

	Investment in low-carbon R&D	Comment
Row 1	Yes	We are studying the technology of making chemicals from water and carbon dioxide by utilizing artificially created photosynthesis (artificial photosynthesis), and we plan to commercialize it around 2030. We are researching and developing technologies that can produce plastics and rubber without relying on fossil resources and reduce carbon dioxide.

C-CH9.6a

(C-CH9.6a) Provide details of your organization's investments in low-carbon R&D for chemical production activities over the last three years.

Technology area
Waste heat recovery

Stage of development in the reporting year
Large scale commercial deployment

Average % of total R&D investment over the last 3 years
20

R&D investment figure in the reporting year (unit currency as selected in C0.4) (optional)

Average % of total R&D investment planned over the next 5 years
20

Explain how your R&D investment in this technology area is aligned with your climate commitments and/or climate transition plan
The given percentages for R&D investment for the past three years and the next five years are maximum values; the exact values are less than 20%.

Energy-saving investments, mainly in waste heat recovery, are recognized by our company as low-carbon type and managed separately from other capital investments. However, the payback period and return on capital are not much different from other capital investments. As for R&D investment, we do not currently have a clear category of products and processes to promote low-carbon type, but we are considering establishing an R&D structure to promote low-carbon type by 2020.

C-CO9.6a/C-EU9.6a/C-OG9.6a

(C-CO9.6a/C-EU9.6a/C-OG9.6a) Provide details of your organization's investments in low-carbon R&D for your sector activities over the last three years.

Technology area	Stage of development in the reporting year	Average % of total R&D investment over the last 3 years	R&D investment figure in the reporting year (unit currency as selected in C0.4) (optional)	Average % of total R&D investment planned over the next 5 years	Explain how your R&D investment in this technology area is aligned with your climate commitments and/or climate transition plan

C10. Verification

C10.1

(C10.1) Indicate the verification/assurance status that applies to your reported emissions.

	Verification/assurance status
Scope 1	Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	Third-party verification or assurance process in place

C10.1a

(C10.1a) Provide further details of the verification/assurance undertaken for your Scope 1 emissions, and attach the relevant statements.

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Underway but not complete for reporting year – previous statement of process attached

Type of verification or assurance
Limited assurance

Attach the statement
Mitsubishi Chemical Group Corporation Data FY2021.pdf

Page/ section reference
p.6, Third Party Guarantees

Relevant standard
ISAE 3410

Proportion of reported emissions verified (%)
100

C10.1b

(C10.1b) Provide further details of the verification/assurance undertaken for your Scope 2 emissions and attach the relevant statements.

Scope 2 approach
Scope 2 market-based

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Underway but not complete for reporting year – previous statement of process attached

Type of verification or assurance
Limited assurance

Attach the statement
Mitsubishi Chemical Group Corporation Data FY2021.pdf

Page/ section reference
p.6, Third Party Guarantees

Relevant standard
ISAE 3410

Proportion of reported emissions verified (%)
100

C10.1c

(C10.1c) Provide further details of the verification/assurance undertaken for your Scope 3 emissions and attach the relevant statements.

Scope 3 category
Scope 3: Purchased goods and services

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Underway but not complete for reporting year – previous statement of process attached

Type of verification or assurance
Limited assurance

Attach the statement
Mitsubishi Chemical Group Corporation Data FY2021.pdf

Page/section reference
p.6, Third Party Guarantees

Relevant standard
ISAE 3410

Proportion of reported emissions verified (%)
100

Scope 3 category
Scope 3: Capital goods

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Underway but not complete for reporting year – previous statement of process attached

Type of verification or assurance
Limited assurance

Attach the statement
Mitsubishi Chemical Group Corporation Data FY2021.pdf

Page/section reference
p.6, Third Party Guarantees

Relevant standard
ISAE 3410

Proportion of reported emissions verified (%)
100

Scope 3 category
Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2)

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Underway but not complete for reporting year – previous statement of process attached

Type of verification or assurance
Limited assurance

Attach the statement
Mitsubishi Chemical Group Corporation Data FY2021.pdf

Page/section reference
p.6, Third Party Guarantees

Relevant standard
ISAE 3410

Proportion of reported emissions verified (%)
100

Scope 3 category
Scope 3: Upstream transportation and distribution

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Underway but not complete for reporting year – previous statement of process attached

Type of verification or assurance
Limited assurance

Attach the statement
Mitsubishi Chemical Group Corporation Data FY2021.pdf

Page/section reference
p.6, Third Party Guarantees

Relevant standard
ISAE 3410

Proportion of reported emissions verified (%)
100

Scope 3 category
Scope 3: Waste generated in operations

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Underway but not complete for reporting year – previous statement of process attached

Type of verification or assurance
Limited assurance

Attach the statement
Mitsubishi Chemical Group Corporation Data FY2021.pdf

Page/section reference
p.6, Third Party Guarantees

Relevant standard
ISAE 3410

Proportion of reported emissions verified (%)
100

Scope 3 category
Scope 3: Business travel

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Underway but not complete for reporting year – previous statement of process attached

Type of verification or assurance
Limited assurance

Attach the statement
Mitsubishi Chemical Group Corporation Data FY2021.pdf

Page/section reference
p.6, Third Party Guarantees

Relevant standard
ISAE 3410

Proportion of reported emissions verified (%)
100

Scope 3 category
Scope 3: Employee commuting

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Underway but not complete for reporting year – previous statement of process attached

Type of verification or assurance
Limited assurance

Attach the statement
Mitsubishi Chemical Group Corporation Data FY2021.pdf

Page/section reference
p.6, Third Party Guarantees

Relevant standard
ISAE 3410

Proportion of reported emissions verified (%)
100

Scope 3 category
Scope 3: Downstream transportation and distribution

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Underway but not complete for reporting year – previous statement of process attached

Type of verification or assurance
Limited assurance

Attach the statement
Mitsubishi Chemical Group Corporation Data FY2021.pdf

Page/section reference
p.6, Third Party Guarantees

Relevant standard
ISAE 3410

Proportion of reported emissions verified (%)
100

Scope 3 category
Scope 3: End-of-life treatment of sold products

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Underway but not complete for reporting year – previous statement of process attached

Type of verification or assurance
Limited assurance

Attach the statement
Mitsubishi Chemical Group Corporation Data FY2021.pdf

Page/section reference
p.6, Third Party Guarantees

Relevant standard
ISAE 3410

Proportion of reported emissions verified (%)
100

C10.2

(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?
Yes

C10.2a

(C10.2a) Which data points within your CDP disclosure have been verified, and which verification standards were used?

Disclosure module verification relates to	Data verified	Verification standard	Please explain
C5. Emissions performance	Year on year change in emissions (Scope 1 and 2)	ISAE3000/ISAE3410	Page 1, Environmental data Mitsubishi Chemical Group Corporation Data FY2021.pdf
C5. Emissions performance	Year on year change in emissions (Scope 3)	ISAE3000/ISAE3410	Page 1, Environmental data Mitsubishi Chemical Group Corporation Data FY2021.pdf

C11. Carbon pricing

C11.1

(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?
Yes

C11.1a

(C11.1a) Select the carbon pricing regulation(s) which impacts your operations.
Japan carbon tax

C11.1c

(C11.1c) Complete the following table for each of the tax systems you are regulated by.

Japan carbon tax

Period start date
April 1 2022

Period end date
March 31 2023

% of total Scope 1 emissions covered by tax
40

Total cost of tax paid
1000000000

Comment

C11.1d

(C11.1d) What is your strategy for complying with the systems you are regulated by or anticipate being regulated by?

[Status]

MCG is currently regulated by a global warming tax (carbon tax), but because the carbon tax rate is not very high, the financial impact of the carbon tax in Japan is limited. However, as regulations regarding global warming become stricter in the future, the tax rate is expected to increase and the scope of taxation is expected to expand. Under the scenario of stricter regulations based on the 2DS of the Paris Agreement, the carbon price will rise to about double the 2019 level in 2025 and 3 to 4 times the 2019 level in 2040. Based on this, we analyzed Japan's energy-intensive businesses (petrochemicals and industrial gases) to identify potential business and financial risks.

[Issue]

As a result, we recognized that existing processes that currently emit large amounts of GHGs for manufacturing have significant financial risks associated with increased overhead costs through scenario analysis, and that the challenge is to reduce the carbon tax burden through GHG reductions. Therefore, we formulated "KAITEKI Vision 30（KV30）" and set a goal to reduce our environmental impact by working on GHG reduction and effective utilization throughout the entire value chain as part of our sustainability management efforts.

[Action]

Specifically, we are promoting the improvement of logistics efficiency, including the optimization of product shape and packaging, such as increasing transportation lot size and modal shift to rail transportation, to reduce GHG emissions associated with logistics. In addition, to reduce GHG emissions from sales activities, we are actively introducing hybrid vehicles as our company car.

[Results]

Through continued efforts to reduce GHG emissions in our business activities, we expect to achieve a 26% reduction in GHG emissions in Japan in fiscal 2030 (compared to fiscal 2013). We also intend to reduce our financial impact by continuing to examine strategies to address global warming.

C11.2

(C11.2) Has your organization canceled any project-based carbon credits within the reporting year?

No

C11.3

(C11.3) Does your organization use an internal price on carbon?

No, but we anticipate doing so in the next two years

C12. Engagement

C12.1

(C12.1) Do you engage with your value chain on climate-related issues?

Yes, our suppliers
Yes, our customers/clients
Yes, other partners in the value chain

C12.1a

(C12.1a) Provide details of your climate-related supplier engagement strategy.

Type of engagement
Engagement & incentivization (changing supplier behavior)

Details of engagement
Facilitate adoption of a unified climate transition approach with suppliers

% of suppliers by number
100

% total procurement spend (direct and indirect)
100

% of supplier-related Scope 3 emissions as reported in C6.5

Rationale for the coverage of your engagement
In order to contribute to the resolution of social issues and the realization of a sustainable society, we have established our group concept "KAITEKI", and have set materialities for resolving issues, including climate change-related issues.

Among the materialities, we recognize the establishment of a supply chain considering CSR as one of the most important issues, and our policy is to promote the effective use of resources and energy and the reduction of waste throughout the supply chain.

In achieving CSR procurement, we believe it is necessary for all our upstream suppliers and our purchasing department to share an awareness of CSR procurement and strengthen our efforts based on a relationship of mutual trust.

Impact of engagement, including measures of success
The purpose of this program is to share the awareness of CSR procurement between our purchasing department and suppliers and to strengthen the relationship of mutual trust between our company and suppliers in terms of cooperation with all suppliers toward CSR procurement.

Specifically, we believe that CSR procurement can be achieved by establishing guidelines and conducting CSR surveys to visualize the level of efforts, providing feedback and communication for the next activity, and establishing a cycle to check the status and progress. We regard the establishment of this cycle as a measure of success.

We have created a CSR Procurement Guidebook, which describes 13 norms to be shared with our suppliers, and have posted it on our website.
We ask our suppliers to respond to both the guidebook and the CSR questionnaire to deepen the dialogue.

In FY2019, we provided feedback on the questionnaire we conducted with our major suppliers in FY2018, and in FY2020, we updated the questionnaire to identify risks related to human rights, labor, the environment, fair business practices, and compliance in our supply chain, as well as for activities aimed at improving these risks.

As a result of requesting responses to these questionnaires and providing feedback, in FY2021 and FY2022, we achieved sending CSR questionnaires to raw materials suppliers that account for 90% of actual purchase amounts among targeted suppliers. We also completed evaluating and sending feedback letters to all suppliers who had already answered questionnaires.

In addition to the above activities, we also focus on human resource development for the promotion of CSR procurement, holding the "KAITEKI Promotion Conference" twice a year for members of our Purchasing and Logistics Divisions to provide education on "fairness, equity, and transparency," "partnership," "legal compliance," and "CSR procurement" in our Basic Purchasing Policy.

Based on the above, we consider this collaboration with suppliers on CSR procurement to be a success because we were able to establish a cycle of visualization of the level of efforts, feedback, communication for the next activity, and confirmation of the status and progress.

Comment

C12.1b

(C12.1b) Give details of your climate-related engagement strategy with your customers.

Type of engagement & Details of engagement

Collaboration & innovation	Run a campaign to encourage innovation to reduce climate change impacts

% of customers by number
10

% of customer - related Scope 3 emissions as reported in C6.5
8

Please explain the rationale for selecting this group of customers and scope of engagement
In order to contribute to the resolution of social issues and the realization of a sustainable society, we have established our group concept "KAITEKI", and have set materialities for resolving issues, including climate change-related issues.

Among the materialities, GHG emissions reduction is one of the most important issues in our business portfolio strategy, and we are promoting business model reforms in our various businesses under our new medium-term management plan "Forging the future".

Among the various businesses, as an integrated chemical manufacturer, we have a carbon fiber composite materials business, of which the mobility industry, including automobiles and aircraft, is an important customer, accounting for about 10% of our sales, mainly lightweight materials for car bodies.

Among the mobility industries, the automotive market in particular is highly interested in reducing GHG emissions through car body weight reduction, and we intend to address climate change-related issues through collaboration with all of our customers in the automotive industry by utilizing our knowledge and expertise in carbon fiber composite materials.

Impact of engagement, including measures of success
Carbon fiber-reinforced plastic (CFRP), which has both light weight and high strength, is a material that can contribute to improved fuel efficiency and reduced CO2 emissions when used in automobile bodies. We see the purpose of our collaboration with our customers, the automakers, as providing them with automotive body solutions through our CFRP. Therefore, we have positioned the measure of success as the expansion of the application of CFRP to automotive car bodies and its adoption by our customer automakers.

In strengthening the development and manufacturing of CFRP, we invested 35 billion yen in our affiliate C.P.C., located in Italy, in 2021, including the addition of a 5,000-ton capacity large press molding machine. C.P.C. has strong relationships with automakers because of its strength in manufacturing CFRP molded parts mainly for high-end automobiles, combined with its expertise in weight reduction of parts and vehicles using design and simulation technology.
The company has also established a technical center that performs simulations during molding, and is working to strengthen its ability to propose solutions to customers.

As a result of these efforts, our CFRP was adopted for the roof section of the RS 5 Coupe by Audi of Germany and the inner back door of the Prius PHV by Toyota Motor Corporation, respectively.
Therefore, we consider this engagement activity to be a success. In recent years, we have successively invested in CFRP intermediate base materials and recycling, and we plan to raise the sales of our carbon fiber-related business to 400 billion yen in FY2025, about twice the current level.

C12.1d

(C12.1d) Give details of your climate-related engagement strategy with other partners in the value chain.

Dai Nippon Printing Co., Ltd. ("DNP") and Refineverse Group Inc. ("Refineverse") are other partners in the value chain.

In collaboration with these companies, we will utilize the information management system of Circulize S.A. of the Netherlands ("Circulize") to manage and track biomass and recycled raw materials (traceability), including compliance with life cycle assessment (LCA) and other environmental impact assessment indicators, with a high level of transparency and reliability. The two companies have decided to jointly conduct a demonstration test ("the Demonstration") by the end of September to establish a transparent and reliable supply chain, including the management and tracking (traceability) of biomass and recycled raw materials and the assessment of environmental impacts such as life cycle assessment (LCA).

[our climate-related strategy with other partners in the value chain, indicating sectoral, regional, or operational context].

Companies and organizations of chemical sector, including our company, are required to utilize sustainable resources such as biomass and recycled raw materials as alternatives to petroleum-based plastics, and it is important to manage raw material usage and other evidence such as certified materials. In addition, visualization of GHG emissions such as CO2 emissions of each supplier and the degree of environmental friendliness of products to end consumers are also required. In response, Circulize has developed a supply chain traceability system that uses public blockchains to track raw materials to final products. This highly confidential proprietary encryption technology enables the management and sharing of confidential and public information of each company in the supply chain. Through this demonstration, MCC, DNP, and Refineverse, which encompass the value chain, will verify the usefulness of building a supply chain with high traceability accuracy in order to further add value to products using biomass and recycled raw materials and to contribute to more sophisticated raw material management through the mass balance method.

C12.2

(C12.2) Do your suppliers have to meet climate-related requirements as part of your organization's purchasing process?
Yes, suppliers have to meet climate-related requirements, but they are not included in our supplier contracts

C12.2a

(C12.2a) Provide details of the climate-related requirements that suppliers have to meet as part of your organization's purchasing process and the compliance mechanisms in place.

Climate-related requirement
Measuring product-level emissions

Description of this climate related requirement
Ask suppliers about their CFP (carbon footprint value)

% suppliers by procurement spend that have to comply with this climate-related requirement
10

% suppliers by procurement spend in compliance with this climate-related requirement
0

Mechanisms for monitoring compliance with this climate-related requirement
Other, please specify (A system is being developed to interview suppliers whose CFP impact is significant at the purchasing stage. This is aimed at improving the rating of suppliers and the accuracy of calculation.)

Response to supplier non-compliance with this climate-related requirement
Retain and engage

C12.3

(C12.3) Does your organization engage in activities that could either directly or indirectly influence policy, law, or regulation that may impact the climate?

Row 1

External engagement activities that could directly or indirectly influence policy, law, or regulation that may impact the climate
Yes, our membership of/engagement with trade associations could influence policy, law, or regulation that may impact the climate

Does your organization have a public commitment or position statement to conduct your engagement activities in line with the goals of the Paris Agreement?
Yes

Attach commitment or position statement(s)
MCG_20211020cnjpn.pdf
MCG_20211020cneng.pdf

Describe the process(es) your organization has in place to ensure that your external engagement activities are consistent with your climate commitments and/or climate transition plan
In our "Policy for Achieving Carbon Neutrality by 2050," developed in 2021, we incorporated a strategy to address climate change issues into our strategy and pledged in the document of "accelerate our efforts to reduce GHG emissions throughout our product chain"

Primary reason for not engaging in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate
<Not Applicable>

Explain why your organization does not engage in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate
<Not Applicable>

C12.3b

(C12.3b) Provide details of the trade associations your organization is a member of, or engages with, which are likely to take a position on any policy, law or regulation that may impact the climate.

Trade association
Japan Chemical Industry Association/日本化学工業協会

Is your organization's position on climate change policy consistent with theirs?
Consistent

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
Our representative director is the chairman and president of JCIA known as the industry association, so that our company takes the same position with the industry association.
The association promotes various climate change mitigation activities for its member companies.
Two activities of the association's primary initiatives are shown as follows:
(1) Promotion of voluntary action plan on the environment for member companies of improving energy consumption intensity in order to reduce CO2 emissions.
(2) Promotion of carbon-Life Cycle Analysis (cLCA) - a standard for calculation of avoided emissions developed by JCIA.

Funding figure your organization provided to this trade association in the reporting year (currency as selected in C0.4)
2500000

Describe the aim of your organization's funding
Funding (payment of membership fees) to the Japan Chemical Industry Association is intended to enable industry associations to work together to promote initiatives such as reducing CO2.
The amount of funding provided is the membership fee for the Responsible Care Committee of the Japan Chemical Industry Association.

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?
Yes, we have evaluated, and it is aligned

C12.4

(C12.4) Have you published information about your organization's response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Publication
In mainstream reports

Status
Complete

Attach the document
MCG_REPORT FY2022.pdf

Page/Section reference
p.16-19 Approach to Sustainability and Initiatives

Content elements
Governance
Strategy
Risks & opportunities
Emissions figures
Emission targets

Comment

Publication
In voluntary sustainability report

Status
Underway – previous year attached

Attach the document
KAITEKI REPORT 2022(JP).pdf
KAITEKI REPORT 2022(EN).pdf

Page/Section reference
p.22-29 New management policy
p.30-48 Opportunities
p.26 Emissions Target
p.70 Materiality
p.50-68 Governance
p.65-67 Risks
p.97 Emissions figure (Trend Graph)

Content elements
Governance
Strategy
Risks & opportunities
Emissions figures
Emission targets

Comment

C12.5

(C12.5) Indicate the collaborative frameworks, initiatives and/or commitments related to environmental issues for which you are a signatory/member.

	Environmental collaborative framework, initiative and/or commitment	Describe your organization's role within each framework, initiative and/or commitment
Row 1	Task Force on Climate-related Financial Disclosures (TCFD) UN Global Compact	[TCFD] MCG Group expressed its support for the TCFD's final recommendations in October 2018. We will work to enhance our climate change-related measures, including the promotion of environmental impact reduction and energy conservation activities, the promotion of renewable energy use, and the expansion of product lines that contribute to GHG emissions reduction, as well as gradually expand our information disclosure to enhance our corporate value. [UN Global Compact] The MCG Group has established a "Global Policy on Respect for Human Rights and Employment and Labor" as a concrete guideline, while presenting its basic stance on human rights in accordance with international norms such as the Universal Declaration of Human Rights, the UN Global Compact, the UN Guiding Principles on Business and Human Rights, and ISO 26000 to its group members. In addition, our overseas group companies are striving to comply with applicable laws and regulations and best human rights practices in their respective countries, to improve employee satisfaction, and to develop business activities while establishing appropriate value chain management.

C15. Biodiversity

C15.1

(C15.1) Is there board-level oversight and/or executive management-level responsibility for biodiversity-related issues within your organization?

	Board-level oversight and/or executive management-level responsibility for biodiversity-related issues	Description of oversight and objectives relating to biodiversity	Scope of board-level oversight
Row 1	No, but we plan to have both within the next two years	<Not Applicable>	<Not Applicable>

C15.2

(C15.2) Has your organization made a public commitment and/or endorsed any initiatives related to biodiversity?

	Indicate whether your organization made a public commitment or endorsed any initiatives related to biodiversity	Biodiversity-related public commitments	Initiatives endorsed
Row 1	Yes, we have made public commitments only	Commitment to Net Positive Gain Other, please specify (In 2018, we endorsed the Keidanren Declaration on Biodiversity (revised version).)	<Not Applicable>

C15.3

(C15.3) Does your organization assess the impacts and dependencies of its value chain on biodiversity?

Impacts on biodiversity

Indicate whether your organization undertakes this type of assessment
Yes

Value chain stage(s) covered
Direct operations
Upstream
Downstream

Portfolio activity
<Not Applicable>

Tools and methods to assess impacts and/or dependencies on biodiversity

Please explain how the tools and methods are implemented and provide an indication of the associated outcome(s)
<Not Applicable>

Dependencies on biodiversity

Indicate whether your organization undertakes this type of assessment
No, but we plan to within the next two years

Value chain stage(s) covered
<Not Applicable>

Portfolio activity
<Not Applicable>

Tools and methods to assess impacts and/or dependencies on biodiversity
<Not Applicable>

Please explain how the tools and methods are implemented and provide an indication of the associated outcome(s)
<Not Applicable>

C15.4

(C15.4) Does your organization have activities located in or near to biodiversity- sensitive areas in the reporting year?
No

C15.5

(C15.5) What actions has your organization taken in the reporting year to progress your biodiversity-related commitments?

	Have you taken any actions in the reporting period to progress your biodiversity-related commitments?	Type of action taken to progress biodiversity- related commitments
Row 1	Yes, we are taking actions to progress our biodiversity-related commitments	Land/water protection Land/water management Other, please specify (Development of GobiMat® (soil erosion prevention block mat) and Tensar® (embankment reinforced geogrid))

C15.6

(C15.6) Does your organization use biodiversity indicators to monitor performance across its activities?

	Does your organization use indicators to monitor biodiversity performance?	Indicators used to monitor biodiversity performance
Row 1	Yes, we use indicators	State and benefit indicators Other, please specify (Products with a high level of contribution were selected based on an evaluation from a comprehensive perspective, including direct contribution to biodiversity, environmental impact over the lifecycle, and financial impact.)

C15.7

(C15.7) Have you published information about your organization's response to biodiversity-related issues for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Report type	Content elements	Attach the document and indicate where in the document the relevant biodiversity information is located
In voluntary sustainability report or other voluntary communications	Content of biodiversity-related policies or commitments Impacts on biodiversity	1. "Biodiversity Conservation" in "Mitsubishi Chemical Sustainability Report 2021" p.10, p.55. 2. "Mitsubishi Chemical Holdings Group Biodiversity Conservation Policy" MCG biodiversity policy(EN).pdf MCG biodiversity policy(JP).pdf sr_mcc_2021 (EN).pdf sr_mcc_2021 (JP).pdf

C16. Signoff

C-FI

(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

C16.1

(C16.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	Vice President, Chief Strategy Officer	Other C-Suite Officer