Mitsubishi Chemical Group Corporation - Water Security 2022

W0. Introduction

W0.1

(W0.1) Give a general description of and introduction to your organization.

Mitsubishi Chemical Holdings Corporation (MCHC) was established in October 2005. Its four core operating companies are Mitsubishi Chemical Corporation, (which is merged with two other operating companies of MCHC, Mitsubishi Plastic. Inc. and Mitsubishi Rayon Co. in April 2017), Mitsubishi Tanabe Pharma Corporation, Life Science Institute, Inc, which is established in April 2014 for the most advanced and high-quality solutions to contribute widely to people's health, and Nippon Sanso Holdings Corporation which joined MCHC in November 2014. MCHC's five principal business segments are electronics applications, designed materials, health care, chemicals, and polymers. At the end of May 2022 the MCHC Group comprised of 625 consolidated companies employing a total of 69,784 people around the world. MCHC started KAITEKI Vision 30(KV30), which is the framework of MCHC's next medium-term consolidated management plan for 2030. KV30 is MCHC Group vision for 2030. This new initiative draws on its predecessor's three decision criteria of Sustainability, Health, and Comfort in a drive to become a leading global company.

In April 2022, the MCHC Group shifted from a structure in which each holding company and operating company operated separately to one in which the entire group is managed as a single entity under the concept of "One Company, One Team". In line with this change, the company name was changed from MCHC to MCG on July 1, 2022.

W-CH0.1a

(W-CH0.1a) Which activities in the chemical sector does your organization engage in?

Bulk organic chemicals
Bulk inorganic chemicals
Specialty organic chemicals
Specialty inorganic chemicals

W-OG0.1a

(W-OG0.1a) Which business divisions in the oil & gas sector apply to your organization?

Please select

W0.2

(W0.2) State the start and end date of the year for which you are reporting data.

	Start date	End date
Reporting year	April 1 2021	March 31 2022

W0.3

(W0.3) Select the countries/areas in which you operate.

China
Indonesia
Japan
United States of America

W0.4

(W0.4) Select the currency used for all financial information disclosed throughout your response.

JPY

W0.5

(W0.5) Select the option that best describes the reporting boundary for companies, entities, or groups for which water impacts on your business are being reported.

Companies, entities or groups over which operational control is exercised

W0.6

(W0.6) Within this boundary, are there any geographies, facilities, water aspects, or other exclusions from your disclosure?

No

W0.7

(W0.7) 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

W1. Current state

W1.1

(W1.1) Rate the importance (current and future) of water quality and water quantity to the success of your business.

	Direct use importance rating	Indirect use importance rating	Please explain
Sufficient amounts of good quality freshwater available for use	Vital	Important	In the chemical industry's manufacturing process (direct use), large quantities of high-quality fresh water is required for a number of purposes, for example: cleaning resin discharged from products; and chemical reactions in the manufacturing process of medical products and foods. As a result, water availability is an important consideration in plant location decisions. Therefore, we rated the importance of direct water use as "Vital". We believe that water availability will continue to become an increasingly important factor in the future. Since fresh water used for cleaning is discharged in relatively large quantities, quality control is very important. We are also making efforts to expand the applications of our products in order to expand our business. Therefore, it is expected that the number of products to be cleaned will increase and the need to control the cleaning level according to the product will increase. Thus, increasing the variety of products and controlling each cleaning level are the reasons why we anticipate that water availability will become an increasingly important factor in the future. For indirect use, in the upstream phase of production for materials such as resins that we produce, a huge amount of water mainly for cooling, and steam is used. In the downstream phase, water is used to process and assemble products we produce and so in general the requirement of water use is lower. Although upstream water demand may be lower compared to industries that require agricultural raw materials, the chemical sector's use of water will become more important in the future as water availability decreases and the use of raw materials made from plants increases. Therefore, we rated the importance of indirect use of water as "Important". Noted that cooling and steam, which are the main applications, hardly cause water pollution at the use stage. Therefore, circulation system to reuse used water many times has already established for each of two uses.
Sufficient amounts of recycled, brackish and/or produced water available for use	Vital	Neutral	When used directly, seawater is essential to cover large amounts of cooling in coastal facilities. Therefore, we rated the importance of direct use of water as "Vital". In inland plants where only fresh water can be used, we recycle cooling and steam applications thoroughly within the site, while cleaning applications are recycled to the best extent possible. Direct use of water other than fresh water can be important in the future. The reason is that droughts due to climate change and other factors may force us to limit the use of fresh water. However, in case a large amount of seawater is used, it can give negative impacts on the natural environment of the water supply area. Instead, we would prefer to recycle water within our own location. For indirect use, in the upstream phase of production of material such as resins that we produce, seawater or recycled water is used similarly to how it is used at our own sites and so the importance of water resources is equal at both our own sites and upstream sites. Downstream processing, in which we purchase resins and other products that we manufacture, (and process and assemble them further), use little seawater, and recycled water is not very important. For this reason, we evaluated its importance as "neutral." We expect this trend will be continued with the following two reasons. First, the upstream site already has a water recycling system in place. Second, the use of seawater in the product assembly process in downstream processing leads to corrosion of the product assembly machine.

W1.2

(W1.2) Across all your operations, what proportion of the following water aspects are regularly measured and monitored?

	% of sites/facilities/operations	Please explain
Water withdrawals – total volumes	100%	Water withdrawal is usually measured using a flow meter. Considering the importance of water in our manufacturing process (cooling, cleaning, water as a raw material, etc.), we record using automatic measuring equipment in 100% of our manufacturing facilities. We check and monitor the data of the automatic measuring device once a month.
Water withdrawals – volumes by source	100%	Water supplied from municipal water sources is continuously monitored using automated equipment to check compliance with licensing requirements and water costs. Monitoring is also ongoing to evaluate the efficiency of water use in facilities where large amounts of groundwater and surface water are used. Monthly aggregations are reported to site administrators and used to evaluate the various performance characteristics of the manufacturing industry.
Entrained water associated with your metals & mining sector activities - total volumes [only metals and mining sector]	<Not Applicable>	<Not Applicable>
Produced water associated with your oil & gas sector activities - total volumes [only oil and gas sector]	Not relevant	
Water withdrawals quality	100%	Withdrawal quality parameters such as turbidity, hardness, and pH are important for stable operations as well as product quality and are therefore monitored continuously using automated equipment or by sampling at all facilities that use surface water or groundwater. As for water supplied by third party sources, since the quality of water is normally stable, we do not measure its quality by ourselves. Instead, we do monitor it on a regular basis, normally once a month, using data obtained from the distributors. The distributors constantly and automatically measure the quality of the water supplied. Should they detect any abnormalities in the water quality from their measurement results, they are required to contact us immediately. Therefore, including this indirect monitoring, we are virtually and constantly monitoring the quality of all water withdrawn and used in our operations.
Water discharges – total volumes	100%	To evaluate the impact of quality and cost, we monitor the effluent volume at 100% of our facilities. Most of our facilities use automated equipment to continuously measure discharge volume based on the total volumes of wastewater. At facilities that generate only a small amount of wastewater, the amount of wastewater is instead periodically (monthly) measured and discharged to general wastewater treatment facilities. This is because when the volume of wastewater is intermittent, it makes it impossible to continuously measure the amount of wastewater.
Water discharges – volumes by destination	100%	We continuously measure the amount of wastewater. The wastewater is discharged into fresh water and seawater as well as public sewage treatment systems. To mitigate averse environmental impacts and to evaluate costs and compliance with regulation the volumes are automatically and continuously measured for most of our sites. For sites with only small volumes of discharge water volumes are measured periodically (monthly). This is because when the volume of wastewater is intermittent, which makes it impossible to continuously measure the amount of wastewater.
Water discharges – volumes by treatment method	100%	Water that is discharged into rivers, oceans, and other public water areas are discharged through wastewater treatment facilities to prevent pollution. In order to properly manage the performance of this wastewater treatment facility, it is necessary to monitor the quality and quantity of wastewater received. Therefore, we continuously measure the volume of wastewater received by wastewater treatment facilities using automated equipment at all facilities. In public wastewater treatment facilities and where wastewater is discharged to other companies, wastewater treatment is carried out downstream, so in most cases, the wastewater is discharged without prior measuring of its quality. For facilities with very low discharges, measurements are usually made about once a month.
Water discharge quality – by standard effluent parameters	100%	Monitors COD, total nitrogen, and other regulatory parameters that are included in the monitored area for wastewater to public waters. The method and frequency of measurement, e.g., daily, monthly, will vary from site to site and case-by-case. In the case of emissions into public waters, measurements are made at all sites exceeding the frequency specified by laws and regulations. Monitoring is voluntarily performed once a month when releasing into public sewage systems.
Water discharge quality – temperature	100%	Continuous monitoring of temperature by automated measurement devices is performed for emissions to public waters that may have significant environmental impacts. We also use the activated sludge method for wastewater treatment facilities that we operate and manage. In the activated sludge method, it is important to control the temperature that affects the activity of aerobic bacteria. Therefore, wastewater treatment facilities use automatic measuring devices to monitor the temperature in real time and we check the record once a month. Such monitoring and measurements are carried out at our Ibaraki factory, etc., which accounts for 60%.
Water consumption – total volume	100%	Water consumption is defined as the difference between measured withdrawal and facility emissions. Therefore, the measurement frequency of water intake and drainage is the same as the frequency of consumption measurement. In other words, measurement frequency at production sites with a small amount of wastewater will be once every few days. On the other hand, the consumption at a production site with a large amount of wastewater is always measured because the wastewater is automatically and constantly measured. Usage is aggregated monthly to identify abnormalities. If the amount of wastewater is small and is not measured at all times (e.g., in an office), the amount of water taken in and the amount of wastewater discharged are regarded as the same, and the amount of water consumed is defined as 0.
Water recycled/reused	100%	Approximately 100% of water recycling and reuse facilities are continually measured. Initiatives to increase water recovery and recycling will be undertaken in the future to improve water use efficiency. In order to account the exact amount of recycling, we have educated the manager of each facility on the definition of the amount of recycling. In addition, we have started to examine the insufficient equipment in order to be able to determine the correct volumes of recycled water. As a result of these measures, the proportion of each facility that measures the amount of recycling has increased. Specifically, we measure the amount discharged from a pump that circulates water with an automatic measuring device to know the amount recycled. On the other hand, at each facility, the amount of recycled data is effectively analyzed as information for studying ways to further increase the amount recycled. As a result, the effect is gradually becoming apparent.
The provision of fully-functioning, safely managed WASH services to all workers	100%	We constantly have safe water and sanitation facilities at all business sites. Also, the suppliers of water to all business sites are constantly monitoring the water quality. In addition, water quality data will be submitted on a regular basis. The status of safe water and sanitation facilities is monitored and reported annually through our Employee Health Management Performance Monitoring.

W1.2b

(W1.2b) What are the total volumes of water withdrawn, discharged, and consumed across all your operations, and how do these volumes compare to the previous reporting year?

	Volume (megaliters/year)	Comparison with previous reporting year	Please explain
Total withdrawals	857478	Lower	The actual amount of total water withdrawal for FY2021 was 857478 ML. However, this amount includes the amount of water withdrawal that has been newly added by M&A since FY2021. This new additional water withdrawal was 2858 ML. Accordingly, in order to make an accurate comparison with the total water withdrawal of last year, it is necessary to exclude the new added water withdrawal from the actual value of FY2021. Thus, the result of calculation：【857478－2858＝854620】is the value for comparison. On the other hand, through our examination, the total water withdrawal last year was 864735 ML. As a result, we recorded a decrease (1.2% from the previous year). Though there is an increase in water withdrawal due to a recovery of production to previous levels in other plants, this decrease is mainly due to the shutdown of a production line at a plant with a large water withdrawal in FY2020.
Total discharges	808691	Lower	The actual amount of total wastewater discharged in FY2021 was 808691 ML. However, this amount includes the amount of wastewater that has been newly added by M&A since FY2021. This new additional wastewater volume was 765 ML. Therefore, in order to make an accurate comparison with the total amount of wastewater discharged last year, it is necessary to exclude the newly added amount of wastewater from the actual values for FY2021. Then, the result of calculation:【808691-765＝807926】is the value for comparison. On the other hand, through our examination, the total amount of wastewater discharged last year was 817684 ML. As a result, we recorded a decrease (1.2% from the previous year). We believe that this is due to the improved efficiency of freshwater recycling and a decrease in total water withdrawal. We will continue to improve this recycling amount and expect this trend to continue in the future.
Total consumption	48787	Lower	The actual total consumption for FY2021 was 48787 ML. However, this amount includes the amount of consumption that has been newly added by M&A since FY2021. This new additional consumption was 2092 ML. Accordingly, in order to make an accurate comparison with the total consumption of last year, it is necessary to exclude the newly added consumption from the actual value of FY2021. Thus, the result of calculation：【48787－2092＝46695】 is the value for comparison. On the other hand, through our examination, the total consumption of last fiscal year was 47051 ML. As a result, we recorded a slight decrease (0.8% from the previous year). We believe that this is due to the decrease in total water withdrawal and total waste water discharged.

W1.2d

(W1.2d) Indicate whether water is withdrawn from areas with water stress and provide the proportion.

	Withdrawals are from areas with water stress	% withdrawn from areas with water stress	Comparison with previous reporting year	Identification tool	Please explain
Row 1	Yes	1-10	About the same	WRI Aqueduct	We used WRI Aqueduct to screen water stress at 106 manufacturing sites around the world in 2020 for the first time. The biggest reason for choosing the WRI Aqueduct is that it is easy to use. Water risk assessments must be conducted independently by personnel at each production site around the world. This is because that personnel in charge has to understand the characteristics of their own area, so of course, it is a very important factor that anyone can easily use it. In addition, we focused on Physical Risks Quantity among the four screening indicators of WRI Aqueduct. The reason is that the average Physical Risks Quantity score is highest when comparing the four WRI Aqueduct scores. In other words, we have focused on evaluating the most severe indicator. The water withdrawal at these 106 locations is equivalent to approximately 96% of the total water withdrawal of MCHC Group. Through the screening of the WRI Aqueduct, we identified 11 sites potentially exposed to water stress. The water withdrawal at these 11 locations is equivalent to 6% of the total water withdrawal of MCHC group. However, this is not the end of our water stress screening, because we regard WRI Aqueduct evaluation as the primary screening. Therefore, we conducted a questionnaire survey on the 11 sites with high scores of WRI Aqueduct, and on 3 sites where the amount of water withdrawal was relatively high although the score of WRI Aqueduct was not high. In addition, this questionnaire survey confirmed the level of awareness of water risks among employees at each site and whether or not they have a countermeasure for such water risks. This is our second screening. The ratio of water withdrawal at the 14 sites where this secondary screening was conducted is equivalent to 19% of the total water withdrawal of MCHC group. As a result of this questionnaire survey, 3 production sites were identified as high water-stressed sites. The ratio of water withdrawal at these 3 sites is equivalent to 1.8% of the total water withdrawal of MCHC Group. Like the above, we decided to assess water stress in two steps. As water stress is not expected to change in the short term, water stress risk assessments will be repeated every 5 years and will be implemented for all new plants to be constructed.

W1.2h

(W1.2h) Provide total water withdrawal data by source.

	Relevance	Volume (megaliters/year)	Comparison with previous reporting year	Please explain
Fresh surface water, including rainwater, water from wetlands, rivers, and lakes	Relevant	81728	Lower	Fresh surface water is mainly used for primary cooling and it is important and relevant in our business. The actual value of freshwater withdrawal for FY2021 was 81728 ML. However, this amount includes water withdrawal that has been newly added due to M&A since FY2021. This additional water withdrawal was 24 ML. Therefore, in order to make an accurate comparison with last year, it is necessary to exclude this added water withdrawal from the actual value of FY2021. Thus, the calculation result:【81728-24＝81704】 is the value for comparison. On the other hand, through our examination, the total amount of surface water withdrawal of last fiscal year was 85043 ML. As a result, we recorded a decrease (3.9% from last year).We believe that this is due to the increased efficiency of freshwater recycling and the relative increased water withdrawal from third parties. We will continue to improve this recycling amount and expect this trend to continue in the future.
Brackish surface water/Seawater	Relevant	636408	Lower	Seawater is mainly used in our business for re-cooling primary cooling water. Therefore, a sufficient amount of seawater is associated with our business. The actual amount of seawater withdrawal in FY2021 was 636408 ML. This amount was not affected by M & A after FY2021. As a result, we recorded a decrease (1.9% from the previous year). We evaluate this due to the improvement in recycling efficiency. For example, improving recycling efficiency means, for example, increasing the number of cycles from 8 to 10 and continuing the use of fresh water for a long time. As a result, the frequency of freshwater replenishment is reduced, resulting in a reduction of freshwater withdrawal and sea water withdrawal for re-cooling primary cooling water. By improving this recycling rate, we expect this downward trend to continue.
Groundwater – renewable	Relevant	31399	Higher	Groundwater (renewable) is mainly used for cooling and is relevant to our business. The actual amount of groundwater withdrawal in FY2021 was 31399ML. However, this includes 46 ML of groundwater withdrawal that has been newly added due to M&A since FY2021. It is necessary to exclude this added amount from the actual values of FY2021 for comparison. The calculation result：【31399－46＝31353】is the value for comparison. The total amount of groundwater withdrawal in last fiscal year was 28643 ML. Therefore, we recorded an increase (9.5% from the previous year). We believe that this increase is due to a recovery of production to previous levels, which was reduced by COVID-19.
Groundwater – non-renewable	Not relevant	<Not Applicable>	<Not Applicable>	Chemical plants are located on the premise of large-scale use of water, and do not rely on such non-recycled water resources from the viewpoint of sustainability. The survey has not been conducted separately from renewable groundwater, but we consider that this water is not used currently nor should it be used in the future.
Produced/Entrained water	Not relevant	<Not Applicable>	<Not Applicable>	Because of the necessity of stable operations, the utilization of freshwater and seawater with stable water quality is indispensable for chemical plants, and the utilization of produced water is not considered common now, nor should it be in the future. However even at present, there are cases involving droughts, where the facilities located in water stressed areas sometimes accept water temporarily. This demonstrates that it may be necessary to ensure that this water is effectively utilized as freshwater might be constantly depleted in the future.
Third party sources	Relevant	107942	Higher	We use water sources from third parties primarily for cooling. It is relevant and important to our operations. The actual amount of water from third party in FY2021 was 107942ML. However, this includes 2788 ML which has been newly added due to M&A since FY2021. It is necessary to exclude this newly added amount from the actual value of FY2021 for comparison. The calculation result：【107942-2788＝105154】 is the value for comparison. On the other hand, through our examination, the total amount of water withdrawal from third parties of last fiscal year was 102561 ML. As a result, we recorded an increase (2.5% from the previous year). We believe that this increase is due to a recovery of production to previous levels, which was reduced by COVID-19.

W1.2i

(W1.2i) Provide total water discharge data by destination.

	Relevance	Volume (megaliters/year)	Comparison with previous reporting year	Please explain
Fresh surface water	Relevant	78356	Lower	The main use of freshwater is for primary cooling and this water may be discharged into the surface water after confirming there is no change in water quality. Therefore, it is important and relevant to our company as a discharge destination. The actual amount of wastewater discharged to the fresh surface water in FY2021 was 78356 ML. However, this amount includes 7 ML of discharged water, which was newly added by M&A since FY2021. It is necessary to exclude this newly added wastewater from the actual values for FY2021 for comparison. The calculation result：【78356－7＝78349】 is the value for comparison. The amount of wastewater discharged to the fresh surface water last year was 79142 ML. As a result, we recorded a slight decrease (1.0% from the previous year).This decrease is due to the improved efficiency of freshwater recycling. We will continue to improve the recycling rate and expect that this trend will continue in the future.
Brackish surface water/seawater	Relevant	715204	Lower	The main use of seawater is recooling and is returned to the sea after confirming there is no change in water quality. It is important as a destination for the discharge of seawater. The actual amount of water discharged to the sea in FY2021 was715204 ML. This amount was not affected by M & A after FY2021.On the other hand, through our examination, the total amount of wastewater discharge to the sea of last fiscal year was 720508 ML. As a result, we recorded a decrease (0.7% from last year). This decrease is due to the improved efficiency of freshwater recycling. Water is discharged to the sea adjacent to sites. We are reducing the amount of seawater withdrawal by improving fresh water recycle efficiency, and the amount of wastewater discharged to sea decrease. We will continue to improve the recycling rate and expect that this trend will continue in the future.
Groundwater	Not relevant	<Not Applicable>	<Not Applicable>	Despite proper treatment of wastewater, discharge to groundwater is a last resort for the chemical industry, both in the present and in the future, particularly when taking into account the possibility of contamination.
Third-party destinations	Relevant	15132	Lower	The main use of water is cooling. If the water is dirty, we will process it and discharge to third party's discharge destination. It is important as a release destination. The actual amount of wastewater discharged to third parties in FY2021 was 15132 ML.However, this amount includes 758 ML of discharged water, which was newly added by M&A since FY2021. It is necessary to exclude this newly added wastewater from the actual values for FY2021 for comparison. The calculation result：【15132－758＝14374】 is the value for comparison. On the other hand, through our examination, the total amount of wastewater discharge to third parties was 17894 ML in last fiscal year. As a result, we recorded an significant decrease (19.7%). We believe that this is mainly due to the closure of a plant with a large volume of wastewater discharged to third parties in FY2020.

W1.2j

(W1.2j) Within your direct operations, indicate the highest level(s) to which you treat your discharge.

	Relevance of treatment level to discharge	Volume (megaliters/year)	Comparison of treated volume with previous reporting year	% of your sites/facilities/operations this volume applies to	Please explain
Tertiary treatment	Relevant	18545	About the same	71-80	Freshwater used in the production process of our chemical plants is used not only for cooling but also for chemical reactions. To discharge the freshwater used in the chemical reaction, the advanced treatment of the waste water is performed. Therefore, it is related and important to our business. In fact, the amount of waste water treated in FY2021 was 18,545 ML. On the other hand, through our examination, the amount of waste water treated in FY2020 was 18,722ML. As a result, the processed waste water amount was almost same as that in the previous year. We are continuously addressing to reduce the discharge of pollutants into public waters by installing and improving the advanced wastewater treatment facilities.
Secondary treatment	Relevant	669	Lower	71-80	The scope of reporting regarding wastewater treatment is widened, and we will report the amount of secondary treated waste water from this year. Freshwater used in the production process of our plants is used not only for cooling but also for production. The secondary treatment is performed to discharge the waste water. Therefore, it is related and important to our business. In fact, the amount of secondary treatment performed in FY2021 was 669 ML. On the other hand, through our examination, the amount of secondary treatment performed in FY2020 was 837ML. As a result, the amount of secondary treated waste water decreased by 20.1%. This is due to the decrease in total amount of waste water. Wastewater is treated with activated sludge treatment to comply with emission standards for public water bodies that are stricter than that for sewage discharge. At two domestic plants where secondary treatment is performed, we constantly measure the water quality of the wastewater such as pH, COD, nitrogen and phosphorus and when we detect an abnormality, we immediately stop its discharge and store it in a reserve tank.
Primary treatment only	Relevant	27252	Lower	71-80	Fresh water used in the production process of our chemical plant is used not only for cooling but also for cleaning. The primary treatment is performed to discharge the fresh water used for this cleaning. Therefore, it is related and important to our business. In fact, the amount of primary treated waste water in FY2021 was 27,252 ML. On the other hand, through our examination, the amount of primary treated waste water in FY2020 was 27,674 ML. As a result, the amount of primary treated waste water decreased by 1.5%. This is due to the decrease in total amount of waste water discharged.
Discharge to the natural environment without treatment	Relevant	522261	About the same	71-80	The scope of reporting regarding wastewater treatment is widened, and we will increase the number of our production site covered from this year. Most of the freshwater used in the production process of our chemical plants is used for cooling. The fresh water used for cooling is not contaminated and discharged without treatment. Therefore, it is related to our business. In fact, the amount in FY2021 was 522,261 ML. On the other hand, through our examination, the amount in FY2020 was 520,704 ML. As a result, the amount of untreated waste water slightly increased by 0.3%. Considering that there is a recovery in production in some plants to previous levels, the increase in untreated waste water discharged is relatively low. This is due to the efficient use of fresh water for cooling by increasing the number of circulation of fresh water for cooling.
Discharge to a third party without treatment	Relevant	5163	Lower	71-80	The scope of reporting regarding wastewater treatment is widened, and we will report the amount of untreated waste water that is discharged to third parties from this year. Most of the freshwater used in the production process of our chemical plants is used for cooling. The fresh water used for cooling is not contaminated and discharged without treatment. Therefore, it is related to our business. In fact, the amount in FY2021 was 5,163 ML. On the other hand, through our examination, the amount in FY2020 was 5,340 ML. As a result, the amount of untreated waste water decreased by 3.3%. This is due to the efficient use of fresh water for cooling by increasing the number of circulation of fresh water for cooling.
Other	Not relevant	<Not Applicable>	<Not Applicable>	<Not Applicable>	In our business, there was no manufacturing site.

W1.3

(W1.3) Provide a figure for your organization's total water withdrawal efficiency.

	Revenue	Total water withdrawal volume (megaliters)	Total water withdrawal efficiency	Anticipated forward trend
Row 1	3976948000000	857478	4637959.22460984	Regarding the problem of global water depletion, we are planning to contribute to the solutions as a company which solve water issues through our products, and thus see an increase in our revenue over time. However, as part of our Environment Materiality, it is important for us to reduce our impact on water resources and therefore see a decrease in total water withdrawals over the years, which we predict will lead to an overall increase in water efficiency.

W-CH1.3

(W-CH1.3) Do you calculate water intensity for your activities in the chemical sector?

Yes

W-CH1.3a

(W-CH1.3a) For your top five products by production weight/volume, provide the following water intensity information associated with your activities in the chemical sector.

Product type

Bulk inorganic chemicals

Product name

Industrial gases (N2, O2 and Argon)

Water intensity value (m3)

2.42

Numerator: water aspect

Freshwater withdrawals

Denominator

Other, please specify (KNm3)

Comparison with previous reporting year
Lower

Please explain
We assess the water intensity of oxygen, nitrogen and argon in total. This is because one plant separates and produces three gases from the air. A close examination of the water intensity for FY2021 was 2.42 . On the other hand, the water intensity for FY2020 was 2.55. Therefore, a decrease of 5.1% in water intensity compared to the previous year was recorded. The production volume was increased by 11.3%. The water withdrawal volume was increased by 5.4%. This means that the increase in water withdrawals is controlled relative to the increase in production, suggesting that fresh water use is efficient. The efficiency of freshwater use is considered to be the result of an increase in circulation rate. With the accumulation of this effort, it is expected that the water intensity will gradually decrease in the future.

Product type
Bulk inorganic chemicals

Product name
Coke

Water intensity value (m3)
1.6

Numerator: water aspect
Freshwater withdrawals

Denominator
Ton

Comparison with previous reporting year
Higher

Please explain
An increase of 1.9% in water intensity compared to the previous year (1.57) was recorded. The production volume was decreased by 3.2%. The water withdrawal volume was decreased by 0.9%. This is due to the decrease in production. A decrease in production will lead to a partial suspension of production equipment. However, we need to continue to supply cooling water to production facilities that have been suspended. If the cooling water is stopped, scale etc. will settle in the piping. Under such circumstances, if the equipment and the supply of cooling water is restarted, scale may accumulate in parts such as the heat exchanger, causing problems such as blockage. As a result, water withdrawal was decreased slightly, compared to the decrease in production volume. Therefore, it is evaluated that the water intensity increased due to maintaining the cooling water supply to the suspended production equipment.

Product type
Bulk organic chemicals

Product name
Ethylene and propylene

Water intensity value (m3)
6

Numerator: water aspect
Freshwater withdrawals

Denominator
Ton

Comparison with previous reporting year
Lower

Please explain
A decrease of 9.1% in water intensity compared to the previous year (6.6) was recorded. The production volume was increased by 15.5%. The water withdrawal volume was increased by 5.3%. This means that the increase in water withdrawals is controlled relative to the increase in production, suggesting that fresh water use is efficient. The efficiency of freshwater use is considered to be the result of an increase in circulation rate. With the accumulation of this effort, it is expected that the water intensity will gradually decrease in the future.

Product type
Bulk organic chemicals

Product name
Methyl methacrylate and methacrylic acid.

Water intensity value (m3)
15.4

Numerator: water aspect
Freshwater withdrawals

Denominator
Ton

Comparison with previous reporting year
Higher

Please explain
An increase of 2.0% in water intensity compared to the previous year (15.1) was recorded. The production volume was increased by 0.4%. The water withdrawal volume was increased by 2.1%. Firstly, when compared to last year, one of the major changes is that one of the production plants was closed in 2021. Therefore, the overall structure of production site has changed, and this may have affected the water intensity. Therefore, it is not possible to directly determine whether the efficiency of freshwater use at each site has improved. However, the efficiency of freshwater use needs to be improved to reduce water withdrawal. The efficiency of freshwater use is considered to be the result from an increase in the circulation rate. Through these efforts, the water intensity is expected to gradually decrease in the future.

Product type
Bulk organic chemicals

Product name
Polyethylene and polypropylene

Water intensity value (m3)
2.3

Numerator: water aspect
Freshwater withdrawals

Denominator
Ton

Comparison with previous reporting year
Lower

Please explain
A decrease of 4.2% in water intensity compared to the previous year (2.4) was recorded. The production volume was increased by 7.1 %. The water withdrawal volume was increased by 2.6%. This means that the increase in water withdrawals is controlled relative to the increase in production, suggesting that fresh water use is efficient. The efficiency of freshwater use is considered to be the result of an increase in circulation rate. With the accumulation of this effort, it is expected that the water intensity will gradually decrease in the future.

W-OG1.3

(W-OG1.3) Do you calculate water intensity for your activities associated with the oil & gas sector?
Please select

W1.4

(W1.4) Do you engage with your value chain on water-related issues?
Yes, our suppliers
Yes, our customers or other value chain partners

W1.4a

(W1.4a) What proportion of suppliers do you request to report on their water use, risks and/or management information and what proportion of your procurement spend does this represent?

Row 1

% of suppliers by number
76-100

% of total procurement spend
76-100

Rationale for this coverage
Our petrochemical plants are located in areas with low water stress to avoid the risk of water depletion. Due to the nature of our business, most existing suppliers of raw materials are located within the same neighborhood for logistical and production efficiency reasons. As a result, we assessed that our existing suppliers have similar water risk exposures as ours and do not need to collect information from them. We, however, request suppliers to send us information to assess their risks on water when we changed suppliers of raw materials or when they relocate. So, all potential suppliers need to report us information on water if they want to make a contract with us. The status of the report is reflected in the evaluation process for selecting a supplier, so it becomes an incentive and encouragement of activeness to supplier. Prospective suppliers who wish to contract with us should minimize their impact on the environment through compliance with laws and regulations and, when necessary, setting of voluntary standards. Required standards include monitoring methods for wastewater, sludge, exhaust and others, as well as reducing the amounts of releases of these substances through improvement of control and disposal methods.

Impact of the engagement and measures of success
Implementing a water risk assessment when there are changes in raw material supply reduces the potential for supplier related disruption to operations. The water risk assessment mentioned here is the water quality, available supply, risk avoidance measures, etc. By mandating this, nearly 100% of changes are covered. Some suppliers are exposed to water risks e.g. flood damage, and depending on the risk magnitude are required to implement the appropriate risk mitigation measures. We have records of delivery and quantity of suppliers affected continuously by water-related reasons. Therefore, it is possible to predict whether key supplies will be affected when there is a drought etc. The criteria for the success of this engagement are to ensure a stable supply of water and to protect the quality of the water, including the suppliers. We have continued such efforts, and believe that we are successful at present because there were no events on the above risks in FY2021.

Comment

W1.4b

(W1.4b) Provide details of any other water-related supplier engagement activity.

Type of engagement
Onboarding & compliance

Details of engagement
Requirement for water-related targets is included in your supplier selection mechanism

% of suppliers by number
26-50

% of total procurement spend
26-50

Rationale for the coverage of your engagement
Petrochemical complexes such as Kashima and Mizushima in Japan host oil refining and the other chemical factories that are raw material suppliers. As a result of this structure, there is close collaboration with suppliers on managing wastewater discharges. This is facilitated by relatively small number of suppliers (1-2%), however, large volumes of transactions with these suppliers account for more than 20% of all transactions.

Impact of the engagement and measures of success
The effectiveness of water quality conservation and improvement is extremely high, as more than 50% of the total wastewater output of the industry in the region is controlled by the cooperation of all companies in the refineries, petrochemicals, and even the complexes that manufacture derivatives. In addition, the industrial complexes established in Japan's Seto Inland Sea are subject to strict wastewater regulations due to the closed water area and therefore we must continuously meet these standards. These standards are established in accordance with the Water Pollution Control Law. For example, in Kagawa Prefecture, which faces the Seto Inland Sea, regulations have been established for three items: chemical oxygen demand (COD), nitrogen content (T-N), and phosphorus content (T-P) to prevent pollution during discharge. At Kagawa Works, wastewater quality is measured daily during the wastewater discharge period in accordance with these items. Continuous measurement of the concentration of the regulated substances subject to total volume control also gives the wastewater treatment facility an idea of how to improve the efficiency of our activated sludge process. Through these efforts, we are contributing to improving the quality of wastewater. In addition, since the cooperation status of related suppliers is reflected in the process for evaluating suppliers, we are encouraging the aggressiveness of suppliers as an incentive. The results of our water quality surveys are not only published in our annual sustainability report, but are also disclosed through the publication of RC (responsible care) reports at each operation site where each RC policy is stated. In addition, we support our suppliers' efforts to improve water quality by conducting surveys and providing feedback on the survey results based on a shared guidebook.

Comment

W1.4c

(W1.4c) What is your organization’s rationale and strategy for prioritizing engagements with customers or other partners in its value chain?

To solve water problems, it is essential to increase the amount of water used by our customers, and we aim to supply 10 billion cumulative tons of water in 10 years from 2016 to 2025. Our company targets developing countries in Asia and Africa, where water depletion is significant but demand for water in daily life and agriculture is very high. In these countries, not only water supply problems but also infrastructure such as energy, logistics, and agricultural materials are often inadequate, and simply providing a water supply system does not work. Therefore, we propose an appropriate system structure in accordance with the social situation of each country, and while receiving financial support such as ODA and International Cooperation Agencies, we are trying to promote the use of more effective systems by developing and testing regional and industrial business models that utilize the water we have obtained. In Myanmar, the deterioration of existing water supply systems and the increase in turbidity and salinization of rivers due to the prolonged rainy and dry seasons is becoming a serious problem. It is speculated that these problems are influenced by climate change. As such, the securing of available drinking water is becoming an urgent issue. In 2017, we established a joint venture, MW Aqua Solutions Co., Ltd., with Wellthy Corporation, and Myanmar Water Engineering & Products Co. Ltd. as a total solution provider that analyzes and monitors water quality. In addition, MW Aqua Solutions Co., Ltd. has begun to contribute to the stable provision of local drinking-water. In this engagement, we aim to supply 10 billion tons of water cumulatively over 10 years from 2016 to 2025. To achieve this goal, we have set a milestone of supplying a cumulative 5 billion tons of water from 2016 to 2022. As actual results are generally on target with a cumulative supply of 3.95 billion tons of water by 2021, we are confident that this engagement will be successful.

W2. Business impacts

W2.1

(W2.1) Has your organization experienced any detrimental water-related impacts?
No

W2.2

(W2.2) In the reporting year, was your organization subject to any fines, enforcement orders, and/or other penalties for water-related regulatory violations?
No

W3. Procedures

W-CH3.1

(W-CH3.1) How does your organization identify and classify potential water pollutants associated with its activities in the chemical sector that could have a detrimental impact on water ecosystems or human health?

Based on our product stewardship policy established in 2015, MCHC disclose risk information on product safety through life cycle (development, procurement, production, distribution, marketing, use, disposal, and recycling), and collaborate with stakeholders in order to minimize their impact on human health, safety, and the environment.

In this activity, we classify chemicals according to international standards such as REACH and GHS classification based on the type and extent of hazards.

The International Council of Chemical Associations (ICCA) promote voluntary initiatives in the chemical industry under its Global Product Strategy (GPS), which emphasizes risk-based chemicals management throughout supply chains and disclosure of risk management information on chemicals and products.

Our company launched GPS initiatives in FY 2009.

From then on, we steadily assess the risks inherent in the chemical products, manage them appropriately based on assessment results, and compile and publish the results as GPS Safety Summaries.

Regarding hazardous substances in the water system, substances that are highly toxic to living bodies and the environment are regulated as hazardous substances in Japan under the Water Pollution Control Law.

These substances such as cyan, or many organic compounds (such as benzene) have carcinogenic, mutagenic and reproductive toxicities, and so strict management is required.

In our company (in the manufacturing stage), these hazardous substances are not only relevant to some of our products but also various intermediates and by-products that are produced in the manufacturing process and so we must exercise caution when handling these substances as they can come in large amounts.

The substances subject to regulation under this Water Pollution Control Law in Japan are being managed and reduced as top priority substances to prevent water pollution worldwide as well as in Japanese sites which cover 70% of our company's water discharge.

In the use and disposal stages of products (other than the manufacturing stage), we make every effort to minimize the risk of such hazardous materials leaking to customers as impurities, and to share information on these hazardous substances with the customer so that appropriate measures can be taken even in the event of a leak or a mixture into a product.

W-CH3.1a

(W-CH3.1a) Describe how your organization minimizes adverse impacts of potential water pollutants on water ecosystems or human health. Report up to ten potential pollutants associated with your activities in the chemical sector.

Potential water pollutant	Value chain stage	Description of water pollutant and potential impacts	Management procedures	Please explain
Benzene	Direct operations	Benzene is contained in large quantities in cracked gasoline, a by-product in the production of ethylene and propylene by naphtha crackers, and also in coke oven gas in the production of coke. Moreover, benzene is supplied to the user as a raw material for solvents and resins. So our management of benzene covers our direct operations and our customers. As there is concern over its carcinogenicity, mutagenicity, and reproductive toxicity to the organism, and also its acute toxicity to aquatic organisms even in very small amount, it is regulated in the Water Pollution Control Law of Japan as a hazardous substance that may affect living organisms and the environment.	Compliance with effluent quality standards	We have implemented the following benzene leakage prevention measures and have confirmed every year that there are no leakage accidents at our operating sites. There were no accidents in FY2021 and thus we consider our monitoring strategy a success. (1)Most benzene is newly formed in the cracker reaction. In order to prevent leakage to water, it is usual to monitor the concentration in wastewater, and a equipment is designed to prevent its leakage to public water systems. Therefore, although it is handled on the order of tens of thousands of tons in the sites, the leak to the public water system is zero under normal operating states. (2)The frequency of measurement at the points discharged to the public water system varies depending on the site, but has been confirmed to be non-leaking, with once to 4 times per month. In order to detect a trace leak caused by a equipment trouble before it reaches the public water area, the risk of the leak is further suppressed by constructing a system to measure, shut off, and recover the leak at a frequency of several hours in the wastewater ditch around the benzene manufacturing and use facility. In addition, as measures to prevent leakage during product use, recommendations for environmental pollution measures such as the installation of exhaust ventilation and wastewater facilities are described in the safety summary of benzene and shared with customers. Regarding this sharing with customers, we try to check the progress by having direct conversations with customers around once a per year. By achieving all of these aspects, we rate our method of management as successful.
Inorganic cyanide compounds	Direct operations	Cyan compounds are synthesized as intermediates in the production process of resins and inorganic cyanide compounds are produced as byproducts. As they are not contaminated in our raw materials and resin products, our management of them focuses only on our direct operations. They are highly lethal toxics even in very small amount that cause intracellular respiration inhibition by cyanide ions. So they are regulated under the Japanese Water Pollution Law as hazardous substances that may affect living organisms and the environment.	Compliance with effluent quality standards Measures to prevent spillage, leaching, and leakages	We have implemented the following cyan compounds leak prevention measures and have confirmed every year that there are no accidents at our operating sites. There were no accidents in FY2021 and thus we consider our monitoring strategy a success. (1)It is subject to the regulations of the Water Pollution Control Law of Japan, and monitoring for leaks in public water systems is performed at the final outlets once to four times per month. As a by-product of production, the volume handled at the site is as high as at several thousand tons, but the amount of leakage in the past 10 years is below the detection limit at any of the production sites handling such substances. (2)In order to prevent leakage into the water, not only the concentration in the wastewater is monitored, but a mechanism is constructed to prevent leakage into the water system. Measurements are made about once an hour in the side ditches near the facilities where the equipment is manufactured and used. In the event of a leak, the amount of leakage is constantly suppressed to zero by a system that shuts off and collects the water at that step. By achieving all of these aspects, we rate our method of management as successful.
Polychlorinated biphenyl	Other, please specify (waste management)	Though we had manufactured PCBs as heat media and electrical insulators until 1972, it turned out that they are easily accumulated in living organisms and are carcinogenic. As such, its production and use were restricted in Japan from the same year, and its production and import were totally prohibited in 1975 under the law. From then on, we were obliged to store the products that we shipped to our customers as heat media, so we collected them from the customers and kept them safe. In the same year, the Japanese government set a standard to remove accumulated PCBs from the bottom of public water and obliged companies to dredge contaminated sediment from all around Japan. Therefore, it was designated as a hazardous substance under the Water Pollution Law, and the discharge is strictly regulated.	Compliance with effluent quality standards Measures to prevent spillage, leaching, and leakages Other, please specify (Development of efficient decomposition)	We implement the following PCB leakage prevention measures and confirm that there are no leakage accidents at our operating bases every year. There were no accidents in FY2021 and thus we consider our monitoring strategy a success. (1)It is a regulated substance of the Water Pollution Control Law, and the public waters are monitored so that it can be detected even if there is a leak. (2)Various measures have been taken to prevent leaks, and PCBs collected and stored have already been detoxified, eliminating the risk of leaks. (3)PCBs contained in transformers used in-house are also successively treated for detoxification. Until the detoxification is completed, strict control is carried out to prevent leakage into the ground and water systems in accordance with the management regulations. By achieving all of these aspects, we rate our method of management as successful.

W-OG3.1

(W-OG3.1) How does your organization identify and classify potential water pollutants associated with its activities in the oil & gas sector that may have a detrimental impact on water ecosystems or human health?

W-OG3.1a

(W-OG3.1a) For each business division of your organization, describe how your organization minimizes the adverse impacts on water ecosystems or human health of potential water pollutants associated with your oil & gas sector activities.

Potential water pollutant	Business division	Description of water pollutant and potential impacts	Management procedures	Please explain

W3.3

(W3.3) Does your organization undertake a water-related risk assessment?

Yes, water-related risks are assessed

W3.3a

(W3.3a) Select the options that best describe your procedures for identifying and assessing water-related risks.

Value chain stage
Direct operations
Supply chain
Other stages of the value chain

Coverage
Full

Risk assessment procedure
Water risks are assessed as part of an established enterprise risk management framework

Frequency of assessment
Annually

How far into the future are risks considered?
3 to 6 years

Type of tools and methods used
Tools on the market
Enterprise risk management
Databases

Tools and methods used
WRI Aqueduct

Contextual issues considered
Water regulatory frameworks
Status of ecosystems and habitats
Access to fully-functioning, safely managed WASH services for all employees

Stakeholders considered
Customers
Employees
Investors
Local communities

Comment

W3.3b

(W3.3b) Describe your organization's process for identifying, assessing, and responding to water-related risks within your direct operations and other stages of your value chain.

Since the number of production sites exceeds 100 and is dispersed throughout the world, it is necessary to evaluate the risk of water depletion in the future.

The current state and future projections of water stress were assessed using the WRI Aqueduct.

WRI Aqueduct is used to assess water risk for domestic and international production and research sites. Each item is scored on a 5-point scale from 0 to 5, and the information is displayed as a world map, allowing detailed information to be obtained for each region.

More than 98% of production sites are located in locations with an overall score of 4 or less on a 5-point scale, which is calculated by adding up the amount of physical risk, the quality of physical risk, and regulatory and reputational risk. In addition, more than 90% of all water withdrawals at all sites take place in low-risk locations with a score of 3 or less.

From the matrix in which the tool's outputs and the size of the water usage were arranged in two axes, 22 production sites with a high risk of water were selected, and a hearing was conducted on the detailed risk.

In order to assess the risks from plant operations and conflicts among stakeholders, which are difficult to evaluate with water risk tools, we interviewed internal knowledge and identified five production sites (two basins) with risks that ultimately affect operations.

It has been confirmed that the risk has already been recognized and controlled at these facilities, and problems such as shutdown have not become apparent for the past 20 years.

We have not made any additional business decisions regarding water as we have already managed these identified risks.

It has also been confirmed that the risk assessment for suppliers in the petrochemical division is equivalent to the results of our own risk assessment because the manufacturing base is located near the company's own site.

Therefore, the results of the WRI Aqueduct assessment can be used as they are.

Through the above methods, we evaluate and manage "physical risk" for production activities, "regulatory risk" associated with the tightening of water withdrawal regulations and effluent standards, and "reputational and market risk" related to our reputation in society.

However, suppliers in the Functional Chemicals Division are scattered around the world by many micro businesses and, therefore, we are considering prioritization of those investigations in the future.

W4. Risks and opportunities

W4.1

(W4.1) Have you identified any inherent water-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes, both in direct operations and the rest of our value chain

W4.1a

(W4.1a) How does your organization define substantive financial or strategic impact on your business?

Risks are prioritized using the following criteria:

(1) Assigning a financial impact value to the size of potential economic loss, human impact, and impact on corporate reputation.

(2) Those with potentially significant financial impacts as determined in (1) are assessed for probability of occurrence.

(3) The product (multiplication) of (1) and (2) is considered to be the magnitude of the risk;

Larger risks as calculated through this method are categorized as serious (material) risks and reported to the Management Committee, where they are discussed and countermeasures considered.

For risks related to water, financial impact of about 3 billion yen, which is about 0.1% of sales, is used as a guideline for this risk assessment.

This risk assessment applies to our direct operations sites as well as to our suppliers, confirming that at this time almost all our sites and suppliers are not exposed to serious risks associated with water stress.

< Examples of identified risks >

However, at our company, we operate three large-scale plants requiring large amounts of fresh water in the Seto Inland Sea area where severe droughts have frequently occurred during the past ten to twenty years.

For these three plants, we have found that the potential economic impact of droughts in the form of shutdowns and decline in utilization rates cannot be ignored.

In the future, if a drought still occurs, losses due to shutdowns and reduced utilization rates could exceed the significant financial impact of approximately 3 billion yen.

Therefore, we conducted interviews at these three large-scale factories to confirm the operational response to the droughts that occurred in the past.

We were able to confirm that solutions had been put in place to avoid financial impacts during past droughts.

In addition, we have implemented other measures, such as writing down past experiences of reducing the amount of withdrawal which was carried out during past droughts in a manual, so that if similar droughts occur in the future, we will be able to swiftly implement optimal operation countermeasures.

In addition to these aspects, we are also implementing tangible measures such as investments in facilities to avoid impacts on operations when a drought occurs.

In addition, we are working with our neighboring suppliers and customers in a systematic way to reduce the risks from droughts.

For this purpose, we also decentralizing some of our suppliers.

We conducted the same risk analysis on the quality of discharge water, and in addition to the three sites mentioned above which were identified as having a risk for water stress, two sites in Indonesia were identified as risk sites.

It is assumed that the two Indonesian sites will have a particularly high reputation risk as a risk due to tightened water regulations.

W4.1b

(W4.1b) What is the total number of facilities exposed to water risks with the potential to have a substantive financial or strategic impact on your business, and what proportion of your company-wide facilities does this represent?

	Total number of facilities exposed to water risk	% company-wide facilities this represents	Comment
Row 1	5	Less than 1%	Three sites located in the Seto Inland Sea of Japan (Mizushima, Sakaide, and Kakogawa): The three sites are located in different water basins but the area as a whole experiences periodical droughts (once every 10 to 20 years). Additionally, because the inland sea is a closed water body, it is subject to more stringent legislation compared to other areas and the possibility of introduction of stricter regulation is considered higher compared to other locations. This is further influenced by the presence of a national park in the area. Two sites located in Indonesia (Melak (Java), TPA and PET film plants):In Indonesia, the volume of water supplied from seawater was increased. The WRI Aqueduct indicates water stress is Medium to High (2.7) with water not entirely being depleted. These facilities account for approximately 21% of the Group's total water withdrawal, primarily because large volumes of water are needed for cooling purposes.

W4.1c

(W4.1c) By river basin, what is the number and proportion of facilities exposed to water risks that could have a substantive financial or strategic impact on your business, and what is the potential business impact associated with those facilities?

Country/Area & River basin

Japan	Other, please specify (Seto Inland sea)

Number of facilities exposed to water risk
3

% company-wide facilities this represents
Less than 1%

Production value for the metals & mining activities associated with these facilities
<Not Applicable>

% company's annual electricity generation that could be affected by these facilities
<Not Applicable>

% company's global oil & gas production volume that could be affected by these facilities
Not applicable

% company's total global revenue that could be affected
1-10

Comment
Three sites located in the Seto Inland Sea of Japan (Mizushima, Sakaide, and Kakogawa): These three sites are located in different water basins but the area as a whole has experiences of periodical droughts (once every 10 to 20 years). Additionally, because the inland sea is a closed water body, it is subject to more stringent legislation compared to other areas and the possibility for introduction of stricter regulation is considered as higher compared to other locations. This is further influenced by the presence of a national park in the area.

Country/Area & River basin

Indonesia	Other, please specify (Cidanau in Java Island)

Number of facilities exposed to water risk
2

% company-wide facilities this represents
Less than 1%

Production value for the metals & mining activities associated with these facilities
<Not Applicable>

% company's annual electricity generation that could be affected by these facilities
<Not Applicable>

% company's global oil & gas production volume that could be affected by these facilities
Not applicable

% company's total global revenue that could be affected
1-10

Comment
In Indonesia, the volume of water supplied from seawater increased due to the fact that seawater is still used for cooling purposes. The WRI Aqueduct indicates water stress is Medium to High (20-40%) with freshwater not being entirely depleted.

W4.2

(W4.2) Provide details of identified risks in your direct operations with the potential to have a substantive financial or strategic impact on your business, and your

response to those risks.

Country/Area & River basin

Japan	Other, please specify (Seto Inland sea)

Type of risk & Primary risk driver

Acute physical	Drought

Primary potential impact
Increased operating costs

Company-specific description
The Seto Inland Sea area in Japan experiences periodic drought events, once every 10 to 20 years. We have three sites in this area: Okayama, Hiroshima, and Kagawa. In the case that the supply of industrial water decreases, production levels may also need to be reduced. Past drought seasons lasted for weeks or months. If a drought occurs in the Seto Inland Sea area and there is water shortage, we believe that all three business establishments will be affected. These three sites have a production capacity of about 30% of the entire group, so in the unlikely event that they are affected, there is a risk that sales will be affected by the decrease in production capacity. However, in the event of a drought, we use an operations manual containing countermeasures developed based on past drought experiences to avoid financial and strategic impacts. This is our “soft-side” response. On the other hand, our past experience is that droughts can also highlight weaknesses in production equipment. Therefore, we strategize and implement investment plans to deal with the weaknesses identified in production facilities.

Timeframe
More than 6 years

Magnitude of potential impact
Medium

Likelihood
Likely

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

Potential financial impact figure (currency)
3000000000

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

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

Explanation of financial impact
Severe droughts have the potential to reduce production efficiency and volumes resulting in potential financial impacts of several billion yen. Droughts have occurred many times in the past and we have been taking countermeasures. We calculated 3 billion yen by taking into consideration the effect of the deteriorated manufacturing intensity, as well as the cost and labor cost of the measures (temporary construction of water supply pipes and pumps) taken at this time. Considering the impact of climate change 10 years or more in the future, we believe that it is necessary to continue to anticipate the same levels of financial impact.

Primary response to risk
Develop drought emergency plans

Description of response
Measures to minimize the potential impacts of drought include access to multiple water sources (backup water supplies) for example from other rivers (as at Sakaide) and use of groundwater (as at Kakogawa). In addition, manuals are in place at all plants outlining the measures to be taken in the case of drought including for example rules for cooperating with local governments, prioritization of water use, water recycling etc. Each site has also established a program for the systematic reduction in water consumption when droughts occur.

Cost of response
40000000

Explanation of cost of response
Examples of cost impacts associated with a response to a drought event include energy costs from running ground extraction pumps and installation of temporary water pipes. This is the cost for securing the operational rate during the occurrence of drought. Specifically, we calculated the cost of newly purchased equipment (tens of millions of yen) and the cost of installing it (millions of yen) to be 40 million yen. These are not one-time costs but are incurred every time implementation is necessary. Construction costs of backup water sources (e.g. digging groundwater wells) which were established at the time plants are constructed are not included.

Country/Area & River basin

Japan	Other, please specify (Seto Inland sea)

Type of risk & Primary risk driver

Regulatory	Regulation of discharge quality/volumes

Primary potential impact
Increased cost of capital

Company-specific description
Several of our plants discharge wastewater to an area adjacent to the Seto Inland Sea National Park. As a result of its designation as a National Park, wastewater discharge standards are already stricter compared to other areas. Additionally, there is the possibility of further strengthening of discharge standards. In such a case, investments of several hundred million to several billion yen may potentially be required to ensure continued compliance with regulatory requirements.

Timeframe
More than 6 years

Magnitude of potential impact
Medium-high

Likelihood
Likely

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

Potential financial impact figure (currency)
3000000000

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

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

Explanation of financial impact
Failure to comply with revised water discharge regulations may result in penalties such as a temporary shutdown of the facility. It could potentially cause losses of between 100 and 200 million yen. Beyond this, publicity that the regulations have not been cleared may damage our reputation. As a result, it may develop into a boycott movement. Including this effect, we estimated it to be 3 billion yen. This depends on the development of regulations but we see it as highly likely that the development within the next 10 years there will lead to a situation where we must assume such financial implications.

Primary response to risk
Improve pollution abatement and control measures

Description of response
For plants located at the Seto Inland Sea area, in the case of changes in regulation, there is a high probability that investment in new equipment will be required to ensure compliance. Aside from investments in new equipment, other less tangible, measures are also required. For example, depending on the new regulations introduced, we adjust and update the format of any relevant reports so they properly reflect recorded data of managed substances. We believe that both types of responses, tangible and intangible, are necessary.

Cost of response
1000000000

Explanation of cost of response
Capital investment costs are estimated for installations for the treatment of residue that may be subject to new emission regulations. The current evaluation considers technology development expenses and capital investment concerning regulated substances. Specifically, we have estimated the total cost to be 1 billion yen by combining the technology development cost (several hundred million yen) and the capital investment cost to install it (tens of millions of yen). It is necessary to make separate estimations should another new regulated substance cause problems. Aside from investments in new equipment, other less tangible, measures are also required. For example, labor costs will be incurred when updating the format of reports and record. In addition, we have to educate our employees about the content of regulatory changes. Implementing such training involves not only the labor cost of the employee being educated, but also the labor cost of the employee conducting the training. It is necessary to estimate such costs separately, and to appropriately train the employees who are to conduct these trainings. This type of human resource development also needs to be considered in the management strategy for employee development.

Country/Area & River basin

Indonesia	Other, please specify (Cidanau in Java Island)

Type of risk & Primary risk driver

Regulatory	Regulation of discharge quality/volumes

Primary potential impact
Increased operating costs

Company-specific description
Factories in Indonesia manufacture Purified terephthalic acid, PET resins. The total water discharge from this plant is 174,633,750 tons, which represents approximately 82% of our total overseas water discharge.Current wastewater treatment processes in place are based on an activated sludge process with additional costs incurred for maintenance and monitoring. Should stricter legislation be introduced, investment costs of several hundred million yen may be required. In the case of non-compliance resulting in a shutdown of operations lasting several weeks, production related losses may amount to 30 to 40 million yen. Furthermore, if the wastewater treatment facility is upgraded, an education period will be required for employees to learn how to use the upgraded facility. In such a case, we may dispatch an employee to the manufacturer of the equipment and receive training to operate the equipment. This cost varies depending on the type of equipment in question, but it cannot be ruled out that the cost may reach 5 million yen.

Timeframe
4-6 years

Magnitude of potential impact
Medium

Likelihood
Likely

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

Potential financial impact figure (currency)
40000000

Potential financial impact figure - minimum (currency)

<Not Applicable>

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

Explanation of financial impact
In the case of non-compliance resulting in a shut-down of operations for several weeks, production related losses may reach 30 to 40 million yen. There are concerns that contamination of the area where we discharge used water will continue and that the related financial impact will materialize within 5 years.

Primary response to risk
Improve pollution abatement and control measures

Description of response
If water quality regulations are strengthened, we expect new plant and equipment investments are required to continue operations. Therefore, it is essential to take measures such as upgrading facilities. The measures we are referring to here includes not only the tangible aspect such as new equipment but also the less tangible aspects such as labor cost incurred to operate the equipment. In fact, we are planning an expansion to increase the capacity of the sewage treatment at Hiroshima Plant.

Cost of response
1000000000

Explanation of cost of response
We have estimated the initial investment cost related to the establishment and enhancement of facilities for regulatory compliance. Specifically, we have calculated the total cost of technology development (several hundred million yen) and the capital investment cost for installing it (several hundred million yen) to be one billion yen.

W4.2a

(W4.2a) Provide details of risks identified within your value chain (beyond direct operations) with the potential to have a substantive financial or strategic impact on your business, and your response to those risks.

Country/Area & River basin

Japan	Other, please specify (All rivers)

Stage of value chain
Other, please specify (End-of -Life treatment phase)

Type of risk & Primary risk driver

Technology	Substitution of existing products with lower water impact options

Primary potential impact
Increased operating costs

Company-specific description
There is growing concern over micro-plastics across the world, because they accumulate in the body of aquatic organisms and damage marine ecosystems. Some countries in the EU and Japan have already set regulations on the use of disposable plastics and promote companies to recycle and reuse plastics. This trend is expected to continue in the near future. Of the total sales of MCHC Group, around 40% is related to chemical products and plastic products. If other countries begin to introduce regulations on plastic products and promote shift to substitutes of plastics, the impact on the Group's business will be extremely large. For example, there may be an impact on technology strategies, such as taking action to promote research and development aimed at reducing the cost of manufacturing biodegradable plastic products that will replace conventional plastic products. In fact, we have already launched a number of biodegradable plastic products (BioPBS ™). Thus, in the case of biodegradable plastic products, there is a possibility that the procurement channels for non-conventional raw materials may be changed. In addition, it is possible that the quantity of new raw materials will not meet our required volumes. Therefore, it is necessary to simultaneously satisfy the following three criteria: securing the acquisition channels, securing of the necessary amounts, and that the purchase costs are reasonable. There is a risk of increased costs to confirm these conditions.

Timeframe
More than 6 years

Magnitude of potential impact
High

Likelihood
Very likely

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

Potential financial impact figure (currency)
3000000000

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

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

Explanation of financial impact
If regulations on the use of plastics are introduced worldwide and substitutions to other materials is promoted on a significant scale, our sales of raw materials and products related to food packaging, which are closely related to this issue, will decline by approximately 3 billion yen, which accounts for half of our sales of raw materials and products in FY 2019. Depending on global regulatory trends, we believe we have to, at the latest, consider this financial impact within 10 years.

Primary response to risk

Direct operations	Increase investment in new technology

Description of response
We need to increase investments in biodegradable plastics that decompose into harmless components after they are disposed into the ocean, and expand the market for products that can be substituted with existing plastics. In areas where it is difficult to meet functional needs, we need to invest large amounts of money to develop products as well as treatment and recycling technologies that respond to society’s demands, such as preventing marine dumping, strengthening recovery, and resolving waste disposal issues. Therefore, this has the potential to have a direct impact on our technology strategy. As an example, we are promoting not only research and development of biodegradable plastic products, but also the research and development of raw materials of conventional plastic products. It is necessary to appropriately prioritize among our several research and development themes. In setting this priority, we consider at least the following three aspects: Society's demands, the impact of contribution to society by developed products, and profitability.

Cost of response
41120000000

Explanation of cost of response
Investments in the above technology development, plant construction, marketing, etc. At present, there are still many uncertainties, and the scale of investment cannot be fully ascertained. However, as a rough guide, we assume that the total investment in chemicals and functional products in 2021 will be about 10% of the total investment in facilities and R&D. Given that the total investment in equipment and R&D is 411,200 million yen, the total investment in chemicals and functional products can be calculated to be 41,120 million yen. We believe that this level of costs is necessary on an annual basis. Furthermore, we see that these costs must be invested not only in a single year, but continuously over a period of five years or more.

W4.3

(W4.3) Have you identified any water-related opportunities with the potential to have a substantive financial or strategic impact on your business?
Yes, we have identified opportunities, and some/all are being realized

W4.3a

(W4.3a) Provide details of opportunities currently being realized that could have a substantive financial or strategic impact on your business.

Type of opportunity
Products and services

Primary water-related opportunity
Sales of new products/services

Company-specific description & strategy to realize opportunity
Regarding the problem of global water depletion, we are planning to contribute to the solutions as a company which solve water issues through our products. Our products such as separation membranes, water coagulants, and ion exchange resins purify contaminated water into pure water, so by integrating them to various solutions related to water issues we can contribute substantially. To further this goal, in 2016 we set a target for the amount of water made available by our products and began strategically promoting this goal through monetary contributions. Our company supplied 334 million tons of water in FY 2017. In Myanmar, the deterioration of existing water supply systems and the increase of particles and soil and salinization of rivers due to the prolonged rainy and dry seasons, which are considered to be influenced by climate change, has become a serious issue, and the securing of available drinking water became urgent. MW Aqua Solutions Co., Ltd., partly founded by Mitsubishi Chemicals in 2017, not only provides water treatment functions, but also contributes to the stable supply of local drinking water as a total solution provider that analyzes and monitors water quality. And since 2017, while accumulating the necessary know-how as a total solution provider of water, we are considering expanding the total solution water technologies to the rest of the world.

Estimated timeframe for realization
1 to 3 years

Magnitude of potential financial impact
Medium-high

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

Potential financial impact figure (currency)
60000000000

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

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

Explanation of financial impact
As a target for FY 2016-2025, our company is going to provide a cumulative total of 10 billion tons of water through our products. In practice, MW Aqua Solutions is selling hollow fiber membranes that can be used in wastewater treatment facilities, mainly overseas, where the value of water is high. In FY 2018, they supplied 230 million tons of water. By achieving this goal, we expect the sales of Environment and Living Solutions Business Unit, which manages these products, to increase by 60 million yen from 110 million yen in FY 2015 to 188 million yen in FY 2025.

W5. Facility-level water accounting

W5.1

(W5.1) For each facility referenced in W4.1c, provide coordinates, water accounting data, and a comparison with the previous reporting year.

Facility reference number
Facility 1

Facility name (optional)
Mizushima(Petrochemical)

Country/Area & River basin

Japan	Other, please specify (Seto inland sea)

Latitude
34.503213

Longitude
133.762304

Located in area with water stress
Yes

Primary power generation source for your electricity generation at this facility
<Not Applicable>

Oil & gas sector business division
Not applicable

Total water withdrawals at this facility (megaliters/year)
173364

Comparison of total withdrawals with previous reporting year
Lower

Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes
0

Withdrawals from brackish surface water/seawater
160668

Withdrawals from groundwater - renewable
0

Withdrawals from groundwater - non-renewable
0

Withdrawals from produced/entrained water
0

Withdrawals from third party sources
12696

Total water discharges at this facility (megaliters/year)
172581

Comparison of total discharges with previous reporting year
Lower

Discharges to fresh surface water
0

Discharges to brackish surface water/seawater
172581

Discharges to groundwater
0

Discharges to third party destinations
0

Total water consumption at this facility (megaliters/year)
783

Comparison of total consumption with previous reporting year
Higher

Please explain
Freshwater withdrawal has decreased(2.0%) and seawater withdrawal also has decreased (11.6%), resulting in a decrease in total water withdrawal(11.0%). The amount of total water withdrawal and total waste water discharged are almost same as that in FY2019. We believe that this decrease is due to the decrease in production. A decrease in production will lead to a partial suspension of production equipment. The amount of water consumed is calculated by subtracting the amount of water discharge from the amount of water withdrawal.

Facility reference number
Facility 2

Facility name (optional)
Sakaide (Coke)

Country/Area & River basin

Japan	Other, please specify (Seto Inland sea)

Latitude
34.349753

Longitude
133.84812

Located in area with water stress
Yes

Primary power generation source for your electricity generation at this facility
<Not Applicable>

Oil & gas sector business division
Not applicable

Total water withdrawals at this facility (megaliters/year)
73192

Comparison of total withdrawals with previous reporting year
Lower

Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes
0

Withdrawals from brackish surface water/seawater

67446

Withdrawals from groundwater - renewable
0

Withdrawals from groundwater - non-renewable
0

Withdrawals from produced/entrained water
0

Withdrawals from third party sources
5746

Total water discharges at this facility (megaliters/year)
69803

Comparison of total discharges with previous reporting year
Lower

Discharges to fresh surface water
0

Discharges to brackish surface water/seawater
69803

Discharges to groundwater
0

Discharges to third party destinations
0

Total water consumption at this facility (megaliters/year)
3389

Comparison of total consumption with previous reporting year
Higher

Please explain
Freshwater withdrawal has decreased (1.6%) and seawater withdrawal has decreased (3.0%), resulting in a decrease in total water withdrawal (2.9%). We believe that this decrease is due to the decrease in production. A decrease in production will lead to a partial suspension of production equipment. The amount of water consumed is calculated by subtracting the amount of water discharge from the amount of water withdrawal.

Facility reference number
Facility 3

Facility name (optional)
Kakogawa (Coke)

Country/Area & River basin

Japan	Other, please specify (Seto Inland sea)

Latitude
34.725167

Longitude
134.833776

Located in area with water stress
Yes

Primary power generation source for your electricity generation at this facility
<Not Applicable>

Oil & gas sector business division
Not applicable

Total water withdrawals at this facility (megaliters/year)
34006

Comparison of total withdrawals with previous reporting year
Higher

Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes
0

Withdrawals from brackish surface water/seawater
31875

Withdrawals from groundwater - renewable
0

Withdrawals from groundwater - non-renewable
0

Withdrawals from produced/entrained water
0

Withdrawals from third party sources
2131

Total water discharges at this facility (megaliters/year)
33692

Comparison of total discharges with previous reporting year
Higher

Discharges to fresh surface water
0

Discharges to brackish surface water/seawater
33692

Discharges to groundwater
0

Discharges to third party destinations
0

Total water consumption at this facility (megaliters/year)
313

Comparison of total consumption with previous reporting year
Lower

Please explain
Freshwater withdrawal has increased (0.9%) and seawater withdrawal has increased (12.9%), resulting in an increase in total water withdrawal (12.0%). On the other hand, the production amount decreased. We believe that this is due to the fact that the water withdrawal was not adjusted appropriately for the decrease in production. However, in order to reduce water withdrawal, it is necessary to improve the efficiency of freshwater use. We will continue our efforts to improve the efficiency of freshwater use by improving the recycling rate.The amount of water consumed is calculated by subtracting the amount of water discharge from the amount of water withdrawal.

Facility reference number
Facility 4

Facility name (optional)
Melak (Java)

Country/Area & River basin

Indonesia	Other, please specify (Cidanau in Java Island)

Latitude
-6.214

Longitude
106.829818

Located in area with water stress
Yes

Primary power generation source for your electricity generation at this facility
<Not Applicable>

Oil & gas sector business division
Not applicable

Total water withdrawals at this facility (megaliters/year)
176553

Comparison of total withdrawals with previous reporting year
Higher

Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes
0

Withdrawals from brackish surface water/seawater
174634

Withdrawals from groundwater - renewable
0

Withdrawals from groundwater - non-renewable
0

Withdrawals from produced/entrained water
0

Withdrawals from third party sources
1919

Total water discharges at this facility (megaliters/year)
174634

Comparison of total discharges with previous reporting year
Higher

Discharges to fresh surface water

0

Discharges to brackish surface water/seawater
174634

Discharges to groundwater
0

Discharges to third party destinations
0

Total water consumption at this facility (megaliters/year)
1919

Comparison of total consumption with previous reporting year
Higher

Please explain
Freshwater withdrawal has increased (15.1%) and seawater withdrawal has increased (1.7%), resulting in an increase in total water withdrawal (1.8%). We believe that this increase is due to a recovery of production to previous levels, which was reduced by COVID-19.The amount of water consumed is calculated by subtracting the amount of water discharge from the amount of water withdrawal.

Facility reference number
Facility 5

Facility name (optional)
TPA and PET film plants

Country/Area & River basin

Indonesia	Other, please specify (Cidanau in Java Island)

Latitude
-6.214

Longitude
106.829952

Located in area with water stress
Yes

Primary power generation source for your electricity generation at this facility
<Not Applicable>

Oil & gas sector business division
Not applicable

Total water withdrawals at this facility (megaliters/year)
1694

Comparison of total withdrawals with previous reporting year
Higher

Withdrawals from fresh surface water, including rainwater, water from wetlands, rivers and lakes
0

Withdrawals from brackish surface water/seawater
1672

Withdrawals from groundwater - renewable
0

Withdrawals from groundwater - non-renewable
0

Withdrawals from produced/entrained water
0

Withdrawals from third party sources
21

Total water discharges at this facility (megaliters/year)
1680

Comparison of total discharges with previous reporting year
Higher

Discharges to fresh surface water
0

Discharges to brackish surface water/seawater
1676

Discharges to groundwater
0

Discharges to third party destinations
4

Total water consumption at this facility (megaliters/year)
14

Comparison of total consumption with previous reporting year
Lower

Please explain
Freshwater withdrawal has increased (6.5%) and seawater withdrawal has increased (8.3%), resulting in an increase in total water withdrawal (8.2%). We believe that this increase is due to a recovery of production to previous levels, which was reduced by COVID-19.The amount of water consumed is calculated by subtracting the amount of water discharge from the amount of water withdrawal.

W5.1a

(W5.1a) For the facilities referenced in W5.1, what proportion of water accounting data has been third party verified?

Water withdrawals – total volumes

% verified
76-100

Verification standard used
Based on ISAE 3000, it has been verified together with other environmental indicators such as GHG emissions.

Please explain
<Not Applicable>

Water withdrawals – volume by source

% verified
76-100

Verification standard used
Based on ISAE 3000, it has been verified together with other environmental indicators such as GHG emissions.

Please explain
<Not Applicable>

Water withdrawals – quality by standard water quality parameters

% verified
Not verified

Verification standard used
<Not Applicable>

Please explain

Water discharges – total volumes

% verified
76-100

Verification standard used
Based on ISAE 3000, it has been verified together with other environmental indicators such as GHG emissions.

Please explain
<Not Applicable>

Water discharges – volume by destination

% verified
76-100

Verification standard used
Based on ISAE 3000, it has been verified together with other environmental indicators such as GHG emissions.

Please explain
<Not Applicable>

Water discharges – volume by final treatment level

% verified
76-100

Verification standard used
Based on ISAE 3000, it has been verified together with other environmental indicators such as GHG emissions.

Please explain
<Not Applicable>

Water discharges – quality by standard water quality parameters

% verified
76-100

Verification standard used
Based on ISAE 3000, it has been verified together with other environmental indicators such as GHG emissions.

Please explain
<Not Applicable>

Water consumption – total volume

% verified
Not verified

Verification standard used
<Not Applicable>

Please explain

W6. Governance

W6.1

(W6.1) Does your organization have a water policy?
Yes, we have a documented water policy that is publicly available

W6.1a

(W6.1a) Select the options that best describe the scope and content of your water policy.

	Scope	Content	Please explain
Row 1	Company-wide	Description of business dependency on water Description of business impact on water Description of water-related performance standards for direct operations Description of water-related standards for procurement Reference to international standards and widely-recognized water initiatives Company water targets and goals Commitment to align with public policy initiatives, such as the SDGs Commitments beyond regulatory compliance Commitment to water-related innovation Commitment to stakeholder awareness and education Commitment to water stewardship and/or collective action Acknowledgement of the human right to water and sanitation Recognition of environmental linkages, for example, due to climate change	In addition to providing products and services with low environmental impact, we also state in our group code of conduct that we shall work to reduce environmental impact of our operations and protect the environment, including ecosystems. As a manufacturer that requires large amounts of water as well as a water environment solutions provider, we consider water resource conservation as one important activity among our environmental preservation efforts. Our Basic Policy on Safety and the Environment states an obligation to conserve and improve the environment, and we have set standards for both operations and procurement. We have also set targets to FY2025 for improvement of the quality of discharged water in direct operations as well as the supplying products and services that contribute to the solution of water resource problems. These were established based on a materiality analysis conducted with reference to international standards, water-related initiatives and the SDGs. In order to solve water issues, we recognize the necessity of initiatives that go beyond legal compliance, innovation to create better products and services, linkage between water issues and other environmental issues, and the need for awareness-raising activities on sanitation and water.

W6.2

(W6.2) Is there board level oversight of water-related issues within your organization?

Yes

W6.2a

(W6.2a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for water-related issues.

Position of individual	Please explain
Chief Executive Officer (CEO)	We shifted to a governance model with board level committees from FY2015 to enhance management transparency and fairness and to strengthen management supervision functions. The role of the Board of Directors is to formulate management policies and oversight of management. In this way the operational management by the executive officers in charge of decision-making and execution of business is separated from the board. To strengthen the board's oversight function, the majority of directors do not concurrently serve as executive officers. The CEO, who is a member of the board of directors, is responsible for reporting on issues closely related to the water to the board. As an example of water-related decisions made so far, the annual achieved figure for the amount of recycled water provided (970 million tons in 2021) is posted in the "KATTEKI REPORT 2021" published by our Company.

W6.2b

(W6.2b) Provide further details on the board's oversight of water-related issues.

	Frequency that water-related issues are a scheduled agenda item	Governance mechanisms into which water-related issues are integrated	Please explain
Row 1	Scheduled - some meetings	Monitoring implementation and performance Overseeing acquisitions and divestiture Overseeing major capital expenditures Reviewing and guiding annual budgets Reviewing and guiding business plans Reviewing and guiding major plans of action Reviewing and guiding risk management policies Reviewing and guiding strategy Reviewing and guiding corporate responsibility strategy Reviewing innovation/R&D priorities	The Board of Directors of the Company decides on the basic policies of management such as medium-term management strategy and annual budget. In principle, decisions on business execution based on these policies are delegated to executive officers, except for matters which are legally required to be decided by the Board. Therefore, the Board mainly supervises the execution of business by the executive officers who are responsible for business execution decisions and their execution based on the basic management policy set by the Board. Specifically, this is decided after deliberation at the Executive Officers' Meeting, which is a board of councilors made up by all executive officers. Furthermore, appropriate and efficient decision-making is achieved by clearly specifying the mandates of each executive officer. The Executive Officers' Meeting deliberates and decides on important matters related to the management of the Company and the Group, and monitors the MCHC Group's business based on the basic management policy. We have set the Management of Sustainability (MOS) index as one of our basic policies to visualize the degree of contribution to each of the aspects “people”, “society”, and “the sustainability of the earth”, which were introduced in fiscal 2011. There are two indicators related to water in this MOS index; "Reduce the burden on the water environment" and "provide products and services that help solve water resource problems" , and they have specific targets; specifically, the goal of reaching 10 billion tons of recycled water by 2025, with an achieved value of 970 million tons supplied in 2021. Based on the target values in line with the basic policy, we hold annual briefing sessions on the evaluation of performance targets, annual budget, and business plans. Regarding the other items, they are reported whenever necessary, but with regard to risk, we have decided to report the result of the annual deliberations by the Risk Committee from FY 2018 in light of its importance. In principal, executive officers who are responsible for each execution field report on the topics, so the matters related to the MOS index are reported by the Chief Sustainability Officer (CSO). In addition, we hold the KAITEKI promotion meeting, which consists of the directors of Mitsubishi Chemical Holdings, Inc. (excluding the outside directors), and the CSO and Chief Health Officer (CHO) of our four group companies. At the KAITEKI promotion meeting, CSOs and CHOs of each company report on the performance and progress of the MOS indicators of their respective operating companies. In addition to this, in the KAITEKI Promotion Conference 2020, the direction of the new MOS indicators in preparing a new medium-term plan starting in 2021 was discussed. Through frank and open discussions among directors with diverse backgrounds, we are trying to further enhance the Board as a mechanism that can properly deal with ESG matters including water issues.

W6.2d

(W6.2d) Does your organization have at least one board member with competence on water-related issues?

	Board member(s) have competence on water-related issues	Criteria used to assess competence of board member(s) on water-related issues	Primary reason for no board-level competence on water-related issues	Explain why your organization does not have at least one board member with competence on water-related issues and any plans to address board-level competence in the future
Row 1	Yes	With the rapid increase in awareness of global environmental initiatives in many countries, we recognize that it is important for us to identify and incorporate into our discussions the risks and opportunities that may arise as climate change progresses, as well as the regulations of each country. Based on this recognition, we evaluate individuals with expertise in areas related to climate change, including water-related issues, (and the ability to incorporate this knowledge into our business risks and opportunities, as well as into our management strategies) as people who are well versed in climate-related issues.	<Not Applicable>	<Not Applicable>

W6.3

(W6.3) Provide the highest management-level position(s) or committee(s) with responsibility for water-related issues (do not include the names of individuals).

Name of the position(s) and/or committee(s)
Chief Sustainability Officer (CSO)

Responsibility
Assessing future trends in water demand
Assessing water-related risks and opportunities
Managing water-related risks and opportunities

Frequency of reporting to the board on water-related issues
More frequently than quarterly

Please explain
The CSO is the highest level of management responsible for the Company's water-related responsibilities. Prior to reporting to the Company's Board of Directors, the CSO attends Executive Board meetings for coordination among the executive officers. The composition of the Board of Directors is based on a skill matrix that sets out areas of particular expectation; the CSO is responsible for determining and executing business actions in accordance with the basic management policies established by the Board, such as KAITEKI Vision 30, a medium-term management plan that includes water-related targets. The CEO determines basic management policies, such as the medium-term management plan and annual budget, and delegates decisions on business execution based on these basic policies to the CSO. Specifically, the CSO reports to the executive officers to enhance corporate value from a non-financial perspective. The final report is made to the Board of Directors.

W6.4

(W6.4) Do you provide incentives to C-suite employees or board members for the management of water-related issues?

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

W6.4a

(W6.4a) What incentives are provided to C-suite employees or board members for the management of water-related issues (do not include the names of individuals)?

	Role(s) entitled to incentive	Performance indicator	Please explain
Monetary reward	Board chair Board/Executive board Director on board Corporate executive team Chief Executive Officer (CEO) Chief Operating Officer (COO) Chief Risk Officer (CRO) Chief Sustainability Officer (CSO)	Reduction of water withdrawals Improvements in efficiency - direct operations Improvements in waste water quality - direct operations	Water-related goals are reflected in our executive compensation. Of the compensation, 37.5% is performance-linked. Of these, cash bonuses are calculated using the formula [standard amount for each position x KAITEKI value evaluation (0% to 200%) x individual evaluation (± 20%)]. In addition, performance-linked stock compensation is calculated by [Standard points for each position x KAITEKI value evaluation (0% to 200%)]. Among the KAITEKI value evaluations, there are MOS index, MOT specification, and MOE index. Among the MOS indicators, the following are specific evaluation contents related to water. (1) Reduction of environmental load on water system ・ Total phosphorus emissions ・ Total nitrogen emissions in wastewater ・ COD emissions ・ (2) Providing products and services that contribute to solving water resource problems
Non-monetary reward	Other, please specify (Director of the manufacturing plant)	Improvements in efficiency - product-use Improvements in waste water quality - direct operations Improvements in waste water quality - supply chain	Plant managers and environmental managers at each site who have been able to improve relationships with local communities by complying with wastewater regulations and improving water quality receive awards from the president and the executive officer in charge of technology.

W6.5

(W6.5) Do you engage in activities that could either directly or indirectly influence public policy on water through any of the following?

Yes, direct engagement with policy makers

Yes, trade associations

W6.5a

(W6.5a) What processes do you have in place to ensure that all of your direct and indirect activities seeking to influence policy are consistent with your water policy/water commitments?

The CSO (Chief Sustainability Officer) is responsible for all activities related to water, including supervision of planning and execution of water related activities. The Sustainability Promotion Council meetings are held twice or three times a year and are led by the CSO with all relevant activities reported to the meetings. Consistency and alignment with our strategy and activities that could influence public policy on water are also confirmed at these meetings. In case it turns out to be inconsistent, CSO will immediately give instructions for improvement to the person in charge of the operating company. Specifically, the KAITEKI Promotion Office of Mitsubishi Chemical Holdings will act as the department in charge.

W6.6

(W6.6) Did your organization include information about its response to water-related risks in its most recent mainstream financial report?

Yes (you may attach the report - this is optional)

FY2021 KAITEKI Report 02.pdf

Water management _ Coexistence with the environment _ Sustainability _ Mitsubishi Chemical Group Corporation.pdf

FY2021 KAITEKI Report 01.pdf

FY2021 KAITEKI Report 03.pdf

FY2021 KAITEKI Report 04.pdf

W7. Business strategy

W7.1

(W7.1) Are water-related issues integrated into any aspects of your long-term strategic business plan, and if so how?

	Are water-related issues integrated?	Long-term time horizon (years)	Please explain
Long-term business objectives	Yes, water-related issues are integrated	11-15	We believe that the problem of water stress worldwide will become increasingly important in the future. We therefore aim to provide "products and services that contribute to solve water problems" which we have set as one of our sustainability index to be achieved in line with our medium-term management plan toward 2025. From FY 2017, we began to consider our long-term strategic vision toward 2030 and set a more ambitious index on water with target values. We aim to realize advanced recycling. Advanced recycling, which we have defined, is that water quality is the same level in withdrawal and discharge. In particular, we are considering monitoring with COD concentration. We believe that aiming for the advanced recycling as well as improving the circulation efficiency of fresh water will lead to the reduction in the amount of water withdrawal.
Strategy for achieving long-term objectives	Yes, water-related issues are integrated	11-15	From FY 2017, we considered our long-term strategic vision toward 2030 to solve the problems of water stress. We named our long-term strategic vision "KAITEKI Vision 30", and we have already made an external announcement. We are now searching for promising products, increasing investments in existing water-contributing products, and at the same time, trying to identify and strengthen other products that are not currently regarded as water-contributing products.
Financial planning	Yes, water-related issues are integrated	11-15	From FY 2017, we considered our long-term strategic vision toward 2030 to solve the problems of water stress. We named our long-term strategic vision "KAITEKI Vision 30", and we have already made an external announcement. In line with the long-term business goals shown above, in order to increase available water supply, we are considering various measures including further strengthening production facilities and acquiring companies with new technologies. Specifically, in terms of financial planning, we are considering selecting a model manufacturing site by 2030 and expanding water treatment facilities and monitoring facilities. As a cost for this, we have included a budget of about 1 billion yen.

W7.2

(W7.2) What is the trend in your organization's water-related capital expenditure (CAPEX) and operating expenditure (OPEX) for the reporting year, and the anticipated trend for the next reporting year?

Row 1

Water-related CAPEX (+/- % change)

2

Anticipated forward trend for CAPEX (+/- % change)

1

Water-related OPEX (+/- % change)

2

Anticipated forward trend for OPEX (+/- % change)

1

Please explain

Regarding our CAPEX, the majority of capital investment is related to wastewater treatment facilities, and we are striving to improve wastewater quality. Total capital expenditures decreased by approximately 3.5% from the previous year. The reason for the decrease was largely due to our new mid-term financial plan, which focuses on finding a balance between shareholder returns, improved financial structures, and investments in business growth. The resulting balance was a decrease of roughly 9 billion yen in overall CAPEX. However, the trend is expected to change over time as we continue to find a balance in our business investments. Conversely, the company's OPEX is expected to gradually decrease as we continue our efforts to improve water efficiency. One specific example of such efficiency improvements is the increased circulation rate of freshwater cooling systems.

W7.3

(W7.3) Does your organization use scenario analysis to inform its business strategy?

	Use of scenario analysis	Comment
Row 1	Yes	With the Paris Agreement entered into force, there is an urgent need to reduce greenhouse global gas emissions to mitigate climate change. Chemical industries, which emit large amounts of GHG in their production, are greatly affected by this, and even if they actively take measures to reduce GHG emissions, a mechanism for continuing business has to be established as soon as possible. Therefore, the progress of global warming and the mid-term development of climate change countermeasures (targeting around 2030) were quantitatively analyzed based on several scenarios, and future risks and opportunities for several of our major businesses were evaluated. Based on these results, we created a long-term strategic vision "KAITEKI Vision 30" (toward 2030) and made an external announcement.

W7.3a

(W7.3a) Provide details of the scenario analysis, what water-related outcomes were identified, and how they have influenced your organization's business strategy.

	Type of scenario analysis used	Parameters, assumptions, analytical choices	Description of possible water-related outcomes	Influence on business strategy
Row 1	Water-related	As climate-change related disasters become more prevalent, some theories suggest that climate change will increase the frequency of such natural disasters, which would increase risk exposure. When applied to us, most of our production sites are located in coastal areas that are easily affected by high waves and typhoons, which increases the risk of water such as floods due to the effects of climate warming. Therefore, it can be assumed that in 2030, the water risk of at least 3 days of shutdown will increase to about 3 times the current level. In response to this, we plan and consider that by 2025, prioritize large-scale sites in the coastal area and complete the measures, and by 2030, complete the measures for all sites.	The results of our scenario analysis showed that many of our large-scale plants are located in coastal areas. In both a 2-degree and 4-degree scenario, the risk of flooding due to typhoons and storm surges increases tremendously due to the rise in sea level caused by climate change. Additionally, the risk of factory shut-downs for several days to weeks increases as a result of the growing frequency of natural disasters. If an extended factory shutdown were to occur, for example, we would have a prolonged decrease in productivity and output, which would not only affect our profits, but also our entire supply chain.	In order to ensure resilience against flooding disasters, it is effective to take the same measures as taken for the tsunami disasters caused by the earthquakes. As we are currently focusing on responding to risks related to earthquakes, we are consequently also taking measures to reduce water risk caused by global warming. As measures against this, it is possible to reduce the risk of submersion by raising the height of foundations for such power receiving equipment significantly compared to the past. For example, in the case of a flood disaster, problems such as breakdown may occur in power receiving facility installed outdoors. Additionally, in certain plants where typhoons often occur, we have installed back-up water tanks to prevent total plant shut downs or reductions in productivity. In relation to our mid-term financial plans, we will actively continue these measures to 2025.

W7.4

(W7.4) Does your company use an internal price on water?

Row 1

Does your company use an internal price on water?

No, but we are currently exploring water valuation practices

Please explain

Uniform pricing is extremely difficult to implement because the operating areas of plants are scattered around the world, and the sources and the ways in which water is used are extremely diverse. For example, it is determined that the value of 1 t of water in Japan is not equal to the value of 1 t of water in Indonesia. First, a method of monitoring the amount of risk according to the source and use of water needs to be established, and then, if water pricing is assessed as an effective method of reducing the risk, we intend to introduce it. We expect that it will take more than two years to conclude on this.

W7.5

(W7.5) Do you classify any of your current products and/or services as low water impact?

	Products and/or services classified as low water impact	Definition used to classify low water impact	Primary reason for not classifying any of your current products and/or services as low water impact	Please explain
Row 1	Yes	We define products that have a low environmental impact under our Environmental Materiality. Within our Environmental Materiality standards, our water-related materialities include reducing our environmental impact while improving the quality of water we supply worldwide. When these standards are applied to our products, for example, we classify low-water impact products as products that reduce the amount of wastewater discharged into the environment or improve the quality of wastewater.	<Not Applicable>	Our Membrane Bio Reactor (MBR) submerged water treatment system is a product with minimal water impact because it allows treated water to be reused directly as recovered water. It is widely used in the treatment of domestic and industrial wastewater, gray water reuse facilities, and tertiary treatment using metal recovery membranes. The membrane filtration method saves space, adds more value, and produces clearer treated water. The discharge of suspended solids from the treated water is also greatly reduced, making operations easier. As the treated water can be directly reused as recovered water due to the improved quality of the treated water, the system is very useful. By installing RO membrane units in the back-end treatment facilities, the treated water can be recovered as processed water. This reduces incoming water and sewage treatment volumes at plants, reducing overall maintenance costs. The system has already been used in more than 5,000 projects in Japan and overseas.

W8. Targets

W8.1

(W8.1) Describe your approach to setting and monitoring water-related targets and/or goals.

	Levels for targets and/or goals	Monitoring at corporate level	Approach to setting and monitoring targets and/or goals
Row 1	Company-wide targets and goals Business level specific targets and/or goals Activity level specific targets and/or goals Site/facility specific targets and/or goals Brand/product specific targets and/or goals	Targets are monitored at the corporate level Goals are monitored at the corporate level	The company-wide environmental management objectives include "We'll supply 10 billion tons of reusable freshwater over a 10 year period starting in 2016". The Environmental and Living Solutions business area of MCC, a company in the MCHC group, incorporates these environmental contribution objectives into its business plans and works to achieve these objectives until 2025, which is the target year. In addition, we are promoting measures to eliminate leakage of hazardous substances to minimize the impact on the environment, in manufacturing facilities that withdraw and discharge large volumes of water. Although the leakage has already been eliminated during normal operations, there still remains a risk of leakage when there are problems with operations or equipment. We are planning to introduce a leakage detection and shutdown system to minimize the leakage risk for all production sites that emit water into public water sources, and we have already completed the installment of such a system at several sites in Japan. By 2025, we aim to complete installation at all target production sites in Japan. We have not yet set goals for overseas sites, but we are considering introducing them sequentially starting with high risk areas. Specifically, among overseas locations, we think that Indonesia with a relatively large withdrawal volume should be considered first. However, we will accumulate know-how on how to set water-related targets and goals, including monitoring, through domestic studies. We believe that this know-how is applicable for setting and monitoring overseas targets. Therefore, first of all, we prioritize domestic evaluations, but in fact, we believe that we are considering domestic and overseas examinations simultaneously. In other words, we intend to implement management that maximizes the accumulated know-how obtained through domestic studies, and then take this know-how overseas to expand and materialize leadership.

W8.1a

(W8.1a) Provide details of your water targets that are monitored at the corporate level, and the progress made.

Target reference number
Target 1

Category of target
Product use-phase

Level
Business activity

Primary motivation
Increase freshwater availability for users/natural environment within the basin

Description of target
At the global level, the shortage of available fresh water is increasing, and business are also required to contribute to the elimination of water shortages. For this problem, the possibility of contributing as a group was examined. As a result, we believe that the use of the products and technologies of our Group can make a contribution, and set the following goals. By using hollow fiber membranes/systems for sewage treatment, hollow fiber membranes/systems for water purification, and groundwater membrane filtration systems, etc., which are products of our Group, we set a target to supply a cumulative total of 10 billion tons of water will be supplied from FY 2016 to FY 2025.

Quantitative metric
Other, please specify (Supply of fresh water available)

Baseline year
2015

Start year
2016

Target year
2025

% of target achieved
40

Please explain
The status of achievement of the targets is monitored once a year together with other sustainability-related environmental management targets.

W8.1b

(W8.1b) Provide details of your water goal(s) that are monitored at the corporate level and the progress made.

Goal
Improve wastewater quality beyond compliance requirements

Level
Company-wide

Motivation
Risk mitigation

Description of goal
At production sites that purify their own wastewater and discharge water to public sources, the quality of wastewater during normal operations is already at a reasonable level, but there is a risk that pollutants would leak into public waters through wastewater drainage in the event of equipment failure, floods or other incidents. In FY 2021, the total amount of water which our group has discharged to public water bodies exceeded 15,132 ML, which is an extremely important issue. Strengthening systems to detect leakage of pollutants at an early stage, establishing systems to shut off wastewater channels and recover pollutants in the event of a leak, as well as measures to reduce the risk of leaks to public water bodies are all being implemented at the relevant sites. In our long-term strategic vision "KAITEKI Vision 30" for 2030, we have set as a qualitative goal not only to comply with the regulated value of wastewater quality but also to achieve stricter in-house goals.

Baseline year
2020

Start year
2021

End year
2030

Progress
In fact, at all of our locations, we are implementing step-by-step management and monitoring measures to achieve our own goals that are stricter than legal standards. Measures for large-scale facilities along the coast of Japan (Kashima, Mizushima, Yokkaichi, Sakaide, Kurosaki, Otake) were completed by March 2017. This covered 92.8% of Japan's emissions to public water bodies (FY2015), well above the 2018 target of 80%. Currently, we are expanding this measure to other medium-sized bases. Our ultimate goal is to implement this measure in 100% of our locations. Although it is a qualitative goal, it is used as an index to measure the progress of coverage. The current progress is about 93%.

W9. Verification

W9.1

(W9.1) Do you verify any other water information reported in your CDP disclosure (not already covered by W5.1a)?

Yes

MCHC2020_ENG.indd Data Sheet.pdf

W9.1a

(W9.1a) Which data points within your CDP disclosure have been verified, and which standards were used?

Disclosure module	Data verified	Verification standard	Please explain
W1 Current state	Withdrawal and Discharge of Freshwater, total volume	ISAE 3000	Our disclosures differ from the data reported to CDP as we only disclose freshwater withdrawal and discharge volumes excluding seawater. Verification of FY 2021 data is in progress, so we have attached the previous year's datasheet together with the independent assurance report.

W10. Sign off

W-FI

(W-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.

W10.1

(W10.1) Provide details for the person that has signed off (approved) your CDP water response.

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

W10.2

(W10.2) Please indicate whether your organization agrees for CDP to transfer your publicly disclosed data on your impact and risk response strategies to the CEO Water Mandate's Water Action Hub [applies only to W2.1a (response to impacts), W4.2 and W4.2a (response to risks)].

No