Material Issues for Social Value Creation

Contribute to the Environment

Climate Change Mitigation and Adaptation

Sumitomo Chemical regards climate change as a social issue that chemical companies should take the lead in addressing, and has been making various efforts to solve it from early on. In recent years, as the movement toward carbon neutrality has gained momentum around the world, Sumitomo Chemical has been promoting group-wide efforts to achieve carbon neutrality by leveraging its technological capabilities and knowledge accumulated as a diversified chemical company.

Disclosure in Line with TCFD Recommendations

Sumitomo Chemical expressed its support for the TCFD recommendations when they were published in June 2017. In line with the four recommended disclosure items, "Governance," "Risk Management," "Strategy," and "Metrics and Targets," the Group's efforts to address climate change issues are introduced on pages 41-44.

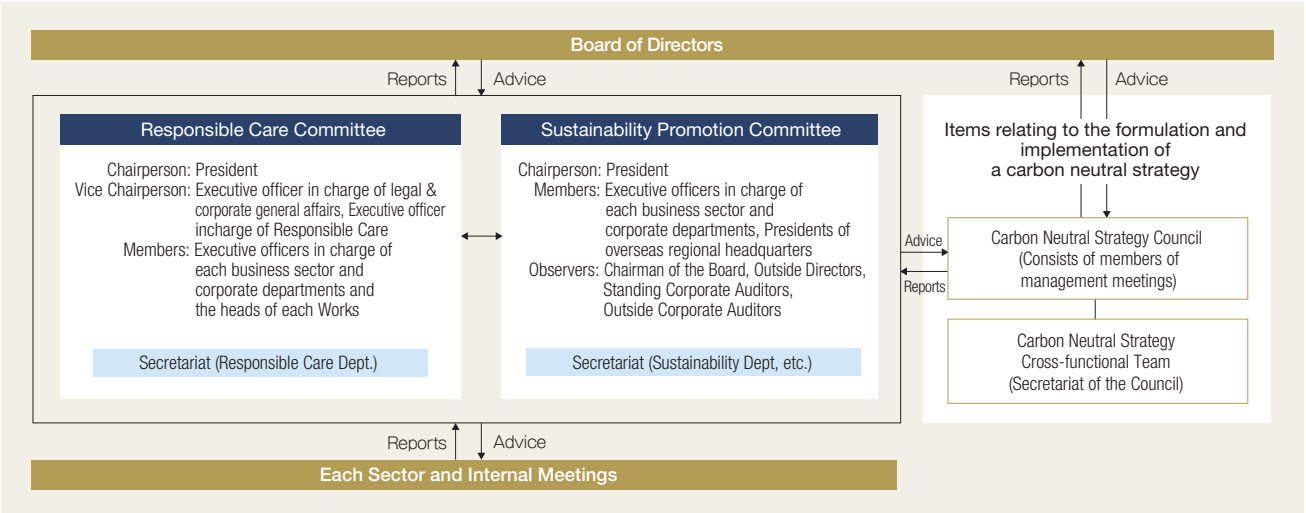
Please refer to the Sustainability Data Book (to be released in August 2022) for a scenario analysis recommended for disclosure in the "Strategy" section and other information on climate.

Governance

Sumitomo Chemical has established meetings and committees to deliberate important matters related to the management of the Group from a broad and diverse perspective in order to enhance its business execution and supervisory functions. Through these meetings and committees, the Company reports to the Board of Directors at least once a quarter on issues related to the promotion of sustainability, including climate change.

Management Meetings	Deliberation of important matters such as management strategies and capital investments, including proposals and reports to be submitted to the Board of Directors
Sustainability Promotion Committee	Deliberations on important matters related to sustainability promotion
Responsible Care Committee	Formulation of annual policies, mid-term plans, and specific measures to address climate change, as well as analysis and evaluation of performance
Carbon Neutral Strategy Council	Promotion of specific measures set forth in the grand design for achieving carbon neutrality in 2050

Structures for Responding to Climate Change



Risk Management

To achieve sustainable growth, Sumitomo Chemical makes an effort to detect, at an early stage, various risks that may hinder the achievement of its business objectives, and takes proper measures. We focus on building and expanding a system relating to risk management so that we can promptly and properly address risks when they emerge.

Climate change issues are positioned as one of the Group's major medium- to long-term risks through, for example, an assessment from the perspective of the likelihood of their occurrence and impact, and are integrated into the Group's overall risk management process.

Specific initiatives → P.98 Risk Management

Strategy

In December 2021, Sumitomo Chemical formulated a grand design for achieving carbon neutrality by 2050. We will promote efforts to mitigate climate change from the perspectives of both **"Obligation"** (to bring the Group's GHG emissions close to zero) and **"Contribution"** (to reduce global GHG emissions through the Group's products and technologies).

In addition, as part of our efforts to adapt to climate change, we are striving to provide solutions adapted to global environmental changes in agriculture and infectious diseases, and to strengthen new product development.

● Investments to achieve carbon neutrality

Starting in FY 2019, in order to contribute to the realization of carbon neutrality for society as a whole, we calculate economic indicators reflecting internal carbon pricing (10,000 yen per ton) when GHG emissions are expected to increase or decrease for individual investment projects, and make investment decisions.

● Investment Scale

From FY2013 to FY2021, we have implemented or made decisions to make approximately 80 billion yen of carbon neutral-related investments. We plan to consider investments of approximately 120 billion yen through FY2030, for a total of approximately 200 billion yen.

Specific initiatives for "Obligation"

Major sources of GHG emissions from chemical plants

The chemical industry is an industry in which raw materials are converted into products through chemical reactions that are driven by electricity, heat from steam, and other forms of energy. Of our GHG emissions in FY2021, 70% come from energy sources such as in-house power generation, 16% came from processes resulting from chemical reactions and waste treatment, and 14% come from energy sources associated with purchased electricity. We aim to reduce GHG emissions by focusing on the conversion to clean energy for energy-derived GHG and on the development of necessary technologies for process-derived GHG.

Reduction of GHG from energy (fuel for in-house power generation): Fuel Conversion

In the Ehime and Chiba regions, where our plants are located, we are promoting the conversion from coal, petroleum coke, heavy oil, and other fuels with high CO_2 emission coefficients to LNG, which has a low CO_2 emission coefficient.

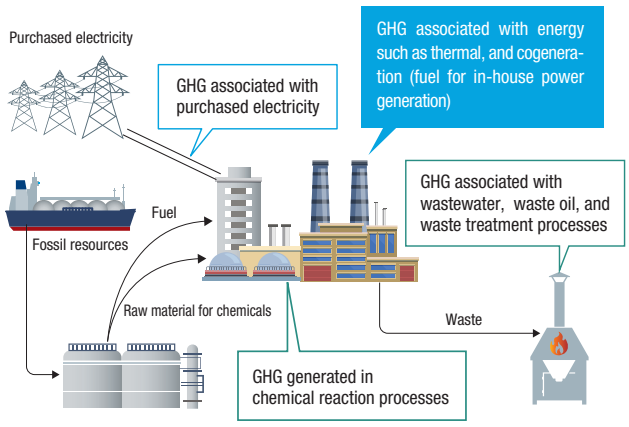
March 2022: Completion of one of the largest LNG tanks in Japan on the Ehime Works site and start of supply

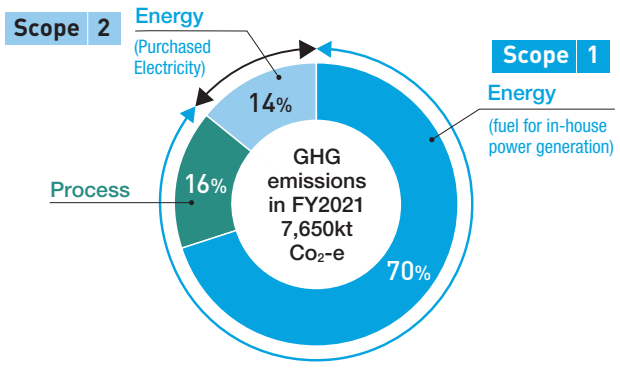
	Ehime region	Chiba region
Fuel	Coals and heavy oil ▶ LNG	Petroleum coke ▶ LNG
Amount of CO_2 reduction	650,000 tons/year	240,000 tons/year

Reduction of process-derived GHG

Specific initiatives → P.47 Sustainable use of natural capital

We are promoting the conversion to clean energy for reducing energy-derived GHG and focusing on the development of necessary technologies for reducing process-derived GHG.





Reduction of GHG from energy (purchased electricity): Use of renewable energy

At our Oita Works, we have reduced GHG emissions by 20% by converting 100% of purchased energy to renewable energy. We also achieved a 10% GHG reduction by switching from heavy oil to city gas, resulting in a total GHG reduction of approximately 30% compared to FY2013.

Material Issues for Social Value Creation

Contribute to the Environment

Climate Change Mitigation and Adaptation

Specific initiatives for "Contribution"

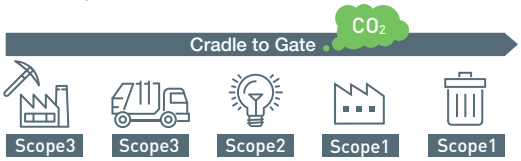
Development of tools to calculate the carbon footprint of products (CFP)

The evaluation of product CFP is essential to reduce GHG emissions in society. However, it is not easy to calculate the CFP of chemical products due to the complexity of their manufacturing processes. In response, we developed our own automatic calculation tool and completed the CFP evaluation of all of our products (approximately 20,000 items) by the end of 2021. In addition to aiming to complete CFP evaluations of Group companies' products by the end of FY2022, we have begun providing this tool to other companies free of charge.

Our original calculation tool speeds up the calculation of CFP for our products

Created the original automatic CFP calculation tool

- Built based on commercially available software (Microsoft Access/Excel)
- Prepared multiple calculation models accounting for the characteristics of chemical manufacturing processes (co-products, by-product fuels, steam generation, etc.) (Choose from the pull-down menu of models and execute calculation)
- Can easily calculate carbon footprint for each stage (intermediates or final product). E.g., raw material to Intermediate A to Intermediate B ... to final product.

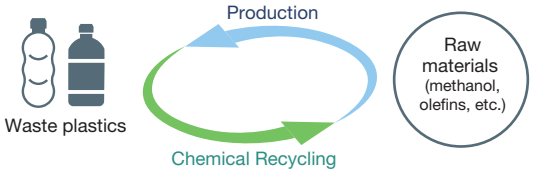


Establishment of carbon resource recycling system

We are developing chemical recycling technologies to convert garbage and waste plastics into basic raw materials for chemicals, such as methanol, ethanol, and olefins, and to use them as raw materials for new plastics.

→P. 45 Contribute to recycling resources

Recycling of carbon resources

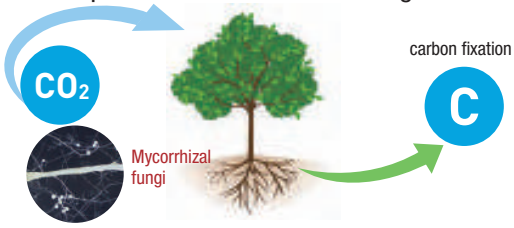


Challenges to carbon negative emissions

We are developing a technology whereby attaching useful microorganisms existing in soil to the roots of plants and allowing them to coexist, we not only promote the absorption of CO_2 by plants through photosynthesis, we also fix CO_2 in the ground in the form of carbon compounds. This will enable ordinary fields, forests, and other natural spaces to absorb and fix even greater amounts of CO_2, contributing a net negative amount of carbon to the atmosphere.

→P. 47 Sustainable use of natural capital

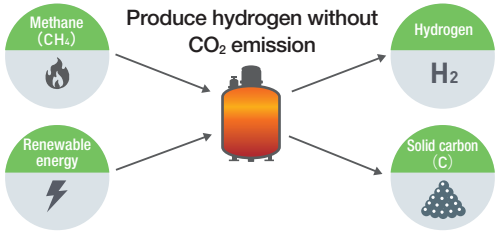
Utilizes the power of nature to promote absorption of atmospheric CO_2 and its fixation in the ground



Response to methane gas

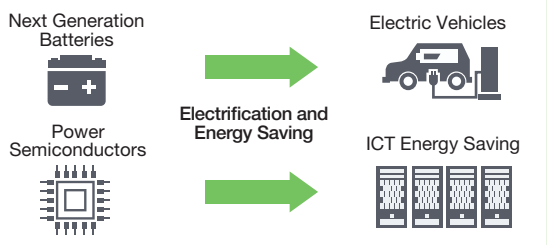
The future shift to clean energy will require the availability of CO_2-free hydrogen. To address this issue, we are developing a technology to produce hydrogen from methane without CO_2 emissions. This technology will help reduce methane, a GHG, and contribute to the realization of a carbon neutrality.

Produce hydrogen without CO_2 emission



Highly efficient energy infrastructure

One issue in the Society 5.0 concept is the increase in CO_2 emissions from the electricity necessary for transmitting massive volumes of data. In light of this, our company is contributing to creating energy-saving power supplies by providing compound semiconductor materials for next-generation power semiconductors. In addition, in response to the spread of electric vehicles, which is expected to accelerate going forward, we are working to develop next-generation storage batteries, such as solid-state batteries.



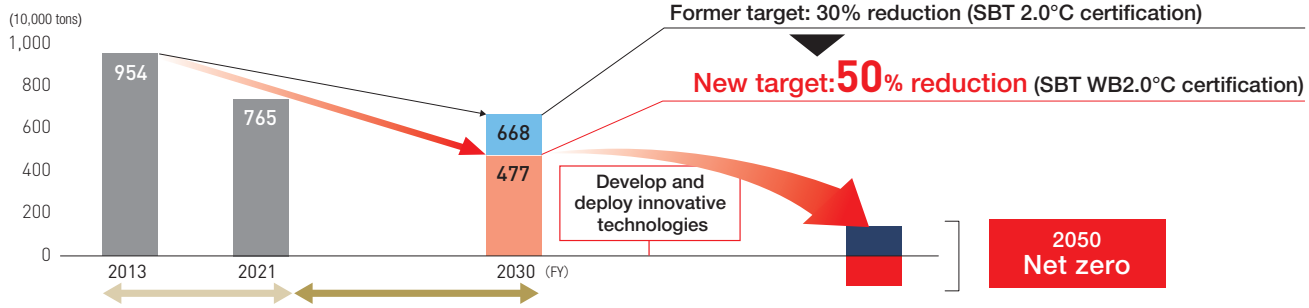
Metrics and Targets (Risk)

As a metric for climate-related risks, we are the first integrated chemical company in the world to utilize GHG emission reduction targets certified as Science Based Targets (SBT). In 2021, our group*1 revised its 2030 GHG emissions (Scope 1+2) reduction target significantly upward from 30% to 50%*2. With regard to this new reduction target, we obtained certification of SBT's Well Below 2°C standard in December of the same year. Until 2030, we aim to achieve this target through thorough energy conservation and fuel conversion in the manufacturing processes of existing plants and the use of the best available technologies (BAT) at this point in time.

On the other hand, to reach net-zero emissions by 2050, it will be difficult to respond only with existing technologies, and innovative technologies such as carbon-negative emissions and CCUS*3 will be necessary. We will continue to study the development of these and their early implementation.

*1: Sumitomo Chemical + domestic and overseas consolidated subsidiaries
*2: Compared to FY2013
*3: Capture, effective utilization, and storage of CO_2 emitted from plants, etc.

Scope 1+2



Past Initiatives	●Energy conservation and rationalization in manufacturing processes ●Restructuring of Chiba Works and Ehime Works (Ethylene plant shutdown, liquid-phase caprolactam shutdown, etc.)
Initiatives for FY2030	●Thorough energy conservation and rationalization of manufacturing processes (use of BAT) ●Fuel conversion (introduction of LNG, etc. at Ehime and Chiba Works) ●Promotion of introduction of renewable energy sources ●Reduction of GHG emissions other than CO_2, etc.

Scope 3

Reduce GHG emissions (Scope 3 (Categories 1 and 3)) of major Group companies

by 14% from FY2020 by FY2030

Supplier Engagement Initiatives

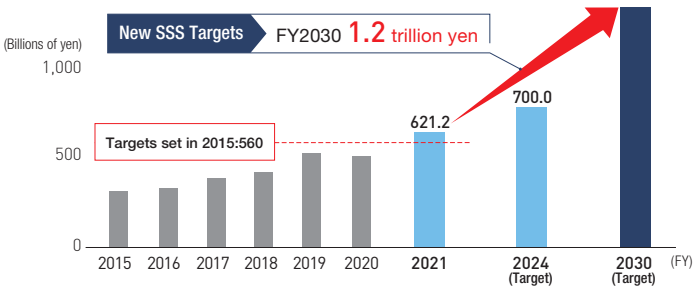
As part of our efforts to encourage our major suppliers to reduce GHG emissions, we hold an annual supplier information exchange meeting. In 2022, we held a hybrid face-to-face and web-based meeting with 22 major suppliers in Japan to explain our efforts to reduce Scope 3 emissions and to request their cooperation in reducing GHG emissions and sharing information on reductions. In recognition of these efforts, we have been selected as a Supplier Engagement Leader by CDP for two consecutive years.

CDP SUPPLIER ENGAGEMENT LEADER 2021

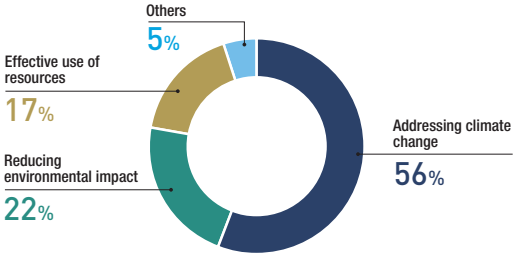
Metrics and Targets (Opportunities)

Sumika Sustainable Solutions (SSS) is used as a metric for climate-related opportunities. SSS is an initiative in which we designate those of our Group's products and technologies that contribute to the fields of addressing climate change, reducing environmental impact, and effective use of resources in order to promote their development and spread. We have achieved our goal of 560 billion yen in sales revenue from designated products by FY2021. We have now set a new target of 1.2 trillion yen in FY2030, more than double the FY2021 level.

Sumika Sustainable Solutions' New Sales Revenue Targets



Environmental contribution of products and technologies in each designated field (FY2021)



Results for FY2021	●Sales of our group: 2,765.3 billion yen	●Sales revenue of SSS-designated products: 621.2 billion yen	●Number of SSS-designated products and technologies (total): 66

Material Issues for Social Value Creation

Contribute to the Environment

Contribute to Recycling Resources

Our lives are based on limited resources. Massive consumption of resources and disposal of waste lead not only to resource depletion, but also to the destruction of ecosystems. For sustainable use of resources, we need to reduce the consumption of natural resources while at the same time circulating the resources we have.

In addition to waste management and effective use of resources at our offices and works, Sumitomo Chemical is working on the development and social implementation of recycling technologies for plastics and other resources.

Initiatives to Realize Circular System for Rare Metals

We are developing technology to recycle recovered lithium-ion battery cathode materials as cathode materials again without returning them to metal.

→P. 68 Direct Recycling of Cathode Materials

Initiatives to Realize Circular System for Plastics

Our KPI for recycling resources

In order to further promote the development of recycling technologies and their implementation in society, we have set KPI and target related to our contribution to recycling resources.

We will continue to utilize waste plastics as raw materials and promote actively the recycling in order to realize a society in which waste plastics are recycled as resources instead of being discharged into the environment.

KPI：The amount of recycled plastics utilized in manufacturing processes

Promote adoption of technologies for reducing environmental impact and advance circular economy for carbon resources

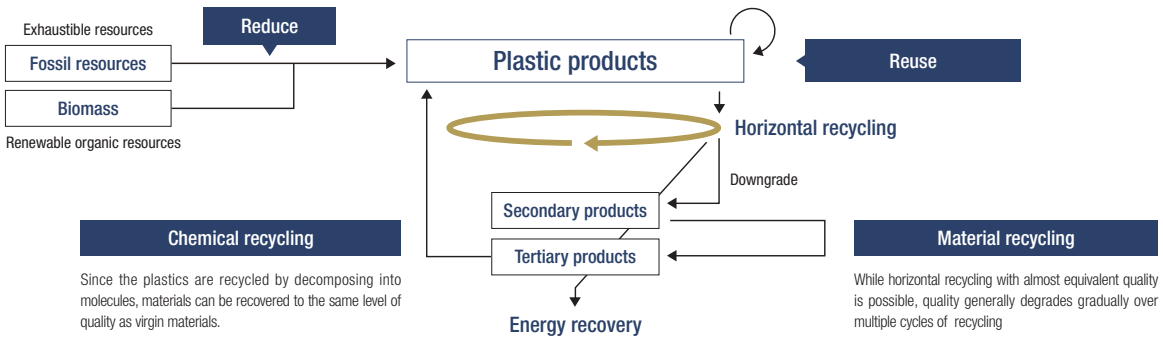
Target

200k tons/year by FY2030

*13% of our plastic production volumes

Toward a circular system for plastics, it is important to make an effort to reduce, reuse, and recycle (material recycling and chemical recycling) at each stage of the plastic value chain. These efforts contribute to the reduction of fossil resource extraction and reduce greenhouse gas (GHG) emissions from manufacturing processes and disposal by reducing plastic use and waste.

Overall picture of circular system for plastics



Efforts for 3Rs (reduce, reuse and recycle)

Method		Example of our initiatives
Reduce	Reduce the amount of plastic used and the amount of waste plastic generated	**Refill Pouch** Compared with a bottle, this refill pouch is lighter, and therefore offers higher transportation efficiency, while also being stronger. 
Reuse	Reuse the same products	**Returnable Box** Compared with a cardboard box, this returnable box made of foamed polypropylene sheets can be used repeatedly, and therefore offers higher environmental friendliness, while also being superior in water resistance, load capacity and cleanliness. 
Material recycling	Reuse waste plastics as raw materials for new products	See right page
Chemical recycling	Chemically decompose municipal solid wastes and waste plastics and use them as new raw materials for plastics	See right page

Material Recycling

We are promoting the development of various technologies to realize material recycling of plastic products.

Recycled polypropylene (PP) for automotive applications

We have advanced technology to produce recycled PP using plastics from waste materials and End-of Life parts as a resource. Since June 2021, we have been studying a business alliance with REVER CORPORATION to establish a business alliance of recycling systems from resource recovery to sorting, reprocessing, and sales.

A polyethylene product for packages and containers that contributes to achieving horizontal recycling

Plastic packages and containers for food and daily necessities are composed of several layers, each of which is made of a different type of resin with a different characteristic, depending on the application, making them difficult to separate and sort for recycling. Sumicle® is a highly rigid PE product developed by our company for packages and containers, to the outer base layer where nylon or PET was traditionally used, all the raw materials of packages and containers can be unified to PE, making it possible to achive horizontal recycling of plastic product. We have already started providing samples and aim to commercialize the product as early as FY2022.

Recycling technology for decolorizing printed layers of plastic packages and containers

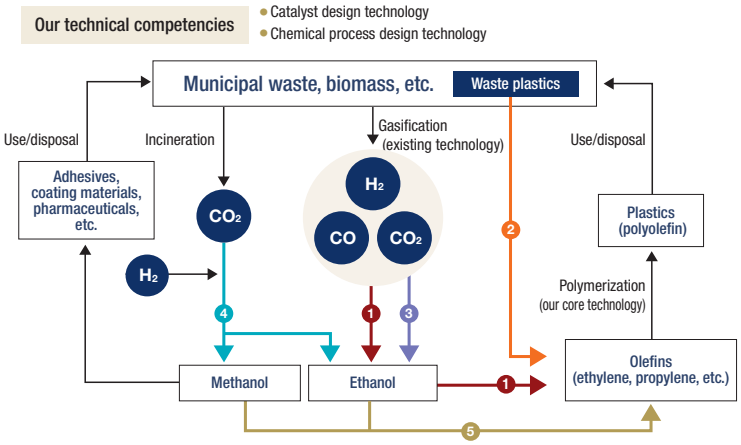
Most plastic packages and containers have printing on their surface, so even if processed for material recycling, the ink colors remain, making it difficult to apply them for horizontal recycling.

In cooperation with PILOT CORPORATION, we are jointly developing a technology for decolorizing printed layers of plastic packages and containers through a recycling process.

Chemical Recycling

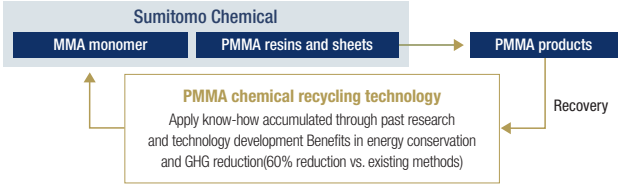
We are developing chemical recycling technology by leveraging our catalyst design and chemical processing design technologies, while also collaborating with partners. With chemical recycling technology, we will help to reduce the use of fossil resources, the amount of waste plastics, and GHG emissions from the incineration of waste plastics, and thereby contribute to building a sustainable society. In February 2022, in recognition of our ambitious efforts, two projects comprising four themes of chemical recycling technologies we are working on in collaboration with other companies and academia were selected by NEDO* for their Green Innovation Fund projects. We will continue to promote efforts to realize chemical recycling.

*New Energy and Industrial Technology Development Organization (NEDO)



Number on a chart	Technology	Cooperating Partners	Reference
1	Polyolefin production from waste derived ethanol	SEKISUI CHEMICAL CO., LTD.	Completion of test production facility (See TOPICS below)
2	Olefin production through direct cracking of waste plastics	Maruzen Petrochemical Co., Ltd. Muroran Institute of Technology	Adopted by NEDO (Project scale: approx. 25.30 billion yen)
3	Ethanol production using synthesis gas derived from waste plastics	National Institute of Advanced Industrial Science and Technology (AIST)	
4	Highly efficient alcohols production from CO_2	AIST Shimane University	Adopted by NEDO (Project scale: approx. 24.08 billion yen)
5	Olefin production from alcohols	National Institute of Advanced Industrial Science and Technology (AIST)	

In addition to these efforts, we have established its own chemical recycling technology to pyrolyze acrylic resin (PMMA, polymethyl methacrylate) and regenerate it as raw material MMA monomer in collaboration with The Japan Steel Works, Ltd. We plan to construct a pilot facility at our Ehime Works and begin pilot tests in the fall of 2022, with sample provision starting in 2023.



TOPICS

Completed construction of pilot facility to produce renewable ethanol-based ethylene for environmentally sustainable polyolefin

In April 2022, we established a new pilot ethylene production facility at our Chiba Works (Ichihara City, Chiba Prefecture) that uses environmentally friendly ethanol derived from waste and biomass as a raw material. This will enable us to manufacture polyolefin product with both reduced environmental impact and high quality equivalent to conventional products. Currently, we are cultivating the market by providing samples, aiming for commercialization in FY2025.

Pilot facility to produce ethylene from renewable ethanol

Recycled Plastic Brand

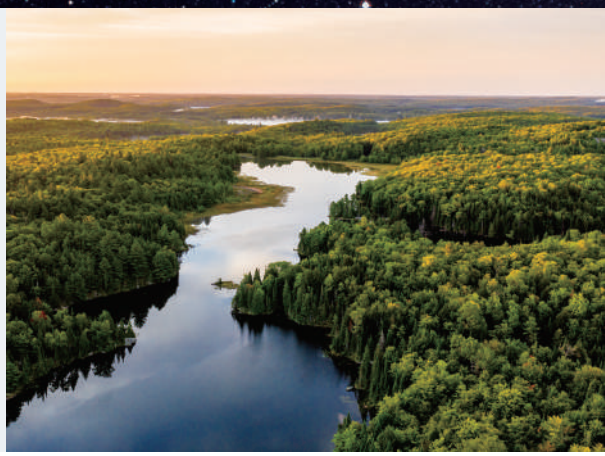
In September 2021, we launched Meguri®, a new brand for recycled plastic products. In the future, we will expand the Meguri® product lineup and increase production and sales of these products, thereby playing a role in realizing a circular economy.

Meguri
CIRCULARITY FOR ALL

Material Issues for Social Value Creation

Contribute to the Environment

Sustainable Use of Natural Capital



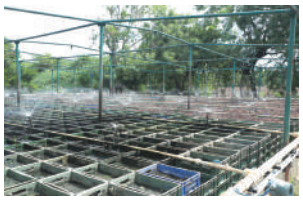
Sumitomo Chemical has been conducting its business using various natural capital such as water and soil, and the entire Group has been implementing various initiatives for the sustainable use of natural capital. Now that the goal of halting the decline of natural capital and putting it on a recovery track by 2030 is widely supported by the international community, we have once again recognized ecosystem conservation and sustainable use of natural capital as important issues and are making further efforts.

Sustainable Use of Water

In addition to our efforts to reduce water consumption, we have achieved thorough purification of wastewater from our business sites through the operation of stable and advanced wastewater treatment facilities. We also aim to contribute to the sustainable use of water resources by society as a whole through the implementation of our technologies developed through these efforts.

Initiatives in areas with declining water resources

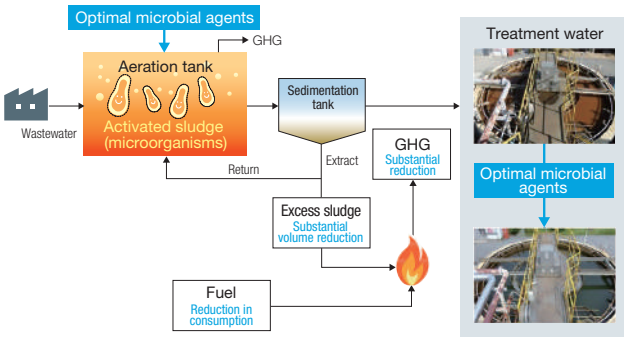
In the surrounding area where Sumitomo Chemical India's Bhavnagar plant is located, population growth, increased demand for water for agricultural use, and decreased precipitation have made the decrease in water resources a challenge. To address this issue, the plant decided to purchase wastewater from households for partial reuse and to treat it within the plant for use in production. In addition to laying 2km of piping to transport the household wastewater to the plant, the plant uses earthworm farming technology to treat the wastewater, rather than the more common activated sludge method, to suit the characteristics of household wastewater, which contains a relatively high amount of nutrients. This approach has made it possible to secure a stable amount of water needed for production activities while reducing the amount of river water previously purchased from the local government by more than 70%. It has also achieved the economic effect of reducing water purchase costs by about half.



Wastewater being purified through earthworm farming

Innovations in Wastewater Treatment Technology

Sumitomo Chemical is promoting biotechnological wastewater treatment. Wastewater treatment is an essential initiative to prevent water pollution and promote the recycling and reuse of water resources, but it requires a lot of energy for treatment and generates GHG when excess sludge is incinerated. To address this issue, we have improved wastewater treatment capacity while reducing the amount of sludge generated, GHG emissions associated with wastewater treatment, and fuel consumption through the use of optimal microbial agents. We will continue to contribute to the sustainable use of water resources through the widespread use of our wastewater treatment technology.



Sustainable Use of Soil

Efforts to conserve and restore the soil environment are important to achieve the promotion of sustainable agriculture. We will contribute to the sustainable use of soil through our business by utilizing our accumulated expertise in agrochemicals and biotechnology.

Contributed to the spread of no-till farming

No-till farming is a method of agriculture in which tillage is not done before sowing the crop. No-till farming has attracted increasing attention worldwide in recent years because of its ability to protect soil from wind and water erosion, conserve soil organic matter, and eliminate mechanical tillage to save fuel and reduce GHG emissions. With herbicides such as Rapidicil® and flumioxazin, we hope to contribute to the realization.

→ P. 75 Health & Crop Sciences Sector

Soil fertility by mycorrhizal fungi

Mycorrhizal fungi, a type of soil-dwelling microorganism that lives in symbiosis with plant roots, stimulates plant growth by accepting carbon compounds produced by plants through photosynthesis. This property increases the amount of carbon compounds in the soil and promotes carbon fixation, thereby reducing atmospheric CO_2 and contributing to soil fertility. We are working on the development of technology utilizing mycorrhizal fungi to achieve carbon neutrality and solve food problems.

Benefits of mycorrhizal fungi (including some hypotheses undergoing validation)