



# Environment

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## Contributing to the SDGs through Environmental Activities





## Environmental Activity Goals and Results

Goal achieved or steadily progressing: ○ Goal not achieved: △

Items	Boundary	Fiscal 2018 Goals	Fiscal 2018 Results	Evaluation	Fiscal 2019 Goals	Page
Addressing Climate Change	Sumitomo Chemical	Improve 15% by fiscal 2020 compared to fiscal 2005 levels	Improved by 16.0% relative to fiscal 2005		Improve 15% by fiscal 2020 compared to fiscal 2005 levels	Pages 72–80
	Sumitomo Chemical and Group companies in Japan	Improve over 1% per year on average	Improved by 0.9% relative to fiscal 2015	△	Improve over 1% per year on average	
	Group companies overseas	Improve over 1% per year on average	Improved by 3.5% relative to fiscal 2015		Improve over 1% per year on average	
Improve unit energy consumption	Sumitomo Chemical	Improve 15% by fiscal 2020 compared to fiscal 2005 levels	Improved by 18.4% relative to fiscal 2005		Improve 15% by fiscal 2020 compared to fiscal 2005 levels	
	Sumitomo Chemical and Group companies in Japan	Improve over 1% per year on average	Improved by 0.3% relative to fiscal 2015	△	Improve over 1% per year on average	
	Group companies overseas	Improve over 1% per year on average	Improved by 2.9% relative to fiscal 2015		Improve over 1% per year on average	
Improve unit energy consumption in the logistics division	Sumitomo Chemical and Group companies in Japan*	Improve over 1% per year on average over five years	Improved by an annual average of 1.0% over five years	○	Improve over 1% per year on average over five years	

Note: Further details are provided in the supplementary data (pages 88–89).

\* Within the scope of specified shippers according to the definition stipulated under the Act on the Rational Use of Energy



## Environmental Activity Goals and Results

Goal achieved or steadily progressing: ○ Goal not achieved: △

Items	Boundary	Fiscal 2018 Goals	Fiscal 2018 Results	Evaluation	Fiscal 2019 Goals	Page
<b>Environmental Protection</b>						
Severe environmental accidents	Sumitomo Chemical and consolidated subsidiaries in Japan and overseas	0	0	○	Severe environmental accidents = 0	
Laws and regulations, etc.	Sumitomo Chemical	Properly respond to more stringent laws and regulations and proactively address trends in new environmental regulations	Studied and responded to amendments to the PRTR Act, WET, and the Air Pollution Control Act (asbestos). Thoroughly discussed legislation to ease or tighten regulations with the Diet.	○	Properly respond to more stringent laws and regulations and proactively address trends in new environmental regulations	
Environmental protection management methods, etc.	Sumitomo Chemical	Provide individual support to Group companies for responding to environmental regulations	Provided individual support related to the Waste Management and Public Cleansing Law and the Act on Promotion of Global Warming Countermeasures	○	Provide individual support to Group companies for responding to environmental regulations	
Prevention of air and water pollution	Sumitomo Chemical	Meet voluntary management criteria*1	There was one instance of the legal standard limit being exceeded and another instance where a limit agreed upon with a municipality was exceeded. We have investigated the causes and taken countermeasures.	△	Meet voluntary management criteria	
Effective use of water resources	Sumitomo Chemical	Promote effective and efficient use of water resources	Unit water usage fell by 1.6% relative to fiscal 2017		Promote effective and efficient use of water resources	
	Group companies overseas	Improve unit water consumption by at least 1% on average per year	Unit water consumption improved by 5.6% relative to fiscal 2015	○	Improve unit water consumption by at least 1% on average per year	
Response to PRTR	Sumitomo Chemical	Maintain 60% lower total emissions relative to fiscal 2008	Reduced emissions by 90.1% relative to fiscal 2008		Maintain 60% lower total emissions relative to fiscal 2008	
	Sumitomo Chemical and Group companies in Japan	Maintain total emissions of air and water pollutants at below fiscal 2015 levels to fiscal 2020	Reduced emissions by 15.9% relative to fiscal 2015	○	Maintain total emissions of air and water pollutants at below fiscal 2015 levels to fiscal 2020	
Reduction of VOC emissions	Sumitomo Chemical	Maintain VOC emissions reductions at 30% relative to fiscal 2000	Reduced emissions by 41.7% relative to fiscal 2000	○	Maintain VOC emissions reductions at 30% relative to fiscal 2000	Pages 81–87
Prevention of soil and groundwater contamination	Sumitomo Chemical and Group companies in Japan	Keep hazardous materials strictly within Company premises*2	Kept hazardous materials strictly within Company premises	○	Keep hazardous materials strictly within Company premises	
Prevention of ozone layer depletion	Sumitomo Chemical and Group companies in Japan	<ul style="list-style-type: none"> <li>Eliminate the use of refrigeration units that use CFCs as coolants by fiscal 2025</li> <li>Eliminate the use of refrigeration units that use HCFCs as coolants by fiscal 2045</li> </ul>	Systematically replaced refrigeration units that use CFCs and HCFCs as coolants	○	<ul style="list-style-type: none"> <li>Eliminate the use of refrigeration units that use CFCs as coolants by fiscal 2025</li> <li>Eliminate the use of refrigeration units that use HCFCs as coolants by fiscal 2045</li> </ul>	
Conservation of Biodiversity	Sumitomo Chemical	Ensure compliance with "Sumitomo Chemical's Commitment to the Conservation of Biodiversity"	Ensured compliance with "Sumitomo Chemical's Commitment to the Conservation of Biodiversity" and promoted detailed initiatives	○	Ensure compliance with "Sumitomo Chemical's Commitment to the Conservation of Biodiversity"	
Reduce the amount of industrial waste sent to landfills	Sumitomo Chemical	Maintain 80% reduction compared to fiscal 2000 levels	Reduced emissions by 83.7% relative to fiscal 2000	○	Maintain 80% reduction compared to fiscal 2000 levels	
	Sumitomo Chemical and Group companies in Japan	Maintain waste volume at below fiscal 2015 levels to fiscal 2020	Reduced by 1.9% relative to fiscal 2015	○	Maintain waste volume at below fiscal 2015 levels to fiscal 2020	
Properly treated PCB waste	Sumitomo Chemical and Group companies in Japan	<ul style="list-style-type: none"> <li>(High concentrations of PCB*3) Work toward appropriate storage and recovery of waste containing high concentrations of PCBs and complete PCB waste treatment at an early stage</li> <li>(Minute amounts of PCB*4) Work toward appropriate storage and recovery of waste containing minute amounts of PCBs and complete PCB waste treatment by March 2025</li> </ul>	<ul style="list-style-type: none"> <li>(High concentrations of PCB) Sumitomo Chemical: Completed treatment Group companies in Japan: Continuing treatment; continued to promote the storage and recovery of untreated waste</li> <li>(Minute amounts of PCB) Implemented the treatment of waste containing minute amounts of PCBs at certain factories; continued to promote the storage and recovery of untreated waste</li> </ul>	○	<ul style="list-style-type: none"> <li>(High concentrations of PCB) Work toward appropriate storage and recovery of waste containing high concentrations of PCBs and complete PCB waste treatment at an early stage</li> <li>(Minute amounts of PCB) Work toward appropriate storage and recovery of waste containing minute amounts of PCBs and complete PCB waste treatment by March 2025</li> </ul>	

Note: Further details are provided in the supplementary data (pages 90–108).

\*1 Voluntary management targets that are stricter than the criteria of relevant laws and regulations, including agreements reached with local authorities.

\*2 Keep hazardous materials strictly within Company premises: Controlled on the premises.

\*3 High concentrations of PCB: Polychlorinated biphenyl (PCB) intentionally used as insulation oil in such items as electric appliances

\*4 Minute amounts of PCB: PCB unintentionally mixed in as insulation oil in such items as electric appliances (over 0.5mg/kg)



## Addressing Climate Change

### Basic Stance

The Sumitomo Chemical Group considers climate change one of the most pressing challenges facing society. To address this problem, we are actively working to reduce greenhouse gases by utilizing the technology we have cultivated as a diversified chemical company. We are also taking action to respond to risks and to seize opportunities related to solving climate change-related problems that are having a major impact on people's lives on a global scale.

### Management System

The Group is addressing climate change as one of its Responsible Care activities (refer to page 56 "Organization of Responsible Care"). Key matters are regularly discussed at Management Meetings, Sustainability Promotion Committee Meetings, and Responsible Care Committee Meetings, where the relevant measures to take are determined. The Responsible Care Committee also assesses and monitors risks related to climate change issues.

A wide range of specific issues related to energy and greenhouse gases are taken up for detailed discussion at Company-wide Science Based Targets (SBTs) GM Meetings, Company-wide Energy Manager Meetings, Department Liaison Meetings on Global Warming, Group Company Information Exchange Meetings, and other gatherings. Through the establishment of these various meetings, we have created a system capable of steadily and swiftly sharing important information in addition to managing energy and greenhouse gases for Works, research laboratories, business sectors, and Group companies.

Meeting	Coordinator	Members	Content
Company-wide SBTs GM Meeting	Managing executive officer (Responsible Care manager)	General managers in charge of SBTs at individual worksites	Discussing various measures aimed at achieving SBTs
Company-wide Energy Manager Meeting	Responsible Care general manager	Section managers in charge of Energy and GHGs at their worksites	Sharing and spreading information on initiatives at each worksite
Department Liaison Meeting on Global Warming	Responsible Care general manager	Section managers in charge of climate change action at the departmental and corporate levels	Sharing Company-wide policies and ESG issues
Group Company Information Exchange Meeting	Managing executive officer (Responsible Care manager)	Managers in charge of climate change action for Group companies	Sharing Group policies and issues and promoting best practices

### Goals and Results

For goals and results for Addressing Climate Change, refer to Environmental Activity Goals and Results.

# Addressing Climate Change

★: Assured by an independent assurance provider

## Energy Consumption and Greenhouse Gas Emissions

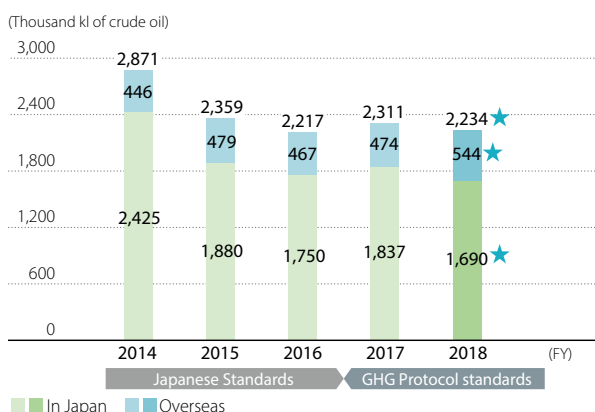
The Group's greenhouse gas emissions for fiscal 2017 onward are calculated in accordance with the GHG Protocol (refer to page 167 "Calculation Standards for Environmental and Social Data Indicators"). The boundary of calculation has been expanded to include principal consolidated Group companies, which account for up to 99.8% of consolidated net sales.

### Greenhouse Gas Emissions ★

(Thousand tons of CO<sub>2</sub>e)

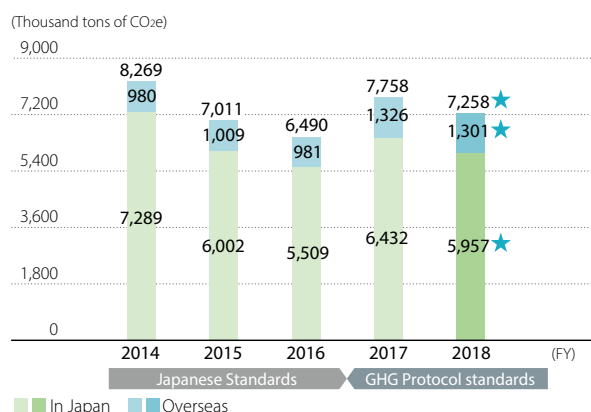
	Sumitomo Chemical and Group Companies in Japan	Overseas Group Companies	Total
Scope1	5,633	432	6,065
Scope2	324	869	1,193
Total	5,957	1,301	7,258

### Energy Consumption



Notes: • Japanese Standards: Calculated based on the Act on the Rational Use of Energy.  
 • Having adopted the GHG Protocol standards for our GHG emission disclosures, we now include the following data previously excluded from calculations: amount of energy consumed in the production of power and steam sold to external parties by Sumitomo Chemical Group (the portion attributable to energy provider subsidiaries was included in years prior to fiscal 2016). The amount of energy consumed by Sumitomo Chemical's non-production sites and the Group's non-production sites is included from fiscal 2017 and fiscal 2018, respectively.

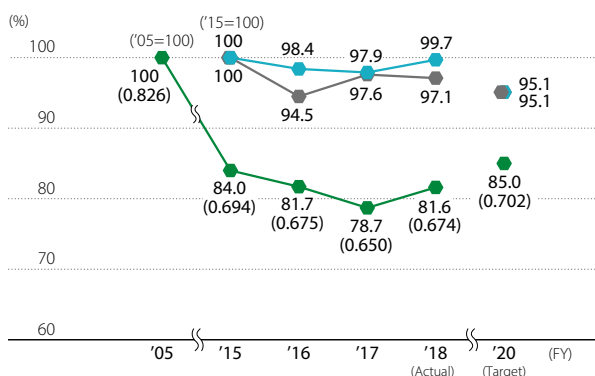
### Greenhouse Gas Emissions



Notes: • Japanese Standards: Calculated based on the Act on the Rational Use of Energy and the Act on Promotion of Global Warming Countermeasures.  
 • Having adopted the GHG Protocol standards for our GHG emission disclosures, we now include the following data that was not included in previous calculations: CO<sub>2</sub> emissions from energy sold to external parties by the Group (the portion attributable to energy provider subsidiaries was included prior to fiscal 2016); CO<sub>2</sub> emissions from energy use attributable to Sumitomo Chemical's non-production sites; CO<sub>2</sub> emissions from non-energy sources not included in the scope of the Act on Promotion of Global Warming Countermeasures. CO<sub>2</sub> emissions from energy use attributable to Sumitomo Chemical's non-production sites and the Group's non-production sites is included from fiscal 2017 and fiscal 2018, respectively.

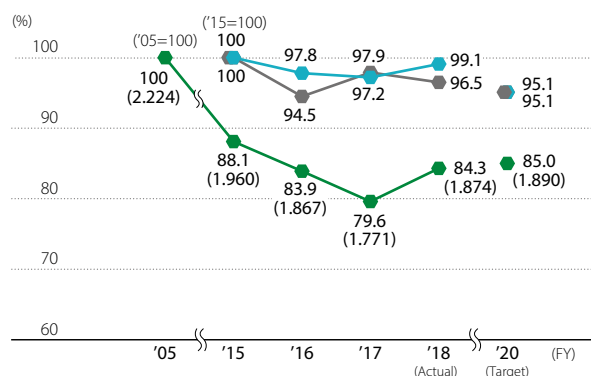
## Unit Energy Consumption and Unit CO<sub>2</sub> Emissions (Production Bases)

### Unit Energy Consumption Index



Notes: • The figures are indexed to energy consumption (kl) at production bases per production volume (tons).  
 • Values in parentheses are unit figures based on Sumitomo Chemical's results.  
 • Calculated based on the Act on Rational Use of Energy in order to show the Common Energy and Environmental Protection Targets of Sumitomo Chemical Group.

### Unit CO<sub>2</sub> Emissions Index



Notes: • The figures are indexed to CO<sub>2</sub> emissions from energy use (tons) at production bases per production volume (tons).  
 • Values in parentheses are unit figures based on Sumitomo Chemical's results.  
 • Calculated based on the Act on Promotion of Global Warming Countermeasures in order to show the Common Energy and Environmental Protection Targets of Sumitomo Chemical Group.



## Addressing Climate Change

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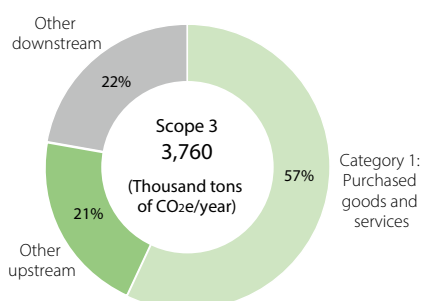
### Status of Scope 3 GHG Emissions

Category	Emissions (Thousand tons of CO <sub>2</sub> e/year)
1. Purchased goods and services ★	2,132
2. Capital goods	394
3. Fuel- and energy-related activities not included in Scopes 1 and 2 ★	298
4. Upstream transportation and distribution ★	61
5. Waste generated in operations ★	30
6. Business travel	7
7. Employee commuting	9
8. Upstream leased assets	<1
9. Downstream transportation and distribution	<1
10. Processing of sold products	—
11. Use of sold products ★	44
12. End-of-life treatment of sold products	780
13. Downstream leased assets	—
14. Franchises	—
15. Investments	—

Notes: • For Scope 3 data, indirect greenhouse gas emissions from business activities throughout the supply chain are calculated separately by category and then added together.

• Calculated for Sumitomo Chemical and Group companies listed on stock indices in Japan (Sumitomo Dainippon Pharma Co., Ltd.; Koei Chemical Co., Ltd.; Taoka Chemical Co., Ltd.; and Tanaka Chemical Corporation).

• Category 4 does not include Taoka Chemical Co., Ltd., but includes Nippon A & L Inc.



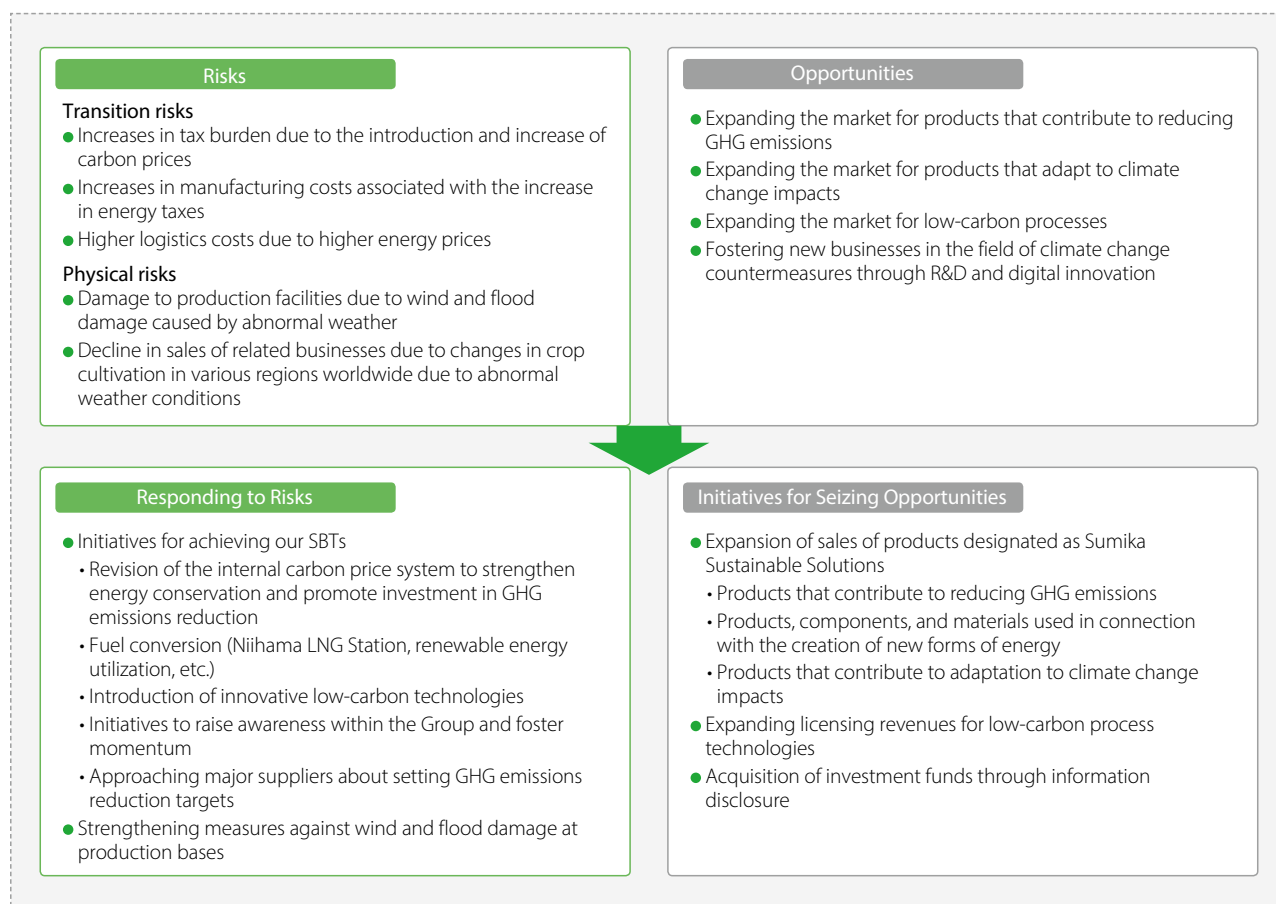


## Addressing Climate Change

### Examples of Initiatives

#### Responding to Risks and Seizing Opportunities related to Climate Change

The Sumitomo Chemical Group identifies and analyzes the risks and opportunities posed by climate change issues to its business over the medium to long-term, including the size, scope of impacts, and other issues. In addition, we are implementing measures to respond to risks through initiatives for achieving our SBTs, and striving to seize new business opportunities through the development and spread of products and technologies designated as Sumika Sustainable Solutions. Concrete initiatives are reported to management meetings, the Sustainability Promotion Committee, the Responsible Care Committee, the Plant Managers' Meetings, and the Group-wide President Meetings.



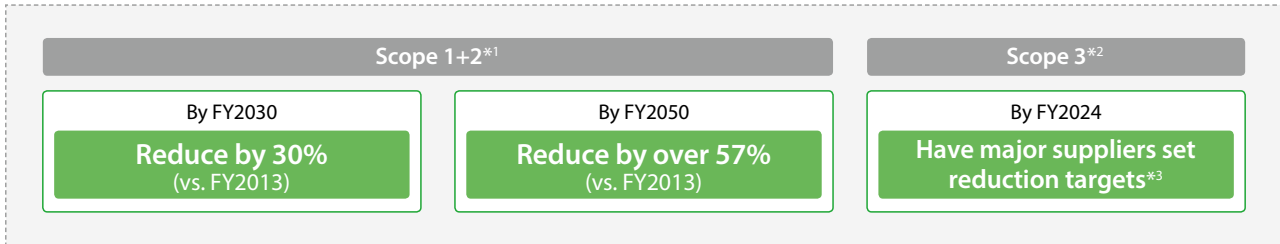
#### Science Based Target Initiative

Science-based targets (SBTs) are greenhouse gas emissions reduction targets set by companies, based on climate science, to meet the 2015 Paris Agreement goal of keeping the increase in global average temperatures to below 2°C compared to pre-industrial temperatures. In March 2018, medium to long-term plans for greenhouse gas (GHG) reductions were deliberated at our management meeting and we agreed to establish science-based targets (SBTs) in accordance with the Science Based Targets. Then in October 2018, Sumitomo Chemical gained approval from the Science Based Targets initiative for the company's Group-wide greenhouse gas emissions reduction targets. Sumitomo Chemical is the first diversified chemical company in the world to have obtained this approval.



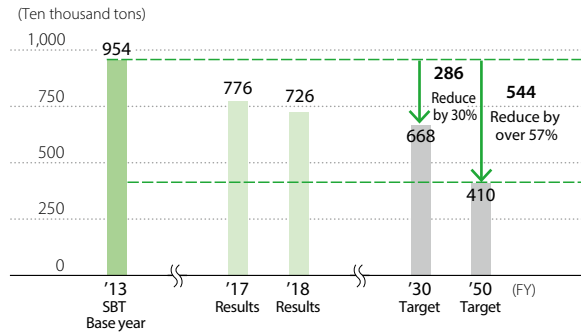
## Addressing Climate Change

### Our Approved GHG Emissions Reduction Targets



- \*1 Scope 1: Direct emissions from factory operations, such as fuel use in manufacturing processes  
Scope 2: Indirect emissions from purchases of power and heat from outside the factory
- \*2 Scope 3: Emissions from the manufacturing and transportation of purchased raw materials
- \*3 Covers suppliers accounting for 90% of procured raw materials and other items based on weight

### Greenhouse Gas (GHG) Emission Volume and Reduction Targets



The baseline year for the Sumitomo Chemical Group’s science-based targets is fiscal 2013, which is the same baseline year used by the Japanese government for GHG emissions reduction targets in accordance with the Paris Agreement. Our Group will focus on reducing its GHG emissions (Scope 1+2) by 57% or more from fiscal 2013 levels by fiscal 2050, while providing solutions for significant GHG reductions in the value chain.



## Addressing Climate Change

### Promoting Sumika Sustainable Solutions

Through the initiative of Sumika Sustainable Solutions, which began in 2016, the Group has been working to develop and promote its products and technologies that help mitigate climate change\*1 and facilitate adaptation to climate change.\*2 (refer to page 15.)

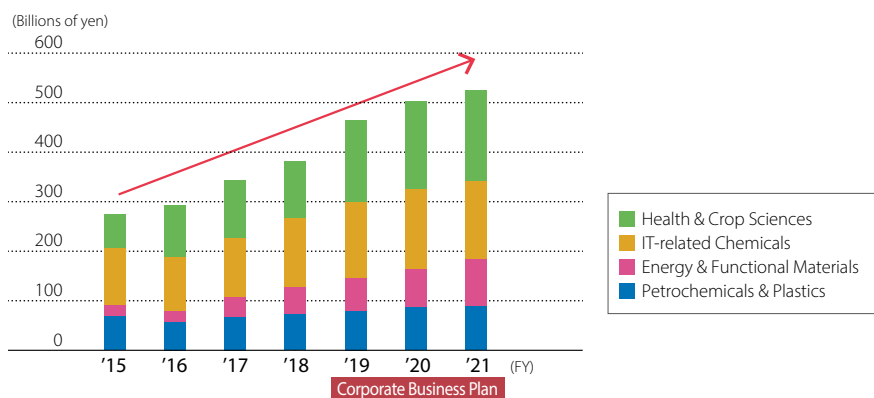
\*1 Reducing and absorbing greenhouse gases

\*2 Working to stem or lessen the current effects of climate change as well as harnessing the new climatic conditions

Sumika Sustainable Solutions

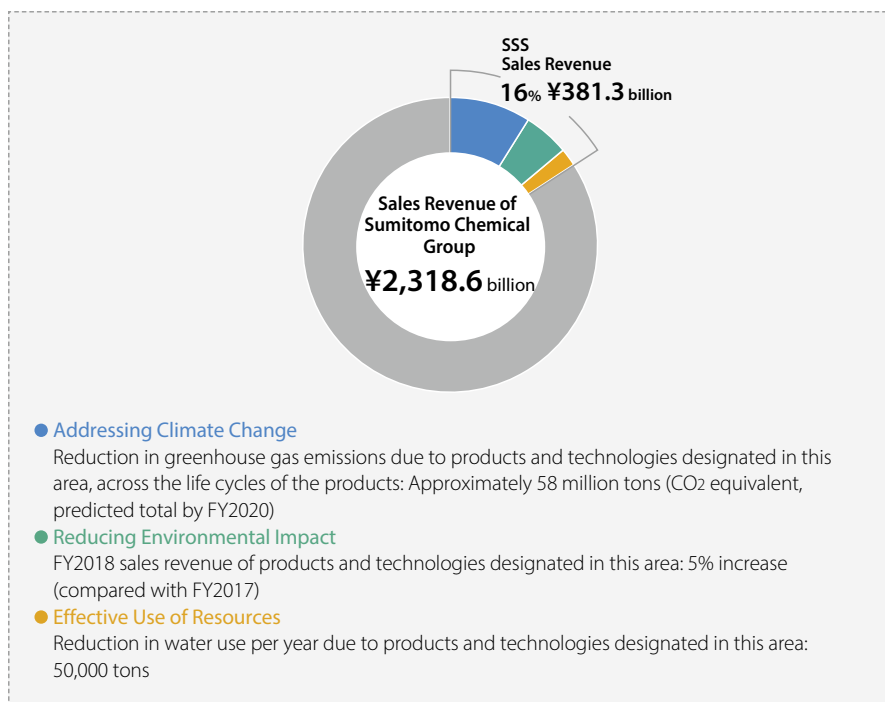
<https://www.sumitomo-chem.co.jp/english/sustainability/sdgs/sss/>

### Sales Revenue of Designated Products and Technologies



A total of 48 products and technologies have been designated so far, and Sumitomo Chemical aims to quickly double their sales revenue compared with FY2015.

### Breakdown by Designation Area (FY2018 Results)



## Addressing Climate Change

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### Measures for Adaptation

Understanding that climate change must be addressed, people are paying more attention to the development of products and technologies that can facilitate adaptation to the changes. Under the banner of Sumika Sustainable Solutions, the Sumitomo Chemical Group has certified many of its products and technologies that promote adaptation. These include vector control products (to ward off infectious disease-carrying pests whose spread correlates with climate change), mycorrhizal fungi for use as a soil amendment product (to extend growing periods during droughts by 30% and improve crop yields), and clear acrylic windows for seawalls that protect against high tides and tsunami.

Of these products, the Company's malaria prevention mosquito net Olyset™ Net was introduced as a tool for helping prevent a rise in malarial infections due to climate change on the side event of COP22, which was held in Morocco in November 2016, and on the side event of COP23, which was held in Germany in November 2017. It was also introduced at Japan's Ministry of the Environment's Climate Change Adaptation Information Platform, Japan's Ministry of Economy, Trade and Industry's *Climate Change Adaptation Good Practices by Japanese Private Sector*, and other venues.

Japan's Ministry of the Environment's Climate Change Adaptation Information Platform

<http://www.adaptation-platform.nies.go.jp/en/index.html>

Japan's Ministry of Economy, Trade and Industry's *Climate Change Adaptation Good Practices by Japanese Private Sector*

<http://www.adaptation-platform.nies.go.jp/en/lets/adaptationbiz/sumitomokagaku.html>

### Initiatives Aimed at Reducing Greenhouse Gas Emissions at Each Worksite

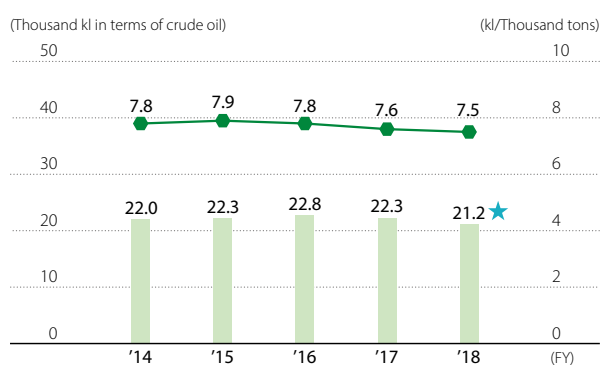
Each Sumitomo Chemical worksite helps reduce greenhouse gas emissions, including in the following ways: installing the latest highly efficient equipment; introducing rationalization and energy-saving measures in production processes; switching to lower-carbon fuels and other forms of energy; installing LED lighting; and soliciting employee suggestions on how to further improve our energy-saving efforts. Furthermore, regarding cleanrooms and other facilities where finding ways to save energy is difficult and requires a high level of expertise, we have launched initiatives in cooperation with experts. Information on the state of these activities is exchanged at Energy Manager Meetings, at which representatives from each worksite gather in one location to work on reducing the greenhouse gas emissions of the Company as a whole.

### Logistics Initiatives

Sumitomo Chemical continues to promote modal shift, or transportation by more efficient and environmentally friendly modes, such as rail and ship instead of trucks. In fiscal 2018, unit energy consumption fell (improved) by 1.6% compared with fiscal 2017, an average of a 1% improvement over the past five years. We will continue to improve unit energy consumption by our target of 1% or more.

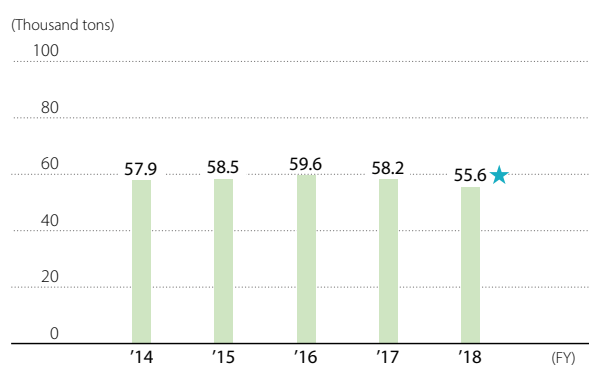
### Reduction of Environmental Impact in Logistics Operations (Sumitomo Chemical and Group companies in Japan)

#### Energy Consumption



■ Energy consumption (left axis) ● Unit energy consumption (right axis)

#### CO2 Emissions



Note: Calculated for Sumitomo Chemical and a Group company in Japan (specified consigner: Nippon A&L Inc.)



## Addressing Climate Change

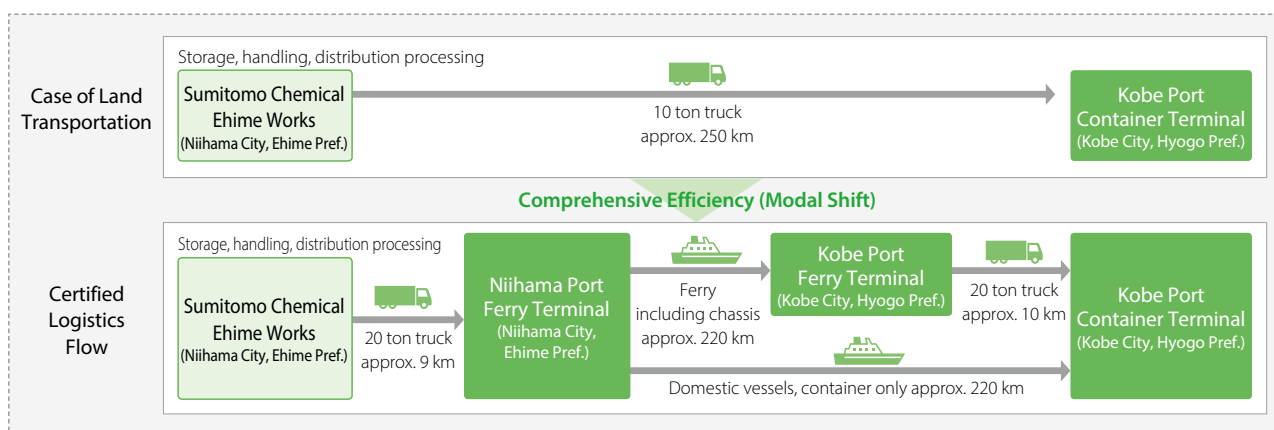
### Feed Additive Methionine Logistics Operations Certified by Government as “Comprehensive Efficiency Plan”

In April 2019, Sumitomo Chemical, The Sumitomo Warehouse Co., Ltd., and Shikoku Kaihatsu Ferry Co., Ltd. jointly have received a “Comprehensive Efficiency Plan” certification from Japan’s Ministry of Land, Infrastructure, Transport and Tourism with respect to the companies’ certain business plan involving domestic transportation by ship in Japan of feed additive methionine produced at the Sumitomo Chemical’s Ehime Works (“Ehime Works”). This certification is issued in accordance with “Act on Advancement of Integration and Streamlining of Distribution Business.”

The Act stipulates, among others, certifying selected business projects or initiatives as “Comprehensive Efficiency Plan,” along with the provision of related supportive measures, where rationalized transportation of materials will make their distribution operations more efficient while at the same time lessening environmental impact or reducing required manpower during the course of materials distribution. If the certification is granted, business operators are entitled to receive various benefits, including special tax treatment.

The tripartite business plan certified by the Ministry encompasses operations for transporting by ship nearly all the distance of methionine from the Ehime Works to Kobe Port with respect to the expanded production of methionine\* as above. In granting the certification, the Ministry duly recognized the distinctive advantage resulting from the business plan that CO<sub>2</sub> emissions will lower by approximately 55%, truck transportation will decrease by approximately 94%, and truck drivers’ working hours will drop by approximately 91%, all compared with equivalent instances of the methionine transported to Kobe Port entirely by land.

\* Sumitomo Chemical expanded the production capacity of methionine at the Ehime Works in October 2018 from approximately 150,000 metric tons per annum to approximately 250,000 metric tons per annum. We plan to further increase the amount of methionine transported to Kobe port, a main export port.



### Evaluating Water-Related Problems

The Group is evaluating water-related risks at each production base from the perspective of water supply and demand risks and water pollution susceptibility risks.

#### Evaluating Water Supply and Demand Risks

The Group evaluates the baseline water stress in communities where a plant is located as well as underground water stress, the severity of droughts caused by seasonal changes in the water supply, the water storage capacity of the drainage basin, projected changes in water stress, and the percentage of water resources in the drainage basin that are protected.

#### Evaluating Water Pollution Susceptibility Risks

The Group evaluates water supply and demand and its fragility in terms of access to drinking water, water pollution, protected downstream areas, and the presence of endangered species in bodies of fresh water identified by the International Union for Conservation of Nature (IUCN).

As a result of the evaluation results, we are taking specific actions to reduce risks going forward for plants evaluated to have high water-related risks.



## Addressing Climate Change

### The BioCarbon Fund\*

Sumitomo Chemical finances afforestation projects in developing countries and poverty-stricken countries through the World Bank's BioCarbon Fund. These projects are geared to contribute to the restoration of abandoned land, the conservation of water resources, biodiversity conservation, and the reduction of greenhouse gases. Since participating for the first time in 2005, Sumitomo Chemical has been involved in multiple afforestation projects, which have led to a combined total of 229 thousand tons in reductions in CO<sub>2</sub> emissions.

\* BioCarbon Fund:

This fund was established by the World Bank to finance projects to plant trees and preserve forests with the objective of acquiring CO<sub>2</sub> credits (emissions rights issued based on the volume of CO<sub>2</sub> reduced or absorbed as a result of projects designed to reduce greenhouse gases).

### R&D Initiatives for Addressing Climate Change

One of the basic policies of the Medium-Term Corporate Business Plan (FY2019–2021) is accelerating the development of next-generation businesses. One priority area of that policy is reducing environmental impact. Sumitomo Chemical has identified energy storage, energy conservation, and carbon recycling as areas of strength that are indispensable to helping solve climate change problems and for which the Company can use the technologies it has cultivated to date.

In the field of energy storage, we are developing next-generation batteries and fully solid state battery materials that help reduce greenhouse gas emissions. In addition, in the field of energy conservation, we strive to develop water treatment processes with low environmental impact and CO<sub>2</sub> separation membranes to enhance energy efficiency. In the field of carbon recycling, we are currently working to develop bioprocesses that use synthetic biology and chemical production processes that use carbon capture and utilization (CCU).

Moreover, as an initiative to ensure next-generation energy, we are conducting a survey related to CO<sub>2</sub>-free hydrogen manufacturing technologies that do not emit CO<sub>2</sub> during the manufacturing stage and their effective implementation.

In these fields, we are promoting research and development while actively installing external technologies in collaboration with academia and startup companies.

### External Evaluations

Sumitomo Chemical was selected for the A List, the highest evaluation, in the CDP's climate change action survey. (January 2019)

<https://www.sumitomo-chem.co.jp/english/news/detail/20190122e.html>

Sumitomo Chemical was ranked first among 37 chemical companies in Japan in the 10th Corporate Climate Action Survey by the World Wide Fund for Nature Japan (WWF Japan), under the materials industry section. (May 2019) (Japanese only)

<https://www.wwf.or.jp/activities/activity/3967.html>

The Japan Chemical Industry Association awarded the Sumitomo Chemical Group the Examiner's Special Award at the 13th JCIA Responsible Care Awards (Japanese only) for the Group's initiatives aimed at realizing a low-carbon society. (June 2019)

## Looking Ahead

The Sumitomo Chemical Group will continue actively working to solve climate change problems using the technological capabilities it has cultivated as a diversified chemical company.



## Environmental Protection

### Basic Stance

The Sumitomo Chemical Group is working in unison to reduce its environmental impact. Specifically, we have set out goals in each field, including protecting the atmosphere and aquatic environments, conserving resources and managing waste, properly managing chemical substances, protecting biodiversity, and protecting soil environments. Each worksite is striving to enhance its initiatives aimed at achieving these goals.

During the three years of the previous medium-term Corporate Business Plan (FY2016–2018) we emphasized initiatives to appropriately respond to laws and regulations and to reduce environmental impact and achieved some success.

Over the course of the three years of the new medium-term Corporate Business Plan (FY2019–2021) we aim to continue strengthening and enhancing our initiatives based on voluntary control and further enhance the level of activity undertaken by the consolidated Group. We also strive to more accurately and quickly disclose environmental performance indicators.

We are focusing on the following specific measures.

#### 1. Appropriate Response to Laws and Regulations

- (1) By maintaining careful control of the execution and management of construction plans, we ensure appropriate response to notifications when changing the soil type of specified facilities that use hazardous substances and an expansion of opportunities for soil contamination surveys. (Soil Contamination Countermeasures Act)
- (2) We have enhanced the evaluation and management of environmental risks related to substances expected to become subject to PRTR Act surveys. (PRTR Act)
- (3) Regarding refrigeration units using CFCs and HCFCs, we are systematically upgrading to equipment that uses low-GWP HFCs or non-fluorocarbon refrigerants (Ozone Layer Protection Law). We are also minimizing fluorocarbon leaks into the atmosphere from refrigeration and air conditioning equipment. (Act for Rationalized Use and Proper Management of Fluorocarbons)
- (4) We will systematically remove all electronic equipment that uses PCBs (in storage or in operation) by March 2025. (Act on Special Measures against PCB Waste)

#### 2. Reducing Environmental Impact

Going forward, we will keep working to achieve our medium- to long-term voluntary management targets in the fields of air, water, soil, and waste, focusing our response on production sites.

### Management System

The president and the executive officers in charge of Responsible Care serve as the coordinators of the Environment and Safety Group of the Responsible Care Department. This group is responsible for matters related to environmental protection for the Company as a whole and supports the environmental protection activities of Group companies.

Our worksites (head offices, Works, research laboratories) have established sections in charge of environmental protection operations, appointed coordinators, and execute specific duties. Regarding the execution of duties, the corporate department (Responsible Care Department) formulates Company-wide annual policies and Company-wide medium-term (three-year) policies every fiscal year. Then each worksite, in light of these policies and in consideration of its own characteristics and regional situation, formulates an action policy and launches specific activities from the new fiscal year.

Regarding amendments to laws and regulations, the Responsible Care Department vigilantly pays attention to national trends and, as appropriate, provides feedback to the national governments. In this way we strive to ensure the situation (details of the amendments, possible impacts, visualization of countermeasures, etc.) is within the Company's control. As for amendments that have a large impact, we access the necessary information in advance and notify worksites to prepare for meeting compliance requirements.

Note: "Organization of Responsible Care" is detailed on page 56.



## Environmental Protection

★: Assured by an independent assurance provider

### Goals and Results







The Sumitomo Chemical Group has established key environmental protection items as common goals. By following up on the results of each company, we are working to reduce our environmental impact in a systematic way.

#### Environmental Performance

Sumitomo Chemical collects and totals environmental data for the Company and Group companies in Japan, including data on energy and resource consumption, production quantities, and environmental impact (e.g., release of pollutants into the air and water).

#### Primary Environmental Performance (Fiscal 2018)

Figures in black: Sumitomo Chemical and Group companies in Japan  
 Figures in green: Sumitomo Chemical

INPUT Energy and Resources			OUTPUT Product Manufacturing and Environmental Impact																																									
 <b>Water</b> ★	(Million tons)		(Thousand tons)																																									
	Industrial water	63.3	59.8	(Calculated on the basis of ethylene production) <sup>*5</sup> <b>2,490</b> <b>1,343</b>																																								
	Drinking water, etc.	0.8	0.5																																									
	Seawater	848.1	166.5																																									
	Groundwater	22.7	20.0																																									
Other water	2.4	2.4																																										
 <b>Energy</b> ★ Calculated as kl of crude oil	(Thousand kl)		<b>Products</b> ★																																									
	Fuel, heat, and electricity <sup>*1</sup>	1,690	992	 <b>Water Pollutant Emissions</b> ★																																								
 <b>Exhaustible Resources</b>	(Thousand tons)		 <b>Waste Materials</b> ★																																									
	Hydrocarbon compounds	1,676	1,383	 <b>Atmospheric Emissions</b> ★																																								
	Metals (excluding minor metals) <sup>*2</sup>	121	117	<table border="1"> <thead> <tr> <th colspan="2"></th> <th colspan="2" style="text-align: right;">(Thousand tons)</th> </tr> </thead> <tbody> <tr> <td>Waste emissions<sup>*7</sup></td> <td>244</td> <td>52</td> <td colspan="2"></td> </tr> <tr> <td>Landfill<sup>*7</sup></td> <td>23</td> <td>4.0</td> <td colspan="2"></td> </tr> <tr> <td colspan="4">(Breakdown)</td> <td colspan="2"></td> </tr> <tr> <td>On-site landfill</td> <td>0</td> <td>0</td> <td colspan="2"></td> </tr> <tr> <td>External landfill</td> <td>23</td> <td>4</td> <td colspan="2"></td> </tr> </tbody> </table>					(Thousand tons)		Waste emissions <sup>*7</sup>	244	52			Landfill <sup>*7</sup>	23	4.0			(Breakdown)						On-site landfill	0	0			External landfill	23	4										
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No. of electrical devices containing high concentrations of PCBs <sup>*4</sup>	10 units	0 units																																										
PCB volume <sup>*4</sup>	0.1 kl	0 kl																																										
No. of refrigeration units using specified CFCs as a coolant	32 units	4 units																																										
No. of refrigeration units using HCFCs as a coolant	272 units	73 units																																										

\*1 The energy (calculated as kl of crude oil) and greenhouse gas (all seven gases) indices were calculated in accordance with the GHG Protocol (refer to page 167 "Calculation Standards for Environmental and Social Data Indicators") for principal consolidated Group companies in Japan, which account for up to 99.8% of consolidated net sales.

• Having adopted the GHG Protocol standards for our GHG emission disclosures, we now include the following data that was not included in previous calculations: amount of energy used to produce electricity and steam sold to external parties by the Group and the resultant CO<sub>2</sub> emissions; amount of energy used by Sumitomo Chemical and Group companies in Japan non-production sites and the resultant CO<sub>2</sub> emissions; CO<sub>2</sub> emissions from non-energy sources not included in the scope of the Act on Promotion of Global Warming Countermeasures.

\*2 Calculations include the following 12 metals: iron, gold, silver, copper, zinc, aluminum, lead, platinum, titanium, palladium, gallium, and lithium.

\*3 Calculations include the following seven rare metals: nickel, chromium, tungsten, cobalt, molybdenum, manganese, and vanadium. The supply structure for each of these rare metals is extremely fragile. These rare metals are subject to national stockpiling.

\*4 Fluorescent lamps and mercury lamp ballast as well as contaminated substances (wastepaper, etc.), including PCB waste, are not included in unit and volume data.

\*5 Certain assumptions were made in calculations due to the difficulty of obtaining weight-based figures for some products.

\*6 Calculated based on the amount released into water/the air of each substance subject to the Order for Enforcement of the PRTR Act.

In fiscal 2018, we revised the method for calculating the emissions of specified substances into water. Using the previous calculation method, emissions totaled 43 tons for both Sumitomo Chemical and Group companies in Japan and 38 tons for Sumitomo Chemical alone.

\*7 The amount of coal ash generated at Sumitomo Joint Electric Power, which is included in "Waste emissions" and "Landfill" (Sumitomo Chemical and Group companies in Japan) is calculated on a dry-weight basis.

In addition, although the amount of waste generated at Group companies in Japan and reduced at Sumitomo Chemical's facilities is included in "Waste emissions" (Sumitomo Chemical and Group companies in Japan), the amount is insignificant.

\*8 In reference to the Act on Promotion of Global Warming Countermeasures, companies that emit less than 3,000 tons of CO<sub>2</sub>-equivalent per year for each type of greenhouse gas are outside the boundary of calculation.



## Environmental Protection

### Examples of Initiatives

#### Protecting the Atmospheric Environment

By strengthening our measures for fixed emission sources, we are working on reducing our various environmental impacts, including emissions of soot and dust from boilers, leaks of fluorocarbons from refrigeration equipment, emissions of mercury from industrial waste incinerators, emissions of hazardous air pollutants and VOCs from manufacturing plants, and airborne asbestos from the demolition of buildings.

##### 1. Reining in PM2.5\* Emissions

We conduct detailed surveys of boilers, gas turbines, heating furnaces, dry furnaces, cracking furnaces, waste incinerators, and other such equipment, testing for emissions of VOCs and other gaseous atmospheric pollutants, soot, SO<sub>x</sub>, NO<sub>x</sub>, and hydrogen chloride, which are also the source of secondary particles and PM<sub>2.5</sub>. We strive to further reduce emissions for each source.

\* Particulate matter of up to 2.5 μm in diameter

##### 2. Managing Fluorocarbon Refrigeration Equipment

As part of efforts to protect the ozone layer and combat global warming, we are systematically upgrading fluorocarbon refrigeration equipment (units that use CFCs, HCFCs, HFCs) employed in production processes to equipment that uses HFCs with a low global warming potential (GWP) or non-fluorocarbon refrigerants. Our goal is to complete these upgrades within the upgrade deadlines for the equipment.

###### Upgrade Deadlines for Each Type of Equipment

- CFC equipment: Eliminate use of these units by fiscal 2025 (currently a total of 32 units held by the Group)
- HCFC equipment: Eliminate use of these units by fiscal 2045 (currently a total of 272 units held by the Group)

We aim to dutifully adhere to this plan, which, in line with the Act for Rationalized Use and Proper Management of Fluorocarbons, includes devising ways of minimizing leaks when industrial refrigeration and air conditioning equipment is in use as well as taking thorough, swift action once problems related to equipment installation are uncovered.

##### 3. Emissions of Mercury into the Atmosphere from Waste Incinerators

We measured concentrations of mercury (both gas and particles) emitted into the atmosphere by our waste incinerators, which we own as assets, and completed a study of the impact of these emissions. The results have confirmed that mercury is being effectively removed by emission gas removal equipment, including bag filters and scrapers installed at incinerators, and that the concentration of mercury released into the atmosphere from any of our incinerators does not exceed the emission guidelines set under the Air Pollution Control Act.



## Environmental Protection

★: Assured by an independent assurance provider

### Protecting the Aquatic Environment

In addition to our initiatives aimed at reducing overall water use, we have realized thorough purification of polluted water from manufacturing plants and other facilities by operating stable and sophisticated water treatment facilities.

#### 1. Responding to Increasing Sophistication of Activated Sludge Treatment

At all Works, we are striving to develop management technologies for water treatment that will further reduce our environmental impact and apply these technologies to realize safe and secure wastewater treatment.

At some Works, for process wastewater that is difficult to break down we use an activated sludge treatment involving microbial immobilization to stabilize the process water and reduce treatment costs. We are still considering applying this treatment to a wider scope of water.

#### 2. Responding to Water Quality Standards

By strengthening our voluntary management, we are meeting reduction goals for continual emissions of COD, nitrogen, and phosphorus emitted into the ocean and waterways from drains, including public water resources. In addition, we have realized stable water treatment by enhancing the management technologies used in water treatment facilities. We are continually working to reduce the impact of water emissions from our plants on Tokyo Bay and other closed coastal waters where regulations are in place for reducing the total water emissions of COD, nitrogen, and phosphorus.

#### 3. Promoting the Effective Use of Water

We uncover various issues related to the use of fresh water on the worksite level and assess and manage the associated risks. In addition, we strive to reduce the amount of water we use by examining more effective ways to use water by application, while continuing to maintain and improve the quality of water released from our business sites into public water resources such as the ocean and waterways.

#### ■ Water Usage (Sumitomo Chemical Group)

	(Million tons)		
	FY2016	FY2017	FY2018
Sumitomo Chemical ★	243	253	249
Sumitomo Chemical Group	982	1,024	944
(Breakdown)			
Sumitomo Chemical and Group companies in Japan ★	975	1,017	937
Overseas Group companies	7.09	7.19	7.34

Note: Water usage volume includes seawater





## Environmental Protection

### Resource Saving and Waste Reduction

We are systematically working to reduce the amount of exhaustible raw materials used, quickly and properly dispose of PCB waste, and reduce the amount of industrial waste sent to landfills.

#### 1. Promoting Resource Saving

We are striving to enhance the economic benefits gained from resource saving activities, such as improving the throughput yield of exhaustible raw materials and product yield.

##### ■ Exhaustible Raw Material Use (Sumitomo Chemical, Group Companies in Japan)

(Thousand tons)

	FY2016		FY2017		FY2018	
	Sumitomo Chemical and Group Companies in Japan	Sumitomo Chemical	Sumitomo Chemical and Group Companies in Japan	Sumitomo Chemical	Sumitomo Chemical and Group Companies in Japan	Sumitomo Chemical
Hydrocarbon compounds	1,779	1,525	1,835	1,593	1,676	1,383
Metals (excluding minor metals)	116	111	120	115	121	117
Minor metals	0.17	0.05	10.17	0.02	13.54	0.07

Note: Economic effects are detailed on page 107 of the Data Book.

#### 2. Thoroughly Managing Waste and Reducing Landfill Waste

We have achieved a major reduction in industrial landfill waste by reducing the amount of industrial waste generated and promoting recycling. In addition, as a specified resource industry identified by the Act on Promotion of Effective Use of Resources, we are also working to systematically limit the generation of industrial byproducts (sludge).

#### 3. Moving up the Schedule for Comprehensive Treatment of Waste with Minute Amounts of PCBs before Legal Disposal Deadline

We winnowed the external operators jointly contracted to dispose of waste by main Group companies down to just one. Regarding the waste with minute amounts of PCBs (transformers, condensers, etc.) being stored or used by each company, we formulated a plan to comprehensively treat the waste over multiple years and are promoting proper management. We plan to dispose of all such waste by March 2025. (We expect to dispose of a total of around 500 pieces of equipment and around 1,800 tons of waste.)



## Environmental Protection

### Biodiversity Preservation Initiatives

Taking biodiversity into consideration is one of Sumitomo Chemical's most important pillars as it strives toward building a sustainable society. Since formulating Sumitomo Chemical's Commitment to the Conservation of Biodiversity, we have actively participated in a private-sector biodiversity partnership and promoted initiatives while giving considerable thought to what we should be mindful of as a chemical company.

#### Sumitomo Chemical's Commitment to the Conservation of Biodiversity

1. We position the conservation of biodiversity as one of our most important management issues and strive to help protect the global environment.
2. We work to continuously reduce environmental impact in our production operations and our development and supply of products and services and in cooperation with third parties in the supply chain and thereby contribute to the conservation of biodiversity.
3. By regularly implementing education programs, we ensure that employees fully recognize and understand the importance of biodiversity and promote our commitment to its conservation.
4. We continuously engage in corporate social responsibility activities that contribute to environmental protection and lead to greater trust and confidence from society.
5. We disclose the results of these efforts and maintain effective communication with the general public.

(Formulated December 2011)

### Examples of Initiatives

1. Promoting "Sumika Sustainable Solutions"
2. Improving energy efficiency, recycling resources, promoting the 3Rs, encouraging CSR procurement
3. Undertaking environmental impact assessments at the planning stage for new plant construction and implementing countermeasures
4. Implementing environmental protection projects jointly with NGOs
5. Complying with internal safety management regulations pertaining to the use of genetically modified organisms
6. Undertaking proper management of chemical substances

### Appropriate Management of Chemical Substances

Regarding class 1 specified chemical substances (PRTR Act) and VOCs, we conduct environmental risk analyses regardless of the amount emitted into the environment. We are also taking measures to reduce use and emissions.

### Examples of Initiatives

#### 1. Meeting Voluntary Environmental Targets

At the boundaries of plant premises and at final drainage exits, we have set voluntary environmental targets for the concentration of pollutants in air and water and work to meet those targets.

#### 2. Reducing Atmospheric Emissions (FY2018 results: atmospheric emissions accounted for around 97% of total emissions (air and water))

We are, of course, taking measures to reduce emissions mainly by sealing facilities and improving operation methods. But we are also working to intently and systematically reduce atmospheric emissions primarily by additionally taking such disposal measures as recovering emissions through absorption, purification, and stronger cooling; incinerating emissions; and suppressing emissions through internal floating roofs for tanks.

#### 3. Operating Company-wide PRTR Calculation Systems

Using the Company's proprietary calculation system, Sumitomo Chemical is striving to increase the accuracy and level of detail of the data on emission amounts and transfer amounts for each substance.



## Environmental Protection

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### Protecting the Soil Environment

We quantify the soil environments of worksites, strictly prevent the diffusion of pollutants, and actively work to prevent contamination.

#### Examples of Initiatives

##### 1. Regularly Monitoring Groundwater

We analyze the groundwater at the boundaries of our worksites to confirm that levels of hazardous materials are below those stipulated by standards.

##### 2. Preventing Soil Contamination

We have established rules regarding the construction standards and the content of regular inspections for various equipment, including the gutters, floors, plumbing, and bund walls of facilities handling chemical substances. We are working to prevent soil contamination from leaks by thoroughly complying with these rules.

### Looking Ahead

The focus of Sumitomo Chemical Group's basic policy on protecting the environment has shifted since the early 2000s from responding to laws and regulations toward strengthening voluntary management. As pressure increases to protect the environment on a global scale and to improve the efficacy of the measures taken at each worksite, we think it is necessary to understand international environmental protection trends better than ever and take forward-looking action.

From the perspective of continued risk management, we will focus our efforts on issues that are assessed as being high risk over the medium to long term and take appropriate action that enhances voluntary management.