



Environmental Protection / Climate Change Action

Addressing Climate Change

The extreme weather events and other adverse effects of climate change will have a major impact on people's lives around the world. Addressing these changes will require a two-pronged effort focusing on mitigation (reducing and absorbing greenhouse gases) and adaptation (working to stem or lessen the current effects of climate change as well as harnessing the new climatic conditions). One of the most important issues will be carrying out these efforts and simultaneously realizing a sustainable society that supports economic development. The Sumitomo Chemical Group is working hard from various perspectives on Goal 13 of the SDGs—climate action.

To this end, in June 2017, Sumitomo Chemical joined over 100 other global business leaders in supporting the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD), which was founded by the Financial Stability Board (FSB).^{*} Through our support of these recommendations, we will reassess the impact of climate change on the Group and continue to promote disclosures, beginning with those related to our action on climate change, as we work to develop a sustainable society and spur the shift toward a low-carbon economy.

^{*} FSB:

An international organization whose members include central banks, financial regulatory authorities, and ministries of finance from 25 major countries.



President Tokura's statement support of the TCFD recommendation

Management System

Sumitomo Chemical is addressing climate change as one of its Responsible Care activities (see page 23 "Organization of Responsible Care Activities"). Although final decisions on key matters are the purview of the Responsible Care Committee, information on pertinent issues is also shared at the Board of Directors meetings, Management Meetings, Works GM Meetings, Group Company President Meetings, and other venues, bringing more depth to the discussions.

A wide range of specific issues related to energy and greenhouse gases are taken up for detailed discussion at Department GM Meetings, 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, and business sectors. Information is also shared via Liaison Meetings of Corporate Departments, which hold discussions related to the ESG issue of climate change action.

Measures to Reduce Greenhouse Gas Emissions

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. In fiscal 2017, we made steady progress toward our targets for the unit energy consumption index and unit CO₂ emission index through a reduction in the amount of steam used and introduction of cogeneration facilities as well as other efforts.



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Energy Consumption and Greenhouse Gas Emissions

The Group's greenhouse gas emissions for fiscal 2017 onward are calculated in accordance with the GHG Protocol.

Greenhouse Gas Emissions

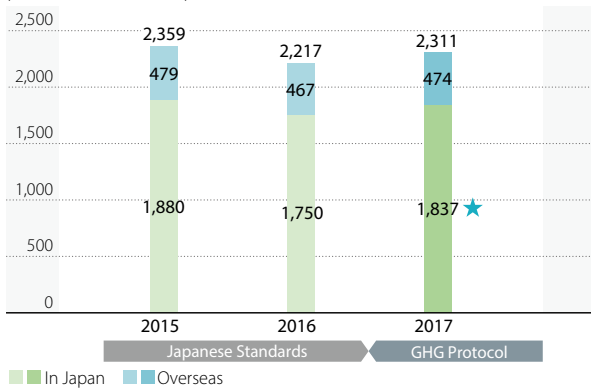
(Thousands of tonnes of CO₂e)

	Sumitomo Chemical and Group Companies in Japan★	Overseas Group Companies	Total
Scope 1	6,107	571	6,678
Scope 2	326	755	1,080
Total	6,432	1,326	7,758

Note: When adding the results of one overseas Group company to the results of Sumitomo Chemical and Group companies in Japan, Scope 1 emissions total 6,232 thousand tonnes of CO₂e★ and Scope 2 emissions total 638 thousand tonnes of CO₂e★. Going forward, we will continue to expand the scope of overseas Group companies assured by an independent assurance provider.

Energy Consumption

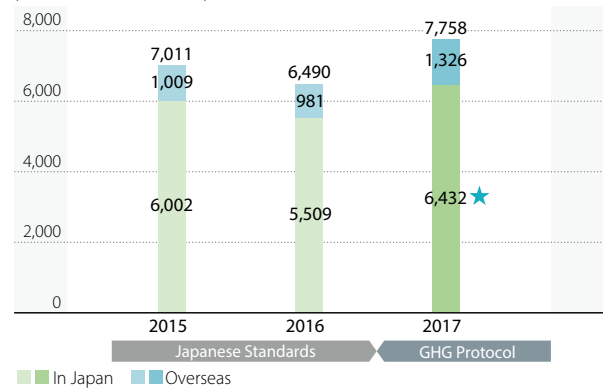
(Thousands of kl of crude oil)



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 used to produce 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). In addition, the amount of energy used by Sumitomo Chemical's non-production sites is included from fiscal 2017. In addition, the amount of energy used by Sumitomo Chemical's non-production sites is included from fiscal 2017.

Greenhouse Gas Emissions

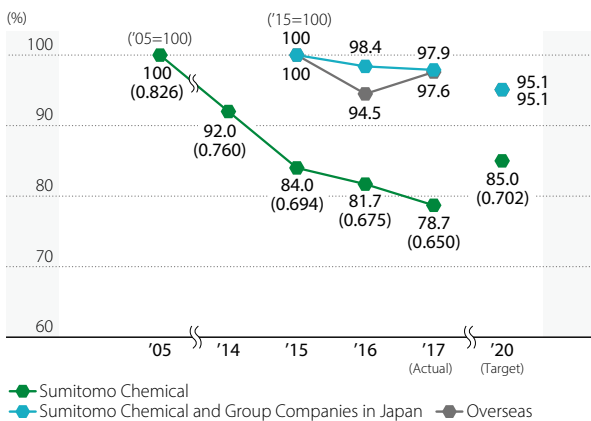
(Thousands of tonnes of CO₂e)



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: CO₂ emissions from energy sold to external parties by the Group (the portion attributable to energy provider subsidiaries was included prior to fiscal 2016); CO₂ emissions from energy use attributable to Sumitomo Chemical's non-production sites; CO₂ emissions from non-energy sources not included in the scope of the Act on Promotion of Global Warming Countermeasures.

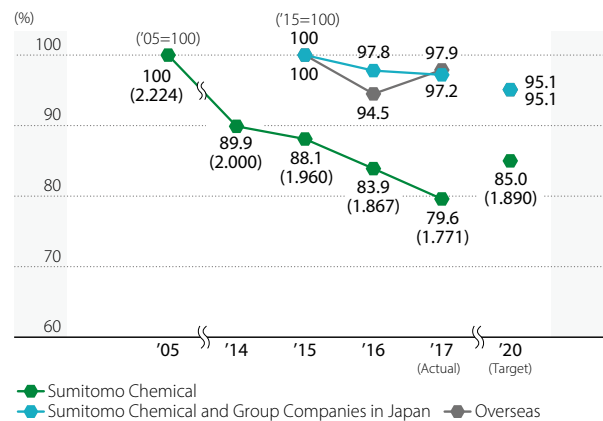
Unit Energy Consumption and Unit CO₂ Emissions (Production Bases)

Unit Energy Consumption Index



Notes: • The figures are indexed to energy consumption (kl) at production bases per production volume (tonnes).
 • 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 CO₂ Emissions Index



Notes: • The figures are indexed to CO₂ emissions from energy use (tonnes) at production bases per production volume (tonnes).
 • 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.



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Status of Scope 3 GHG Emissions

Category	Emissions (Thousands of Tonnes of CO ₂ e)
1. Purchased goods and services ★	1,985
2. Capital goods	111
3. Fuel- and energy-related activities not included in Scopes 1 and 2 ★	290
4. Upstream transportation and distribution ★	57
5. Waste generated in operations ★	28
6. Business travel	7
7. Employee commuting	8
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	945
13. Downstream leased assets	—
14. Franchises	—
15. Investments	—
Total	3,475

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.; and Taoka Chemical Co., Ltd.).
- Category 4 does not include Taoka Chemical Co., Ltd.

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 175,000 tonnes in reductions in CO₂ 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 CO₂ credits (emissions rights issued based on the volume of CO₂ reduced or absorbed as a result of projects designed to reduce greenhouse gases).



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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.

Sumika Sustainable Solutions

https://www.sumitomo-chem.co.jp/english/csr/process_product/

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 at COP22, which was held in Morocco in November 2016, and COP23, which was held in Germany in November 2017. It was also introduced at Japan's Ministry of the Environment's Climate Change Adaptation Platform, Japan's Ministry of Economy, Trade and Industry's Climate Change Adaptation Good Practices by Japanese Private Sector, and other venues.

The website for Japan's Ministry of the Environment's Climate Change Adaptation Platform (Sumitomo Chemical's page)

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

The website for Japan's Ministry of Economy, Trade and Industry's Climate Change Adaptation Good Practices by Japanese Private Sector (Sumitomo Chemical is featured in Area 13, Health & Sanitation)

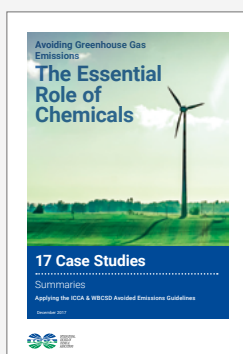
<http://www.sc.mufg.jp/english/company/news/000014701.pdf>

Measures for the Risks and Opportunities of Climate Change

By analyzing the physical impacts of climate change and the risks associated with adjusting social systems, we are studying the possible effects climate change could have on our businesses. We are also looking to determine promising new business opportunities based on the analysis of various scenarios. Looking ahead, we plan to publicly release our findings on our website, in the *Annual Report*, and via other media.

Working with Global Chemical Companies

Sumitomo Chemical served as the chair of the Global Working Group on Energy and Climate Change of the International Council of Chemical Associations (ICCA) between June 2016 and June 2018. During this time, we led joint international research surveys related to helping reduce GHG emissions through chemical products and technologies. We also worked to promote the spread of the results of the research surveys.





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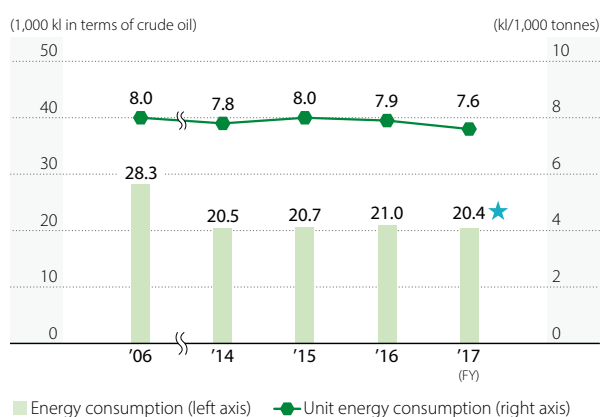
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Logistics Initiatives

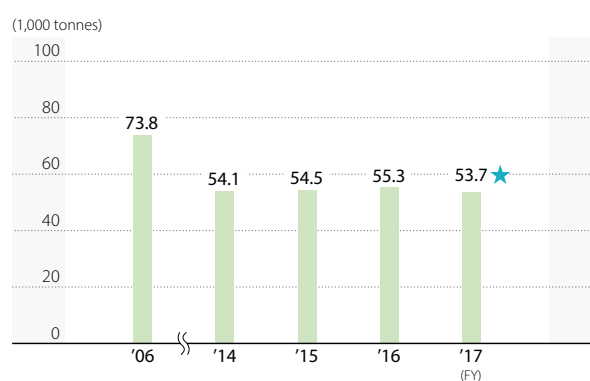
Sumitomo Chemical continues to promote modal shift, or transportation by more efficient and environmentally friendly modes, such as rail and ship instead of trucks. In fiscal 2017, unit energy consumption fell (improved) by 3.4% compared with fiscal 2016. We will continue to improve unit energy consumption by our target of 1% or more.

Reduction of Environmental Impact in Logistics Operations (Sumitomo Chemical)

Energy Consumption



CO2 Emissions



Note: Data (energy consumption, CO2 emissions) for previous fiscal years has been retroactively adjusted to enhance accuracy.

Promoting the Effective Use of Water

The Sumitomo Chemical Group recognizes that the importance of water as a limited natural resource is a global issue. 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)

	(Millions of tonnes)		
	FY2015	FY2016	FY2017
Sumitomo Chemical★	282	243	253
Sumitomo Chemical and Group companies in Japan★	1,043	975	1,017
Overseas Group companies	6.48	7.09	7.19

Notes: • Including seawater

• Data for previous fiscal years has been retroactively adjusted to enhance accuracy.



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Effective Procurement of Raw Materials

To maximize production efficiency for such chemical raw materials as ethylene and propylene, Sumitomo Chemical suspended operations at its ethylene plant in 2015 and consolidated production at Keiyo Ethylene Co., Ltd., which is a joint venture between Maruzen Petrochemical Co., Ltd. and Sumitomo Chemical.

■ Raw Material Use (Group, Sumitomo Chemical)

	2015		2016		2017	
	Group	Sumitomo Chemical	Group	Sumitomo Chemical	Group	Sumitomo Chemical
Hydrocarbon compounds	1,940	1,553	1,779	1,525	1,835	1,593
Metals (excluding minor metals)	123	117	116	111	120	115
Minor metals	0.08	0.02	0.17	0.05	10.17	0.02

(Thousand tonnes)

Note: Tanaka Chemical Corporation and SCIOCS COMPANY LIMITED are included in Group companies from 2017.

Thorough Waste Management and the Reduction of Landfill Waste ★

Sumitomo Chemical and Group companies in Japan work in unison to make industrial waste treatment more transparent and to properly manage it. We have worked to help achieve the goals of the Japan Business Federation's voluntary environmental action plan, a major industry initiative. Among these goals was to reduce the amount of industrial waste sent to landfills to 70% below the fiscal 2000 level by fiscal 2020. In addition, we set in-house reduction targets and work to reduce the amount of waste generated and promote recycling. In fiscal 2017, landfill waste was 1 thousand tonnes on a non-consolidated basis and 21 thousand tonnes for Sumitomo Chemical and Group companies in Japan, representing reductions well beyond the targets of the above-mentioned action plans. From fiscal 2017 onwards, we will continue to properly manage waste and reduce landfill waste with the target of reducing landfill waste 80% compared with fiscal 2000.

Processing PCB Waste

As for both high- and low-concentration PCB-containing waste, the entire Group is stepping up its equipment surveys, seeking to identify PCB-containing devices currently in use, including condensers, transformers, and stabilizers. In addition, we are disposing of waste in line with the regulations stipulated in the Act on Special Measures against PCB Wastes.



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Protecting the Atmosphere, Water, and Soil

Sumitomo Chemical and Group companies in Japan work to identify major environmental risks in each field in line with the latest laws and regulations, including the Air Pollution Control Act, Water Pollution Control Act, and Soil Contamination Countermeasures Act. We take measures to systematically reduce risks related to highly important and urgent matters.

Protecting the Atmosphere

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_x, NO_x, and hydrogen chloride, which are also the source of secondary particles and PM2.5. We strive to further reduce emissions for each source.

* Particulate matter of up to 2.5 μm in diameter

Enhancing Fluorocarbon Management

We are executing a plan with a definitive deadline to completely phase out refrigeration equipment that uses CFCs and HCFCs as refrigerants. With regard to refrigeration equipment that uses HFCs as well, we have begun considering systematically switching over to equipment that uses HFCs with a low global warming potential or to non-CFC equipment. 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.

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.

Protecting Aquatic Environments

Regulations for Reducing Total Water Emissions

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. To help achieve the goals of the eighth basic policy on reducing total water emissions, which has a target fiscal year of 2020 and covers all prefectures in Japan, we will continue to work to treat water emitted by our Works.

Promoting Safer and More Reliable Water Treatment

We have developed water treatment management technology that helps reduce our impact on the environment and are employing this technology to realize safe and reliable water treatment at all our plants.

Protecting the Soil Environment

Based on soil management conditions at Sumitomo Chemical business sites, we have established targets to prevent harmful substances (oil, heavy metals) from spreading beyond the boundaries of these sites. To this end, we have continued surveys and evaluations of soil contamination as well as remediation work on Group-owned land. We have also monitored groundwater close to our boundaries on a regular basis to confirm that levels of hazardous materials, including heavy metals and oils, are below those stipulated by environmental standards.



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Biodiversity Preservation Initiatives

Taking biodiversity into consideration is one of Sumitomo Chemical's most important pillars as it strives toward building a sustainable society. We actively participate in a private-sector biodiversity partnership while giving considerable thought to what we should be mindful of as a chemical company. We are also expanding individual activities at Group companies.

Example Activities

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

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.

Looking Ahead

To effectively use the earth's limited resources and shift to a sustainable society, we must fulfill our ever expanding role in the field of environmental conservation. The Sumitomo Chemical Group aims to further reduce environmental risks through measures intended to address environmental conservation issues. These measures are centered on ongoing strict risk management, adherence to domestic and overseas regulations, careful monitoring of environmental trends, and promoting proactive and effective voluntary activities.



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Environmental Performance

Sumitomo Chemical collates 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 2017)

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			
 Water ★		(Millions of tonnes)			(Thousands of tonnes)	
	Industrial water	68.8	63.3	(Calculated on the basis of ethylene production)*5		
	Drinking water, etc.	0.9	0.4	2,602	1,371	
	Seawater	926.9	171.8			
	Groundwater	17.6	15.0			
	Other water	2.5	2.5			
 Energy ★		(Thousands of kl)				
	Fuel, heat, and electricity*1	1,837	979			
 Exhaustible Resources		(Thousands of tonnes)				
	Hydrocarbon compounds	1,835	1,593			
	Metals (excluding minor metals)*2	120	115			
	Minor metals*3	10.17	0.02			
PCB/CFCs under Secure Storage						
No. of electrical devices containing high concentrations of PCBs*4	58 units	18 units				
PCB volume*4	1.0 kl	0.1 kl				
No. of refrigeration units using specified CFCs as a coolant	48 units	12 units				
No. of refrigeration units using HCFCs as a coolant	262 units	102 units				
			 Products ★			
			 Water Pollutant Emissions ★			
			 Waste Materials ★			
			 Atmospheric Emissions ★			
			(Thousands of tonnes of CO ₂)			
			Greenhouse gases (seven gases)*1			
			Emissions from energy use (CO ₂)			
			CO ₂ emissions from other than energy use			
			N ₂ O			
			HFC, PFC			
			CH ₄ , SF ₆			
			NF ₃			
			(Tonnes)			
			Others			
			NO _x			
			SO _x			
			Soot and dust			
			Substances subject to the PRTR Act*6			

*1 From fiscal 2017, the energy (calculated as kl of crude oil) and greenhouse gases (all seven gases) indices were calculated in accordance with the GHG Protocol.

• 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 CO₂ emissions; amount of energy used by Sumitomo Chemical's non-production sites and the resultant CO₂ emissions; CO₂ 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 (promulgated on November 21, 2008).

*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 tonnes of CO₂-equivalent per year for each type of greenhouse gas are outside the scope of calculation.