

Calculation Standards for Environmental and Social Data Indicators

1. Period: April 2017 to March 2018
2. Boundary: Refer to Boundary of This Report on page 3 of the *Sustainability Data Book 2018*.
3. Calculation Method:

Environmental Data Indicator	Unit	Calculation Method
Energy	Energy consumption Thousand kl of crude oil	$\{(Amount\ of\ electricity\ purchased \times Per\text{-}unit\ heating\ value + Amount\ of\ heat\ purchased \times Per\text{-}unit\ heating\ value) + \sum(Amount\ of\ each\ fuel\ used \times Per\text{-}unit\ heating\ value\ for\ each\ fuel)\} \times 0.0258$ The per-unit heating value of electricity, per-unit heating value for each fuel, and the types of fuel included in the scope of calculation are based on the values and calculation methods outlined in the Act on the Rational Use of Energy. Because we calculated GHG emissions in accordance with the GHG Protocol from fiscal 2017, the energy usage amount includes the energy used to produce electricity and steam sold to external parties by the Group. The heating value used overseas is based on standard heating values used in the formulation of Japanese laws.
Amount of Exhaustible Resources Used	Hydrocarbon compounds	Thousand tonnes Total amount of hydrocarbon compounds used as raw materials (only raw materials purchased from outside the Sumitomo Chemical Group).
	Metals (excluding minor metals)	Thousand tonnes Total amount of metals, excluding minor metals, used as raw materials: iron, gold, silver, copper, zinc, aluminum, lead, platinum, titanium, palladium, gallium, and lithium (only raw materials purchased from outside the Sumitomo Chemical Group).
	Minor metals	Thousand tonnes Total amount of minor metals used as raw materials: nickel, chromium, tungsten, cobalt, molybdenum, manganese, and vanadium (only raw materials purchased from outside the Sumitomo Chemical Group).
Water	Industrial water, drinking water, seawater, groundwater, and other water Million tonnes	Amount of industrial water, drinking water, seawater, groundwater, and other water used.
PCBs/CFCs in Use or under Secure Storage	No. of electrical devices containing high concentrations of PCBs	Units The number of electrical devices containing high concentrations of PCBs, such as condensers and transformers, that are currently in use or under secure storage. Does not include fluorescent lamps and mercury lamp ballasts or contaminated substances (wastepaper, etc.).
	PCB volume	kl The total amount of PCBs in electrical devices containing PCBs, calculated as the net PCB content by volume. Does not include fluorescent lamps and mercury lamp ballasts or contaminated substances (wastepaper, etc.).
	No. of refrigeration units using specified CFCs as a coolant	Units The number of refrigerator units currently using specified CFCs as a coolant.
	No. of refrigeration units using specified HCFCs as a coolant	Units The number of refrigerator units currently using specified HCFCs as a coolant.
Products	Calculated on the basis of ethylene production Thousand tonnes	The production volume of products is calculated on the basis of ethylene production, using the amount of energy necessary to manufacture the products by weight and the amount of energy necessary for ethylene production by weight. Some assumptions were made in calculations due to the difficulty of obtaining weight-based figures for certain products.
Water Pollutant Emissions	COD	Tonnes The total amount of COD emitted into public water bodies (coastal waters/waterways) and sewer systems. Calculated as: The COD concentration at drains included in the scope of calculation \times The amount of water drained into public water bodies and sewer systems from each drain.
	Phosphorus	Tonnes The total amount of phosphorus emitted into public water bodies (coastal waters/waterways) and sewer systems. Calculated as: The phosphorus concentration at drains included in the scope of calculation \times The amount of water drained into public water bodies and sewer systems from each drain.
	Nitrogen	Tonnes The total amount of nitrogen emitted into public water bodies (coastal waters/waterways) and sewer systems. Calculated as: The nitrogen concentration at drains included in the scope of calculation \times The amount of water drained into public water bodies and sewer systems from each drain.
Waste Materials	Waste emission amount	Thousand tonnes The total amount of waste discharged from business sites. The amount of coal ash generated at Sumitomo Joint Electric Power Co., Ltd., which is included in the waste discharge amount, is calculated on a dry-weight basis.
	Landfill disposal amount: – On-site landfill – External landfill	Thousand tonnes The total amount of waste disposed of in landfills. The amount of coal ash generated at Sumitomo Joint Electric Power Co., Ltd., which is included in the landfill disposal amount, is calculated on a dry-weight basis. * Landfill disposal amount for Sumitomo Chemical: Of the waste remaining after external reduction processing, the entire amount disposed of in landfills (not recycled) is calculated as the external landfill disposal amount. ** Landfill disposal amount for Group companies in Japan: At some companies' factories, the waste remaining after the external reduction processing of waste is not included.
	Total landfill	Thousand tonnes Sumitomo Chemical: The total amount of waste disposed of in landfills. Group companies in Japan: The total amount of waste disposed of in landfills.

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Atmospheric Emissions	Greenhouse gas emissions	<p>CO₂ emissions from energy use: Amount of electricity purchased × CO₂ emission coefficient for electricity + Amount of steam purchased × CO₂ emission coefficient for steam + Σ(Amount of each fuel used × Per-unit heating value for each fuel × CO₂ emission coefficient for each fuel)</p> <p>The CO₂ emission coefficient for steam, per-unit heating value for each fuel, and CO₂ emission coefficient for each fuel are based on the values outlined in the Greenhouse Gas Emissions Accounting, Reporting, and Disclosure System of the Act on Promotion of Global Warming Countermeasures. The CO₂ emission coefficient for electricity in Japan uses the values for each fiscal year by electric power company and overseas uses the IEA's fiscal 2014 efficiency indicators for each country. From fiscal 2017, results include the energy used to produce the power and steam sold to external parties in accordance with the GHG Protocol.</p> <p>CO₂ emissions from other than energy use and non-CO₂ GHG emissions: In Japan, results are based on the calculation method outlined in the Greenhouse Gas Emissions Accounting, Reporting, and Disclosure System of the Act on Promotion of Global Warming Countermeasures. From fiscal 2017, results include CO₂ emissions generated by processes not subject to reporting under the Act on Promotion of Global Warming Countermeasures but that emit 3,000 or more tonnes of CO₂. Overseas, of the companies that emitted over 7,000 tonnes of CO₂ from energy use in fiscal 2016, four reported emissions of CO₂ and other GHGs from other than energy use and calculated their figures in accordance with the laws and regulations of their respective countries.</p>
	NO _x	Tonnes The total amount of nitrogen oxides originating from facilities specified in the Air Pollution Control Act. Calculated as: Each facility's dry gas emission volume × NO _x (N ₂ O) concentration.
	SO _x	Tonnes The total amount of sulfur oxides originating from facilities specified in the Air Pollution Control Act. Calculated as: Amount of sulfur in fuel used by each facility × Amount of fuel used. Or calculated as: Each facility's dry gas emission volume × SO _x (SO ₂) concentration.
	Soot and dust	Tonnes The total amount of soot and dust originating from facilities specified in the Air Pollution Control Act. Calculated as: Each facility's dry gas emission volume × Soot and dust concentration.
Substances Subject to the PRTR Act	Atmospheric emissions, water pollutant emission	Tonnes Calculated based on the amended Order for Enforcement of the Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (amended Order for Enforcement of the PRTR Act), executed on April 1, 2010.
Logistics	Usage amount (Boundary: Sumitomo Chemical)	Thousand kl of crude oil The energy usage amount is calculated as 10 GJ = 0.258 kl of crude oil, based on the Energy Saving Act Guide Book for Shippers written and edited by Japan's Agency for Natural Resources and Energy.
	CO ₂ emissions (Boundary: Sumitomo Chemical)	Thousand tonnes of CO ₂ Calculated based on the Manual for Calculation and Report of Greenhouse Gas Emissions (Ver. 4.1) from Japan's Ministry of the Environment and Ministry of Economy, Trade and Industry using the energy usage amount calculated above in GJ.
Scope 3 Greenhouse Gas Emissions (Sumitomo Chemical and Group companies listed in Japan)	Category 1: Purchased goods and services	Tonnes of CO ₂ Σ[(Volume and monetary amount of goods and services purchased and acquired × Emission intensity)] Values used for emission intensity (volume) are based on the values outlined in the Basic Database for Carbon Footprint Communication Programs Version 1.01. Values used for emission intensity (monetary amount) are based on the values outlined in the Database on Emission Intensities for Calculating Organizational Greenhouse Gas Emissions, etc. through a Supply Chain Version 2.5 March 2018.
	Category 2: Capital goods	Tonnes of CO ₂ Σ[(Value of capital goods) × (Emission intensity)] Values used for emission intensity are based on the values outlined in the Database on Emission Intensities for Calculating Organizational Greenhouse Gas Emissions, etc. through a Supply Chain Version 2.5 March 2018.
	Category 3: Fuels and energy-related activities not included in Scope 1 or 2	Tonnes of CO ₂ Σ[(Amount of electricity purchased) × (Emissions intensity)] + Σ[(Amount of heat purchased) × (Emissions intensity)] + Σ[(Amount of each fuel used) × (Emissions intensity for each fuel)] Values used for emission intensity are based on the values outlined in the Database on Emission Intensities for Calculating Organizational Greenhouse Gas Emissions, etc. through a Supply Chain Version 2.5 March 2018 and the Basic Database for Carbon Footprint Communication Programs Version 1.01.
	Category 4: Upstream transportation and distribution	Tonnes of CO ₂ Refer to the calculation method for CO ₂ emissions under logistics.
	Category 5: Waste generated in operations	Tonnes of CO ₂ Σ[(Amount of waste by type and processing method (incinerating, disposing of in landfills, recycling, disposing of in landfills) × CO ₂ emissions intensity of waste by type and processing method)] Waste by type and Unit CO ₂ emissions intensity by processing method are based on the values outlined in the Database on Emission Intensities for Calculating Organizational Greenhouse Gas Emissions, etc. through a Supply Chain Version 2.5 March 2018.
	Category 6: Business travel	Tonnes of CO ₂ By mode of travel: Σ(Expenses paid for transportation × Emission intensity) Values used for emission intensity are based on the values outlined in the Database on Emission Intensities for Calculating Organizational Greenhouse Gas Emissions, etc. through a Supply Chain Version 2.5 March 2018.
	Category 7: Employee commuting	Tonnes of CO ₂ By mode of commuting: Σ(Expenses paid for transportation × Emission intensity) Values used for emission intensity are based on the values outlined in the Database on Emission Intensities for Calculating Organizational Greenhouse Gas Emissions, etc. through a Supply Chain Version 2.5 March 2018.

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Scope 3 Greenhouse Gas Emissions (Sumitomo Chemical and Group companies listed in Japan)	Category 8: Upstream leased assets	Tonnes of CO ₂	Calculations of emissions from leased vehicles: $\Sigma(\text{Amount of gasoline consumed annually per vehicle} \times \text{Emission intensity})$ The amount of gasoline consumed annually per vehicle is calculated using the Annual Report on Automobile Transportation Statistics. Values used for emission intensity are based on the efficiency indicators outlined in the Accounting, Reporting, and Disclosure System of the Act on Promotion of Global Warming Countermeasures.
	Category 9: Downstream transportation and distribution	Tonnes of CO ₂	Refer to the calculation method used for CO ₂ emissions in the logistics section above. Calculations are for fertilizer products for which the suppliers are known and that are sold to consumers as final products.
	Category 10: Processing of sold products	Tonnes of CO ₂	Exempted: The Group's products are mainly materials and components used for various applications, which makes it difficult to know such details as the nature of the processing products undergo after delivery. Based on the calculation guidelines for the chemical industry created by the WBCSD, the Group is exempted from this category.
	Category 11: Use of sold products	Tonnes of CO ₂	Calculations are for the pharmaceutical product fixed-dose mist inhalers as well as fertilizer products for which GHG emissions levels are known and that are sold to consumers as final products. $\Sigma(\text{Fertilizer sales volume by type} \times \text{Percentage of nitrogen in fertilizers by type} \times \text{N}_2\text{O efficiency indicator by type} \times 298 (\text{GWP}))$ $\Sigma(\text{HFC volume in fixed-dose mist inhalers} \times \text{GWP})$ Values for GWP are based on efficiency indicators listed in Appendix 15 under the Calculation Method and Efficiency Indicator Chart in the Accounting, Reporting, and Disclosure System of the Act on Promotion of Global Warming Countermeasures.
	Category 12: End-of-life treatment of sold products	Tonnes of CO ₂	Calculations are for the Group's main resin-related products. $\Sigma\{(\text{Production volume of resin-related products}) \times (\text{Emission intensity})\}$ Values used for emission intensity are based on the values outlined in the Database on Emission Intensities for Calculating Organizational Greenhouse Gas Emissions, etc. through a Supply Chain Version 2.5 March 2018.
	Category 13: Downstream leased assets	Tonnes of CO ₂	Exempted: There are no relevant leased assets.
	Category 14: Franchises	Tonnes of CO ₂	Exempted: There are no relevant operations.
Category 15: Investments	Tonnes of CO ₂	Exempted: Because Sumitomo Chemical changed its approach to financial control consolidation for disclosure purposes from fiscal 2017, the Group is now exempted from this category.	

Social and Economic Data Indicator		Unit	Calculation Method
Occupational Safety and Health	Frequency rate of lost-workday injuries	—	$(\text{Number of lost-workday injuries and casualties} \div \text{Cumulative total of hours worked}) \times 1,000,000$

Environmental Accounting Indicators		Unit	Calculation Method
Environmental Protection Costs		100 million yen	Costs include depreciation.
Economic Effects	Reduced costs through energy saving	100 million yen	Reduced costs of energy through energy-saving activities.
	Reduced costs through resource saving	100 million yen	Reduced costs of waste processing attributable to resource-saving activities.
	Reduced costs through recycling activities	100 million yen	Reduced costs in the previous fiscal year of waste processing expenses through waste reduction attributable to recycling activities and gains on sales of valuable resources obtained from recycling, etc.