Calculation Standards for Environmental and Social Data Indicators

1. Period: April 2016 to March 2017
2. Scope: Refer to Boundary of This Report on page 2 of the *Sustainability Data Book 2017*.
3. Calculation Method:

Environmental Data Indicator		Unit	Calculation Method
Energy	Fuel, heat, and electricity	Thousand kl of crude oil	((Amount of electricity purchased × Per-unit heating value + Amount of heat purchased × Per-unit heating value) + ∑(Amount of each fuel used × Per-unit heating value for each fuel)) × 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. The energy usage amount by Sumitomo Joint Electric Power Co., Ltd., a company engaged in power business activities, includes the amount of fuel used internally but does not include the energy usage amount by the production of power and steam sold to external parties.
	Energy consumption	Thousand kl of crude oil	((Amount of electricity purchased × Per-unit heating value + Amount of heat purchased × Per-unit heating value) + ∑(Amount of each fuel used × Per-unit heating value for each fuel) × 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. The heating value used overseas is also based on the values outlined in the Japanese law, except for that used by a few Group companies, which employ values set out by the laws of the country in which they operate.
Amount of Exhaustible Resources Used	Hydrocarbon compound	Thousand tonnes	Total amount of hydrocarbon compounds used as raw materials (only raw materials purchased from outside the Sumitomo Chemical Group).
	Metals (excluding rare metals)	Thousand tonnes	Total amount of metals, excluding rare 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).
	Rare metals	Thousand tonnes	Total amount of rare 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.
PCB/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 (excluding the power and steam sold to parties outside the Sumitomo Chemical Group by Sumitomo Joint Electric Power Co., Ltd., a company engaged in power business activities) 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 × 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 × 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 × The amount of water drained into public water bodies and sewer systems from each drain.
Waste Materials	Waste discharge 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 - Total 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. (The landfill disposal amount for Sumitomo Joint Electric Power Co., Ltd. is included.)
Atmospheric Emissions	CO_2 emissions from energy use	Thousand tonnes of CO_2	Amount of electricity purchased × CO_2 emission coefficient for electricity + Amount of steam purchased × CO_2 emission coefficient for steam + ∑(Amount of each fuel used × Per-unit heating value for each fuel × CO_2 emission coefficient for each fuel) The CO_2 emission coefficient for electricity, CO_2 emission coefficient for steam, per-unit heating value for each fuel, and CO_2 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 CO_2 emission coefficient for electricity uses the values for each fiscal year by electric power company.

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Environmental Data Indicator		Unit	Calculation Method
Atmospheric Emissions	CO_2 emissions from energy use	Thousand tonnes of CO_2	Amount of electricity purchased × CO_2 emission coefficient for electricity + Amount of steam purchased × CO_2 emission coefficient for steam + Amount of each fuel used × Per-unit heating value for each fuel × CO_2 emission coefficient for each fuel **Sumitomo Chemical and Group companies in Japan:** The CO_2 emission coefficient for electricity, CO_2 emission coefficient for steam, per-unit heating value for each fuel, and CO_2 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 CO_2 emission coefficient for electricity uses the values for each fiscal year by electric power company. **Group companies overseas:** The CO_2 emission coefficient for electricity is based on values such as the statistical data promulgated by the national government where each Group company is located. The CO_2 emission coefficient for steam, per-unit heating value for each fuel, and CO_2 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.
	CO_2 and N_2O emissions from other than energy use	Thousand tonnes of CO_2	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.
	NOx	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 × NOx (N_2O) concentration.
	SOx	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 × SOx (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 (Scope: Sumitomo Chemical (non-consolidated))	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 (Scope: Sumitomo Chemical (non-consolidated))	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 (Non-Consolidated))	Purchased goods and services	Tonnes of CO_2	∑(weight of raw materials purchased (by type) × CO_2 emission intensity by raw material type) The weight of raw materials purchased (by type) covers roughly 94% of the total amount (weight basis) of raw materials purchased by the Company. Values used for CO_2 emission intensity by raw material type are based on the Basic Database for Carbon Footprint Communication Programs Version 1.01.
	Fuels and energy-related activities not included in Scope 1 or 2	Tonnes of CO_2	Amount of electricity purchased × Unit CO_2 emissions intensity + Amount of heat purchased × Per-unit CO_2 emissions intensity + ∑(Amount of each fuel used × Unit CO_2 emissions intensity for each fuel) Unit CO_2 emissions intensity of Electricity and Heat and Unit CO_2 emissions intensity for each fuel are based on the values outlined in the Database on Emission Intensities for Calculating Organizational Greenhouse Gas Emissions, etc. through a Supply Chain Version 2.4 March 2017 and the Basic Database for Carbon Footprint Communication Programs Version 1.01.
	Upstream transportation and distribution	Tonnes of CO_2	Refer to the calculation method for CO_2 emissions under logistics.
	Waste generated in operations	Tonnes of CO_2	∑(Waste by type × Amount by processing method (incinerating, disposing of in landfills, recycling, disposing of in landfills) × Unit CO_2 emissions intensity by 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 2.4 March 2017.
	Use of sold products	Tonnes of CO_2	∑(Fertilizer sold by type × Percentage of nitrogen in fertilizer by type × N_2O emission coefficient by type × (298(GWP)) Of Sumitomo Chemical's products, only fertilizers sold to consumers as an end product are subject to calculation. The calculations use the 15 N_2O emission coefficient values by category (presented separately) outlined in the List of Accounting Methods and Emission Coefficients of the Accounting, Reporting, and Disclosure System based on the Act on Promotion of Global Warming Countermeasures.

Social and Economic Data Indicator		Unit	Calculation Method
Occupational Safety and Health	Frequency rate of lost-workday injuries	–	(Number of lost-workday injuries and casualties ÷ Cumulative total of hours worked) × 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.