

Valmet GHG Inventory

tCO2	Baseline 2019	SBTi Target 2030	Emissions 2019	Emissions 2020	Emissions 2021	Emissions 2022	% of total CO2 emissions	Description of the calculation principle and data quality assessment
Scope 1	21,500		17,632	19,131	21,549	21,133	24%	Scope 1 emissions are based on default CO2 emission factors for combustion from the "2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy". The 2019 baseline is calculated based on emission data from 2019 for Valmet ad Neles (Valmet merged with Neles on 1 April 2022) and data from acquisitions from 2019-2021.
Scope 2, market based	108,900		85,049	87,338	81,216	65,138	76%	4 The following emissions factors have been applied to the 2019 data: "eGRID 2019 Subregion GHG Output Emission Rates" (United States Environmental Protection Agency), "China eGRID 2019 Emission Output Rates" (Clean Development Mechanism China), "CO2 emission factors of the National Interconnected System of Brazil" for 2019 (Brazilian Technology and Science Ministry) and "European Residual Mixes 2019" (Association of Issuing Bodies). The following emissions factors have been applied to the 2020 and 2021 data: "eGRID 2019 Subregion GHG Output Emission Rates" (United States Environmental Protection Agency), "China eGRID 2019 Emission Output Rates" (Clean Development Mechanism China), "CO2 emission factors of the National Interconnected System of Brazil" for 2020 (Brazilian Technology and Science Ministry), "European Residual Mixes 2020" (Association of Issuing Bodies) for electricity in Europe and "International Energy Agency (IEA) (2020) Emission Factors" for district heating in Europe. The following CO2 conversion factors have been applied to the 2022 data: "eGRID 2020 Subregion GHG Output Emission Rates" (United States Environmental Protection Agency), "China 2022 Emission Factors" (China Ministry of Ecology and Environment) for China (excluding Shanghai area), "China Shanghai 2022 Emission factors" (China Shanghai Ecological Environment Bureau) for China Shanghai area, "CO2 emission factors for Brazil" for 2022 (Brazilian Science, Technology and Innovation ministry), "Annual average CO2 factors" for 2022 (Chile Energia Abierta - National energy commission) for Chile, "European Residual Mixes 2021" (Association of Issuing Bodies) for electricity and steam in Europe and "International Energy Agency (IEA) (2020) Emission Factors" for district heating in Europe. Supplier-specific CO2 conversion factors were applied for electricity consumption in Canada; France; Indonesia; Lenox, the USA; Swiecie, Poland; and hydro-based electricity in Jiading, China, as well as for carbon neutral district heating in Finland and in Swiecie, Poland and solar energy consumption in Brazil, China and Finland. Contract-based specific CO2 conversion factors were applied for carbon neutral electricity in Scandinavia which is purchased with guarantees of origin. Location-based factors were applied in India, Saudi-Arabia, South Africa, South Korea, Thailand.
Scope 2, location based			59,800	60,500	73,400	76,400		Location-based CO2 emission factors are based on 2018 emissions as given by the "International Energy Agency (IEA) (2020) Emission Factors". Data for 2020 has been restated due to minor updates in the emission factors.
Total Scope 1&2	130,400	26,080	102,681	106,469	102,765	86,271	0.1%	
Scope 3 (tCO2e)								
Category 1	1,441,000	1,152,800	1,200,225	1,094,267	1,656,122	2,237,000	2.9%	i) Valmet has assessed its Scope 3 emissions based on GHG Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard. The analysis is based on monetary value of purchased goods and services by supplier by category and supplier country. (ii) Data quality is fair. Data quality has been assessed based on GHG Protocol's Corporate Value Chain Accounting and Reporting Standard. The biggest source of uncertainty are the emission factors (fair). Purchase data is based on Valmet's internal data systems and is relatively reliable (good). (iii) Conversion factors from Exiobase are used to calculate the CO2 emissions based on monetary flows. The emission flows have been calculated based on environmentally extended input output analysis and emission factors from Exiobase (www.exiobase.eu). The data include direct purchase order amount.
Category 2	79,716		66,387	86,982	79,723	105,557	0.1%	Valmet's gross capital expenditure (excluding acquisitions) in 2022 totaled EUR 112 million (2019: EUR 97 million), of which maintenance investments were EUR 37 million (2019: EUR 37 million). When compared to Valmet's external purchases (2022: 3.259MEUR), capital goods spend is not relevant.
Category 3	24,239		19,884	20,419	18,988	15,229	0.0%	The emissions have been calculated based on the breakdown of Valmet's energy consumption by country and source. The emission factors from DEFRA have been utilized. The calculated emissions cover the same sources of energy as scope 1 and 2 calculations.
Category 4	63,097	50,478	52,224	49,501	50,771	56,356	0.1%	The analysis of upstream and downstream transportation and distribution emissions is based on suppliers' CO2 emission reports (share of suppliers' CO2 reports in 2022: 30%), and when not available, the monetary value of purchased transportation services following the same calculation methodology as for Scope 3 category 1 emissions. Data quality is fair. Data quality has been assessed based on GHG Protocol's Corporate Value Chain Accounting and Reporting Standard. The biggest source of uncertainty is the emission factors (fair). Purchase data is based on Valmet's internal data systems and is relatively reliable (good).
Category 5	202		196	222	211	217	0.0%	Valmet has assessed the CO2 emissions from the disposal of waste generated in operations. Waste generated are mostly reused (27%), recycled (38%), energy recovered or incinerated (25%). Small share is landfilled or composted, deep well injected or onsite stored (10%).
Category 6	47,253	33,077	40,689	15,348	17,525	36,867	0.0%	The analysis of business travel emissions is based on emission, mileage and spend data from travel agencies and internal systems. Travel agencies' CO2 reports cover around 40% (2019: 70%) of reported emissions in 2022. The calculation includes air and rail travel, rented cars, compensated mileages and hotel nights. Business travel calculations at Valmet includes travelling by air, rented vehicle and compensated mileages as well as hotel nights. (ii) Data quality is fairly good. The data used covers 97 percent of Valmet's global workforce in 2022.
Category 7	47,511		38,985	40,269	40,843	50,310	0.1%	Valmet has assessed the CO2 emissions from employee commuting.
Category 8	25,852		16,250	16,250	16,500	26,250	0.0%	Valmet has assessed the CO2 emissions from Upstream Leased Assets.
Category 9	108,842		90,086	85,389	87,580	92,988	0.1%	The emissions from downstream transportation and distribution are based on monetary value of transportation spend and supplier CO2 reports. Suppliers' CO2 reports cover around 30 percent of reported emissions in 2022. The distribution of transportation modes and emission intensity from upstream transportations (category 4) has been applied for downstream transportations. The downstream transportation (category 9) is estimated to be around 60 percent of the total transportation emissions paid by Valmet. The downstream transportation and distribution emissions figure is also including the transportations paid by Valmet's customers, which has been estimated to be 10% of Valmet's total transportation spend. Tank-to-Wheel is estimated to be 24% less than Well-to-Wheel emissions. See also cat 4. explanation.
Category 10	0		0	0	0	0	0.0%	Valmet is not selling any intermediate products to downstream companies; thus the number of intermediate products is zero (0).
Category 11	27,715,109	13,857,555	27,715,109	54,141,325	70,971,468	73,950,824	96.5%	The CO2 calculation is based on Valmet's average product-specific energy consumption and product specifications, including delivered capacity, and intended fuel mix. The IEA Scenario for current policies (STEPS) power sector emission intensity reduction (CAGR) is utilized in projecting the lifetime emissions for electricity and steam. Quantifying and projecting the future emissions from use of sold products involves many assumptions, and the actual emissions from the use of sold products largely depend on the choices our customers make. For these reasons, the figure reported is an estimate to understand the magnitude of category 11 lifetime emissions, which represents more than 95 percent of Valmet's value chain emissions. Lifetime emissions are calculated for direct use-phase emissions from products that directly consume energy (fossil fuels, steam or electricity) or produce process GHG-emissions during the use of the product. Most of the life cycle CO2 emissions arise during their use phase of our technologies (not applicable to pulp mills). For paper machines, power plants and other similar products the use phase can contribute to over 95% of life cycle CO2 emissions, dependent largely on choices made by our customers. i) Lifetime emissions calculation is based on Valmet data on average product specific energy consumption and product specifications including delivered capacity and intended fuel mix. Lifetime emissions from electricity and steam consumption are based on IEA data and scenarios for power sector emissions intensity. ii) Data quality is fair. Quantifying and projecting the future emissions from use of sold products involves a large number of assumptions and the actual emissions from use of sold products are largely dependent on choices made by our customers. For these reasons, the figure estimated is an estimate to understand the magnitude of category 11 emissions and to define the base year for SBTi targets. Valmet is also developing it's methods to have more complete and accurate data for projecting the emissions from use of sold products. iii) Data regarding the GHG-emissions of our products are from product specifications and case by case basis taking into consideration customer specific aspects. The data include Valmet's entire sold paper, board and tissue production lines, fossil-fired fluidizer bed boilers and lime kilns, during their expected lifetime (25 years), excluding basic machine unit assembly groups and smaller equipment deliveries. The CO2 calculation is based on Valmet's average product-specific energy consumption and product specifications, including delivered capacity and intended fuel mix. N2O and CH4 included from biomass combustion in pulp and energy production. CO2 emissions from electricity are calculated based on the IEA (2020) country-specific emission factors. CO2 emissions from steam are calculated based on Fisher International installed base fuel mix data. Emission factors for fuels are based on IPCC, Defra and Statistics Finland. The IEA Scenario for current policies (STEPS) power sector emission intensity reduction (CAGR) is utilized in projecting the lifetime emissions for electricity and steam. The included paper, board and tissue machines represent 71 percent of Paper (PAP) business line's total orders received in 2020-2022, excluding basic machine unit assembly groups and smaller equipment deliveries. The fossil-fired boilers and lime kilns represent 24 percent of Pulp and Energy (P&E) business line's 2020-2022 orders received. The remaining 76 percent of P&E's orders received is assumed to be carbon neutral (incl. bioenergy self-sufficient pulp mills and biomass-fired boilers). The share of total orders received is calculated based on a three-year average (2020-2022) to balance the annual differences between project revenue realizations. The data used cover 86 percent of Valmet's three-year average of total PAP and P&E orders received. Valmet's Services, Automation Systems and new Flow Control business line products are excluded from the calculation as their impact to the total use phase CO2 emissions are insignificant (estimated that less than 5%) comparing to Paper and Pulp and Energy business line products.
Category 12	0		0	0	0	0	0.0%	Valmet's products consist almost completely of steel, which can be recycled after use. There recycling of steel has negative carbon footprint according to data provided by Worldsteel.
Category 13	0		0	0	0	0	0.0%	Based on our assessment the number of Valmet's downstream leased assets is zero (0).
Category 14	0		0	0	0	0	0.0%	Valmet has no franchising business. Thus, the number of relevant operations is zero (0).
Category 15	3,699		2,869	3,025	3,182	4,104	0.0%	Valmet has assessed the CO2 emissions from investments.
Total	29,686,921		29,345,584	56,259,466	73,045,677	76,661,971	100%	