

2023 Basis of Reporting

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OVERVIEW

Merck & Co. Inc., known as MSD outside of the United States and Canada, is committed to reporting complete and accurate environmental data to the greatest extent possible. ERM CVS provided independent limited assurance to our Company for select 2023 greenhouse gas (GHG) emissions and water metrics, which are included in our 2023/2024 Impact Report and 2024 CDP Corporate Integrated Questionnaire. The purpose of this document is to outline the approach and scope used to quantify the GHG emissions and water performance data included in the 2023 limited assurance scope of work.

SCOPE / BOUNDARY

The metrics included cover our activities from January 1, 2023 - December 31, 2023.

The operational control approach is used to account for GHG emissions, water supply, consumption, and discharge from our facilities globally. All facilities under our operational control in 2023 were included. Facilities incorporated in the Environmental Data Collection (EDC) program are known as “EDC Sites”. All other company-owned and leased facilities are known as “Non-EDC” sites.

No new acquisitions nor divestments occurred in 2023.

GHG EMISSIONS

SCOPE 1

Definition	<p>Direct emissions resulting from on-site combustion of stationary and mobile sources and fugitive emission releases.</p> <p><i>Stationary Sources</i> - Powerhouse operations comprise most of the direct emissions. Environmental control units (i.e., incinerators) are additional sources of emissions of these greenhouse gases.</p> <p><i>Mobile Sources</i> - Vehicle fleet and air fleet</p> <p><i>Fugitive Emission Sources</i> - Refrigeration units and HVAC systems</p>
Units	Metric tons (CO ₂ e)
Source	Energy and fugitive emission data is tracked in the company EHS enterprise software (Enablon). The Enablon database is managed by

	Global Safety & Environment (GSE) and is the basis for company reporting and for measuring progress toward achieving corporate energy and GHG reduction goals.
Calculation Methodology	<p>GSE Environmental Sustainability Center of Excellence (CoE) uses data collected by the enterprise to quantify the Company GHG emissions according to the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition). Where necessary, emission factors are updated to AR5. The following approaches are used to quantify GHG emissions from the various sources at the Company facilities:</p> <ul style="list-style-type: none"> • Direct emissions from natural gas are quantified by compiling natural gas usage via bills and/or meter readings issued to each facility and applying the “Natural Gas” emission factor found on Table 1 EPA Climate Leaders GHG Inventory (last modified February 13, 2024). • Direct emissions from the combustion of fuel oil, kerosene, liquefied petroleum gas (LPG) and other fuels are quantified by compiling fuel delivery quantities and/or fuel bills and applying emissions factors listed below: <ul style="list-style-type: none"> ○ “Diesel” emission factor is based on “Distillate Fuel Oil No. 2” found on Table 1 EPA Climate Leaders GHG Inventory (last modified February 13, 2024) ○ “Kerosene” emission factor is based on “Kerosene” found on Table 1 EPA Climate Leaders GHG Inventory (last modified February 13, 2024) ○ “LPG” emission factor is based on “Liquefied Petroleum Gases (LPG)” found on Table 1 EPA Climate Leaders GHG Inventory (last modified February 13, 2024). ○ “Propane Gas” emission factor is based on “Propane Gas” found on Table 1 EPA Climate Leaders GHG Inventory (last modified February 13, 2024). ○ “No. 2 Fuel Oil” and “Other Fuel” emission factor is based on “Distillate Fuel Oil No. 2” found on Table 1 EPA Climate Leaders GHG Inventory (last modified February 13, 2024) ○ “Other Waste” is based on “Municipal Solid Waste” found on Table 1 EPA Climate Leaders GHG Inventory (last modified February 13, 2024) and converted to tons. ○ “Solvent for Destruction” and “Solvent for Energy” are based on the HV from the sites, which is 0.125 MMBTU/gal, and is equivalent to the emission factor for Motor Gasoline on Table 1 EPA Climate Leaders GHG Inventory (last modified February 13, 2024).

	<ul style="list-style-type: none"> ○ “Biomass” emission factor is based on “Wood and Wood Residuals” found on Table 1 EPA Climate Leaders GHG Inventory (last modified February 13, 2024). • Direct emissions associated with fugitive sources are based on refrigerant replacement records and are quantified by applying IPCC AR5 Global Warming Potentials (GWP’s). For refrigerant blends, the IPCC AR5 GWP factors and US EPA SNAP “Percentage Composition of Substitute Refrigerant Blends” table are used. In cases where the GWP is not available, the manufacturer’s GWP factor is used. • Direct emissions from the vehicle fleet are quantified using total miles driven and applying emissions factors based on “Motor Gasoline” found in Table 2 and “Gasoline Passenger Cars” found in Table 3 EPA Climate Leaders GHG Inventory (last modified February 13, 2024). Motor gasoline emission factor is used to for converting fleet miles to kg CO₂e, assuming 23 mpg (e.g., 8.78/23 mpg). • Direct emissions from our aviation fleet are quantified using gallons of jet fuel consumed and applying emissions factors based on “Kerosene-Type Jet Fuel” found in Table 2 and “Jet Fuel” in Table 5 EPA Climate Leaders GHG Inventory (last modified February 13, 2024). • Direct emissions from Non-EDC sites use total square footage to estimate their natural gas use. This energy is assumed to be split with 33.3% being natural gas consumption for heating in accordance with EPA Energy Star assumptions. Where square footage was not available, the average size location is calculated using the average of our known Non-EDC site square footage. The average size location value is then substituted back into those locations that had no data available to use as an estimate.
<p>Assumptions / Exclusions</p>	<ul style="list-style-type: none"> • Where data is available, process emissions from Thermal Oxidizers are used in place of the calculated natural gas emissions. Natural gas emissions that are associated with Thermal Oxidizers are removed from the emissions total, and substituted with specific emissions from the Thermal Oxidizer. • Where Thermal Oxidizer data is not available, CO₂e emissions from the fuel used in these units are already captured, but the CO₂e emissions from combustion of solvent vapor are not tracked by sites. It is estimated that these emissions will contribute much less than 1% of the corporate emissions.

	<ul style="list-style-type: none"> • Process emissions from acetylene cylinders are not included in our Scope 1 emissions. A small number of facilities have acetylene cylinders on-site. It is estimated that these emissions will contribute much less than 1% of the corporate emissions. • Only CH₄ and N₂O are reported in our Scope 1 emissions for the biomass metric.
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SCOPE 2 (MARKET-BASED & LOCATION-BASED)

Definition	Indirect emissions resulting from the purchase of electricity, cooling water and steam.
Units	Metric tons (CO ₂ e)
Source	Energy data is tracked in the company EHS enterprise software (Enablon). The Enablon database is managed by Global Safety & Environment (GSE) and is the basis for company reporting and for measuring progress toward achieving corporate energy and GHG reduction goals.
Calculation Methodology	<p>The Environmental Sustainability CoE uses data collected by the enterprise to quantify the Company GHG emissions according to the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition). Where necessary, emission factors are updated to AR5. The following approaches are used to quantify GHG emissions from the various sources at the Company facilities:</p> <ul style="list-style-type: none"> • Indirect emissions from electricity usage are quantified by compiling meter readings or electric bills issued to each facility and applying emissions factors from those listed below: <ul style="list-style-type: none"> ○ 2023 eGRID (February 13, 2024); ○ Australia NGA Factors July 2023 (Table 1 EF Scope 2 emissions factors) ○ Canada National Inventory Report 1990 - 2021 -- Table A13-1 Electricity Generation and GHG Emission Details for Canada ○ 2023 IEA Emission Factors

	<ul style="list-style-type: none"> ○ 2022 EU Residual Mix Factors – Updated May 2023 (most recent available as of 5/26/23) ○ 2023 UK Defra factor for UK ○ Brazil: Year 2023 factors from the Ministry of Science, Technology, Innovation and Communication. Fator médio - Inventários corporativos: "Arquivos dos fatores médios de emissão de CO2 grid mês/ano" ○ India: CO2 factors from India Central Electricity Authority: CO2 Baseline Database, Version 19, November 2023 (Build Margin emission factor) <ul style="list-style-type: none"> ● Indirect emissions from steam are quantified based on the steam purchased applying emissions factors based on Table 7 EPA Climate Leaders GHG inventory (last modified February 13, 2024 ● Indirect emissions from cooling water are quantified based on the cooling water purchased and applying site specific emissions factors listed below: <ul style="list-style-type: none"> ○ Singapore: 0.3914 kg/KWH (Singapore 2023 IEA Emission Factor) x 0.238 (Energy Star table 2) x .00029308 KWH/BTU x 1 BTU/lb F x 8.34 lb/gal x 7.2 F (delta T) ○ Germany: 0.68403 kg/KWH (Germany EU Residual Emission Factor 2023) x 0.238 (Energy Star table 2) x .00029308 KWH/BTU x 1 BTU/lb F x 8.34 lb/gal x 6 F (delta T) (Germany Reports CW --- delta T ~ 6 F) ● Our Kenilworth facility has its own unique purchased electricity and steam factors based off the on-site 3rd party cogeneration unit and power purchase which avoids transmission line losses and therefore has a different emission factor than the regional eGrid factor. ● The Non-EDC sites' total square footage is used to estimate their purchased electricity. This energy is assumed to be split with 67.7% dedicated to electricity consumption in accordance with EPA Energy Star assumptions. Where square footage was not available, the average size location is calculated. The average size location value is then substituted back into those locations that had no data available to use as an estimate. ● Market-based emission factors where utility supplied renewable energy is purchased will reflect the adjusted emission factor. ● The energy attribute credits (EACs) from virtual power purchase agreements (VPPA's) are applied as per the allowable rules regarding regions for Renewable Energy. (For example, our Texas
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	ERCOT VPPA will allow the offset of Market-based emissions in the United States market, starting with the most intensive kg/CO ₂ e purchased electricity grid factor first. This rule follows any green building certifications (i.e., LEED) allocation commitments we make.
Assumptions / Exclusions	<ul style="list-style-type: none"> • Purchased steam assumes natural gas fuel is used to generate steam or heat at 80% thermal efficiency and is converted from kWh to MMBTu. •

SCOPE 3

Definition	<p>Indirect emissions resulting from our upstream & downstream activities, which include the following Scope 3 categories:</p> <ul style="list-style-type: none"> • Category 1 - Purchased Goods & Services • Category 2 - Capital Goods • Category 3 - Fuel-and-energy-related activities (not included in Scope 1 or 2) • Category 4 - Upstream transportation & distribution • Category 5 - Waste Generated in Operations • Category 6 - Business travel • Category 7 - Employee Commuting • Category 9 - Downstream transportation and distribution • Category 11 - Use of sold products • Category 12 - End of life treatment of sold products <p>ERM CVS provides limited assurance for Category 3, 11, and a percentage of Category 6. The other five Scope 3 categories not listed above are not relevant to our business and therefore not quantified.</p>
Units	Metric tons (CO ₂ e)
Source	<ul style="list-style-type: none"> • Spend-based methods (Category 1 (partially), 2, 4 (partially), 6 (partially), & 12) data is tracked via SAP • Fuel and waste-based methods (Category 3 & 5) data is tracked in the company EHS enterprise software (Enablon)

	<ul style="list-style-type: none"> • Employee-based method (Category 7) is estimated using employee data from the Company Form-10K • Product-specific method (Category 11) data is tracked by the manufacturing sites and tracking of sales data • Category 6 & 4 both include primary data from select vendors • Category 9 is based off information from wholesalers
Calculation Methodology	<p>The Environmental Sustainability CoE uses data collected by the enterprise to quantify the Company GHG emissions according to the World Resources Institute (WRI) Corporate Value Chain (Scope 3) Accounting and Reporting Standard. Where necessary, emission factors are updated to AR5. The following approaches are used to quantify GHG emissions from the various sources at the Company facilities:</p> <ul style="list-style-type: none"> • <i>Category 1 - Purchased Goods & Services:</i> An Economic Input-Output model calculation was performed using our 2023 third-party spend data and primary activity-based data provided directly from suppliers. • <i>Category 2 - Capital Goods:</i> An Economic Input-Output model calculation was performed using our 2023 third-party spend data. • <i>Category 3 - Fuel-and-energy-related activities (not included in Scope 1 or 2):</i> Emissions are based on emission factors from the Argonne National Laboratory's GREET 2023 Model (https://greet.es.anl.gov/) and is used in conjunction with Company fuel and energy use data. Fuel mix data was obtained from IEA 2023 "Electricity & Heat" database. Calculations include WTT for all fuel consumed, WTT and T&D for purchased electricity and steam, and WTT T&D for purchased electricity. Purchased electricity and steam T&D losses (other than UK) utilize the 2017 T&D- overseas electricity factors, while the UK utilizes the 2023 T&D- UK electricity factor. • <i>Category 4 - Upstream transportation & distribution:</i> Emissions are based on primary activity-data provided to us by our vendors and an Economic Input-Output model calculation using our 2023 spend data. • <i>Category 5 - Waste Generated in Operations:</i> Waste generated in operations is used with the US EPA WARM Model (v16.1) • <i>Category 6 - Business travel:</i> Most of our data for air, rail, train, car rental and hotel stays are provided by our primary travel vendor. Primary air travel and hotel stay data utilized 2023 DEFRA factors.

	<p>Primary rail and car rental data utilized emission factors from the EPA Climate Leaders GHG inventory (last modified February 13, 2024) adjusted to AR5. Employee reimbursable mileage emissions are calculated based on mileage records and the emission factor from “Motor Gasoline” found in Table 2 EPA Climate Leaders GHG Inventory (last modified February 13, 2024). The non-primary travel vendor data emissions were based on our company's 2023 third party spend data and an Economic Input-Output Model performed by Climate Earth, Inc. Limited Data Assurance was granted for a percentage of our emissions calculated from primary travel vendor data and employee reimbursable travel mileage data. The total reported here includes non-primary travel vendor data emissions and modelled data.</p> <ul style="list-style-type: none"> • <i>Category 7 - Employee Commuting:</i> The methodology involves the assumption that our employees drive an average of 10,000 miles per year. A fuel efficiency value was assumed per gallon used. These values were applied across the world and then multiplied by the number of employees listed in our Form 10-K. The calculation methodology was multiplied by 60% to accommodate the rate employees are working through a hybrid model. • <i>Category 9 - Downstream transportation and distribution:</i> This category includes transportation and distribution through our product wholesalers, direct mailing with localized distribution and transportation as well as customer pick-up. The shared emissions from our transportation and distribution wholesalers was determined to be the largest portion of the impact. The calculation methodology was changed for 2023 reporting. We had previously used our “Upstream transportation and distribution” spend as a surrogate for the for the downstream impacts, calculated through the WRI GHG Protocol Quantis Tool, however this tool is no longer supported. We calculated our impacts using primary activity-data for the weight of products shipped via our wholesalers at the country level. We determined the average number of kilometers our products traveled via each mode of transportation. We used the 2023 UK Defra tonne.km factors to determine the impacts instead of utilizing a co-product allocation methodology. • <i>Category 11 - Use of sold products:</i> This category currently includes our Animal Health products Engemycin®, Neo CAF®, Oxytetrin® LA. These products use propane as a propellant for administration. We utilized the LPG emission factor from the EPA Climate Leaders GHG inventory (last modified February 23, 2024)
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	<p>adjusted to AR5. Biomark and HyperInfusion products utilize technical specification data sheets to estimate lifetime energy use. We utilize the Average USA CO2e eGrid factor (last modified February 23, 2024) adjusted to AR5.</p> <ul style="list-style-type: none"> • <i>Category 12 - End of life treatment of sold products:</i> Emissions are based on packaging spend data, assuming a certain make-up of packaging materials based off the category description. The estimated tons of waste are then entered into US EPA WARM Model (v16.1) .
<p>Assumptions / Exclusions</p>	<ul style="list-style-type: none"> • “Waste Generated in Operations” value represents the metric tons of CO2eq emitted from company waste that was "landfilled" and "combusted". The value does not include waste that was "recycled" or "composted" which resulted in negative values. • Business travel reimbursable mileage assumes an average mileage of 23 mpg. • Business car travel data provided by vendor includes “car days” instead of miles. We assume 91 miles driven per day. • “End of Life Treatment” value represents the estimated metric tons of CO2eq emitted from our company’s containers and packaging that was estimated to be “landfilled” and “combusted” in 2022 by the end users. The value does not include waste that was recycled or composted which resulted in carbon negative values. • Category 11, Use of Sold Products, includes emissions from the use of our Animal Health products Engemycin®, Neo CAF®, Oxytetrin® LA as well as relevant Biomark and HyperInfusion products. • Category 3 does not include the T&D losses from purchased cooling water, as the impacts are insignificant.

WATER

WATER WITHDRAWAL

<p>Definition</p>	<p>Total volume of water withdrawn from the following sources:</p> <ul style="list-style-type: none"> • Fresh surface water • Brackish/sea water • Groundwater
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	<ul style="list-style-type: none"> • Third Party <p><i>Total Fresh Surface Water</i> - Volume of water supplied to the site via fresh surface water source. Fresh surface water includes water that occurs naturally including rivers, streams, and lakes.</p> <p><i>Total Brackish/ Seawater</i> - Volume of water supplied to the sites via fresh brackish or seawater water source. Brackish or seawater includes oceans, brackish bays, and saltwater estuaries.</p> <p><i>Total Groundwater</i> - Volume of water supplied to the site via groundwater source.</p> <p><i>Total Third party</i> - Volume of water supplied to the site via a public supply.</p>
Units	Million m ³
Source	Water withdrawal data is tracked in the company EHS enterprise software (Enablon). The Enablon database is managed by Global Safety & Environment (GSE) and is the basis for company reporting and for measuring progress toward achieving the corporate water use goal.
Calculation Methodology	<p>GSE Environmental Sustainability Center of Excellence (CoE) uses data collected by the enterprise to quantify the Company total water withdrawal. It is calculated by adding the volume of water withdrawn from the following sources: fresh surface water, brackish/sea water, groundwater and public supply.</p> <ul style="list-style-type: none"> • Non-EDC site water use is calculated based on square footage and application of an average water use and discharge factor (16 US gal/square foot). • The factor is derived based on a weighted square footage and water usage calculation by building uses identified in 2012 the United States Energy Information Administration (EIA) study - Commercial Building Energy Consumption Survey (CBECS). • This average water use factor will be calculated annually • 0.00378541 = gallons to cubic meter conversion factor
Assumptions / Exclusions	<p>Assumptions - water use and water discharge are the same value for Non-EDC sites.</p> <p>Exclusions - rainwater is excluded from water use calculations.</p> <p>Rainwater - Total volume collected from this source - Report rainwater only if a portion of a metered discharge point contains significant</p>

	amounts rainwater. In this case, estimate the volume discharged at the metered point if it is combined with wastewater and report as supply to the site.
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WATER DISCHARGE

Definition	<p>Total volume of water discharged to the following receptors:</p> <p><i>Fresh Surface Waters</i> - Total Volume of Water Discharged to This Receptor - Volume of water leaving the facility directly to fresh surface waters. Fresh surface water includes water that occurs naturally including rivers, streams, and lakes. It does not include discharges to brackish or sea waters.</p> <p><i>Ground Water</i> - Total Volume of Water Discharged to this Receptor - Volume of water leaving the facility directly to ground water. Groundwater includes any subsurface waters.</p> <p><i>Brackish or Sea Water</i> - Total Volume of Water Discharged to this Receptor - Volume of water leaving the facility directly to brackish or seawater. Brackish or seawater includes oceans, brackish bays, and saltwater estuaries.</p> <p><i>Volume of Water Discharged to a Third Party</i> - Volume of water leaving the facility to a municipal or non-municipal sewer system through a sewer pipe or trucked offsite to a third party.</p>
Units	Million m ³
Source	Water discharge data is tracked in the company EHS enterprise software (Enablon). The Enablon database is managed by Global Safety & Environment (GSE) and is the basis for company reporting and for measuring progress toward achieving the corporate water use goal.
Calculation Methodology	GSE Environmental Sustainability Center of Excellence (CoE) uses data collected by the enterprise to quantify the Company total water discharge. It is calculated by adding the volume of water discharged to the following receptors: fresh surface water, brackish/sea water, groundwater and third party. From these values, rainwater is subtracted when reported.
Assumptions / Exclusions	<p>Assumptions - water use and water discharge are the same value for Non-EDC sites.</p> <p>Exclusions - rainwater is excluded from water discharge calculations.</p>

	<p>If Rainwater is included in supply; Volume of Rainwater Discharged to Surface Water - Report the metered flow of rainwater discharged to fresh surface water. Report only if rainwater is included in supply.</p> <p>If Rainwater is included in supply; Volume of Rainwater Discharged to Ground Water - Report the metered flow of rainwater discharged to groundwater. Report only if rainwater is included in supply.</p> <p>If Rainwater is included in Supply; Volume of rainwater discharged to brackish water or sea water - Report the metered flow of rainwater discharged to brackish or seawater. Report only if rainwater is included in supply.</p> <p>If Rainwater is included in Supply; Volume of rainwater discharged to external treatment facility by pipe - Report the metered flow of rainwater discharged to a third party. Report only if rainwater is included in supply.</p>
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