2022 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 2022 greenhouse gas (GHG) emissions and water metrics, which are included in our 2022/2023 ESG Progress Report, 2023 CDP Climate and 2023 CDP Water Security disclosures. 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 2022 limited assurance scope of work.

SCOPE / BOUNDARY

The metrics included cover our activities from January 1, 2022 – December 31, 2022.

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 2022 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.

In 2022, we added 10 facilities from a previous acquisition to our EDC program. Their historical environmental data (including energy, fugitive emissions and water metrics) were taken back to the baseline year.

No divestments occurred in 2022.

GHG EMISSIONS

SCOPE 1

Definition	Direct emissions resulting from on-site combustion of stationary and mobile sources and fugitive emission releases. *Stationary Sources* – Powerhouse operations comprise most of the direct emissions. Environmental control units (i.e., incinerators) are additional sources of emissions of these greenhouse gases. *Mobile Sources* – Vehicle fleet and air fleet *Fugitive Emission Sources* – Refrigeration units and HVAC systems

Units	Metric tons (CO_2e)
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	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: • 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 Protocol (last modified March 16, 2023). • 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: ○ "Diesel" emission factor is based on "Distillate Fuel Oil No. 2" found on Table 1 EPA Climate Leaders GHG Inventory Protocol (last modified March 16, 2023) ○ "Kerosene" emission factor is based on "Kerosene" found on Table 1 EPA Climate Leaders GHG Inventory Protocol (last modified March 16, 2023). ○ "LPG" emission factor is based on "Liquefied Petroleum Gases (LPG)" found on Table 1 EPA Climate Leaders GHG Inventory Protocol (last modified March 16, 2023). ○ "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 Protocol (last modified March 16, 2023). ○ "Other Waste" is based on "Municipal Solid Waste" found on Table 1 EPA Climate Leaders GHG Inventory Protocol (last modified March 16, 2023) 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 Protocol (last modified March 16, 2023). ○ "Biomass" emission factor is based on "Wood and Wood Residuals" found on Table 1 EPA Climate Leaders GHG Inventory Protocol (last modified March 16, 2023). • 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 IPPC 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 EPA Climate Leaders GHG Inventory Protocol (last modified March 16, 2023). 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 EPA Climate Leaders GHG Inventory Protocol (last modified March 16, 2023). • 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% 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.
Assumptions / Exclusions	• Process emissions from thermal oxidizers and acetylene cylinders are not included in our Scope 1 emissions. A small number of facilities have thermal oxidizers and acetylene cylinders on-site. 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. • Only CH_4 and N_20 are reported in our Scope 1 emissions for the biomass metric.

SCOPE 2 (MARKET-BASED & LOCATION-BASED)

Definition	Indirect emissions resulting from the purchase of electricity, cooling water and steam.
Units	Metric tons (CO_2e)
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	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: • 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: ○ 2022 eGRID (March 2023); ○ Australia NGA Factors April 14 2022 (Table 44 EF Scope 2 emissions factors) ○ Canada National Inventory Report 1990 - 2020 -- Table A13-1 Electricity Generation and GHG Emission Details for Canada ○ 2022 IEA Emission Factors ○ 2021 EU Residual Mix Factors – Updated May 2022 (most recent available as of 3/15/23) ○ 2022 UK Defra factor for UK ○ Brazil: Year 2022 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 18, September 2022 (Build Margin emission factor)

	• Indirect emissions from steam are quantified based on the steam purchased applying emissions factors based on Table 7 EPA Climate Leaders GHG inventory Protocol (last modified 16-Mar-2022).
	• Indirect emissions from cooling water are quantified based on the cooling water purchased and applying site specific emissions factors listed below:
	  ○ Singapore: 0.387 kg/KWH (Singapore 2022 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. 61784 kg/KWH (Germany EU Residual Emission Factor 2022) 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% 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 zero.
	• 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 ERCOT VPPA will allow the offset of Market-based emissions in the United States market, starting with the most intensive kg/CO2e purchased electricity grid factor first. This rule follows any green building certifications (i.e., LEED) allocation commitments we make.

Assumptions / Exclusions	• Purchased steam assumes natural gas fuel is used to generate steam or heat at 80% thermal efficiency and is converted from kWh to MMBTu.

	• Some sites purchase cooling water and heating water. A 20˚F change in cooling water temperature and a 100˚F change in heating water temperature were assumed for each of the respective volumes. This heat value is derived from the equation Q = m Cp ΔT. Heating water was treated as purchased steam using the same assumptions regarding natural gas and boiler efficiency.

SCOPE 3

Definition	Indirect emissions resulting from our upstream & downstream activities, which include the following Scope 3 categories: • 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 ERM CVS provides limited assurance for Category 3, 11, and 28% of Category 6. The other seven Scope 3 categories not listed above are not relevant to our business and therefore not quantified.
Units	Metric tons (CO_2e)
Source	• Spend-based methods (Category 1, 2, 4 (partially), 6 (partially), 9, & 12) data is tracked via SAP • Fuel and waste-based methods (Category 3 & 5) data is tracked in the company EHS enterprise software (Enablon) • 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 site • Category 6 & 4 both include primary data from select vendors
Calculation Methodology	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: • *Category 1 – Purchased Goods & Services*: An Economic Input-Output model calculation was performed using our 2022 third-party spend data. • *Category 2 – Capital Goods*: An Economic Input-Output model calculation was performed using our 2022 third-party spend data. • *Category 3 – Fuel-and-energy-related activities (not included in Scope 1 or 2)*: Emissions are based on emission factors from the Argonne National Laboratory's GREET 2022 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 2022 "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 2022 T&D- UK electricity factor. • *Category 4 - Upstream transportation & distribution*: Emissions are based on primary activity data provided to us by our vendors and an Economic Input-Output model calculation using our 2022 spend data. • *Category 5 - Waste Generated in Operations*: Waste generated in operations is used with the US EPA WARM Model (v15.1) • *Category 6 - Business travel*: 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 2022 DEFRA factors. Primary rail and car rental data utilized emission factors from the EPA Climate Leaders GHG inventory Protocol (last modified Mar 2023) 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 Protocol (last modified March 16, 2023). The non-primary travel vendor data emissions were based on our company's 2022 third party spend data and an Economic Input-Output Model performed by Climate Earth, Inc. Limited Data Assurance was granted for 76,582 or 28% 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. • *Category 7 - Employee Commuting*: 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 Form10-K. The calculation methodology was reduced by 45% to accommodate the rate employees were working a remote and/or hybrid model. • *Category 9 - Downstream transportation and distribution*: We used the WRI GHG Protocol Quantis Tool and our "Upstream transportation and distribution" spend data as a surrogate to estimate our downstream data. All product handled in the "downstream transportation and distribution" category would have been first handled by our "upstream transportation and distribution" before transfer at point of sale. However, our "upstream transportation and distribution" would include impacts from activities such as direct-to-customer shipping, shipping to hospitals, doctors and pharmacies bulk transfer and warehousing. Our "downstream transportation and distribution" would include direct mailing with more localized distribution and transportation as well as customer pick-up. Therefore, our estimated calculated value is higher than what our expected actual value would be. • *Category 11 - Use of sold products*: This category currently only 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 Protocol (last modified Mar-2023) adjusted to AR5. • *Category 12 - End of life treatment of sold products*: 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 (v15.1) .

Assumptions / Exclusions	• "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 only. We do sell products that have use phase emissions due to associated electricity consumption, however they were excluded this year due to lack of available data. We are working to gather the data for inclusion in future reporting years. • Category 3 does not include the T&D losses from purchased cooling water, as the impacts are insignificant.

WATER

WATER WITHDRAWAL

Definition	Total volume of water withdrawn from the following sources: • Fresh surface water • Brackish/sea water • Groundwater • Third Party *Total Fresh Surface Water* - 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.

	Total Brackish/ Seawater - Volume of water supplied to the sites via fresh brackish or seawater water source. Brackish or seawater includes oceans, brackish bays, and saltwater estuaries. *Total Groundwater* - Volume of water supplied to the site via groundwater source. *Total Third party* - Volume of water supplied to the site via a public supply.
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	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. • 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	Assumptions – water use and water discharge are the same value for Non-EDC sites. Exclusions – rainwater is excluded from water use calculations. Rainwater - Total volume collected from this source - Report rainwater only if a portion of a metered discharge point contains significant 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.

WATER DISCHARGE

Definition	Total volume of water discharged to the following receptors: *Fresh Surface Waters* - 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. *Ground Water* - Total Volume of Water Discharged to this Receptor - Volume of water leaving the facility directly to ground water. Groundwater includes any subsurface waters. *Brackish or Sea Water* - 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. *Volume of Water Discharged to a Third Party* - Volume of water leaving the facility to a municipal or non-municipal sewer system through a sewer pipe.
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	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	Assumptions – water use and water discharge are the same value for Non-EDC sites. Exclusions – rainwater is excluded from water discharge calculations. 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.

	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. 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. 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.