Carbon Accounting & Reporting Methodology

Methodology

Goldman Sachs applies greenhouse gas (GHG) and water inventory accounting principles throughout its methodology that are consistent with *The GHG Protocol Corporate Accounting and Reporting Standard* (GHG Protocol Corporate Standard) developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD).

Organizational Boundary

Goldman Sachs operates a global portfolio of facilities and captures the global portfolio in both its GHG and water inventories. We use the operational control approach to establish the organizational boundary of our GHG and water reporting. As defined by the GHG Protocol, we include operations where we have the full authority to introduce and implement operating policies. Under this approach, 100% of our activities (GHG emissions, fuels and energy consumption, water use, and refrigerant usage) from all owned and leased facilities globally over which we have operational control are counted. While Goldman Sachs is the primary occupant of many owned or leased facilities, there are many occurrences where the firm occupies a multi-tenant facility. For multi-tenant buildings, many services, including energy and water utilities, are shared among tenants, and property managers allocate fees on a percent occupied area basis. This includes full-service gross-leased offices and co-located data centers where the energy and water utilities are paid for by the property manager and/or not specifically metered for the firm's operations. In these situations, primary data is typically unavailable, and the firm's environmental impact is estimated based on statistical samplings of similar spaces within the same region.

Operational Boundary

All GHG emissions associated within the organizational boundary operations are included and categorized as Scope 1 (direct) and Scope 2 (required indirect) emissions. Scope 1 emission sources include natural gas, fuel oil and HFC refrigerants. Scope 2 emissions include electricity, purchased steam and chilled water. The Scope 1 and 2 GHG inventory includes CO_2, CH_4, and N_2O emissions from electricity and fuel consumption and HFC emissions from refrigerant use. We do not report emissions of SF_6, PFCs, or NF_3 as no sources within the operational control of the firm have been identified to date.

Quantification Methodology & Data Management

The majority of GHG activity data and emissions are tracked through an externally developed enterprise carbon and water accounting platform, which records global facility utility information. Global energy and water consumption data based on utility bills is collected monthly in local units. For GHG emissions, emissions factors applied are referenced in the Emissions Factors section below.

In cases where utilities are unavailable or included in full service gross leases, energy and water consumption is estimated by applying average energy or water use intensities per square foot based on performance of similar metered facilities; local emissions factors are subsequently applied for energy and GHG emissions. In the case of energy use in co-located data centers, we estimate energy use and GHG emissions by measuring instantaneous power or by applying an average energy demand per server figure to actual server quantities. At each location, a power usage effectiveness (PUE) and utilization diversity factor are applied to the power demand to establish electricity consumption.

Goldman Sachs conforms to the *GHG Protocol Scope 2 Guidance* for quantifying Scope 2 emissions from purchased electricity. Specifically, the firm quantifies and reports two Scope 2 emission totals, using a location-based method and a market-based method. The location-based method considers average emission factors for the electricity grids that provide electricity. The market-based method considers contractual arrangements under which the reporting company procures power from specific sources, such as renewable energy.

In quantifying location-based emissions, for electricity purchased in the US, we apply US EPA eGRID sub-regional emission factors. For electricity purchased in the UK, we apply country-specific factors from the UK Department for Environment, Food and Rural Affairs (DEFRA). For electricity purchased in Brazil, we apply country-specific factors from the Brazil Ministry of Science, Technology, and Innovation. For electricity purchased in India, we apply country-specific factors from the India Central Electricity Authority. For electricity purchased at all other locations, we apply national emission factors provided by the International Energy Agency (IEA). A complete list of location-based electricity emission factors used in the 2020 GHG Inventory is provided in the Emissions Factors section below.

In quantifying market-based emissions, the *GHG Protocol Scope 2 Guidance* defines a hierarchy of emission factors for quantifying market-based emissions, in order from highest to lowest preference. The table below provides a description of the hierarchy and the relevance to Goldman Sachs.

Table 1 – Scope 2 Market-based emission factor hierarchy

Emission Factors	Examples	Description
Direct line connection	Campus central plant, neighboring facility, on-site generator owned by others	Goldman Sachs does not currently have any direct line connections.
Energy attribute certificates	Renewable Energy Certificates (RECs), Guarantee of Origin (GOs)	Goldman Sachs purchases RECs and other renewable energy instruments that will be applied using an emission factor of zero.
Electricity contracts	Power purchase agreement (PPA)	Goldman Sachs has not entered into any specific electricity contracts at this time.
Supplier-specific emission factors	Factors provided by supplier of products in a deregulated market, or a utility in a regulated market	Goldman Sachs will wait until these factors are publicly available from its suppliers.
Residual mix	Available for European Union countries	Goldman Sachs purchases 100% green power for all European countries and therefore residual factors are not needed.
Location-based factors	International Energy Agency (IEA), US EPA eGRID, UK Defra, Brazil MCTIC, India CEA	If none of the above options are available, Goldman Sachs will use regional or national factors as in the location-based method.

As part of its commitment to procure 100% renewable electricity, we plan to purchase renewable energy instruments for all locations where there is a suitable instrument to buy. Thus, an emission factor of zero will be used to quantify market-based Scope 2 emissions from all purchased electricity in the US, Canada, Australia, Brazil, China, Europe, India, Indonesia, Israel, Japan, Malaysia, Mexico, New Zealand, Singapore, South Africa, Taiwan, Turkey, UAE, and the UK. For all other regions, where there may be no instruments available to match the market, the location-based factors will be used to quantify market-based emissions.

Emissions Factors and Global Warming Potential

The emissions of each GHG (CO_2, CH_4, N_2O, HFC) are converted to CO_2-equivalents (CO_2e) on the basis of their global warming potential (GWP). The source of the GWP's used are the IPCC Fourth Assessment Report (AR4 - 100 year)

Table 2 – Scope 1 and 2 (location-based) GHG Inventory Emission Factors

Emission Source	Factor	Source Reference
Natural Gas	5.93 $kgCO_2e$/therm	GHG Protocol Tool, "*Emission Factors from Cross-Sector Tools"* – (April 2014)
Diesel Fuel Oil	10.19 $kgCO_2e$/gallon	GHG Protocol Tool, "*Emission Factors from Cross-Sector Tools"* – (April 2014)
Purchased Steam (Con-Edison in NYC)	52.83 $kgCO_2e$/klb-delivered	INVENTORY OF NEW YORK CITY GREENHOUSE GAS EMISSIONS: Year 2016 Steam factor
2020 Purchased Electricity (non-United States)	Varies by country	Year 2018 factors from "CO_2 Emissions from Fuel Combustion (2020 Edition)", IEA, Paris. United Kingdom: Year 2018 factors from "2020 Government GHG Conversion Factors for Company Reporting: Methodology Paper for Emission Factors." UK DEFRA. Brazil: Year 2019 factors from the Ministry of Science, Technology, and Innovation. "Fator médio - Inventários corporativos" India: Year 2019 factors from the India Central Electricity Authority: Baseline Carbon Dioxide Emissions Database, Version 15.0, December 2019.
2020 Purchased Electricity (United States)	Varies by eGRID subregion	Year 2019 eGRID Subregion Emission Factors (Source: eGRID2019, February 2021)

GHG Emissions Intensity

Goldman Sachs tracks three emissions intensity metrics, based on net Scope 1 and 2 emissions, in order to evaluate and track the performance of our operations over time using the below definitions:

- **Full-Time Occupants (FTE)** - Full-time occupant includes full-time employees (FTE).
- **Rentable Square Feet (RSF)** –Includes the operational building area for all facilities within the Organizational Boundary of the GHG Inventory for the reporting year.
- **Net Revenue ($M)** – Emissions/$ Net Revenue (in millions) is based on "Net Revenues, including interest income" as stated in the firm's annual Consolidated Statement of Earnings.

Reporting Period

Goldman Sachs reports carbon emissions on a calendar year basis. This report summarizes the 2020 calendar year GHG emissions.

Tracking Emissions Over Time

Goldman Sachs adheres to the GHG Protocol accounting procedures that require that historic emissions data be recalculated as organizations undergo significant structural changes such as acquisitions, divestments, and mergers or methodology changes such as error correction and changes in calculation methodology. The historic year adjustments are necessary as structural and methodological changes will alter the historical reporting profile, making meaningful comparisons over time difficult. In order to maintain consistency over time, or in other words, to keep comparing “like with like”, historic emission data must be recalculated.