



# Greenhouse Gas and Energy Inventory Process

## Methodology

The GE Greenhouse Gas (GHG) Inventory follows the World Resources Institute/World Business Council for Sustainable Development (WRI/WBCSD) *Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, Revised Edition* (the "Protocol"). GE utilizes the Protocol for all definitions, assumptions, and calculations discussed in this document unless explicitly stated otherwise.

GE reports under the "control" approach for emissions in Scopes 1 and 2, as defined in the Protocol, from sources over which it has operational control. Selected Scope 3 emissions are reported. At a high level, the Protocol defines Scope 1 emissions as direct GHG emissions from sources that are owned or controlled by the company, Scope 2 emissions as emissions from the generation of purchased electricity consumed by the company, and Scope 3 emissions as emissions that are a consequence of the activities of the company, but occur from sources not owned or controlled by the company. GE reports this data with the unit of CO<sub>2</sub>-equivalent which is the universal unit of measurement to indicate global warming potential of greenhouse gases.

## Inventory Scope

The GHG Inventory includes data from individual facilities (primarily manufacturing facilities), additional rooftops (primarily offices, warehouses, and small service shops), and the vehicle and air fleets that GE operates for its own use. The inventory scope is adjusted annually as a result of divestiture, closure or consolidation with other facilities, acquisitions, newly established facilities, or when facilities meet the reporting criteria for the first time.

GE's worldwide GHG emissions are the total of three categories:

- Data from the largest facilities in the Company
- Estimates for small facilities and additional rooftops
- Data from centrally managed vehicles including fleet and aircraft


## Emission Factors and Global Warming Potentials


GE uses emission factors to determine the GHG emissions from a unit of activity data like fuel consumption. These factors are primarily from the U.S. Environmental Protection Agency (EPA) Mandatory GHG Reporting Rule (40 CFR part 98) to calculate CO<sub>2</sub> emissions for combustion of fuel. The 100-year global warming potential (GWP) for CH<sub>4</sub>, N<sub>2</sub>O, HFCs, SF<sub>6</sub> and PFCs are also taken from the U.S. EPA Mandatory GHG Reporting Rule (40 CFR part 98). Emissions of CH<sub>4</sub> and N<sub>2</sub>O from the combustion of fuels are calculated using emissions factors obtained from EPA Climate Leaders program documents. Other direct emission factors are obtained from WRI and Intergovernmental Panel on Climate Change (IPCC) documents when U.S. EPA factors are not available.

Updated October 2020

**Since 2011, GE has reduced operational greenhouse gas emissions by nearly 0.62 million metric ton CO<sub>2</sub>-equivalents.**

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 [www.ge.com/sustainability](http://www.ge.com/sustainability)

 [sustainability@ge.com](mailto:sustainability@ge.com)

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GE uses U.S. EPA eGRID sub-regional average emission factors to calculate indirect emissions resulting from the purchase of electricity in the United States. Indirect emissions resulting from the purchase of electricity outside of the U.S. are calculated using countrywide average factors obtained from the International Energy Agency (IEA). Electricity emissions for the 2011 baseline year were calculated using EPA eGRID factors for 2010 and IEA factors for 2011. Electricity emissions for the current reporting year are calculated using the most recent grid emissions factors available from the EPA and IEA as of the month of January following the reporting year.

GE uses the location-based emission factors for Scope 2 calculations. As defined in the Protocol, a location-based method reflects the average emissions intensity of grids on which consumption occurs. Certain external parties require market-based emission factors be used for specific, traceable purchases of renewable energy from our operations.

## Large Sites

GE maintains a GHG Inventory database in a cloud-based environmental management system to collect the necessary detailed inventory data from the following types of facilities:

- Manufacturing, power generation and engine/turbine test facilities
- Service and distribution facilities with greater than 50 employees
- Major business headquarters
- Major stand-alone data centers

The GHG Inventory database allows each site to enter the quantity of electricity and fuel used by fuel type and the unit of measure based on its own electricity and fuel purchase and/or combustion records as well as data on emissions of other GHGs. The software system calculates emissions, in metric tons of CO<sub>2</sub> equivalents, for each emission category as well as a total for all emission categories.

The software system calculates direct-combustion emissions by multiplying a given quantity of fuel by an emission factor and calculates indirect emissions for electricity that was purchased by multiplying a given quantity of electricity by an emission factor. Direct emissions resulting from the generation of electricity for export off-site are included within direct emissions. The Protocol recommends this approach and instructs companies to report emissions from exported electricity, heat or steam under supporting information and not to deduct those emissions from company emissions.

The Inventory includes sites in Europe and Asia that import steam or hot water from third-party cogeneration plants or district heating plants. Each of these sites determined the quantity and type of fuel needed by the third-party plant to generate the steam or hot water purchased by the site. This quantity of fuel is then multiplied by the appropriate emission factor to determine the indirect emissions from steam or hot water purchases. A default thermal efficiency of 80% is used to calculate the quantity of fuel needed to generate the steam or hot water that was purchased based on guidance provided in the WRI/WBCSD Emission Calculation Tool. Most of the plants use the default thermal efficiency.

Emissions of other GHGs (direct-process emissions of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, SF<sub>6</sub> and PFCs) are entered directly as kilograms or metric tons and converted to metric tons of CO<sub>2</sub> equivalents using the EPA's published 100-year GWP coefficients. Generally, emissions are based on purchase records and the assumption that all used material was emitted. For certain processes, however, site-specific knowledge of the process and/or emissions factors are used to determine actual emissions.

GE quantifies biomass-related emissions as allowed by the WRI protocol. GE

subtracts a certain amount of metric tons of CO<sub>2</sub> from its GHG inventory as those emissions are attributed to the use of biomass as allowed by the Protocol.

Because a subset of large facilities are responsible for about 80% of the emissions in this category, GE collects all data from that group of facilities annually. Data for the small facilities is collected less frequently and prorated in interim years based on historical data.

## Small Sites

GE does not collect detailed emissions data from worldwide "small" locations due to the difficulty and expense that would be associated with such an effort in comparison to the relative significance of the emissions in GE's overall inventory. The sites that fall into this category are primarily small office facilities, but include all locations that do not meet the criteria defined above for "large sites."

Emissions for these small facilities are calculated based on the "COMMERCIAL BUILDINGS ENERGY CONSUMPTION SURVEY (CBECS)", published by the U.S Energy Information Administration. Using this tool, GE determines the expected electricity and natural gas usage for a facility based on the type, location and square footage of the facility. GHG emissions are calculated using this estimate of energy usage and the appropriate emission factor as described above for Large Sites.

## Mobile Sources

GE calculates emissions from motor vehicles centrally managed by third party contractors in the U.S., Canada, Europe, Japan, Australia, New Zealand and Mexico; motor vehicles leased or rented from Penske Truck Leasing and Ryder Logistics in the U.S.; and motor vehicles owned by GE businesses in the U.S. In addition, GE calculates emissions from GE-owned corporate aircraft including the flying test bed (a large airliner used for flight-testing jet engines). Mobile source emissions are calculated by obtaining fuel

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use and/or vehicle-miles-traveled records and applying appropriate emission factors obtained from the U.S. EPA Climate Leaders guidance documents. Methane and nitrous oxide emissions for mobile sources are also calculated using emission factors obtained from the U.S. EPA Climate Leaders program guidance documents. In addition, GE includes emissions from GE-controlled motor vehicles that are refueled on-site at GE Large Sites. The emissions from these vehicles are included in the combustion-of-fuels calculations for Large Sites discussed above.

## Power Generation Investments

GE invests in thermal and renewable energy projects through equity, lease, and debt. GE reports GHG emissions from investments in which GE holds an equity interest based upon the business unit's percentage of equity ownership as Scope 3 emissions.

## Sources Not Included

The following GHG emission sources are not included in the Inventory because GE does not have operational control:

- Minority-owned joint ventures
- Energy-generation facilities where GE has a service relationship, but where GE does not have operational control
- Aircraft, motor vehicles, railroad locomotives, etc., owned by GE, but leased to and controlled by others
- Most WRI/WBCSD Scope 3 sources including but not limited to the extraction and production of purchased materials, the transportation of purchased fuels, the use of sold products and services, etc.

The following operational emission sources are not included in GE's GHG Inventory due to very small contributions:

- Motor vehicles controlled by GE but not centrally managed through Element, Arval, Penske Truck Leasing, or Ryder Logistics
- Motor vehicles owned by GE businesses outside the United States and Canada that are not refueled at GE properties
- Leakage of hydrofluorocarbons from GE-owned and -operated air conditioning, refrigeration and chilling systems
- Remedial activities operationally controlled by GE

## Baseline Adjustment

GE has established 2011 as a baseline year for measuring progress toward achieving its GHG-emissions-reduction commitments. Baseline-year GHG-emissions data are adjusted to reflect the changes in GE structure and determine the real change in emissions and energy use of the current portfolio of operations during a given period. Prior interim years, such as 2014, are not adjusted.

All "large sites" as defined above are baseline adjusted per the GHG Protocol, with acquired sites added and divested sites removed. Individual small sites, of which the largest is less than 0.1% of the total company GHG emissions, are not baseline adjusted. However, when an entire GE business is divested or acquired, the small sites from that business are baseline adjusted. Mobile sources are not baseline adjusted.

## Quality Assurance

GE is continuing to work toward increasing the accuracy of its GHG Inventory. It has modified its GHG Inventory collection database to simplify it, developed numerous guidance documents and an internal guidance website, and has provided extensive training for internal users on the Inventory. As an added measure, GE periodically performs data-quality reviews on the GHG

Inventories, including side-by-side comparisons of GHG emissions across years, to identify and understand the reasons for significant differences (changes in production, fuel, manufacturing processes, etc.). When data-quality issues are identified, research is initiated to analyze and correct gaps where necessary.

The overall uncertainty of the Scope 1 and Scope 2 totals is estimated to be less than 5% due to GE's data reporting, training, and quality control processes.

## Analysis of Cumulative GHG and Energy Efficiency Projects

GE is focused on generating value and outcomes for our customers, the Company, people and the planet. One way the businesses measure that value is to track energy efficiency and GHG reduction projects. Each project logged includes descriptive information, projected costs, and estimated GHG and cost savings. Two cumulative measures of those projects are tracked over time: total GHG emissions reduced and total cost savings.

To estimate total GHG emissions reduced and costs saved, GE analyzes all projects in the database covering the given period and logged as being completed. The sum of estimated GHG reduction for all projects matching aforementioned characteristics is captured as estimated annual GHG and cost reduction due to interventions. This process is repeated for subsequent years and compounded annually. Prior years are not adjusted for business transformations, changes in grid factors or other changes.

GE businesses may purchase carbon offsets.

