



Guide to Greenhouse Gas Management for Small Business & Low Emitters



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Introduction

Small businesses and other low emitters can take a leading role in helping the United States reduce the risks of climate change by implementing actions that save money, improve productivity, and lower greenhouse gas (GHG) emissions.

This document is a guide to estimating and reducing an organization's GHG emissions. It was developed by the Environmental Protection Agency's (EPA's) Center for Corporate Climate Leadership (the Center) to address the growing interest by low emitters on this topic. The accompanying [Simplified GHG Emissions Calculator \(Calculator\)](#) and [Simplified Inventory Management Plan \(IMP\) Form](#) are available for download to create a comprehensive climate change management strategy.

Using these tools will enable low emitters, such as office-based organizations, suppliers, small businesses, and public institutions to:

- Create a comprehensive inventory of all GHG emissions;
- Develop a GHG Inventory Management Plan (IMP) for data consistency over time; and
- Set a GHG reduction goal and track progress towards that goal.

1.1. This Guide

This guide walks the user through the following four key steps, including the use of tools designed to assist the low emitter. These tools and guidance are intended for companies calculating emissions from US-based operations.

All low emitter tools are available at the [Center for Corporate Climate Leadership](#) website.

[Additional technical resources for managing GHG inventories](#) are also available.

Step 1: Get Started

- Greenhouse Gas Inventories Defined
- Principles of Greenhouse Gas Accounting
- Choosing a Base Year
- Identifying Organizational Boundaries

Step 2: Calculate Greenhouse Gas Emissions

- Tool: Simplified GHG Emissions Calculator
- Sources Covered by the Calculator
- Using the Calculator
- Identifying Emission Source Types (Operational Boundaries) and Quantifying Emissions

Step 3: Create a GHG Inventory Management Plan

- Tool: Simplified Inventory Management Plan (IMP)
- Documenting Inventory Procedures
- Inventory Management Plan for Low Emitters
- Additional Inventory Management Plan Tools

Step 4: Set a Reduction Goal and Track Progress

- Tool: Inventory Summary and Goal Form
- Annual Greenhouse Gas Inventory Summary and Goal Tracking Form
- Setting a Greenhouse Gas Reduction Goal
- Determining the Type of Goal
- Going Carbon Neutral
- EPA Resources for Reducing Greenhouse Gas Emissions

Step 1 – Get Started

A. Greenhouse Gas Inventories Defined

Many organizations are developing GHG inventories. An inventory is a list of emission sources and the associated emissions quantified using standardized methods. EPA inventory guidance is based on the [World Resources Institute/World Business Council for Sustainable Development \(WRI/WBCSD\) GHG Protocol Corporate Accounting and Reporting Standard \(GHG Protocol\)](#), which is the global standard for calculating corporate GHG emissions.

Calculating GHG emissions involves the following process, which is explained in this guide:

- Choose a base year for the emissions inventory against which future emissions will be tracked.
- Identify the facilities to include in the inventory (organizational boundaries).
- Identify the sources within the facilities to include in the inventory (operational boundaries).
- Follow a standardized and accepted methodology to calculate the GHG emissions from each identified source.
- Include each of the seven major GHGs: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆), and nitrogen trifluoride (NF₃).

B. Principles of Greenhouse Gas Accounting

The GHG Protocol is based on five principles. When in doubt about applying the tools explained in this guide to ambiguous issues or situations, refer back to these principles to ensure the creation of a high-quality, credible inventory:

1. **Relevance:** Ensure the GHG inventory appropriately reflects the GHG emissions of the organization and serves the decision-making needs of internal and external users.
2. **Completeness:** Account for and report on all GHG emission sources and activities within the chosen inventory boundary. Disclose and justify any specific exclusions.

LEASED ASSETS: The organizational boundary approach will help determine which operations to include that are not fully owned and operated by the reporting organization under a scope 1 and 2 inventory, such as leased office space or fleet vehicles. When using an operational control approach a general rule of thumb for leases suggests that if the organization has access to the data (e.g., pays the utility bills or purchases gasoline), those operations are under its control and should be included in the inventory as scope 1 or 2 emissions. Companies that do not have access to the data but still wish to include those operations in their inventory can use estimates derived from national data, such as the [Commercial Buildings Energy Consumption Survey](#).

See more information on the General Help sheet in the Calculator or [the GHG Protocol guidance on leased assets](#). Emissions from leased assets that do not fall within an organization's boundary can be included in the inventory as scope 3 emissions sources.

3. **Consistency:** Use consistent methodologies to allow for meaningful comparisons of emissions over time. Transparently document any changes to the data, inventory boundary, methods, or any other relevant factors in the time series.

4. **Transparency:** Address all relevant issues in a factual and coherent manner, based on a clear audit trail. Disclose any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used.
5. **Accuracy:** Ensure that the quantification of GHG emissions is systematically neither over nor under actual emissions, as far as can be judged, and that uncertainties are reduced as far as practicable. Achieve sufficient accuracy to enable users to make decisions with reasonable assurance as to the integrity of the reported information.

C. Choosing a Base Year

For the inventory, collect data for a full year of operating activities. Many GHG emissions reporting programs require reporting on a calendar year basis, but another 12-month period such as a fiscal year may be preferable for some entities. The emissions calculated from these data will then serve as the base year data, against which emissions will be compared over time. The base year data should be high quality in order to provide a meaningful comparison; therefore, choose a recent year. For example, for an organization starting this process in 2016, collecting data for a base year of 2015 will likely provide the most robust data for its inventory.

D. Identifying Organizational Boundaries

An organizational boundary is used to determine which facilities or operations will be included in the GHG emissions inventory. Two approaches may be used in determining an organizational boundary, an equity share or a control approach:

- The equity share approach accounts for GHG emissions based on the organization's share of equity (typically by percentage ownership) in a facility or operation.
- The control approach is divided into either financial or operational control: Under financial control, include operations for which the organization has the ability to direct financial and operating policies with a view to gaining economic benefits from those activities.
 - Under operational control, include operations for which the organization has full authority to implement operating policies.

Step 2 – Calculate Greenhouse Gas Emissions

A. Sources Covered by the EPA Simplified GHG Emissions Calculator

Emission sources of all seven major GHGs are accounted for in an inventory: CO₂, CH₄, N₂O, HFCs, PFCs, SF₆, and NF₃.

Based on key characteristics of emissions sources, such as the control the organization has to affect them, the GHG Protocol organizes sources into the following three categories, or scopes:

- Scope 1: Emissions from sources that the organization owns or controls, like natural gas-fired boilers or vehicle fleets. These are also called direct emissions.
- Scope 2: Emissions that are a consequence of the operations of the organization, but occur at sources owned or controlled by another organization, most typically electricity, heat, or steam. These are also called indirect emissions.
- Scope 3: Indirect emissions that are not covered in scope 1 or 2, including business travel, employee commuting, and product transport. Guidance on identifying and quantifying scope 3 emissions and identifying possible advantages of reporting them, is provided in the calculator.

The Calculator allows the user to estimate GHG emissions from scope 1, scope 2, and scope 3 sources. Organizations using this guide will likely find that most of their emissions come from building heating and cooling, fleet vehicles, electricity use, and employee travel.

For those in the industrial sector such as pulp and paper, cement, chemicals, and iron and steel, you may have sector-specific emission sources that are not covered by the Calculator. Instead, look to [EPA's Greenhouse Gas Reporting Program](#) which provides guidance and tools that can aid in the calculation and reporting of these emissions. Other organizations, such as the GHG Protocol and industry associations, provide tools and guidance on calculating emissions from industrial processes.

B. Using the Calculator

The Calculator is a Microsoft Excel workbook separated into the following sections:

- Introduction to the Calculator
- Boundary Questions
- Summary of Organization's Emissions
- Data entry and calculation for scope 1 emissions sources
 - Stationary Combustion
 - Mobile Sources
 - Refrigeration and Air Conditioning Leakage
 - Fire Suppression Systems
 - Purchased Gases
 - Waste Gases
- Data entry and calculation for scope 2 emissions sources
 - Purchases of Electricity
 - Purchases of Steam or Heat

- Data entry and calculation for scope 3 emissions sources
 - Employee Business Travel
 - Employee Commuting
 - Product Transport
- Purchased Offsets
- Unit Conversions
- Heat Content
- Emission Factors
- Help Sheets

How to Use the Calculator and Guide

Data collected by the organization for each emission source can be entered into the orange boxes within the Calculator. The Calculator uses emissions factors from [EPA’s Emission Factors Hub](#) to automatically calculate GHG emissions totals in the blue and green colored boxes within the workbook. Blue and green summary boxes represent the scope 1 & 2 and scope 3 portions of the organization GHG inventory, respectively. Totals are calculated in metric tons of CO₂ equivalent (CO₂e), which is the standard unit for comparing the degree of potential climate impact caused by emissions of different GHGs. The total CO₂e emissions are summarized for all sources at the organization on the Summary sheet in the workbook.

Reminder: It is important to pay attention to units (e.g., cubic feet, gallons). The units from the data collected must match the units in the Calculator for that particular data requirement. For example, fuel usage for vehicles must be entered in gallons. For situations where the data collected does not match the units in the Tool, please refer to the Conversion Factors section in the Calculator to locate a factor to convert the data to the appropriate units.

Each emission source type described in this section of the guide is divided into three headings to assist the organization in collecting data and calculating the emissions from that source. These headings are:

- **DEFINITION:** Here the user will find the definition of the emission source.
- **COLLECT:** Here the user will find information on what data should be collected about the emission source.
- **QUANTIFY:** Here the user will find the information needed to enter the data into the Calculator in order to calculate emissions from the emission source. Entries are made into the orange colored boxes in the Calculator.

For some sources, the Calculator provides several options for calculating emissions, based on data availability. Make sure to read the instructions at the top of each section in the Calculator before entering the data. Remember to enter data covering a full year.

C. Identifying Emission Source Types (Operational Boundaries) and Quantifying Emissions

Scope 1 Direct Emissions

Scope 1 GHG emissions occur from sources that are owned or controlled by the organization. Examples include boilers used to heat buildings, refrigerant leakage from air conditioners, or travel in a fleet vehicle. Scope 1 sources may also include leased vehicles or equipment for which the organization pays the fuel bills or can access the fuel use data.

Within the Calculator, sources are categorized into six types of scope 1 sources: stationary combustion, mobile sources, refrigeration and air conditioning equipment, fire suppression equipment, purchased gases, and waste gases. While

most companies will have at least some scope 1 emission sources, it is possible for an office-based organization to have few or none.

Stationary Combustion

DEFINITION: Combustion emission sources are stationary sources that combust fuel, like a natural gas hot water heater for an office building or an oil burning boiler. Emissions result from the actual combustion of the fuels to produce useful products, like heat and hot water.

COLLECT: To account for these sources, collect information about the type of fuel used and the quantity of fuel combusted at each facility. Sources of data can vary, but the data are often provided by the utility company that supplies the fuel to the organization. A monthly natural gas bill, for example, can be used to provide information regarding how much natural gas was purchased for the previous billing cycle.

QUANTIFY: Enter the data into the appropriate orange colored boxes of the Calculator section titled Stationary Combustion. Once the data are entered into the Calculator, the CO₂e emissions are calculated and summarized in the blue colored box.

Mobile Source Emissions

DEFINITION: Mobile sources, like organization-owned cars and heavy duty vehicles, generate emissions by burning fuel. The fuel usage for any vehicle that is included within the organization's selected boundary approach should be reported in this section as direct emissions.

COLLECT: Determine the types of vehicles, types and amount of fuel, and the miles driven for each vehicle or vehicle type. Data sources vary, but fuel usage is often determined from fuel receipts or purchase records, and mileage can be determined from vehicle records. Mileage or fuel use can also be estimated based on vehicle fuel economy from the manufacturer or www.fueleconomy.gov if the other data sources are not readily available.

QUANTIFY: Enter the data into the appropriate orange colored boxes of the Calculator section titled Mobile Sources. If the organization owns or leases biofuel or ethanol vehicles, the percentage of biologically-based fuel should be entered into the boxes provided; default values are available if needed. Once the data are entered into the Calculator, the CO₂e emissions are calculated and summarized in the blue colored box.

Refrigeration and Air Conditioning Leakage

DEFINITION: Refrigeration and Air Conditioning (AC) Equipment sources can vary in size based on the type of organization. Emissions from refrigeration and AC devices in facilities or vehicles are caused by the leakage of chemicals with global warming impact during use, maintenance, and/or disposal of the device. They are often small sources for office-based organizations. For example, a small office building may have one rooftop air conditioning unit while a grocery store chain may have several rooftop air conditioning units per store as well as a multitude of other refrigeration equipment.

COLLECT: Choose one of three different calculation methods available in the Refrigeration and AC section of the Calculator. The types of refrigerants along with the data needs for each method are listed in the Calculator. Data for these sources are often collected from maintenance and inspection records, work orders, or invoices from contractors that service this equipment. Refrigerants not included on the list may be chemicals that do not need to be included in the inventory. For example, ozone depleting substances, such as chlorofluorocarbons (CFCs) or Freon and hydrochlorofluorocarbons (HCFCs), are regulated internationally and are typically excluded from a GHG inventory or reported as a memo item.

QUANTIFY: Enter the data into the appropriate orange colored boxes of the Calculator section titled Refrigeration and AC. Once the data are entered into the Calculator, the CO₂e emissions are calculated and summarized in the blue colored box.

Fire Suppression Systems

DEFINITION: Fire Suppression emission sources can range in scale from a small portable fire extinguisher to a large scale fire suppression system for an office building or warehouse. The emissions are caused by chemicals (e.g., HFCs, CO₂) emitted from fire suppression devices during use, maintenance, and disposal.

COLLECT: Choose one of three different calculation methods available in the Fire Suppression section of the Calculator. In each method, choose the types of fire suppression gases used and then gather the corresponding emissions data. Data for these sources are often collected from maintenance and inspection records, work orders, or invoices from contractors that service this equipment.

QUANTIFY: Enter the data into the appropriate orange colored boxes of the Calculator section titled Fire Suppression. Once the data are entered into the Calculator, the CO₂e emissions are calculated and summarized in the blue colored box.

Purchased Gases

DEFINITION: Industrial gases are sometimes used in processes such as manufacturing, testing, or laboratory uses. For example, CO₂ gas is often used in welding operations. These gases are typically released to the atmosphere after use. Any releases of the seven major greenhouse gases (CO₂, CH₄, N₂O, PFCs, HFCs, SF₆, and NF₃) must be included in the GHG inventory. Ozone depleting substances, such as CFCs and HCFCs, are regulated internationally and are typically excluded from a GHG inventory or reported as a memo item.

COLLECT: Determine if CO₂, CH₄, N₂O, PFCs, HFCs, SF₆, or NF₃ are used in processes such as those mentioned above. If so, collect the mass of gas purchased. If data are not available in mass units, the user may need to convert from volume to mass using the density of the specific gas.

QUANTIFY: Enter the data into the appropriate orange colored boxes of the Calculator section titled Purchased Gases. Once the data are entered into the Calculator, the CO₂e emissions are calculated and summarized in the blue colored box.

Waste Gases

DEFINITION: Some operations, such as printing operations or paint booths, emit organic compounds. In some cases, these waste gas streams are combusted with a flare or thermal oxidizer. This combustion results in CO₂ emissions that should be included in GHG inventories. These are uncommon sources for most office-based organizations.

COLLECT: Collect information about the volume of waste gas that was combusted. Because of the variable composition of waste gas streams, the user will also need to find out what chemicals are present in the waste gas stream and the quantity of each chemical. Please note that oxidation factor and gas density should be also collected if practicable; however, default values can be used if needed. The oxidation factor accounts for the amount of carbon in the fuel that is converted to CO₂ during combustion.

QUANTIFY: Enter the data into the appropriate orange colored boxes of the Calculator section titled Waste Gases. Once the data are entered into the Calculator, the CO₂e emissions are calculated and summarized in the blue colored box.

Scope 2 Indirect Emissions

Scope 2 indirect emissions are emissions from energy (e.g., electricity, heat, and steam) consumed in owned or controlled equipment or operations but generated by another entity other than the reporting organization. For example, although the reporting organization may own equipment that consumes electricity, like office computers and copy machines, a power plant operated by a third-party is likely burning fuel to generate the electricity that the reporting organization is using to operate its equipment. Therefore, the indirect emissions of the reporting organization are the direct emissions of the third-party that operates the power plant.

For many companies, purchased electricity is the largest source of indirect GHG emissions and the most significant opportunity to reduce those emissions. The Calculator section on scope 2 emissions has two types: purchases of electricity and purchases of steam.

[Guidance released in early 2015](#) requires organizations to report two scope 2 totals: location-based and market-based. This is referred to as dual reporting. The organization should quantify and report both totals in its GHG inventory. 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 organization procures power from specific sources, such as renewable energy. For contractual arrangements to be included as market-based emissions, they must meet the quality criteria outlined in the guidance document and also on the Market-Based Method Help sheet in the Calculator. Market-based emission factors can be entered based on the organization's contractual arrangements and on the availability of factors. The Calculator is set up such that if no market-based factors are entered, it will calculate them as equal to location-based, based on the requirements of the scope 2 guidance.

More information is available in the Greenhouse Gas Inventory Guidance document, Indirect Emissions from Purchased Electricity. This document is downloadable on the [Center for Corporate Climate Leadership Website](#) under GHG Inventory Guidance/Cross-Sector Guidance.

Purchases of Electricity

DEFINITION: GHGs are emitted when fossil fuels are combusted to generate electricity. Companies account for their responsibility for these emissions by reporting them as scope 2 emissions.

COLLECT: Collect electricity purchase information in units of kWh for each facility. The organization's best data source is typically its electricity bill or invoice. Data on any contractual arrangements, such as for renewable energy certificates (RECs) or utility green power products, should also be collected. This should include the units (e.g., kWh), as well as the relevant emission factors. These purchases should be separately accounted for using the appropriate market-based emissions factor. See help sheet in the Calculator for how to enter these data.

In the Calculator, there is a map at the bottom of the Electricity section which divides the United States into subregions based on the electric grid. Select the subregion(s) in which the organization's facilities are located to determine the correct emission factors to use, since different parts of the country use different fuels to generate electricity. Multiple facility locations can be entered as separate line items in the Calculator. If a facility is on the border of a subregion, enter the zip code into [EPA's Power Profiler](#) to find the correct subregion.

QUANTIFY: Enter the data into the appropriate orange and yellow colored boxes of the Calculator section title Electricity (Table 1) if market-based factors are applicable. Once the data are entered into the Calculator, the CO₂e emissions are calculated and summarized in the blue colored boxes at the bottom of the sheet.

Purchases of Steam or Heat

DEFINITION: Similar to electricity production, GHGs are emitted when fossil fuels are combusted to generate steam or heat. If the reporting organization purchases steam or heat, the emissions are accounted for as scope 2 emissions.

COLLECT: Determine the amount of steam purchased, the types of fuel that the steam supplier uses to generate the steam, and either the emission factors provided by the steam supplier or the boiler efficiency. If values for boiler efficiency are unavailable, a default of 80 percent is provided in the Calculator.

QUANTIFY: Enter the data into the appropriate orange and yellow colored boxes (Table 1) of the Calculator section titled Steam. Once the data are entered into the Calculator, the CO₂e emissions are calculated and summarized in the blue colored boxes at the bottom of the sheet.

Scope 3 Indirect Sources

Scope 3 indirect emissions are a consequence of the activities of an organization but are not owned or controlled by the organization. Companies may choose to report these emissions sources, which include employee commuting or transporting products to market using contract carriers. While not all companies choose to report scope 3 emission sources, estimating these emissions can provide a more complete picture of the organization's climate change impact and offer the organization more opportunities to reduce emissions. For example, if employee commuting emissions are included, it may also be beneficial to report the emission reductions from implementing a telecommuting or employee carpool program.

In the Calculator, sources are categorized into three types of scope 3 sources most commonly reported: employee business travel, employee commuting, and product transport. Additionally, the Calculator has space to report Offset purchases if these are applicable to your business. In previous versions, the Calculator had a separate space to report purchased green power / renewable energy certificates (RECs). Due to the new dual reporting of location- and market-based emissions, RECs and green power purchases are now reported on the Electricity sheet.

Employee Business Travel

DEFINITION: Employee business travel emissions differ from the required mobile source emission reporting in that they account for employee business travel in vehicles not owned or leased by the organization, such as taxis, trains, commercial airplanes, and personal vehicles used for sales.

COLLECT: Collect information about employees' business travel methods. For travelers that use a personal vehicle, choose the vehicle type from the Calculator and collect data for the vehicle miles during the reporting period. For rail, bus, and air travel, the mode of travel should be selected from the Calculator options and an estimate of the passenger mileage data provided for each.

QUANTIFY: Enter the data into the appropriate orange colored boxes (Tables 1-3) of the Calculator section titled Business Travel. Once the data are entered into the Calculator, the CO₂e emissions are calculated and summarized in the green colored box.

Employee Commuting

DEFINITION: Employee commuting emissions differ from the required mobile source emission reporting in that they account for employee travel to and from work in vehicles not owned or leased by the organization, including personal vehicles, buses, and trains.

COLLECT: Collect information about each employee's commuting method. For commuters that use a personal vehicle, the appropriate vehicle type should be selected from the Calculator and data collected for the vehicle miles during the reporting period. For rail, bus, and air travel, the mode of transport should be selected from the Calculator options and an estimate of the passenger mileage data provided for each.

QUANTIFY: After the data have been collected, enter the data into the appropriate orange colored boxes (Tables 1-2) of the Calculator section titled Employee Commuting. Once the data are entered into the Calculator, the CO₂e emissions are calculated and summarized in the green colored box.

Product Transport

DEFINITION: Emissions from product transport include product and material shipments by vehicles not owned or leased by the organization. For example, the organization could hire another company to transport product from the manufacturing location to distribution centers or final markets. (Note: if an organization owns or leases the trucks or other transport vehicles, these would be part of its scope 1 mobile source emissions.) Another example of product transport is paying a courier to transport documents from one office to another.

COLLECT: Collect information about shipment methods (on-road vehicle, waterborne craft, freight rail, or aircraft). For road shipments, the user may enter data based on vehicle mileage or ton-miles of product transported. As defined in the Calculator Product Transport Help sheet, ton-miles is calculated by multiplying the weight transported by the distance of each shipment. If the vehicle mileage option is chosen, then the organization should select the type of vehicle and enter the total mileage for that vehicle type. The ton-miles option is only applicable for heavy-duty trucks and the organization need only enter the total ton-miles traveled. For product transport via freight rail, waterborne, or air transport, the organization should enter the total ton-miles data.

QUANTIFY: Enter the data into the appropriate orange colored boxes (Tables 1-2) of the Calculator section titled Product Transport. Once the data are entered into the Calculator, the CO₂e emissions are calculated and summarized in the green colored box.

Purchased Offsets

DEFINITION: Offsets are project-based direct emission reductions and/or removals that occur outside the organizational boundary of the reporting organization. Offsets must be quantified using an approved methodology, such as the [Climate Action Reserve](#). Offsets can be purchased by an organization to offset emissions from scope 1, scope 2, and scope 3 emission sources. Renewable energy certificates are not project offsets and do not convey a direct emissions reduction to their owner. RECs are measured in MWh units, whereas project offsets are measured in tons of direct emission reductions.

COLLECT: Quantity of offsets purchased in metric tons CO₂e for each offset project.

QUANTIFY: Enter the data into the appropriate orange colored boxes (Table 1) of the Calculator section titled Offsets. Once the data are entered into the Calculator, the CO₂e emissions are summarized in the green colored box.

Using Portfolio Manager with the Calculator

ENERGY STAR Portfolio Manager is an interactive energy management tool that allows an organization to track and assess energy consumption across its entire portfolio of buildings in a secure online environment. Users can transfer their Portfolio Manager data into the Calculator to help calculate their organization-wide GHG emissions.

To transfer the correct data from Portfolio Manager to the Calculator, the organization should log in to Portfolio Manager, navigate to the Reports tab, and create a new report template. After naming the report template, select all facilities in the portfolio that fall within the organizational boundary. Then select a single year for the report timeframe, indicating the last day of the reporting calendar year. You will now select the information and metrics to include in this report. They should include those outline in Table 1.

After you have selected all of these metrics, click Apply the Selection, then Save the template. Once saved, the template may be used as often as needed to generate the report. Reports may be viewed directly, and downloaded as an Excel file.

Table 1: Information to be Included in Metrics Report

Property Information	Property Name Property GFA - Self-Reported (ft ²)
	Energy Use by Fuel Source
	Natural Gas Use (therms or kBtu)
	Fuel Oil \#1 Use (kBtu)
	Fuel Oil \#2 Use (kBtu)
	Fuel Oil \#4 Use (kBtu)
	Fuel Oil \#5 & 6 Use (kBtu)
	Diesel \#2 Use (kBtu)
Direct Emissions Fuels	Kerosene Use (kBtu)
	Propane Use (kBtu)
	Coal - Anthracite Use (kBtu)
	Coal - Bituminous Use (kBtu)
	Coke Use (kBtu)
	Wood Use (kBtu)
	Other Use (kBtu)
	Electricity Use - Grid Purchase (kBtu)
Indirect Emissions Fuels	District Steam Use (kBtu)
	District Hot Water Use (kBtu)
Greenhouse Gas Emissions	eGRID Subregion
	Green Power - Onsite (kWh)
Renewable Energy & Green Power	Green Power - Offsite (kWh)
	Percent of RECs Retained

Once the report has been generated, the organization should input the data into the Calculator as follows:

For direct emissions resulting from fuels combusted on site, and for each fuel type:

1. Open the Stationary Combustion section of the Calculator.
2. Enter a Source ID number.
3. Under Source Description, enter “Portfolio Manager Report.”
4. Under Fuel Combusted, select the appropriate fuel.
5. Input the amount of fuel use under Quantity Combusted. If the fuel use is in units of kBtu, divide by 1000 to determine fuel use in mmBtu.
6. Select the appropriate units of measure for indirect emissions resulting from the purchase of electricity, steam, or heat.
7. Open the Electricity or Steam sections of the Calculator.
8. For each building to be reported, enter a Source ID and Source Description.
9. For electricity, determine the building’s eGRID subregion using the map in the Calculator or from the facility’s summary page in Portfolio Manager.
10. Input each building’s Electricity Use – Grid Purchase in kWh under Electricity Purchased.
11. Input each building’s steam or heat (District Hot Water) use in mmBtu under Steam Purchased. If the steam or heat use is in units of kBtu, divide by 1000 to determine use in mmBtu.

Companies can then add data from sources not included in Portfolio Manager, such as vehicle fleets, to the Calculator and complete their organization-wide GHG inventory.

Step 3 – Create a GHG Inventory Management Plan (IMP)

A. Documenting Inventory Procedures

An IMP is a useful tool for accurately documenting the processes used to collect the GHG inventory data, so that a high quality inventory can be completed year after year. An IMP documents the answers to questions like, “What facilities did we include in the inventory? Which sources are included? Who in the organization collects the utility bill information? How do we account for new facilities or acquisitions?”

Companies develop and maintain an IMP that describes their process for completing a high-quality, corporate-wide inventory. The IMP is a protocol developed by each organization which addresses their unique procedures for creating a credible corporate-wide GHG emissions inventory on an annual basis.

B. GHG Inventory Management Plan

The EPA’s Simplified Inventory Management Plan (IMP) tool is available for companies using the Calculator to determine their GHG emissions. The Simplified IMP is presented in a basic format and some items in the form have been pre-populated with default responses consistent with the use of the Calculator. The organization should fill out the applicable table entries in the form. The Simplified IMP is available at the Center for Corporate Climate Leadership website (under Step 3).

The seven major components of an IMP are:

1. Organization Information: organization name, address, and inventory contact information.
2. Boundary Conditions: organizational and operational boundary descriptions.
3. Emissions Quantification: quantification methodologies and emission factors.
4. Data Management: data sources, collection process, and quality assurance.
5. Base Year Adjustments: adjustments for structural and methodology changes.
6. Management Tools: roles and responsibilities, training, and file maintenance.
7. Auditing & Verification: auditing, management review, and corrective action.

To help the user develop a complete IMP, each of the above components are described in more detail below. Additional instructions for completing these components are provided in the Simplified IMP.

Organization Information

This section provides general organizational information such as, organization name, corporate address, and inventory contact information.

Boundary Conditions

Emission sources to be included in a GHG inventory depend greatly on the boundary conditions selected by an organization. An organization can use either an equity share approach or a control approach to define its organizational boundaries (see Step 1 of this guide for more information on identifying organizational boundaries).

This section of the IMP should also include a list of operations or facilities in the inventory based on the chosen organizational boundary, as well as procedures used to identify each operation or facility. Finally, a list of the type of GHGs emitted from each operation or facility should be included in this section.

Emissions Quantification

This section provides the specific methodologies and emission factors used to estimate all of the organization's GHG emissions. A credible GHG inventory requires accurate data and verifiable quality assurance procedures. EPA provides [Greenhouse Gas Inventory Guidance Documents](#) which are based on the GHG Protocol and default emission factors based on U.S. and international standards. These protocols require the collection and reporting of the seven major GHG emissions. All emissions are reported as CO₂e based on the global warming potential (GWP) value of each gas.

Data Management

A description for each data source should be included in the IMP which also contains information on how data are gathered from that data source, and where the data are maintained. The data sources may be specific operations or may be emission categories (e.g., mobile sources, refrigerants, electrical usage). Details on any normalization factors used and quality assurance procedures, as well as information on data security and storage procedures should also be included for each data source.

Base Year Adjustments

An organization will choose a base year for its emissions inventory (global), reflecting the most recent year that data are available when the organization starts reporting. When a significant change occurs that might confound the tracking of emissions over time or progress towards goal achievement, then the organization may retroactively recalculate their base year emissions. This recalculation may be done for significant changes to the data, inventory boundary, methods, or any other relevant factors. The organization's best judgment is used to define the significance of any changes that might trigger a base year adjustment. Significant changes that may trigger a base year recalculation include:

- Structural changes to ownership or control (e.g., mergers, acquisition, divestiture, and outsourcing and in-sourcing of emitting activities);
- Changes in status of leased assets (ending leases or obtaining new leases);
- Changes in calculation methodology or improvement in the accuracy of emission factors or activity data; and
- Discovery of significant errors.

Base year emissions are not recalculated if the organization makes an acquisition or divestiture of operations that did not exist in its base year, though historic data after the base year should be adjusted. Base year emissions and any historic data in general are not recalculated for organic business growth or decline. The specific corporate policies for base year adjustments due to structural or methodology changes should be outlined in this section of the IMP.

Management Tools

The management tools serve to identify the roles and responsibilities, training procedures, and file maintenance procedures of the organization.

Auditing and Verification

Identifies procedures for auditing (internal and external), management review, and how corrective actions are taken.

Step 4 – Set a Goal and Track Progress

This section provides an introduction on how to reduce GHG emissions and track them annually using recommended tools. This section can help answer questions like, “How do I set a goal to reduce my GHG emissions?” or “Now that I’ve calculated my GHG emissions, how do I track these emissions from year to year?”

A. Annual GHG Inventory Summary and Goal Tracking Form

Organizations can track GHG emissions annually by completing the [Annual GHG Inventory Summary and Goal Tracking Form](#). The data from the Calculator Summary section shows your organization’s GHG emissions in metric tons of CO₂e, which can be entered from the Calculator Summary into the Annual Reporting Form without any further conversions or calculations. It is recommended that each reporting organization annually track emissions by scope. Tracking the reporting organization’s emissions intensity, such as total emissions per FTE or square foot, is also suggested, as intensity metrics often provide more insight into changes in emissions over time than absolute emissions.

B. Setting a GHG Reduction Goal

Setting a goal is a tangible action that communicates to stakeholders an organization’s climate strategy and commitment. Having a target can motivate staff, help drive long-term strategies, and save money for the organization through energy efficiency projects. A credible goal should meet the following criteria:

1. Corporate-wide: including operations within the boundary.
2. Forward-looking: based on the most recent base year for which data are available.
3. Long-term: achieved over five to 10 years.
4. Reduction from baseline emissions: expressed as an absolute GHG reduction, a decrease in GHG intensity, or as a goal to be carbon neutral. Absolute goals are EPA’s preference.
5. Aggressive: in comparison to the projected GHG performance for the organization’s sector.
6. Include scope 1 and 2 emissions, at a minimum, plus major scope 3 sources if available.

A goal can be set using either location-based or market-based emissions. If the goal is for market-based emissions, contractual instruments such as RECs and REC-based green power products can be used to reduce a reporting organization’s scope 2 emissions. RECs are tradable contractual instruments that represent the full environmental attributes of one mega-watt hour of renewable energy generation on the electricity grid. Purchase of RECs or REC-based green power products, such as participation in utility-sponsored green power programs, allows an organization to associate the zero emissions rate of a renewable energy resources to their electricity use under their market-based calculation. More information on purchasing green power is available on the [EPA’s Green Power Partnership](#) website.

EPA’s Annual Inventory and Goal Tracking Form may contain the organization’s historical data and helps track progress towards meeting an absolute, intensity-based, or carbon neutral GHG reduction goal.

C. Determining the Type of Goal

Goals can be expressed as an absolute GHG emissions reduction or as a decrease in GHG intensity. Absolute GHG reduction goals compare total GHG emissions in the goal year to those in a base year. GHG intensity goals allow an organization to account for increases or decreases in production, square footage, or other metric over time. The ratio of GHG emissions to an appropriate normalizing factor becomes the organization’s key performance indicator for measuring GHG intensity. Companies with emissions primarily from office space should use square footage of space as their normalizing factor. Organizations may choose to use number of employees if employee business travel is a large percentage of its total emissions.

D. Going Carbon Neutral

In addition to absolute and intensity-based GHG reduction goals, some organizations set a goal to be carbon neutral, which is a commitment to achieve and maintain net zero GHG emissions in an organization’s operations. A carbon neutral goal should include the following:

1. Have a robust, transparent GHG inventory and IMP in place and cover all emission sources included in the organization’s goal, including major scope 3 sources.
2. Look for opportunities to reduce the reporting organization’s emissions - for example, through energy efficiency, installing onsite renewable energy, or setting up employee commuting programs. Set an absolute or intensity-based internal reduction goal to motivate the organization to implement these changes.
3. Purchase green power, renewable energy certificates (RECs), and/or offsets for the reporting organizations emissions not reduced through internal projects. The reporting organization can purchase REC-based green power or RECs to reduce its market-based Scope 2 electricity emissions. It can then purchase project offsets to offset the remaining emissions. If this is part of the goal strategy, then market-based emissions must be reported.

E. EPA Resources for Reducing GHG Emissions

The Center’s website provides a list of resources to help companies meet their GHG reduction goals, including those listed below.

Visit the [Center for Corporate Climate Leadership](#) website:

- Energy Efficiency Resources:
 - EPA ENERGY STAR Program
 - Department of Energy resources
 - EPA Combined Heat and Power Partnership
- Renewable Energy:
 - EPA Green Power Partnership
- Transportation:
 - SmartWay Transport Partnership

References

IPCC (2006). 2006 IPCC Guidelines for National Greenhouse Gas Inventories. The National Greenhouse Gas Inventories Programme, The Intergovernmental Panel on Climate Change, H.S. Eggleston, L. Buendia, K. Miwa, T. Ngara, and K. Tanabe (eds.). Hayama, Kanagawa, Japan. <http://www.ipcc-nggip.iges.or.jp/public/2006gl/>.

US EPA. Greenhouse Gas Inventory Guidance. Direct Emissions from Stationary Combustion Sources. January 2016. <https://www.epa.gov/climateleadership/center-corporate-climate-leadership-direct-emissions-stationary-combustion-sources>.

US EPA. Greenhouse Gas Inventory Guidance. Direct Emissions from Mobile Combustion Sources. January 2016. <https://www.epa.gov/climateleadership/center-corporate-climate-leadership-direct-emissions-mobile-combustion-sources>.

US EPA. Greenhouse Gas Inventory Guidance. Direct Fugitive Emissions from Refrigeration, Air Conditioning, Fire Suppression, and Industrial Gases. November 2014. <https://www.epa.gov/climateleadership/center-corporate-climate-leadership-direct-fugitive-emissions-refrigeration-air>

US EPA. Greenhouse Gas Inventory Guidance. Indirect Emissions from Purchased Electricity. January 2016. <https://www.epa.gov/climateleadership/center-corporate-climate-leadership-indirect-emissions-purchased-electricity>

US EPA (2016). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 - 2014. <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2014>

World Resources Institute (WRI). Working 9 to 5 on Climate Change: An Official Guide. December 2002. <http://www.ghgprotocol.org/files/ghgp/tools/working9-5.pdf>.

World Resources Institute/World Business Council for Sustainable Development. The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard. March 2004. <http://www.ghgprotocol.org/standards/corporate-standard>.