

# Environmental Protection Agency Carbon Footprint Calculator



This tutorial and spreadsheet will enable you to calculate and document the emissions and carbon footprint of an organization using recognized GHG accounting standards.



Version Control

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# Calculating Emissions

In order to effectively calculate emissions we should have knowledge of:

- the GHG accounting standard or protocol with information on the sector, sources, and processes that it covers;
- the approaches needed for determining CO<sub>2</sub>e e.g., direct measurement, vehicle mileage, etc.;
- collecting activity data and selecting their appropriate emission factors;
- the likely emissions sources and the scopes they fall under;
- other information such as quality control practices.



Calculations are based on the data available for different business activities. Most actions and decisions a company makes can cause carbon. A more comprehensive and exact data collection will provide a more accurate calculation.

## Using the Carbon Calculator Spreadsheet

There are different calculation tools available and you can choose one that suits your organization. The one covered in this tutorial is based on the GHG emission estimates from the United States Environmental Protection Authority (EPA). It is designed to be a simplified calculation tool to help organizations estimate and inventory their annual greenhouse gas (GHG) emissions.

The calculator will determine the direct and indirect emissions from all sources at a company when activity data are entered into the various sections of the workbook for one annual period.



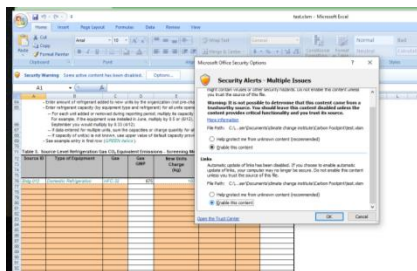
Download the EPA calculator spreadsheet by clicking here.

[https://www.climatechange.org.au/pdf/EPA\\_GHG.xlsm](https://www.climatechange.org.au/pdf/EPA_GHG.xlsm)

The calculator is an Excel workbook separated into the following sections:

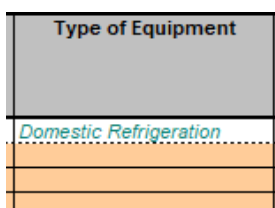
- Introduction to the Calculator
- Boundary Questions
- Summary of Organization's Emissions
- Data entry and calculation for scope 1 emission sources - Stationary Combustion, Mobile Sources, Refrigeration and Air Conditioning Leakage, Fire Suppression Systems, Purchased Gases and Waste Gases
- Data entry 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, Waste
- Purchased Offsets
- Unit Conversions
- Heat Content
- Emission Factors
- Help Sheets

Once you have downloaded the spreadsheet, you can then open it and begin entering your data.



- ❖ Click on Enable macros – you may get an error message saying that some links can't be updated which you can disregard.

Data collected by the organization for each emission source can be entered into the orange boxes within the Calculator.



Blue and green summary boxes represent the scope 1 & 2 and scope 3 portions of the organization GHG inventory, respectively.

Reductions	
Offsets	0 CO <sub>2</sub> -e (metric tons)
Net Scope 1 and 2 Location-Based Emissions	0 CO <sub>2</sub> -e (metric tons)
Net Scope 1 and 2 Market-Based Emissions	0 CO <sub>2</sub> -e (metric tons)

- ❖ Click on the Summary tab and fill in your company details

Totals are calculated in metric tons of CO<sub>2</sub> equivalent (CO<sub>2</sub>e) on the Summary sheet tab.

When entering data, pay attention to units (e.g., cubic feet, gallons). The units from the data collected must match the units in the Calculator for that data requirement. You can readily convert from metric.

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.

17 **Calculator Guidance - Important Information**

18 (A) Navigate to the data entry sheets using the drop down menu in the dark grey cell below and then clicking on the "Go To Data Entry Sheet" button. On the data entry sheets enter data in ORANGE cells only.

19 (B) This Calculator has several "Tool Sheets" with useful reference data such as unit conversions, heat contents, and emission factors. Click on the buttons below to go to the appropriate Tool Sheet.

20 (C) Data must be entered in the units specified on the data entry sheets. Use the "Unit Conversions" or "Heat Content" sheets if unit conversion is necessary prior to entering data into the Calculator.

Introduction Summary Boundary Questions Stationary Combustion Mobile Sources Refrigeration and AC Fire Suppression Purchased

❖ Click on the Introduction Tab on the bottom L/H side of the screen and read the notes.

The questions below refer to scope 3 emissions sources and offsets. If you answer "yes" you may choose whether or not to include these emissions sources in your inventory. Use the corresponding sheet to enter data.

Business Travel	Yes or No?
Do your employees travel for business using transportation other than owned or leased vehicles (e.g., commercial airline flights, rental cars, trains)?	?
Employee Commuting	
Do your employees commute to work in personal vehicles or use public transportation?	?
Product Transport	
Do you hire another company to transport products or other materials to or from your facilities?	?
Waste Generated in Operations	
Do you generate waste that is disposed of in a facility owned by another organization?	?
Offsets	
Do you purchase greenhouse gas offsets?	?

Introduction Summary Boundary Questions Stationary Combustion Mobile Sources Refs

❖ Click on the Boundary Tab and answer the questions relating to operational boundaries.

## Scope 1 Direct Emissions

These 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

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.

Guidance

(A) Enter annual data for each combustion unit, facility, or site (by fuel type) in ORANGE cells on Table 1. Example entry is shown in first row (CONCRETE row 1).

- Select "Fuel Combusted" from drop down box.
- Enter "Quantity Combusted" and choose the appropriate units from the drop down box in the unit column. If it's necessary to convert units, common heat contents can be found on the "Heat Content" sheet and unit conversions on the "Unit Conversion" sheet.

(B) If fuel is consumed in a facility but stationary fuel consumption data are not available, an estimate should be made for completeness. See the "Items to Note" section of the Help sheet for suggested estimation approaches.

(C) Diesel and CO<sub>2</sub> emissions are not reported in the total emissions, but are reported separately at the bottom of the sheet.

Table 1. Stationary Source Fuel Combustion

Source ID	Source Description	Source Area and ID	Fuel Combusted	Quantity Combusted	Units
CONCRETE	Self Storage Facility	0017	NATURAL GAS	33,000	MMBtu

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❖ [Click on the Stationary Combustion Tab.](#)

Many businesses will not have to fill this section. If you use gas to heat your premises you should be able to get the amount of gas in MMBtu units from your bill, otherwise you can use other unit.

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.

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 CO<sub>2</sub>e emissions are calculated and summarized in the blue colored box.

## Mobile Source Emissions

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.

(A) Enter annual data for each vehicle or group of vehicles (grouped by vehicle type, vehicle year, and fuel type) in ORANGE cells in Table 1. Example entry is shown in first row (02/03). **Notes:** Only enter **gallons used** as based by your organization on this sheet. All other vehicle use such as employee commuting or business travel is considered a scope 3 emissions source and should be reported in the corresponding scope 3 sheets.

- Select "On-Road" or "Non-Road" from drop down box to determine the Vehicle Types available
- Select "Vehicle Type" from drop down box (closest type available)
- Enter "Fuel Usage" in appropriate units (units appear when vehicle type is selected)
- If mileage or fuel usage is unknown, estimate using appropriate fuel economy values (see Reference Table below)
- Vehicle year and Miles Traveled are not necessary for non-road equipment

(B) When using biofuels, typically the biofuel (biodiesel or ethanol) is mixed with a petroleum fuel (diesel or gasoline) for use in vehicles. Enter the biodiesel and ethanol percentages of the fuel if known, or leave default values.

Biodiesel Percent:  %  
 Ethanol Percent:  %

(C) Biomass CO<sub>2</sub> emissions from biodiesel and ethanol are not reported in the total emissions, but are reported separately at the bottom of the sheet.

**Table 1: Mobile Source Fuel Combustion and Miles Traveled**

Source ID	Source Description	On-Road or Non-Road?	Vehicle Type	Vehicle Year	Fuel Usage	Units	Miles Traveled
02/03	02/03	OnRoad	Ships and Boats - Diesel	1990	500	gal	3,877

❖ Click on the Mobile Sources tab.

On-Road or Non-Road?	Vehicle Type	Vehicle Year
NonRoad	Ships and Boats - Diesel	1990
OnRoad	Ships and Boats - Gasoline (2 stroke)	
	Passenger Cars - Gasoline	
	Light-Duty Trucks - Gasoline	
	Heavy-Duty Vehicles - Gasoline	
	Motorcycles - Gasoline	
	Passenger Cars - Diesel	
	Light-Duty Trucks - Diesel	
	Medium- and Heavy-Duty Vehicles - Diesel	
	Light-Duty Cars - Methanol	

❖ You have to type in the value 'OnRoad' or 'NonRoad' for the calculation to work

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](http://www.fueleconomy.gov) if the other data sources are not readily available.

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 CO<sub>2</sub>e emissions are calculated and summarized in the blue colored box.



## **Refrigeration and Air Conditioning Leakage**

Refrigeration and Air Conditioning (AC) Equipment sources can vary in size based on the type of organization. They are often small sources for office-based organizations.

Most businesses will not use this tab. If you are running air-conditioning, then the emissions are accounted for through your electricity account.

### **Refrigeration and AC**

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. 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.

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.

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 CO<sub>2</sub>e emissions are calculated and summarized in the blue colored box.

## **Fire Suppression Systems**

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, CO<sub>2</sub>) emitted from fire suppression devices during use, maintenance, and disposal.

### **Fire Suppression**

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.

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 CO<sub>2</sub>e emissions are calculated and summarized in the blue colored box.

## **Purchased Gases**

Industrial gases are sometimes used in processes such as manufacturing, testing, or laboratory uses. For example, CO<sub>2</sub> gas is often used in welding operations.

### **Purchased Gases**

These gases are typically released to the atmosphere after use. Any releases of the seven major greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, PFCs, HFCs, SF<sub>6</sub>, and NF<sub>3</sub>) 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.

Determine if CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, PFCs, HFCs, SF<sub>6</sub>, and NF<sub>3</sub> 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.

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 CO<sub>2</sub>e emissions are calculated and summarized in the blue colored box.

### **Waste Gases**

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 CO<sub>2</sub> emissions that should be included in GHG inventories. These are uncommon sources for most office-based organizations.



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 CO<sub>2</sub> during combustion.

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 CO<sub>2</sub>e 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.

## Scope 2 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.

### Purchases of Electricity

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.

Tip: Enter electricity usage by location and then look up the eGRID subregion for each location.  
If you purchase renewable energy that is less than 100% of your site's electricity, see the example in the market-based method Help sheet.

Table 1. Total Amount of Electricity Purchased by eGRID Subregion				Market-Based						Location-Based			
Source ID	Source Description	Source Area (sq ft)	eGRID Subregion where electricity is consumed	Electricity Purchased (kWh)	Emission Factors			Emissions			Emissions		
					CO <sub>2</sub> Emissions (lb/MWh)	CH <sub>4</sub> Emissions (lb/MWh)	N <sub>2</sub> O Emissions (lb/MWh)	CO <sub>2</sub> Emissions (lb)	CH <sub>4</sub> Emissions (lb)	N <sub>2</sub> O Emissions (lb)	CO <sub>2</sub> Emissions (lb)	CH <sub>4</sub> Emissions (lb)	N <sub>2</sub> O Emissions (lb)
Bldg-012	East Power Plant	12,517	HRS (MCC Miscellaneous)	200,000	0	0	0	0.0	0.0	0.0	297,120.0	28.8	1.4
Mann	Office	2,000	ERCOT (ERCOT All)	300,000	0.121	0.045	0.056	36.3	13.5	16.8	260,580.0	17.1	2.4
					<center factor>	<center factor>	<center factor>						
					<center factor>	<center factor>	<center factor>						
					<center factor>	<center factor>	<center factor>						
					<center factor>	<center factor>	<center factor>						
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					<center factor>	<center factor>	<center factor>						

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❖ [Click on the Electricity Tab](#)

Your electricity bill may show the amount of CO<sub>2</sub>e that you have consumed, in which case you can skip this step and simply type in the amount in the Summary tab (you will have to temporarily un-protect the worksheet).

Electricity tariffs now often have a mixture of renewable and fossil fuel generation. So if you apply a fossil fuel emission factor to the entire kWh amount that you purchased, your emission calculations will be too high. You must get the accurate data from your electricity supplier. The location-based approach, therefore, need not be used.

Collect electricity purchase information in units of kWh. It may be for each facility in the company. An organization's best data source is typically its electricity bill or invoice. Data on any contractual arrangements, such as 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.

Enter the data into the appropriate orange and yellow colored boxes of the Calculator section titled Electricity (Table 1) if market-based factors are applicable. Once the data are entered into the Calculator, the CO<sub>2</sub>e emissions are calculated and summarized in the blue colored boxes at the bottom of the sheet.

### **Purchases of Steam or Heat**

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.

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.

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 CO<sub>2</sub>e emissions are calculated and summarized in the blue colored boxes at the bottom of the sheet.



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.

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 CO<sub>2</sub>e emissions are calculated and summarized in the green colored box.

## Employee Commuting

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.

U.S. Environmental Protection Agency

**Guidance**

(A) Enter annual data in ORANGE cells in the table corresponding to the transport method. Example entry is shown in first row (GREEN italic).

(B) For employees commuting in a personal vehicle, select the "Vehicle Type" and enter miles traveled (vehicle-miles) in Table 1.

(C) For employees commuting using public transportation, select the "Transport Type" and enter miles traveled (passenger-miles) in Table 2.

Tip: If more than one employee travels by the same vehicle type or transport type, miles can be combined and entered in one row.

**Table 1. Personal Vehicle - Employee Commuting by Vehicle-Miles (CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O)**

Source ID	Source Description	Vehicle Type	Vehicle-Miles (miles)	CO <sub>2</sub> Emissions (tpg)	CH <sub>4</sub> Emissions (tpg)	N <sub>2</sub> O Emissions (tpg)
JC001	John Doe I	Passenger Car	100	34	0.0	0.0
Admin	Office Staff	Passenger Car	50,000	17,050	450.0	400.0

[Purchased Gases](#) [Waste Gases](#) [Electricity](#) [Steam](#) [Business Travel](#) **Commuting** [Product Transport](#)

❖ **Click on the Commuting tab**

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.

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**

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.

Guidance  
 (A) Enter annual data in ORANGE cells in the table corresponding to the transport method. Example entry is shown in first row (GREEN italic)  
 (B) For rail, water, or air shipments, enter short-ton-mile data in Table 2. See help sheet for details on calculating short ton-miles.  
 (C) For road shipments, if your organization's product is the only product transported in the vehicle (i.e. full truckload shipments) then enter the vehicle type and miles for each leg of transport in Table 1. Emissions are calculated using vehicle-miles.  
 (D) For road shipments, if your organization's product makes up only part of the truck load (i.e. less-than-truckload or LTL shipments), then enter the vehicle type and short ton-miles (product weight (short tons) x distance) for each leg of transport in Table 2. Emissions are calculated using short ton-miles. See help sheet for details on calculating ton-miles.  
 Tip: Make sure all transport legs are accounted for from manufacturing facility to distribution to customer.

Table 1. On-Road Vehicle Product Transport by Vehicle-Miles (CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O)

Source ID	Source Description	Vehicle Type	Vehicle-Miles (miles)	CO <sub>2</sub> Emissions (kg)	CH <sub>4</sub> Emissions (g)	N <sub>2</sub> O Emissions (g)
<i>Wp527</i>	<i>Steel Plant Finished Goods</i>	<i>Medium and Heavy-Duty Truck</i>	<i>10</i>	<i>332</i>	<i>1.3</i>	<i>1</i>

• • • Purchased Gases • Waste Gases • Electricity • Steam • Business Travel • Commuting • **Product Transport**

❖ Click on the Product Transport tab

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.

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.



# Waste

Scope 3 emissions from waste include the disposal and treatment of waste generated. These emission factors align with the requirements of the GHG Protocol Scope 3 Standard.

**❖ Click on the Product Transport tab**

The emission factors do not include any avoided emissions impact from any of the disposal methods. All the factors presented include transportation emissions, which are optional in the Scope 3 Calculation Guidance, with an assumed average distance traveled to the processing facility. AR4 GWPs are used to convert all waste emission factors into CO2e.

Collect information on the amount of weight disposed at your facilities, by the type of waste (plastics, paper, etc.) and disposal method (recycling, incineration, etc.).

Refer to the Emission Factors worksheet in the Calculator for a complete list of materials and available disposal methods.

After the data have been collected, enter the data into the appropriate orange colored boxes (Table 1) of the Calculator section titled Waste. Once the data are entered into the Calculator, the CO2e emissions are calculated and summarized in the green colored box.

## Purchased Offsets

Offsets are project-based direct emission reductions and/or removals that occur outside the organizational boundary of the reporting organization.

**Table 1. Total Amount of Purchased Offsets**

ID	Project Description	Offsets Purchased (Metric Tons CO <sub>2</sub> e)
Trees	Forestry Project	5,000
<b>GHG Reductions</b>		
<b>Total CO<sub>2</sub> Equivalent Emission Reductions (metric tons) - Offsets</b>		<b>0.0</b>

Offsets must be quantified using an approved methodology. Offsets can be purchased from the Climate Change Institute at the right market price 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.

Quantity of offsets purchased in metric tons CO<sub>2</sub>e for each offset project.

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 CO<sub>2</sub>e emissions are summarized in the green colored box.

**Tool Sheet: Unit Conversions** U.S. Environmental Protection Agency

<b>Mass</b>			
Convert From	Convert To	Multiply By	Units
pounds (lb)	gram (g)	453.592	g / lb
pounds (lb)	kilogram (kg)	2.20462	kg / lb
pounds (lb)	metric ton	0.000453592	metric ton / lb
kilogram (kg)	pounds (lb)	2.20462	lb / kg
gram (g)	short ton	0.000001102	short ton / g
kilogram (kg)	short ton	0.00110231	short ton / kg
metric ton	short ton	1.10231	short ton / metric ton
pounds (lb)	short ton	0.0005	short ton / lb
short ton	short ton	1.000	short ton / short ton
metric ton	pounds (lb)	2,204.62	lb / metric ton
metric ton	kilogram (kg)	1,000	kg / metric ton
<b>Volume</b>			
Convert From	Convert To	Multiply By	Units
standard cubic foot (scf)	US gallon (gal)	7.48052	gal / scf
standard cubic foot (scf)	barrel (bbl)	0.178107	scf / bbl
standard cubic foot (scf)	liter (L)	28.3168	L / scf
standard cubic foot (scf)	cubic meters (m <sup>3</sup> )	0.0283168	m <sup>3</sup> / scf
US gallon (gal)	barrel (bbl)	0.02375	bbl / gal
US gallon (gal)	liter (L)	3.78541	L / gal
US gallon (gal)	cubic meters (m <sup>3</sup> )	0.00378541	m <sup>3</sup> / gal
barrel (bbl)	US gallons (gal)	42	gal / bbl
barrel (bbl)	liter (L)	158.987	L / bbl
barrel (bbl)	cubic meters (m <sup>3</sup> )	0.158987	m <sup>3</sup> / bbl
liter (L)	cubic meters (m <sup>3</sup> )	0.001	m <sup>3</sup> / L
liter (L)	US gallon (gal)	0.264179	gal / L
cubic meters (m <sup>3</sup> )	barrel (bbl)	0.28925	bbl / m <sup>3</sup>
cubic meters (m <sup>3</sup> )	US gallon (gal)	264.179	gal / m <sup>3</sup>
cubic meters (m <sup>3</sup> )	liter (L)	1,000	L / m <sup>3</sup>
<b>Energy</b>			
Convert From	Convert To	Multiply By	Units
kilowatt hour (kWh)	Btu	3,412.14	Btu / kWh
kilowatt hour (kWh)	kilowatt hour (kWh)	1.000	kWh / kWh
megajoule (MJ)	gigajoules (GJ)	0.001	GJ / MJ
quadrillion (QJ)	million Btu (mmBtu)	0.947817	mmBtu / QJ

Electricity, Steam, Business Travel, Commuting, Product Transport, Waste, Offsets

The rest of the tabs on the spreadsheet contain reference data and help sheets.

## Summary

Once you have finished collecting and entering the data you should check your figures, particularly to ensure that the units of measurement that you chose are correct for the applied emission factor.

Summary of Organization's Emissions:

Scope 1 Emissions		
Go To Sheet	Stationary Combustion	0 CO <sub>2</sub> e (Metric tons)
Go To Sheet	Mobile Sources	0 CO <sub>2</sub> e (Metric tons)
Go To Sheet	Refrigeration / AC Equipment Use	0 CO <sub>2</sub> e (Metric tons)
Go To Sheet	Fire Suppression	0 CO <sub>2</sub> e (Metric tons)
Go To Sheet	Purchased Gases	0 CO <sub>2</sub> e (Metric tons)
Location-Based Scope 2 Emissions		
Go To Sheet	Purchased and Consumed Electricity	0 CO <sub>2</sub> e (Metric tons)
Go To Sheet	Purchased and Consumed Steam	0 CO <sub>2</sub> e (Metric tons)
Market-Based Scope 2 Emissions		
Go To Sheet	Purchased and Consumed Electricity	0 CO <sub>2</sub> e (Metric tons)
Go To Sheet	Purchased and Consumed Steam	0 CO <sub>2</sub> e (Metric tons)
Total organization Emissions		
	Total Scope 1 & Location-Based Scope 2	0 CO <sub>2</sub> e (Metric tons)
	Total Scope 1 & Market-Based Scope 2	0 CO <sub>2</sub> e (Metric tons)
Scope 3 Emissions		
Go To Sheet	Employee Business Travel	0 CO <sub>2</sub> e (Metric tons)
Go To Sheet	Employee Commuting	0 CO <sub>2</sub> e (Metric tons)
Go To Sheet	Product Transport	0 CO <sub>2</sub> e (Metric tons)
Go To Sheet	Waste	0 CO <sub>2</sub> e (Metric tons)
Required Supplemental Information		
Go To Sheet	Biomass CO <sub>2</sub> Emissions from Stationary Sources	0 CO <sub>2</sub> e (Metric tons)
Go To Sheet	Biomass CO <sub>2</sub> Emissions from Mobile Sources	0 CO <sub>2</sub> e (Metric tons)
	<b>Total Emissions</b>	0 CO <sub>2</sub> e (Metric tons)
Productions		
	Offsets	0 CO <sub>2</sub> e (Metric tons)

Introduction | **Summary** | Boundary Questions | Stationary Combustion

❖ Click on the Summary tab to see your results

You should now create your organization's GHG statement and a template can be found on our website. Keep copies of your files including the Excel spreadsheet calculator file, a copy of the corporate protocol and any emails or notes of meetings relating to your GHG survey and accounting methods.

There may be some emissions that you need to account for, such as by employees working from home. This is more difficult to estimate. You can find average estimates put out the UNFCC carbon calculator which are perfectly acceptable. There is also guidance on the EPA website.

By estimating your organization's carbon footprint you have taken most important step towards carbon neutrality. This gives you the data required to effectively conduct an ongoing an emission reduction program. It also allows you to know how many tonnes of carbon offsets are required for your organization to become climate neutral and gain registration through the Climate Change Institute.

