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EPA Simplified GHG Emissions Calculator ("the Calculator")

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The EPA Simplified GHG Emissions Calculator ("the Calculator") is designed as a simplified calculation tool to help organizations estimate and inventory their annual greenhouse gas (GHG) emissions for US-based operations. All methodologies and default values provided are based on the most current Center for Corporate Climate Leadership Greenhouse Gas Inventory Guidance Documents and the *Emission Factors Hub*. The Calculator will quantify the direct and indirect emissions from sources at an organization when activity data are entered into the various sections of the workbook for one annual period.

Before entering data, please: 1) Enable Macros and 2) Familiarize yourself with the *Simplified Guide to GHG Management for Organizations*.

Access the guide: https://www.epa.gov/system/files/documents/2022-09/Simplified_Guide_GHG_Management_Organizations.pdf

The simplified guide presents more details and information covered in the calculator; please check the guide for more info if you have questions.

There are three primary steps in completing a GHG inventory. Each emissions source also has these three steps.

(1) **DEFINE**: The first step in completing a GHG inventory is to determine the boundaries and emissions sources included within those boundaries. After you have defined your organizational and operational boundaries, you can use the questions on the "Boundary Questions" worksheet to help you determine which emissions sources are relevant to your business.

[Go to Boundary Questions](#)

(2) **COLLECT**: The second step is to collect data for the defined annual period. This step is typically the most time consuming, since the data can be difficult to gather. This Calculator has help sheets with suggestions and guidance for each emissions source and a general help sheet for data management. **Click the drop down menu boxes below to navigate to these sheets.**

Help - Market-Based Method

(3) **QUANTIFY**: The third step is to calculate emissions. This Calculator is designed to complete the emissions quantification step for you. Once the user enters data in this MS Excel spreadsheet, the emissions will be calculated and totaled on the "Summary" sheet.

Calculator Guidance - Important Information

- (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.
- (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.
- (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.
- (D) If more guidance is needed, you can reference the emission factor data sources found on the "Emission Factors" sheet.

Tool Sheets	Quick Data Entry Navigation
Unit Conversions	Stationary Combustion
Heat Content	
Emission Factors	

Calculator Notes

Emission sources of all seven major GHGs are accounted for in the inventory and in this Calculator: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆), and nitrogen trifluoride (NF₃). The Calculator allows the user to estimate GHG emissions from scope 1 (direct), scope 2 (indirect), and some scope 3 (other indirect) sources.

The Calculator uses U.S.-specific cross-sector emission factors from the *Emission Factors Hub*. Many industrial sectors also have process-related emissions sources that are specific to their sector. EPA's Greenhouse Gas Reporting Program provides guidance and tools that can aid in the calculation and reporting of these emissions:

<https://www.epa.gov/gbgrreporting>

The GHG Protocol also provides guidance on calculating emissions from industrial processes.

Operational Boundary Questions - Emissions Sources to Include

Guidance

Use the questions below to help you determine which emissions sources should be included in the inventory.

Emissions Source Questions

A typical office-based organization will likely have the following (scope 1 and scope 2) emissions sources:

- Stationary Combustion
- Refrigeration and AC
- Electricity

If you answer "yes" to a question below, that emissions source should be included in your inventory. For each facility within the defined organizational boundary, collect the necessary data for the selected time period. Use the corresponding Excel sheet to quantify these emissions.

Tip: you may need to ask your landlord about heating sources, steam purchased and refrigerants

Stationary Combustion	Yes or No?
Do you have facilities that burn fuels on-site (e.g., natural gas, propane, coal, fuel oil for heating, diesel fuel for backup generators, biomass fuels)?	Y
Mobile Sources	
Do any vehicles fall within your organizational boundary? This can include cars, trucks, propane forklifts, aircraft, boats. Only vehicles owned or leased by your organization should be included here.	Y
Refrigeration and Air Conditioning	
Do your facilities use refrigeration or air conditioning equipment?	Y
Fire Suppression	
Do your facilities use chemical fire suppressants?	N
Purchased Gases	
Do you purchase any industrial gases for use in your business? These gases may be purchased for use in manufacturing, testing, or laboratories.	N
Electricity	
Does your inventory include facilities that use electricity?	Y
Steam	
Do you purchase steam for heating or cooling in your facilities?	N
Market-Based Emission Factors (entered on Electricity and or Steam tabs)	
Do you purchase renewable energy certificates (RECs) or green power products? Do you purchase electricity through a power purchase agreement (PPA)? Do you have supplier-specific emission factors?	N

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)?	Y
Employee Commuting	
Do your employees commute to work in personal vehicles or use public transportation?	Y
Upstream Transportation and Distribution	
Do you hire another company to transport products or other materials to or from your	N
Waste Generated in Operations	
Do you generate waste that is disposed of in a facility owned by another organization?	Y
Offsets	
Do you purchase greenhouse gas offsets?	N

Scope 1 Emissions from Mobile Sources

- Guidance:**
- (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 (2018/2019). Only enter **vehicle use data or mileage** by your organization on this sheet. All other vehicles are both an employee commuting or business travel is considered a scope 2 emissions source and should be reported in the corresponding scope 2 sheets.
 - (B) Enter the latest vehicle combustion factors reflect year 2021 data. Therefore, for all vehicle model years 2022 onward, the 2021 year factor is used.
 - Select "On-Road" or "Off-Road" from the drop down box to determine the Vehicle Type available. You **must** make this selection before pricing the vehicle type.
 - Select "Vehicle Type" from drop down box (lowest 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 from the manufacturer, www.fueleconomy.gov, or the Reference Table below.
 - Vehicle year and Miles traveled are not necessary for non-road equipment.
 - (C) When using default, typically the default (biomethane or ethanol) is mixed with a petroleum fuel (diesel or gasoline) for use in vehicles. Enter the biomass and ethanol percentages of the fuel if known, or leave default values shown below.

Biomethane Percent:	0%
Ethanol Percent:	0%

(C) Biomethane CO₂ emissions from biomass and ethanol are not reported in the total emissions, but are reported separately at the bottom of the sheet.

Table 1. Mobile Source Fuel Consumption and Miles Traveled

Source ID	Source Description	On-Road or Off-Road	Vehicle Type	Vehicle Year	Fuel Usage	Units	Miles Traveled
2018-2019	Passenger Cars - Gasoline	On-Road	Passenger Cars - Gasoline	2018	100.00	gal	10,000
2018-2019	Passenger Cars - Gasoline	On-Road	Passenger Cars - Gasoline	2019	100.00	gal	10,000
2018-2019	Medium-Duty Trucks - Gasoline	On-Road	Medium-Duty Trucks - Gasoline	2018	100.00	gal	10,000
2018-2019	Medium-Duty Trucks - Gasoline	On-Road	Medium-Duty Trucks - Gasoline	2019	100.00	gal	10,000
2018-2019	Heavy-Duty Vehicles - Gasoline	On-Road	Heavy-Duty Vehicles - Gasoline	2018	100.00	gal	10,000
2018-2019	Heavy-Duty Vehicles - Gasoline	On-Road	Heavy-Duty Vehicles - Gasoline	2019	100.00	gal	10,000

Reference Table: Average Fuel Economy for Vehicle Types

Vehicle Type	Average Fuel Economy (mpg)
Passenger Cars - Gasoline	24.9
Passenger Cars - Diesel	31.1
Medium-Duty Trucks - Gasoline	24.2
Medium-Duty Trucks - Diesel	32.8
Heavy-Duty Vehicles - Gasoline	12.4
Heavy-Duty Vehicles - Diesel	15.4

Average mpg values from the U.S. Department of Transportation, Federal Highway Administration, Highway Statistics 2022 (Updated February 2024), Table 16A.1.

GHG Emissions

Total Organization-Wide Mobile Source Fuel Usage and CO₂ Emissions (On-Road and Off-Road Vehicles)

Fuel Type	Units	CO ₂ (kg)
Motor Gasoline	200 gal	2,267
Diesel Fuel	0 gal	0
Medium-Duty Trucks	0 gal	0
Passenger Cars - Gasoline	0 gal	0
Passenger Cars - Diesel	0 gal	0
Light-Duty Trucks - Gasoline	0 gal	0
Light-Duty Trucks - Diesel	0 gal	0
Heavy-Duty Vehicles - Gasoline	0 gal	0
Heavy-Duty Vehicles - Diesel	0 gal	0
Off-Road	0 gal	0
Off-Road Natural Gas (LPG)	0 gal	0
Off-Road Natural Gas (LPG)	0 gal	0
Off-Road Natural Gas (LPG)	0 gal	0
Off-Road Natural Gas (LPG)	0 gal	0

Note: emissions here are only for the gasoline portion of the fuel. Biogenic CO₂ emissions are reported below (note different formula).
Note: emissions here are only for the diesel portion of the fuel. Biogenic CO₂ emissions are reported below (note different formula).

Total Organization-Wide On-Road Gasoline Mobile Source Mileage and CH₄/N₂O Emissions

Vehicle Type	Vehicle Year	Mileage (miles)	CH ₄ (g)	N ₂ O (g)
Passenger Cars - Gasoline	1980-89	0	0.0	0.0
	1990	0	0.0	0.0
	1991	0	0.0	0.0
	1992	0	0.0	0.0
	1993	0	0.0	0.0
	1994	0	0.0	0.0
	1995	0	0.0	0.0
	1996	0	0.0	0.0
	1997	0	0.0	0.0
	1998	0	0.0	0.0
	1999	0	0.0	0.0
	2000	0	0.0	0.0
	2001	0	0.0	0.0
	2002	0	0.0	0.0
	2003	0	0.0	0.0
	2004	0	0.0	0.0
	2005	0	0.0	0.0
	2006	0	0.0	0.0
	2007	0	0.0	0.0
	2008	0	0.0	0.0
2009	0	0.0	0.0	
2010	0	0.0	0.0	
2011	0	0.0	0.0	
2012	0	0.0	0.0	
2013	0	0.0	0.0	
2014	0	0.0	0.0	
2015	0	0.0	0.0	
2016	0	0.0	0.0	
2017	0	0.0	0.0	
2018	0	0.0	0.0	
2019	0	0.0	0.0	
2020	0	0.0	0.0	
2021	1,260	3.1	2.0	
2022	0	0.0	0.0	
2023	0	0.0	0.0	
2024	0	0.0	0.0	
2025	0	0.0	0.0	
2026	0	0.0	0.0	
2027	0	0.0	0.0	
2028	0	0.0	0.0	
2029	0	0.0	0.0	
2030	0	0.0	0.0	
2031	0	0.0	0.0	
2032	0	0.0	0.0	
2033	0	0.0	0.0	
2034	0	0.0	0.0	
2035	0	0.0	0.0	
2036	0	0.0	0.0	
2037	0	0.0	0.0	
2038	0	0.0	0.0	
2039	0	0.0	0.0	
2040	0	0.0	0.0	
2041	0	0.0	0.0	
2042	0	0.0	0.0	
2043	0	0.0	0.0	
2044	0	0.0	0.0	
2045	0	0.0	0.0	
2046	0	0.0	0.0	
2047	0	0.0	0.0	
2048	0	0.0	0.0	
2049	0	0.0	0.0	
2050	0	0.0	0.0	
2051	0	0.0	0.0	
2052	0	0.0	0.0	
2053	0	0.0	0.0	
2054	0	0.0	0.0	
2055	0	0.0	0.0	
2056	0	0.0	0.0	
2057	0	0.0	0.0	
2058	0	0.0	0.0	
2059	0	0.0	0.0	
2060	0	0.0	0.0	
2061	0	0.0	0.0	
2062	0	0.0	0.0	
2063	0	0.0	0.0	
2064	0	0.0	0.0	
2065	0	0.0	0.0	
2066	0	0.0	0.0	
2067	0	0.0	0.0	
2068	0	0.0	0.0	
2069	0	0.0	0.0	
2070	0	0.0	0.0	
2071	0	0.0	0.0	
2072	0	0.0	0.0	
2073	0	0.0	0.0	
2074	0	0.0	0.0	
2075	0	0.0	0.0	
2076	0	0.0	0.0	
2077	0	0.0	0.0	
2078	0	0.0	0.0	
2079	0	0.0	0.0	
2080	0	0.0	0.0	
2081	0	0.0	0.0	
2082	0	0.0	0.0	
2083	0	0.0	0.0	
2084	0	0.0	0.0	
2085	0	0.0	0.0	
2086	0	0.0	0.0	
2087	0	0.0	0.0	
2088	0	0.0	0.0	
2089	0	0.0	0.0	
2090	0	0.0	0.0	
2091	0	0.0	0.0	
2092	0	0.0	0.0	
2093	0	0.0	0.0	
2094	0	0.0	0.0	
2095	0	0.0	0.0	
2096	0	0.0	0.0	
2097	0	0.0	0.0	
2098	0	0.0	0.0	
2099	0	0.0	0.0	
2100	0	0.0	0.0	

Total Organization-Wide On-Road Non-Gasoline Mobile Source Mileage and CH₄/N₂O Emissions

Vehicle Type	Fuel Type	Vehicle Year	Mileage (miles)	CH ₄ (g)	N ₂ O (g)
Passenger Cars - Diesel	Diesel	1980-1989	0	0.0	0.0
		1990-2024	0	0.0	0.0
Light-Duty Trucks - Diesel	Diesel	1980-1989	0	0.0	0.0
		1990-2024	0	0.0	0.0
Medium and Heavy-Duty Vehicles	Diesel	1980-1989	0	0.0	0.0
		1990-2024	0	0.0	0.0
Light-Duty Cars	Hybrid	2010-2024	0	0.0	0.0
	CHP	2010-2024	0	0.0	0.0
	LPNG	2010-2024	0	0.0	0.0
Light-Duty Trucks	Hybrid	2010-2024	0	0.0	0.0
	LPNG	2010-2024	0	0.0	0.0

	LNG		0	0.0	0.0
	Biodiesel		0	0.0	0.0
Medium-Duty Trucks	LPG		0	0.0	0.0
	LPG		0	0.0	0.0
	LNG		0	0.0	0.0
	Biodiesel		0	0.0	0.0
Heavy-Duty Trucks	Midheavy		0	0.0	0.0
	Heavy		0	0.0	0.0
	CHG		0	0.0	0.0
	LPG		0	0.0	0.0
	LNG		0	0.0	0.0
	Biodiesel		0	0.0	0.0
Buses	Midheavy		0	0.0	0.0
	Heavy		0	0.0	0.0
	LPG	n	n	n	n
	LNG	0	0.0	0.0	
	Biodiesel		0	0.0	0.0

Total Organization-Wide Non-Road Mobile Source Fuel Usage and CH₄/N₂O Emissions

Vehicle Type	Fuel Type	Fuel Usage (gallons)	CH ₄ (g)	N ₂ O (g)
Ships and Boats	Recreational Fuel Oil	0	0.0	0.0
	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
Locomotives	Diesel	0	0.0	0.0
	Diesel	0	0.0	0.0
Aircraft	Jet Fuel	0	0.0	0.0
	Aviation Gasoline	0	0.0	0.0
Agricultural Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Gasoline Off-Road Trucks	0	0.0	0.0
	Diesel Equipment	0	0.0	0.0
	Diesel Off-Road Trucks	0	0.0	0.0
	LPG	0	0.0	0.0
Construction/Mining Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Gasoline Off-Road Trucks	0	0.0	0.0
	Diesel Equipment	0	0.0	0.0
	Diesel Off-Road Trucks	0	0.0	0.0
	LPG	0	0.0	0.0
Lawn and Garden Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	305	917.2	458.6
	Diesel	0	0.0	0.0
	LPG	0	0.0	0.0
Airport Equipment	Gasoline	0	0.0	0.0
	Diesel	0	0.0	0.0
	LPG	0	0.0	0.0
Industrial/Commercial Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Diesel	0	0.0	0.0
	LPG	0	0.0	0.0
Logging Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Diesel	0	0.0	0.0
Railroad Equipment	Gasoline	0	0.0	0.0
	Diesel	0	0.0	0.0
Recreational Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Diesel	0	0.0	0.0
	LPG	0	0.0	0.0

Total CO₂ Equivalent Emissions (metric tons) - Mobile Sources
2.7
Total Biomass CO₂ Equivalent Emissions (metric tons) - Mobile Sources
0.0

