

Calculating Emissions

August 2023
Workshop #3




ISRI
Institute for Sustainable Resources
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Okay – now we will go over the details of actually calculating your emissions!

Experts to guide us through this:L

- Eric Christensen, whose company WSP, has worked with EPA on their emissions calculation for 20 years, is with us today to touch briefly on EPA's resources.
- Abbie Webb, from Casella Waste Systems will lead us through a sample inventory she created using EPA's calculator.

Identifying and Calculating Emissions

The first step in identifying and calculating a company's emissions is to categorize the GHG sources within the company's boundaries.

GHG emissions typically occur from the following source categories:

- 1. Stationary combustion:** Combustion of fuels in stationary equipment.
- 2. Mobile combustion:** Combustion of fuels in transportation devices such as automobiles and trucks
- 3. Process emissions:** Emissions from physical or chemical processes such as PFC emissions from aluminum smelting, etc.
- 4. Fugitive emissions:** Intentional and unintentional releases such as equipment leaks from joints, seals, packing, gaskets, as well as fugitive emissions from wastewater treatment, cooling towers, gas processing facilities, etc.
- 5. Electricity Use.** Purchased electricity for operations.

Every business has processes, products, or services that generate direct and/or indirect emissions.

August 2023

Before turning over to Eric and Abbie, I wanted to highlight the first step in identifying and calculating a company's emissions.

This process starts with categorizing the GHG sources within the company's boundaries.

GHG emissions typically occur from the following categories:

1. Fuel used in equipment in your facilities.
2. Fuels in transportation vehicles such as cars and trucks
3. Emission from industrial processes associate with cement manufacturing, petrochemical processing, aluminum smelting, and other industrial processes.
4. Emissions from equipment leaks, as well as fugitive emissions from landfills and gas processing facilities and other sources.
5. Electricity that is purchased for a company's operations

These are the primary focus for the inventory. I think it makes it less overwhelming to remember that there are really only a few areas to focus on for our emissions inventory.

U.S. EPA's GHG Emissions Calculator

US EPA's Simplified GHG Emissions Calculator

- The US EPA's Simplified GHG Emissions Calculator is designed as a simplified calculation tool to help small business and low emitter organizations estimate and inventory their annual greenhouse gas (GHG) emissions. The calculator will determine the direct and indirect emissions from all sources at an organization when activity data are entered into the various sections of the workbook for one annual period.
- The GHG Protocol currently references EPA's calculator as a preferred resource for certain U.S. entities.
- The Simplified GHG Emissions Calculator is supported by Excel 2021 or later (PC and Mac).
- It is free to use and was updated in 2023. It is generally updated on an annual basis.



The US EPA's Simplified GHG Emissions Calculator was originally designed to be a simplified calculation tool to help **small business and low emitter organizations** estimate and inventory their annual greenhouse gas (GHG) emissions.

I like using a tool that is available in the public domain, is updated frequently, and is not subject to specific sector or company interpretations.

With that, I'll hand it over to Eric to introduce EPA's Emissions Calculator.

A Drive-Through of EPA's Calculator Tool



Getty Images

Abbie Webb, Sustainability Director at Casella Waste Systems, and Chair of ISRI's Sustainability Network will walk us through a sample MRF emissions calculation.



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With that brief introduction, I'll turn it over to Abby Web, director of sustainability for Casella Waste Systems, and the Chair of ISRI's Sustainability Network. She has created a sample report using EPA's calculator and will walk us through the process.

Greenhouse Gas Reporting at Casella

Background

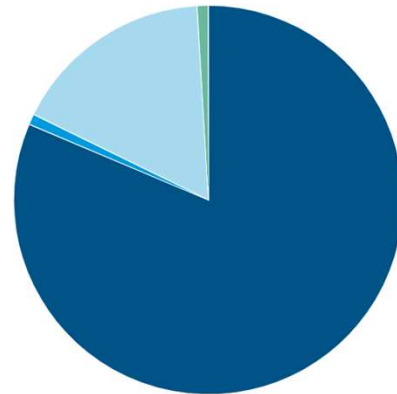
- Began reporting in early 2000s
- Charter Members of EPA Climate Leaders
- 2012 Received EPA Climate Leadership Award

Our Inventory today

- Operational control boundary
- 81% landfills, 17% fleet, 2% heating and electricity
- If we include upstream/downstream, Scope 3 is about 30%

Why do we do this?

- Find ways to cut emissions and meet our goals
- Disclosures: CDP Climate, GRI, SASB, ESG raters, supply chain surveys, etc.



- Landfill GHG [t CO2e], 2022
- Stationary Combustion GHG [t CO2e], 2022
- Mobile Combustion GHG [t CO2e], 2022
- Electricity GHG, Grid [t CO2e], 2022



Case Study – 2 sample recycling facilities

1. Compile Scope 1 and 2 data: Stationary Combustion, Mobile Combustion, Electricity

- Need gallons, kilowatt-hours, therms, etc.
- Break down by fuel type
- Not dollars

2. Data Sources

- Initially we sent annual survey to every division
- Today our Accounts Payable team enters units as they process invoices; we run a quarterly report from our procurement database
- Auditors like to tie back to invoices

Site Activity Summary

	2022	
	MRF 1	MRF 2
Diesel (mobile) [gal (US)]	26,759	57,040
Biodiesel B20 (mobile) [gal (US)]		
Kerosene (mobile) [gal (US)]		
Propane (mobile) [gal (US)]		9,301
CNG (mobile) [DGE]		
Natural gas (stationary) [thm (US)]		21,119
Propane (stationary) [thm (US)]	13,910	
Heating oil or diesel (stationary) [gal (US)]		
Kerosene (stationary) [gal (US)]		
Gasoline (stationary) [gal (US)]		
Electricity (grid mix) [kWh]	1,367,574	3,123,190

Calculated: Aug 01, 2023 14:18

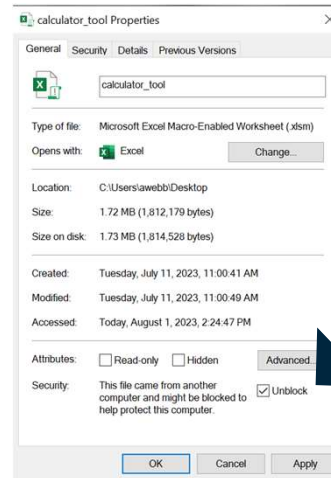


Case Study – 2 sample recycling facilities (cont.)

Download EPA simplified GHG emissions calculator

<https://www.epa.gov/climateleadership/simplified-ghg-emissions-calculator>

I had to do this unblock step to enable the macros



Case Study – 2 sample recycling facilities (cont.)

Mobile Combustion

- Enter by facility and fuel type
- Both sites have on-road diesel trucks; one also has propane forklifts
- On-road vehicles also need vehicle year and miles traveled; I estimated both for this demo

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 (GREEN Italics). Only enter vehicles owned or leased 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.

- Note: As of the v9 Simplified GHG Calculation tool update, the latest mobile combustion factors reflect year 2020 data. Therefore, for all vehicle model years 2021 onward, the 2020 year factor is used.

- Select "On-Road" or "Non-Road" from drop-down box to determine the Vehicle Types available. **Must make this selection before picking vehicle type.**

- 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 CO₂ 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
Fleet-012	HQ Fleet	OnRoad	Passenger Cars - Gasoline	2019	500	gal	12,650
MRF-A	Facility A	OnRoad	Medium- and Heavy-Duty Vehicles - Diesel	2020	26,756	gal	196,411
MRF-B	Facility B	OnRoad	Medium- and Heavy-Duty Vehicles - Diesel	2020	57,040	gal	418,674
MRF-B	Facility B	NonRoad	Industrial/Commercial Equipment - LPG		9,361	gal	

Summary | Stationary Combustion | **Mobile Sources** | Refrigeration and AC | Fire Suppression | Purchased Gases ...

1							
2							
3	Total CO ₂ Equivalent Emissions (metric tons) - Mobile Sources						918.3
4							
5	Total Biomass CO ₂ Equivalent Emissions (metric tons) - Mobile Sources						0.0
6							



Case Study – 2 sample recycling facilities (cont.)

Summary Report

- Emissions by activity and scope
- Total Scope 1 and 2 emissions

EPA's tool also includes tabs for select Scope 3 categories

Summary of Organization's Emissions:

Scope 1 Emissions			
Go To Sheet	Stationary Combustion	192	CO ₂ -e (metric tons)
Go To Sheet	Mobile Sources	918	CO ₂ -e (metric tons)
Go To Sheet	Refrigeration / AC Equipment Use	0	CO ₂ -e (metric tons)
Go To Sheet	Fire Suppression	0	CO ₂ -e (metric tons)
Go To Sheet	Purchased Gases	0	CO ₂ -e (metric tons)
Location-Based Scope 2 Emissions			
Go To Sheet	Purchased and Consumed Electricity	1,108	CO ₂ -e (metric tons)
Go To Sheet	Purchased and Consumed Steam	0	CO ₂ -e (metric tons)
Market-Based Scope 2 Emissions			
Go To Sheet	Purchased and Consumed Electricity	1,108	CO ₂ -e (metric tons)
Go To Sheet	Purchased and Consumed Steam	0	CO ₂ -e (metric tons)
Total organization Emissions			
Total Scope 1 & Location-Based Scope 2		2,218	CO ₂ -e (metric tons)
Total Scope 1 & Market-Based Scope 2		2,218	CO ₂ -e (metric tons)



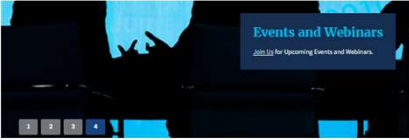
Abbie to wrap up and turn it over to Eric for EPA Resources.

Mention that there will be time for additional questions right after the resource page.

U.S. EPA Introduction & Resources

EPA Center for Corporate Climate Leadership | US EPA

EPA Center for Corporate Climate Leadership



EPA's Center for Corporate Climate Leadership serves as a resource center for all organizations looking to expand their work in the area of greenhouse gas (GHG) measurement and management.



<h3>GHG Inventory Guidance</h3> <ul style="list-style-type: none"> GHG Inventory Development Process Determine Organizational Boundaries Inventory Guidance for Low Emitters Scope 1 and Scope 2 Inventory Guidance Scope 3 Inventory Guidance Inventory Measurement Plan Guidance Corporate GHG Inventory and Scope 3 Emissions Accounting 	<h3>GHG Measurement Resources</h3> <ul style="list-style-type: none"> GHG Emission Factors Hub Scope 1 and GHG Emissions Calculators GHG Emission Software GHG Reduction Programs and Strategies Integrating Global Warming Potentials 	<h3>Supply Chain</h3> <ul style="list-style-type: none"> Supply Chain Guidance GHG Emission Guidance Supplier Engagement Survey How to Conduct Supplier Emissions Data Gap Analysis Factor Specific Emissions Methodologies Scope 3 Inventory
<h3>Center Basics</h3> <ul style="list-style-type: none"> About the Center Webinars and Events Climate Leadership Awards Submit your Testimony GHG Calculators 	<h3>Climate Risks Disclosure</h3> <ul style="list-style-type: none"> How to Report on Climate Risks and Opportunities Climate Risk and Opportunities Defined GHG and Other Related Resources 	<h3>What's New</h3> <ul style="list-style-type: none"> GHG Simplified GHG Emissions Calculator updated (May 2023) GHG Emission Factors Hub updated (April 2023) New EPA Paper - Renewable Electricity Procurement on Behalf of Others: A Corporate Reporting Guide (pdf)



GHG Inventory Guidance

- GHG Inventory Development Process
- Determine Organizational Boundaries
- Inventory Guidance for Low Emitters
- Scope 1 and Scope 2 Inventory Guidance
- Scope 3 Inventory Guidance
- Inventory Management Plan Guidance
- Corporate GHG Inventorying and Target Setting Self-Assessment

What's New

- GHG Simplified GHG Emissions Calculator updated (May 2023)
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- New EPA Paper - Renewable Electricity Procurement on Behalf of Others: A Corporate Reporting Guide (pdf)



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