### Tools for Calculating GHG Emissions, Avoided Emissions, and Emission Equivalencies

When presenting information on Greenhouse Gases, there are three basic calculations that collectively present a comprehensive emissions story for materials managed by ISRI members:

1. **A company’s own emissions**. This includes both direct operating emissions, as well as indirect emissions from energy purchased and its third-party suppliers.
2. Emissions that are **avoided** by recycling.
3. **Emission equivalents** of avoided emissions or emissions reductions into other activities that may be easier to explain to customers and other stakeholders, such as trees planted or cars taken off the road.

Each of these calculations gives a different perspective of the recycling story. Completing all three can help companies and their customers understand the net benefits of recycling beyond a company, but to the entire value chain.

**Calculator models**

U.S. EPA has 3 calculators can be used for these calculations. They are each updated regularly, they are transparent, and they are available for use by any company with no charge.

**U.S. EPA’s calculator tools:**

* 1. **US EPA’s Simplified GHG Emissions Calculator (**[Simplified GHG Emissions Calculator | US EPA](https://www.epa.gov/climateleadership/simplified-ghg-emissions-calculator))**[[1]](#endnote-1).** This calculator allows businesses to input data using an on-line excel file, and to calculate its Direct Operating (Scope 1) and Indirect Electricity (Scope 2) emissions. It is updated annually and is referenced by the GHG Protocol[[2]](#endnote-2) as a preferred emissions calculation tool.

Calculates: A company’s own emissions

* 1. **U.S. EPA’s WARM tool** ([Waste Reduction Model (WARM) | US EPA](https://www.epa.gov/warm) ). This tool measures the emissions avoided by recycling (sometimes referred to as Scope 4 emissions). The EPA created its Waste Reduction Model (WARM) to provide high-level estimates of potential greenhouse gas (GHG) emissions reductions, energy savings, and economic impacts from several different waste management practices. WARM estimates these impacts from baseline and alternative waste management practices—source reduction, recycling, anaerobic digestion, combustion, composting and landfilling.

Calculates: Emissions that are avoided by recycling

* 1. **U.S. EPA’s Equivalency Calculator (**[**Greenhouse Gas Equivalencies Calculator | US EPA**](https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator)). The Greenhouse Gas Equivalencies calculator allows you to **convert emissions or energy data to the equivalent amount of carbon dioxide (CO2) emissions from using that amount. The calculator translates abstract measurements into concrete terms your audience can more easily understand**, such as the annual emissions from cars, households, or power plants,which may be useful in communicating your greenhouse gas reduction strategy, reduction targets, or other initiatives aimed at reducing greenhouse gas emissions.

Calculates: Equivalent activities to emissions avoided or reduced

EPA’s calculators are designed for smaller, and/or lower emissions organizations. Large complex corporations with multiple sites may need to rely on enterprise software tools or consultants for accurate emissions calculations.

**Using These Tools**

These tools are all fairly straightforward, with data entry points and explanation available on the EPA’s website. Background assumptions (e.g. energy intensity, mileage to markets, etc.) are updated regularly and are consistent across all users. This levels the playing field and reduces criticism of manipulation by companies or users.

Each has its own purpose, with the Simplified GHG Emissions Calculator serving to provide a company with its own emissions inventory. To prepare for using this tool, gather your key data points, outlined for you in the [Environmental Data Gathering Template](https://isri.isri2.org/wp-content/uploads/2024/03/ISRI-Environmental-Input-Sheet.xlsx) file.

Separately, the WARM Tool, can be used by recyclers to convey the environmental benefits of a customer’s specific tons via emissions they are “avoiding” through their recycling efforts. Be sure to report this number separately from your GHG inventory figure in your sustainability or ESG reporting.

Finally, many recyclers find it helpful to provide examples of the emissions benefits of recycling by using example of equivalent efforts, which is where the Equivalencies Calculator comes in handy. For example, recycling X tons of recyclables saves the equivalent of taking XXX of cars off the road. Before you use this tool, you’ll need to use either the GHG Calculator or WARM Tool mentioned above, or have prepared your own emissions figures, to enter those figures into the Equivalencies Tool. You can’t directly calculate the equivalencies without first calculating your emissions.

**Summary**

EPA regularly updates its models. For example EPA is currently developing some additional guidance for “Avoided Emissions” (Scope 4), and has also developed extensive guidance for Supply Chain emissions (Scope 3) [Supply Chain Guidance | US EPA](https://www.epa.gov/climateleadership/supply-chain-guidance). Please refer to Workshop #5 for more information about Scope 3 and Scope 4.

As companies start their journey to take inventory of their emissions, and to communicate them internally and externally, the three calculators can tell the story to a company’s stakeholders about the value of their recycling activities.

1. ***EPA’s Simplified GHG 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 so it may not be appropriate for large multi-site corporation.* [↑](#endnote-ref-1)
2. ***The Greenhouse Gas Protocol (GHG Protocol).*** *The GHG Protocol’s corporate accounting and reporting standard has been developed and updated over several decades. It is the global standard for emissions**reporting. The Global Reporting (GRI) Initiative is the framework that ISRI is using for our ESG Reporting system. Since GRI relies on the GHG Protocol for emissions inventory work as part of their reporting structure, ISRI’s toolkit is relying on the two pre-eminent global accepted frameworks that link GHG emissions calculations and reporting. The GHG Protocol provides guidance specifically to companies to prepare GHG inventories to create a true and fair account of their emissions, through the use of standardized approaches and principles.* [↑](#endnote-ref-2)