ClimateBiz
The Business Resource for Climate Management

A Partnership of



# SECTION: Backgrounders







## Calculating Greenhouse Gas Emissions

Source: ClimateBiz.com

Related Backgrounders

- Measuring and Report ClimateBiz

Calculating a company's greenhouse gas emissions be a complex and time-consuming task. It also varies somewhat by company, because the activities that produce GHG emissions may differ. For example, a manufacturing company will likely have extensive emissions from its industrial operations, while the main emissions from a financial services corporation will be from office emissions heating and cooling, operating office equipment) and travel.

The various GHG measuring protocols provide extensive guidance and tools for c seeking to measure their emissions. Here are a few of the basic concepts and ter common to most GHG measuring protocols.

**The basic calculation**

GHG emissions result from some activity that burns fossil fuels, releasing emissio carbon dioxide or some other greenhouse gas. (GHG releases can also be due to changes, but these are not relevant to most companies' operations.) The two bas of the calculation are the "activity data," which quantify an activity, and the "emi factors," which convert energy use to the amount of emissions produced based o emissions per unit of energy or fuel used.

- Examples of *activity data* include kilowatt-hours of electricity used to light an o operate equipment, and miles driven for business travel or to transport goods.
- *Emissions factors* are determined and disseminated by a variety of governmen agencies and organizations, and apply to specific types of energy sources. For according to the U.S. Energy Information Administration the emissions factor f gasoline is 19.564 pounds of carbon dioxide produced per gallon of gasoline us

Determining a company's emissions, at a very basic level, entails first identifying activities that generate emissions, and then using the emissions factor of the fuel calculation that determines the emissions generated. At a simple level, the calcul

[activity data] X [emissions factors].

Units must be consistent, however, and in some cases an interim calculation mus made. For example, to determine emissions from driving, one would take [miles divided by [fuel efficiency, i.e., miles per gallon]. This calculation results in numb gallons of gasoline used, which is then multiplied by [emissions factor of 19.564] the pounds of CO2 emitted:

[100 MILES TRAVELED] / [25 MILES PER GALLON] X [19.564 LBS CO2 PER GALL 78.256 LBS CO2

**Direct and indirect emissions**

Any true measure of a company's total emissions must take into account both dir indirect emissions.

- Direct emissions are those that are produced by a source controlled by the cor Examples include operations within a company-owned factory, or gasoline burı company car.
- Indirect emissions are those that result from a company activity, but are produ source external to the company. One common example is use of electricity prc a commercial utility. The company uses the electricity to run lights or office eq but the electric utility is producing the power (and the emissions).

Organizational and operational boundaries

Another challenge in calculating emissions is the need to determine boundaries, i

- *Organizational boundaries*, which determine what parts of a company will be a for in the emissions inventory. A company may have overseas operations, join ventures that are only partly owned, or a manufacturing facility that it shares another company. All of these examples present challenges in determining the organizational boundary.
- *Operational boundaries*, which determine the limits of the activities that a com count towards it emissions. For example, will the company count emissions fro of consultants working on a company project?

Measuring protocols provide guidance in determining boundaries, but ultimately these are company decisions.

**CO2 equivalents**

The most common greenhouse gas is carbon dioxide. Numerous other gases, hov also have greenhouse properties, including methane, nitrous oxide, hydrofluoroca (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride. These gases each diffe ability to absorb heat in the atmosphere. For example, methane is 21 times as pc CO2, so it is considered to have a "global warming potential" of 21. Other gases a hundreds or thousands of times as powerful as CO2. Therefore, a pound of emiss CO2 is not the same in terms of climate impact as a pound of another greenhous

rectify this discrepancy, GHG emissions are often reported in terms of “CO2 equi
determined by multiplying the amount of emissions of a particular gas by the glo
warming potential of the gas.