ERA
environmental consulting

# A Guide to Greenhouse Gas Accounting for Business

An eBook that covers how they're changing the way we do business, why it's important and how to calculate them properly.

# Table of Contents

# How Greenhouse Gas Reporting & Accounting Can Help Your Business

Tracking, calculating, accounting and reporting your air emissions is fast becoming as mandatory for business as filing annual taxes.

In fact, when commenting on a 2010 survey conducted by The Chartered Institute of Management Accountants (CIMA), the American Institute of Certified Public Accountants (AICPA) and the Canadian Institute of Chartered Accountants (CICA), AICPA Senior Vice President for Member Competency and Development Arleen Thomas said:

> *"As companies both large and small incorporate environmental and social considerations into their strategies for long-term business success, U.S. CPAs and other professional accountants have an important role to play. The survey report highlights the important work that we have to do in the accounting profession which is why the AICPA is taking a leadership role in the U.S. and collaborating with CIMA, CICA and the Prince's Project to provide global thought leadership and services to help our members develop skills and competence in sustainability accounting and reporting." [1]*

Part of a sound business sustainability program is ensuring that your organization implements environmental, social and economic strategies that protect your business's interests into the future.

These have been proven to contribute to long-term success by reducing financial costs and improving public relations. Leading companies are now beginning to recognize that making decisions based on sustainability performance indicators translates to successful bottom-line business performance. They are also beginning to understand that investors are more attracted to companies that focus on long-term sustainable profitability and competitive advantage. [2]

One area in particular that will contribute to a company's success, which is starting to receive a huge amount of attention, is carbon accounting and trading.

> *"Tackling Climate Change could create opportunities for a company to increase its value by up to 80%. Conversely, it could threaten up to 65% of the value if the company is poorly positioned."*
>
> *(The McKinsey Report September, 2008)*

*"More than 40 Fortune 500 companies in the U.S. have set targets for greenhouse-gas reductions. Of these, 11 have already met them, and not one has lost money."*

*(Pew Research Center April, 2008)*

# Getting your accounting started

Central to these processes is the ability to effectively account and reporting your Greenhouse Gases (GHGs).

This is involves calculating your carbon footprint and then reporting it to a relevant organization or agency.

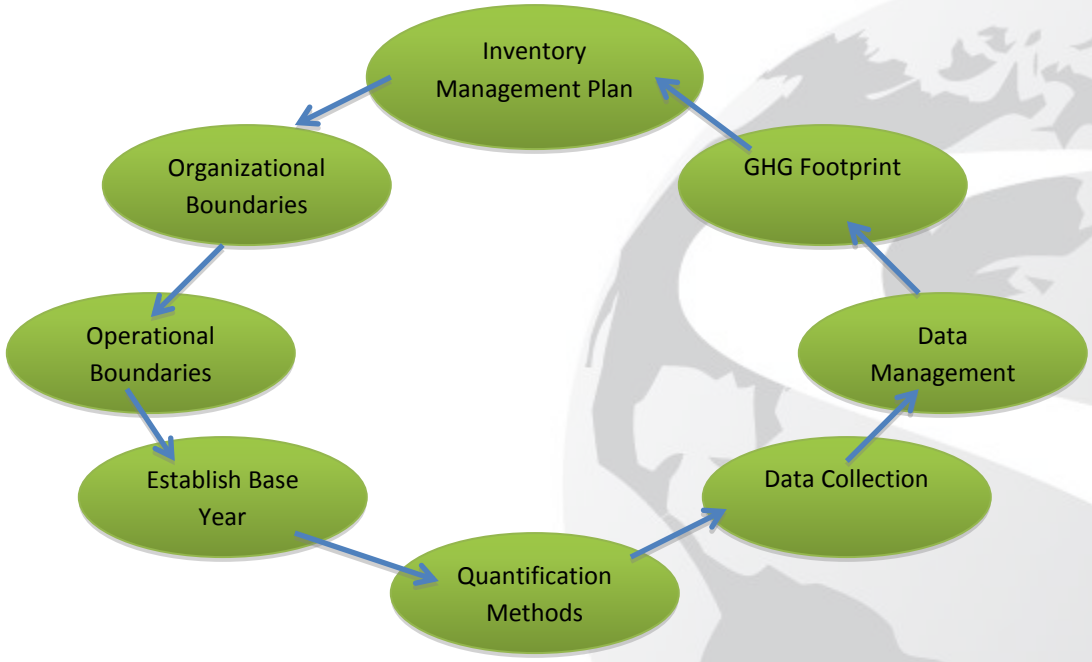



**Figure 1** - The process undertaken for calculating a company's carbon footprint is annual cycle, starting with an inventory management plan.

# Your Inventory Management Plan

The first step is to design an **Inventory Management Plan**. This organizes all the aspects of carbon accounting that your company will to partake in.

It involves managing risks and identifying reductions, as well as participating in mandatory or voluntary carbon reporting.

First, let's look at the difference between **GHG Accounting** and **GHG Reporting**.

Regardless of your company size, **accounting** for your GHG emissions involves two steps:

1. Identifying and quantifying the emissions from your operations.
2. Linking this data to specific operations, geographical locations, business processes and owners.

Once you have collected and connected this data to the sources that produced it, **reporting** is simply presenting this GHG data in the required format to the organizations or programs that offer a reporting platform.

## Why report and who do you report to?

There are several organizations and programs that will allow you to disclose your GHG data. These include:

- GHG Registries
  - CA Climate Action Registry (CCAR)
  - The Climate Registry (TCR)
  - DOE 1605b
- GHG Reduction Programs
  - EPA Climate Leaders
- Protocol
  - World Resources Institute and World Business Council for Sustainable Development
- Trading Programs
  - Chicago Climate Exchange (CCX)
- Investor Disclosure
  - Global Reporting Initiative
  - Carbon Disclosure Project

The choice of organization you wish to report to will depend on the reasoning behind your GHG reporting, although the days of "voluntary" reporting have ended in the U.S.

The EPA introduced Greenhouse Gas Rule on October 29, 2009, which requires reporting of annual emissions of all Greenhouse Gases.

Outside of this mandatory reporting, many companies also choose to report their annual carbon emissions to the Carbon Disclosure project, for example, because they feel their Carbon Disclosure Rating will influence a stockholders decision to invest in their company.

They are therefore considering this one of their key investment statistics and ratios, alongside their net profit margin and return on average assets.

**Key stats and ratios**

| | Q2 (Apr '11) | 2010 |
|---|---|---|
| Net profit margin | 18.19% | 33.77% |
| Operating margin | 21.67% | 24.06% |
| EBITD margin | - | 27.78% |
| Return on average assets | 10.30% | 19.51% |
| Return on average equity | 24.09% | 42.32% |
| Employees | 139,600 | - |
| Carbon Disclosure Rating | - | 78/100 |

More ratios from Thomson Reuters »

**Figure 2** – Key statistics and ratios for the Coca Cola company, late April 2011

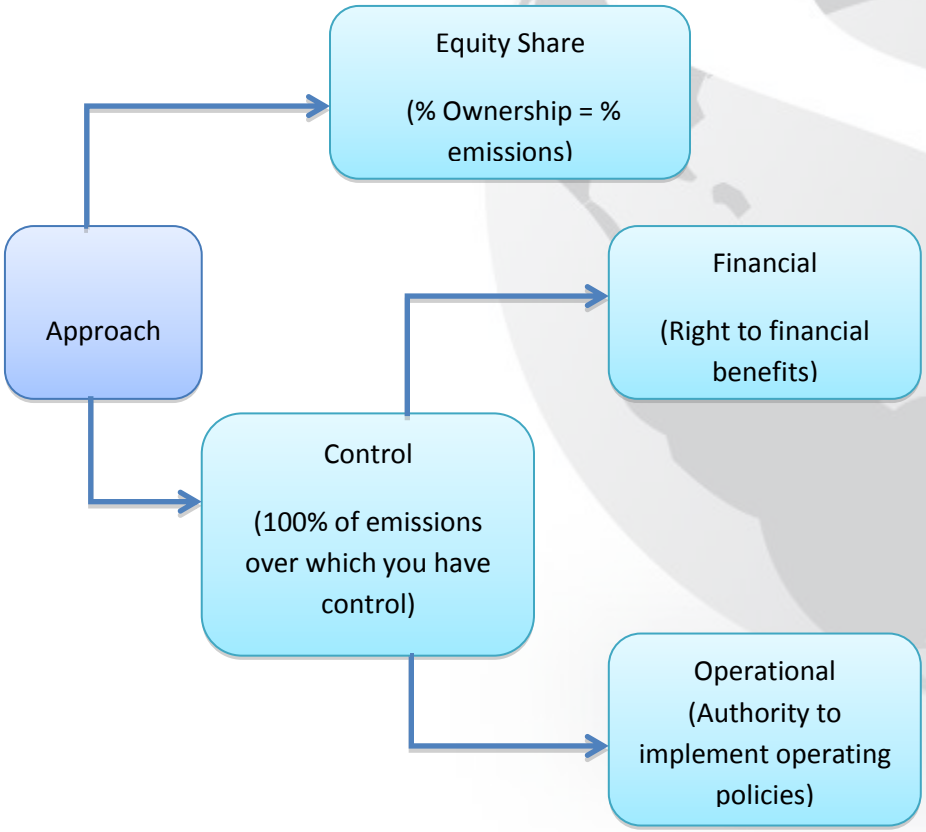
# Defining Your Company for Greenhouse Gas Success

Once you have decided what sort of reporting your company is going to undertake, the next step is to define your **organizational** and **operational boundaries** for your GHG accounting.

In defining these terms, your company fully recognizes and accounts for the emission sources that fall under your responsibility. You do not have to define and account for all of your sources. Some are mandatory and others are voluntary, but generally speaking any sources that are on site at one of your facilities is mandatory to report.

## Setting your organizational boundaries

**Organizational boundaries** are the extent to which your organization or company has control over emissions. The diagram below will help in understanding organizational boundaries.



Defining your **organizational boundaries** involves three steps:

1. Listing the operations within your organization that contribute to your GHG emissions
2. Defining the level of control for each operation
3. Establishing reporting entities for each operation and the roll-up requirements for organization wide reporting

## Operational boundaries – The depth of your reporting commitments

**Operational boundaries** help you to determine the types and scope of the emissions that you are going to account for.

*Scope 1* emissions are considered to be your "core" emissions – those emissions that are directly produced by assets owned or controlled by the company during operations. These sources include emissions from on-site power generation, process related emissions and mobile sources such as company trucks and vehicles.

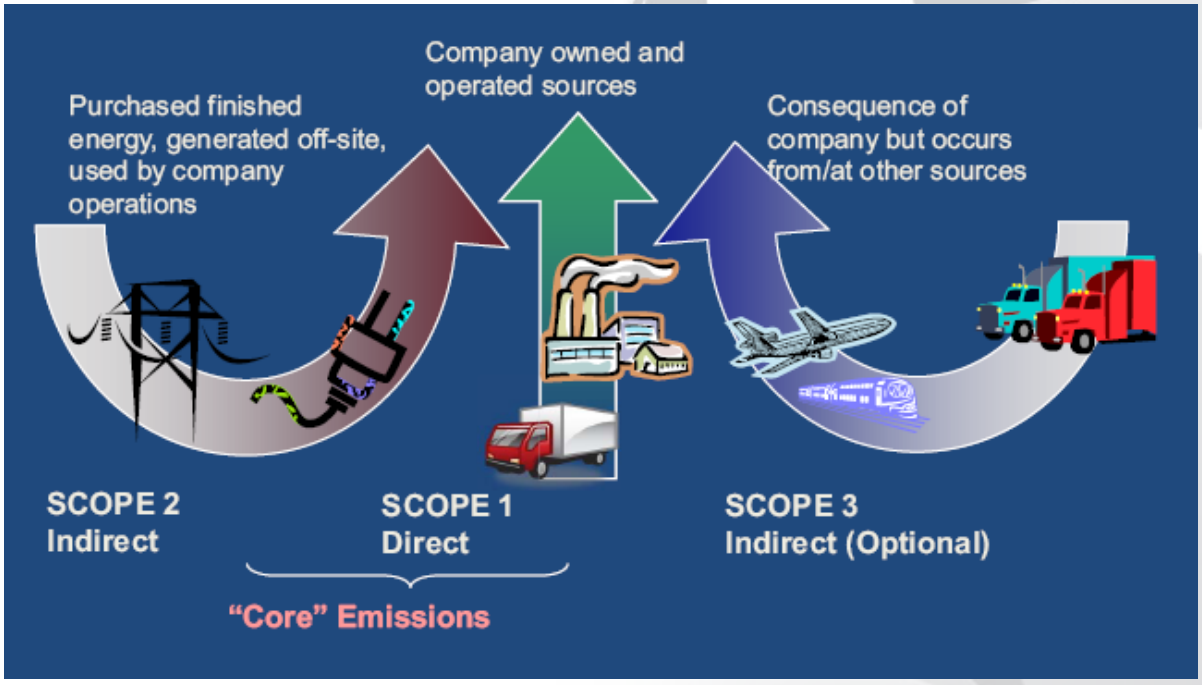



**Figure 3** – The three scopes of emissions that your company is responsible for.

*Scope 2* emissions are indirect emissions, but still related to the operations at your facility. This is largely the emissions that are related to finished energy your facilities

purchased and used on-site. In this scenario, energy purchased from a coal-fired power plant will have huge levels of emissions versus energy purchased from a renewable source or a nuclear source.

*Scope 3* emissions are also considered indirect emissions. Unlike Scope 2, these emissions are not directly related to the operation of one of your facilities, but they exist as a result of your business operations. Examples include the emissions generated from shipping your product with a third party hauler and those generated by company employees during air transit.

Emissions that fall under Scope 3 are optional to report. Companies have no requirement to report them, but organizations who are seriously considering their sustainability initiatives can opt to include these in their emissions accounting.

## Classifying your sources

After working out your organizational boundaries, it is important to classify your emission sources into categories. These include:

- Boilers
- Company Fleet Vehicles
- Purchased Energy
- Chilled Water
- Engines
- Space Heating
- HVAC Systems
- Landscaping Equipment
- Forklifts
- Emergency Generators
- Sanitary waste
- Commuting
- Outsourced distribution
- Other

# How to Measure Your Emissions the Right Way

Measuring your emissions correctly takes careful consideration. It is important to consider not only your emissions in any year, but the context that these emissions were generated in. There are a few easy steps that can be taken to ensure that you and your company are not only measuring your GHGs correctly, but that you can use this information as actionable insight into how your company is performing.

## Why should I set an inventory base year?

Think of your **inventory base year** as the yardstick against which you're going to measure all of your future emissions. It is used to set a base line, against you will be able track your progress.

To determine your inventory base year emissions you need to identify the following:

- Base Year Selection
  - For this you will need a verifiable set of emissions data.
  - It is also important to have reasons for justifying this year as your selection.
- Base Year Changes
  - These are structural changes to your company, in both organization and infrastructure
  - Methodology changes & error correction for the calculation of emissions in previous years
- Significance Threshold
  - This is the amount considered significant for the base year to be changed due to changes in structure or methodology for calculation of energy usage. Normally this figure is 5% of GHG inventory
  - It is important to review this figure on an annual basis

Tracking these figures across a timeframe will allow your company to communicate to your shareholders, executives and the public how far you are progressing with your continuous improvement activities.

# How do I measure my emissions?

At this point you will have defined your sources and the processes that are responsible for generating your emissions. The next step is **emission quantification**.

This relatively simple step is driven by a basic formula.

$$GHG\ Emissions = Activity\ \times Emission\ Factor\ (\frac{Emissions}{Activity})$$

Emission factors for different classifications of sources give an accurate idea of the amount of emissions generated by a unit of activity.

Examples of different units of activity for the different scopes include:

- Scope 1 - Quantity of fuel purchased
- Scope 2 - VOC oxidizing equipment hours of operation
- Scope 2 - Metered electricity consumption
- Scope 3 - Fuel use or miles traveled

Below are a group of tables that list the emission factors that are most commonly used for quantifying emissions. These include emission factors for combustion and mobile sources

**Table B-4: $CO_2$ Emission Factors (mass $CO_2$/fuel energy) for Non-Fossil Fuel Combustion**

| Fossil Fuel | Heat Content (HHV) | $CO_2$ Content Coeffecient |
|---|---|---|
| **Solid** | (mmBtu/ton) | (kg $CO_2$/mmBtu) |
| Wood and Wood Waste (12% moisture) | 15.38 | 93.87 |
| Kraft Black Liquor (North American hardwood) | 11.98 | 94.41 |
| Kraft Black Liquor (North American softwood) | 12.24 | 95.13 |
| **Gas** | (Btu/scf) | |
| Landfill Gas (50% $CH_4$/50% $CO_2$) | 502.50 | 52.07 |
| Wastewater Treatment Biogas | varies | 52.07 |

## Table B-3: $CO_2$ Emission Factors (mass $CO_2$/fuel energy) for Fossil Fuel Combustion

| Fossil Fuel | Heat Content (HHV) | $CO_2$ Content Coefficient |
|---|---|---|
| **Coal and Coke** | (mmBtu/ton) | (kg $CO_2$/mmBtu) |
| Anthracite Coal | 25.09 | 103.62 |
| Bituminous Coal | 24.93 | 93.46 |
| Sub-bituminous Coal | 17.25 | 97.09 |
| Lignite | 14.21 | 96.43 |
| Unspecified (industrial coking) | 26.27 | 93.72 |
| Unspecified (industrial other) | 22.05 | 93.98 |
| Unspecified (electric utility) | 19.95 | 94.45 |
| Unspecified (residential/commercial) | 22.05 | 95.33 |
| Coke | 24.80 | 113.67 |
| **Natural Gas** | (Btu/scf) | (kg $CO_2$/mmBtu) |
| Natural Gas | 1,029 | 53.06 |
| **Petroleum** | (mmBtu/Barrel) | (kg $CO_2$/mmBtu) |
| Distillate Fuel Oil (#1, 2, & 4) | 5.8250 | 73.15 |
| Residual Fuel Oil (#5 & 6) | 6.2870 | 78.80 |
| Kerosene | 5.6700 | 72.31 |
| Petroleum Coke | 6.0240 | 102.12 |
| LPG (average for fuel use) | 3.8492 | 63.16 |
| Common LPG Components: | | |
| Ethane | 2.9160 | 59.58 |
| Propane | 3.8240 | 63.07 |
| Isobutane | 4.1620 | 65.08 |
| n-Butane | 4.3280 | 64.97 |
| **Waste Tires** | (mmBtu/ton) | (kg $CO_2$/mmBtu) |
| Waste Tires | 28.00 | 112.84 |

**Table 4. Default Fuel economy factors for different types of mobile sources and activity data**

| Vehicle Characteristics | | | CO2/km traveled |
|---|---|---|---|
| *Vehicle Type* | *Liters/100km* | *mpg* | *gram CO2 / km* |
| New small gas/electric hybrid | 4.2 | 56 | 100.1 |
| Small gas auto, hghwy | 7.3 | 32 | 175.1 |
| Small gas auto, city | 9.0 | 26 | 215.5 |
| Medium gas auto, hghwy | 7.8 | 30 | 186.8 |
| Medium gas auto, city | 10.7 | 22 | 254.7 |
| Large gas automobile, hwy | 9.4 | 25 | 224.1 |
| Large gas automobile, city | 13.1 | 18 | 311.3 |
| Medium Station wagon, hwy | 8.7 | 27 | 207.5 |
| Med Station wagon, city | 11.8 | 20 | 280.1 |
| Mini Van, hwy | 9.8 | 24 | 233.5 |
| Mini Van, city | 13.1 | 18 | 311.3 |
| Large Van, hwy | 13.1 | 18 | 311.3 |
| Large Van, city | 16.8 | 14 | 400.2 |
| Mid size. Pick-up Trucks, hwy | 10.7 | 22 | 254.7 |
| Pick-up Trucks, city | 13.8 | 17 | 329.6 |
| Large Pick-up Trucks, hwy | 13.1 | 18 | 311.3 |
| Large Pick-up Trucks, city | 15.7 | 15 | 373.5 |
| LPG automobile | 11.2 | 21 | 266 |
| Diesel automobile | 9.8 | 24 | 233 |
| Gasoline light truck | 16.8 | 14 | 400 |
| Gasoline heavy truck | 39.2 | 6 | 924 |
| Diesel light truck | 15.7 | 15 | 374 |
| Diesel heavy truck | 33.6 | 7 | 870 |
| Light motorcycle | 3.9 | 60 | 93 |
| Diesel bus | 35.1 | 6.7 | 1034.611322 |

**[Source: Miles per gallon for typical vehicles based on averages from US - EPA 2001 Guide. Also available at www.epa.gov/autoemissions]**

GHG Protocol - Mobile Guide (03/21/05) v1.3

**Table 5. Default distance based emission factors for different types of mobile sources**

(Tables 5.1 to 5.5 are from Environmental Reporting – Guidelines for Company Reporting on GHG Emissions, DEFRA, UK)

| Table 5.1: Passenger Road Transport Conversion Factors: Petrol cars | | | | | |
|---|---|---|---|---|---|
| **Size of car and distance units** | **Total units travelled** | **Units** | **x** | **kg $CO_2$ per unit** | **Total kg $CO_2$** |
| Small petrol car Max 1.4 litre engine | | miles | x | 0.28 | |
| | | km | x | 0.17 | |
| Medium petrol car From 1.4 – 2.1 litres | | miles | x | 0.36 | |
| | | km | x | 0.22 | |
| Large petrol car Above 2.1 litres | | miles | x | 0.44 | |
| | | km | x | 0.27 | |
| Average Petrol car | | miles | x | 0.33 | |
| | | km | x | 0.20 | |

Source: COPERT II emission factors and Transport Research Laboratory data, combined with real road testing cycle data

| Table 5.2: Passenger Road Transport Conversion Factors: Diesel cars | | | | | |
|---|---|---|---|---|---|
| **Size of car and distance units** | **Total units travelled** | **Units** | **x** | **kg $CO_2$ per unit** | **Total kg $CO_2$** |
| Small diesel car 2.0 litre or under | | miles | x | 0.19 | |
| | | km | x | 0.12 | |
| Large diesel car Over 2.0 litre | | miles | x | 0.23 | |
| | | km | x | 0.14 | |
| Average diesel car | | miles | x | 0.20 | |
| | | km | x | 0.12 | |

Source: COPERT II emission factors and Transport Research Laboratory data, combined with real road testing cycle data

| Table 5.3: Rail and Air Passenger Transport Conversion Factors | | | | | |
|---|---|---|---|---|---|
| **Method of travel** | | **Person/kms travelled (pkm)** | **x** | **kg $CO_2$ per pkm** | **Total kg $CO_2$** |
| Rail | | | x | 0.06 | |
| Air[4] | long haul | | x | 0.11 | |
| | short haul | | x | 0.18 | |

Source: NETCEN, British Airways, DHL, Railtrack, English, Welsh and Scottish Railways LTD.

| Table 5.4: Freight Road Mileage Conversion Factors | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Type of lorry** | **Tonne km** | **x** | **Litres fuel per km** | **x** | **Fuel conversion factor** | | **Total kg $CO_2$** |
| Articulated | | x | 0.40 | x | Petrol | 2.31 | |
| | | | | x | Diesel | 2.68 | |
| | | | | x | LPG | 1.51 | |
| Rigid | | x | 0.35 | x | Petrol | 2.31 | |
| | | | | x | Diesel | 2.68 | |
| | | | | x | LPG | 1.51 | |

Source: Continuing Survey of Road Goods Transport 1997

| Table 5.5: Other Freight Road Mileage Conversion Factors | | | | | |
|---|---|---|---|---|---|
| **Freight transport mode** | | **Tonne km** | **x** | **Factor** | **Total kg $CO_2$** |
| Rail | | | x | 0.03 | |
| Air | long haul | | x | 0.57 | |
| | short haul | | | | |
| | | | x | 1.58 | |
| Shipping[3][4][5] | small ro-ro | | x | 0.06 | |
| | large ro-ro | | | | |
| | small tanker | | | | |
| | large tanker | | | | |
| | small bulk carrier | | | | |
| | large bulk carrier | | | | |
| | | | x | 0.02 | |
| | | | x | 0.04 | |
| | | | x | 0.003 | |
| | | | x | 0.014 | |
| | | | x | 0.007 | |

Source: Lloyds Register Marine Research Programme 1990

3 revised figure in line with factors used in National Air Emissions Inventory
4 Long haul - Asia, Australasia, the Americas, Middle and Far East Short haul - average 500km
5 Small ro-ro - 1,268 deadweight tonnes, max speed 16.2 knots
Large ro-ro - 4,478 deadweight tonnes, max speed 23.2 knots
Small tanker - 844 deadweight tonnes, max speed 8.2 knots
Large Tanker - 18,371deadweight tonnes, max speed 15 knots
Small Bulk carrier - 1,720 deadweight tonnes, max speed 10.9 knots
Large Bulk carrier - 14,201 deadweight tonnes, max speed 11.2 knots

# Calculating emissions from VOC Oxidizers

Calculating CO2 emissions from VOC oxidizing equipment is something that can be a little tricky, so we've included an example below that runs through the process [4]

## Example: Determining an Emission Factor for a Gas Waste Stream

A Climate Leaders Partner has a thermal oxidizer destroying a waste gas stream of different components. The Partner has data on volume of gas combusted and on the mole fraction of the different components of the waste gas stream.

The first step is to determine the total number of moles in the waste stream per a specific volume. This is based on the assumed temperature and pressure of the gas. Assuming conditions of 1 atm and 25° C, there are 2.55 x $10^{-3}$ lbmole of gas per cubic foot of gas. This factor could be adjusted to meet the specific temperature and pressure conditions of the Partner's waste gas stream. An emission factor is then determined per cubic feet of gas based on the following Equation EX-1:

### Equation EX-1: Determining Emission Factor for Gas Waste Stream

$$\text{Emission Factor}\left(\frac{\text{lb.C}}{\text{ft.}^3}\right) = \sum_{i=1}^{n} MF_i \times \text{Moles} \times \text{m.w.}_i \times CF_i$$

where:

$MF_i$ = Molar Fraction of Gas Component i $\left(\frac{\text{lbmole i}}{\text{Moles}}\right)$

Moles = Total Number of Moles in a Specific Volume of Gas Mixture $\left(\frac{\text{lbmole}}{\text{ft.}^3}\right)$

$\text{m.w.}_i$ = Molecular Weight of Gas Component i $\left(\frac{\text{lb. i}}{\text{lbmole i}}\right)$

$CF_i$ = Carbon Fraction of Gas Component i $\left(\frac{\text{lb.C}}{\text{lb.i}}\right)$

The following Table EX-1 shows an example gas waste stream with the mole fractions of different components.

### Table EX-1: Example Gas Waste Stream

| Gas Component | Mole % | lbmole | m.w. | % C | lb. C |
|---|---|---|---|---|---|
| $CO_2$ | 5% | $1.28 \times 10^{-4}$ | 44 | 27% | 0.001531 |
| $CH_4$ | 30% | $7.66 \times 10^{-4}$ | 16 | 75% | 0.009188 |
| $C_3H_8$ | 20% | $5.10 \times 10^{-4}$ | 44 | 82% | 0.018376 |
| $C_6H_6$ | 35% | $8.93 \times 10^{-4}$ | 78 | 92% | 0.064315 |
| Other non-C | 10% | $2.55 \times 10^{-4}$ | ? | 0% | 0 |
| Total | 100% | $2.55 \times 10^{-3}$ | — | — | 0.093409 |

Based on Table EX-1 it can be seen that the emission factor for this example gas waste stream is 0.0934 lb. C per ft³ of waste gas. This emission factor can be used in conjunction with the total amount of gas combusted as well as an oxidation factor and converted to $CO_2$ in order to obtain total emissions from waste gas combustion.

# Emissions from indirect sources

In contrast to oxidizing equipment, calculating your **emissions from indirect sources** for Scope 2 & 3 emissions is a straightforward process.

Determining your Scope 2 emissions involves referencing the Emissions & Generation Resource Integrated Database (eGRID).

This database is a comprehensive source of data on the environmental characteristics of almost all electric power generated in the United States.

Simply put, it allows you to know the emission factor for your electricity use, based on the methods of electricity production in your region.

Therefore, all you need to know to calculate your indirect Scope 2 emissions is:

1. The eGRID subregion your facility is located in (emission factor).
2. The quantity of electricity use at your facility (activity).

Once you know your eGRID subregion, you simply refer to the table below, which shows the emission rates/factors for each region, as well as the US average.

Then you simply multiply use this information in the following formula:

$$GHG\ Emissions\ (tonnes) = Activity\ \times Emission\ Factor\ \left(\frac{Emissions}{Activity}\right) \times \frac{1}{2{,}204.62}\left(\frac{tonne}{lbs}\right)$$

If you are unsure of your facility's subregion, use the EPA Power Profiler tool to find your facility's subregion based on its zip code.

www.epa.gov/cleanenergy/powerprofiler.html

Your Scope 3 emissions can be calculated in a similar manner by referencing the emission factors for the various methods of transportation.

These can be found from the list of mobile source emission factors in the tables listed previously.

# Bringing it all together

Once you have quantified all of your emissions from the sources that you are taking responsibility for, the summation of these numbers will give you your annual carbon footprint.

But you may be wondering, how do I add my nitrous oxide emissions to my carbon dioxide emissions?

This is where we take advantage of Carbon Equivalence ($CO_2$-e) and Global Warming Potential (GWP)

# What is CO2e (Carbon Equivalence) and GWP?

GHGs have varying heat-trapping abilities and atmospheric lifetimes.

Global warming potential (GWP) is a metric used to compare emissions among GHGs. The GWP of CO2 is 1.0, and the GWP of other GHGs are expressed relative to CO2 in a term that is called carbon equivalence or CO2e

For example, methane (CH4) has a GWP of 21, which means that each metric ton of CH4 emissions would have 21 times as much impact on global warming as a metric ton of CO2 emissions.

So our formula for calculation this becomes:

Therefore, you have to fine the GWP of each greenhouse gas, multiple it by the mass of emissions from your facility and this will give you your CO2e values that are used to measure your carbon footprint.

| eGRID Subregion | eGRID Subregion Name | Emission Rates 2007 | | |
|---|---|---|---|---|
| | | Carbon Dioxide (CO2) lbs/MWh | Methand (CH4) lbs/MWh | Nitrous Oxide (N2O) lbs/MWh |
| AKGD | ASCC Alaska Grid | 1284.72 | 0.027 | 0.007 |
| AKMS | ASCC Miscellaneous | 535.73 | 0.023 | 0.004 |
| AZNM | WECC Southwest | 1252.61 | 0.019 | 0.017 |
| CAMX | WECC California | 681.01 | 0.028 | 0.006 |
| ERCT | ERCOT All | 1252.57 | 0.018 | 0.014 |
| FRCC | FRCC All | 1220.11 | 0.041 | 0.015 |
| HIMS | HICC Miscellaneous | 1343.82 | 0.135 | 0.022 |
| HIOA | HICC Oahu | 1620.76 | 0.091 | 0.021 |
| ROE | MRO East | 1696.32 | 0.029 | 0.029 |
| MROW | MRO West | 1772.67 | 0.029 | 0.029 |
| NEWE | NPCC New England | 827.95 | 0.077 | 0.015 |
| NWPP | WECC Northwest | 858.79 | 0.016 | 0.014 |
| NYCW | NPCC NYC/Westchester | 704.80 | 0.026 | 0.003 |
| NYLI | NPCC Long Island | 1418.74 | 0.091 | 0.013 |
| NYUP | NPCC Upstate NY | 683.27 | 0.017 | 0.010 |
| RFCE | RFC East | 1059.32 | 0.027 | 0.017 |
| RFCM | RFC Michigan | 1651.11 | 0.033 | 0.028 |
| RFCW | RFC West | 1551.52 | 0.018 | 0.026 |
| RMPA | WECC Rockies | 1906.06 | 0.024 | 0.029 |
| SPNO | SPP North | 1798.71 | 0.021 | 0.029 |
| SPSO | SPP South | 1624.03 | 0.025 | 0.022 |
| SRMV | SERC Mississippi Valley | 1004.10 | 0.022 | 0.011 |
| SRMW | SERC Midwest | 1779.27 | 0.021 | 0.030 |
| SRSO | SERC South | 1495.47 | 0.024 | 0.025 |
| SRTV | SERC Tennessee Valley | 154.85 | 0.020 | 0.025 |
| SRVC | SERC Virgina/Carolina | 1118.41 | 0.022 | 0.019 |
| **US Average** | | **1293.05** | **0.025** | **0.020** |
| Source: U.S. EPA eGRID2010 Version 1.1 (2007 data); | | | | |

**Table 2** – List of emission factors for every eGRID subregion in the U.S, based on 2007 data.

# Steps to a Successful Carbon Footprint Emission Calculation

So, to recap the entire process which we've gone through, a successful effort to account and report your greenhouse gas emissions should look like the following:

- Create a Process Map of your Company
  - Inventory Management Plan
- Establish the Data Map
  - Base Year Designation
  - Operational and Organizational Boundaries
- Collect Data
- Quantify Emissions
- Report on Emissions

If you follow this plan you'll be in a strong position to accurately be able to represent your GHG emissions to the general public, interested stakeholders in your company and to any government agency that is mandating the collection of GHG emissions.

If you would like any help with some of the more complicated processes involved in these calculations, or would be interested in learning how Environmental, Health & Safety Management Software can take the hassle out of GHG Accounting and Reporting, please contact ERA on (256) 513-4769 or visit www.era-environmental.com

**References:**

[1]

http://www.prnewswire.com/news-releases/global-survey-findings-on-accounting-for-sustainability-practices-released-by-cima-aicpa-and-cica-111988374.html

[2]

http://www.ted.com/talks/ray_anderson_on_the_business_logic_of_sustainability.html

[3

http://www.epa.gov/climateleaders/index.html