Calculating GHG Emissions - Key Steps

Process to Identify and Calculate GHG Emissions

**STEP 1**
Identify the emission sources

**STEP 2**
Select a calculation approach

**STEP 3**
Collect data and choose emissions factors

**STEP 4**
Apply calculation tools

**STEP 5**
Roll-up the data to arrive at the total GHG emissions

GHG Inventory Planning & Management Calculation and Analysis - Process
Step 1 - Identify Sources

Identify Sources
- Stationary combustion
- Mobile combustion
- Process emissions
- Fugitive emissions

Identify each source in context of Scope 1, 2 or 3

Step 2 – Select Calculation Approach

Select Calculation Approach
- Direct measurement is not common or practical
- Emissions usually calculated based on facility or process
- Most common is by the application of documented emission factors

Companies should use the most appropriate and accurate calculation approach available
Step 3 – Collect Data and Choose Emissions Factors

Collect Data and Choose Emissions Factors

- Most Scope 1 GHG emissions will be calculated based on purchased quantities of commercial fuels using published emissions factors.

- Most Scope 2 GHG emissions will be calculated from metered electricity consumptions and emissions factors.

- Most Scope 3 GHG emissions will be calculated from activity data and emissions factors.

Larger industrial firms will be the exception where these processes will not be sufficient to develop a true emissions inventory.

Step 4 – Apply Calculation Tools

Apply Calculation Tools

- Various industry and cross-sector tools are available to enable automation and accuracy when developing industry specific inventories.

- Cross-Sector – Applied to different sectors and include stationary and mobile combustion, HFC in refrigeration and air conditioning.

- Sector-Specific – Designed to calculate emissions in specific industry sectors such as aluminum, iron, and steel, cement, etc.
Step 5 – Roll-Up Data to Corporate Level

Roll-Up Data to Corporate Level

- Centralized Approach – Individual facilities report activity data to corporate level where GHG emissions are calculated

- Decentralized Approach – Individual facilities report GHG emissions using approved methods and tools to corporate level

Choice depends on organizations needs and the two approaches are not mutually exclusive!

Ungraded Quiz – Question 1

Company ABC decided to quantify its Scope 3 emissions, including emissions from the employees’ commute and business flights. They have 150 employees and each travels by automobile for 20 miles average for one way and do not carpool. They work 200 days per year. The employee total flight miles are 15,000 by scheduled flights. Use automobile average emission factor of 0.2 kg CO₂/mile Use flight emission factor of 0.9 kg CO₂/mile

What are the Scope 3 emissions of ABC?

- 12,000 kg of CO₂
- 253.5 mt of CO₂
- 25,500 mt of CO₂
- 25.5 mt of CO₂
Ungraded Quiz – Question 1: Feedback

Emissions from employee travel by automobile:
200 days x 2 trips = 400 trips per employee per year
400 trips x 150 employees = 60,000 total trips for all employees
60,000 x 20 miles = 1,200,000 miles  1,200,000 x 0.2 = 240,000 kg

Emissions from employee travel by flight:
15,000 x 0.9 = 13,500 kg Total Emissions:
240,000 + 13,500 = 253,500 kg = 253.5 mt of CO₂

Ungraded Quiz – Question 2

Company ABC decided to quantify its emissions, including emissions from the employees’ business travel by company-owned cars totaling 2,500 km and business flights on commercial jets. The employee total flight miles are 15,000.
Use automobile average emission factor of 0.2 kg CO₂/km
Use flight emission factor of 0.9 kg CO₂/pkm

What are the Scope 1 emissions of ABC?

- 500 kg of CO₂
- 14 mt of CO₂
- 13,500 kg of CO₂
- 5 mt of CO₂

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