THE SOLENT CLUSTER

HOW TO...

BUILDING A SCOPE 1 & SCOPE 2 GHG EMISSIONS BASELINE

INTRODUCTION TO GREENHOUSE GASES

What are greenhouse gases (ghgs) emissions?

Greenhouse gases (GHGs) are gases that trap heat in the Earth's atmosphere and are key contributors to the greenhouse effect and global warming. Each type of greenhouse gas varies in its ability to absorb heat, which is measured by its Global Warming Potential (GWP). These gases originate from a variety of processes including the combustion of fossil fuels, deforestation, and various industrial processes, among others.

What do GHGs consist of?

The primary components of GHGs include the following gases, each with distinct sources and impacts on the atmosphere:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Sulfur Hexafluoride (SF_6)
- Nitrogen Trifluoride (NF_3)
- Chloro/Hydro/Per Fluorocarbons (CFCs, HFCs, PFCS)

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INTRODUCTION SCOPE 1, 2 & 3 GHG EMISSIONS

What are Scope 1, 2 & 3 emissions?

- **Scope 1 emissions** are direct emissions from sources that a company owns or controls directly. Examples of Scope 1 emissions include the combustion of gas in boilers, incinerators, or as part of industrial processes; emissions from chemical reactions during the production of cement, alloys, and steel; and fuel consumption by the company's vehicle fleet.
- **Scope 2 emissions** are indirect emissions resulting from the energy that a company purchases and consumes. These emissions typically arise from the generation of purchased electricity consumed by the company's buildings, as well as from the acquired heat, steam, or cooling.
- **Scope 3 emissions** encompass indirect emissions from a company's entire value chain, including both upstream and downstream activities. This category includes emissions from the production of purchased goods and services such as raw materials, IT services, and business travel, as well as emissions associated with the use and end-of-life treatment of the company's products, such as those from the sale and combustion of fossil fuels by customers.

UNDERSTANDING THE IMPORTANCE OF A GHG EMISSIONS BASELINE

Why should GHG emissions be baselined?

- **Establishing a critical reference point:** It provides an accurate, quantifiable measurement of current emissions levels at a company or specific site, which is vital for understanding the scale of emissions and forming the basis of all future climate action strategies.
- **Setting and tracking reduction targets:** By establishing a baseline, organisations can set realistic, science-based emission reduction goals and monitor progress over time. This helps evaluate the effectiveness of strategies implemented to reduce emissions.
- **Enabling comparative analysis:** Baselining allows emissions to be quantified in terms of CO2 equivalent, considering the global warming potentials of different gases. This standardised measurement is essential for consistent tracking and reporting, facilitating comparison across industries and gases.
- **Guiding strategic implementation:** A clear and comprehensive understanding of baseline emissions enables organisations to strategically plan and execute targeted actions to reduce their carbon footprint effectively. This proactive approach supports regulatory compliance and can lead to cost savings through improved operational efficiencies.
- **Enhancing risk management:** Baselining emissions equips companies to foresee and adapt to regulatory changes and shifts towards a low-carbon economy. It also helps in identifying and mitigating climate-related risks to operations and supply chains, thereby increasing resilience.

STEP-BY-STEP GUIDE TO CONDUCTING AN EMISSIONS BASELINE

This structured approach ensures comprehensive tracking and reporting of GHG emissions.

1. PERIMETER OF THE BASELINE

- Begin by selecting a baseline year that offers complete and reliable data representing normal operations, avoiding years affected by unusual events like pandemics or equipment shutdowns.
- Define the boundaries where emissions are calculated, covering the entire group or specific business units/sites. Both Scope 1 and Scope 2 emissions should be included as a minimum. A preliminary evaluation of Scope 3 can be added to identify relevant subcategories for further analysis.

2. DATA COLLECTION

Scope 1

- Gather annual data on fossil fuel consumption (usually measured in joules, kilowatt-hours, or liters) including all petroleum-based fuels used across company operations, from vehicles to industrial processes, as well as natural gas, diesel, kerosene, fuel oil, and heavy oil.
- Track coal and biomass consumption (usually reported in kilograms or kWh), distinguishing between fossil coal, biocarbon, and biomass/biofuels.
- Record and estimate refrigerant gas leaks and other emissions such as methane, nitrous oxide, sulfur hexafluoride, and nitrogen trifluoride from various sources like equipment and chemical reactions.

Scope 2

- Gather annual data on purchased electricity consumption (in kWh). Include the details of energy contracts and identify specific green tariffs, Guarantees of Origins, Renewable Energy Certificates, or Power Purchase Agreements from renewable production (for market-based scope 2 approach).
- Document purchased steam, heat, or cooling, including quantities and sources (in kWh).

3. CALCULATION OF EMISSIONS

Scope 1

- Calculate emissions from fossil fuel and coal/coke by multiplying consumption by their respective emission factors.
- For other gases such as refrigerants and methane leaks, use specific emission factors.
- For bioenergy emissions, consider the net emission of CO2 as zero, since CO2 released during combustion was absorbed during biomass growth.
    - Multiply the amount of bioenergy consumed by the greenhouse gas intensity factor, which accounts for all associated emissions, to determine total emissions in CO2 equivalent.
    - Note that GHG Protocol does not yet have a specific rule for biomethane guarantees of origin (GO). However, for the time being, it might be permissible to apply the biomethane emission factor to the volume of gas consumption accounted for by the purchased Guarantees of Origin (GOs), in accordance with the GHG Protocol's market-based method for Scope 2.

Scope 2

- Calculate emissions for Scope 2, as per 2 methods (you can use either or, but the location base data should be reported as a minimum):
    - Location-based: Calculate emissions by applying grid-specific emission factors to the total purchased electricity and heat.
    - Market-based method: Report emissions per market-based guidelines, setting emissions to zero for renewable energy credits or when renewable energy is produced onsite, and use specific green tariff emission factors for those contracts.

Point of attention:

- Apply the appropriate emission factor (based on the origin, location of consumption, usage...).
- Ensure units used between consumption amount and emission factors are correct.

LINKS AND FURTHER INFORMATION

GHG protocol

UK Emission factors

UK government guidelines on GHG reporting

Blunomy: We help to accelerate the transition