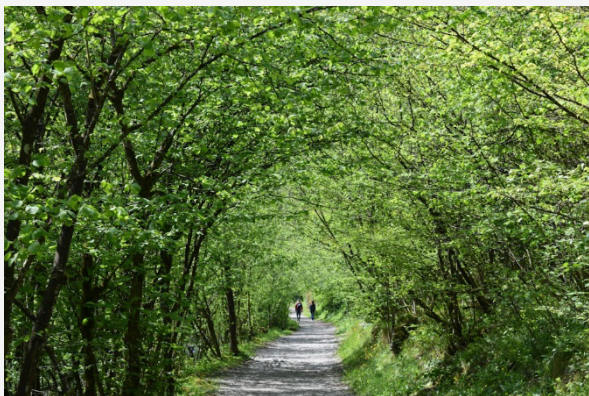


Stepping Stone to Sustainable Change

Greenhouse gas (GHG) accounting, a term that may seem complex and technical, is in fact a straightforward yet crucial process. It involves the process of quantifying greenhouse gases that an organization emits into the atmosphere. These emissions are not just numbers on a page; they are significant contributors to global warming and climate change, which are the most pressing issues facing humanity today.

The importance of understanding these emissions cannot be overstated. This understanding is the first step towards reducing them. By measuring these emissions, organizations can shine a light on the main sources of their emissions. This is not a process of assigning blame, but rather a means of focusing reduction efforts where they will have the most impact. It's about finding the areas where change is not only possible but also effective.



But understanding and measuring emissions is just the beginning. GHG accounting also provides the foundation for target- and goal-setting programs (e.g., Science-based Targets initiative, or SBTi) and mandatory climate disclosure rules (e.g., IFRS S2 Climate-related Disclosures, European Sustainability Reporting Standards, etc.). These programs and mandates have resulted in incentives for entities to reduce emissions within their inventory.

One of the most powerful aspects of GHG accounting is its ability to track progress over time. This is not a one-off process, but a

continuous cycle of measurement, analysis, action, and review. It allows organizations to see the results of their efforts, to celebrate their successes, and to make necessary adjustments to their strategies. It's about continuous improvement, about striving for better, about making a real and lasting difference.

What Constitutes GHG Emissions?

GHG accounting measures so-called greenhouse gas inventory – the inventory is not just a list, but a comprehensive record of emission sources and the associated emissions quantified using standardized methods. Contrary to common belief, it's not only carbon dioxide (CO₂) emissions that contribute to global warming—other gases like methane and various refrigerants are also considered greenhouse gases (GHGs), and they can be thousands of times more potent.¹

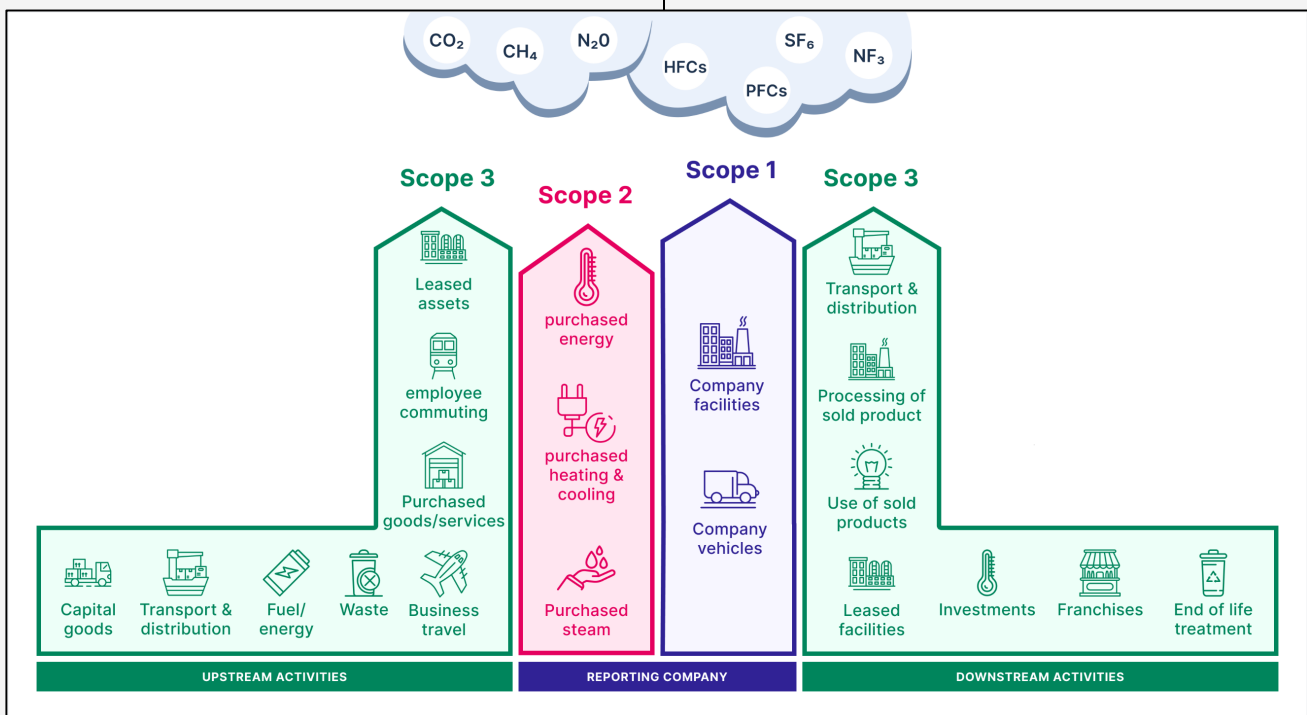
Greenhouse gas emissions are categorized into three scopes: Scope 1, Scope 2, and Scope 3. Each scope represents a different aspect of an organization's emissions, providing a holistic view of its environmental footprint.

- **Scope 1** emissions are direct emissions from owned or controlled sources. These include stationary sources like furnaces, boilers, heaters, and combustion turbines, which are often the most visible sources of emissions. Mobile sources, such as vehicles and forklifts, also fall under this category. Then there are fugitive emissions, which are often overlooked but can be significant. These include emissions from refrigerants, which can escape into the atmosphere during their use and disposal.
- **Scope 2** emissions are indirect emissions from the generation of purchased energy. These are the emissions that result from the electricity, steam, heating, and cooling consumed by the organization. While these emissions may not be directly produced by the organization, they are a direct result of its

energy consumption and are therefore an important part of its environmental impact.

- **Scope 3** emissions are all other indirect emissions not included in scope 2. These emissions can often be the most challenging to quantify, but they can also be the most significant. They include emissions from business travel, employee commuting, and upstream and downstream emissions of the value chain. These emissions are often overlooked, but they represent a significant portion of an organization’s total emissions.

Availability of Data: The availability and quality of data can significantly impact the accuracy of GHG accounting. The first preference should be for reported data and physical activity-based data. In the absence of both, emissions should be estimated based on revenue or assets of the project, in combination with the EEIO (environmentally extended input-output) table. The EEIO table provides emissions estimations expressed per economic activity (e.g., tCO2 e/unit of revenue or asset).



Source: Circularise

The Accounting Process on the Entity Level

The GHG accounting process on the entity level is a systematic approach that involves several key steps. It begins with setting organizational boundaries, which define the extent of an organization’s operations and responsibilities. This is followed by determining operational boundaries, which identify the specific activities and sources of emissions within the organization. The final step is data collection and calculation, which quantifies the emissions associated with each source. However, the process is not without its challenges. There are several key considerations to watch for:

Financed Emissions of Scope 3: Financed emissions of Scope 3 are becoming increasingly important for financial institutions. Most of a financial institution’s carbon footprint falls under this category. While it can be technically challenging to account for these emissions, the demand for this information from stakeholders and disclosure standards is increasing.

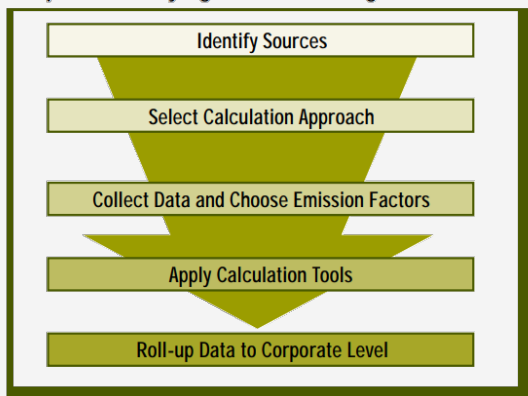
Transparency and Verifiability: Documenting the methodologies and data sources used in the accounting process is crucial. Providing clear explanations for any changes in emissions ensures the process is transparent and verifiable. Non-compliance with GHG accounting standards can lead to serious issues. For instance, there have been cases in China where non-compliance has resulted in significant penalties.

GHG ACCOUNTING NON-COMPLIANCE. China's Ministry of Ecology and Environment slammed four GHG emission audit firms for falsifying GHG emissions data in 2022², as part of the country's efforts to improve data quality as it prepares to expand its national emissions trading scheme into more industrial sectors. The companies were involved in various forms of fabricating data on coal consumption, coal quality and electricity usage, as well as doctoring dates of samplings and inspections.

Steps to Accurate GHG Emissions Calculation

Identifying and calculating GHG emissions involves several key steps. First, it's essential to identify the sources of GHG emissions within the defined inventory boundary. Next, categorize these emissions into Scope 1, Scope 2, and Scope 3. Once categorized, collect relevant data for each source, such as fuel consumption or electricity usage. Use standardized methods and emission factors to quantify the emissions from each source. Finally, compile the data into a comprehensive GHG inventory, ensuring accuracy and consistency in reporting.

Steps in identifying and calculating GHG emissions



Source: GHG Protocol

Project-Level Accounting: A Detailed Look into Climate Mitigation Contribution

Project-based accounting is a method primarily employed to help us understand how individual projects positively or negatively affect GHG emissions. It works by estimating the prospective changes in GHG emissions that result from specific projects or actions.

To do this, it uses a “what if” scenario, also known as a counterfactual baseline scenario. This scenario imagines what the GHG emissions would have been if the project had not taken place. By comparing the Project Scenario, i.e. actual emissions (from the project) with the estimated emissions (from the “what if” scenario), one can see the effect of the project on GHG emissions. It allows organizations to quantify the impact of their projects in reducing emissions, providing a detailed look into their climate performance.

There are two important distinctions between entity-level and project-level GHG accounting. Firstly, the entity-level accounting approach uses boundaries defined by emissions sources owned or controlled by the reporting organization and in the company’s value chain, whereas the project accounting approach identifies all potential primary and secondary impacts of the project in question and assesses the GHG emission increases or reductions from the baseline relative to the project activity.³

Secondly, unlike the entity-level accounting, project-level accounting is usually ex-ante. This means that the accounting process rely on projected data, rather than observed data. This presents a unique challenge, as it requires the use of estimates and assumptions to quantify emissions. One can find such estimates in reports such as feasibility study report.

ACCOUNTING FOR RELATIVE GHG EMISSIONS OF RENEWABLE ENERGY PROJECT.⁴ A loan funds a grid-connected geothermal power plant in Country C, producing 270 GWh/year. The project’s absolute emissions, including fugitive emissions of CO₂ and methane, total 4,900 tCO₂e/year. Consequential emissions are from other plants reducing load due to the project, calculated as unknown output “A” GWh/year times Country C’s emission factor (220 tCO₂/GWh). The baseline scenario considers increased emissions from other plants if the project didn’t exist, calculated similarly with unknown output “B” GWh/year, times emission factor. Relative emissions are the project’s absolute emissions plus “A” minus “B” emissions, resulting in -54,500 tCO₂e/year, indicative of the project climate mitigation contributions of this amount every year.

One of the key aspects of project-level accounting is the accounting for relative emissions. It is particularly useful in quantifying the mitigation contribution of projects. Thereby organizations can make informed investment decisions (e.g., to avoid investments with carbon lock-in).

Useful Tools and Resources

Greenhouse Gas Protocol	
https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf	
By: GHG Protocol	GHG Protocol provides detailed guidelines for measuring and reporting GHG emissions. It is the most adopted carbon accounting standards worldwide.
IFRS S2 Climate-related Disclosures	
https://www.ifrs.org/issued-standards/ifrs-sustainability-standards-navigator/ifrs-s2-climate-related-disclosures/	
By: International Sustainability Standards Board (ISSB)	ISSB issued IFRS S2 in June 2023, providing guidance on for climate-related disclosures, including GHG emissions. These can help organizations understand and manage the financial risks associated with climate change.
International Financial Institutions Technical Working Group (IFI TWG) on Greenhouse Gas Accounting	
https://unfccc.int/topics/mitigation/resources/ifis-harmonization-of-standards-for-ghg-accounting	
By: IFI TWG	The methodologies set out project type-specific approaches of GHG accounting during project appraisal, harmonised among MDBs. The sectors

References:

¹ The potency is demonstrated by Global Warming Potential (GWP), which is a multiplier applied to greenhouse gases such as methane and Nitrous Oxide to equate the impact they have on the Earth's temperature with that of Carbon Dioxide. The latest GWP values have been refined with the Sixth Assessment Report from the IPCC (AR6) in 2021. See also: [IPCC Sixth Assessment Report Global Warming Potentials - ERCE](#)

² "China slams firms for falsifying carbon data", by Reuters.

³ "Inventory and Project Accounting: A Comparative Review", by GHG Protocol.

⁴ Case study originally from [International Financial Institutions Guideline for a Harmonised Approach to Greenhouse Gas Accounting](#), by IFI TWG.

	covered include Renewable Energy, Energy Efficiency, Transport, and Energy Efficiency in Water Supply.
The Global GHG Accounting and Reporting Standard for the Financial Industry	
https://carbonaccountingfinancials.com/files/downloads/PCAF-Global-GHG-Standard.pdf	
By: Partnership for Carbon Accounting Financials (PCAF)	PCAF set out the standard to provide harmonized approach among private sector financial institutions to assess and disclose the GHG emissions associated with their loans and investments (or "financed emissions").
IEA Emission Factors 2023	
https://www.iea.org/data-and-statistics/data-product/emissions-factors-2023	
By: International Energy Agency (IEA)	The database provides the latest data for calculating GHG emissions related to a wide range of activities and fuels.
US Environmentally-Extended Input-Output (USEEIO) Models	
https://www.epa.gov/land-research/us-environmentally-extended-input-output-useeio-models	
By: United States Environmental Protection Agency (US EPA)	Developed by EPA researchers, USEEIO melds data on economic transactions between 389 industry sectors with a wealth of environmental information, including data on land, water, energy and mineral use, air pollution, nutrients, and toxics. It is widely used for applications such as calculating carbon footprints and environmental assessments.

The New Development Bank is a multilateral development bank established by Brazil, Russia, India, China and South Africa with the purpose of mobilising resources for infrastructure and sustainable development projects in emerging markets and developing countries.

NDB website: <https://www.ndb.int>
 ESG Department: esg@ndb.int
 NDB Headquarters: 1600 Guozhan Road,
 Pudong New District, Shanghai 200126, China

NDB Sustainability

