

MBA Skillset: GHG Inventory

Overview

A corporate greenhouse gas (GHG) inventory measures the GHG emissions associated with business activities and allows a company to track and manage emissions over time.

A firm might complete a GHG inventory for several reasons. Some businesses are subject to mandatory reporting, such as large companies incorporated in the U.K. and corporations regulated through California's cap-and-trade market.ⁱ Regulatory standards in the U.S. and abroad are expected to subject more firms to mandatory reporting in the future.ⁱⁱ

Other firms might complete a GHG inventory as part of their corporate sustainability reporting and/or to meet the expectations of the investor community for [ESG \(environmental, social, and governance\)](#) data. Additionally, some sustainability reporting and ranking regimes ask for GHG inventory disclosures or require them for high scores (e.g., [CDP](#), [Dow Jones Sustainability Index](#)).

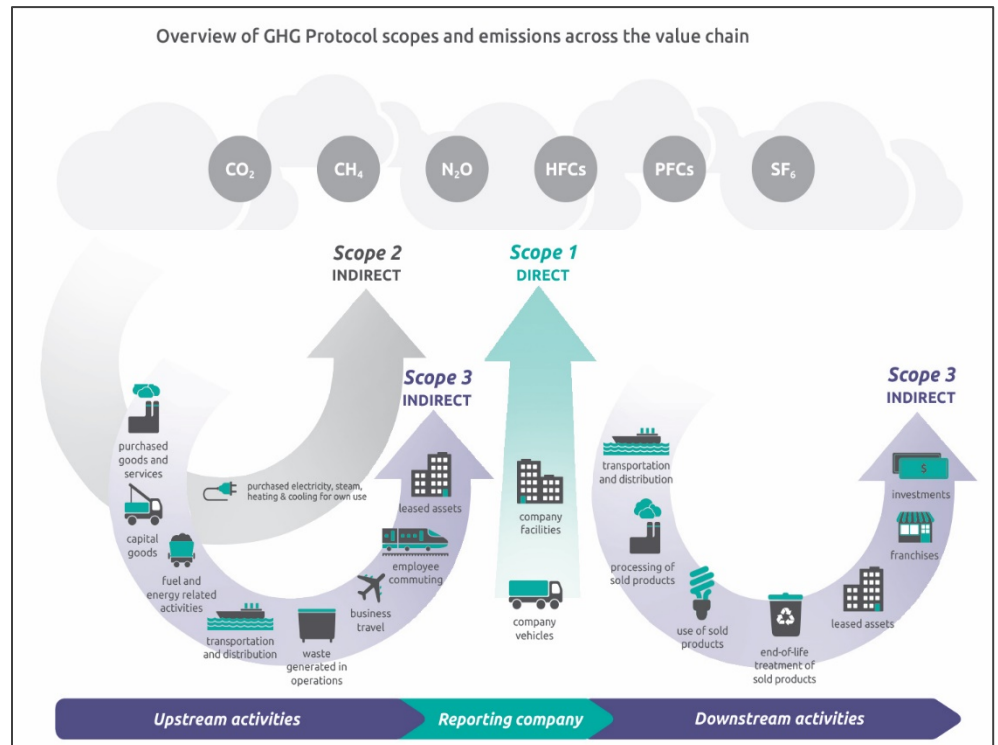
Voluntary tracking and public reporting of GHG emissions is also the cornerstone of any carbon reduction initiative. The "gold standard" of corporate carbon reduction target-setting is the [Science-Based Targets initiative \(SBTi\)](#), which requires alignment with the Intergovernmental Panel on Climate Change's (IPCC) decarbonization pathways for staying within 1.5 and 2 degrees of planetary warming.

Increasingly common corporate climate commitments such as "carbon neutral" and "net zero" goals generally involve pairing emissions reductions with carbon offsets to compensate for unabated emissions. Carbon offsets can be in the form of avoided emissions (e.g., preventing deforestation) or carbon removal (e.g., reforestation). The SBTi recently released the first uniform [standard for net zero targets](#), requiring absolute emission reductions paired with carbon removal.

In 2020, approximately 30% of Fortune 500 companies had made a public commitment that they are, or will be by 2030, carbon neutral, meeting a 100% renewable energy ("[RE100](#)"), science-based emission reduction, or net zero target.ⁱⁱⁱ Some companies are even going beyond these common commitments. For example, [Microsoft](#) has pledged to be "[carbon negative](#)" by removing more carbon from the atmosphere than it emits by 2030 and removing all legacy emissions since its founding by 2050.

How and When to Use

The [GHG Protocol](#) ("Protocol") is the most frequently used guidance for private-sector GHG inventories, providing a uniform methodology for calculating and categorizing GHG emissions among various industries. The Protocol was developed through a multi-year process of stakeholder engagement and published by the [World Resource Institute \(WRI\)](#) and the [World Business Council on Sustainable](#)



Source: World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD). Greenhouse Gas Protocol, Corporate Value Chain (Scope 3) Accounting & Reporting Standard <https://ghgprotocol.org/standards/scope-3-standard>

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[Development \(WBCSD\)](#) in 2001.^{iv} It is also the accounting framework for SBTi reduction targets and the technical criteria for renewable energy procurement for RE100, a corporate commitment to purchase 100% renewable energy.

Inventories following the Protocol must measure emissions of carbon dioxide, methane, and the other gases defined by the Kyoto Climate Protocol. For data uniformity, all emissions are converted to carbon equivalents (hence, terms like "carbon reporting" and "carbon accounting" are often used.)

The Protocol guides users through all aspects of developing an inventory, including boundary setting, source identification, quality management, and emissions factor selection. It distinguishes corporate emissions in three categories or "Scopes":

- **Scope 1 emissions:** direct GHG emissions from assets controlled or owned by the company (e.g., emissions from the use of fuel in company owned vehicles, boilers, furnaces, etc.).
- **Scope 2 emissions:** indirect emissions associated with the purchase of electricity, steam, heat or cooling for controlled or owned assets.
- **Scope 3 emissions:** all other indirect emissions that are caused by company activities but occur from sources not owned or controlled by the company.

Scope 3 reporting is optional in the Protocol. In 2011, [The Corporate Value Chain Standard](#) was released, focusing entirely on Scope 3 accounting. Scope 3 emissions are further divided into 13 categories, involving both upstream and downstream supply chain emissions.

Until recently, most companies only reported Scope 1 and 2 emissions; however, stakeholder recognition that Scope 3 is often the largest part of a corporate footprint is pressuring companies to measure and attempt to influence Scope 3 emissions. Inventories can be developed manually in spreadsheets or through a variety of software tools, which are becoming more sophisticated. Many companies seek to have their inventories verified by a third party, which provides confidence in the reported data and is encouraged by some investors and raters, including CDP.^v

Scope 3 accounting requires extensive data inputs and estimations; therefore, some companies choose to hire consultants to assess emissions (e.g., [ICF](#), [ERM](#), [3Degrees](#)). Establishing credible data for Scope 3 calculations can be especially daunting for large multinational companies with global supply chains. For instance, [IBM publicly reports](#) on the complexities of measuring its Scope 3 emissions. Products to streamline Scope 3 assessment are emerging in the market and may eventually reduce the burden of value

chain carbon accounting. [Lifecycle assessment](#) is another tool that companies find useful in estimating Scope 3 emissions. The Protocol also provides [estimation tools](#) and accounting [guidance](#) online.

Limitations

For companies seeking to reduce their climate impact, a GHG inventory is not a standalone decarbonization road map, but rather a tool to inform decarbonization strategies. The quality of an inventory is also dependent on the quality of available data from a wide array of company and supply chain partner operations.

Although decreasing emissions over time can be an indicator of strong carbon reduction programs, GHG accounting alone is not a wholistic reflection of a company's climate initiatives. For example, an inventory does not reflect a company's involvement in climate-positive activities such as policy engagement, contributing to avoided emissions, or investment in research and development for technologies such as clean energy or carbon removal. As such, a GHG inventory may not be the most accurate indication of a company's climate impact, especially as corporate climate commitments become increasingly creative (e.g., [Google's](#) 24/7 carbon-free energy commitment or [Stripe's](#) investment in carbon removal technology, etc.).

The WRI/WBCSD partnership has published other relevant guidance for corporate entities including a standard for estimating and reporting [avoided emissions](#), [project-specific emission impacts](#), and conducting a [product-level life cycle assessment](#). The Protocol itself will also undergo periodic revisions to address complex accounting issues that arise within the private sector (e.g., treatment of biogenic emissions, land use change, and carbon removal).^{vi}

Bottom Line

Undertaking a corporate GHG emission inventory is beneficial for multiple reasons. It is a tool to increase awareness of a company's impact, track progress toward emission reduction targets, and measure effectiveness of mitigation programs. It is also essential to meeting the needs of stakeholders (e.g., investors, consumers, suppliers, governments) through reporting and ESG disclosures.

Further Reading

- [GHG Protocol Corporate Accounting and Reporting Standard](#)
- [GHG Protocol Scope 3 Calculation Guidance](#)
- [EPA Center for Corporate Climate Leadership: GHG Inventory Development and Guidance](#)

ⁱ <https://www.gov.uk/government/publications/environmental-reporting-guidelines-including-mandatory-greenhouse-gas-emissions-reporting-guidance>

ⁱⁱ <https://www.sec.gov/sec-response-climate-and-esg-risks-and-opportunities>

ⁱⁱⁱ <https://www.naturalcapitalpartners.com/insights/response-required>

^{iv} <https://ghgprotocol.org/about-us>

^v <https://guidance.cdp.net/en/guidance?cid=13&ctype-theme&idtype=ThemelD&incchild=1µsite=0&otype=ScoringMethodology>

^{vi} <https://ghgprotocol.org/blog/update-greenhouse-gas-protocol-carbon-removals-and-land-sector-initiative>