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1 Absolute Emissions

1.1 Definition[\[edit\]](#)

Absolute Emissions. [Greenhouse Gas Emissions](#) attributed to a financial institution's lending and investing activity.

- Expressed in tonnes CO2
- As defined in^[1]

1.2 References[\[edit\]](#)

1. [?](#) PCAF (2020). The Global GHG Accounting and Reporting Standard for the Financial Industry. First edition.

2 Activity Data

2.1 Definition[\[edit\]](#)

Activity Data are quantitative measures of a level of activity that results in **GHG Emissions**. Activity data is multiplied by an **GHG Emission Factor** to derive the GHG emissions associated with a process or an operation. ^[1]

2.2 Examples[\[edit\]](#)

- kilowatt–hours of electricity used
- quantity of fuel used
- output of a process
- hours equipment is operated
- distance traveled, and
- floor area of a building

2.3 References[\[edit\]](#)

1. ? The Greenhouse Gas Protocol, Policy and Action Standard

3 Base Year GHG Emissions

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- 1 Definition
- 2 Recalculation
 - ◆ 2.1 Significance thresholds for recalculations
- 3 References

3.2 Definition[edit]

Base Year GHG Emissions are the emissions of a base year that companies choose as their reporting baseline under the [GHG Protocol](#).^[1]

This is a year for which verifiable emissions data are available and companies must specify their reasons for choosing that particular year. Companies should choose as a base year the earliest relevant point in time for which they have reliable data. Some organizations have adopted 1990 as a base year in order to be consistent with the Kyoto Protocol. However, obtaining reliable and verifiable data for historical base years such as 1990 can be very challenging.

Most companies select a single year as their base year. However, it is also possible to choose an average of annual emissions over several consecutive years. For example, the U.K. ETS specifies an average of 1998-2000 emissions as the reference point for tracking reductions. A multi-year average may help smooth out unusual fluctuations in [GHG Emissions](#) that would make a single year's data unrepresentative of the company's typical emissions profile.

The inventory base year can also be used as a basis for setting and tracking progress towards a [GHG Emissions Target](#) in which case it is referred to as a *target base year*.

If a company continues to grow through acquisitions, it may adopt a policy that shifts or "rolls" the base year forward by a number of years at regular intervals. A fixed base year has the advantage of allowing emissions data to be compared on a like-with-like basis over a longer time period than a rolling base year approach. Most emissions trading and registry programs require a fixed base year policy to be implemented.

3.3 Recalculation[edit]

Companies shall develop a base year emissions recalculation policy, and clearly articulate the basis and context for any recalculations. If applicable, the policy shall state any "significance threshold" applied for deciding on historic emissions recalculation. "Significance threshold" is a qualitative and/or quantitative criterion used to define any significant change to the data, inventory boundary, methods, or any other relevant factors. It is the responsibility of the company to determine the "significance threshold" that triggers base year emissions recalculation and to disclose it. It is the responsibility of the verifier to confirm the company's adherence to its threshold policy. The following cases shall trigger recalculation of base year emissions:

- Structural changes in the reporting organization that have a significant impact on the company's base year emissions. A structural change involves the transfer of ownership or control of emissions-generating activities or operations from one company to another. While a single structural change might not have a significant impact on the base year emissions, the cumulative effect of a number of minor structural changes can result in a significant impact. Structural changes include:
 - ◆ Mergers, acquisitions, and divestments
 - ◆ Outsourcing and insourcing of emitting activities
- Changes in calculation methodology or improvements in the accuracy of emission factors or activity data that result in a significant impact on the base year emissions data
- Discovery of significant errors, or a number of cumulative errors, that are collectively significant.

In summary, base year emissions shall be retroactively recalculated to reflect changes in the company that would otherwise compromise the consistency and relevance of the reported GHG emissions information. Once a company has determined its policy on how it will recalculate base year emissions, it shall apply this policy in a consistent manner. For example, it shall recalculate for both GHG emissions increases and decreases.

3.3.1 Significance thresholds for recalculations[edit]

Whether base year emissions are recalculated depends on the significance of the changes. The determination of a significant change may require taking into account the cumulative effect on base year emissions of a number of small acquisitions or divestments. The GHG Protocol Corporate

Standard makes no specific recommendations as to what constitutes ?significant.? However, some GHG programs do specify numerical significance thresholds, e.g., the California Climate Action Registry, where the change threshold is 10 percent of the base year emissions, determined on a cumulative basis from the time the base year is established.

3.4 References[\[edit\]](#)

1. ? The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

4 Baseline Emissions

4.1 Definition[\[edit\]](#)

Baseline Emissions is an estimate of [GHG Emissions](#), removals, or storage associated with a [Baseline Scenario](#).^[1]

4.2 References[\[edit\]](#)

1. [?](#) The Greenhouse Gas Protocol, Policy and Action Standard

5 Biogenic Carbon Dioxide Emissions

5.1 Definition[\[edit\]](#)

Biogenic Carbon Dioxide Emissions. CO2 emissions from a stationary source directly resulting from the combustion or decomposition of biologically based materials other than fossil fuels.

As defined in^[1]

5.2 References[\[edit\]](#)

1. [?](#) The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

6 Black Carbon

6.1 Definition[\[edit\]](#)

Black Carbon is a climate forcing agent formed through the incomplete combustion of fossil fuels, biofuel, and biomass.^{[\[1\]](#)}

6.2 References[\[edit\]](#)

1. [?](#) The Greenhouse Gas Protocol, Policy and Action Standard

7 Bottom-Up GHG Emissions

7.1 Definition[\[edit\]](#)

Bottom-Up GHG Emissions are methods (such as engineering models) that calculate or model the change in GHG emissions for each source, project, or entity, then aggregate across all sources, projects, or entities to determine the total change in GHG emissions.^[1]

7.2 References[\[edit\]](#)

1. [?](#) The Greenhouse Gas Protocol, Policy and Action Standard

8 Direct GHG Emissions

8.1 Definition[[edit](#)]

Direct GHG Emissions. Emissions from sources that are owned or controlled by the reporting entity or the borrower or investee.

- Also called [Scope 1 GHG Emissions](#)
- As defined in^[1]

What is classified as direct and indirect emissions is dependent on the consolidation approach (equity share or control) selected for setting the organizational boundary

8.2 See Also[[edit](#)]

- [Indirect GHG Emissions](#)

8.3 References[[edit](#)]

1. [?](#) The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

9 GHG Accounting

9.1 Contents

- 1 Definition
- 2 Principles
 - ◆ 2.1 Relevance
 - ◆ 2.2 Completeness
 - ◆ 2.3 Consistency
 - ◆ 2.4 Transparency
 - ◆ 2.5 Accuracy
- 3 See Also
- 4 References

9.2 Definition[edit]

GHG Accounting. A means of measuring the direct and indirect emissions to the Earth's **Biosphere** of CO₂ and its equivalent gases from industrial activities

9.3 Principles[edit]

The **GHG Protocol**^[1] Principles stipulate:

9.3.1 Relevance[edit]

Ensure the **GHG Inventory appropriately reflects the **GHG Emissions** of the company and serves the decision-making needs of users - both internal and external to the company.**

For an organization's **GHG Report** to be relevant means that it contains the information that users "both internal and external to the company" need for their decision making. An important aspect of relevance is the selection of an appropriate **GHG Inventory Boundary** that reflects the substance and economic reality of the company's business relationships, not merely its legal form. The choice of the inventory boundary is dependent on the characteristics of the company, the intended purpose of information, and the needs of the users. When choosing the inventory boundary, a number of factors should be considered, such as:

- Organizational structures: control (operational and financial), ownership, legal agreements, joint ventures, etc.
- Operational boundaries: on-site and off-site activities, processes, services, and impacts
- Business context: nature of activities, geographic locations, industry sector(s), purposes of information, and users of information

9.3.2 Completeness[edit]

Account for and report on all **GHG Emission Sources and activities within the inventory boundary. Disclose and justify any specific exclusions.**

All relevant emissions sources within the chosen inventory boundary need to be accounted for so that a comprehensive and meaningful inventory is compiled. In practice, a lack of data or the cost of gathering data may be a limiting factor. Sometimes it is tempting to define a minimum emissions accounting threshold (often referred to as a **GHG Materiality Threshold**) stating that a source not exceeding a certain size can be omitted from the inventory. Technically, such a threshold is simply a predefined and accepted negative bias in estimates (i.e., an underestimate).

Although it appears useful in theory, the practical implementation of such a threshold is not compatible with the completeness principle of the GHG Protocol Corporate Standard. In order to utilize a materiality specification, the emissions from a particular source or activity would have to be quantified to ensure they were under the threshold. However, once emissions are quantified, most of the benefit of having a threshold is lost.

A threshold is often used to determine whether an error or omission is a material discrepancy or not. This is not the same as a *de minimis* for defining a complete inventory. Instead companies need to make a good faith effort to provide a complete, accurate, and consistent accounting of their GHG emissions. For cases where emissions have not been estimated, or estimated at an insufficient level of quality, it is important that this is transparently documented and justified. **GHG Verification** can determine the potential impact and relevance of the exclusion, or lack of quality, on the overall inventory report.

9.3.3 Consistency[edit]

Use consistent methodologies to allow for meaningful performance tracking of emissions over time. Transparently document any changes to the data, inventory boundary, methods, or any other relevant factors in the time series.

Users of GHG information will want to track and compare GHG emissions information over time in order to identify trends and to assess the performance of the reporting company. The consistent application of accounting approaches, inventory boundary, and [GHG Calculation Methodology](#) is essential to producing comparable GHG emissions data over time. The GHG information for all operations within an organization's inventory boundary needs to be compiled in a manner that ensures that the aggregate information is internally consistent and comparable over time. If there are changes in the inventory boundary, methods, data or any other factors affecting emission estimates, they need to be transparently documented and justified.

9.3.4 Transparency[edit]

Address all relevant issues in a factual and coherent manner, based on a clear audit trail. Disclose any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used.

Transparency relates to the degree to which information on the processes, procedures, assumptions, and limitations of the GHG inventory are disclosed in a clear, factual, neutral, and understandable manner based on clear documentation and archives (i.e., an [Audit Trail](#)).

- Information needs to be recorded, compiled, and analyzed in a way that enables internal reviewers and external verifiers to attest to its credibility.
- Specific exclusions or inclusions need to be clearly identified and justified
- Assumptions disclosed, and
- Appropriate references provided for the methodologies applied and the data sources used.

The information should be sufficient to enable a third party to derive the same results if provided with the same source data. A *transparent* report will provide a clear understanding of the issues in the context of the reporting company and a meaningful assessment of performance. An independent external verification is a good way of ensuring transparency and determining that an appropriate audit trail has been established and documentation provided.

9.3.5 Accuracy[edit]

Ensure that the quantification of GHG emissions is systematically neither over nor under actual emissions, as far as can be judged, and that [uncertainties](#) are reduced as far as practicable. Achieve sufficient accuracy to enable users to make decisions with reasonable confidence as to the integrity of the reported information.

Data should be sufficiently precise to enable intended users to make decisions with reasonable assurance that the reported information is credible. GHG measurements, estimates, or calculations should be systematically neither over nor under the actual emissions value, as far as can be judged, and that uncertainties are reduced as far as practicable. The quantification process should be conducted in a manner that minimizes uncertainty. Reporting on measures taken to ensure accuracy in the accounting of emissions can help promote credibility while enhancing transparency.

9.4 See Also[edit]

- [PCAF GHG Accounting and Reporting Requirements^{\[2\]}](#)

9.5 References[edit]

1. ? The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008
2. ? PCAF (2020). The Global GHG Accounting and Reporting Standard for the Financial Industry. First edition.

10 GHG Accounting Consolidation Approach

10.1 Definition[edit]

GHG Accounting Consolidation Approach. Refers to how an organization sets boundaries for [GHG Accounting](#) and results in the concrete [GHG Inventory Boundary](#).

Types include:

- [GHG Accounting Equity Approach](#)
- When using the control approach to consolidate GHG emissions, companies shall choose between either the operational control or financial control criteria.
 - ◆ [GHG Accounting Financial Control Approach](#)
 - ◆ [GHG Accounting Operational Control Approach](#)

As defined in^[1]

10.2 See Also[edit]

- [Control](#)

10.3 References[edit]

1. ? The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

11 GHG Accounting Equity Approach

11.1 Definition[edit]

Under the equity share approach, a company accounts for [GHG Emissions](#) from operations according to its share of equity in the operation. ^[1]

The equity share reflects economic interest, which is the extent of rights a company has to the risks and rewards flowing from an operation. Typically, the share of economic risks and rewards in an operation is aligned with the company's percentage ownership of that operation, and equity share will normally be the same as the ownership percentage. Where this is not the case, the economic substance of the relationship the company has with the operation always overrides the legal ownership form to ensure that equity share reflects the percentage of economic interest.

The principle of economic substance taking precedent over legal form is consistent with international financial reporting standards. The staff preparing the inventory may therefore need to consult with the company's accounting or legal staff to ensure that the appropriate equity share percentage is applied for each joint operation (see Table 1 for definitions of financial accounting categories).

11.2 See Also[edit]

- [GHG Accounting Consolidation Approach](#)

11.3 References[edit]

1. ? The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

12 GHG Accounting Financial Control Approach

12.1 Definition[edit]

The company has financial control over the operation if the former has the ability to direct the financial and operating policies of the latter with a view to gaining economic benefits from its activities.^[1]

For example, financial control usually exists if the company has the right to the majority of benefits of the operation, however these rights are conveyed. Similarly, a company is considered to financially control an operation if it retains the majority risks and rewards of ownership of the operation's assets.

12.2 References[edit]

1. ? The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

13 GHG Accounting Operational Control Approach

13.1 Definition[[edit](#)]

Under the control approach, a company accounts for 100 percent of the [GHG Emissions](#) from operations over which it has control. It does not account for GHG emissions from operations in which it owns an interest but has no control. Control can be defined in either financial or operational terms. ^[1]

In most cases, whether an operation is controlled by the company or not does not vary based on whether the financial control or operational control criterion is used. A notable exception is the oil and gas industry, which often has complex ownership / operatorship structures. Thus, the choice of control criterion in the oil and gas industry can have substantial consequences for a company's [GHG Inventory](#). In making this choice, companies should take into account how GHG emissions accounting and reporting can best be geared to the requirements of emissions reporting and trading schemes, how it can be aligned with financial and environmental reporting, and which criterion best reflects the company's actual power of control.

A company has operational control over an operation if the former or one of its subsidiaries has the full authority to introduce and implement its operating policies at the operation. This criterion is consistent with the current accounting and reporting practice of many companies that report on emissions from facilities, which they operate (i.e., for which they hold the operating license). It is expected that except in very rare circumstances, if the company or one of its subsidiaries is the operator of a facility, it will have the full authority to introduce and implement its operating policies and thus has operational control.

Under the operational control approach, a company accounts for 100% of emissions from operations over which it or one of its subsidiaries has operational control.

It should be emphasized that having operational control does not mean that a company necessarily has authority to make all decisions concerning an operation. For example, big capital investments will likely require the approval of all the partners that have joint financial control. Operational control does mean that a company has the authority to introduce and implement its operating policies.

More information on the relevance and application of the operational control criterion is provided in petroleum industry guidelines for reporting GHG emissions (IPIECA, 2003).

13.2 See Also[[edit](#)]

- [GHG Accounting Equity Approach](#)
- [GHG Accounting Consolidation Approach](#)

13.3 References[[edit](#)]

1. ? The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

14 GHG Data Types

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- [1 Definition](#)
- [2 Activity Data](#)
- [3 Reported Data](#)
- [4 Estimated Data](#)
- [5 See Also](#)
- [6 References](#)

14.2 Definition[\[edit\]](#)

GHG Data Types denotes the range of available data used by organizations in disclosing [GHG Emissions](#).^{[1], [2]}

14.3 Activity Data[\[edit\]](#)

Activity data is a quantitative measure of a level of activity that results in GHG emissions (for example, liters of fuel consumed, or kilograms of material purchased).

A [GHG Emission Factor](#) is a factor that converts activity data into GHG emissions data (for example kg CO2 emitted per liter of fuel consumed, or kg CO2 emitted per kilograms of material produced).

14.4 Reported Data[\[edit\]](#)

Reported Data is either reported by companies and/or based on estimations by specialised data providers if companies do not report carbon emissions. Although data is provided by companies directly, reported data contains errors and biases, as there is no global mandatory framework which defines how GHG emissions should be accounted for, or mandatory third-party verification.

Companies decide which GHG emissions are within their system boundaries, and therefore reported, and which are not. This means that an investor can never be quite sure if a company really reports all GHG emissions that it should. A bias is also introduced by the fact that reporting companies are not evenly distributed between markets. Lastly, it is important to understand that reported data as well often contains estimations made by the reporting companies. A full set of scope 3 data always contains estimations, since it is impossible to measure, for example, the emissions of products sold during their use.

14.5 Estimated Data[\[edit\]](#)

Estimated Data GHG data can be estimated with different methodologies, which can roughly be grouped as follows:

- bottom-up extrapolation based on reported data (regressions and/or sector averages)
- bottom-up calculation based on reported energy data (e.g. energy consumption)
- top-down modelling via Economic Input-Output Life Cycle Assessment (EIO-LCA)

14.6 See Also[\[edit\]](#)

- [EXIOBASE](#)
- [Environmentally Extended Input-Output Data](#)

14.7 References[\[edit\]](#)

1. [?](#) Swiss Sustainable Finance, Measuring Climate-Related risks in Investment Portfolios
2. [?](#) WRI, Greenhouse Gas Protocol

15 GHG Emission Factor

15.1 Definition[\[edit\]](#)

A **GHG Emission Factor** is a factor that converts activity data into GHG emissions data^[1]

Two types of emission factors can be used for calculating emissions associated with a material or product:

- Life cycle emission factors, which include emissions that occur at every stage of a material/product's life, from raw material acquisition or generation of natural resource to end of life
- Cradle-to-gate (sometimes referred to as 'upstream') emission factors, which include all emissions that occur in the life cycle of a material/product up to the point of sale by the producer.

15.2 Example[\[edit\]](#)

- kg CO₂ emitted per liter of fuel consumed, or
- kg CO₂ emitted per kilograms of material produced

15.3 References[\[edit\]](#)

1. ? WRI, Greenhouse Gas Protocol

16 GHG Emission Intensity Metric

16.1 Definition[\[edit\]](#)

GHG Emission Intensity Metric. Emissions per a specific unit.^[1]

16.2 Examples[\[edit\]](#)

- tCO₂ e/?M invested
- tCO₂ e/MWh
- tCO₂ e/ton product produced
- tCO₂e/?M company revenue

16.3 References[\[edit\]](#)

1. ? The Greenhouse Gas Protocol, Policy and Action Standard

17 GHG Emission Scope

17.1 Definition[edit]

GHG Emission Scope. The GHG Protocol Corporate Accounting and Reporting Standard classifies an organization's **GHG Emissions** into three scopes.

- **Scope 1 GHG Emissions** are direct emissions from owned or controlled **GHG Emission Sources**.
- **Scope 2 GHG Emissions** are indirect emissions from the generation of purchased energy.
- **Scope 3 GHG Emissions** are all indirect emissions (not included in scope 2) that occur in the value chain of the reporting organization, including both upstream and downstream emissions.

17.2 Disclosures[edit]

Per the **TCFD Recommendations**, Organizations should provide their Scope 1 and Scope 2 GHG emissions and, if appropriate, **Scope 3 GHG Emissions** and the related risks.

GHG emissions should be calculated in line with the **GHG Protocol** methodology to allow for aggregation and comparability across organizations and jurisdictions. As appropriate, organizations should consider providing related, generally accepted industry-specific GHG efficiency ratios.

GHG emissions and associated metrics should be provided for historical periods to allow for trend analysis. In addition, where not apparent, organizations should provide a description of the methodologies used to calculate or estimate the metrics.

As defined in^[1]

17.3 References[edit]

1. ? PCAF (2020). The Global GHG Accounting and Reporting Standard for the Financial Industry. First edition.

18 GHG Emissions Aggregation

18.1 Definition[edit]

GHG Emissions Aggregation is the process of summarizing an entities total **GHG Emissions** from all **GHG Emissions Sources** within its **GHG Inventory**.^[1]

To report a corporation's total GHG emissions, companies will usually need to gather and summarize data from multiple facilities, possibly in different countries and business divisions. It is important to plan this process carefully to minimize the reporting burden, reduce the risk of errors that might occur while compiling data, and ensure that all facilities are collecting information on an approved, consistent basis. Ideally, corporations will integrate GHG reporting with their existing reporting tools and processes, and take advantage of any relevant data already collected and reported by facilities to division or corporate offices, regulators or other stakeholders.

The tools and processes chosen to report data will depend upon the information and communication infrastructure already in place (i.e., how easy is it to include new data categories in corporate databases). It will also depend upon the amount of detail that corporate headquarters wishes to be reported from facilities. Data collection and management tools could include:

- Secure databases available over the company intranet or internet, for direct data entry by facilities
- Spreadsheet templates filled out and e-mailed to a corporate or division office, where data is processed further
- Paper reporting forms faxed to a corporate or division office where data is re-entered in a corporate database. However, this method may increase the likelihood of errors if there are not sufficient checks in place to ensure the accurate transfer of the data.

18.2 Approaches[edit]

There are two basic approaches for gathering data on GHG emissions from a corporation's facilities:

- Centralized: individual facilities report activity/fuel use data (such as quantity of fuel used) to the corporate level, where GHG emissions are calculated.
- Decentralized: individual facilities collect activity/fuel use data, directly calculate their GHG emissions using approved methods, and report this data to the corporate level.

18.3 References[edit]

1. ? The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

19 GHG Emissions Calculation Approaches

19.1 Definition[edit]

There are a variety of possible **GHG Emissions Calculation Approaches** that can be used by an entity in the process of **calculating GHG emissions**.^[1] Companies should use the most accurate calculation approach available to them and that is appropriate for their reporting context.

19.2 Possible Approaches[edit]

- Direct measurement of GHG emissions by monitoring concentration and flow rate.
- Emissions may be calculated based on a mass balance or stoichiometric basis specific to a facility or process.
- GHG emissions estimated through the application of documented **emission factors**. These factors are calculated ratios relating GHG emissions to a proxy measure of activity at an emissions source. The IPCC guidelines (IPCC, 1996) refer to a hierarchy of calculation approaches and techniques ranging from the application of generic emission factors to direct monitoring.

In many cases, particularly when direct monitoring is either unavailable or prohibitively expensive, accurate emission data can be calculated from fuel use data. Even small users usually know both the amount of fuel consumed and have access to data on the carbon content of the fuel through default carbon content coefficients or through more accurate periodic fuel sampling.

19.3 References[edit]

1. ? The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

20 GHG Emissions Calculation Tools

20.1 Definition[[edit](#)]

GHG Emission Calculation Tools are any software tools that implement specified [GHG Emissions Calculation Approaches](#) on the basis of collected activity data, emission factors and other input data sets.

There are two main categories of calculation tools:^[1]

- Cross-sector tools that can be applied to different sectors. These include stationary combustion, mobile combustion, HFC use in refrigeration and air conditioning, and measurement and estimation uncertainty.
- Sector-specific tools that are designed to calculate emissions in specific sectors such as aluminum, iron and steel, cement, oil and gas, pulp and paper, office-based organizations.

20.2 References[[edit](#)]

1. ? The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

21 GHG Emissions Double Counting

21.1 Definition[\[edit\]](#)

GHG Emissions Double Counting. Occurs when GHG emissions (generated, avoided, or removed) are counted more than once in a [GHG Inventory](#) or toward attaining mitigation pledges or financial pledges for the purpose of mitigating climate change.

When two or more companies hold interests in the same joint operation and use different consolidation approaches (e.g., Company A follows the equity share approach while Company B uses the financial control approach), emissions from that joint operation could be double counted. This may not matter for voluntary corporate public reporting as long as there is adequate disclosure from the company on its consolidation approach. However, double counting of emissions needs to be avoided in trading schemes and certain mandatory government reporting programs.

As defined in^[1]

21.2 References[\[edit\]](#)

1. ? The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

22 GHG Emissions Drivers

22.1 Definition[\[edit\]](#)

GHG Emissions Drivers are socioeconomic or other conditions or other policies/actions that influence the level of emissions or removals. For example, economic growth is a driver of increased energy consumption. Drivers that affect emissions activities are divided into two types other policies or actions and non--policy drivers.^[1]

22.2 References[\[edit\]](#)

1. [?](#) The Greenhouse Gas Protocol, Policy and Action Standard

23 GHG Emissions Estimation Method

23.1 Definition[\[edit\]](#)

A **GHG Emissions Estimation Method** is an equation, algorithm, or model that quantitatively estimates [GHG Emissions^{\[1\]}](#). An emissions estimation method is comprised of parameters.

23.2 Example[\[edit\]](#)

A simple emissions estimation method is the following equation:

[GHG Emissions](#) = [GHG Emission Factor](#) × [Activity Data](#).

23.3 References[\[edit\]](#)

1. [?](#) The Greenhouse Gas Protocol, Policy and Action Standard

24 GHG Emissions Scope

24.1 Definition[\[edit\]](#)

GHG Emissions Scope is terminology introduced by the [GHG Protocol](#) to help delineate direct and indirect emission sources, improve transparency, and provide utility for different types of organizations and different types of climate policies and business goals.^[1]

Three ?scopes? (scope 1, scope 2, and scope 3) are defined for GHG accounting and reporting purposes. Scopes 1 and 2 are carefully defined in the standard to ensure that two or more companies will not account for emissions in the same scope. This makes the scopes amenable for use in GHG programs where double counting matters.

Companies shall separately account for and report on scopes 1 and 2 at a minimum.

- [Scope 1 GHG Emissions](#)
- [Scope 2 GHG Emissions](#)
- [Scope 3 GHG Emissions](#)

24.2 References[\[edit\]](#)

1. ? The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

25 GHG Emissions Sources

25.1 Definition[edit]

GHG Emissions Sources are any identifiable physical artefacts that at any time during their lifecycle act as emitters of **green house gas**, that is they release into the Earth's atmosphere any of the seven gases mandated under the Kyoto Protocol and to be included in national inventories under the United Nations Framework Convention on Climate Change (UNFCCC).

GHG Emissions may be due to chemical processes that occur in contact with the atmosphere (combustion, chemical processing) or leaks.

25.2 GHG Protocol Categories[edit]

The **GHG Protocol** identifies the following high level categories^[1]:

- Stationary combustion: combustion of fuels in stationary equipment such as boilers, furnaces, burners, turbines, heaters, incinerators, engines, flares, etc.
- Mobile combustion: combustion of fuels in transportation devices such as automobiles, trucks, buses, trains, airplanes, boats, ships, barges, vessels, etc.
- Process emissions: emissions from physical or chemical processes such as CO₂ from the calcination step in cement manufacturing, CO₂ from catalytic cracking in petrochemical processing, PFC emissions from aluminum smelting, etc.
- Fugitive emissions: intentional and unintentional releases such as equipment leaks from joints, seals, packing, gaskets, as well as fugitive emissions from coal piles, wastewater treatment, pits, cooling towers, gas processing facilities, etc.

25.3 References[edit]

1. ? The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

26 GHG Inventory

26.1 Contents

- 1 Definition
- 2 Business Objectives
- 3 Technical Components
- 4 References

26.2 Definition[edit]

GHG Inventory is the enumeration of an entity's contributions to **Greenhouse Gas Emissions**. ^[1] A corporate GHG inventory program includes all institutional, managerial, and technical arrangements made for the collection of data, preparation of the inventory, and implementation of steps to manage the quality of the inventory.

26.3 Business Objectives[edit]

The GHG inventory serves various business goals:

- Managing **GHG Risks** and identifying reduction opportunities
 - ◆ Identifying risks associated with GHG constraints in the future
 - ◆ Identifying cost effective reduction opportunities
 - ◆ Setting GHG targets, measuring and reporting progress
- Public reporting and participation in voluntary GHG programs
 - ◆ Voluntary stakeholder reporting of GHG emissions and progress towards GHG targets
 - ◆ Reporting to government and NGO reporting programs, including GHG registries
 - ◆ Eco-labelling and GHG certification
- Participating in mandatory reporting programs
 - ◆ Participating in government reporting programs at the national, regional, or local level
- Participating in GHG markets
 - ◆ Supporting internal **GHG Emissions Trading** programs
 - ◆ Participating in external cap and trade allowance trading programs
 - ◆ Calculating carbon/**GHG Taxes**
- Recognition for early voluntary action.
 - ◆ Providing information to support ?baseline protection? and/or credit for early action

26.4 Technical Components[edit]

- **Methods** : These are the technical aspects of inventory preparation. Companies should select or develop methodologies for estimating emissions that accurately represent the characteristics of their source categories. The **GHG Protocol** provides many default methods and calculation tools to help with this effort. The design of an inventory program and quality management system should provide for the selection, application, and updating of inventory methodologies as new research becomes available, changes are made to business operations, or the importance of inventory reporting is elevated.
- **Data**: This is the basic information on activity levels, emission factors, processes, and operations. Although methodologies need to be appropriately rigorous and detailed, **Data Quality** is more important. No methodology can compensate for poor quality input data. The design of a corporate inventory program should facilitate the collection of high quality inventory data and the maintenance and improvement of collection procedures
- **Inventory Processes and Systems**: These are the institutional, managerial, and technical procedures for preparing GHG inventories. They include the team and processes charged with the goal of producing a high quality inventory. To streamline GHG inventory quality management, these processes and systems may be integrated, where appropriate, with other corporate processes related to quality.
- **Documentation**: This is the record of methods, data, processes, systems, assumptions, and estimates used to prepare an inventory. It includes everything employees need to prepare and improve a company's inventory. Since estimating GHG emissions is inherently technical (involving engineering and science), high quality, transparent documentation is particularly important to credibility. If information is not credible, or fails to be effectively communicated to either internal or external stakeholders, it will not have value.

26.5 References[\[edit\]](#)

1. [?](#) The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

27 GHG Inventory Boundary

27.1 Definition[edit]

The scope of the assessment in terms of the range of GHG effects (and non--GHG effects, if relevant), sources and sinks, and greenhouse gases that are included in the assessment. An entity's **GHG Inventory Boundary** involves^[1]

- identifying emissions associated with its operations
- categorizing them as **Direct GHG Emissions** and **Indirect GHG Emissions**, and
- choosing the scope of accounting and reporting for indirect emissions.

Effective **GHG Emissions Management** helps set operational boundaries that are comprehensive with respect to direct and indirect emissions. This helps a company better manage the full spectrum of **GHG Risks** and opportunities that exist along its value chain.

27.2 References[edit]

1. ? The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

28 GHG Protocol

28.1 Contents

- [1 Definition](#)
- [2 History](#)
- [3 Standards](#)
- [4 See Also](#)
- [5 References](#)

28.2 Definition[\[edit\]](#)

The **Greenhouse Gas Protocol** (GHG Protocol) is a comprehensive global standardized framework to measure and manage GHG emissions from private and public sector operations, value chains, and mitigation actions.^[1] The GHG Protocol supplies the world's most widely used GHG accounting standards.

28.3 History[\[edit\]](#)

The Greenhouse Gas Protocol Initiative is a multi-stakeholder partnership of businesses, non-government organizations, governments and others, convened by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), a Geneva-based coalition of 170 international companies.

Launched in 1998, the Initiative's mission is to develop internationally accepted greenhouse gas (GHG) accounting and reporting standards for business and to promote their broad adoption

28.4 Standards[\[edit\]](#)

- The GHG Protocol Corporate Accounting and Reporting Standard which provides a step-by-step guide for companies to use in quantifying and reporting their GHG emissions. The Corporate Accounting and Reporting Standard provides the accounting platform for virtually every corporate GHG reporting program in the world.
- The GHG Protocol Project Quantification Standard (a guide for quantifying reductions from GHG mitigation projects)

28.5 See Also[\[edit\]](#)

- [Partnership for Carbon Accounting Financials^{\[2\]}](#)

28.6 References[\[edit\]](#)

1. [?](#) The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008
2. [?](#) PCAF (2020). The Global GHG Accounting and Reporting Standard for the Financial Industry. First edition.

29 GHG Risks

29.1 Definition[edit]

GHG Risks are any **Risk Type** that is strongly related to a company's **GHG Emissions** profile. A company's GHG exposure is a management issue in light of heightened scrutiny by the insurance industry, shareholders, and the emergence of environmental regulations/policies designed to reduce GHG emissions.^[1]

In the context of future GHG regulations, significant GHG emissions in a company's value chain may result in increased costs (upstream) or reduced sales (downstream), even if the company itself is not directly subject to regulations. Thus investors may view significant indirect emissions upstream or downstream of a company's operations as potential liabilities that need to be managed and reduced. A limited focus on direct emissions from a company's own operations may miss major GHG risks and opportunities, while leading to a misinterpretation of the company's actual GHG exposure.

29.2 Mitigation[edit]

Compiling a comprehensive **GHG Inventory** improves a company's understanding of its emissions profile and any potential GHG liability or exposure.

Accounting for emissions can help identify the most effective reduction opportunities. This can drive increased materials and energy efficiency as well as the development of new products and services that reduce the GHG impacts of customers or suppliers. This in turn can reduce production costs and help differentiate the company in an increasingly environmentally conscious marketplace. Conducting a rigorous GHG inventory is also a prerequisite for setting an internal or public GHG target and for subsequently measuring and reporting progress.

29.3 References[edit]

1. ? The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

30 Global Warming Potential

30.1 Definition[\[edit\]](#)

Global Warming Potential (GWP) is a factor describing the radiative forcing impact (degree of harm to the atmosphere) of one unit of a given GHG relative to one unit of CO₂.^[1]

30.2 References[\[edit\]](#)

1. [?](#) The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

31 Greenhouse Gas Emissions

31.1 Definition[\[edit\]](#)

Greenhouse Gas Emissions (GHG Emissions). The seven gases mandated under the [Kyoto Protocol](#) and to be included in national inventories under the United Nations Framework Convention on Climate Change (UNFCCC):

- [carbon dioxide](#) (CO₂)
- [wikipedia:methane](#) (CH₄)
- [wikipedia:nitrous oxide](#) (N₂O)
- [wikipedia:hydrofluorocarbons](#) (HFCs)
- [wikipedia:perfluorocarbons](#) (PFCs)
- [wikipedia:sulphur hexafluoride](#) (SF₆), and
- [wikipedia:nitrogen trifluoride](#) (NF₃)

As defined in^[1]

31.2 References[\[edit\]](#)

1. ? PCAF (2020). The Global GHG Accounting and Reporting Standard for the Financial Industry. First edition.

32 Historical GHG Emission Profile

32.1 Definition[edit]

The **Historical GHG Emission Profile** is a consistent historical timeseries of the **GHG Emissions** of an entity that properly accounts for acquisitions, divestments, mergers and other significant structural changes. Such changes alter an entity's historical emission profile, making meaningful comparisons over time difficult.

Companies may need to track emissions over time in response to a variety of business goals, including:

- Public reporting
- Establishing GHG targets
- Managing **GHG Risks** and opportunities
- Addressing the needs of investors and other stakeholders

A meaningful and consistent comparison of emissions over time requires that companies set a performance datum with which to compare current emissions. This performance datum is referred to as the **Base Year GHG Emissions**.

As Defined in^[1]

32.2 References[edit]

1. ? The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

33 How to Calculate GHG Emissions

33.1 How to Calculate GHG Emissions[[edit](#)]

According to the [GHG Protocol](#), companies generally calculate [GHG Emissions](#) using the following steps:^[1]

- Every business has processes, products, or services that generate direct and/or indirect emissions from one or more of the possible source categories. The first step is to Identify [GHG Emissions Sources](#)
- Select from possible [GHG Emissions Calculation Approaches](#)
- Collect activity data and choose [emission factors](#)
- Apply [GHG Emissions Calculation Tools](#)
- Roll-up [GHG emissions data](#) to corporate level.

33.2 References[[edit](#)]

1. [?](#) The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

34 Indirect GHG Emissions

34.1 Definition[\[edit\]](#)

Indirect GHG Emissions. Emissions that are a consequence of the activities of the reporting entity but occur at sources owned or controlled by another entity.

- Consist of [Scope 2 GHG Emissions](#) and [Scope 3 GHG Emissions](#)
- As defined in^[1]

What is classified as direct and indirect emissions is dependent on the consolidation approach (equity share or control) selected for setting the organizational boundary

34.2 See Also[\[edit\]](#)

- [Direct GHG Emissions](#)

34.3 References[\[edit\]](#)

1. [?](#) The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

35 Net GHG Emissions

35.1 Definition[\[edit\]](#)

Net GHG Emissions are the aggregation of **GHG Emissions** (positive emissions) and removals (negative emissions).^[1]

35.2 References[\[edit\]](#)

1. ? The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

36 Scope 1 GHG Emissions

36.1 Contents

- [1 Definition](#)
- [2 Examples](#)
- [3 Calculation](#)
- [4 See Also](#)
- [5 References](#)

36.2 Definition[\[edit\]](#)

Scope 1 GHG Emissions. [Direct GHG Emissions](#) that occur from sources owned or controlled by the reporting company.

36.3 Examples[\[edit\]](#)

[GHG Emissions Sources](#) that are owned or controlled by the company are:

- Physical production in owned or controlled process equipment
- Generation of electricity, heat, or steam. These emissions result from combustion of fuels in stationary sources, e.g., boilers, furnaces, turbines
- Chemical processing. Most of these emissions result from manufacture or processing of chemicals and materials, e.g., cement, aluminum, adipic acid, ammonia manufacture, and waste processing
- Emissions from company owned vehicles
- Transportation of materials, products, waste, and employees. These emissions result from the combustion of fuels in company owned/controlled mobile combustion sources (e.g., trucks, trains, ships, airplanes, buses, and cars)
- Fugitive emissions. These emissions result from intentional or unintentional releases, e.g., equipment leaks from joints, seals, packing, and gaskets; methane emissions from coal mines and venting; hydrofluorocarbon (HFC) emissions during the use of refrigeration and air conditioning equipment; and methane leakages from gas transport.

Direct CO₂ emissions from the combustion of biomass shall not be included in scope 1 but reported separately.

GHG emissions not covered by the Kyoto Protocol, e.g. CFCs, NOx, etc. shall not be included in scope 1 but may be reported separately.

As defined in^[1]

36.4 Calculation[\[edit\]](#)

For most small to medium-sized companies and for many larger companies, scope 1 GHG emissions will be calculated based on the purchased quantities of commercial fuels (such as natural gas and heating oil) using published emission factors.

36.5 See Also[\[edit\]](#)

- [GHG Emissions Scope](#)

36.6 References[\[edit\]](#)

1. [?](#) The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

37 Scope 2 GHG Emissions

37.1 Contents

- [1 Definition](#)
- [2 Examples](#)
- [3 Calculation](#)
- [4 See Also](#)
- [5 References](#)

37.2 Definition[\[edit\]](#)

Scope 2 GHG Emissions. [Indirect GHG Emissions](#) from the generation of purchased or acquired electricity, steam, heating, or cooling consumed by the reporting company. Purchased electricity is defined as electricity that is purchased or otherwise brought into the organizational boundary of the company.

37.3 Examples[\[edit\]](#)

Scope 2 emissions physically occur at the facility where the electricity, steam, heating, or cooling is generated.

[1]

37.4 Calculation[\[edit\]](#)

Scope 2 GHG emissions will primarily be calculated from metered electricity consumption and supplier-specific, local grid, or other published emission factors.

37.5 See Also[\[edit\]](#)

- [GHG Emissions Scope](#)

37.6 References[\[edit\]](#)

1. [?](#) The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008

38 Scope 3 GHG Emissions

38.1 Contents

- [1 Definition](#)
- [2 Significance](#)
- [3 Standards](#)
- [4 Examples](#)
- [5 Calculation](#)
- [6 Issues and Challenges](#)
- [7 See Also](#)
- [8 References](#)

38.2 Definition[\[edit\]](#)

Scope 3 GHG Emissions. All other [Indirect GHG Emissions](#) (not included in [Scope 2 GHG Emissions](#)) that occur in the value chain of the reporting company. As defined in^[1]

Scope 3 is an optional reporting category that allows for the treatment of all other indirect emissions.

Scope 3 emissions are other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. transmission and distribution losses) not covered in [Scope 2 GHG Emissions](#), outsourced activities, use of sold products, waste disposal, etc.

Scope 3 emissions can be broken down into:

- upstream emissions that occur in the supply chain (for example, from production or extraction of purchased materials) and
- downstream emissions that occur as a consequence of using the organization's products or services.

38.3 Significance[\[edit\]](#)

For some business sectors scope 3 emissions may form the majority of emission (e.g. as consumers use a company's products) and are thus essential in capturing the full [Climate-Related Risk](#) profile of said sectors.

38.4 Standards[\[edit\]](#)

There are existing international and European standards on the matter, that could serve for the calculation of scope 3 emissions

- ISO 14064 on standards for greenhouse gas accounting and verification
- the Product Environmental Footprint (PEF) and
- Organisation Environmental Footprint (OEF)

38.5 Examples[\[edit\]](#)

- Emissions of logistics
- Emissions of business trips
- Emissions of employees' commuter traffic
- Emissions of upstream chains
- Emissions of purchased materials
- Emissions of product utilisation phase
- Emissions of product or waste disposal
- Outsourced activities

38.6 Calculation[\[edit\]](#)

Scope 3 GHG emissions will primarily be calculated from activity data such as fuel use or passenger miles and published or third-party emission factors. In most cases, if source- or facility-specific emission factors are available, they are preferable to more generic or general emission factors.

38.7 Issues and Challenges[\[edit\]](#)

- Scope 3 emissions data are typically estimates rather than measurements ([GHG Data Types](#))
- Carbon footprint approaches must allocate the responsibility for scope 3 emissions across industries without double counting ([GHG Emissions Double Counting](#))

38.8 See Also[\[edit\]](#)

- [Greenhouse Gas Emissions](#)
- [GHG Emissions Scope](#)

38.9 References[\[edit\]](#)

1. [?](#) The Greenhouse Gas Protocol, A corporate accounting and reporting standard, Revised Edition 2008