



Required Greenhouse Gases in Inventories

Accounting and Reporting Standard Amendment
February, 2013



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Required greenhouse gases for inclusion in corporate and product life cycle inventories

This Accounting Note amends requirements regarding the greenhouse gases (GHGs) to include in inventories, as well as how the emissions of those GHGs should be reported within inventories. These requirements supersede those in the Greenhouse Gas Protocol Corporate Accounting and Reporting Standard, Revised Edition (2004; 'Corporate Standard'); Corporate Value Chain (Scope 3) Accounting and Reporting Standard (2011; 'Scope 3 Standard'); Product Life Cycle Accounting and Reporting Standard (2011, 'Product Standard'); and all associated sectoral guidance published until 2012.

A note on terminology in GHG Protocol Standards

The GHG Protocol uses specific terms to connote reporting requirements and recommendations. The term “shall” is used to indicate what is required for a GHG inventory to conform to a given Standard. The term “should” is used to indicate a recommendation, but not a requirement. The term “may” is used to indicate an option that is permissible or allowable. Within the guidance sections of each Standard, the term “required” is used to refer to “shall” statements given elsewhere in the standard.

Amendments

1. When using the Corporate Standard, Scope 3 Standard, Product Standard, or any associated sectoral guidance (collectively termed 'Standards' in this Amendment), companies:
 - a. Shall account for and report the emissions of all the GHGs required by the UNFCCC/Kyoto Protocol at the time the corporate or product inventory is being compiled. These GHGs are currently: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆), and nitrogen trifluoride (NF₃).¹
 - b. Should report the emissions of other, optional GHGs, including those GHGs regulated by the Montreal Protocol on Substances that Deplete the Ozone Layer, as long as:
 - i. 100-year Global Warming Potential (GWP) values for these GHGs have been defined in IPCC Assessment Reports.
 - ii. A list of these GHGs is included in the inventory.

These emissions shall be reported outside of the scopes of a corporate inventory.

2. When using the Corporate Standard, companies:
 - a. Shall use 100-year GWP values from the IPCC.
 - b. Should use GWP values from the most recent Assessment Report, but may choose to use other IPCC Assessment Reports.
 - c. Shall use GWPs from a single Assessment Report for any one inventory, where possible. If GWPs for a particular gas are not provided in the chosen Assessment Report, companies shall select the most recent GWPs for that gas.
 - d. Should use the same GWPs for the current inventory period and the base year, as well as for inventories prepared according to the Scope 3 Standard, to maintain consistency across time and scopes.
 - e. Shall report the source of the GWP values and indicate if multiple Assessment Reports have been used.

The exact changes to the Standards introduced by these amendments are detailed in Table 1. These amendments do not affect other specifications in the Standards, such as those pertaining to biogenic CO₂ emissions or other boundary considerations.

¹ This Amendment will be updated should the list of GHGs required by UNFCCC/Kyoto Protocol change in the future.

Table [1] Detailed summary of amended requirements in the *Greenhouse Gas Protocol Corporate Standard, Scope 3 Standard and Product Standard**

Standard	Page and chapter reference	Amended requirements
Corporate Standard	<p>p2; Introduction</p> <p>P45; Chapter 6 – Identifying and Calculating GHG Emissions</p> <p>p63; Chapter 9 – Reporting GHG Emissions</p> <p>p63; Chapter 9 – Reporting GHG Emissions</p>	<p>This <i>GHG Protocol Corporate Standard</i> provides standards and guidance for companies and other types of organizations preparing a GHG emissions inventory. It covers the accounting and reporting of the six greenhouse gases covered by the UNFCCC/Kyoto Protocol — currently, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆), and nitrogen trifluoride (NF₃).</p> <p>Companies:</p> <ul style="list-style-type: none"> • Shall use 100-year GWP values from the IPCC. • Should use GWP values from the most recent Assessment Report, but may choose to use other IPCC Assessment Reports. • Shall use GWPs from a single Assessment Report for any one inventory, where possible. If GWPs for a particular gas are not provided in the chosen Assessment Report, companies shall select the most recent GWPs for that gas. • Should use the same GWPs for the current inventory period and the base year, as well as for inventories prepared according to the Scope 3 Standard, to maintain consistency across time and scopes. <p>Required information: Emissions data for all six GHGs covered by the UNFCCC/Kyoto Protocol separately (CO₂, CH₄, N₂O, HFCs, PFCs and SF₆) in metric tonnes and in tonnes of CO₂ equivalent.</p> <p>Required information: Source of the GWP values and indicate if multiple Assessment Reports have been used.</p> <p>Optional information: Emissions from GHGs not covered by the UNFCCC/Kyoto Protocol (e.g., CFC, NO_x) reported separately from the scopes. A list of any optional GHGs included in an inventory shall be reported.</p>
Scope 3 Standard	<p>p21; Chapter 3 – Summary of Steps and Requirements</p> <p>p59 and p60; Chapter 6 – Setting the Scope 3 Boundary</p> <p>p119; Chapter 11 – Reporting</p>	<p>Requirements: Companies shall account for scope 3 emissions of CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆, and NF₃, if they are emitted in the value chain.</p> <p>Boundary requirements: Companies shall account for scope 3 emissions of carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆), and nitrogen trifluoride (NF₃), if they are emitted in the value chain.</p> <p>Required information: For each scope 3 category, total emissions of GHGs (CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆, and NF₃) reported in metric tons of CO₂ equivalent, excluding biogenic CO₂ emissions and independent of any GHG trades, such as purchases, sales, or transfers of offsets or allowances.</p>

Table [1] Detailed summary of amended requirements in the *Greenhouse Gas Protocol Corporate Standard, Scope 3 Standard and Product Standard** (continued)

Standard	Page and chapter reference	Amended requirements
<i>Product Standard</i>	p120; Chapter 11 – Reporting	Optional information: Emissions of any GHGs other than CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ and NF ₃ , whose 100-year GWP values have been identified by the IPCC, to the extent they are emitted in the company's value chain (e.g., CFCs, HCFCs, NO _x , etc.) and a list of any additional GHGs included in the inventory.
	p121; Chapter 11 – Reporting	Reporting guidance: Companies are required to include emissions of each of the required greenhouse gases covered by the UNFCCC/Kyoto Protocol (i.e., CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, and SF ₆ , and NF ₃) in the reported scope 3 emissions data, but are not required to separately report scope 3 emissions by individual gas.
	p14; Chapter 3 – Summary of Steps and Requirements	Requirements: <ul style="list-style-type: none"> Companies shall account for carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs) emissions to, and removals from, the atmosphere of carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆), and nitrogen trifluoride (NF₃) Additional GHGs included in the inventory shall be listed in the inventory report.
	p27; Chapter 6 – Establishing the Scope of a Product Inventory	Requirements: Companies shall account for these six seven gases in their product GHG inventory if they are emitted during the product's life cycle. Companies should account for any other GHGs whose 100-year GWP values have been identified by the IPCC if they are emitted during the product's life cycle. Any additional GHGs that are accounted for shall be listed in the inventory report to improve transparency.

*Text that has been added to the Standards is underlined and text that has been deleted from the Standards is struck out.

Frequently Asked Questions

1. **Why is the Greenhouse Gas Protocol issuing this Amendment?**

National reporting guidelines under the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol require that specific GHGs be included in national GHG emissions inventories. To remain consistent with national inventory practices, the Greenhouse Gas Protocol (GHG Protocol) requires that these same GHGs also be reported in corporate and product life cycle GHG emissions inventories. Originally, the requirements of the UNFCCC/Kyoto Protocol, and therefore of the GHG Protocol, were limited to a set of six individual GHGs or classes of GHGs. However, changes to international accounting and reporting rules under the UNFCCC/Kyoto Protocol now also require the reporting of another GHG, NF_3 . Existing GHG Protocol Standards need to be updated to reflect this change and to accommodate any further changes that may occur to the UNFCCC/Kyoto Protocol's list of required GHGs. In addition, GHG Protocol Standards have varying specifications on the selection of GWP values. This Amendment has been issued to more closely align corporate accounting practices with national inventory practices and to ensure consistent requirements across all GHG Protocol standards.

2. **When will the Amendment become effective?**

The Amendment is effective immediately. All new inventories prepared for the next year of annual reporting (either on a fiscal or calendar year basis) shall reflect this Amendment, to remain in conformance with the Standards.

3. **Does the Amendment affect the requirements of GHG Programs?**

Organizations that participate in GHG Programs should continue to use the accounting and reporting specifications of those Programs. Many GHG Programs, however, also follow the UNFCCC/Kyoto Protocol and are therefore likely to also adopt similar changes.

4. **Does the Amendment require the recalculation of base year inventories?**

Not necessarily. The answer depends on the extent to which an entity emits the newly required GHG(s), both in its base year and current reporting period. Some entities may not emit sufficient amounts of the GHG to exceed a 'significance threshold' that would trigger a base inventory recalculation. On the other hand, large industrial producers or consumers of the GHG may have to recalculate their base inventories. All entities should review their recalculation policy and assess the magnitude of emissions of the GHG in both their base year and current reporting period, as a basis for determining whether recalculations are necessary.

5. **What happens when the Kyoto Protocol expires?**

The Second Commitment Period of the Kyoto Protocol expires in 2020. Consequently, this Amendment will be in effect through at least 2017, at which point the GHG Protocol will re-evaluate it.

6. **What is nitrogen trifluoride (NF_3)?**

NF_3 is used as a replacement for PFCs (mostly C_2F_6) and SF_6 in the electronics industry. It is typically used in plasma etching and chamber cleaning during the manufacture of semi-conductors and LCD (Liquid Crystal Display) panels. NF_3 is broken down into nitrogen and fluorine gases in situ, and the resulting fluorine radicals are the active cleaning agents that attack the poly-silicon. NF_3 is also used in the photovoltaic industry (thin-film solar cells) for "texturing, phosphorus silicate glass (PSG) removal, edge isolation and reactor cleaning after deposition of silicon nitrate or film silicon". NF_3 is further used in hydrogen fluoride and deuterium fluoride lasers, which are types of chemical lasers.

Source: http://unfccc.int/national_reports/annex_i_ghg_inventories/items/4624.php

Appendix: Background Information

Nature and diversity of Greenhouse Gases

GHGs are atmospheric gases that absorb and emit radiation within the thermal infrared range and that contribute to the greenhouse effect and global climate change. Many different GHGs are produced as a result of human activities, including:

- Carbon dioxide (CO₂)
- Methane (CH₄)
- Nitrous oxide (N₂O)
- Hydrofluorocarbons (HFCs)
- Perfluorinated compounds:
 - Sulphur hexafluoride (SF₆)
 - Nitrogen trifluoride (NF₃)
 - Perfluorocarbons (PFCs)
- Fluorinated ethers (HFEs)
- Perfluoropolyethers (e.g., PFPEs)
- Chlorofluorocarbon (CFCs)
- Hydrochlorofluorocarbon (HCFCs)

National and international mechanisms to reduce GHG emissions

At the Rio Earth Summit in 1992, international negotiators adopted the **United Nations Framework Convention on Climate Change** (UNFCCC). The UNFCCC's objective is to prevent dangerous human interference with the climate system by stabilizing atmospheric concentrations of GHGs at safe levels. The UNFCCC itself set no mandatory limits on GHG emissions for individual countries and contains no enforcement mechanisms. Instead, the UNFCCC provides for updates ('Protocols') that set mandatory emission limits. The **Kyoto Protocol** was adopted in 1997 and came into force in 2005. It set binding GHG emissions reduction targets for a group of industrialized countries. These targets are implemented in rolling emissions reductions **commitment periods**, with the first period from 2008 to 2012, and the second from 2013 to 2020. Over 190 countries have ratified the UNFCCC and its Kyoto Protocol.

All Parties to the UNFCCC are required to compile national inventories of the emissions and removals of the GHGs that are not controlled by the **Montreal Protocol on Substances That Deplete the Ozone Layer** (Montreal Protocol), a protocol to a separate United Nations convention. Hence, while CFCs and HCFCs are GHGs, they are also potent ozone-depleting substances and are not covered by the UNFCCC. In compiling national inventories all Parties use a methodological framework provided by the **Intergovernmental Panel on Climate Change** (IPCC), which is a technical body established by the United Nations to provide a clear scientific summary of the physical basis of the climate system and climate change. This summary is periodically updated and published in IPCC **Assessment Reports**². The last (Fourth) Assessment Report was published in 2007 and the Fifth Assessment Report will be published in 2013/2014.

Amongst other activities, the IPCC evaluates and quantifies the contribution of different gases and aerosols to climate change. As scientific understanding of the climate system advances, Parties may be required to report on the emissions of new GHGs. Thus, in the First Commitment Period of the Kyoto Protocol, all Parties had only to report emissions of four specific GHGs (CO₂, CH₄, N₂O, and SF₆) and two classes of GHGs (PFCs and HFCs). But in the Second Commitment

2 http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml#1

Period, Parties are also required to report NF_3 emissions. NF_3 was not regulated earlier by the Kyoto Protocol in part because its potential importance as a GHG was not evaluated until the 2001 IPCC Assessment Report. Other changes to the required list of GHGs may occur in the future.

Finally, the IPCC Assessment Reports establish values for the **Global Warming Potential** (GWP) of different GHGs. GWP values describe the radiative forcing impact of one unit of a given GHG relative to one unit of CO_2 . GWP values convert GHG emissions data for non- CO_2 gases into units of carbon dioxide equivalent (CO_2e). Because radiative forcing is a function of the concentration of GHGs in the atmosphere, and because the methodology to calculate GWP continues to evolve, GWP factors are reassessed every few years in the IPCC Assessment Reports. A GHG's GWP value depends on the time horizon over which the potential has been calculated. IPCC Assessment Reports express GWPs over 20, 100 and 500 year time horizons, and the choice of time horizon reflects the weight attached by policy makers to the short- and long-term costs and benefits of different climate change policies. Under UNFCCC/Kyoto Protocol requirements, national inventories must use 100 year values from the Second Assessment Report.

Incorporation of UNFCCC/Kyoto Protocol inventory requirements into GHG Protocol's Standards

The Standards require the reporting of the GHGs covered by the UNFCCC/Kyoto Protocol, as well as the use of IPCC GWP values. This requirement exists to:

- Ensure corporate accounting practices are based on the best available scientific evidence regarding the importance of individual GHGs, as evaluated by the UNFCCC and IPCC.
- Ensure consistency between national and corporate reporting practices, allowing corporate inventories to inform the development of national (and sub-national) inventories.

Typology of GHG Protocol publications

The GHG Protocol publishes five categories of products:

1. GHG Accounting and Reporting Standards. These 'Standards' are the source of authoritative principles and methodologies for the accounting and reporting of GHG emissions in different types of GHG emissions inventories, including corporate and product life cycle emissions inventories. These Standards can be used by any organization, irrespective of sector.
2. Sectoral supplements to individual Standards. These 'Sectoral Guidance' documents provide additional context and sector-specific information to aid interpretation and application of a given Standard within a given sector. They may include information on methodological choices, calculations, and data sources or default data specific to the sector.
3. Emissions calculation tools. These 'Tools' help organizations develop a GHG inventory by providing a framework for inventory calculations that often includes default data and emission factors. Tools can be developed for a specific category of emissions source (e.g., transport) or sector (e.g., cement), often in conjunction with Sectoral Guidance. Tools can also be developed to accompany entire Standards.
4. Product Rules. Product Rules are specifically designed to accompany the GHG Protocol Product Life Cycle Accounting and Reporting Standard and are published with the goal of building consensus on the additional specifications needed to achieve product comparison for particular products or product categories. Product Rules are also known as 'product category rules (PCR)' or 'supplementary requirements'.
5. Accounting Notes. These either provide clarifications on interpreting existing Standards or amend requirements in those Standards. They also apply to all Sectoral Guidance affiliated with those Standards.



GREENHOUSE GAS PROTOCOL

The Greenhouse Gas Protocol provides the foundation for sustainable climate strategies and more efficient, resilient and profitable organizations. GHG Protocol standards are the most widely used accounting tools to measure, manage and report greenhouse gas emissions.

www.ghgprotocol.org

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