Sustainability reporting developments

A comprehensive guide

Greenhouse Gas Protocol

Interpretative guidance

November 2023

To our clients and other friends

Investors and other stakeholders have increased their focus on climate-related matters over the last several years and are requesting that entities provide reliable data on the direct and indirect greenhouse gas emissions generated throughout an entity's value chain.

Investor demand for reliable climate-related disclosures is further supported by an increased focus from regulators and standard setters, with final requirements recently issued or expected soon from the Securities and Exchange Commission (SEC), International Sustainability Standards Board (ISSB) and the European Financial Reporting Advisory Group (EFRAG). Although the requirements of these proposed or final rules and standards differ, they all would require reporting entities to report the amount of greenhouse gases (GHGs) emitted by their operations. They each would either require or allow the use of the Greenhouse Gas Protocol (GHG Protocol) to report the indirect and direct emissions generated by a business.

This demand by investors and regulators has led many entities to turn to their finance and accounting functions to leverage their unique skill sets to enhance ways of producing and reporting these disclosures in a well-controlled environment. As these disclosures become mandatory, the accuracy and auditability of the data included in them will be of even greater importance. Although certain principles and concepts are consistent between financial reporting and GHG emissions accounting and reporting, the requirements of GHG emissions accounting and reporting are unique with certain differences from financial accounting and reporting.

This publication discusses the requirements of the GHG Protocol and provides insights gathered from our experience in helping clients prepare sustainability reports, as well as attesting to the data within these reports. The GHG Protocol will continue to evolve over time and is expected to be updated by the end of 2025, at which point new or revised guidance is expected. Our goal is to help finance and accounting professionals understand the complexity and nuances of emissions reporting using the GHG Protocol, as well as address certain areas of interpretation.

Although certain underlying principles in the GHG Protocol are based on financial accounting principles, this publication does not describe generally accepted accounting principles. Users should refer to our Financial reporting development (FRD) publications for guidance related to accounting principles.

November 2023

Contents

Notice to readers:

This publication includes excerpts from and references to standards and guidance issued by the Greenhouse Gas Protocol. The standards and guidance of the Greenhouse Gas Protocol are included in various publications with multiple chapters. Throughout this publication references to guidance in the Greenhouse Gas Protocol are shown using the publication name and chapter number. Similar information may be included in multiple publications of the Greenhouse Gas Protocol.

This publication has been carefully prepared, but it necessarily contains information in summary form and, therefore, is intended for general guidance only; it is not intended to be a substitute for detailed research or the exercise of professional judgment. The information presented in this publication should not be construed as legal, tax, accounting, or any other professional advice or service. Ernst & Young LLP can accept no responsibility for loss occasioned to any person acting or refraining from action as a result of any material in this publication. You should consult with Ernst & Young LLP or other professional advisors familiar with your particular factual situation for advice concerning specific audit, tax or other matters before making any decisions.

1 Overview and scope

1.1 Overview

The GHG Protocol provides standards and guidance for measuring and managing GHG emissions. Many reporting entities apply the protocol in their voluntary reporting, and regulators and standard setters that are developing new requirements for climate-related reporting also refer to it.

The GHG Protocol is a partnership between the World Resources Institute (WRI), a US-based global research non-profit organization focused on global challenges, including climate, and the World Business Council for Sustainable Development (WBCSD), a Geneva-based coalition of more than 200 international companies focusing on sustainability matters, working in collaboration with businesses, non-governmental organizations and other stakeholders.

The partnership has issued the following publications, which we refer to collectively as the GHG Protocol:

- Corporate Accounting and Reporting Standard (Corporate Standard)[1]
- Scope 2 Guidance[2]
- Corporate Value Chain (Scope 3) Accounting and Reporting Standard (Scope 3 Standard)[3]
- Technical Guidance for Calculating Scope 3 Emissions (Scope 3 Guidance)[4]

This Sustainability reporting developments publication discusses these publications, which address accounting for, measuring and reporting emissions of the following seven greenhouse gases identified by the United Nations Framework Convention on Climate Change (UNFCCC):

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur hexafluoride (SF_6)
- Nitrogen trifluoride (NF_3)

The partnership has also published other standards, including standards for governments and standards on emissions from a project and during a product's lifecycle. This publication does not address those standards.

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1 https://ghgprotocol.org/corporate-standard
2 https://ghgprotocol.org/scope-2-guidance
3 https://ghgprotocol.org/corporate-value-chain-scope-3-standard
4 https://ghgprotocol.org/scope-3-calculation-guidance-2

The Corporate Standard was first issued in 2001, subsequently amended[5] in 2013 and supplemented by the Scope 2 Guidance, Scope 3 Standard and Scope 3 Guidance. Refer to Section 1.5 for a discussion of when to apply these standards and guidance.

Updates to the GHG Protocol

The GHG Protocol requested feedback in early 2023 to understand whether there is a need to update its standards and guidance, the scope of potential updates and potential approaches to any updates. Feedback was due in March 2023. Stakeholders should monitor developments for potential changes to the GHG Protocol.

The GHG Protocol includes guidance for how corporate entities and other types of organizations (e.g., nonprofit entities, non-governmental organizations, government agencies) gather information about their GHG emissions and report that information to stakeholders. The GHG Protocol requires a reporting entity to first define its organizational boundary, which determines the entities (or portions of entities) that should be included by the reporting entity for purposes of GHG emissions reporting.

A reporting entity identifies its organizational boundary using either the equity share or control approach. This process is similar to the process to define the reporting entity for a set of financial statements for financial reporting (i.e., what entities to consolidate), though the evaluation is not the same. After setting its organizational boundary, the reporting entity establishes its operational boundary, which determines the direct and indirect emissions associated with operations it owns or controls and the extent of accounting and reporting for indirect emissions that occur outside of the reporting entity. See section 2.5 and section 2.6 for more information about establishing organizational and operational boundaries, respectively.

Once the boundaries are set, the reporting entity calculates GHG emissions for each reported scope (see section 1.3 for more information about each scope). These emissions are typically measured in metric tons of individual GHGs and metric tons of carbon dioxide equivalent (CO_2e) units, a standard metric used to compare the impact of greenhouse gases on the environment (see section 2.2).

The GHG Protocol is designed to enable reporting entities to track and report consistent and comparable GHG emissions data over time. Therefore, it requires a reporting entity to establish a base year (a specific year or an average of multiple years) against which subsequent emissions can be compared.

The GHG Protocol requires the base year emissions to be retrospectively recalculated in certain circumstances to maintain comparability over time (see section 2.7 for more information regarding establishing a base year and reporting emissions over time). In addition, the GHG Protocol includes required and recommended disclosures about a reporting entity's GHG emissions (see section 3.4 for disclosure requirements related to Scope 1 emissions, section 4.6 for disclosure requirements related to Scope 2 emissions, section 5.3 for disclosure requirements related to Scope 3 emissions and chapter 6 for general disclosure requirements).

1.2 Scope

Many entities use the GHG Protocol to account for, measure and report on their GHG emissions in voluntary sustainability reports. However, some standard setters and policymakers throughout the world are beginning to require entities to use (or consider the principles in) the GHG Protocol in their sustainability disclosures.

[5] Required gases and GWP values_0.pdf (ghgprotocol.org)

For example, the International Financial Reporting Standards (IFRS) Sustainability Disclosure Standards issued by the ISSB require an entity to use the GHG Protocol, the European Sustainability Reporting Standards (ESRS) issued by the European Commission require an entity to consider the principles, requirements and guidance in the GHG Protocol and proposed rules issued by the SEC allow an entity to use the methodology in the GHG Protocol to determine its GHG emissions. Additionally, the state of California enacted two climate-disclosure laws that require certain entities (public and private entities that do business in the state and meet certain annual revenue thresholds) to report emissions using the GHG Protocol.

1.3 Categories of GHG emissions (Scope 1, Scope 2 and Scope 3 emissions)

Excerpt from GHG Protocol

Scope 2 Guidance

Glossary

Scope 1 emissions Emissions from operations that are owned or controlled by the reporting company.

Scope 2 emissions Indirect emissions from the generation of purchased or acquired electricity, steam, heat or cooling consumed by the reporting company.

Scope 3 emissions All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.

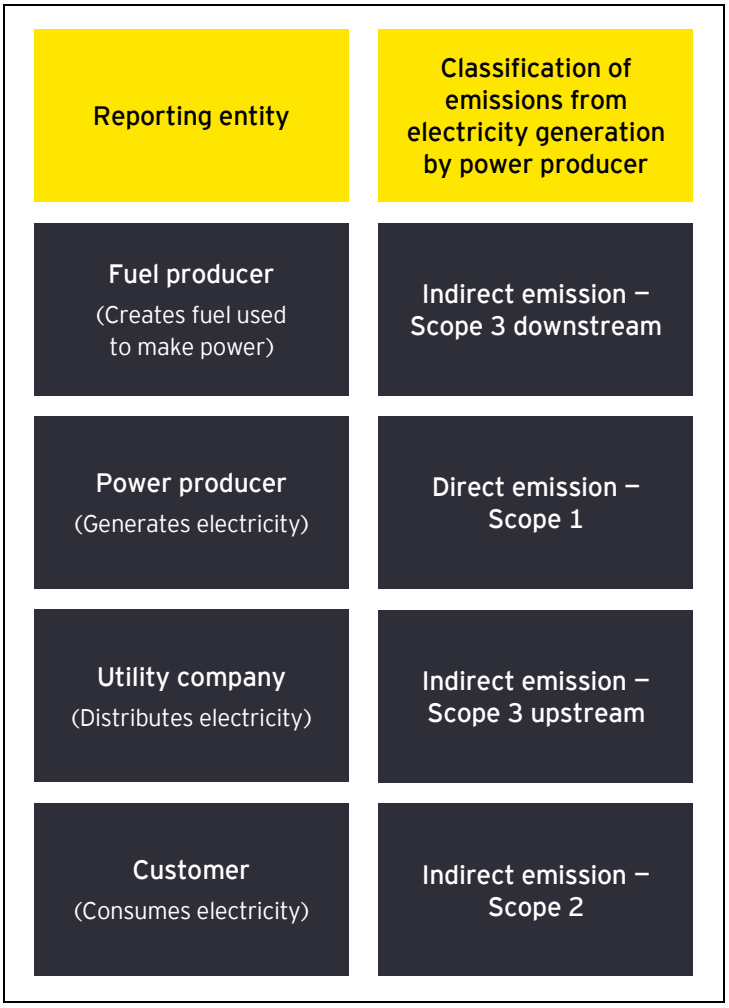
The GHG Protocol requires a reporting entity to categorize GHG emissions as follows:

- Scope 1 emissions are direct emissions from sources owned or controlled by a reporting entity within its reporting boundary (refer to sections 2.5 and 2.6 for discussion of the reporting boundary, which is a combination of a reporting entity's selected organizational and operational boundaries). Common examples include emissions from fuel combustion at entity-owned production plant generators or fuel emissions from entity-owned or entity-controlled vehicles.
- Scope 2 emissions are the indirect emissions generated from purchased energy (i.e., electricity, heat, steam and cooling) that was consumed by a reporting entity. Common examples include emissions from the generation of electricity purchased from a utility company.
- Scope 3 emissions are indirect emissions, other than Scope 2 emissions, from sources owned or controlled by other entities in a reporting entity's value chain (i.e., upstream or downstream activities). Common examples include emissions from purchased goods or services and emissions from business travel.

The GHG Protocol requires a reporting entity to differentiate its GHG emissions from direct and indirect sources (i.e., Scope 1 vs. Scope 2 and Scope 3), but it does not require a reporting entity to report on Scope 3 emissions (see section 1.5). However, some regulations may require it to report Scope 3 emissions. This accounting and reporting structure increases the transparency of the emissions based on which party is emitting the GHGs. It also avoids double counting by making sure that two or more reporting entities do not account for the same emissions in Scope 1, while also providing information about a reporting entity's other GHG emissions. That is, if every entity and individual throughout the world reported their GHG emissions, the total of all Scope 1 emissions would equal the total GHGs emitted throughout the world.

However, a stakeholder may also want information about how a reporting entity's decisions (e.g., how much purchased electricity its production process uses, the impact of business travel) affects GHG emissions, which is why reporting entities also report their indirect GHG emissions in Scope 2 and Scope 3 emissions.

The following graphic, based on Figure B.1 in the Scope 2 Guidance, shows how GHG emissions created from the generation of electricity by the power producer would be reported under the different scopes for various reporting entities involved in the value chain.



Identifying the relevant scope is fundamental to applying the GHG Protocol, because the accounting and reporting requirements differ based on the scope of the GHG emission. The following illustrations show how electricity emissions used in a manufacturing process and for cloud computing services would be reported by different entities.

Illustration 1-1: Classification of electricity emissions used in a manufacturing process

A power company generates and sells electricity directly to a toy manufacturing company, which then uses that electricity to produce a product. The product is then sold to a toy store.

- The power company that generates electricity would report the emissions from that electricity generation in its Scope 1 emissions.
- The toy manufacturing company that consumes the electricity while making the product would report the electricity-related emissions in its Scope 2 emissions.
- The toy store that purchases the product would report the emissions used to make the product (including the portion of the electricity-related emissions required to produce the purchased product) in its upstream Scope 3 emissions.

Illustration 1-2: Classification of electricity emissions used for cloud computing services

A power company generates and sells electricity directly to a technology company, which then uses that electricity to provide cloud computing services for its customers.

- The power company that generates electricity would report the emissions from that electricity generation in its Scope 1 emissions.
- The technology company that consumes the electricity while providing the cloud computing services would report the electricity-related emissions in its Scope 2 emissions.
- The customers that purchase the cloud computing services would report these emissions in their upstream Scope 3 emissions.

1.4 GHG accounting and reporting principles

Excerpt from GHG Protocol

Scope 2 Guidance

Chapter 3

As with financial accounting and reporting, generally accepted GHG accounting and reporting principles are intended to underpin and guide GHG accounting and reporting to ensure that the reported information represents a faithful, true, and fair account of a company's GHG emissions.

GHG accounting and reporting shall be based on the following principles:

- **Relevance**. 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.
- **Completeness**. Account for and report on all GHG emission sources and activities within the inventory boundary. Disclose and justify any specific exclusion.
- **Consistency.** 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.
- **Transparency.** 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.
- **Accuracy**. 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.

The GHG Protocol is a principles-based set of standards. The principles serve as a foundation for a true and fair presentation of an entity's GHG emissions in accordance with the guidance in the GHG Protocol. They provide reporting entities with direction when the application of the GHG Protocol to specific facts and circumstances is not addressed or is otherwise unclear.

These principles are partially based on the financial accounting and reporting principles included in chapters of the conceptual frameworks of the Financial Accounting Standards Board (FASB)[6] and of the International Accounting Standards Board (IASB),[7] which are relevance (including materiality), faithful representation, comparability, verifiability, timeliness and understandability.

The following are the GHG accounting and reporting principles included in the Corporate Standard, the Scope 2 Guidance and the Scope 3 Standard:

Relevance: A reporting entity's GHG inventory should accurately reflect its GHG emissions and provide both internal and external users with decision-useful information. A key attribute of relevance is the selection of an appropriate reporting boundary that reflects the economic reality of the reporting entity's operations, not just the legal form. Refer to sections 2.5 and 2.6 for a discussion of boundaries.

Completeness: A reporting entity should account for and report on all GHG emissions sources and activities within the identified boundary, with any exclusions specifically identified, justified and disclosed. The use of a materiality threshold for reporting emissions is not consistent with this principle. That is, a materiality threshold may be used to determine whether an incomplete inventory is a material discrepancy that would affect the decisions of users of the report, but any exclusions should still be identified and justified.

Consistency: A reporting entity should apply the same methodologies over time. This principle applies to data sources, identified boundaries and any other factors that are relevant to users of the report. Any changes to the methodologies, data, boundaries or other relevant factors should be disclosed. When applied, this principle allows users of the report to observe changes in trends and assess the performance of the reporting entity over time. Unlike for financial reporting, the consistency principle does not address comparability across reporting entities.

Transparency: A reporting entity should address all relevant issues in a factual, neutral, understandable and auditable manner. A reporting entity should disclose relevant assumptions, methodologies and data sources. The information disclosed should be sufficient for a third party to be able to reach the same conclusions if it was provided the same data. The GHG Protocol indicates that independent external attestation, although not required by the GHG Protocol, is an effective method to demonstrate transparency.

Accuracy: A reporting entity should present emissions information with sufficient accuracy for users to make decisions based on the reasonable integrity of the data. The emissions information reported should not be systematically over or under the actual emissions. A reporting entity should reduce the uncertainty inherent in emissions data as far as practicable.

1.4.1 Trade-offs between reporting principles

A reporting entity may face trade-offs between some of the reporting principles in certain cases. For example, it may determine that achieving a more complete inventory requires the use of less accurate data, which would affect the accuracy of the inventory. Conversely, it may determine that achieving a more accurate inventory requires the exclusion of certain activities with low accuracy, which would affect the completeness of the inventory. The reporting entity will need to balance the principles based on its facts and circumstances and compensate for these trade-offs through disclosure. These types of conflicts may resolve themselves over time, so a reporting entity should reevaluate its assessment as facts and circumstances change. For example, as the accuracy and completeness of data increases, the conflict between the completeness and accuracy principles in the example above will be reduced.

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[6] Chapter 3, *Qualitative Characteristics of Useful Financial Information*, of Financial Accounting Standards Board Concepts Statement No. 8, *Conceptual Framework for Financial Reporting*

[7] Chapter 2, *Qualitative Characteristics of Useful Financial Information*, of the International Accounting Standards Board's *Conceptual Framework for Financial Reporting*

1.5 How to apply the Corporate Standard, Scope 2 Guidance and Scope 3 Standard

The Corporate Standard provides the foundational requirements and guidance for accounting and reporting for GHG emissions. The Scope 2 Guidance amends the Corporate Standard and adds requirements and guidance for accounting and reporting for Scope 2 emissions (e.g., how to consider contractual instruments, such as renewable energy certificates, when calculating Scope 2 emissions). Therefore, an entity reporting under the Corporate Standard must also report under the Scope 2 Guidance.

The Scope 3 Standard supplements the Corporate Standard and provides additional requirements and guidance on reporting Scope 3 emissions if a reporting entity elects to report under both the Corporate Standard and the Scope 3 Standard. The Scope 3 Guidance supplements the Scope 3 Standard and provides practical guidance for calculating Scope 3 emissions, including calculation methodologies for each Scope 3 category, potential data sources to be used and illustrative examples.

An entity reporting under the Corporate Standard is not required to disclose Scope 3 emissions. As a result, there are three options under the GHG Protocol for reporting Scope 3 emissions, as described in the following table, which is based on Table 1.1 in the Scope 3 Standard:

Option	Description	Applicable GHG criteria
1	A reporting entity reports its Scope 1 and Scope 2 GHG emissions and either (1) no Scope 3 emissions or (2) Scope 3 emissions from activities that are not aligned with any of the prescribed Scope 3 categories (the latter is very rare)	▸ Corporate Standard ▸ Scope 2 Guidance
2	A reporting entity reports its Scope 1 and Scope 2 GHG emissions and some, but not all, relevant and material Scope 3 GHG emissions in accordance with the Scope 3 calculation guidance but not with the Scope 3 Standard	▸ Corporate Standard ▸ Scope 2 Guidance ▸ Scope 3 Guidance
3	A reporting entity reports its Scope 1 and Scope 2 GHG emissions and all relevant and material categories of Scope 3 GHG emissions	▸ Corporate Standard ▸ Scope 2 Guidance ▸ Scope 3 Standard ▸ Scope 3 Guidance

We believe that an entity reporting Scope 3 emissions under the Corporate Standard should use the Scope 3 Guidance as the basis for its calculations. The disclosures required by the Corporate Standard are similar to those in the Scope 3 Standard, but the Scope 3 Standard requires disaggregation of certain disclosures by Scope 3 category. Therefore, we also believe that an entity reporting any Scope 3 emissions categories under the Corporate Standard should provide its disclosures disaggregated by Scope 3 category, instead of at an aggregate level.

Certain disclosures are required while others are optional under the Corporate Standard, Scope 2 Guidance and Scope 3 Standard, so a reporting entity will need to disclose the applicable information from each applicable standard. Refer to section 3.4, section 4.6, section 5.3 and chapter 6 of this publication for a list of the applicable disclosures.

2 Key concepts

2.1 GHG definition

The GHG Protocol addresses emissions of the seven GHGs defined by the UNFCCC[8] — carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6) and nitrogen trifluoride (NF_3). These gases are classified as GHGs because they trap heat in the atmosphere. Some of the common sources of GHG emissions are as follows:

- Carbon dioxide is primarily emitted through fuel combustion (or combustion of waste, wood, and other biological material) and industrial processes, with the burning of fossil fuels being the most significant source. Carbon dioxide can be removed from the atmosphere, or sequestered, through natural biological methods (e.g., absorbed by plants) or other processes.
- Methane is primarily emitted during the processing or production of coal, natural gas and oil. Methane is also emitted by certain agricultural practices, livestock and the decay of organic compounds.
- Nitrous oxide is primarily emitted from agricultural soil management, land use, industrial activities, burning fossil fuels and waste, and treating wastewater.
- Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride and nitrogen trifluoride are synthetic GHGs (i.e., they do not have natural sources) that are primarily emitted from household, commercial and industrial processes. Hydrofluorocarbons are primarily used as refrigerants. Perfluorocarbons are a byproduct of aluminum production and are used in the manufacturing of semiconductors. Sulfur hexafluoride is used in magnesium production and in the manufacturing of semiconductors; it is also an insulating gas in electrical transmission equipment. Nitrogen trifluoride is used in the manufacturing of semiconductors.

The GHG Protocol acknowledges there are other GHGs (e.g., chlorofluorocarbons (CFCs), nitrogen oxides (NOx)) that are not covered by the UNFCCC and includes an optional disclosure for a reporting entity to separately disclose GHG emissions from other GHGs.

How we see it

Carbon dioxide, methane and nitrous oxide are the most common GHGs emitted by an entity and will likely be included in a reporting entity's emissions. Additionally, hydrofluorocarbons are emitted by many entities using refrigeration or air conditioning, so they are often included in a reporting entity's emissions. The remaining synthetic GHGs (i.e., PFCs, SF_6 and NF_3) are more industry-specific and may not be emitted by all reporting entities.

[8] The Corporate Standard initially included only six GHGs. However, the Corporate Standard was amended in 2013 to add NF_3 as a seventh GHG for disclosure under the GHG Protocol.

2.2 Definition of carbon dioxide equivalent

Each GHG described above has a different global warming potential (GWP). The GWP of a given GHG indicates how much energy one unit of the GHG absorbs (i.e., the ability of that gas to trap heat in the atmosphere) compared to one unit of carbon dioxide, generally over a 100-year period. The larger the GWP, the more that the GHG warms the earth compared to carbon dioxide over the stated time period. For example, PFCs and HFCs often absorb thousands of times more energy than carbon dioxide. The GWP of each GHG is published as a factor and used to translate GHGs, other than carbon dioxide, into carbon dioxide equivalent (CO_2e) units.

The GHG Protocol considers CO_2e to be the universal unit of measurement for GHGs since it expresses the GWP of each GHG in terms of the GWP of one unit of carbon dioxide. CO_2e and individual GHGs are often expressed in metric tons, which is the equivalent of 1,000 kilograms (or approximately 2,204 pounds). The purpose of this measure is to enable a reporting entity, users and other stakeholders to compare the potency of the overall emissions from a reporting entity, both across entities and over time, even when the composition of the GHG emissions changes.

2.2.1 GWP factors

Excerpt from GHG Protocol

Scope 3 Standard

Chapter 7

Global warming potential (GWP) values

Global warming potential (GWP) values describe the radiative forcing impact (or degree of harm to the atmosphere) of one unit of a given GHG relative to one unit of carbon dioxide. GWP values convert GHG emissions data for non-CO_2 gases into units of carbon dioxide equivalent (CO_2e).

Companies should use GWP values provided by the Intergovernmental Panel on Climate Change (IPCC) based on a 100-year time horizon. Companies may either use the IPCC GWP values agreed to by United Nations Framework Convention on Climate Change (UNFCCC) or the most recent GWP values published by the IPCC. Companies should use consistent GWP values across their scope 1, scope 2, and scope 3 inventory and should maintain consistency in the source of GWP values used over time (by consistently following guidance provided by either the UNFCCC or IPCC, once selected). Companies that have already developed scope 1 and scope 2 GHG inventories should use the same GWP values for scope 3 to maintain consistency across the scopes. Companies that have not previously developed a corporate GHG inventory should use the most recent GWP values.

Companies are required to disclose the source of GWP values used to calculate the inventory.

Accounting and Reporting Standard Amendment

Companies:

- 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.

Accounting and Reporting Standard Amendment

Required information:

- Source of the GWP values and indicate if multiple Assessment Reports have been used.

The GHG Protocol recommends that a reporting entity use GWP factors published by the Intergovernmental Panel on Climate Change (IPCC), which are calculated based on a 100-year time horizon. If a reporting entity reports a GHG inventory for the first time, it should use the most recent values published by the IPCC. A reporting entity that has already developed a GHG inventory may use either the:

- Most recent GWP values published by the IPCC (i.e., currently, the Sixth Assessment Report (AR6) of the IPCC, issued in April 2022[9])
- IPCC values agreed to by the UNFCCC (i.e., currently the Fourth Assessment Report (AR4) of the IPCC)

The source of the GWP values that are used should be, where possible, consistent across all scopes and must clearly be disclosed, including indicating whether multiple assessment reports have been used. Additionally, once a selection has been made (i.e., either the most recent GWP values or values agreed to by UNFCCC), a reporting entity should consistently apply this selection over time. See section 2.7.2 of this publication for a discussion of how a reporting entity should update previously reported emissions if it elects to use the most recent GWP value issued by the IPCC and the IPCC issues new GWP values.

The GHG Protocol website[10] has not been updated for the GWP values published by the IPCC in AR6 but includes the values published within AR4 and the Fifth Assessment Report (AR5). Many of the tools published by the GHG Protocol also currently use GWP values from AR5. The following chart lists the IPCC GWP values for certain GHGs published in AR4, AR5 and AR6 using a 100-year time horizon:

GHG	AR4	AR5	AR6
CO_2	1	1	1
CH_4	25	28	28
N_2O	298	265	273
SF_6	22,800	23,500	25,200
NF_3	17,200	16,100	17,400

See the GHG Protocol website[10] for the GWP values for the various HFCs and PFCs. As discussed in section 2.7.2.1 below, when a new or updated emissions factor or GWP value is used, a reporting entity should recalculate base year emissions (and prior year emissions if recalculated) using the new emissions factor or GWP value if the impact is material.

[9] IPCC_AR6_WGI_Chapter_07_Supplementary_Material.pdf

[10] https://ghgprotocol.org/sites/default/files/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_0.pdf

How we see it

As illustrated above, the differences in GWP values among the IPCC AR4, AR5 and AR6 may not be large enough to be significant to the users of the sustainability report, particularly when a reporting entity has limited SF_6 and NF_3 emissions. We believe a reporting entity may use a previous version of the GWP factors published by the IPCC (i.e., the AR4 or AR5) if the difference in the reported information is not material to the users. See section 3.3.2 for considerations around GWP values that are included in emissions factors.

2.3 Materiality

Excerpt from GHG Protocol

Corporate Standard

Chapter 10

Chapter 1 provides a useful interpretation of the relationship between the principle of completeness and the concept of materiality. Information is considered to be material if, by its inclusion or exclusion, it can be seen to influence any decisions or actions taken by users of it. A material discrepancy is an error (for example, from an oversight, omission or miscalculation) that results in a reported quantity or statement being significantly different to the true value or meaning.

While the concept of materiality involves a value judgment, the point at which a discrepancy becomes material (materiality threshold) is usually pre-defined. As a rule of thumb, an error is considered to be materially misleading if its value exceeds 5% of the total inventory for the part of the organization being verified.

The verifier needs to assess an error or omission in the full context within which information is presented. For example, if a 2% error prevents a company from achieving its corporate target then this would most likely be considered material.

Chapter 1

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 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. Verifiers can determine the potential impact and relevance of the exclusion, or lack of quality, on the overall inventory report.

The GHG Protocol defines material information as information that, if included or excluded, would influence any decisions or actions taken by users of that information. The GHG Protocol does not provide a "bright line" indicating the appropriate level of materiality that should be used by a reporting entity and indicates materiality should consider both quantitative and qualitative factors. However, it does provide an example of 5% of the total inventory for the part of the organization being verified as a frequent measure of materiality used by entities verifying emissions information. Each verifier or assurance provider will set its own materiality based on professional standards and its methodology, which could differ from the example provided. The concept of materiality is used throughout the GHG Protocol.

Establishing a materiality threshold to evaluate errors and omissions is not the same as using a de minimis threshold when preparing a complete inventory (i.e., omitting certain GHG emissions within the identified boundary and not disclosing that omission because the related emissions are expected to be de minimis). Any emissions omitted need to be estimated to determine whether they result in a material error. If they are material, any exclusions of GHG emissions sources and activities within the identified boundary should be specifically identified, justified and disclosed.

2.4 Estimation uncertainties

The GHG Protocol acknowledges that it is necessary for an entity to make certain estimates to compile its emissions inventory. Each estimate contains a certain level of uncertainty that should be considered when assessing the reliability of the emissions inventory.

Emissions estimates are subject to two types of uncertainty: scientific uncertainty, which is specific to emissions reporting, and estimation uncertainty, which commonly exists in estimates used to prepare financial statements.

Scientific uncertainty is created when the science of the actual emission generation and/or removal process is not fully understood. Understanding and quantifying the impact of scientific uncertainty on an entity's emissions inventory is highly subjective.

Estimation uncertainty arises anytime emissions are calculated. Estimation uncertainty is the combination of:

- Model uncertainty, which is uncertainty inherent in the ability of the models to calculate the actual emissions
- Parameter uncertainty, which is uncertainty regarding the accuracy of the inputs (e.g., activity data) to the models used to quantify emissions

Understanding or quantifying the impact of model uncertainty on an entity's emissions inventory is highly subjective. However, the impact of parameter uncertainty can often be calculated through sensitivity analysis, statistical analysis and expert knowledge. For example, a reporting entity that uses sampling to develop its activity data can use statistical analysis to quantify the uncertainty in the data. A reporting entity can also compare its activity data across multiple reference sources, including different facilities and public data.

Given the prevalence of estimates in emissions inventory data, the GHG Protocol has developed supplementary guidance[11] on assessing uncertainty, as well as a basic uncertainty assessment for GHG inventory data. The goal of this tool is to help an entity understand the level of uncertainty within their emissions inventory and use that information to increase the quality of their GHG inventory.

[11] https://ghgprotocol.org/sites/default/files/2023-03/ghg-uncertainty.pdf

The GHG Protocol includes an optional disclosure of information on the quality of the inventory, which would include information on causes and magnitude of uncertainties in emissions estimates. This optional disclosure is discussed further in section 6.2.

2.5 Organizational boundaries

Excerpt from GHG Protocol

Corporate Standard

Glossary

Organizational boundaries: The boundaries that determine the operations owned or controlled by the reporting company, depending on the consolidation approach taken (equity or control approach).

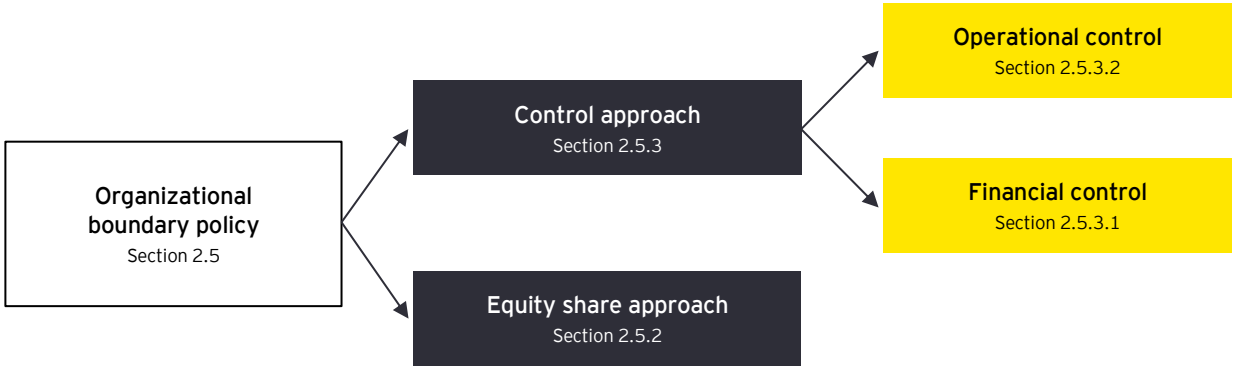
A reporting entity may have many different entities in its legal and organizational structure, which may include wholly owned subsidiaries, partially owned subsidiaries (e.g., joint ventures) and equity method investments. The GHG Protocol provides guidance on whether a reporting entity must include emissions from these various entities when accounting for and reporting emissions. The GHG Protocol refers to the process of identifying which entities to include as "setting organizational boundaries." The process is similar to the process to define the reporting entity for a set of financial statements for financial reporting (i.e., what entities to consolidate). That is, the organizational boundary selected determines which entities are included by the reporting entity for purposes of GHG emissions reporting.

The GHG Protocol allows a reporting entity to select one of two methods of setting organizational boundaries:

- The equity share approach (see section 2.5.2 above)
- The control approach (see section 2.5.3 above)

The GHG Protocol calls these methods consolidation approaches. For entities that wholly own and control all their operations, either approach will result in the same organizational boundary. However, for entities that have partially owned operations (or for entities that only have an economic interest in the operations without control), the organizational boundary identified, and therefore, the GHG emissions included in their inventory, can differ depending on the consolidation approach used.

Because control can be defined from an operational or financial perspective, the GHG Protocol further divides the control approach into the operational control approach and financial control approach. The decision tree below shows the options available to a reporting entity for determining its organizational boundary and the related section of this publication where these options are discussed further.



2.5.1 Consistency in organizational boundaries

A reporting entity must consistently apply the selected approach throughout its entire legal structure. That is, when the parent is the reporting entity, one subsidiary of a parent cannot apply the equity share approach for its subsidiaries while another subsidiary of the same parent applies the operational control approach for its subsidiaries. Inconsistent application of the organizational boundary over time could result in misleading information.

A reporting entity may change the consolidation approach selected, but that change would be subject to the prior-year recalculation requirements discussed in section 2.7.2.1.

2.5.2 Equity share approach

Excerpt from GHG Protocol

Scope 2

Glossary

Equity share approach: A consolidation approach whereby a company accounts for GHG emissions from operations according to its share of equity in the operation. The equity share reflects economic interest, which is the extent of rights a company has to the risks and rewards flowing from an operation.

Under the equity share approach, a reporting entity sets its organizational boundary based on its share of the equity of an owned or partially owned entity (i.e., the reporting entity includes the same proportionate share of emissions of the owned entity as its share of equity of the entity). The equity share percentage used by the reporting entity should reflect the extent of the rights the reporting entity has to both the risks and rewards generated by an owned entity. This percentage is often the same as the legal ownership share of the owned entity, but it may not be in all cases. For example, the equity share and ownership share will differ when the ownership share does not faithfully represent the economic interest in the owned entity.

The following example illustrates the application of the equity share approach.

Illustration 2-1: Using the equity share approach

Example 1

A reporting entity legally owns 75% of the equity of a subsidiary and has selected the equity share approach to determine its organizational boundary. The reporting entity has rights to the risks and rewards of 75% of the subsidiary.

In this scenario, the reporting entity reports 75% of the GHG emissions related to the subsidiary.

Example 2

A reporting entity legally owns 75% of the equity of a subsidiary, but the investors share disproportionately in the economic risks and rewards of the subsidiary. In this example, a contractual arrangement among the investors allocates 55% of the risks and rewards of the subsidiary to the reporting entity.

The reporting entity has selected the equity share approach to determine its organizational boundary. In this scenario, the reporting entity reports 55% of the GHG emissions related to the subsidiary.

2.5.3 Control approach

Under the control approach, a reporting entity includes within its organizational boundaries 100% of the emissions of operations over which it has control, regardless of the equity share or legal ownership share held by the reporting entity. For example, a reporting entity that has an equity share of 65% and control over a subsidiary would account for and report 100% of that entity's emissions using the control approach. Conversely, if the reporting entity has an equity share of 35% in an entity that it does not control, none of the emissions of the uncontrolled entity would be included in the reporting entity's GHG inventory.

The GHG Protocol provides two methods of determining control: financial control and operational control. The selected control approach must be used consistently throughout the entire organization and over time.

2.5.3.1 Financial control

Excerpt from GHG Protocol

Corporate Standard

Chapter 3

Financial Control. 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.[2] 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.

Under this criterion, the economic substance of the relationship between the company and the operation takes precedence over the legal ownership status, so that the company may have financial control over the operation even if it has less than a 50 percent interest in that operation. In assessing the economic substance of the relationship, the impact of potential voting rights, including both those held by the company and those held by other parties, is also taken into account. This criterion is consistent with international financial accounting standards; therefore, a company has financial control over an operation for GHG accounting purposes if the operation is considered as a group company or subsidiary for the purpose of financial consolidation, i.e., if the operation is fully consolidated in financial accounts. If this criterion is chosen to determine control, emissions from joint ventures where partners have joint financial control are accounted for based on the equity share approach.

[2] Financial accounting standards use the generic term "control" for what is denoted as "financial control" in this chapter.

A reporting entity has financial control over another entity if it can control the entity to gain economic benefits from the entity's activities. Financial control is often obtained if the reporting entity has the right to the majority of the economic benefits of the operation. Similar to the concept of equity share above, the determination of financial control depends on the economic substance of the relationship rather than the legal ownership. That is, financial control is not determined by legal ownership but by whether the reporting entity holds the rights to the majority of the economic benefits of the operation (e.g., the risks and rewards of ownership of the entity's assets). For example, a reporting entity may have financial control over another entity that is a variable interest entity, even though it owns less than 50% of the other entity.

When joint financial control exists (e.g., a joint venture under US GAAP), emissions are accounted for using the equity share approach even when the financial control approach is applied throughout the remainder of the reporting entity.

How we see it

We believe that the determination of financial control will often be consistent with the determination of control for financial reporting purposes under US GAAP (i.e., if an entity is consolidated for financial reporting purposes, it will likely be included in the organizational boundaries under the financial control approach).

However, the financial accounting guidance on the assessment of control under US GAAP (and IFRS) has changed since the Corporate Standard was first issued. In addition, there are differences between US GAAP and IFRS. Therefore, there may be differences between the consolidation conclusion under the GHG Protocol's financial control approach and the conclusion for financial accounting.

2.5.3.2 Operational control

Excerpt from GHG Protocol

Corporate Standard

Chapter 3

Operational 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.

The GHG Protocol specifies that a reporting entity that applies the operational control approach needs to include any facility over which it has operational control, even if it is not the owner of the facility, in the organizational boundary. This is particularly relevant for leased assets and other assets that are operated under a contractual arrangement, as discussed further in section 2.5.5 below.

A reporting entity that elects to use the operational control approach determines control by whether it has the authority to introduce and implement operating policies at an operation or facility. Operational control does not mean that the reporting entity can make all decisions concerning the operation or facility. For example, operational control may include decisions about how the day-to-day functions are performed but may not include certain other significant decisions (e.g., financing decisions, buying/selling significant assets) otherwise relevant to the financial control conclusions.

Certain facilities or operations may be under joint financial control (e.g., joint ventures, joint operations). Under the operational control approach, a reporting entity needs to determine whether it can introduce and implement operating policies for each facility or operation to determine whether the joint operation is included in its reporting boundary. A reporting entity that has operational control over an operation will include 100% of the operation's emissions in its reporting boundary even though it only owns 50% of the joint venture.

2.5.4 Factors to consider when selecting an approach to determine organizational boundary

As described above, the GHG Protocol provides a reporting entity with flexibility in determining which consolidation approach to use when setting its organizational boundary. The GHG Protocol provides both a general principle as well as several factors for an entity to consider. A reporting entity should also consider whether it is required by applicable regulations to apply a prescribed consolidation approach.

Generally, absent any regulatory requirements to adopt a specific consolidation approach, an entity should select the approach that results in the organizational boundary that is most consistent with the entity's purpose for reporting under the GHG Protocol. For example, if an entity is internally reporting GHG emissions to management with a goal of reducing emissions, the operational control approach may be most appropriate since the entity reports emissions from operations it is able to control and, therefore, change to reduce emissions. Conversely, if a reporting entity is a company that invests in other companies but does not control any of the investments and has a goal of reporting its GHG emissions inventory to investors, the equity share would likely be more appropriate.

To support this general principle, the GHG Protocol provides factors to consider when determining which approach is most appropriate when setting the organizational boundary. These factors include:

- Does the selected approach reflect the commercial reality of an arrangement?
- Are there required reporting frameworks from governments or emissions trading programs that specify a specific organizational boundary must be used?
- Does the selected approach reflect the liability and risk management of the reporting entity?
- Does the selected approach align with financial accounting and reporting?
- Does the selected approach provide management with decision-useful information?
- Is the selected approach cost effective and is the relevant data available?
- Does the selected approach result in a complete emissions population?

We believe that a reporting entity generally will not be able to choose an approach that will satisfy all of the factors above. The best approach will be one that satisfies the factors that are most relevant and meaningful to the users of the GHG emissions information while remaining consistent with the general principle of meeting the reporting entity's purpose of reporting emissions.

Applying the operational control or the financial control approach can result in the same organizational boundary in some situations. However, the GHG Protocol provides examples of when the organizational boundary differs based on the control approach applied and notes this often may be the case in the oil and gas industry, which often has complex operating and ownership structures.

For example, a reporting entity may have less than a 50% interest in a joint operating agreement (JOA) but still serve as the lead operator of that JOA and, therefore, has operational control. If the reporting entity applies the operational control approach, it would include the JOA in its organizational boundary. If it applies the financial control approach, it would not include it.

Conversely, a reporting entity may own 75% of an entity, but the minority owner has control over operating decisions, and therefore, the reporting entity does not have operational control. In this case, a reporting entity applying the operational control approach would not include this entity in its organizational boundary, while a reporting entity applying the financial control approach would include it.

How we see it

The most common consolidation approach that we observe entities apply when they report voluntarily is the operational control approach, since this often better aligns with their objective of voluntarily reporting the emissions that they can influence over time. However, this trend could change as new standards and regulations are introduced, which may specify which consolidation approach must be used for reporting GHG emissions. The determination of operational control often requires judgment and is based on the facts and circumstances of each entity and its operations.

2.5.5 Organizational boundary for specific situations

The selected consolidation approach is also used to determine whether emissions from contractual agreements, such as outsourced operations or franchises, are included in a reporting entity's organizational boundary.

2.5.5.1 Leased assets

The determination of whether to include emissions from leased assets depends on the consolidation approach selected.

How we see it

Individuals preparing emissions reporting information may not have experience with lease classification and other financial accounting concepts. A reporting entity's accounting group should support the preparers of the emissions report in this analysis.

Equity share or financial control approach

Excerpt from GHG Protocol

Corporate Standard

Chapter 4

Leased assets, outsourcing, and franchises

The selected consolidation approach (equity share or one of the control approaches) is also applied to account for and categorize direct and indirect GHG emissions from contractual arrangements such as leased assets, outsourcing, and franchises. If the selected equity or control approach does not apply, then the company may account for emissions from the leased assets, outsourcing, and franchises under scope 3. Specific guidance on leased assets is provided below:

- **Using equity share or financial control:** The lessee only accounts for emissions from leased assets that are treated as wholly owned assets in financial accounting and are recorded as such on the balance sheet (i.e., finance or capital leases).
- **Using operational control:** The lessee only accounts for emissions from leased assets that it operates (i.e., if the operational control criterion applies).

When the equity share or financial control consolidation approaches are selected, determining whether to include leased assets in the organizational boundary depends on the type of lease identified for financial accounting purposes (using US GAAP or IFRS). The table below describes the related emissions accounting using the equity share or financial control consolidation approaches for lessees and lessors based on the lease type:

Lease classification as determined by ASC 842, *Leases*	**Lessee**	**Lessor**
Finance lease	Has financial control or equity ownership [i.e., the right-of-use asset (representing the right to the underlying asset that is effectively "wholly owned") is recognized on the financial statements]; therefore, related emissions are within the organizational boundary (i.e., reported as Scope 1 or Scope 2 emissions)	Does not have financial control or equity ownership; therefore, related emissions are not within the organizational boundary (i.e., reported as Scope 3, Category 13, *Downstream leased assets*)
Operating lease	Does not have financial control or equity ownership; therefore, related emissions are not within the organizational boundary (i.e., reported as Scope 3, Category 8, *Upstream leased assets*)	Has financial control or equity ownership; therefore, related emissions are within the organizational boundary (i.e., reported as Scope 1 or 2)

How we see it

The Corporate Standard, which provides guidance for categorizing emissions from leased assets, was issued in 2004, well before the more recent US GAAP and IFRS standards on leases (i.e., Accounting Standards Codification (ASC) 842 and IFRS 16, *Leases*) were issued. The distinction between lease classifications discussed in the Corporate Standard is based on the financial accounting guidance in effect in 2004 (i.e., ASC 840, *Leases*, and International Accounting Standard (IAS) 17, *Leases*). The lease classification guidance in ASC 842 is similar to that in ASC 840; therefore, the table above applies to lease classification under ASC 842. However, IFRS 16 removed lease classification for lessees (i.e., most leases are recognized and measured similar to leases classified as finance leases under US GAAP).

If a non-US GAAP lessee has leases that would be classified as operating leases under IAS 17 or ASC 842, we believe that when applying the equity share or financial control approaches the lessee should conclude that related emissions are not within the organizational boundary as indicated in the table above. Further, we believe if a lessee applies the short-term lease exemption under ASC 842 or IFRS 16 (or the leases of low-value assets exemption under IFRS 16), it should consider the arrangement to be an operating lease.

Operational control approach

Excerpt from GHG Protocol

Corporate Standard

Chapter 4

Leased assets, outsourcing, and franchises

The selected consolidation approach (equity share or one of the control approaches) is also applied to account for and categorize direct and indirect GHG emissions from contractual arrangements such as leased assets, outsourcing, and franchises. If the selected equity or control approach does not apply, then the company may account for emissions from the leased assets, outsourcing, and franchises under scope 3. Specific guidance on leased assets is provided below:

- **Using equity share or financial control**: The lessee only accounts for emissions from leased assets that are treated as wholly owned assets in financial accounting and are recorded as such on the balance sheet (i.e., finance or capital leases).
- **Using operational control:** The lessee only accounts for emissions from leased assets that it operates (i.e., if the operational control criterion applies).

Under ASC 842, a lessee has the right to control the use of an identified asset, which often demonstrates operational control. Therefore, when the operational control approach is used, a lessee includes the related emissions in its organizational boundaries and accounts for any direct emissions from the leased asset as Scope 1 emissions and any purchased energy used by the leased asset as Scope 2 emissions. Consequently, a lessor does not have operational control of the leased asset, so it accounts for the related emissions as Scope 3, Category 13, *Downstream leased assets,* emissions, if Scope 3 emissions are reported.

How we see it

When identifying whether an arrangement contains a lease under ASC 842, an entity determines whether the contract conveys the right to control the use of an identified asset for a period of time in exchange for consideration. This evaluation includes determining whether the customer has the right to direct how and for what purpose the identified asset is used throughout the period of use. Under ASC 842 (and IFRS 16), a lessee does not need to have a right to operate the underlying asset to have the right to direct how and for what purpose it is used. That is, the lessee may direct the use of an asset that is operated by the lessor.

For purposes of allocating GHG emissions, we believe a lessee's right to control the identified asset (i.e., direct how and for what purpose the identified asset is used) throughout the period of use generally demonstrates operational control of the asset under the GHG Protocol, regardless of whether the lessee or lessor operates the leased asset. See section 1.2, *Determining whether an arrangement contains a lease*, of our Financial reporting developments (FRD) publication, ***Lease Accounting***, for further discussion on identifying leases.

In a leased building with multiple tenants, there are often shared spaces among all of the building's tenants, such as the main floor lobby area and elevators. The determination of whether the tenant or landlord has operational control over these shared spaces is the basis for how the emissions from those shared spaces are accounted for. A reporting entity should consider whether, as a tenant of a building, it has influence (e.g., the ability to request certain actions from the landlord) or decision-making authority over the operation of the shared spaces in the leased building and could, therefore, have operational control over them. If the reporting entity determines that it has operational control of those spaces, under the operational control approach, it should account for the emissions from those spaces in its organizational boundary.

2.5.6 How the SEC proposal, ESRS and ISSB standards define boundaries

How organizational boundaries are defined is an area where regulatory requirements could differ from the GHG Protocol.

Under the SEC proposal, the organizational boundary would be based on the boundary of the financial statements (i.e., include proportionate share of the Scope 1 and Scope 2 emissions of entities in which a registrant holds equity method investments and entities that it proportionately consolidates) instead of the multiple consolidation approaches allowed by the GHG Protocol.

Under the ESRS, a reporting entity includes entities consolidated in its financial statements as part of its reporting boundary (i.e., organizational boundary) and applies the operational control approach described by the GHG Protocol for entities not consolidated in the financial statements (e.g., equity method investments, joint ventures and unconsolidated subsidiaries) and contractual arrangements. The ESRS also require an entity to disaggregate Scope 1 and Scope 2 emissions for (1) consolidated entities and (2) equity method investments, joint ventures and other unconsolidated subsidiaries for which it has operational control.

Under the ISSB's standards, a reporting entity is required to follow the GHG Protocol when defining its organizational boundary (unless a jurisdictional authority or an exchange on which the entity is listed requires the use of a different method for measuring GHG emissions), disclose the approach used for calculating emissions and separately disclose Scope 1 and Scope 2 emissions for (1) consolidated entities and (2) other investees, such as equity method investments, joint ventures and other unconsolidated subsidiaries.

2.6 Operational boundaries

Excerpt from GHG Protocol

Corporate Standard

Glossary

Operational boundaries: The boundaries that determine the direct and indirect emissions associated with operations owned or controlled by the reporting company. This assessment allows a company to establish which operations and sources cause direct and indirect emissions, and to decide which indirect emissions to include that are a consequence of its operations.

After a reporting entity sets its organizational boundary, the GHG Protocol requires it to determine its operational boundaries. This is the process of (1) identifying the emissions that relate to the reporting entity (which has been established by the organizational boundary), (2) determining if these emissions are direct (Scope 1) or indirect (Scope 2 or Scope 3), and (3) determining the extent of accounting for and reporting indirect emissions (i.e., which Scope 3 emissions, if any, are included in the GHG inventory and reported). Simply, this is the process of identifying and classifying GHG emissions within the organizational boundary.

2.6.1 Identifying emissions associated with operations

To identify the emissions associated with operations, a reporting entity should consider all sources of emissions discussed within this publication in section 3.2 for Scope 1 emissions, section 4.2 for Scope 2 emissions and section 5.1 for Scope 3 emissions. All emissions should be identified for all operations of the reporting entity. This can be one of the most complicated aspects of accounting for emissions.

How we see it

Identifying a complete emissions inventory often requires collaboration between those preparing the emissions information, which is often performed at the corporate level, and those responsible for the day-to-day operations of a reporting entity's facilities.

The emissions reported by a reporting entity must be complete within the selected inventory boundary. Any exclusions must be clearly identified and justified, with any assumptions disclosed. While the GHG Protocol implies exclusions are permissible, they must be assessed for materiality and relevance (i.e., whether any exclusions, individually or in the aggregate, are determined to be material and/or their exclusion makes the reported emissions profile misleading). Generally, material emissions within the chosen boundaries should only be excluded if it is not possible for the company to reasonably estimate such emissions. Such exclusion must be identified, justified and the assumptions disclosed. Adjusting operational or organizational boundaries to minimize emissions amounts is not appropriate.

As the sophistication of an entity's GHG calculation tools increases, its operational boundary may change over time. The GHG Protocol encourages companies to improve the precision of their reporting over time. See section 2.7.2 below for guidance on how a reporting entity should account for these changes over time. See section 2.7.3 below for guidance related to updating previously reported information that is considered to be an error.

2.6.2 Classifying emissions associated with operations and determining the extent of accounting and reporting for Scope 3 emissions

Each type of GHG emission is classified into a given scope. See section 1.3 for our discussion of the identification of direct and indirect emissions and a general discussion of classifying emissions into Scopes 1, Scope 2 and Scope 3. In addition, see section 1.5 above on the different reporting options for Scope 3 emissions under the GHG Protocol.

2.7 Emissions over time

Excerpt from GHG Protocol

Corporate Standard

Glossary

Base year: A historic datum (a specific year or an average over multiple years) against which a company's emissions are tracked over time.

The GHG Protocol is designed to enable reporting entities to track and report consistent and comparable emissions data over time. The first step to tracking emissions over time is the establishment of a base year. A base year is a benchmark against which subsequent emissions can be compared to create meaningful comparisons over time and may be used for setting GHG reduction targets.

To comply with the GHG Protocol principles of relevance and consistency, a reporting entity is required to establish and report a base year for its Scope 1 and Scope 2 GHG emissions. A base year is only required for Scope 3 emissions when Scope 3 performance is tracked or a Scope 3 reduction target has been set. That is the case whether the entity is reporting under the Corporate Standard or the Scope 3 Standard (see section 1.5).

How we see it

The GHG Protocol encourages reporting entities to begin reporting GHG emissions information and improve the completeness and precision of that information over time. While the GHG Protocol requires a company to establish and report a base year for its Scope 1 and Scope 2 emissions, a reporting entity that recently started to report GHG emissions information and has not established an emissions reduction target may choose not to set a base year until the precision and completeness of their emissions inventory have improved. In this situation, the reporting entity should disclose that a base year has not yet been established and the reason for not establishing a base year.

The GHG Protocol does not require a reporting entity to report prior-year information other than the base year, but it may elect to do so.

2.7.1 Base year selection

Excerpt from GHG Protocol

Corporate Standard

Chapter 5

Companies shall choose and report a base year for which verifiable emissions data are available and specify their reasons for choosing that particular year.

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.

A reporting entity needs to choose a base year for which verifiable emissions data is available. The base year selected should be representative of the GHG emissions of the reporting entity. For example, a reporting entity that experienced significantly elevated levels of sales and operations in 2020 due to the COVID-19 pandemic should not select 2020 as a base year, since this base year would allow it to show significant reductions in emissions in subsequent years when sales and operations stabilized. The objective of establishing a base year is to allow a reporting entity and users to track progress against that year.

The GHG Protocol allows a reporting entity to create a base year using an average of annual emissions over several consecutive years. This approach may be selected to obtain a more representative emissions profile that smooths out unusual fluctuations in GHG emissions. Additionally, under the GHG Protocol, a reporting entity may adopt a policy that moves the base year forward every set number of years. While a moving base year may be more useful for an entity that is significantly growing, it does not allow users of the information to compare emissions over a longer period of time. A reporting entity also has the option to select a separate base year for each scope. The criteria for selecting the base year for each scope are the same as those for selecting a single base year.

How we see it

While the GHG Protocol allows a reporting entity to select a separate base year for each scope, we believe a reporting entity should select a consistent base year for Scope 1, Scope 2 and Scope 3 emissions, unless there is a supportable reason for having different base years. Such reasons could include a lack of available Scope 3 information for the base year selected for Scope 1 and Scope 2, or facts and circumstances that result in non-representative emissions for one scope in the year selected as a base year compared to the other scopes presented.

A reporting entity must disclose its selected base year (or years), as well as its rationale for selecting that year (or years).

2.7.2 Updating base year and prior-year (if reported and recalculated) emissions

Excerpt from GHG Protocol

Corporate Standard

Chapter 5

Recalculating base year emissions

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.

Significance threshold for recalculations

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."

To achieve consistent and comparable emissions data over time, a reporting entity is required under the GHG Protocol to recalculate its base year to reflect the impact of significant events that have occurred. If other prior-year emissions data is included in the report, we believe a reporting entity should also recalculate those years or clearly disclose that they have not been recalculated and are, therefore, not comparable.

A reporting entity should develop a base-year and prior-year emissions recalculation policy that describes the nature of events that would cause the base or prior years to be recalculated, as well as a significance threshold used to determine if the base and prior years require recalculation. Once this policy is developed, it should be consistently applied (e.g., for both increases and decreases in emissions) and disclosed. See section 2.7.2.3 for a discussion of setting a base year recalculation policy. Anytime a recalculation of base or prior years is performed, a reporting entity should also clearly disclose the context for why a recalculation was required.

2.7.2.1 Circumstances that require recalculation

Excerpt from GHG Protocol

Corporate Standard

Chapter 5

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.

Scope 3 Standard

Chapter 9

9.3 Recalculating base year emissions

Companies are required to recalculate base year emissions when the following changes occur and have a significant impact on the inventory:

- Structural changes in the reporting organization, such as mergers, acquisitions, divestments, outsourcing, and insourcing
- Changes in calculation methodologies, improvements in data accuracy, or discovery of significant errors
- Changes in the categories or activities included in the scope 3 inventory

The GHG Protocol requires a reporting entity to recalculate base-year data when the events or changes in circumstances listed below occur and the reporting entity's significance threshold is met, as discussed in section 2.7.2.3 below. A reporting entity should also recalculate any reported prior-year data or clearly disclose that those years have not been recalculated and, therefore, are not comparable.

- Structural changes to the reporting entity (such as divestments, mergers and acquisitions that affect the organizational boundary)
- Outsourcing and insourcing activities that shift emissions outside the reporting boundary
- Changes in calculation methodology
- Improvements in the accuracy of emissions factors or activity data
- Discoveries of an error or errors that are individually or collectively material
- Additions of new Scope 3 categories

If base-year emissions are not recalculated for these events and changes in circumstances, the reported emissions would indicate that the amount of GHG emissions from the same assets had changed over time to a greater extent than they really did. For example, improvements in the calculation methodology or data do not change the actual amount of GHG emitted into the atmosphere from the same assets in the past, but they make the measurement of those emissions more accurate. Therefore, such changes require recalculation of base-year data if the impact is material.

Only updating the current-year emissions for the better data or calculation methodology would make it appear as though the actual emissions had changed to a greater extent than they really did compared to the base year. Similarly, the discovery of an error in a prior reporting year does not change the actual amount of GHGs emitted into the atmosphere in that year, so the prior-year emissions should be recalculated. See section 2.7.3 below for discussion of correcting prior year errors.

In some circumstances more accurate data may be identified that cannot reasonably be applied to all prior years or is not available for every year presented. In these cases, a reporting entity may extrapolate the more accurate data input to all years presented or present unadjusted prior year numbers and disclose the use of the new data and when it was applied. This disclosure should be made each year the new and old data points are both presented. This disclosure aligns with the general GHG reporting principle of transparency.

Structural changes often shift emissions from one reporting entity to another without changing the actual amount of GHGs emitted into the atmosphere. The reporting entity that currently owns or controls the assets should report emissions from those assets in its base year or prior years (if recalculated) for comparison purposes. Therefore, a reporting entity needs to recalculate its base year for any significant acquisitions or divestments. Base- or prior-year recalculations should only be made for events that have occurred and not based on management's plans or expectations of future events.

Some outsourcing or insourcing arrangements also shift emissions from one reporting entity to another without changing the actual amount of GHGs emitted into the atmosphere. If a reporting entity is reporting Scope 1, Scope 2 or Scope 3 emissions, such arrangements would only change the scope of those emissions. However, as noted in section 1.5 of this publication, a reporting entity does not need to report Scope 3 emissions (or all relevant categories of Scope 3 emissions). Therefore, if outsourcing or insourcing arrangements shift emissions between Scope 1 or Scope 2 and a Scope 3 category that was not previously reported, recalculation of Scope 1 and Scope 2 emissions for the base and prior years (if recalculated) to reflect this change is required.

That is because not recalculating the Scope 1 or Scope 2 base-year or prior-year (if recalculated) emissions to reflect this change would make it appear as though the Scope 1 or Scope 2 emissions decreased over time, instead of just being moved to a non-reported category. In addition, if a separate base year is selected for each scope, the base year needs to be recalculated for any changes between scopes due to insourcing our outsourcing arrangements.

The following example illustrates the base-year recalculation requirement for a structural change.

Illustration 2-2: Recalculation of a base year for structual change

Company A and Company B have prepared sustainability reports that report emissions in accordance with the GHG Protocol since 2018, and both have established a base year of 2018. Company C is a fully owned and controlled subsidiary of Company B. Below are the emissions generated by each entity.

	Reported in prior years				Not yet reported
GHG Emissions (metric tons of CO_2e)	**2018**	**2019**	**2020**	**2021**	**2022**
Company A	90	100	110	120	130
Company B (includes Company C emissions)	200	205	210	215	220
Total GHG emissions	**290**	**305**	**320**	**335**	**350**

Company C's emissions were:

	2018	2019	2020	2021	2022
Company C emissions (not reported separately)	20	20	20	20	20

In 2022, Company A purchased Company C from Company B. In 2022, when the acquisition occurred, Company A determined the impact of the acquisition of Company C met the significance threshold included within its base year recalculation policy. Therefore, Company A recalculated the base year and decided to optionally recalculate the prior years presented to make sure the presentation was consistent over time. Company B reached the same conclusion. The reports issued for 2022 presented the following information:

GHG emissions (metric tons of $C0_2e$)	**2018**	**2019**	**2020**	**2021**	**2022**
Company A (includes Company C emissions)	110	120	130	140	150
Company B (no longer includes Company C emissions)	180	185	190	195	200
Total GHG emissions	**290**	**305**	**320**	**335**	**350**

As illustrated above, Company A adjusted the base year and prior years presented for the impact of acquiring Company C and added the 20 metric tons of $C0_2e$ generated by Company C in each year presented to its total emissions. Company B also adjusted the base and prior years reported for the impact of divesting Company C and subtracted the 20 metric tons of $C0_2e$ generated by Company C in each year presented.

Recalculation of the base year provides comparability of the current year emissions data with prior years. Without this adjustment, the acquisition of Company C would result in an apparent increase in emissions for Company A in 2022, and an apparent decrease in emissions for Company B in 2022. However, the actual GHGs emitted into the atmosphere (represented by the "total GHG emissions" line item above) remained unchanged over this period.

2.7.2.2 Scenarios that do not require recalculation

Excerpt from GHG Protocol

Corporate Standard

Chapter 5

Base year emissions and any historic data are not recalculated for organic growth or decline.

Base year emissions are not recalculated if the company makes an acquisition of (or insources) operations that did not exist in its base year.

Structural changes due to "outsourcing" or "insourcing" do not trigger base year emissions recalculation if the company is reporting its indirect emissions from relevant outsourced or insourced activities.

The GHG Protocol does not require a reporting entity to recalculate base-year and prior-year (if recalculated) data when the following events or changes in circumstances occur:

- Organic growth or decline
- Acquired facilities that did not exist in the base year (or prior years if reported)
- Outsourcing or insourcing activities that only change the classification of reported emissions (i.e., insourcing and outsourcing activities that do not shift emissions outside the reporting boundary)

As discussed above, we believe the GHG Protocol's objective is for the base year and prior years (if recalculated) to be recalculated only when the actual amount of emissions in the environment has not changed over time and not adjusting the prior years would make it appear as though emissions had changed. The following events and circumstances reflect situations in which actual emissions change over time.

- The base year and prior years (if recalculated) are not recalculated to reflect the impact of organic growth (such as higher emissions due to increased use of existing facilities or increased emissions from newly constructed facilities) or an organic decline in operations (such as the closure of stores or facilities, as opposed to selling the stores, due to unfavorable economic conditions), since these changes reflect true changes in total GHG emissions over time.
- If a reporting entity acquires a facility or entity that came into existence after the base year, the base year would not be recalculated for the acquisition because there were no emissions from the facility or entity in the base year since it didn't exist yet. Instead, prior year data (if recalculated) would be recalculated from the date the acquired facility or entity came into existence. Similarly, the base year would not be recalculated for a divestment of a facility or entity that came into existence after the base year. Only the prior years (if recalculated) when the divested facility or entity was operating would be recalculated.
- If insourcing or outsourcing arrangements only change the classification of emissions among scopes that were previously reported by the reporting entity, base year and prior years (if recalculated) recalculation is not required. That is because these emissions were already reported by the reporting entity. For example, an outsourcing activity that shifts emissions between Scope 1 and Scope 3 emissions when an entity reports on all relevant Scope 3 categories does not require recalculation of the base year and prior years (if recalculated). However, we believe that a reporting entity should disclose that emissions were shifted between Scope 1 and Scope 3 due to an outsourcing arrangement to prevent the reported information from being misleading. If a separate base year is selected for each scope, the base year needs to be recalculated for any changes between scopes due to insourcing or outsourcing arrangements.

2.7.2.3 Setting a significance threshold for recalculation of the base year

Excerpt from GHG Protocol

Corporate Standard

Glossary

Significance threshold: A qualitative or quantitative criteria used to define a significant structural change. It is the responsibility of the company/ verifier to determine the "significance threshold" for considering base year emissions recalculation. In most cases the "significance threshold" depends on the use of the information, the characteristics of the company, and the features of structural changes.

The GHG Protocol requires a reporting entity to set a significance threshold for determining when base year data should be recalculated. The significance threshold is a qualitative or quantitative (or combination of both) threshold used to evaluate whether base year data should be recalculated due to changes to data, organizational boundary, operational boundary, calculation methods or any other relevant changes, including those discussed in section 2.7.2.1 above. A significance threshold policy includes an assessment of structural changes and when data from such events is incorporated or removed from the reporting entity's emissions.

How we see it

While the GHG Protocol specifies that a qualitative or quantitative significance threshold should be used for determining when base year data should be recalculated, we believe in practice a significance threshold should often include both qualitative and quantitative criteria.

The significance threshold should be used to evaluate both individual changes as well as the aggregate impact of multiple events, because the cumulative impact of multiple small changes may result in base year data no longer being comparable.

A reporting entity should disclose its significance threshold. The level of detail included within this disclosure (e.g., quantitative significance threshold, qualitative considerations) may vary based on the goals of the reporting entity, as well as the importance of the threshold to the reported information. For example, if there has been a significant number of events requiring recalculation of the base year, a more detailed disclosure of the significance threshold is likely appropriate.

The GHG Protocol does not specifically address what the significance threshold should be. However, regulatory standards may include such guidance, so reporting entities should consider whether their reports would be subject to any regulatory requirements.

2.7.2.4 Timing of recalculations

Excerpt from GHG Protocol

Corporate Standard

Chapter 5

When significant structural changes occur during the middle of the year, the base year emissions should be recalculated for the entire year, rather than only for the remainder of the reporting period after the structural change occurred.

If it is not possible to make a recalculation in the year of the structural change (e.g., due to lack of data for an acquired company), the recalculation may be carried out in the following year.

Base years, and prior years if reported, should be recalculated assuming the change occurred on the first day of the year. For example, if a structural change occurs in the middle of the year, the base year, other prior years recalculated and current year recalculations should be recalculated for the full year, rather than for the point in time the structural change occurred.

The GHG Protocol indicates that a recalculation should be made in the year of the structural change (e.g., acquisition, divestiture) if the data is available. If it is not possible to make a recalculation in the year of the structural change (e.g., due to lack of data for an acquired company), the GHG Protocol allows a one-year grace period and states that the recalculation may be carried out in the following year. We believe the reporting entity should disclose that the related recalculation was not made in the current year and why.

Depending on the emissions data availability of an acquired entity, it may take a reporting entity more than one year, as allowed by the GHG Protocol, to gather and incorporate data from structural changes into its reported metrics. Under these circumstances, a reporting entity should disclose the exclusions and boundary inconsistencies, as described in sections 2.5.1 and 6.1 of this publication. These disclosures should include the specific exclusions and justification for the exclusions, and they should clearly indicate that due to this inconsistency there may be significant excluded emissions, if applicable.

2.7.2.5 Subsequent events

The GHG Protocol does not provide guidance related to the presentation and disclosure of events that occur after the end of the reporting period but before the report is issued (i.e., subsequent events). We believe that in the absence of guidance, a reporting entity should establish and consistently apply a policy that indicates how it will report different types of subsequent events that occur after the reporting date but before the report is issued (e.g., structural changes, application of environmental attribute certificates).

2.7.3 Discovery of errors in prior years

As discussed in section 2.7.2.1 above, the GHG Protocol requires that a reporting entity recalculate base-year information for the discovery of errors that are material, either individually or in aggregate. If there is a subsequently discovered fact (i.e., a fact that, if known when the report was issued, would have resulted in different reported information) that impacts the base-year or any prior-year information, a qualitative and quantitative assessment of the materiality of the error should be performed. If the subsequently discovered fact existed as of the date of the report and has a material impact on previously reported information, it may be necessary to restate the previously reported information, and the assurance provider may need to withdraw and/or reissue their assurance report.

These considerations do not apply to other recalculation scenarios required by the GHG Protocol, such as recalculations due to acquisition or divestiture.

How we see it

An assessment of the materiality of updates to previously reported information over which assurance was provided requires judgement from both the reporting entity and the assurance provider. A reporting entity should work with its assurance provider when these situations are identified.

2.8 GHG emissions reductions

As entities make commitments to reduce their reported GHG inventory, they may implement multiple strategies, which could include reducing GHG emissions from sources within the entity's organizational boundary or acquiring and using GHG offsets to reduce their reported emissions and energy attribute certificates (EACs) to report emissions from low-emission sources, as discussed further in sections 2.8.3 and 2.8.2 below, respectively.

Different types of GHG reduction have different impacts on the calculation and reporting of a reporting entity's GHG emissions. The GHG Protocol describes different GHG reductions and provides reporting considerations and criteria.

2.8.1 GHG reductions from sources within an entity's organizational boundary

Under the GHG Protocol, projects that reduce GHG emissions from sources included in the reporting entity's organizational boundary do not need to be reported separately, unless the reduction is separated from the activity and sold or transferred as a credit or offset. In most cases, the effects of these types of internal emissions reduction projects (often called avoided emissions or avoidances) are captured as a reduction to an entity's Scope 1 emissions. Refer to section 3.3 below for discussion on calculating Scope 1 emissions.

Emissions reported as part of the GHG inventory are reported gross of any reductions that have been sold or transferred as offsets. The use of net emissions factors (i.e., emission factors that include the impact of certain offsets) is not allowed by the GHG Protocol, because the impact of offsets must be reported separately from the Scope 1, Scope 2 and Scope 3 emissions (i.e., reported gross). See our Technical Line, ***Accounting considerations for transactions and arrangements related to climate change initiatives***, for a discussion of how to account for the sale and purchase of these offsets for financial reporting purposes.

2.8.2 Energy attribute certificates (including renewable energy certificates)

EACs are tradeable certificates that are separable from the actual energy produced and evidence the type of energy produced and the related environmental attributes associated with the energy produced (e.g., the GHG emissions produced by the energy generation source). EACs are often issued (e.g., by a registry) when one megawatt-hour (MWh) of electricity is generated and delivered to the electricity grid from a renewable energy resource (e.g., solar, wind). The registry will issue the EAC and assign it a unique tracking number after verifying that the energy attributes meet the verification standard used by the specific registry. These registries can be owned and operated by regulators or independent third parties (e.g., Electricity Reliability Council of Texas (ERCOT)). Registries track the ownership of EACs as they are transferred between parties to prevent ownership disputes and ultimately make sure that only one entity can claim the related energy attributes upon retirement of the EAC.

EACs facilitate energy claims by entities that purchase power from the electric grid, since the entities often receive commingled electricity from different generation sources, with no way to trace the attributes of the specific energy received. However, the holder of an EAC can claim the attributes in the EAC (i.e., the emissions factor) for the commingled electricity it consumes from the grid.

Certain types of EACs are common to different geographical markets and include Guarantees of Origin (GOs), which are common in Europe, and renewable energy certificates (RECs), which are common in the US. EACs may be used by utilities to meet jurisdictional compliance requirements (e.g., Renewable Portfolio Standards (RPS)) or by other entities to demonstrate that they have used or supported power produced by renewable energy sources.

EACs can also be used voluntarily by entities or consumers to demonstrate that they have used or supported power produced by renewable energy sources, which may factor into their calculation of Scope 2 emissions under the market-based method. The Scope 2 market-based method to calculate GHG emissions takes into consideration an entity's energy procurement decisions (i.e., an entity can apply attributes from purchased EACs to reduce their market-based method Scope 2 emissions). Refer to Section 4.5 below for discussion of the market-based method.

EACs used voluntarily are generally purchased in a jurisdiction that is oversupplied with EACs relative to EAC demand for any compliance purposes in that market. Some entities obtain EACs by investing in projects that generate EACs, or they may purchase EACs from a third party that generates EACs or from another holder in an open market. Many entities also use power purchase agreements (PPAs) or virtual power purchase agreements (VPPAs) to obtain EACs.

EACs include information such as the location where the energy was generated (e.g., the facility), the date the facility opened (certain states require that the energy be produced by "new" generating facilities, or have limits on the age), the type of energy source they came from (e.g., wind, solar), the date of generation and the date the EAC was produced. The date of generation is important because each EAC has a "vintage." Different jurisdictions may have different rules on how long an EAC may be used (i.e., when it expires). See section 2.8.2.3 below for a discussion of the Scope 2 quality criteria, which determine whether an EAC can be used when reporting under the GHG Protocol.

2.8.2.1 RPS compliance programs

There are three main types of RPS compliance programs: supplier disclosures, supplier quotas and tax exemptions. Some RPS compliance programs require energy suppliers to disclose to consumers the energy attributes associated with the delivered energy to substantiate their own differentiated product offerings (e.g., low-carbon or renewable energy sourced products). In other RPS compliance programs, energy suppliers may be required to source a specific portion of their energy from specified renewable energy sources. In these instances, EACs are submitted to substantiate compliance with the set quota. Other times, entities may be able to redeem EACs for tax credits or reductions (e.g., a reduction of their tax obligation), depending on the applicable tax code. EACs used for RPS compliance programs can only be issued by energy generation facilities that meet the eligibility requirements of the applicable jurisdiction's RPS legislation and are used to comply with the RPS in that jurisdiction.

2.8.2.2 Incorporation of EACs into Scope 2 emissions (single certificate systems vs. multi-certificate systems)

As discussed above in section 2.8.2, under the market-based method, EACs allow a reporting entity to report Scope 2 emissions from low-emission sources. For EACs to be used to reduce Scope 2 emissions, they must meet certain quality criteria, discussed in section 2.8.2.3 below. Additionally, the reporting entity must consider whether the EAC is generated in a single certificate system or a multi-certificate system. A single certificate system only issues one EAC for each MWh of energy generated.

A multi-certificate system issues multiple certificates for each MWh generated, with each certificate conveying a separate attribute of the energy that has been generated. If a multi-certificate system is used, only the EAC that contains the attribute of the GHG emissions can be used to reduce Scope 2 emissions, as the other attributes are not relevant to GHG accounting. Additionally, only one EAC containing the GHG emissions attribute should be generated from the system, otherwise multiple entities could claim the emissions reduction, which would double-count the reduction and is not allowed under the GHG Protocol.

2.8.2.3 Quality criteria

Excerpt from GHG Protocol

Scope 2 Guidance

Chapter 7

Table 7.1 Scope 2 Quality Criteria

All contractual instruments used in the market-based method for scope 2 accounting shall:

1. Convey the direct GHG emission rate attribute associated with the unit of electricity produced.
2. Be the only instruments that carry the GHG emission rate attribute claim associated with that quantity of electricity generation.
3. Be tracked and redeemed, retired, or canceled by or on behalf of the reporting entity.
4. Be issued and redeemed as close as possible to the period of energy consumption to which the instrument is applied.
5. Be sourced from the same market in which the reporting entity's electricity-consuming operations are located and to which the instrument is applied.

In addition, utility-specific emission factors shall:

6. Be calculated based on delivered electricity, incorporating certificates sourced and retired on behalf of its customers. Electricity from renewable facilities for which the attributes have been sold off (via contracts or certificates) shall be characterized as having the GHG attributes of the residual mix in the utility or supplier-specific emission factor.

In addition, companies purchasing electricity directly from generators or consuming on-site generation shall:

7. Ensure all contractual instruments conveying emissions claims be transferred to the reporting entity only. No other instruments that convey this claim to another end user shall be issued for the contracted electricity. The electricity from the facility shall not carry the GHG emission rate claim for use by a utility, for example, for the purpose of delivery and use claims.

Finally, to use any contractual instrument in the market-based method requires that:

8. An adjusted, residual mix characterizing the GHG intensity of unclaimed or publicly shared electricity shall be made available for consumer scope 2 calculations, or its absence shall be disclosed by the reporting entity.

The Scope 2 Guidance includes Scope 2 quality criteria that all contractual instruments (including EACs) must meet to be used by a reporting entity in its market-based method Scope 2 emissions calculation. These Scope 2 quality criteria are intended to limit contractual instruments that can be used in the market-based method to those that reliably and uniquely convey GHG emission rate claims to the reporting entity. If a reporting entity includes contractual instruments that do not meet the Scope 2 quality criteria in its Scope 2 emissions under the market-based method, the reported metric is no longer calculated in accordance with the GHG Protocol and risks misleading the report users. In addition, a reporting entity should not present an adjusted total that includes those contractual instruments as a "workaround" to attempt to take credit for the lower emissions.

Further, some compliance programs or jurisdictions may require contractual instruments to meet additional quality criteria. Of the criteria established by the GHG Protocol, the first five are applicable to all contractual instruments, while criteria six through eight are specific to certain scenarios. The Scope 2 quality criteria included in the GHG Protocol are as follows:

Criteria 1 — Conveying GHG emission rate claims

The contractual instrument must include specific language documenting the ownership or ability to claim specific emissions attributes of the energy being generated. This includes the type and the amount of renewable energy claimed. The emissions factor of the energy can be conveyed either directly or implicitly.

Criteria 2 — Unique claims

The contractual instrument must be the only instrument with which the related GHG emissions attribute claim is associated. That is, no other contractual instruments can provide GHG emissions attributes for the specific energy generated. In a multi-certificate system, multiple certificates may need to be retired together to meet this quality criterion.

Criteria 3 — Retirement for claims

The contractual instrument must be tracked and then redeemed, retired or canceled by the reporting entity or on behalf of the reporting entity to reduce the reporting entity's emissions. The retirement, redemption or cancellation of contractual instruments can be tracked through a tracking system, third-party certification, contract audit, regulated trading schemes or other systems. This criterion is meant to make sure that only one reporting entity can claim the GHG emissions attributes of the energy produced, even though the contractual instrument that conveys those attributes may be held by various parties throughout its contractual life.

The GHG Protocol does not specify what is considered a retirement, redemption or cancellation of a contractual instrument, which may depend on the registry or tracking system used. Professional judgment is required to determine whether a contractual instrument has been retired for purposes of including it in the calculation of the Scope 2 market-based method. We believe that the best evidence of the retirement of a contractual instrument is a confirmation or certificate from a supplier or registry that the contractual instrument has been or will be retired by a certain date.

However, in some circumstances, immediate retirement may not be possible (e.g., when retirements can only be done at certain intervals, there is a delay in the receipt of the contractual instrument). Therefore, in these cases, we believe a reporting entity must control the contractual instrument (or be guaranteed their delivery for energy that has already been produced (e.g., have a contract that requires the supplier to deliver a specific number of EACs either through generation or purchase)) and an irrevocable decision to retire the contractual instrument must be made to apply the contractual instrument to the Scope 2 market-based method. If the instrument is subsequently not retired after the related emissions have been reported, it would be considered an error. The reporting entity would then need to assess the impact of the error on the previously reported amounts.

Criteria 4 — Vintage

The GHG Protocol indicates that a contractual instrument must include the date the related energy was generated, and that date must be "as close as possible" to the period of energy consumption to which the contractual instrument is applied. The GHG Protocol does not define "as close as possible," so professional judgment is required to determine what period meets this requirement. The GHG Protocol states that the timing should be consistent with any standards that exist in the market of the contractual instrument. Therefore, any specific vintage requirements for contractual instruments in regulatory programs or trading schemes must be followed by a reporting entity.

How we see it

One common approach in practice in the US for determining "as close as possible" is to use the requirements of the Green-e Framework for Renewable Energy Certification,[12] which requires EACs to be generated in the reporting year (i.e., the year in which the EAC is applied to the Scope 2 market-based method), six months before the reporting year or three months after the reporting year (i.e., a 21-month window). Green-e is one of the largest global clean energy certification organizations.

We believe that a reporting entity should establish a policy defining what is "as close as possible," considering any applicable regulations when developing its policy, and apply that policy consistently.

Criteria 5 — Market boundaries

The contractual instrument must be generated from the same market in which the reporting entity's energy consuming operations are located for it to be applied against a reporting entity's emissions. The GHG Protocol states that a reporting entity should follow the market boundaries the regulatory, certification or issuing body has established for trading and redeeming, retiring or canceling the contractual instrument.

The US and Canada are often considered a single market, even though it is made up of several independent electric grids, because of its broad federal laws and regulations. Similarly, the European Union is often considered a single market, even though it is made up of several countries, because it has a common set of market rules and a regional connection. Additionally, some countries may explicitly state that EACs from a certain market are allowed to be used within those countries.

Criteria 6 — Utility- or supplier-specific emission factors

If a utility- or supplier-specific emissions factor is used in the market-based method, the factor should be calculated based on actual energy delivered, and the utility or supplier should disclose whether and how EACs are used in the emissions factor calculation.

Specifically, utility- or supplier-specific emissions factors should only be used in the market-based method if:

- The utility is the utility provider for the reporting entity's site.
- The emissions factor only includes the effect of renewable energy for which the associated EACs are retired for general use and not otherwise sold (i.e., the emissions factor should not include the effect of EACs that are sold to a specific customer).
- The emissions factor includes all emissions from "electricity delivered" and not just emissions from energy generated by the utility (i.e., the emissions factor includes emissions from both energy generated by the supplier/utility and energy purchased by the supplier/utility).

A utility- or supplier-specific emissions factor may reflect EACs retired for compliance purposes, as long as those certificates convey the attributes for the public benefit and not a specific customer. A reporting entity should not calculate a supplier-specific emission factor itself.

[12] https://www.green-e.org/faq#:~:text=When%20do%20RECs%20expire%3F,the%20calendar%20year%20has%20ended.

Criteria 7 — Direct contracts or purchasing emission factors (i.e., direct contracts for electricity)

When a reporting entity purchases electricity directly from generators or consumes electricity generated onsite, it must make sure that that all contractual instruments conveying emissions claims are transferred to it and not another party. Direct contracts to purchase electricity include PPAs and VPPAs. PPAs and VPPAs often convey EACs to the customer.

However, if a direct contract or direct purchase does not convey EACs, a third party should verify that the contract and emissions claim are provided solely to the buyer. This verification makes sure that no other instrument conveys the related GHG emissions claim to another party for the electricity consumed by the buyer (i.e., avoids double counting). In addition, if the power purchased is resold, the reseller cannot claim the "use" of the emissions factors acquired through the PPA or VPPA.

Criteria 8 — Residual mix emissions factor

A residual mix emissions factor represents the grid average emissions factor after all claimed renewable energy on the grid has been removed. That is, a residual mix emissions factor is the result of removing the effects of EACs retired by customers and other claims to lower emissions energy sources (e.g., through direct contracts or purchases) from the average emissions factor for the specific market.

To present emissions using the market-based method, a reporting entity must use a reliable residual mix emissions factor, when it is available, for any electricity for which EACs or other claims to emissions attributes have not been applied. The use of a residual mix emissions factor results in only one entity taking credit for the EAC or other claim to the emissions attribute under the market-based method (i.e., entities that don't retire the EAC can't take the benefit for the renewable energy through a lower average emissions factor for the market). See section 4.5.1.4 below for additional guidance related to using a residual mix in the Scope 2 market-based method.

2.8.2.4 Quality criteria for purchases of steam, heat and cooling

Excerpt from GHG Protocol

Scope 2 Guidance

Appendix A

The scope 2 accounting concepts, methods, and examples referenced in this guidance are drawn primarily from, and apply primarily to, electricity purchasing and use. However, steam, heat, and cooling energy systems may also use contractual instruments to convey attributes and claims. For instance, companies may have contracts to receive heat or steam from providers that specify the fuel source and emission rate associated with their received energy. In addition, "green heat" certificates generated from biogenic fuel sources may be issued and traded independently from the energy flows and injection into the distribution grid.

Companies shall report emissions from the purchase and use of these energy products the same as for electricity: according to a location-based and market-based method, if the contractual instruments used meet the Scope 2 Quality Criteria as appropriate for gas transactions. These may be the same total where direct line transfers of energy are used.

The GHG Protocol allows reporting entities to use emissions factors based on contractual instruments (including EACs) in its market-based method Scope 2 emissions calculation of emissions from purchased steam, heat and cooling. However, these emissions factors must meet the quality criteria described in section 2.8.2.3 above.

How we see it

The markets for contractual instruments related to purchased stream, heat and cooling are often relatively immature compared to electricity markets. As such, it will likely be very challenging for reporting entities to meet the Scope 2 Quality Criteria for instruments related to purchased stream, heat and cooling.

Contractual instruments can also be created for other energy sources, such as the production of renewable natural gas or aviation fuel, that produce Scope 1 emissions. EACs for other energy sources can be disclosed separately from Scope 1 or Scope 3 information, but the emissions factor within these EACs cannot be used to calculate emissions reported under the GHG Protocol.

2.8.3 Offsets

Offsets (also referred to in the GHG Protocol as "offset credits," "GHG offsets" or "verified emission reductions") are generated through verified projects that reduce, remove or avoid GHG emissions and are used to compensate (i.e., offset) GHG emissions from elsewhere that are included in a reporting entity's inventory. Unlike EACs, offsets do not confer any claims or attributes about energy consumed, but instead represent metric tons of CO_2 reduced, removed or avoided by a qualifying project.

Under the GHG Protocol, offsets are reported separately from the reporting entity's Scope 1, Scope 2 or Scope 3 emissions inventory. That is, a reporting entity's emissions are reported gross of the impacts of any offsets. We believe a reporting entity may separately disclose a net organizational emissions metric that shows the impact of purchased offsets. We also believe a reporting entity may allocate carbon offsets to certain classifications of emissions (e.g., Scope 1, Scope 2, Scope 3).

The GHG Protocol does not include quality guidance for carbon offsets similar to the quality guidance for EACs. We believe the Scope 2 quality criteria (see section 2.8.2.3) are useful and should be considered when evaluating the quality and treatment of carbon offsets a company chooses to apply to its emissions inventory for purposes of calculating a separate metric from its reported inventory emissions.

Offsets are often purchased or acquired from external parties. Different types of offsets and how they are quantified, verified and reported are described in the sections below.

2.8.3.1 Avoidance offsets

Avoidance offsets are generated from projects that reduce or avoid emissions by preventing their release into the atmosphere. For example, activities such as limiting timber harvest levels or capturing methane emitted from landfills could be verified and generate avoidance offsets. Avoidance offsets are quantified by calculating the difference between the emissions avoided as a result of the project and a baseline scenario. The baseline scenario represents what would have happened in the absence of the project. There is inherent judgment and subjectivity involved in determining the baseline scenario because it represents a hypothetical scenario.

2.8.3.2 Removal offsets

Removal offsets are generated from projects that focus on the removal and/or storage of GHG emissions. These types of projects include afforestation (i.e., planting a forest to store greenhouse gases) or carbon capture and sequestration. Removal offsets are quantified by determining the emissions removed or stored by the project activity.

2.8.3.3 Fundamental characteristics of offsets

The GHG Protocol for Project Accounting, which is not covered in this publication, requires the project activities that generate offsets to demonstrate the concept of additionality. That is, GHG reductions should only be recognized for project activities and related GHG reductions that would not have happened otherwise. While certain project activities might reduce emissions compared to historical levels, the GHG reductions do not have additionality if the emissions reductions do not differ from what otherwise would have happened in the baseline scenario (e.g., because of regulatory requirements). The GHG Protocol for Project Accounting acknowledges there is subjectivity in demonstrating additionality in a project activity and provides the following examples of possible tests for additionality. Table 3.1 from the GHG Protocol for Project Accounting describes possible tests to determine additionality, as follows:

TABLE 3.1 Examples of possible "tests" for additionality

TEST	GENERAL DESCRIPTION OF THE TEST AS IT IS COMMONLY FORMULATED
Legal, Regulatory, or Institutional Test	The GHG project must reduce GHG emissions below the level required (or effectively required) by any official policies, regulations, guidance, or industry standards. If these reductions are not achieved, the assumption is that the only real reason for doing the project is to comply with regulations, and any claimed GHG reductions are not additional.
Technology Test	The GHG project and its associated GHG reductions are considered additional if the GHG project involves a technology that is not likely to be employed for reasons other than reducing GHG emissions. The default assumption is that for these technologies, GHG reductions are a decisive reason (if not the only reason) for implementing them. GHG projects involving other technologies could still be considered additional, but must demonstrate additionality through some other means.
Investment Test	Under the most common version of this test, a GHG project is assumed to be additional if it can be demonstrated (e.g., through the divulgence of project financial data) that it would have a low rate of return without revenue from GHG reductions. The underlying assumption is that GHG reductions must be a decisive reason for implementing a project that is not an attractive investment in the absence of any revenue associated with its GHG reductions. A GHG project with a high or competitive rate of return could still be additional, but must demonstrate additionality through some other means.
Common Practice Test	The GHG project must reduce GHG emissions below levels produced by "common practice" technologies that produce the same products and services as the GHG project. If it does not, the assumption is that GHG reductions are not a decisive reason for pursuing the project (or conversely, that the only real reason is to conform to common practice for the same reasons as other actors in the same market). Therefore, the GHG project is not considered to be additional.
Timing Test	The GHG project must have been initiated after a certain date to be considered additional. The implicit assumption is that any project started before the required date (e.g., before the start of a GHG program) could not have been motivated by GHG reductions. Under most versions of this test, though, GHG projects started after the required date must still further establish additionality through some other test.

In addition to the concept of additionality, a reporting entity should assess the risk of reversibility for GHG reductions from project activities that are reported as offsets. This risk is primarily related to project activities achieving GHG reductions through the removal or storage of GHGs (i.e., removal offsets). The Corporate Standard suggests that an entity should assess whether the project's GHG reductions might be temporary (i.e., reversed) at some point in the future whereby the GHGs are returned to the atmosphere through either intentional or unintentional actions (e.g., the harvesting of timber earlier than contemplated in the design of the project, forest fires). The risk of reversibility may be mitigated through specific actions incorporated into the design of the project activities and should be considered when verifying the offset.

2.8.3.3.1 Identification and quantification of secondary effects

Unintended changes in GHG emissions may result from projects that generate the offsets. These emissions changes are called secondary effects. If significant, the impact of secondary effects should be included in the calculation of the offset.

2.8.3.4 Verification of offsets

Offsets can be verified, certified and/or approved by an external GHG program, such as a carbon registry. Carbon registries or other external GHG programs track offset projects, verify those projects and issue offset credits for each emission reduction or removal that is verified. The purpose of these registries is to track offsets to avoid double counting and to enable entities to sell, trade and retire these offsets.

3 Scope 1 emissions

3.1 Definition

Excerpt from GHG Protocol

Corporate Standard

Chapter 4

Scope 1: Direct GHG emissions

Direct GHG emissions occur from sources that are owned or controlled by the company, for example, emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.; emissions from chemical production in owned or controlled process equipment.

Scope 1 emissions are emissions from sources owned or controlled by a reporting entity. For example, emissions from equipment, a vehicle or production processes that are owned or controlled by the reporting entity are considered Scope 1 emissions. These emissions include all direct emissions within the entity's inventory boundary. The combination of organizational and operational boundaries make up a reporting entity's inventory boundary, which is also called the reporting boundary. Refer to section 2.5 above for information on organizational boundaries and Section 2.6 above for information on operational boundaries.

The GHG Protocol is designed to avoid double counting GHG emissions. That is, two or more reporting entities should never account for the same emissions as Scope 1 emissions. For example, emissions from the generation of heat, electricity or stream that is sold to another entity are not subtracted from Scope 1 emissions but are reported as Scope 2 emissions by the entity that purchases the related energy. Theoretically, if every entity and individual throughout the world reported their GHG emissions using the same organizational boundary (e.g., equity share, financial control or operational control approach), the total of all Scope 1 emissions would equal the total GHGs emitted throughout the world.

3.2 Types of Scope 1 emissions

The GHG Protocol describes four types of Scope 1 emissions: stationary combustion, mobile combustion, process emissions and fugitive emissions. The type of emissions that are included in Scope 1 will vary based on the industry and business model of the reporting entity. For example, an office-based reporting entity that leases its facilities under operating leases may only have material Scope 1 emissions from mobile combustion because they own or operate a fleet of sales and delivery vehicles, whereas a manufacturing reporting entity may have Scope 1 emissions of all types, such as those from mobile combustion from the operation of on-site forklifts, stationary combustion from the operation of on-site dryers that are part of the manufacturing process, fugitive emissions from on-site refrigeration units and process emissions from off-gassing from the product as it goes through the manufacturing process. The GHG Protocol includes optional calculation tools for each of these emission categories.[13]

[13] https://ghgprotocol.org/calculation-tools#cross_sector_tools_id

3.2.1 Stationary combustion

Excerpt from GHG Protocol

Corporate Standard

Glossary

Stationary combustion: Burning of fuels to generate electricity, steam, heat, or power in stationary equipment such as boilers, furnaces etc.

Stationary combustion is the combustion of fuels in stationary equipment owned or controlled by the reporting entity. Stationary equipment can include boilers, furnaces, burners, turbines, heaters, incinerators, generators and engines. Stationary combustion emissions are often created as part of the process to generate heat, electricity or steam. However, emissions from the generation of purchased or acquired heat, electricity or steam consumed by the reporting entity are Scope 2 emissions. Refer to chapter 4 of this publication for discussion of Scope 2 emissions.

3.2.2 Mobile combustion

Excerpt from GHG Protocol

Corporate Standard

Glossary

Mobile combustion: Burning of fuels by transportation devices such as cars, trucks, trains, airplanes, ships etc.

Mobile combustion is the combustion of fuels in mobile equipment owned or controlled by the reporting entity. Mobile equipment can include ground vehicles, ships and planes. Mobile combustion emissions are often created during the transportation of personnel, materials, products and waste.

3.2.3 Process emissions

Excerpt from GHG Protocol

Corporate Standard

Glossary

Process emissions: Emissions generated from manufacturing processes, such as the CO_2 that is arises from the break-down of calcium carbonate ($CaCO_3$) during cement manufacture.

Process emissions are emissions created by physical or chemical processing used by a reporting entity to manufacture or refine materials. These emissions also include emissions generated by processing waste. Examples of process emissions include CO_2 emitted from manufacturing concrete and PFCs emitted from smelting aluminum.

3.2.4 Fugitive emissions

Excerpt from GHG Protocol

Corporate Standard

Glossary

Fugitive emissions: Emissions that are not physically controlled but result from the intentional or unintentional releases of GHGs. They commonly arise from the production, processing, transmission, storage and use of fuels and other chemicals, often through joints, seals, packing, gaskets, etc.

Fugitive emissions are intentional and unintentional releases of GHGs from equipment and property owned or controlled by the reporting entity. These releases include equipment leaks, such as those from air conditioners or refrigerators, as well as emissions from coal piles, pits, wastewater treatment ponds, cooling towers and gas processing facilities.

3.2.5 Biogenic emissions

Excerpt from GHG Protocol

Corporate Standard

Chapter 4

Direct CO_2 emissions from the combustion of biomass shall not be included in scope 1 but reported separately (see chapter 9).

Glossary

Biofuels: Fuel made from plant material, e.g. wood, straw and ethanol from plant matter

Appendix B

Sequestered atmospheric carbon

During photosynthesis, plants remove carbon (as CO_2) from the atmosphere and store it in plant tissue. Until this carbon is cycled back into the atmosphere, it resides in one of a number of "carbon pools." These pools include (a) above ground biomass (e.g., vegetation) in forests, farmland, and other terrestrial environments, (b) below ground biomass (e.g., roots), and (c) biomass-based products (e.g., wood products) both while in use and when stored in a landfill.

Carbon can remain in some of these pools for long periods of time, sometimes for centuries. An increase in the stock of sequestered carbon stored in these pools represents a net removal of carbon from the atmosphere; a decrease in the stock represents a net addition of carbon to the atmosphere.

Biomass contains carbon that was initially removed from the atmosphere through photosynthesis and includes wood, vegetation and roots. Biomass also includes biofuels. The GHG protocol requires a reporting entity to exclude direct CO_2 emissions generated from the combustion of biomass and biofuels from its Scope 1 emissions. However, the direct CH_4 and N_2O emissions generated by the combustion of biomass should be included in Scope 1 emissions.

3.3 Calculation of Scope 1 emissions

Excerpt from GHG Protocol

Corporate Standard

Chapter 6

Once the inventory boundary has been established, companies generally calculate GHG emissions using the following steps:

1. Identify GHG emissions sources
2. Select a GHG emissions calculation approach
3. Collect activity data and choose emission factors
4. Apply calculation tools
5. Roll-up GHG emissions data to corporate level.

The first step to calculate Scope 1 emissions is to identify all sources of Scope 1 emissions included in the categories listed in section 3.2 above within a reporting entity's inventory boundary. Once all the sources have been identified, a reporting entity needs to determine a calculation approach. There are multiple methods for calculating GHG emissions, including the following:

- Direct monitoring (i.e., measuring the concentration of GHGs and the rate of emissions from operations and processes)
- Calculating emissions based on a mass balance equation (i.e., an equation balancing the material entering and leaving a system based on the law of physics that matter cannot be created nor destroyed) or stoichiometric equation (i.e., an equation using the reactants and products in a balanced chemical equation) specific to a process or facility, often based on the inputs consumed
- Estimating the GHGs emitted using activity data and emissions factors

When determining which calculation approach to use, a reporting entity should select the most accurate calculation approach available that is consistent with the GHG Protocol's reporting objectives, which acknowledge that reporting emissions should not be prohibitively expensive. For example, many reporting entities do not have the equipment or information needed to apply the direct monitoring or mass balance/stoichiometric equation calculation approaches. Therefore, estimating GHG emissions using activity data and emissions factors is currently the most common approach used by reporting entities. However, regulators may require a reporting entity to monitor or measure emissions data for regulatory reporting purposes (e.g., the Environmental Protection Agency (EPA) may require some entities to monitor certain emissions using a direct monitoring approach). A reporting entity should consider all available emissions data when determining the correct calculation approach to use.

The formula to calculate Scope 1 emissions in metric tons of the relevant GHG (tGHG) based on activity data and emissions factors is as follows:

Activity data *Section 3.3.1* **X** **Emissions factor** *Section 3.3.2* **=** **tGHG**

However, as discussed in section 2.2 above, the GHG Protocol considers CO_2e to be the universal unit of measurement for GHGs. Therefore, the calculated metric tons of the relevant GHG needs to be converted to metric tons of CO_2e by applying the GWP of the applicable GHG, which can be simplified to the following formula to calculate Scope 1 emissions in metric tons of CO_2e (tCO_2e):

Activity data *Section 3.3.1* **X** **Emissions factor** *Section 3.3.2* **X** **GWP** *Section 2.2.1* **=** **tCO_2e** *Section 2.2*

These formulas are also used to calculate Scope 2 (section 4.3) and certain Scope 3 emissions.

3.3.1 Activity data

Activity data is the number of times that a specific activity occurs for which an emissions factor is available and can be applied. For Scope 1 emissions, activity data is often denominated in fuel consumed (e.g., gallons of gasoline, cubic feet of natural gas) or units of product produced. The activity data that a reporting entity obtains will depend on the nature of the operations of the reporting entity. For example, industrial reporting entities will likely require different or additional activity data than a reporting entity in a non-industrial sector. For example, an industrial reporting entity may need to calculate the rate of GHG emissions from a production process, which can be directly monitored.

Actual activity data, such as the amount of fugitive emissions emitted by an office building air conditioning system, may not always be available. In such cases the reporting entity should estimate the relevant activity data. If significant, the nature of these estimates should be disclosed, as discussed in section 3.4.1 below.

3.3.2 Emissions factors

Excerpt from GHG Protocol

Scope 2 Guidance

Glossary

Emission factor: A factor that converts activity data into GHG emissions data (e.g., kg CO_2e emitted per liter of fuel consumed, kg CO_2e emitted per kilometer traveled, etc.).

An emissions factor is a value that represents the quantity of a specific GHG (or CO_2e) emitted for a specific unit of activity. For example, CO_2 emissions by fuel type for specific vehicles are common emissions factors used for calculating Scope 1 mobile emissions.

Emissions factors may come from third parties or be internally developed. When using third-party emissions factors, a reporting entity should use emission factors, where possible, that are publicly available.

A reporting entity should assess all emissions factors used, whether internally developed (i.e., custom) or third-party maintained, for appropriateness and reliability. Questions to consider when making this assessment may include:

- Who issued the emissions factors? Are they a reputable organization? Do they have the appropriate expertise to issue emission factors?
- What is the underlying data for the emission factors and calculation methodology used? Is the underlying data credible and supported?
- What years do they represent? Are there any lags? How often are they updated?
- What is the boundary for the emissions factors? Are they geographical/industry-specific?
- What are the units of the emission factors? Which GWP are incorporated?
- Is the nature of the emission factor appropriate given the activity data being used (e.g., fuels can have both stationary and mobile combustion emission factors, so the correct factor should be selected)?
- Are there any adjustments made to the emissions factors (e.g., radiative forcing, well-to-tank, lower heating value vs. higher heating value)?

Not all of the considerations above are relevant for each type of emission factor. If a company chooses to use internally developed emissions factors, additional effort will be necessary to assess the appropriateness of using such factors.

A reporting entity should pay particular attention to the units of measure for third-party emissions factors. For example, emissions factors may be presented in a different measurement of the activity than the underlying data (e.g., gallons vs. liters of fuel). An understanding of the units of measure of the emissions factors and any necessary conversion is critical to calculating accurate Scope 1 emissions.

Third parties may periodically update the published emissions factors based on updated or more precise data. When multiple vintages (e.g., year the emissions factor was published) of an emissions factor are available, the GHG Protocol does not specifically require the use of the most recent emissions factor. However, the GHG Protocol requires a reporting entity to use the most appropriate, accurate and precise and highest quality emissions factor available for each calculation. We believe that when multiple vintages of emissions factors are available, a reporting entity should use the most recent emissions factor for the full period presented unless an earlier emissions factor is the most appropriate, accurate and precise and highest quality in the specific circumstances. However, if emissions factors are issued after the company has begun its emissions inventory calculation, it may not be practical for an entity to apply the newly issued emissions factors. A reporting entity should develop a policy for when it updates newly issued emissions factors. Additionally, if an emissions factor is updated during the year, we believe a single emissions factor (e.g., the new or the old based on facts and circumstance) should be used for the full year to be comply with the GHG Protocol's consistency principle (see section 1.4 above).

How we see it

Certain publicly available emissions factors include a GWP used to convert the related emissions to CO_2e. The GWP used in an emissions factor may not be based on the most recent GWP values published by the IPCC (i.e., currently, the AR6 of the IPCC, issued in April 2022). We believe a reporting entity may use emissions factors that are based on a previous version of the GWP factors published by the IPCC (i.e., the AR4 or AR5) if the difference in the reported information is not significant to the users of the sustainability information. We believe a reporting entity generally should not manually update a publicly available emissions factor for an updated GWP because that would introduce additional risk into the emissions calculation. See section 2.2.1 above for additional information on GWPs.

We believe a reporting entity should disclose the emissions factors used to provide users of the sustainability information with appropriate context related to the reported emissions. To the extent an internally developed emissions factor is used, more detailed disclosures are warranted to be consistent with the GHG Protocol's transparency principle (see section 1.4 above). A disclosure about an internally developed emissions factor may include a description of the underlying data, calculation methodologies, units, time period, boundaries, and any adjustments because this information would not otherwise be available to a user of the sustainability information as it would be for a publicly available third-party emissions factor.

3.3.3 Calculation tools

The GHG Protocol provides several calculation tools (generally spreadsheets) on their website[14] to assist reporting entities in calculating Scope 1 emissions. The use of these tools is optional and not required by the GHG Protocol. These tools are divided into three categories applicable to corporate entities:

- Cross-sector tools: Tools that can be applied regardless of the sector in which the reporting entity operates
- Sector-specific tools: Tools that are only applicable to reporting entities that operate in specific sectors
- Country-specific tools: Tools that are customized for emissions in certain developing countries (e.g., China, India)

[14] https://ghgprotocol.org/calculation-tools

Most tools use the same structure and contain guidance on how to use the tool. The guidance for each calculation tool often contains the following:

- An overview of the tool
- Information on choosing activity data and emissions factors
- A description of the various calculations methods that can be used based on the availability of activity data and emissions factors
- Guidance on inventory quality
- Guidance on documentation to support the calculations

How we see it

Given recent investor and regulatory focus on GHG inventories, reporting entities are increasingly using third-party services or purchased systems to track and calculate their GHG emissions inventory, instead of relying on spreadsheet-based calculation tools.

3.4 Disclosure of Scope 1 emissions

The Corporate Standard provides specific required and optional disclosures for Scope 1 emissions. The required disclosures have to be included in the report that includes the Scope 1 emissions metric for it to be presented in accordance with the GHG Protocol. Optional disclosures do not have to be included in the report that includes the Scope 1 emissions metric for it to be presented in accordance with the GHG Protocol. Appendix C of this publication includes a disclosure checklist with a comprehensive list of all required, recommended and optional disclosures established by the GHG Protocol.

3.4.1 Required disclosures

Excerpt from GHG Protocol

Corporate Standard

Chapter 9

Information on emissions

- Total scope 1 and 2 emissions independent of any GHG trades such as sales, purchases, transfers, or banking of allowances.
- Emissions data separately for each scope.
- Emissions data for all six GHGs separately (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6) in metric tonnes and in tonnes of CO_2 equivalent
- Emissions data for direct CO_2 emissions from biologically sequestered carbon (e.g., CO_2 from burning biomass/biofuels), reported separately from the scopes.
- Methodologies used to calculate or measure emissions, providing a reference or link to any calculation tools used.

A reporting entity is required to disclose the following information for Scope 1 emissions:

- Total Scope 1 emissions in units of CO_2e, presented gross (i.e., without the impact of any GHG sales, purchases, transfers or allowances) and separately from Scope 2 emissions
- Total Scope 1 emissions disaggregated by each of the seven GHGs separately in metric tons of each GHG and metric tons of CO_2e
- Direct CO_2 emissions from biologically sequestered carbon (disclosed separately from Scope 1 emissions)
- Methods used to calculate Scope 1 emissions, including a reference or link to any calculation tools used

When disclosing the method used to calculate Scope 1 emissions, we believe a reporting entity should reference the emissions factors used and include a description of the data sources (e.g., to the extent material, actual activity data or estimated activity data). Additionally, we believe a reporting entity should include a description of any significant assumptions used in its calculation of Scope 1 emissions. See section 6.1 below for the general required disclosures established by the GHG Protocol that are not related specifically to Scope 1 emissions.

The following example illustrates how Scope 1 emissions should be disclosed on an aggregated and disaggregated basis. This example is not a complete example of an emissions report and only presents a limited number of disclosures related to Scope 1 emissions. Scope 2 emissions and Scope 3 emissions, as well as certain general disclosure requirements, are excluded for purposes of this illustration.

Illustration 3-1: Disclosure of Scope 1 emissions

In 20X3 Company A calculated the following direct GHG emissions (i.e., Scope 1 emissions) within its reporting boundary:

- 115 metric tons of CO_2, of which 15 metric tons of CO_2 were emissions from burning biofuels (i.e., biologically sequestered carbon)
- 5 metric tons of N_2O
- 20 metric tons of CH_4

Company A prepared a report in accordance with the GHG Protocol. To convert the various greenhouse gases to CO_2e, it used the most recent 100-year GWP values published by the IPCC (at the time of this example, N_2O GWP of 273 and CH_4 GWP of 28).

Below is an excerpt of some disclosures related to Scope 1 emissions presented by Company A in its sustainability report:

Scope 1 GHG emissions by type:

	Metric tons	**Metric tons CO_2e**	***Calculation of CO_2e (not disclosed)***
CO_2	100	100	*100 mt x GWP of 1*
N_2O	5	1,365	*5 mt x GWP of 273*
CH_4	20	560	*20 mt x GWP of 28*
Total		2,025	

Fifteen metric tons of CO_2 were emitted from the burning of biofuels in the reporting period.

We estimated Scope 1 emissions using the Stationary Combustion and Transport or Mobile Combustion tools provided by the GHG Protocol. These emissions were primarily generated by our fleet of company vehicles and manufacturing equipment. Stationary combustion emissions factors were obtained from the IPCC 2006 Guidelines for National Greenhouse Gas Inventories, and mobile combustion emissions factors were obtained from the US EPA Climate Leaders (updated May 2008). The global warming potentials for each GHG are sourced from the Intergovernmental Panel on Climate Change Sixth Assessment Report, 7.SM.6 *Tables of greenhouse gas lifetimes, radiative efficiencies and metrics*. Actual activity data based on fuel usage was used in both the stationary and mobile combustion calculations.

3.4.2 Optional disclosures

Although the optional disclosures are not required by the GHG Protocol, we believe they should be made if the reporting entity determines that excluding them would make the presentation of the GHG emissions misleading.

Excerpt from GHG Protocol

Corporate Standard

Chapter 9

Information on emissions and performance

- Emissions data further subdivided, where this aids transparency, by business units/facilities, country, source types (stationary combustion, process, fugitive, etc.), and activity types (production of electricity, transportation, generation of purchased electricity that is sold to end users, etc.).
- Emissions attributable to own generation of electricity, heat, or steam that is sold or transferred to another organization (see chapter 4).
- Emissions from GHGs not covered by the Kyoto Protocol (e.g., CFCs, NOx,), reported separately from scopes.

A reporting entity has the option to disclose Scope 1 emissions data at a more disaggregated level than required above if the disaggregation increases the transparency of the information. This includes disaggregation of Scope 1 emissions data by business unit, facility, country, source type (see section 3.2 above), or activity type (e.g., transportation, generation of electricity). Other optional Scope 1 disclosures include the following:

- Scope 1 emissions from the generation of electricity, heat or steam that is sold or transferred to other entities
- Scope 1 emissions from GHGs that are not CO_2, CH_4, N_2O, HFCs, PFCs, SF_6 or NF_3 but have a GWP identified by the IPCC, separately from the emissions for the reported Scopes, along with a list of those GHGs included in the inventory

See section 6.2 below for other optional disclosures included in the GHG Protocol that are not specifically related to Scope 1 emissions.

3.5 Scope 1 reporting requirements from the SEC proposal, California climate laws, ESRS and ISSB standards

Under the SEC proposal, a reporting entity would disclose gross Scope 1 emissions in metric tons of CO_2e, both in the aggregate for Scope 1 and for each of the seven GHGs within Scope 1. Disclosure of Scope 1 emissions would be required regardless of materiality. The impact of purchased or generated offsets would be excluded from these calculations and separately disclosed. A registrant would also be required to disclose GHG intensity metrics for each scope in terms of metric tons of CO_2e per unit of total revenue and per unit of production for that entity's industry.

The California Climate Corporate Data Accountability Act (SB-253) requires reporting entities that had more than $1 billion in annual revenue in the previous fiscal year and do business in California to annually disclose their Scope 1 emissions in accordance with the GHG Protocol. These disclosures should be made in metric tons of CO_2e, both in the aggregate for Scope 1 and for each of the seven GHGs for Scope 1. The California Greenhouse gases: climate-related financial risk law (SB-261) requires reporting entities with more than $500 million in annual revenue in the previous fiscal year that do business in California to biennially disclose climate-related information in accordance with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD), which include reporting Scope 1 emissions.

The ESRS requires an entity to separately disclose aggregate Scope 1 emissions in metric tons of CO_2e, if material, with the impact of purchased or generated offsets excluded and separately disclosed. An entity is permitted to disaggregate those emissions, including by the seven GHGs or by country, but disaggregation is not required. The ESRS requires additional disclosures, including the percentage of Scope 1 GHG emissions under regulated emissions trading schemes.

The ISSB standards require a reporting entity to disclose aggregate Scope 1 emissions in metric tons of CO_2e, but a reporting entity wouldn't be required to report emissions for each of the seven GHGs. The impact of purchased or generated offsets would be excluded from these calculations and separately disclosed. Scope 1 emissions are only required to be disclosed if material. Disclosure of intensity metrics is not required.

4 Scope 2 emissions

4.1 Definition

Excerpt from GHG Protocol

Scope 2 Guidance

Glossary

Scope 2 emissions Indirect emissions from the generation of purchased or acquired electricity, steam, heat or cooling consumed by the reporting company.

Scope 2 emissions are considered indirect emissions because an entity outside of the reporting entity's organizational boundary (e.g., a power-generating facility owned by a third-party energy company) generates the emissions from the production of the electricity, steam, heat or cooling that is consumed by the reporting entity. That is, GHG emissions are a consequence of the activities of the reporting entity having consumed electricity, steam, heat or cooling produced by a third party.

Purchased electricity is often the largest source of Scope 2 emissions for a reporting entity because it is regularly consumed as part of the reporting entity's operations (e.g., used to operate certain machinery and equipment, lights, heating and cooling systems). Steam is another widely used energy source for industrial processes and is primarily used for mechanical work and heating. Heat is used to heat water or specific equipment in a production process, and heat and cooling provided by third parties may be used in commercial or industrial buildings to control interior temperatures.

Only electricity, steam, heat and cooling purchased or acquired from a third party are included in a reporting entity's Scope 2 emissions. In contrast, emissions from the fuel used to produce electricity, steam, heat and cooling that is generated directly by the reporting entity (e.g., through an onsite power plant, boiler, furnace, air conditioning unit) is included in its Scope 1 emissions.

The term "electricity" is used throughout the GHG Protocol and in this publication to represent all acquired or purchased energy (i.e., electricity, steam, heat and cooling) from parties outside the reporting entity's organizational boundary.

The GHG Protocol includes two methods for calculating Scope 2 emissions: the location-based method (LBM) and the market-based method (MBM). The objective of these two methods is to allocate the emissions from electricity generation to the end consumer (i.e., an end user's Scope 2 emissions within a reporting period). The LBM reflects the average emissions of the geographical location where the electricity was purchased or acquired, while the MBM provides the opportunity to reflect emissions from the energy procurement decisions and actions taken by the end consumer. See below sections 4.3.1 for guidance on when to use these methods, 4.4 for guidance on the LBM and 4.5 for guidance on the MBM.

4.2 Sources of electricity

Generated electricity is either distributed to end consumers through direct line transfer (i.e., directly from the electricity generator) or a local electricity grid. The GHG Protocol outlines different considerations for determining how emissions from generated electricity are accounted for and reported by entities involved in the generation, transfer and consumption.

A reporting entity needs to consider its organizational boundary when determining the appropriate reporting of emissions from electricity. A reporting entity would include any emissions from owned or controlled assets within its organizational boundary that generate electricity as Scope 1 emissions. Any emissions from electricity consumed by the reporting entity that is generated outside the organizational boundary are included as Scope 2 emissions. See section 2.5 above for guidance on determining whether an asset is within the reporting entity's organizational boundary.

4.2.1 Purchased or acquired electricity from direct line transfer

An energy producer may generate electricity and transfer it directly and exclusively to a single entity that consumes it as part of its operations. This is known as a direct line transfer. The Scope 2 Guidance provides the following examples of direct line transfers from third parties:

Excerpt from GHG Protocol

Scope 2 Guidance

Chapter 5

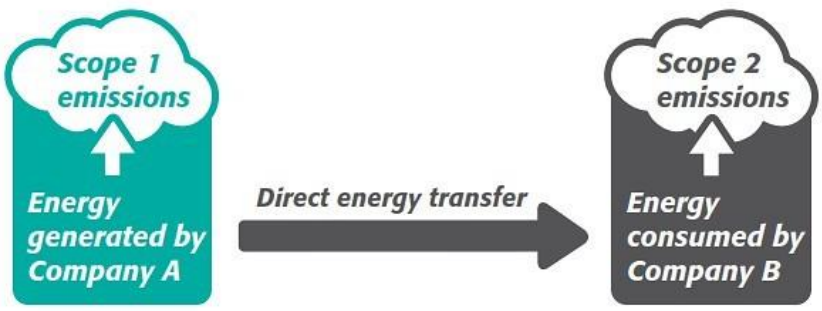
In this example, energy production is fed directly and exclusively to a single entity—here, Company B. This applies to several types of direct line transfers, including:

- An industrial park or collection of facilities, where one facility creates electricity, heat, steam, or cooling and transfers it directly to a facility owned or operated by a different party.
- For energy produced by equipment installed on-site (e.g. on-site solar array or a fuel cell using natural gas) that is owned and operated by a third party.
- For electricity, heat, steam, or cooling produced within a multi-tenant leased building (by a central boiler, or on-site solar) and sold to individual tenants who do not own or operate the building or the equipment. Tenants may pay for this energy as part of a lump rental cost and the tenant may not receive a separate bill.

In any of these scenarios:

- The company with operational or financial control of the energy generation facility would report these emissions in their scope 1, following the operational control approach, while the consumer of the energy reports the emissions in scope 2. …
- If all the energy generation is purchased and consumed, then Company B's scope 2 emissions will be the same as Company A's scope 1 emissions (minus any transmission and distribution losses, though in most cases of direct transfer there will be no losses).

Figure 5.2 Direct line energy transfer



A reporting entity needs to consider its organizational boundary when determining the appropriate reporting of emissions in direct line transfers. In the examples above, the reporting entity (Company B) would include the electricity it consumes as Scope 2 emissions under the equity share, financial control or operational control approaches (see section 2.5 above for more information about these approaches) because it does not own, otherwise financially control or operationally control the electricity generation equipment/facility.

4.2.2 Purchased or acquired electricity from an electric grid

Excerpt from GHG Protocol

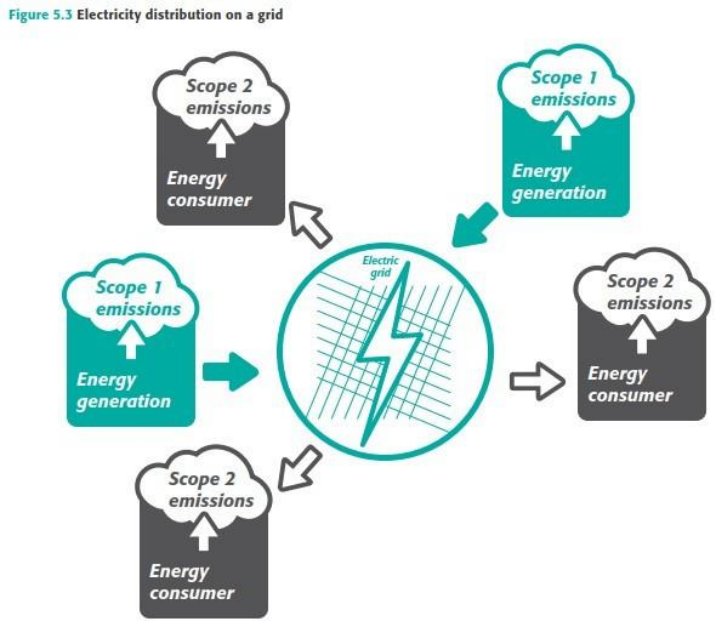
Scope 2 Guidance

Chapter 5

Most consumers purchase or acquire some or all of their electricity through the electric grid, a shared electricity distribution network. Depending on the design of the grid, there may be a small number of central generation facilities providing energy to many consumers, or there may be a large number of generation facilities representing different technology types (thermal power using coal or natural gas inputs, or wind turbines, solar photovoltaic cells, or solar thermal, etc.). ...

Because it is a shared network as opposed to a direct line, consumers may not be able to identify the specific power plant producing the energy they are using at any given time.[5] Use of specified generation on the grid can only be determined contractually. Energy on the grid moves to the nearest point it can be used, and multiple regions can exchange power depending on the capacity and needs of these regions. Steam, heat, and cooling can also be delivered through a grid, often called a district energy system. Such systems provide energy to multiple consumers, though they often have only one generation facility and serve a more limited geographic area than electricity grids.

Figure 5.3 Electricity distribution on a grid



[5] In rare situations, such as islands with a single, small grid, it may be possible to determine which power station was operating and providing power to the grid users.

A reporting entity often acquires some or all its electricity from an electric grid owned and operated by a third party. An electric grid is a shared electricity distribution network where electricity moves to the closest point it can be consumed. The design of an electric grid can vary, and the grid is often supplied by different sources of electricity generation (e.g., wind, solar, natural gas, coal, nuclear, hydro). Different sources of electricity generation emit different amounts of emissions. Because an electric grid is a shared distribution network, the end consumer is generally unable to identify the emissions associated with the specific electricity it acquires and consumes. Emission factors for different electric grids are often used by a reporting entity to calculate its scope 2 emissions. See section 4.3 below for further discussion of calculation methods for Scope 2 emissions.

4.2.3 Distributed electricity generation (electricity consumed from on-site production and the grid)

Excerpt from GHG Protocol

Scope 2 Guidance

Chapter 5

Some companies own, operate, or host energy generation sources such as solar panels or fuel cells on the premises of their building or in close proximity to where the energy is consumed. This arrangement is often termed "distributed generation" or "on-site" consumption, as it consists of generation units across decentralized locations (often on the site where the energy output will be consumed, as opposed to utility-scale centralized power plants). The company may consume some or all of the energy output from these generation facilities; sell excess energy output back to the grid; and purchase additional grid power to cover any remaining energy demand.

The owners/operator of a distributed generation facility may therefore have both scope 1 emissions from energy generation, as well as scope 2 emissions from any energy purchased from the grid, or consumed from on-site generation where attributes (e.g., certificates) are sold.

Activity data. Determining the underlying activity data (in MWh or kWh) in these systems may be challenging given the flux of electricity coming in or flowing out. Many markets utilize "net metering" for these systems, which allows grid purchases to be measured only as net of any energy exported to the grid. This net number may also be the basis for how costs are assessed.

For accurate scope 2 GHG accounting, companies shall use the total—or gross—electricity purchases from the grid rather than grid purchases "net" of generation for the scope 2 calculation. A company's total energy consumption would therefore include self-generated energy (any emissions reflected in scope 1) and total electricity purchased from the grid (electricity). It would exclude generation sold back to the grid.

If a company cannot distinguish between its gross and net grid purchases, it should state and justify this in the inventory.

In addition to using electricity from the grid, a reporting entity may generate electricity on-site from equipment within its reporting boundary, such as solar panels, propane combustion in a generator or wind turbines. This electricity is often consumed on-site by the reporting entity with any excess electricity sold to the grid. However, it is difficult to accurately measure the quantity of electricity sold to the grid in these scenarios due to the fluctuation in the level of electricity coming out of or going into the grid.

In these scenarios, the GHG Protocol requires a reporting entity to include the gross amount of electricity purchased from the grid as the basis for Scope 2 emissions (i.e., any electricity generated on-site and sold back to the grid is not subtracted from the amount purchased from the grid, so it is excluded from the Scope 2 activity data). The emissions from self-generated electricity consumed by the reporting

entity and from self-generated electricity sold to the grid are reported as Scope 1 emissions because they are directly generated emissions. The emissions from electricity purchased from the grid are reported as Scope 2 emissions because the reporting entity is indirectly responsible for them.

In some cases, the gross amount of electricity purchased from the grid may not be distinguishable because the utility provider only reports the net electricity purchased from the grid. When a reporting entity cannot distinguish between its gross and net grid purchases, it is required to disclose that fact and justify why gross reporting of electricity consumed from the grid is not possible.

Illustration 4-1: Distributed electricity

Company A has corporate offices with solar panels, which are owned by Company A, installed on the roof. Company A uses the electricity generated by these solar panels in addition to drawing electricity from the grid. Additionally, at times Company A sells electricity generated by the solar panels to the grid.

In 20X3, Company A's electricity generation and usage and related emissions (only including CO_2 for simplicity) are as follows:

	kWh	CO_2 emissions factor (lbs/kWh)	Metric ton/lbs	CO_2 output (metric ton)
Electricity generated by solar and used on-site (Scope 1)	60,000	0.0	1/2,204.6	0.0
Electricity generated by solar and sold to grid (Scope 1)	10,000	0.0	1/2,204.6	0.0
Electricity purchased from grid (Scope 2)	250,000	1.23	1/2,204.6	139.5
Total				139.5

On a net basis, Company A purchased 240,000 more kWh from the grid than it sold to the grid. However, the GHG Protocol requires Company A to report on the gross electricity consumed. Therefore, the CO_2 emissions generated by Company A related to the electricity generated and consumed (both from on-site production and from the grid) for its corporate office are as follows:

Scope 1	0.0
Scope 2	139.5
Total	139.5

4.2.4 On-site renewable electricity when EACs are sold

Excerpt from GHG Protocol

Scope 2 Guidance

Chapter 6

The creation of a certificate that conveys an energy generation attribute claim means that the underlying power—sometimes called "null power"—can no longer be considered to contain the energy attributes, including the type of energy (e.g., that it is "renewable") and its GHG emission rate (that it is zero emissions/MWh). By the conveyance of energy attributes or certificates to a third party separate from the electricity, users of the null power electricity cannot claim to be buying or using renewable energy in the absence of owning the certificate. Instead, companies consuming energy from owned/operated facilities or direct-line transfers where certificates are sold off, shall calculate that consumption using other market-based method emission factors such as "replacement" certificates, a supplier-specific emission rate, or residual mix (for the market-based method total) and the grid average emission factor (for the location-based total).

6.4.1 How certificate sales affect on-site energy consumption in the location-based method

Companies who are consuming energy directly from a generation facility that has sold certificates (either owned/operated equipment or a direct line) forfeit not only the right to claim those emissions in the market-based method (requiring the use of some other market-based data source such as other "replacement" certificates, a supplier-specific emission factor, or residual mix) but also the right to claim that emissions profile in the location-based method. Overall, the location-based method is designed to show emissions from the production supporting the local consumption without reference to any contractual relationships. However, the attributes contained in certificates usually carry legally enforceable claims, which should take precedence.

A reporting entity may have on-site renewable energy at facilities (e.g., solar panels, a wind turbine) within its reporting boundary. Close physical proximity or even connection of the renewable energy installation to the reporting entity's operations does not necessarily entitle the reporting entity to the right to claim the related emissions attributes of the renewable energy installation.

As discussed in section 2.8.2.3 below, under quality criteria 7, the ability of the reporting entity to claim the emissions attributes depends on whether the entity that owns or controls (depending on the consolidation approach selected) the facility receives and retains EACs for the renewable energy generated, transfers them to the reporting entity or transfers them to a third party. For example, if EACs are generated for on-site renewable energy and the reporting entity transfers those EACs to a third party, the reporting entity cannot claim the emissions attributes of the renewable energy because it does not hold the EACs through their retirement.

Emissions from owned/controlled facilities are generally included as Scope 1 emissions. However, reporting emissions from energy generated from owned/controlled facilities as Scope 2 emissions (under both the LBM and MBM) when the EACs are transferred to a third party is required because the contractual instrument does not change the fact that energy is physically consumed; the contractual instrument only affects the emissions reported for that energy. See sections 4.4.2 and 4.5.2 below for more details of how reporting entities treat energy related to contractual instruments sold using the LBM and MBM, respectively.

Illustration 4-2: Distributed electricity

Company A has corporate offices with solar panels, which are owned by Company A, installed on the roof. Company A uses the electricity generated by these solar panels, in addition to drawing electricity from the grid. Additionally, at times Company A sells electricity generated by the solar panels to the grid. Company A sells the EACs for the electricity generated by the solar panels to Company B.

Since Company A sells the EACs related to the solar panels, it has sold the right to claim the renewable energy attributes of the solar electricity and cannot claim those attributes, including the 0 mtCO2e/kWh emission factor. Instead, it must use the most appropriate, accurate, precise and highest quality emissions factor available for that electricity under either the LBM or MBM (see section 4.4.1 and 4.5.1 below, respectively) for the amount of power generated by the solar panels.

In 20X3, Company A's electricity generation and usage and related emissions, using the grid average emissions factor for the electricity from the solar panels (only including CO_2 for simplicity), are as follows:

	kWh	CO_2 emissions factor (lbs/kWh)	Metric ton/lbs	CO_2 output (metric ton)
Electricity generated by solar and used on-site (Scope 2)	60,000	1.23	1/2,204.6	33.5
Electricity generated by solar and sold to grid (Scope 1)	10,000	0.0	1/2,204.6	0.0
Electricity purchased from grid (Scope 2)	250,000	1.23	1/2,204.6	139.5
Total				173.0

The emissions related to the electricity generated by solar and used onsite is reported as Scope 2 emissions, even though it was generated by the reporting entity, because the related emissions attributes were sold. Therefore, the energy consumed is assumed to have come from the grid, as Company A can no longer benefit from the EACs that were sold. The electricity generated by solar and sold to the grid has an emissions factor of zero because it did not generate any emissions and is reported as Scope 1 emissions.

Scope 1	0.0
Scope 2	173.0
Total	173.0

4.2.5 Considerations for transmission and distribution of electricity

There are special considerations for determining Scope 2 emissions for electric utility reporting entities that transmit and/or distribute electricity generated by third parties, such as electricity transmission and distribution companies. For example, an electric utility company's operations may include reselling electricity initially acquired from third-party electric power generators to the local grid or reselling electricity acquired from the grid to end consumers through an owned and operated transmission and distribution (T&D) system. A T&D system generally includes power lines, transformers and electrical substations used to deliver energy to customers.

A portion of electricity is lost during the T&D process due to the inefficiency of power lines as they transmit electricity. These losses are called T&D losses (or referred to as "line losses"). Consistent with the Scope 2 definition, an electric utility company transmitting and distributing electricity acquired or generated from third parties accounts for the emissions from the energy lost during the T&D process (i.e., the T&D losses) as Scope 2 emissions if the T&D system is within the reporting entity's inventory boundary.

An integrated electric utility company that generates its own electricity and transports and distributes that electricity in the same grid or uses a direct transfer arrangement already includes the emissions from all electricity it generated (i.e., both the electricity consumed by the end consumer and the electricity lost during the T&D process) as Scope 1 emissions. Therefore, no additional emissions for T&D losses are reported.

The end consumer only includes the emissions from the electricity it consumes (i.e., the energy it purchases or acquires) as Scope 2 emissions. It does not report the emissions from T&D losses as Scope 2 emissions because it generally does not own or control the T&D system. Instead, the end consumer reports emissions from T&D losses as Category 3, *Fuel- and energy-related activities*, Scope 3 emissions.

How we see it

An integrated utility company that transmits and distributes electricity generated within its reporting boundary, as well as transmits and distributes electricity acquired from third parties, may not know the amount of T&D losses attributable to electricity generated within its reporting boundary (i.e., emissions already included in its Scope 1 emissions) compared with the amount of T&D losses attributable to the acquired electricity (i.e., emissions that should be included in Scope 2 emissions). If this information is not available, the reporting entity may need to allocate the T&D losses between the electricity generated and the electricity acquired for purposes of reporting Scope 1 and Scope 2 emissions. If the impact of this estimate is material to the reported amounts, the estimation method should be disclosed.

4.3 Calculating Scope 2 emissions

Excerpt from GHG Protocol

Scope 2 Guidance

Chapter 6

Once the inventory boundary has been established, companies generally calculate GHG emissions using the following steps:

- Identify GHG emission sources for scope 2 emissions
- Determine whether the market-based approach applies
- Collect activity data and choose emission factors for each method
- Calculate emissions
- Roll up GHG emissions data to corporate level.

A reporting entity needs to consider its organizational boundary (i.e., equity share approach, financial control approach and operational control approach) and operational boundary before identifying emissions sources and categorizing them as Scope 1, Scope 2 or Scope 3 emissions. Refer to above sections 2.5 for information on organizational boundaries and 2.6 for information on operational boundaries.

After identifying its organizational and operational boundaries, a reporting entity generally uses the following steps to calculate its Scope 2 emissions:

- Identify emissions sources (e.g., operations, assets, processes) within its boundaries that consume purchased or acquired electricity
- Determine whether MBM instruments are available and, therefore, that the MBM method applies (e.g., whether there are contractual instruments related to purchased electricity)
- Collect activity data and identify and apply appropriate emissions factors for both the location-based method and the market-based method
- Calculate emissions
- Compile the Scope 2 emissions data at the reporting entity level

4.3.1 Applicability of the market-based method

Excerpt from GHG Protocol

Scope 2 Guidance

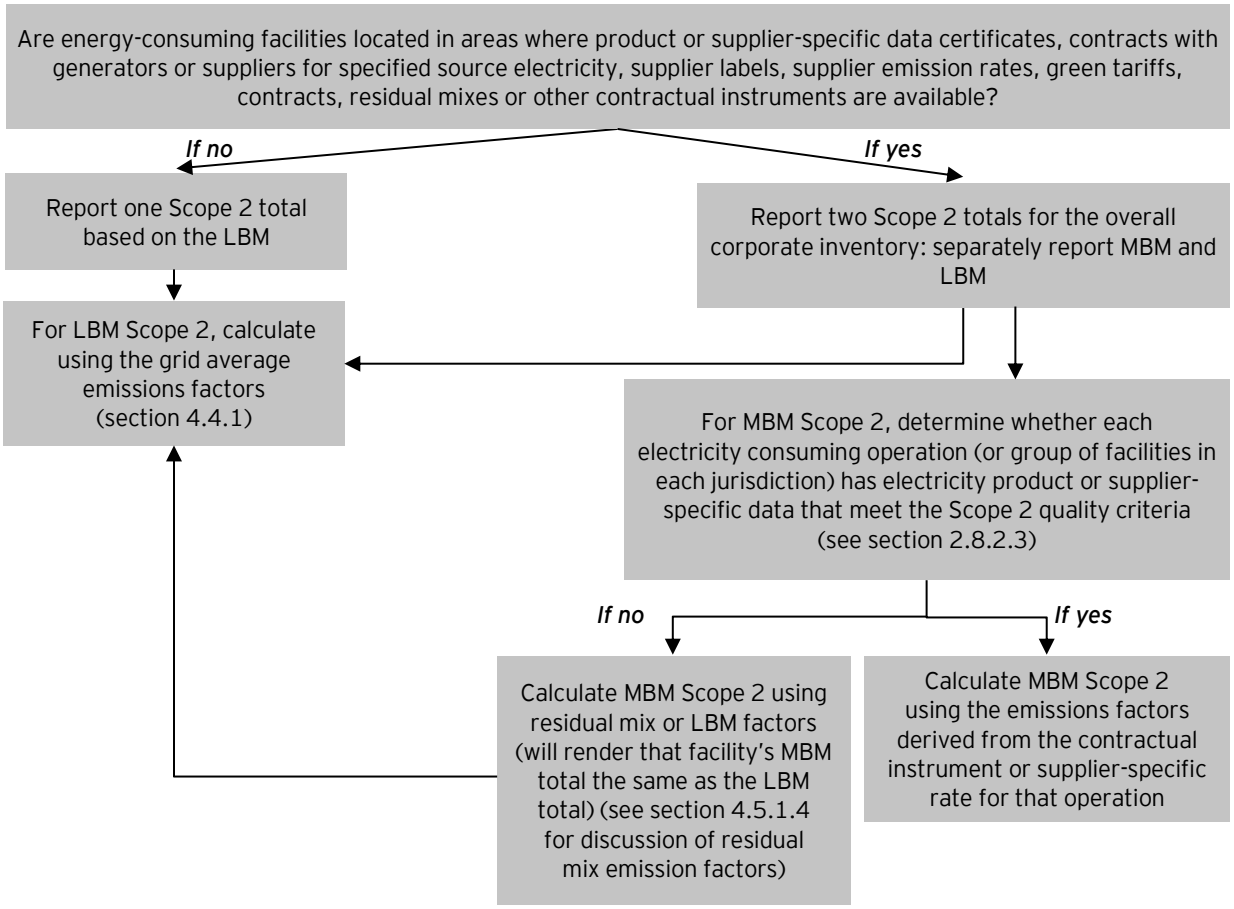
Chapter 6

The presence of contractual information in any market where a company has operations triggers the requirement to report according to the market-based method. …

If no facilities in the entire organizational boundary of the reporting entity are located in markets with contractual claims systems, or where no instruments within those systems meet Scope 2 Quality Criteria required by this document, then only the location-based method shall be used to calculate scope 2.

The GHG Protocol requires all reporting entities with electricity consumption to report under both the LBM and MBM (i.e., dual reporting) if any market where an entity has operations has differentiated energy products in the form of contractual instruments (e.g., renewable energy certificates, energy attribute certificates, supplier-specific contracts) that meet the Scope 2 quality criteria discussed in section 2.8.2.3 above. See section 2.8 of this publication for additional information about contractual instruments.

A reporting entity should use only the LBM if it does not have any facilities or operations in its entire organizational boundary that operate in markets with differentiated energy products in the form of contractual instruments that meet the Scope 2 quality criteria. The following flowchart, which is based on Figure 6.1 from the Scope 2 Guidance, shows the decision process a reporting entity should follow to determine whether the use of both the LBM and MBM is required. The sections referenced in the following flowchart are located in this publication.



How we see it

Examples of markets that currently have differentiated energy products in the form of contractual instruments include the US, EU Member States, European Economic Area, Australia, most Latin American countries, Japan and India. We believe that many reporting entities will be required to report emissions using both methods.

As highlighted in the flowchart above, when a reporting entity has operations in multiple markets and only a portion of the markets have differentiated energy products, the reporting entity is still required to report its entire Scope 2 emissions using the MBM and LBM. In those cases, the reporting entity is required to use the LBM amount in its MBM calculation for the portion of the markets that does not have differentiated energy products.

Each unit of electricity should correspond to an emissions factor that is appropriate based on the location or market where that electricity is consumed. For example, a reporting entity applying the MBM that purchases certificates for 60% of its electricity consumption has to identify and apply emission factors for the remaining 40% of the electricity using the hierarchy described in section 4.5.1 below. That is, it is not appropriate to use the purchased emission factor included in the certificate for more than 60% of the electricity used.

Similar to Scope 1 emissions, the general calculation formula for Scope 2 emissions (using both the MBM and LBM) is:

Activity data *Section 4.3.2*	**X**	**Emissions factor** *Section 4.4.1* *Section 4.5.1*	**=**	**tGHG**

The use of the LBM or MBM determines which emission factor is used. See below sections 4.4 for more information on selecting emissions factors using the LBM and 4.5 for more information on selecting emissions factors using the MBM.

4.3.2 Activity data

Excerpt from GHG Protocol

Scope 2 Guidance

Chapter 6

For scope 2 calculation, activity data includes all energy purchased/acquired and consumed from an entity outside of the organization or from owned/operated generation facilities where energy attributes (e.g. certificates) have been sold or transferred.

To determine activity data, metered electricity consumption or utility bills specifying consumption in MWh or kWh units can provide the most precise activity data. In some cases these may not be available, as with consumption occurring in a shared space without energy metering. In these cases, estimations may be used such as allocating an entire building's electricity usage to all tenants on the basis of the reporter's square footage and the building's occupancy rate (called the Area method).

The activity data used to calculate Scope 2 emissions is often provided to the reporting entity by the utility provider or through metered energy consumption at facilities within the reporting entity's reporting boundary. This data is often in the form of a measure of watt hours of electricity used (e.g., megawatt hours (MWh), kilowatt hours (KWh)) but can take other forms depending on the type of energy (electricity, steam, heat or cooling) purchased from a third party. Precise activity data may not always be available. In such cases, a reporting entity needs to estimate its activity data.

4.3.2.1 Scope 2 emissions from leased assets

See section 2.5.5.1 above for a discussion of emissions related to electricity, steam, heat or cooling used by or at leased assets. The section notes that the emissions reporting depends on the chosen organizational boundary as well as other factors.

4.4 Location-based method

The LBM reflects the average emissions factors of the electricity grids on which a reporting entity consumes electricity. The LBM is required to be used by all reporting entities. A reporting entity's electricity procurement decisions (e.g., a decision to purchase electricity generated from renewable sources) are not factored into the LBM calculation of Scope 2 emissions. Therefore, this method can be applied in all locations and provides information on emissions from the overall mix of generation sources used in the grid. The LBM results in Scope 2 emissions from a reporting entity's activities in the respective region that are consistent with the Scope 2 emissions from other entities' activities in the same region. This provides better comparability among entities based on the location of their activities.

Under the LBM, a reporting entity uses an emissions factor that represents the average emissions from energy generation within a defined geographical area (e.g., local, subnational or national level) during a defined time period, which is often 12 months (i.e., the grid average emissions factor). Supplier-specific emissions factors should not be used under this method. Additionally, these emissions factors do not reflect the impact of contractual instruments.

The example below, which is based on Table 6.6 in the Scope 2 Guidance, illustrates how a grid average emissions factor is calculated.

Illustration 4-2: Grid average emissions factor calculation

Three energy generation facilities operate in a subnational geographical area. The grid average emissions factor for this subnational geographical area is calculated as follows:

Energy facility type	Emissions from generation	Total generation in MWh
Coal facility A	50,000 metric tons CO_2e	55,000
Natural gas facility B	10,000 metric tons CO_2e	30,000
Wind farm facility C	0 metric tons CO_2e	15,000
Total within boundary	**60,000 metric tons CO_2e**	**100,000**
Total grid average	**60,000 metric tons CO_2e / 100,000 MWh**	**0.6 metric tons CO_2e /MWh**

The grid average emission factor is 0.6 metric tons CO_2e /MWh.

4.4.1 LBM emissions factor hierarchy

Excerpt from GHG Protocol

Scope 2 Guidance

Chapter 5

Companies should use the most appropriate, accurate, precise, and highest quality emission factors available for each method.

The average emissions factor for electricity under the LBM should characterize all the GHG emissions associated with the electricity generation from facilities located within a specific geographical boundary.

The GHG Protocol includes a hierarchy for determining the most appropriate emissions factors to use under the LBM. The following chart, based on Table 6.2 in the Scope 2 Guidance, presents this hierarchy:

Emissions factors	Example	Level of precision
Regional or subnational grid average emission factors	Emissions & Generation Resource Integrated Database (eGRID) total output emission rates	Higher ↕ Lower
National grid average emissions factors	International Energy Agency (IEA) national electricity emission factors	

The regional or subnational emissions factors represent all energy production occurring in a defined distribution region that equals or approximates a geographically precise energy distribution and use area. A region that is based on an actual distribution and use area should reflect net physical energy imports and exports.

The eGRID[15] is a comprehensive source of data published by the EPA, including the emissions characteristics of almost all electric power generated in the US. eGRID splits the US into approximately 30 subareas for purposes of reporting. This data is more precise (and, therefore, higher in the LBM emissions factor hierarchy) because it reports emissions specific to where the energy is distributed and used (i.e., a regional or subnational basis). Other countries (e.g., Canada and Australia) also publish regional emissions factors. A less precise measure (and, therefore, lower in the LBM emission factor hierarchy) would be emissions factors defined based on national borders (or other federal/state borders) rather than actual energy distribution and use areas.

In addition to determining which emissions factor best aligns with the energy distribution and use area, a reporting entity has to also consider other data quality factors, such as reliability, completeness, temporal representativeness (i.e., what year of data the emissions factor is based on compared to the reporting year) and technological representativeness in determining which emission factor is most appropriate.

Grid average emissions factors are different from marginal grid emissions factors, which represent the emissions factor for the next incremental unit of power produced (i.e., the emissions factor of the cleanest power generation facility in the boundary that still has available capacity). The GHG Protocol prohibits the use of marginal emissions factors in the LBM.

How we see it

Temporal representativeness becomes a more significant indicator of emissions factor data quality during periods of significant improvement in GHG emissions from the grid due to changing infrastructure (e.g., a significant increase in renewable power generation facilities). Judgment is required to determine which emission factor is most appropriate based on the facts and circumstances.

4.4.2 LBM emissions calculation

Under the LBM, each unit of electricity consumption should be multiplied by the emissions factor most appropriate, accurate, precise and highest quality available (as described in section 4.4.1 above) for the reporting entity's location. The following table, which is based on Table 6.1 from the Scope 2 Guidance, illustrates how Scope 2 emissions should be calculated for each source of electricity described in section 4.2 above. The sections referenced in the following table are located in this publication.

[15] https://www.epa.gov/egrid

	GHG reporting under the LBM
Energy consumed from owned/operated generation (e.g., a reporting entity owns a solar panel and consumes the energy)	
No certificates are generated or sold	No Scope 2 emissions are reported for consumption of energy from owned/controlled generation when no EACs are sold because the related emissions are reported in Scope 1.
Certificates from generation facility are retired/retained by the generation facility's owner who consumes the energy	No Scope 2 emissions are reported for consumption of energy from owned/controlled generation because the related EACs were retired by the reporting entity. A reporting entity should report the EAC retention separately.
Certificates are sold to a third party	Scope 2 emissions are reported using the most appropriate, accurate, precise and highest quality emissions factor available under the location-based emissions factor hierarchy (see section 4.4.1).
Energy consumed from a direct line (e.g., a reporting entity receives power directly from a generator, with no grid transfers)	
No certificates are generated or sold	Scope 2 emissions are reported using a specific emissions factor from the direct line source.
Certificates from generation facility are retired/retained by the energy consumer	Scope 2 emissions are reported using a specific emissions factor from the direct line source (i.e., the same emissions factor as the certificate).
Certificates are sold to a third party	Scope 2 emissions are reported using the most appropriate, accurate, precise and highest quality emissions factor available under the location-based emissions factor hierarchy (see section 4.4.1).
Energy consumed from the grid	
No certificates are generated or sold from any generation facilities on the grid	Scope 2 emissions are reported using the most appropriate, accurate, precise and highest quality emissions factor available under the location-based emissions factor hierarchy (see section 4.4.1).
Certificates are purchased from grid generation facilities or are included in a supplier-specific emissions factor	Scope 2 emissions are reported using the most appropriate, accurate, precise and highest quality emissions factor available under the location-based emissions factor hierarchy (see section 4.4.1). That is, a supplier-specific emissions factor should not be used.
Certificates from grid generation facilities are sold to third parties	Scope 2 emissions are reported using the most appropriate, accurate, precise and highest quality emissions factor available under the location-based emissions factor hierarchy (see section 4.4.1).

4.4.3 LBM treatment of emissions from biomass

Excerpt from GHG Protocol

Scope 2 Guidance

Chapter 6

Biogenic materials—including biomass, biofuels, and biogas—are increasingly used as a resource for energy generation on-site and on the grid. While biomass can produce fewer GHG emissions than fossil fuels and may be grown and used on a shorter time horizon, it still produces GHG emissions and should not be treated with a "zero" emission factor. Based on the Corporate Standard, any CH_4 or N_2O emissions from biogenic energy sources use shall be reported in scope 2, while the CO_2 portion of the biofuel combustion shall be reported outside the scopes. In practice, this means that any market-based method data that includes biofuels should report the CO_2 portion of the biofuel combustion separately from the scopes.

Biogenic materials (e.g., biomass, biofuel and biogas) can be used to generate energy either on-site or for the grid. While these materials typically emit less GHGs than other fuels, they still emit GHGs. The GHG protocol specifies that CH_4 or N_2O emissions from biogenic energy generation need to be included in Scope 2 emissions. However, CO_2 emissions from biogenic energy generation, if presented, are required to be presented separately from Scope 1, Scope 2 and Scope 3 emissions (see Illustration 3-1 in section 3.4.1 above for an example). Many of the common grid average emissions factors used in the LBM do not include the portion of the emissions factor related to biogenic energy generation and do not separately report CO_2 emissions from biogenic energy generation. The GHG Protocol recommends disclosing this omission if this data is not separately available.

4.5 Market-based method

The MBM represents the emissions associated with the choices a reporting entity makes when acquiring electricity. Scope 2 emissions under the MBM are derived from a reporting entity's contractual relationships or instruments. For example, if a reporting entity chooses a specific energy generation supplier or enters into a supply agreement for electricity from a regional wind farm, it would use the emissions factors resulting from these contracts in its Scope 2 emissions calculation under the MBM. Unlike the LBM, the MBM provides information about the decisions a reporting entity has made to reduce emissions from its consumption of electricity.

Contractual instruments include direct contracts with a supplier (e.g., PPAs, VPPAs) and bundled or unbundled attribute claims (e.g., renewable energy certificates, energy attribute certificates, guarantees of origin, supplier-specific emission rates, residual mix factors). See section 2.8 of this publication for further discussion of contractual instruments. Contractual instruments have to meet the quality criteria in the Scope 2 Guidance to be included in the calculation of Scope 2 emissions under the MBM. See section 2.8.2.3 above for further discussion of the Scope 2 quality criteria.

4.5.1 MBM emissions factor hierarchy

Excerpt from GHG Protocol

Scope 2 Guidance

Chapter 5

Companies should use the most appropriate, accurate, precise, and highest quality emission factors available for each method.

A reporting entity may have access to multiple MBM emissions factors for each of its energy-consuming operations. In this case, it should use the most appropriate, accurate, precise and highest quality emissions factor available. Determining which emission factor to use requires judgment based on facts and circumstances.

The GHG Protocol includes a hierarchy for determining which emissions factor is the most appropriate, accurate, precise and highest quality emissions factor. This hierarchy indicates that a reporting entity should first use an emissions factor derived from contractual instruments that meet the Scope 2 quality criteria (and indicates the hierarchy of contractual instruments as well).

When a reporting entity does not have contractual instruments for a given market or the contractual instruments do not meet the quality criteria in the Scope 2 Guidance, subnational or national residual mix factors are then used, if available. Residual mix factors represent the emissions that remain from the generation of electricity across the grid after the impact of claimed contractual instruments has been removed. When residual mix factors are not available, other grid average emission factors are used instead, such as those used under the LBM.

The following chart, based on Table 6.3 in the Scope 2 Guidance, presents this hierarchy:

Emissions factors	Example	Level of precision
EACs	Renewable energy credits	Higher  Lower
Factors from contracts for electricity where EACs do not exist or are not required for a usage claim	PPAs or VPPAs	
Supplier/utility specific emission rates	Emission rate allocated and disclosed to retail electricity users, representing the entire delivered energy product (i.e., not only the supplier's owned assets)	
Residual mix (subnational or national) factors	Calculated by EU country under RE-DISS project	
Other grid average emission factors	eGRID total output emission rates	

See the following sections for specific considerations for each type of MBM emissions factor.

4.5.1.1 Energy attribute certificates

EACs are tradeable certificates that are separable from the actual energy produced and evidence the type of energy produced and the related environmental attributes associated with the energy produced (e.g., the GHG emissions produced by the energy generation source). EACs that meet the Scope 2 quality criteria established by the GHG Protocol are generally the most appropriate, accurate, precise and highest quality emissions factors to use in the MBM. See section 2.8.2 above for more details about EACs and the related quality criteria.

4.5.1.2 Factors from contracts for electricity

PPAs and VPPAs are two popular ways for a reporting entity to form agreements with a specific energy generator and gain access to emissions factors reported under the MBM. Additionally, these contracts often provide the energy supplier with a long-term revenue stream that allows them to access financing to build the renewable energy source. PPAs and VPPAs can be structured either to generate EACs or not. When an EAC is generated, it serves as the emission factor for the arrangement, since this is the most accurate emissions factor available based on the MBM emissions factory hierarchy, assuming it meets the Scope 2 quality criteria (see section 2.8.2.3). When EACs are sold to third parties (other than the power purchaser), the power purchaser cannot claim the renewable attributes of the energy generation facility.

When EACs are not generated, a PPA or VPPA can still convey the emissions factor, as long as the arrangement includes appropriate language to convey the emissions attributes to the power purchaser, and the contract meets the electricity-specific quality criterion described in section 2.8.2.3 above. That criterion requires an audit trail or other mechanism to prove that no other entity can claim the emissions factor for the energy.

4.5.1.3 Supplier/utility emission rates

Excerpt from GHG Protocol

Scope 2 Guidance

Chapter 6

When using a supplier-specific emission factor, companies should seek to ensure that:

- The emission rate is disclosed, preferably publicly, according to best available information, …

- That the utility or supplier discloses whether and how certificates are used in the emission factor calculation, unless there is third-party certification of the utility product. In particular, companies should seek to ensure that if the supplier has a differentiated product (e.g. a renewable energy product or tariff), the certificates or other contracts used for that product should be used only for that product and not counted in the standard product offer.
- That the supplier-specific emission factor includes emissions from all the energy delivered by the utility, not just the generation assets owned by the supplier (e.g. what is required by some fuel mix disclosure rules). Many suppliers purchase significant portions of their energy from other generators via contracts, or through the spot market. The emission factor should reflect the emissions from all of these purchases. A supplier-specific emission rate can also reflect certificates retired for compliance purposes (such as U.S. state RPS programs) which also convey attributes for public benefit and claims.

In some energy markets, a single supplier may provide all the energy for a given area. In other energy markets, there may be competition from a number of suppliers that interface directly with customers. Regardless of the market, an energy supplier or utility may provide emissions factors for the energy delivered to its customers. These supplier-/utility- specific emissions factors may be used in the MBM if the Scope 2 quality criteria are met (see section 2.8.2.3 above). A reporting entity should not separately calculate or estimate a supplier-/utility- specific emissions factor for Scope 2 emissions.

If a supplier purchases offsets on behalf of its customers, the customer reports these offsets separately from the Scope 1, Scope 2 and Scope 3 amounts to accurately reflect the emissions generated by the creation of the energy. See section 2.8.3 above for additional guidance on offsets, including the verification of those offsets.

4.5.1.4 Residual mix factors

Excerpt from GHG Protocol

Scope 2 Guidance

Chapter 6

To prevent double counting of GHG emission rate claims tracked through contractual instruments, the market-based method requires an emission factor that characterizes the emission rate of untracked or unclaimed energy. This emission factor creates a complete data set under the market-based method, and represents the regional emissions data that consumers should use if they operate in a market with choice for consumers, differentiated products, and supplier specific data, but did not purchase certificates or a specified product, do not have a contract with a specified source, or do not have supplier-specific information.

A residual mix emissions factor is similar to a grid average emissions factor used in the LBM, but it excludes the impact of claimed contractual instruments within the grid (i.e., the benefit of the contractual instruments is removed because they are claimed by other parties). Since contractual instruments are often based on renewable energy, the residual mix emission factor is usually higher than the grid average emission factor. Residual mix emissions factors do not exist in all markets.

The Scope 2 Guidance explicitly mentions the EU RE-DISS project as a source of residual mix emissions factors for countries in the EU. Any other residual mix emissions factors should be assessed for appropriateness, since many of these factors only remove the renewable energy certified or sold by the publishing organization (and exclude other potential EACs). See section 2.8.2.3 above for discussion of the quality criteria for residual mix emissions factors.

If a residual mix emissions factor does not exist, a reporting entity has to disclose that fact. A reporting entity should not separately calculate or estimate a residual mix emissions factor.

4.5.1.5 Other grid average emissions factors

If a residual mix emissions factor is not available, a reporting entity may use an unadjusted grid average emissions factor, such as that used in the LBM.

4.5.2 MBM emissions calculation

Under the MBM, each unit of electricity consumption should be multiplied by the most appropriate, accurate, precise and highest quality emissions factor available (as described in section 4.5.1 above) for the reporting entity's market. The following table, which is based on Table 6.1 from the Scope 2 Guidance, illustrates how Scope 2 emissions should be calculated for each source of electricity described in section 4.2 of this guidance. The sections referenced in the following table are located in this publication.

	GHG reporting under the MBM
Energy consumed from owned/operated generation (e.g., a reporting entity owns a solar panel and consumes the energy)	
No certificates are generated or sold	No Scope 2 emissions are reported for consumption of energy from owned/controlled generation when no EACs are sold because the related emissions are reported in Scope 1.
Certificates from generation facility are retired/retained by the generation facility's owner who consumes the energy	No Scope 2 emissions are reported for consumption of energy from owned/controlled generation because the related EACs were retired by the reporting entity. A reporting entity should report the EAC retention separately.
Certificates are sold to a third party	Scope 2 emissions are reported using the most appropriate, accurate, precise and highest quality emissions factor available under the market -based emissions factor hierarchy (see section 4.5.1).
Energy consumed from a direct line (e.g., a reporting entity receives power directly from a generator, with no grid transfers)	
No certificates are generated or sold	Scope 2 emissions are reported using the specific emissions factor from the direct line source.
Certificates from generation facility are retired/retained by the energy consumer	Scope 2 emissions are reported using the certificate emissions factor (i.e., the same emissions factor as the source-specific emissions factor).
Certificates are sold to a third party	Scope 2 emissions are reported using the most appropriate, accurate, precise and highest quality emissions factor available under the market-based emissions factor hierarchy (see section 4.5.1).
Energy consumed from the grid	
No certificates are generated or sold from any generation facilities on the grid	Scope 2 emissions are reported using the most appropriate, accurate, precise and highest quality emissions factor available under the market-based emissions factor hierarchy (see section 4.5.1).
Certificates are purchased from grid generation facilities or are included in a supplier-specific emissions factor	Scope 2 emissions are reported using the most appropriate, accurate, precise and highest quality emissions factor available under the market-based emissions factor hierarchy (see section 4.5.1).
Certificates from grid generation facilities are sold to third parties	Scope 2 emissions are reported using the most appropriate, accurate, precise and highest quality emissions factor available under the market-based emissions factor hierarchy (see section 4.5.1).

How we see it

As illustrated by the table above and the LBM calculation table in section 4.4.2 above, if a reporting entity does not have contractual instruments or other MBM-specific emission factors (such as a residual mix emissions factor), it would need to use the same emissions factors that are used for the Scope 2 LBM emissions calculation, specifically a grid average emissions factor. This scenario could result in calculating and reporting the same value for both Scope 2 LBM and MBM emissions. This presentation would still be in accordance with the Scope 2 Guidance.

4.5.3 MBM treatment of emissions from biomass

Excerpt from GHG Protocol

Scope 2 Guidance

Chapter 6

Biogenic materials—including biomass, biofuels, and biogas—are increasingly used as a resource for energy generation on-site and on the grid. While biomass can produce fewer GHG emissions than fossil fuels and may be grown and used on a shorter time horizon, it still produces GHG emissions and should not be treated with a "zero" emission factor. Based on the Corporate Standard, any CH_4 or N_2O emissions from biogenic energy sources use shall be reported in scope 2, while the CO_2 portion of the biofuel combustion shall be reported outside the scopes. In practice, this means that any market-based method data that includes biofuels should report the CO_2 portion of the biofuel combustion separately from the scopes.

Biogenic materials (e.g., biomass, biofuel and biogas) can be used to generate energy either on-site or for the grid. While these materials typically emit less GHGs than other fuels, they still emit GHGs. The GHG Protocol specifies that CH_4 or N_2O emissions from biogenic energy generation need to be included in Scope 2 emissions. However, CO_2 emissions from biogenic energy generation, if presented, are required to be presented separately from Scope 1, Scope 2 and Scope 3 emissions. Therefore, any market-based method emissions factors that include biogenic emissions will need to provide the CO_2 emissions separately from the other GHGs, if presented. If this data is not separately available, we believe a reporting entity should disclose this omission.

4.6 Scope 2 disclosures

The Corporate Standard provides required and optional disclosures for Scope 2 emissions. Additionally, the Scope 2 Guidance, which amended the Corporate Standard, provides incremental required, recommended and optional disclosures for Scope 2 emissions. The required and optional disclosures from each of these standards often overlap and may not be described precisely the same in each. However, we believe the intent of the disclosures is generally the same. Both sets of required disclosures (see section 4.6.1 below) have to be included in the report that includes the Scope 2 emissions metric for it to be presented in accordance with the GHG Protocol. Recommended (see section 4.6.2 below) and optional (see section 4.6.3 below) disclosures do not have to be included in the report that includes the Scope 2 emissions metric for it to be presented in accordance with the GHG Protocol. Appendix C of this publication includes a disclosure checklist with a comprehensive list of all required, recommended and optional disclosures established by the GHG Protocol.

4.6.1 Required Scope 2 disclosures

The Corporate Standard contains the following required disclosures related to Scope 2 emissions:

Excerpt from GHG Protocol

Corporate Standard

Chapter 9

Information on emissions:

- Total scope 1 and 2 emissions independent of any GHG trades such as sales, purchases, transfers, or banking of allowances.
- Emissions data separately for each scope.
- Emissions data for all six GHGs separately (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6) in metric tonnes and in tonnes of CO_2 equivalent
- Methodologies used to calculate or measure emissions, providing a reference or link to any calculation tools used.

The Scope 2 Guidance contains the following additional required disclosures related to Scope 2 emissions (see section 6.1 of this publication for general required disclosures in the Scope 2 Guidance):

Excerpt from GHG Protocol

Scope 2 Guidance

Chapter 7

For companies with operations only in markets that do not provide product or supplier-specific data or other contractual instruments:

- Only one scope 2 result **shall** be reported, based on the location-based method.

For companies with any operations in markets providing product or supplier-specific data in the form of contractual instruments (Markets are increasingly developing and refining purchasing options, and the list is not exhaustive. Currently this includes the EU Economic Area, the U.S., Australia, most Latin American countries, Japan, and India, among others.)

- Companies **shall** account and report scope 2 emissions in two ways and label each result according to the method: one based on the location-based method, and one based on the market-based method.
- Many companies' GHG inventories will include a mix of operations globally, some where the market-based method applies and some where it does not. Companies **shall** account for and report all operations' scope 2 emissions according to both methods.
    - To do so, emissions from any operations in locations that do not support a market-based method approach **shall** be calculated using the location-based method (making such operations' results identical for location-based and market-based methods). Companies should note what percentage of their overall electricity consumption reported in the market-based method reflects actual markets with contractual information.

Scope 2 Quality Criteria [EY note: Certain non-disclosure related requirements and optional disclosures omitted from this excerpt]

- If a residual mix is not currently available, reporters **shall** note that an adjusted emissions factor is not available or has not been estimated to account for voluntary purchases and this may result in double counting between electricity consumers.

Inventory totals. [EY note: Certain optional disclosures omitted from this excerpt]

- If reporting a single corporate inventory total, the scope 2 method used should be the same as the one used for goal setting. Companies **shall** disclose which method was chosen for this purpose.

Methodology disclosure. Companies **shall** disclose methods used for scope 2 accounting. For the market-based method, companies **shall** disclose the category or categories of instruments from which the emission factors were derived, where possible specifying the energy generation technologies.

A reporting entity is required to disclose Scope 2 emissions using the LBM or both the LBM and MBM, depending on the nature of the energy markets where it has operations (see section 4.3.1 above). We believe that a reporting entity with operations in the US, Canada, EU Member States, European Economic Area, Australia, most Latin American countries, Japan or India is generally required to report using both the LBM and the MBM.

If a reporting entity is required to disclose Scope 2 emissions under both methods (i.e., dual report) but only has an LBM value (i.e., its LBM and MBM values are the same), it is required to disclose the LBM value for its MBM value and should consider disclosing that the values are the same for the current year because of the lack of contractual instruments and residual mix factors.

A reporting entity is required to report the following amounts of Scope 2 emissions under both methods:

- Total Scope 2 emissions in units of CO_2e, separately from Scope 1 emissions
- Total Scope 2 emissions disaggregated by each of the seven GHGs separately in metric tons of each GHG and metric tons of CO_2e

These disclosures have to be presented on a gross basis (i.e., without the impact of any GHG sales, purchases, transfers or allowances).

A reporting entity also has to describe any estimation methodologies used to calculate Scope 2 emissions (e.g., proxies, gap filling methodologies), including providing a reference or link to any calculation tools used. We believe that this disclosure should include references to the emission factors used, a description of the data sources used (e.g., to the extent material, actual activity data or estimated activity data) and a description of any significant assumptions used in the calculation.

When a reporting entity presents Scope 2 emissions using the MBM and a residual mix emissions factor is not available, it discloses that fact and that, as a result, electricity may be double counted among consumers. Additionally, the reporting entity discloses the category or categories of contractual instruments (e.g., RECs, green tariffs, supplier-specific) that are the basis for the MBM emissions factors, specifying the energy generation technologies underlying those contractual instruments where possible.

A reporting entity that presents the total of Scope 1 and Scope 2 emissions in CO_2e has the option to present a single total or a total using the LBM and a total using the MBM. If a reporting entity presents a single total, the method used for that total should be the same as the one used for goal setting and has to be disclosed.

The following example illustrates how a reporting entity may calculate Scope 2 emissions on an aggregated and disaggregated basis and should disclose this information.

Illustration 4-3: Calculation and disclosure of Scope 2 emissions

Company A has manufacturing facilities across the US and the EU. Company A has entered into PPAs, purchased EACs (in the form of renewable energy credits) and has a direct power agreement for certain facilities. Given it operates in a market that has contractual instruments, Company A is required to report using both the LBM and MBM.

Company A's Scope 2 electricity consumption is included in the charts below, which also shows the CO_2e emissions factors applied for the respective calculation method (i.e., LBM or MBM) based on the emissions factor hierarchy.

Activity data in reporting period			Location-based method			
Facility	**Energy consumption (MWh)**	**Energy type**	**Most accurate emissions factor***	**GHG**	**Emissions factor (mt GHG/MWh)**	**GHG emissions (mt)**
US Ops	100,000	Grid-distributed with PPA	Subnational grid average	CO_2	0.396000	39,600.0
				CH_4	0.000033	3.3
				N_2O	0.000005	0.5
				CO_2e	0.398298	39,829.8
	200,000	Grid-distributed with EAC	Subnational grid average	CO_2	0.396000	79,200.0
				CH_4	0.000033	6.6
				N_2O	0.000005	1.0
				CO_2e	0.398298	79,659.6
	100,000	Direct line from single supplier	Supplier-specific rate	CO_2	0.365000	36,500.0
				CH_4	0.000020	2.0
				N_2O	0.000004	0.4
				CO_2e	0.366739	36,673.9
	100,000	Grid-distributed	Subnational grid average	CO_2	0.396000	39,600.0
				CH_4	0.000033	3.3
				N_2O	0.000005	0.5
				CO_2e	0.398298	39,829.8
EU Ops	300,000	Grid from single supplier	National grid average (Country A)	CO_2	0.403333	120,999.9
				CH_4	0.000017	5.1
				N_2O	0.000002	0.6
				CO_2e	0.404249	121,274.7
	200,000	Grid-distributed	National grid average (Country B)	CO_2	0.401500	80,300.0
				CH_4	0.000017	3.4
				N_2O	0.000002	0.4
				CO_2e	0.402416	80,483.2
				Total	**CO_2**	**396,199.9**
					CH_4	**23.7**
					N_2O	**3.4**
					CO_2e	**397,751.0**

Activity data in reporting period			Market-based method			
Facility	**Energy consumption (MWh)**	**Energy type**	**Most accurate emissions factor***	**GHG**	**Emissions factor (mt GHG / MWh)**	**GHG emissions (mt)**
US Ops	100,000	Grid-distributed with PPA	PPA with REC retention by purchaser	CO_2	0.000000	–
				CH_4	0.000000	–
				N_2O	0.000000	–
				CO_2e	0.000000	–
	200,000	Grid-distributed with EAC	EAC purchase	CO_2	0.000000	–
				CH_4	0.000000	–
				N_2O	0.000000	–
				CO_2e	0.000000	–
	100,000	Direct line from single supplier	Supplier-specific rate	CO_2	0.365000	36,500.0
				CH_4	0.000020	2.0
				N_2O	0.000004	0.4
				CO_2e	0.366739	36,673.9
	100,000	Grid-distributed	Grid average (no residual mix factor available)	CO_2	0.396000	39,600.0
				CH_4	0.000033	3.3
				N_2O	0.000005	0.5
				CO_2e	0.398298	39,829.8
EU Ops	300,000	Grid from single supplier	Supplier-specific rate	CO_2	0.365020	109,506.0
				CH_4	0.000028	8.4
				N_2O	0.000004	1.2
				CO_2e	0.366757	110,027.1
	200,000	Grid-distributed	Residual mix	CO_2	0.485000	97,000.0
				CH_4	0.000037	7.4
				N_2O	0.000006	1.2
				CO_2e	0.487524	97,504.8
				Total	**CO_2**	**282,606.0**
					CH_4	**21.1**
					N_2O	**3.3**
					CO_2e	**284,035.6**

* These emissions factors meet the Scope 2 quality criteria

Since Company A reports under the GHG Protocol, it is required to dual report this information in CO_2e and by each GHG. This disclosure could be provided using the following format:

Scope 2 GHG emissions by type:

	Scope 1		Scope 2 MBM		Scope 2 LBM	
	Metric tons	**Metric tons of CO_2e**	**Metric tons**	**Metric tons of CO_2e**	**Metric tons**	**Metric tons of CO_2e**
CO_2 emissions	xx	xx	282,606.0	282,606.0	396,199.9	396,199.9
CH_4 emissions	xx	xx	21.1	572.6	23.7	662.1
N_2O emissions	xx	xx	3.3	857.0	3.4	889.0
Total		xx		284,035.6		397,751.0

Note that the table above does not include all required disclosures for Scope 2 emissions. It is intended to show one way of presenting the Scope 2 emissions metric. See above for a list of all required disclosures related to Scope 2 emissions.

See section 6.1 of this publication for the required disclosures in the Scope 2 guidance that are not specifically related to Scope 2 emissions.

4.6.2 Recommended Scope 2 disclosures

The Scope 2 Guidance recommends that a reporting entity provide the following disclosures. Recommended disclosures are only included in the Scope 2 Guidance (i.e., the Corporate Standard and Scope 3 Standard do not include recommended disclosures). Although these disclosures are not required by the GHG Protocol, we believe they should be made if the reporting entity determines that excluding them would make the presentation of the GHG emissions misleading.

Excerpt from GHG Protocol

Scope 2 Guidance

Chapter 7

Annual electricity consumption. Companies **should** report total electricity, steam, heat, and cooling per reporting period separately from the scopes totals (in kWh, MWh, BTU, etc.), which should include all scope 2 activity data as well as the quantity of energy consumed from owned/operated installations (which may be only reported in scope 1 and not in scope 2.)

Biogenic emissions. Companies **should** separately report the biogenic CO_2 emissions from electricity use (e.g. from biomass combustion in the electricity value chain) separately from the scopes, while any CH_4 and N_2O emissions should be reported in scope 2.

- Companies **should** document if any GHG emissions other than CO_2 (particularly CH_4 and N_2O) are not available for, or excluded from, location-based grid average emissions factors or with the market-based method information.

Other instrument retirement. Companies **should** disclose additional certificate or other instrument retirement performed in conjunction with their voluntary claim, such as with certificate multipliers or any pairing required by regulatory policy.

Instrument features. Where relevant, companies **should** disclose key features associated with their contractual instruments claimed, including any instrument certification labels that entail their own set of eligibility criteria, as well as characteristics of the energy generation facility itself and the policy context of the instrument. These features are elaborated in Chapter 8.

Role of corporate procurement in driving new projects. Where relevant, companies **should** elaborate in narrative disclosure how any of the contractual instruments claimed in the market-based method reflect a substantive contribution by the company in helping implement new low-carbon projects.

Certain required Scope 3 disclosures from the Scope 2 Guidance are not included in the excerpt above but are included and discussed in Chapter 5 of this publication.

The Scope 2 guidance recommends a reporting entity disclose the following information related to Scope 2 emissions:

- Total energy consumption (i.e., both Scope 2 activity data and energy consumption from owned and operated installations included in Scope 1) from electricity, steam, heat and cooling in the applicable energy unit (e.g., MWh, BTU)
- Biogenic CO_2 emissions from electricity use separately from Scope 1, Scope 2 or Scope 3
- Whether any other GHG emissions other than CO_2 associated with biogenic emissions from electricity use have been excluded from the LBM grid average emission factors or the MBM information applied (e.g., have CH_4 and N_2O been excluded?)
- Additional instruments that were required to be retired to meet regulatory reporting requirements in connection with the retirement of instruments applied to Scope 2 MBM emissions (e.g., certificate multipliers or other pairings required by regulatory policy)
- Key features of the contractual instruments claimed, including any instrument certification labels with their own set of eligibility criteria, as well as a description of the energy generation facility and the policy context of the instrument
- If applicable, narrative disclosure about how the contractual instruments claimed in the reported Scope 2 MBM emissions reflect a substantive contribution by the reporting entity in helping implement new low-carbon projects

4.6.3 Optional Scope 2 disclosures

The Scope 2 Guidance and Corporate Standard include optional disclosures. Although these disclosures are not required by the GHG Protocol, we believe they should be made if the reporting entity determines that excluding them would make the presentation of the GHG emissions misleading.

The Corporate Standard contains the following optional disclosures related to Scope 2 emissions:

Excerpt from GHG Protocol

Corporate Standard

Chapter 9

Information on emissions and performance:

- Emissions data further subdivided, where this aids transparency, by business units/facilities, country, source types (stationary combustion, process, fugitive, etc.), and activity types (production of electricity, transportation, generation of purchased electricity that is sold to end users, etc.).

- Emissions attributable to the generation of electricity, heat or steam that is purchased for re-sale to non-end users (see chapter 4).
- Emissions from GHGs not covered by the Kyoto Protocol (e.g., CFCs, NOx,), reported separately from scopes.

General disclosures and disclosures related to Scope 1 and Scope 3 are omitted from the excerpt above but are included and discussed in Chapters 6, 3 and 5 of this publication, respectively. The Scope 2 Guidance contains the following additional optional disclosures related to Scope 2 emissions:

Excerpt from GHG Protocol

Scope 2 Guidance

Chapter 7

Companies may provide a reference to an internal or external third-party assurance process, or assurance of conformance provided by a certification program, supplier label, green power program, etc. An attestation form may be used to describe the chain of custody of purchased certificates or other contractual instruments.

Inventory totals. For companies adding together scope 1 and scope 2 for a final inventory total, companies may either report two corporate inventory totals (one reflecting each scope 2 method), or may report a single corporate inventory total reflecting one of the scope 2 methods.

Scope 2 totals disaggregated by country. This can improve transparency on where market-based method totals differ from location-based.

Avoided emissions estimation. Consistent with Chapter 8 of the *Corporate Standard*, companies **may** separately report an estimation of GHG emissions avoided from a project or action (also see Section 6.9). This quantification should be based on project-level accounting, with methodologies and assumptions documented (including to what the reduction is being compared). See the *GHG Project Protocol* and *GHG Protocol Guidelines for Grid-Connected Electricity Projects* for example methodologies.

Advanced grid study estimations. Where advanced studies (or real-time information) are available, companies **may** report scope 2 estimations separately as a comparison to location-based grid average estimations, and companies can document where this data specifically informed efficiency decision making or time-of-day operations. Because these studies or analyses may be more difficult to use widely across facilities or to standardize/aggregate consistently without double counting, companies should ensure that any data used for this purpose has addressed data sourcing and boundaries consistent with the location-based method.

Scope 2 results calculated by other methods. If companies are subject to mandatory corporate reporting requirements for facilities in a particular region/nation that specify methodologies other than the two required for dual reporting, these companies **may** report these results separately from the scopes.

Disclose purchases that did not meet scope 2 quality criteria. If a reporting entity's energy purchases did not meet all Scope 2 Quality Criteria, the entity **may** note this separately. This note should detail which Criteria have been met, with details of why the remaining Criteria have not. This will provide external stakeholders with the information they require, and allow the reporting entity to disclose the efforts made to adhere to the guidance. (As noted in Chapter 6, location-based method data will be used as proxy emission factors in the market-based method total.)

A reporting entity has the option to disclose Scope 2 emissions data at a more disaggregated level than required if the disclosure helps make the report more transparent. This disaggregation could include data by business unit, country (which could improve the transparency on where MBM totals differ from LBM totals), source type (as discussed in section 4.2 of this publication) or activity type (e.g., transportation, generation of electricity).

Other optional Scope 2 disclosures include:

- Reference to internal or external assurance processes or reports, including those related to contractual instruments
- Two corporate inventory totals of Scope 1 and Scope 2 emissions (one reflecting the LBM Scope 2 amount and one reflecting the MBM Scope 2 amount), or a single total reflecting one of the Scope 2 method amounts
- Scope 2 emissions from the generation of electricity, heat or steam that is purchased for resale to non-end users
- Scope 2 emissions from GHGs that are not CO_2, CH_4, N_2O, HFCs, PFCs, SF_6 or NF_3 but have a GWP identified by the IPCC, separately from the emissions for the reported Scope 1, Scope 2 and Scope 3, along with a list of those GHGs included in the inventory
- An estimate of avoided emissions based on project-level accounting and the methodologies and assumptions applied
- Scope 2 emissions estimate using an advanced grid study (or real-time) information for comparison with the Scope 2 LBM grid average emissions
    - If such an estimate is disclosed, the reporting entity may also disclose information on how the use of advanced grid study (or real-time) information has informed efficiency decision-making or time-of-day operations.
- Scope 2 emissions calculated using methods other than the LBM and MBM that are required by mandatory corporate reporting requirements in a particular region
- Purchased instruments that did not meet the Scope 2 quality criteria and, therefore, were not included in the entity's Scope 2 MBM emissions calculation
    - A reporting entity should disclose the criteria that were met and why the remaining criteria were not met. We believe that additional calculations of Scope 2 MBM emissions that include instruments that do not meet the Scope 2 quality criteria (e.g., "Scope 2 MBM would be XX considering these instruments") should not be disclosed because they could be misleading.

See section 6.2 of this publication for other optional disclosures included in the GHG Protocol that are not specifically related to Scope 2 emissions.

4.6.4 Scope 2 reporting requirements from the SEC proposal, California climate laws, ESRS and ISSB standards

Under the SEC proposal, a reporting entity would be required to disclose Scope 2 emissions in metric tons of CO_2e, both in the aggregate and for each of the seven GHGs. Disclosure of Scope 2 emissions would be required regardless of materiality. The impact of purchased or generated offsets would be excluded from these calculations and separately disclosed. A registrant would also be required to disclose GHG intensity metrics for each scope in terms of metric tons of CO_2e per unit of total revenue

and per unit of production for that entity's industry. The SEC proposal would allow companies to disclose their Scope 2 GHG emissions using an LBM, an MBM, both methods separately, a combination of the methods or another method as long as it is identified.

California SB-253 requires reporting entities that had more than $1 billion in annual revenue in the previous fiscal year and do business in California to annually disclose their Scope 2 emissions in accordance with the GHG Protocol. These disclosures should be made in metric tons of CO_2e, both in the aggregate for Scope 2 and for each of the seven GHGs for Scope 2. California SB-261 requires reporting entities with more than $500 million in annual revenue that do business in California to biennially disclose climate-related information in accordance with the TCFD's recommendations, which include reporting Scope 2 emissions.

The ESRS requires an entity to separately disclose aggregate Scope 2 emissions, if material, in metric tons of CO_2e, with the impact of purchased or generated offsets excluded and separately disclosed. An entity is permitted to disaggregate those emissions, including by the seven GHGs or by country, but disaggregation is not required. The ESRS requires disclosure of Scope 2 emissions, if material, using both the LBM and the MBM. For an intensity metric, the ESRS requires an entity to only disclose its total emissions (inclusive of Scope 1, Scope 2 and Scope 3 emissions) using both an LBM and an MBM per monetary unit of net revenue.

The ISSB standards require a reporting entity to disclose aggregate Scope 2 emissions in metric tons of CO_2e, but a reporting entity is not required to report emissions for each of the seven GHGs. The impact of purchased or generated offsets is excluded from these calculations and separately disclosed. The ISSB standards require a reporting entity to disclose its Scope 2 emissions using an LBM and provide relevant information about contractual instruments related to managing the energy it has purchased. Scope 2 emissions are only required to be disclosed if material. Disclosure of intensity metrics is not required.

5 Scope 3 emissions

5.1 Definition

Excerpt from GHG Protocol

Scope 3 Standard

Glossary

Scope 3 emissions: All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.

Value chain: In this standard, "value chain" refers to all of the upstream and downstream activities associated with the operations of the reporting company, including the use of sold products by consumers and the end-of-life treatment of sold products after consumer use.

Upstream emissions: Indirect GHG emissions from purchased or acquired goods and services.

Downstream emissions: Indirect GHG emissions from sold goods and services. Downstream emissions also include emissions from products that are distributed but not sold (i.e., without receiving payment).

Scope 3 emissions are all indirect upstream and downstream emissions that occur in the value chain of the reporting entity, except for indirect emissions from purchased or acquired electricity, steam, heating or cooling consumed by the reporting company (i.e., Scope 2 emissions). Examples of Scope 3 emissions from upstream activities include the production and third-party transportation of purchased or acquired goods and services, while examples from downstream activities include the emissions generated from the use or consumption of sold goods and services.

The Scope 3 Standard provides requirements and a step-by-step approach to report Scope 3 emissions. The standard breaks down Scope 3 emissions into 15 distinct categories, which are intended to capture the various emissions sources from activities in the reporting entity's value chain and to organize Scope 3 emissions to make them more comparable over time and across entities. The categories are designed to be mutually exclusive with no double counting of emissions between categories and are as follows:

Category	Category description[16]
1. Purchased goods and services	Extraction, production and transportation of goods and services purchased or acquired by the reporting entity in the reporting year, not otherwise included in Categories 2 through 8
2. Capital goods	Extraction, production and transportation of capital goods purchased or acquired by the reporting entity in the reporting year
3. Fuel- and energy-related activities (not included in Scope 1 or Scope 2)	Extraction, production, and transportation of fuels and energy purchased or acquired by the reporting entity in the reporting year, not already accounted for in Scope 1 or Scope 2, including: ▸ Upstream emissions of purchased fuels (extraction, production and transportation of fuels consumed by the reporting entity) ▸ Upstream emissions of purchased electricity (extraction, production and transportation of fuels consumed in the generation of electricity, steam, heating and cooling consumed by the reporting entity) ▸ T&D losses (generation of electricity, steam, heating and cooling that is consumed (i.e., lost) in a T&D system) reported by end user ▸ Generation of purchased electricity sold to end users (generation of electricity, steam, heating and cooling purchased by the reporting entity and sold to end users) reported by the utility company or energy retailer only
4. Upstream transportation and distribution	Transportation and distribution of products purchased by the reporting entity in the reporting year between a reporting entity's tier 1 suppliers[17] and its own operations (in vehicles and facilities not owned or controlled by the reporting entity) Transportation and distribution services purchased by the reporting entity in the reporting year, including inbound logistics, outbound logistics (e.g., of sold products) and transportation and distribution among a reporting entity's own facilities (in vehicles and facilities not owned or controlled by the reporting entity)
5. Waste generated in operations	Disposal and treatment of waste generated in the reporting entity's operations in the reporting year (in facilities not owned or controlled by the reporting entity)
6. Business travel	Transportation of employees for business-related activities during the reporting year (in vehicles not owned or operated by the reporting entity)
7. Employee commuting	Transportation of employees between their homes and their worksites during the reporting year (in vehicles not owned or operated by the reporting entity)
8. Upstream leased assets	Operation of assets leased by the reporting entity (lessee) in the reporting year and not included in Scope 1 and Scope 2 — reported by lessee
9. Downstream transportation and distribution	Transportation and distribution of products sold by the reporting entity in the reporting year between the reporting entity's operations and the end consumer (if not paid for by the reporting entity), including retail and storage (in vehicles and facilities not owned or controlled by the reporting entity)
10. Processing of sold products	Processing of intermediate products sold in the reporting year by downstream companies (e.g., manufacturers)
11. Use of sold products	End use of goods and services sold by the reporting entity in the reporting year

[16] Based on Table 5.4 of the *GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard*

[17] Tier 1 suppliers are suppliers with which the reporting entity has a purchase order for goods or services, while tier 2 suppliers are suppliers with which a reporting entity's tier 1 suppliers have a purchase order.

Category	Category description[16]
12. End-of-life treatment of sold products	Waste disposal and treatment of products sold by the reporting entity (in the reporting year) at the end of their life
13. Downstream leased assets	Operation of assets owned by the reporting entity (lessor) and leased to other entities in the reporting year, not included in Scope 1 and Scope 2 – reported by lessor
14. Franchises	Operation of franchises in the reporting year, not included in Scope 1 and Scope 2 – reported by franchisor
15. Investments	Operation of investments (including equity and debt investments and project finance) in the reporting year, not included in Scope 1 or Scope 2

The Scope 3 Guidance includes different calculation approaches for the various Scope 3 categories.

How we see it

Because the GHG Protocol does not contemplate every reporting scenario for each reporting entity, there may be certain circumstances where the listed calculation methodologies are not appropriate or are considered misleading. In these rare instances, it may be acceptable to use an alternative calculation methodology.

Additionally, for each category the Scope 3 Guidance sets the minimum boundaries, which are the activities that are required to be included, if relevant. The GHG Protocol includes these boundaries so that major activities are included within a Scope 3 inventory, without requiring that every emission from every entity or activity in the reporting entity's value chain be identified and evaluated for inclusion in the inventory. The minimum boundaries for each category are listed in Table 5.4 of the Scope 3 Standard. A future version of this publication will provide more detailed guidance on Scope 3 emissions, including Scope 3 categories and related calculation approaches.

5.2 Time boundary

Excerpt from GHG Protocol

Scope 3 Standard

Chapter 5

Time boundary of scope 3 categories

This standard is designed to account for all emissions related to the reporting company's activities in the reporting year (e.g., emissions related to products purchased or sold in the reporting year). For some scope 3 categories, emissions occur simultaneously with the activity (e.g., from combustion of energy), so emissions occur in the same year as the company's activities (see figure 5.3). For some categories, emissions may have occurred in previous years. For other scope 3 categories, emissions are expected to occur in future years because the activities in the reporting year have long-term emissions impacts. For these categories, reported emissions have not yet happened, but are expected to happen as a result of the waste generated, investments made, and products sold in the reporting year. For these categories, the reported data should not be interpreted to mean that emissions have already occurred, but that emissions are expected to occur as a result of activities that occurred in the reporting year.

Figure [5.3] Time boundary of scope 3 categories

A reporting entity's reported Scope 3 emissions in the current year represent the emissions in the value chain (regardless of the year those emissions occur) resulting from the reporting entity's activities in the current reporting year. That is, a reporting entity's Scope 3 emissions may include emissions from parties in the value chain that occurred in a prior year or are expected to occur in a future year if those emissions are a result of activities of the reporting entity in the current year.

For example, a vendor's emissions from the production of raw materials that occurred in the year prior to the reporting entity's purchase of those raw materials are reported as Scope 3 emissions in the year the reporting entity purchases the raw materials. Similarly, a customer's emissions from the disposal of a product sold by the reporting entity are reported as Scope 3 emissions (Category 12, *End of life treatment of sold products*) in the year the reporting entity sells that product, even though those emissions likely won't occur until future years. The figure above from the Scope 3 Standard details the 15 Scope 3 emissions categories and the time boundary considerations for each category.

5.3 Scope 3 disclosures

A reporting entity is not required to report Scope 3 emissions under the GHG Protocol Corporate Standard, but it may report some, but not all, relevant and material Scope 3 emissions from certain activities or Scope 3 categories it chooses under that standard. However, if a reporting entity reports under the GHG Protocol Corporate Standard and the Scope 3 Standard, it is required to report all relevant and material categories of Scope 3 emissions that are identified by the Scope 3 Standard. See section 1.5 on reporting Scope 3 emissions and the relationship between the Corporate Standard and the Scope 3 Standard. A reporting entity may also be required to report its Scope 3 emissions (or specific categories of Scope 3 emissions) using the GHG Protocol (or a different reporting framework) due to regulatory requirements.

The Corporate Standard and Scope 2 Guidance provide required, recommended and optional disclosures for Scope 3 emissions. Additionally, the Scope 3 Standard provides incremental required and optional disclosures for Scope 3 emissions. The required and optional disclosures from each of these standards often overlap and may not be described precisely the same in each. However, we believe the intent of the disclosures is generally the same when a company elects to report under both the Corporate Standard and the Scope 3 Standard.

The sections below provide an overview of the required and optional disclosures for Scope 3 emissions under the GHG Protocol. Both sets of required disclosures (section 5.3.1 below) have to be included in the report that includes the Scope 3 emissions metric for it to be presented in accordance with the GHG Protocol. Recommended and optional (see sections 5.3.2 and 5.3.3 below, respectively) disclosures do not have to be included in the report that includes the Scope 3 emissions metric for it to be presented in accordance with the GHG Protocol. Appendix C of this publication includes a disclosure checklist with a comprehensive list of all required, recommended and optional disclosures established by the GHG Protocol.

5.3.1 Required disclosures

Excerpt from GHG Protocol

Corporate Standard

Chapter 9

Description of the company and inventory boundary

- An outline of the operational boundaries chosen, and if scope 3 is included, a list specifying which types of activities are covered.

Scope 3 Standard

Chapter 11

11.1 Required information

- Total scope 3 emissions reported separately by scope 3 category
- For each scope 3 category, total emissions of GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) reported in metric tons of CO_2 equivalent, excluding biogenic CO_2 emissions and independent of any GHG trades, such as purchases, sales, or transfers of offsets or allowances
- A list of scope 3 categories and activities included in the inventory
- A list of scope 3 categories or activities excluded from the inventory with justification of their exclusion
- For each scope 3 category, any biogenic CO_2 emissions reported separately
- For each scope 3 category, a description of the types and sources of data, including activity data, emission factors and GWP values, used to calculate emissions, and a description of the data quality of reported emissions data
- For each scope 3 category, a description of the methodologies, allocation methods, and assumptions used to calculate scope 3 emissions
- For each scope 3 category, the percentage of emissions calculated using data obtained from suppliers or other value chain partners

Certain required general disclosures are not included in this excerpt but are included in Chapter 6 of this publication.

In addition to the disclosures listed in the Scope 3 Standard, we believe that a reporting entity should provide a description of any emissions included in the reported Scope 3 category that are outside of the minimum boundary for that category.

5.3.2 Recommended disclosures

Excerpt from GHG Protocol

Scope 2 Guidance

Chapter 7

7.2 Recommended disclosures

Basis for upstream scope 3. The reporting entity should identify which methodology has been used to calculate and report scope 3, category 3—upstream energy emissions not recorded in scope 1 and 2, scope 3.

In addition to disclosing which methodology has been used for Scope 3, Category 3, we believe that a reporting entity that is provided MBM values by their suppliers for any Scope 3 categories should disclose that the MBM was used for that category.

Although the recommended disclosures are not required by the GHG Protocol, we believe they should be made if the reporting entity determines that excluding them would make the presentation of the GHG emissions misleading.

5.3.3 Optional disclosures

Excerpt from GHG Protocol

Corporate Standard

Chapter 9

Information on emissions and performance

- Emissions data from relevant scope 3 emissions activities for which reliable data can be obtained.

Scope 3 Standard

Chapter 11

11.2 Optional information

A public GHG emissions report should include, when applicable, the following additional information:

- Emissions data further subdivided where this adds relevance and transparency (e.g., by business unit, facility, country, source type, activity type, etc.)
- Emissions data further disaggregated within scope 3 categories where this adds relevance and transparency (e.g., reporting by different types of purchased materials within category 1, or different types of sold products within category 11)
- Emissions from scope 3 activities not included in the list of scope 3 categories (e.g., transportation of attendees to conferences/events), reported separately (e.g., in an "other" scope 3 category)

- Emissions of GHGs reported in metric tons of each individual gas
- Emissions of any GHGs other than CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 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, NF_3, NOX, etc.) and a list of any additional GHGs included in the inventory
- Historic scope 3 emissions that have previously occurred, reported separately from future scope 3 emissions expected to occur as a result of the reporting company's activities in the reporting year (e.g., from Waste generated in operations, Use of sold products, End-of-life treatment of sold products)

Certain optional general disclosures are not included in this excerpt but are included in Chapter 6 of this publication.

Although the optional disclosures are not required by the GHG Protocol, we believe they should be made if the reporting entity determines that excluding them would make the presentation of the GHG emissions misleading. We believe that when a reporting entity elects to disclose emissions from activities not included in the list of Scope 3 categories in the Scope 3 Standard and Scope 3 Guidance, it should disclose the same information about the activity as is required for the identified categories of Scope 3 emissions. These disclosures include:

- A description of any estimation methodologies used (e.g., proxies, gap filling methodologies), including a reference or link to any calculation tools used
- A description of the data sources used (e.g., to the extent material, actual activity data or estimated activity data)
- References to the emission factors used
- A description of any significant assumptions used in the calculation

5.3.4 Scope 3 reporting requirements from the SEC proposal, California climate laws, ESRS and ISSB standards

The SEC proposal would require an entity to disclose its Scope 3 emissions if they are material or if the entity has set an emissions target that includes Scope 3 emissions. Like Scope 1 and Scope 2 emissions, Scope 3 emissions would be disclosed on an aggregate CO_2e basis and would be disaggregated by the seven GHGs. A registrant would also have to disclose the categories of upstream or downstream activities that are included in the calculation and disclose Scope 3 emissions data separately for any category that is significant to the registrant. A registrant would also have to disclose Scope 3 GHG intensity metrics in terms of CO_2e per unit of total revenue and per unit of production for that entity's industry. Smaller reporting companies (as defined by the SEC) would not be required to disclose Scope 3 emissions. The proposal would also provide a safe harbor that would limit a registrant's liability for inaccurate disclosures of Scope 3 emissions, unless the disclosures were made without a reasonable basis, or in other than good faith.

California SB-253 requires reporting entities that had more than $1 billion in annual revenue in the previous fiscal year and do business in California to annually disclose their Scope 3 emissions in accordance with the GHG Protocol. These disclosures should be made in metric tons of CO_2e in total and disaggregated by each Scope 3 category. California SB-261 does not require disclosure of Scope 3 emissions.

The ESRS requires entities to disclose Scope 3 emissions from each material Scope 3 category and only disclose an intensity metric for their total emissions of all three scopes.

The ISSB standards require entities to disclose material Scope 3 emissions. An entity is required to disclose the categories of upstream or downstream activities from the GHG Protocol that are included in the Scope 3 emissions calculation. Entities participating in financial activities, including commercial and investment banks, asset managers, and insurance entities are required to report on financed emissions as part of their Scope 3 emission reporting. The ISSB standards provide certain relief to address practical challenges of disclosing Scope 3 emissions. This includes allowing, under certain conditions, an entity to measure its Scope 3 emissions using information from entities in its value chain with reporting cycles that are not aligned with the entity's reporting period and providing a temporary exemption for disclosing Scope 3 emissions for one year in the first annual reporting period in which an entity applies IFRS S2, *Climate-related Disclosures*. In addition, an entity may use only reasonable and supportable information that is available at the reporting date without undue cost or effort in measuring its Scope 3 emissions.

6 General disclosures

The Corporate Standard, Scope 2 Guidance and Scope 3 Standard include required, recommended and optional disclosures for Scope 1, Scope 2 and Scope 3 emissions (see sections 3.4, 4.6 and 5.3 of this publication, respectively). The Corporate Standard, Scope 2 Guidance and Scope 3 Standard also include required and optional disclosures that do not directly relate to the amount of GHGs emitted in each scope, which are presented in this chapter. The required and optional disclosures from each of these standards often overlap and may not be described, within each respective standard and guidance, precisely the same. However, we believe the intent of the disclosures is generally the same. The sections below provide an overview of the required and optional general disclosures within the GHG Protocol. Appendix C of this publication includes a disclosure checklist with a comprehensive list of all required, recommended and optional disclosures established by the GHG Protocol.

6.1 Required disclosures

Excerpt from GHG Protocol

Corporate Standard

Chapter 9

Required information

A public GHG emissions report that is in accordance with the GHG Protocol Corporate Standard shall include the following information:

Description of the company and inventory boundary

- An outline of the organizational boundaries chosen, including the chosen consolidation approach.
- An outline of the operational boundaries chosen, and if scope 3 is included, a list specifying which types of activities are covered.
- The reporting period covered.

Information on emissions

- Year chosen as base year, and an emissions profile over time that is consistent with and clarifies the chosen policy for making base year emissions recalculations.
- Appropriate context for any significant emissions changes that trigger base year emissions recalculation (acquisitions/divestitures, outsourcing/insourcing, changes in reporting boundaries or calculation methodologies, etc.).
- Any specific exclusions of sources, facilities, and/or operations.

Scope 2 Guidance

Chapter 7

Base-year information

Companies shall disclose the year chosen as the base year; the method used to calculate the base year's scope 2 emissions; whether historic location-based data is used as a proxy for a market-based method; and the context for any significant emission changes that trigger base-year emissions recalculation (acquisitions/divestitures, outsourcing/insourcing, changes in reporting boundaries or calculation methodologies, etc.)

Disclose basis for goal setting

If a company sets a corporate inventory reduction goal and/or a scope 2-specific reduction goal, the company shall clarify whether the goal is based on the location-based method total or market-based method total.

Scope 3 Standard

Chapter 11

11.1 Required Information

Companies shall publicly report the following information: [EY note: Required disclosures related to Scopes 1, 2, and 3 omitted from this excerpt]

- Once a base year has been established: the year chosen as the scope 3 base year; the rationale for choosing the base year; the base year emissions recalculation policy; scope 3 emissions by category in the base year, consistent with the base year emissions recalculation policy; and appropriate context for any significant emissions changes that triggered base year emissions recalculations

Certain required disclosures related to Scope 1, Scope 2 and Scope 3 are omitted from the excerpts above but are included and discussed in chapters 3, 4 and 5 of this publication, respectively.

A reporting entity is required to make certain disclosures that provide general information about the reporting entity, including information on the inventory boundary (including the consolidation approach) and the reporting period covered. In many cases, the disclosure of the reporting period is met by including headings in the report (e.g., "Statements of GHG emissions for the year ended 12/31/2X"). Otherwise, separate disclosure is required.

A reporting entity is also required to disclose information about its base year. This required information includes:

- The year chosen as the base year and reasons for choosing that year
- A discussion of the policy for base-year recalculations and any significance threshold applied
- Context for any significant emissions changes that have triggered a base-year emissions recalculation, such as structural changes (i.e., mergers, acquisitions, divestitures, outsourcing and insourcing of emitting activities), changes in reporting boundaries, changes in calculation methodology or improvements in the accuracy of emissions factors or activity data (see section 2.7.2 above for discussion of updating base years)
- Emissions for the identified base year that are calculated in accordance with the entity's base year recalculation policy
- The method used to calculate the base year's Scope 2 emissions
- If an MBM is used to calculate the base year's Scope 2 emissions, whether location-based data is used as a proxy for an MBM due to a lack of availability of Scope 2 MBM base year data

As described in section 2.7 above, a reporting entity is required to establish and report on a base year for Scope 1 and Scope 2 emissions regardless of if Scope 1 and Scope 2 emissions targets have been set, but it is not required to set a base year for Scope 3 emissions unless it tracks Scope 3 performance over time or sets a Scope 3 reduction target. If Scope 3 emissions are included for the base year, a reporting entity must disclose Scope 3 emissions by category in the base year.

If the reporting entity has a goal related to its base-year emissions, we believe the entity should disclose the goal and annual progress against the goal to not be misleading.

The following example illustrates the required disclosures about a reporting entity's base year.

Illustration 6-1: Disclosure of base year information

Company A prepares a sustainability report that includes GHG emissions presented in accordance with the GHG Protocol. Company A has set a reduction target for Scope 1, Scope 2 and Scope 3 emissions and selected a base year of 202X for each scope. The base year information was disclosed in a prior report. Company A acquired an entity during the current year and recalculated its current- and base-year information to reflect this acquisition.

Company A disclosed the following information related to the base year within its report (this example does not include disclosures related to the current year information):

GHG emissions by scope (in metric tons of CO_2e)	202X (base year, as amended)
Scope 1	2,025
Scope 2	750
Scope 3	3,120
Total	5,895

The Company has identified 202X as the base year for all scopes because verifiable emissions data was available and the measurements against 202X are meaningful to the science-based initiative targets select by Company A for Scope 1, Scope 2 and Scope 3. Emissions data is assessed against data from the base year to track and communicate performance.

The emissions base year is subject to recalculation in response to material changes, including changes in calculation methodology, changes due to data accuracy and structural changes, such as acquisitions or divestitures, and material changes in the identified boundaries. Company A has set a significance threshold of 5% of the sum of base-year Scope 1, Scope 2 and Scope 3 emissions for updating base year emissions. Scope 2 base-year emissions are calculated using the market-based method. In 10% of the markets we operate in, market-based emissions factor information is not applicable or available, so data from the location-based method is used to represent emissions in those markets.

In the current year, Company A acquired Company Y. Management assessed the impact of this acquisition on our previously reported emissions and determined that the impact of this acquisition exceeded our significance threshold for base year recalculations. As such, we recalculated the 20X2 emissions presented in the current year report to include operations of Company Y for the full year. The operations of Company Y are also included in the current-year information presented in this report.

Any exclusions of emissions data from sources, facilities or operations must be disclosed and justified.

6.2 Optional disclosures

Although the optional disclosures are not required by the GHG Protocol, the disclosures should be made if the reporting entity determines excluding such disclosures would make the presentation of the GHG emissions misleading.

Excerpt from GHG Protocol

Corporate Standard

Chapter 9

Optional information

A public GHG emissions report should include, when applicable, the following additional information:

Information on emissions and performance

- A description of performance measured against internal and external benchmarks.
- Relevant ratio performance indicators (e.g. emissions per kilowatt-hour generated, tonne of material production, or sales).
- An outline of any GHG management/reduction programs or strategies.
- Information on any contractual provisions addressing GHG-related risks and obligations.
- An outline of any external assurance provided and a copy of any verification statement, if applicable, of the reported emissions data.
- Information on the causes of emissions changes that did not trigger a base year emissions recalculation (e.g., process changes, efficiency improvements, plant closures).
- GHG emissions data for all years between the base year and the reporting year (including details of and reasons for recalculations, if appropriate)
- Information on the quality of the inventory (e.g., information on the causes and magnitude of uncertainties in emission estimates) and an outline of policies in place to improve inventory quality. (see chapter 8).
- Information on any GHG sequestration.
- A list of facilities included in the inventory.
- A contact person.

Information on offsets

- Information on offsets that have been purchased or developed outside the inventory boundary, subdivided by GHG storage/removals and emissions reduction projects. Specify if the offsets are verified/certified (see chapter 8) and/or approved by an external GHG program (e.g., the Clean Development Mechanism, Joint Implementation).
- Information on reductions at sources inside the inventory boundary that have been sold/transferred as offsets to a third party. Specify if the reduction has been verified/certified and/or approved by an external GHG program (see chapter 8).

Scope 2 Guidance

Chapter 7

Scope 2 quality criteria.

- Companies **may** provide a reference to an internal or external third-party assurance process, or assurance of conformance provided by a certification program, supplier label, green power program, etc. An attestation form may be used to describe the chain of custody of purchased certificates or other contractual instruments.

Avoided emissions estimation. Consistent with Chapter 8 of the Corporate Standard, companies **may** separately report an estimation of GHG emissions avoided from a project or action (also see Section 6.9). This quantification should be based on project-level accounting, with methodologies and assumptions documented (including to what the reduction is being compared). See the GHG Project Protocol and GHG Protocol Guidelines for Grid-Connected Electricity Projects for example methodologie.

Scope 3 Standard

Chapter 11

11.2 Optional information

A public GHG emissions report should include, when applicable, the following additional information:

- Qualitative information about emission sources not quantified
- Information on any GHG sequestration or removals, reported separately from scope 1, scope 2 and scope 3 emissions
- Information on project-based GHG reductions calculated using the project method (e.g., using the GHG Protocol for Project Accounting), reported separately from scope 1, scope 2, and scope 3 emissions
- Information on avoided emissions (e.g., from the use of sold products), reported separately from scope 1, scope 2, and scope 3 emissions
- Quantitative assessments of data quality
- Information on inventory uncertainty (e.g., information on the causes and magnitude of uncertainties in emission estimates) and an outline of policies in place to improve inventory quality
- The type of assurance performed (first or third party), the relevant competencies of the assurance provider(s), and the opinion issued by the assurance provider
- Relevant performance indicators and intensity ratios Information on the company's GHG management and reduction activities, including scope 3 reduction targets, supplier engagement strategies, product GHG reduction initiatives, etc.
- Information on supplier/partner engagement and performance
- Information on product performance
- A description of performance measured against internal and external benchmarks
- Information on purchases of GHG reduction instruments, such as emissions allowances and offsets, from outside the inventory boundary
- Information on reductions at sources inside the inventory boundary that have been sold/transferred as offsets to a third party
- Information on any contractual provisions addressing GHG-related risks or obligations
- Information on the causes of emissions changes that did not trigger a scope 3 base year emissions recalculation
- GHG emissions data for all years between the scope 3 base year and the reporting year (including details of and reasons for recalculations, if appropriate)
- Additional explanations to provide context to the data

Certain required disclosures included in the GHG Protocol are omitted from the excerpt above but are included and discussed in section 6.1 of this publication.

The GHG Protocol includes several optional disclosures about the reporting entity's performance and strategies that would provide users of the sustainability information with insight on how well the reporting entity is managing its emissions and its plans to further reduce emissions.

In addition to the required disclosures on inventory boundary described in section 6.1 above, a reporting entity may disclose a list of the facilities that are included in the reported emissions inventory. A reporting entity may have contracts that address GHG-related risks and obligations (e.g., a joint operation may have a contract that specifies how the ownership of emissions or the responsibility for managing emissions and associated risk is distributed between the parties involved in the joint operation). In these cases, the reporting entity may disclose information about the contractual provisions that address GHG-related risks and obligations.

The Scope 3 Standard includes an optional disclosure on qualitative information about any emission sources that are not quantified and included in the reported emissions. We believe this optional disclosure should also apply to any excluded Scope 1 and Scope 2 emissions.

The GHG Protocol also includes optional disclosures about the base year. If there are any significant emissions changes in the current year that have not triggered base year recalculations (e.g., process changes, efficiency improvements, organic structural growth (e.g., opening newly constructed facilities) or decline (e.g., facilities closures)), a reporting entity may disclose the causes of these changes. A reporting entity may also disclose emissions data for all years between the base year and the current reporting year calculated in accordance with the entity's base-year recalculation policy.

When base-year and prior-year (if applicable) recalculations have been made, a reporting entity may disclose emissions previously reported in prior years (i.e., emissions before recalculation) to show the effect of the change in the reporting entity's structure over time.

If a reporting entity receives an external assurance report, it should provide that report. A reporting entity may also disclose information about the external assurance received, which can include the type of assurance, relevant competencies of the assurance provider, and conclusion or opinion of the assurance provider.

The GHG Protocol also includes optional disclosures on the quality of a reporting entity's GHG inventory, including the following:

- Information on the cause and size of estimates related to the emissions inventory
- A qualitative assessment of the quality of the information presented
- A description of the reporting entity's policies to improve the quality of the emissions inventory

Additionally, a report may disclose the contact information for an individual at the reporting entity that can respond to questions about the emissions inventory.

Optional disclosures related to GHG offsets (including both GHG removal and avoidance)

GHG removals are the elimination of GHGs after they have entered the atmosphere, which includes sequestration (i.e., the long-term storage of captured GHGs). A reporting entity may disclose information on GHG sequestration or removals, as applicable (e.g., in biomass-based industries, such as forestry), but these disclosures must be separate from the scopes (i.e., on a gross basis). However, we believe an emissions value net of any offsets (excluding offsets sold or transferred to a third party) may be separately and distinctly reported from the scopes.

GHG avoidance is the prevention of GHGs being emitted into the atmosphere. When a reporting entity achieves GHG reductions or avoids emissions due to a project or action within their inventory, it may disclose:

- An estimate of the emissions reduction or emissions avoided, based on the Greenhouse Gas Protocol project-level accounting guidance. This information must be presented separately from the scopes
- The methodology and assumptions used to calculate the emissions reduction or emissions avoided, including to what the reduction is being compared

When a reporting entity purchases or develops offsets outside of the inventory boundary, it may disclose:

- Information about the offsets, disaggregated by storage/removals and emissions reduction projects
- Whether the offsets are verified or certified
- Whether the offsets are approved by an external GHG program

If a reporting entity discloses information about offsets for emissions reductions at sources inside its inventory boundary, it should disclose the amount of any offsets that have been sold or transferred to third parties. The reporting entity may disclose the following information about those sold or transferred offsets:

- Information about the offsets
- Whether the offsets are verified or certified
- Whether the offsets are approved by an external GHG program

A Abbreviations used in this publication

Abbreviation	Greenhouse Gas Protocol
AR4	Fourth Assessment Report of IPCC
AR5	Fifth Assessment Report of IPCC
AR6	Sixth Assessment Report of IPCC
BTU	British Thermal Unit
CFCs	Chlorofluorocarbons
CH_4	Methane
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
Corporate Standard	Corporate Accounting and Reporting Standard
EACs	Energy attribute certificates
EFRAG	European Financial Reporting Advisory Group
eGRID	Emissions & Generation Resource Integrated Database
EPA	Environmental Protection Agency
ERCOT	Electricity Reliability Council of Texas
ESRS	European Sustainability Reporting Standards
EU	European Union
FASB	Financial Accounting Standards Board
GHG	Greenhouse gas
GOs	Guarantees of Origin
GWP	Global warming potential
HFCs	Hydrofluorocarbons
IASB	International Accounting Standards Board
ICT	Information and Communication Technology
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
ISSB	International Sustainability Standards Board
JOA	Joint operating agreement
KWh	Kilowatt hours
LBM	Location-based method
MBM	Market-based method
MWh	Megawatt-hour
N_2O	Nitrous oxide
NF_3	Nitrogen trifluoride
NOx	nitrogen oxides
PFCs	Perfluorocarbons
PPAs	Power purchase agreements
RECs	Renewable energy certificates

Abbreviation	Greenhouse Gas Protocol
RPS	Renewable Portfolio Standards
Scope 3 Guidance	Technical Guidance for Calculating Scope 3 Emissions
Scope 3 Standard	Corporate Value Chain (Scope 3) Accounting and Reporting Standard
SEC	Securities and Exchange Commission
SF_6	Sulfur hexafluoride
T&D	Transmission and distribution
UNFCCC	United Nations Framework Convention on Climate Change
VPPAs	Virtual power purchase agreements
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute

B Glossary

The Corporate Standard, Scope 2 Guidance and Scope 3 Standard include separate glossaries defining the key terms used in each standard and guidance. This appendix includes excerpts from each of the glossaries defining the terms relevant to our publication. These key terms often overlap and may not be described precisely the same in the Corporate Standard, Scope 2 Guidance and Scope 3 Standard. The standard or guidance that describes the term differently is indicated with an asterisk (*).

Publication	Glossary definition
Scope 2 Guidance Scope 3 Standard	**Activity data:** A quantitative measure of a level of activity that results in GHG emissions. Activity data is multiplied by an emissions factor to derive the GHG emissions associated with a process or an operation. Examples of activity data include 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.
Scope 2 Guidance Corporate Standard*	**Additionality:** A criterion often applied to GHG project activities, stipulating that project-based GHG reductions should only be quantified if the project activity "would not have happened anyway"—i.e., that the project activity (or the same technologies or practices that it employs) would not have been implemented in its baseline scenario.
Scope 2 Guidance Scope 3 Standard*	**Allocation:** The process of assigning responsibility for GHG emissions from a specific generating unit or other system (e.g., vehicle, business unit corporation) among its various users of the product or service.
Scope 2 Guidance Corporate Standard*	**Allowance:** A commodity issued by an emissions trading program that gives its holder the right to emit a certain quantity of GHG emissions.
Scope 3 Standard Corporate Standard*	**Associate:** An entity in which the parent company has significant influence but neither financial control nor joint financial control.
Scope 3 Standard	**Assurance:** The level of confidence that the inventory and report are complete, accurate, consistent, transparent, relevant, and without material misstatements.
Scope 3 Standard	**Assurer:** A competent individual or body who is conducting the assurance process, whether internally within the company or externally.
Scope 2 Guidance	**Attribute:** Descriptive or performance characteristics of a particular generation resource. For scope 2 GHG accounting, the GHG emission rate attribute of the energy generation is required to be included in a contractual instrument in order to make a claim.
Scope 2 Guidance Scope 3 Standard Corporate Standard*	**Audit trail:** Well-organized and transparent historical records documenting how the GHG inventory was compiled.
Scope 2 Guidance	**Avoided emissions:** An assessment of emissions reduced or avoided compared to a reference case or baseline scenario.

Publication	Glossary definition
Scope 3 Standard Corporate Standard*	**Base year:** A historical datum (e.g., year) against which a company's emissions are tracked over time.
Corporate Standard Scope 2 Guidance Scope 3 Standard	**Base year emissions:** GHG emissions in the base year
Scope 2 Guidance Scope 3 Standard Corporate Standard*	**Base year emissions recalculation:** Recalculation of emissions in the base year to reflect a change in the structure of the company or a change in the accounting methodology used, to ensure data consistency over time.
Scope 3 Standard Corporate Standard*	**Baseline:** A hypothetical scenario for what GHG emissions would have been in the absence of a GHG project or reduction activity.
Scope 2 Guidance	**Baseline scenario:** A hypothetical description of what would have most likely occurred in the absence of any considerations about climate change mitigation. For grid-connected project activities, the baseline scenario is presumed to involve generation from the build margin, the operating margin, or a combination of the two.
Scope 2 Guidance Corporate Standard*	**Biofuels:** Fuel made from plant material, such as wood, straw, and ethanol from plant matter.
Scope 2 Guidance Scope 3 Standard	**Biogenic CO2 emissions:** CO2 emissions from the combustion or biodegradation of biomass.
Scope 2 Guidance	**Biogenic gas (biogas):** Methane that is produced from a biomass resource, such as animal waste, agricultural waste, landfill gas, municipal waste, or digester gas.
Scope 2 Guidance Scope 3 Standard	**Biomass:** Any material or fuel produced by biological processes of living organisms, including organic non-fossil material of biological origin (e.g., plant material), biofuels (e.g., liquid fuels produced from biomass feedstocks), biogenic gas (e.g., landfill gas), and biogenic waste (e.g., municipal solid waste from biogenic sources).
Corporate Standard	**Boundaries:** GHG accounting and reporting boundaries can have several dimensions, (i.e., organizational, operational, geographic, business unit, and target boundaries). The inventory boundary determines which emissions are accounted and reported by the company.
Scope 2 Guidance	**Bundled:** An energy attribute certificate or other instrument that is traded with the underlying energy produced.
Scope 3 Standard	**Business travel:** Transportation of employees for business-related activities.
Corporate Standard Scope 2 Guidance	**Cap-and-trade system:** A system that sets an overall emissions limit, allocates emissions allowances to participants, and allows them to trade allowances and emission credits with each other.

Publication	Glossary definition
Scope 3 Standard	**Capital goods:** Final goods that have an extended life and are used by the company to manufacture a product, provide a service, or sell, store, and deliver merchandise. In financial accounting, capital goods are treated as fixed assets or plant, property and equipment (PP&E). Examples of capital goods include equipment, machinery, buildings, facilities, and vehicles.
Corporate Standard	**Capital Lease:** A lease which transfers substantially all the risks and rewards of ownership to the lessee and is accounted for as an asset on the balance sheet of the lessee. Also known as a Financial or Finance Lease. Leases other than Capital/Financial/Finance leases are Operating leases. Consult an accountant for further detail as definitions of lease types differ between various accepted financial standards.
Corporate Standard	**Carbon sequestration:** The uptake of CO2 and storage of carbon in biological sinks.
Scope 3 Standard	**Category:** See "Scope 3 category"
Scope 2 Guidance	**Certificate:** See energy attribute certificate
Scope 2 Guidance Scope 3 Standard Corporate Standard*	**CO2 equivalent (CO2e):** The universal unit of measurement to indicate the global warming potential (GWP) of each greenhouse gas, expressed in terms of the GWP of one unit of carbon dioxide. It is used to evaluate releasing (or avoiding releasing) different greenhouse gases against a common basis.
Corporate Standard Scope 2 Guidance	**Cogeneration unit/combined heat and power (CHP):** A facility producing both electricity and steam/heat using the same fuel supply.
Scope 3 Standard	**Component:** An intermediate product.
Corporate Standard	**Consolidation:** Combination of GHG emissions data from separate operations that form part of one company or group of companies.
Scope 2 Guidance Scope 3 Standard	**Consumer:** The end consumer or final user of a product.
Scope 2 Guidance	**Contractual instrument:** Any type of contract between two parties for the sale and purchase of energy bundled with attributes about the energy generation, or for unbundled attribute claims. Markets differ as to what contractual instruments are commonly available or used by companies to purchase energy or claim specific attributes about it, but they can include energy attribute certificates (RECs, GOs, etc), direct contracts (for both low-carbon, renewable or fossil fuel generation), supplier-specific emission rates, and other default emission factors representing the untracked or unclaimed energy and emissions (termed the residual mix) if a company does not have other contractual information that meet the Scope 2 Quality Criteria.
Corporate Standard Scope 2 Guidance Scope 3 Standard	**Control:** The ability of a company to direct the policies of another operation. More specifically, it is defined as either operational control (the organization or one of its subsidiaries has the full authority to introduce and implement its operating policies at the operation) or financial control (the organization has the ability to direct the financial and operating policies of the operation with a view to gaining economic benefits from its activities).

Publication	Glossary definition
Scope 3 Standard	**Co-product:** One of multiple products produced by a facility or other system that has a market value.
Scope 3 Standard	**Cradle-to-gate:** All emissions that occur in the life cycle of purchased products, up to the point of receipt by the reporting company (excluding emissions from sources that are owned or controlled by the reporting company).
Scope 3 Standard	**Customer**: An entity that purchases or acquires the products of another entity (i.e., a supplier). A customer may be a business customer or an end consumer.
Scope 3 Standard	**Debt investment:** Investment in an entity (e.g., through loans or bonds) for a fixed period of time that entitles the holder to repayment of the original investment (i.e., principal sum) plus interest, but does not entitle the investor to ownership in the entity.
Corporate Standard Scope 2 Guidance Scope 3 Standard	**Direct emissions:** Emissions from sources that are owned or controlled by the reporting company.
Corporate Standard	**Direct monitoring:** Direct monitoring of exhaust stream contents in the form of continuous emissions monitoring (CEM) or periodic sampling.
Scope 2 Guidance	**Distributed generation:** Decentralized, grid-connected, or off-grid energy facilities located in or near the place where energy is used.
Scope 2 Guidance Corporate Standard*	**Double counting:** Two or more reporting companies claiming the same emissions or reductions in the same scope, or a single company reporting the same emissions in multiple scopes.
Scope 3 Standard	**Downstream emissions:** Indirect GHG emissions from sold goods and services. Downstream emissions also include emissions from products that are distributed but not sold (i.e., without receiving payment).
Scope 3 Standard	**Economic allocation:** Allocating the emissions of an activity based on the market value of each output/product.
Scope 2 Guidance	**Electric utility:** An electric power company whose operations may include generation, transmission, and distribution of electricity for sale. Also called electricity or energy supplier.
Scope 2 Guidance	**Eligibility criteria:** Features or conditions defined by a policy or program that determine which energy generation facilities can participate in the program or whose certificates will fulfill programmatic requirements.
Scope 2 Guidance Scope 3 Standard Corporate Standard*	**Emission factor:** A factor that converts activity data into GHG emissions data (e.g., kg CO2e emitted per liter of fuel consumed, kg CO2e emitted per kilometer traveled, etc.).
Corporate Standard Scope 2 Guidance Scope 3 Standard	**Emissions:** The release of greenhouse gases into the atmosphere.

Publication	Glossary definition
Scope 3 Standard	**Employee commuting:** Transportation of employees between their homes and their worksites.
Scope 2 Guidance	**Energy:** Formally, energy is defined as the amount of work a physical system can do on another. In this Guidance, energy refers to electrical energy generated by power plants and delivered to energy users over a power grid.
Scope 2 Guidance	**Energy attribute certificate:** A category of contractual instruments used in the energy sector to convey information about energy generation to other entities involved in the sale, distribution, consumption, or regulation of electricity. This category includes instruments that may go by several different names, including certificates, tags, credits, etc.
Scope 2 Guidance	**Energy generation facility:** Any technology or device that generates energy for consumer use, including everything from utility-scale fossil fuel power plants to rooftop solar panels.
Scope 2 Guidance Scope 3 Standard	**Equity investment:** A share of equity interest in an entity. The most common form is common stock. Equity entitles the holder to a pro rata ownership in the company.
Scope 2 Guidance Scope 3 Standard	**Equity share approach:** A consolidation approach whereby a company accounts for GHG emissions from operations according to its share of equity in the operation. The equity share reflects economic interest, which is the extent of rights a company has to the risks and rewards flowing from an operation.
Corporate Standard	**Equity share:** 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.
Corporate Standard	**Estimation uncertainty:** Uncertainty that arises whenever GHG emissions are quantified, due to uncertainty in data inputs and calculation methodologies used to quantify GHG emissions.
Scope 3 Standard	**Extrapolated data:** Data from a similar process or activity that is used as a stand-in for the given process or activity, and has been customized to be more representative of the given process or activity.
Scope 3 Standard	**Final product:** Goods and services that are consumed by the end user in their current form, without further processing, transformation, or inclusion in another product. Final products include not only products consumed by end consumers, but also products consumed by businesses in the current form (e.g., capital goods) and products sold to retailers for resale to end consumers (e.g., consumer products).
Scope 2 Guidance Corporate Standard*	**Finance lease:** A lease that transfers substantially all the risks and rewards of ownership to the lessee and is accounted for as an asset on the balance sheet of the lessee. Also known as a capital or financial lease. Leases other than capital/financial/finance leases are operating leases.
Scope 2 Guidance Scope 3 Standard	**Financial control:** The ability to direct the financial and operating policies of an entity with a view to gaining economic benefits from its activities.

Publication	Glossary definition
Scope 2 Guidance Scope 3 Standard	**Financial control approach:** A consolidation approach whereby a company accounts for 100 percent of the GHG emissions over which it has financial control. It does not account for GHG emissions from operations in which it owns an interest but does not have financial control.
Scope 3 Standard	**First party assurance:** Person(s) from within the reporting company but independent of the GHG inventory process conducts internal assurance. (Also called "self-" or "internal-assurance.")
Corporate Standard	**Fixed asset investment:** Equipment, land, stocks, property, incorporated and non-incorporated joint ventures, and partnerships over which the parent company has neither significant influence nor control.
Scope 3 Standard	**Franchise:** A business operating under a license (granted by a franchisor) to sell or distribute the franchisor's goods or services within a certain location.
Scope 3 Standard	**Franchisee:** An entity that operates a franchise and pays fees to a company (i.e., the franchisor) for the license to sell or distribute the franchisor's goods or services.
Scope 3 Standard	**Franchisor:** A company that grants licenses to other entities (i.e., franchisees) to sell or distribute its goods or services, and in return receives payments, such as royalties for the use of trademarks and other services.
Scope 2 Guidance	**Fuel mix disclosure:** A report by energy suppliers to their consumers disclosing the generation resources and associated attributes (such as GHG emissions and nuclear waste quantities) provided by that supplier. Disclosure laws often aim to enable informed customer choice in deregulated or liberalized markets.
Corporate Standard	**Fugitive emissions:** Emissions that are not physically controlled but result from the intentional or unintentional releases of GHGs. They commonly arise from the production, processing transmission storage and use of fuels and other chemicals, often through joints, seals, packing, gaskets, etc.
Scope 2 Guidance	**Generation:** The electrical energy produced by a power plant or project activity.
Corporate Standard	**GHG capture:** Collection of GHG emissions from a GHG source for storage in a sink.
Corporate Standard	**GHG credit:** GHG offsets can be converted into GHG credits when used to meet an externally imposed target. A GHG credit is a convertible and transferable instrument usually bestowed by a GHG program.
Corporate Standard	**GHG offset:** Offsets are discrete GHG reductions used to compensate for (i.e., offset) GHG emissions elsewhere, for example to meet a voluntary or mandatory GHG target or cap. Offsets are calculated relative to a baseline that represents a hypothetical scenario for what emissions would have been in the absence of the mitigation project that generates the offsets. To avoid double counting, the reduction giving rise to the offset must occur at sources or sinks not included in the target or cap for which it is used.

Publication	Glossary definition
Scope 2 Guidance Corporate Standard*	**GHG program:** A generic term for: (1) any voluntary or mandatory, government or nongovernment initiative, system, or program that registers, certifies, or regulates GHG emissions; or (2) any authorities responsible for developing or administering such initiatives, systems, or programs.
Scope 2 Guidance Corporate Standard*	**GHG project:** A specific activity or set of activities intended to reduce GHG emissions, increase the storage of carbon, or enhance GHG removals from the atmosphere. A GHG project may be a standalone project or a component of a larger non-GHG project.
Corporate Standard	**GHG registry:** A public database of organizational GHG emissions and/or project reductions. For example, the US Department of Energy 1605b Voluntary GHG Reporting Program, CCAR, World Economic Forum's Global GHG Registry. Each registry has its own rules regarding what and how information is reported.
Corporate Standard	**GHG removal:** Absorption or sequestration of GHGs from the atmosphere.
Corporate Standard	**GHG sink:** Any physical unit or process that stores GHGs; usually refers to forests and underground/deep sea reservoirs of CO2.
Corporate Standard	**GHG source:** Any physical unit or process which releases GHG into the atmosphere.
Corporate Standard	**GHG trades:** All purchases or sales of GHG emission allowances, offsets, and credits.
Corporate Standard Scope 2 Guidance Scope 3 Standard	**Global warming potential (GWP):** 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.
Scope 3 Standard	**Good:** A tangible product.
Scope 2 Guidance Corporate Standard*	**Green power:** A generic term for renewable energy sources and specific clean energy technologies that emit fewer GHG emissions relative to other sources of energy that supply the electric grid. Includes solar photovoltaic panels, solar thermal energy, geothermal energy, landfill gas, low-impact hydropower, and wind turbines. Resources included in a given certification, reporting, or recognition program may vary.
Scope 2 Guidance	**Green power product/green tariff:** A consumer option offered by an energy supplier distinct from the "standard" offering. These are often renewables or other low-carbon energy sources, supported by energy attribute certificates or other contracts.
Scope 2 Guidance Scope 3 Standard	**Greenhouse gas inventory:** A quantified list of an organization's GHG emissions and sources.
Scope 2 Guidance Corporate Standard* Scope 3 Standard*	**Greenhouse gases (GHG):** For the purposes of this standard, GHGs are the seven gases covered by the UNFCCC: carbon dioxide (CO2); methane (CH4); nitrous oxide (N2O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); sulphur hexafluoride (SF6), and nitrogen trifluoride (NF3).

Publication	Glossary definition
Scope 2 Guidance	**Grid:** A system of power transmission and distribution (T&D) lines under the control of a coordinating entity or "grid operator," which transfers electrical energy generated by power plants to energy users—also called a "power grid." The boundaries of a power grid are determined by technical, economic, and regulatory-jurisdictional factors.
Scope 2 Guidance	**Grid operator:** The entity responsible for implementing procedures to dispatch a set of power plants in a given area to meet demand for electricity in real time. The precise institutional nature of the grid operator will differ from system to system. The grid operator may be alternately referred to as a "system dispatcher," "control area operator," "independent system operator," or "regional transmission organization," etc.
Corporate Standard	**Group company / subsidiary:** The parent company has the ability to direct the financial and operating policies of a group company/subsidiary with a view to gaining economic benefits from its activities.
Corporate Standard	**Heating value:** The amount of energy released when a fuel is burned completely. Care must be taken not to confuse higher heating values (HHVs), used in the US and Canada, and lower heating values, used in all other countries (for further details refer to the calculation tool for stationary combustion available at www.ghgprotocol.org).
Scope 2 Guidance Corporate Standard* Scope 3 Standard*	**Indirect GHG emissions:** Emissions that are a consequence of the operations of the reporting company, but occur at sources owned or controlled by another company. This includes scope 2 and scope 3.
Corporate Standard	**Insourcing:** The administration of ancillary business activities, formally performed outside of the company, using resources within a company.
Corporate Standard	**Intensity ratios:** Ratios that express GHG impact per unit of physical activity or unit of economic value (e.g. tonnes of CO2 emissions per unit of electricity generated). Intensity ratios are the inverse of productivity/efficiency ratios.
Corporate Standard Scope 2 Guidance	**Intensity target:** A target defined by reduction in the ratio of emissions and a business metric over time e.g., reduce CO2 per metric ton of cement by 12 percent between 2000 and 2008.
Scope 2 Guidance Corporate Standard*	**Intergovernmental Panel on climate change (IPCC):** An international body of climate change scientists. The role of the IPCC is to assess the scientific, technical, and socioeconomic information relevant to the understanding of the risk of human-induced climate change
Scope 3 Standard	**Intermediate product:** Goods that are inputs to the production of other goods or services that require further processing, transformation, or inclusion in another product before use by the end consumer. Intermediate products are not consumed by the end user in their current form.
Corporate Standard	**Inventory:** A quantified list of an organization's GHG emissions and sources.
Scope 2 Guidance Corporate Standard*	**Inventory boundary:** An imaginary line that encompasses the direct and indirect emissions included in the inventory. It results from the chosen organizational and operational boundaries.

Publication	Glossary definition
Corporate Standard Scope 2 Guidance	**Inventory quality:** The extent to which an inventory provides a faithful, true, and fair account of an organization's GHG emissions.
Scope 2 Guidance	**Jurisdiction:** A geopolitical region under a single legal and regulatory authority. For market boundaries for certificate use and trading described in this guidance, jurisdictions are typically countries but may be multi-country regions.
Corporate Standard	**Kyoto Protocol:** A protocol to the United Nations Framework Convention on Climate Change (UNFCCC). Once entered into force it will require countries listed in its Annex B (developed nations) to meet reduction targets of GHG emissions relative to their 1990 levels during the period of 2008–12.
Corporate Standard	**Leakage (Secondary effect):** Leakage occurs when a project changes the availability or quantity of a product or service that results in changes in GHG emissions elsewhere.
Scope 3 Standard	**Leased asset:** Any asset that is leased (e.g., facilities, vehicles, etc.)
Scope 3 Standard	**Lessee:** An entity that has the right to use an asset through a contract with the owner of the asset (i.e., the lessor).
Scope 3 Standard	**Lessor:** An entity that owns an asset and leases it to a third party (i.e., the lessee).
Scope 3 Standard	**Level of assurance:** Refers to the degree of confidence stakeholders can have over the information in the inventory report.
Scope 2 Guidance	**Levy Exemption Certificate (LEC):** Certificates used in the U.K. to provide energy suppliers with evidence needed to demonstrate to HMRC that electricity supplied to U.K. business customers is exempt from the Climate Change Levy.
Scope 2 Guidance Scope 3 Standard	**Life cycle:** Consecutive and interlinked stages of a product system, from raw material acquisition or generation of natural resources to end of life.
Scope 2 Guidance Scope 3 Standard Corporate Standard*	**Life cycle assessment (LCA):** Compilation and evaluation of the inputs, outputs, and the potential environmental impacts of a product system throughout its life cycle.
Scope 2 Guidance	**Location-based method for scope 2 accounting:** A method to quantify scope 2 GHG emissions based on average energy generation emission factors for defined locations, including local, subnational, or national boundaries.
Scope 2 Guidance	**Market-based method for scope 2 accounting:** A method to quantify scope 2 GHG emissions based on GHG emissions emitted by the generators from which the reporter contractually purchases electricity bundled with instruments, or unbundled instruments on their own.
Scope 3 Standard Corporate Standard*	**Material misstatement:** Individual or aggregate errors, omissions and misrepresentations that significantly impact the GHG inventory results and could influence a user's decisions.
Scope 3 Standard	**Materiality:** Concept that individual or the aggregation of errors, omissions and misrepresentations could affect the GHG inventory and could influence the intended users' decisions.

Publication	Glossary definition
Corporate Standard	**Materiality threshold:** A concept employed in the process of verification. It is often used to determine whether an error or omission is a material discrepancy or not. It should not be viewed as a de minimus for defining a complete inventory.
Scope 2 Guidance	**Megawatt (MW):** A unit of electrical power. One megawatt of power output is equivalent to the transfer of one million joules of electrical energy per second to the grid.
Scope 2 Guidance	**Megawatt-hour (MWh):** A unit of electrical energy equal to 3.6 billion joules; the amount of energy produced over one hour by a power plant with an output of 1 MW.
Corporate Standard	**Mobile combustion:** Burning of fuels by transportation devices such as cars, trucks, trains, airplanes, ships etc.
Corporate Standard	**Model uncertainty:** GHG quantification uncertainty associated with mathematical equations used to characterize the relationship between various parameters and emission processes.
Scope 2 Guidance	**Net metering:** A method for energy suppliers to credit customers for electricity that they generate on site in excess of their own electricity consumption and sell back to the grid. Any electricity purchases from the gird are deducted (or "netted") from the generation sent to the grid. The specific financial rules for net metering may vary by country and state.
Scope 3 Standard	**Non-production-related procurement:** Purchased goods and services that are not integral to the company's products, but are instead used to enable operations (also called indirect procurement).
Scope 2 Guidance	**Null power**: Energy from which energy attribute certificates or other instruments have been separated and sold off, leaving the underlying power without specific attributes. Also called "commodity electricity."
Scope 2 Guidance	**Offset credit:** Offset credits (also called offsets, or verified emission reductions) represent the reduction, removal, or avoidance of GHG emissions from a specific project that is used to compensate for GHG emissions occurring elsewhere, for example to meet a voluntary or mandatory GHG target or cap. Offsets are calculated relative to a baseline that represents a hypothetical scenario for what emissions would have been in the absence of the mitigation project that generates the offsets. To avoid double counting, the reduction giving rise to the offset must occur at sources or sinks not included in the target or cap for which it is used.
Scope 2 Guidance	**On-site generation:** Electricity generated by a generation facility located where some or all of the energy is used. If the generation facility is owned and operated by the consuming company, it can be called "self-generation." On-site generation is a form of distributed energy generation.
Scope 2 Guidance Corporate Standard*	**Operating lease:** A lease that does not transfer the risks and rewards of ownership to the lessee and is not recorded as an asset in the balance sheet of the lessee. Leases other than operating leases are capital/financial/finance leases.

Publication	Glossary definition
Corporate Standard	**Operation:** A generic term used to denote any kind of business, irrespective of its organizational, governance, or legal structures. An operation can be a facility, subsidiary, affiliated company or other form of joint venture.
Scope 2 Guidance Scope 3 Standard Corporate Standard*	**Operational boundaries:** The boundaries that determine the direct and indirect emissions associated with operations owned or controlled by the reporting company.
Scope 2 Guidance Scope 3 Standard	**Operational control:** A consolidation approach whereby a company accounts for 100 percent of the GHG emissions over which it has operational control. It does not account for GHG emissions from operations in which it owns an interest but does not have operational control.
Corporate Standard	**Organic growth/decline:** Increases or decreases in GHG emissions as a result of changes in production output, product mix, plant closures and the opening of new plants.
Corporate Standard Scope 2 Guidance Scope 3 Standard	**Organizational boundaries:** The boundaries that determine the operations owned or controlled by the reporting company, depending on the consolidation approach taken (equity or control approach).
Corporate Standard Scope 3 Standard	**Outsourcing:** The contracting out of activities to other businesses.
Corporate Standard	**Parameter uncertainty:** GHG quantification uncertainty associated with quantifying the parameters used as inputs to estimation models.
Scope 3 Standard	**Parent company:** An entity that has one or more subsidiaries.
Scope 3 Standard	**Physical allocation:** Allocating the emissions of an activity based on an underlying physical relationship between the multiple inputs/outputs and the quantity of emissions generated.
Scope 2 Guidance	**Power purchase agreement (PPA):** A type of contract that allows a consumer, typically large industrial or commercial entities, to form an agreement with a specific energy generating unit. The contract itself specifies the commercial terms including delivery, price, payment, etc. In many markets, these contracts secure a long-term stream of revenue for an energy project. In order for the consumer to say they are buying the electricity of the specific generator, attributes shall be contractually transferred to the consumer with the electricity.
Scope 3 Standard	**Primary data:** Data from specific activities within a company's value chain.
Corporate Standard	**Primary effects:** The specific GHG reducing elements or activities (reducing GHG emissions, carbon storage, or enhancing GHG removals) that the project is intended to achieve.
Scope 3 Standard	**Process:** A set of interrelated or interacting activities that transforms or transports a product.
Corporate Standard	**Process emissions:** Emissions generated from manufacturing processes, such as the CO2 that is arises from the breakdown of calcium carbonate (CaCO3) during cement manufacture.

Publication	Glossary definition
Scope 3 Standard	**Product:** Any good or service.
Scope 3 Standard	**Production-related procurement:** Purchased goods that are directly related to the production of a company's products (also called direct procurement).
Corporate Standard	**Productivity/efficiency ratios:** Ratios that express the value or achievement of a business divided by its GHG impact. Increasing efficiency ratios reflect a positive performance improvement. e.g. resource productivity (sales per tonne GHG). Productivity/efficiency ratios are the inverse of intensity ratios.
Scope 3 Standard	**Project finance:** Long term financing of projects (e.g., infrastructure and industrial projects) by equity investors (sponsors) and debt investors (financiers), based on the projected cash flows of the project rather than the balance sheet of the sponsors/lenders.
Scope 3 Standard	**Proxy data:** Data from a similar process or activity that is used as a stand-in for the given process or activity without being customized to be more representative of the given process or activity.
Corporate Standard	**Ratio indicator:** Indicators providing information on relative performance such as intensity ratios or productivity/efficiency ratios.
Corporate Standard Scope 2 Guidance	**Renewable energy:** Energy taken from sources that are inexhaustible, (e.g., wind, water, solar, geothermal energy, and biofuels).
Scope 2 Guidance	**Renewable energy certificate (REC):** A type of energy attribute certificate, used in the U.S. and Australia. In the U.S., a REC is defined as representing the property rights to the generation, environmental, social, and other non-power attributes of renewable electricity generation.
Scope 2 Guidance	**Renewable portfolio standards (RPS):** A state- or national-level policy that requires that a minimum amount (usually a percentage) of electricity supply provided by each supply company is to come from renewable energy.
Corporate Standard Scope 3 Standard	**Reporting:** Presenting data to internal management and external users such as regulators, shareholders, the general public or specific stakeholder groups.
Scope 3 Standard	**Reporting year:** The year for which emissions are reported.
Scope 2 Guidance	**Residual mix:** The mix of energy generation resources and associated attributes such as GHG emissions in a defined geographic boundary left after contractual instruments have been claimed/retired/canceled. The residual mix can provide an emission factor for companies without contractual instruments to use in a market-based method calculation.
Scope 2 Guidance	**Retailer (also retail provider):** The entity selling energy to final consumers, representing final process in the delivery of electricity from generation to the consumer. Also known as electric service provider, competitive power supplier or power marketer depending on the national or subnational regulation.
Corporate Standard	**Reversibility of reductions:** This occurs when reductions are temporary, or where removed or stored carbon may be returned to the atmosphere at some point in the future.

Publication	Glossary definition
Corporate Standard	**Rolling base year:** The process of shifting or rolling the base year forward by a certain number of years at regular intervals of time.
Corporate Standard	**Scientific Uncertainty:** Uncertainty that arises when the science of the actual emission and/or removal process is not completely understood.
Corporate Standard	**Scope:** Defines the operational boundaries in relation to indirect and direct GHG emissions.
Scope 2 Guidance Scope 3 Standard	**Scope 1 emissions:** Emissions from operations that are owned or controlled by the reporting company.
Scope 2 Guidance Scope 3 Standard*	**Scope 2 emissions:** Indirect emissions from the generation of purchased or acquired electricity, steam, heat or cooling consumed by the reporting company.
Scope 2 Guidance	**Scope 2 quality criteria:** A set of requirements that contractual instruments shall meet in order to be used in the market-based method for scope 2 accounting.
Scope 3 Standard	**Scope 3 activity:** An individual source of emissions included in a scope 3 category.
Scope 2 Guidance	**Scope 3 category:** One of the 15 types of scope 3 emissions.
Scope 2 Guidance Scope 3 Standard	**Scope 3 emissions:** All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.
Scope 3 Standard	**Secondary data:** Data that is not from specific activities within a company's value chain.
Corporate Standard	**Secondary effects (Leakage):** GHG emissions changes resulting from the project not captured by the primary effect(s). These are typically the small, unintended GHG consequences of a project.
Scope 2 Guidance	**Self-generation:** On-site generation owned or operated by the entity that consumes the power.
Corporate Standard	**Sequestered atmospheric carbon:** Carbon removed from the atmosphere by biological sinks and stored in plant tissue. Sequestered atmospheric carbon does not include GHGs captured through carbon capture and storage.
Scope 3 Standard	**Service:** An intangible product.
Scope 2 Guidance Corporate Standard*	**Significance threshold:** A qualitative or quantitative criterion used to define a significant structural change. It is the responsibility of the company, GHG program to which the company is reporting, or the company's verifier to determine the "significance threshold" for considering base-year emissions recalculation. In most cases the "significance threshold" depends on the use of the information, the characteristics of the company, and the features of structural changes.
Scope 3 Standard	**Significant influence:** Power to participate in the financial and operating policy decisions but not control them. A holding of 20 percent or more of the voting power (directly or through subsidiaries) will indicate significant influence unless it can be clearly demonstrated otherwise. See International Accounting Standard (IAS) 28 for additional criteria for determining significant influence.

Publication	Glossary definition
Corporate Standard	**Stationary Combustion:** Burning of fuels to generate electricity, steam, heat, or power in stationary equipment such as boilers, furnaces etc.
Corporate Standard	**Structural change:** A change in the organizational or operational boundaries of a company that result in the transfer of ownership or control of emissions from one company to another. Structural changes usually result from a transfer of ownership of emissions, such as mergers, acquisitions, divestitures, but can also include outsourcing/insourcing.
Scope 3 Standard	**Subsidiary:** An entity over which the parent company has control, including incorporated and non-incorporated joint ventures and partnerships over which the parent company has control.
Scope 2 Guidance	**Supplier:** An entity that provides or sells products to another entity (i.e., a customer). For this guidance, refers to electricity supplier.
Scope 2 Guidance	**Supplier quota:** Regulations requiring electricity suppliers to source a percentage of their supply from specified energy sources, e.g. Renewable Portfolio Standards in U.S. states. Regulations generally defined eligibility criteria that energy facilities must fulfill in order to be used to demonstrate compliance.
Scope 2 Guidance	**Supplier-specific emission factor:** An emission rate provided by an electricity supplier to its customers, reflecting the emissions associated with the energy it provides. Suppliers offering differentiated products (e.g., a renewable energy product) should provide specific emission rates for each product and ensure they are not double counted with standard power offers.
Scope 2 Guidance Scope 3 Standard	**Supply chain:** A network of organizations (e.g., manufacturers, wholesalers, distributors and retailers) involved in the production, delivery, and sale of a product to the consumer.
Scope 3 Standard	**Third party assurance:** Person(s) from an organization independent of the GHG inventory process conducts third party assurance. (Also called "External assurance.")
Scope 3 Standard	**Tier 1 supplier:** A supplier that provides or sells products directly to the reporting company. A tier 1 supplier is a company with which the reporting company has a purchase order for goods or services.
Scope 3 Standard	**Tier 2 supplier:** A supplier that provides or sells products directly to the reporting company's tier 1 supplier. A tier 2 supplier is a company with which the reporting company's tier 1 supplier has a purchase order for goods and services.
Scope 2 Guidance	**Tracking system:** A database or registry that helps execute energy attribute certificate issuance and cancellation/retirement/claims between account holders in the system. It can track information on certificates or generation occurring throughout the defined system. They are typically tied to geopolitical or grid operational boundaries.
Scope 2 Guidance	**Unbundled:** An energy attribute certificate or other instrument that is separate, and may be traded separately, from the underlying energy produced.

Publication	Glossary definition
Scope 3 Standard Corporate Standard*	**Uncertainty:** 1. Quantitative definition: Measurement that characterizes the dispersion of values that could reasonably be attributed to a parameter. 2. Qualitative definition: A general and imprecise term that refers to the lack of certainty in data and methodology choices, such as the application of non-representative factors or methods, incomplete data on sources and sinks, lack of transparency etc.
Corporate Standard	**United Nations Framework Convention on Climate Change (UNFCCC):** Signed in 1992 at the Rio Earth Summit, the UNFCCC is a milestone treaty that provides an overall framework for international efforts to mitigate climate change. The Kyoto Protocol is a protocol to the UNFCCC.
Scope 3 Standard	**Upstream emissions:** Indirect GHG emissions from purchased or acquired goods and services.
Scope 2 Guidance	**Utility:** See electric utility.
Scope 3 Standard	**Value chain:** In this standard, "value chain" refers to all of the upstream and downstream activities associated with the operations of the reporting company, including the use of sold products by consumers and the end-of-life treatment of sold products after consumer use.
Corporate Standard Scope 3 Standard	**Value chain emissions:** Emissions from the upstream and downstream activities associated with the operations of the reporting company.
Corporate Standard	**Verification:** An independent assessment of the reliability (considering completeness and accuracy) of a GHG inventory.
Scope 2 Guidance	**Vintage:** The date that electric generation occurs and/or was measured, from which an energy attribute certificate is issued. This should be distinguished from an energy facility's age (e.g. date that a generating unit commenced operation).
Scope 3 Standard	**Waste:** An output of a process that has no market value.

C GHG Protocol Disclosure Checklist

Greenhouse Gas Protocol (GHGP) disclosure checklist

Name of entity: Prepared by:

Reporting period: Approved by:

Instructions and explanatory comments

Completion of this checklist is recommended for all sustainability assurance engagements that include greenhouse gas (GHG) emissions as subject matter AND identify any of the below as the criteria (collectively, the "GHGP"):

- The GHG Protocol: A Corporate Accounting and Reporting Standard ("Corporate Standard")
- The GHG Protocol Scope 2 Guidance ("Scope 2 Guidance")
- The GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard ("Scope 3 Standard")
- The GHG Protocol Technical Guidance for Calculating Scope 3 Emissions ("Scope 3 Technical Guidance")

This checklist includes references to the required disclosures and other disclosures the GHGP collectively considers to be recommended and optional.

The Corporate Standard was published in 2004 and was amended by the Scope 2 Guidance when it was published in 2015. The Scope 3 Standard was published in 2011 as a supplement to the Corporate Standard, and the Scope 3 Technical Guidance was published in 2013 as a supplement to the Scope 3 Standard. As described in Table 1.1 of the Scope 3 Standard, Corporate-level GHG reporting options, there are three reporting options under the GHGP. Some sustainability reporting frameworks refer to the GHG Protocol and require the disclosure of Scope 3 emissions. Therefore, not all these options are available for entities applying those frameworks.

Option	Description	Applicable GHG Criteria — illustrative example of referencing criteria	Applicable sections of the checklist
1	A company reports its Scope 1 and Scope 2 GHG emissions and either: (1) no Scope 3 emissions; or (2) Scope 3 emissions from activities that are not aligned with any of the prescribed Scope 3 categories (the latter is very rare)	***The GHG Protocol: A Corporate Accounting and Reporting Standard*** *and* ***The GHG Protocol Scope 2 Guidance****.*	***Required***: 1, 2, 4, 5, 7 ***As applicable***: 3, 6, 8 — 17, 21, 29 — 43 ***Not applicable***: 18 — 20, 22 — 28
2	A company reports its Scope 1 and Scope 2 GHG emissions and some, but not all, relevant and material Scope 3 GHG emissions in accordance with the Scope 3 calculation guidance but not following the Scope 3 reporting guidance	***The GHG Protocol: A Corporate Accounting and Reporting Standard***, ***The GHG Protocol Scope 2 Guidance*** *and the* ***Technical Guidance for Calculating Scope 3 Emissions*** for the reported Scope 3 emissions*. The* ***GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard*** *is not applied*	***Required***: 1, 2, 4, 5, 7, 18 — 20 ***As applicable:*** 3, 6, 8 — 17, 21 — 43 ***Not applicable***: 19

Option	Description	Applicable GHG Criteria — illustrative example of referencing criteria	Applicable sections of the checklist
3	A company reports its Scope 1 and Scope 2 GHG emissions and all relevant and material categories of Scope 3 GHG emissions	***The GHG Protocol: A Corporate Accounting and Reporting Standard***, ***The GHG Protocol Scope 2 Guidance***, ***The GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard*** *and* ***The GHG Protocol Technical Guidance for Calculating Scope 3 Emissions***	***Required***: 1, 2, 4, 5, 7, 19, 20 ***As applicable:*** 3, 6, 8 — 17, 21 — 43 ***Not applicable***: 18

This checklist is intended to provide users with a summary of the required, recommended and optional disclosures within the standards and guidance from the GHGP described above in one place. In addition, this checklist does not include any incremental disclosure requirements from sustainability reporting frameworks that refer to the GHGP. Reading this checklist is not a replacement for reading the relevant portions of the GHGP standards and guidance. Entities should refer directly to the relevant GHGP source for the comprehensive disclosure requirements and additional context.

Items in the checklist denoted by the following symbol (§) are not explicit reporting requirements from the GHGP. In our view, entities should consider disclosing this information as it ensures the objectives of the related required disclosures included in the GHGP are met.

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Instructions — One of the following responses is required for each disclosure question within the respective sections of this checklist:

- **Yes** — Indicates the disclosure was made
- **No** — Indicates that the disclosure is applicable but has not been made
- **N/A** — Item not present (disclosure not applicable to the company)

Reference/Explanation — Required for all responses for required disclosures — "yes" and "no". If checked "yes", then the disclosure location should be noted (e.g., report, schedule, footnote number). **Any item marked "No" should be explained in the checklist or in a separate memorandum. Items not disclosed because they are immaterial should be marked "No" and the explanation should include an appropriate qualitative and/or quantitative assessment.**

The recommended and optional disclosures specified in the GHGP are noted throughout the checklist, by inserting "**Recommended**" or "**Optional**" in front of the item. Although these disclosures are not required by the GHGP, they should be made if the entity determines that excluding such disclosures would make the presentation of the GHG emissions misleading. An entity is not required to provide an explanation for any recommended or optional item marked "No". "No" indicates the entity has concluded that the exclusion of such a disclosure does not make the presentation of the information misleading.

		Yes	No	N/A	Reference/Explanation
I. General disclosures					
Description of the company and inventory boundary					
1.	Disclose the following information about the reporting boundary for the Statements of GHG emissions: (Corporate Standard Chapter 9)				
	a. The organizational boundary (e.g., legal entities, geographic locations)	☐	☐	☐	
	i. **Optional**: A list of facilities included in the reported emissions inventory	☐	☐	☐	
	b. The operational boundary (e.g., emissions associated with its operations)	☐	☐	☐	
	c. The consolidation approach (e.g., equity share, financial control, operational control) applied consistently to the inventory	☐	☐	☐	
2.	Disclose the reporting period covered by the Statements of GHG emissions. In most cases, this can be made apparent by headings (e.g., "Statements of GHG emissions for the year ended 12/31/2X"), Otherwise, separate disclosure is required. (Corporate Standard Chapter 9)	☐	☐	☐	
3.	**Optional**: If the entity has contracts that address GHG-related risks and obligations (e.g., a joint operation with a contract that specifies how the ownership of emissions or the responsibility for managing emissions and associated risk is distributed between the parties involved in the joint operation), disclose information about the contractual provisions that address GHG-related risks and obligations (Corporate Standard Chapter 9, Scope 3 Standard Chapter 11)	☐	☐	☐	
Information on Scope 1 and Scope 2 emissions					
4.	Disclose the following separately for each Scope, inclusive of emission from all seven GHGs, and independent of any GHG trades (e.g., purchases, sales, or transfers of offsets or allowances) and/or carbon offsets: (Corporate Standard Chapter 9, Scope 2 Guidance Chapter 7, Scope 3 Standard Chapter 11)				
	a. Total Scope 1 emissions	☐	☐	☐	
	b. Total Scope 2 location-based method (LBM) emissions	☐	☐	☐	
	c. Total Scope 2 market-based method (MBM) emissions **Note:** In cases where a company does not have MBM information or has operations in locations that do not support a MBM approach, emissions shall be calculated using the LBM (making such operations' results identical for LBM and MBM)	☐	☐	☐	
5.	Disclose the following separately by the seven GHGs that are material to the company (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3) in metric tons and in tons of CO_2 equivalent: (Corporate Standard Chapter 9, Scope 3 Standard Chapter 11) **Note:** The requirement in the Corporate Standard includes six GHGs. However, the Scope 2 Guidance amended the Corporate Standard to include NF_3 as a seventh GHG for disclosure				

		Yes	No	N/A	Reference/Explanation
	a. Scope 1 emissions	☐	☐	☐	
	b. Scope 2 LBM emissions	☐	☐	☐	
	c. Scope 2 MBM emissions	☐	☐	☐	
	d. **Optional**: Emissions in the reporting entity's operations or value chain from GHGs that are not CO_2, CH_4, N_2O, HFCs, PFCs, SF_6 or NF_3 but have a GWP identified by the IPCC, separately from the emissions for the reported Scopes, along with a list of those GHGs included in the inventory	☐	☐	☐	
6.	If the reporting entity consumes biogenically sequestered carbon as fuel (e.g., biomass, biofuels), disclose the direct CO_2 from those biogenic emissions separately from the Scope 1 and Scope 2 GHG emissions and by Scope (Corporate Standard Chapter 9, Scope 2 Guidance Chapter 7)	☐	☐	☐	
	a. **Recommended**: Disclose biogenic CO_2 emissions from electricity use separately from the Scopes	☐	☐	☐	
	b. **Recommended**: Disclose whether any GHG emissions other than CO_2 associated with biogenic emissions from electricity use are not available for, or have been excluded from, the LBM grid average emission factors or the MBM information applied (e.g., have CH_4 and N_2O been excluded)	☐	☐	☐	
7.	Disclose the following about the methodologies used to calculate and measure Scope 1 and Scope 2 GHG emissions: (Corporate Standard Chapter 9, Scope 2 Guidance Chapter 7)				
	a. Scope 1 GHG emissions				
	i. A description of any estimation methodologies used (e.g., proxies, gap filling methodologies), including providing a reference or link to any calculation tools used	☐	☐	☐	
	ii. References to the emission factors used (§)	☐	☐	☐	
	iii. A description of the data sources used (e.g., to the extent material, actual activity data vs estimated activity data) (§)	☐	☐	☐	
	iv. A description of any significant assumptions used in the calculation (§)	☐	☐	☐	
	b. Scope 2 LBM GHG emissions				
	i. A description of any estimation methodologies used (e.g., proxies, gap filling methodologies), including providing a reference or link to any calculation tools used	☐	☐	☐	
	ii. References to the emission factors used (§)	☐	☐	☐	
	iii. A description of the data sources used (e.g., to the extent material, actual activity data vs estimated activity data) (§)	☐	☐	☐	
	iv. A description of any significant assumptions used in the calculation (§)	☐	☐	☐	

		Yes	No	N/A	Reference/Explanation
	c. Scope 2 MBM GHG emissions				
	i. A description of any estimation methodologies used (e.g., proxies, gap filling methodologies), including providing a reference or link to any calculation tools used	☐	☐	☐	
	ii. References to the emission factors used (§)	☐	☐	☐	
	iii. A description of the data sources used (e.g., to the extent material, actual activity data vs estimated activity data) (§)	☐	☐	☐	
	iv. A description of any significant assumptions used in the calculation (§)	☐	☐	☐	
	v. **Recommended**: In cases where a company does not have MBM information or has operations in locations that do not support a MBM approach, disclose the percentage of overall electricity consumption reported in the market-based method that reflects actual markets with contractual information	☐	☐	☐	
	vi. The category or categories of instruments (e.g., RECs, green tariffs, supplier-specific) from which the MBM emission factors were derived, where possible specifying the energy generation technologies (e.g., wind, solar) (Scope 2 Guidance Chapter 7, Chapter 8)	☐	☐	☐	
	(a) **Recommended**: Disclose key features associated with the contractual instruments claimed, including any instrument certification labels that include their own set of eligibility criteria, as well as characteristics of the energy generation facility and the policy context of the instrument	☐	☐	☐	
	(b) **Recommended**: If the contractual instruments claimed in the reported Scope 2 MBM emissions reflect a substantive contribution by the company in helping to implement new low-carbon projects, disclose narrative information about how this was done	☐	☐	☐	
	(c) **Optional**: Disclose an internal or external third-party assurance process, or assurance of conformance provided by a certification program, supplier label, green or power program (e.g., through an assurance form)	☐	☐	☐	
8.	Disclose any exclusions of sources, facilities and/or operations from emissions disclosures. (Corporate Standard Chapter 9, Scope 2 Guidance Chapter 7, Scope 3 Standard Chapter 11) **Note:** Emissions disclosed by reporting entities shall be complete within the selected reporting boundary, and the reporting boundary shall be complete to reflect the operations of the company. Any exclusions should be justified	☐	☐	☐	
	a. **Optional**: Disclose qualitative information about any emission sources that are not quantified and included in the reported emissions (Scope 3 Standard Chapter 11) (§)	☐	☐	☐	

		Yes	No	N/A	Reference/Explanation
9.	If the reporting entity adds together its Scope 1 and Scope 2 emissions to report an aggregate value, disclose either of the following: (Scope 2 Guidance Chapter 7)	☐	☐	☐	
	a. Two aggregate values (i.e., one reflecting each Scope 2 method — LBM and MBM); or	☐	☐	☐	
	b. An aggregate value reflecting one of the Scope 2 methods (LBM or MBM) and the Scope 2 method used. **Note:** The method used should be the same method used for goal setting, if applicable	☐	☐	☐	
10.	**Optional**: Disclose further disaggregation of emissions data, such as by business units, facilities, country, source types (e.g., stationary combustion, process, fugitive), and activity types (e.g., production of electricity, transportation). (Corporate Standard Chapter 9, Scope 3 Standard Chapter 11)	☐	☐	☐	
Information on base year					
11.	Disclose the following about the base year: (Corporate Standard Chapter 5 and 9, Scope 2 Guidance Chapter 7, Scope 3 Standard Chapter 11) **Note:** A reporting entity is required to establish and report on a base year for Scope 1 and Scope 2 emissions, but it is not required to set a base year for Scope 3 emissions until it chooses to track Scope 3 performance or sets a Scope 3 reduction target **Note:** If the reporting entity discloses information on base year and has a goal related to its base year emissions, consider disclosing the goal and annual progress against the goal **Note**: If information on base year is not included in the presentation of the subject matter that is subject to assurance, the reporting entity should consider what disclosures on the subject matter may be appropriate to provide context to report users related to base year reporting				
	a. Year chosen as base year and reasons for choosing this base year	☐	☐	☐	
	b. Discussion of the policy for base year recalculations and any significance threshold applied	☐	☐	☐	
	c. Context for any significant emissions changes that have triggered base year emissions recalculation, such as structural changes (i.e., mergers, acquisitions, divestitures, outsourcing and insourcing of emitting activities), changes in reporting boundaries, changes in calculation methodology or improvements in the accuracy of emission factors or activity data	☐	☐	☐	
	d. **Optional**: If there are any significant emissions changes in the current year that have not triggered base year recalculations (e.g., process changes, efficiency improvements, organic structural growth (e.g., opening newly constructed facilities) or decline (e.g., facilities closures)), disclose the causes of these changes	☐	☐	☐	

		Yes	No	N/A	Reference/Explanation
	e. Emissions for the identified base year and current reporting year that are calculated in accordance with the entity's base year recalculation policy	☐	☐	☐	
	f. **Optional**: Emissions data for all years between the base year and the current reporting year calculated in accordance with the entity's base year recalculation policy	☐	☐	☐	
	g. The method used to calculate the base year's Scope 2 emissions	☐	☐	☐	
	h. If a MBM is used to calculate the base year's Scope 2 emissions, whether location-based data is used as a proxy for a MBM due to a lack of availability of Scope 2 MBM base year data	☐	☐	☐	
	i. If Scope 3 emissions are included for the base year, disclose Scope 3 emissions by category in the base year	☐	☐	☐	
	j. **Optional**: Disclose recalculated emissions as well as emissions reported in respective prior years (i.e., emissions before recalculation) to illustrate the evolution of the reporting entity's structure over time.	☐	☐	☐	

II. Scope-specific disclosures

Scope 2 specific disclosures

12.	For Scope 2 MBM emissions, if a residual mix emission factor is not currently available or applied to the Scope 2 MBM emissions calculation, disclose that an adjusted emissions factor is not available or has not been estimated to account for voluntary purchases and this may result in double counting between electricity consumers. (Scope 2 Guidance Chapter 7)	☐	☐	☐	
13.	**Optional**: Disclose further disaggregation of Scope 2 LBM and MBM emissions by country. (Scope 2 Guidance Chapter 7).	☐	☐	☐	
14.	**Optional**: Where advanced grid study (or real-time) information is available, disclose the following information: (Scope 2 Guidance Chapter 7)	☐	☐	☐	
	a. A separate Scope 2 estimate using the advanced grid study (or real-time) information for comparison with the Scope 2 LBM grid-average emissions	☐	☐	☐	
	b. Information on how the use of advanced grid study (or real-time) information has informed efficiency decision making or time-of-day operations	☐	☐	☐	
15.	**Optional**: If the reporting entity is subject to mandatory corporate reporting requirements for facilities in a particular region that specify calculation methodologies for Scope 2 reporting other than the LBM and MBM, disclose the results for these methodologies separately from the Scopes (Scope 2 Guidance Chapter 7)	☐	☐	☐	

		Yes	No	N/A	Reference/Explanation
16.	**Recommended**: Disclose additional instruments that were required to be retired to meet regulatory reporting requirements in connection with the retirement of instruments applied to Scope 2 MBM emissions (e.g., certificate multipliers or other pairings required by regulatory policy). (Scope 2 Guidance Chapter 7)	☐	☐	☐	
17.	**Optional**: If the reporting entity purchased instruments that did not meet all Scope 2 Quality Criteria and, therefore, were not included in the entity's Scope 2 MBM emissions calculation, disclose: (Scope 2 Guidance Chapter 7) **Note**: Additional calculations of Scope 2 MBM emissions that include instruments that do not meet the Scope 2 Quality Criteria (e.g., "Scope 2 MBM would be XX considering these instruments") may not be included in the presentation of the subject matter because they could make it misleading				
	a. That the reporting entity purchased instruments that did not meet all of the Scope 2 Quality Criteria	☐	☐	☐	
	b. The Quality Criteria that have been met and why the remaining Quality Criteria have not been met	☐	☐	☐	
Scope 3 specific disclosures					
18.	If the reporting entity is reporting on some, but not all relevant and material Scope 3 emission categories, report the emissions separately for each calculated category. (Scope 3 Standard Chapter 11, Corporate Standard Chapter 9)	☐	☐	☐	
19.	If the reporting entity is reporting on all relevant and material Scope 3 emission categories, disclose a list of all fifteen Scope 3 categories and indicate which categories and activities are included and which are excluded. For those categories that are excluded, disclose the justification for the exclusion. (Scope 3 Standard Chapter 11)	☐	☐	☐	
20.	For each scope 3 category reported as applicable, disclose the following: (Scope 3 Standard Chapter 11): **Note**: If an entity is reporting on some but not all relevant and material Scope 3 emissions, it is only required to disclose information in accordance with the Corporate Standard, which does not define the Scope 3 categories. It is recommended to define and calculate the Scope 3 emissions in accordance with the Technical Guidance for Calculating Scope 3 Emissions and to provide the detailed disclosures related to Scope 3 categories as indicated below	☐	☐	☐	
	a. Category 1: Purchased goods and services				
	i. The calculated emissions for the category using the minimum boundaries listed for the category, independent of any GHG trades (e.g., purchases, sales, or transfers of offsets or allowances) and/or carbon offsets and excluding biogenic emissions	☐	☐	☐	

		Yes	No	N/A	Reference/Explanation
	ii. A description of the emission factors and Global Warming Potential (GWP) values applied	☐	☐	☐	
	iii. A description of the types and sources of data (including activity data) used, including the data quality of reported emissions	☐	☐	☐	
	iv. The percentage of emissions calculated using data from suppliers or other value chain partners	☐	☐	☐	
	v. The calculation methodologies applied (e.g., a methodology from the Scope 3 Technical Guidance), allocation methods and a description of any estimation methodologies used (e.g., proxies, gap filling methodologies)	☐	☐	☐	
	vi. A description of any significant assumptions used in the calculation	☐	☐	☐	
	vii. If applicable, for each Scope 3 category, any biogenic CO_2 emissions reported separately	☐	☐	☐	
b.	*Category 2: Capital goods*				
	i. The calculated emissions for the category using the minimum boundaries listed for the category, independent of any GHG trades (e.g., purchases, sales, or transfers of offsets or allowances) and/or carbon offsets and excluding biogenic emissions	☐	☐	☐	
	ii. A description of the emission factors and Global Warming Potential (GWP) values applied	☐	☐	☐	
	iii. A description of the types and sources of data (including activity data) used, including the data quality of reported emissions	☐	☐	☐	
	iv. The percentage of emissions calculated using data from suppliers or other value chain partners	☐	☐	☐	
	v. The calculation methodologies applied (e.g., a methodology from the Scope 3 Technical Guidance), allocation methods and a description of any estimation methodologies used (e.g., proxies, gap filling methodologies)	☐	☐	☐	
	vi. A description of any significant assumptions used in the calculation	☐	☐	☐	
	vii. If applicable, for each Scope 3 category, any biogenic CO_2 emissions reported separately	☐	☐	☐	
c.	*Category 3: Fuel- and energy-related activities (not included in Scope 1 or Scope 2)*				
	i. The calculated emissions for the category using the minimum boundaries listed for the category, independent of any GHG trades (e.g., purchases, sales, or transfers of offsets or allowances) and/or carbon offsets and excluding biogenic emissions	☐	☐	☐	

		Yes	No	N/A	Reference/Explanation
ii.	A description of the emission factors and Global Warming Potential (GWP) values applied	☐	☐	☐	
iii.	A description of the types and sources of data (including activity data) used, including the data quality of reported emissions	☐	☐	☐	
iv.	The percentage of emissions calculated using data from suppliers or other value chain partners	☐	☐	☐	
v.	The calculation methodologies applied (e.g., a methodology from the Scope 3 Technical Guidance), allocation methods and a description of any estimation methodologies used (e.g., proxies, gap filling methodologies)	☐	☐	☐	
vi.	A description of any significant assumptions used in the calculation	☐	☐	☐	
vii.	If applicable, for each Scope 3 category, any biogenic CO_2 emissions reported separately	☐	☐	☐	
viii.	**Recommended**: If Category 3 is calculated using Scope 2 MBM values, disclose that the MBM was used for the emissions calculation (Scope 2 Guidance, Chapter 7)	☐	☐	☐	
d.	*Category 4: Upstream transportation and distribution*				
i.	The calculated emissions for the category using the minimum boundaries listed for the category, independent of any GHG trades (e.g., purchases, sales, or transfers of offsets or allowances) and/or carbon offsets and excluding biogenic emissions	☐	☐	☐	
ii.	A description of the emission factors and GWP values applied	☐	☐	☐	
iii.	A description of the types and sources of data (including activity data) used, including the data quality of reported emissions	☐	☐	☐	
iv.	The percentage of emissions calculated using data from suppliers or other value chain partners	☐	☐	☐	
v.	The calculation methodologies applied (e.g., a methodology from the Scope 3 Technical Guidance), allocation methods and a description of any estimation methodologies used (e.g., proxies, gap filling methodologies)	☐	☐	☐	
vi.	A description of any significant assumptions used in the calculation	☐	☐	☐	
vii.	If applicable, for each Scope 3 category, any biogenic CO_2 emissions reported separately	☐	☐	☐	
viii.	A description of any emissions included in the reported Category that are outside of the minimum boundary for that Category, noting that reporting entities shall report for Scope 3 emissions according to the minimum boundaries listed for each Category in the Scope 3 Standard (§)	☐	☐	☐	

		Yes	No	N/A	Reference/Explanation
e.	*Category 5: Waste generated in operations*				
	i. The calculated emissions for the category using the minimum boundaries listed for the category, independent of any GHG trades (e.g., purchases, sales, or transfers of offsets or allowances) and/or carbon offsets and excluding biogenic emissions	☐	☐	☐	
	ii. A description of the emission factors and GWP values applied	☐	☐	☐	
	iii. A description of the types and sources of data (including activity data) used, including the data quality of reported emissions	☐	☐	☐	
	iv. The percentage of emissions calculated using data from suppliers or other value chain partners	☐	☐	☐	
	v. The calculation methodologies applied (e.g., a methodology from the Scope 3 Technical Guidance), allocation methods and a description of any estimation methodologies used (e.g., proxies, gap filling methodologies)	☐	☐	☐	
	vi. A description of any significant assumptions used in the calculation	☐	☐	☐	
	vii. If applicable, for each Scope 3 category, any biogenic CO_2 emissions reported separately	☐	☐	☐	
	viii. A description of any emissions included in the reported Category that are outside of the minimum boundary for that Category, noting that reporting entities shall report for Scope 3 emissions according to the minimum boundaries listed for each Category in the Scope 3 Standard(§)	☐	☐	☐	
f.	*Category 6: Business travel*				
	i. The calculated emissions for the category using the minimum boundaries listed for the category, independent of any GHG trades (e.g., purchases, sales, or transfers of offsets or allowances) and/or carbon offsets and excluding biogenic emissions	☐	☐	☐	
	ii. A description of the emission factors and GWP values applied	☐	☐	☐	
	iii. A description of the types and sources of data (including activity data) used, including the data quality of reported emissions	☐	☐	☐	
	iv. The percentage of emissions calculated using data from suppliers or other value chain partners	☐	☐	☐	
	v. The calculation methodologies applied (e.g., a methodology from the Scope 3 Technical Guidance), allocation methods and a description of any estimation methodologies used (e.g., proxies, gap filling methodologies)	☐	☐	☐	

		Yes	No	N/A	Reference/Explanation
	vi. A description of any significant assumptions used in the calculation	☐	☐	☐	
	vii. If applicable, for each Scope 3 category, any biogenic CO_2 emissions reported separately	☐	☐	☐	
	viii. A description of any emissions included in the reported Category that are outside of the minimum boundary for that Category, noting that reporting entities shall report for Scope 3 emissions according to the minimum boundaries listed for each Category in the Scope 3 Standard. (§)	☐	☐	☐	
g.	*Category 7: Employee commuting*				
	i. The calculated emissions for the category using the minimum boundaries listed for the category, independent of any GHG trades (e.g., purchases, sales, or transfers of offsets or allowances) and/or carbon offsets and excluding biogenic emissions	☐	☐	☐	
	ii. A description of the emission factors and GWP values applied	☐	☐	☐	
	iii. A description of the types and sources of data (including activity data) used, including the data quality of reported emissions	☐	☐	☐	
	iv. The percentage of emissions calculated using data from suppliers or other value chain partners	☐	☐	☐	
	v. The calculation methodologies applied (e.g., a methodology from the Scope 3 Technical Guidance), allocation methods and a description of any estimation methodologies used (e.g., proxies, gap filling methodologies)	☐	☐	☐	
	vi. A description of any significant assumptions used in the calculation	☐	☐	☐	
	vii. If applicable, for each Scope 3 category, any biogenic CO_2 emissions reported separately	☐	☐	☐	
	viii. A description of any emissions included in the reported Category that are outside of the minimum boundary for that Category, noting that reporting entities shall report for Scope 3 emissions according to the minimum boundaries listed for each Category in the Scope 3 Standard. (§)	☐	☐	☐	
h.	*Category 8: Upstream leased assets*				
	i. The calculated emissions for the category using the minimum boundaries listed for the category, independent of any GHG trades (e.g., purchases, sales, or transfers of offsets or allowances) and/or carbon offsets and excluding biogenic emissions	☐	☐	☐	
	ii. A description of the emission factors and GWP values applied	☐	☐	☐	

		Yes	No	N/A	Reference/Explanation
	iii. A description of the types and sources of data (including activity data) used, including the data quality of reported emissions	☐	☐	☐	
	iv. The percentage of emissions calculated using data from suppliers or other value chain partners	☐	☐	☐	
	v. The calculation methodologies applied (e.g., a methodology from the Scope 3 Technical Guidance), allocation methods and a description of any estimation methodologies used (e.g., proxies, gap filling methodologies)	☐	☐	☐	
	vi. A description of any significant assumptions used in the calculation	☐	☐	☐	
	vii. If applicable, for each Scope 3 category, any biogenic CO_2 emissions reported separately	☐	☐	☐	
	viii. A description of any emissions included in the reported Category that are outside of the minimum boundary for that Category, noting that reporting entities shall report for Scope 3 emissions according to the minimum boundaries listed for each Category in the Scope 3 Standard. (§)	☐	☐	☐	
i.	*Category 9: Downstream transportation and distribution*				
	i. The calculated emissions for the category using the minimum boundaries listed for the category, independent of any GHG trades (e.g., purchases, sales, or transfers of offsets or allowances) and/or carbon offsets and excluding biogenic emissions	☐	☐	☐	
	ii. A description of the emission factors and GWP values applied.	☐	☐	☐	
	iii. A description of the types and sources of data (including activity data) used, including the data quality of reported emissions	☐	☐	☐	
	iv. The percentage of emissions calculated using data from suppliers or other value chain partners	☐	☐	☐	
	v. The calculation methodologies applied (e.g., a methodology from the Scope 3 Technical Guidance), allocation methods and a description of any estimation methodologies used (e.g., proxies, gap filling methodologies)	☐	☐	☐	
	vi. A description of any significant assumptions used in the calculation	☐	☐	☐	
	vii. If applicable, for each Scope 3 category, any biogenic CO_2 emissions reported separately	☐	☐	☐	
	viii. A description of any emissions included in the reported Category that are outside of the minimum boundary for that Category, noting that reporting entities shall report for Scope 3 emissions according to the minimum boundaries listed for each Category in the Scope 3 Standard. (§)	☐	☐	☐	

		Yes	No	N/A	Reference/Explanation
j.	*Category 10: Processing of sold products*				
	i. The calculated emissions for the category using the minimum boundaries listed for the category, independent of any GHG trades (e.g., purchases, sales, or transfers of offsets or allowances) and/or carbon offsets and excluding biogenic emissions	☐	☐	☐	
	ii. A description of the emission factors and GWP values applied	☐	☐	☐	
	iii. A description of the types and sources of data (including activity data) used, including the data quality of reported emissions	☐	☐	☐	
	iv. The percentage of emissions calculated using data from suppliers or other value chain partners	☐	☐	☐	
	v. The calculation methodologies applied (e.g., a methodology from the Scope 3 Technical Guidance), allocation methods and a description of any estimation methodologies used (e.g., proxies, gap filling methodologies)	☐	☐	☐	
	vi. A description of any significant assumptions used in the calculation	☐	☐	☐	
	vii. If applicable, for each Scope 3 category, any biogenic CO_2 emissions reported separately	☐	☐	☐	
k.	*Category 11: Use of sold products*	☐	☐	☐	
	i. The calculated emissions for the category using the minimum boundaries listed for the category, independent of any GHG trades (e.g., purchases, sales, or transfers of offsets or allowances) and/or carbon offsets and excluding biogenic emissions	☐	☐	☐	
	ii. A description of the emission factors and GWP values applied	☐	☐	☐	
	iii. A description of the types and sources of data (including activity data) used, including the data quality of reported emissions	☐	☐	☐	
	iv. The percentage of emissions calculated using data from suppliers or other value chain partners	☐	☐	☐	
	v. The calculation methodologies applied (e.g., a methodology from the Scope 3 Technical Guidance), allocation methods and a description of any estimation methodologies used (e.g., proxies, gap filling methodologies)	☐	☐	☐	
	vi. A description of any significant assumptions used in the calculation	☐	☐	☐	
	vii. If applicable, for each Scope 3 category, any biogenic CO_2 emissions reported separately	☐	☐	☐	

		Yes	No	N/A	Reference/Explanation
	viii. A description of any emissions included in the reported Category that are outside of the minimum boundary for that Category, noting that reporting entities shall report for Scope 3 emissions according to the minimum boundaries listed for each Category in the Scope 3 Standard. (§)	☐	☐	☐	
l.	*Category 12: End-of-life treatment of sold products*				
	i. The calculated emissions for the category using the minimum boundaries listed for the category, independent of any GHG trades (e.g., purchases, sales, or transfers of offsets or allowances) and/or carbon offsets and excluding biogenic emissions	☐	☐	☐	
	ii. A description of the emission factors and GWP values applied	☐	☐	☐	
	iii. A description of the types and sources of data (including activity data) used, including the data quality of reported emissions	☐	☐	☐	
	iv. The percentage of emissions calculated using data from suppliers or other value chain partners	☐	☐	☐	
	v. The calculation methodologies applied (e.g., a methodology from the Scope 3 Technical Guidance), allocation methods and a description of any estimation methodologies used (e.g., proxies, gap filling methodologies)	☐	☐	☐	
	vi. A description of any significant assumptions used in the calculation	☐	☐	☐	
	vii. If applicable, for each Scope 3 category, any biogenic CO_2 emissions reported separately	☐	☐	☐	
m.	*Category 13: Downstream leased assets*				
	i. The calculated emissions for the category using the minimum boundaries listed for the category, independent of any GHG trades (e.g., purchases, sales, or transfers of offsets or allowances) and/or carbon offsets and excluding biogenic emissions	☐	☐	☐	
	ii. A description of the emission factors and GWP values applied	☐	☐	☐	
	iii. A description of the types and sources of data (including activity data) used, including the data quality of reported emissions	☐	☐	☐	
	iv. The percentage of emissions calculated using data from suppliers or other value chain partners	☐	☐	☐	
	v. The calculation methodologies applied (e.g., a methodology from the Scope 3 Technical Guidance), allocation methods and a description of any estimation methodologies used (e.g., proxies, gap filling methodologies)	☐	☐	☐	
	vi. A description of any significant assumptions used in the calculation	☐	☐	☐	

		Yes	No	N/A	Reference/Explanation
vii.	If applicable, for each Scope 3 category, any biogenic CO_2 emissions reported separately	☐	☐	☐	
viii.	A description of any emissions included in the reported Category that are outside of the minimum boundary for that Category, noting that reporting entities shall report for Scope 3 emissions according to the minimum boundaries listed for each Category in the Scope 3 Standard. (§)	☐	☐	☐	
n.	*Category 14: Franchises*				
i.	The calculated emissions for the category using the minimum boundaries listed for the category, independent of any GHG trades (e.g., purchases, sales, or transfers of offsets or allowances) and/or carbon offsets and excluding biogenic emissions	☐	☐	☐	
ii.	A description of the emission factors and GWP values applied	☐	☐	☐	
iii.	A description of the types and sources of data (including activity data) used, including the data quality of reported emissions	☐	☐	☐	
iv.	The percentage of emissions calculated using data from suppliers or other value chain partners	☐	☐	☐	
v.	The calculation methodologies applied (e.g., a methodology from the Scope 3 Technical Guidance), allocation methods and a description of any estimation methodologies used (e.g., proxies, gap filling methodologies)	☐	☐	☐	
vi.	A description of any significant assumptions used in the calculation	☐	☐	☐	
vii.	If applicable, for each Scope 3 category, any biogenic CO_2 emissions reported separately	☐	☐	☐	
viii.	A description of any emissions included in the reported Category that are outside of the minimum boundary for that Category, noting that reporting entities shall report for Scope 3 emissions according to the minimum boundaries listed for each Category in the Scope 3 Standard. (§)	☐	☐	☐	
o.	*Category 15: Investments*				
i.	The calculated emissions for the category using the minimum boundaries listed for the category, independent of any GHG trades (e.g., purchases, sales, or transfers of offsets or allowances) and/or carbon offsets and excluding biogenic emissions	☐	☐	☐	
ii.	A description of the emission factors and Global Warming Potential (GWP) values applied	☐	☐	☐	
iii.	A description of the types and sources of data (including activity data) used, including the data quality of reported emissions	☐	☐	☐	

		Yes	No	N/A	Reference/Explanation
	iv. The percentage of emissions calculated using data from suppliers or other value chain partners	☐	☐	☐	
	v. The calculation methodologies applied (e.g., a methodology from the Scope 3 Technical Guidance), allocation methods and a description of any estimation methodologies used (e.g., proxies, gap filling methodologies). **Note:** Although not required by the GHG Protocol, *Part A — Financed Emissions* of the Partnership for Carbon Accounting Financials' *Global GHG Accounting and Reporting Standard,* which is built on the GHG Protocol, is often used to report on Category 15 Scope 3 emissions	☐	☐	☐	
	vi. A description of any significant assumptions used in the calculation	☐	☐	☐	
	vii. If applicable, for each Scope 3 category, any biogenic CO_2 emissions reported separately	☐	☐	☐	
21.	**Optional**: When emissions from activities not included in the list of Scope 3 categories are calculated, disclose: (Scope 3 Standard Chapter 11, Corporate Standard Chapter 9)				
	a. The emissions from other activities in an "other" Scope 3 category separate from the listed Scope 3 categories. **Note**: This may be included as a disclosure or added to the schedule of Scope 3 emissions	☐	☐	☐	
	b. A description of any estimation methodologies used (e.g., proxies, gap filling methodologies, etc.), including providing a reference or link to any calculation tools used	☐	☐	☐	
	c. A description of the data sources used (e.g., to the extent material, actual activity data vs estimated activity data) (§)	☐	☐	☐	
	d. References to the emission factors used (§)	☐	☐	☐	
	e. A description of any significant assumptions used in the calculation (§)	☐	☐	☐	
22.	For any Scope 3 Categories that use Scope 2 MBM values (e.g., Scope 3 Category 3 calculated using the MBM), disclose that the MBM was used for the emissions calculation for that Category. This disclosure will likely be included in the Category specific calculation description. (Scope 2 Guidance Chapter 7) (§)	☐	☐	☐	
23.	Disclose any exclusions of sources, facilities and/or operations from emissions disclosures. (Corporate Standard Chapter 9, Scope 2 Guidance Chapter 7, Scope 3 Standard Chapter 11) **Note:** Emissions disclosed by reporting entities shall be complete within the selected reporting boundary, and the reporting boundary shall be complete to reflect the operations of the company. Any exclusions should be justified	☐	☐	☐	

		Yes	No	N/A	Reference/Explanation
24.	**Optional**: Disclose qualitative information about any emission sources that are not quantified and included in the reported Scope 3 emissions (Scope 3 Standard Chapter 11)	☐	☐	☐	
25.	**Optional**: Disclose emissions by individual gas in metric tons for reported Scope 3 emissions **Note:** A reporting entity is not required to separately report Scope 3 emissions by individual gas, as is required for Scope 1 and Scope 2 emissions	☐	☐	☐	
26.	**Optional**: Disclose further disaggregation of emissions data, such as by business units, facilities, country, source types (e.g., stationary combustion, process, fugitive), and activity types (e.g., production of electricity, transportation). (Corporate Standard Chapter 9, Scope 3 Standard Chapter 11)	☐	☐	☐	
27.	**Optional**: Disclose further disaggregation of Scope 3 emissions within each category, such as disaggregation by different types of purchased materials within category 1, or by different types of sold products within category 11. (Scope 3 Standard Chapter 11)	☐	☐	☐	
28.	**Optional**: Disclose Scope 3 emissions that have previously occurred separately from Scope 3 emissions expected to occur. (Scope 3 Standard Chapter 11) **Note:** Some of the emissions in certain Scope 3 categories are for future expected emissions such as the lifetime emissions of a sold product in Category 11, emissions from the treatment of a company's waste in Category 5 and the end-of-life treatment of sold products in Category 12. Other emissions have already occurred, such as the life cycle emissions associated with a purchased good in Category 1 or the transportation and distribution losses and associated emissions in Category 3.	☐	☐	☐	

III. Other disclosure topics

Targets and goals					
29.	If the reporting entity sets a Scope 1 and Scope 2 emissions reduction goal and/or a Scope 2-specific reduction goal, disclose which Scope 2 method (LBM or MBM) the goal is based on. (Scope 2 Guidance Chapter 7)	☐	☐	☐	
30.	**Optional**: Disclose any GHG management and reduction programs and strategies of the reporting entity. (Corporate Standard Chapter 9, Scope 3 Standard Chapter 11)	☐	☐	☐	
31.	**Optional**: Disclose the following about Scope 3 GHG management, targets and goals: (Scope 3 Standard Chapter 11)				
	a. Scope 3 reduction targets	☐	☐	☐	
	b. Supplier engagement strategies, reduction activities and performance (e.g., percentage of suppliers that have provided primary GHG emissions data)	☐	☐	☐	

		Yes	No	N/A	Reference/Explanation
	c. Product performance (e.g., emissions intensity per product, durability) and GHG reduction activities related to products	☐	☐	☐	
32.	**Optional**: Disclose the relevant emissions performance indicators and intensity ratios (e.g., emissions per kWh generated, emissions per ton of material produced, emissions per sales unit). (Corporate Standard Chapter 9, Scope 3 Standard Chapter 11)	☐	☐	☐	
33.	**Optional**: Disclose a description of performance measured against internal and external benchmarks. (Corporate Standard Chapter 9, Scope 3 Standard Chapter 11)	☐	☐	☐	
Energy not consumed by the reporting entity					
34.	**Optional**: If the entity generates electricity, heat or steam that is sold or transferred to another entity, disclose the emissions from this generation separately from the Scopes. (Corporate Standard Chapter 9)	☐	☐	☐	
35.	**Optional**: If the entity purchases electricity, heat or steam for re-sale to non-end users, disclose the emissions from this generation separately from the Scopes. (Corporate Standard Chapter 9)	☐	☐	☐	
Energy information					
36.	**Recommended**: Disclose total energy consumption (i.e., both Scope 2 activity data and energy consumption from owned and operated installations included in Scope 1) from the sources listed below in the applicable energy unit (e.g., MWh, BTU): (Scope 2 Guidance Chapter 7)				
	a. Electricity	☐	☐	☐	
	b. Steam	☐	☐	☐	
	c. Heat	☐	☐	☐	
	d. Cooling	☐	☐	☐	
Report information					
37.	**Optional**: Disclose or include the following about external assurance received over reported emissions data: (Corporate Standard Chapter 9, Scope 3 Standard Chapter 11)				
	a. The external assurance received, including the type of assurance, relevant competencies of the assurance provider and conclusion or opinion of the assurance provider	☐	☐	☐	
	b. A copy of the assurance report or verification statement	☐	☐	☐	
38.	**Optional**: Disclose the following about the quality of the GHG inventory: (Corporate Standard Chapter 9, Scope 3 Standard Chapter 11)				
	a. Information on the quality of the inventory (e.g., information on the causes and magnitude of uncertainties in emissions estimates)	☐	☐	☐	
	b. A quantitative assessment of data quality	☐	☐	☐	
	c. A discussion of the reporting entity's policies in place to improve inventory quality	☐	☐	☐	

		Yes	No	N/A	Reference/Explanation
39.	**Optional**: Disclose a person that users of the report may contact about the inventory. (Corporate Standard, Chapter 9)	☐	☐	☐	
Carbon offsets and avoidances					
40.	**Optional**: Disclose information on GHG sequestration or removals, as applicable (e.g., biomass-based industries such as forestry), separately from the Scopes. (Corporate Standard Chapter 9, Scope 3 Standard Chapter 11, Corporate Standard Appendix B)	☐	☐	☐	
41.	**Optional**: Disclose the following for GHG emissions reductions or GHG emissions avoided from a project or action within the inventory: (Scope 2 Guidance Chapter 7, Scope 3 Standard Chapter 11)				
	a. An estimate of GHG emissions reductions or GHG emissions avoided from the project or action within the inventory, separately from the Scopes, based on project-level accounting	☐	☐	☐	
	b. The methodologies and assumptions used to quantify the avoided emissions estimate, including to what the reduction is being compared	☐	☐	☐	
42.	**Optional**: Disclose the following for offsets that have been purchased or developed outside the emissions inventory boundary: (Corporate Standard Chapter 9, Scope 3 Standard Chapter 11) **Note:** Emissions reported as part of the GHG inventory are reported gross of any offsets. A net emissions value may be separately and distinctly reported from the Scopes				
	a. Amounts of and information about the offsets, disaggregated between storage/removals and emissions reduction projects	☐	☐	☐	
	b. Whether the offsets are verified or certified	☐	☐	☐	
	c. Whether the offsets are approved by an external GHG programs (e.g., Clean Development Mechanism, Joint Implementation)	☐	☐	☐	
43.	**Optional**: Disclose the following for emissions reductions at sources inside the emissions inventory boundary that have been sold or transferred as offsets to third parties: (Corporate Standard Chapter 9, Scope 3 Standard Chapter 11) **Note:** Emissions reported as part of the GHG inventory are reported gross of any reductions that have been sold or transferred as offsets. An emissions value net of offsets, excluding sold or transferred offsets, may be reported separate from the Scopes				
	a. Amounts of and information about the offsets	☐	☐	☐	
	b. Whether the offsets are verified or certified	☐	☐	☐	
	c. Whether the offsets are approved by an external GHG programs (e.g., Clean Development Mechanism, Joint Implementation).	☐	☐	☐	

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