



Greenhouse Gas Protocol

Detailed Summary of Responses from Scope 2 Guidance Stakeholder Survey

Executive summary

Background on Scope 2 Guidance: The *Greenhouse Gas (GHG) Protocol Scope 2 Guidance (Scope 2 Guidance)*, published in 2015, requires dual reporting of indirect emissions from purchased electricity, steam, heat, and cooling using two distinct methods: location-based and market-based reporting. The location-based method assigns emissions based on the average emission intensity of the grid(s) in which an organization operates, while the market-based method allocates emissions based on the specific electricity purchase decisions an organization makes. These methods were designed to meet the objectives of the *GHG Protocol Corporate Standard* and *Scope 2 Guidance*, which are to help companies accurately report their value chain GHG emissions by using standardized approaches, reduce the costs associated with compiling a GHG inventory, provide information for effective emission management strategies, facilitate participation in GHG programs, promote consistency and transparency in accounting, understand risks and opportunities related to electricity consumption, identify internal reduction opportunities and track performance, engage energy suppliers and partners in GHG management, and enhance stakeholder information and corporate reputation through transparent reporting.

Updating Scope 2 Guidance: Since its publication, the *Scope 2 Guidance* has been used by thousands of organizations and there have been many important developments in GHG accounting. These include new regulations which mandate climate-related disclosures, a steep increase in the adoption of net-zero targets, and research on the use and impact of the guidance and standards. To ensure the GHG Protocol continues to effectively support and enable these developments, the GHG Protocol began a formalized process in 2022 to update the *Scope 2 Guidance*. This process, the next steps of which are outlined below, is guided by the principle of providing robust GHG accounting standards and guidance for organizations to measure progress towards science-based, net-zero targets aligned with the global 1.5°C goal. In addition, a key goal of the update is to harmonize and align with accounting rules developed by major regulatory and voluntary disclosure and target-setting programs and initiatives.

Scope 2 Guidance Survey background: Following discussions with over 1,000 stakeholders about the effectiveness and appropriateness of the current *Scope 2 Guidance* as well as proposed alternative accounting methods, the GHG Protocol secretariat solicited written feedback through an online survey between November 2022 and March 2023. This survey was one of four conducted to gather feedback on various options for updating or maintaining the current suite of GHG Protocol corporate standards and guidance. The "[Scope 2 Survey](#)" received over 400 responses in addition to roughly [70 detailed proposals](#) from stakeholders explaining whether they wanted the standard changed and why. Survey respondents included businesses, academia, non-profits, industry groups, the power sector, and government institutions, among others.

Scope 2 Survey summary: This draft Scope 2 Survey Summary Report provides an overview of responses from all survey respondents and highlights common themes. This summary will be used to inform further stakeholder discussions around key revisions to the *Scope 2 Guidance* and related GHG Protocol standards. Responses ranged from suggestions of minor edits and/or additional guidance to major revisions. Some feedback also included critiques of potential new scope 2 accounting requirements or alternative methodologies popularized in concept after the publication of the original Scope 2 Guidance. The following summarizes major points of feedback from the survey.

- **Modifying the structure of and process to update GHG Protocol standards:** The *Scope 2 Guidance* is one of several GHG Protocol publications detailing how organizations account for and report their value chain GHG emissions. Other documents include the *Corporate Accounting and Reporting Standard* (2004), *Corporate Value Chain (Scope 3) Standard* (2011), and *Scope 3 Calculation Guidance* (2013). A large volume of feedback suggested that the GHG Protocol should consolidate its requirements across all these documents, i.e., scope 1, scope 2, and scope 3 into a single document to streamline accounting and reporting. A regular process of updating the standards to keep up with a rapidly evolving GHG management and climate action ecosystem was also suggested.
- **Creating alignment with voluntary and regulatory climate disclosure programs:** Respondents strongly urged the GHG Protocol to coordinate closely with voluntary target- and goal-setting programs such as the Science Based Targets initiative (SBTi) and regulatory developments which mandate climate-related disclosures, including the EU Corporate Sustainability Reporting Directive (CSRD), the US SEC's proposed rule on climate-related disclosures, and the International Sustainability Standards Board (ISSB) standards developed by the International Financial Reporting Standards (IFRS).
- **Reviewing the objectives of scope 2 reporting:** Many respondents provided feedback on the appropriateness of the current objectives, if the objectives have been achieved in practice, and whether or how they should be amended going forward to align with the GHG Protocol's evolving purpose and role facilitating voluntary target-setting programs as well as emerging climate disclosure mandates.

- **Updating dual reporting requirements:** There was significant feedback representing multiple perspectives on the usefulness, appropriateness, implementation, and overall results of the dual reporting requirement. Some respondents recommended maintaining dual reporting with various modifications to the location-based and/or market-based methods, while other respondents suggested that only one of the two methods should be required. Support for the location-based approach emphasized that it appropriately represents emissions throughout the reporting entity's value chain. Support for the market-based approach emphasized that it is necessary to account for purchased energy attribute claims, which may differ from the actual energy flow in the grid. Many respondents proposed improvements to the location- and/or market-based methods. Some favored more specific requirements. Others preferred maintaining flexibility while supporting interpretation or adaptation by other emissions reporting and/or target-setting programs.
- **Requiring or encouraging granular time and location criteria:** Respondents wanting more specific requirements frequently referred to studies that demonstrate the importance of using detailed data to ensure any emission reductions claimed in a GHG inventory are closely correlated with actual atmospheric GHG emission reductions. For example, some emphasized the need to consider the specific emission intensity of the electric grid on an hourly basis when determining scope 2 emissions. These responses also advocated that clean energy purchases should only be accounted for when the carbon-free resource is on the same grid as the facility(ies) claiming to use power therefrom. These measures were seen as essential for accurately tracking the progress of emission reductions. However, some respondents expressed concerns about the difficulties and practicality of implementing these specific requirements. For example, some said that it might make it more difficult for organizations to participate in clean energy purchasing programs due to the challenge of collecting hourly electricity consumption data, limited procurement options to buy clean energy tracked on an hourly basis, and uncertainty identifying whether a clean energy resource could actually provide electricity to facilities that claim to be consuming the energy.
- **Allowing flexibility in time and location criteria:** Those in favor of flexible interpretations stressed the need for accounting standards and clean energy procurement opportunities that are feasible to implement for organizations of all sizes, sophistication levels, and global regions. They generally supported maintaining the current flexibility in the *Scope 2 Guidance*, which allows the use of emission factors averaged over a year instead of shorter intervals. Additionally, they advocated for the continued ability to purchase energy attribute certificates (EACs), like guarantees of origin (GOs) or renewable energy certificates (RECs), from larger regions with common EAC trading markets, rather than being limited to grid boundaries that require some degree of physical electricity delivery. However, many comments also pointed out that the flexibility inherent to the current approach often leads to less-than-ideal outcomes. They expressed concern that under the current framework, flexibility allows purchases of claims that are physically disconnected from underlying electricity consumption, and

the reported reductions in an organization's emissions inventory may not actually correspond to overall reductions in the atmosphere.

- **Calling for new emission impact-based reporting approach:** Some comments proposed a change from, or addition to, current inventory accounting methods to a new approach for demonstrating the emission reduction effects of buying clean energy. This approach, similar to project-based accounting, involves accounting for the emission reductions resulting from replacing carbon-intensive power plants with cleaner energy sources. It also considers load management strategies that optimize increased energy consumption at times when clean energy is abundant and reduced energy consumption at times when the grid relies on more carbon-intensive resources. Most of these comments suggested calculating this information using marginal emission factors instead of average grid emission factors because marginal rates reflect how emissions incrementally change in response to new clean energy resources or changes in demand for energy. Respondents posited that this method would provide stronger incentives for investing in grids that have the greatest potential for reducing carbon emissions compared to current market- and location-based inventory accounting methods. However, concerns were raised about the compatibility of this method with existing inventory methodologies and science-based, net-zero targets, as well as practical implementation, including issues with data accessibility and technical limitations.
- **Requiring additionality criteria:** The topic of additionality, wherein an action must result in emissions reductions beyond what would have occurred in the absence of that action, was discussed in the context of both market-based accounting as well as under any new impact-based methodology. Support for introducing an additionality requirement emphasized its necessity to ensure inventory emission reduction claims more clearly align with atmospheric emission reductions. Feedback in support of maintaining the current practice emphasized that the concept of additionality is inappropriate to apply to the market-based method because the market-based method allocates energy usage rather than offsetting emissions. Responses also highlighted distinctions between electricity “usage claims” from “impact claims,” suggesting additionality only be applied in impact-based claims.
- **Adding clarifications and new guidance:** Respondents also provided various suggestions for adding clarifications and new guidance, including specific use cases, new technologies, and data. Examples included: encouraging the GHG Protocol’s involvement in developing global emission factor databases; updated guidance for purchased steam, heat, and cooling; clarification on transmission and distribution (T&D) losses; clarifying overlaps between accounting for emissions in scope 2 or scope 3 category 3; and creating guidance for specific use cases like electric vehicle charging, and leased assets, and other activities.

Next steps:

Note: Between July 26th and September 8th, 2023, GHG Protocol offered an opportunity for stakeholders who submitted responses to the Scope 2 Guidance Survey to provide feedback on the draft Scope 2 Survey Summary Report to ensure that perspectives were comprehensively and accurately represented. The log of changes made from the originally published draft summary report is included at the end of this document.

This summary report will support the development of specific workplans for scope 2 updates and related GHG Protocol standards, to be developed through technical working groups and other committees as part of the standards development process. In addition, the GHG Protocol secretariat will continue to solicit new information and review relevant new research studies on scope 2 as they become available throughout the update process.

The GHG Protocol secretariat is also currently meeting with organizations that submitted a [scope 2 proposal](#) for detailed discussion of their proposals. The GHG Protocol has tentatively identified several common themes within the scope 2-related proposals submitted, which reflect similar themes that emerged from the Scope 2 Survey responses presented in this summary.

The next phase of stakeholder engagement will include a summary of these proposals. The goals of this work are to support widespread understanding of the proposals and GHG Protocol accounting and reporting principles. The results of these sessions and this summary of survey responses will help inform the initial topics and deliberations for the scope 2 technical working group.

In tandem with this process, the GHG Protocol is finalizing a new governance structure. The GHG Protocol's updated governance will provide overall strategic direction and oversight of the standards update process. Information about the standards update process and opportunities to participate will be shared with subscribers to the GHG Protocol newsletter via email. If you'd like to receive email updates, please subscribe to the GHG Protocol newsletter [here](#).

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Background

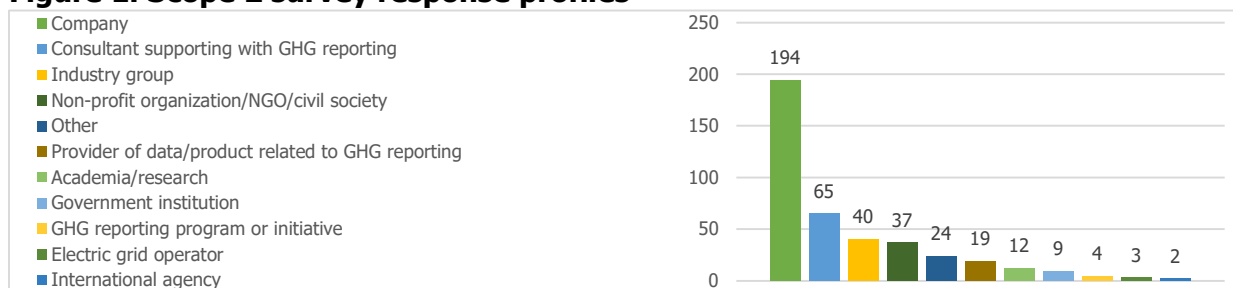
Since the publication of Greenhouse Gas (GHG) Protocol’s *Corporate Accounting and Reporting Standard* (2004), *Corporate Value Chain (Scope 3) Standard* (2011), *Scope 3 Calculation Guidance* (2013), and *Scope 2 Guidance* (2015), there have been many important developments in GHG accounting and reporting and GHG emission management. Among these are the introduction of the Science Based Targets initiative (SBTi), the trend toward net-zero targets, new regulations which mandate climate-related disclosures, use of the standards by thousands of companies, and academic research on their use and impact.

Between November 2022 and March 2023, GHG Protocol collected stakeholder input via four online surveys and proposal submissions with suggestions for updating existing standards/guidance or developing new sector-specific guidance. This feedback covered the GHG Protocol’s *Corporate Standard*, *Scope 2 Guidance*, *Scope 3 Standard*, and supporting documents, and will inform the scope of the updates that GHG Protocol makes to its standards and guidance.

The aim of any updates will be to align with best practice approaches to ensure GHG Protocol standards for scope 1, scope 2 and scope 3 are effective in providing a rigorous and credible accounting foundation for businesses to measure, plan and track progress toward science-based and net-zero targets in line with the global 1.5°C goal. Any future updates will seek harmonization and alignment with accounting rules under development through major disclosure initiatives.

This report summarizes stakeholder feedback from the Scope 2 Survey. The GHG Protocol secretariat received 403 responses to the survey on *Scope 2 Guidance*. Responses detailed by organization type are shown in Figure 1 below. In addition, stakeholders submitted roughly 70 proposals related to scope 2. Proposals that attested public attribution can be found [here](#).

Figure 1. Scope 2 survey response profiles



A. General feedback

A.1. Consolidate GHG Protocol standards and improve user experience

Survey respondents suggested that the revised *Scope 2 Guidance* be more concise. Many expressed difficulties in determining which GHG Protocol reporting requirements are applicable to their organization and understanding how the various GHG Protocol standards and guidance documents interact with each other. Survey results indicated users’ interest in consolidating the

Scope 2 Guidance reporting requirements with other GHG Protocol requirements in the *Corporate Standard*, *Scope 3 Standard*, and forthcoming *Land Sector and Removals Guidance* into one single overarching GHG Protocol standards document and moving all guidance and calculation examples related to scope 1, scope 2, scope 3, and land sector and removals into separate documents. It was also suggested that adding numerical references to the paragraphs of all the standards, as well as associating guidance and examples to their respective applicable paragraphs, could help improve the user experience in navigating the various GHG Protocol standards documents.

A.2. Adopt a more frequent update process

To ensure the GHG Protocol remains current with the latest climate science, relevant research, and market developments, stakeholders urged the GHG Protocol to implement a regular cadence for updating its standards more frequently, and on an ongoing basis.

Stakeholders suggested that this could both help the GHG Protocol adequately prepare for potential updates, as well as help organizations better anticipate changes and mitigate risks that come with less frequent but potentially more significant updates to the standards.

Some respondents suggested developing a formal forum for users of the GHG Protocol to report inconsistencies in the interpretation and application of the standards, which could be continuously addressed by the GHG Protocol secretariat to help prepare topics for regularly scheduled updates.

A.3. Increase coverage of emerging markets

Stakeholder feedback included a request to better represent markets from around the world, including the GHG Protocol documenting where the market-based accounting method is required for different regions of the world, plus incorporating additional examples of location-based and market-based calculations in geographies outside the United States (US) and Europe (EU).

Some respondents suggested that the current *Scope 2 Guidance* leaves out pathways for renewable energy development and climate mitigation in less developed countries where renewable energy development would have outsized socio-economic impact. Some respondents specifically highlighted Africa, South America, and Southeast Asia as regions that would benefit from particular attention. These comments suggested that scope 2 requirements be updated to better align with market-based opportunities in these regions.

A.4. Refine the objectives of the GHG Protocol Scope 2 Guidance

A commonly raised topic in stakeholder feedback was identification of what the objectives and purposes are in scope 2 emissions inventory reporting, including the original intent, how it has been used in practice, and what should be considered in the context of updates and revisions.

Current objectives stated in the Corporate Standard and Scope 2 Guidance

The introduction of the *GHG Protocol Corporate Standard* provides a list of accounting and reporting objectives which the standard was designed to support and enable:

- To help companies prepare a GHG inventory that represents a true and fair account of their emissions through the use of standardized approaches and principles
- To simplify and reduce the costs of compiling a GHG inventory
- To provide business with information that can be used to build an effective strategy to manage and reduce GHG emissions
- To provide information that facilitates participation in voluntary and mandatory GHG programs
- To increase consistency and transparency in GHG accounting and reporting among various companies and GHG programs.

In the current *GHG Protocol Scope 2 Guidance*, section 2.1 provides a further overview of the business goals of scope 2 accounting and reporting. Consistent with the *Corporate Standard* and *Scope 3 Standard*, it states companies consuming electricity may seek to:

- Identify and understand the risks and opportunities associated with emissions from purchased and consumed electricity
- Identify internal GHG reduction opportunities, set reduction targets, and track performance
- Engage energy suppliers and partners in GHG management
- Enhance stakeholder information and corporate reputation through transparent public reporting.

Each of these is elaborated further in Chapter 2 of the *Scope 2 Guidance*.

Feedback on objectives of the GHG Protocol Scope 2 Guidance

Within the Scope 2 Survey, stakeholders responded with a range of perspectives on what the objectives of scope 2 and GHG accounting at large should be. Cited responses included (not exhaustive):

- Must be an accurate reflection of emissions from the reporting entity's value chain
- Reflect the physical consumption of energy and emissions associated with the operation to generate that energy
- Focus not on "purchased electricity" but on "consumed" electricity that has been supplied from a shared distribution grid
- Incentivize decarbonization through accurate accounting and reporting
- Prioritize and promote actions and strategies for high quality emission reductions and removals
- Ensure that the usage of market-based instruments within a scope 2 emissions inventory accurately reflects emissions across the electricity system
- Enable comparability between reporting organizations
- Be based on verifiable facts and distinguished from impact or causation claims which reflect estimates based on assumptions about what would have happened absent the intervention
- Avoid overly burdensome or complex requirements which may limit market participation from companies that don't have well-resourced sustainability teams

Many respondents emphasized a need to ensure any updates to scope 2 accounting design principles and objectives adopted via the revisions process must be based on science, agnostic to politics, and more clearly demonstrate specific and testable outcomes.

Responses included calls for any revised market-based scope 2 accounting and reporting requirements to be supported by research and analysis that backs up the GHG Protocol's theory of change on the relationship between market-based instruments in scope 2 and emission reductions. Such analysis should clearly explain with evidence how voluntary energy attribute certificate (EAC) markets affect individual and collective project development, both directly and indirectly, as well as the relationship between an organization's GHG emission inventory and global atmospheric GHG emissions.

Other survey respondents stated that the current market-based *Scope 2 Guidance* is sufficient as it represents the minimum features necessary for EAC instruments to enable implementation of a market-based method for scope 2 accounting. These comments emphasized that the scope 2 market-based method is simply intended to allocate indirect emissions associated with specified electricity procurement to consumers, whereas additional requirements related to quantifiable emission reductions (e.g., does the use of EACs in a scope 2 inventory result in any GHG emission reductions to the atmosphere) may be more well suited for target- and goal-setting programs and/or quantified with project- and intervention-based evaluations outside of a GHG emissions inventory.

Some survey respondents argued that the objective of scope 2 is to accurately represent the emissions associated with the physical consumption of purchased electricity, heat, and cooling, and stated that this can only be meaningfully achieved by the location-based method. These respondents purported that incentives and performance-related objectives offered by the current market-based method functionally serve a different purpose from accurate emissions accounting and should be reported separate from the inventory. Here, too, some also thought that the benefits of clean energy investments could be evaluated using project- and intervention-based methods outside the emission inventory as an alternative to the current market-based method. Collectively, this information could then be used to inform on progress through target- and goal-setting programs.

Section B of this report summarizes feedback on maintaining or eliminating the dual reporting requirement and the stakeholder perspectives on the merits of the current location- and market-based methods. Survey response feedback on specific revisions and modifications proposed for the two methods are presented in section C. Considerations related to additionality and causality are presented in section D. Feedback concerning the introduction of a new impact-based reporting metric is presented in section E.

A.5. Align with target and goal-setting programs, such as SBTi and RE100

Respondents indicated that the GHG Protocol should collaborate with voluntary target and goal-setting initiatives such as the Science Based Targets Initiative (SBTi), RE100, and similar

voluntary programs which rely on the *Scope 2 Guidance* within their respective technical criteria. Some suggested that significant changes to the *Scope 2 Guidance* could have implications for these initiatives and for the companies who have set targets in accordance with these initiatives. Respondents signaled a need for compatibility across GHG accounting standards and target-setting initiatives to maintain the integrity of their public climate-related commitments.

B. Feedback on current scope 2 dual reporting requirement and the location- and- market-based methods

B.1. Current requirement on dual reporting

The current *Scope 2 Guidance* section 7.1 states that, for organizations with operations only in markets that do not provide supplier-specific data or other contractual instruments, only one scope 2 result shall be reported using the location-based method. For organizations in markets providing product or supplier specific data in the form of contractual instruments, organizations 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. This is also termed “dual reporting.”

- **Location-based** reflects the average emissions intensity of grids on which energy consumption occurs and uses grid-average emission factor data (*Scope 2 Guidance*, section 1.5, page 8).
- **Market-based** reflects emissions from electricity that organizations have purposefully chosen (or their lack of choice) using emission factors from contractual instruments (*Scope 2 Guidance*, section 1.5, page 8).

The location-based and market-based methods generally use different methodologies to show different results and are not comparable across organizations (e.g., one organization’s location-based is not comparable to another organization’s market-based scope 2). Each method’s definitions and purposes are detailed in Table 4.1 from the *Scope 2 Guidance*, copied below.

Table 4.1 Comparing market-based and location-based methods (Scope 2 Guidance, page 26)

Table 4.1 Comparing market-based and location-based methods

	Market-Based Method	Location-Based Method
Definition	A method to quantify the scope 2 GHG emissions of a reporter based on GHG emissions emitted by the generators from which the reporter contractually purchases electricity bundled with contractual instruments, or contractual instruments on their own	A method to quantify scope 2 GHG emissions based on average energy generation emission factors for defined geographic locations, including local, subnational, or national boundaries
How method allocates emissions:	Emission factors derived from the GHG emission rate represented in the contractual instruments that meet Scope 2 Quality Criteria	Emission factors representing average emissions from energy generation occurring within a defined geographic area and a defined time period
Where method applies:	To any operations in markets providing consumer choice of differentiated electricity products or supplier-specific data, in the form of contractual instruments	To all electricity grids
Most useful for showing:	<ul style="list-style-type: none"> Individual corporate procurement actions Opportunities to influence electricity suppliers and supply Risks/opportunities conveyed by contractual relationships, including sometimes legally enforceable claims rules 	<ul style="list-style-type: none"> GHG intensity of grids where operations occur, regardless of market type The aggregate GHG performance of energy-intensive sectors (for example, comparing electric train transportation with gasoline or diesel vehicle transit) Risks/opportunities aligned with local grid resources and emissions
What the method's results omit:	<ul style="list-style-type: none"> Average emissions in the location where electricity use occurs 	<ul style="list-style-type: none"> Emissions from differentiated electricity purchases or supplier offerings, or other contracts

(Source: *Scope 2 Guidance*, Table 4.1, page 26)

Scope 2 Guidance on dual reporting

Dual reporting allows organizations to compare their individual purchasing decisions to the overall GHG-intensity of the grids on which their facilities operate. The current *Scope 2 Guidance* section 7.4 on dual reporting outlines several benefits from reporting location- and market-based scope 2 emissions using the two different methods:

- Distinguishing changes in choices vs. changes in grid emissions intensity
- Providing for a more complete assessment of the GHG impacts, risks, and opportunities associated with energy purchasing and consumption
- Providing transparency for stakeholders
- Improving comparability across operations (on location-based method) where the organization's GHG inventory includes operations in markets without contractual instruments
- Facilitating participation in programs with different reporting requirements

Scope 2 Guidance on doubling counting considerations within dual reporting

Section 5.5 in the *Scope 2 Guidance* states that the dual reporting requirement can complicate an understanding of whether double counting is occurring and whether it threatens the inventory's accuracy. Table 5.2 from the *Scope 2 Guidance* details scenarios of double counting, along with whether they introduce accuracy errors and how they are, or can be, addressed.

Table 5.2 Scope 2 accounting introduced by the Scope 2 Guidance (Scope 2 Guidance, page 40)

Table 5.2 Additions to scope 2 accounting introduced by the Scope 2 Guidance

Type of double counting	Examples	How to prevent double counting
Between scope 1 and 2		
Between scope 1 and 2 in different inventories	A company reports emissions from grid-delivered energy use in scope 2, while a generation facility on the grid reports its facility's emissions in scope 1.	No double counting problem—this is an inherent part of the corporate reporting framework.
Between scope 1 and 2 in the same inventory	A company owns a natural gas fuel cell and consumes the output directly (with no grid transfers).	Depending on the consolidation approach chosen, emissions from owned/operated generation shall be reported under scope 1 (if any emissions occur). The emissions from consumed energy shall not be repeated in scope 2 since they have already been reported in scope 1.
Between multiple companies' scope 2 inventories		
Between multiple companies' scope 2 inventories based on different methods	In aggregate: The energy attribute certificates from a renewable generation facility are sold to a company who claims them and reports their emission rate in scope 2 (market-based). The grid emissions factor for the region will also reflect this facility's emission rate. Consumers using the grid emissions factor (location-based method) will be double counting the emission rate conveyed by the energy attribute certificate (market-based method).	This is an inherent condition of two methods. Each method's results shall not be added or netted. Each method represents a separate way of allocating energy generation emissions, so depending on geographic or market boundaries, each method's scope 2 result can reflect some of the same emissions reflected in the other method.
Between multiple companies' scope 2 inventories of the same method	May occur in the market-based method if energy attribute certificates are sold from an owned/operated solar panel, but owner also consumes the energy and claims zero emissions rate.	If energy attribute certificates are sold from energy generation, companies shall treat consumed electricity as though it were purchased from the grid—using the hierarchies of emission factors indicated for both methods (Table 6.2 and Table 6.3). Sold energy attribute certificates may be reported separately. Scope 1 reporting shall still reflect any emissions from the generator.
	May occur in the location-based method if grid emission factors reflect different geographic boundaries (e.g. local, regional, national). May occur in the market-based method if instrument claims are unclear (see instrument tracking below), or if residual mix is not available	This is a function of data rather than the accounting framework. Companies shall use the most accurate and appropriate emission factors listed in the emission factor hierarchy for each method (see Chapter 6).
	Two different certificate types are generated from a single MWh (one for supplier quotas, one for supplier disclosure). Neither certificate is clear on whether energy attribute claims are included. If users assume they are, different suppliers may count the same attributes in their mix.	This guidance's Scope 2 Quality Criteria require consumers to ensure that only one instrument conveys a GHG emission rate claim to consumers, and that that claim be clearly conveyed with the instrument, or if multiple instruments convey the GHG emission rate claim, that all such instruments be owned and retired to substantiate a usage and scope 2 claim.

Source: *Scope 2 Guidance*, Table 5.2, page 40

B.2. Overview of survey feedback on dual reporting requirement

Survey responses on the dual reporting requirement and the two underlying methods varied widely, with interest on this topic generally fitting within the following options:

1. Maintain the dual reporting requirement,
2. Require only *one* method (i.e., either location-based or market-based),
3. Adopt revisions to the location-based and/or market-based methods, and/or
4. Introduce a new impact-based reporting metric, either in addition to or in place of the current dual reporting requirement.

While most of the feedback focused on the electric power sector, survey respondents also called for clarification whether dual reporting is also required for other sources of scope 2 emissions, such as heating, cooling, and steam.

B.3. Feedback in favor of maintaining the dual reporting requirement

Responses supporting the current dual reporting requirement generally aligned with the stated benefits included in the current *Scope 2 Guidance* listed above from section B.1. under '*Scope 2 Guidance on dual reporting.*'

Some respondents suggested that in addition to maintaining dual reporting, the GHG Protocol should more clearly articulate the distinction between the two methods, better highlighting the different functions and purposes of market-based and location-based reporting. For example, some respondents suggested that market-based reporting is needed in the near-term to incentivize investment action in the absence of policy, but that it should be phased out over the long-term to align definitions of net-zero with location-based outcomes. Respondents stated that clarification is needed on what types of claims can be made using the location-based and market-based methods and how each approach should interact with climate action targets, net-zero goals, etc.

Among responses supporting dual reporting, it was noted that scope 2 requirements should more clearly indicate in what markets or jurisdictions globally it is possible to report market-based emissions. As an example, several respondents suggested the presence of an adequate EAC registry in a given country and/or market indicates the feasibility of reporting market-based emissions therein.

B.4. Feedback in favor of eliminating dual reporting and requiring organizations to report only a single method

Three primary challenges with the current *Scope 2 Guidance* dual reporting requirements were identified among stakeholder feedback for consideration: it is confusing and complex, implementation of the requirement is often inconsistent, and there is confusion on double counting when one method is compared to the other method. Feedback regarding requiring

exclusively either market-based or location-based as the sole reporting requirement is summarized in sections B.5 and B.6.

Cited responses included (not exhaustive):

- **Dual reporting is confusing and complex**
 - Separately managing and communicating two representations of an organization's scope 2 emissions is challenging for both internal and external stakeholders, including investors.
 - Reporting scope 2 emissions needs to be simple enough to be accessible by all organizations, including those with limited resources so that broad adoption of scope 2 emission accounting and reporting is possible.
- **Many organizations do not adhere to the dual reporting requirement and choose to report the more favorable number**
 - Numerous survey respondents pointed to non-compliance with the dual reporting requirement as a significant concern.
 - While the GHG Protocol requires dual reporting, this requirement is not regularly carried through to GHG reduction planning because target-setting and tracking tend to focus on one of the two options (e.g., if the market-based method is used for reporting and measurement toward organization's sustainability targets, the location-based method often becomes less important).
- **Dual reporting results in perceived double counting**
 - Given the aforementioned partial adherence to the dual reporting requirement, requiring both location-based and market-based reporting in regions with attribute tracking systems may lead to misconception of the occurrence of double counting.
 - As an example, an organization in southern Europe could report zero scope 2 market-based emissions by claiming use of Scandinavian-sourced guarantees of origin (GOs), meanwhile a Scandinavian organization reports near-zero location-based scope 2 emissions because the local grid is powered by a significant amount of non-emitting generation, without the need to retire GOs. When these location-based and market-based numbers are compared there is a perception of double counting.

B.5. Reporting the location-based method emission total in scope 2

Current requirements on location-based reporting

The current *Scope 2 Guidance* requires all organizations to report scope 2 emissions using the location-based method for all regions and markets globally. See above sub-section B.1. "*Current requirement on dual reporting*" for requirements where operations exist in markets that provide supplier-specific data or other contractual instruments.

Table 6.2 in the *Scope 2 Guidance* details the location-based emission factor hierarchy for selecting emission factors to attribute to an organization's electricity consumption data.

Table 6.2 Location-based emission factor hierarchy (Scope 2 Guidance, page 47)

Data forms listed here should convey combustion-only (direct) GHG emission rates, expressed in metric tons per MWh or kWh.

Table 6.2 Location-based method emission factor hierarchy

Data forms listed here should convey combustion-only (direct) GHG emission rates, expressed in metric tons per MWh or kWh.

Emission factors	Indicative examples
<p>Regional or subnational emission factors</p> <p><i>Average emission factors representing all electricity production occurring in a defined grid distribution region that approximates a geographically precise energy distribution and use area. Emission factors should reflect net physical energy imports/exports across the grid boundary.</i></p>	<p>eGRID total output emission rates (U.S.)^a</p> <p>Defra annual grid average emission factor (U.K.)^b</p>
<p>National production emission factors</p> <p><i>Average emission factors representing all electricity production information from geographic boundaries that are not necessarily related to dispatch region, such as state or national borders. No adjustment for physical energy imports or exports, not representative of energy consumption area.</i></p>	<p>IEA national electricity emission factors^c</p>

Notes:

a Although eGRID output rates represent a production boundary, in many regions this approximates a consumption or delivery boundary, as eGRID regions are drawn to minimize energy imports/exports. See: <http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html>.

b See Defra: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/224437/pb13988-emission-factor-methodology-130719.pdf.

c IEA emission factors do not adjust for imports/exports of energy across national boundaries. See: http://data.iea.org/ieastore/product.asp?dept_id=101&pf_id=304.

Source: *Scope 2 Guidance*, Table 6.2, page 47

Feedback in support of reporting only the location-based method in scope 2

Within the survey responses proposing that the GHG Protocol’s *Scope 2 Guidance* only require location-based emission reporting, responses varied regarding whether accounting and reporting using the market-based method should be (i) be made optional, and/or (ii) be reported entirely outside of a scope 2 GHG inventory. Alternatively, some posit whether the objectives of the market-based method would be more appropriately evaluated through an alternative accounting method(s) or framework(s) (e.g., utilizing impact or consequential accounting methods).

Among comments proposing that scope 2 requirements only include the location-based method, some highlighted the importance of using both the scope 2 GHG inventory (i.e., attributional) and a project- or intervention-based (i.e., consequential) method to measure emissions. This feedback suggested that attributional methods are intended and best suited for allocating

responsibility, setting reduction targets, and tracking progress within specific boundaries, such as a value chain. Consequential methods, on the other hand, are designed to assess whether actions taken and/or investments made either reduce emissions or, critically, *unintentionally* lead to an increase in emissions outside a reporting organization's defined boundaries. Section E covers stakeholder responses on reporting an emission impact-based method in more detail.

Within many comments proposing a location-based only requirement, respondents also suggested reporting a revised location-based method. Section C in this report covers various elements of the proposed modifications of the location-based method (e.g., updates to activity data, emission factors, etc.).

These responses suggested several potential reasons they believe support requiring only the location-based method in scope 2 emission reporting: (i) from a physical power flow perspective it is the most accurate method to allocate emissions embodied in physically undifferentiable electricity, (ii) it is the simplest and most transparently comparable representation of an organization's electricity emissions, and (iii) it is one of the necessary methods whereby to ensure value chain emission reduction targets are aligned with actual reductions in emissions to the atmosphere.

Cited reasons from respondents included (not exhaustive):

- **The location-based method more accurately reflects the allocation of emissions from an organization's value chain**
 - The location-based method reflects the physical consumption of electricity and emissions associated with the operation to generate that electricity. This method is the necessary and appropriate method to reflect and account for the physical reality of the consumption of electricity from a *shared* electric grid (i.e., electrical energy consumed from a grid is undifferentiated and undifferentiable with respect to the origin of the energy consumption and thus emissions need be accounted for similarly).
 - This method provides a meaningful quantification of emissions from *consumed* electricity that has been supplied from a shared distribution grid without distortion from what contractual instruments may have been acquired independently for various policy and incentive purposes. Separately, the *impacts* of these interventions are more appropriately quantified and reported via project-level evaluations.
 - The location-based method is necessary to ensure that organizations meet their value chain emissions reduction targets with actual reductions in atmospheric emissions equivalent to their claimed inventory emission reductions.
- **Simplest, most accessible reporting method**
 - The location-based method is the most accessible option that is broadly inclusive to organizations of all levels of sophistication, which is important for a global standard.
 - Location-based scope 2 emission reporting is the simplest and most transparent means to compare emissions from consumed energy (e.g., electricity) between organizations.

- **Aligns the allocation of value chain emission reduction targets with actual reductions in atmospheric emissions**
 - The location-based method provides a geographic load-based view of emissions while incentivizing decision-makers to engage in improving energy efficiency and supporting grid-level decarbonization within markets where they have a footprint, whether through policy intervention, utility collaborations, or other mechanisms. Individual scale actions to reduce atmospheric GHG emissions are more appropriately quantified via project-level evaluations.
 - Under current market-based accounting in scope 2, if an organization reduces its footprint using EACs, the reported market-based footprint of other organizations (assuming they report at all) would be artificially increased due to the allocation of residual emissions. Any reduction of an organization's inventory should correspond to a quantifiable reduction in atmospheric emissions without simply shifting the burden to other organizations.

Feedback on the challenges of reporting scope 2 with the location-based method

Respondents raised several concerns about the exclusive use of the location-based method in scope 2. In addition to the current absence of widely acknowledged credit and recognition for project-based or intervention accounting in target- and goal-setting programs, some raised doubts about the usefulness of requiring a location-based inventory. They question whether it is worth the time and cost burden, considering that little-to-nothing can be done to manage or reduce the emissions measured by this method since top-down policy and energy efficiency measures are generally the only options. Many also stated that it does not accurately reflect the impact of an organization's actions on the actual emissions of the electric grid system.

Although there was general agreement that the location-based method distributes the overall emissions from electricity generation among all consumers based on their proportional usage, respondents pointed out that it is still one of perhaps many subjective approaches for allocating responsibility of indirect emissions. Respondents' reasoning for this position noted the absence of any direct and consistent correlation between the total amount of electricity consumed by an organization and the actual electric power sector emissions produced as a result. Respondents emphasized that the location-based method may not accurately reflect a fair or informative allocation of system emissions (e.g., an existing facility consuming electricity on a clean grid before a new coal plant was constructed must now account for emission-intensive generation built to serve other, newer electricity customers). Absent any quantification of the real impact of an organization's actions on total GHG emissions, respondents stressed the importance of evaluating the location-based method's usage in relation to the benefits it offers.

Feedback also called attention to the overall limited actionability of a location-based inventory and concern that solely requiring and/or relying on the location-based method would slow or entirely halt progress toward electricity sector decarbonization. These responses suggested that

by allowing only a location-based method, organizations would effectively be limited to relying on utility-led emission reduction targets or top-down government policy mechanisms. These responses acknowledged the potential emission reductions from efficiency improvements, relocating their entire business or institution to cleaner grid regions, etc., while also noting potentially small overall impacts and/or the impracticality of such solutions.

Responses also cited that in some markets across the world where EAC tracking and tracing systems exist for compliance purposes, there frequently is a legal right to the zero-emission claims associated with certificates. Section 6.4.1 of the *Scope 2 Guidance* further elaborates on this topic.

B.6. Reporting the market-based method emission total in scope 2

Current requirements on market-based reporting

The current *Scope 2 Guidance* requires organizations with any operations in electricity markets that provide product or supplier-specific data in the form of contractual instruments to report scope 2 emissions in two ways, the location-based, and the market-based method.

Organizations reporting scope 2 emissions using the market-based method are required to ensure that any contractual instruments used meet the scope 2 quality criteria specified in Table 7.1 below.

Table 7.1 Scope 2 Quality Criteria (Scope 2 Guidance, page 60)

Further explanation on select Scope 2 Quality Criteria can be found in Section 7.5.

Table 7.1 Scope 2 Quality Criteria

Further explanation on select Scope 2 Quality Criteria can be found in Section 7.5.

All contractual instruments used in the market-based method for scope 2 accounting shall:
<ol style="list-style-type: none"> 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:
<ol style="list-style-type: none"> 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:
<ol style="list-style-type: none"> 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:
<ol style="list-style-type: none"> 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.

Source: *Scope 2 Guidance*, Table 7.1, page 60

Feedback in support of reporting only the market-based method in scope 2

Survey responses favoring the market-based method as the only required method tended to recommend that the disclosure of the location-based method could be included as optional scope 2 information, reported outside of the (market-based) scope 2 GHG inventory, or removed from the standard altogether. Within comments supporting the market-based method there was also a range of interest in more clearly defining the role of project- or intervention-based emission accounting and reporting. Some suggested an emissions impact-based method should replace the current scope 2 location- or market-based method, e.g., the market-based method would be calculated using a project- or intervention-based method and the result reported as a scope 2 inventory total. Others proposed parallel reporting of an emission impact-based method alongside the location- and/or market-based method. This latter approach was often combined with highlighting a need to increase the prevalence of impact-based methods in target- and goal-setting programs. Feedback on emission impact reporting is presented in section E.

Responses emphasized several positions to justify only requiring the market-based method in scope 2 emission reporting: (i) it is the only way to track consumer choice in electricity supply,

(ii) it is currently the only available option to meaningfully incentivize voluntary climate action in the electric power sector, (iii) existing targets and commitments tend to utilize market-based totals, (iv) that ubiquitous use of residual mix data is the most accurate method to eliminate double counting, and (v) that the market-based method has contributed to growth of the renewable energy market.

Cited reasonings from respondents included (not exhaustive):

- **The market-based method is the only way to track consumer choice in electricity supply**
 - The market-based method is a framework designed to reflect how production attributes of specified generation (e.g., 1 MWh of electricity produced without direct GHG emissions) are tracked, purchased, and delivered to retail load. In many electricity markets, these EACs are considered a legal instrument conveying clearly defined attributes to the entity retiring the EAC.
- **A market-based method is necessary to incentivize voluntary climate action in the electric power sector**
 - In the absence of any top-down policy or regulation, the integration of contractual instruments within reporting companies' GHG inventories via the market-based method is the only generally recognized lever for incentivizing voluntary action and investment in carbon-free energy. It has helped underpin the development of power purchase agreement (PPA) markets in dozens of countries.
 - The value of the GHG Protocol is to recognize and incentivize voluntary action to decarbonize global electricity grids at the fastest possible rate. The market-based method has encouraged the expansion of renewable energy deployment and created a pathway that allows organizations of all sizes to set ambitious decarbonization goals.
 - The market-based accounting method is a critical element of scope 2 accounting as it provides organizations with an actionable tool to funnel monetary resources to carbon-free energy projects and reduce the reporting organization's emissions through the tracking of carbon-free electricity.
- **Existing goals, targets and commitments are predicated on the market-based method**
 - Many companies have public commitments, such as GHG reduction and renewable energy purchasing targets, that were established using the existing scope 2 market-based method. Any updates that drastically change market-based accounting need to be evaluated relative to existing commitments made across these target-setting schemes.
- **Ubiquitous use of residual mix eliminates double counting; creates an accurate allocation of emissions**
 - Allowing both location-based and market-based reporting in regions where there are attribute tracking systems creates risk of double counting if the two are compared because attributes claimed by an organization are also included in the grid average emission factor used by that and other organizations. Residual mix data that represents the untracked or unclaimed

generation, if used ubiquitously by reporting entities instead of a grid average emission factor, would most accurately allocate emissions from the shared grid while also factoring in consumer choice.

- If a organization is not actively purchasing contractual instruments to cover their energy consumption, they should report the residual mix for that location. In some locations this may require the development of residual mix calculations. This encourages countries to develop their residual mix methodologies, if not already done.
- Additional stakeholder feedback on residual mix data is covered in section F.4.
- **The market-based method contributes to growth and development of renewable energy markets globally**
 - Power producers and retail providers cited a consistent increase in the number of customers who have demonstrated willingness to manage their scope 2 emissions by purchasing energy from renewable sources using the market-based method. Increased prevalence of bilateral renewable energy contracts (e.g., virtual and physical PPAs), growth in customers who sign up for green tariffs, etc. were identified as key metrics of successfully contributing to the decarbonization of the energy system.
 - Respondents cited that according to Bloomberg New Energy Finance, “total volumes [of clean energy contracts signed by corporations] were equivalent to more than 10% of all the renewable energy capacity added globally [in 2021], showing the impact corporate sustainability pledges are having on clean energy build.”
 - Some respondents also cited rapid growth in voluntary markets and EAC transactions across Asia, Africa, the Middle East, and Latin America as further support the market-based method is helping to accelerate carbon-free electricity deployment globally.

Within the comments proposing to require only the market-based method, there was a range of preferences concerning keeping the existing requirements essentially unchanged or introducing a variety of modifications to the activity data, emission factors, and quality criteria associated with the market-based method. See section C for more on this topic.

Feedback on the challenges of reporting scope 2 with the market-based method

Some respondents cited concerns regarding whether the market-based method is an accurate and/or appropriate reflection of a reporting entity’s emissions from electricity and challenged whether it results in true emissions reductions as per its intended ‘theory of change’. These concerns often stated that the current method is not appropriate for tracking or representing the physical consumption of energy and any claims to have caused emissions reductions must be supported by or be based upon a consequential GHG accounting analysis.

Many respondents noted that residual mix data is not available in many regions of the world, and that without it, accurately apportioned electricity emission data is not realistic for all market participants. Additional stakeholder feedback on residual mix data is covered in section F.4.

Many respondents stated that while they believe the scope 2 market-based method has had some degree of impact catalyzing a range of different corporate renewable energy procurement behavior, not all the actions have and/or will continue to result in collective changes in low-carbon energy supply and/or global atmospheric GHG emission reductions. Some cited that the use of market-based instruments to achieve science-based reduction targets, without any clear demonstration of emission reductions, is a flaw of the market-based method. Others cited that all procurement mechanisms are currently treated equally with respect to their ability to reduce the inventory emissions associated with a reporting entity's load, despite the fact that they may and likely do have different emission impacts.

In order to address these discrepancies, many respondents suggested updating the scope 2 activity data, emission factors, and quality criteria requirements within the market-based method, covered in section C below. Feedback on additionality is covered in section D.

C. Responses on activity data, emission factors, and quality criteria requirements

C.1. Current data and quality criteria requirements for the location-based and market-based methods

Chapter 6 of the *Scope 2 Guidance* outlines the basic process and necessary information for calculating scope 2 emissions:

1. Collect all activity data, i.e., 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.
2. Determine the most appropriate, accurate, precise, and highest quality emission factors available for both the location-based and market-based (if applicable) methods.
3. Multiply all activity data from each operation by the emission factor applicable for that activity based on the facility's location or market.

Chapter 7 of the *Scope 2 Guidance* provides further details on the necessary scope 2 accounting and reporting requirements, including the quality criteria that must be satisfied for any contractual instruments used in the market-based method (see Table 7.1 on scope 2 quality criteria, copied in section B.6. in this report). Additionally, on activity data, emission factors, and quality criteria requirements the current *Scope 2 Guidance* states:

- **Annual consumption:**
 - Organizations *should* report total annual consumption of purchased electricity, heat, and cooling (*Scope 2 Guidance*, section 7.2, page 61).
- **Emission factor selection:**

- Organizations *should* use the most appropriate, accurate, precise, and highest quality emission factors available for each method (section 6.5, page 45).
- That organizations *can* evaluate emission factor data based on quality indicators including their reliability, completeness, and geographic, temporal, and technological representativeness (*Scope 2 Guidance*, section 6.10.1, page 54).
- **Location-based grid average emission factors:**
 - Table 6.2 in the *Scope 2 Guidance* indicates preferences for selecting emission factors for the location-based method (*Scope 2 Guidance*, section 6.5, page 47).
 - The most appropriate spatial boundaries for emission factors serving the location-based method are those that approximate regions of energy distribution and use, such as balancing areas and that all generation and emissions data within this boundary *should* be aggregated and any net physical energy imports/exports and their related emissions *should* be considered. Options are also provided to use larger boundaries when necessary (*Scope 2 Guidance*, section 6.10.1, page 54).
- **Market-based emission factor quality criteria:**
 - Table 6.3 in the *Scope 2 Guidance* represents a hierarchy of instruments based on the most precise (e.g., energy attribute certificates issued in units that match consumption units, e.g., MWh) to least precise (averages of attributes representing all unclaimed production in a region) (*Scope 2 Guidance*, section 6.5, page 48).
 - If organizations have access to multiple market-based emission factors for each energy-consuming operation, they *should* use the most precise option for each operation (*Scope 2 Guidance*, section 6.11, pages 54-57).
 - Organizations *shall* ensure that any contractual instruments used in the market-based method total meet the scope 2 quality criteria (*Scope 2 Guidance*, section 7.1, page 60):
 - Criteria 4, Vintage: "Be issued and redeemed *as close as possible* to the period of energy consumption to which the instrument is applied".
 - Criteria 5, Market Boundaries: "Be sourced from the *same market* in which the reporting entity's electricity-consuming operations are located and to which the instrument is applied".
 - Section 7.5 in the *Scope 2 Guidance*, "Additional guidance on Scope 2 Quality Criteria" details potential considerations an organization *should* use in complying with these requirements (*Scope 2 Guidance*, section 7.5, pages 63-65).

C.2. Feedback on specificity vs. flexibility of scope 2 activity data, emission factors, and quality criteria requirements

Survey respondents generally expressed an opinion that the current *Scope 2 Guidance* provides significant flexibility in determining how to interpret various requirements (e.g., emission factor applicability, quality criteria eligibility, etc.). Responses to the Scope 2 Survey were mixed in opinion concerning what, if any, updates should be made to the accounting and reporting requirements for activity data, emission factors (for both the location- and market-based methods), and quality criteria (for contractual instruments in the market-based method).

Preferences varied concerning whether updates should provide new *guidance* and/or create new *requirements*.

Some respondents urged that the revisions process should result in the stipulation of *more specific requirements* that reporting organizations must adhere to, citing existing and new research that such changes are necessary to accurately represent the GHG emissions of an organization's value chain. For both the location-based and market-based methods, these responses suggested that such changes are required to ensure the credibility of a scope 2 GHG inventory. Some respondents called for specific guidance on types and sources of emission factors to use in location-based and market-based calculations, including guidance on what to do in the case of missing national-level emission factors. More specific requirements were also said by respondents to improve comparability and consistency across different organizations' scope 2 inventories. Within comments that argued for increased specificity, many respondents also proposed that GHG Protocol should require the *most precise* or "granular" data and quality criteria. Discussion on granularity is captured in sections C.3. and C.4.

Other comments suggested that the GHG Protocol should *maintain or increase its current flexibility* in interpretation of requirements, emphasizing the importance of feasibility and achievability, and allowing organizations to have discretion in selecting the most suitable option for their specific circumstances. Many of these responses said that the GHG Protocol should only set the minimum criteria, and that regulatory and voluntary target-setting programs are more appropriate for establishing specific requirements on allowable market-based options to drive change in electricity generation supply over time. Some responses also noted that any changes that restrict market-based purchasing options or increase reporting complexity could lead to decelerated action by organizations and slow progress toward climate change mitigation. To address these practical challenges some suggested maintaining or minimizing the use of prescriptive words like "shall" and instead keeping or using words like "may" and "should." Within these comments, many respondents also suggested that the *least precise* data and quality criteria should be the minimum criteria, termed here as "broad". Discussion on flexibility and broadness of requirements is captured in sections C.3. and C.5.

Commonly cited rationales for maintaining flexibility in interpretation of scope 2 requirements or moving toward more specificity are summarized in Figure 2 below.

Figure 2. Stakeholder feedback on specificity and flexibility

	Most cited reasons include:
Stipulate specific requirements	<ul style="list-style-type: none"> • Grid modeling exercises demonstrate emissions reductions linked when specificity is used* • Better facilitates comparison between organizations • Minimizes confusion in interpretation • Improves auditability • Potentially reduce risks of greenwashing <p>*See Figure 3 for specific requirements.</p>
Maintain/increase flexibility in interpretation	<ul style="list-style-type: none"> • GHG inventory accounting and reporting needs to be easy and accessible to all • Flexibility needed where data and procurement options are inconsistent • Specificity should be left to regulatory and programmatic GHG disclosure programs

Some respondents suggested a wholly different approach to scope 2 accounting that is based on matching emission impacts associated with energy production and consumption, which is presented in section E of this report, *'Feedback on introducing a new emissions impact reporting requirement.'*

C.3. Feedback on granularity vs. broadness of scope 2 activity data, emission factors, and quality criteria requirements

Within responses that argued for prescribing more specific requirements or maintaining flexibility regarding the interpretation of requirements, many stakeholders argued that GHG Protocol should require or encourage the most precise or “granular” data and quality criteria. Others argued that the least precise or “broad” criteria should be the minimum requirement, with the option for organizations to make a choice, or for regulatory or voluntary target-setting programs to set their own additional criteria.

Commonly cited rationale for granular or broad requirements is summarized in Figure 3 below.

Figure 3. Stakeholder feedback on granularity and broadness

	Most cited reasons include:
Require granularity	<ul style="list-style-type: none"> • More closely aligns with physical delivery of electricity • Reduces issue with double counting • Enables scaling of new clean technologies and emission reduction strategies that can only be effectively deployed using high resolution data • Research indicates that procurement with: <ul style="list-style-type: none"> • hourly matching to consumption, • deliverability and • additionality may improve alignment of inventory and system-wide emissions (IEA, TU Berlin, Princeton University, Florence School of Regulation)
Keep broad	<ul style="list-style-type: none"> • Doesn't preclude market participation from orgs with fewer resources • Needed where data and procurement options are unavailable or difficult to access • Granularity could restrict market development and investment in grids that need it most, leading to equity concerns • Allows for greater avoided emissions impacts from dirtier grids as opposed to local, clean ones

C.4. Granular, specific requirements or encouragement

Most of the feedback requesting more specificity in scope 2 focused on requiring or encouraging additional granularity. Granularity tended to be defined as activity data and emission factors that are temporally matched on an hourly basis, and using a market boundary that is aligned with matching generation and load within the same physically deliverable grid boundary such as in the same bidding zone, balancing authority, or similar criteria. Survey feedback included suggestions for increasing granularity within both the location-based and market-based methods.

Rationale for increasing granularity in location-based method

Some respondents referenced a 2022 [study](#) showing that the current location-based method using annual activity data matched with annual grid average emission data is not granular enough to provide an accurate account of an organization's grid-based GHG emissions, nor does it incentivize corporate action for load shifting and changing consumption patterns overall. These comments suggested that any location-based accounting should be done on an hourly basis over geographical boundaries where electricity is physically deliverable, consistent with power flow modeling.

Rationale for increasing granularity in market-based method

Most respondents' rationale for increasing granularity of the market-based quality criteria requirements reflect the positions that (i) the current *Scope 2 Guidance* allows for market-based emission reduction claims without any clear global emission reduction benefits, and (ii) scope 2 emissions reporting must better align with real-world reductions in emissions to ensure accuracy, accountability, and continued acceptance. It was also shared that any such framework should make intuitive sense (e.g., be linked to physical realities such as requiring a

reasonable grid connection between the electric generator and consumer, only claiming usage of solar energy during the daytime, etc.).

To address these challenges, most organizations proposing a more granular accounting approach referenced a growing body of research, including from the [IEA](#), [TU Berlin](#), [Princeton University](#), and [Florence School of Regulation](#). This research generally supports claims that electricity supplied from new assets, in the same hour on the same "deliverable" grid, not only ensures zero-carbon electricity supply in the value chain of the consumer but also reduces emissions at a system-level.

Comments encouraging more granular requirements also pointed to [statements](#) by European TSOs made through ENTSO-E where they highlighted that more granular guarantee of origin (i.e., EAC) mechanisms are "needed to ensure an effective contribution to a fully decarbonized electricity system".

Based on the above considerations, proponents of these new granular quality criteria requirements suggest that the changes align market-based emission claims with an organization's value chain emissions and do so using an attributional methodology consistent with the *GHG Protocol Corporate Standard*.

Supporters also pointed out that using a detailed hourly-matched and deliverable attributional accounting approach would create a system better suited to making claims about using zero-emissions electricity. Importantly, this accounting method would be based on evidence that demonstrates that such procurement actions lead to reduced system-level emissions (i.e., using an attributional or allocational methodology supported by consequential evaluations).

Suggested areas to make these modifications included addressing activity data, emission factors, and quality criteria as outlined below.

Granular market boundaries

Responses for more specific requirements on market boundary quality criteria requirements generally aligned with the discussion on granularity presented above. How stringent the market boundary should be made varied from using the local electric grid plus any interconnected grid system, to a strict demonstration of deliverability using power flow models, congestion pricing analysis, or similar approaches.

Stated reasoning for these changes focuses on the concern that the current quality criteria fail to plausibly represent an organization's value chain emissions, i.e., that any claimed usage of attributes of energy production (i.e., EACs used in a scope 2 inventory) must originate from generation facilities that could have reasonably supplied energy to the location claiming the attributes.

This position was also often linked to aligning a GHG inventory emission reduction claim by a reporting organization, with an actual reduction in atmospheric emissions. A similar example was often provided:

A wind facility generates one EAC. Two different building owners, each located on different grid regions far away, are considering buying that wind EAC. Depending on which organization buys that EAC, the same EAC would end up having a different magnitude of GHG emission reductions between the two organizations' scope 2 inventory. This is because there are differences in the local grid emission intensity of the wind generator and the grid load at the two different locations (e.g., building A's scope 2 total in a coal-heavy region would drop more than building B's in a much cleaner region). Requiring EACs be sourced from generation within the same deliverable market boundary as the load claiming its consumption could mitigate this otherwise artificial outcome.

Note that section E, '*Feedback on introducing a new emissions impact reporting requirement*' discusses survey feedback on emissions impact accounting.

Granular vintage requirements

Responses for more specific requirements on vintage quality criteria requirements generally aligned with the discussion on granularity presented previously (section C.4.) as well as similar reasoning for more specific market boundaries.

Responses advocating for hourly-specific vintage requirements noted it would provide a more accurate estimate of the emissions associated with organizations' electricity consumption and create a closer connection between organizations' clean electricity purchasing and their actual electricity consumption.

This outcome was supported on the premise that the emissions associated with the consumption of electricity can vary widely based on the time of day when the electricity is consumed depending on the mix of resources providing electricity to the grid at a given time.

Other respondents indicated scope 2 should specify that EACs must be redeemed within the same season, month, or day, generally noting that while shorter periods are presumably more accurate than longer periods, a transition period from annual to stricter vintage requirements would likely be necessary for market adoption.

Considerations on feasibility of granular requirements

The majority of support for more specific and granular reporting requirements recognized challenges inherent to such a transition, while maintaining that such changes are necessary for the reasons stated above. Several options were presented to help manage a transition period.

Initial steps included a phase-in period where vintage requirements are phased in from annual to monthly, and monthly to hourly resolutions, and that market boundaries transition to become aligned with grid regions, similar to transitions adopted by emerging policy programs and regulators.

To make hourly accounting more accessible, some respondents proposed using standardized load and generation curves as the default when only annual or monthly data is available. This

was suggested to allow for quantifying emissions resulting from fossil fuel sources during coverage gaps.

Some respondents highlighted that existing standards, such as ANSI, suggest that there is already published methodology for implementing hourly consumption data and that it is possible to establish default data if hourly metering is prohibitive. Others also pointed to a variety of new accounting software tools that make implementing granular data accessible.

C.5. Broad, flexible requirements

Most of the feedback around maintaining flexibility in requirements centered on the continued use of annual data and broad market boundaries and the need to ensure feasibility of requirements. There was marked recognition of the various challenges that organizations may face in obtaining activity data, emission factors, and other information to comply with the quality criteria requirements. Responses also highlighted challenges, both internal to an organization and externally, regarding engaging in energy procurement strategies that support decarbonization, including EAC procurements, long-term purchase agreements, new resource development on-site or off-site, and other related activities. The importance of multiple procurement options for internal decision-making processes was highlighted as a valuable means to manage the range of risks and benefits associated with decarbonization pathways.

Responses also noted that significant changes (e.g., entirely removing the option for market instruments) should be considered with respect to the impact on existing contractual arrangements, the remaining or new options for organizations to meet climate goals, as well as the implications for an organization's willingness to take on long-term commitments without an expectation of reasonable stability in GHG Protocol accounting practices.

Respondents in support of flexible and broad requirements also suggested that the role of the GHG Protocol is to maintain an accounting framework that can be adapted and adopted for different purposes in regulatory and voluntary target- and-goal-setting contexts.

Suggested areas to make these modifications included addressing activity data, emission factors, and quality criteria as outlined below.

Flexible market boundaries

Some comments advocating for flexible market boundary definitions stated that this supports wide market-based procurement options for organizations of all sizes and sophistication to take action. Conversely, narrow market boundaries could have the opposite effect and may restrict procurement and other investments that catalyze decarbonization.

Responses on this topic also outlined that market boundaries need no relation to a physical grid because attribute markets can be different (e.g., larger) than the physical grid network, because attributes (direct emissions) are not actually associated with the physical power delivered through the grid.

Keeping boundaries for market-based scope 2 quality criteria broad was also encouraged due to the difficulty in effectively and accurately assessing market boundaries based on interconnections, transmission constraints, congestion pricing, power deliverability models, etc. Some of these comments suggested that the GHG Protocol should defer to jurisdictional standards where they exist, while keeping broadly applicable requirements.

Discussion on flexible market boundaries also noted that this could expand the options available to organizations to take actions which enable the greater emissions impact (e.g., allow organizations to procure and develop renewable energy in the regions where it has the greatest emission reduction potential). Discussion on reporting emission impacts is covered in section E.

Flexible vintage requirements

Most responses favoring flexible vintage requirements stated the quality criteria should be unchanged, allowing organizations to match their annual electric consumption with EACs produced as close as possible in time. The reasoning for this outcome centered primarily on facilitating engagement across a wide range of markets with varying product availability and transaction infrastructure.

Many supporters for flexible vintage requirements raised concerns that a more granular matching (e.g., hourly) requirement would hinder overall demand for clean energy procurement efforts. The lack of existing granular products, costs, and difficulties for companies with widely distributed facilities, interactions with scope 3 reporting requirements, as well as challenges to structuring renewable energy procurement portfolios were noted as obstacles to more granular vintage quality criteria requirements.

Some respondents also noted that the current vintage quality criteria requirements already allow organizations to use more granular accounting options if they wish to do so and thus further changes may be unnecessary.

C.6. Other feedback on specific requirements

Accounting for bundled and unbundled energy attribute certificates

Some responses advocated for only allowing EACs bundled with the purchase of the underlying energy, or that the EACs be required to be included with the energy supplier. The most common reasoning for this position was related to improving causal linkage between the generation and purchase of electricity thus any emission reduction benefits. Section D of this report further discusses causal linkage, presented herein using the term: "additionality."

Others supported the current equal treatment of both energy purchases bundled with EACs, or procuring certificates on their own (i.e., unbundled). Some said that bundled and unbundled EACs are fundamentally equivalent with one another. It was noted that in the US, current state Renewable Portfolio Standards (RPS) often cannot be met by utilities without purchasing unbundled EACs.

Some also said that disallowing or discouraging unbundled EAC transactions would have an outsized impact on the entire EAC market and renewable electricity development landscape. For example, an onsite solar project that sells its EACs to make the project's economics favorable would become unprofitable without the ability to make such EAC sales. Other examples noted that the project economics for new PPAs and virtual PPAs (vPPAs) could also be less favorable if the off taker buying the energy plus EACs was no longer able to sell surplus EACs. Some also cautioned that any discouragement of unbundled EAC transactions could also decrease access to renewable energy in underserved customer segments.

These comments highlighted the practicality that many companies do not have access to any procurement options other than unbundled EACs. Some respondents cited that according to the [US Environmental Protection Agency](#) (US EPA), except for retail EACs, no other individual procurement option is available that covers even half of the electricity consumers or half of total electricity sales in the United States. This occurs because of challenges in meeting credit-worthiness requirements necessary to engage in a PPA, as well as the general complexities of the process, regulatory hurdles, and lack of availability in some markets. Given their lower barrier to entry, unbundled EACs are the primary way for many companies to claim the environmental attributes represented by renewable electricity and can be an equitable option to promote access to renewable energy for underserved customer segments. Survey respondents with this position tended to suggest that flexibility in any requirement around bundled or unbundled EACs needs to be maintained.

Developing an emission factor data source database

Several responses expressed challenges in comprehending and choosing scope 2 emission factors from the numerous sources available to organizations, for both the location-based and market-based methods. To address this, it was suggested that the GHG Protocol should establish a definitive list of acceptable emission factor data sources and facilitate the creation of international databases for emission factors. Advocates stated this approach would enhance transparency and consistency in emissions reporting.

Using consumption-based emission factors instead of production-based

The *Scope 2 Guidance* section 6.5 states that grid-average emission factors should convey combustion-only (direct) GHG emission rates, representing electricity production occurring in a defined grid distribution region. They should also reflect net physical energy imports/exports across the grid boundary.

Some respondents suggested that electricity *consumption* emission factors, as opposed to *production*, need to be required to appropriately reflect potentially significant impacts of net physical energy imports and exports across a grid boundary instead of only using local generation within a given grid territory. This is necessary to accurately represent the emissions associated with an end user's consumed electricity.

However, it was also stated that consumption-based emission factor datasets are not widely published by governments nor by international agencies, unlike production-based emission factors, which are typically used in location-based inventories.

Technology eligibility

Respondents suggested scope 2 requirements should explicitly indicate that *zero-emission* electricity sources, as opposed to just *renewable* electricity sources, can be included in the inventory as such, regardless of the emission factor being stated alongside the technology. It was noted by many that EACs frequently omit specific GHG emission factors. Additional feedback supported all-attribute tracking for reporting purposes (e.g., a tracking system or registry records a certificate for all MWh generated, regardless of the technology type that generated the power, any eligibility for state or federal renewable or clean energy certificates, etc.).


Order of operations for applying emission factors using the data hierarchy

Some respondents urged that specific guidance is needed on the order of operations to use when applying different types of emission factor sources provided in the data hierarchy in Table 6.3 of the *Scope 2 Guidance* (see Table 6.3 below). For example, respondents suggested that if a utility delivers a product with 20% renewable power substantiated by EACs, then the utility's customer should be able to claim that 20% of their purchased energy is covered by renewable electricity and only the remaining 80% would be applicable for further market-based EAC retirement. Confusion was raised if the current requirements simply assign the utility a supplier-specific emission rate, and whether EACs for the entire load would be necessary to substantiate a 100% claim. Section 6.6 in the *Scope 2 Guidance* further discusses this issue.

Table 6.3 Market-based scope 2 data hierarchy examples (Scope 2 Guidance, page 48)

Table 6.3 Market-based scope 2 data hierarchy examples

Data forms listed here should convey combustion-only (direct) GHG emission rates, expressed in metric tons per MWh or kWh. Reporting entities should ensure that market-based method data sources meet Scope 2 Quality Criteria. Instruments listed here are not guaranteed to meet Scope 2 Quality Criteria, but are indicative of instrument type.

Emission factors	Indicative examples	Precision
Energy attribute certificates or equivalent instruments (unbundled, bundled with electricity, conveyed in a contract for electricity, or delivered by a utility)	<ul style="list-style-type: none"> • Renewable Energy Certificates (U.S., Canada, Australia and others) • Generator Declarations (U.K.) for fuel mix disclosure • Guarantees of Origin (EU) • Electricity contracts (e.g. PPAs) that also convey RECs or GOs • Any other certificate instruments meeting the Scope 2 Quality Criteria 	Higher 
Contracts for electricity, such as power purchase agreements (PPAs) ^a and contracts from specified sources, where electricity attribute certificates do not exist or are not required for a usage claim	<ul style="list-style-type: none"> • In the U.S., contracts for electricity from specified nonrenewable sources like coal in regions other than NEPOOL and PJM • Contracts that convey attributes to the entity consuming the power where certificates do not exist • Contracts for power that are silent on attributes, but where attributes are not otherwise tracked or claimed 	
Supplier/Utility emission rates , such as standard product offer or a different product (e.g. a renewable energy product or tariff), and that are disclosed (preferably publicly) according to best available information	<ul style="list-style-type: none"> • Emission rate allocated and disclosed to retail electricity users, representing the entire delivered energy product (not only the supplier's owned assets) • Green energy tariffs • Voluntary renewable electricity program or product 	
Residual mix (subnational or national) that uses energy production data and factors out voluntary purchases	<ul style="list-style-type: none"> • Calculated by EU country under RE-DISS project ^{b, c} 	
Other grid-average emission factors (subnational or national) – see location-based data	<ul style="list-style-type: none"> • eGRID total output emission rates (U.S.).^d In many regions this approximates a consumption-boundary, as eGRID regions are drawn to minimize imports/exports • Defra annual grid average emission factor (UK) • IEA national electricity emission factors^e 	

Notes:

a Because PPAs are the primary example of this type of instrument used in the markets consulted in this TWG process, this class of instrument may be referred to in shorthand as "PPAs" with the recognition that other types of contracts that fulfill a similar function may go by different names.

b See: http://www.reliable-disclosure.org/static/media/docs/RE-DISS_2012_Residual_Mix_Results_v1_0.pdf.

c The Norwegian authority also publishes a residual mix emission factor that can be found here: <http://www.nve.no/en/Electricity-market/Electricity-disclosure-2011/>.

d See: <http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html>.

e See: <http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html>.

Source: *Scope 2 Guidance*, Table 6.3, page 48

Additional feedback from respondents

- Additional clarity on recommended or preferred language to substantiate EAC retirement and if retired EACs can be allocated through a clear chain of custody.
- Further specificity on the content that must be included in a supplier- or utility-specific factor (e.g., resource type, EAC procurement and retirement details, etc.).
- More clarity was called for on potential interactions between verified carbon offsets sourced from carbon-free generation facilities and any EACs from the same resource.
- More clearly articulate the relationship between regulatory compliance programs that require energy providers to procure energy attribute certificates and the supplier emission factors that they provide to consumers, including whether separation of claims are necessary.
- Additional clarification is needed regarding whether exclusively carbon dioxide (CO₂-only) values are acceptable or if they must be carbon dioxide equivalent (CO₂e). Respondents said that some, but not the majority, of external assurers argue that supplier-specific emission factors must either (i) use the common unit, CO₂e or (ii) report greenhouse gases separately, e.g., CO₂, CH₄, and N₂O separately. Respondents also said that in practice, most suppliers/utilities do not publish this information and it is unrealistic to expect this without regulation requiring them to do so.

D. Feedback on proof of additionality

D.1. Current requirements on additionality

Section 11.3 in the current *Scope 2 Guidance* notes that contractual instruments claimed in the market-based method need not fulfil criteria such as offset “additionality” or prove the overall market impact of individual purchases or supplier programs result in direct and immediate changes in overall supply.

The *Scope 2 Guidance* states that in GHG accounting, additionality is a term specifically associated with offsets and project-level accounting, which is distinct from corporate GHG accounting. The claim that X metric tons of GHG emissions have been avoided at a global level can only be credible if the offset credit was the “intervention” that made the project happen—and that, without that intervention, that project would not have occurred. Such a claim requires proof of cause-and-effect and is critical to support the integrity of offset credits. However, offsets represent a different claim (avoided GHG emissions compared to a baseline scenario) than energy generation attributes (X GHG emissions from Y unit of energy generation). Scope 2 reporting is a report of usage and as such is independent of issues associated with additionality (*Scope 2 Guidance*, section 11.3, pages 90-91).

Furthermore, regarding the concept of accounting for reductions in indirect value chain emissions the *Corporate Standard* states:

“Reductions in indirect emissions (changes in scope 2 or 3 emissions over time) may not always capture the actual emissions reduction accurately. This is because there is not always a direct cause-effect relationship between the activity of the reporting company and the resulting GHG emissions. For example, a reduction in air travel would reduce a company’s scope 3 emissions. This reduction is usually quantified based on an average emission factor of fuel use per passenger. However, how this reduction actually translates into a change in GHG emissions to the atmosphere would depend on a number of factors, including whether another person takes the “empty seat” or whether this unused seat contributes to reduced air traffic over the longer term. Similarly, reductions in scope 2 emissions calculated with an average grid emission factor may over- or underestimate the actual reduction depending on the nature of the grid.

Generally, as long as the accounting of indirect emissions over time recognizes activities that in aggregate change global emissions, any such concerns over accuracy should not inhibit companies from reporting their indirect emissions. In cases where accuracy is more important, it may be appropriate to undertake a more detailed assessment of the actual reduction using a project quantification methodology.”

D.2. Stakeholder responses on additionality

Feedback to keep additionality requirements outside of scope 2

Some survey responses aligned with the current position in the *Corporate Standard* and *Scope 2 Guidance* on the role of additionality. This included feedback that the market-based accounting method applies to all energy generation in a defined grid, not just “low-carbon” or renewable energy from projects supported by a specific organization’s financial support and that considerations of offset additionality criteria are not fundamental to, or largely compatible with, the underlying rules for market-based scope 2 accounting and allocation.

Responses favoring continued exclusion of additionality from inventory accounting further refined this position in several ways, including a discussion on the importance to distinguish electricity “usage” from “impact” claims and view additionality as appropriate to incorporated in only the impact assessment. Some of these comments also proposed a two-pronged approach:

- Keep a market-based inventory accounting (i.e., attributional) method for reporting emissions from electricity use, requiring load matched with generation on a time and locational basis, ideally hourly and deliverable. This approach was described as allowing for inventory reductions through transactions that change load matching, while still reflecting emissions from use. Additionality was identified as irrelevant to constructing this type of inventory.
- Also include a project- or intervention-based accounting (i.e., consequential) method requirement where high-emission transactions are calculated and reported, considering additionality as an important factor. This ensures and enables organizations can effectively

prioritize interventions with high impact and disclose transactions with both significant and minimal (or negative) emissions impact.

Feedback supporting introducing additionality requirements in usage claims in scope 2

Within responses supporting the introduction of additionality requirements, there was a general opinion that proof of additionality or a clearer connection with causality (e.g., the organization making a claim helped cause the outcome it is taking credit for) should play an important role in the future of credible scope 2 accounting.

Many of these responses stated the market-based method in its current form has thus far lacked any definitive demonstration that the accounting method has resulted in an aggregate change in global emissions over time. These responses cited peer-reviewed literature from [Nature Climate Change](#) and research from [Princeton University](#) that the current approach has, in fact, not achieved this outcome.

Reasoning and potential explanations for these outcomes highlighted issues of inadequate price signals for EACs in some markets where both too-low demand and an overabundance of unbundled EACs from existing carbon free generation facilities create oversupply in the market. It was also noted that it is becoming increasingly likely in many parts of the world that solar and wind projects would be built anyway for economic or policy reasons not related to voluntary buyer actions.

For the market-based method to become sufficiently credible, respondents included a range of quality criteria updates to ensure additionality and thus that reductions in an organization's scope 2 emissions inventory correspond to real world emissions reductions. There were many cited examples of circumstances that could affect whether a project (bundled with its attributes, or unbundled certificates) would be considered additional. These included (not exhaustive):

- The degree to which a PPA/vPPA project benefits from government incentives, legacy investments, etc.
- Whether grid connection issues rather than only financing are preventing a project from being built
- Whether there is oversupply relative to demand for EACs in a given market at any given time (where a proxy such as a price threshold would need to be determined)
- The types of technology being used in a PPA/vPPA (with newer or less pervasive technology likely to be more additional compared to wind or solar)
- The range of procurement options available (PPAs/vPPAs, green tariffs, unbundled EACs, etc.) and variations in how effective each are at driving an increase in renewable energy capacity according to a to-be-defined set of metrics
- The idea that additionality is not likely to be a binary variable for renewable projects, but more likely to exist on a spectrum

Respondents drew parallels to the carbon offsets market, which requires offsets to pass an additionality test, and urged the GHG Protocol to introduce quantitative thresholds for EACs to be deemed additional and/or of high carbon reduction quality.

Some provided examples on how additionality could be verified, such as introducing requirements around asset age, subsidy status, repowering, avoided curtailment, and long-term contracts. Some said additionality could be proven by EAC prices that are at or above a market-specific floor price, which should be set and managed by an independent body. Other respondents pointed to the Clean Development Mechanism Additionality Test of the UNFCCC as a resource.

There were varying degrees of how supporters of various potential updates to scope 2 addressed additionality as a requirement. For example, some granular accounting proponents viewed including various types of additionality measures as a fundamental requirement alongside criteria of deliverability and hourly matching. Responses prioritizing emission impact reporting (presented in section E) also included a spectrum of appetites for additionality requirements.

Others noted that additionality, while in theory a helpful indicator of impact, is too difficult to prove. For example, some said that additionality may be difficult to identify because of the opaque nature of the investment process, and that it requires counterfactual analysis. These respondents argue that that for this reason, proof of additionality should not be required.

E. Feedback on introducing a new emissions impact reporting requirement

E.1. Current requirements on avoided emissions

Currently, organizations can calculate and report estimated grid emissions that are avoided by low-carbon energy generation and use *separately* from the scopes. The *Scope 2 Guidance* presents an introduction to how GHG emissions inventories should be prepared at the corporate, project, and product levels in Chapter 1. Section 1.1 references the [GHG Protocol for Project Accounting](#) (*Project Protocol*) which describes how companies can quantify the GHG impacts of specific projects undertaken to reduce emissions, avoid emissions occurring in the future, or sequester carbon. Within the context of the electric power sector, this type of analysis broadly seeks to reflect the impacts of clean generating resources on the rest of the grid: for example, the power output and emissions from a fossil-fuel generation facility may be backed down or entirely avoided by using output from a low-carbon electricity generating facility.

The current *Scope 2 Guidance* (section 6.9) notes that these avoided emissions estimates inherently represent impacts outside the inventory boundary, given that they include the overall impacts of a given intervention on the entire electricity system, as opposed to the emissions exclusively attributable to the reporting organization. Avoided emissions estimates are not necessarily equivalent to reductions in global emissions and should therefore not be used to reduce an organization's footprint. However, the guidance states that quantifying avoided emissions can provide several technical and strategic benefits, including:

- Identifying where low-carbon energy generation, load management, etc. can have the biggest GHG impact on an electricity system, based on operating margins.
- Demonstrating that grid-connected generating facilities provide system-wide services in addition to conveying a specific emission rate at the point of production.

Section 6.9 of the *Scope 2 Guidance* directs organizations interested in this type of analysis to follow project-level methodology; see GHG Protocol *Project Protocol* and the sector-specific supplement, [Guidelines for Grid-Connected Electricity Projects](#). This may be most beneficial where an organization has taken actions that avoid higher-carbon generation dispatch at the margins.

E.2. Stakeholder responses on emissions impact reporting

The Scope 2 Survey responses included a significant interest in creating a new requirement to report avoided emissions.

Generally, respondents identified that quantifying avoided emissions from interventions can be useful to highlight actions beyond the organization's GHG inventory and that requiring the reporting of this information would incentivize organizations to focus on making investments that maximize emission avoidance from the electricity grid. Importantly, this approach enables organizations to focus on engaging with projects that have the most impact without constraining development to where the reporting organization has operations consuming electricity. This was repeatedly emphasized as a means to encourage clean energy development globally, where it is most needed both from an emission impact perspective as well as energy equity and other socioeconomic benefits.

Preferences varied on where and how this type of information should be reported, though most respondents shared common motivations. Some proposed modifications to the current scope 2 market-based method; others suggested withdrawing the current market-based method and replacing it with a requirement to report location-based emissions alongside a project- or intervention-based accounting method. Performing all three evaluations, i.e., dual reporting of a location-based and market-based scope 2 inventory, and a project- or intervention-based impact report, was also suggested.

Several respondents highlighted that more analysis quantifying the benefits of implementing an avoided emissions approach at scale would shed further light on the benefits of this methodology.

An illustration of the challenge that some stakeholders wish to better address can be summarized by the following examples:

- An organization has load in a high carbon intensity grid region with electricity generated by predominately coal, oil, and gas generation. The reporting organization matches all their load with EACs generated by a renewable energy project situated far away on a different, much cleaner electricity grid region. When comparing the emissions induced by the organization's (high-carbon) load with the emissions avoided by clean (low-carbon) generation on a different grid, the load in the dirty grid induces more emissions

than the generation in the clean grid avoids. However, regardless of this outcome the organization would report zero scope 2 market-based emissions.

- The same example could be considered with the opposite siting configuration: the organization's clean energy investment in a dirty grid avoids more carbon than their operation in a clean grid induces, yet they would still report the same zero scope 2 market-based emissions.
- A third example considers that the emissions associated with the time of day in which an organization uses electricity may be significantly different than the emissions avoided at the time of day in which their renewable energy purchases or projects generate clean electricity.

The absence of target- and goal-setting programs' recognition for avoided emissions was also highlighted as a challenge. Because there is nowhere meaningful to report information that recognizes organizations' actions for maximally avoiding emissions, respondents emphasized a lack of any emission reduction incentives to use electricity at times of the day when the grid is cleanest, nor to site a renewable energy project in a grid that would avoid the most emissions.

Responses on where to report emissions impact

Respondents noted an absence of any a clear program or reporting category to report emissions impact, avoided emissions, or project- or intervention-based inventories, particularly if not permitted in a scope 2 inventory.

Many respondents of the Scope 2 Survey indicated that while currently an optional disclosure category separate from the scopes, requiring the reporting of emissions impacts for purchased electricity, heating, or cooling is necessary. Some suggested this could be implemented as a replacement for either the location-based or market-based method in scope 2 or reported separately as a supplemental number. Respondents stated that such a requirement is crucial for ensuring avoided emissions and impact-based accounting are appropriately valued in the emission disclosure and target-setting ecosystem, ultimately mobilizing billions of dollars globally in clean energy investments.

Stakeholders interested in this topic often pointed to the current lack of integration between inventory reporting, emissions impact disclosures, and target-setting programs. Some responses highlighted that both the concept of emissions impact as well as marginal emission factors, which are based on consequential impacts to the system, are currently incompatible with the Science-based Targets Initiative's (SBTi) target validation protocol. These comments stated the effective result of this is that organizations pay little-to-no attention to avoided emissions or other impact-based metrics given that SBTi is predicated on the GHG Protocol's attributional inventory approach.

Some responses thought that reporting of emissions impacts outside of the scopes as a separate figure should be required so that organizations can report their efforts of reducing emissions outside of their value chain, with potential similarities to offsets. However, other respondents said that, while avoided emissions or emissions impact assessments can be useful prospectively to make determinations between choices in procurement options, they are not

indicative of a project offset because marginal emission rate (MER) data conveys avoided emissions, not direct emissions reductions. Some also urged a need for more discussion the intersection of EACs and carbon offsets, questioning, for example, if a carbon offset issued from an electricity project instead of an EAC provides a GHG emissions claim for the associated MWh.

Feedback also noted that the current *Scope 2 Guidance* dual-reporting requirement is already potentially cumbersome with two emission totals and adding a third number would further complicate many general users' understanding of GHG emission reporting data.

Responses on how to report emissions impact

Some respondents said that, unlike today's scope 2 calculation that allocates total system emissions to the consumption of electricity by organizations, the focus should instead be placed on the marginal emissions impacts of a load's electricity consumption and the impact of a clean energy resource's generation output. Therefore, rather than attributing total system emissions to load (i.e., using grid averages) and accounting for market-based transactions by assigning a zero-emission production rate (i.e., each EAC retired yields 1 MWh without emissions), the emissions *impact* of each activity of the reporting organization should be measured and accounted for accordingly.

A commonly suggested method for calculating an organization's emissions impact is simplified by the following example:

$$\text{Emissions Impact} = \text{Induced Emissions} - \text{Avoided Emissions}$$

Induced Emissions:

- In many responses, induced emissions were defined as the total greenhouse gases emitted into the atmosphere because of the generation of electricity an organization consumes from the grid where it operates. It was suggested that this be calculating by multiplying activity data (i.e., MWh consumption) by locational marginal emission rates or LMERS (i.e., marginal CO₂e/MWh), as opposed to grid average emission rates (i.e., average CO₂e/MWh) that are currently used for calculating scope 2 emissions.
- Other responses proposed using grid average emission factors to calculate the induced emissions allocated to load.

Avoided Emissions:

- Avoided emissions, in these examples, were defined as the greenhouse gases estimated to have been avoided from being emitted into the atmosphere because of the generation from clean energy resources, emission-optimized dispatch of batteries, shifting load from high to low marginal emission periods, or other electricity-related interventions taken by an organization. This could be calculated, for example, by multiplying a clean energy project's generation data (i.e., MWh generated) by LMERS (i.e., marginal CO₂e/MWh).

Responses on how to implement emissions impact reporting

Respondents who discussed implementing emissions impact reporting noted that to practically implement an emission impact reporting requirement, there would be a need for sufficient MER/LMER data availability and a standardized methodology for calculating MERs, in addition to the development of a broader emissions impact reporting standard(s).

Respondents noted that MER data currently only exists in certain markets and mostly covers MERs on an annual and regional basis, though respondents cited that ideally avoided emission calculations need to use granular MER data (e.g., consumption is matched in time with the physically deliverable marginal generation resource to that load, and generation is similarly matched in time against the marginal generating resource dispatched for that location). As an example, the US EPA publishes MERs by region, project type, and year in its AVERT database. However, at the hourly and sub-regional level, this data is only currently publicly available in the United States through two of the country's independent system operators. In other regions of the world, this data is more obscure or unavailable, though several non-governmental organizations and private companies are beginning to model and market this data in recent years.

Comments on this topic identified that organizations providing access to this data tend to use varied methodologies in their modeling calculations and estimations, leading to sometimes inconsistent or incomparable results. For example, MERs can reflect impacts from interventions over varied time frames, such as long-term impacts (e.g., building a new renewable asset that is incorporated into a utility's resource plan) or short-term impacts (e.g., operating a battery to help reduce load during high emission hours on a grids). Based on the survey responses there does not yet appear to be clear alignment on which estimation methodologies (e.g., short-run or long-run marginal emissions) are best suited and most accessible for incorporating avoided impacts.

Respondents suggested that building out a widely accepted database of currently available MER data from grid regions around the world would be necessary for the overall success and confidence in emission impact claims. Many thought that the GHG Protocol could play a role by creating a standard or best practice guidelines for MER calculation methodology that data providers must meet to be acceptable for use in an emissions impact reporting method, and how companies should estimate this information when source data is not available. Some respondents also suggested that the GHG Protocol develop data hierarchy guidance on balancing the accuracy of temporal and geographic granularity of consumption data and marginal emission rate data, similar to the data hierarchy guidance encouraged by stakeholders that support a modified market-based method as presented in section C above.

Lastly, respondents noted that the GHG Protocol should recognize that the definition of impact will continue to evolve, and any additional emissions impact reporting standard should be designed either to be flexible or updated on a regular basis.

F. Feedback on additional guidance, new technologies and use cases

Almost all respondents agreed that the *Scope 2 Guidance* would benefit from updated and expanded clarifications and new guidance on how to perform specific scope 2 emission calculation steps in a variety of circumstances. Feedback was also provided with suggestions related to emerging technologies, types of data, and other topics.

F.1. Accounting for purchased steam, heat, and cooling

Current requirements on accounting for purchased steam, heat, and cooling

While scope 2 as an emissions reporting category applies to indirect emissions from the purchase/acquisition and consumption of electricity, steam, heat, and cooling, the *Scope 2 Guidance* focuses primarily on electricity purchases and use. Appendix A in the *Scope 2 Guidance* addresses accounting for steam, heat, and cooling.

The *Scope 2 Guidance* states that organizations are required to report emissions from the purchase and use of steam, heat, and cooling energy products the same as for electricity: dual report according to the location-based and market-based method, noting that these types of purchases may result in the same total where direct line transfers of energy are used.

General feedback on accounting for purchased steam, heat, and cooling

Some survey respondents suggested that more guidance and examples are needed on reporting scope 2 emissions associated with purchased steam and heat consumption, including various production sources of heat such as air-, ground-, or water-source heat pumps, exothermal processes, combined heat and power (CHP) resources, as well as district heating systems.

In this feedback, several respondents also urged for

- A more detailed explanation on the dual reporting requirement for emissions from energy supplied by district heating facilities, including if and how energy attribute certificates apply.
- Provision related to accounting for indirect emissions from purchased energy that originates from the combustion of renewable natural gas or waste incineration at the plant level.
- Updates and revision of accounting rules from GHG Protocol [*Allocation of GHG Emissions from a Combined Heat and Power \(CHP\) Plant*](#) (2006) to include new guidance for allocation of emissions from CHP, specifically any hierarchy of preferred methodologies as well as harmonization with regulatory and policy frameworks globally.
- Estimation methodologies for calculating appropriate and conservative emission factors for purchased steam, heat, and cooling when a supplier does not provide emission rates based on their actual production intensities.
- Accounting methods for energy produced by new technologies such as hydrogen, and other emerging technologies.

Feedback on accounting for waste heat

Appendix A also covers how to treat steam, heat, and cooling as a “waste” product, i.e., the energy would have otherwise been vented into the environment but is instead captured for useful work. When a reporting organization is supplied these energy products from a third party via direct line as “waste” from an industrial process, accurate emissions accounting requires the underlying emissions associated with the original generation process of this heat to be reported.

Feedback on this topic suggested that the GHG Protocol should provide supplemental guidance on how and where to report avoided emissions from installation and operation of fossil-based energy sources when an organization instead purchases waste heat. Rationale for this approach included enabling incentives for organizations to use waste heat from other companies.

F.2. Emission factors used in scope 2 from waste-to-energy

The *Scope 3 Standard*, category 5, ‘*Waste Generated in Operations*,’ includes a discussion on accounting for emissions from waste when that waste is sent for incineration at a facility with energy recovery (waste-to-energy). The *Scope 3 Calculation Guidance* states that the consumers of the energy generated from a waste-to-energy combustion process should account for the emissions from incineration in their scope 2 emissions (*Scope 3 Calculation Guidance*, Chapter 5, page 80).

Some respondents requested the emission allocation across scope 2 and scope 3 category 5 be reevaluated, proposing that energy products such as heat recovered from waste incineration (also known as “waste-to-energy (WTE)” or “energy-from-waste (EfW)” i.e., when energy produced from the combustion of municipal solid waste (MSW) is used to generate electricity, heat, etc.) should be treated as having a zero-emission factor when reported in end-users’ scope 2 inventory. The rationale for this new approach was based on a position that emissions from the waste decomposition would have otherwise been vented to the environment if not incinerated for energy distribution. Additionally, these respondents stated that there is a need to shift the emission burden from the consumer of purchased energy to the one producing the waste because doing so would better incentivize the company producing waste to reduce it. These respondents further pointed out that if incineration is the only available option for waste treatment, it is possible that any reduction of purchased energy has zero effect on the need for waste incineration. The respondents also postulate that the current GHG Protocol method counteracts material recycling, promotes inefficient use of energy, and does not comply with EU legislation and other disclosure rules (e.g., the standard EN 15804 and the EPD system), which may lead to increased emissions of greenhouse gases.

Additionally, potential complexities were identified between appropriately allocating emissions between a reporting organization’s scope 2 and scope 3 when they both generate waste and purchases the waste-to-energy output (e.g., purchasing significantly more emission-intensive steam or heat than the organization’s proportional share of waste incinerated, or alternatively if they generate a significant volume of emission-intensive waste but only buy comparatively little

steam or heat from the waste-to-energy facility).

F.3. Reporting transmission and distribution (T&D) losses

Current requirements on reporting T&D losses

Transmission and distribution losses refer to the amount of electricity that is lost during the process of delivering it from power plants to consumers due to factors such as resistance in power lines and equipment inefficiencies. The GHG emissions embodied with T&D losses are reported in scope 3 category 3 for energy consumers. The total energy quantity consumed (i.e., MWhs) and reported in scope 2 serves as the basis for determining T&D activity data.

Section 4.2 of the *Scope 2 Guidance* on the emission-rate approach says that scope 2 accounting methods use generation-only emission factors, which do not include T&D losses or upstream lifecycle emissions associated with the technology of fuel used in generation.

Appendix B of the *Scope 2 Guidance* states that organizations should disclose which calculation method (i.e., market- or location-based) they are using to calculate and report T&D losses in scope 3 category 3, but do not need to “dual report” this total. For instance, if organizations, their suppliers, or other value chain partners have purchased energy attribute certificates to cover the quantity of grid losses, they can report this calculation based on the market-based method procedures in this Guidance. If not, organizations should use the appropriate location-based method emission factors.

Feedback on reporting T&D losses

Comments from stakeholders predominately focused on the need for clarification around how to designate and report T&D line losses for the electric industry and whether it should be reported as part of scope 2 or scope 3 for end-use reporters.

Respondents suggested that more detailed guidance should be provided for the various parts of T&D systems to explain how losses should be accounted for and where they should be reported depending on the operational and organizational control models. Cited examples included (not exhaustive):

- Provide greater clarification on how to address line losses for different types of power companies, including vertically integrated utilities, transmission and distribution companies (i.e., “wires only” companies), investor-owned utilities (IOUs), independent power providers (IPPs), municipal and public power utilities, electric power generation owner/operators, transmission and distribution cooperatives, etc.
- Develop utility-specific accounting rules, including for T&D losses depending on ownership/control over distribution infrastructure.
- Develop supplemental guidance that details losses from high voltage transmission versus low voltage local distribution, and what is or is not included in the end-user scope 2 emission rates.

F.4. Residual mix data

The *Scope 2 Guidance* defines the residual mix as 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, or canceled. The residual mix provides the appropriate emission factor for organizations' use when calculating their market-based scope 2 emissions when they are without contractual instruments or a supplier-specific emission rate.

As presented in section B of this report, many respondents suggested that more ubiquitous use of residual mix data would lead to more accurate allocation of emissions to market participants and therefore more accurate application of the market-based method.

However, many respondents noted that residual mix data is not available in many regions of the world, and there are challenges in obtaining it particularly outside of the EU or areas without all-attribute energy attribute tracking systems. Some respondents said that in certain instances partial residual grid mix data can be obtained; however, its accuracy is challenging to ensure due to the confidential, bilateral nature of some energy market transactions and incompleteness of utility data reporting for all the locations in which customers consume electricity.

Survey feedback included suggestions that the GHG Protocol could play a role by supporting the development of a residual grid mix database globally which could be utilized by organizations for their scope 2 market-based reporting. Respondents also suggested that the GHG Protocol should develop new or endorse existing guidelines on a default approach for calculating residual grid mix data in the absence of utility provided emission factors. There were also suggestions to remove the use of grid average emission factors from the residual mix hierarchy as they can include a significant volume of generation attributes already claimed by both voluntary and regulatory programs. Alternatives such as using thermal or combustion generation only emission rates were suggested based on the rationale that few, if any, organizations voluntarily purchase EACs associated with emission-producing generation technologies.

F.5. Other topics raised by respondents

Market-based accounting for biogas/biomethane

Some stakeholders offered feedback related to the use of market-based instruments for biogas, biomethane, renewable natural gas (RNG), "recycled fuels", etc. This topic was addressed by the Market-based Accounting Approaches [Survey](#) which was out for consultation at the same time as the Scope 2 Survey. This issue will be considered holistically with other proposals for market-based mechanisms across sectors and scopes to determine their appropriate use in GHG accounting, reporting and/or target setting. To receive future updates, please sign up for GHG Protocol's [newsletter](#).

Guidance on accounting for round trip efficiency in energy storage

Survey feedback included requests for establishing clear scope 2 guidance and reporting requirements for energy storage systems (ESS), including battery storage, pumped hydro, EV-grid integration, etc., and specifically how to account for the differences between energy input and output from energy storage systems and round-trip efficiency losses.

A suggested approach offered by some respondents was to report scope 2 emissions based on the net electricity consumption, which is the difference between the energy purchased from the grid and the electricity returned to the grid by an energy storage system. This approach would be similar to how transmission and distribution losses are accounted for in scope 3. To calculate the scope 2 emissions for the energy storage system, the organization would determine the total gross imported energy, total exported energy, and then calculate the "net imported energy" to account for round-trip efficiency losses and internal consumption. The emissions associated with this net imported energy would be considered the scope 2 emissions for the energy storage system. Rationale for this approach highlighted that scope 2 is an indirect emission category that includes GHG emissions from the generation of purchased or acquired electricity, steam, heat, or cooling *consumed* by the reporting organization.

Accounting for on-site/behind the meter electricity projects

Section 6.4.1 of the *Scope 2 Guidance* says that companies who are consuming energy directly from a generation facility (e.g., an on-site solar PV system located on the reporting organization's rooftop that is interconnected behind the utility meter) that has sold the energy attribute certificates forfeit not only the right to claim those emission benefits in the market-based method (requiring the use of some other market-based method 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. Table 6.1 in the *Scope 2 Guidance* provides more details on accounting for scope 2 with and without certificate sales.

Some respondents indicated a need for further clarification or potential revisions on the need to own and retire EACs related to on-site projects to make claims to the zero-carbon generation in the location-based method. Reasons supporting these considerations noted that the current methodology requirements that retaining ownership of the energy attribute certificates is required for under location-based accounting is not consistent with the idea of location and market-based dual reporting. These comments stated that tracking, ownership, or retirement of attributes should not be applicable under location-based accounting for the method to be internally consistent.

Accounting for small scale off-grid installations in emerging markets

Some respondents called for additional guidance for accounting of the purchase and sale of energy associated with "off-grid" energy generating installations. These comments highlighted that in certain markets where there is a lack of larger, regional electrical grid infrastructure unique challenges may exist. Respondents drew attention to the need for specific requirements for these circumstances in the Scope 2 standard to address these situations.

Electric vehicles

Some respondents indicated a need to develop specific guidance covering scenarios for EV charging. This includes answering questions regarding which scope (i.e., scope 2 or 3) the electricity used in EV charging should be reported depending on different operational and organizational boundaries. The following examples reflect some of the different scenarios survey respondents identified as needing further clarification:

- EV charger hosted on reporting organizations property and is owned by an external supplier and independently metered. The external supplier has its own contract with the electricity provider. Customers charging their EV pay for electricity usage to external supplier.
- EV charger hosted on reporting organizations property and is owned by an external supplier but behind the same meter as the reporting organization. The reporting organization charges the external supplier for electricity usage associated with the EV chargers. Customers pay for electricity usage to external supplier.
- EV charger is owned by the reporting organization who also has a direct contract with electricity provider. Customers pay for electricity usage to the reporting organization.
- EV charger is owned by the reporting organization who also has a direct contract with electricity provider. Customers charge for free without any payments for electricity usage to the reporting organization.

Biogenic emissions

Some respondents indicated that additional guidance is necessary on if and how biogenic emissions from purchased energy should be reported including how different greenhouse gasses produced during combustion are reported. Some pointed to SBTi's requirement to report forest, land, and agriculture (FLAG) emissions. Some also pointed out that its necessary to clarify that for the location-based method, biogenic emissions are sometimes included in grid average emission factor data. There are multiple ways biogenic emissions can be reported and consistency as appropriate across GHG Protocol reporting standards is necessary. Further evaluation of reporting biogenic emissions will be evaluated holistically across all GHG Protocol Standards and Guidance.

G. Feedback on alignment with policy and regulatory GHG disclosure programs

Many respondents noted a need to support harmonization across the various regulatory and programmatic GHG accounting and reporting landscapes to minimize confusion, simplify requirements, and reduce the time and resources required to comply with the multitude of current and forthcoming rules.

G.1. Mandatory corporate GHG disclosure

Respondents noted that the practice of disclosing an inventory of an organization's value chain GHG emissions is quickly transitioning from a voluntary activity to a regulated requirement. New and updated corporate GHG disclosure policies are under development in the EU, US, United Kingdom (UK), and other jurisdictions, and will require firms to submit emission disclosure reports to government regulators. Planned disclosure requirements in both the US (Securities

and Exchange Commission proposed Climate Disclosure rule) and the EU (Corporate Sustainability Reporting Directive), as well as the IFRS's ISSB framework, references the GHG Protocol as the foundation for implementation guidance.

Some respondents stated that the transition to mandatory GHG disclosure for regulatory purposes creates the need for a consistent and common method for accounting for an organization's emissions. These responses were concerned that if different reporting methods emerge it could generate unnecessary friction for corporate emissions inventory reporting, add new workloads to corporate sustainability teams, and possibly foment skepticism about emissions reporting and data. There was also a sentiment that as the de facto standard for inventory reporting, the GHG Protocol should work with government regulators to ensure consistency across emerging reporting frameworks that will be included in these new regulations.

Respondents also urged the GHG Protocol to engage with policymakers and other standard-setting bodies to ensure that GHG accounting standards are fit for purpose in the context of new regulation. Feedback on this topic observed that the GHG Protocol needs to balance supporting both voluntary GHG inventory reporting and action but *also* regulatory disclosure requirements, and thus the importance of engagement with policymakers as stakeholders in the GHG Protocol revision process.

G.2. Market-based accounting: Overlap of voluntary EAC claims and compliance schemes

The current *Scope 2 Guidance* does not require contractual instruments claimed in scope 2 to be "in addition to," or independent from, regulatory policies such as subsidies, tax exemptions, or supplier quotas. Due to the design of renewable energy production targets in some regions, achieving "regulatory surplus" with voluntary purchases may not always be possible. For transparency and stakeholder understanding of voluntary purchases, the *Scope 2 Guidance* encourages that organizations disclose the relationships between instruments claimed in scope 2 and regulatory policies as part of the disclosure of overall instrument features. Organizations should also disclose retirement of additional certificates or other instruments performed in conjunction with their voluntary claims (See *Scope 2 Guidance*, section 8.2, "Reporting on the relationship between voluntary purchases and regulatory policies" for additional details).

Responses to the Scope 2 Survey highlighted the importance of section 8 and provided several points for consideration around additional clarifications, including (not exhaustive):

- Addressing inconsistency across jurisdictions with varying levels of voluntary procurement options, recognizing some markets currently have limited or no options available.
- Providing updated guidance on an organization's ability to make market-based claims associated with renewable power supplied under regulatory compliance schemes, particularly if the energy supplier also makes claims regarding the same renewable power.

- Establishing clear requirements under which the usage of both “compliance” and “voluntary” credits can be reported, and guidance on how to communicate the emissions impacts.

G.3. Learnings from low-carbon hydrogen regulations

Survey responses included reference to the incentive programs for clean hydrogen, and specifically the growing body of research published in support demonstrating compliance with the low embodied emission requirements for grid-connected electrolysis production pathways. These included the recently finalized European Commission’s delegated regulation on Union methodology for RFNBOs and the pending 45V Production Tax Credit laid out in the US’s Inflation Reduction Act. The programs’ significant financial incentives and/or compliance requirements, intended to expand a supply chain for low embodied emission hydrogen, have spurred academic research and discussion across industries and regulators around technical implementation of the plans. Survey responses identified that there is potentially significant overlap between the intention of these hydrogen production incentives and the GHG Protocol *Scope 2 Guidance* when it comes to claiming the usage and any corresponding emission impacts of consuming carbon-free electricity. However, responses also identified there may be differences between the specific modeling scenarios for unique regulatory frameworks, and scope 2 reporting, since the modelling is used to evaluate life cycle emissions from electrolysis-based hydrogen production, and scope 2 reporting is intended to be a globally applicable methodology to calculate and report value chain emission inventories.

Low-carbon hydrogen regulations in Europe [have already been published](#), and the US 45V requirements are anticipated to be finalized soon. Technical criteria for implementation of the EU rules include requirements around additionality, temporal matching of electricity consumption to hydrogen production using a monthly vintage until 2029, and on an hourly basis starting in 2030, and deliverability of power between generation and load defined by the same bidding zone.

Some respondents to the Scope 2 Survey indicated that the GHG Protocol should follow similar criteria laid out in the implementation plans for hydrogen by adopting granular accounting methodologies such as those in the European hydrogen rules and several other policy mandates listed below. Some suggested that by diverging from the granular market-based accounting approaches being adopted by compliance programs, the GHG Protocol could risk its relevance. Please see section C for feedback regarding similarly granular scope 2 requirements.

Policies mandating granular accounting as cited by respondents included (not exhaustive):

- EU Delegated Act on detailed rules for the production of RFNBO Hydrogen requiring 1-hour period correlation between production and consumption and deliverability requirements of electricity starting in 2030
- US Presidential Executive Order 14057 for the US government to source 50% hourly CFE by 2030
- UK RTFO Guidance for Renewable Fuels of Non-Biological Origin requiring 30-minute temporal correlation between electricity generation and consumption

- UK Low Carbon Hydrogen Standard requiring 30-minute temporal correlation between electricity generation and consumption for low carbon hydrogen generation
- France VertVolt Standard requiring half-hourly matching between the customer supply and consumption
- Ireland 2023 Climate Action Plan requiring “time stamped” Guarantees of Origin; clean energy claims must be made for the same hour and geographical location as production
- Germany Ammonia Import Tender requiring that production of hydrogen is matched on an hourly basis with renewable energy generation under a PPA

H. Feedback on clarifications needed across scopes

H.1. Reporting indirect emissions in scope 2 and scope 3 category 3

Current requirements on scope 3 category 3

The *Corporate Value Chain (Scope 3) Standard* defines scope 3 category 3 as emissions related to the production of fuels and energy purchased and consumed by the reporting organization in the reporting year that are not included in scope 1 or 2.

Category 3 excludes emissions from the combustion of fuels or electricity consumed by the reporting organization, since they are already included in scope 1 or 2. Scope 1 includes emissions from the combustion of fuels by sources owned or controlled by the reporting organization. Scope 2 includes emissions from the combustion of fuels to generate electricity, steam, heating, and cooling purchased and consumed by the reporting organization (*Scope 3 Standard*, section 5.5, page 41).

Category 3 includes four activities: a) upstream emissions from purchased fuels, b) upstream emissions from purchased electricity, c) T&D losses, and d) generation of purchased electricity that is sold to end users. Table 5.5 on page 41 of the *Scope 3 Standard* details these activities and their applicability to reporting entities.

The *Scope 2 Guidance* impacts how an organization assesses its scope 3 category 3 emissions. The *Scope 2 Guidance* states that a reporting organization shall disclose whether a market-based or location-based scope 2 total is used as the basis for calculating scope 3 category 3 (*Scope 2 Guidance*, section 1.10, page 10).

Emission factors used in scope 2 represent generation-only emission factors (e.g., emissions assessed at the point of energy generation) (see *Scope 2 Guidance*, section 4.2, page 27), whereas scope 3 category 3 uses life cycle emission factors that exclude emissions from combustion (see *Scope 3 Calculation Guidance*, page 41).

Feedback on reporting in scope 2 or scope 3 category 3

Some respondents suggested a need to clarify the relationship between accounting for emissions in scope 2 or scope 3 category 3 and reasons for separation between the reporting categories. These responses provided examples including that upstream emissions caused by

hydrogen production can vary substantially depending on how it is produced, yet direct combustion of hydrogen as a fuel produces minimal GHG emissions. While the direct emissions in from hydrogen would be near-zero, to demonstrate the GHG Protocol principle of “completeness” and to comply with the Scope 3 Standard, companies must report the upstream emissions from hydrogen in their scope 3 category 3 inventory, though currently neither the *Corporate Standard* nor the *Scope 2 Guidance* requires the organization to do so. Respondents called attention to additional technologies, such as large-scale impoundment reservoir hydropower and other emerging technologies that face similar questions regarding upstream and fugitive emissions.

Several respondents also pointed out that while the *Scope 2 Guidance* allows companies to choose whether they use a location-based or market-based scope 2 total to determine their scope 3 category 3 emissions, there is a need for more specificity in whether companies should use one or the other. Some respondents pointed to a concern that allowing the market-based method as a basis for scope 3 category 3 means that organizations could claim zero scope 3 category 3 total when also claiming a zero scope 2 total, though there are still inherent indirect life cycle emissions that should be accounted for.

H.2. Leased assets

Current requirements on reporting emissions from leased assets

The organizational boundaries set by the reporting entity, which are described in Chapter 3 of the *Corporate Standard*, determined how leased assets should be treated by a reporting entity.

The *Scope 2 Guidance* details leased assets in section 5.2.1, and refers to the *Corporate Standard* Appendix F, which notes that all leases confer operational control to the lessee or tenants, unless otherwise noted. Therefore, if an organization is a tenant in a leased space or using a leased asset and applies the operational control approach, any energy purchased or acquired from another entity (or the grid) shall be reported in scope 2. On-site heat generation equipment, such as a basement boiler, typically falls under the operational control of the landlord or the building management organization. Tenants therefore would report consumption of heat generated on-site as scope 2. If a tenant can demonstrate that they do not exercise operational control in their lease, they shall document and justify the exclusion of these emissions.

Emissions from assets an organization owns and leases to another entity, but does not operate, can be included in scope 3 or excluded from the inventory.

Feedback on reporting emissions from leased assets

Note that this topic will be addressed through the *Corporate Standard* update process, which will cover organizational boundaries more holistically. This process is set to kick off in the coming months. For more information, please sign up for GHG Protocol’s [newsletter](#).

Issues with double counting emissions responsibility: Some respondents cited that, often, two companies (the lessee and lessor) will claim the same space under their scope 2 reporting boundary or conversely, both will claim it in their scope 3 reporting boundary. In the

case where it is in both organizations' scope 2 boundary, there is potential to over-purchase renewable energy for the same space. In the case where it is in both of their scope 3 reporting boundaries, there is potential for it to be ignored and remain unaddressed. Respondents suggested a need for additional guidance on to how to account for and allocate emissions in situations where landlords purchase electricity, steam, heat and cooling on behalf of their tenants to ensure double counting is prevented.

Reporting purchased heating in scope 1 versus scope 2: In many instances, natural gas or fuel oil is used for heating in leased spaces. Some respondents cited that, currently, some companies place the associated emissions in scope 1, and some place them in scope 2. Respondents noted it is unclear if the *Scope 2 Guidance* establishes a preference for the latter as being more appropriate and observed that in practice organizations often still place these emissions in scope 1 on the basis that they have control over the heating in the space and pay for the heating bill, and thus should report as any other combusted fuel. Respondents noted that more prescriptive details on this point could improve the comparability of inventories.

H.3. Addressing electricity use in value chain through a market-based method

Currently, market-based accounting is not allowed in scope 3, apart from scope 3 category 3 T&D losses (see section F.3. of this report).

Some organizations have cited interest in purchasing renewable electricity attribute certificates on behalf of and for the benefit of a value chain partner, such as a supplier or customer, to help reduce the value chain partner's scope 2 emissions and thus the reporting organization's scope 3 emissions. Many organizations cited that the GHG Protocol should adopt and build upon the US EPA's 2022 guidance, [Renewable Electricity Procurement on Behalf of Others: A Corporate Reporting Guide](#).

These responses suggested that within a reporting organization's scope 3 inventory, the GHG protocol should also allow organizations to directly claim or use EACs on behalf of their value chain partners regardless of any actions taken by the value chain partners to procure renewable or low-carbon electricity. These respondents tended to suggest that any market-based measures taken on behalf of value chain partners should also be subject to the same technical rules (e.g., quality criteria for market boundaries, vintage, etc.) set in any forthcoming updates. Proponents of this strategy argued that value chain partners are often located in emerging markets, which desperately need investment in renewable generation projects, and that allowing organizations to retire EACs on behalf of their supply chain partners would be a practical solution for organization to leverage now to incentivize renewable electricity projects in these emerging markets.

Note that this topic will be also be addressed through the *Scope 3 Standard and Market-Based Accounting Approaches* update processes, which will cover market-based accounting across scopes more holistically. This process is set to kick off in the coming months. For more information, please sign up for GHG Protocol's [newsletter](#).

I. Feedback on additional reporting metrics

The current list of required information for scope 2, as well as recommended disclosure and optional information, can be found in Chapter 7 of the *Scope 2 Guidance*.

Some respondents of the Scope 2 Survey indicated that additional reporting metrics should be added to the list of requirements laid out by the *Scope 2 Guidance*. Some examples of additional metrics cited included (not exhaustive):

- **Carbon-Free Electricity (CFE) Score:** a “CFE Score” would estimate what share of a buyer’s consumption of electricity is matched with generation from clean energy resources, demonstrated by CFE purchases. This number could be calculated on an annual and/or hourly basis and would include a baseline CFE score for different utility service areas considering mandatory CFE purchase requirements (e.g., US state RPS requirements, state-mandated nuclear life extensions, “rate base” generation, etc.).
- **Weighted Average Hourly CFE Score:** indicates the percentage of each hour’s consumption that is matched with carbon-free generation across a selected period. Each hour’s score should be capped at 100%. For example, if there is a solar contract, it cannot apply excess daytime generation to cover deficient nighttime hours and ‘boost’ the hourly match score.
- **Minimum CFE Score:** indicates the single lowest hour’s CFE match percentage across a selected time period. This metric reveals the hourly reliability that only certain generation types (nuclear, hydropower, geothermal, storage) excel at providing. For example, one could achieve a relatively high average hourly match score by combining wind and solar (for example, 60-80% on average), but the single hour minimum across a given time period is bound to be much lower, or even zero, if you don’t include some dispatchable or firm CFE in the mix.
- **Policy Advocacy Alignment:** indicates an organization’s efforts (from a qualitative or quantitative perspective) to advocate for clean energy and climate policies at national and sub-national levels. Requires organizations to disclose whether their political influence efforts are aligned with policies that aim to decarbonize the electricity system, for example, implementation of a federal clean energy standard or any policies that would increase a state renewable portfolio percentage.
- **Additionality:** See section D.
- **Emission impacts:** See section E.
- **Social and community co-benefits:** indicates the social and community co-benefits associated with purchased and retired market-based instruments
- **Sustainable Development Goal (SDG) Impact:** indicates actions in alignment with United Nation SDGs. Similar to reporting metrics on social and community co-benefits, examples here related to the energy access provided in emerging markets.

Log of Changes to Draft Summary Report – October 2023

Between July 26th and September 8th, 2023, GHG Protocol offered an opportunity for stakeholders who submitted responses to the Scope 2 Guidance Survey to provide feedback on the draft Scope 2 Survey Summary Report to ensure that perspectives were comprehensively and accurately represented. Fewer than 5% of survey respondents requested revisions to the originally published draft summary report. The log of changes made from the draft summary report is below.

- In the Executive Summary, the bullet on “Requiring or encouraging granular time and location criteria” was edited for clarity that some responses suggested granular data and quality criteria should be *encouraged*, while others thought it should be *required*.
- In the Executive Summary, text was added to the bullet on “Allowing flexibility in time and location criteria” to clarify feedback that such flexibility allows purchases of claims that are physically disconnected to underlying electricity consumption.
- In the Executive Summary, the section on “Next Steps” was edited to include the most up-to-date information on next steps within the GHG Protocol *Scope 2 Guidance* standard update process as of early November 2023.
- Section A.3 was revised to include specific mention of several regions.
- Section B.5 was revised to clarify respondents’ positions on location-based emissions allocation.
- Section B.5 was revised for clarity on points related to the legal basis for EACs.
- Section C.2 additional context was added on respondents’ calls for specific guidance on where to source certain emission factors for use in location-based and market-based calculations, including what to do in the case of missing information.
- Mentions of “empirical research” or “empirical evidence” were modified in some cases to remove the word “empirical” for clarity.
- Section C.3 clarification was added that some responses suggested granular data, emission factors, and quality criteria should be *encouraged*, while others thought it should be *required*.
- Section C.4 clarification was added that some responses suggested granular data, emission factors, and quality criteria should be *encouraged*, while others thought it should be *required*.
- Section C.4 was revised to clarify feedback on the accessibility of hourly consumption data.
- Section C.6 ‘Technology Eligibility’ was updated to include feedback on the need for all-attribute tracking systems to support complete GHG reporting.
- Section C.6 Table 6.3 ‘Market-based scope 2 data hierarchy examples’ was added from the *Scope 2 Guidance*. A reference to Section 6.6 in the *Scope 2 Guidance* was also added for background context on the feedback received.
- Section D.2 ‘Feedback to keep additionality requirements outside of scope 2’ was amended to clarify that some but not all responses that favored the separation of claims on usage and impact also suggested requiring a modified market-based method with granular time and location matching criteria as well as separate reporting requirements around project- or intervention-based accounting.

- Section D.2 sub-header 'Feedback supporting introducing additionality requirements in usage claims scope 2' was revised for clarity around usage claims.
- Section F.1 'General feedback on accounting for purchased steam, heat and cooling' was edited for clarity on the feedback around accounting needs for emerging technologies.
- Section F.2 discussion on waste-to-energy was edited for additional clarity on acronyms. Additional clarity was provided based on survey feedback regarding potential objectives for revising accounting practices for WTE to shift the emission reporting burden from the consumer of the purchased energy to the producer of the waste, and also current practices counteract with legislation and other disclosure rules in the EU.
- Section F.5 'Market-based accounting for biogas/biomethane' was edited for additional clarity on examples of emerging technologies that require new guidance.
- Section F.5 updated with 'Accounting for small scale off-grid installations in emerging markets' to more clearly reflect feedback on the need for guidance on off-grid energy generating installations in regions that lack well-developed electrical grid infrastructure.
- Section F.5 'Biogenic emissions' was updated to clarify feedback on the need for additional guidance and the GHG Protocol's plan to evaluate biogenic emissions holistically across all GHG Protocol Standards and Guidance.
- Section G.3 'Learnings from low-carbon hydrogen regulations' was modified to clarify that the EU Delegated Act on detailed rules for the production of RFNBO hydrogen includes a deliverability requirement.
- Section G.3 'Learnings from low-carbon hydrogen regulations' reference to Australia Renewable Energy Indicator/NABERS was removed due to relevance.
- Section H.1 'Feedback on reporting in scope 2 or scope 3 category 3' was updated for clarity on specific technology types or use cases that require new guidance on reporting emissions between scope 2 and scope 3.
- Section H.3 'Addressing electricity use in value chain through a market-based method' was revised to add clarity on feedback around claiming or using EACs on behalf of value chain partners regardless of any actions taken by the value chain partners to procure renewable electricity.