



# Template for submitting proposals related to GHG Protocol's *Corporate Standard, Scope 2 Guidance, Scope 3 Standard, Scope 3 Calculation Guidance* and market-based accounting approaches

(Optional)

## Proposal instructions

GHG Protocol is conducting four related surveys in reference to the following GHG Protocol standards, guidance and topics:

1. Corporate Accounting and Reporting Standard (Revised Edition, 2004) ("Corporate Standard")
2. Scope 2 Guidance (2015)
3. Corporate Value Chain (Scope 3) Accounting and Reporting Standard (2011) ("Scope 3 Standard"), and Technical Guidance for Calculating Scope 3 Emissions, version 1.0, 2013 ("Scope 3 Calculation Guidance")
4. Market-based accounting approaches

**The survey is open until March 14, 2023.** To fill out the survey, [click here](#).

As part of the survey process, respondents may provide proposals for potential updates, amendments, or additional guidance to the *Corporate Standard, Scope 2 Guidance, Scope 3 Standard, or Scope 3 Calculation Guidance*, by providing the information requested in this template. You may also use this template to provide justification for maintaining a current approach on a given topic.

Submitting proposals is optional. Respondents may submit multiple proposals related to different topics.

Proposals should be as concise as possible while providing the requested information. Submissions that are outside of the template may not be considered. Proposals may be made publicly available.

To submit the proposal, please save this file and fill out the fields below. When you've completed your proposal, please upload the file via this [online folder](#). Please name your file STANDARD\_Proposal\_AFFILIATION, e.g., *Scope 2\_Proposal\_WRI*.

## Respondent information

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If proposals are made publicly available, would you like your proposal to be made publicly available? Please write either "Yes" (make publicly available) or "No" (do not make publicly available).

Yes

If your proposal is made publicly available, would you like it to be made publicly available with attribution (with your name and organization provided) or anonymous (without any name or organization provided)? Please write either "With attribution" or "Anonymous".

With attribution

## Proposal and supporting information

- 1. Which standard or guidance does the proposal relate to (Corporate Standard, Scope 2 Guidance, Scope 3 Standard, Scope 3 Calculation Guidance, general/cross-cutting, market-based accounting approaches, or other)? If other, please specify.**

Scope 2 Guidance: Market-Based Modernization Proposal

- 2. What is the GHG accounting and reporting topic the proposal seeks to address?**

Changes to Attributional Scope 2 Market-Based Emissions Inventory

This proposal seeks to:

- More accurately measure the emissions associated with a reporting entity's electricity use taking into account the location and timing of *purchased* carbon-free electricity (CFE) supply (bundled with EACs) and unbundled EACs relative to the location and timing of a reporting entity's consumption.
- Address current concerns of "greenwashing" where an organization can report zero Scope 2 market-based emissions and claim to consume 100% clean energy even when the buyer clearly relies on grid supply, including fossil generation, to serve its consumption.<sup>1</sup>
- Align U.S. mandatory markets, voluntary markets, and utility non-bypassable CFE by properly allocating EACs to prevent a) double counting of EACs, b) double paying for clean energy (i.e., buyers not being able to claim CFE that they already pay for), and c) cost shifting (i.e., buyers able to claim CFE that they do not pay for and may already be purchased by others).
- Measure buyer actions that are needed to decarbonize the grid at all times and in all locations by recognizing the important roles of firm, variable, balancing, transmission, and load management resources required to reliably balance CFE supply with system load.
- Recognize the value of calculating both attributional Scope 2 market-based inventories and consequential avoided emissions and the differences in these calculations.<sup>2, 3</sup> (Also see separate NB/GS Emissions Impact Disclosures Proposal.)
- Enhance accuracy, relevance, and transparency of information provided to potential users of the Protocol (e.g., recognition programs, ESG rating companies, investors, consumers, etc.), while continuing to allow flexibility in reporting since reporting entities' abilities, procurement goals, and access to markets and data differ.<sup>4</sup>

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<sup>1</sup> Ben Elgin and Sinduja Rangarajan, [What Really Happens When Emissions Vanish](#), Bloomberg, October 2022. [Carbon Offset: Last Week Tonight with John Oliver](#), John Oliver, August 2022. Anders Bjørn, Shannon Lloyd, Matthew Brander, and H. Damon Matthews, [Renewable Energy Certificates Threaten the Integrity of Corporate Science-Based Targets](#), Nature Climate Change, June 2022. Phred Dvorak, [Climate-Reporting Rules Could Let Companies Look Greener Than They Are](#), Wall Street Journal, April 2022. [University of Edinburgh's Resources and Evidentiary Literature on Renewable Energy Purchasing and the Market-based \(Scope 2\) Method](#), January 2023. Caroline O'Doherty, [Electricity Firms Told to Drop 'False' 100% Green Power Claims](#), February 2023.

<sup>2</sup> The current Guidance explains that reporting entities may disclose estimates of avoided emissions from the use of low-carbon electricity separate from their Scope 2 inventories on an optional basis using the GHG Protocol Project Protocol or Guidelines for Grid-Connected Electricity Projects. Disclosing estimates of avoided emissions is not common practice today, and entities that estimate avoided emissions impact, whether for voluntary disclosure or to inform their own decision making, do not rely on the Project Protocol and use alternative methods.

<sup>3</sup> Google, [24/7 Carbon-Free Energy: Methodologies and Metrics](#), February 2021, at 1, 6, 8, 12, 14, and 20. Matthew Brander, [The Most Important GHG Accounting Concept You May Not Have Heard of: the Attributional Consequential Distinction](#), GHG Management Institute, March 2021, at 1-5. Enrique Gutierrez, Julia Guyon, Craig Hart, Zoe Hungerford, and Luis Lopez, [Advancing Decarbonisation Through Clean Electricity Procurement](#), International Energy Agency, November 2022, at 12-14, 23-25, 54-65, and 72-73. Roger Ballentine, Patrick Falwell, Liana Biasucci and Neil Fisher, [Modernizing How Electricity Buyers Account and are Recognized for Decarbonization Impact and Climate Leadership](#), Green Strategies and The NorthBridge Group, August 2022, at 32-45.

<sup>4</sup> See proposal to implement a standardized reporting format like a Carbon Facts label.

**3. What is the potential problem(s) or limitation(s) of the current standard or guidance which necessitates this proposal?**

The Scope 2 Guidance has been successful in encouraging the development of wind and solar in the most economically viable locations. However, the Scope 2 Guidance does not address the actions needed to achieve new, more ambitious net zero goals to decarbonize electricity grids in all locations and times, to maximize carbon emissions reductions, and to ensure a diverse mix of CFE generation and balancing resources are developed to provide reliability. As the goals and market uses of GHG reporting have changed, the Scope 2 Guidance needs to be updated to provide more relevant and accurate information. Our proposals address three fundamental problems with the current Scope 2 Guidance.

- 1) It does not accurately measure the emissions associated with a reporting entity's electricity use and fails to take into account the location and timing of purchased CFE supply bundled with Energy Attribute Certificates (EACs)<sup>5</sup> and unbundled EACs relative to the location and timing of a reporting entity's consumption (i.e., an organization can report zero Scope 2 market-based emissions and claim to consume 100% clean energy even when the buyer clearly relies on grid supply, including fossil generation, to serve its consumption).
- 2) It does not measure the *actual* emissions impact (avoided emissions) to the atmosphere resulting from a reporting entity's electricity procurement. The Protocol therefore cannot distinguish between high and low emission impact actions taken by reporting entities.
- 3) It does not ensure the diversity of carbon-free resources (firm, variable, balancing, etc.) needed to achieve net-zero goals reliably and affordably.<sup>6</sup>

This proposal focuses on the first and third of these problems. Also see responses to Scope 2 Guidance Survey and submitted Scope 2 NB/GS Emissions Impact Disclosures Proposal (Proposals 2a through 2f) and NB/GS Standardized Reporting Format Proposal, including an illustrative Carbon Facts label (Proposals 3a through 3c).

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<sup>5</sup> EACs in this proposal refer to energy attribute certificates with carbon-free emissions.

<sup>6</sup> To be fair, the GHG Protocol was never intended to a) accurately measure emissions associated with the timing and location of an organization's electricity use, b) actual emission reductions on the grid, or c) ensure a diverse mix of resources needed to achieve full decarbonization of the electric grid. Because of this, the existing Protocol cannot be relied on in its current form to measure (in a pure accounting sense), incentivize, or recognize actions that will do the most to speed decarbonization.

#### 4. Describe the proposed change(s) or additional guidance.

**The market-based accounting method should be maintained and improved.**<sup>7</sup> Updates that increase the time and location granularity of Scope 2 accounting and enable inventories to better reflect the emissions from generation of acquired and consumed electricity can make significant improvements to the Guidance, drive the development of a diverse mix of resources needed to decarbonize the electricity grids in all locations and at all times, and help address “greenwashing” concerns raised by many stakeholders.<sup>8</sup>

The purpose of the proposed changes to Scope 2 market-based accounting should be made clear (i.e., what the proposed changes are intended to accomplish). **The purpose of an improved Scope 2 market-based inventory should be to more accurately reflect the emissions associated with a buyer’s electricity use by taking into account the location and timing of CFE supply and/or EAC purchases relative to the timing and location of a buyer’s consumption.**<sup>9</sup> That is, to allow a reporting entity to make more accurate and credible claims about their *purchased* CFE (and emissions) associated with their electricity consumption.<sup>10</sup> This aligns with the broader goal of the GHG Protocol to ensure that the reported information represents a “faithful, true, and fair account of a company’s GHG emissions.” To this end, the proposed changes are:

- a) **Proposal 1a: The Scope 2 Guidance should indicate that reporting entities should prepare inventories on a more granular basis, when such data is available, and put Granular Certificates or GCs (location and time-stamped) at the top of the Table 6.3 data hierarchy (highest precision).**
- b) **Proposal 1b: The Scope 2 Guidance should count only purchased EACs that are located within or delivered to the same regional grid or balancing authority as load (i.e., out-of-market EACs that are not delivered to the same regional grid or balancing authority as load should not be used to reduce market-based inventories,<sup>11</sup> although they could be used to separately report progress toward achieving RE100 / CFE100 purchasing goals or to report avoided emissions). The geographic market boundary defines the area from which certificates can be purchased and claimed for a buyer’s Scope 2 accounting and reporting. The market for**

<sup>7</sup> As EACs are one of the more accessible and widely used options for buyer procurement, policy makers should make them available where possible. EACs are an important mechanism in that they may be the only option for some smaller buyers that do not have access to green tariffs and lack the profile to enter into a long term PPA.

<sup>8</sup> Policy makers should also support including more granular time- and location-based information in certificate schemes to increase their applicability for consumers pursuing more ambitious procurement goals.

<sup>9</sup> The calculation of a market-based emissions inventory is distinct from directly measuring avoided emissions into the atmosphere.

<sup>10</sup> At the same time, the Scope 2 Guidance should also recognize that reporting entities may wish to report and make other types of claims, such as reporting progress toward RE100 (e.g., matching renewable energy supply with annual consumption over broad geographic areas) or taking actions that reduce emissions into the atmosphere. Improvement in Scope 2 market-based inventories or these other measures could occur simultaneously or independently of each other, and each should be measured as accurately as possible and valued accordingly. The Scope 2 Guidance should provide reporting entities greater opportunity to report progress in achieving a variety of goals. See Scope 2 Proposals related to adding a separate assessment of consequential avoided emissions and developing a standardized reporting format like a Carbon Facts label.

<sup>11</sup> EACs outside of the regional grid or balancing authority should be bundled with supply that is delivered to the same regional grid as load.

purchasing and selling electricity is typically an RTO, power pool, or balancing area, with exports and imports often broadening these markets. RECs were created in the late 1990s and by design separated the environmental attributes from the underlying electricity, disconnecting RECs from the physical deliverability of power to a purchaser. This framework promoted the development of renewable energy resources in the most economically viable locations – effectively encouraging buyers to minimize the dollars spent per renewable energy generated in MWh, regardless of location (Scope 2 Guidance, p. 64). For example, despite differences in state law, local regulatory policy, and variation in physical interconnection within these regions—the entire United States is considered a single market for use of EACs (Scope 2 Guidance, p. 65). As a result, current market-based accounting allows buyers to rely on fossil generation from their regional grid while purchasing RECs far from their location of consumption. This can lead to valid criticisms that Scope 2 market-based accounting method does not accurately measure the emissions associated with a buyer’s electricity use, nor will it encourage the development of CFE to be always available at all locations on the electric grid. As net-zero objectives are adopted to decarbonize electric grids and more organizations seek to better understand the carbon footprint associated with their electricity use, “re-connecting” clean energy generation with system and buyer consumption becomes necessary both in terms of timing and location. More granular geographic market boundaries are needed to better measure emissions associated with electricity use. Therefore, applying a regional grid boundary to Scope 2 market-based accounting would represent a significant improvement in measuring emissions resulting from a buyer’s electricity use.<sup>12</sup> The trading of granular certificates will allow buyers to trade surplus EACs or purchase EACs in specific hours within a given market boundary, which effectively allows for aggregation of CFE generation to meet aggregated demand profiles (not just an individual company’s consumption).

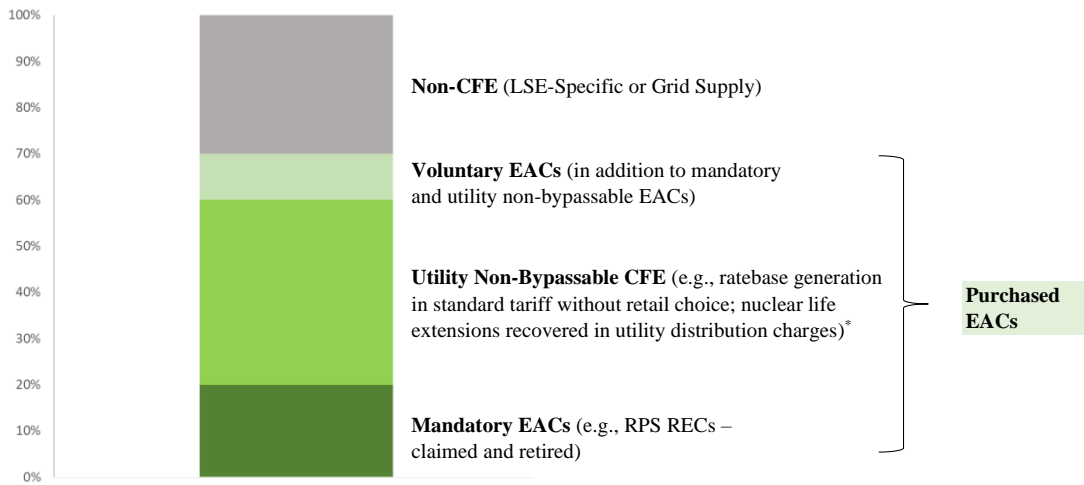
- c) **Proposal 1c: The Scope 2 Guidance should clarify that CFE attributes shall not exceed load in any time matching interval selected.** For example, the Scope 2 Guidance should clarify that if a reporting entity is matching CFE by hour, then excess CFE above the customer’s load in one hour cannot be used in another hour unless energy storage is used.
- d) **Proposal 1d: The Scope 2 Guidance should allow reporting entities to count equally all EACs that are purchased and retired either directly or on their behalf by their load-serving entity (LSE).** Scope 2 Guidance should clarify that purchased EACs (bundled or unbundled) should be tracked and fairly allocated in the marketplace to avoid double counting. In the United States, each reporting entity should be able to count 1) its fair share of purchases of **mandatory EACs** (e.g., utility purchases of RECs to meet a state RPS); 2) its fair share of purchases of **utility non-bypassable CFE** (e.g., charges it pays for ratebase CFE generation included in a vertically

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<sup>12</sup> It is also valuable to consider market areas (or load/bidding zones) within regional grids taking into account transmission constraints. In the US, bidding zones are analogous to market zones where the locational marginal price (LMP) is the same within a regional grid. In areas where LMP markets have not yet been developed, operating areas within or delivered to vertically integrated utilities also could be considered. In Europe, bidding zones are being used to support renewable hydrogen rules. The link between EACs and physical energy deliverability increases as the definition of geographic market boundary becomes narrower. But as geographic granularity increases, issues may arise over the liquidity of EAC markets in these areas.

integrated utility standard tariff service or due to a state mandate to protect existing nuclear energy)<sup>13</sup>; and 3) additional purchases of **voluntary EACs** (e.g., through PPAs, a retail supplier contract, green tariff, etc.). Reporting entities should be able to claim in their Scope 2 market-based inventories all clean EACs purchased and retired directly or on their behalf by their LSE whether from new or existing<sup>14</sup> resources or as result of mandatory, utility non-bypassable CFE, or voluntary procurement.<sup>15</sup>

**Purchased EACs and Non-CFE Supply (Illustrative)**



\* This CFE does not qualify for RPS but utilities could allocate the output of this CFE to customer load that pays for these resources. The associated EACs currently may or may not be registered and retired. These EACs should not be transferred or “given away for free” in the residual mix to satisfy voluntary procurement goals of customers who did not pay for these EACs.

The Scope 2 Guidance should also clarify that reporting entities should not claim utility non-bypassable purchases of CFE and/or EACs that are allocated to other customers even if that CFE is not claimed or retired by those customers. This is necessary to ensure that voluntary EAC procurement is additional to mandatory or non-bypassable purchases, not simply a reshuffling of EACs to customers interested in voluntary procurement.<sup>16</sup> Better tracking of all

<sup>13</sup> Non-bypassable CFE is defined here to be distinct from mandatory EACs and does not qualify for state RPS requirements. Non-bypassable CFE could be bundled with the associated EACs (even in these EACs are not claimed and retired by most ratepayers) or could be in the form of unbundled EACs whose costs are recovered in non-bypassable utility charges. These EACs may or may not currently be retired as these markets for 24/7 products continue to evolve on a voluntary basis. Voluntary EAC procurement should be in addition to both mandatory and non-bypassable CFE/EACs.

<sup>14</sup> The concept of “additionality” is more appropriately addressed within a consequential avoided emissions calculation (measured on tons) than in calculating an attributional Scope 2 market-based inventory that is focused on matching MWh with load.

<sup>15</sup> RMI found in its analysis that in general, including existing CFE in an hourly match metric lowers the cost of achieving a given match level and may alter the resources procured to meet a given match level, but does not significantly change the cost structure of achieving higher levels of hourly matching. (Mark Dyson, Sakhi Shah, and Chaz Teplin, *Clean Power by the Hour Assessing the Costs and Emissions Impacts of Hourly Carbon-Free Energy Procurement Strategies*, RMI, July 2021, at 15).

<sup>16</sup> This proposal is consistent with the findings in the *IEA study*. “A key role of policy makers is to ensure consistency across various policy objectives in the energy market. This includes putting in place mechanisms to ensure that clean electricity procurement strategies implemented by companies or organizations, whether

forms of CFE is necessary to harmonize U.S. compliance and voluntary markets and align the interests of companies and policymakers to support grid decarbonization. Mandatory, non-bypassable, and voluntary EAC purchases should complement rather than compete. EACs should count equally to reduce a company's market-based emissions inventory and to improve its "CFE Score".<sup>17</sup> This harmonization will become more important as RPS and clean energy standards increase. The Scope 2 Guidance should adopt policies that maintain the integrity of existing mandatory programs and utility non-bypassable CFE while ensuring that there is no double counting of EACs, no double paying by companies for clean energy, and no cost shifting (e.g., allowing a reporting entity to claim CFE or EACs that they do not pay for and may already be purchased by others on the grid). This approach will provide a complete and accurate depiction of total purchased EACs (CFE Score) across mandatory, utility non-bypassable, and voluntary programs as well as emissions associated with non-CFE supply.<sup>18</sup>

- e) **Proposal 1e: To prevent double counting, the Scope 2 Guidance should remove from the Table 6.3 data hierarchy "other grid-average emissions factors" location-based data.**<sup>19</sup> These emissions factors should not be used when calculating Scope 2 market-based inventories. By definition, these non-attributional system average emissions factors include all CFE and ignore the ownership claims and EAC rights of other buyers on the grid. For both restructured and vertically integrated US markets, eGRID total output emissions data does not account for state-level clean energy mandates or other non-bypassable CFE purchases that customers are already paying for in utility charges. Because eGRID data is disconnected from the attributional accounting framework, using it to establish grid-supplied CFE will result in some companies getting credit for clean energy they did not buy and other companies not getting credit for clean energy they bought. Until residual mix can be properly calculated in the United States (i.e., removing all mandatory, utility non-bypassable and other voluntary EACs from system average emissions factors), the residual mix should not be used to calculate market-based inventories. Instead, reporting entities (or their LSE) should have to buy, claim, and retire EACs to substantiate a purchase claim. To address these double counting concerns, we recommend the Scope 2 Guidance adopt a "bottom up" book and claim approach and

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individually or collectively, are not simply linked to clean electricity that policy already enables but truly adding clean generation to power systems and advancing progress towards overarching goals. Crucially, policy makers need to ensure that mechanisms exist allowing corporate consumers to go above and beyond existing clean electricity mandates." (at 75) IEA recommends, "Such a situation can be avoided by designing government obligation-based schemes to ensure that all consumers must receive a minimum allocation. In this case, entities or tariff offers seeking to claim "100%" renewables would need to procure additional clean electricity since the mandated minimum has to be allocated to other consumers." (at 34)

<sup>17</sup> The CFE Score measures the percentage of electricity consumption that is matched with carbon-free electricity generation for a given market boundary and time interval. If measured hourly, such that the CFE and/or EACs cannot exceed consumption in any hour, the total CFE and/or EACs divided by total load across all hours in the year would result in the annual average CFE Score for hourly consumption.

<sup>18</sup> Third party recognition programs and ESG rating organizations may also want to measure the voluntary actions of reporting entities. For example, if a reporting entity reports a total 100% CFE Score, this does not indicate what CFE is voluntary or in addition to mandatory or non-bypassable CFE procurement (e.g., whether purchased voluntary EACs increased from a baseline of mandatory 0% or mandatory 80% CFE in standard utility service absent any voluntary procurement).

<sup>19</sup> This includes eGRID total output system average (US), Defra annual grid average emissions factor (UK), and IEA national electricity emissions factors.



encourage EACs from all types of CFE to be retired to substantiate claims, including mandatory, utility non-bypassable, and voluntary EACs that a reporting entity purchases and retires directly and/or are retired on their behalf.<sup>20</sup>

**If a reporting entity cannot rely on purchased or allocated granular certificates, EACs, or supplier-specific emissions factors in Table 6.3, then the reporting entity should as a last resort apply an emissions factor that represents either fossil or non-baseload generation (e.g., eGRID fossil output, or alternatively, eGRID non-baseload emissions factors).**<sup>21, 22</sup> This approach does not require the use of eGRID total output emissions factors or a calculation of residual mix. It will support the integrity of a reporting entity's claims, prevent double counting, and allow a company to fairly take credit for the EACs purchased. *[Note: This recommendation applies to the U.S. market and relies on data available today. Solutions in Europe and other markets may differ given the absence of mandatory markets, supplier disclosure requirements, and/or centralized calculation of residual mix.]*

- f) **Proposal 1f: The Scope 2 Guidance should be amended to require buyers to disclose market-based inventories on a regional grid or balancing authority basis.** Buyers currently can report emissions as one aggregate total across the globe. Disclosing inventories by regional grid or balancing authority (or possibly by country if narrower market boundary is not practical), rather than aggregated to a buyer level, will better demonstrate geographically where exposure to carbon intensive generation is the highest.
- g) **Proposal 1g: WRI should provide guidance and work with recognition programs, ESG rating companies, and climate leadership programs to improve accuracy, transparency and credibility of climate claims based on the GHG Protocol.** Greater guidance is necessary regarding reporting entity claims related to the Guidance (e.g., what can be claimed given certain calculations). This will especially be true if the Guidance recognizes an expanded menu of options for reporting (e.g., annual versus hourly matching, different market boundaries, etc.). Reporting entities should be provided clear guidance about claims with respect to:
  - When and under what conditions can a reporting entity claim to be “using” 100% clean energy,
  - How to characterize (and changes to) emissions in Scope 2 market-based inventories or CFE Score<sup>23</sup> with annual versus hourly matching,

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<sup>20</sup> Alternatively, if utility non-bypassable CFE or their associated EACs are not registered and retired, it may be deemed acceptable to allow utilities to certify that a reporting entity has been allocated their fair share of these EACs and that these attributes cannot be allocated to other parties (i.e., cannot be used to satisfy the mandatory or voluntary claims of other buyers or be included in the residual mix).

<sup>21</sup> These published eGRID fossil fuel and non-baseload emissions factors are on average about 70% higher than total output emissions factors (although this difference varies by eGRID subregion depending on the supply mix). Either would be a significant improvement over the current Guidance.

<sup>22</sup> This will encourage reporting entities to request and LSEs to disclose LSE-specific emissions factors and a reporting entity's fair share of allocated EACs that an LSE procures on a reporting entity's behalf.

<sup>23</sup> We recommend that the Guidance require entities to estimate and disclose a CFE Score on an annual and/or hourly basis. The score can signal how aggressively a reporting entity is moving to procure CFE over time.

- How to characterize annual matching across broad geographic boundaries (e.g., RE100 or CFE100), and
- When and under what conditions can a reporting entity claim reductions in emissions into the atmosphere (avoided emissions).

For example, under updated Guidance, it is possible that a reporting entity could match 100% of its annual consumption with EACs and report zero Scope 2 market-based emissions while another reporting entity could match 100% of its hourly consumption with EACs and report zero Scope 2 market-based emissions. To prevent confusion among users of the Protocol, further guidance is required to improve accuracy, transparency, and credibility of climate claims. Currently, the Protocol is interpreted to allow reporting entities to claim “using” clean energy or about how their products are “made with clean energy” when such claims are in fact demonstrably false. Similarly, the types of claims about clean energy use based on the Guidance are reasonably interpreted by consumers to reflect contributions those reporting entities are making to mitigate climate change, yet the Guidance does not require reporting entities to include any evidence of such actual contributions to emission reductions into the atmosphere. To avoid this risk of deception, we suggest that the updated Guidance indicate what types of claims are justifiable (e.g., not allow claims such as “made using” or “made with” clean energy). If the Guidance wishes to clarify when companies can make claims regarding “use” or “made with” renewable or carbon-free electricity, we suggest that the Guidance only allow these claims in cases where companies have matched CFE purchases with their electricity consumption on both a time- and location-basis. Using granular certificates by hour and location, companies would need to demonstrate that the CFE purchases are generated in or delivered to their local electric grid and match their actual load on an hourly basis.<sup>24</sup> At the same time, progress toward annual matching and RE100 claims should continue to be permitted.<sup>25</sup> Similarly, claims about emissions reductions into the atmosphere should be accompanied by a calculation of avoided emissions. To reduce the risk of deception, we suggest that the Guidance require companies to disclaim whether or not they have calculated the emissions impact to the atmosphere of their clean energy procurement decisions. If a company has not estimated the emissions impact, they should only be allowed to make claims on clean energy transactions and not on climate benefit. Without such calculations, companies should disclose that the climate impact related to their renewable energy claim has not been estimated and cannot be substantiated. By requiring more precise language when discussing a reporting entity’s procurement of CFE, the Guidance can reduce the risk that the reasonable consumer is misled by claims about the energy used to produce the goods and services they consume and avoid unwarranted and unjustified conclusions about the real benefit to the climate from reporting entity actions.<sup>26</sup>

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<sup>24</sup> Claims about clean energy use should be substantiated with the use of hourly granular certificates and actual hourly load data (i.e., hourly 24/7 accounting based on actual data should be viewed as the “gold standard” for purchase claims related to clean energy use).

<sup>25</sup> When actual hourly data is not available, use of supply and load profiles may be used as an interim step but should not serve as a replacement for hourly (sub-hourly) accounting based on actual data.

<sup>26</sup> Claims about emissions reductions to the atmosphere should be substantiated with avoided emissions calculations as opposed to reductions in Scope 2 market-based inventories.

h) **Proposal 1h: If WRI wants to continue to be the guardian of internationally recognized standards for calculating and reporting GHG emissions, WRI should commit the resources to maintain and update the Guidance on a more regular basis.** Climate goals have changed. Reporting entity goals have become more ambitious, complex and diverse. Data capabilities and calculation methodologies have changed. Given the critical importance of this effort to accelerate decarbonization across world economies and the dynamic, fast-paced nature of markets with diverse capabilities and needs, the Guidance needs to be modernized on a more regular and consistent basis.<sup>27</sup>

**5. Please explain how the proposal aligns with the GHG Protocol decision-making criteria and hierarchy (A, B, C, D below), while providing justification/evidence where possible.**

**A. GHG Protocol accounting and reporting approaches shall meet the GHG Protocol accounting and reporting principles (see Annex for definitions):**

- Accuracy, Completeness, Consistency, Relevance, Transparency
- Additional principles for land sector activities and CO<sub>2</sub> removals: Conservativeness, Permanence, and Comparability if relevant

Incorporating granular (location and time-stamped) EACs in Scope 2 market-based emissions inventories and limiting the matching of EACs to those sourced within or delivered to the same grid as load will link EAC purchases and emissions more directly with electricity use (and deliverability). While typically it is not possible to physically trace electricity flows from a specific generation source on the electric grid to a specific customer load, granular EACs would be more closely tied to the timing and location of customer consumption, much like the underlying obligations of electricity supply today. Suppliers serving retail customers or utilities on a wholesale basis routinely have a contractual obligation to “deliver” a specific quantity of electricity to a particular market area in a specific hour. More granular time and location GHG accounting that more closely reflects electricity markets will provide a more accurate, complete, consistent, relevant and transparent picture of a reporting entity’s emissions associated with the timing and location of its electricity use. Companies will no longer be able to report zero Scope 2 market-based emissions and claim they are using 100% renewable energy by making EAC purchases that clearly do not match the location and timing of their consumption.

Current accounting, with annual matching across broad geographic boundaries, can easily result in greatly-reduced or zero Scope 2 market-based emissions inventories, and be interpreted to support a company’s claims of “using” 100% renewable energy. For example, RE100 neither requires nor asks for any information on the relation between such procurements and actual emissions reductions, nor does it require any relationship between procured renewable supply or RECs and the actual timing of the buyer’s consumption from the grid. A company can procure from projects located across vast geographies and far from its locations of electricity use (i.e., procure RECs associated with electricity that cannot be “delivered” to a buyer in a standard electricity contract). Likewise, a company can procure renewable energy from variable solar energy projects that exclusively deliver CFE during

<sup>27</sup> For example, the [Responsible Steel Standard Development Procedures](#), version 2.0, calls for regular review and revision within a maximum of five years (at 15).

daytime hours to “cover” load during times of day that could not be physically served by solar energy. This ability to report zero Scope 2 emissions when the CFE does not actually displace fossil generation relied on to serve load is misleading and often misinterpreted by users of the Protocol.<sup>28</sup> It harms the overall credibility of the GHG reporting system and can lead to valid criticisms that Scope 2 market-based accounting method does not accurately measure the emissions associated with a buyer’s electricity use. More directly linking EACs with electricity deliverability on a 24/7 basis will enhance credibility in the accounting system.

More granular location and time emissions accounting will also encourage the development of CFE generation and balancing resources, such as advanced energy storage and load management, that are needed to decarbonize electricity grids at all locations and times, making the Protocol much more relevant to overall grid decarbonization initiatives. This is consistent with the predominant body of analysis on decarbonization of the electricity sector, which indicates that the fastest, most cost-effective, and reliable pathway to grid decarbonization is through a diverse portfolio of carbon-free technologies, including wind and solar, along with firm CFE and advanced storage technologies.<sup>29</sup>

In the United States, the proposal is also designed to harmonize U.S. compliance and voluntary markets and align the interests of reporting entities and policymakers to support grid decarbonization regardless of whether it is through mandatory programs, utility non-bypassable CFE, or voluntary EAC purchases. Mandatory, utility non-bypassable, and voluntary EAC purchases should complement rather than compete. Counting all CFE equally, regardless of technology or supplier source, that a reporting entity purchases (even if not “contracted”), is more accurate, complete, consistent, relevant, transparent, and fair.

**B. GHG Protocol accounting and reporting approaches shall align with the latest climate science and global climate goals (i.e., keeping global warming below 1.5°C). To support this objective (non-exhaustive list):**

- Direct emissions reported in a company’s inventory should correspond to emissions to the atmosphere. Reductions in direct emissions reported in a company’s inventory should correspond to reductions in emissions to the atmosphere.
- Indirect emissions reported in a company’s inventory should in the aggregate correspond to emissions to the atmosphere. Reductions in indirect emissions reported in a company’s inventory should in the aggregate correspond to reductions in emissions to the atmosphere.

Neither reductions in Scope 2 market-based emissions inventories nor adding new MWh of CFE (sometimes referred to as additionality) should be equated or confused with measuring *actual* emissions reductions into the atmosphere. See separate proposal for measuring consequential avoided emissions.

<sup>28</sup> Caroline O’Doherty, [Electricity Firms Told to Drop ‘False’ 100% Green Power Claims](#), February 2023.

<sup>29</sup> Bruce Phillips, Neil Fisher, and Anjie Liu, [Review and Assessment of Literature on Deep Decarbonization in the United States: Importance of System Scale and Technological Diversity](#), The NorthBridge Group, April 2021.

“Too often environmental professionals, policy-makers, and standard-setters fail to distinguish between two major types of GHG accounting methods – which are appropriate for fundamentally different purposes. Using the wrong type of method can lead to bad decision-making – and unfortunately, this happens all too often. Many GHG accounting practitioners will be familiar with ‘attributional’ type methods, which create inventories of emissions—for example, corporate GHG inventories, national GHG inventories, and traditional product life cycle assessments. Often practitioners mistakenly assume that attributional is the only type of method, and try to use such methods to answer questions that they cannot and should not be used to answer – like how much a mitigation action reduces emissions. A fundamentally different type of GHG accounting method is ‘consequential’, which aims to quantify the change in emissions caused by decisions or interventions.”<sup>30</sup>

### **Reductions in Scope 2 Market-Based Inventories vs. Avoided Emissions**

Numerous studies, articles, and analyses indicate that attributional reductions in Scope 2 inventories and consequential avoided emissions calculations should not be confused.<sup>31</sup> Even if market-based reporting is modified to better match the timing and location of consumption, a reduction in market-based emissions may or may not be related to actual emissions reductions. A company could report zero emissions by purchasing EACs within the same regional grid that match its hourly consumption with little reduction in actual grid emissions. For example, if a reporting entity is located on a grid with a high percentage of CFE resources already<sup>32</sup> and/or can purchase EACs from unclaimed existing CFE within the same grid, it may be able to report zero Scope 2 market-based emissions, even with 24/7 time and location matching, with little incremental impact on emissions into the atmosphere. Purchases of EACs that match a reporting entity’s consumption by hour and location can zero out its Scope 2 market-based inventories. In this case, the impact on emissions into the atmosphere will depend on other factors – e.g., whether purchased EACs are increasing from a 0% CFE Score to 100% or from 80% to 100%; whether incremental CFE resources are added, what existing grid resources are displaced, etc. It is also possible that a reporting entity could have a high Scope 2 market-based inventory but have a significant impact on emissions into the atmosphere due to its procurement actions outside its market boundary and/or if marginal energy resources displaced are largely coal-fired power.

The current Scope 2 Guidance recognizes that changes in inventories may not accurately reflect actual emissions reductions into the atmosphere and was not designed to calculate avoided emissions.<sup>33</sup> The same situation is likely to continue under a modernized Scope 2 market-based inventory. Again, the

<sup>30</sup> Matthew Brander, [The Most Important GHG Accounting Concept You May Not Have Heard of: the Attributional Consequential Distinction](#), GHG Management Institute, March 2021, at 1.

<sup>31</sup> Google, [24/7 Carbon-Free Energy: Methodologies and Metrics](#), February 2021, at 1, 6, 8, 12, 14, and 20. Matthew Brander, [The Most Important GHG Accounting Concept You May Not Have Heard of: the Attributional Consequential Distinction](#), GHG Management Institute, March 2021, at 1-5. Enrique Gutierrez, Julia Guyon, Craig Hart, Zoe Hungerford, and Luis Lopez, [Advancing Decarbonisation Through Clean Electricity Procurement](#), International Energy Agency, November 2022, at 12-14, 23-25, 54-65, and 72-73. Roger Ballentine, Patrick Falwell, Liana Biasucci and Neil Fisher, [Modernizing How Electricity Buyers Account and are Recognized for Decarbonization Impact and Climate Leadership](#), Green Strategies and The NorthBridge Group, August 2022, at 32-45.

<sup>32</sup> For instance, this could be due to mandatory RPS programs or utility non-bypassable CFE.

<sup>33</sup> The Guidance notes that calculating avoided emissions would provide “strategic benefits” including identifying where low-carbon energy generation can have the biggest impact. (Scope 2 Guidance, at 28, 52).

purpose of an improved Scope 2 market-based inventory should be to more accurately reflect the emissions associated with a buyer's electricity use by taking into account the location and timing of CFE supply and/or EAC purchases relative to the timing and location of a buyer's consumption. While potentially related, reductions in Scope 2 market-based inventories should not be conflated with calculations of avoided emissions.

### **Additionality vs. Avoided Emissions**

Additionality, which we define here as helping achieve the deployment of new CFE capacity, is sometimes prioritized in buyer procurement strategies presumably with the intention to enhance the GHG reduction impact of buyer actions.<sup>34</sup> But additionality is not equivalent to measuring reductions in emissions into the atmosphere. Not all CFE MWh, even if from new resources, have the same environmental benefit. Analyses have demonstrated that an additional MWh of CFE can have widely different emissions impacts depending on the timing and location of when that CFE is produced and the types of resources that new CFE displaces. For example, WattTime found that an Illinois wind project can have three times the emissions impact as a California solar project.<sup>35</sup> Similarly, Salesforce concluded that a West Virginia solar project had almost three times the emissions impact as a California solar project,<sup>36</sup> and a Boston University study found that a South Dakota wind project would have two to three times the emissions impact as a similar project in New England.<sup>37</sup>

Additionality is a poor proxy for measuring avoided carbon emissions, especially as renewable resource penetration increases and these resources increasingly displace other CFE resources.<sup>38</sup> Therefore, we recommend that WRI consider having reporting entities more directly measure changes in emissions into the atmosphere resulting from CFE procurement (whether near or far from load) and other actions (e.g., on-site generation, storage, load management). Measuring avoided emissions directly, and as accurately as possible, will help prioritize interventions that correspond to reductions in emissions into the atmosphere. This can be done in combination with reducing Scope 2 inventories when matching EACs with a company's consumption (e.g., when selecting the appropriate CFE technology or CFE site location within a regional grid) as well as inform decisions about how best to prioritize projects across market areas and maximize carbon emissions reductions at the lowest possible cost. While potentially related, additionality should not be conflated with calculations of avoided emissions.

### **Scope 2 Market-Based Inventories and Avoided Emissions Should Be Measured in Parallel**

An updated Scope 2 market-based inventory (as part of attributional accounting) and emissions impact into the atmosphere (as part of consequential accounting) should ideally be measured

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<sup>34</sup> Current Scope 2 Guidance does not require additionality. Adding additionality criteria to Scope 2 market-based accounting could reduce the approaches available to many consumers, particularly small and medium customers who are not able to sign long-term contracts with significant financial guarantees for new resources.

<sup>35</sup> Henry Richardson, [Accounting for Impact, Refocusing GHG Protocol Scope 2 Methodology on Impact Accounting](#), WattTime, September 2022, at 6-7.

<sup>36</sup> Salesforce, [More than a Megawatt: Embedding Social & Environmental Impact in the Renewable Energy Procurement Process](#), October 2020, at 10.

<sup>37</sup> <https://www.bu.edu/sustainability/projects/bu-wind/>.

<sup>38</sup> The development of new CFE resources, or additionality, is certain to be an important consideration in calculating avoided emissions, but the timing and location of that generation and the resources displaced on the grid are also important.

separately and in parallel. Both attributional and consequential accounting provide valuable insight and answer different questions.

#### **Attributional Accounting**

1. Location-Based Inventory: What is the emissions inventory associated with the grid mix used to serve the timing and location of a reporting entity's electricity consumption?
2. Market-Based Inventory: What is the emissions inventory associated with a reporting entity's purchases to serve the timing and location of their electricity consumption?

#### **Consequential Accounting**

3. Avoided Emissions: What is the emissions impact to the atmosphere associated with a reporting entity's procurement and other actions?
4. Carbon Emissions Baseline: What is the emissions impact associated with a marginal change in the timing and location of a reporting entity's electricity consumption?

(See separate NB/GS Emissions Impact Disclosures Proposal.)

#### **C. GHG Protocol accounting frameworks should support ambitious climate goals and actions in the private and public sector.**

- Would this proposal enable organizations to pursue more effective GHG mitigation/decarbonization efforts as compared to the existing standards and guidance? If so, how?
- Would this proposal better inform decision making by reporting organizations and their stakeholders (e.g., related to climate-related financial risks and other relevant information associated with GHG emissions reporting)?

Yes. The proposed changes to the attributional Scope 2 market-based emissions inventory would more accurately reflect the emissions associated with a buyer's electricity use by taking into account the location and timing of purchased CFE supply (bundled with EACs) and unbundled EACs relative to a buyer's consumption. In other words, purchases of EACs would more closely be linked with the timing and location of a reporting entity's consumption. In making Scope 2 inventories a more accurate reflection of emissions from consumption, Scope 2 inventories will better signal to buyers where and when emissions from consumption remain relatively high and incentivize actions that will reduce emissions from consumption.

Further, the proposed changes to the attributional Scope 2 market-based emissions inventory would encourage organizations to find CFE solutions that match every hour of their load. This could entail a range of demand-side, supply-side, and grid investments, including combinations of energy storage to balance variable CFE, firm CFE resources, demand response, and needed grid upgrades to enable growing shares of CFE to meet organizational load on their local grid. As more organizations pursue this strategy, this will support investment in the broad set of actions needed to decarbonize the electric grid. This contrasts with the current incentive structure which drives demand for the lowest cost CFE, typically variable renewable energy in locations where it can be built and operated at the lowest cost.

In addition to supporting more effective GHG mitigation strategies, over time, systems and products will evolve to support purchases of location- and hourly-time-matched CFE at a lower cost. As more organizations pursue 24/7 procurement goals and have an opportunity to measure their progress in GHG Scope 2 market-based reporting, this will facilitate market trading of granular certificates, similar to the way electricity is bought and sold today. Trading of time-based certificates (T-EACs) can allow corporates to pursue hourly matching in a more cost-effective manner. Certificate trading allows corporates to trade surplus clean generation in specific hours, which effectively allows for aggregation of generation to meet different demand profiles.<sup>39</sup>

Also see response to question #8 below that describes how the proposals support ambitious climate goals and actions in the private and public sector.

**D. GHG Protocol accounting frameworks which meet the above criteria should be feasible. (For aspects of accounting frameworks that meet the above criteria but are difficult to implement, GHG Protocol should provide additional guidance and tools to support implementation.)**

- What specific information, data or calculation methods are required to implement this proposal (e.g., in the case of scope 2, data granularity, grid data, consumption data, emission information, etc.)? Would new data/methods be needed? Are current data/methods available? How would this be implemented in practice?
- Would this proposal accommodate and be accessible to all organizations globally who seek to account for and report their GHG emissions? Are there potential challenges which would need to be further addressed to implement this proposal globally? What would be the potential solutions?

Our primary recommendations related to location-based and market-based accounting call for the Guidance to encourage the calculation of these inventories by matching hourly consumption with the corresponding hourly emissions factors so that Scope 2 inventories more accurately reflect the emissions from the purchase and use of electricity. While the full range of data may not be immediately available to all buyers and in all markets, we highlight the types and sources of data that are currently available to buyers in the United States that would allow them to immediately begin preparing at least some portion of their Scope 2 inventories on a more time-granular basis.

To improve the accuracy of Scope 2 location-based and market-based inventories by incorporating more time and locational granular data, reporting entities can use their hourly consumption data and hourly grid emissions factors. In cases where actual hourly data is not available, we highlight examples of how hourly data could be estimated using annual or monthly data and hourly profiles for load and/or supply.

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<sup>39</sup> International Energy Agency, [Advancing Decarbonisation Through Clean Electricity Procurement](#), November 2022, at 12.



### **Load Data Hierarchy** (in order of preference)

Both location-based and market-based inventories could be improved with the use of hourly load data. Even if a buyer's hourly consumption data is not immediately available, alternative data, including a utility's load profile or a standard load profile by customer type, can be used in the interim to reasonably estimate a buyer's hourly consumption, although hourly matching claims should be substantiated with the use of hourly granular certificates.

- Actual buyer hourly metered load (Utilities / Buyers)
- Estimated hourly load data based on utility load profiles applied to actual buyer monthly meter reads that are used to determine hourly retail supply obligations (Utilities)
- Estimated hourly load data based on standard load profiles by customer type and location that could be applied to actual buyer metered monthly or annual data. (NREL, 2021, [End-Use Load Profiles for the U.S. Building Stock](#)); Also, see DOE [Load Profiles](#) data)<sup>40</sup>
- Actual monthly load (Buyers)
- Actual annual load (Buyers)

**Emissions Factor (EF) Hierarchy** (in order of preference) – Whenever possible, use of more granular time and location emissions factors should be preferred.

- Purchased granular certificates (EnergyTag, M-RETS,<sup>41</sup> PJM,<sup>42</sup> other registries)<sup>43</sup>
- Purchased EACs, annual or monthly (LSE, Buyer)<sup>44</sup>
- Supplier specific emissions factor (LSE)<sup>45, 46</sup>
- Residual mix – Until residual mix can be properly calculated in the United States (i.e., removing all mandatory, utility non-bypassable and other voluntary EACs from system average emissions factors), the residual mix should not be used to calculate market-based inventories. Instead, reporting entities (or their LSE) should have to buy, claim, and retire EACs to substantiate a clean energy purchase claim.<sup>47</sup>
- eGRID fossil fuel output, or alternatively non-baseload, emissions factors<sup>48</sup> (either annual or hourly) shall be used as a last resort if none of the above are available. (EIA)

### **CFE/EAC Supply Hierarchy** (in order of preference)

- Granular certificates by hour and location (based on actual contracted CFE or LSE allocation of CFE output from specific plants used to satisfy mandatory programs (RPS), non-bypassable utility CFE, and voluntary procurement (green tariff, retail supply contract, PPA, etc.).
- Estimated hourly EACs could be calculated using standard supply profiles by resource type and location applied to monthly or annual EACs if granular certificate or actual hourly

supply data is not available (RTO generation profiles by resource type, e.g., [PJM](#), [NREL PV Watts Tool](#), EIA)

- Monthly EACs
- Annual EACs

In the United States, data to develop more time and location-granular Scope 2 inventories and inform avoided emissions calculations is already available, but public entities including the EPA and Department of Energy need to provide additional data, analytic tools, and guidance on what data should serve as substitutes if preferred data is not available. See comments of CATF, NorthBridge, and

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<sup>40</sup> When actual hourly data is not available, use of supply and load profiles may be used as an interim step but should not serve as a replacement for hourly (sub-hourly) accounting based on actual data.

<sup>41</sup> M-RETS, a renewable resource tracking system that tracks and manages the activity of a diverse variety of environmental attributes and other energy commodities, developed technical tools to collect hourly data in January 2019 and has used them to facilitate hourly EAC claims since January 2021. M-RETS supports voluntary tracking across North America and has a compliance footprint that covers all or portions of 15 midcontinent states and one Canadian province. Later this year, the M-RETS footprint will expand to include 11 Western and two Canadian provinces.

<sup>42</sup> PJM Environmental Information Services will provide hourly, time-stamped certificates for PJM generation starting in March 2023. ( <https://insidelines.pjm.com/pjm-eis-to-produce-energy-certificates-hourly/>, February 2023).

<sup>43</sup> As described earlier, purchased GCs or EACs associated with mandatory, utility non-bypassable CFE, and voluntary procurement should be counted equally.

<sup>44</sup> The term “purchases” should not be limited to a reporting entity’s “contracts” and should include all forms of EAC purchases (e.g., through utility tariffs) made directly or on behalf of the Agency. Even if not purchased by a customer via a contract, a customer may be required to pay for CFE (or unbundled EACs) in non-bypassable utility charges.

<sup>45</sup> In the US, it would be helpful to standardize reporting of “CFE Baseline” (CFE Score) and “Baseline Emissions” by utility service area taking into account mandatory / non-bypassable CFE purchase requirements (e.g., RPS, state mandated nuclear life extensions and ratebase generation mix) in utility standard tariff (and non-bypassable) service. A CFE Baseline and carbon intensity used for calculating Scope 2 Market-based emissions (expressed in pounds per MWh) could be standardized for basic utility service based on state RPS or clean energy requirements, if any, and the utility supply mix. EEI, in collaboration with member companies, corporate customers, and the World Resources Institute, developed a carbon emissions and electricity mix reporting template to collect timely and consistent carbon dioxide intensity rates for delivered electricity by operating company to provide that information to customers in one central location. Further work likely would be needed to standardize this information across reporting utilities. [EEI Utility CO<sub>2</sub> Emission Factor Database](#).

<sup>46</sup> Similarly, we support CRS’s comments to the EPA that, “The standardization of methodologies for calculating utility-specific emission factors that convey the GHG emissions intensity of contractually delivered electricity to customers...would significantly increase the accuracy of tracking progress towards corporate climate targets. Further working with utilities to centrally publish a comprehensive standardized dataset of utility-specific emission factors by product would streamline reporting and facilitate more accurate tracking of goals over time.” CRS Comments, [Docket ID No. EPA-HQ-OAR-2022-0878](#), January 18, 2023.

<sup>47</sup> Also see response to question #6 below related to data and tracking needed to align U.S. mandatory, utility non-bypassable and voluntary EAC markets.

<sup>48</sup> eGRID fossil fuel output emission rates are calculated based on plants whose primary fuel is coal, oil, gas, or other fossil fuel. Alternatively, WRI could provide guidance that reporting entities use eGRID emissions factors for non-baseload generation as a last resort. eGRID defines non-baseload emission rates as the output emission rates for plants that combust fuel and have capacity factors less than 0.8, weighted by generation and a percent of generation determined by capacity factor.

Green Strategies regarding data needs to improve the granularity, accessibility, and transparency of electric system data to support modernized Scope 2 Guidance.<sup>49</sup>

1. EPA should support the reporting of currently reported eGRID generation and emissions factor data—especially total output, fossil, and non-baseload emissions factors on an hourly basis for all the geographic boundaries covered in the eGRID dataset.
2. When plant-specific emissions factors or actual hourly generation supply data are not available, EPA should provide guidance on what emissions rate and/or supply profile would be most appropriate to use by resource type and U.S. location.
3. When actual hourly data or specific utility load profiles are not available, the EPA should provide guidance on what hourly load profile would be most appropriate to use by customer type and U.S. region.
4. EPA should offer a standardized template for GHG reporting that will clarify the approach being used by each reporting company and facilitate apples-to-apples comparisons.

Also see response to question #6 below. Also see our response to the Scope 2 Guidance Survey question #30.

**6. Consistent with the hierarchy provided above, are there potential drawbacks or challenges to adopting this proposal? If so, what are they?**

We recommend that the Guidance adopt new provisions to report more time and location-granular Scope 2 inventories but anticipate several challenges. While not all data is readily available, calculations are not automated/standardized and corporate goals, abilities and access to markets differ, flexibility is needed in GHG reporting since not all buyers can do 24/7 accounting or calculate avoided emissions impact. This will require greater transparency and reporting options that allow entities flexibility to select different market boundaries and time intervals with a transition towards and recognition of buyers who rely on more granular and accurate data to support claims.

- 1) **Access to granular data.** Not all data, including hourly consumption data and hourly location-specific grid emissions factors, is readily available to many reporting entities. In addition to data access, reporting entities vary in ability to utilize such data, and many entities will not be able to complete 24/7 accounting or avoided emissions calculations right away. New tools to automate and standardize calculations will be needed. Improvement not perfection should be the immediate goal. The underlying methodologies, data and rigor of calculations that may be used today can be improved and perfected over time. The Protocol should allow entities flexibility to select different market boundaries and time intervals with a transition towards and recognition of buyers who rely on more granular and accurate data to support claims. For entities that cannot access sufficient data, the Protocol should explore whether standardized load and supply profiles could be used for some transition period when actual hourly data is not available. The Protocol should emphasize the need for reporting entities to be

<sup>49</sup> [Docket ID No. EPA-HQ-OAR-2022-0878](#), Jan. 18, 2023.

transparent about the inputs and methods used in calculating inventories and emissions impact.

- 2) **Resistance to change from some reporting entities.** In shifting to time and location-granular Scope 2 estimation, emissions inventories could increase relative to annual inventories. In addition, by tying EAC matching to time and location criteria, companies will no longer be able to claim they are “using” 100% renewable energy by making EAC purchases that clearly do not match the location and timing of their consumption.

To overcome resistance, the Protocol could still instruct buyers to disclose information that will help external audiences understand the nature and ambition of a reporting entity’s climate efforts. For example, the Protocol could recognize buying EACs from carbon-free resources to match 100% of consumption as a worthwhile procurement objective even if not matching load on a time and location basis. Per the NB/GS Standardized Reporting Format Proposal, the Protocol could allow buyers greater opportunity to report progress pursuing a variety of goals (e.g., 24/7 matching, RE100, avoided emissions, incremental CFE development, etc.)

- 3) **Data and tracking needed to align U.S. mandatory, utility non-bypassable and voluntary EAC markets.** (See proposal 1d above). This will require tracking of all CFE (on both an annual and hourly basis) and allocating CFE fairly to the load that pays for that CFE in the form of purchased RECs, utility non-bypassable tariff charges,<sup>50</sup> and/or voluntary EAC purchases. LSEs, including utilities, will need to establish methods to fairly allocate CFE and/or the associated EACs to load depending on how customers in each service area pay for these resources (e.g., volumetric energy and/or demand charges). Voluntary procurement should be in addition to all forms of mandatory CFE/EAC procurement (i.e., RPS and utility non-bypassable CFE/EACs). To avoid double counting, this will require that **all** mandatory CFE/EACs be removed from the residual mix in the United States. This raises several challenges. First, not all CFE is currently tracked in the United States by registries. Second, residual mix is not currently calculated in many markets in the United States on an annual basis (let alone on an hourly basis). Third, CFE and/or the associated EACs that do not satisfy state RPS requirements often are not currently tracked, registered and retired by U.S. registries so rules would need to be established to remove these attributes from the residual mix so that they are not “socialized” to customers who did not pay for those attributes.

Alternatively, as suggested earlier in this proposal, reporting entities in the United States that want to make voluntary CFE claims that exceed utility standard delivery service could be required to purchase and retire EACs associated with those claims, either on an annual or hourly basis. These purchases could be made by the reporting entity directly or on their behalf by their LSE. This “bottom up” approach applied to each reporting entity does not require the tracking of all CFE/EAC purchases made by other customers, grid CFE, or residual mix. As with RPS, all reporting entity claims would need to be substantiated with the purchase and retirement of attributes.<sup>51</sup>

- 4) **Access to supplier or utility-specific emissions factors.** Emissions factors need adequate integrity. For example, emissions factors must properly exclude the purchases / claims of

other electricity buyers and also reflect time and location-specific sourcing. Buyers should request and load serving entities (LSEs) should disclose whether and how EACs are used in the emission factor calculation unless there is third party certification of the utility product. An LSE's emission factor may be for a standard product offer or a differentiated product. A reporting entity's EACs could be included as part of mandatory (RPS), utility standard tariff or non-bypassable service (ratebase generation, state nuclear life extension), and voluntary procurement (e.g., green tariff, PPA, other low-carbon power product or tariff). The LSE emission factor should be disclosed (preferably publicly) according to best available information (e.g., *EEI Utility CO<sub>2</sub> Emission Factor Database*; See footnotes 45 and 46 related to supplier specific emissions factor in response to question #5D above). Not being able to use grid average total output emissions factors in market-based accounting will increase pressure on buyers to request and suppliers to provide LSE-specific emissions factors.

- 5) **Comparability (e.g., differences in reported annual vs. hourly matching figures).** Reporting entities could continue to calculate market-based emissions and a CFE Score based on annual data as hourly data becomes more accessible. However, these annual figures would not be directly comparable to market-based emissions and a CFE Score for organizations that are able to use hourly (or monthly) data. To address this challenge, an *annual* emissions inventory and a CFE Score could be converted to an estimated corresponding *hourly* emissions inventory and CFE Score using standardized generation supply and customer load profiles for the applicable generation and customer type by location. *(This could be done by a third party. WRI or others, such as the EPA, could provide guidance or tools to facilitate such comparisons.)* More relevant and accurate accounting metrics (like shown in the NB/GS Standardized Reporting Format Proposal) will allow third party recognition programs to distinguish and reward high impact actions.

**7. Would the proposal improve alignment with other climate disclosure rules, programs and initiatives or lead to lack of alignment? Please describe.**

Yes, in comparison to current Scope 2 accounting under the existing Guidance, the proposal would improve alignment with recent large electricity buyer next generation procurement initiatives and policy mandates to adopt more granular time and location accounting methodologies. All of these rules, programs and initiatives rely on market-based accounting on a more granular basis.

**Electricity Buyers:**

- **U.S. Federal Government** – In 2021, President Biden issued the Executive Order on Catalyzing Clean Energy Industries and Jobs through Federal Sustainability, which directs the Federal Government to achieve “100 percent carbon pollution-free electricity on a net annual basis by 2030, including 50 percent 24/7 carbon pollution-free electricity” on an hourly basis with electricity that is generated in the same grid region where consumption occurs.

<sup>50</sup> These non-bypassable utility charges may cover ratebase CFE and the associated EACs embedded in a bundled utility tariff for standard delivery service (in vertically integrated markets) or unbundled EACs associated with state-mandated life extensions (in restructured markets), distinct from state-mandated RPS requirements. Like RPS, this CFE is mandatory. All customers within certain service areas are required to purchase this CFE.

<sup>51</sup> State RPS programs vary by state. In some states, LSEs must procure EACs or can make alternative compliance payments on behalf of the load it serves.

- **Google** – In September 2020, Google announced the adoption of a new goal to decarbonize its electricity supply completely and operate on 24/7 carbon-free energy, everywhere, by 2030.
- **Microsoft** – In 2021, Microsoft adopted a “100/100/0” commitment, pledging to have 100% of its electric consumption, 100% of the time, matched by carbon-free electricity purchases by 2030.
- **Iron Mountain** – Iron Mountain has adopted a goal to use 100% clean energy, 100% of the time in its data centers and achieve net-zero emissions company-wide by 2040.
- **Peninsula Clean Energy** – In 2017, Peninsula Clean Energy, a Community Choice Aggregator (CCA) for San Mateo County located just south of San Francisco, adopted a goal to deliver 100% renewable energy on a 24/7 basis by 2025, matching its clean energy supply with its load every hour of every day to reduce its demand signal for unabated fossil fuels from the grid.
- **Des Moines, Iowa** – In January 2021, the city of Des Moines, Iowa passed a new resolution that aims to achieve 100 percent, 24/7 carbon-free electricity by the year 2035.

In addition, policy mandates/standards listed below require accounting at hourly (or sub-hourly) and local granularity:

- **EU** - Published draft Delegated Act on detailed rules for the production of RFNBO Hydrogen requiring 1 hour period correlation between production and consumption of electricity.
- **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** - French Government 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 have to be made for the same hour and geographical location as production.
- **Germany** - Government Ammonia Import Tender requiring that production of hydrogen is matched on an hourly basis with renewable energy generation under a PPA.

If the Protocol does not evolve to enable accounting that is aligned with these procurement initiatives and policy mandates, it may lead to confusion and even questions regarding the Protocol’s relevance given more granular market-based methodologies in compliance and large buyer programs.

**8. Please attach or reference supporting evidence, research, analysis, or other information to support the proposal, including any active research or ongoing evaluations. If relevant, please also explain how the effectiveness of the proposal can be evaluated and tracked over time.**

There is significant evidence, research, and analysis to support the following points:

- 1) **We Are Not Decarbonizing Fast Enough.** According to the October 2022 report by the UN Environment Programme<sup>52</sup> there exists today “no credible pathway to 1.5C.” Across the globe, we are failing to develop the array of clean energy technologies to achieve decarbonization at the rate needed to remove structural barriers to climate success. Beyond the reach of policy incentives, carbon-free electric generation must increase exponentially in both the U.S. and globally. Progress to date has come from *both* policy and growing demand for clean electricity from large power users: more than a third of wind and solar capacity deployment has been driven by private demand above and beyond policy incentives. Electricity buyers have enabled the deployment of many gigawatts of new wind and solar generation capacity, helping to significantly drive down the costs of these technologies by aligning their procurement strategies with the Protocol and the requirements of third-party programs.<sup>53</sup>
- 2) **We Are Not Developing the Resources Needed to Achieve Decarbonization in a Reliable, Cost-Effective and Less Risky Manner.** The immense decarbonization challenge is best met not just with additions of wind and solar capacity, but also by rapidly deploying firm and dispatchable CFE resources to complement and balance variable renewable resources – a role largely filled today by fossil generation. In 2021, The NorthBridge Group published a review and assessment of over 40 studies from a diverse group of analysts at consulting firms, universities and research organizations examining the technological and economic feasibility of deep decarbonization. Among its conclusions, The NorthBridge Group found broad agreement that “a diverse portfolio of clean energy technologies, including variable renewables (primarily wind and solar) and firm electric generating technologies, is needed to maintain reliable low-cost electric service, provide flexibility to overcome important economic and deployment uncertainties, achieve decarbonization goals in regions of the country where variable renewable technologies are less competitive and decarbonize non-electric sectors of the economy.”<sup>54</sup> Similarly, a 2018 study by Sepulveda, et al. provides a “comprehensive techno-economic evaluation of two pathways: one

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<sup>52</sup> <https://www.unep.org/resources/emissions-gap-report-2022>

<sup>53</sup> See [CEBA Deal Tracker](#) (64.5 GW of clean energy in the US since 2014, representing 37% of U.S. CFE capacity additions); EU PPAs (IHS) 12 GW in 2020; James Kobus, Ali Ibrahim Nasrallah, and Jim Guidera, [The Role of Corporate Renewable Power Purchase Agreements in Supporting US Wind and Solar Deployment](#), Columbia University Center on Global Energy Policy, March 2021; Jenny Heeter, Eric O’Shaughnessy, and Rebecca Burdet, [Status and Trends in the Voluntary Market \(2020 data\)](#), NREL, September 2021; “Sustainable Energy in America Factbook,” Business Council for Sustainable Energy, Bloomberg New Energy Finance (BNEF), 2021 43, <https://bcse.org/factbook/>; Doug Miller, [The NextGen Activator Community Guide: A Guide on How to Update the Voluntary Carbon-Free Electricity \(CFE\) Market System to Activate a Broader Menu of Procurement Options Available to Energy Customers and Advance Systemic Grid Decarbonization](#), Clean Energy Buyers Institute (CEBI), September 2022, at 6.

<sup>54</sup> Bruce Phillips, Neil Fisher, and Anjie Liu, [Review and Assessment of Literature on Deep Decarbonization in the United States: Importance of System Scale and Technological Diversity](#), The NorthBridge Group, April 2021, p. 4.

reliant on wind, solar, and batteries, and another also including firm low-carbon options (nuclear, bioenergy, and natural gas with carbon capture and sequestration).” The study finds that, “[a]cross all cases, the least-cost strategy to decarbonize electricity includes one or more firm low-carbon resources. Without these resources, electricity costs rise rapidly as CO2 limits approach zero. Batteries and demand flexibility do not substitute for firm resources. Improving the capabilities and spurring adoption of firm low-carbon technologies are key research and policy goals.”<sup>55</sup> A 2018 literature review by Jenkins, et al. reviews 40 studies of pathways to achieve 80-100% reduction in power sector emissions. Certain studies assess meeting decarbonization targets while relying primarily or entirely on variable renewable energy in combination with energy storage and demand management, while other studies rely on those resources plus a range of firm carbon-free resources. Among the literature review’s conclusions, the authors find: “Whichever path is taken, we find strong agreement in the literature that reaching near-zero emissions is much more challenging – and requires a different set of low carbon resources – than comparatively modest emissions reductions (e.g., CO2 reductions of 50%–70%). This is chiefly because more modest goals can readily employ natural gas-fired power plants as firm resources. Pushing to near-zero emissions requires replacing the vast majority of fossil fueled power plants or equipping them with CCS.”<sup>56</sup>

- 3) **The Existing GHG Protocol Does Not Encourage CFE with the Highest Impact.** The rapid decarbonization of the electricity sector is an essential component in achieving net-zero emissions by mid-century, both to mitigate that sector’s emissions and because of the need to use electrification to decarbonize other sectors of the economy. However, the Protocol’s methods for measuring Scope 2 emissions in their current forms are not adequately aligned with the pathways and actions that are urgently needed in the electric grid to achieve new, more ambitious net-zero GHG emission goals in an affordable and reliable manner. Existing rules and rewards programs for large buyer decision making encourage the least cost CFE investments, not the most impactful investment decisions. Scope 2 gives equal credit to electricity procurement transactions irrespective of the degree to which those transactions actually reduce emissions associated with a reporting entity’s electricity use, actually impact emissions into the atmosphere, or enhance reliability in balancing CFE with load at all times and locations.<sup>57</sup> This allows companies to report emissions reductions even in the absence of true reductions. The Protocol is not currently able in many instances to distinguish between next generation transactions (including 24/7 procurement, needed development of CFE, storage, and load management

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<sup>55</sup> Sepulveda et al., [The Role of Firm Low-Carbon Electricity Resources in Deep Decarbonization of Power Generation](#), November 2018.

<sup>56</sup> Jesse Jenkins, Max Luke, and Samuel Thernstrom, [Getting to Zero Carbon Emissions in the Electric Power Sector](#), December 2018.

<sup>57</sup> Not all CFE MWh have the same value. Timing, location, and transmission constraints matter when matching customer load within a market area. Timing, location and the resources displaced by incremental CFE matter when determining avoided emissions. A diverse mix of resources, including firm, dispatchable, balancing, load management, and transmission resources are needed to maintain reliability on the grid within a market area.



technologies, and/or targeted efforts to displace carbon-intensive fossil generation) with high carbon reduction impact and buyer actions with lower carbon reduction impact.<sup>58, 59</sup>

#### 4) **Temporal and Locational Matching of EACs with Consumption on a 24/7 Basis Supports the Development of a Diverse Mix of CFE Technologies and Balancing Resources Needed to Achieve Deep Grid Decarbonization.**

Detailed system analysis across various markets supports the link between pursuing 24/7 procurement goals and the development of a diverse mix of CFE generation and balancing resources.<sup>60</sup>

- “24/7 supports development of wider mix of technologies needed to reach net zero. A key finding is that when companies set more granular goals – such as matching their electricity demand hourly (rather than annually as has been the dominant practice) – it can stimulate deployment of the wider portfolio of flexible technologies needed for net zero transitions in the power sector.” ([IEA study](#), at 3)
- “Annual goals do not support all the solutions needed. Goals based on annual matching of electricity or only targeting emissions do not deliver all the technologies that will be needed as power systems decarbonize and reach higher renewables integration phases.” ([IEA study](#), at 7)
- “Matching the corporate demand profile on an hourly basis (or less) with demand and generation both located within the same grid delivers more robust emissions reduction in high-renewables systems and drives deployment of a more diverse and flexible portfolio of clean technologies and solutions.” ([IEA study](#), at 7)
- “IEA modelling for India and Indonesia shows that hourly matching strategies (as compared to annual) lead to a more diverse technology portfolio, including clean dispatchable generation and storage.” ([IEA study](#), at 11)

<sup>58</sup> These problems are discussed at length in [Modernizing How Electricity Buyers Account and are Recognized for Decarbonization Impact and Climate Leadership](#), Roger Ballentine, Patrick Falwell, Liana Biasucci and Neil Fisher, Green Strategies and The NorthBridge Group, August 2022.

<sup>59</sup> Ben Elgin and Sinduja Rangarajan, [What Really Happens When Emissions Vanish](#), Bloomberg, October 2022. [Carbon Offset: Last Week Tonight with John Oliver](#), John Oliver, August 2022. Anders Bjørn, Shannon Lloyd, Matthew Brander, and H. Damon Matthews, [Renewable Energy Certificates Threaten the Integrity of Corporate Science-Based Targets](#), Nature Climate Change, June 2022. Phred Dvorak, [Climate-Reporting Rules Could Let Companies Look Greener Than They Are](#), Wall Street Journal, April 2022. [University of Edinburgh’s Resources and Evidentiary Literature on Renewable Energy Purchasing and the Market-based \(Scope 2\) Method](#), January 2023.

<sup>60</sup> Enrique Gutierrez, Julia Guyon, Craig Hart, Zoe Hungerford, and Luis Lopez, [Advancing Decarbonisation Through Clean Electricity Procurement](#), International Energy Agency, November 2022. Iegor Riepin and Tom Brown, [System-Level Impacts of 24/7 Carbon-free Electricity Procurement in Europe](#), Department of Digital Transformation in Energy Systems, TU Berlin, October 2022. Xu and Jenkins, [Electricity System and Market Impacts of Time-based Attribute Trading and 24/7 Carbon-free Electricity Procurement](#), Princeton University, Zero-carbon Energy Systems Research and Optimization Laboratory (ZERO Lab), September 2022. Long Duration Energy Storage Council, [A Path Towards Full Grid Decarbonization with 24/7 Clean Power Purchase Agreements](#), May 2022. Melissa Lott & Bruce Phillips, [Advancing Corporate Procurement of Zero Carbon Electricity in the United States: Moving from RE100 to ZC100](#), Columbia University and The NorthBridge Group, December 2021. [24/7 Carbon-Free Energy Compact](#), United Nations, September 2021.

- “Importantly, as achieving hourly matching requires more control over generation and demand, these goals guide corporates to procure more diverse and flexible clean technologies and solutions...As a result, corporates adopting these strategies provide a more comprehensive contribution to bringing power systems along the net zero transition and can lead the way in developing the technologies needed.” ([IEA study](#), at 23)
- “Early deployment by corporates of firm clean electricity generation or advanced storage options that have higher costs can help spur cost declines, ultimately making these technologies more cost-effective.” ([IEA study](#), at 70)
- “For companies seeking to help lead net zero transitions, more granular strategies such as hourly matching can deliver the full portfolio of technologies needed to decarbonise the entire power sector.” ([IEA study](#), at 74)
- “24/7 CFE drives early deployment of advanced, “clean firm” generation and / or long-duration energy storage, creating initial markets for deployment, innovation, and cost-reductions that make it easier for societal at large to follow the path to 100% carbon-free electricity.” ([Princeton study](#), at 5)
- “24/7 CFE can eliminate carbon dioxide emissions associated with a buyer’s electricity consumption, going beyond the impact of procurement of renewable energy to meet 100% of annual volumetric demand. 24/7 CFE can also drive greater system level emissions reductions than 100% annual matching if the CFE target is high enough, via expediting the exit of natural gas generating capacity and production from the electricity system.” ([Princeton study](#), at 5)
- “24/7 CFE procurement would create an early market for the advanced technologies, stimulating innovation and learning from which the whole electricity system would benefit.” ([TU Berlin study](#), at 11)
- “24/7 carbon-free energy (CFE) procurement leads to lower emissions for both the buyer and the system, as well as reducing the needs for flexibility in the rest of the system.” ([TU Berlin study](#), at 11)
- “To fully decarbonize our electricity supply, we will focus on ensuring that each hour of our consumption is fully matched by carbon-free electricity generation. Focusing on hourly measurement helps connect our corporate sustainability goals to the physical reality of the grid systems and energy markets where we operate.” (Google, [24/7 Carbon-Free Energy: Methodologies and Metrics](#), at 4)
- “...our 24/7 CFE goal is focused on decarbonizing our electricity supply on every grid where we operate. The emissions that Google is responsible for through our electricity consumption vary based on the carbon intensity of the grids where we operate and our procurement of clean electricity on those same grids. Focusing on the locations where we operate is the only way to drive the electricity-related emissions that we are directly responsible for to zero.” (Google, [24/7 Carbon-Free Energy: Methodologies and Metrics](#), at 4)
- “With our new 24/7 CFE goal, we are deliberately opening up the technology envelope to encompass all carbon-free energy technologies which we believe will play important roles in enabling decarbonization of electricity grids. Existing CFE sources like hydro and nuclear power already make significant carbon-free contributions to grids around the world, and numerous studies show that reducing emissions to zero by mid-century, so-called ‘deep

decarbonization,' is more feasible and cost-effective with a diverse portfolio of carbon-free resources." (Google, [24/7 Carbon-Free Energy: Methodologies and Metrics](#), at 4-5)

- "The results of our analysis demonstrate that targeting a diverse portfolio of carbon-free technologies can most cost-effectively decarbonize electricity demand. This approach is particularly helpful at higher levels of decarbonization, as the marginal contribution of any one type of technology decreases." (Google, [24/7 Carbon-Free Energy: Methodologies and Metrics](#), at 19)
- "Hourly procurement strategies can create demand for emerging technologies needed to fully decarbonize the grid...By setting 100% hourly matching targets, buyers create a demand signal for emerging technologies that can also meet valuable system-wide needs in decarbonized grids." ([RMI study](#), at 6 and 21)
- Market experience also demonstrates that organizations pursuing 24/7 procurement strategies are more likely to include some form of firm CFE and storage resources in their clean energy portfolio mix<sup>61</sup> compared to organizations that rely on traditional wind and solar PPAs when pursuing goals related to annual matching or maximizing avoided emissions.

The effectiveness of this proposal can be evaluated and tracked over time using a standardized reporting format, like shown in the NB/GS Standardized Reporting Format Proposal. Measurement of reductions in emissions into the atmosphere is discussed more fully in the separate NB/GS Emissions Impact Disclosures Proposal.

**9. If applicable, describe the process or stakeholders/groups consulted as part of developing this proposal.**

Over the past four years, we have participated in numerous discussions with stakeholders and working groups as part of developing this proposal, including:

- **NextGen Carbon-Free Electricity Procurement Project**, partnership with Clean Air Task Force, Green Strategies, Inc. and The NorthBridge Group, Inc.
- Conferences and consultations with Clean Energy Buyers Alliance (CEBA) members and Clean Energy Buyers Institute's (CEBI) Next Generation Carbon-Free Electricity Procurement Initiative
- Participation in EnergyTag granular certificate standards development and working groups<sup>62</sup>

<sup>61</sup> Google\_AES includes repowered hydro and storage (announced May 2021); Google\_NV Energy includes storage (Dec 2020), Google\_Fervo includes geothermal (May 2021), Iron Mountain\_RPD Energy includes nuclear (April 2021), Microsoft\_Vattenfall includes hydro (Nov 2019), Peninsula Clean Energy includes geothermal, small hydro and storage (Jan 2023), Standard Power\_Energy Harbor includes nuclear (July 2021).

<sup>62</sup> The EnergyTag Granular Certificate Scheme Standard details how certificates should be issued, transferred and retired to avoid double-counting. The Standard has the support of over 100 organizations from around the world, including UN Energy and most of the world's largest electricity providers, buyers, and trade associations. It was developed with the oversight of the world's leading energy attribute system experts. EnergyTag's Chair founded and ran the Association of Issuing Bodies, which oversees the world's largest energy attribute system today, the European Guarantee of Origin, which tracks over 30% of European electricity.

- Participation in Columbia University Center on Global Energy Policy stakeholder workshops on GHG Protocol update
- Consultations with utilities and wholesale suppliers
- Consultations with other environmental non-profits and registries<sup>63</sup>
- Consultations with technology software and blockchain developers<sup>64</sup>

We also reviewed numerous studies, academic papers, and articles in the process of developing this proposal (see response to question #10 below). Based on our participation in these conversations and review of these studies and articles, we have found that stakeholder positions related to Scope 2 market-based accounting fall into four general categories:

- 1) Some stakeholders support continuing **Scope 2 market-based attributional inventory reporting and adding a preference for use of more granular data** tied to the timing and location of a buyer's consumption.
- 2) Some stakeholders support **eliminating Scope 2 market-based accounting and replacing it with only a consequential avoided emissions impact** accounting/disclosure (Avoided Emissions). Some also suggest comparing this to a buyer's carbon emissions baseline (CEB) to provide better context, where the CEB equals a buyer's consumption at a specific time and location multiplied by the marginal emissions factor at that time and location.
- 3) Some stakeholders support **retaining and improving the accuracy of Scope 2 market-based inventories** (like in #1) **and separately reporting the consequential emissions impact of their actions.** (like in #2).
- 4) Some stakeholders support **combining both approaches** – e.g., **calculating avoided emissions (#2 above) and comparing them to / netting them against their emissions inventory from their load (#1 above).**

Our recommendation at this time is to adopt the third approach, which we believe would address many of the concerns raised by stakeholders, and provide better insight to measure, incentivize, and recognize the climate impact of the range of procurement and other actions taken by reporting entities.

<sup>63</sup> In the United States, M-RETS, the world's largest registry operator, has piloted GCs successfully and can offer hourly tracking across many states in the U.S today. The I-REC registry operates in over 55+ countries and is offering its GC solution for customers around the world.

<sup>64</sup> Various granular certificate and hourly matching software providers can offer hourly tracking today to their customers (e.g., Flexidao, Granular Energy, Powerledger, Cleartrace, etc.).

**10. If applicable, provide any additional information not covered in the questions above.**

**Next Generation Procurement – Key Papers and Articles**

The NorthBridge Group assembled the following list of papers and articles that discuss efforts to 1) match CFE with load on a 24/7 basis; 2) measure avoided emissions; 3) modernize the GHG Protocol and Scope 2 accounting; 4) understand the impact and value of voluntary procurement efforts; and 5) develop environmental liability accounting.

(Sorted by topic and date)

**Matching CFE Supply with Load (24/7)**

1. Jan Pepper, Greg Miller, Sara Maatta and Mehdi Shahriari, [\*Achieving 24/7 Renewable Energy By 2025\*](#), Peninsula Clean Energy, January 2023.
2. Adam Diamant, [\*24/7 Carbon-Free Energy: Matching Carbon-Free Energy Procurement to Hourly Electric Load\*](#), EPRI, December 2022.
3. Emily Pontecorvo, [\*How a New Subsidy for 'Green Hydrogen' Could set off a Carbon Bomb, Grist\*](#), December 2022.
4. International Energy Agency, [\*Advancing Decarbonisation Through Clean Electricity Procurement\*](#), November 2022.
5. Iegor Riepin and Tom Brown, [\*System-Level Impacts of 24/7 Carbon-free Electricity Procurement in Europe\*](#), Department of Digital Transformation in Energy Systems, TU Berlin, October 2022.
6. Xu and Jenkins, [\*Electricity System and Market Impacts of Time-based Attribute Trading and 24/7 Carbon-free Electricity Procurement\*](#), Princeton University, Zero-carbon Energy Systems Research and Optimization Laboratory (ZERO Lab), September 2022.
7. Roger Ballentine, Patrick Falwell, Liana Biasucci and Neil Fisher, [\*Modernizing How Electricity Buyers Account and are Recognized for Decarbonization Impact and Climate Leadership\*](#), Green Strategies and The NorthBridge Group, August 2022.
8. Long Duration Energy Storage Council, [\*A Path Towards Full Grid Decarbonization with 24/7 Clean Power Purchase Agreements\*](#), May 2022.
9. [\*CATF Comments on U.S. Federal Government Request for Information Regarding its Plan to Transition the Federal Government to a Carbon-Free Electricity Supply\*](#), March 2022.
10. Melissa Lott & Bruce Phillips, [\*Advancing Corporate Procurement of Zero Carbon Electricity in the United States: Moving from RE100 to ZC100\*](#), Columbia University and The NorthBridge Group, December 2021.
11. [\*24/7 Carbon-Free Energy Compact\*](#), United Nations, September 2021.
12. Bruce Phillips, Neil Fisher, and Anjie Liu, [\*Review and Assessment of Literature on Deep Decarbonization in the United States: Importance of System Scale and Technological Diversity\*](#), The NorthBridge Group, April 2021.
13. Google, [\*24/7 Carbon-Free Energy: Methodologies and Metrics\*](#), February 2021.
14. Sepulveda et al., [\*The Role of Firm Low-Carbon Electricity Resources in Deep Decarbonization of Power Generation\*](#), ScienceDirect, November 2018.
15. Google, [\*Moving toward 24x7 Carbon-Free Energy at Google Data Centers, https://storage.googleapis.com/qweb-sustainability.appspot.com/pdf/24x7-carbon-free-energy-data-centers.pdf?utm\\_source=newsletter&utm\\_medium=email&utm\\_campaign=newsletter\\_axiosgenerate&stream=top\*](https://storage.googleapis.com/qweb-sustainability.appspot.com/pdf/24x7-carbon-free-energy-data-centers.pdf?utm_source=newsletter&utm_medium=email&utm_campaign=newsletter_axiosgenerate&stream=top), October 2018.

## Measuring Avoided Emissions

1. Emissions First Partnership, <https://www.emissionsfirst.com/>, December 2022.
2. Greg Miller, [Applying the Consequential Emissions Framework for Emissions-Optimized Decision-Making for Energy Procurement and Management](#) and [Guide to Sourcing Marginal Emissions Factor Data](#), Clean Energy Buyers Institute, November 2022.
3. Enrique Gutierrez, Julia Guyon, Craig Hart, Zoe Hungerford, and Luis Lopez, [Advancing Decarbonisation Through Clean Electricity Procurement](#), International Energy Agency, November 2022.
4. David Luke Oates, [Making It Count Updating Scope 2 Accounting to Drive the Next Phase of Decarbonization](#), REsurety, October 2022.
5. Gavin McCormick, [How Impact Accounting Can Accelerate Corporate Emissions Reductions](#), WattTime, GreenBiz, October 2022.
6. Henry Richardson, [Accounting for Impact, Refocusing GHG Protocol Scope 2 Methodology on 'Impact Accounting'](#), WattTime, September 2022.
7. Roger Ballentine, Patrick Falwell, Liana Biasucci and Neil Fisher, [Modernizing How Electricity Buyers Account and are Recognized for Decarbonization Impact and Climate Leadership](#), Green Strategies and The NorthBridge Group, August 2022.
8. Samuel Huestis, Charles Cannon, Sahithi Pingali, [Approach to Quantify Net Material Emissions Impact of Renewable Energy Purchases](#), RMI, Draft V1.0, May 2022.
9. [Rivian and Clearloop Partner on Solar Project That Carves a New Path for More Impactful Corporate Renewable Procurement](#), Clearloop, April 2022.
10. Pieter Gagnon and Wesley Cole, [Planning for the Evolution of the Electric Grid with a Long-Run Marginal Emission Rate](#), National Renewable Energy Laboratory, March 2022.
11. Dr. David Luke Oates and Dr. Kathleen Spees, [Locational Marginal Emissions A Force Multiplier for the Carbon Impact of Clean Energy Programs](#), REsurety and The Brattle Group, March 2022.
12. Hua He, Aleksandr Rudkevich, Xindi Li, Richard Tabors, Alexander Derenchuk, Paul Centolella, Ninad Kumthekar, Chen Ling, Ira Shavel, [Using Marginal Emission Rates to Optimize Investment in Carbon Dioxide Displacement Technologies](#), Tabors Caramanis Rudkevich, The Electricity Journal, Volume 34, November 2021.
13. Qingyu Xu et al., [System-level Impacts of 24/7 Carbon-free Electricity Procurement](#),” Zero-carbon Energy Systems Research and Optimization Laboratory, Princeton University, November 2021.
14. Olivier Corradi, Gavin McCormick, Henry Richardson, Trevor Hinkle, [A Vision for how Ambitious Organizations can Accurately Measure Electricity Emissions to take Genuine Action](#), Electricity Map and WattTime, August 2021.
15. Richard Tabors, [Marginal Emission Rate: The Needed Metric of Carbon Displacement in an Increasingly Electrified World](#), Tabors Caramanis Rudkevich, July 2021.
16. Mark Dyson, Sakhi Shah, and Chaz Teplin, [Clean Power by the Hour Assessing the Costs and Emissions Impacts of Hourly Carbon-Free Energy Procurement Strategies](#), RMI, July 2021.
17. Dr. Wenbo Shi and Mohammad Karimzadeh, [Automating Load Shaping for EVs: Optimizing for Cost, Grid Constraints, and... Carbon?](#), Singularity Energy and Sense Labs, June 2021.
18. Matthew Brander, [The Most Important GHG Accounting Concept You May Not Have Heard of: the Attributional Consequential Distinction](#), GHG Management Institute, March 2021.
19. [Nucor, Emissionality, and the Pursuit of Green Steel](#), WattTime, December 2020.
20. Salesforce, [More than a Megawatt: Embedding Social & Environmental Impact in the Renewable Energy Procurement Process](#), October 2020.

21. [WattTime Partners with Salesforce to Incorporate 'Emissionality' into Renewable Energy Procurement Strategy](#), WattTime, October 2020.
22. [A Study in Emissionality: Why Boston University Looked Beyond New England for Its First Wind Power Purchase](#), Renewable Energy World, January 2019.
23. Matthew Brander, Michael Gillenwater, Francisco Ascuia, [Creative Accounting: A Critical Perspective on the Market-Based Method for Reporting Purchased Electricity \(Scope 2\) Emissions](#), Centre for Business and Climate Change at University of Edinburgh Business School and GHG Management Institute, Elsevier, 2018.
24. Rudkevich, A. & Ruiz, Pablo, (2012), [Locational Carbon Footprint of the Power Industry: Implications for Operations, Planning and Policy Making](#), March 2012.
25. Rudkevich, Aleksandr, John Hancock Tower, and T. Clarendon Street, [Locational Carbon Footprint and Renewable Portfolio Standards](#), Proceedings of the 7th conference economics energy markets, 2010.

#### **Need for Modernization of GHG Protocol or Concerns About Greenwashing**

1. Caroline O'Doherty, [Electricity Firms Told to Drop 'False' 100% Green Power Claims](#), February 2023.
2. [University of Edinburgh's Resources and Evidentiary Literature on Renewable Energy Purchasing and the Market-based \(Scope 2\) Method](#), January 2023.
3. Heather Clancy, [Emissions Accounting Needs a Makeover, and It's Coming](#), Greenbiz, January 2023.
4. Matthew Brander and Anders Bjørn, [Principles for Accurate Corporate GHG Inventories and Options for Market-Based Accounting – Working Paper](#), December 2022.
5. United Nations' High-Level Expert Group on the Net Zero Emissions Commitments of Non-State Entities, [Integrity Matters: Net Zero Commitments By Businesses, Financial Institutions, Cities And Regions](#), November 2022.
6. Ben Elgin and Sinduja Rangarajan, [What Really Happens When Emissions Vanish](#), Bloomberg, October 2022.
7. Roger Ballentine, Patrick Falwell, Liana Biasucci and Neil Fisher, [Modernizing How Electricity Buyers Account and are Recognized for Decarbonization Impact and Climate Leadership](#), Green Strategies and The NorthBridge Group, August 2022.
8. [Carbon Offset: Last Week Tonight with John Oliver](#), John Oliver, August 2022.
9. Anders Bjørn, Shannon Lloyd, Matthew Brander, and H. Damon Matthews, [Renewable Energy Certificates Threaten the Integrity of Corporate Science-Based Targets](#), Nature Climate Change, June 2022.
10. Phred Dvorak, [Climate-Reporting Rules Could Let Companies Look Greener Than They Are](#), Wall Street Journal, April 2022.
11. [Clean Air Task Force Comments on SEC's Proposed Climate Risk Disclosure Rules](#), CATF and Green Strategies, June 2022
12. Meredith Fowlie, [Here Comes Climate Disclosure Regulation](#), Energy Institute Blog, UC Berkeley, October 2021.

#### **Next Generation Procurement (General) and Value of Voluntary Procurement**

1. Doug Miller, [The NextGen Activator Community Guide: A Guide on How to Update the Voluntary Carbon-Free Electricity \(CFE\) Market System to Activate a Broader Menu of Procurement Options Available to Energy Customers and Advance Systemic Grid Decarbonization](#), Clean Energy Buyers Institute (CEBI), September 2022.
2. [Transcript \(and Podcast\): Ezra Klein Interviews Jesse Jenkins](#), September 2022.

3. Armond Cohen, [It's Time We Update Our Corporate Electricity Procurement Standards to Decarbonize the Electric Grid](#), Clean Air Task Force, August 2022.
4. James Sallee, [Voluntary Green Power to the Rescue?](#), Energy Institute at Haas Blog, August 2022.
5. Jenny Heeter, Eric O'Shaughnessy, and Rebecca Burdet, [Status and Trends in the Voluntary Market \(2020 data\)](#), NREL, September 2021.
6. Lori Bird, Eric O'Shaughnessy, and Norma Hutchinson, [Actions Large Energy Buyers Can Take To Transform And Decarbonize The Grid: Procurement Practices For Achieving 100% Carbon Free Electricity](#), WRI, August 2021.
7. James Kobus, Ali Ibrahim Nasrallah, and Jim Guidera, [The Role of Corporate Renewable Power Purchase Agreements in Supporting US Wind and Solar Deployment](#), Columbia University Center on Global Energy Policy, March 2021.
8. [Why Corporate Energy Buyers Should "Go to 11"](#), Roger Ballentine and Armond Cohen, Green Strategies and Clean Air Task Force, GreenBiz, February 2021.

#### **Environmental Liability Management Accounting**

1. Alicia Seiger and Marc Roston, Working Paper, [The Road to Climate Stability Runs through Emissions Liability Management](#), Stanford Steyer-Taylor Center for Energy Policy & Finance, November 2022.
2. Alicia Seiger and Marc Roston, Authors' Note, [From Carbon Counting to Carbon Accounting: The Case for Emissions Liability Management](#), Stanford Steyer-Taylor Center for Energy Policy & Finance, November 2022.
3. Robert Kaplan and Karthik Ramanna, [Accounting for Climate Change](#), Harvard Business Review, November/December 2021.
4. Robert Kaplan and Karthik Ramanna, [We Need Better Carbon Accounting. Here's How to Get There, Harvard Business Review](#), April 2021.

## Proposal Annex

### **GHG Protocol Decision-Making Criteria and Hierarchy**

- A. First, GHG Protocol accounting and reporting approaches shall meet the GHG Protocol accounting and reporting principles:**
  - Accuracy, Completeness, Consistency, Relevance, Transparency
  - Additional principles for land sector activities and CO<sub>2</sub> removals: Conservativeness, Permanence, and Comparability if relevant
  - (See table below for definitions)
- B. Second, GHG Protocol accounting and reporting approaches shall align with the latest climate science and global climate goals (i.e., keeping global warming below 1.5°C). To support this objective (non-exhaustive list):**
  - Direct emissions reported in a company's inventory should correspond to emissions to the atmosphere. Reductions in direct emissions reported in a company's inventory should correspond to reductions in emissions to the atmosphere.



- Indirect emissions reported in a company’s inventory should in the aggregate correspond to emissions to the atmosphere. Reductions in indirect emissions reported in a company’s inventory should in the aggregate correspond to reductions in emissions to the atmosphere.

**C. Third, GHG Protocol accounting frameworks should support ambitious climate goals and actions in the private and public sector:**

- Accounting framework/s would enable organizations to pursue more effective GHG mitigation/decarbonization efforts as compared to the existing standards and guidance
- Accounting framework/s would better inform decision making by reporting organizations and their stakeholders (e.g. related to climate-related financial risks and other relevant information associated with GHG emissions reporting)

**D. Fourth, GHG Protocol accounting frameworks which meet the above criteria should be feasible to implement for the users of the frameworks.**

- For aspects of accounting frameworks that meet the above criteria but are difficult to implement, GHG Protocol should provide additional guidance and tools to support implementation.

**GHG Protocol Accounting and Reporting Principles**

Principle	Definition
<b>Accuracy</b>	Ensure that the quantification of GHG emissions (and removals, if applicable) is systematically neither over nor under actual emissions (and removals, if applicable), and that uncertainties are reduced as far as practicable. Achieve sufficient accuracy to enable users to make decisions with reasonable assurance as to the integrity of the reported information.
<b>Completeness</b>	Account for and report on all GHG emissions (and removals, if applicable) from sources, sinks, and activities within the inventory boundary. Disclose and justify any specific exclusions.
<b>Consistency</b>	Use consistent methodologies to allow for meaningful performance tracking of emissions (and removals, if applicable) over time and between companies. Transparently document any changes to the data, inventory boundary, methods, or any other relevant factors in the time series.
<b>Relevance</b>	Ensure the GHG inventory appropriately reflects the GHG emissions (and removals, if applicable) of the company and serves the decision-making needs of users – both internal and external to the company.
<b>Transparency</b>	Address all relevant issues in a factual and coherent manner, based on a clear audit trail. Disclose any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used.
<b>Conservativeness</b> (Land Sector and Removals Guidance)	Use conservative assumptions, values, and procedures when uncertainty is high. Conservative values and assumptions are those that are more likely to overestimate GHG emissions and underestimate removals, rather than underestimate emissions and overestimate removals.
<b>Permanence</b> (Land Sector and Removals Guidance)	Ensure mechanisms are in place to monitor the continued storage of reported removals, account for reversals, and report emissions from associated carbon pools.

<b>Comparability (optional)</b> (Land Sector and Removals Guidance)	Apply common methodologies, data sources, assumptions, and reporting formats such that the reported GHG inventories from multiple companies can be compared.
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