

**RESPONSES TO GHG PROTOCOL SCOPE 2 SURVEY
MARCH 2023**

Scope 2 Guidance

11. Does your organization use the Greenhouse Gas Protocol Scope 2 Guidance to develop and report its greenhouse gas inventory?

No

12. How satisfied are you with the current GHG Protocol Scope 2 Guidance?

Very dissatisfied

13. Do you think there is a need to update the GHG Protocol S2 Guidance?

Minor update (limited updates, clarifications, additional guidance, or refresh needed)

14. Please explain your selection. You may enter brief comments here or submit a more detailed proposal using the proposal template. [3949 characters]

Our choice of “very dissatisfied” in response to question 12 was because the problems with the Guidance are “major”; we chose “minor” in question 13 because the fixes are not difficult.

Major Problems

The major problems with the Guidance include: 1) the rules lead to inventories that are *not* a true and fair account of a company’s emissions from electricity use (thus exposing them to greenwashing claims); 2) the rules dissuade companies from making the types of procurements needed to decarbonize the grid in all places and at all times; and 3) the rules allow and incent interventions to achieve inventory reductions that may have little relation to any actual emissions reductions, thus undermining the Protocol’s theory of change that attribution leads to inventories, disclosure, and then impact.

Location-based accounting provides a rough but very imperfect picture of emissions from electricity use; current market-based rules can be even worse. The electricity a reporting entity uses at any location and time comes from a mix of generation sources and in any given hour that generation might come from coal, gas, nuclear, or renewables. There are ways that an entity can impact the generation mix they buy and use, such as by installing solar panels on their roof. Under the Guidance, however, an entity can (and is encouraged to) acquire RECs and use those instruments to erase emissions from their inventory –

without necessarily changing their actual electricity use in any way. At the time the Guidance was written, this system perhaps made sense – wind and solar deployment was scarce, and building new capacity, regardless of the location, helped mature the industry and bring down costs. That is not the need today.

The second major problem is that entities are allowed to reduce inventories using attributes without regard to time or location (essential variables that determine emissions from electricity use). By allowing entities to match load with attributes on an annual basis and without regard to whether the generation underlying those attributes is even in or delivered to the same grid, entities can erase their emissions and have no incentive to procure from badly needed firm and dispatchable carbon-free generation or to prioritize the decarbonization of their local grid.

The third problem is that the rules and Guidance sever the links of “*attribution* → *inventories* → *disclosure* = *impact*” – because inventory reductions may not and need not represent actual emissions reductions. There is no requirement under the Guidance that an entity evaluate or even discuss whether a REC used to erase *reported* Scope 2 emissions was associated with an *actual* decrease in emissions into the atmosphere. And it may in fact be that there is little such association. If one REC comes from a new wind farm in West Texas and another from a new solar farm in West Virginia, they both have the same impact on an inventory despite having very different emissions impact. Perhaps “*impact*” was considered differently when the Guidance was conceived, but today the impact called for by climate science is decarbonization.

Workable Updates

Three changes are needed. First, only allowing entities to use attributes from generation sourced within or delivered to their same grid would make an inventory better reflect emissions from electricity use. Second, matching attributes to load on shorter timeframes than annually will provide support for load shifting, energy storage, and sourcing firm and dispatchable carbon-free electricity (CFE) resources. Third, companies should be asked to consider and report the real-world emissions impact of their procurement.

These updates are implantable and would lead to major impact. We describe in detail how to implement these updates below and under NorthBridge/Green Strategies Proposals (NB/GS Proposals) for Market-Based Modernization, separate Emissions Impact Disclosures, and Standardized Reporting Format.

15. Do you think there is a need for updates related to the S2 location-based method?

Minor update (limited updates, clarifications, additional guidance, or refresh needed)

16. Please explain your selection. You may enter brief comments here or submit a more detailed proposal using the proposal template.

Location-based reporting could be improved with the use of more time and location-granular information. The current location-based method only directs electricity buyers to prepare inventories by matching annual consumption with the annual average emissions factors of regional grids and does not ask for more time or locationally granular information. The current Guidance already explains how reporting entities can understand the GHG intensity of the grid at specific time intervals and adopt strategies like load shifting or load curtailment even if the GHG reduction benefits of those strategies may not translate into inventory reductions. Since the adoption of the Guidance, more data and analytics have become available, and reporting entities in many markets are already managing their energy consumption to take advantage of time periods with the relative abundant CFE or avoid time periods with heavy unabated fossil generation. As such, *the Scope 2 Guidance should call for the preparation of location-based inventories that better reflect the timing and location of a reporting entity's consumption.*

Calculating more time-granular inventories adds a level of precision in estimating the emissions associated with a reporting entity's electricity use and may encourage a reporting entity to better account for the timing of its consumption in order to achieve GHG reduction impact. *We recommend the Guidance amend its existing hierarchy for calculating location-based inventories and require reporting entities to use the most time-granular inputs when the information is available.* Such a hierarchy could have hourly matching at the top, followed by other time periods (i.e., monthly), before annual matching. There is a growing body of research that justifies a focus on more time-granular considerations. For example, a study calculated Scope 2 inventories for approximately 113,000 simulated residential and commercial buildings in 52 grid balancing areas across the United States using annual-average and hourly grid emission factors. The study indicates that the annual average GHG accounting can result in an overestimation up to 33% and underestimation up to 22% when compared to hourly-average accounting, depending on a number of factors. The study underscores that that these annual accounting biases will only get worse. As grids continue to integrate more variable renewable energy sources to meet state renewable portfolio standards and climate goals, variability in hourly GHG intensity will likely increase. And, as more and more large end-use loads are electrified, such as vehicle charging, water heating, and space conditioning, building, total facility load profiles are expected to become spikier and more variable. Both of these trends will increase the bias and/or inaccuracies associated with Scope 2 emissions inventories that are calculated using annual average emissions factors and annual load. (Miller et al, *Hourly Accounting of Carbon Emissions from Electricity Consumption*, 2022 Environ. Res. Lett. 17 044073, pages 5, 9-10).

Improvements may also be possible now or in the future to better reflect consideration of transmission constraints within regional grids. *For example, more granular market, load, or*

bidding zones (e.g., areas with the same locational marginal prices) could be placed at the top of a locational hierarchy to incorporate consideration for transmission constraints and congestion. Pairing load and grid emissions factors on a more granular time and location basis will improve the accuracy of location-based emissions inventories.

Entities currently can report location-based emissions as one aggregate total. *The Scope 2 Guidance should also encourage reporting entities to disclose location-based inventories on a narrower geographic (e.g., by regional grid), rather than just global, basis. This will better demonstrate geographically where exposure to GHG intensive generation is the highest.*

17. Do you think there is a need for updates related to the S2 market-based method?

Minor update (limited updates, clarifications, additional guidance, or refresh needed)?

18. Please explain. You may enter brief comments here or submit a more detailed proposal using the proposal template.

Modifying (not eliminating) the market-based method, primarily through introducing new criteria to account for the location and timing of consumption and purchased CFE, is necessary to more accurately measure the emissions arising from the acquisition and consumption of electricity (see NB/GS Market-Based Modernization Proposal). While the Guidance introduced the market-based method to provide one perspective of the emissions from electricity use and with consideration for a reporting entity's purchased contractual instruments, current market-based accounting distorts the perspective of such emissions. Having accurate and more granular accounting is necessary so that reporting entities take steps to mitigate the emissions associated with serving their load. This update also will support reporting entities in adopting goals aimed at more narrowly matching consumption with CFE on a time and location basis and emphasize the need for the full set of variable and firm and dispatchable solutions to decarbonize the electric grid. *In parallel with disclosing "modified" market-based inventories, we believe the Guidance must adopt new provisions for reporting entities to separately discuss and disclose the emissions impact to the atmosphere so that entities account for and prioritize the GHG reduction impact of their procurement, investments, and energy management decisions.*

Allow purchased energy attribute credits (EACs)/contractual instruments to reduce inventories only if sourced from or delivered to the same grid as consumption

By permitting the matching of annual consumption with EACs sourced from different grid regions (and irrespective of whether EAC-generating projects are meaningfully reducing emissions), a buyer can portray fossil-heavy consumption from the local grid mix as clean. A buyer need not concern itself with its local grid mix if it can reduce its "emissions from electricity use" through out-of-market transactions. *We propose limiting the matching of*

consumption to only purchased instruments sourced within or delivered to the same regional grid as load. Through such restrictions, Scope 2 inventories will better reflect the emissions related to consumption.

Require increasingly granular time-matching of attributes and load

The annual matching of attributes and load leads buyers to ignore the timing of their consumption and how it relates to when power from purchased instruments is delivered to the grid. The timing of generation and load has significant implications, and a sole focus on annual matching could lead to suboptimal procurement. *We recommend that the Guidance place more time-granular instruments at the top of the emissions factor hierarchy and require time-granular matching when data is available so that inventories will better reflect GHG-intensity at given times and guide reporting entities to consider the solutions needed to decarbonize the electricity sector at all times including load shifting, energy storage, and firm and dispatchable CFE.* The marketplace is already evolving to offer time-granular EACs and 24/7 retail products, which combine variable and firm and dispatchable CFE.

Reporting entities “shall” discuss and “should” estimate avoided emissions impact

Since the Protocol endorses converting MWh of rate-based instruments irrespective of actual impact and largely irrespective of the location of generation into numerical emissions inventory reductions, reporting entities have little incentive to distinguish between the relative reduction impacts of different procurement strategies (*e.g.*, a choice to procure from a new project in wind-saturated West Texas vs a new solar farm in fossil-saturated West Virginia). *As such, we recommend the Guidance require the discussion of intended impact through procurement and encourage disclosure of estimates of avoided GHG emissions impact to complement the preparation of market-based inventories.*

19. Do you think there is a need for updates related to the dual reporting requirement, i.e., to report scope 2 emissions using both the location-based method and market-based method?

Minor update (limited updates, clarifications, additional guidance, or refresh needed)

20. Please explain. You may enter brief comments here or submit a more detailed proposal using the proposal template.

We agree that having a dual reporting requirement adds value. However, we consider market-based inventories modified to incorporate our recommendations for more granular time and location matching to provide better perspective of emissions from electricity use.

Such inventories reflect a reporting entity's purchases of electricity relative to the timing and location of its consumption. A more granular market-based assessment of emissions encourages a reporting entity to adopt or pursue a broader range of solutions and actions to lower the emissions from its electricity consumption at given times and locations.

The location-based method offers a more limited perspective of a reporting entity's Scope 2 emissions by reflecting grid average emissions and not the emissions associated with the supply and instruments that a reporting entity actually invests in or purchases. The location-based method adds value in that it offers a useful benchmark for demand management actions and can be used for estimating the extent to which a reporting entity's modified market-based Scope 2 emissions are higher or lower than those in the region, on average.

21. Does your org publicly report S2 emissions using the location-based method, the market-based method, or both?

Not applicable

22. Does your organization publicly set GHG reduction targets/goals for scope 2 emissions based on the location-based method, the market-based method, or both?

Not applicable

23. If your organization reports a GHG inventory, does your organization use residual emission factors when calculating scope 2 emissions using the market-based method?

Not applicable

24. Chapter 11 of the Scope 2 Guidance, titled "How Companies Can drive Electricity Supply Changes with the market-based method", elaborates how organizations can use their procurement power to substantively contribute to new low-carbon energy supply. In this context, does your organization pursue any of the options suggested in Chapter 11 and/or otherwise empirically evaluate the connection between changes in GHG emissions to the atmosphere and your organization's scope 2 related decarbonization investments? (yes, no, not sure)

Yes

25. If so, how?

From working directly with large corporate and public sector electricity buyers, we have seen how the GHG Protocol and the Scope 2 Guidance influence procurement strategy and

what procurement options it has incentivized to date. Given its influence, we urge the adoption of updates that will support *all* of the procurement, investment, and other strategies necessary to drive decarbonization in the electric sector. The current Scope 2 Guidance and the market-based method have provided well-understood pathways under Scope 2 accounting for using solutions including energy efficiency and conservation, on-site solar generation, and transactions for RECs, whether unbundled or bundled (spot market purchases, long-term power purchase agreements (virtual or physical), green tariffs) to reduce inventories. The Scope 2 Guidance does not adequately support other emerging options including: load shifting to hours with less GHG intensity, energy storage, time-granular certificates, products that incorporate firm and dispatchable carbon-free generation to match load on a time and location basis, and transactions that aim to maximize GHG reduction benefits relative to alternative transactions with lower GHG reduction benefits that may also reduce or eliminate market-based emissions inventories.

We recommend that the Protocol update the Scope 2 Guidance’s discussion (currently found in Chapters 10 and 11) to highlight how the timing and location of consumption and buyer procurement can have varying emissions impact and should be a necessary consideration for reporting entities. Such discussion should also highlight the need for both variable and firm and dispatchable carbon-free resources in decarbonizing the electric grid.

26. Has your organization identified any instances where application of the current Scope 2 Guidance has led to changes in your reported GHG inventory (i.e., an increase or decrease in reported emissions) while potentially leading to an unequal or opposite outcome in total GHG emissions to the atmosphere?

Yes

27. If so, please explain.

We identify instances where reporting entities can use the market-based method to calculate inventory reductions even when real-world emissions reduction is relatively limited or does not occur. We also highlight instances where the existing market-based method would indicate equal reductions in inventories under different procurement strategies despite widely varying real-world emissions impact.

Instances where a reporting entity can calculate a reduction in its market-based inventory despite achieving zero or relatively limited reduction in emissions from its purchase and use of electricity include: (1) transacting for EACs and/or electricity from existing projects; and (2) transacting for EACs and/or electricity from new projects in grid regions with relatively high shares of CFE. In both instances, a reporting entity can match EACs with consumption to calculate a net decrease in Scope 2 emissions regardless of emissions reductions into the atmosphere. *To mitigate this issue, we recommend that the Guidance adopt new provisions*

for emissions impact disclosures to be completed in parallel with introducing new criteria in Scope 2 accounting to prohibit the matching of consumption with EACs sourced from different grids than load, but otherwise allow the matching of EACs sourced within or delivered to the regional grid and corresponding to the time interval of demand. Even if a buyer reduces its inventories under these restrictions, the buyer must still separately disclose whether it has achieved emissions impact (if any).

We also highlight three transaction examples where the current market-based accounting would recognize the same level of reduction in a Scope 2 inventory, but where the extent to which a buyer reduces the emissions from its consumption and/or achieves GHG reduction impact varies. We assume each of the following examples yields an equal volume of EACs/other contractual instruments: (3) executing a virtual power purchase agreement (VPPA) with a new solar project in a different grid region far from load; (4) executing a PPA with a new solar project in the same grid region as load; and (5) executing a retail supply agreement (competitive supplier or utility) where load is matched on a 24/7 basis by a portfolio of CFE resources located in or delivered to the same grid. The buyer sources EACs from the resources that meet its demand in examples (4) and (5), but not (3). We do not wish to discourage example (3), but Scope 2 accounting should reflect emissions associated with consumption and the extent to which consumption is matched on a time and location basis with CFE. Following our recommendations, the reporting entity can estimate and disclose GHG impact in parallel and separately from Scope 2 market-based accounting, and example (3) may achieve relatively high impact if the project's grid has high GHG intensity. In example (4), under current rules, the reporting entity can match SRECs toward any MWh of annual consumption, but if our recommended time-matching criteria are adopted, it could only match SRECs generated during the same time period as load and could not exceed load in any hour (SRECs would not be applied to hours when solar is not generating) and the buyer would need to find alternative resources to cover unmatched hours. In example (5), the buyer has contracted for a mix of resources that have better, if not completely, mitigated the emissions from consumption. It is possible that under example (5) the buyer relies entirely on existing or new resources or some combination. Its Scope 2 market-based inventory would not indicate any further emissions to mitigate (i.e., a zero inventory), while the emissions impact to the atmosphere would be reflected in a separate emissions impact disclosure.

28. New grid-connected technologies and/or their increased deployment may require further clarification or changes to the Scope 2 Guidance to better address accounting of emissions associated with these resources. Please select from the potential options below any technologies which would benefit from updates or additional guidance. Please also include any additional technologies outside of this list which should be considered. Any specific suggestions related to these technologies should be submitted in the Scope 2 proposal section.

a. Advanced Metering Infrastructure (“AMI”)

- b. Demand-side load management (e.g., demand response, load shifting, etc.)
- c. Electric vehicle charging and grid integration
- d. Energy storage technology
- e. Hydrogen as an “energy carrier” similar to electricity, steam, cooling, etc.
- f. More geographically granular electric grid emission data (e.g., emissions associated with electricity at specific locations)
- g. More time-granular electric grid emission data (e.g., monthly, hourly, etc. emission factors in addition to annual values)

Replacing existing fossil energy while maintaining grid reliability and avoiding a rapid rise in electricity prices will require substantial new investments in CFE that is firm and dispatchable as well as investments in grid flexibility and transmission. (See Sepulveda et al., *The Role of Firm Low-Carbon Electricity Resources in Deep Decarbonization of Power Generation*, November 2018 and 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). The Guidance has well-supported the procurement of variable renewables, and procurement of wind and solar has comprised the bulk of CFE procurement and investment to date. Other technologies are needed to achieve the decarbonization of the grid at all times and all locations. *The Guidance, both in its discussion and in its inventory preparation methods, needs to encourage consideration for both variable and firm and dispatchable CFE generation (including nuclear power, fossil energy equipped with carbon capture, utilization, and storage (CCUS), hydrogen produced with renewables or natural gas with CCUS, and firm renewables such as geothermal energy and hydropower), grid improvements (advanced metering infrastructure, transmission), and solutions capable of adjusting the timing of energy supply and demand to use CFE (energy storage, hydrogen as an energy carrier, demand-side load management, EV charging and grid integration).*

Shifting to a modified market-based approach, as proposed, will help encourage all strategies that can contribute to a clean electric grid at all times and locations. The existing market-based approach that uses annual matching encourages reporting entities to procure or invest in the lowest cost CFE regardless of time and location—typically variable wind and solar power. When reporting entities seek to match their load every hour of the day with deliverable CFE under a modified market-based approach, this will lead to consideration of a broader set of tools capable of serving demand in all times of the year. A company that previously relied exclusively on RECs from solar to reduce Scope 2 inventories will find when reporting on a more granular time- and location-granular basis, solar may only help to match around 40% to 50% of their hourly load. Matching a higher percentage of hourly load can be achieved with incremental procurement and investments in a range of firm CFE generation technologies and utilizing energy storage and demand management.

Our recommended additional reporting recommendations (see the categories and metrics illustrated in the NorthBridge/Green Strategies Standardized Reporting Format Proposal) also provide opportunities for reporting entities to disclose how they are helping deploy the full range of CFE technologies and solutions. In addition to the procurement of CFE generation, a reporting entity could also highlight investments in the grid, storage, and demand management solutions. Finally, entities could also highlight investments or procurement in emerging CFE technologies.

We recommend that the Guidance better emphasize that it does not exclude the use of any CFE technology. In certain instances, the Guidance should address specific topics that reporting entities have faced to date, including how to report the use of energy storage or what to do if EACs are not available for certain CFE options (for example, follow the next option under the emissions factor hierarchy).

29. Are there existing resources, tools, or databases developed by other organizations that you would suggest that GHG Protocol consider to support organizations in applying the Scope 2 Guidance?

To improve the accuracy of location-based inventories, we encourage reporting entities to match hourly consumption data and hourly grid emissions factors. We highlight existing data options, and in cases where hourly data is not available, we identify how annual or monthly data and load profiles could be used to estimate hourly load:

- Emissions Factor: hourly eGRID total output average emissions factors (data source: EIA or RTO/Balancing Authority)
- Load Data Hierarchy (in order of preference)
 - Actual reporting entity hourly metered load (Utilities/Buyers)
 - Estimated hourly load data based on utility load profiles applied to actual reporting entity 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 reporting entity metered monthly or annual data.
 - Annual load (Buyers)

To improve the accuracy of market-based inventories, we again encourage the matching of hourly consumption data and the hourly emissions factors of purchased instruments:

- Load Data Hierarchy (same as above)

- Emissions Factor (EF) Hierarchy
 - Purchased granular certificates (EnergyTag; MRETS; other registries)
 - Purchased EACs, annual or monthly (LSE/Buyer)
 - Supplier specific emissions factor (LSE)
 - 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.*
 - *eGRID fossil fuel output, or alternatively non-baseload, emissions factor (either annual or hourly) to be used as last resort if none of the above are available (EIA)*

- CFE/EAC Supply Hierarchy
 - 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 (RTO generation profiles by resource type, e.g., *PJM, NREL PV Watts Tool*, EIA)
 - Monthly EACs
 - Annual EACs

To separately estimate and disclose avoided emissions impact associated with a reporting entity's procurement and load management actions, we encourage the following:

- Calculating a Carbon Emissions Baseline (load*locational marginal emissions rate (LMER)) *(this baseline (measured in tons of CO₂e) provides an estimate of emissions associated with a reporting entity consuming one more or less MWh (using same Load Data Hierarchy as above) at a particular time and location. Our suggested baseline uses LMER in order to reflect the emissions factor of a grid's marginal resource)*

- Calculating Avoided Emissions (incremental CFE*LMER) *(while potentially calculated with several methods and different inputs, we believe it should reflect incremental CFE resulting from procurement and a LMER that reflects the GHG intensity of the emissions likely to be displaced by the incremental MWh of CFE on a time and location basis)*

- Marginal Emissions Factor (EF) Hierarchy



- Hourly (or sub-hourly) locational marginal emissions rate or LMER (RTO or third party)
- Hourly eGRID non-baseload or fossil emissions factors (EIA)
- Annual AVERT avoided CO₂ emissions factor (EPA)
- Annual eGRID non-baseload or fossil emissions factors (EIA)

Avoided emissions can be calculated with two annual numbers or more accurately using granular location and time data, but it can also be calculated with publicly available data sources that cover the globe including eGRID fossil or non-baseload factors, EPA's AVERT, and UNFCCC's Harmonized IFI Default Grid Factors. Reporting entities should identify incremental CFE by resource type used in avoided emissions calculations following the CFE/EAC supply hierarchy.

30. Are there new resources, tools, or databases that you think need to be developed to support organizations in applying the Scope 2 Guidance?

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 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 submitted by CATF, NorthBridge, and Green Strategies to EPA regarding funding to support corporate GHG accounting, *Docket ID No. EPA-HQ-OAR-2022-0878*, January 18, 2023. Our comments recommend the following:

EPA should assemble data in standardized formats that it already possesses or can readily produce (e.g., hourly generation and associated emissions factors, generation emissions rates by resource type, generation profiles by resource type, etc.). In instances where EPA does not have direct access to the data needed, EPA should provide guidance on acceptable standards for data collection and reporting of other necessary data (e.g., tracking of EACs needed to determine a utility baseline CFE Score and emissions factors) from other market participants (e.g., balancing authorities, registries, and utilities).

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. As more buyers seek to disclose the actual GHG emissions impact of their actions and more stakeholders expect to see this information, EPA should work with EIA and other partners, to create a standardized database to report marginal emissions factors by time and location.
3. As a first step to track CFE claims, EPA should collect information about EACs from registries and begin to compile this information in a centralized database.

4. 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.
5. When actual hourly data or specific utility load profiles are not available, EPA should provide guidance on what hourly load profile would be most appropriate to use by customer type and U.S. region.
6. EPA should offer a standardized template for GHG reporting that will clarify the approach being used by each reporting company to set and measure its Scope 2 commitment and facilitate apples-to-apples comparisons.
7. All companies should be asked to report the emissions associated with their electricity use from purchased power as delivered, moving from annual to hourly reporting as data becomes available.
8. To better assess the extent to which companies are having GHG reduction impact through CFE procurement, CFE investments from outside the region, and/or out-of-region EAC purchases, EPA should encourage companies to disclose information about the avoided emissions impact of their transactions, potentially offering recommended methodologies.
9. In considering how to implement these recommendations, EPA should: 1) prioritize releasing the data called for in these recommendations that it already possesses or can readily produce, 2) following that, acquire, process and release the data called for in these recommendations that it can request from its data sources (such as RTOs and balancing authorities) given current regulatory authority, and 3) explore ways to acquire the additional data needed but requires new regulatory authority. The Agency should also consider whether another agency (e.g., EIA) has authority to assemble some of the needed data.

31. Are there challenges in complying with the GHG Protocol Scope 2 Guidance requirements? If yes, please briefly describe the challenges as well as any potential solutions, industry-specific guidance, etc. that could address these challenges. You may enter brief comments here or submit a more detailed proposal using the proposal template.

In recommending the Guidance require more time- and location-granular Scope 2 inventories and disclosure of avoided emissions from CFE procurement, we anticipate several challenges:

- 1) **Access to granular data.** Not all data, including hourly consumption data and hourly location-specific emissions factors, is readily available. New tools to automate and standardize calculations also are likely needed. *The Guidance should explore whether standardized load and supply profiles could be used for some transition period when actual hourly data is not available.* Improvement in Scope 2 disclosure, not perfection, should be the immediate goal. *The Guidance should allow flexibility to select different*

market boundaries and time intervals with a transition towards and recognition of reporting entities who use granular data.

- 2) **Resistance to change.** In shifting to granular criteria, inventories could increase relative to annual inventories. In addition, with granular 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 Guidance should instruct reporting entities to disclose information that will help external audiences understand the nature and ambition of climate efforts. The Guidance could allow reporting entities opportunity to report progress pursuing a variety of goals (e.g., 24/7 matching, RE100, avoided emissions, incremental CFE development).

- 3) **Tracking needed to align U.S. mandatory, utility non-bypassable and voluntary EAC markets.** *Each reporting entity should be able to count 1) its fair share of purchases of **mandatory EACs** (e.g., utility purchases to meet a state RPS); 2) its fair share of purchases of **utility non-bypassable CFE** (e.g., charges for ratebase CFE generation included in a vertically integrated utility standard tariff service or due to a mandate to protect existing nuclear energy); and 3) additional purchases of **voluntary EACs** (e.g., through PPAs, a retail contract, green tariff, etc.).* Reporting entities should be able to claim all clean EACs purchased and retired directly or on their behalf by their LSE whether from new or existing resources. Better tracking of all forms of CFE is necessary to harmonize U.S. compliance and voluntary markets.
- 4) **Access to supplier or utility-specific emissions factors.** Emissions factors need adequate integrity. Emissions factors must properly exclude the purchases/claims of other buyers and also reflect time and location-specific sourcing. Buyers should request and LSEs should disclose whether and how EACs are used in the emission factor calculation unless there is third party certification. 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, retail product). The LSE emission factor should be disclosed according to the best available information.
- 5) **Comparability.** Reporting entities could continue to calculate inventories with annual data as hourly data becomes more accessible. However, these annual figures would not be directly comparable to organizations using hourly data. To address this challenge, an *annual* emissions inventory could be converted automatically to an estimated corresponding *hourly* emission using standardized generation supply and customer load profiles for the applicable generator and customer type by location. *(This could be done*

by a third party. WRI or others, such as EPA, could provide guidance to facilitate such comparisons.) More relevant and accurate accounting metrics (see “Carbon Facts” Standardized Reporting Format Proposal) will allow third party recognition programs to distinguish and reward high impact actions.

32. GHG inventory reporting can overlap and/or interact with regulatory policy mandates, state and federal subsidies, emission reporting or target-setting programs, etc. (e.g., see the Scope 2 Guidance, Chapter 8.2 Reporting on the relationship between voluntary purchases and regulatory policies). Are there clarifications or changes in the Scope 2 Guidance that would simplify and harmonize complying with the Scope 2 Guidance and better align with regulatory policy mandates, programs, etc.? If so, please identify such interactions and share any potential solutions.

When measuring market-based inventories with either annual or hourly matching, a key consideration is the treatment of existing or legacy CFE and who owns the “rights” to claim and retire the associated EACs, and what happens to these rights if they are not claimed and retired. Existing CFE (and the associated EACs) should not be doubled counted, nor should they be ignored when meeting annual or hourly attributional accounting matching goals. To do that, all CFE should be tracked, even if that CFE is not currently used to satisfy state RPS. When satisfying the location and time requirements in the Guidance, reporting entities should be allowed to count EACs that they pay for whether purchased in voluntary procurement markets, mandatory markets (RPS), or other forms of non-bypassable CFE purchases (e.g., CFE attributes embedded in utility standard tariff service or non-bypassable distribution charges that do not qualify for RPS). Similarly, reporting entities should not be allowed to count EACs associated with CFE supply that they do not pay for.

The Scope 2 Guidance should clarify that purchased EACs include a reporting entity’s load share of EACs associated with these mandatory/compliance and non-bypassable CFE purchases. The Scope 2 Guidance should also clarify that other reporting entities pursuing voluntary procurement goals cannot claim 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 mandatory or non-bypassable EACs to customers interested in voluntary procurement. For both restructured and vertically integrated U.S. 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. Therefore, we recommend that eGRID total output emissions data no longer be used in the calculation of Scope 2 market-based inventories.

Questions on Scope 2 Guidance Aggregational Theory of Change

The current Scope 2 Guidance uses location-based and market-based accounting. Under the latter framework, Energy Attribute Certificates (EACs) are used to track and allocate consumer demand for the GHG attributes from a finite supply of attributes available for those claims. Ideally this results in demand signals that encourage development of new clean energy supply and GHG emissions reductions (see the Scope 2 Guidance 11.1 Energy attribute supply and demand).

Currently, a limited number of customers globally voluntarily report GHG emission inventories. Even for those that do, obtaining the necessary information from suppliers can be challenging. For example, customers with high-emission power suppliers or contracts may not be disclosing or even have access to such information. Combined with other market factors, this lack of critical mass in reporting may challenge the efficacy of the “aggregational” theory of change and the ‘disclosure-risk-action’ paradigm, potentially reducing its overall efficacy in aggregate (see GHG Protocol Corporate Standard (WRI/WBCSD 2004), p. 59–60).

However, new regulatory mandates (such as climate disclosure initiatives including one by the US Securities and Exchange Committee (SEC), FSA disclosures in Japan, the European Union Corporate Sustainability Reporting Directive (CSRD), etc.) and growing consumer awareness are leading to increased demand for information about GHG inventories. These recent changes underscore the importance of developing an accounting framework that can be widely adopted and can help drive meaningful change.

Since the publication of the Scope 2 Guidance in 2015, seven years’ worth of data are now available to evaluate the performance of this accounting method and the “aggregational” theory of change. The following questions seek feedback on how we can use that data and experience to (1) assess the validity of the premise that EACs promote market-driven increases in clean energy and reduced emissions and/or (2) develop a predictive framework that will streamline GHG inventory accounting and ensure global atmospheric GHG reductions.

33. Based on the past seven years’ worth of data, under the current market-based accounting framework, is there empirical support for the premise that market-based scope 2 accounting framework results in collective changes in low-carbon energy supply and global atmospheric GHG emission reductions? Please explain, including empirical justification on why or why not. You may enter brief comments here or submit a more detailed proposal using the proposal template.

See reply to Question 37 and NB-GS Market-Based Modernization Proposal.

34. If necessary, are there changes to the market-based framework that can ensure rigorous accounting that demonstrates collective changes in low-carbon supply and global atmospheric GHG emission reductions? If unnecessary, why; If so, what changes? You may enter brief comments here or submit a more detailed proposal using the proposal template. [2458 characters]

At a high level, the shortcomings of the current Scope 2 accounting and the broader landscape of programs that rely on the Protocol's Scope 2 methods result from the core "theory of change" upon which it was built – attributing emissions to a company through the calculation of an inventory and disclosing those emissions for the world to see will then lead to interventions, including spurring aggregational demand for attributes, to reduce those emissions. The theory only holds true if an inventory is an accurate allocation of actual emissions and aggregational demand for attributes achieves reductions. We have demonstrated how Scope 2 market-based inventories fail to give an accurate perspective of emissions associated with the timing and location of purchases relative to a reporting entity's consumption and how the procurement of attributes can achieve minimal actual emissions impact in the atmosphere in several instances.

The theory concedes, correctly, that inventories themselves have no climate value (the climate really does not care what emissions are in whose inventory; it only cares about the total amount of emissions). The climate value, per the theory, comes from actions and interventions to reduce an inventory. The Protocol's sacrifice of "true and fair" disclosures of emissions from electricity use was presumably deemed consistent with the theory of "*attribution → inventories → disclosure → impact.*" To "reduce" their inventories, companies were given the tool of using RECs with the idea that that REC accumulation in turn would create "impact." Under this framework, there has been increased demand for renewable energy with more new wind and solar getting built, but grid decarbonization requires other actions beyond just the addition of new variable capacity irrespective of the timing and location of that generation and irrespective of the actual emissions impact of that new capacity. Current Scope 2 accounting methods that incentivize a focus on reducing inventories through renewable energy and REC procurements are outdated at best and destined to provide diminishing marginal benefit over time. Our Proposals suggest modifications and additions to current reporting such that inventories better reflect emissions and that reporting drives and incentivizes more meaningful actions. (See NB/GS Market-Based Modernization Proposal, separate Emissions Impact Disclosures Proposal, and Standardized Reporting Format Proposal.)

Questions on Scope 2 Guidance Attribute Quality Criteria

The Scope 2 Guidance Quality Criteria requirements were developed to represent the minimum features necessary to implement a market-based method of scope 2 GHG accounting using Energy Attribute Certificates (EACs). As designed, the market-based accounting method allows

organizations to report in their inventory an immediate GHG emission reduction without necessarily needing to demonstrate a corresponding immediate and equivalent reduction in emissions to the atmosphere. This outcome is consistent with the supply/demand aggregational theory of change described above. (Note, please see questions 35-36 evaluating this topic.) However, the current EAC quality criteria required to claim the zero-emission attributes of a grid resource enables a range of EAC procurement options representing a broad spectrum of outcomes a reporting organization can take responsibility for in their inventory. Narrowly in the context of scope 2 inventory accounting, so long as the minimum quality criteria are fulfilled, all procurement options, strategies, etc. are treated equivalently. Chapter 7, Criteria 4 “Vintage” states all contractual instruments shall “Be issued and redeemed as close as possible to the period of energy consumption to which the instrument is applied.” Common practice today is for an organization to match some amount of their annual electric consumption load with Energy Attribute Certificates (EACs) produced in the same reporting year.

35. What are the tradeoffs between continuing this practice as compared to introducing a more specific quality criteria than “as close as possible”? Should this quality criteria be made more specific (e.g., to specify it must be within the same year, month, hour, etc.) or remain unchanged? Please briefly explain or use the proposal template for a detailed reply.

The Scope 2 Guidance should introduce more specific criteria that encourages the matching of EACs and consumption on the narrowest time basis possible when data regarding the timing of EAC’s underlying generation and electricity consumption is available. We recommend the Guidance indicate a preference for hourly matching under both the location and market-based method. We recognize that more time-granular consumption and grid emissions data may not be available to all reporting entities and may introduce more calculation steps in inventory preparation, but given that data availability and calculation tools are rapidly improving, the Protocol should continually revisit its requirements in relation to time and update the Guidance more frequently.

As explained in our reply to Question 18, the current practice of matching MWh of annual consumption with annual emissions factors (under either location-based or market-based methods) weakens the incentive for reporting entities to consider the timing of their consumption and when power from purchased contractual instruments is delivered to the grid. In both instances, timing has significant GHG implications and may lead to suboptimized procurement decisions. For example, annual matching does not support managing or shifting load or discharging energy storage systems based on the GHG-intensity of the grid at specific times. Annual matching also allows a buyer to purchase EACs produced at any time over the course of the year (and often from projects located on different regional grids than the buyer’s own consumption and regardless of the GHG reduction impact of EAC-generation projects) and apply them to any MWh of consumption

regardless of its GHG-intensity. A buyer does need to consider whether it is matching EACs to MWh consumption that occurred during times of abundant CFE or unabated fossil. In some cases, a buyer may source EACs from variable generation projects whose output may exceed load at given times and apply excess EACs against load in time periods of deficient output. Matching CFE resources with consumption at all times and in all places is critical to achieving grid decarbonization.

With improvement in data and analytics, buyers can now better understand when CFE is abundant or when unbated fossil generation is abundant. In addition to informing optimal use of energy storage and load shifting, buyers can seek solutions that reduce reliance on unabated fossil generation at given times. Such solutions are likely to include firm and dispatchable resources which may have a bigger impact on displacing marginal fossil energy than variable renewables alone. The development of retail products that offer time-matched CFE and consumption has already begun, along with efforts to time-stamp EACs and build markets for granular certificates that can facilitate project development just as RECs have done for wind and solar.

Chapter 7, Criteria 5 “Market Boundaries” states all contractual instruments shall “Be sourced from the same market in which the reporting entity’s electricity-consuming operations are located and to which the instrument is applied.” Currently certificate market-boundaries encompass broad geographic regions such as entire continents and span multiple physical grid boundaries (i.e., see the Scope 2 Guidance, page 64: “...markets for unbundled certificates have often been less constrained than those for electricity itself”).

36. What are the tradeoffs between continuing this practice as compared to introducing more specific guidance on the Market Boundary quality criteria? Please briefly explain or use the proposal template for a detailed reply.

The Scope 2 Guidance should narrow the geographic boundary for the matching of purchased EACs and consumption. The Guidance should require that purchased EACs are located within or bundled with supply delivered to the same regional grid or balancing authority as load. Introducing more narrow geographic matching requirements geographic restrictions would represent a significant improvement in measuring emissions resulting from a reporting entity’s electricity use.

The market for 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 (The 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 (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 to reduce inventories. 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. It is also valuable to consider market areas (or load/bidding zones) within regional grids considering transmission constraints. In the United States, bidding zones are analogous to market zones where the locational marginal price is the same within a regional grid. 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 sub-areas. Trading of granular certificates allows 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).

Chapter 7: Scope 2 Quality Criteria presents eight specific quality criteria.

37. Please provide any additional considerations related to any of these criteria and/or potential additional criteria that could improve the application of location-based and/or market-based Scope 2 reporting (see Scope 2 Guidance, Chapter 4 for additional detail on how these methods contribute to GHG reductions in the electricity sector). [3031 characters]

We recommend the Guidance amend or clarify the Quality Criteria to accommodate proposals to enable more time and location granular matching in Scope 2 inventory preparation (see proposed modifications to Table 6.3 market-based data hierarchy shown in response to question #18 and #29 and separate NB/GS Market-Based Modernization Proposal (response to question 5D)).

Contractual Instruments

With respect to the current Guidance’s criteria in Table 7.1.1, the Guidance should clarify that EACs from all forms of CFE “purchased” (not necessarily contracted) by or on behalf of

reporting entity should be counted equally whether from mandatory, utility non-bypassable, or voluntary procurement.

With respect to criteria in Table 7.1.3, the Guidance should clarify that EACs not purchased (or allocated to) by or on behalf of the reporting entity should not be included in the reporting entity's market-based inventory.

With respect to criteria in Table 7.1.4 and 7.1.5, granular certificates that convey time attributes and that are generated within or delivered to the same regional grid or balancing authority as load should be at the top of the data hierarchy. More granular market boundaries that reflect transmission constraints within these market boundaries should be preferred when calculating Scope 2 market-based inventories. While we recommend excluding the matching of consumption with certificates sourced from different grid regions than load, our recommendations call for establishing new provisions for reporting entities to disclose the consequential impact (avoided emissions) of their interventions and providing opportunities to disclose progress toward achieving RE100/CFE100 purchasing goals independent of the market boundaries in Scope 2 inventories.

Utility-Specific Emissions Factors

With respect to criteria in Table 7.1.6, it would be helpful to standardize reporting of baseline "CFE Score" (see NB/GS Standardized Reporting Format Proposal; a CFE Score would estimate the share of a buyer's consumption matched by CFE purchases and could be calculated on an annual and/or hourly basis) *and baseline emissions inventory by utility service area taking into account mandatory and non-bypassable CFE purchase requirements (e.g., RPS, state mandated nuclear life extensions and ratebase generation) in utility standard tariff/default service* (see EEI Utility CO2 Emission Factor Database). This could facilitate market-based reporting, prevent double counting, and provide a benchmark to highlight the baseline CFE Score or grid intensity of purchases before a reporting entity engages in voluntary procurement.

Residual Mix

With respect to criteria in Table 7.1.8, see response to question 29. *In the United States, if EACs or supplier-specific emissions factors are not available for all or a portion of load, the Guidance should require the reporting entity to rely on eGRID fossil fuel output, or alternatively non-baseload, emissions factors as a last resort to calculate its Scope 2 market-based inventories.*

Additional Feedback on the Scope 2 Guidance

41. Please provide any additional considerations or context related to new clarifications or guidance in scope 2, maintaining the existing Scope 2 Guidance without changes, changes in the current location-based and/or market-based methods, or new methodological options that account for indirect reductions and meet GHG Protocol decision criteria (for more information on the decision criteria, please see the annex of the proposal template)?

Replacing existing fossil energy while maintaining grid reliability and avoiding a rapid rise in electricity prices will require substantial new investments in CFE that is firm and dispatchable as well as investments in grid flexibility and transmission. The Guidance has well-supported the procurement of variable renewables, and procurement of wind and solar has comprised the bulk of CFE procurement and investment to date. Other technologies are needed to achieve the decarbonization of the grid at all times and all locations. The Guidance, both in its discussion and in its inventory preparation methods, needs to encourage consideration for both variable and firm and dispatchable CFE generation (including nuclear power, fossil energy equipped with carbon capture, utilization, and storage (CCUS), hydrogen produced with renewables or natural gas with CCUS, and firm renewables such as geothermal energy and hydropower), grid improvements (advanced metering infrastructure, transmission), and solutions capable of adjusting the timing of energy supply and demand to use CFE (energy storage, hydrogen as an energy carrier, demand-side load management, EV charging and grid integration).

Shifting to a modified market-based approach, as proposed, will help encourage all strategies that can contribute to a clean electric grid at all times and locations. The existing market-based approach that uses annual matching encourages reporting entities to procure or invest in the lowest cost CFE regardless of time and location—typically variable wind and solar power. When reporting entities seek to match their load every hour of the day with deliverable CFE under a modified market-based approach, this will lead to consideration of a broader set of tools capable of serving demand in all hours of the day. A company that previously relied exclusively on RECs from solar to reduce Scope 2 inventories will find when reporting on a more granular time- and location-granular basis, solar may only help to match around 40% to 50% of their hourly load. Matching a higher percentage of hourly load can be achieved with incremental procurement and investments in a range of carbon-free firm generation technologies and utilizing energy storage and demand management.

Our recommended additional reporting recommendations (see the categories and metrics illustrated in the NorthBridge/Green Strategies Carbon Facts Label Proposal) also provide opportunities for reporting entities to disclose how they are helping deploy the full range of CFE technologies and solutions. In addition to the procurement of CFE generation, a reporting entity could also highlight investments in the grid, storage, and demand management solutions. Finally, entities could also highlight investments or procurement in emerging CFE technologies.

We recommend that the Guidance better emphasize that it does not exclude the use of any CFE technology. In certain instances, the Guidance should address specific topics that reporting entities have faced to date, including how report the use of energy storage or what to do if EACs are not available for certain CFE options (for example, follow the next option under the emissions factor hierarchy).