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 February 28, 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*.

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

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

Updates to the Scope 2 Guidance Market-Based Method

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

The current market-based Scope 2 Guidance method, specifically the inclusion of both environmental attribute certificates (EACs) and emission factors in the same data hierarchy, results in EACs mathematically displacing grid-supplied electricity on a 1-to-1 basis. This is inconsistent with how electricity markets and resource dispatch works and, as a result, results in inaccurate calculations of the emissions impacts electric loads and clean energy procurement actually have. By applying different emission factors for electricity consumption and EACs, and calculating the emissions separately prior to netting the results, the revised Scope 2 market-based inventory total will be more consistent with actual GHG emissions changes from a company's electricity consumption and procured clean energy.

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

Our proposal includes expanding the existing market-based emission factor data hierarchy concept into data hierarchies for energy consumption, procured clean energy, and their associated emission factors to drive companies to select more granular and applicable data sets.

The proposal also includes quality criteria for renewable energy and other clean energy procurement, building on existing work by RE100.

The proposal also revises the "order of operations" of the current market-based method approach. Rather than matching EACs with MWhs of load, then applying a load emission factor to any

remainder, this Proposal calculates GHG emissions to serve electricity consumption (loads) and displaced GHG emissions from clean energy procurement separately. This proposal is more consistent with how electricity resource dispatch – and the GHG emissions associated with that dispatch – works, improving overall accuracy of Scope 2 inventories.

See attached document (beginning at page 8) for a strawman proposal illustrating these recommendations, including where they are already consistent with the current Scope 2 Guidance and which changes would need to be made.

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_2 removals: Conservativeness, Permanence, and Comparability if relevant

The Proposal meets the following accounting and reporting principles:

Accuracy: by measuring the emissions (and displaced emissions) of load and procured clean energy projects separately this proposal improves accounting accuracy by being more consistent with how electricity is dispatched and how energy procurement decisions actually impact GHG emissions.

Completeness: all Scope 2 emissions are accounted for.

Consistency: the proposal accounting is consistent with how electricity grids operate and how company decisions impact electric grid GHG emissions. This proposal uses consistent methodologies to allow for meaningful performance tracking of emissions over time.

Relevance: by better aligning Scope 2 market-based accounting with how the electric grid operates, the proposal ensures that the GHG inventory appropriately reflects the GHG emissions of the company and serves the decision-making needs of users.

Transparency: this proposal does not include recommendations on reporting requirements. However, since the proposal builds on the existing Scope 2 Guidance data hierarchy concept and the procurement impact criteria are measurable there is nothing to indicate that this proposal will not meet the transparency principle.

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.

By better aligning Scope 2 market-based calculations with how electricity is dispatched and the associated emissions, this proposal will allow company indirect (Scope 2) emissions to correspond to the emissions (and emissions reductions) in the atmosphere from the electric sector.

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, this proposal will enable organizations to pursue more effective GHG mitigation/decarbonization efforts. As electric grids increase their share of renewable energy generation, in part due to accelerated voluntary renewable energy procurement driven by the existing Scope 2 Guidance, the timing and location of clean energy generation matters more than ever in the amount of GHG emissions mitigated. The methodology outlined in this Proposal will more accurately quantify the induced and reduced GHG emissions associated with loads and procured clean energy projects, and the calculation will allow for these emissions values to change as the electric grids change over time.

Importantly, by measuring the GHG emissions value of load and contracted clean energy projects separately, the Scope 2 guidance will no longer need the concept of market boundaries as a GHG accounting concept. In the current Guidance the market boundary concept ensures that there is some electrical relationship between a company's electricity consumption and the contracted renewable energy, with both activities happening in the same general electric grid. This is important with how the current market-based method Emission Factor hierarchy is structured. By quantifying these activities separately, companies will have an incentive to procure clean energy projects in grids with equivalent or higher GHG emissions rates than load, thus optimizing for GHG emission reduction impact. These grids may be in locations that the company does not operate facilities or have electric load. Other reporting and leadership programs may wish to maintain the concept of market boundaries to advance important non-GHG accounting goals of local economic development, pollution reduction, community benefits, or advancing renewable energy policy development in a particular geography. These programs should be free to do so, but from a GHG accounting perspective the market boundaries concept would no longer be needed. By removing the market boundaries requirement that procured renewable energy be sourced from the same grids as companies operate in, the proposal may drive new clean and renewable energy projects in regions of the world that are underserved today. For example, according to data from Bloomberg New Energy Finance, of the over 110 GW of corporate renewable energy power purchase agreements announced in the last decade, over 90% of these projects are located in the Americas or Europe. As GHG emissions are global in nature and do not adhere to geographic boundaries, this change can enable

adding clean energy projects to the dirtiest grids, and has the potential to drive faster global decarbonization of the electricity sector.

In addition, by encouraging companies to obtain hourly (or sub-hourly) data to calculate Scope 2 emissions, combined with measuring load and procured clean energy emissions separately, this proposal allows companies to capture emissions reduction benefits from, and thus invest more in, energy decarbonization solutions in addition to renewable energy procurement. These solutions and any associated emissions reductions (from, for example, carbon-informed load management, energy storage, and EV charging schedules informed by grid carbon data), are not easily captured or calculated in Scope 2 market-based inventories today. The reason behind this is twofold: 1) the current Scope 2 Guidance has few examples of using hourly (or non-annual) data, and how to combine that data with other sets of data that may be in annual form, and 2) the current method's approach for procured EACs to displace load MWhs on a 1:1 basis means that, once a company have procured enough EACs by volume to match it load, the company sees no further inventory GHG reductions from load-side GHG reduction projects. Separately measuring the GHG value of both these "behind the meter" activities and the "front of the meter" clean energy procurement (including energy storage facilities) will quantify the GHG reduction value of other types of electricity decarbonization projects for companies.

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?

The Proposal adopts the data hierarchy concept from the current Scope 2 Guidance, which has driven companies to source higher quality/more applicable emission factors while at the same time ensuring that all companies have accessible data options to complete reporting.

The Proposal includes available data set examples for the different types of data included in each of the 4 data hierarchies (load data, load emission factors, clean energy generation data, clean energy emission factors). While new data sets continue to be developed, the Proposal as drafted allows for companies to use existing, available data sets today.

By using the data hierarchy concept and eliminating the GHG accounting need for market boundaries, this proposal is accessible and can accommodate users operating globally. This was a key design feature that will enable more clean energy deployment outside of the traditional markets of North America and Europe.

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

The drawbacks include potential impacts to companies' clean electricity procurement strategies to meet their Scope 2 emissions goals. Under the current approach of 1 EAC = 1 MWh of load GHG emissions. If a company's load is fairly steady, then once a company has procured enough EACs to equal their load they are deemed to have zeroed out their Scope 2 emissions, independent of the actual emissions impact on the electric grids in which they operate. This proposal, by separately measuring GHG emissions and displacement of loads and clean electricity procurement separately, means companies Scope 2 inventories (on both the load and project side) will be more sensitive to changes on the electric grid emissions profile over time, injecting some uncertainty (and requiring more active management) of a company's Scope 2 portfolio to continue to minimize Scope 2 emissions.

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

Yes, it would lead to more alignment with RE100's procurement options and CRS's Standard Delivery Renewable Energy Guidance (2021), both of which have addressed the "order of operations" issue of how different clean electricity complements, not displaces, other procurement methods.

The Impactful Procurement Quality Criteria is adapted from RE100's December 2022 technical guidance for its members procuring renewable energy. The 15 year commissioning window for eligible renewable energy projects is also consistent with the U.S. EPA Green Power Partnership Agreement procurement criteria.

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.**

This proposal has common elements with:

1. On the approach of measuring load and procured clean energy emissions separately before combining:
    a. WattTime's Accounting for Impact whitepaper
    b. Resurety's Making it Count whitepaper
    c. Hua, H. et al. Using marginal emission rates to optimize investment in carbon dioxide displacement technologies. The Electricity Journal, October 2021.
2. On the Impactful Procurement Impact criteria:
    a. RE100's Technical Criteria (December 2022 update)

b. U.S. EPA Green Power Partnership Agreement, Eligible Sources of Green Power (on the 15 year commissioning window).

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

This Proposal is consistent with many of the Emissions First Partnership Principles: 'Electricity Emissions Accounting Principles to Drive Climate Action' principles.

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

See detailed Proposal below. The level of detail in the Proposal at this stage is meant to illustrate how the Proposal: 1) builds on existing Scope 2 Guidance content, and 2) can be implemented with available data types by companies of all sizes right now.

Outstanding questions, notes on terminology, and relevant industry developments are included as footnotes.

Proposal: Emissions-Focused Scope 2 Market-Based Accounting Method

Summary

This Scope 2 market-based method revision proposal ("Proposal") recommends modifying the current Scope 2 calculation approach of "matching" energy attribute certificates (EACs) to electricity consumption by separately accounting for the emissions associated with electricity consumption ("load") and the emissions reduced by the procurement of clean electricity. This Proposal uses the terminology "reduced emissions" or "emissions reductions" to describe the reduction in system-wide emissions that occurs as a result of clean energy added to the grid from corporate activity. This Proposal includes a recommendation that the current Scope 2 market-based emissions factor hierarchy (which drives companies to source more "accurate" emission factors while recognizing that not all emission factor types are available in each market) be expanded into 4 separate hierarchies:

a. Load electricity consumption data type hierarchy (electricity consumption)
b. Load emission factor hierarchy (electricity consumption)
c. Renewable Energy generation data hierarchy (still backed by EACs)
d. GHG reduction activities emission factor hierarchy

To address issues of impactful procurement / additionality criteria (which are not currently included in the Scope 2 Guidance requirements) this Proposal recommends adopting requirements for impactful

procurement of renewable energy and the associated EACs derived from RE100's Technical Criteria Update, *Commissioning or re-powering date limit, with exemptions and grandfathering* (Section 5:2.2, pg 14 of the December 2022 version).

This Proposal includes examples of available, existing data sets for the different data types included in the proposed data hierarchy tables. The list of available data sets are not exhaustive, and are provided to illustrate implementation feasibility of the proposed approach. We look forward to working with stakeholders to identify other available datasets and to evaluate the feasibility of the proposed data hierarchy tables with end user companies and others.

Similar to the approach with the current Scope 2 Guidance, companies will need to evaluate the data hierarchies against the GHG Protocol accounting and reporting principles of relevance, completeness, consistency, transparency, and accuracy in selecting the most appropriate data to complete their inventory.

Outline of Proposal

I. Short summary of the current Scope 2 Guidance market-based calculation method for an EAC-purchasing energy user.
II. Revision Proposal
    a. Overall Scope 2 Emissions Calculation Formula
    b. Data Hierarchy Tables
        i. Electricity Consumption (load)
        ii. Load emission factors
        iii. Procured renewable energy generation
        iv. displaced emissions emission factor
    c. Procurement Impact Criteria
    D. Accounting Method Applicability for Companies with Hourly Matching Goals
III. Implications of Proposal Changes to Company Scope 2 Strategies
IV. Outstanding Issues to Address

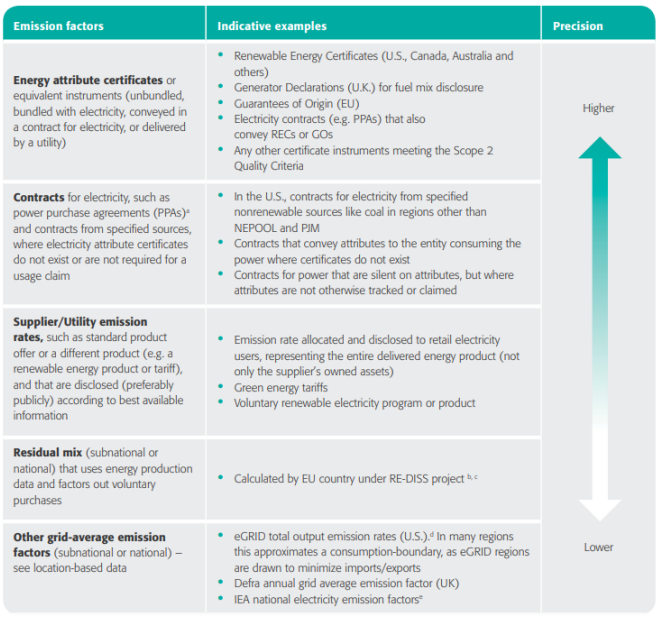
I. From current Scope 2 Guidance: how the market-based method is calculated by companies procuring EACs

Although the Scope 2 Guidance does not include an explicit formula for calculating GHG emissions under the market-based method, following the Market-Based Emission Factor Hierarchy (Table 6.3) and the included examples the basic calculation formula to calculate GHG emissions using the current market-based method is:

$$\sum_{facilities} \left(MWh_{facility} - EACs\right) \times EF_{facility} = GHG\ Emissions$$

This approach requires companies to assign EACs to specific electricity-consuming facilities (within the same market boundary). This is demonstrated in the table 6.5 example in the Guidance.

Scope 2 Guidance – Emissions Factor Hierarchy



Emission factors	Indicative examples	Precision
Energy attribute certificates or equivalent instruments (unbundled, bundled with electricity, conveyed in a contract for electricity, or delivered by a utility)	• Renewable Energy Certificates (U.S., Canada, Australia and others) • Generator Declarations (U.K.) for fuel mix disclosure • Guarantees of Origin (EU) • Electricity contracts (e.g. PPAs) that also convey RECs or GOs • Any other certificate instruments meeting the Scope 2 Quality Criteria	Higher
Contracts for electricity, such as power purchase agreements (PPAs)[a] and contracts from specified sources, where electricity attribute certificates do not exist or are not required for a usage claim	• In the U.S., contracts for electricity from specified nonrenewable sources like coal in regions other than NEPOOL and PJM • Contracts that convey attributes to the entity consuming the power where certificates do not exist • Contracts for power that are silent on attributes, but where attributes are not otherwise tracked or claimed	
Supplier/Utility emission rates, such as standard product offer or a different product (e.g. a renewable energy product or tariff), and that are disclosed (preferably publicly) according to best available information	• Emission rate allocated and disclosed to retail electricity users, representing the entire delivered energy product (not only the supplier's owned assets) • Green energy tariffs • Voluntary renewable electricity program or product	
Residual mix (subnational or national) that uses energy production data and factors out voluntary purchases	• Calculated by EU country under RE-DISS project [b,c]	
Other grid-average emission factors (subnational or national) – see location-based data	• eGRID total output emission rates (U.S.).[d] In many regions this approximates a consumption-boundary, as eGRID regions are drawn to minimize imports/exports • Defra annual grid average emission factor (UK) • IEA national electricity emission factors[e]	Lower

Key outcomes/implications from this current approach:

- EACs are classified as emission factors, despite being different units (MWhs) than the other listed emission factors (CO2e/MWh).
- EACs are assumed to have the same emission factor intensity of load in the calculation.
- Mathematically, the only way to get to zero Scope 2 emissions are if 1) $MWh_{facility}$ = EACs by volume (100% voluntary procurement), or if the Grid GHG emission factor ($EF_{facility}$) = 0 (100% carbon free grid).
    - Company-procured renewables and system-wide grid decarbonization are mathematically competing, not complimentary in the company's Scope 2 market-based inventory.
    - Mathematically, companies striving to reduce Scope 2 emissions as part of net zero goals have an incentive to focus solely on the amount of EACs they procure, rather than on reducing grid emission factors via system-wide decarbonization.

II. Proposed Revised Scope 2 Guidance Approach

A. Scope 2 Emissions Calculation Formula

The general formula for calculating corporate Scope 2 market-based emissions[1] under this Proposal is:

[1] This proposal describes this approach as "market-based" because the proposal uses EACs. Some stakeholders advocate for two "market-based" methods in the upcoming Scope 2 revision process: 1) they call the current market-based method which applies EACs first then load emission factors, but measured hourly instead of annually (see "key outcomes/implications from this current approach" in Section 1 for the important "order of operations" implications of this approach), and 2) an emissions-based approach that calculates load and RE emission reductions separately (like this

$$Load\ GHG\ Emissions - GHG\ emission\ reductions = Scope\ 2\ emissions$$

For load GHG emissions =>

$$MWh_{load} \times EF_{load} = Load\ GHG\ Emissions$$

For GHG emission reductions from renewable energy procurement =>

$$EACs_{renewable\ energy\ project} \times EF_{renewable\ energy\ project} = GHG\ emission\ reductions$$

For GHG emissions changes from standalone (front of the meter) energy storage facilities =>

$$Energy\ Storage\ GHG\ Emissions\ = \sum_{hour\ t=1}^{n} A_i \times EF_i$$

Where:

A_i = Actual project dispatch (negative for discharging, positive for charging) in interval i (MWh)

n = Number of intervals in calculation period (one year, or 8760 hours)

EF_i = Marginal emissions rate at the time of dispatch by the energy storage operation in interval i

By calculating load and emission reductions from procured clean energy separately, this Scope 2 formula allows companies to answer these questions:

1) What were the GHG emissions from the electric grid and utilities serving my load?

2) What were the actual emission reductions resulting from my contracted clean energy?

Why This Proposal Does Not Use the Market Boundaries Concept

By measuring the GHG emissions of load and contracted clean energy projects separately, this Proposal does not use market boundaries as a GHG accounting concept. In the current Guidance the market boundary concept ensures that there is some electrical relationship between a company's electricity consumption and the contracted clean energy, with both

approach). This "market based" proposal is consistent with the second type of approach of calculating load and RE project emissions separately.

activities happening in the same general electric grid. This is necessary given how the current market-based emission factor hierarchy is structured, as EACs are assigned to specific load and assumed to have an emission factor of zero.

By quantifying these activities separately, companies will have a more accurate measure of their net carbon impact and will have the option to source clean energy projects in grids with equivalent or higher GHG emissions rates to loads, thus more effectively displacing GHG emissions. These grids may be in locations that the company does not operate facilities or have electric load. Companies would still have the ability to procure in the same grids if they chose to.

Other reporting and leadership programs may wish to maintain the concept of market boundaries to advance important non-GHG accounting goals of local economic development or advancing renewable energy policy development on a particular electric grid. These programs should be free and encouraged to do so, but from a GHG accounting perspective the market boundaries concept would no longer be needed.

By removing the market boundaries requirement that procured clean energy be sourced from the same grids as companies operate in, this approach may drive new renewable energy projects in regions of the world that are underserved today. For example, according to data from Bloomberg New Energy Finance, of the over 110 GW of corporate renewable energy power purchase agreements announced in the last decade, over 90% of these projects are located in the Americas or Europe. As GHG emissions are global in nature and do not adhere to geographic boundaries, this increased geographic flexibility has the potential to drive faster global decarbonization of the electricity sector in regions outside the Americas and Europe.

B. Data Hierarchies

The following tables propose data hierarchies for load consumption data, load emission factors, renewable energy generation data (backed by EACs), and EAC project emission factors. Additional work is needed to develop appropriate data hierarchies for standalone energy storage systems.

Calculating Load Emissions

Formula for calculating emissions from load when hourly load data is available:

$$\sum_{facility=1}^{i} \sum_{hour\ t=1}^{8760} \left(MWh\ load_{i,t} \times EF_{i,t}\right)$$

Formula for calculating emissions from load when only annual load data is available:

$$\sum_{facility=1}^{i} \left(MWh\ load_{i} \times EFavg_{i}\right)$$

1. Electricity Consumption Data Hierarchy (load MWh)

Time Period	Data Type	Description and Notes	Precision
Hourly	Data from utility billing-grade meter(s)	May be available from load-serving utilities, landlord sub meters.	
	Data from non-utility metering equipment (e.g. landlord submetered data)	Users should seek to validate data from non-utility meters to ensure quality is sufficient	
Annually	Data from utility billing-grade meter(s)	Data sources include utility invoices.	
	Data from non-utility metering equipment	Example: submetered electricity usage, reported by landlord to tenant.	

2. Load GHG Emission Factor Data Hierarchy[2]

Calculation Time Period	Emission Factor Type	Description/ & Notes	Current Examples	Precision
Hourly	Average Emission Factor from same electric grid	"Same electric grid" could be regional transmission organization or balancing area as defined in current Scope 2 Guidance	electricityMap Singularity US EIA Hourly Grid Monitor	
Annual	Utility-specific Emission Factor	In current Scope 2 Guidance emission factor hierarchy	EEI Utility CO2 Emission Factor Database	
	Grid Residual Emission Factor		PJM, NYISO, NEPOOL , green-e residual data AIB European Residual Mix	
	Location-based Grid Emission Factor		IEA country-level and subregional GHG electricity emission factors	

[2] The proposed load emission factor data hierarchy table uses average emission factors, the same type used in the current Scope 2 Guidance. There is active industry discussion if average or marginal emissions rates are most appropriate for load GHG emissions calculations. While marginal emissions rates better reflect the emissions changes from small load changes (e.g. load management around grid carbon signals), from an inventory disclosure perspective it is difficult to claim that a specific company's load is served by the marginal grid resource. This results from how utilities and grid planners look at aggregate load forecasts in planning generation resource decisions.

The appropriateness of average or marginal emission rates for load GHG accounting will likely be an active discussion in the Scope 2 Guidance revision process. It is important to note that the overall structure of this proposal (calculating load emissions and contracted project emissions separately) can accommodate both approaches.

Calculating GHG Reduction Project Displaced Emissions

Formula for calculating emission reductions from renewable energy projects when hourly renewable energy generation data from a specific project is available:

$$\sum_{project\ ID=1}^{j} \sum_{hour\ t=1}^{8760} \left(MWh\ of\ renewable\ energy\ generation_{j,t} \times EF_{j,t}\right)$$

Formula for calculating emission reductions from renewable energy when only annual renewable energy generation data is available:

$$\sum_{project\ ID=1}^{j} \left(MWh\ of\ renewable\ energy\ generation_{j} \times EFmarginal_{j}\right)$$

3. Renewable Energy Generation Data Hierarchy

Time Period	Generation Data Type	Examples	Precision
Hourly (or sub-hourly)	Generation data from a specific project / known generation point	Generation data, backed by EACs, from PPAs or green tariffs	
Annually	Generation data from a specific project / known generation point	Generation data, backed by EACs, from PPAs or green tariffs	
	Generation data where the specific generating project is unknown. Need to know the electric grid where the EAC is generated.	EACs procured from broker	

The Renewable Energy Generation Data Hierarchy assumes that the reporting company has title, and has retired, environmental attributes from these generation sources. Companies need third-party, registered environmental attributes to make claims on their contracted renewable generation in Scope 2 inventories.

Hourly EAC availability is currently limited, but through ongoing stakeholder processes the availability of hourly EACs is expected to grow. The proposed data hierarchy **does not** require that a project generate hourly EACs in order to use hourly generation. Instead, if a company has retired annual (or quarterly) EACs from a project that meet the *impactful procurement quality criteria* (see below) the Company can use the associated hourly generation from the underlying asset (if known and available) in its Scope 2 calculation.

4. Renewable Energy Project Emission Factors

Calculation Time Period	Emission Factor Type	Description & Notes	Current Examples	Precision
Hourly (or sub-hourly)	Marginal Emission Factor at same location of project (physical grid node)	Current data availability is a mix of third party and grid operator/government data sets. There are active efforts to increase availability, methodology consistency.	Resurety, PJM	
	Marginal Emission Factor from same regional electric grid		WattTime, CAISO.	
Annual	Avoided Emission Rates by RE generator technology, region	Available by region, project type, by year	U.S. EPA AVERT tool UNFCCC marginal emission rates by country	
	Location-based (average) Grid Emission Factor[3]	Typically available by country or subregion, by year	IEA country-level and subregional GHG electricity emission factors	

Matching Time Periods

Scope 2 emissions are calculated by multiplying electricity data (MWh) by the appropriate emission factor (mt CO2e/MWh). As a result, the time period of the electricity data and the emission factor need to match. For example, it doesn't make sense to multiply hourly renewable energy generation data when only annual emission factors are available for a given project. When evaluating the data hierarchies by data type, users should consider the types of data available for the other part of the calculation (electricity or emission factor data) when selecting the appropriate level in the hierarchy. Users should also develop plans for updating data sets as they improve and become more granular over time.

C. Impactful Procurement Quality Criteria

The Scope 2 Guidance should encourage companies to make impactful clean energy procurement (and use) decisions, with the ultimate goal to deploy more clean energy resources onto electrical grids than what would be developed without the corporate demand. How to codify what "impactful" means in a

[3] This discussion draft proposes that companies can use annual average emission factors when marginal emission factors are unavailable. This ensures companies can continue to complete Scope 2 calculations. As noted in the load emissions section, the choice of average and marginal emissions rates is under active discussion among industry participants. Though annual marginal emissions rates are available from the UNFCCC, more information is needed to understand how they are developed and what use cases are appropriate.

global GHG accounting standard is difficult, and any requirements need to be implementable and measurable by companies, verifiers, and other stakeholders.

With these goals in mind, this proposal incorporates the criteria around asset age and procurement offtake agreement term lengths, two observable and measurable criteria, adapted from RE100's December 2022 technical criteria.

Specifically, this proposal recommends that companies may use voluntary clean energy procurement, backed by EACs, that meet these criteria:

Procured EACs must be generated from renewable energy generation facilities commissioned or re-powered within the previous 15 years (as measured from the inventory year), or be one of the following types of procurement:

1. Self-generation (e.g. behind-the-meter installations owned by the reporting company)
2. Physical power purchase agreements with on-site projects or off-site projects to which there is a direct line with no grid transfers
3. Long-term project-specific contracts the corporate buyer has entered into as the original offtaker[4] from the project(s), and extensions of those contracts, even if they exceed fifteen years in length, including:
    a. Physical power purchase agreements
    b. Financial power purchase agreements
    c. Project-specific contracts with electricity suppliers (e.g. green tariffs)
    d. Project-specific contracts for unbundled EACs (with a specific underlying asset)
4. Grandfathered contracts with operational commencement dates before <inset date>.[5,6]

D. Accounting Method Applicability for Companies with Hourly Matching Goals

The decision to limit clean energy procurement to a load balancing authority, and to match the time of contracted clean energy to a company's load, can be valuable program choices to drive certain policy goals. If a company chooses to implement such an approach, this calculation method can still be used and provides emissions results compatible with so-called "24/7"-style procurement.

Recall from the approach above that:

$$\text{GHG Emissions} = \sum_{facility=1}^{i} \sum_{hour\ t=1}^{8760} \left(MWh\ load_{i,t} \times EF_{i,t}\right) - \sum_{project\ ID=1}^{j} \sum_{hour\ t=1}^{8760} \left(MWh\ of\ renewable\ energy\ generation_{j,t} \times EF_{j,t}\right)$$

[4] Definition of original offtaker should be flexible enough to accommodate more complex procurement structures, including i) instances of projects selling electricity into the wholesale market initially for a limited period before a longer-term offtake agreement begins, or ii) instances where a corporate buyer enables another buyer (i.e. a supplier) to procure from the project during its first years of operation; in both cases, corporate buyer would need to provide evidence of contractual commitment in advance of project construction.

[5] This transition decision may be best left to reporting and leadership/targeting setting organizations that work more closely with reporting companies.

[6] RE100's technical criteria also allow reporting buyers to exempt procurement of renewable electricity up to 15% of their total electricity consumption from the listed requirements. This is an example of how a leadership program could adapt Scope 2 impactful procurement quality criteria for their specific program.

If a company assigns renewable energy project generation to a load facility(ies) in the same balancing authority, the equation simplifies to:

$$\text{GHG Emissions} = \sum_{balancing\ authority\ =\ 1}^{i} \quad \sum_{hour\ t=1}^{8760} \quad ((MWh\ load_{i,t} * EF_{i,t}) - (renewable\ energy\ generation(MWh)_{i,t} * EF_{i,t}))$$

If the same emission factor, both in type and source, is used to calculate load emissions and renewable energy project emission reductions (e.g. average or marginal emission factors from a grid operator) the equation further simplifies to:

$$\text{GHG Emissions} = \sum_{balancing\ authority\ =\ 1}^{i} \quad \sum_{hour\ t=1}^{8760} \quad (MWh\ load_{i,t} - renewable\ energy\ generation(MWh)_{i,t}) * EF_{i,t}$$

This is similar to the formula (equation 5) articulated by *Google's 24/7 Methodology and Metrics white paper*.

III. Implications of Proposal Changes to Company Scope 2 Strategies

If this proposal were implemented, companies would more directly realize inventory GHG emissions changes because of:

1. Changes to the GHG intensity of electric grid systems their facilities operate in, even if these companies have also procured clean energy (since these are calculated separately).
2. Changes to the GHG emissions from contracted energy storage systems (stand alone, or potentially coupled with renewable energy systems).
3. Energy efficiency investments at company facilities, even if the company has already procured significant volumes of clean energy.
4. Electric load scheduling around grid carbon signals (if hourly load and emission factors are used).
5. Renewable energy and other clean energy procurement from more carbon-intensive grids and times of generation, even if those projects are not located on the same regional grid as the company's facilities.

However, it is important to recognize that this Proposal could impact existing contracts companies have executed. Under the current market-based Scope 2 Guidance companies that have procured sufficient EACs to equal their annual electricity consumption are insulated from changes to the electric grid's carbon intensity, and how that intensity differs by location on the grid and time of generation/consumption. That is, once the volume of EACs and load is equal, companies are deemed to have zero Scope 2 emissions independent of the electric grid emissions rates in the inventory year.

Moving to an approach where the GHG emissions of load and those reduced by clean energy procurement are measured separately can introduce uncertainty to existing market-based Scope 2 goal strategies. Under this new approach companies will need to track, and be more invested in, reducing the GHG intensity of the regional grids where their facilities are located. Companies will also need to track the marginal GHG emissions rates of the grid and the hours procured renewable energy is generating. While introducing additional complexity, this Proposal better aligns load and renewable energy generation activities with how the electric grid operates and is likely to drive greater decarbonization than the current approach. In addition, the Proposal allows companies to retain the value of existing clean energy contracts that may be located in regional grids outside of where a company's facilities are located, which may not be the case with other proposed approaches. It is an important implementation consideration to not penalize companies acting under the current Scope 2 Guidance.

Reporting and leadership programs adopting a new Scope 2 Guidance market-based approach will need to consider designing transitional reporting programs and grandfathering systems.

IV. Outstanding Issues to Address

1. What are the appropriate emission factor data hierarchies for energy storage system GHG emissions changes? It is likely that only hourly (or sub hourly) charging/discharging and emission factor data sets are appropriate for energy storage GHG accounting. There are other industry initiatives developing project-level energy storage system GHG emissions methodologies that could be leveraged in this process.
2. What are the emissions reduction opportunities identified and available to companies when using average emission rates or marginal emission rates to calculate load GHG emissions?

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_2 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
Accuracy	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.
Completeness	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.
Consistency	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.
Relevance	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.
Transparency	Address all relevant issues in a factual and coherent manner, based on a clear audit trail. Disclose any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used.
Conservativeness (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.
Permanence (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.
Comparability (optional) (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.