GREENHOUSE GAS PROTOCOL

Corporate Standard Technical Working Group

Subgroup 3, Meeting #11

GHG Protocol Secretariat team:
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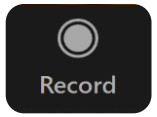
December 9th, 2025

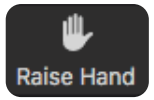
WORLD RESOURCES INSTITUTE

World Business Council for Sustainable Development

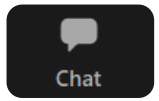
Meeting information



This meeting is **recorded**.



Please use the **Raise Hand** function to speak during the call.

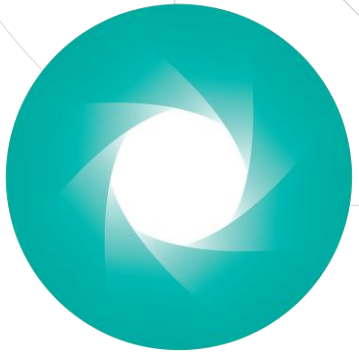


You can also use the **Chat** function in the main control.

Recording, slides, and meeting minutes will be shared after the call.

Agenda

Introduction and housekeeping	10 minutes
Progress updates from ISB and CS subgroups	10 minutes
Justifiable exclusions and Scope 2 TWG	20 minutes
Data quality and Scope 3 TWG	40 minutes
Required greenhouse gases	30 minutes
Wrap-up and next steps	10 minutes



GREENHOUSE GAS PROTOCOL

Agenda

Introduction and housekeeping	**10 minutes**
Progress updates from ISB and other CS subgroups	10 minutes
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Data quality and Scope 3 TWG	20 minutes
Required greenhouse gases	50 minutes
Wrap-up and next steps	10 minutes

GREENHOUSE GAS PROTOCOL

Today's objectives

1. Review **progress updates** on the EOY deliverable and from the ISB, Subgroup 1, and Subgroup 2
2. Review feedback from Scope 2 TWG on **justifiable exclusions** for scope 2
3. Consider definitions and requirements for **data quality disaggregation and uncertainty**
4. Introduce and start discussing **required greenhouse gases**

Today, we will consider a proposal on data quality and will start discussing uncertainty

Housekeeping: Guidelines and procedures

- We want to make **TWG meetings a safe space** – our discussions should be open, honest, challenging status quo, and 'think out of the box' in order to get to the best possible results for GHG Protocol
- Always **be respectful**, despite controversial discussions on content
- TWG members should **not disclose any confidential information** of their employers, related to products, contracts, strategy, financials, compliance, etc.
- In TWG meetings, **Chatham House Rule** applies:
  - "When a meeting, or part thereof, is held under the Chatham House Rule, participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed."
- **Compliance and integrity** are key to maintaining credibility of the GHG Protocol
  - Specifically, all participants need to follow the **conflict-of-interest policy**
  - **Anti-trust rules** have to be followed; please avoid any discussion of competitively sensitive topics*

* Such as pricing, discounts, resale, price maintenance or costs; bid strategies including bid rigging; group boycotts; allocation of customers or markets; output decisions; and future capacity additions or reductions

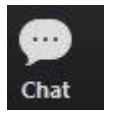
Zoom logistics and recording of meetings

Zoom Meetings

- All participants are muted upon entry
- Please turn on your video
- Please include your full name and company/organization in your Zoom display name

Raise your hand in the participants feature and unmute yourself to speak

Use the chat function to type in your questions

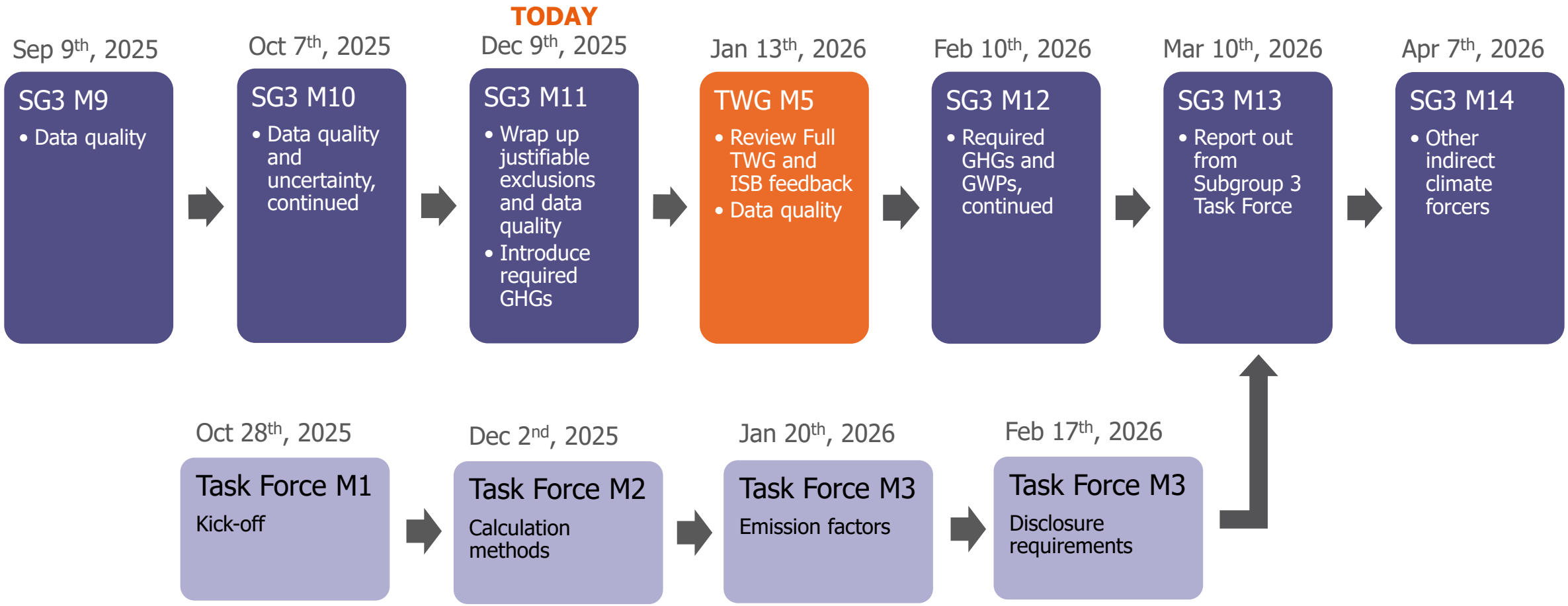


Meetings will be recorded and shared with all TWG members for:

- Facilitation of notetaking for Secretariat staff
- To assist TWG members who cannot attend the live meeting or otherwise want to review the discussions

Recordings will be available for a limited time after the meeting; ***access is restricted to TWG members only.***

Subgroup 3 schedule: Phase 2



Legend: Subgroup 3 | Full TWG | Task Force

Schedule of upcoming Subgroup 3 and Full TWG meetings (tentative)

Meeting type	#	Date	Time	Topics
Full TWG	5	January 13th, 2026	Option 1: 08:00 ET / 14:00 CET / 21:00 CHN Option 2: 16:00 ET / 22:00 CET / 05:00 CHN	• Review preliminary Subgroup 1 phase 2 outcomes • Review preliminary Subgroup 3 phase 2 outcomes
Task Force	3	January 20th, 2026	09:00 ET / 15:00 CET / 22:00 CHN	• Continue calculation methods; emission factors
Subgroup 3	12	February 10th, 2026	09:00 ET / 15:00 CET / 22:00 CHN	• Global warming potential
Task Force	4	February 17th, 2026	09:00 ET / 15:00 CET / 22:00 CHN	• Continue emission factors; disclosure requirements
Subgroup 3	13	March 10th, 2026	09:00 ET / 15:00 CET / 22:00 CHN	• Task Force to report out on calculation methods, emission factors, and disclosure requirements
Subgroup 3	14	April 7th, 2026	09:00 ET / 14:00 CET / 21:00 CHN	• Other climate forcers
Subgroup 3	15	May 5th, 2026	09:00 ET / 15:00 CET / 21:00 CHN	• Wrap up phase 2 topics
Full TWG	6	May 19th, 2026	Option 1: 08:00 ET / 14:00 CET / 20:00 CHN Option 2: 16:00 ET / 22:00 CET / 04:00 CHN	• Review Subgroup 1 phase 2 outcomes (tracking emissions over time)
Full TWG	7	May 26th, 2026	Option 1: 08:00 ET / 14:00 CET / 20:00 CHN Option 2: 16:00 ET / 22:00 CET / 04:00 CHN	• Review Subgroup 2 phase 2 outcomes (verification and assurance)
Full TWG	8	June 2nd, 2026	Option 1: 08:00 ET / 14:00 CET / 20:00 CHN Option 2: 16:00 ET / 22:00 CET / 04:00 CHN	• Review Subgroup 3 phase 2 outcomes (data and calculation methodology)

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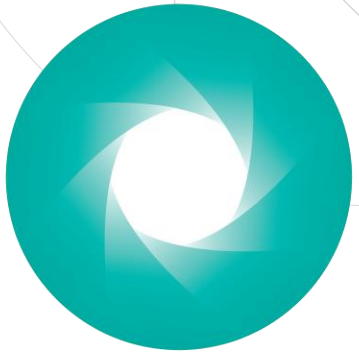


GREENHOUSE GAS PROTOCOL

End-of-year public deliverable: Summary of outcomes agreed by TWG and ISB

(Milestone defined in Corporate Standard Development Plan (SDP), Section 9: Workplan and timeline)

Contents: Phase 1 topics	Information provided for each topic
• Objectives statement • GHG accounting and reporting principles • Organizational boundaries • Scope 3 requirement • Justifiable exclusions for scopes 1 and 2	• Current approach/current text • Summary of proposed changes • Proposed new text • Options considered • Rationale/basis for conclusions

Summary of outcomes to be provided for informational purposes only, to provide interim guidance to stakeholders until complete draft for public consultation available in 2026.

Timeline for public release:

October
- ISB pulse checks on phase 1 outcomes

→

November 10
- Draft shared with TWG and ISB members for comment

→

November 24
- ISB vote on end-of-year public deliverable

→

December
- Public release

Deadline (November 30th) has already passed for submitting any questions, comments, or concerns. However please reach out if you would still like to submit comments.

Subgroup 1: Phase 2 progress

Phase 2 topics discussed to date:

- Selecting a **base year** (Meeting 6)
- Base year recalculation and **significance thresholds** (Meeting 7)
- Options for when **sufficient data unavailable** for base year recalculation (Meeting 9)
- **Emissions profile over time (Meeting 10)**

Subgroup 1, Meeting 11 on December 16th will serve to tie up loose ends on phase 2 topics previously discussed (above).

Methods of tracking emissions over a time series considered:

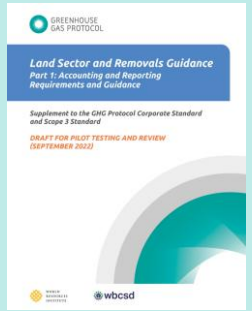
- **Original (historical) inventory time series:** Annual historical reported emissions
- **Recalculated inventory time series:** Annual emissions, with recalculation
- **Recalculated target relevant time series:** Recalculated time series over relevant period for an active emissions reduction target
- **Emissions intensity time series:** Emissions intensity per unit of physical activity or economic value

Questions discussed:

1. What emissions **information over a time series** is most important to users' **decision-making**?
2. How should requirements/recommendations related to the **recalculated inventory** time series be updated?
3. Should any requirements/ recommendations be considered for **other methods for presenting GHG emissions over a time series**?

A feedback survey for Subgroup 1 Meeting 10 is underway, with outcomes from the meeting pending final results from the survey.

2. What does "conformance with GHG Protocol" mean?

Current situation	**Two options**: • Conformance with Corporate Standard • Conformance with Scope 3 Standard	But in practice, companies often just report "conformance with GHG Protocol" and the meaning is unclear
Proposed approach	"Conformance with GHG Protocol" means **conformance with requirements for scope 1, scope 2, and scope 3**  + **Land Sector & Removals** conformance, *when applicable* 	**TBD** **Actions & Market Instruments** conformance

2. Two case studies that promote feasibility

Scope 2 TWG recommendation:
Exemptions for hourly matching

Eligible companies would not be required to use hourly matching in the market-based approach

- **Approach^**: Exemptions
- **Eligibility**: Consumption below electricity threshold and/or small companies (definition TBD)
- **Principles affected**: Accuracy

Corporate Standard TWG recommendation:
Less stringent scope 3 requirement

Eligible companies would report to a less stringent scope 3 requirement (i.e., most relevant 3 categories)

- **Approach^**: Conformance level*
- **Eligibility**: Small companies, following SBTi company categorization approach
- **Principles affected**: Completeness and relevance

Discussion questions posed to the ISB

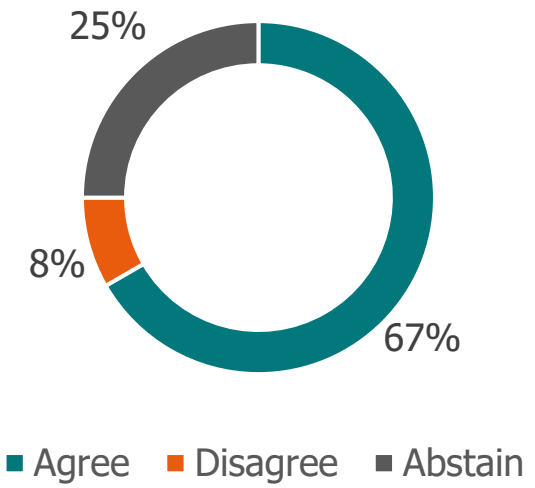
Would the reporters still be "**in conformance with GHG Protocol**"?
Should an **aligned approach** be used for these two case studies?

*The ISB indicated in Meeting 13 that they do not support conformance levels, and instead support GHG Protocol recommending different levels of reporting. The noted "conformance level" would be a recommendation to programs.

^The following slides define exemptions, conformance levels, and guidance only approaches

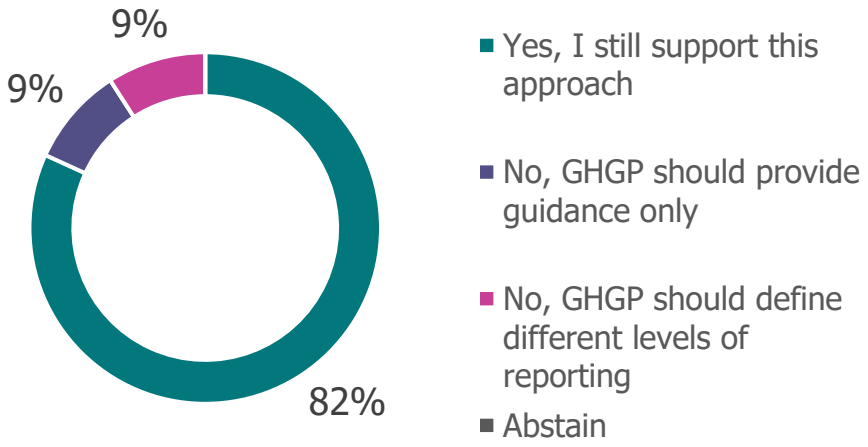
Different levels of reporting: Pulse checks from ISB Meeting 15

Conformance:
Majority agreement with proposed approach on **conformance with GHG Protocol** (see previous slide)



12 responses, including ISB members and observing entities

Recommend different levels:
Confirmed *majority support* for GHG Protocol **recommending different levels of reporting** to external programs (meeting 13 outcome)



14 responses, including ISB members and observing entities

Next steps:

- Continue discussion at January ISB meeting
- Clarify the difference and appropriate application for "exemptions" and "conformance levels"
- Define the audience and format for different levels of reporting

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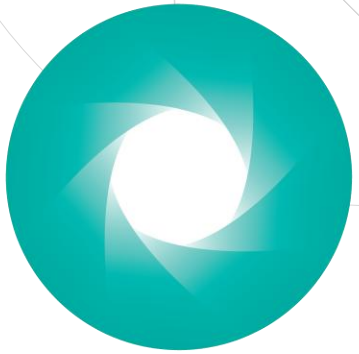

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Subgroup 3, phase 1: Package of proposed revisions agreed by TWG

Topic		Preliminary outcome
Justifiable exclusions for scopes 1 and 2	Prescriptive and **quantitative approach**	• **Maintain** scope 1 and scope 2 exclusions • Make scope 1 and scope 2 exclusions **more prescriptive and quantitative**
	Separate thresholds for scopes 1 and 2	• Define **separate quantitative exclusion thresholds** for scopes 1 and 2.
	1% emissions exclusion threshold	Define a **1% quantitative exclusion threshold** for scope 1 and a 1% quantitative exclusion threshold for scope 2* • *Companies **shall** account for and report at least 99% of scope 1 emissions, 99% of scope 2 emissions, and 95% of total required scope 3 emissions.* • *Companies **should** account for and report all scope 1 and scope 2 emissions.* *Note: Scope 3 TWG is separately recommending a 5% quantitative exclusion threshold for scope 3*
	Require **total quantification** to justify exclusions	**Total scope 1 and scope 2 emissions** shall be quantified to justify exclusions • *Companies **shall quantify** scope 1 and scope 2 emissions to justify exclusions.* • *Companies **shall disclose and justify** the exclusion of any scope 1 emissions and scope 2 emissions.* • *Companies **should** use the best available data to quantify total emissions to justify exclusions.* • *Companies **may** quantify total emissions to justify exclusions using any method.*

**Scope 2 TWG discussed proposed quantitative exclusion threshold at November TWG meeting*

Subgroup 3, phase 1: Feedback received from ISB

Topic	Preliminary outcomes	Level of support** (ISB members at Meeting 15)	Feedback from ISB
Justifiable exclusions for scopes 1 and 2*	Prescriptive and **quantitative approach**	**Support: 9 of 11** (5 support with minor edits) Oppose: 2 of 11 Abstain: 0 of 11	**Support:** • Significant improvement over current ambiguity while maintaining practical feasibility **Opposition** (2 members): • **Opposition to a rules-based approach** and preference for maintaining the current principles-based approach • Concern about the **accuracy of the hotspot analysis**, which is needed to determine exclusion threshold • **Interoperability concerns** with external programs that use principles-based approach (e.g., materiality) • Question: If total emissions must be quantified, why not just report 100% of emissions? **Suggestions for revision:** • Consider **different exclusion threshold for scope 2** versus scope 1 due to market- and location-based methods • **Scope 2 TWG should consult** on the appropriate scope 2 threshold • **Explanation of the exclusion** should be disclosed • Consider a **de minimis** provision within the scope 1 and 2 exclusion thresholds
	Separate thresholds for scopes 1 and 2		
	1% emissions exclusion threshold		
	Require **total quantification** to justify exclusions		

**Scope 3 TWG is separately recommending a 5% quantitative exclusion threshold for scope 3.*
***Three responses were received from observing entities, all of which indicated either full support or support with minor edits.*

Discussion with Scope 2 TWG

Nov 18 Scope 2 TWG

Secretariat presented proposed outcomes on justifiable exclusions for scope 2

Dec 9 CS SG3 TWG

Subgroup 3 to discuss feedback from Scope 2 TWG

Date TBD Scope 2 TWG

Final discussions with Scope 2 TWG

Questions discussed by Scope 2 TWG

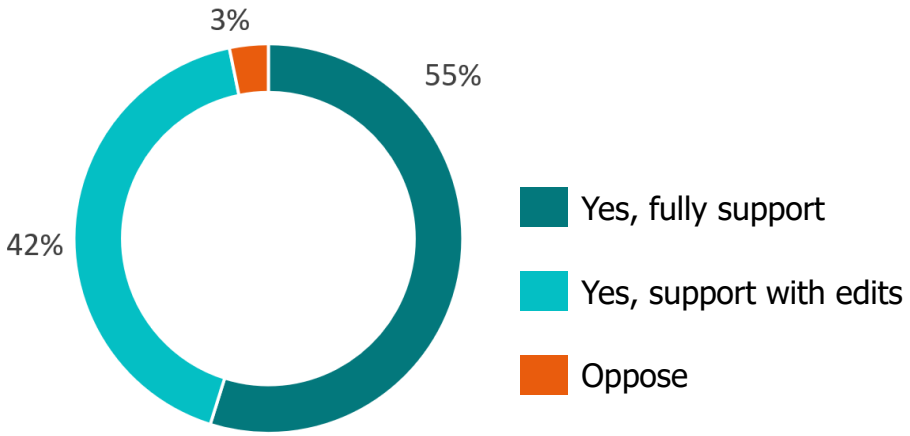
1. Should the 1% exclusion boundary be defined across the entire scope 2 inventory or by market boundary?
2. How should the **exclusion boundary** be defined for location-based versus market-based?
    a. **Calculate based on location-based** and apply to market-based (as applicable) using the same boundary
    b. **Calculate separately** for location-based and market-based
3. Should any **minimum methods** be defined for the total quantification of emissions to justify exclusions?
    a. **No minimum methods requirements** (CS and S3 TWGs recommendation)
    b. **Define minimum methods requirements** for scope 2

Discussion with Scope 2 TWG

Scope 2 TWG poll results

Do you support the Corporate Standard TWG recommendation for justifiable exclusions for scopes 1 and 2?

97% of Scope 2 TWG members support



Feedback from Scope 2 TWG members

General feedback:

- **Assurance** rationale for requiring total quantification of emissions is compelling
- Same **boundary** should be used for exclusions for location-based and market-based approach
- Discussed the difference between scope 2 exemptions (for methodology) and exclusions (for completeness)

Suggestions for revision:

- **De minimis** provision should be included
- Limit justifiable exclusions to a **list of acceptable reasons**
- **MWh exclusion threshold** instead of or in addition to emissions exclusion threshold to ensure most electricity consumption is accounted for

Discussion questions

1. Should justifiable exclusions be limited to a defined list of acceptable reasons?
2. Should an additional MWh exclusion threshold be defined for scope 2?

Note: De minimis to be discussed on following slides

For more information, see the minutes for Scope 2 TWG Meeting 20, to be posted to the repository on 12/5/25

GHG Protocol context: Corporate Standard and "de minimis"

Current language in the Corporate Standard

De minimis is defined in the context of verification:

"*A materiality threshold is not the same as* ***de minimis emissions, or a permissible quantity of emissions that a company can leave out of its inventory****.*"
-page 69-70

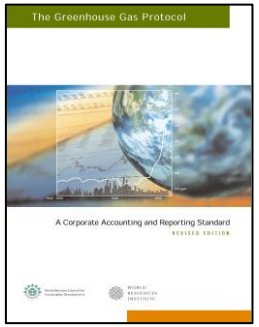
"Rule of thumb" that is misinterpreted:

"*As a rule of thumb, an error is considered to be* ***materially misleading if its value exceeds 5%*** *of the total inventory for the part of the organization being verified."*
-page 69

Note: "De minimis" is only mentioned in passing twice in the Corporate Standard in the context of verification, and is not mentioned once in any other GHG Protocol Standard

Key points:

- The concept of "de minimis" is **not currently used in defining justifiable exclusions**
- Material discrepancy for verification is often **misinterpreted** as a permissible 5% exclusion from the GHG inventory



De minimis provision

Previous subgroup 3 meeting 6 outcome

Majority support for combining de minimis emissions with a quantitative exclusion threshold for scopes 1 and 2.

Feedback received

- **ISB members**: Consider a de minimis provision within the scope 1 and 2 exclusion thresholds
- **Scope 2 TWG members**: De minimis is important to the application of the exclusion threshold, especially with assurance rationale

Scope 3 TWG provision on "de minimis"

Companies may exclude de minimis [scope 3] emissions as part of the 5% exclusion threshold, provided that total exclusions (de minimis and non-de minimis) are not reasonably expected to exceed said 5%.

Scope 3 TWG draft guidance text "de minimis"

"De minimis emissions are emissions reasonably expected to be insignificant or negligible. An example of de minimis emissions could be the scope 3 category 1 emissions attributable to paper clips and staples used by a reporting company.

Companies may exclude de minimis emissions as part of the 5% exclusion threshold. Companies may use prior studies, modeling, proxy measures, other evidence, or expert judgment to assess de minimis emissions. Companies should reasonably expect de minimis emissions to be insignificant or negligible.

If a company does not reasonably expect any potentially insignificant or negligible emissions to be de minimis, then the company shall quantitatively assess said emissions to determine that the emissions are de minimis. The cumulative total of de minimis and non-de minimis exclusions shall not exceed the 5% exclusion threshold."

-Draft revised chapter 6 of the Scope 3 Standard

De minimis provision

Discussion

Poll questions

1. **Should the following de minimis provision be adopted for the scope 1 and scope 2 exclusion threshold?**

   Companies may exclude de minimis emissions as part of the 1% exclusion threshold, provided that total exclusions (de minimis and non-de minimis) are not reasonably expected to exceed 1% of total scope 1 emissions or total scope 2 emissions.

   a. Yes, adopt this provision for scopes 1 and 2
   b. No, reporters should be required to quantify all emissions to justify exclusions
   c. Abstain, I need more information to respond

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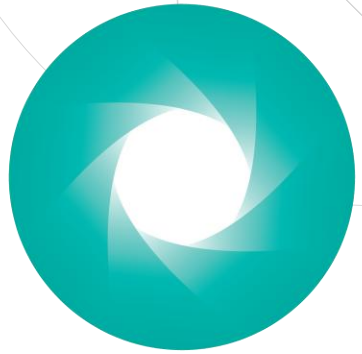

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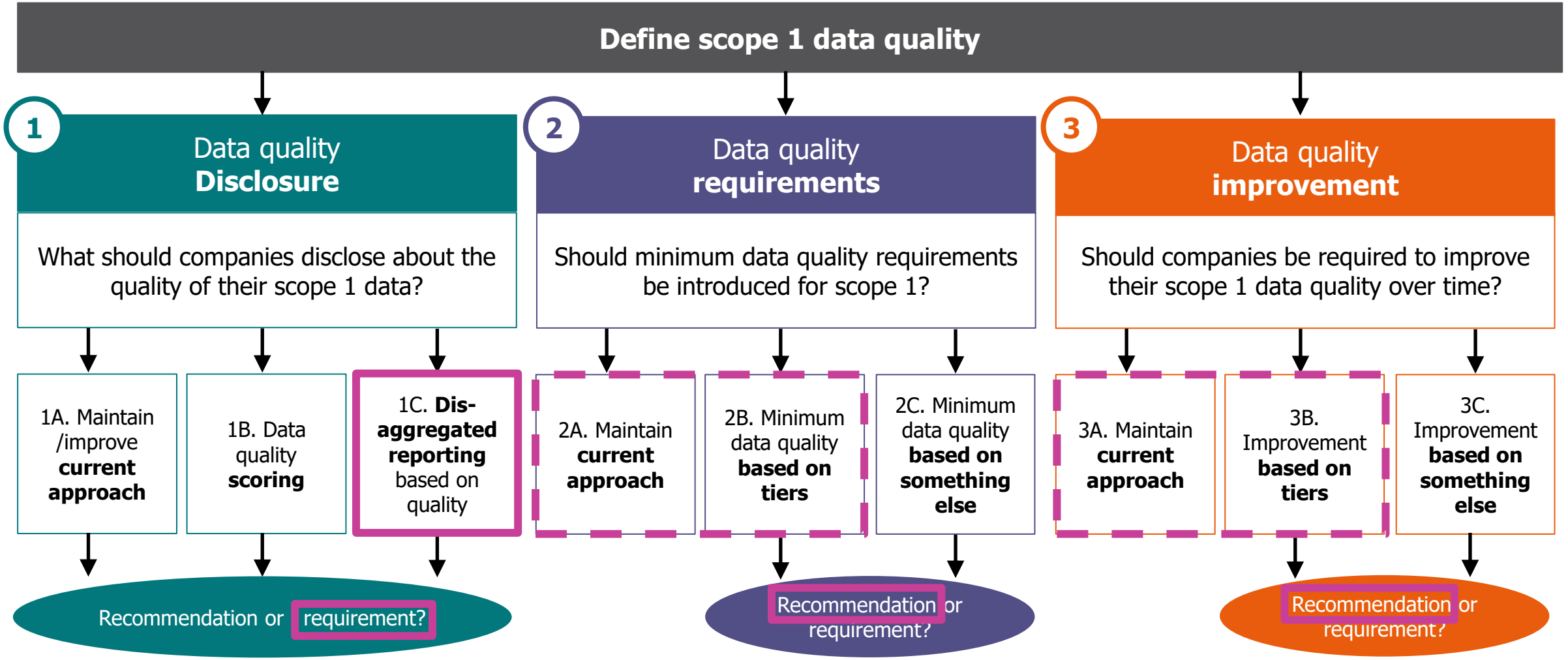
Subgroup 3 Phase 2: Data quality



Subgroup 3: Meeting 10 preliminary outcomes (in-meeting polls + survey results)

	Preliminary outcome	Subgroup 3 survey results	Pending items to be discussed today
Data quality disaggregation	*Majority support* for defining data quality tiers with the **Scope 3 TWG proposal** plus an additional "**measured**" tier	**10 of 15: Modified Scope 3 TWG proposal (67%)** 2 of 15: Scope 3 TWG proposal (13%) 1 of 15: Calculation method (7%) 1 of 15: Principles approach (7%) 1 of 15: Abstain (7%)	• "Measured" tier definition to be finalized • Proposed "measured" tier was presented to Scope 3 TWG for consideration
Other data quality	*Majority support* for **recommending minimum data quality**	**11 of 15: Recommendation (73%)** 4 of 15: Requirement (27%) 0 of 15: Abstain (0%)	• Define recommendations for minimum data quality and improving data quality
	Majority support for **recommending improving data quality**	**11 of 15: Recommendation (73%)** 4 of 15: Requirement (27%) 0 of 15: Abstain (0%)	

Subgroup 3: Meeting 10 preliminary outcomes (in-meeting polls + survey results)

	Preliminary outcome	Subgroup 3 survey results*	Pending items to be discussed today
Uncertainty	*Split opinions* on whether to maintain current approach (define but do not specifically recommend) or recommend an **uncertainty assessment**	3 of 14: Current approach (21%) **7 of 14: Recommend (50%)** 1 of 14: Require (7%) 3 of 14: Abstain (21%)	• Continue discussion following split opinions
	Split opinions on which type of uncertainty assessment should be recommended, with the most support for **allowing companies to choose**	0 of 8 – Pedigree matrix approach (0%) 0 of 8 – Gaussian method (0%) **4 of 8 – Allow companies to choose (50%)** 0 of 8 – Other qualitative assessment (0%) 1 of 8 – Other qualitative assessment (13%) 3 of 8 – Abstain (38%)	• Continue discussion following split opinions

**Preliminary results. To be updated as more survey results are available.*

Data quality tiers for disaggregation: Meeting 10 preliminary outcome

Activity types	Measured	Specific	Non-specific	EEIO/Spend-based
Stationary combustion	• Direct measurement • Energy content of fuel • Carbon content of fuel	• Volume/weight of fuel • Fuel-specific EFs	• Estimated fuel consumption • Industry average emission factors	• EEIO emission factors
Mobile combustion	• Direct measurement • Energy content of fuel • Carbon content of fuel	• Volume/weight of fuel • Fuel-specific EFs	• Distance traveled • Industry average emission factors	• EEIO emission factors
Process emissions	• Direct measurement	• Measured in physical units • Modeled in chemical or physical modeling	• Volume/weight of material produced • Industry average emission factors	• EEIO emission factors
Fugitive emissions	• Direct measurement • Mass balance method	• Volume of refrigerant leaked • Weight of fertilizer • Volume of waste treated • Specific EFs	• Industry average emission factors • Average leak rate by HVAC type • Number of animals	• EEIO emission factors

Note: This table is in draft form

Open questions on data quality

Data quality topic	Open questions
Data quality tiers	1. Should the data quality tiers be uniform across scopes, or should they be scope-specific tiers?
Defining the "measured" tier	2. How should the "measured" tier be defined? 3. How should option B for the "measured" data quality tier be defined?
Defining data quality	4. How should minimum data quality recommendations be defined? 5. How should data quality improvements over time be defined?
Uncertainty assessment	6. Should an uncertainty assessment be recommended? 7. If so, what type of uncertainty assessment should be recommended?

Note: The following questions will be addressed at a later stage:

- Should scope 1 data quality reporting be disaggregated by stationary, mobile, fugitive, and process emissions?
- How should the requirements for "specific" activity data and emission factors be defined?

Discussion

Data quality disaggregation: Question #1 on data quality tiers

1. Should the data quality tiers be uniform across scopes, or should they be scope-specific tiers?

Option A:
Uniform tiers across scopes
(i.e., 5 tiers for scopes 1 and 3)

Scope 1	Scope 2	Scope 3
Measured	*TBD*	Measured
Specific		Specific
Non-specific*		Non-specific*
EEIO/spend-based*		EEIO/spend-based*
Unclassified		Unclassified

Option B:
Scope-specific tiers
(i.e., measured, specific, other for scope 1)

Scope 1	Scope 2	Scope 3
3. Measured 2. Specific 1. Other	*TBD*	3. Specific/measured 2. Other 1. EEIO/spend-based*

- "**Unclassified**" remains an option for data quality reporting but is not a tier.
- "**Other**" was previously named non-specific. However since it is defined as any emissions data that does not meet the criteria for measured, specific, or EEIO/spend-based, it is renamed here to "other."

**Tier name might be changed. Non-specific may be changed to partially specific.*

Discussion

Data quality disaggregation: Question #2 on the measured tier

2. How should the "measured" data quality tier be defined?

Option A
Direct monitoring only

= Emission data obtained only from physical direct monitoring/measurement

Examples:
- Continuous Emissions Monitoring Systems (CEMS)
- Periodic sampling of emissions

Pros	Cons
• Clearly and narrowly defined • Aligns with top tier in direct emissions programs (e.g., EPA GHGRP, EU ETS)	• Does not include other very high quality estimates (e.g., carbon content of fuel)

Option B*
Direct monitoring + other measured data

= Emission data obtained only from physical direct monitoring/measurement OR other direct measurements of activities or processes

Examples:
- Continuous Emissions Monitoring Systems (CEMS)
- Periodic sampling of emissions
- Carbon or energy content of fuel
- Mass balance method

Pros	Cons
• Incorporates other high quality estimates	• Would need to be clearly defined to avoid overlapping with "specific" tier

**If there is support for option B, then possible definitions will be considered on the following slide*

Discussion

Data quality disaggregation: Question #2 on the measured tier

3. How should option B for the "measured" data quality tier be defined?

Option	Definition	Pros	Cons
B1. **ISO definition** of primary data	"Quantified value of a process or an activity obtained from a direct measurement or a calculation based on direct measurements" Note: Primary data can include GHG emission factors (3.1.7) or GHG removal factors (3.1.8) and/or GHG activity data (3.2.1). • GHG emission factor (3.1.7) = coefficient relating GHG activity data (3.2.1) with the GHG emission (3.1.5) • GHG activity data (3.2.1) = quantitative measure of activity that results in a GHG emission (3.1.5) or GHG removal (3.1.6) -ISO 14064-1:2018	• Alignment with ISO	• Definition could be open to interpretation • Could overlap with "specific" category
B2. **Scope 3 Standard** definition of direct measurement	Emissions quantified "using direct monitoring, mass balance or stoichiometry" -Scope 3 Standard, p. 68	• Incorporates other high quality estimates	• Mass balance and stoichiometry methods need clear definitions
B3. **Suggestion** from Scope 3 Secretariat	Quantitative data obtained directly from monitoring or measurement of processes at a facility or activity level (including direct monitoring and measured energy content of fuel)	• Aims to bring clarity to the types of data that qualify for the "measured" tier	• Does not directly align with an existing program
B4. Other options?			

Data quality disaggregation: Question #2 on the measured tier

Draft definitions for direct monitoring, mass balance method, and stoichiometry method

Term	Definitions	Source	Examples
Direct monitoring	Emission data obtained only from physical direct monitoring/measurement	Secretariat draft	• Continuous Emissions Monitoring System (CEMS) • Periodic sampling with sensors, scaled to annual emissions
Mass balance method*	Approach based on the conservation of mass in which a quantity can be estimated based on the inputs, outputs, generation, consumption, and accumulation of a product within a system.	Secretariat draft	• Refrigerant leakage can be calculated based on the storage inventory, purchases and sales of refrigerants, and any changes in refrigerant equipment capacity
Stoichiometry method	Approach based on chemical reaction equations in which emissions are calculated based on the atomic mass of the reactants and products. This method assumes perfect conversion, but system efficiencies can be applied separately.	Secretariat draft	• Calculate the amount of CO_2 combusted based on the carbon content of natural gas. $CH_4+O_2 \rightarrow CO_2+H_2O$ • Calculate the amount of CO_2 released during the calcination step of cement production, where $CaCO_3$ decomposes into CaO and CO_2

*The revised LSR Standard defines mass balance in the context of a chain-of-custody model, which is not relevant to the mass balance method for calculating emissions

Sources: GHG Protocol Guidance on Stationary Combustion, GHG Protocol HFC Tool, EPA GHG Inventory Guidance: Direct Emissions from Stationary Combustion Sources, EPA Direct Fugitive Emissions

Discussion

Data quality disaggregation: Question #4-5 on defining data quality

4. How should minimum data quality recommendations be defined?

a. General recommendation that reporters use best available data
b. Recommend X% of data is "measured" tier
c. Recommend X% of data is "measured" OR "specific" tier
d. Other

What % should be defined?

Source	Scope 1 emissions (%)
Scope 1 total	**100%**
Measured	50%
Specific	40%
Non-specific (name TBD)	10%
EEIO/spend based	0%
Unknown/unclassified	0%

5. How should data quality improvement be defined?

a. General recommendation that reporters improve data quality over time
b. Recommend that reporters increase % of "measured" data
c. Recommend that reporters increase % of "measured" and "specific" tier
d. Other

Source	Year 1: Scope 1 emissions (%)	Year 2: Scope 1 emissions (%)
Scope 1 total	**100%**	**100%**
Measured	50%	50%
Specific	40%	55%
Non-specific (name TBD)	10%	5%
EEIO/spend based	0%	0%
Unknown/unclassified	0%	0%

Note: Numbers are for demonstration purposes only

Discussion

Data quality disaggregation: Question #6-7 on uncertainty assessment

6. Should an uncertainty assessment be recommended?*

a. No. Define but do not specifically recommend (status quo)
b. Yes. Recommend an uncertainty assessment

Scope 3 Standard uncertainty definitions:**

1. **Quantitative definition**: Measurement that characterizes the dispersion of values that could reasonably be attributed to a parameter.
2. **Qualitative definition**: A general and imprecise term that refers to the lack of certainty in data and methodology choices, such as the application of non-representative factors or methods, incomplete data on sources and sinks, lack of transparency etc.

-Scope 3 Standard, page 141

Scope 3 Standard also defines the following types of uncertainty:

Parameter, scenario, and model uncertainty

7. If so, what type of uncertainty assessment should be recommended?

a. Quantitative method
b. Qualitative method
c. Specific method (e.g., Gaussian, Pedigree Matrix)
d. Leave up to the discretion of the reporter

GHG Protocol provides two uncertainty assessment tools:

Gaussian method

Measurement and Estimation Uncertainty of GHG Emissions

Pedigree matrix method

Scope 3 Uncertainty Calculation Tool

See Calculation Tools and Guidance | GHG Protocol

Developing a new uncertainty assessment tool is outside the scope of this revision

*Subgroup 3 Meeting 10 poll had split opinions between the two options shown
**Scope 3 Standard updated the uncertainty definitions in Corporate Standard

Discussion and poll questions on data quality

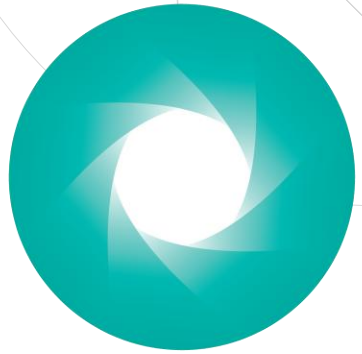
Full Group Discussion

Poll questions

Data quality topic	Open questions	Options
Data quality tiers	1. Should the data quality tiers be uniform across scopes, or should they be scope-specific tiers?	a. Uniform tiers across scopes (i.e., 4 tiers for scopes 1 and 3) b. Scope-specific tiers (i.e., measured, specific, other for scope 1)
Defining the "measured" tier	2. How should the "measured" tier be defined?	a. Direct monitoring only b. Direct monitoring + other data (e.g., mass balance, stoichiometry) c. Other
	3. How should option B for the "measured" data quality tier be defined?	a. ISO definition of primary data b. Scope 3 Standard definition of direct measurement c. Suggestion from Scope 3 Secretariat d. Other
Defining data quality	4. How should minimum data quality recommendations be defined?	a. General recommendation that reporters use best available data b. Recommend that X% of data is "measured" tier c. Recommend that X% of data is "measured" OR "specific" tier d. Other
	5. How should data quality improvement over time be defined?	a. General recommendation that reporters improve data quality over time b. Recommend that reporters increase % of "measured" data c. Recommend that reporters increase % of "measured" and "specific" tier d. Other
Uncertainty assessment	6. Should an uncertainty assessment be recommended?	a. No. Define but do not specifically recommend (status quo) b. Yes. Recommend an uncertainty assessment.
	7. If so, what type of uncertainty assessment should be recommended?	a. Quantitative method b. Qualitative method c. Specific method (e.g., Gaussian, Pedigree Matrix) d. Leave up to the discretion of the reporter

Agenda

Introduction and housekeeping	10 minutes
Progress updates from ISB and other CS subgroups	10 minutes
Justifiable exclusions and Scope 2 TWG	20 minutes
Data quality and Scope 3 TWG	40 minutes
Required greenhouse gases	**30 minutes**
Wrap-up and next steps	10 minutes



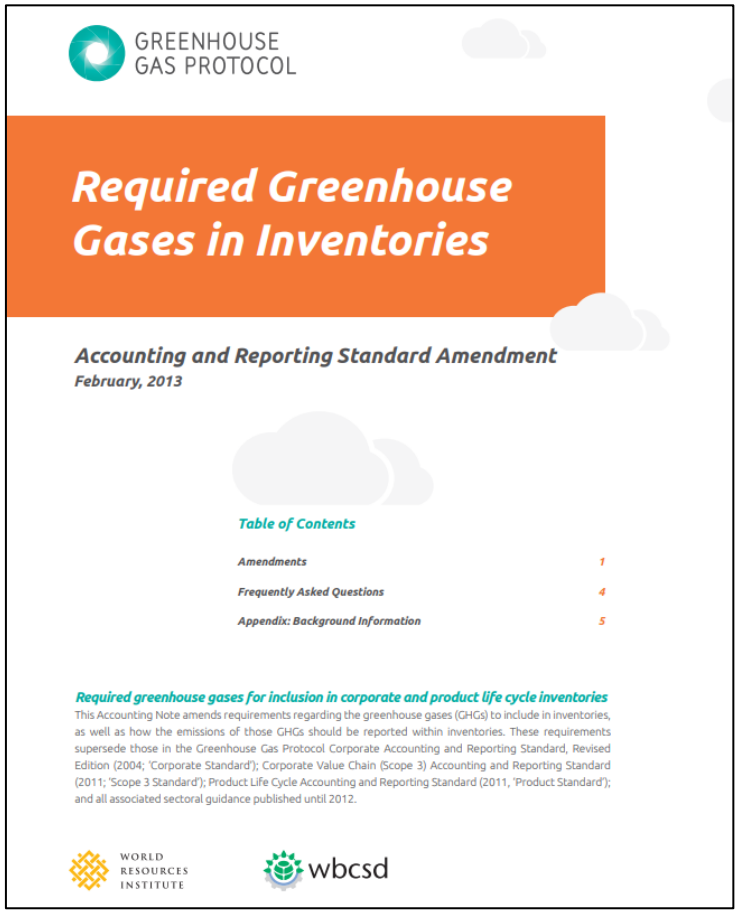
GREENHOUSE GAS PROTOCOL

F. Scope of work: Data/calculation methodology (Subgroup 3, Phase 2)

F.5. Updates to current requirements in the *Corporate Standard* on **required GHGs and global warming potential (GWP) values**:

- Integration and update of 2013 amendment on required GHGs into *Corporate Standard*.
- Revisit which GHGs companies are required to report on, considering GHGs not governed by the United Nations Framework Convention on Climate Change (UNFCCC).
- Revisit requirement for companies to report emissions from each required GHG individually.
- Clarification regarding which Intergovernmental Panel on Climate Change (IPCC) Assessment Report (AR) should be used for GWP values.
- Revisit the 100-year GWP as the only required metric and consider additionally a 20-year GWP, particularly for short-lived GHGs such as methane.

Current requirements: GHG Protocol


GREENHOUSE GAS PROTOCOL

Required Greenhouse Gases in Inventories

Accounting and Reporting Standard Amendment
February, 2013

Table of Contents

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Required greenhouse gases for inclusion in corporate and product life cycle inventories
This Accounting Note amends requirements regarding the greenhouse gases (GHGs) to include in inventories, as well as how the emissions of those GHGs should be reported within inventories. These requirements supersede those in the Greenhouse Gas Protocol Corporate Accounting and Reporting Standard, Revised Edition (2004; 'Corporate Standard'); Corporate Value Chain (Scope 3) Accounting and Reporting Standard (2011; 'Scope 3 Standard'); Product Life Cycle Accounting and Reporting Standard (2011, 'Product Standard'); and all associated sectoral guidance published until 2012.

WORLD RESOURCES INSTITUTE wbcsd

Amendment on required GHGs has the most up to date recommendations and requirements for GHG Protocol

Key take-aways

- **Required gases**
  - GHGs covered by **UNFCCC**, currently:
  - CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3
- **Other gases**
  - **Separate reporting** (outside of the scopes) is **recommended** if GWPs are available and the gases are included in the inventory
- **Corporate Standard**
  - GHGs reported **individually** in metrics tonnes **and** tonnes of CO2 equivalent
- **Scope 3 Standard**
  - Not required to report separately by GHG (i.e., **CO_2e is fine**)

Source: GHG Protocol Amendment on required gases and GWP values

Current requirements: GHG Protocol

1. When using the Corporate Standard, Scope 3 Standard, Product Standard, or any associated sectoral guidance (collectively termed 'Standards' in this Amendment), companies:

   a. Shall account for and report the emissions of all the GHGs required by the UNFCCC/Kyoto Protocol at the time the corporate or product inventory is being compiled. These GHGs are currently: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6), and nitrogen trifluoride (NF_3).[1]

   b. Should report the emissions of other, optional GHGs, including those GHGs regulated by the Montreal Protocol on Substances that Deplete the Ozone Layer, as long as:

      i. 100-year Global Warming Potential (GWP) values for these GHGs have been defined in IPCC Assessment Reports.

      ii. A list of these GHGs is included in the inventory.

      These emissions shall be reported outside of the scopes of a corporate inventory.

Source: GHG Protocol Amendment on required gases and GWP values

Current requirements: Corporate Standard

Corporate Standard:

Current requirements for GHGs

Note: Requirements for GWPs excluded from this slide

Page and chapter reference	Amended requirements
p2; Introduction	This *GHG Protocol Corporate Standard* provides standards and guidance for companies and other types of organizations preparing a GHG emissions inventory. It covers the accounting and reporting of the ~~six~~ greenhouse gases covered by the **UNFCCC**/Kyoto Protocol — **currently,** carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), ~~and~~ sulphur hexafluoride (SF_6), **and nitrogen triflouride (NF_3).**
p63; Chapter 9 – Reporting GHG Emissions	Required information: Emissions data for all ~~six~~ GHGs covered by the **UNFCCC**/Kyoto Protocol separately ~~(CO_2, CH_4, N_2O, HFCs, PFCs and SF_6)~~ in metric tonnes and in tonnes of CO_2 equivalent. Required information: **Source of the GWP values and indicate if multiple Assessment Reports have been used.**
p63; Chapter 9 – Reporting GHG Emissions	Optional information: Emissions from GHGs not covered by the **UNFCCC**/ Kyoto Protocol (e.g., CFC, NO_x) reported separately from the scopes. **A list of any optional GHGs included in an inventory shall be reported.**

Source: [GHG Protocol Amendment on required gases and GWP values]

Current requirements: Scope 3 Standard

Scope 3 Standard:

Current requirements for GHGs

Note: Requirements for GWPs excluded from this slide

Page and chapter reference	*Amended requirements*
p21; Chapter 3 – Summary of Steps and Requirements	Requirements: Companies shall account for scope 3 emissions of CO_2, CH_4, N_2O, HFCs, PFCs, ~~and~~ SF_6, **and NF_3**, if they are emitted in the value chain.
p59 and p60; Chapter 6 – Setting the Scope 3 Boundary	Boundary requirements: Companies shall account for scope 3 emissions of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), ~~and~~ sulphur hexafluoride (SF_6), **and nitrogen triflouride (NF_3)**, if they are emitted in the value chain.
p119; Chapter 11 – Reporting	Required information: For each scope 3 category, total emissions of GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, ~~and~~ SF_6, **and NF_3**) reported in metric tons of CO_2 equivalent, excluding biogenic CO_2 emissions and independent of any GHG trades, such as purchases, sales, or transfers of offsets or allowances.
p120; Chapter 11 – Reporting	Optional information: Emissions of any GHGs other than CO_2, CH_4, N_2O, HFCs, PFCs, SF_6 **and NF_3**, whose 100-year GWP values have been identified by the IPCC, to the extent they are emitted in the company's value chain (e.g., CFCs, HCFCs, NO_x, etc.) and a list of any additional GHGs included in the inventory.
p121; Chapter 11 – Reporting	Reporting guidance: Companies are required to include emissions of each of the required greenhouse gases **covered by the UNFCCC/Kyoto Protocol** (i.e., CO_2, CH_4, N_2O, HFCs, PFCs, ~~and~~ SF_6, **and NF_3**) in the reported scope 3 emissions data, but are not required to separately report scope 3 emissions by individual gas.

Source: GHG Protocol Amendment on required gases and GWP values

Current requirements: Reporting by GHG

Mock reporting template showing required and optional reporting by gas and scope

	Total CO_2e	**CO_2**		**CH_4**		**N_2O**		**HFCs**		**PFCs**		**SF_6**		**NF_3**	
	t CO_2e	t CO_2	t CO_2e	t CH_4	t CO_2e	t N_2O	t CO_2e	t HFC	t CO_2e	t PFC	t CO_2e	t SF_6	t CO_2e	t NF_3	t CO_2e
Scope 1	Required	Required		Required		Required		Required		Required		Required		Required	
Scope 2	Required	Required		Required		Required		Required		Required		Required		Required	
Scope 3	Required, by category	*Optional*		*Optional*		*Optional*		*Optional*		*Optional*		*Optional*		*Optional*	
Other gases	*Optional*	*Optional*		*Optional*		*Optional*		*Optional*		*Optional*		*Optional*		*Optional*	

External programs: Required GHGs

	Name	Required GHGs Per GHG or CO_2e
IFRS	**IFRS S2**	*"…an entity to disclose its absolute gross greenhouse gas emissions generated during the reporting period, expressed as **metric tonnes of CO_2 equivalent**. To meet this requirement, the entity shall aggregate the seven constituent greenhouse gases into CO_2 equivalent values."* (Paragraph 29(a))
	ESRS E1	*"The undertaking shall disclose i**n metric tonnes of CO_2eq** its: (a) gross Scope 1 GHG emissions; (b) gross Scope 2 GHG emissions; (c) gross Scope 3 GHG emissions; and (d) total GHG emissions."* (Paragraph 44)
CARB	**California** ***CA SB 253, 219***	--
CDP	**CDP**	Requires emissions to be reported **in metric tons CO_2e** The questionnaire gives the option to breakdown **scope 1 emissions** by GHG type (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NF_3, and other-to be specified by the discloser) Example question: 7.15.1 for scope 1 emissions breakdown
SCIENCE BASED TARGETS	**SBTi** ***Draft CNZ v. 2.0***	*"Include all emission scopes and all GHGs (carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3), as well as the groups of hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs))."* (C6.1)
ISO	**ISO** **14064-1:2018**	"The organization shall quantify direct GHG emissions **separately for CO_2, CH_4, N_2O, NF_3, SF_6 and other appropriate GHG groups** (HFCs, PFCs, etc.) **in tonnes of CO_2e**." (Section 5.2.2)
GRI	**GRI** ***102 Climate change 2025***	Seven gases covered by the Kyoto Protocol Scope 1: *"provide a breakdown of gross Scope 1 GHG emissions by CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, and NF_3, in metric tons and metric tons of CO_2 equivalent"* (102-5 (b)) Scope 2: *"provide a breakdown of gross location-based Scope 2 GHG emissions by CO_2, CH_4, and N_2O in metric tons and metric tons of CO_2 equivalent"* (102-6 (b)

International agreements on greenhouse gases

UN Environment Programme

Montreal Protocol
1987

The Montreal Protocol on Substances that Deplete the Ozone Layer

Ozone-depleting substances controlled by the treaty:

- **CFCs**
- Halons
- Carbon tetrachloride
- Methyl chloroform
- **HCFCs** - transitional substances allowed until 2040
- Methyl bromide

GHG added to the treaty:

- **HFCs** - not an ozone-depleting substance; added by the Kigali Amendment, 2016

About Montreal Protocol

UNFCCC

Kyoto Protocol
1997

Operationalized the UNFCCC (United Nations Framework Convention on Climate Change)

GHGs controlled by the Kyoto Protocol:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur Hexafluoride (SF_6)
- Nitrogen Trifluoride (NF_3) – *Added in the Doha Amendment in 2012*

The Kyoto Protocol | UNFCCC

Paris Agreement
2016

Requires parties to set and update NDCs (nationally determined contributions) every 5 years

GHGs remain unchanged from the Kyoto Protocol

Key aspects of the Paris Agreement | UNFCCC

UNFCCC: Required and optional GHGs

Required GHGs

GHGs required under UNFCCC and their primary sources

Carbon dioxide (CO_2)	Fossil fuel use and land management
Methane (CH_4)	Agricultural activities, waste management, fossil fuel use
Nitrous oxide (N_2O)	Agricultural activities (especially fertilizer use), fossil fuel use
Hydrofluorocarbons (HFCs)	Used as replacements for CFCs
Perfluorocarbons (PFCs)	Industrial processes, especially aluminum production
Sulfur Hexafluoride (SF_6)	Electrical transmission and distribution
Nitrogen Trifluoride (NF_3)	Semiconductor manufacturing, LCD and solar panel production

Other GHGs

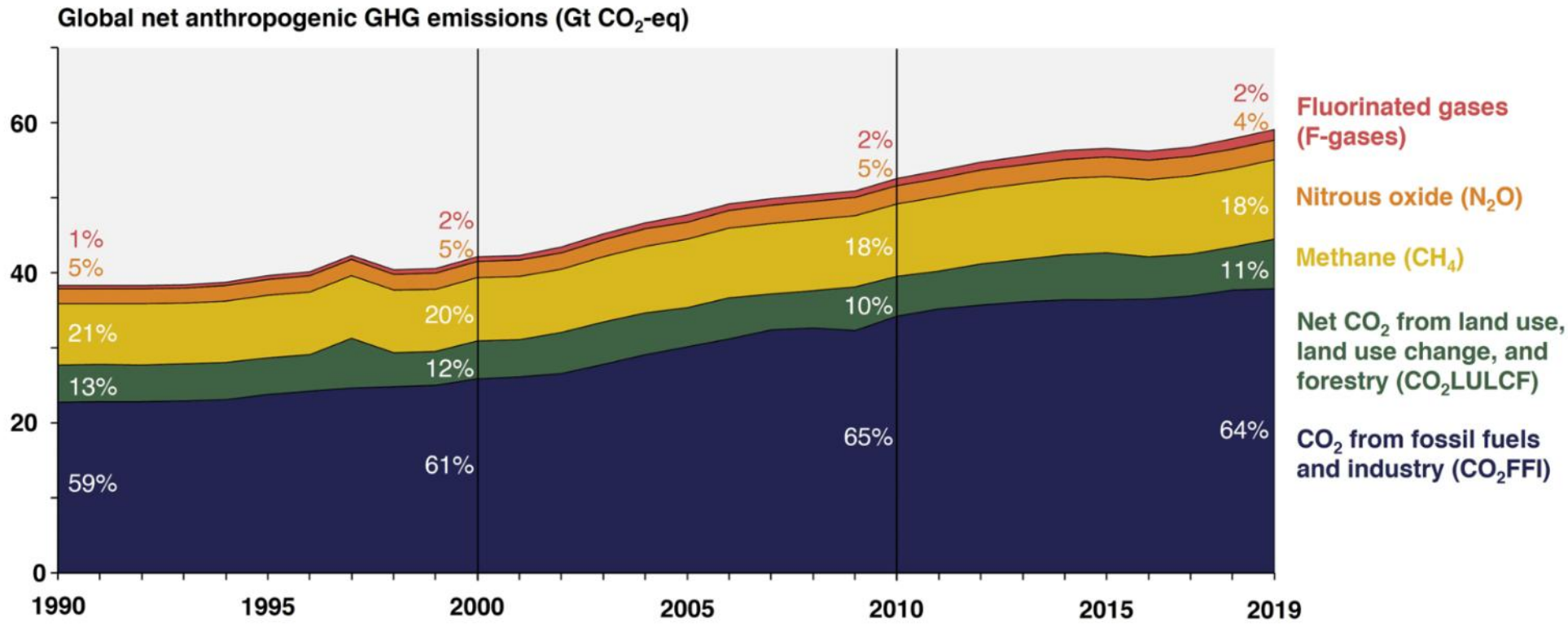
The following GHGs **are not required under UNFCCC**:

- CFCs – covered by Montreal Protocol
- HCFCs – covered by Montreal Protocol
- Ground-level ozone (O_3)
- Water vapor (H_2O)
- Nitrogen oxides (NO_x)
- Nonmethane volatile organic compounds (NMVOCs)
- Aerosols

What are Greenhouse Gases? | Greenhouse Gas Management Institute
Global Greenhouse Gas Overview | US EPA

Global net anthropogenic GHG emissions

CO2, CH4, and N2O make up the majority (>98) of global GHG emissions



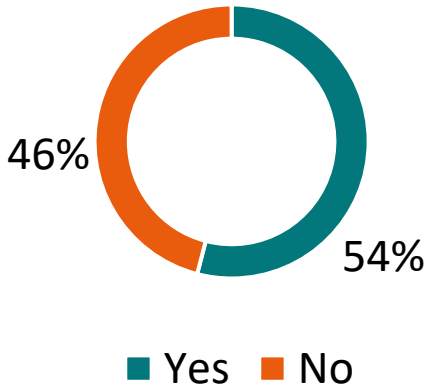
Fluorinated gases = HFCs, PFCs, SF_6, NF_3

Source: *Global Greenhouse Gas Overview | US EPA*

CDP data analysis of reporting by GHG

54% of companies break down their scope 1 emission by gas

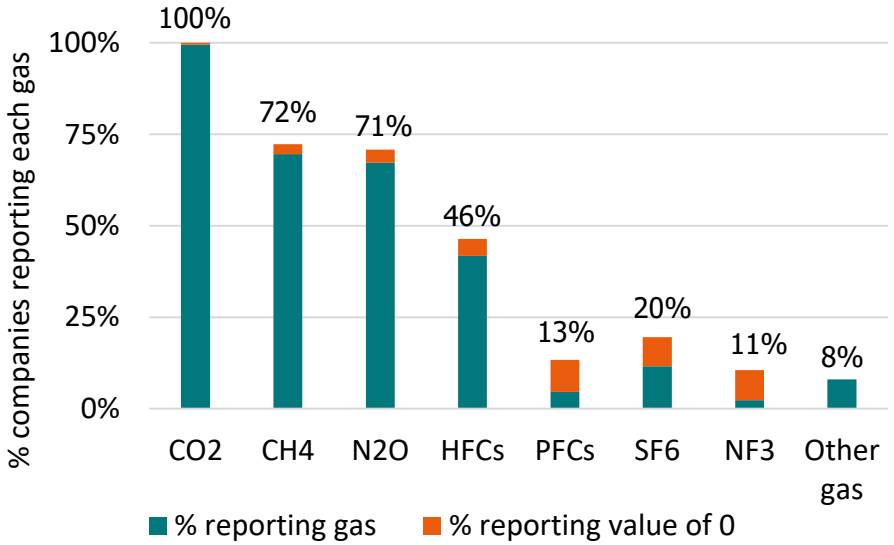
CDP question #7.1: Does your organization break down its Scope 1 emissions by greenhouse gas type?



- *Count: 6,311 companies*
- *Excludes companies that listed the question as not applicable.*
- *This question was not asked for other scopes.*

Percent of companies that report gases other than CO_2

CDP question #C7.1a: Break down your total gross global Scope 1 emissions by greenhouse gas type



- *Count: 3,252 companies*
- *Includes reported values of "0" which indicate when a reporter actively entered a value of "0" for a gas.*
- *Excludes companies that listed the question as not applicable.*

Take-aways

- Most companies also report CH4 and N2O
- Some companies are also reporting HFCs, PFCs, SF6, and NF3
- The most common other gases are refrigerants (125 instances), HCFCs (50), and CFCs (10)

POWERED BY CDP DATA

Source: CDP disclosures in 2023

GHG Protocol stakeholder survey feedback

There was limited stakeholder survey feedback on the topic of required GHGs. The following feedback was received:

- Remove the reporting requirement to report emissions data for all seven GHGs separately, in metric tonnes of respective gas type and CO2 equivalent
- Request for guidance for disaggregated reporting of GHGs in instances where emission factors are not disaggregated and for GHGs like SF6 and NF3 that are not relevant to all industries
- For GHGs not covered by UNFCCC:
  - Consider whether they should be a reporting requirement
  - Consider whether their emissions should be aggregated with those from GHGs covered by the UNFCCC

Key questions: Required gases

Discussion

1. Which GHGs should be **required**?
   a. GHGs covered by UNFCCC – *status quo*
   b. Define a specific list of GHGs beyond those covered by UNFCCC
   c. Other

2. Should GHGs be required to be **individually reported** for **scopes 1, 2 and 3**?

Scope 1	Scope 2	Scope 3
a. Emissions data for each required GHG shall be reported **separately** – ***status quo***	a. Emissions data for each required GHG shall be reported separately**– *status quo***	a. Emissions data for each required GHG shall be reported
b. Reporting of **total CO_2e only** should be allowed, with separate reporting by gas recommended	b. Reporting of **total CO_2e only** should be allowed, with separate reporting by gas recommended	b. CO_2e reporting should be allowed – ***status quo***

Should the requirement to report GHGs in metric tonnes AND metric tonnes CO2e be reconsidered?

Key questions: Other GHGs

Discussion

3. Should **other GHGs** not covered by UNFCCC be **optional or recommended?**
   a. Make reporting of other GHG's optional ("may" statement)
   b. Recommend reporting of all other GHGs ("should" statement) – ***status quo***

   Note: Question 1 considered whether to expand list of required GHGs

4. **Which other GHGs** should be optional/recommended?
   a. All other GHGs – ***status quo***
   b. Only GHGs covered by the Montreal Protocol
   c. Other (define specific GHGs)

5. Should other GHGs be reported **separately** or as part of the main GHG inventory?
   a. Other GHGs should be reported **separately** – ***status quo***
   b. Other GHGs should be reported as **part of the main GHG inventory**

Discussion and poll questions on data quality

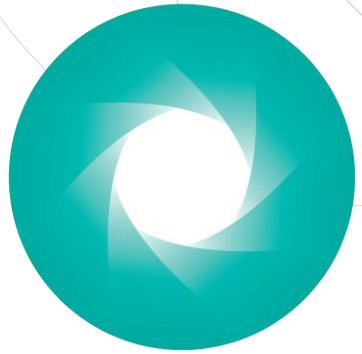
Full Group Discussion

Poll questions

Topic	Questions	Options		
Required GHGs	1. Which GHGs should be **required**?	a. GHGs covered by UNFCCC – *status quo* b. Define a specific list of GHGs beyond those covered by UNFCCC c. Other		
	2. Should GHGs be required to be **individually reported** for scopes 1, 2 and 3?	**Scope 1** a. Yes – *status quo* b. No (required only total CO2e)	**Scope 2** a. Yes – *status quo* b. No (require only total CO2e)	**Scope 2** a. Yes b. No (require only total CO2e) – *status quo*
Other GHGs	3. Should **other GHGs** not covered by UNFCCC be optional or recommended?	a. Make reporting of other GHG's optional ("may" statement) b. Recommend reporting of all other GHGs ("should" statement) – *status quo*		
	4. **Which other GHGs** should be optional/recommended?	a. All other GHGs – *status quo* b. Only GHGs covered by the Montreal Protocol c. Other (define specific GHGs)		
	5. Should other GHGs be reported separately or as part of the main GHG inventory?	a. Other GHGs should be reported **separately** – *status quo* b. Other GHGs should be reported as **part of the main GHG inventory**		

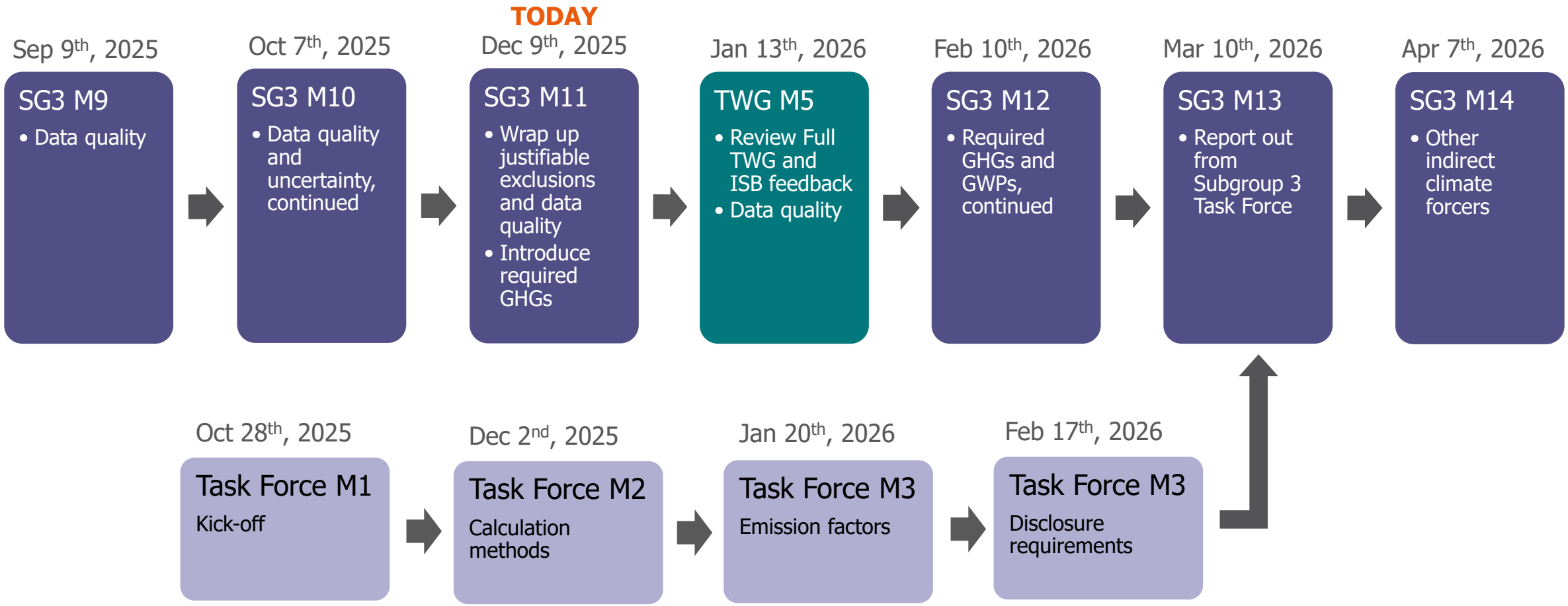
Agenda

Introduction and housekeeping	10 minutes
Progress updates from ISB and other CS subgroups	10 minutes
Justifiable exclusions and Scope 2 TWG	20 minutes
Data quality and Scope 3 TWG	40 minutes
Required greenhouse gases	**30 minutes**
Wrap-up and next steps	10 minutes



GREENHOUSE GAS PROTOCOL

Subgroup 3 schedule: Phase 2



Legend: Subgroup 3 | Full TWG | Task Force

Next steps

Upcoming meetings:

Full TWG Meeting 5 • *Review phase 2 outcomes from Subgroups 1 and 3*	Tuesday January 13th, 2026	**Option 1**: 8:00 ET / 14:00 CET / 20:00 CHN **Option 2**: 16:00 ET / 22:00 CET / 04:00 CHN on Wednesday October 22nd
Subgroup 3 Meeting 12 • *Global warming potential*	Tuesday February 10th, 2026	9:00 ET / 15:00 CET / 22:00 CHN

Items to be shared by GHG Protocol Secretariat:

- Final slides, minutes, and recording from this meeting
- Feedback survey on meeting 10 topics

TWG member action items:

- **Review** meeting materials
- Fill out post-meeting **feedback survey**, due data TBD

GREENHOUSE GAS PROTOCOL

Thank you!

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Appendix

GREENHOUSE GAS PROTOCOL

Uncertainty, as defined in GHG Protocol

Uncertainty =

1. **Quantitative definition**: Measurement that characterizes the dispersion of values that could reasonably be attributed to a parameter.
2. **Qualitative definition**: A general and imprecise term that refers to the lack of certainty in data and methodology choices, such as the application of non-representative factors or methods, incomplete data on sources and sinks, lack of transparency etc.

-Scope 3 Standard, page 141

See also:

- **Scope 3 Standard, Appendix B: Uncertainty in Scope 3 Emissions**
- **GHG Protocol guidance on uncertainty assessment in GHG inventories and calculating statistical parameter uncertainty**
- **GHG Protocol, Quantitative Inventory Uncertainty**