GREENHOUSE GAS PROTOCOL

Corporate Standard Technical Working Group

Subgroup 3, Meeting #12

GHG Protocol Secretariat team:
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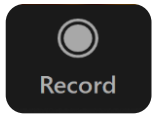
February 10th, 2026

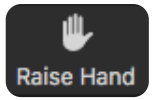
WORLD RESOURCES INSTITUTE

World Business Council for Sustainable Development

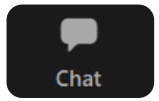
Meeting information



This meeting is **recorded**.



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

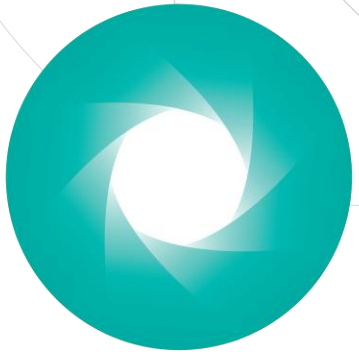


You can also use the **Chat** function in the main control.

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

Agenda

Introduction and housekeeping	10 minutes
Follow-up from Full TWG meeting	20 minutes
Required greenhouse gases	30 minutes
Global warming potential	50 minutes
Wrap-up and next steps	10 minutes



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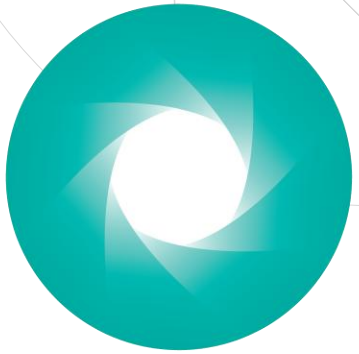

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Today's objectives

1. Review **poll results** from Full TWG Meeting 5
2. Continue discussing **required greenhouse gases**
3. Introduce and start discussing **global warming potential**

Today, we will focus on required GHGs and global warming potential

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:

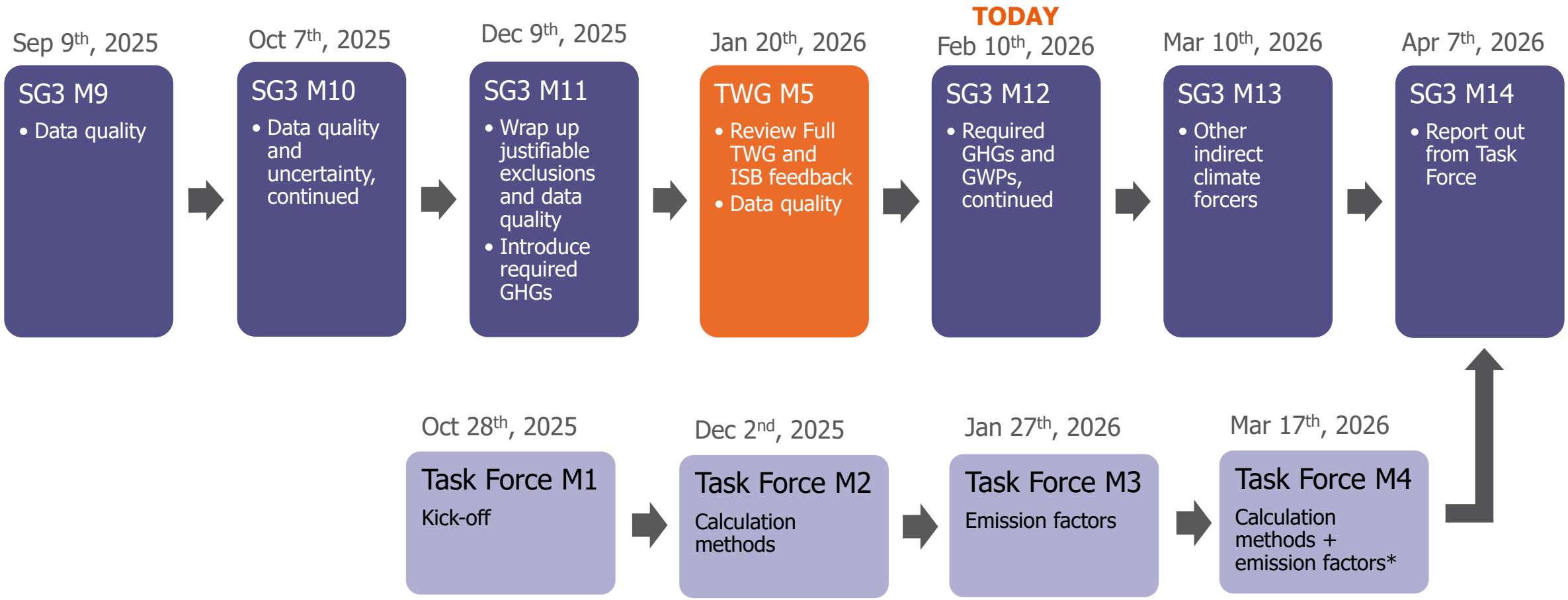
- Facilitation of notetaking for Secretariat staff
- To assist TWG members who cannot attend the live meeting or otherwise want to review the discussions

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

UPDATE: Recordings will be available upon request only. Please email Iain.Hunt@wri.org to request the recording.

Note: All dates are tentative; workplan is under revision

Subgroup 3 schedule: Phase 2



**Revised topic. To be scheduled: Task Force meeting on disclosure requirements*

Legend: Subgroup 3 | Full TWG | Task Force

Note: All dates are tentative; workplan is under revision

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

Meeting type	#	Date	Time	Topics
Full TWG	5	January 20th, 2026	Session 1: 08:00 ET / 14:00 CET / 21:00 CHN Session 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 27th, 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**
Subgroup 3	13	March 10th, 2026	09:00 ET / 15:00 CET / 22:00 CHN	• Other climate forcers
Task Force	4	February 17th, 2026	09:00 ET / 15:00 CET / 22:00 CHN	• Calculation methods + emission factors
Subgroup 3	14	April 7th, 2026	09:00 ET / 14:00 CET / 21:00 CHN	• Task Force to report out on calculation methods, emission factors, and disclosure requirements
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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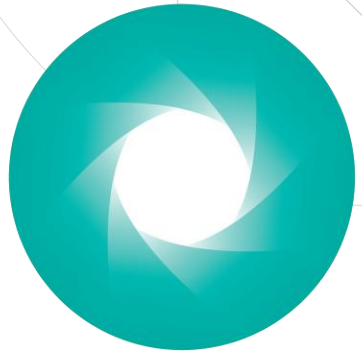

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Subgroup 3 topics covered at Full TWG meeting

1

Phase 1 wrap-up:

Justifiable exclusions

- Coordination with Scope 2 TWG
- De minimis provision

2

Phase 2:

Data quality

- Data quality tiers
- Uncertainty

3

Phase 2:

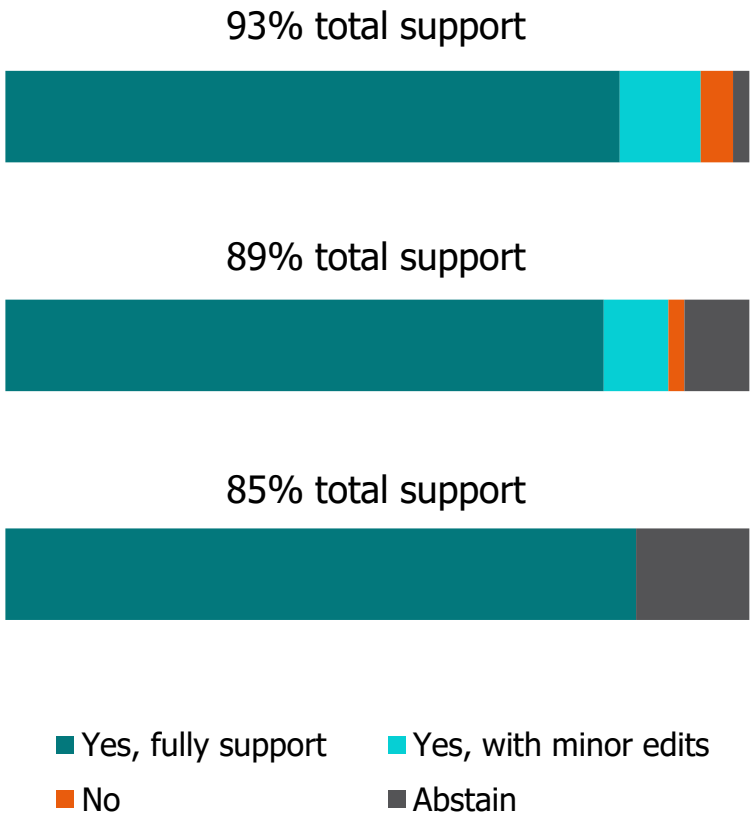
Disclosure requirements

- Disaggregated reporting by activity type

Note: Due to time constraints, this topic was not addressed at Full TWG Meeting 5.

Full TWG: Indicative poll results on Subgroup 3 topics – Justifiable exclusions

Indicative poll results on justifiable exclusions



Majority support for **de minimis** provision for scopes 1 and 2

Majority agreement that justifiable exclusions should **NOT** be limited to a defined **list of acceptable reasons**

Majority agreement that **MWh exclusion threshold** should **NOT** be defined for scope 2

46 members

TWG member feedback

- Suggestion that a different exclusion threshold be used for very small scope 1 and scope 2 emissions
- Concern that with a de minimis provision, companies may not quantify any emissions to justify exclusions

Next steps

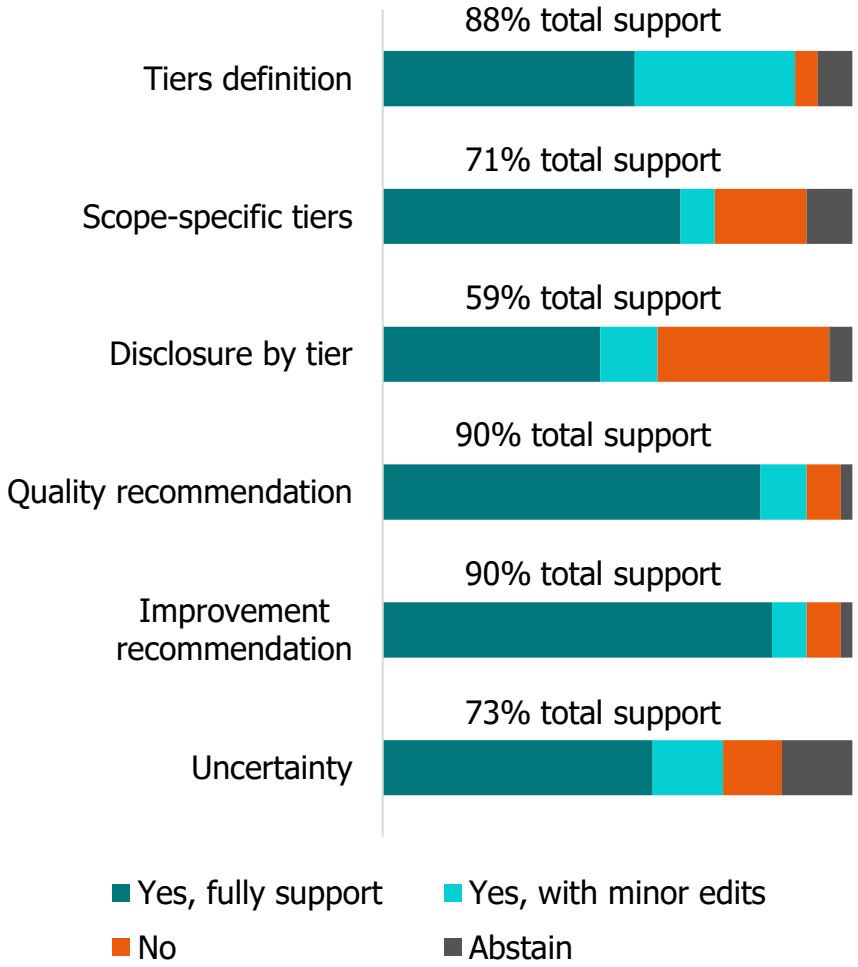
- These topics will be brought back to the Scope 2 TWG for their consideration
- Guidance on appropriate cases for de minimis emissions will be developed

Subgroup 3 Phase 2: Preliminary outcomes on data quality

		Subgroup 3 preliminary outcomes:
Defining data quality	How should scope 1 data quality be defined?	**Define** scope-specific **data quality tiers**
Data quality **disclosure**	What should companies disclose about the quality of their scope 1 data?	**Require** disclosure of emissions by data quality tier
Data quality **requirements**	Should minimum data quality requirements be introduced for scope 1?	**Recommend** best available data be used*
Data quality **improvement**	Should companies be required to improve their scope 1 data quality over time?	**Recommend** data quality improvement over time*
Uncertainty	Should an uncertainty assessment be recommended? If so, what type?	**Recommend** uncertainty assessment, with the type left up to the reporter

**Split opinions; this is the outcome with the most support*

Full TWG: Indicative poll results on Subgroup 3 topics – Data quality



Majority support for the proposed data quality tiers

Majority support for defining scope-specific tiers

Split opinions on requiring disaggregation of scope 1 emissions by data quality tier

Majority support for recommending best available data

Majority support for general recommendation to improve data quality over time

Majority support for recommending an uncertainty assessment, with the type of assessment left up to the reporter

41 members for all polls except uncertainty, which had 40 responses

TWG member feedback

- **General support** for the tiering approach for data quality
- Concern about **feasibility** of requiring disaggregation by data quality tier
- Data quality **tier names** should be harmonized across scopes
- Concern that the framework would imply that the **"measured" tier** is higher quality than the "specific" tier, which is not always the case
- Questions about the value of doing the data quality disaggregation
- The term "**best available data**" must be clearly defined

Next steps

- Data quality tiers are being revised, in coordination with Scope 3 Secretariat

Data quality tiers: An alternative proposal

Current approach:

Companies **shall** report scope 1 inventory emissions disaggregated by the specificity of the data, in **three tiers**:

- **Measured** (i.e., quantitative data from monitoring or measurement)
- **Specific** (i.e., activity data AND emission factors specific to the emissions source)
- **Other** (e.g., industry averages, spend-based emission factors)

Companies **may** report any emissions source as "unclassified."

Concerns raised:

- Feasibility
- Differentiating between "measured" and "specific" may not add value for companies
- Not aligned with other programs

Alternative approach:

Companies **shall** report scope 1 inventory emissions disaggregated by the data source and calculation method, in **two tiers**:

- **Primary data** (i.e., Quantified value of a process or an activity obtained from a direct measurement or a calculation based on direct measurements)
- **Secondary data** (i.e., Data obtained from sources other than primary data)

Considerations:

- Promotes feasibility
- Aligned with ISO by using ISO definitions of primary and secondary data
- "Unclassified" option is no longer necessary.

Discussion:

Which approach do you prefer for data quality disaggregation?

Data quality: Proposed text

Proposed text for data quality:

- Companies **should** use the best available data when calculating their greenhouse gas emissions.
- Companies **should** select data that are the most representative in terms of technology, time, and geography; most complete; and most reliable.

Notes:

- This is based on the Full TWG support for recommending best available data
- Second statement is from the Scope 3 Standard and uses the data quality indicators
- "Best available data" to be defined with accessibility considered

Discussion:

Do you have any feedback on this draft text?

Proposed text for improving data quality over time:

- Companies **should** improve the data quality of the inventory over time by replacing lower quality data with higher quality data.
- Companies **should** prioritize data quality improvement for activities that have relatively low data quality and that have relatively high emissions.
- Companies **should** set data quality improvement targets based on established metrics and considering the company context.
- Companies **may** use year-on-year improvement targets, or mid-term horizon targets.

Notes:

- This is based on the Full TWG support for recommending improving data quality over time
- Based on text from the Scope 3 Standard (bullets 1 and 2) and Scope 3 TWG draft text (bullets 3 and 4)

Poll questions on data quality

Poll questions

Topic	Questions	Options	Draft text
Data quality tiers	1. Which set of **data quality tiers** do you prefer?	a. Current approach (i.e., measured, specific, other, unclassified) b. Alternative approach (i.e., primary data, secondary data)	See slide #16
Data quality text	2. Do you support the proposed text for **data quality**?	a. Yes, fully support b. Yes, with minor edits c. No	• Companies **should** use the best available data when calculating their greenhouse gas emissions. • Companies **should** select data that are the most representative in terms of technology, time, and geography; most complete; and most reliable.
	3. Do you support the proposed text for **improving data quality over time?**	a. Yes, fully support b. Yes, with minor edits c. No	• Companies **should** improve the data quality of the inventory over time by replacing lower quality data with higher quality data. • Companies **should** prioritize data quality improvement for activities that have relatively low data quality and that have relatively high emissions. • Companies **should** set data quality improvement targets based on established metrics and considering the company context. • Companies **may** use year-on-year improvement targets, or mid-term horizon targets.

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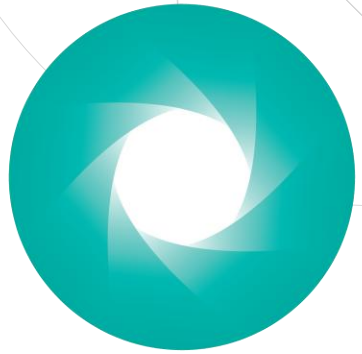

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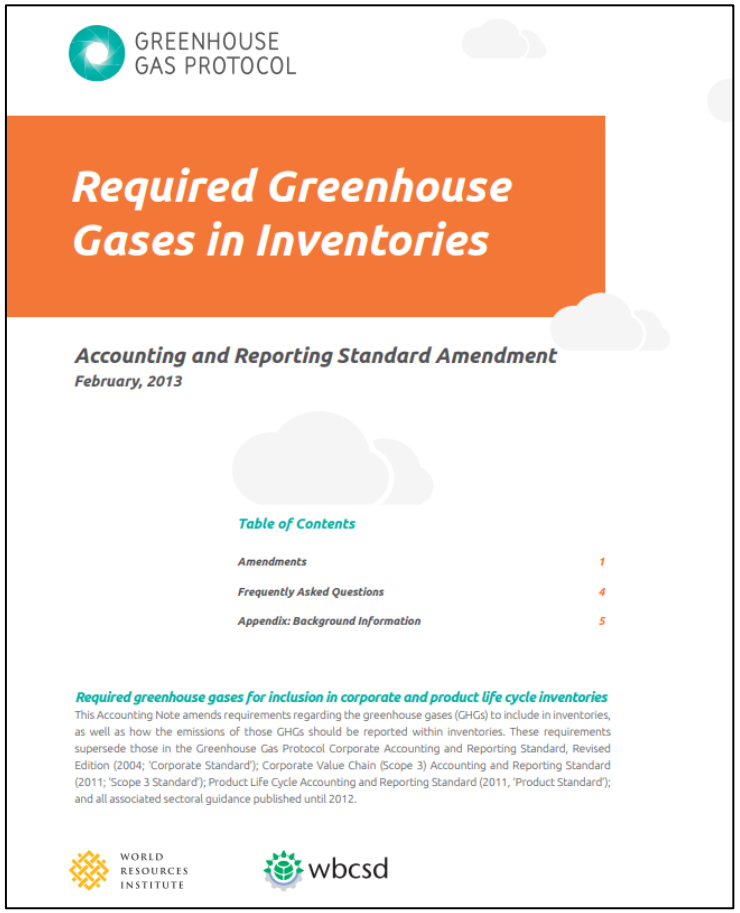
Current requirements: GHG Protocol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Required Greenhouse Gases in Inventories

Accounting and Reporting Standard Amendment
February, 2013

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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.

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

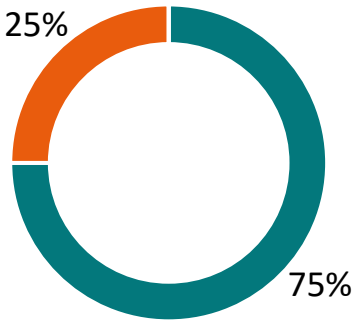
Key take-aways

- **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

Subgroup 3 poll results: Required GHGs

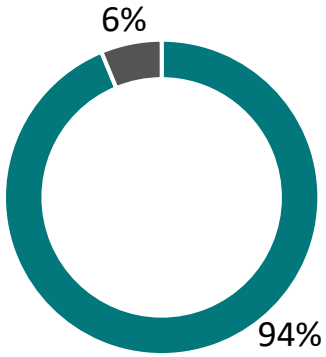
Which GHGs should be required?



Majority support for requiring the **GHGs covered by UNFCCC**

- GHGs covered by UNFCCC – status quo
- Define a specific list of GHGs beyond those covered by UNFCCC
- Abstain, I need more information to respond

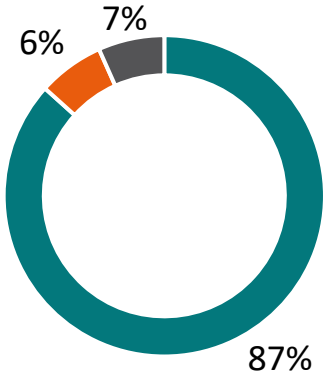
Should GHGs be required to be individually reported for **scope 1**?



Majority support for requiring **individual reporting of scope 1 GHGs**

- Yes – status quo
- No (required only total CO2e)
- Abstain, I need more information to respond

Should GHGs be required to be individually reported for **scope 2**?



Majority support for requiring **individual reporting of scope 2 GHGs**

- Yes – status quo
- No (required only total CO2e)
- Abstain, I need more information to respond

Note: The question for individual reporting of GHG for scope 3 will be posed again due to error in poll question last meeting

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		Other gases	
	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	t GHG	t CO_2e
Scope 1	Required	Required		Required		Required		Required		Required		Required		Required		*Optional*	
Scope 2	Required	Required		Required		Required		Required		Required		Required		Required		*Optional*	
Scope 3	Required, by category	*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)) Note: Disaggregated reporting of GHGs could be required if it would result in material information (following IFRS S1)
	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)
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)

Note: California Health and Safety Code section 38532 does not specifically mention required GHGs. States that entities shall "measure and report its emissions of greenhouse gases in conformance with the Greenhouse Gas Protocol"

Discussion and poll questions on required GHGs

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 3** a. Yes b. No (require only total CO2e) – *status quo*
Other GHGs	3. Should **other GHGs** not covered by UNFCCC be recommended or optional?	**a. Recommend** reporting of all other GHGs ("should" statement) – *status quo* b. Make reporting of other GHG's **optional** ("may" statement) c. Other		
	4. **Which other GHGs** should be recommended/optional?	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**		

Note: Greyed out questions were posed at Subgroup 3 Meeting 11

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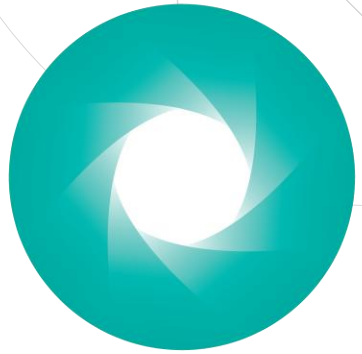

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F. Scope of work: Data/calculation methodology (Subgroup 3, Phase 2)

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.

Global Warming Potential: Background

Global Warming Potential (GWP)
=
radiative forcing impact of one unit of a given GHG relative to one unit of CO_2 over a specific period of time*

Key components for selecting GWP value:

- Specific to each **GHG**
- Multiple **time horizons** available
- Updated with each IPCC **Assessment Report**

Why are GWP values used?

→ Common, normalized units (CO_2-equivalents)

GWP values convert GHG emissions data for non-CO_2 gases into units of carbon dioxide equivalent (CO_2e)

Why do GWP values change?

- Radiative forcing is a function of the **concentration of GHGs in the atmosphere**
- **Methodology** to calculate GWP continues to evolve

*Corporate Standard GWP definition does not include "over a specific period of time"

Current requirements for GWP: GHG Protocol

2. When using the Corporate Standard, companies:

a. Shall use 100-year GWP values from the IPCC.

b. Should use GWP values from the most recent Assessment Report, but may choose to use other IPCC Assessment Reports.

c. Shall use GWPs from a single Assessment Report for any one inventory, where possible. If GWPs for a particular gas are not provided in the chosen Assessment Report, companies shall select the most recent GWPs for that gas.

d. Should use the same GWPs for the current inventory period and the base year, as well as for inventories prepared according to the Scope 3 Standard, to maintain consistency across time and scopes.

e. Shall report the source of the GWP values and indicate if multiple Assessment Reports have been used.

Key points:

- 100-year GWP **required**
- Most recent AR **recommended**
- Using single AR **required**, where possible
- Using same GWPs for base year **recommended**
- GWP disclosure **required**

AR = IPCC Assessment Report

Source: GHG Protocol Amendment on required gases and GWP values

GWP: External programs - Other Standards

Name	Requirements for GWP: Summary	Full text
ISO **14064-1:2018** **Corporate carbon footprint**	• **100-year GWP required** • **Latest IPCC GWP recommended** • Other time horizons may be used but reported separately	• *The organization shall convert the quantity of each type of GHG to tonnes of CO2e using appropriate GWPs.* • *The latest IPCC's GWP **should** be used. If not, justification shall be provided.* • *The GWP time horizon **shall be 100 years**.* • *Other GWP time horizons may be used, but **reported separately.***
ISO **14067:2018** **Product carbon footprint**	• **100-year GWP required** • **Latest IPCC GWP required**, if not otherwise stated and justified • Other GWP time horizons and GTP may be used but reported separately	• *In the LCIA phase of a CFP study, the potential climate change impact of each GHG emitted and removed by the product system **shall** be calculated by multiplying the mass of GHG released or removed by the **100-year GWP** given by the IPCC in units of kg CO2e per kg emission (with climate feedbacks, according to IPCC).* • *Where GWP values are amended by the IPCC, the **latest values shall be used** in the CFP calculations **if not otherwise stated and justified**.* • ***GWP for other time horizons and GTP**, as given by the IPCC, **may be used** in addition to GWP 100 but should be reported separately.* • *NOTE 2 - 100-year global warming potential (GWP 100) is used to represent shorter-term impacts of climate change, reflecting the rate of warming. 100-year global temperature potential (GTP 100) is used as an indicator for the longer-term impacts of climate change, reflecting the long-term temperature rise. **There is no scientific basis for choosing a 100-year time horizon compared to other time horizons.** The time horizon is a value judgement of international convention that weighs the effects that are likely to occur over different time horizons.*
GRI ***102 Climate change 2025***	• **100-year GWP required** • **Latest IPCC GWP required**	• *The **latest IPCC** GWP values **shall** be used.* • *The GWP time horizon **shall be 100 years**.* • *If the organization reports information for previous reporting periods calculated using different Intergovernmental Panel on Climate Change (IPCC) GWP values, it should report the values used in each reporting period.*

Note: SBTi CNZS does not appear to mention GWP

GWP: External programs – Climate disclosure rules

Name	Requirements for GWP: Summary	Full text
UNFCCC	• **100-year GWP required** • **IPCC Fifth Assessment Report**, or subsequent IPCC report • Other time horizons and metrics (e.g., GTP) may be used in addition	*Each Party **shall use the 100-year time-horizon global warming potential (GWP) values from the IPCC Fifth Assessment Report, or 100-year time-horizon GWP values from a subsequent IPCC assessment report** as agreed upon by the CMA, to report aggregate emissions and removals of GHGs, expressed in CO2 eq. Each Party may in addition also use other metrics (e.g. global temperature potential) to report supplemental information on aggregate emissions and removals of GHGs, expressed in CO2 eq. In such cases, the Party shall provide in the national inventory document information on the values of the metrics used and the IPCC assessment report they were sourced from.* Source: UNFCCC, decision 18/CMA.1, annex, chapter II

IFRS S2	Distinguishes between direct measurement and emissions calculated with emission factors
	• **Direct measurement**:
	  • Required to use 100-year time horizon
	  • Required to use latest IPCC AR
	• **Emission factors (EFs)**:
	  • Required to use representative EFs
	  • If EFs are aggregated, not required to disaggregate and recalculate with latest IPCC 100-year GWPs
	  • If EFs are NOT aggregated, the entity is required to use the latest IPCC 100-year GWPs
		• *(B21) If an entity uses **direct measurement** to measure its greenhouse gas emissions, the entity is required to convert the seven constituent greenhouse gases into a CO2 equivalent value using global warming potential values based on a **100-year time horizon**, from the **latest IPCC** assessment available at the reporting date.*
		• *(B22) If an entity uses emission factors to estimate its greenhouse gas emissions, the entity shall use—as its basis for measuring its greenhouse gas emissions—the emission factors that best represent the entity's activity (see paragraph B29). If these emission factors have already converted the constituent gases into CO2 equivalent values, the entity is not required to recalculate the emission factors using global warming potential values based on a 100-year time horizon from the latest Intergovernmental Panel on Climate Change assessment available at the reporting date. However, if an entity uses emission factors that are not converted into CO2 equivalent values, then the entity shall use the global warming potential values based on a 100-year time horizon from the latest Intergovernmental Panel on Climate Change assessment available at the reporting date.*

ESRS E1	• *The **latest IPCC** GWP values **shall** be used.* • *The GWP time horizon **shall be 100 years**.* • *If older GWP's are used, it should be justified in accordance with ESRS 2 GDR-M para 49.*	*"When preparing the information for reporting GHG emissions, the undertaking shall use the most recent Global Warming Potential (GWP) values published by the Intergovernmental Panel on Climate Change (IPCC) based on a 100-year time horizon to calculate CO2eq emissions of non-CO2 gases. If emission factors based on older GWP values are the most suitable or available, the undertaking can use these and explain…" (AR 39 (d) amended as AR 20 for paras. 28 and 29-(c)*

Note: California Health and Safety Code section 38532 does not specifically mention GWP. States that entities shall "measure and report its emissions of greenhouse gases in conformance with the Greenhouse Gas Protocol"

GWP: External programs – Summary

Name	100-year GWP	Latest IPCC GWP values	Other GWP time horizons	Notes
ISO 14064-1:2018 (CCF)	**Required**	**Recommended**	• May be used but reported separately	NA
ISO 14067:2018 (PCF)	**Required**	**Required**, if not otherwise stated and justified	• May be used but reported separately • Includes GTP	Notes that there is no scientific basis for choosing a 100-year time horizon compared to other time horizons
GRI *102 Climate Change 2025*	**Required**	**Required**	NA	NA
UNFCCC	**Required**	**IPCC Fifth Assessment Report**, or subsequent IPCC report		NA
IFRS S2	• Direct measurement: **Required** • Emission factors by GHG: **Required** • Aggregated (CO2e) emission factors: **Not required**	• Direct measurement: **Required** • Emission factors by GHG: **Required** • Aggregated (CO2e) emission factors: **Not required**	• Other metrics (including GTP) may be used	NA
ESRS E1	**Required**	**Required**	NA	Use of older GWPs must be justified

Note: California Health and Safety Code section 38532 does not appear to mention GWP

GHG Protocol stakeholder survey feedback: GWP

Guidance requested:

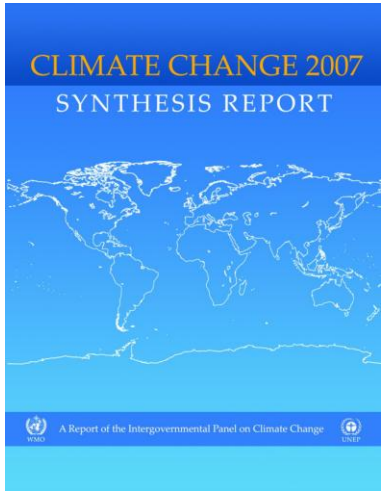
- Clarify **which IPCC Assessment Report (IPCC AR)** should be utilized for GWP values
    - Confusion about the **discrepancies** between the latest IPCC AR and UNFCCC requirements for GWP
    - Clarify ways that **historical years can be recalculated** using GWPs from a more recent IPCC AR to ensure target tracking
- Add clarity on the use of GWPs for **refrigerants that are not covered by the UNFCCC**. Examples of such guidance already exist and can be built upon (e.g., in the U.S. entities tend to refer to California Air Resource Board source on refrigerant GWPs).
- Clarify how to proceed when **CO2e emission factors cannot be disaggregated** into constituent GHGs

Suggestions:

- **Revisit 100-year GWP** as the sole required metric
- Consider **support of a 20-year GWP**, particularly as it relates to methane and other short-lived GHGs
- Some suggested dual reporting of 100-year GWP and 20-year GWP, and others suggested replace the 100-year GWP with the 20-year GWP for reporting requirements.

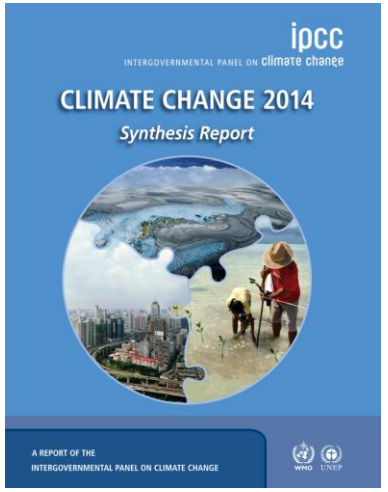
GWP: IPCC Assessment Reports

Global Warming Potential values are released in IPCC Assessment Reports



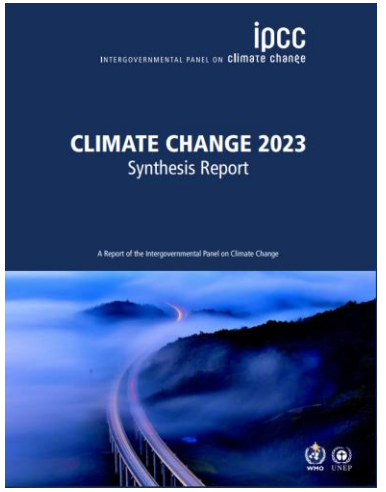
IPCC Fourth Assessment Report (**AR4**)
2007

No longer widely used



IPCC Fifth Assessment Report (**AR5**)
2013

Used by EPA and DEFRA



IPCC Sixth Assessment Report (**AR6**)
2021

Earlier IPCC Assessment Reports (AR3 in 2001, AR2 in 1995, and AR1 in 1990) are no longer used for GWP values.

GWP: IPCC Assessment Reports

IPCC Global Warming Potential (GWP) values relative to CO_2

Common chemical name or industrial designation	Chemical formula	GWP values for 100-year time horizon		
		Fourth Assessment Report (AR4)	Fifth Assessment Report (AR5)	Sixth Assessment Report (AR6)
Major Greenhouse Gases				
Carbon dioxide	CO_2	1	1	1
Methane – non-fossil	CH_4	25	28	27.0
Methane – fossil	CH_4	N/A	30	29.8
Nitrous oxide	N_2O	298	265	273
Nitrogen trifluoride	NF_3	17,200	16,100	17,400
Sulfur hexafluoride	SF_6	22,800	23,500	24,300
Hydrofluorocarbons (includes unsaturated hydrofluorocarbons)*				
HFC-23	CHF_3	14,800	12,400	14,600
HFC-32	CH_2F_2	675	677	771
HFC-41	CH_3F	92	116	135
HFC-125	CHF_2CF_3	3,500	3,170	3,740
HFC-134	CHF_2CHF_2	1,100	1,120	1,260

Key changes across ARs:

Fluctuation in GWP values

- CH_4 changes by 12%
- N_2O changes by 11%

Disaggregation of CH_4 into **fossil and non-fossil** GWP

- Change made for AR5

Source: IPCC GWP Values, compiled by GHGP

GWP: Time horizon

GWP time horizon refers to the time period over which warming effects are considered

GHG	Atmospheric lifetime (years)	20-year GWP	100-year GWP	500-year GWP
CO2	Multiple	1	1	1
CH4 non-fossil	11.8	**79.7**	**27.0**	7.2
CH4 fossil	11.2	**82.5**	**29.8**	10.0
N2O	109	273	273	130

Time horizons published by IPCC

- **20-year**
- **50-year**
- **100-year**

The difference is more pronounced for shorter-lived GHGs (like methane)

20-year time horizon has been promoted because:

- Highlights the impact of **shorter-lived GHGs**
- Recognizes the **urgency** of climate action

Source: IPCC Sixth Assessment Report

GWP: 20-year time horizon

Should the 20-year time horizon GWP be required, recommended, or an option?

Option	Notes	Pros	Cons
Require reporting with 20-year GWP ("shall")	• In addition to or instead of required reporting with 100-year GWP	• Highlights **short-lived GHGs** • Recognizes **urgency of climate action**	• **Hinders feasibility**
Recommend reporting with 20-year GWP ("should")	• In addition to required reporting with 100-year GWP	• Highlights short-lived GHGPs • Recognizes urgency of climate action • **Manages feasibility** as a recommendation	• Could hinder feasibility
Provide 20-year GWP as an **option** ("may" statement)	• In addition to required reporting with 100-year GWP • Other programs use this approach for all time horizons (e.g., ISO, IFRS S2)	• **Aligned** with other standards, programs • **Promotes flexibility**, especially if extended to GTP, other time horizons	• Could **hinder transparency** of the impact of shorter-lived GHGs
Stay silent on 20-year GWP	Status quo	• Status quo	• **Lack of clarity** for reporters

Discussion:

Should the 20-year time horizon GWP be required, recommended, an option, or should GHGP stay silent?

Source: IPCC Sixth Assessment Report

GWP: Fossil and non-fossil methane

Starting in Assessment Report 5, the IPCC differentiated methane into fossil methane and non-fossil methane

GHG	AR4 100-year GWP	AR5 100-year GWP	AR6 100-year GWP
CH4 **non-fossil**	25	28	27.0
CH4 **fossil**	NA	30	29.8

Fossil methane

- **Fossil fuel fugitive emission sources** (e.g., oil & gas systems, coal mining) and **industrial processes** where carbon in methane is of fossil origin (e.g., carbide production, ethylene production).
- **GWP value** includes the added radiative forcing effect from **CO2 that is formed from the oxidation of methane**, which occurs at the end of a methane molecule's atmospheric lifetime and then persists for the remainder of the 100-year time horizon.

Non-fossil methane

- **All other sources of methane emissions, including the combustion of fossil fuels** (i.e., mobile and stationary combustion)
- **GWP does not include the oxidation to CO2 effect** as the carbon at issue is either deemed not to be a net addition to the carbon cycle (i.e., of biogenic origin) or already accounted for in CO2 emissions from the same source.
- **Subtracts** carbon that is partially oxidized (e.g., to formaldehyde), deposited, and sequestered

For most corporate inventory reporters, non-fossil methane GWP is applicable

Fossil methane GWP only applies for select process emissions and industrial processes

Source: IPCC GWP Values, compiled by GHGP

GWP: Fossil and non-fossil methane

Guidance currently in GHG Protocol document titled: IPCC Global Warming Potential Values

Methane GWP Instructions

The IPCC AR6 provides multiple GWP values for methane:

- Methane - fossil
- Methane – non-fossil

The **Methane - fossil** GWP value should be used for methane emissions from fossil fuel fugitive emission sources (e.g., oil & gas systems, coal mining) and industrial processes where carbon in methane is of fossil origin (e.g., carbide production, ethylene production). This GWP value includes the added radiative forcing effect from CO_2 that is formed from the oxidation of methane, which occurs at the end of a methane molecule's atmospheric lifetime and then persists for the remainder of the 100-year time horizon.

All other sources of methane emissions, including from combustion of fossil fuels, should use the **Methane - non-fossil** GWP value. The "non-fossil" GWP does not include the oxidation to CO_2 effect as the carbon at issue is either deemed not to be a net addition to the carbon cycle (i.e., of biogenic origin) or already accounted for in CO_2 emissions from the same source. The "non-fossil" GWP should be used for combustion emissions (i.e., mobile and stationary combustion), as the GWP also does not include the methane oxidation to CO_2 as this radiative forcing is typically already accounted for through the estimation of combustion CO_2 emissions for the same emission source; therefore, it would be double counting to apply the higher fossil GWP value.[ii]

Discussion:

Should GHG Protocol provide guidance on fossil and non-fossil methane in the Corporate Standard?

Or is the guidance in the GWP document sufficient?

Source: IPCC GWP Values, compiled by GHGP

GWP: Global Temperature change Potential (GTP)

Global Temperature change Potential (GTP)

=

change in global mean surface temperature at a specific point in time in response to an emission pulse, *relative to CO2*

GHG	Atmospheric lifetime (years)	GTP-50	GTP-100
CO2	Multiple	1	1
CH4 non-fossil	11.8	13.2	7.5
CH4 fossil	11.2	10.4	4.7
N2O	109	290	233

GTP goes a step further than GWP

- GWP is a measure of heat absorbed
- GTP is a measure of the temperature change

As a result, GTP estimates are more complex and uncertain.

GTP is an end-point metric

- Because it is specific to a particular year, it could be suitable for target-setting

However…

UNFCCC, IPCC, climate rules, and other climate programs use GWP to standardize GHG emissions

And…

There are other proposed metrics (e.g., GWP*)

Source: IPCC AR6 Chapter 7 | Climate Change 2021: The Physical Science Basis

GWP: Aggregated emission factors in CO2e

Aggregated CO2e emission factors are already in units of CO2-equivalents

This means GWPs have already been applied, and it is difficult (or sometimes impossible) for reporters to separate out the emission factors into its constituent GHGs

This is most common for scope 3 emission factors, such as:

- Lifecycle emission factors
- Spend-based emission factors (e.g., EEIO)

Maintaining "companies <u>should</u> use the most recent IPCC Assessment Report" would address this issue

Discussion:

- Should the same IPCC AR requirements apply to aggregated (CO2e) emission factors?
- What should be prioritized when there are tradeoffs: Representativeness or the IPCC AR version?

IFRS S2 takes the following approach to aggregated emission factors:

Distinguishes between direct measurement and emissions calculated with emission factors for GWP requirements

- **Direct measurement**:
  - Required to use 100-year time horizon
  - Required to use latest IPCC AR
- **Emission factors (EFs)**:
  - Required to use representative EFs
  - **If EFs are aggregated, <u>not required</u> to disaggregate and recalculate with latest IPCC 100-year GWPs**
  - If EFs are NOT aggregated, the entity is required to use the latest IPCC 100-year GWPs

IFRS

Global Warming Potential

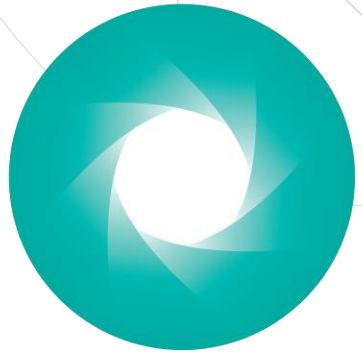
Full Group Discussion **Poll questions**

Draft for TWG discussion

Topic	Questions	Options
Time horizon	1. Should the **100-year GWP** continue to be required?	a. Yes, **require** 100-year GWP – *status quo* b. No, 100-year GWP should be **reconsidered**
	2. Should the **20-year GWP** be required, recommended, or an option for separate reporting?	**a. Require** 20-year GWP ("shall" statement) **b. Recommend** 20-year GWP ("should" statement) c. Provide 20-year GWP as an **option** ("may" statement) **d. Stay silent** on 20-year GWP – *status quo*
	3. Should **other metrics** (e.g., GTP, GWP*) be required, recommended, or optional for separate reporting?	**a. Require** other metrics in addition to GWP **b. Recommend** other metrics in addition to GWP c. Provide other metrics as an **option** ("may" statement) **d. Stay silent** on other metrics – *status quo*
Assessment Reports	4. Which IPCC **Assessment Report (AR)** should be used?	**a. Shall** use the most recent IPCC Assessment Report **b. Should** use the most recent IPCC Assessment Report – *status quo*
	5. Should the same IPCC AR be used **across the inventory**?	**a. Shall** use GWPs from a single AR for any one inventory **b. Shall** use GWPs from a single AR for any one inventory, **where possible** – *status quo* **c. Should** use GWPs from a single AR for any one inventory
	6. Should the same IPCC AR be used for the **base year**?	**a. Require** that the same GWPs are used for the inventory and base year **b. Recommend** that the same GWPS are used for the inventory and base year – *status quo*
Aggregated emission factors	7. Should the same IPCC AR requirements apply to **aggregated (CO2e) emission factors**?	**a. Shall** use the same IPCC AR for aggregated emission factors **b. Should** use the same IPCC AR for aggregated emission factors **c. May** use the same IPCC AR for aggregated emission factors

Agenda

Introduction and housekeeping	10 minutes
Follow-up from Full TWG meeting	20 minutes
Required greenhouse gases	30 minutes
Global warming potential	50 minutes
Wrap-up and next steps	**10 minutes**



GREENHOUSE GAS PROTOCOL

Next steps

Upcoming meetings (tentative):

Subgroup 3 Meeting 13 • *Other climate forcers* • *Continue on other phase 2 topics*	Tuesday March 10th, 2026	9:00 ET / 14:00 CET / 21:00 CHN
Subgroup 3 Task Force Meeting 4 • *Calculation methods + emission factors*	Tuesday March 17th, 2026	9:00 ET / 14:00 CET / 21:00 CHN

Note: We are revising the workplan. Stay tuned for updated meeting dates.

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 date TBD

GREENHOUSE GAS PROTOCOL

Thank you!

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