GREENHOUSE GAS PROTOCOL

Scope 3 Technical Working Group Meeting

Working draft, do not cite

Full TWG
Phase 2, Meeting 11

Quantification methods for category 11 and 12, and recent survey results

April 9th, 2026

WORLD RESOURCES INSTITUTE

World Business Council for Sustainable Development

Supplementary pre-read materials

- E2 | Spreadsheet case study model comparing cumulative and annualized approaches for a company designing and introducing more durable products (Stock vs sales-based comparison scenarios.xlsx)

- E3 | Spreadsheet model comparing (Using static vs projected EFs for cumulative approach.xlsx):
  - Emissions outputs use of static emission factors;
  - Projected emission factors based on historic trends;
  - Actual emission factors

- E1.7 | Optional pre-read material (unlikely to be discussed in this upcoming TWG) (Optional pre-read E1.7, folder):
  - Various standards/guidance available for ICT scope 3 calculations

(Draft; for discussion)

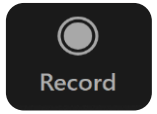
Agenda

- Housekeeping (10 mins)
- Quantification approaches and forward-looking emission factors (50 mins)
- End-of-life quantification approach (25 mins)
- Other survey results (10 mins)
- Additional reporting metrics (20 mins)
- Next steps (5 mins)

(Draft; for discussion)

Housekeeping and decision-making criteria

Welcome and Meeting information



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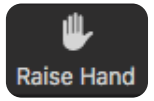
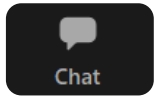


Please mute yourself by default and unmute when speaking

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.

Housekeeping

- 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 the 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*

- Maintain a respectful approach to communicating by:
  - Assuming positive intent; making space for different perspectives; and defaulting to curiosity

* 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

Decision-Making Criteria

- Evaluating options: Describe pros and cons of each option relative to each criterion. Qualitatively assess the degree to which an option is aligned with each criterion through a green (most aligned), yellow (mixed alignment), orange (least aligned) ranking system. Some criteria may be not applicable for a given topic; if so, mark N/A.
- Comparing options: The aim is to advance approaches that ideally meet all decision criteria (i.e. maximize pros and minimize cons against all criteria). If options present tradeoffs between criteria, the hierarchy should be generally followed, such that, for example, scientific integrity is not compromised at the expense of other criteria, while aiming to find solutions that meet all criteria.

Illustrative example	Option A: Name	Option B: Name	Option C: Name
1A. Scientific integrity	• Pros • Cons	• Pros • Cons	• Pros • Cons
1B. GHG accounting and reporting principles	• Pros • Cons	• Pros • Cons	• Pros • Cons
2A. Support decision making that drives ambitious global climate action	• Pros • Cons	• Pros • Cons	• Pros • Cons
2B. Support programs based on GHG Protocol and uses of GHG data	• Pros • Cons	• Pros • Cons	• Pros • Cons
3. Feasibility to implement	• Pros • Cons	• Pros • Cons	• Pros • Cons

Note: This is a summary version. For further details, refer to the full decision-making criteria included in the annex to the Governance Overview, available at https://ghgprotocol.org/our-governance.

(Draft; for discussion)

2026 workplan

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Pre-read

Full Scope 3 TWG Meetings - 2026

Meeting #	Date	Time	Topic
7	*Jan 15*	*9-11 AM ET*	• *EOY Survey review & Phase 2 (2026) SoW and Timeline review*
8	*Feb 5*	*9-11 AM ET*	• *Phase 1 review, Category 10/11 considerations*
9	*Feb 26*	*9-11 AM ET*	• *Phase 1 survey review, Category 10/11 considerations*
ISB Meeting	*Mar 12*	*n/a*	• *Approval of Phase 1 Revisions to-date and/or Progress Update for public disclosure*
10	*Mar 19*	*9-11 AM ET*	• *Category 10/11 (continued)*
11	**Apr 9**	**9-11 AM ET**	• **Category 10/11 (continued)**
12	Apr 30	9-11 AM ET	• **Circularity, recycling, second-hand, and waste incineration**
13	May 21	9-11 AM ET	• Circularity (continued)
14	Jun 11	9-11 AM ET	• Circularity (continued)
ISB Meeting	*Jun 29*	*n/a*	• *Review and Approval of Phase 2 Revisions*
15	Jul 2	9-11 AM ET	• **Review Draft text and/or ISB comments**
16	July 23	9-11 AM ET	• Review Draft text and/or ISB comments (continued)

Target deadline for public consultation: **October 20th, 2025** *

** This is the target deadline for public consultation is being reviewed by the Secretariat and may change in the coming months.*

(Draft; for discussion)

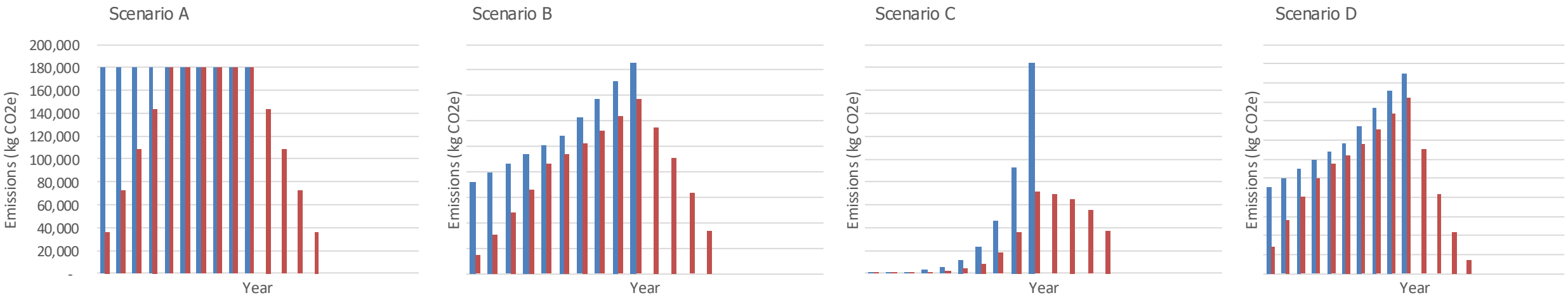
E2. Quantification methodologies for durable products

E2.1 and E2.2 | Reminder of approaches being considered

- For each approach, the following statements articulate what a company **reports**:

Current approach	Stock-based approach*
All current and future year use-phase emissions from a sold product, are estimated and reported in the **year** that the product is **sold**.	**All** use-phase emissions from a sold product, are estimated and reported in the **year(s)** that the product is **in use**.

- As shown below, holding all assumptions the same (e.g., lifespan, usage-rates, emission factors, etc.), a company using either approach would report the **same cumulative multi-year** category 11 emissions:



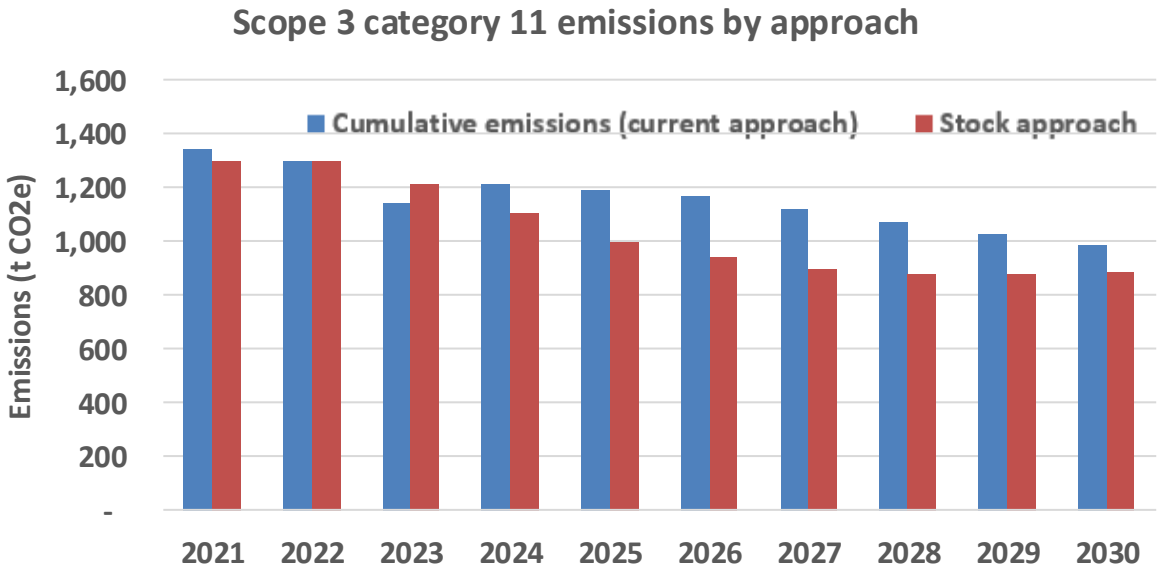
* Usage-based approach (E2.2) is considered here a subtype of a stock-based approach
Note that for some products (e.g., software), defining product "lifetime" is less intuitive

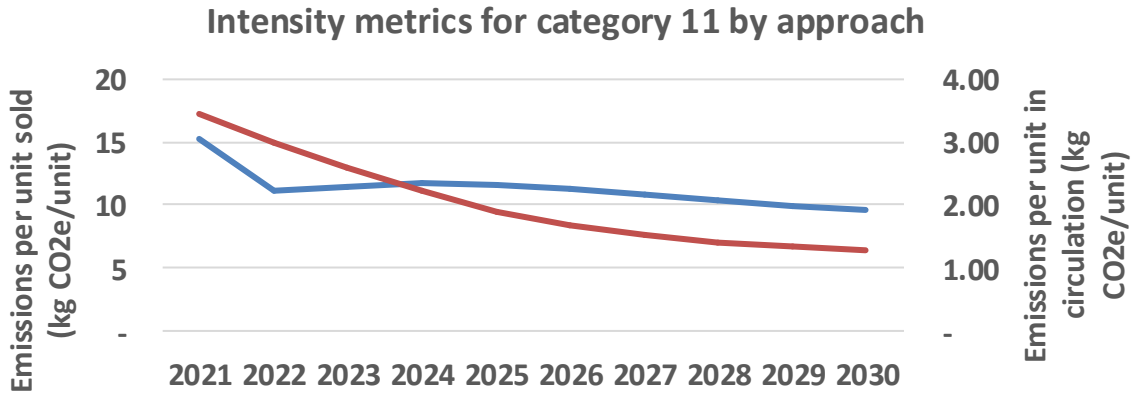
E2.1 and E2.2 | Case study – mobile phone company

- A mobile company has three handsets with different expected lifetimes and energy efficiencies released over time

Product	Expected lifetimes	Energy consumption per year when sold (kWh/yr)	Sales begin in	Sales end in
A	5 years	7.5	2016	2025
B	6 years	3.5	2021	2027
C	8 years	3.5	2023	n/a

- ***Model assumptions***: synthetic retirement schedule created to match expected lifetimes; assumed 2.5% increase in energy consumption per year (to simulate loss of battery life); global electricity emission factors used; Sales data and baseline emissions from ESG reports.
- No data on phones in circulation available prior to 2021. Assumed compound growth back to 2016.
- Uses static emission factors in the cumulative emissions approach





Input parameters are loosely derived from Fairphone's publicly available ESG disclosures, sustainability reports, and product LCAs. The resulting outputs are illustrative only and should not be interpreted as Fairphone's actual or official data.

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For discussion

E2.1 and E2.2 | Decision-making criteria for different quantification approaches

Criteria	Current approach	Stock-based approach
1A. Scientific integrity	• **Pros**: Accounts for lasting emissions impact of a company's activity in a given year • **Cons**: Less physically grounded as emissions are not accounted in the year they are emitted; doesn't easily allow the use of measured usage statistics (i.e., higher quality data)	• **Pros**: More scientific as emissions are accounted in the year they are emitted; more readily allows usage-based; models used to estimate in-year emissions more likely to use appropriate emission factors
1B. GHG accounting and reporting principles	• **Pros**: Transparent, complete, consistent, and relevant • **Cons**: Potentially less accurate as assumptions need to be made on changing externalities (e.g., grid decarbonization)	• **Pros**: Similarly transparent, complete, consistent, accurate (relying on more reliable parameter assumptions), and relevant.
2A. Support decision making that drives ambitious global climate action	• **Pros**: Shifting product portfolio is reflected immediately; re-baselining would be easier • **Cons**: Durable products disincentivized	• **Pros**: Encourages good practice tracking of product use characteristics and engaging with product lifespan • **Cons**: Durable products disincentivized; companies would not see the benefit of changing their products design immediately; Re-baselining would be challenging
2B. Support programs based on GHG Protocol and uses of GHG data	• **Pros**: Harmonizes with other standards, what is used in target setting, and downstream programs and with the *Product Standard*	• **Cons**: Would not harmonize fully with other standards nor with the *Product Standard* (full life cycle basis)
3. Feasibility to implement	• **Pros**: No hassle maintaining records • **Cons**: Sometimes difficult to estimate	• **Pros:** Most of the data and assumptions that are needed for this approach are the same as for the current approach • **Cons**: More complicated to collect emissions data and maintain records, especially for acquired companies.

- The options and preliminary comparisons herein are not designed to be final, complete, or all-encompassing.

E2.1 and E2.2 | Potential options for TWG consideration*

Option	Description
#1 **Parallel reporting**	**Shall** use **current approach**; **Shall** use stock-based approach* (i.e., two (dual) GHG inventories for Cat. 11) - Parallel reporting gives programs (e.g., target setting or disclosure frameworks) choices for which metric best serves program objectives - Adds complexity and burden for reporters **
#2 **Current approach**	**Shall** use **current approach**; [**Shall**/**should**/**may**] use **stock-based approach** as a reporting metric - Maintains consistency with current standard - Recognizes the benefits of a stock-based approach
#3 **Stock-based approach**	**Shall** use **stock-based approach**; [**Shall**/**should**/**may**] use **current approach** as a reporting metric - Uses the method that corresponds to emissions in the reporting year - Recognizes the benefits of the current approach - Causes some disruption relative to current reporting practices
#4 **Optionality**	**May** use ***either*** **approach (current *or* stock-based)** - Maximizes flexibility for reporters - Hampers comparability, consistency, and harmonization

* In these options, we consider a usage-based approach as a type of stock-based approach

** Multi-statement reporting is being considered by the AMI TWG (e.g., physical, contractual, and consequential statements)

(Draft; for discussion)

E3. Using projected emission factors in lifetime calculations

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For discussion

E3 | Problem statement

- Models of **lifetime emissions in category 11 for sold products** may use emission factor inputs from projected, forward-year EF schedules (e.g., projected EFs of grid decarbonization for future years)
  - For example, some reporting companies may project a growing (higher) % of renewables in the energy generation mix in forward years, particularly for durable electricity-powered products
  - This is not necessarily limited to electricity: other fuels may also have reduced (or increasing) fossil emission factors in future years (e.g., gasoline, diesel, natural gas) (including from declining EROEIs)

- The *Scope 3 Standard* has no explicit text on whether "future-year emission factors" shall/should/may be used for the calculations. **This revision seeks to define what rules (if any) should exist in the revised *Scope 3 Standard***.

- Note that the relevance of this revision depends on the outcomes of E2. Only requiring a stock-based approach for reporting (as opposed to as a performance metric) would avoid needing to resolve this issue fully. Instead, guidance could be developed to outline best practices.

Note that this relevance of this revision changes based on whether a stock-based (and usage-based) approach is used for scope 3 reporting (and not just as additional performance metric)

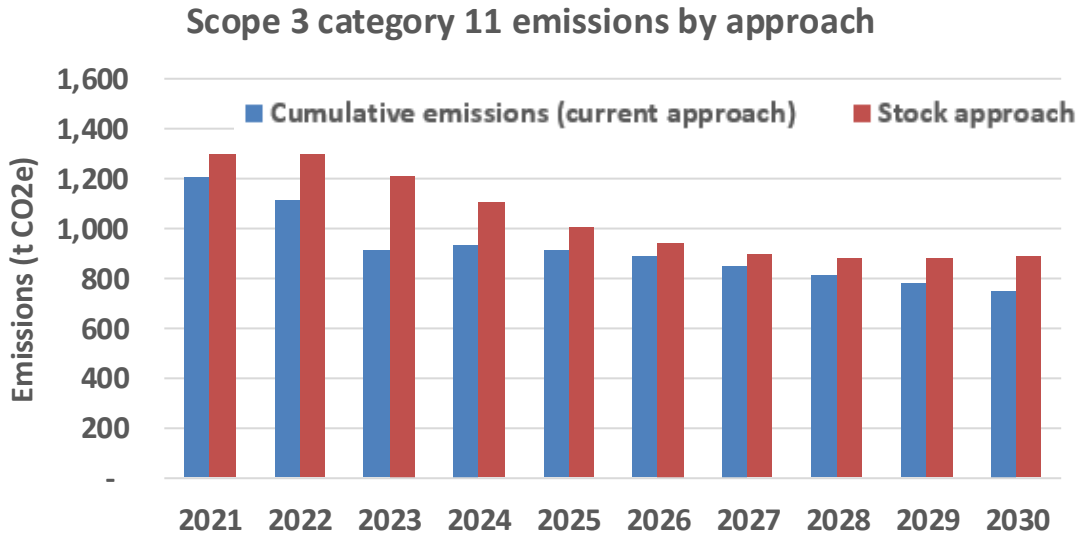
E3 | Case study – mobile phone company using projected grid decarb

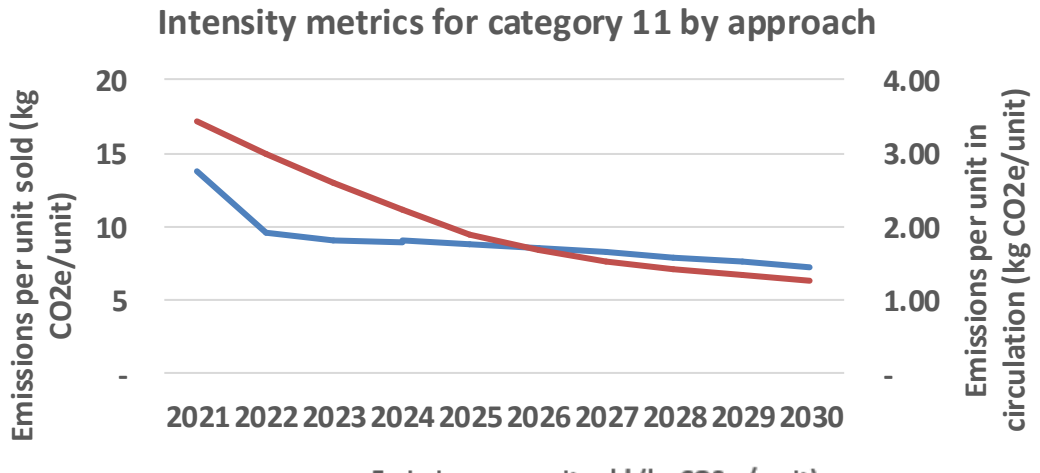
- A mobile company has three models with different expected lifetimes and energy efficiencies released over time

Product	Expected lifetimes	Energy consumption per year when sold (kWh/yr)	Sales begin in	Sales end in
A	5 years	7.5	Pre-time series 2021	2025
B	6 years	3.5		2027
C	8 years	3.5	2023	n/a

- ***Model assumptions***: retirement schedule created, 2.5% increase in energy consumption per year (to simulate battery life), global electricity emission factors, and sales data from ESG publications (with reasonable extrapolations), ***4.2% decarbonization in grid per year***

- **Note that this material will not be presented in the TWG meeting. Please familiarize yourself with accompanying documents prior to the session**





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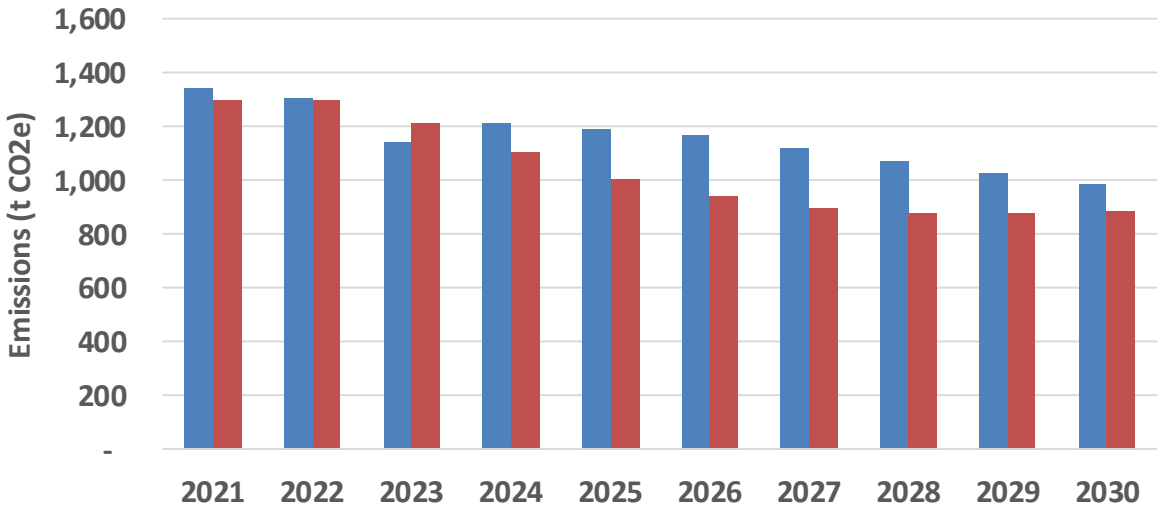
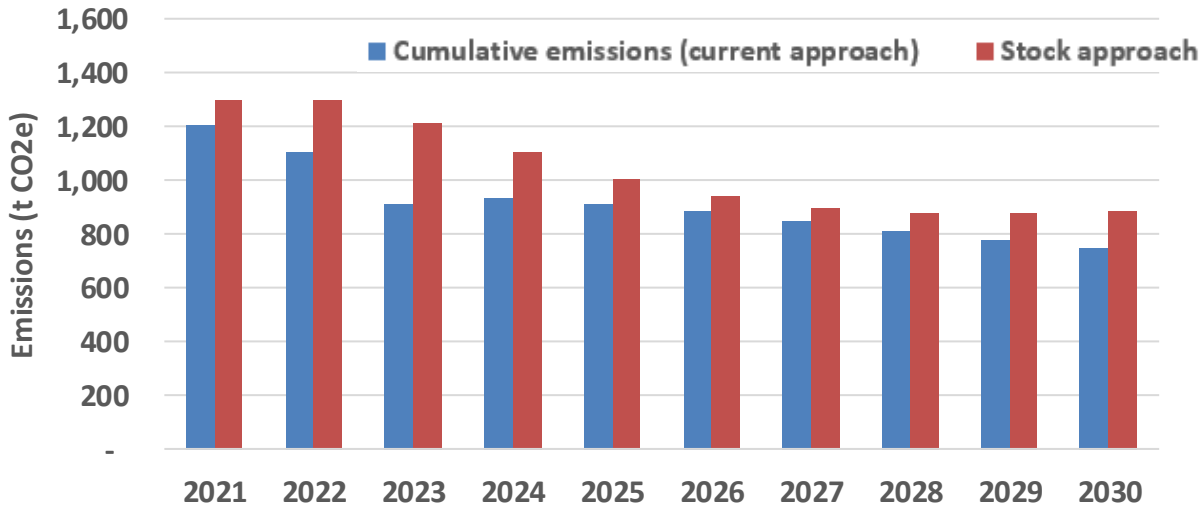
Comparison against static emission factor approach

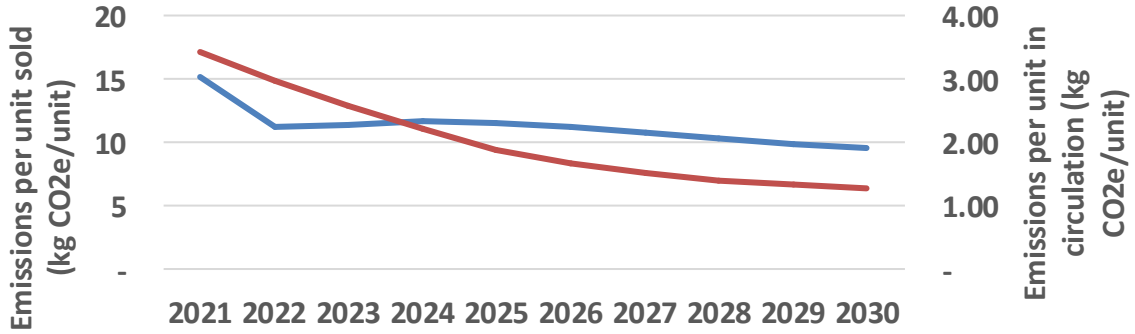
Static emissions factors



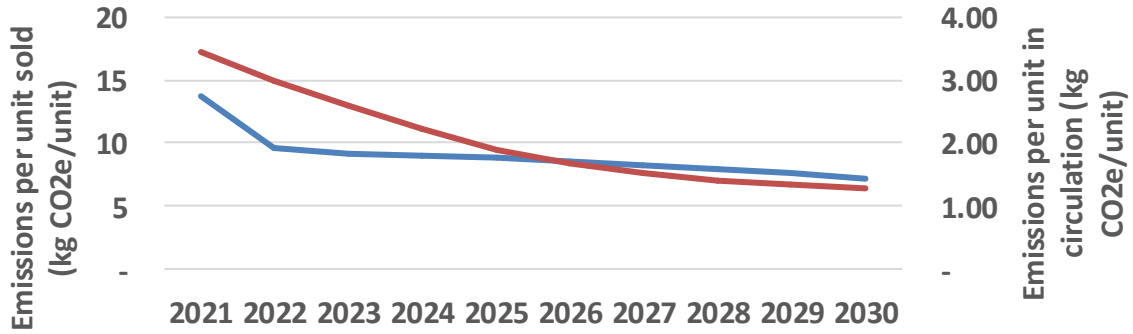
Non-static emission factors



Intensity metrics for category 11 by approach



Intensity metrics for category 11 by approach



E3 | Availability of future-year emission factors

- **Electricity emission factors** for future years are not readily available in the public domain for all countries. Some sources include:
  - IEA World Energy Outlook (regional factors are free on 5-year resolution, country-specific paywalled)
  - EnerData (as with IEA, regional factors on 5-year resolution, country-specific paywalled)
  - IRENA provides data on expected renewable energy generation/capacity but not in an easily navigable format
  - CRREM provides projected emission factors for 44 countries (US, Canada, Europe, major APAC nations)
  - US EIA, NRL Cambium provide data specific for the US

- Less information is available for **other energy types** (e.g., biogas injection into natural gas networks, FAME blending in diesel)

- A requirement ("shall") may not be feasible for all countries, but could be considered feasible to require for companies that sell to certain countries with good coverage of free resources (e.g., US and Europe)

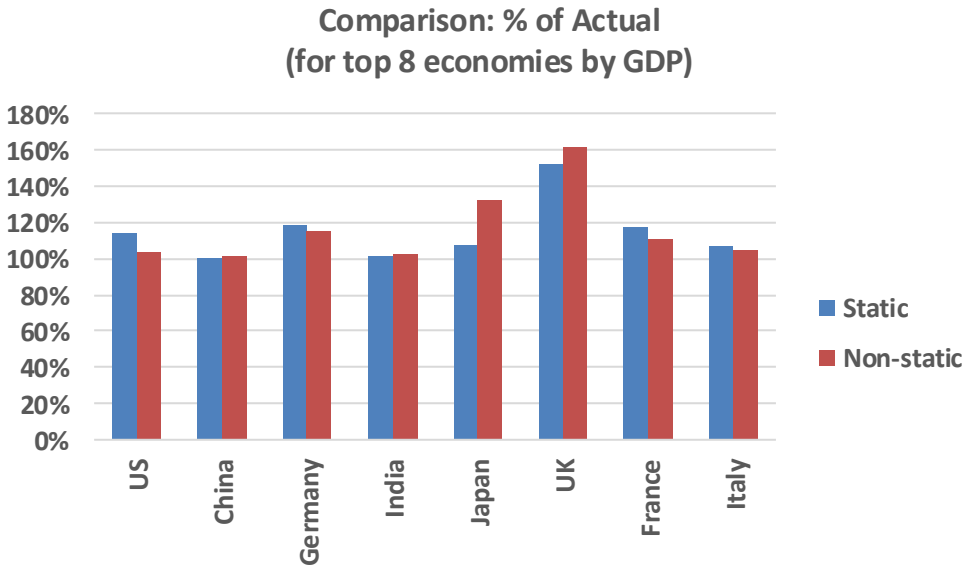
- Extrapolations based on historic data are possible for remaining countries, but extrapolations may overlook the discontinuous nature of underlying reasons for trends (e.g., power plant decommissioning, energy policy changes, funding and incentives for renewable capacity expansion, shifts in import/export approaches) – see next slide and accompanying spreadsheet

E3 | Using historic emissions trends as a proxy

- In the accompanying spreadsheet considers emissions calculations for an electric vehicle consuming 3600 kWh per year with a 10-year lifespan.
- The spreadsheet compares three methods:
  1. Static emission factors from the year of sale (2023) for an EV consuming 3600kWh per year (termed: '**static**')
  2. Projected emission factors based on extrapolated trends from previous years (2005-2012) (termed: '**non-static**')
  3. Actual emission factors (ex-post) (for years 2013-2022) across those 10 years (similar to the stock-based approach, termed 'actual' in the file) (termed: '**actual**')

- The results show that, in general, static and non-static approaches produce similar disparities vs actual emissions, although variation differ across regions and countries

Statistical comparison vs actual	Static	Non-Static
Mean absolute error	12%	16%
Median absolute error	6%	7%
Mean signed error (i.e., bias)	2%	5%
Over-est.	112	118
Under-est.	59	53
% over-estimation	10%	15%
% under-estimation	-14%	-19%
Spread (over-under)	25%	34%



Note that this material will not be presented in the TWG meeting. Please familiarize yourself with accompanying documents prior to the session

E3 | Decision-making criteria

- Options include **requiring** ("shall"), **recommending or allowing** ("should"/"may"), or **disallowing** ("shall not") the use of future year emission factors in category 11. The following is comparison of the general approaches:

Criteria	Using projected emission factors*	Using static emission factors (current status quo)
1A. Scientific integrity	**Pros**: Allows more representative view of emissions associated with sold products, particularly for countries with existing data sources **Cons**: Calculations may need to be based on regional, global, or proxy assumptions which may not more closely resemble reality that a static EF approach	**Pros:** Emission factors that are used will tend to be ex-post and inherently more credible than ex-ante projected emission factors **Cons**: Using ex-post emission factors will not consider important externalities, such as country-specific energy policy, power plant decommissioning schedules, uptake of renewables
1B. GHG accounting and reporting principles	**Pros:** When data is available, it may make reporting more accurate and relevant **Cons:** The range of assumptions that can be made may hinder transparency, comparability, and consistency	**Pros**: Ensures consistency of approach, comparability, and transparency **Cons**: Knowingly misrepresents future emissions and compromises accuracy and relevancy
2A. Support decision making that drives ambitious global climate action	**Pros:** Encourages reporting companies to electrify products, if emissions can be shown (or expected) to be decreasing in regions with high electricity carbon intensities; showing even greater benefit to electrifying; and factors in long-term decreasing EROEI of fossil energy **Cons**: Poor quality modelling may disguise genuine environmental impacts that companies should mitigate	**Pros**: Encourages reporting companies take their own action rather than relying on externalities **Cons**: Does not encourage electrification of products in areas with rapidly changing grid intensities
2B. Support programs based on GHG Protocol and uses of GHG data	**NA.** Unclear how prevalent this practice is. The spirit of the existing text is to use the best available data, which may mean this is already calculated. It may not	**Pros:** Brings comparability to data. Easier for assurers to verify data Unclear how prevalent this practice is currently. The spirit of the existing text is to use the best available data, which may mean this is already calculated.
3. Feasibility to implement	**Pros**: Not easy to source emission factors for several countries and may require technical expertise / capacity that some SMEs may lack	**Pros**: Easier to calculate; aligns with general approach for most companies

* Note that the criteria consider global rules on the use of projected emission factors. The TWG may wish to consider whether the criteria are different for certain jurisdictions and whether the GHGP should create jurisdiction-specific rules.

(Draft; for discussion)

E2.1 & E2.2 Survey results on quantification methods

E2.1 and E2.2 | Indicative survey results on decision-making criteria

Placeholder for survey results.
Please respond to the surveys by 7th April

For discussion

E2.1 and E2.2 | Quantification models

Discussion points

- What is your initial reaction to the indicative survey results?
- Should different approaches be required for different types of product?
  - For intangible products where 'lifetime' or 'lifecycle' is more difficult to conceptualize (e.g., software)
  - If so, can what products this applies to clearly?
- In either case, how should reporting companies consider refurbishment / reuse of their sold products in cases where:
  - The refurbishment / reuse is expected
  - The refurbishment / reuse is not expected

(Draft; for discussion)

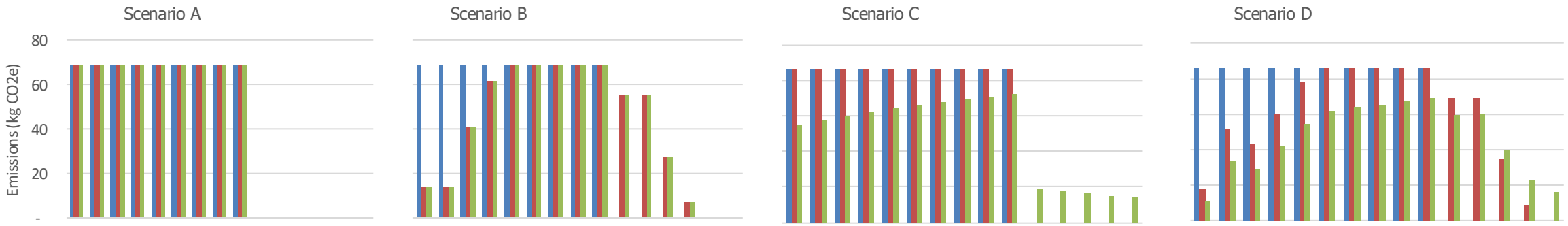
Implication on end-of-life methodology

Comparison of EoL methodologies

- For each approach, the following statements articulate what a company **reports**:

Current approach	Cumulative year-of-disposal approach	Depreciation approach
All emissions from disposal and treatment of a sold product are estimated and reported in the **year** that the product is **sold**.	**All** emissions from disposal and treatment of a sold product are estimated and reported in the **year** that the product is **disposed of**.	**All** emissions from disposal and treatment of a sold product are estimated and reporting over the **year(s)** that emissions **physically occur** (e.g., depreciating).

- In all cases, if assumptions on treatment pathways, emissions intensity of pathways, and gas capture are kept the same, cumulative emissions per kg of waste are equal
  - Scenario A -> For inert* products, non-durable (used and disposed of within one year)
  - Scenario C -> Non-inert products, non-durable
  - Scenario B -> Inert products, durable
  - Scenario D -> Non-inert products, durable



* In this case, inert means does not decay and produce GHG emissions

Implication on end-of-life treatment

Placeholder for survey results.
Please respond to the surveys by 7th April

For discussion

Discussion

Discussion points

?

- What is your initial reaction to the indicative survey results?
  - Do you feel that any important perspectives are underrepresented in the results?
- What implications do you see of this result on incentivizing (or disincentivizing) circularity?

E6. Category 11 metrics

E6 | Revision objective

- On its own, scope 3 category 11 (and potentially other downstream product-related categories) may miss nuances about the environmental impact of products that a company may sell, and noteworthy trends that are disguised by other factors (e.g., increases in sales may obscure energy efficiency improvements that a company may wish to ensure is considered by other users of the data)

- Other metrics can be used to contextualize category 11 emissions. Such as:
  - Emissions intensity per unit of product sold
  - Rates of refurbishment/recycling for products
  - Emissions for a stock-based approach, per unit of product in circulation
  - Average lifetime/durability of products

- In some cases, it may be important to ensure that similar information is available for all reporting companies.

- **<u>This revision considers whether any metrics need to be explicitly required.</u>**
- Additionally, if the TWG feel more metrics should be recommended, then ideas can be raised in this revision

E6 | Existing optional metrics

Scope 3 Standard (p. 122)

Section: "Optional reporting: Information on product performance"

"To provide appropriate context related to category 11 (Use of sold products), a public GHG emissions report should include, when applicable, the following additional information:

- Product performance indicators and intensity metrics (e.g., average GHG intensity of sold products, average energy efficiency of sold products, average emissions per hour of use, average fuel efficiency of sold vehicles, average emissions per kilometer driven, GHG intensity of sold fuels, average emissions per functional unit, etc.)
- Annual emissions from the use of sold products (i.e., emissions that occur in a single year from products sold in the reporting year)
- Average lifetime/durability of sold products
- The methodologies and assumptions used to calculate product performance indicators and intensity metrics
- The percentage of sold products that are compliant with standards, regulations, and certifications, where applicable
- A statement explaining why emissions from category 11 (Use of sold products) have increased or decreased over time
- Any sold products not included in the inventory, with justification for their exclusion
- Other relevant information"

For discussion

E6 | Discussion

Discussion points

?

- What needs to be true for an additional metric to be important enough to be a **requirement for reporting** alongside scope 3 reporting?
- Do any of the existing optional metrics meet these criteria?
  - If yes, how would you go about setting up rules to calculate said metrics?
- Is it the place of the *Scope 3 Standard* to require the disclosure of what may be construed as product-specific metrics?
- How can product use metrics avoid potential inadvertent legal implications of product level environmental claims in terms of consumer protection laws?
- How should the GHGP refer to sector-specific metrics? Should any be explicitly documented in the revised *Scope 3 Standard*?

Other survey results

Placeholder for other survey results

Placeholder for survey results.
Please respond to the surveys by 7th April

Next Steps

Next steps

- GHG Protocol Secretariat:
  - Distribute the Recording
  - Distribute Meeting Minutes and the Feedback Form

- Next meeting:
  - **April 30th Meeting #12 at 9 - 11 AM ET**

GREENHOUSE GAS PROTOCOL

Thank you!

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(Draft; for discussion)

Next TWG meeting (April 30) E1.7 Accounting for non-physical products or services

E1.7 | Problem statement

- Category 11 can be more clearly and consistently applied to physical (tangible) products, rather than non-physical products such as software and digital services.
  - Digital products, in particular, have become more prevalent since the original *Scope 3 Standard* was published

- There is some ambiguity about how downstream emissions should be attributed to products and the data storage, network transfers, and computational requirements of digital products in particular
  - Web-based software is included as a 'type of product' in category 11 for direct use-phase emissions but there is unclear methodological direction

- Ambiguities may lead to inconsistent interpretations and application across reporting companies, limiting comparability and reducing confidence in reported downstream emissions for software and other digital products

- Objective of this revision is to provide more clarity on rules for reporting emissions that occur due to the use of non-physical products, clarify where to report said emissions (if relevant), and appropriate allocation rules

* Note that focus of discussions will be on digital products. Other intangible products use-phase (e.g., services) are likely to be already in a company's scope 1 and 2, and downstream emissions defined as a facilitated activity.

E1.7 | Existing guidance

- A product is defined as "any good or service" (*Scope 3 Standard, pg. 140)*

- Both category 10 and 11, therefore, both implicitly includes any good or service sold by a reporting company:
  - Table 5.4 *Scope 3 Standard* category descriptions:
    - **Processing of sold products:** Processing of intermediate products sold in the reporting year by downstream companies
    - **Use of sold products:** End use of goods and services sold by the reporting company in the reporting year

- Current rules lean towards physical goods, however. E.g., for cat 11:
  - **Direct use-phase emissions** are defined as emissions from products that directly consume energy (fuels or electricity) during use; Fuels and feedstocks; Greenhouse gases and products that contain or form greenhouse gases that are emitted during use *(pg. 155 Technical Guidance)*
  - **Indirect use-phase emissions** includes emissions from products that indirectly consume energy (fuels or electricity) during use *(Table 5.8 Scope 3 Standard)*

- **Importantly, "web-based software" is provided as an example of a product with direct use-phase emissions** *(Table 5.8 Scope 3 Standard)*

E1.7 | Emissions accounting in software

- There is **no standardized approach for quantifying the environmental impact of digital products**. Several standards or guidance methodologies exist, but aren't consistent in approach and aren't well suited for AI systems.
  - Some guidance exists
    - Greenpixie cloud emissions methodology
    - GeSI ICT guidance (already linked to on the GHG Protocol website)
    - ITU-T L. 1410
    - GSMA, GeSi, ITU-T Scope 3 Guidance for Telecommunication Operators

- In general, emissions from the following stages:
  - **Data storage** (e.g., storing data in cooled server rooms will require continuous energy input). *May be fully accounted for in category 1 (Purchased goods and services) if a company purchases storage from third-parties*
  - **Transfers of data over networks** (the utilization of data networks requires energy – the amount of energy can vary depending on the network utilization at a point in time) *May be fully accounted for in category 1 (Purchased goods and services)*
  - **Computation** (e.g., the CPU/GPU operations on an end-users computer for downloadable software, or energy consumed per AI token, or per FLOP, to actually perform the calculations necessary). AI workloads dramatically increase computation energy and may require separate more detailed methods.

- Which, if any, are included in our current definitions of direct use-phase and indirect use-phase emissions?

E1.7 | Case study (SAP)

- In calculating corporate scope 3 inventory, SAP distinguished between:
  - **Category 11: on-premises software sold** (i.e., the software is hosted by customer's servers)
  - **Category 1: cloud-based software sold** (i.e., the software is hosted by cloud servers)

- **On-premises software approach:**
  - Calculations are based on the storage, network, and compute resources required to operate SAP systems and assumption based on usage rates for on-premises software (including CPU, memory, storage and data center efficiency overheads)
  - Lifetime based on announced "end of maintenance" data for each on-premises product in category 11

- **Cloud-based software approach:**
  - If SAP operates cloud-based infrastructure, emissions from operation are in scope 1 and 2
  - If third-parties operate the infrastructure, it is a purchased service (category 1)
  - If SAP leases space or equipment without operational control, included in category 8

* Case study taken from https://www.bsr.org/reports/BSR-Accounting-for-Scope-3-Use-Phase-Emissions-for-Software-Companies.pdf

E1.7 | Potential options*

1. **Maintain (with minor edits) existing definitions and provide more sector-specific guidance**
   - Address emissions accounting through example boxes + guidance only. Encourage the use of sector-specific guidance instead

2. **Refer digital users explicitly to third-party guidance, with recommendations to use those methodologies**
   - Recognizing that the GHG Protocol Secretariat doesn't necessarily have the resources to develop sector guidance for digital products, and reduces operational burden to ensure the Scope 3 Standard remains up-to-date with a quickly evolving sector
   - Examples may include referring to ICT Sector Guidance (GESI); Greenpixie cloud methodology, ITU-T L.1410 (11/2024)

3. **Create separate reporting structure for digital products and treat it as a subcategory** *(In the same way that employee commuting distinguishes between physical commuting and telecommuting).* Rules would then:
   - Define life cycle stages to include (e.g., storage, network, and compute)
   - Define the optionality [should/shall/may] for emissions to be included for each of these types
   - Define the types of products that are subject to these rules, and any exceptions
   - Consider alternative quantification methods (e.g., annualized reporting based on usage)

* The options and preliminary comparisons herein are not designed to be final, complete, or all-encompassing.

For discussion

E1.7 | Discussion

Discussion points

How should any background energy be included?

- Required ('shall') be included
- Optional ('should'/'may')

How should non-physical products be reported if part of a complex "emissions producing" system? What emissions should be included and where?

e.g., GPS software on aircraft. Are any emissions from the plane included in the GPS software company's scope 3?