Agenda item 3.4.
Paragraph 20 of the annotated agenda

Emissions from electricity generation and consumption

Article 6.4 Supervisory Body – 20th meeting
Bonn, Germany, 16 to 20 February 2026

UNFCCC Secretariat
Mitigation Division

Procedural background

- The Supervisory Body, at its 15th meeting (Feb 2025), requested the Methodology Expert Panel (MEP) to revise the following CDM methodological tools:

  - "Baseline, project and/or leakage emissions from **electricity consumption and monitoring of electricity generation**" (CDM TOOL05) and

  - "Tool to calculate **emission factor for an electricity system**" (CDM TOOL07).

Purpose

To estimate **baseline, project and leakage emissions from electricity generation and its consumption** under a proposed Article 6.4 activity.

Key issues and proposed solutions: MEP proposal

Merging CDM TOOL05 and CDM TOOL07

- A single tool is more user-friendly for methodology proponents and activity participants

Broadened scope

- The CDM TOOL05 was limited to determining emissions from electricity consumption
  - ➢ The proposed methodological tool **also includes provisions for determining emissions from electricity generation**.
- The CDM TOOL07 was primarily developed for determining baseline emissions and **did NOT** include approaches for determining project or leakage emissions
  - ➢ The proposed methodological tool **also includes provisions for determining project or leakage emissions associated with electricity consumption**.

Key revisions to CDM TOOL05 and TOOL07

a) Allowing the electricity system emission factor to be used for project and leakage emissions (not only baseline)

b) CDM approach of a combined margin (CM) emission factor is retained

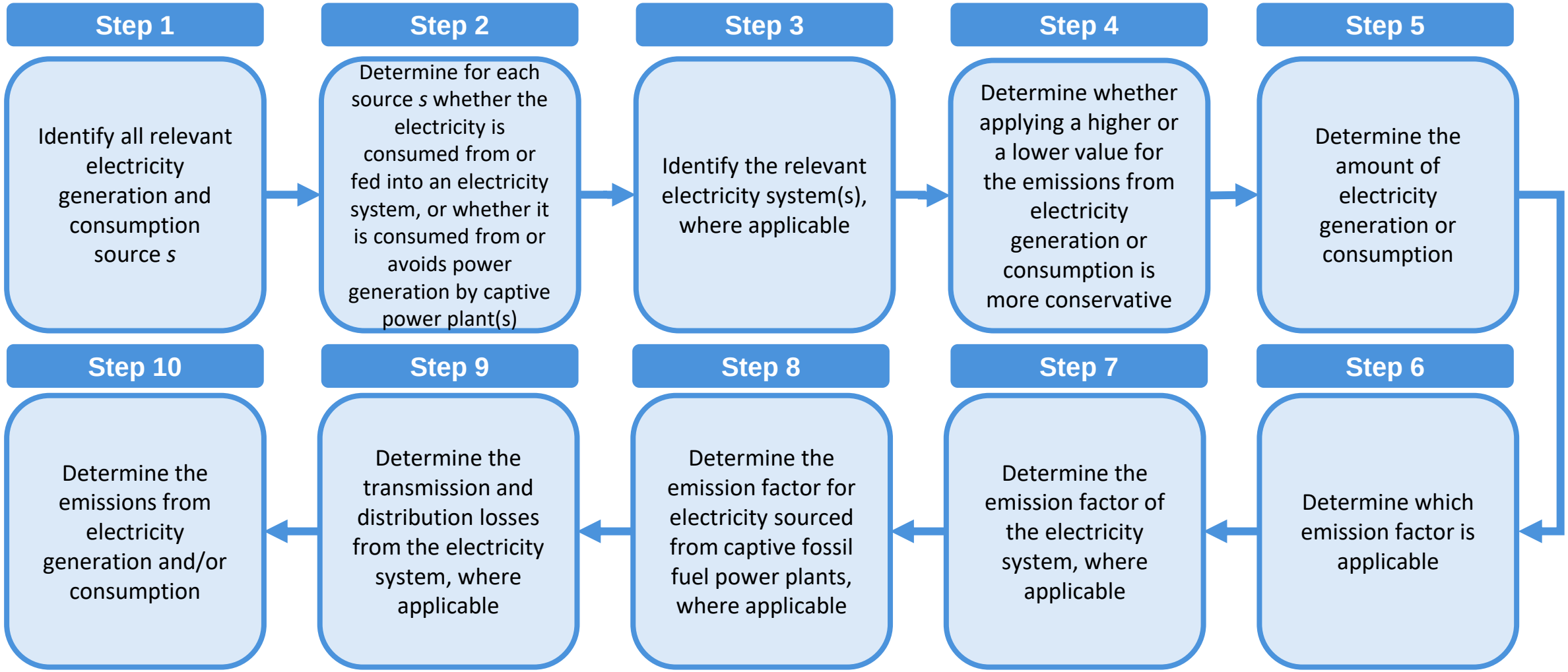
c) Reflecting the increasing contribution of intermittent renewable power generation

d) Addressing issues with data vintage when determining the emission factor based on historical data

e) Inclusion of simplified and conservative default values

f) Systematic consideration of uncertainty in line with requirements in the “Baseline Standard”

Key issues and proposed solutions: Stepwise approach to determine emissions



Key issues and proposed solutions: Key revisions (1/5)

Step 6

Determine which emission factor is applicable

a) Allowing the electricity system emission factor to be used for project and leakage emissions (not only baseline)

- Step 6: Determines whether a higher or a lower value for the emission factor is more conservative
  - **Case 1:** A higher value is considered more conservative, e.g. project emissions from electricity consumption;
  - **Case 2:** A lower value is considered more conservative, e.g. baseline emissions from feeding renewable electricity to the electricity system

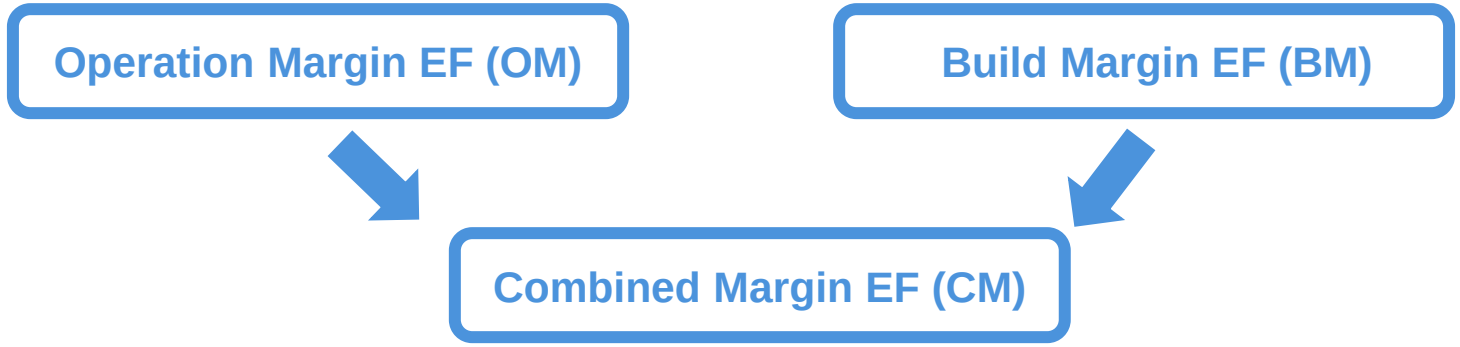
Key issues and proposed solutions: Key revisions (2/5)

Step 7

Determine the emission factor of the electricity system, where applicable

b) CDM approach of a combined margin (CM) emission factor is retained. The CM emission factor consists of:

- A **build margin (BM)** emission factor represents the average emissions intensity of **new** power units that would likely be built in the absence of the Article 6.4 activity
- An **operating margin (OM)** emission factor represents the emissions intensity of **existing** power units whose electricity generation is affected by the Article 6.4 activity



Key issues and proposed solutions: Key revisions (3/5)

Step 7

Determine the emission factor of the electricity system, where applicable

c) Reflecting the increasing contribution of intermittent renewable power generation

- Step 7: Provides refined OM methods (dispatch data OM, simple OM, simple adjusted OM, average OM) and specifies applicability conditions for intermittent/non-intermittent sources under case 1 and case 2.
- Step 7: Refines the provisions regarding data vintage for determining BM emission factor.

Key issues and proposed solutions: Key revisions (4/5)

Step 7

Determine the emission factor of the electricity system, where applicable

Step 8

Determine the emission factor for electricity sourced from captive fossil fuel power plant(s), where applicable

d) Addressing issues with data vintage when determining the emission factor based on historical data

- Step 7 introduces factors ($F_{OM,simple}$, $F_{OM,avg}$ and F_{BM}) to account for the likely annual decrease of the emission intensity over time. This factor is applied when data from a year prior to the monitoring period is used to determine the emission factor.

e) Inclusion of simplified and conservative default values

- Step 7 and Step 8 allow using simplified, conservative default emission factors

Key issues and proposed solutions: Key revisions (5/5)

Step 5

Determine the amount of electricity generation or consumption

Step 7

Determine the emission factor of the electricity system, where applicable

Step 8

Determine the emission factor for electricity sourced from captive fossil fuel power plant(s)

f) Systematic consideration of uncertainty in line with requirements in the "Baseline Standard"

- Step 5,7, and 8 specify the uncertainty of key input data and assumptions, or include procedures to for activity participants to determine the uncertainty
- Section 5.11 includes provisions to assess the uncertainty of emissions from electricity generation or consumptions, in line with the Baseline Standard

Key issues and proposed solutions: Call for public inputs before MEP011

- Launched between 10/12/2025 – 31/12/2025
- 5 submissions received, total of **63 inputs**
  1. Value Network Ventures
  2. GCC
  3. World Bank
  4. Chetan Aggarwal
  5. Martin Burian & Francis Masawi

Section in the draft tool	Number of inputs
General	2
Applicability	2
Definitions	3
General approach	3
Step 1: identification of sources	1
Step 2: determine generation of consumption	3
Step 3: identify electricity system	6
Step 4: case 1 or case 2	5
Step 5: quantify electricity generated or consumed	1
Step 6: identify which emission factor is applicable	1
Step 7: calculate emission factor of electricity system	27
Step 8: calculate emission factor of captive power plant	1
Step 9: determine transmission and distribution losses	3
Uncertainty	3

Key issues and proposed solutions: Call for public inputs before MEP011

Major input and responses by MEP

Section	Input	Response by MEP
General	Several comments requesting clarification were received.	Flowcharts illustrating the available options for each scenario, along with examples, have been included in the tool.
General	The tools should account for electricity market instruments, e.g. wheeling contracts and energy attributes (such as renewable energy certificates (RECs) and Guarantees of Origin (GOs)) .	Due to limited access to data on electricity market contracts, variations in regional implementation of electricity market instruments, and evolving developments in relevant fora or under relevant regulatory frameworks, they were not integrated into the tool. However, the MEP may address this issue in future revisions.
General	Comments were received proposing revisions to simplify the requirements in the tool, such as removing the distinction between Case 1 and Case 2.	The MEP did not include the proposals because they failed to ensure accuracy and conservativeness required for determining emissions from eligible activities.
Step 7	The requirement to exclude solar and wind power plants from the share of electricity generation from renewable sources should be removed when identifying the default emission factor of the electricity system to be applied.	The MEP did not include the proposal since solar and wind power plants are likely to be designated as must-run and will not be impacted.

Key issues and proposed solutions: Call for public inputs before SBM020

- Launched between 04/02/2026 – 11/02/2026
- 2 submissions received, total of **6 inputs**
  1. Gold Standard Foundation
  2. Promethium Carbon

Section in the draft tool	Number of inputs
General	
Applicability	
Definitions	
Step 1: identification of sources	
Step 2: determine generation of consumption	
Step 3: identify electricity system	
Step 4: case 1 or case 2	
Step 5: quantify electricity generated or consumed	
Step 6: identify which emission factor is applicable	
Step 7: calculate emission factor of electricity system	4
Step 8: calculate emission factor of captive power plant	
Step 9: determine transmission and distribution losses	
Appendix 1: Flowcharts of steps	
Appendix 2: Values for FOM_{simple}, FOM_{avg}, F_{BM}	2

Key issues and proposed solutions: Call for public inputs before SBM020 (1/2)

Section	Input	Response by MEP Small Group	Changes to the draft
Step 7	Tool seems to mandate conservative defaults when hourly data is unavailable; penalises countries lacking digital infrastructure of gaining data.	Tool does not mandate conservative defaults. Four OM methods exist, and hourly data is only needed in exceptional cases Underlying concerns around off-grid integration may need future revision.	Extra explanation in para 2 of Appendix 2 Clarification has been added to Footnote 1.
Step 7	In many developing countries, high renewable shares may reflect load-shedding or stalled fossil expansion rather than real fossil displacement. As a result, simplified OM methods may become inapplicable even though fossil plants still set the marginal supply. This could disadvantage such countries, which may lack the data needed for dispatch-based OM. We propose allowing simple OM methods whenever fossil generation is still the marginal source, regardless of renewable share thresholds	It's not correct that Simple Adjusted OM becomes inapplicable when renewable share is high. It is still applicable. However, when zero-carbon units are on the margin, an emission factor of zero must be used. Only simple hourly indicators (like curtailment or 100% renewable hours) are required.	No change has been made.
Step 7	BM discounting (F_{BM}) + OM constraints may push EF for renewables toward zero, while captive fossil projects still use higher defaults. This could unintentionally make fossil projects look better.	"If BM reaches zero, it simply means renewables do not prevent new fossil plants from being built. But renewables still earn emission reductions through OM because they displace existing fossil units. The tool already allows methodological changes if needed. Future inclusion of off-grid fossil plants may further strengthen emission factors.	No change has been made.

Key issues and proposed solutions: Call for public inputs before SBM020 (2/2)

Section	Input	Response by MEP Small Group	Changes to the draft
Appendix 2	Regression-based F_{BM} creates unrealistic rapid decarbonization trends.	Flexibility already exists: participants can choose global vs. national values. Added further explanation in para 2 of Appendix 2 for clarification.	Extra explanation in para 2 of Appendix 2
Appendix 2	Unclear how F_{OM}/F_{BM} values were derived; underlying data may be outdated.	All data were extracted from Ember's country-level electricity dataset, downloaded directly from the Ember data visualizer (2024 release). This is by far, up to the knowledge of the secretariat, the most comprehensive and complete dataset regarding energy generation that's open. The data source used has been added to footnote 2 of Appendix 2.	Footnote 2 has been added for explanation of data

Recommendations to the Supervisory Body

The MEP:

- Recommends the Supervisory Body to adopt the methodological tool.
- Seeks **a mandate** from the Supervisory Body to **annually revise the tool** to incorporate the most recent data for the parameters $F_{OM,simple}$, $F_{OM,avg}$ and F_{BM} into the table in appendix 2 of the tool and to update other relevant parameters or provisions when new data becomes available.

Subsequent work and timelines

a. The default values (F_{OM} and F_{BM}) in the appendix 2 of the tool needs to be regularly updated to incorporate data from recent years.

b. Several other parameter values and provisions should be updated once more data becomes available.

   ➞These points would be addressed by the requested mandate in the previous slide

c. The tool may also be amended to be applicable to activities implemented at other scales (including large-scale crediting and PoAs).

d. The below points may be further addressed in future revisions to this tool.

   - Other potential scenarios, such as power generation by a renewable captive power plant, are not yet applicable under this version of the tool.
   - The proposed tool does not yet include provisions for integrating off-grid power plants in the calculation of the emission factor for the electricity system.

FUTURE REVISION WORK

Future revision work (1/3)

Ref	Future revision	Section	Timing
1	The default values (F_{OM} and F_{BM}) in the appendix 2 of the tool needs to be regularly updated	Appendix 2	Annual revision
2	Scope of applicable activities may be expanded to include other scales (including large-scale crediting and PoAs).	Cover note para 78	No explicit timing determined
3	Potential scenarios, such as power generation by a renewable captive power plant, may be included in future revisions of the tool	Cover note para 11	No explicit timing determined
4	Provisions for integrating off-grid power plants in the calculation of the emission factor for the electricity system may be included	Cover note para 15	No explicit timing determined
5	Procedures to account for the effects of contracts between actors in electricity markets, such as power purchase agreements between specific entities may be included based on evolving developments	Footnote 1	No explicit timing determined

Future revision work (2/3)

Ref	Future revision	Section	Timing
6	Further methods of determining OM emission factors may be considered in the future revision. For example, an electricity consumption source that depends on intermittent generation may only depend on one form of intermittent generation (e.g. only wind power). The effect of such an instance on the electricity system could be reflected through a more refined method in the future.	Footnote 12	No explicit timing determined
7	The uncertainties in table 4 are based on expert judgements by the MEP. The MEP aims to gather additional data and may update these values in a future revision of the tool.	Footnote 13	No explicit timing determined
8	The impact of electricity market instruments, such as wheeling contracts and environmental attributes (e.g., renewable energy certificates), may be considered in future revisions of the tool	Cover note para 41	No explicit timing determined

Future revision work (3/3)

Ref	Future revision	Section	Timing
9	The MEP is currently working on the development of a methodological tool for project and leakage emissions from biomass. This tool may be applied to determine these emissions once it is adopted by the Supervisory Body.	Footnote 11	Once the biomass leakage tool has been developed.
10	A step-wise procedure on how to apply the IPCC guidance on combining uncertainties to determine one common uncertainty value for each of these OM estimation methods was suggested by a stakeholder. The MEP may consider conducting further work on uncertainty in the future.	Cover note para 73	No explicit timing determined

RESPONSES TO QUESTIONS

Questions/ Comments received during the 1st session of SBM020 (1/2)

Ref	Question	Response	Relevant section
1	Can't find options to use national emission factors published by national governments.	Host Parties can determine their national emission factors by developing a standardized baseline prepared based on the provisions of the methodological tool	5.7 Step 7
2	Even if a national EF suggests a very low or zero BM EF, real-world operational constraints must still be taken into account.	The methodological tool calculates the emission of the electricity system taking into account the impact of the different types of Article 6.4 projects (in terms of intermittent and non-intermittent generation) in the operating and build margins of the electricity system; this approach is different from the calculation of GHG emissions for national inventories. The tool is applicable only when a methodology explicitly makes reference to it.	5.7 Step 7
3	Do we have the capacity to support development of standardized emission factors and/or parameters for baselines including for fNRB and grid emission factors?	Sometimes capacity is limited but if host countries want to develop their own approaches, it is possible. Countries could develop their own values, but must be approved by the SBM.	-

Questions/ Comments received during the 1st session of SBM020 (2/2)

Ref	Question	Response	Relevant section
4	Para 41 of Cover Note states that the future revision may address influence of market instruments. The implications may be significant particularly for Latin American countries. The text is “very inconclusive”.	Currently available data are not mature enough to consider influence of such instruments. When appropriate data become available in future, MEP will consider it.	Para 41 of Cover Note
5	Are the figures provided in Table 3 determined based on hypothetical cases (case 1 and case 2), or are informed from the data that may have been evaluated?	The default emission factors listed in Table 3 are simplified and conservative assumptions to address the provisions of case 1 and case 2 when the data needed to determine the emission factor of the captive fossil fuel power plant *p* (i.e., average efficiency and CO_2 emission factor of the fuel type) are not available. As per the footnote 10, they are calculated based on the higher and the lower estimates of power plant efficiencies and CO_2 emission factors for the relevant fuel types and emission factors from IPCC.	Table 3 (page 33)