United Nations Framework Convention on Climate Change

Agenda item 3.1.
Paragraph 7 of the annotated agenda

Revision of ACM0001 CDM methodology and associated methodological tools

Article 6.4 Supervisory Body – Nineteenth meeting
Virtual, 29 to 30 October 2025

UNFCCC Secretariat
Mitigation Division

Procedural background

- 2025 MEP workplan: to initiate work on the revision of CDM methodology ACM0001 and methodological tools (flaring tool, solid waste emissions tool and mass flow tool);

- MEP008: draft methodology and tools published for call for public inputs
  - 9 September to 30 September 2025;
  - 12 submissions received (10 for methodology, 2 for solid waste tool, 1 for mass flow tool);

- MEP009: public inputs considered and draft methodology recommended.

Purpose

To define the procedures, requirements and guidelines for developing and monitoring Article 6.4 activities that involve the capture and/or use of the landfill gas (LFG) generated in solid waste disposal sites (SWDSs), as well as accounting of associated A6.4 ERs.

1. Applicability conditions

CDM methodology	Mechanism methodology
Collection of LFG and destruction in flares or use to generate energy (electricity, heat, supply to consumers)	Same conditions, except supply of biomethane to consumers is included
Baseline scenario: identified by applying the combined tool to identify baseline scenario and demonstrate additionality	Baseline scenario pre-determined: - Existing actual/historical emissions • Methane component in existing SWDSs; • Electricity supplied to the grid; • Electricity supplied to existing captive consumer; • Heat supplied to existing equipment; • Supply of LFG/biomethane to consumers - Best-available technology (BAT): • Methane component in new SWDSs; • Electricity supplied to new captive consumer; • Heat supplied to new equipment;
Management of the SWDS does not change to increase generation of LFG	Same condition, except if the change is required by law or regulation
	Demonstrate that no leakage exist if the existing heat generation equipment is replaced

2. Project boundary

CDM methodology	Mechanism methodology
Site where the LFG is generated, captive power plant(s), power plants connected to the same electricity grid, heat generation equipment and consumers of LFG	Same boundary
Baseline emissions: CH_4 from the decomposition of the waste in the SWDS; CO_2 from electricity generation; CO_2 from heat generation; CO_2 from the use of natural gas by consumers **Project emissions:** CO_2 from fossil fuel consumption (if any); CO_2 from electricity consumption (from grid or captive power plants); CH_4 from flaring; CO_2 from the transportation of compressed/liquefied LFG using trucks; CO_2 from physical leaks in dedicated pipeline	**Baseline emissions:** same sources **Project emissions:** same sources **Leakage emissions:** upstream emissions Indicate whether the source and GHG is controlled, related to or affected by the activity

3. Demonstration of additionality

CDM methodology	Mechanism methodology
Simplified approach based on positive list	Simplified approach not included
Application of the combined tool to identify baseline and demonstrate additionality: - Identification of alternative scenarios; - Barrier analysis; - Investment analysis; - Common practice analysis	Application of the requirements of the additionality standard: - Article 6.4 activity is aligned with environmental and waste management legal requirements in the host country; - Demonstration that the Article 6.4 activity does not lead to lock-in levels of emissions (guidance provided in the methodology); - Investment analysis (guidance provided in the methodology to apply the investment analysis tool); - Common practice analysis (guidance provided in the methodology to apply the common practice tool)

4. Baseline scenario

CDM methodology	Mechanism methodology
Application of the combined tool to identify baseline and demonstrate additionality separately for each component of the project (LFG, electricity generation, heat generation, supply of LFG to consumers).	Baseline scenario pre-determined: - Existing actual/historical emissions • Methane component in existing SWDSs; • Electricity supplied to the grid; • Electricity supplied to existing captive consumer; • Heat supplied to existing equipment; • Supply of LFG/biomethane to consumers - Step-wise procedure to determine the emission intensity of BAT: • Methane component in new SWDSs; • Electricity supplied to new captive consumer; • Heat supplied to new equipment;

5. Baseline emissions prior to downward adjustment

CDM methodology	Mechanism methodology
Determined based on: - Methane component: methane in LFG flared, sent to power plant, to heat generation equipment or supplied to consumer, oxidation factor and methane destroyed in the baseline; - Electricity generated; - Heat generated; - Natural gas used by consumers of the LFG	Same approach, except that the methane destroyed in flares is monitored separately for the primary and backup flares
Methane component: - Oxidation factor = 0.1 (default factor) - Methane destroyed in the baseline: Different cases based on legal/contractual requirements, including a default 20% for case where it is not specified.	Methane component: - Oxidation factor = 0.383 (default factor) or monitored ex-post - Methane destroyed in the baseline: Different cases based on legal/contractual requirements, including a default of 40% if not specified or apply FOD model and conservative collection efficiency and flaring efficiency
Electricity component: - Electricity emission factors: apply the "TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation"	Electricity component: - Conservative default emission factors: • 0.2 tCO_2e/MWh, 0.1 tCO_2e/MWh or 0.03 tCO_2e/MWh for electricity exported to the grid, depending on the share of renewable and nuclear energy generated in the electric grid; • 0.3 tCO_2e/MWh for electricity replacing an existing captive power plant

5. Baseline emissions prior to downward adjustment (cont)

CDM methodology	Mechanism methodology
Heat component: - Efficiency of the baseline heat generation component determined based on the "TOOL09: Determining the baseline efficiency of thermal or electric energy generation systems"	Heat component: - Efficiency of the baseline heat generation component = 90% default (conservative)
Supply of LFG to consumers: - CO_2 emission factor of the natural gas	Same approach

6. Downward adjustment

- No downward adjustment needed under CDM;
- Initial downward adjustment:
  - Applicable for baseline determined based on ***existing actual/historical emissions***;
  - Is highest between:
    - Unadjusted baseline emissions in calendar year 1 of the crediting period multiplied by the uncertainty;
    - 10% emission reductions in calendar year 1 of the crediting period.
  - No initial downward adjustment for baseline components determined ***based on BAT***

6. Downward adjustment (cont)

- Downward adjustment in subsequent years:
  - Flaring sub-component, apply $INDA_{flare}$ as follows:
    - **Flaring only:**
      - 5% if the LFG/biomethane is not financially attractive even with revenues from A6.4ERs but up to a capacity to operate a 5 MW power plant.
      - If conditions above are not met, use 10%;
    - **Utilization with backup flaring:**
      - Backup flare: 1% (methane supplied to the backup flare does not exceed 10% of the amount of methane utilized)
      - 10% for amounts that exceed 10% of the amount that is utilized
    - **Flaring and Utilization with backup flaring:**
      - Backup flare: 1% (methane supplied to the backup flare does not exceed 10% of the amount of methane utilized)
      - 10% for amounts that exceed 10% of the amount of methane utilized and for amounts going to primary flare
  - All other components and sub-components: 1% annual increase

7. Conservative BAU scenario and emissions

- No conservative BAU determined under CDM;
- BAU scenario:
  - Existing actual/historical emissions: continuation of historical scenario
  - BAT: average emissions intensity of any new capacity from similar projects over the last three years (heat component and electricity component);
- Conservative BAU emissions
  - Is lowest between:
    - Minimum conservative BAU baseline emissions (10% of difference between BAU emissions and PE);
    - BAU emissions discounted by the uncertainty;

8. Comparison between crediting baselines

- Compare adjusted BE and conservative BAU

9. Project scenario and emissions

CDM methodology	Mechanism methodology
Sources of emissions: - Consumption of electricity; - Consumption of fossil fuels; - Transportation of LFG/biomethane to consumers; - Physical leaks from dedicated pipeline	Same sources
Electricity consumption: - Electricity emission factors: apply the "TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation"	Electricity component: - Conservative default emission factors: • 1.3 tCO_2e/MWh, 0.87 tCO_2e/MWh or 0.44 tCO_2e/MWh for electricity imported from the grid, depending on the share of renewable and nuclear energy generated in the electric grid; • 1.3 tCO_2e/MWh for electricity replacing an existing captive power plant
No uncertainty need to be accounted	Guidance to consider uncertainty

10. Leakage

CDM methodology	Mechanism methodology
No leakage needs to be accounted	Leakage resulting from: - Replacement of existing heat generation equipment (evidence of scrapping or replaced equipment with lower efficiency); - Apply a discount factor of 0.5% to the adjusted baseline emissions due to upstream emissions (rationale provided in Appendix 1)

11. Avoidance of double-counting

- Signing contracts with consumers of outputs;
- Declare that the outcomes were not claimed by other environmental market or accounting framework;
- Declare that the Article 6.4 activity does not overlap with mandatory domestic mitigation schemes.

Key issues and proposed solutions – Comparison with CDM methodological tools

1. Solid waste tool

- Same approach to calculate the methane emissions;
- Update of default factors (IPCC 2019 refinement);
- Inclusion of uncertainties;
- Oxidation factor: determined through 3 options
    - Option 1: ex-post monitoring using of methane flux through flux-box method;
    - Option 2: monitoring using of methane flux through flux-box method once;
    - Option 3: conservative default factors.

2. Flaring tool

- Applicable for methane from biogenic sources;
- Same approach to calculate the project emissions;
- Inclusion of uncertainties.

3. Mass flow tool

- Same approach to calculate the project emissions;
- Inclusion of uncertainties.

Summary of public inputs received (MEP008)

- 10 submissions received for the methodology, 2 submissions for the SWDS tool, 1 submission on the mass flow tool, no submissions on the flaring tool
- A total of
  - 106 comments for the methodology
  - 6 comments for the solid waste disposal tool
  - 1 comment on the mass flow tool
- **Non-relevant comments:** proposing changes that are not aligned with the RMPs, rules, regulations and standards of the Article 6.4 mechanism:
  - Requesting a second round of public inputs
  - Application of the CDM methodology for new projects (first crediting period) and for projects that transitioned from the CDM (second crediting period);
  - Waive the application of the downward adjustment;
  - Remove the need to conduct common practice analysis;
  - Apply a different reference year to determine the downward adjustment;

Summary of public inputs received (MEP008) - methodology

- **Relevant comments:** technical nature, proposing changes, requesting guidance or requesting clarifications

1. **Applicability conditions**
   - Broad the application (use of biocover and for improvement of existing underperforming systems, allow change on the management of the SWDS).
2. **Additionality – regulatory analysis**
   - Consider level of enforcement of a law or regulation, no need to update the regulatory analysis during the crediting period;
3. **Additionality – lock-in risk analysis**
   - Lock-in to be assessed at technology and practice levels.
4. **Additionality – investment analysis**
   - In favor of Option 1. Use of investment analysis tool;
5. **Baseline – baseline scenario**
   - Broad the scope of BAT identification.

6. **Baseline – baseline emissions**
   - Determining the emissions intensity through BAT for methane not captured;
   - Allow application of the CDM tools or other approaches to determine the emission factor of the grid and of captive power plants;
   - Alternative option to determine the methane destroyed in the baseline;
   - Oxidation factor: use of more conservative default factors, use regression analysis instead of bin approach, use of satellite observation techniques;

7. **Downward adjustment**
   - Apply to primary flare, and to backup flare under specific conditions;
   - Phasing-out of the flaring component should be removed, deferred to the 2nd crediting period, relaxed to reach 0 for the third crediting period, waived for certain SWDSs;
   - Uncertainty of FOD model expected to be higher than uncertainty of measuring instruments: adjustment based on uncertainty should be based on ex-post determination and not ex-ante;
   - How to determine project emissions for components that share the same source (e.g. electricity for flaring and for the biomethane plant).

Summary of public inputs received (MEP008) - methodology

8. Conservative BAU scenario and emissions

- How to incorporate requirements and policies that will enter into force in the future;

9. Project emissions

- Emissions of CH4 and N2O should be included in fossil fuel consumption equations;
- Allow application of the CDM tools or other approaches to determine the emission factor of the grid and of captive power plants.

10. Leakage

- Apply default leakage factors for different components of the Article 6.4 activity;
- Expand the scope of the LCA to include all significant equipment and infra-structure.

Summary of public inputs received (MEP008) – solid waste tool

1. **Definitions**
   - Expand the definition of municipal solid waste.
2. **Data and parameters not monitored**
   - Clarifications on how to consider "bulk waste" and on how to identify elements of anaerobic managed SWDSs;
   - Include default values of DOC_j for plastic polymers.

Summary of public inputs received (SBM019 annotations)

- 5 submissions received for the methodology, 4 submissions for the SWDS tool (one late submission)
- A total of
  - 25 inputs for the methodology
  - 6 inputs for the solid waste disposal tool
- **Repeated comments:** same comment submitted to the call for public inputs to the MEP008 annexes;
- **Non-relevant comments:** proposing changes that are not aligned with the RMPs, rules, regulations and standards of the Article 6.4 mechanism:
  - Requesting a second round of public inputs
  - Application of the CDM methodology for new projects (first crediting period) and for projects that transitioned from the CDM (second crediting period);
  - Waive the application of the downward adjustment;
  - Remove the need to conduct common practice analysis;
  - Apply a different reference year to determine the downward adjustment;
- **Relevant comments:** technical nature, proposing changes, requesting guidance or requesting clarifications;

Summary of public inputs received (SBM019 annotations) - methodology

1. **General**
   - SBM to consider the need for calibrating the multiple avenues where the MEP has chosen for use of defaults;
2. **Additionality – regulatory analysis**
   - *Adopt requirement for update of regulatory analysis at crediting-period renewals;*
3. **Baseline – baseline scenario**
   - Whether the proposed changes to the baseline (higher oxidation factor, conservative grid emission factor) will render LFG projects economically unviable
4. **Baseline – baseline emissions**
   - *$INDA_{flare}$:* clarifications on the timeframe to determine the 10% threshold and how to determine the parameter if backup flare fluctuates around the 10% across consecutive monitoring years;
5. **Project emissions – electricity component**
   - *Allow application of the CDM tools or other approaches to determine the emission factor of the grid and of captive power plants;*
   - *Allow the use of country-data to determine transmission and distribution losses;*
   - *Apply same emission factor for electricity generated and consumed;*

Summary of public inputs received (SBM019 annotations) – solid waste tool

1. **General**
   - *Allow the use of satellite observation techniques to determine OX_y;*
2. **Determining the oxidation factor (OX_y)**
   - Consider the effective thickness of each layer to calculate the oxidation factor;
   - Calculate an adjusted oxidation factor as the product between the oxidation factor and a flaring adjustment factor (reduction fraction of the diffusive gradient attributable to the efficiency of the gas capture and destruction system);
   - Burdensome of conducting sampling and specific requirements;
   - High default factor proposed.
3. **Data and parameters not monitored**
   - Parameter MCF: How to classify “unmanaged” deep landfills.
4. **Measurements of methane flux using flux box technique**
   - Complement and correlate the results using the Flux Box Method with satellite or aerial observations.

Impacts

Approval of this mechanism methodology will enable the development of new Article 6.4 activities that aim to capture and destroy methane or use it for energy purposes.

Subsequent work and timelines

- Methodology is only applicable to projects, will be amended to cover other scales once baseline standard, additionality standard and leakage standard are revised;
- Methodology shall be revised once the work on the renewable energy methodology and tools (ACM0002, AMS-I.D., grid tool and electricity emissions tool) are adopted

Recommendations to the Supervisory Body

The MEP recommends the Supervisory Body to adopt the mechanism methodology