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Bureau of Energy Efficiency's new draft methodologies under the carbon credit offset mechanism

In August 2025, the Bureau of Energy Efficiency (**"BEE"**), as the administrator of the Carbon Credit Trading Scheme, 2023 (**"CCTS"**), has released 3 (three) new draft methodologies for stakeholder consultation under the offset mechanism of the Indian Carbon Market (**"ICM"**). These methodologies provide standardised procedures for measuring, reporting, and verifying Greenhouse Gas (**"GHG"**) emission reductions from specific project activities that generate tradable carbon credits.

Till date, BEE has released several methodologies covering renewable energy projects, energy efficiency interventions, forestry and land-use projects, and waste management. The 3 (three) new draft methodologies expand the scope of eligible project activities into important sectors of India's energy and agriculture economy. These methodologies will enable entities to implement projects that avoid emissions from fossil fuels and waste, while also creating new opportunities for rural farmers and industries to participate in the ICM.

Methodology 1 - Electricity and heat generation from biomass

This draft methodology provides a standardised framework for projects replacing fossil fuels with biomass to generate electricity, heat, or both. By consolidating global best practices under the ICM, the methodology ensures robust measurement of emission reductions from biomass utilisation, residue management and cogeneration systems.

Background and scope

The methodology applies to projects using biomass for generating electricity, heat, or both (cogeneration). It covers greenfield projects, capacity expansions, energy efficiency improvement, and fuel switching projects from fossil fuels to biomass.

Applicability conditions

For a project to be eligible, it must meet strict conditions. These include the following:

1. **Feedstock**: Biomass used in the project plant is limited to biomass residues, biogas, Refuse Derived Fuel ("**RDF**") or biomass from dedicated plantations. Refuse Plastic Fuel ("**RPF**") can be co-fired in the equipment but both RDF and RPF will be treated as fossil fuels for accounting. If non-obligated entities want to claim emission reduction for the biodegradable component in RPF, a revision to this methodology will be required.
2. **Co-firing limit**: Fossil fuels may be co-fired in the project plant but cannot exceed 80% of total energy input.

3. **Residue use**: If biomass residues come from another industrial process (e.g., sugar mills, sawmills), the project cannot cause an increase in that industrial production merely to generate more residues.
4. **Storage and processing**: Biomass must not be stored for more than 1 (one) year and cannot undergo chemical/biological processing (for example fermentation and pyrolysis), except mechanical treatments like drying, shredding, or pelletisation.
5. **Heat and power balance**: Any associated heat generation equipment must operate independently from the project, without influencing or being influenced by the project plant.
6. **Plant Lifetime**: If the project activities involves the replacement or retrofit of existing heat generation equipment, emission reductions can only be claimed until the end of the baseline equipment's expected technical lifetime.

Project boundary and emission sources

The project boundary is broad covering *inter alia*: (a) on-site plants generating power and/or heat (whether fossil, biomass, or co-fired); (b) connected grids (if power is exported); (c) off-site heat sources that supply heat to the site where the ICM project activity is located; (d) biomass transportation and processing; (e) biomass residue disposal sites; (f) geographic boundaries of the dedicated plantations; (g) wastewater treatment facilities; (h) anaerobic digestion sites, and related equipment. GHG inclusion varies by source, based on relevance and simplification.

Calculation of emission reductions

The methodology requires a step-wise calculation:

1. **Additionality**: The project must demonstrate that emission reductions are "additional", i.e., they would not have occurred in the absence of the project. This requires identifying all realistic baseline scenarios such as continued fossil fuel use, grid power, or residue burning. The project must also prove that switching to biomass requires new investment or overcomes barriers that prevent business-as-usual continuation.
2. **Baseline emissions**: Baseline emissions are calculated differently depending on the project type, i.e., (a) cogeneration (heat + power); (b) power-only plants; and (c) heat-only systems. In all cases, the baseline represents the emissions that would occur if the project were not implemented.
3. **Project emissions**: Project emissions include all direct and indirect GHGs arising from project activity, including emissions from project activities, including emissions from biomass and biomass residues, fossil fuel consumption, grid electricity imports, reduced electricity generation, biomass combustion, and biogas production. These emissions can result from biomass and biomass residues, fossil fuel consumption, grid electricity imports, and reduced electricity generation.
4. **Leakage**: Leakage refers to GHG emissions that occur outside the immediate project boundary as a result of the project activity (for example, from transporting biomass over long distances or shifting biomass use from one sector to another). This methodology prevents over-crediting by not issuing Carbon Credit Certificates ("**CCCs**"), if, in any given year, the leakage emissions are so high that the project shows negative overall emission reductions. Moreover, issuance will be suspended in subsequent years until the project has generated sufficient positive emission reductions to fully compensate for the earlier negative balance.
5. **Net emission reductions**: The final emission reductions are calculated as:

   Net reductions = baseline emissions – (project emissions + leakage)

   This ensures that only real, measurable, and additional reductions are credited.
6. **Monitoring requirements**: Monitoring is central to the methodology and relies on approved ICM tools. Key monitored parameters *inter alia* include type and volume of biomass feedstock, amount of fossil fuel co-fired, net electricity generation and/or heat supplied, moisture content, efficiency of conversion systems (boilers, turbines),

biomass transport distances and modes, and lifetime of retrofitted equipment. Data must be monitored continuously and aggregated as appropriated, to calculate emissions reduction.

Biomass methodology is a comprehensive framework covering power-only, heat-only, and cogeneration projects. It incentivises efficient biomass use, avoids Methane ("**CH_4 (methane)**") emissions, and ensures robust monitoring. For industries and power producers, it provides a credible pathway to earn CCCs under the CCTS.

Methodology 2 - Production of compressed biogas

This methodology provides a framework for projects that capture and utilise CH_4 (methane) from organic waste streams to produce renewable gas. By adopting best practices from United Nations Framework Convention on Climate Change Clean Development Mechanism ("**CDM**") and gold standard methodologies, it ensures transparent accounting of avoided CH_4 (methane) emissions and displacement of fossil fuels. The methodology is critical in linking waste management, renewable energy, and the transport sector under the ICM.

Background and scope

The methodology applies to projects that establish new plants for the anaerobic digestion of waste leading to the production of compressed biogas. It covers a wide range of feedstocks, including but not limited to, napier grass, agricultural residues and waste, press mud, waste from agri-product manufacturing industries, animal waste, MSW, etc. Further, the CBG produced may be utilised for cogeneration, electricity generation, industrial heat, or directly as a transport fuel (substitute for CNG).

Applicability conditions

The methodology applies to project activities that install and operate new plants for the treatment of waste through combination of: (a) anaerobic digestion processes; (b) co-composting of wastewater; and (c) Anaerobic co-treatment of wastewater, all leafing to the production of compressed biogas. Hazardous waste and wastewater are not eligible under this methodology.

Project boundary and emission sources

The project boundary for production of Compressed Biogas ("**CBG**") covers both the baseline and project facilities to ensure all relevant emissions are accounted for. It includes the landfill or sludge pits where waste would otherwise have been disposed, the anaerobic digestion plant producing CBG, and any related electricity or heat generation, fuel use, and wastewater treatment. If electricity is exported, the grid is part of the boundary. However, if upgraded biogas is injected, the natural gas distribution system is also included.

Within this boundary, only the main GHG are considered for calculations, primarily CH_4 (methane) from landfills, sludge pits and digesters, and Carbon Dioxide ("**CO_2**") from fossil fuel use or combustion of fossil-based waste. Minor gases such as Nitrous Oxide ("**N_2O**") are generally excluded for simplification. This ensures the boundary captures the most significant emission sources without making the methodology overly complex.

Calculation of emission reductions

The methodology follows a structured approach for calculations which is described as below:

1. **Additionality**: The project must demonstrate that CH_4 (methane) capture and CBG production would not occur under business-as-usual. This involves showing that, in the absence of the project, waste would continue to be landfilled, burnt, or treated anaerobically without recovery.

2. **Baseline emissions**: Baseline emissions represent the GHG released if the project were not implemented. These include CH_4 (methane) from unmanaged landfills or sludge pits, and CO_2 from fossil fuel-based electricity, heat, or mechanical energy that the CBG project will now replace. The methodology provides detailed formulas for each case, whether the project displaces grid electricity, thermal energy, mechanical energy, or cogeneration output.

3. **Project emissions**: CBG projects continue to generate emissions which must be accounted for. These mainly arise from composting or co-composting, which can emit CH_4 (methane) and N_2O, anaerobic digestion and biogas combustion including any leakage and the energy used to upgrade or compress biogas, electricity and fossil fuel use for plant operations, wastewater treatment, and combustion units such as gasifiers, which release CO_2, CH_4 (methane), and N_2O. These sources contribute to the project emissions, which are subtracted from the baseline to determine net emission reductions.

4. **Leakage**: Leakage refers to indirect emissions outside the immediate project boundary. Examples include emissions from transporting biomass or waste over long distances, or situations where diverting waste to CBG reduces the availability of that material for recycling. If, in any given year, if the leakage is so high that overall emission reductions turn negative, the methodology provides a safeguard wherein no CCCs will be issued until positive reductions in later years compensate the deficit.

5. **Net reductions**:

   Finally, the emission reductions credited to the project are calculated as:

   Net reductions = baseline emissions – (project emissions + leakage)

   This ensures that only real, measurable, and additional emission savings are rewarded with CCCs.

6. **Monitoring requirements**: The methodology requires continuous monitoring of key project parameters to ensure transparent and accurate calculation of emission reductions. This includes tracking the quantity and calorific value of upgraded biogas, the volume and composition of waste and wastewater treated, combustion efficiency and stack gas emissions from digesters or combustors. Energy flows are also closely monitored, covering electricity consumed on-site, electricity and heat supplied to the grid or recipient facilities, and fossil fuel use. Additional checks include measuring wastewater characteristics (like COD), recording abnormal operations, and ensuring agricultural by-products or land-use impacts are documented. All measurements must follow approved ICM tools, use calibrated equipment, and be aggregated monthly or annually as specified, to ensure consistency and reliability.

The CBG methodology plays a key role in bringing waste-to-energy projects into the ICM. It offers a reliable system for measuring emission reductions, supports India's Sustainable Alternative Towards Affordable Transportation programme and clean transport targets, and encourages large-scale biogas plants. In doing so, it delivers 3 (three) clear benefits: (a) cutting CH_4 (methane) emissions from waste, (b) replacing fossil compressed natural gas (CNG) with renewable fuel; and (c) creating rural jobs through feedstock collection and by-product use.

Methodology 3 - CH_4 (methane) reduction in rice cultivation

This methodology provides a structured framework for projects that lower CH_4 (methane) emissions from paddy fields by adopting improved water and crop management practices. It adapts global best practices under the ICM to agriculture, ensuring that emission reductions are measurable, additional, and verifiable, while safeguarding yields.

Background and scope

The methodology applies to rice farming projects that reduce CH_4 (methane) emissions through changes in cultivation practices. The methodology includes projects such as:

1. rice farms that change the water regime during the cultivation period from continuously to intermittent flooded conditions and/or a shortened period of flooded conditions;

2. Alternate Wetting and Drying (**"AWD"**) method and aerobic rice cultivation methods; and
3. rice farms that change their rice cultivation practice from transplanted to Direct Seeded Rice ("**DSR**").

Applicability conditions

The methodology applies only to rice cultivation projects that meet specific conditions:

1. the project area must predominantly consist of irrigated, continuously flooded fields during the growing season;
2. rice fields must be equipped with controlled irrigation and drainage facilities, allowing farmers to alternate between dry and wet conditions as required;
3. the project must not reduce rice yields and cannot force farmers to switch to cultivars not previously grown in the area;
4. farmers must receive training and technical support on field preparation, irrigation, drainage, and fertiliser use. The project must ensure that supplemental nitrogen needs are assessed scientifically (e.g., with leaf colour charts, photo sensors, or soil test strips) or based on recognised recommendations;
5. the cultivation practices introduced, including technologies and crop protection products, must not conflict with local regulations; and
6. if the project chooses the default IPCC Tier 1 values (i.e., standard global factors for CH_4 (methane) emissions), no direct field measurements are required. But if the project wants to use field-specific data for greater accuracy, then it must have access to proper infrastructure, such as closed chamber equipment and laboratory analysis, to measure CH_4 (methane) emissions from reference fields.

Project boundary

The project boundary is limited to the rice fields where the improved practices are implemented.

Calculation of emission reductions

The methodology prescribes a step-wise approach for estimating emission reductions from rice cultivation projects:

1. **Baseline emissions**: The baseline represents CH_4 (methane) emissions under conventional practices, typically transplanted rice with continuous flooding. These emissions are established either by using reference fields (field measurements of CH_4 (methane) emissions under traditional methods) or by applying IPCC Tier 1 default emission factors.
2. **Project emissions**: CH_4 (methane) emissions are calculated for the rice fields under the new practices. Adjustments are also made for any potential increase in N_2O from fertiliser use.
3. **Leakage:** While generally negligible, leakage must be considered if rice cultivation shifts outside the project boundary in ways that could offset reductions.
4. **Net reductions:** The final emission reductions are derived using the formula:

   Net Reductions = Baseline Emissions – Project Emissions

Monitoring requirements

Projects must establish robust monitoring systems to ensure credible emission reduction estimates. Key parameters include CH_4 (methane) emission factors for both baseline and project fields (measured with IPCC methods or default factors), cultivation area and duration, use of organic amendments and fertilisers, and any fossil fuel consumption during land preparation. Farmers are required to maintain logbooks documenting sowing dates, fertiliser and amendment applications, irrigation schedules, water regime changes, and yields. These records help verify that the project practices (e.g., AWD or DSR) are actually implemented and representative of the reference fields. Only farms that comply with the defined cultivation practices are included in the calculation of emission reductions. All data must be aggregated seasonally and annually, supported by field surveys and sampling in line with CDM/ICM guidelines.

The rice CH_4 (methane) reduction methodology extends the ICM into the agricultural sector, offering farmers a direct role in climate mitigation. It incentivises climate-smart practices like AWD and DSR, which not only cut CH_4 (methane) emissions but also conserve water and maintain productivity. By providing a credible pathway for agricultural projects to generate CCCs, the methodology brings smallholder farmers into ICM framework and strengthens the link between sustainable agriculture and climate action.

Conclusion

The release of these 3 (three) draft methodologies marks a significant step in expanding the ICM under the CCTS. By covering biomass-based energy, compressed biogas, and rice CH_4 (methane) reduction, BEE has brought both industry and agriculture into the fold of the offset mechanism. These methodologies not only provide credible frameworks for emission reduction accounting but also create avenues for farmers, industries, and project developers to participate in carbon markets. Collectively, they advance India's climate goals by reducing reliance on fossil fuels, cutting CH_4 (methane) emissions from waste and agriculture, and enabling sustainable growth across key sectors of the economy.

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The Firm advises and acts in proceedings, arising in relation to various environmental statutes, before the National Green Tribunal, High Court/s and Supreme Court of India. We have done critical review of major environmental laws and an assessment of their assigned objectives. The firm has been regularly advising clients in matters relating to climate change and energy transition.

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