CLEAN DEVELOPMENT MECHANISM

CDM-SSCWG44-A13

Information note

Methane emissions from biomass storage

Version 01.0

United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. While discussing the standardized baseline “Technology switch in the rice mill sector of Cambodia (ASB004)” at its seventy-sixth meeting, the Executive Board (hereinafter referred to as the Board) of the clean development mechanism (CDM) requested the Small-Scale Working Group (SSC WG) to develop objective criteria, different to those that exist in approved methodologies such as “AMS-I.B: Mechanical energy for the user with or without electrical energy”, for the demonstration and assessment that no significant methane emissions occur from the storage of biomass under anaerobic conditions, for inclusion in biomass-based methodologies.

2. Purpose

2. The purpose of this information note is to inform the Board on the assessment by the SSC WG on the current requirement for assessing methane emissions from biomass storage.

3. Key issues and proposed solutions

3. In the current methodological requirement, possible methane emissions from the biomass storage can be considered negligible as long as the biomass used by the project facility are not stored for more than one year. After analysing the underlying issue as well as taking into account the information from practical operation of biomass based power plants (from studies of PDDs), the SSC WG recommends the Board to continue to use the current requirement for biomass originated from agricultural activities. Nevertheless, the SSC WG recommended further guidance on possible means for demonstrating compliance with this requirement for better clarity.

4. Impacts

4. The proposed means of demonstration of no significant methane emissions from biomass storage provides more clarity and guidance to facilitate the validation and verification process.

5. Subsequent work and timelines

5. No further work is required.

6. Recommendations to the Board

6. The SSC WG recommends that the Board continue using the current requirement for biomass originating from agricultural activities and approve the possible means of demonstration recommended by the SSC WG, which will be incorporated into the “General guidelines for SSC CDM methodologies” at its next revision.

1. Introduction

1. While discussing the standardized baseline "Technology switch in the rice mill sector of Cambodia (ASB004)" at its seventy-sixth meeting, the Executive Board (hereinafter referred to as the Board) of the clean development mechanism (CDM) requested the Small-Scale Working Group (SSC WG) to develop objective criteria, different to those that exist in approved methodologies such as "AMS-I.B: Mechanical energy for the user with or without electrical energy", for the demonstration and assessment that no significant methane emissions occur from the storage of biomass under anaerobic conditions, for inclusion in biomass-based methodologies.

2. Key issues and proposed solutions

2. In almost all approved biomass-based methodologies, methane emissions from the biomass storage are considered to be negligible if the biomass used by the project facility is not stored for more than one year. It was explicitly explained in ACM0006[1] that "CH_4 emissions from storage is excluded for simplification. Since biomass is stored for not longer than one year, this emission source is assumed to be small."

3. According to 2006 IPCC Guideline,[2] biomass types referred to in CDM methodologies for the purpose of energy generation mostly fall into the category of slowly degrading waste", which includes wood, wood products and straw. These biomass types are normally originating from agricultural activities.[3] For such a category, a slower decay rates (k = 0.02) has been assigned by IPCC, meaning that it takes about 35 years (half-life time) for the degradable organic matter to decay to half its initial mass when decaying at a anaerobic disposal site. IPCC further pointed out that "*a much longer half-life of 70 years or above could be justified for shallow dry solid waste disposal site (SWDS) in a temperate climate or for wood waste in a dry, temperate climate)*". With this said, it may be already concluded that storage of such biomass types up to only one year would not likely lead to significant methane emissions. Given that biomass storage in biomass power plant is typically in the form of stockpile",[4] it makes it less prone to anaerobic conditions. Furthermore, a quantitative conservative calculation has indicated that the potential methane emissions from biomass stored for one year are less than 5 per cent of the emission reductions by the biomass power plant following the methodological tool of "Emissions from solid waste disposal sites".[5] Overall, it may be justifiable to neglect potential methane emissions from biomass with a storage time of less than one year.

[1] ACM0006: Consolidated methodology for electricity and heat generation from biomass.

[2] Table 3.3, Chapter 3, Volume 5, IPCC 2006 Guidelines for National Greenhouse Gas Inventories.

[3] That is the biomass types that are discussed in this information note. For other waste types, particularly the food waste, it firstly may be unusual to combust food waste for energy generation and secondly it may be also very rare to store food waste for few months before use or treatment, which makes it less relevant to the issue under discussion.

[4] Anaerobic conditions are not assured in a stockpile with low volume to surface area ratios because the waste may be exposed to higher aeration.

[5] The underlying simplified assumptions are: 4.0kg steam/kWh as the station heat rate (SHR); 700 kcal/kg steam for steam from the boiler with an efficiency of 80 per cent; 3000 kcal/kg as the net calorific value of biomass residues; methane correction factor (MCF) of 0.4 for the case of stockpile and a grid emission factor of 0.8 t CO_2/MWh. Emission reductions are only from displacement of grid electricity.

4. On the other hand, storage of biomass originating from agricultural activities for time periods longer than one year is not very likely in practice. In case of a power plant utilising agricultural biomass residues, the plant's operation is normally synchronized with the seasonal harvesting cycle of the crops. Due to seasonal variation, the plant sizing will be according to the seasonal supply of biomass and not for continuous operation to the full year. For example, in case of a bagasse power plant, it has been commonly reported in PDDs that the bagasse will be used within the season they were produced, immediately after its generation, and the electricity and heat output from the plant will be used for the captive consumption of the agro-industrial mill during its seasonal operation, the surplus being exported. A small amount of bagasse at the end of one harvest season is saved as start-up fuel for the next season. The gap between the harvests is only six months. Even if the project is designed for continuous operation throughout the whole year by sourcing its biomass from a seasonal harvested crop, the biomass storage would be only necessary for the off-season period within a year. In some other cases, where biomass is sourced from urban or industrial wastes (without any significant season constraints), the storage is usually designed to accommodate short time fluctuations of raw biomass procurement, and will be much shorter than one year. Finally, for biomass projects that are based on already existing stocks (e.g. accumulated saw dusts, biomass stockpiles or pre-existing SWDS), the biomass storage is not a consequence of the CDM project operation, and the associated methane emissions cannot be attributed to the project activity.

5. Additional monitoring requirements in principle may be considered for those parameters indicating the occurrence of anaerobic decay during biomass storage, for example biomass biodegradability (C/N ratio), moisture and temperature development and anaerobic conditions. However, these monitoring requirements may increase the transaction cost of the project activity. It is also noteworthy that the quantity and quality of biomass (moisture, NCV) is already checked in the respective monitoring methodology (albeit less frequent), and it is in the plant operator's interests to maintain the biomass in favourable conditions such as low moisture and higher NCV levels (i.e. less prone to methane generation) for a better performance of the plant.

6. Lastly, the SSC WG also noted that no issue has been reported by designated operational entities (DOEs) nor raised by any stakeholders in the past with respect to the current requirement under discussion. Therefore, the SSC WG is of the opinion that the current requirement presents a good balance of the environmental integrity and the simplicity of the methodological framework. The SSC WG recommends that the Board continue using the current requirement i.e. methane emissions from biomass storage can be neglected if the storage is not longer than one year and mandate the SSC WG to propose revisions to "General guidelines for SSC CDM methodologies" to include the stated requirement as all biomass methodologies do not have this requirement.

7. The SSC WG in the meantime would like to recommend the following possible means/evidence that may be used for demonstrating the compliance with this requirement, in order to provide more guidance and clarity to the project proponent or the DOEs:

    (a) The design capacity and physical aspects of biomass storage (e.g. covered, above ground, shallow, etc.) from the feasibility study report (FSR), or via physical confirmation through site visit; or

(b) Mass balance for the plant operation (e.g. biomass generated from the season and the consumption for the year-round operation of the plant); or

(c) Inventory/record of the biomass storage area/volume.

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Document information

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