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TYPE III - OTHER PROJECT ACTIVITIES

Project participants shall apply the general guidelines for the SSC CDM methodologies, information on additionality (attachment A to appendix B) and general guidance on leakage in biomass project activities (attachment C to appendix B) provided at <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html> *mutatis mutandis*.

III.F. Avoidance of methane emissions through composting

Technology/measure

1. This methodology comprises measures to avoid the emissions of methane to the atmosphere from biomass or other organic matter that would have otherwise been left to decay anaerobically in a solid waste disposal site (SWDS), or in an animal waste management system (AWMS), or in a wastewater treatment system (WWTS). In the project activity, controlled aerobic treatment by composting of biomass is introduced.

2. The project activity does not recover or combust landfill gas from the disposal site (unlike AMS-III.G "Landfill methane recovery"), and does not undertake controlled combustion of the waste that is not treated biologically in a first step (unlike AMS-III.E "Avoidance of methane production from decay of biomass through controlled combustion, gasification or mechanical/thermal treatment"). Project activities that recover biogas from wastewater treatment shall use the methodology AMS-III.H "Methane recovery in wastewater treatment". Project activities involving co-digestion of organic matters shall apply the methodology AMS-III.AO "Methane recovery through controlled anaerobic digestion".

3. Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO_2 equivalent annually.

4. This methodology is applicable to the composting of the organic fraction of municipal solid waste and biomass waste from agricultural or agro-industrial activities including manure.

5. This methodology includes construction and expansion of treatment facilities as well as activities that increase capacity utilization at an existing facility. For project activities that increase capacity utilization at existing facilities, project participant(s) shall demonstrate that special efforts are made to increase the capacity utilization, that the existing facility meets all applicable laws and regulations and that the existing facility is not included in a separate CDM project activity. The special efforts should be identified and described.

6. This methodology is also applicable for co-composting wastewater and solid biomass waste, where wastewater would otherwise have been treated in an anaerobic wastewater treatment system without biogas recovery. The wastewater in the project scenario is used as a source of moisture and/or nutrients to the biological treatment process e.g. composting of empty fruit bunches (EFB), a residue from palm oil production, with the addition of palm oil mill effluent (POME) which is the wastewater co-produced from palm oil production.

7. In case of co-composting, if it cannot be demonstrated that the organic matter would otherwise been left to decay anaerobically, baseline emissions related to such organic matter shall

be accounted for as zero, whereas project emissions shall be calculated according to the procedures presented in this methodology for all co-composted substrates.

8. The location and characteristics of the disposal site of the biomass, animal manure and co-composting wastewater in the baseline condition shall be known, in such a way as to allow the estimation of its methane emissions, using the provisions of AMS-III.G, AMS-III.E (concerning stockpile), AMS-III.D "Methane recovery in animal manure management systems" or AMS-III.H respectively.

Project activities for composting of animal manure shall also meet the requirements under paragraphs 1, and 2(c) of AMS-III.D. Further no bedding material is used in the animal barns or intentionally added to the manure stream in the baseline. Blending materials may be added in the project scenario to increase the efficiency of the composting process (e.g. to achieve a desirable C/N ratio or free air space value), however, only monitored quantity of solid waste or manure or wastewater diverted from the baseline treatment system is used for emission reduction calculation. The following requirement shall be checked ex ante at the beginning of each crediting period:

(a) Establish that identified landfill(s)/stockpile(s) can be expected to accommodate the waste to be used for the project activity for the duration of the crediting period;

OR

(b) Establish that it is common practice in the region to dispose off the waste in solid waste disposal site (landfill)/stockpile(s).

9. The project participants shall clearly define the geographical boundary of the region referred in paragraph 8(b), and document it in the CDM-PDD. In defining the geographical boundary of the region, project participants should take into account the source of the waste i.e. if waste is transported up to 50 km, the region may cover a radius of 50 km around the project activity. In addition, it should also consider the distance to which the final product after composting will be transported. In either case, the region should cover a reasonable radius around the project activity that can be justified with reference to the project circumstances but in no case it shall be more than 200 km. Once defined, the region should not be changed during the crediting period(s).

10. In case produced compost is handled aerobically and submitted to soil application, the proper conditions and procedures (not resulting in methane emissions) must be ensured.

11. In case produced compost is treated thermally/mechanically, the provisions in AMS-III.E related to thermal/mechanical treatment shall be applied.

12. In case produced compost is stored under anaerobic conditions and/or delivered to a landfill, emissions from the residual organic content shall to be taken into account and calculated as per the latest version of the methodological tool "Emissions from solid waste disposal sites".

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III.F. Avoidance of methane emissions through composting (cont)

Boundary

13. The project boundary is the physical, geographical site:

(a) Where the solid waste would have been disposed and the methane emission occurs in absence of the proposed project activity;

(b) In the case of projects co-composting wastewater, where the co-composting wastewater would have been treated anaerobically in the absence of the project activity;

(c) Where the treatment of biomass through composting takes place;

(d) Where the products from composting (compost) is handled, disposed, submitted to soil application, or treated thermally/mechanically;

(e) And the itineraries between them (a, b, c and d) where the transportation of waste, wastewater, where applicable manure, product of treatment (compost) occurs.

Baseline

14. The baseline scenario is the situation where, in the absence of the project activity, biomass and other organic matter (including manure where applicable) are left to decay within the project boundary and methane is emitted to the atmosphere.

The baseline emissions are the amount of methane emitted from the decay of the degradable organic carbon in the biomass solid waste or manure. When wastewater is co-composted, baseline emissions include emissions from wastewater co-composted in the project activity. The yearly Methane Generation Potential for the solid waste is calculated using the first order decay model as described in the latest version of the methodological tool "Emissions from solid waste disposal sites". Baseline emissions from the manure composted are calculated as per the procedures of AMS-III.D.

Baseline emissions shall exclude emissions of methane that would have to be captured, fuelled or flared to comply with national or local safety requirement or legal regulations.

$$BE_y = BE_{CH4,SWDS,y} + BE_{ww,y} + BE_{CH4,manure,y} - MD_{y,reg} * GWP\_CH_4 \quad \textbf{(1)}$$

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III.F. Avoidance of methane emissions through composting (cont)

Where:

$BE_{CH4,SWDS,y}$	Yearly methane generation potential of the solid waste composted by the project activity during the years *x* from the beginning of the project activity (*x*=1) up to the year *y* estimated as per the latest version of the methodological tool "Emissions from solid waste disposal sites" (tCO_2e). The tool may be used with the factor "f=0.1" taking into account the methane oxidation effect by the upper layer of the landfill. With the definition of year *x* as 'the year since the project activity started diverting wastes from landfill disposal, *x* runs from the first year of crediting period (*x*=1) to the year for which emissions are calculated (*x*=*y*)'
$MD_{y,reg}$	Amount of methane that would have to be captured and combusted in the year *y* to comply with the prevailing regulations (tonne)
$BE_{CH4,manure,y}$	Where applicable, baseline emissions from manure composted by the project activities, as per the procedures in AMS-III.D
$BE_{ww,y}$	Where applicable, baseline emissions from the wastewater co-composted, calculated as per the procedures in AMS-III.H
GWP_CH_4	*GWP* for CH_4 (value of 21 is used)

Baseline under suppressed demand scenario

15. MCF factor of 0.8 [1] in the baseline emissions calculations on account of existence of suppressed demand situation as described in the "Guidelines on the consideration of suppressed demand in CDM methodologies", is only eligible when all of the following conditions are demonstrated:

(a) It can be demonstrated that waste is being dumped in an uncontrolled manner in human settlement areas under the current practice due to a lack of organised waste collection and disposal system;

(b) It can be demonstrated that only the municipal solid waste is being treated under the project and wastes from other sources such as agricultural or agro-industrial wastes are not being treated under the CDM project;

(c) It can be demonstrated that entire portion of the waste treated under the project activity would comply with the above two conditions, for all other situations the baseline as specified in paragraph 14 shall apply.

[1] Deep landfill (>5m) is most likely the technology for disposing MSW in the scenario of constrained availability of area/space within or close to urban areas and where waste scavenging does not occur. And it is also the least cost alternative for providing comparable level of service to the project technology for treating the waste i.e. composting in this case. MCF value is chosen from the definition provided in 2006 IPCC Guideline applicable to unmanaged deep landfills that do not have controlled placement of waste (i.e. waste directed to specific deposition areas, a degree of control of scavenging and a degree of control of fires) and do not include any cover material, mechanical compacting and levelling of the waste.

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III.F. Avoidance of methane emissions through composting (cont)

Project activity emissions

16. Project emissions from composting process (PE_y) shall be determined as per the latest version of the methodological tool "Project and leakage emissions from composting". PE_y is equivalent to parameter $PE_{COMP,y}$ in the tool.

Leakage

17. If the project technology is the equipment transferred from another activity or if the existing equipment is transferred to another activity, leakage effects are to be considered (LE_y).

18. In case compost is subject to anaerobic storage or disposed of in a SWDS, leakage shall be estimated to account for methane emissions from the anaerobic decay of compost. The relevant procedures in the leakage part of the methodological tool "Project and leakage emissions from composting" shall be followed.

Monitoring

19. In the case of construction of new composting facilities or expansion of capacity of existing composting facilities, the emission reduction achieved by the project activity will be measured as the difference between the baseline emission and the sum of the project emission and leakage.

$$ER_y = BE_y - (PE_y + LE_y) \quad \textbf{(2)}$$

Where:

ER_y	Emission reduction in the year *y* (tCO_2e)
LE_y	Leakage emissions in year *y* (tCO_2e)

In the case of increase of capacity utilization of existing composting facilities, the emission reduction achieved by the project activity will be measured as the difference between the baseline emission and the sum of the project emission and leakage, multiplied by the factor *r* as follows:

$$ER_y = (BE_y - PE_y - LE_y) * (1 - r) \quad \textbf{(3)}$$

The value for *r* is defined as:

$$r = WCOM_{BAU} / TWCOM_y \quad \textbf{(4)}$$

Where:

$TWCOM_y$	Total quantity of waste composted in year *y* (tonnes) at the facility
$WCOM_{BAU}$	Registered annual amount of waste composted (tonnes) at the facility on a business as usual basis calculated as the highest amount of annual compost

production in the last five years prior to the project implementation

20. In case of projects involving increase of capacity utilization of existing composting facilities, the historical records of annual amount of waste treated at the facility in the last five years prior to the project implementation and additional information to cross check the historical records (e.g. invoices of compost sales) shall be provided for project activity validation.

21. The operation of composting facilities shall be documented in a quality control program, monitoring the conditions and procedures that ensure the aerobic condition of the waste during the composting process (e.g. temperature and moisture during different composting stages).

22. Soil application of the compost in agriculture or related activities will be monitored. This includes documenting the sales or delivery of the compost final product. It shall also include an in situ verification of the proper soil application of the compost to ensure aerobic conditions for further decay. Such verification shall be done at representative sample of user sites. The conditions for proper soil application ensuring aerobic conditions can be established by a local expert taking into account the soil conditions, crop types grown and weather conditions.

Project activity under a programme of activities

23. The following conditions apply for use of this methodology in a project activity under a programme of activities:

In case the project activity involves the replacement of equipment, and the leakage effect of the use of the replaced equipment in another activity is neglected, because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified.

24. The monitoring requirements in the methodological tool “Project and leakage emissions from composting” shall be followed.

25. Additional parameters, where relevant, shall be monitored as indicated in the Table 1 below. The applicable requirements specified in the “General Guidelines for SSC CDM methodologies” (e.g. calibration requirements and sampling requirements) are also an integral part of the monitoring guidelines specified below and therefore shall be referred by the project participants.

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III.F. Avoidance of methane emissions through composting (cont)

Table 1: Parameters for monitoring during the crediting period

No.	Parameter	Description	Unit	Monitoring/ recording frequency	Measurement methods and procedures
1	$TWCOM_y$	Total quantity of waste composted in year *y* at the facility	tons	Monthly	In the case of increase of capacity utilization of existing composting facilities, it is used for the calculation of the factor *r*
2		Parameters related to emissions from electricity and/or fuel consumption			As per the procedure in the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" and/or "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion". Alternatively it shall be assumed that all relevant electrical equipment operate at full rated capacity, plus 10% to account for distribution losses, for 8760 hours per annum
3		Parameters related to methane emissions from anaerobic disposal in a landfill of the solid waste (excluding manure)/compost			As per the latest version of the methodological tool "Emissions from solid waste disposal sites
4		Parameters related to baseline methane emissions from animal manure			As per the relevant provisions in AMS-III.D
5		Parameters related to baseline emissions from wastewater co-composted			As per the relevant provisions in AMS-III.H

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III.F. Avoidance of methane emissions through composting (cont)

History of the document

Version	Date	Nature of revision
11.0	11 May 2012	EB 67, Annex 20 To include the issue related to suppressed demand as specified in the "Guidelines on the consideration of suppressed demand in CDM methodologies". In addition, the methods to account for the methane oxidation effect in the upper layer of the landfill as indicated in the latest version of the tool for "Emissions from solid waste disposal sites" are now included. The revision further includes clarification provided to the submission SSC_604 with regard to application of the latest tool "Project and leakage emissions from composting" for determination of project and leakage emissions.
10	EB 59, Annex 5 18 February 2011	To correct the equation for emission reductions calculation in the case of an increase in capacity utilization of existing composting facility.
09	EB 58, Annex 21 26 November 2010	To deconsolidate AMS-III.F to limit the methodology to composting only; anaerobic digestion of biomass will be covered in the new methodology AMS-III.AO.
08	EB 48, Annex 20 17 July 2009	To include composting of manure and to clarify that the baseline waste disposal methods are to be assessed *ex ante*.
07	EB 47, Annex 24 28 May 2009	Provide more guidance regarding the calculation of project emissions from the compost taking into account specific characteristics of the composting technology/measure employed.
06.1	09 February 2009	Corrected title of the "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site".
06	EB 41, Annex 19 02 August 2008	The applicability of the methodology is expanded to include controlled anaerobic digestion of solid organic waste which otherwise would have been left to decay in a waste disposal site.
05	EB 33, Annex 34 27 July 2007	Revision of the approved small-scale methodology AMS-III.F to allow for its application under a programme of activities (PoA)
04	EB 31, Annex 25 04 May 2007	Includes project activities that enhance the capacity utilization of existing compost facilities and provides methods to determine the eligible increased capacity utilization based on the historical records of the annual amount of waste composted at the facility.
03	EB 28, Annex 28 15 December 2006	The applicability of the category is expanded to include co-composting of wastewater along with biomass solid wastes; Methods to calculate baseline emissions from the co-composted wastewater are included and parameters for avoided methane emissions from the composted solid waste are revised. See paragraph 50 of the EB 28 meeting report. Removed the interim applicability condition i.e. 25 $ktCO_2e/y$ limit from all Type III categories.
02	EB 24, Meeting Report, Para. 64 12, May 2006	Introduced the interim applicability condition i.e. 25 $ktCO_2e/y$ limit from all Type III categories.
01	EB 23, Annex 22 24 February 2006	Initial adoption.
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