Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories

TYPE III - OTHER PROJECT ACTIVITIES

Project participants shall take into account the general guidance to the methodologies, information on additionality, abbreviations and general guidance on leakage provided at http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html.

III.F. Avoidance of methane production from decay of biomass through composting

Technology/measure

1. This project category comprises measures to avoid the production of methane from biomass or other organic matter that would have otherwise been left to decay anaerobically in a solid waste disposal site without methane recovery. Due to the project activity, decay is prevented through aerobic treatment by composting and proper soil application of the compost. The project activity does not recover or combust methane (unlike AMS III.G), and does not undertake controlled combustion of the waste (unlike AMS III E). Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO_2 equivalent annually.

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

3. This category 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 methane recovery. The wastewater in the project scenario is used as a source of moisture and/or nutrients to the composting 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.

Boundary

4. 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 soil application of the produced compost takes place,

(e) and the itineraries between them (a, b, c and d), where the transportation of waste, wastewater or compost occurs.

Project Activity Emissions

5. Project activity emissions consist of:

(a) CO_2 emissions due to incremental distances between

(i) The collection points of biomass and the composting site as compared to the baseline solid waste disposal site,

(ii) When applicable, the collection points of wastewater and composting site as compared to baseline wastewater treatment site,

(iii) Composting site and the soil application sites.

(b) CO_2 emissions on account of fossil fuel based energy used by the project activity facilities, which shall include but not limited to energy used for aeration and/or turning of compost piles/heaps and chopping of biomass for size reduction, screening and where relevant drying of the final compost product. Emission factors for grid electricity or diesel fuel use as the case may be shall be calculated as described in category AMS I.D.

$$\mathbf{PE_y = PE_{y,transp} + PE_{y,power}}$$

where:

PE_y project activity emissions in the year "y" (tonnes of CO_2 equivalent)

$PE_{y,transp}$ emissions from incremental transportation in the year "y"

$PE_{y,power}$ emissions from electricity or diesel consumption in the year "y"

$$\mathbf{PE_{y,transp} = (Q_y/CT_y) * DAF_w * EF_{CO2} + (Q_{y,comp}/CT_{y,comp}) * DAF_{comp} * EF_{CO2}}$$

where:

Q_y quantity of waste composted and/or wastewater co-composted in the year "y" (tonnes)

CT_y average truck capacity for waste transportation (tonnes/truck)

DAF_w average incremental distance for solid waste and/or wastewater transportation (km/truck)

EF_{CO2} CO_2 emission factor from fuel use due to transportation ($kgCO_2$/km, IPCC default values or local values may be used).

$Q_{y,comp}$ quantity of final compost product produced in the year "y" (tonnes)

$CT_{y,comp}$ average truck capacity for final compost product transportation (tonnes/truck)

DAF_{comp} average distance for final compost product transportation (km/truck)

Baseline

6. The baseline scenario is the situation where, in the absence of the project activity, biomass and other organic matter 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 composted in the project activity. 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 category AMS III.G. Baseline emissions shall exclude methane emissions that would have to be captured, fuelled or flared to comply with national or local safety requirement or legal regulations.

$$BE_y = BE_{CH4,SWDS,y} - MD_{y,reg} * GWP\_CH_4 + MEP_{y,ww} * GWP\_CH_4$$

where:

$BE_{CH4,SWDS,y}$	yearly methane generation potential of the solid waste composted by the project during the years "x" from the beginning of the project activity (x=1) up to the year "y" estimated as described in AMS III.G (t CO_2e)
$MD_{y, reg}$	amount of methane that would have to be captured and combusted in the year "y" to comply with the prevailing regulations
$MEP_{y,ww}$	methane emission potential in the year "y" of the wastewater. The value of this term is zero if co-composting of wastewater is not included in the project activity.
CH_4_GWP	GWP for CH_4 (value of 21 is used)

7. Methane emission potential of co-composted wastewater is estimated as described in category AMS III.H:

$$MEP_{y,ww} = Q_{y,ww} * COD_{y,ww,untreated} * B_{o,ww} * MCF_{ww,treatment} * GWP\_CH_4$$

where:

$Q_{y,ww}$	volume of wastewater co-composted in the year "y" (m^3)
$COD_{y,ww,untreated}$	chemical oxygen demand of the wastewater in the year "y" (tonnes/m^3)[1]
$B_{o,ww}$	methane producing capacity for the wastewater (IPCC default value for domestic wastewater of 0.21 kg CH_4/kg.COD)[1]
$MCF_{ww, treatment}$	methane correction factor for the wastewater treatment system in the baseline scenario (MCF higher value as per table III.H.1).

Leakage

8. If the composting technology is the equipment transferred from another activity or if the existing equipment is transferred to another activity, leakage effects are to be considered.

Monitoring

[1] The IPCC default value of 0.25 kg CH_4/kg COD was corrected to take into account the uncertainties. For domestic waste water, a COD based value of $B_{o,ww}$ can be converted to BOD_5 based value by dividing it by 2.4, i.e. a default value of 0.504 kg CH_4/kg BOD can be used.

9. The emission reduction achieved by the project activity (in the case of construction of new facilities or expansion of capacity of existing facilities) will be measured as the difference between the baseline emission and the sum of the project emission and leakage.

$$ER_y = (BE_y - (PE_y + Leakage_y)$$

where:

ER_y Emission reduction in the year "y" (tCO_2e)

10. The emission reduction achieved by the project activity (in the case of increase of capacity utilization of existing facilities) will be measured as the difference between the baseline emission and the sum of the project emission and leakage.

$$ER_y = (BE_y - PE_y) \text{ x } (1\text{-}r)$$

where:

ER_y Emission reduction in the year "y" (tCO_2e)

The value for r is defined as

$$r = WCOM_{BAU}/TWCOM_y$$

where:

$TWCOM_y$ total quantity of waste composted in year of (tonnes) at the facility

$WCOM_{BAU}$ registered annual amount of waste composted (tonnes) at the facility on a BAU basis calculated as the highest amount of annual compost production in the last five years prior to the project implementation.

11. The following parameters shall be monitored and recorded annually during the crediting period:

- Quantity of waste composted ($Q_{y,comp}$) and its composition through representative sampling,
- When project activity includes co-composting of wastewater, the volume of co-composted wastewater ($Q_{y,ww}$) and its COD content through representative sampling,
- When project activity includes co-composting of wastewater, the volume of run-off water[2] from the composting site ($Q_{ww,runoff}$) and its COD content through representative sampling. The methane emission potential of the run-off water is calculated as described in paragraph 6 above and will be subtracted from baseline methane emissions from the wastewater co-composted by the project activity.

[2] Consisting of the wastewater applied in excess (i.e. moisture over and above the field capacity of the biomass being composted) and rainwater in the case of unroofed sites.

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III.F. Avoidance of methane production from biomass decay through composting (cont)

- Parameters related to project emissions (PE_y) described above such as CT_y , DAF_w, $CT_{y,comp}$, energy used for aeration, turning of compost piles, pre-processing of the biomass (e.g. size reduction, screening) and where relevant drying of the final compost product.

12. The historical records of annual amount of waste composted 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.

13. The operation of the composting facilities will be documented in a quality control program, monitoring the conditions and procedures that ensure the aerobic condition of the waste during the composting process.

14. 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.

15. The project participants shall demonstrate annually, through the assessment of common practices at proximate waste disposal sites, that the amount of waste composted in the project activity facilities would have been disposed in a solid waste disposal site without methane recovery in the absence of the project activity. When project activity includes co-composting of wastewater demonstrate that wastewater would have been treated in an anaerobic system without methane recovery in the absence of the project activity.

Project activity under a programme of activities

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

16. 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.