CDM: Recommendation Form for Small Scale Methodologies (version 01)

(To be used for presenting questions/proposals/amendments to the simplified methodologies for small-scale CDM project activity categories)

Date of SSC WG meeting:	16–19 August 2010, SSC WG 27
Title/Subject (give a small title or specify the subject of your submission, maximum 200 characters):	Revision of AMS-III.G to allow the use of bio-filters to reduce the methane content of landfill gas
Indicative methodology to which your submission relates (refer the items of Appendix B of the Simplified Modalities and Procedures), if applicable.	AMS-III.G "Landfill Methane Recovery"
Name of the authors of the query:	GianAndrea Garrone Institution: CO2balance Italy srl liotta@entsorga.it, garrone@entsorga.it, g.eenhoorn@do-inc.net

Summary of the query:

Please use the space below to summarize the query related to SSC methodologies/categories SSC Modalities and Procedures provide recommendation/analysis of the SSC WG.

Original text from PP:

Methane in landfill gas can be destroyed or reduced by combustion or flaring. Small scale CDM project destroying or reducing methane in this way can use the approved methodology AMS-III.G.

Another effective way of destroying methane is by passing it through a bio-filter system. The micro organisms in the filter destroy ('eat') the methane. Research shows that this biochemical process is effective. Basically the system does the same as a flare does: the methane is (partly) destroyed when landfill gas is fed into the system. The exhausted gas is emitted to the atmosphere. To develop a CDM project using this technology there is currently no applicable methodology. Methodology III.G seems the most suitable methodology to allow the inclusion of bio-filters. To make it applicable the following changes/ additions need to be applied:

1. The definitions of 'recovery' and/ or 'combustion' should be widened to include 'destruction'. Similar the verbs 'recover' and 'combust' should be widened to include 'destroy'.

2. An option to divert landfill gas from the flare to a bio-filter should be added

3. The monitoring of a bio-filter system should be added to the methodology

Monitoring of a bio-filter system is done by comparing the methane content of the landfill gas at the ingress of the biofilter with the methane content of the exhaust gas.

Proposed changes to the methodology:

Title: Change "Landfill Methane Recovery" to "Landfill Methane Recovery and/ or Destruction"

Change

"1. This project category comprises measures to capture and combust methane from (…)".

To

"1. This project category comprises measures to capture and ~~combust~~ **destroy** methane from (…)".

Change

"12.Emission reductions achieved by the project activity in each year will be assessed ex-post through direct measurement of the amount of methane fuelled, flared or gainfully used. The amount of methane recovered and gainfully used, fuelled or flared shall be monitored ex-post, using continuous flow meters. (…)"

To

"12.Emission reductions achieved by the project activity in each year will be assessed ex-post through direct measurement of the amount of methane fuelled, flared or destroyed or gainfully used. The amount of methane recovered and gainfully used, fuelled or flared shall be monitored ex-post, using continuous flow meters. (…)"

Add a paragraph after § 14 determining the Efficiency of the bio filter (similar to the Flare Efficiency).

Change

"14. Regular maintenance should ensure optimal operation of flares. The flare efficiency, defined as the fraction of time in which the gas is combusted in the flare, multiplied by the efficiency of the flaring process, shall be monitored. (…)"

to

"14. **In the case a flare is installed r**egular maintenance should ensure optimal operation of flares. The flare efficiency, defined as the fraction of time in which the gas is combusted in the flare, multiplied by the efficiency of the flaring process, shall be monitored. (…)"

Add a paragraph after § 14 determining the Efficiency of the bio filter (similar to the Flare Efficiency):

"**15.** In the case a bio-filter is installed regular maintenance should ensure optimal operation of the filter(s). The efficiency of the bio filter (EB; efficiency of biofilter), defined as the efficiency of the biofilter unit, shall be monitored. To determine the efficiency of the biofilter unit, the methane fraction at the ingress and the methane fraction at the egress are measured with a 90/10 confidence/ precision level. If at any given time the methane fraction at the egress is not measured with a 90/10 confidence/ precision level a default value equal to the methane concentration at the ingress should be used for this period."

renumber successive paragraphs to accommodate added paragraph.

Alter the formula as to allow for multiple technologies (e.g. flaring, combustion, bio-filters) to be used to destroy the landfill gas. And:

Rename the Parameter '$LFG_{burnt,y}$' to '$F_{i,y}$' which stands for the landfill gas destroyed in a system "i"

Rename the Parameter 'FE' (Flare Efficiency) to 'DE' (Destruction Efficiency)

Change the definition of FE: "Flare efficiency in the year "y" (fraction)." To a definition for DE: "**Destruction** Efficiency of system "i" in the year "y" (fraction)"

Add a definition for system "i" as follows:

$$MD_{i,y} = \sum_i F_{i,y} * w_{CH4,y} * D_{CH4,y} * DE_{i,y} * GWP_{CH4}$$

Where:

$MD_{i,y}$	Methane destroyed in system "*i*" in year "y"
F_i	Landfill gas destroyed in system "*i*" or used as fuel in year "y" (Nm^3)
$w_{CH4,y}$	Methane content[1] in landfill gas in the year "y" (mass fraction).
$D_{CH4,y}$	Density of methane at the temperature and pressure of the landfill gas in the year "y" ($tonnes/m^3$).
DE_i	Destruction Efficiency of system "*i*" in the year "y" (fraction),
i	System used for the destruction of methane (flare, bio-filter or combusted)

Recommendation by the SSC WG:

Please use the space below to provide amendments/change (in your expert view, if necessary).

Please refer to paragraph 9 of the meeting report of the SSC WG 27 (http://cdm.unfccc.int/Panels/ssc_wg).

Answer to authors of query by the SSC WG:

Please use the space below to provide answer to the authors of the above query.

The small-scale working group of the CDM Executive Board would like to thank the author for the submission.

The SSC WG notes that bio-filters may be a good option for landfills with low landfill gas (LFG) yield rate and/or low methane concentration (% CH4) in LFG. It may also potentially be used for methane destruction in other biogas producing processes (e.g. wastewater treatment system, digester).

However, the methane destruction mechanism for bio-filter system is based on micro-biological activities which is fundamentally different to the technology/measures currently covered in AMS-III.G. To retain the simplified framework of AMS-III.G, the SSC WG would like to consider the application of bio-filters within the framework of a new methodology and would welcome a submission from the project proponent. Such a submission should consider, for example:

1. GHG emissions related to the production and final disposal of the filling/bedding materials used in the bio-filter.
2. GHG emissions related to the disposal of bacterial biomass accumulated in the bio-filter. Considering that this emission source may depend on the operation practices and possibly be incorporated into the emission determination in bullet point 1 (e.g. microorganism accumulated may be separated from the filling material and reused or be disposed of together with the filling material as bulk waste), the project proponent may need to consider the operation practices of the bio-filter system.
3. GHG emissions related to the operation of the treatment system, e.g. energy consumption, possible chemical addition for nutrients, possible wastewater generation, etc.

Justification shall be provided if any GHG emission source is deemed to be negligible.

4. Monitoring instructions related to measuring the effectiveness of the bio-filter, such as the methane concentration and flow in and out of the bio-filter, any physical gas leakages from the filter; and emissions related to the replacement of materials in the filter according to the operation/maintenance design of the bio-filter system.

Signed by the Chair, Mr. Peer Stiansen
Date: 19/08/2010

Signed by the Vice-Chair, Mr. Hugh Sealy
Date: 19/08/2010

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