

Your Emission Reduction is  tCO<sub>2</sub>e/year  tCO<sub>2</sub>e/year  tCO<sub>2</sub>e/year

1st year                      7th year                      Average of 1st-7th year

**III.G. Landfill Methane Recovery**

**Technology/measure**

1. This project category comprises measures to capture and combust methane from landfills (i.e., solid waste disposal sites) used for disposal of residues from human activities including municipal, industrial, and other solid wastes containing biodegradable organic matter.
2. If the recovered methane is used for heat or electricity generation the project can use a corresponding methodology under type I project activities.
3. Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO<sub>2</sub> equivalent annually.

*Remark:*

calculation result

\_\_\_\_\_ to be calculated

to be filled

**Basic Assumption**

This spreadsheet assumes the project activity to start flaring methane in landfill gas collected at closed solid waste disposal site which has received wastes during 10 years, just after its closing.

Project emission (PE)  tCO<sub>2</sub>e/year

PE <sub>y,power</sub>	<input type="text" value="0"/> tCO <sub>2</sub> e/year	
<input type="text" value="0"/> MWh/year		: Project electricity consumption
<input type="text" value="0"/> MW		: Project electricity consumption rate
<input type="text" value="0"/> hours/year		: Operation hours of the project activity
<input type="text" value="0"/> tCO <sub>2</sub> e/MWh		: CO <sub>2</sub> emission factor per 1 MWh

Baseline emission (BE)

1st year  tCO<sub>2</sub>e/year    7th year  tCO<sub>2</sub>e/year    Average of 1st-7th year  tCO<sub>2</sub>e/year

$$BE_y = BE_{CH_4,SWDS,y} - MD_{reg,y}$$

$BE_{CH_4,SWDS,y}$  = Methane emissions avoided during the year  $y$  from preventing waste disposal at the solid waste disposal site (SWDS) during the period from the start of the project activity to the end of the year  $y$  (tCO<sub>2</sub>e)

$MD_{reg,y}$  methane emissions that would be captured and destroyed to comply with national or local safety requirement or legal regulations in the year “ $y$ ” (tCO<sub>2</sub>e)

BE_CH4,SWDS,y	1st year	7th year	Average of 1st-7th year
	0 tCO <sub>2</sub> e/year	0 tCO <sub>2</sub> e/year	0 tCO <sub>2</sub> e/year

$$BE_{CH_4,SWDS,y} = \varphi \cdot (1-f) \cdot GWP_{CH_4} \cdot (1-OX) \cdot \frac{16}{12} \cdot F \cdot DOC_f \cdot MCF \cdot \sum_{x=1}^y \sum_j W_{j,x} \cdot DOC_j \cdot e^{-k_j(y-x)} \cdot (1-e^{-k_j})$$

*quoted from the Tool*

- $\varphi$  = Model correction factor to account for model uncertainties  0.9
- $f$  = Fraction of methane captured at the SWDS and flared, combusted or used in another manner 0
- $GWP_{CH_4}$  = Global Warming Potential (GWP) of methane, valid for the relevant commitment period 21
- $OX$  = Oxidation factor (reflecting the amount of methane from SWDS that is oxidised in the soil or other material covering the waste) 0
- $F$  = Fraction of methane in the SWDS gas (volume fraction)  0.5
- $DOC_f$  = Fraction of degradable organic carbon (DOC) that can decompose  0.5
- $MCF$  = Methane correction factor
- $W_{j,x}$  = Amount of organic waste type  $j$  prevented from disposal in the SWDS in the year  $x$  (tons) *see below*
- $DOC_j$  = Fraction of degradable organic carbon (by weight) in the waste type  $j$  *see "Tool-SSC"*
- $k_j$  = Decay rate for the waste type  $j$  *see "Tool-SSC"*
- $j$  = Waste type category (index) -
- $x$  = Year during the crediting period:  $x$  runs from the first year of the first crediting period ( $x = 1$ ) to the year  $y$  for which avoided emissions are calculated ( $x = y$ ) -
- $y$  = Year for which methane emissions are calculated -

5. The estimation of the methane emission potential of a solid waste disposal site ( $BE_{CH_4,SWDS,j}$  in tCO<sub>2</sub>e) shall be undertaken using the “Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site”, found on the CDM website<sup>1</sup>. The tool may be used:

- With the factor “f=0.0” assuming that no methane is captured and flared.
- With the definition of year x as ‘the year since the landfill started receiving wastes, x runs from the first year of landfill operation (x=1) to the year for which emissions are calculated (x=y)’.

The amount of waste type “j” deposited in each year “x” ( $W_{j,x}$ ) shall be determined by sampling (as specified in the tool), in the case wastes are generated during the crediting period. Alternatively, for existing SWDS, if the pre-existing amount and composition of the wastes in the landfill are unknown, they can be estimated by using parameters related to the attended population or industrial activity, or by comparison with other landfills with similar conditions in regional or national levels.

$W_{j,x}$  \_\_\_\_\_ 0 t/yr

\_\_\_\_\_ ,000 cap. : Population whose waste had been disposed at the landfill site

0.27 t/cap/yr : MSW Generation rate *Source: 2006 IPCC Guidelines for National GHG Inventory (South-Eastern Asia)*

59 % : Fraction of MSW disposed to SWDS *ditto*

MSW composition rate (%)

\_\_\_\_\_ %-weight **wood** *ditto*

\_\_\_\_\_ %-weight **paper** *ditto*

\_\_\_\_\_ %-weight **food** *ditto*

\_\_\_\_\_ %-weight **textile** *ditto*

\_\_\_\_\_ %-weight **garden** *ditto*

MD\_reg,y \_\_\_\_\_ 0 tCO<sub>2</sub>e/year

*No methane is assumed to be destroyed/combusted (by national or local safety requirement or legal regulations) in the absence of the project.*