ARTICLE 6.4 MECHANISM

A6.4-MEP008-A05

Draft Methodological tool

Emissions from solid waste disposal sites

Version 01.0

United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. The Supervisory Body of the Article 6.4 mechanism, at its fifteenth meeting, approved its workplan for 2025 for the Methodological Expert Panel (MEP) and requested the MEP to initiate work on the revision of CDM methodologies / methodological tools / Standard / Guidelines, including the "Tool: Emissions from solid waste disposal sites" (hereinafter referred to as approved CDM Tool).

2. Purpose

2. The purpose of this new methodological tool is to provides procedures to calculate baseline, activity or leakage emissions of methane from solid waste disposed or prevented from disposal at a solid waste disposal site (SWDS).

3. Key issues and proposed solutions

3. This draft methodological tool was developed based on the approved CDM Tool[1], but with revisions to align with the Article 6.4 mechanism framework and standards.

4. The tool can be used to determine emissions for the following types of applications:

   (a) Application A: Methane capture and destruction at existing SWDS (landfills).

   (b) Application B: Avoidance/diversion of waste to prevent methane generation (e.g., composting, anaerobic digestion).

5. This draft methodological tool incorporates updated factors and equations from the 2019 Refinement to the 2006 IPCC guidelines for national greenhouse gases inventories and provides a new value for the oxidation factor (OX_y) for both applications based on a default value that is more conservative one than the value in applied by the approved CDM Tool.

6. Guidance on uncertainty ranges and conservative assumptions to ensure environmental integrity is also added in the proposed new methodological tool.

4. Impacts

7. The approval of this draft methodological tool will allow the development of new Article 6.4 activities that aim to capture and destroy or use the LFG generated in SWDSs, or that aim to prevent the generation of methane in a SWDS due to alternative solid waste treatment options.

5. Subsequent work and timelines

8. The MEP agreed to seek inputs from stakeholders on the draft version of the proposed new methodological tool. The MEP will analyse the inputs and consider them in

[1] See https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-04-v8.1.pdf/history_view

preparation of a revised methodological tool at its next meeting for consideration of the Supervisory Body.

6. Recommendations to the Supervisory Body

9. This is not applicable (Document is published for a call for public inputs.*)*

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1. Introduction

1.1. Scope

1. This methodological tool provides procedures to calculate baseline, activity or leakage emissions of methane from solid waste disposed or prevented from disposal at a solid waste disposal site (SWDS). This tool provides procedures to determine the following parameters:

Table 1. Parameters

Parameter	SI Unit	Description
$BE_{CH4,SWDS,y}$ $AE_{CH4,SWDS,y}$ $LE_{CH4,SWDS,y}$	tCO_2e/year	Baseline, activity or leakage methane missions occurring in year y generated from waste disposal at a SWDS during a time period ending in year y (where y is a period of 12 consecutive months)
$BE_{CH4,SWDS,m}$ $AE_{CH4,SWDS,m}$ $LE_{CH4,SWDS,m}$	tCO_2e/month	Baseline, activity or leakage methane emissions occurring in month m generated from waste disposal at a SWDS during a time period ending in month *m*

1.2. Entry into force and validity

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2. This document enters into force on DD/MM/YYYY and is valid for five years, until DD/MM/YYYY, unless an earlier date applies if the methodological tool is revised or withdrawn in accordance with the procedure "Development, revision and clarification of methodologies and methodological tools" (A6.4-PROC-METH-001)[1].

2. Definitions

3. The following definitions shall apply:

(a) **Aged SWDS cell:** A SWDS cell containing waste which has been in the SWDS for more than 20 years;

(b) **Immature SWDS cell**: A SWDS cell containing waste which has been in the SWDS for less than 5 years;

(c) **Managed SWDS**: A SWDS that has 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 will include at least one of the following: (i) cover material; (ii) mechanical compacting; or (iii) levelling of the waste. In this tool, a SWDS that does not meet this definition is considered an unmanaged SWDS;

(d) **Mature SWDS cell:** A SWDS cell containing waste which has been in the SWDS between 5 and 20 years;

[1] See https://unfccc.int/sites/default/files/resource/A6.4-PROC-METH-001.pdf

(e) **Municipal solid waste (MSW)**: A heterogeneous mix of different solid waste types, usually collected by municipalities or other local authorities. MSW includes household waste, garden/park waste and commercial/institutional waste;

(f) **Residual waste**: A solid waste type with largely homogenous properties. This includes, inter alia, material that remains after the waste is treated, e.g. anaerobic digestate and compost, and biomass residues (by-product, residue or waste stream from agriculture, forestry and related industries);

(g) **Solid waste**: Material that is unwanted and insoluble (including gases or liquids in cans or containers). Hazardous waste is not included in the definition of solid waste. Solid waste may include residual wastes;

(h) **Solid waste disposal site (SWDS):** Designated areas intended as the final storage place for solid waste. Stockpiles are considered a SWDS if: (a) their volume to surface area ratio is 1.5 or larger; and if (b) a visual inspection by the DOE confirms that the material is exposed to anaerobic conditions (i.e. it has a low porosity and is moist);

(i) **Stockpile**: A pile of solid waste (not buried below ground). Anaerobic conditions are not assured in a stockpile with low volume to surface area ratios (less than 1.5) because the waste may be exposed to higher aeration.

4. Further definitions from the Article 6.4 Glossary of Terms, still under development, shall apply when adopted by the Supervisory Body.

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3. Applicability

5. The tool can be used to determine emissions for the following types of applications:

(a) Application A: The Article 6.4 activity mitigates methane emissions from a specific existing SWDS. Methane emissions are mitigated by capturing and flaring or combusting the methane. The methane is generated from waste disposed in the past, including prior to the start of the Article 6.4 activity. In these cases, the tool is only applied for an ex-ante estimation of emissions in the project design document (PDD). The emissions will then be monitored during the crediting period using the applicable approaches in the relevant methodologies (e.g. measuring the amount of methane captured from the SWDS);

(b) Application B: The Article 6.4 activity avoids or involves the disposal of waste at a SWDS, e.g. the municipal solid waste (MSW) is treated with an alternative option, such as composting or anaerobic digestion, and is then prevented from being disposed of in a SWDS. The methane is generated from waste disposed or avoided from disposal during the crediting period. In these cases, the tool can be applied for both ex ante and ex post estimation of emissions. These activities may apply the simplified approach detailed in 0 when calculating baseline emissions.

6. These two types of applications are referred, in the tool, for determining parameters.

7. In the case that: (a) different types of residual waste are disposed or prevented from disposal; or that (b) both MSW and residual waste(s) are prevented from disposal, then the tool should be applied separately to each residual waste and to the MSW.

4. Normative references

8. This baseline and monitoring methodology is based on the following approved methodologies and other references:

   (a) 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 5: Waste. Chapter 3: Solid Waste Disposal.

5. Methodology procedure

5.1. Simplified procedure to determine methane emissions from the SWDS

9. Simplified approaches to the first order-decay (FOD) model and their respective simplified calculations are detailed in the appendix. Article 6.4 activities implementing a simplified approach do not need to apply the procedure detailed in section 5.2, and would require to determine only the relevant parameters from section 5.3.

5.2. Procedure to determine methane emissions from the SWDS

10. The amount of methane generated from disposal of waste at the SWDS is calculated based on the FOD model.[2] The model differentiates between the different types of waste j with respective constant decay rates (k_j) and fractions of degradable organic carbon (DOC_j).

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11. The model calculates the methane generation occurring in year y (a period of 12 consecutive months) or month m based on the waste streams of waste types j ($W_{j,x}$ or $W_{j,i}$) disposed in the SWDS over a specified time period (years or months).

12. In cases where at the SWDS methane is captured (e.g. due to safety regulations) and flared, combusted or used in another manner that prevents emissions of methane to the atmosphere, the emissions are adjusted for the fraction of methane captured (f_y).

13. The amount of methane generated from disposal of waste at the SWDS is calculated for year y ($BE_{CH4,SWDS,y}$ or $AE_{CH4,SWDS,y}$ or $LE_{CH4,SWDS,y}$) using equation (1) or for month m ($BE_{CH4,SWDS,m}$ or $AE_{CH4,SWDS,m}$ or $LE_{CH4,SWDS,m}$) using equation (2). Either of these two approaches may be used to calculate the amount of methane from disposal of waste at the SWDS. All data used to apply the equations should be documented transparently in PDD or the monitoring reports.

14. The PDD should also clearly specify the time period (the consecutive years x or months i) in which waste disposal is considered in the calculation. For application A, this time period may begin before the start of the activity and typically starts when the SWDS starts receiving waste.

15. The emissions are calculated as follows:

[2] As an approximation, methane generation in the SWDS is described as a function of time according to a first order decay process with rapid, moderate and slow degrading organic fractions distinguished.

$$\left.\begin{matrix} BE_{CH4,SWDS,y} \\ AE_{CH4,SWDS,y} \\ LE_{CH4,SWDS,y} \end{matrix}\right\} = \varphi_y \times (1 - f_y) \times GWP_{CH4} \times (1 - OX_y) \times \frac{16}{12} \times F \times MCF_y \times \sum_{x=1}^{y} \sum_{j} \left[W_{j,x} \times DOC_{f,j} \times DOC_j \times e^{-k_j \times (y-x)} \times (1 - e^{-k_j}) \right] \quad \text{Equation (1)}$$

$$\left.\begin{matrix} BE_{CH4,SWDS,m} \\ AE_{CH4,SWDS,m} \\ LE_{CH4,SWDS,m} \end{matrix}\right\} = \varphi_y \times (1 - f_y) \times GWP_{CH4} \times (1 - OX_y) \times \frac{16}{12} \times F \times MCF_y \times \sum_{i=1}^{m} \sum_{j} \left[W_{j,i} \times DOC_{f,j} \times DOC_j \times e^{\frac{-k_j}{12} \times (m-1)} \times \left(1 - e^{\frac{-k_j}{12}} \right) \right] \quad \text{Equation (2)}$$

Where, for the yearly model:

$BE_{CH4,SWDS,y}$ $AE_{CH4,SWDS,y}$ $LE_{CH4,SWDS,y}$	=	Baseline, activity or leakage methane emissions occurring in year *y* generated from waste disposal at a SWDS during a time period ending in year *y* (t CO_2e/yr)
x	=	Years in the time period in which waste is disposed at the SWDS, extending from the first year in the time period (*x* = 1) to year *y* (*x* = *y)*
y	=	Year of the crediting period for which methane emissions are calculated (*y* is a consecutive period of 12 months)
$W_{j,x}$	=	Amount of solid waste type *j* disposed or prevented from disposal in the SWDS in the year *x* (t)

Where, for the monthly model:

$BE_{CH4,SWDS,m}$ $AE_{CH4,SWDS,m}$ $LE_{CH4,SWDS,m}$	=	Baseline, activity or leakage methane emissions occurring in month *m* generated from waste disposal at a SWDS during a time period ending in month *m* (t CO_2e/m)
m	=	Month of the crediting period for which methane emissions are calculated
i	=	Months in the time period in which waste is disposed at the SWDS, extending from the first month in the time period (*i* = 1) to month *m* (*i* = m)
$W_{j,i}$	=	Amount of organic waste type *j* disposed/prevented from disposal in the SWDS in the month *i* (t)

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Where, for both the yearly and monthly model:

φ_y	=	Model correction factor to account for model uncertainties for year *y*
f_y	=	Fraction of methane captured at the SWDS and flared, combusted or used in another manner that prevents the emissions of methane to the atmosphere in year *y*
GWP_{CH4}	=	Global Warming Potential of methane
OX_y	=	Fraction of methane in the LFG that would be oxidized in the soil or other material covering the waste of the SWDS
F	=	Fraction of methane in the SWDS gas (volume fraction)
MCF_y	=	Methane correction factor for year *y*
DOC_j	=	Fraction of degradable organic carbon in the waste type *j* (weight fraction)
$DOC_{f,j}$		Fraction of degradable organic carbon (DOC) for each waste type *j* that decomposes under the specific conditions occurring in the SWDS (weight fraction)
k	=	Decay rate for the waste type *j* (1 / year)
j	=	Type of residual waste or types of waste in the MSW

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5.3. Determining the parameters required to apply the FOD model

16. Table 2 summarizes how the parameters required in this tool can be determined. This includes the use of default values, one-time measurements or monitoring throughout the crediting period. The selection of the option that can be used depends on whether the tool is used for application A or B.

Table 2. Overview of the option to determine parameters

Parameter	Application A	Application B
φ_y	Activity or leakage emissions: default values Baseline emissions: default values or project specific value estimated yearly	
OX_y	Default value	
F	Default value	
$DOC_{f,j,y}$ or $DOC_{f,j,m}$	Default value	In the case of MSW: default value or estimated once In the case of residual waste: estimated once
MCF_y	Default values (based on SWDS type)	Monitored for SWDS with a water table above the bottom of the SWDS Default values (based on SWDS type) for SWDS without a water table above the bottom of the SWDS
k_j	Default values (based on waste type)	
$W_{j,x}$ or $W_{j,i}$	Estimated once	Calculated based on monitored data
DOC_j	Default values (based on waste type)	Default values or waste specific value estimated once
f_y	Estimated once	Monitored

5.3.1. Determining the model correction factor (φ_y)

17. The model correction factor (φ_y) depends on the uncertainty of the parameters used in the FOD model. If project or leakage emissions are being calculated, then $\varphi_y = \varphi_{default} = 1$. If baseline emissions are being calculated, then activity participants may choose between the following two options to calculate φ_y.

5.3.1.1. Option 1: Use a default value

18. Use a default value: $\varphi_y = \varphi_{default}$. Default values for different applications and climatic conditions are provided in the section "Data and parameters not monitored" below.

5.3.1.2. Option 2: Determine φ_y based on specific situation of the activity

19. Undertake an uncertainty analysis for the specific situation of the proposed activity. The overall uncertainty of the determination of methane generation in year y (V_y) is calculated as follows:

$$V_{y=}\sqrt{a^2 + b^2 + c^2 + d^2 + e^2 + g^2} \qquad \text{Equation (3)}$$

20. The factors a, b, c, d, e and g quantify the effect of the uncertainty of different parameters (listed in the second column of table 3), used in the FOD model, on the overall uncertainty of the methane generation in year *y*. Activity participants shall select for each factor a value within the range provided in Table 3,[4] following the instructions in the table, and justify their selection.

Table 3. Instructions for the selection of values for the factors a, b, c, d, e and g

Factor	Parameter	Lower value	Higher value	Instructions for selecting the factor
a	W	2%	10%	Use the lower value if solid waste is weighed using accurate weighbridges. Use the higher value if the amount of waste is estimated, such as from the depth and surface area of an existing SWDS
b	DOC_j	5%	10%	Use the lower value if the DOC*j* is measured. Use the higher value if default values are used
c	$DOC_{f,j}$	5%	15%	Use the lower value if more than 50 per cent of the waste is rapidly degradable organic material or if the SWDS is located in a tropical climate. Otherwise use the higher value
d	F	0%	5%	Use the lower value if more than 50 per cent of the waste is rapidly degradable organic material
e	MCF_y	0%	50%	Use the lower value for managed SWDS. For unmanaged SWDS, use the higher value or determine the factor as 2/d, where d is the depth of the SWDS (in meters)
g	$e^{-k_j \times (y-x)} \times (1 - e^{-k_j})$	5%	20%	The uncertainty values provided express the uncertainty for the exponential term as a whole. Use the lower uncertainty value in the following cases: (i) Application B: if residual waste is disposed at the SWDS and if the value of *k* is larger than 0.2 y^{-1}); and (ii) Application A: if the SWDS compartments where the project is implemented were closed less than three years ago. In all other cases, use the higher value

21. φy is then calculated as follows:

$$\varphi_y = \frac{1}{(1 + V_y)} \qquad \text{Equation (4)}$$

22. For the case that the monthly FOD model is being used (equation (2)), then φ_y refers to the year *y* to which the month *m* belongs.

[4] These uncertainty values are estimated based on the 68 per cent confidence level.

5.3.2. Determining the oxidation factor (OX_y)

23. For both Application A and Application B, apply default values from table Data/parameter 2 in section 6.4 below.

5.3.3. Determining the amounts of waste types *j* disposed in the SWDS ($W_{j,x}$ or $W_{j,i}$)

24. Where different waste types *j* are disposed or prevented from disposal in the SWDS (for example, in the case of MSW), it is necessary to determine the amount of different waste types ($W_{j,x}$ or $W_{j,i}$). In the case that only one type of waste is disposed (for example, in the case of a residual waste), then $W_{j,x} = W_x$ and $W_{j,i} = W_i$ and the following procedures do not need to be applied (e.g. waste sampling is not required).

5.3.3.1. Application A

25. Calculate $W_{j,x}$ or $W_{j,i}$ based on information from the SWDS owner and administration and from interviews with senior employees. The total amount of waste can be calculated from the SWDS surface area and average depth, assuming a specific weight of 1-1.2 t per cubic meter. If the SWDS has distinct compartments and if the amount of waste per compartment and the exploitation period of a compartment is known, then the amounts of waste for a specific series of years can be obtained. Further historic information on amounts, composition and origin of the waste might be found in SWDS administration documents (e.g. contracts with clients and invoices to clients) or obtained from old business plans or business evaluations.

5.3.3.2. Application B

26. Determine the amount of different waste types through sampling and calculate the mean from the samples either using equation (5) to determine the value of $W_{j,x}$ for the yearly model or using equation (6) to determine the value of $W_{j,i}$ for the monthly model, as follows:

$$W_{j,x} = W_x \times p_{j,x} \quad \text{Equation (5)}$$

Where:

$W_{j,x}$	=	Amount of solid waste type j disposed or prevented from disposal in the SWDS in the year *x* (t)
W_x	=	Total amount of solid waste disposed or prevented from disposal in the SWDS in year *x* (t)
$p_{j,x}$	=	Average fraction of the waste type *j* in the waste in year *x* (weight fraction)
j	=	Types of solid waste
x	=	Years in the time period for which waste is disposed at the SWDS, extending from the first year in the time period (*x* = 1) to year *y* (*x* = y)

$$W_{j,i} = W_i \times p_{j,i} \quad \text{Equation (6)}$$

Where:

$W_{j,i}$	=	Amount of solid waste type j disposed or prevented from disposal in the SWDS in the month *i* (t)
W_i	=	Total amount of solid waste disposed or prevented from disposal in the SWDS in month *i* (t)
$p_{j,i}$	=	Average fraction of the waste type *j* in the waste in month *i* (weight fraction)
j	=	Types of solid waste
i	=	Months in the time period in which waste is disposed at the SWDS, extending from the first month in the time period (*i* = 1) to month m (*i* = m)

27. The fraction of the waste type *j* in the waste for the year *x* or month *i* are calculated according to equations (7) and (8), as follows:

$$p_{j,x} = \frac{\sum_{n=1}^{Z_x} p_{n,j,x}}{Z_x}$$ Equation (7)

Where:

$p_{j,x}$	=	Average fraction of the waste type *j* in the waste in year *x* (weight fraction)
$p_{n,j,x}$	=	Fraction of the waste type *j* in the sample *n* collected during the year *x* (weight fraction)
Z_x	=	Number of samples collected during the year *x*
n	=	Samples collected in year *x*
j	=	Types of solid waste
x	=	Years in the time period for which waste is disposed at the SWDS, extending from the first year in the time period (*x* = 1) to year *y* (*x* = y)

$$p_{j,i} = \frac{\sum_{n=1}^{3} p_{n,j,i}}{3}$$ Equation (8)

Where:

$p_{j,i}$	=	Average fraction of the waste type *j* in the waste in month *i* (weight fraction)
$p_{n,j,i}$	=	Fraction of the waste type *j* in the sample *n* collected during or recent to month *i* (weight fraction)
n	=	The three most recent samples collected during or previous to month *i*
j	=	Types of solid waste
i	=	Months in the time period in which waste is disposed at the SWDS, extending from the first month in the time period (*i* = 1) to month *m* (*i* = m)

5.3.4. Determining the fraction of DOC for the waste type *j* that decomposes in the SWDS ($DOC_{f,j,y}$)

5.3.4.1. Application A

28. $DOC_{f,j,y}$ is given as a default value for each waste type *j* provided in the section "Data and parameters not monitored" below.

5.3.4.2. Application B

29. In the case that the tool is applied to MSW, then activity participants may choose to either apply default values for each waste type *j* or to determine $DOC_{f,j,y}$ or $DOC_{f,j,m}$ based on measurements of the biochemical methane potential of the MSW (BMP_{MSW}), as follows:

$$DOC_{f,j,y} = 0.7 \times \frac{12}{16} \times \frac{BMP_{MSW}}{F \times p_{j,y} \times DOC_j} \quad \text{Equation (9)}$$

and

$$DOC_{f,j,m} = 0.7 \times \frac{12}{16} \times \frac{BMP_{MSW}}{F \times p_{j,m} \times DOC_j} \quad \text{Equation (10)}$$

Where:

$DOC_{f,j,y}$	=	Fraction of degradable organic carbon (DOC) for each waste type *j* that decomposes under the specific conditions occurring in the SWDS for year *y* (weight fraction)
$DOC_{f,j,m}$	=	Fraction of degradable organic carbon (DOC) for each waste type *j* that decomposes under the specific conditions occurring in the SWDS for month *m* (weight fraction)
BMP_{MSW}	=	Biochemical methane potential for the MSW disposed or prevented from disposal (t CH_4/t waste)
F	=	Fraction of methane in the SWDS gas (volume fraction)
DOC_j	=	Fraction of degradable organic carbon in the waste type *j* (weight fraction)
$p_{j,y}$	=	Average fraction of the waste type *j* in the waste in year *y* (weight fraction)
$p_{j,m}$	=	Average fraction of the waste type *j* in the waste in month *m* (weight fraction)
j	=	Types of solid waste in the MSW
y	=	Year of the crediting period for which methane emissions are calculated (*y* is a consecutive period of 12 months)
m	=	Month of the crediting period for which methane emissions are calculated

30. In the case that the tool is applied to a residual waste, then activity participants shall determine $DOC_{f,j,y}$ or $DOC_{f,j,m}$ based on measurements of the biochemical methane potential of the residual waste type *j* (BMP_j), as follows:

$$DOC_{f,j,y} = DOC_{f,j,m} = 0.7 \times \frac{12}{16} \times \frac{BMP_j}{F \times DOC_j} \quad \text{Equation (11)}$$

Where:

$DOC_{f,y}$	=	Fraction of degradable organic carbon (DOC) that decomposes under the specific conditions occurring in the SWDS for year *y* (weight fraction)
$DOC_{f,m}$	=	Fraction of degradable organic carbon (DOC) that decomposes under the specific conditions occurring in the SWDS for month *m* (weight fraction)
BMP_j	=	Biochemical methane potential for the residual waste type *j* disposed or prevented from disposal (t CH_4/t waste)
F	=	Fraction of methane in the SWDS gas (volume fraction)
DOC_j	=	Fraction of degradable organic carbon in the waste type *j* (weight fraction)
j	=	Residual waste type applied to the tool
y	=	Year of the crediting period for which methane emissions are calculated (*y* is a consecutive period of 12 months)
m	=	Month of the crediting period for which methane emissions are calculated

5.3.5. Procedure to determine the methane correction factor (*MCFy*)

5.3.5.1. Application A

31. The MCF should be selected as a default value ($MCF_y = MCF_{default}$) provided in the section "Data and parameters not monitored" below.

5.3.5.2. Application B

32. In case of a water table above the bottom of the SWDS (for example, due to using waste to fill inland water bodies, such as ponds, rivers or wetlands), the MCF should be determined as follows:

$$MCF_y = MAX\left\{\left(1 - \frac{2}{d_y}\right), \frac{h_{w,y}}{d_y}\right\} \quad \text{Equation (12)}$$

Where:

MCF_y	=	Methane correction factor for year *y*
$h_{w,y}$	=	Height of water table measured from the base of the SWDS (m)
d_y	=	Depth of SWDS (m)

33. In other situations, the MCF should be selected as a default value ($MCF_y = MCF_{default}$).

5.4. Uncertainty determination

34. The uncertainty shall be determined considering the uncertainty in data and measurements of all parameters required following the guidance from Volume 1, Chapter 3 of the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. The uncertainty shall be expressed as the standard error of the mean and shall be incorporated in the uncertainty calculations in the methodology.

5.5. Data and parameters not monitored

35. For parameters that do not contain the uncertainty, activity participants shall assume uncertainty based on expert judgement and justify the estimates.

Data / Parameter table 1.

<table>
<tr><td>Data/parameter</td><td>$\varphi_{default}$</td></tr>
<tr><td>Description</td><td>Model correction factor to account for model uncertainties for year y</td></tr>
<tr><td>Data unit</td><td>-</td></tr>
<tr><td>Equations referred</td><td>(1), (2), (4)</td></tr>
<tr><td>Purpose of data</td><td>☒ Baseline emissions ☒ Project emissions ☒ Leakage emissions</td></tr>
<tr><td>Value(s) applied</td><td>For project or leakage emissions: $\varphi_{default}$ = 1.
For baseline emissions: refer to the table below to identify the appropriate factor based on the application of the tool (A or B) and the climate where the SWDS is located
Default values for the model correction factor
<table>
<tr><th></th><th>Humid/wet conditions</th><th>Dry conditions</th></tr>
<tr><td>Application A</td><td>0.75</td><td>0.75</td></tr>
<tr><td>Application B</td><td>0.85</td><td>0.80</td></tr>
</table></td></tr>
<tr><td>Source of data</td><td>☐ Measured ☒ Other sources</td></tr>
<tr><td>Choice of data or measurement methods and procedures</td><td>-</td></tr>
<tr><td>Additional comments</td><td>The table above is applicable to Option 1 in the procedure “Determining the model correction factor (φ_y)”</td></tr>
</table>

Data / Parameter table 2.

Data/parameter	OX_y
Description	Fraction of methane in the LFG that would be oxidized in the soil or other material covering the waste of the SWDS
Data unit	-
Equations referred	(1), (2)
Purpose of data	☒ Baseline emissions ☒ Project emissions ☒ Leakage emissions

<table>
<tr><td>Value(s) applied</td><td>Apply the default factors, based on the type of baseline SWDS, the age of SWDS cell and the type of cover:
<table>
<tr><th>Type of SWDS</th><th>Age of the SWDS cell</th><th>Type of cover material</th><th>OX_y (mean)</th><th>Uncertainty</th></tr>
<tr><td rowspan="5">Existing SWDS</td><td rowspan="4">Immature and mature</td><td>No cover (LDCs/SIDS)</td><td>0</td><td>N/A</td></tr>
<tr><td>No cover (non-LDCs/SIDS)</td><td>0.1</td><td></td></tr>
<tr><td>Synthetic</td><td>0.1</td><td></td></tr>
<tr><td>Soil</td><td>0.384</td><td>± 8%</td></tr>
<tr><td>Aged</td><td>Soil</td><td>0.384</td><td>± 8%</td></tr>
<tr><td rowspan="2">Hypothetical SWDS</td><td rowspan="2">N/A</td><td>Synthetic</td><td>0.1</td><td></td></tr>
<tr><td>Soil</td><td>0.384</td><td>± 8%</td></tr>
</table></td></tr>
<tr><td>Source of data</td><td>☐ Measured ☒ Other sources</td></tr>
<tr><td>Choice of data or measurement methods and procedures</td><td>- The IPCC 2019 refinement proposes a value of 0 for SWDSs without cover. The default value of 0 is proposed for no cover case in existing SWDSs in LDCs/SIDS taking into account the circumstances of LDCs/SIDS and since negligible amounts of CH_4 may be oxidized in case of no cover;
- The default value of 0.1 is proposed for existing SWDSs with immature and/or mature waste cells and located in non-LDCs/SIDS with no cover as a conservative assumption since a negligible amount of CH_4 may be oxidized in case of no cover. However, for conservativeness, a value of 0.1 is proposed;
- The default value of 0.1 is proposed for SWDSs with synthetic cover as a conservative assumption;
- The default value of 0.384 is proposed for existing SWDSs with immature and/or mature and/or aged cells and located in non-LDCs/SIDS with soil cover calculated from the statistics provided in Table 3 of SWICS (2012) for flux below 10 $g_{CH4}/m^2.d$ (low-flox),[5] rounded up to the third decimal place. The uncertainty determined is equal to ± 8%</td></tr>
<tr><td>Treatment of uncertainties</td><td>Refer to the values provided in row “Value(s) applied”</td></tr>
<tr><td>Additional comments</td><td>-</td></tr>
</table>

[5] Solid Waste Industry for Climate Solutions (SWICS); *Methane Oxidation Addendum;* 19 November 2012; Available at https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwic-PDexKiOAxX91AIHHVS9AAAQFnoECBgQAQ&url=https%3A%2F%2Fdownloads.regulations.gov%2FEPA-HQ-OAR-2012-0934-0088%2Fcontent.pdf&usg=AOvVaw2Gu9QjQcpN2qXPzko8Df7M&opi=89978449; accessed on 07 June 2025.

Data / Parameter table 3.

Data/parameter	F
Description	Fraction of methane in the SWDS gas (volume fraction)
Data unit	-
Equations referred	(1), (2), (9), (10), (11)
Purpose of data	☒ Baseline emissions ☒ Project emissions ☒ Leakage emissions
Value(s) applied	50% (uncertainty of +/- 5%)
Source of data	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures	2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
Treatment of uncertainties	Refer to the values provided in row "Value(s) applied"
Additional comments	Upon biodegradation, organic material is converted to a mixture of methane and carbon dioxide

Data / Parameter table 4.

Data/parameter	$DOC_{f,j}$
Description	Fraction of degradable organic carbon (DOC) for each waste type *j* that decomposes under the specific conditions occurring in the SWDS
Data unit	-
Equations referred	(1), (2), (9), (10), (11)
Purpose of data	☒ Baseline emissions ☒ Project emissions ☒ Leakage emissions
Value(s) applied	Select the applicable value from the table below:
Source of data	☐ Measured ☒ Other sources
Choice of data or measurement	2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

Waste type *j*	**Value for $DOC_{f,j}$**	**Uncertainty**
Less decomposable wastes (e.g. wood, engineered wood products, tree branches)	0.1	+/- 90%
Moderately decomposable wastes (e.g. paper, textile, nappies)	0.5	+/- 70%
Highly decomposable wastes (e.g. food wastes, grasses, garden and park waste excluding tree branches)	0.7	+/- 30%
Bulk waste	0.5	+/- 70%

methods and procedures	
Treatment of uncertainties	Refer to the values provided in row “Value(s) applied”
Additional comments	-

Data / Parameter table 5.

Data/parameter	$MCF_{default}$
Description	Methane correction factor
Data unit	-
Equations referred	(1), (2), (12)
Purpose of data	☒ Baseline emissions ☒ Project emissions ☒ Leakage emissions
Value(s) applied	Select the applicable value from the table below. The uncertainties are provided below the values:

Type of SWDS	**Value for MFC**
Anaerobic managed solid waste disposal sites These must 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 will include at least one of the following: (i) cover material; (ii) mechanical compacting; or (iii) levelling of the waste	1.0 (-10%, +0%)
Managed poorly – semi-aerobic When semi-aerobic managed SWDS type is managed under one of the following condition, it is regarded as poor management; (i) condition of sunk of leachate drainage system; (ii) closing of valve of drainage or atmosphere-unopening of drainage exit; (iii) capping of gas ventilation exit	0.8 (+/- 20%)
Managed poorly – active-aeration When SWDS, that is equipped as well as active aeration of managed SWDS, is managed under one of the following condition, it is judged as poor management; (i) blockage of aeration system due to failure of drainage; (ii) lack of available moisture for microorganisms due to high- pressure aeration	0.7 (+/- 30%)
Managed well – semi-aerobic When semi-aerobic managed SWDS type is managed under one of the following condition, it is regarded as well management; (i) permeable cover material; (ii) leachate drainage system without sunk; (iii) regulating pondage; and (iv) gas ventilation system without cap, (v) connection of leachate drainage system and gas ventilation system.	0.5 (+/- 20%)

	Unmanaged – shallow (< 5m waste) All SWDS not meeting the criteria of managed SWDS and which have depths of less than 5 metres.	0.4 (+/- 30%)
	Managed well – active aeration Active aeration of managed landfills includes the technology of in-situ low pressure aeration, air sparging, bioventing, passive ventilation with extraction (suction). These must have controlled placement of waste and will include leachate drainage system to avoid the blockage of air penetration, and (i) cover material; (ii) air injection or gas extraction system without drying of waste.	0.4 (+/- 60%)
	Uncategorised SWDS Only if countries cannot categorise their SWDS into above four categories of managed and unmanaged SWDS, the MCF for this category can be used.	0.6 (-50%, +60%)
Source of data	☐ Measured ☒ Other sources	
Choice of data or measurement methods and procedures	2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories	
Treatment of uncertainties	Refer to the values provided between brackets in row "Value(s) applied"	
Additional comments	-	

Data / Parameter table 6.

Data/parameter	DOC_j
Description	Fraction of degradable organic carbon in the waste type *j* (weight fraction)
Data unit	-
Equations referred	(1), (2), (9), (10), (11)
Purpose of data	☒ Baseline emissions ☒ Project emissions ☒ Leakage emissions
Value(s) applied	For MSW, the following values for DOC_j for the different waste types j should be applied. The uncertainties are provided below the default values:

Waste type *j*	***DOC_j* *(% wet waste)***
Wood and wood products	43 (-16%, +7%)
Pulp, paper and cardboard (other than sludge)	40 (-10%, +13%)
Food, food waste, beverages and tobacco (other than sludge)	15

	<table><tr><td></td><td>(-47%, +33%)</td></tr><tr><td>Textiles</td><td>24 (-17%, +67%)</td></tr><tr><td>Garden, yard and park waste</td><td>20 (+/- 10%)</td></tr><tr><td>Glass, plastic, metal, other inert waste</td><td>0</td></tr></table> For the following residual waste types, activity participants may use or derive default values, as follows: (a) For empty fruit brunches (EFB), as their characteristics are similar to garden waste, the value for garden, yard and park waste in the table above may be used as a default (b) For industrial sludge, either a value of 9 per cent (% wet sludge) may be used as a default, assuming an organic dry matter content of 35 percent, or alternatively, if the percentage of organic dry matter content is known, then the DOC value may be calculated as follows: DOC_j (% wet sludge) = 9 x (% organic dry matter content/35); (c) For domestic sludge, either a value of 5 per cent (% wet sludge) may be used as a default, assuming an organic dry matter content of 10 per cent, or alternatively, if the percentage of organic dry matter content is known, then the DOC value may be calculated as follows: DOC_j (% wet sludge) = 5 x (% organic dry matter content/10). If a waste type is not comparable to MSW and cannot clearly be described as a combination of waste types in the table above or if a default value is not available or if the activity participants wish to measure DOC_j, then activity participants should measure DOC_j in an ignition loss test according to the procedure in EN 15169 or similar national or international standards. This measurement is only required once for each waste type *j* and the value determined for DOC_j remains valid during the crediting period
Source of data	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Tables 2.4 and 2.5)
Treatment of uncertainties	Refer to the values between brackets provided in row “Value(s) applied”
Additional comments	-

Data / Parameter table 7.

Data/parameter	k_j
Description	Decay rate for the waste type *j*
Data unit	1/year
Equations referred	(1), (2)
Purpose of data	☒ Baseline emissions ☒ Project emissions ☒ Leakage emissions

Value(s) applied	Apply the following default values for the different waste types *j:* Default values for the decay rate (k_j). The uncertainties are provided below the default values.

Waste type *j*		**Boreal and Temperate (MAT≤20°C)**		**Tropical (MAT>20°C)**	
		Dry (MAP/PET <1)	Wet (MAP/PET >1)	Dry (MAP< 1000mm)	Wet (MAP> 1000mm)
Slowly degrading	Pulp, paper, cardboard (other than sludge), textiles	0.04 (+/- 25%)	0.06 (+/- 17%)	0.045 (- 11%, +33%)	0.07 (- 14%, +21%)
Slowly degrading	Wood, wood products and straw	0.02 (+/- 50%)	0.03 (+/- 33%)	0.025 (- 20%, +60%)	0.035 (- 14%, +43%)
Moderately degrading	Other (non-food) organic putrescible garden and park waste	0.05 (+/- 50%)	0.10 (- 40%, +0%)	0.065 (+/- 23%)	0.17 (- 12%, +18%)
Rapidly degrading	Food, food waste, sewage sludge, beverages and tobacco	0.06 (- 17%, +33%)	0.185 (- 46%, +8%)	0.085 (+/- 18%)	0.40 (- 58%, +75%)

Note: MAT – mean annual temperature, MAP – Mean annual precipitation, PET – potential evapotranspiration. MAP/PET is the ratio between the mean annual precipitation and the potential evapotranspiration.

If a waste type disposed in a SWDS cannot clearly be attributed to one of the waste types in the table above, activity participants should choose, among the waste types that have similar characteristics, the waste type where the values of DOC_j and k_j result in a conservative estimate (lowest emissions) or request a revision of/deviation from this methodology.

In the case of EFB, as their characteristics are similar to garden waste, the parameter values correspondent of garden waste shall be used. In case of sludge from pulp and paper industry, a conservative value of 0.03 shall be used for all precipitation and temperature combinations

Source of data	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures	2019 refinement to the IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Chapter 3, Tables 3.3)
Treatment of uncertainties	Refer to the values between brackets provided in row "Value(s) applied"
Additional comments	Document in the PDD the climatic conditions at the SWDS site (temperature, precipitation and, where applicable, evapotranspiration). Use long-term averages based on statistical data, where available. Provide references

Data / Parameter table 8.

Data/parameter	$\boldsymbol{BMP_{MSW}}$; $\boldsymbol{BMP_j}$
Description	Biochemical methane potential (BMP) of MSW or the residual waste type *j* disposed or prevented from disposal
Data unit	t_{CH4}/t_{waste}
Equations referred	(9), (10), (11)
Purpose of data	☒ Baseline emissions ☒ Project emissions ☒ Leakage emissions
Value(s) applied	
Source of data	☒ Measured ☐ Other sources
Choice of data or measurement methods and procedures	Based on samples. Conduct a fermentation test on a sample of the MSW or the residual waste that is at least 500 g in weight. The test should be undertaken according to a national or international standard, which may need to be adapted to conduct the test on a sample that is 500 g or more in weight. The duration of the fermentation test should be until no further methane is generated (indicating the complete conversion of BMP to methane). Take the average of at least three test results. At least three samples from different batches. Once calculated, the value determined is valid during the crediting period. According to the standard followed (or adapted) to measure BMP.
Additional comments	The BMP is the basis of estimating $DOC_{f,j,y}$ and $DOC_{f,j,m}$ which describes the fraction of DOC that degrades under the specific conditions occurring in the SWDS (for example the moisture, temperature and salt content of the SWDS). For MSW, a default value for $DOC_{f,j,y}$ and $DOC_{f,j,m}$ may be used instead of measurement of the BMP

Data / Parameter table 9.

Data/parameter	$\boldsymbol{GWP_{CH4}}$
Description	Global warming potential of CH_4
Data unit	tCO_2e/tCH_4
Equations referred	(1), (2)
Purpose of data	☒ Baseline emissions ☒ Project emissions ☒ Leakage emissions

Value(s) applied	28
Source of data	☐ Measured ☒ Other sources
Choice of data or measurement methods and procedures	Default value from IPCC Fifth Assessment Report (AR5). Shall be updated according to any future CMA decisions
Additional comments	-

6. Monitoring methodology procedure

6.1. Monitoring procedures

36. Monitoring involves an annual assessment of the conditions at the SWDS where the waste is disposed or prevented from disposal.

6.2. Data and parameters monitored

Data / Parameter table 10.

Data/parameter	f_y	
Description	Fraction of methane captured at the SWDS and flared, combusted or used in another manner that prevents the emissions of methane to the atmosphere in year *y*	
Data unit	-	
Equations referred	(1), (2)	
Purpose of data	☒ Baseline emissions ☒ Project emissions ☒ Leakage emissions	
Measurement intervals	For application A: Once for the crediting period ($f_y = f$) For application B: Annually	
Measurement methods and procedures	Select the maximum value from the following: (a) contract or regulation requirements specifying the amount of methane that must be destroyed/used (if available) and (b) historic data on the amount captured	
Entity/person responsible for the measurement	-	
Measuring instrument(s)	*Type of instrument*	N/A
	Accuracy class	N/A
	Calibration requirements	N/A
	Location	N/A
QA/QC procedures	-	
Additional comment	-	

Data / Parameter table 11.

Data/parameter	W_x or W_i	
Description	Total amount of waste disposed in a SWDS in year *x* or month *i*	
Data unit	-	
Equations referred	(5), (6)	
Purpose of data	☒ Baseline emissions ☒ Project emissions ☒ Leakage emissions	
Measurement intervals	Continuously, aggregated at least annually for year *x* or monthly for month *i*	
Measurement methods and procedures	Measure on wet basis	
Entity/person responsible for the measurement	Measurements by activity participants	
Measuring instrument(s)	*Type of instrument*	N/A
	Accuracy class	N/A
	Calibration requirements	N/A
	Location	N/A
QA/QC procedures	-	
Treatment of uncertainties	Uncertainties are determined based on the measuring instruments	
Additional comment	For application B	

Data / Parameter table 12.

Data/parameter	$W_{org,x}$
Description	Total amount of organic waste disposed in a SWDS in year *x*
Data unit	tonnes
Equations referred	Appendix 1
Purpose of data	☒ Baseline emissions ☒ Project emissions ☒ Leakage emissions
Measurement intervals	Continuously, aggregated at least annually for year *x* or monthly for month *i*
Measurement methods and procedures	Measure on wet basis
Entity/person responsible for the measurement	Measurements by activity participants

Measuring instrument(s)	*Type of instrument*	N/A
	Accuracy class	N/A
	Calibration requirements	N/A
	Location	N/A
QA/QC procedures	-	
Treatment of uncertainties	Uncertainties are determined based on the measuring instruments	
Additional comment	Applicable when applying simplified approach "Reduced waste composition monitoring" according to the appendix	

Data / Parameter table 13.

Data/parameter	$p_{n,j,x}$; $p_{n,j,i}$	
Description	Weight fraction of the waste type *j* in the sample *n* collected during the year *x* or month *i*	
Data unit	%	
Equations referred	(7), (8)	
Purpose of data	☒ Baseline emissions ☒ Project emissions ☒ Leakage emissions	
Measurement intervals	Minimum of three samples every three months	
Measurement methods and procedures	Sample the waste composition, using the waste types *j*, as provided in the table for DOC_j and k_j, and weigh each waste fraction (measure on wet basis)	
Entity/person responsible for the measurement	Sample measurements by activity participants	
Measuring instrument(s)	*Type of instrument*	N/A
	Accuracy class	N/A
	Calibration requirements	N/A
	Location	N/A
QA/QC procedures	-	
Treatment of uncertainties	N/A	
Additional comment	This parameter only needs to be monitored for Application B and if the waste includes more than one waste type *j*. Sampling is not required if the waste comprises only one waste type	

Data / Parameter table 14.

Data/parameter	z_x	
Description	Number of samples collected during the year *x*	
Data unit	%	
Equations referred	(7)	
Purpose of data	☒ Baseline emissions ☒ Project emissions ☒ Leakage emissions	
Measurement intervals	Continuously, aggregated annually	
Measurement methods and procedures	Minimum of three samples every three months	
Entity/person responsible for the measurement	Activity participants	
Measuring instrument(s)	*Type of instrument*	N/A
	Accuracy class	N/A
	Calibration requirements	N/A
	Location	N/A
QA/QC procedures	The sample size and sampling technique must ensure the sample is representative.	
Treatment of uncertainties	N/A	
Additional comment	This parameter only needs to be monitored for Application B and if the waste includes more than one waste type *j*	

Data / Parameter table 15.

Data/parameter	d_y
Description	Depth of the SWDS
Data unit	m
Equations referred	(12)
Purpose of data	☒ Baseline emissions ☒ Project emissions ☒ Leakage emissions
Measurement intervals	Monitoring well that is also used to measure the height of the water table ($h_{w,y}$)
Measurement methods and procedures	Minimum of three samples every three months

Entity/person responsible for the measurement	Activity participants	
Measuring instrument(s)	*Type of instrument*	N/A
	Accuracy class	N/A
	Calibration requirements	N/A
	Location	N/A
QA/QC procedures	Monthly, average annual values to be used in the case of application of the yearly model (equation (1))	
Treatment of uncertainties	N/A	
Additional comment	This parameter needs to be monitored to identify whether the SWDS has a water table above the bottom of the SWDS, such as due to using waste to fill inland water bodies, such as ponds, rivers or wetlands. If the SWDS does have a water table above the bottom of the SWDS, then this parameter is used to determine the MCF	

Data / Parameter table 16.

Data/parameter	$h_{w,y}$	
Description	Height of the water table in the SWDS	
Data unit	m	
Equations referred	(12)	
Purpose of data	☒ Baseline emissions ☒ Project emissions ☒ Leakage emissions	
Measurement intervals	Monthly, average annual values to be used in the case of application of the yearly model (equation (1))	
Measurement methods and procedures	Monitoring well	
Entity/person responsible for the measurement	Activity participants	
Measuring instrument(s)	*Type of instrument*	N/A
	Accuracy class	N/A
	Calibration requirements	N/A
	Location	N/A
QA/QC procedures	-	

Treatment of uncertainties	N/A
Additional comment	This parameter needs to be monitored to identify whether the SWDS has a water table above the bottom of the SWDS, such as due to using waste to fill inland water bodies, such as ponds, rivers or wetlands. If the SWDS does have a water table above the bottom of the SWDS, then this parameter is used to determine the MCF

Data / Parameter table 17.

Data/parameter	a, b, c, d, e, f, g	
Description	Effect of the uncertainty of different parameters	
Data unit	%	
Equations referred	(3)	
Purpose of data	☒ Baseline emissions ☒ Project emissions ☒ Leakage emissions	
Measurement intervals	Annually if the conditions described in the "Instructions for selecting the factor" in Table 3 have changed (e.g. a change in how the weight of the waste is measured). Once for the crediting period, if these conditions do not change	
Measurement methods and procedures	Using the instructions in Table 3 above	
Entity/person responsible for the measurement	Activity participants	
Measuring instrument(s)	*Type of instrument*	N/A
	Accuracy class	N/A
	Calibration requirements	N/A
	Location	N/A
QA/QC procedures	-	
Additional comment	Used in Option 2 for determining the model correction factor	

Appendix. Simplified approaches

1. For projects of application B type, as defined in section 2.2, and which involve solely municipal solid waste, project proponent may use a simplified approach for the determination of baseline methane emissions. Two such approaches are available:

   (a) No waste composition monitoring;

   (b) Reduced waste composition monitoring.

1. No waste composition monitoring

2. In this approach, part of equation (1) which corresponds to the property of waste and climate zone is replaced by default values, relieving the project proponents the task of analysing the composition of waste. The term which may be replaced[1] has the unit of tCO_2/tonne dry waste and is:

$$\left(1 - OX_y\right) \times \frac{16}{12} \times F \times \sum_{x=1}^{y} \sum_{j} DOC_j \times DOC_{f,j,y} \times e^{-k_j \times (y-x)} \times \left(1 - e^{-k_j}\right) \quad \text{Equation (13)}$$

3. Equation (1) is therefore simplified with only W_x as a monitoring parameter:

$$BE_{CH4,SWDS,y} = \varphi_y \times \left(1 - f_y\right) \times GWP_{CH4} \times \sum_{x=1}^{y} Default_x \times W_x \quad \text{Equation (14)}$$

4. The value of $Default_x$ depends on the climate zone and on the year x since the disposal of the waste. The default values have been derived by an analysis of registered projects with verified waste compositions, and the default values are selected to ensure conservativeness of the resulting baseline emissions (using 95% confidence and 10% precision).

Table 1. $Default_x$ values for simplified procedure

x	Tropical wet	Tropical dry	Boreal/ temperate wet	Boreal/temperate dry
1	0.005800	0.001856	0.003382	0.001399
2	0.004212	0.001724	0.002913	0.001325
3	0.003093	0.001601	0.002511	0.001254
4	0.002275	0.001487	0.002163	0.001188
5	0.001657	0.001381	0.001861	0.001125
6	0.001198	0.001281	0.001599	0.001065
7	0.000867	0.001189	0.001371	0.001008

[1] The following assumed values were used in the calculation: OX = 0.1; F = 0.5; $DOC_{f,j,y}$ = 0.5; MCF = 1.

x	Tropical wet	Tropical dry	Boreal/ temperate wet	Boreal/temperate dry
8	0.000635	0.001103	0.001174	0.000954
9	0.000474	0.001024	0.001004	0.000904
10	0.000362	0.000950	0.000859	0.000855
11	0.000284	0.000881	0.000734	0.000810
12	0.000228	0.000817	0.000629	0.000766
13	0.000189	0.000757	0.000539	0.000725
14	0.000160	0.000702	0.000463	0.000687
15	0.000138	0.000651	0.000399	0.000650
16	0.000122	0.000603	0.000344	0.000615
17	0.000109	0.000559	0.000298	0.000582
18	0.000098	0.000518	0.000259	0.000551
19	0.000090	0.000480	0.000226	0.000521
20	0.000082	0.000445	0.000197	0.000493
21	0.000076	0.000413	0.000173	0.000467

2. Reduced waste composition monitoring

5. In this approach, instead of monitoring the composition of the waste in accordance to the waste types *j*, projects may monitor the total wet weight fraction of organic waste ($W_{org,y}$). Organic waste includes wood, paper, food waste, textiles and garden wastes. Similarly to the first approach, the term in equation 13 of the appendix is replaced.

6. Equation (1) is therefore simplified:

$$BE_{CH4,SWDS,y} = \varphi_y \times (1 - f_y) \times GWP_{CH4} \times \sum_{x=1}^{y} Default_{org,x} \times W_{org,x} \quad \text{Equation (15)}$$

7. The value of $Default_{org,x}$ depends on the climate zone. These values were derived by an analysis of registered projects with verified waste compositions, and the $default_{org,x}$ values are selected to ensure conservativeness of the resulting baseline emissions (using 95% confidence and 10% precision).

Table 2. $Default_{org,x}$ values for simplified procedure

x	Tropical wet	Tropical dry	Boreal/ temperate wet	Boreal/temperate dry
1	0.008263	0.002715	0.004905	0.002000
2	0.006066	0.002516	0.004254	0.001891
3	0.004527	0.002330	0.003686	0.001788
4	0.003324	0.002156	0.003177	0.001691
5	0.002348	0.001995	0.002714	0.001599
6	0.001657	0.001845	0.002305	0.001511
7	0.001185	0.001706	0.001953	0.001429

x	Tropical wet	Tropical dry	Boreal/ temperate wet	Boreal/temperate dry
8	0.000862	0.001577	0.001654	0.001351
9	0.000641	0.001458	0.001402	0.001277
10	0.000489	0.001347	0.001191	0.001207
11	0.000384	0.001246	0.001013	0.001141
12	0.000309	0.001152	0.000864	0.001079
13	0.000256	0.001065	0.000738	0.001020
14	0.000218	0.000985	0.000633	0.000964
15	0.000189	0.000911	0.000544	0.000911
16	0.000167	0.000842	0.000470	0.000862
17	0.000150	0.000779	0.000406	0.000815
18	0.000136	0.000721	0.000353	0.000770
19	0.000124	0.000668	0.000308	0.000728
20	0.000114	0.000618	0.000269	0.000689
21	0.000105	0.000572	0.000237	0.000651

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Document information

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