CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAM ACTIVITY DESIGN DOCUMENT FORM (CDM-SSC-CPA-DD)
Version 01

CONTENTS

Annexes

NOTE:

(i) This form is for submission of CPAs that apply a small scale approved methodology using the provision of the proposed small scale CDM PoA.

(ii) The coordinating/managing entity shall prepare a CDM Small Scale Programme Activity Design Document (CDM-SSC-CPA-DD)[1,2] that is specified to the proposed PoA by using the provisions stated in the SSC PoA DD. At the time of requesting registration the SSC PoA DD must be accompanied by a CDM-SSC CPA-DD form that has been specified for the proposed SSC PoA, as well as by one completed CDM-SSC CPA-DD (using a real case). After the first CPA, every CPA that is added over time to the SSC PoA must submit a completed CDM-SSC CPA-DD.

[1] The latest version of the template form CDM-CPA-DD is available on the UNFCCC CDM web site in the reference/document section.

[2] At the time of requesting validation/registration, the coordinating managing entity is required to submit a completed CDM-POA-DD, the PoA specific CDM-CPA-DD, as well as one of such CDM-CPA-DD completed (using a real case).

SECTION A. General description of small scale CDM programme activity (CPA)

A.1. Title of the small-scale CPA:

>>
Title: XXX (IWW-DPRK-XXX)
Version: XX
Date: DD/MM/YYYY

A.2. Description of the small-scale CPA:

>>

Outline of the industrial installation where the CPA is implemented:

[provide a description of the industrial installation]

Outline how wastewater is currently treated at the industrial installation:

[describe the current wastewater treatment situation]

Outline how wastewater will be treated at the industrial installation when the CPA is implemented:

[describe how wastewater at the CPA site will be treated when the CPA is implemented]

Option selected by the CPA for use/destruction of CMM:

In this CPA, the following equipment will be installed in order to achieve emission reductions:

(i) Total number of flares

Number	Size (in MW)	Description

(ii) Total number of electricity generation units:

Number	Size (in MW)	Description

(iii) Total number of heat generation units:

Number	Size (in MW)	Description

[delete as applicable]

Goals of the CPA:

[describe the goals of the CPA]

Timeline schedule for the CPA

Equipment	Installation Date

A.3. Entity/individual responsible for the small-scale CPA:

>> Here the information on the entity/individual responsible of the CPA shall be included, hence forth referred to as CPA implementer(s). CPA implementers can be project participants of the PoA, under which the CPA is submitted, provided their name is included in the registered PoA.

XXX is the CPA implementer. XXX has appointed XXX to be responsible for the CPA. XXX shall be responsible for monitoring at the CPA site.

A.4. Technical description of the small-scale CPA:

A.4.1. Identification of the small-scale CPA:

>>
The CPA's title is XXX
The CPA's unique identification number is IWW-DPRK-XXX

A.4.1.1. Host Party:

>>
Democratic People's Republic of Korea

A.4.1.2. Geographic reference or other means of identification allowing the unique identification of the small-scale CPA (maximum one page):

>>Geographic reference or other means of identification[3], Name/contact details of the entity/individual responsible for the CPA, e.g. in case of stationary CPA geographic reference, in case of mobile CPAs means such as registration number, GPS devices.

The CPA is located in XXX, in the centre/east/west/north/south [delete as appropriate] of the Democratic People's Republic of Korea. The CPA has geographic reference XX°XX'XX north and XX°XX'XX east.

Figure-X shows the location of the project site

[3] E.g. in case of stationary CPA geographic reference, in case of mobile CPAs means such as registration number, GPS devices.

[include maps of project location]

A.4.2. Duration of the small-scale CPA:

A.4.2.1. Starting date of the small-scale CPA:

>>
The start date of the CPA will be the earliest date at which either the implementation or construction or real action of project activity begins, expected to be DD/MM/YYYY.

A.4.2.2. Expected operational lifetime of the small-scale CPA:

>>
The expected operation lifetime of the CPA is XX years.

A.4.3. Choice of the crediting period and related information:

Renewable crediting period; or

Fixed Crediting period

[Delete the one that is not applicable]

A.4.3.1. Starting date of the crediting period:

>>
The date on which the CPA is included in the PoA or the project commissioning date, whichever is later.

A.4.3.2. Length of the crediting period, first crediting period if the choice is renewable CP:

>>
[Either:]

The length of the crediting period for this CPA is 7 years and can be renewed for two periods of seven years each.

[Or:]

The length of the crediting period for this CPA is 10 years.
[delete as appropriate]

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

>>
The estimated amount of emission reductions for this CPA was calculated in accordance with the equations set out in the POA-DD titled "Methane Utilisation and Destruction Programme from Industrial Wastewater in DPR Korea" (Version XXX).

Table X – Estimated emissions reductions over the chosen crediting period

Year	Estimation of overall emission reductions (tonnes of CO_2 e)
DD/MM/YYYY - DD/MM/YYYY	XXX
DD/MM/YYYY - DD/MM/YYYY	XXX
DD/MM/YYYY - DD/MM/YYYY	XXX
DD/MM/YYYY - DD/MM/YYYY	XXX
DD/MM/YYYY - DD/MM/YYYY	XXX
DD/MM/YYYY - DD/MM/YYYY	XXX
DD/MM/YYYY - DD/MM/YYYY	XXX
Total (tonnes of CO_2 e)	XXX
Average annual emissions reductions	XXX

A.4.5. Public funding of the CPA:

>>

No public funding from Parties is provided for this CPA

A.4.6. Information to confirm that the proposed small-scale CPA is not a de-bundled component

>>

1. For the purposes of registration of a Programme of Activities (PoA)[4] a proposed small-scale CPA of a PoA shall be deemed to be a de-bundled component of a large scale activity if there is already an activity[5], which:

   (a) Has the same activity implementer as the proposed small scale CPA or has a coordinating or managing entity, which also manages a large scale PoA of the same sectoral scope, and;

   (b) The boundary is within 1 km of the boundary of the proposed small-scale CPA, at the closest point.

2. If a proposed small-scale CPA of a PoA is deemed to be a debundled component in accordance with paragraph 2 above, but the total size of such a CPA combined with a registered small-scale CPA of a PoA or a registered CDM project activity does not exceed the limits for small-scale CDM and small-scale A/R project activities as set out in Annex II of the decision 4/CMP.1 and 5/CMP.1 respectively, the CPA of a PoA can qualify to use simplified modalities and procedures for small-scale CDM and small-scale A/R CDM project activities.

[4] Only those POAs need to be considered in determining de-bundling that are: (i) in the same geographical area; and (ii) use the same methodology; as the POA to which proposed CPA is being added

[5] Which may be a (i) registered small-scale CPA of a PoA, (ii) an application to register another small-scale CPA of a PoA or (iii) another registered CDM project activity

The small-scale CPA titled XXX (IWW-DPRK-XXX) is not a de-bundled component of a large scale activity. There is no other large-scale CDM project or CPA within 1 km of the boundary of the proposed small-scale CPA. The CPA implementer does not have any other CPAs for implementation under its control and the coordinating/managing entity for the CPA does not manage a large scale PoA with the same sectoral scope.

The CPA implementer has issued a letter confirming that it is neither registered as a CDM Project, nor part of any other PoA.

A.4.7. Confirmation that small-scale CPA is neither registered as an individual CDM project activity or is part of another Registered PoA:

>>

The small-scale CPA XXX (IWW-DPRK-XXX) is neither registered as an individual CDM project or is part of another Registered PoA.

The CPA implementer has issued a letter confirming that it is neither registered as a CDM Project, part or part of any other PoA.

SECTION B. Eligibility of small-scale CPA and Estimation of emissions reductions

B.1. Title and reference of the Registered PoA to which small-scale CPA is added:

>>

Title: Methane Utilisation and Destruction Programme from Industrial Wastewater in DPR Korea
Version: 08
Date: 07/12/2012

B.2. Justification of the why the small-scale CPA is eligible to be included in the Registered PoA :

>>

The CPA titled Pulp Wastewater Treatment at Sinuiju Chemical Fibre Factory (IWW-DPRK-1) is eligible to be included in the PoA titled Methane Utilisation and Destruction Programme from Industrial Wastewater in DPR Korea because it meets the following criteria as required in the PoA:

Table 2: Eligibility demonstration of CPA (IWW-DPRK-1)

Eligibility criteria	Analysis/Evidence
1. The geographic boundary of the CPA lies within the DPR Korea.	[this information is CPA-specific]
2. To meet the conditions that avoid double counting of emission reductions, the proposed CPA under this PoA has not been and will not be either registered as a single CDM project activity or included as a CPA under another PoA. A unique identification number will be included in the specific CPA-DD for each	[this information is CPA-specific]

industrial installation.	
3. The CPA reduces GHG emissions by utilising methane from industrial wastewater for electricity and/or heat generation and/or destroying methane through flaring by adopting one or a combination of the following technologies or measures: a) Substitution of aerobic wastewater or sludge treatment systems with anaerobic systems with biogas recovery and combustion; b) Introduction of anaerobic sludge treatment system with biogas recovery and combustion to a wastewater treatment plant without sludge treatment; c) Introduction of biogas recovery and combustion to a sludge treatment system; d) Introduction of biogas recovery and combustion to an anaerobic wastewater treatment system such as anaerobic reactor, lagoon, septic tank or an on site industrial plant; e) Introduction of anaerobic wastewater treatment with biogas recovery and combustion, with or without anaerobic sludge treatment, to an untreated wastewater stream; f) Introduction of a sequential stage of wastewater treatment with biogas recovery and combustion, with or without sludge treatment, to an anaerobic wastewater treatment system without biogas recovery (e.g. introduction of treatment in an anaerobic reactor with biogas recovery as a sequential treatment step for the wastewater that is presently being treated in an anaerobic lagoon without methane recovery).	[this information is CPA-specific]
4. The starting date of the CPA is the earliest date at which either the implementation or	[this information is CPA-specific]

construction or real action of a CDM project activity, and it cannot be prior to 22/01/ 2012, the commencement of validation (date of beginning of the Global Stakeholder Process posted on the UNFCCC website).	
5. As the CPA adopts the measure/technology X), the following applicability criteria have to be fulfilled:	[this information is CPA-specific]
6. The proposed project activity has to be voluntary action by the industrial installations involved in the CPA under the PoA and the implementation of the proposed project activity is not to fulfil any mandatory policy or regulation.	[this information is CPA-specific]
7. In accordance with the "Guidelines on the demonstration of additionality of small-scale project activities" (Version 09.0), the PoA chooses Option a) Investment barrier to demonstrate additionality. To demonstrate that the CPA faces the investment barrier, the CPA should meet the following criteria: (i) That there is no legal requirement that is enforced for the CPA to be implemented; and (ii) That there are no benefits to the CME besides CDM Revenue; and (iii) That the CME will have to provide all capital for the implementation of the CPA and that such business framework for the implementation of CDM Programmes of Activities in the DPR Korea is equally applicable to all foreign investors.	[this information is CPA-specific]
8. The CPA has to perform a local stakeholder consultation before it may be included in the PoA.	[this information is CPA-specific]
9. The CPA has to ensure that environmental analysis has been performed.	[this information is CPA-specific]
10. The CME confirms in a written statement that no funding from an Annex 1 party is provided	[this information is CPA-specific]

for the CPA.	
11. The proposed CPA is not a debundled project activity. No other project activity may be within 1 km of the project boundary of the proposed small-scale activity at the closest point.	[this information is CPA-specific]
12. For the purpose of determining baseline emissions, a CPA, in the pre-project scenario, released all methane into the atmosphere without destruction or utilisation	[this information is CPA-specific]
13. If the final sludge is not used for soil application in the baseline scenario and project scenario, then a CPA shall only be implemented at sites where the final sludge is disposed at a solid waste disposal site with a water table above the bottom of the solid waste disposal site in both the baseline and the project scenario	[this information is CPA-specific]

[provide any CPA-specific information as applicable]

B.3. Assessment and demonstration of additionality of the small-scale CPA , as per eligibility criteria listed in the Registered PoA:

>>

The PoA-DD titled "Utilisation and Destruction Programme from Industrial Wastewater in DPR Korea" (Version 08) sets out the criteria for the assessment of additionality as follows:

(i) That there is no legal requirement that is enforced for the CPA to be implemented; and
(ii) That there are no benefits to the CME besides CDM Revenue; and
(iii) That the CME will have to provide all capital for the implementation of the CPA and that such business framework for the implementation of CDM Programmes of Activities in the DPR Korea is equally applicable to all foreign investors.

The CPA XXX fulfils these criteria as follows:

[provide description how the CPA fulfils all eligibility criteria for additionality]

B.4. Description of the sources and gases included in the project boundary and proof that the small-scale CPA is located within the geographical boundary of the registered PoA.

>>

As per the emissions sources outlined in the PoA titled “Methane Utilisation and Destruction Programme from Industrial Wastewater in DPR Korea”, the following sources and gases shall be included in this CPA:

Table X: Overview on emissions sources included in or excluded from the project boundary

	Source	Gas		Justification / Explanation
Baseline	Emissions from electricity or fuel consumption in the baseline scenario	CO_2	Included	The main source of emissions from electricity consumption or fuel use in the baseline.
		CH_4	Excluded	Excluded for simplification.
		N_2O	Excluded	Excluded for simplification.
	Emissions from the baseline wastewater treatment system	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from the wastewater treatment system due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
	Emissions from the baseline sludge treatment system	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from the wastewater treatment system due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
	Emissions from the discharge of effluent into river/lake/sea	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from the effluent due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
	Emission from anaerobic decay of the final sludge	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from the effluent due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
Project Activity	Emissions from electricity or fuel consumption in the project activity	CO_2	Included	The main source of emissions from electricity consumption or fuel use in the project activity.
		CH_4	Excluded	Excluded for simplification.
		N_2O	Excluded	Excluded for simplification.
	Emissions from the baseline wastewater treatment system	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from the wastewater treatment system due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
	Emissions from the baseline sludge treatment system	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from the wastewater treatment system due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
	Emissions from the discharge of	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for

	Source	Gas		Justification / Explanation
	effluent into river/lake/sea	CH_4	Included	The major source of emissions from the effluent due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
	Emission from anaerobic decay of the final sludge	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from the effluent due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
	Emission from fugitive emissions	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from inefficiencies in the biogas capture system.
		N_2O	Excluded	Excluded for simplification.
	Emission from biomass storage under anaerobic conditions	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted for
		CH_4	Included	The major source of emissions from the effluent due to decomposition of organic matter.
		N_2O	Excluded	Excluded for simplification.
	Emissions from incomplete flaring of biogas	CO_2	Excluded	Excluded for simplification
		CH_4	Included	The major source of emissions from the incomplete flaring of biogas
		N_2O	Excluded	Excluded for simplification.

[amend the table as applicable for each CPA]

The geographic boundary of the CPA is [list geographic boundary], which lies within the DPR Korea. The CPA location within the geographical boundary of the register PoA is also an eligibility criterion as listed in B.3. The CPA has geographic reference XX°XX'XX north and XX°XX'XX east

B.5. Emission reductions:

B.5.1. Data and parameters that are available at validation:

>>

[delete as appropriate]

Data / Parameter:	$EC_{BL,k,y}$
Data unit:	MWh
Description:	Quantity of electricity that would be consumed by the baseline electricity consumption source *k* during the year *y*
Source of data used:	Historical records at CPA site
Value applied:	CPA specific
Justification of the choice of data or	In accordance with baseline and monitoring methodology.

description of measurement methods and procedures actually applied :	
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$EF_{EL,k,y}$
Data unit:	$tCO2_e/MWh$
Description:	Emission factor for electricity generation for source *k* during the year *y*
Source of data used:	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01)
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01).
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$TDL_{k,y}$
Data unit:	Fraction
Description:	Average technical transmission and distribution losses for providing electricity to source k
Source of data used:	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01).
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01).
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$FC_{i,j,y}$
Data unit:	mass or volume unit
Description:	Quantity of fuel type i combusted in process j during the year y
Source of data used:	CPA owner
Value applied:	CPA specific
Justification of the	In accordance with baseline and monitoring methodology.

choice of data or description of measurement methods and procedures actually applied :	
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$w_{c,i,y}$
Data unit:	tC/mass unit of the fuel
Description:	Weighted average mass fraction of carbon in fuel type k in year y
Source of data used:	Values provided by the fuel supplier in an invoice (preferable source). If this is not available, then measurements by the CPA owner.
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$\rho_{c,i,y}$
Data unit:	mass unit / volume unit of the fuel
Description:	Weighted average density of fuel type *i* in year y
Source of data used:	Values provided by the fuel supplier in an invoice (preferable source). If this is not available, then measurements by the CPA owner
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$Q_{ww,i,y}$
Data unit:	m^3
Description:	Volume of wastewater treated in baseline wastewater treatment system *i* in year y
Source of data used:	Historical data or measurement campaign.

	For Greenfield and capacity addition projects: (i) the value obtained from measurement campaign of comparable existing wastewater plant; (ii) the value provided by the manufacturer/designer of Greenfield wastewater treatment plant using the same technology, demonstrated to be conservative.
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), f).

Data / Parameter:	$COD_{\text{inf } low,i,y}$
Data unit:	tons/m3
Description:	Chemical oxygen demand of the wastewater inflow to the baseline wastewater treatment system *i* in year *y*
Source of data used:	Historical data or measurement campaign. For Greenfield and capacity addition projects: (i) the value obtained from measurement campaign of comparable existing wastewater plant; (ii) the value provided by the manufacturer/designer of Greenfield wastewater treatment plant using the same technology, demonstrated to be conservative.
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), f).

Data / Parameter:	$n_{COD,BL,i}$
Data unit:	Fraction
Description:	COD removal efficiency in of the baseline treatment system i
Source of data used:	Determined in accordance with paragraphs 26 – 28 of the baseline and monitoring methodology AMS.III-H. (Version 16).
Value applied:	CPA specific
Justification of the choice of data or description of	In accordance with baseline and monitoring methodology.

measurement methods and procedures actually applied :	
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), f).

Data / Parameter:	$MCF_{ww,treatment,BL,i}$
Data unit:	Fraction
Description:	Methane correction factor for baseline wastewater treatment system i
Source of data used:	Table III.H.1 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), f).

Data / Parameter:	$B_{o,ww}$
Data unit:	kg CH4/kg COD
Description:	Methane producing capacity of the wastewater
Source of data used:	Paragraph 20 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	0.25
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions and project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), e), f).

Data / Parameter:	UF_{BL}
Data unit:	Fraction
Description:	Model correction factor to account of model uncertainty
Source of data used:	Paragraph 20 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	0.89
Justification of the choice of data or description of measurement methods	In accordance with baseline and monitoring methodology.

and procedures actually applied :	
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	GWP_{CH4}
Data unit:	Fraction
Description:	Global warming potential of methane
Source of data used:	Paragraph 20 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	21
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions and project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$S_{j,BL,y}$
Data unit:	tons
Description:	Amount of dry matter in the sludge that would have been treated by the sludge treatment system *j* in the baseline scenario in year y.
Source of data used:	Historical data or measurement campaign. For Greenfield and capacity addition projects: (i) the value obtained from measurement campaign of comparable existing wastewater plant; (ii) the value provided by the manufacturer/designer of Greenfield wastewater treatment plant using the same technology, demonstrated to be conservative.
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$MCF_{s,treatment,BL,j}$
Data unit:	Fraction
Description:	Methane correction factor for baseline sludge treatment system j
Source of data used:	Table III.H.1 of Approved SSC Methodology AMS-III.H (Version 16)

Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), c).

Data / Parameter:	DOC_s
Data unit:	Fraction
Description:	Degradable organic content of the untreated sludge generated in the year *y*
Source of data used:	Paragraph 22 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	0.257
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions and project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	DOC_F
Data unit:	Fraction
Description:	Fraction of DOC dissimilated to biogas
Source of data used:	Paragraph 22 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions and project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	F
Data unit:	Fraction
Description:	Fraction of CH_4 in biogas
Source of data used:	Paragraph 22 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	0.5

Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions and project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$EF_{composting}$
Data unit:	tons of CH_4 / t of waste (sludge) treated
Description:	Emission factor for composting organic waste
Source of data used:	IPCC default value
Value applied:	0.01 (dry weight basis)
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions and project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), e), f).

Data / Parameter:	SGR_{BL}
Data unit:	tons of dry matter in sludge/ton COD removed
Description:	Sludge generation ratio of the wastewater treatment plant in the baseline scenario
Source of data used:	This ratio will be determined as per paragraphs 26, 27 or 28 of Approved SSC Methodology AMS-III.H (Version 16).
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	SGR_{PJ}
Data unit:	tonne of dry matter in sludge/t COD removed
Description:	Sludge generation ratio of the wastewater treatment plant in the project scenario

Source of data used:	Calculated using the monitored values of COD removal (i.e. $COD_{inflow,i}$ minus $COD_{outflow,i}$) and sludge generation in the project scenario
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$Q_{ww,disch\ arg\ e,BL,y}$
Data unit:	m³
Description:	Volume of treated wastewater discharged in year *y* in the baseline scenario
Source of data used:	Historical data or measurement campaign. For Greenfield and capacity addition projects: (i) the value obtained from measurement campaign of comparable existing wastewater plant; (ii) the value provided by the manufacturer/designer of Greenfield wastewater treatment plant using the same technology, demonstrated to be conservative.
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), d), e), f).

Data / Parameter:	$COD_{ww,discharge,BL,y}$
Data unit:	tons / m³
Description:	Chemical oxygen demand of the treated wastewater discharged into sea, river or lake in the baseline situation in year *y*
Source of data used:	Historical data or measurement campaign. For Greenfield and capacity addition projects: (i) the value obtained from measurement campaign of comparable existing wastewater plant; (ii) the value provided by the manufacturer/designer of Greenfield wastewater treatment plant using the same technology, demonstrated to be conservative.
Value applied:	CPA specific
Justification of the choice of data or	In accordance with baseline and monitoring methodology.

description of measurement methods and procedures actually applied :	
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), d), e), f).

Data / Parameter:	$MCF_{ww,BL,discharge}$
Data unit:	Fraction
Description:	Methane correction factor based on discharge pathway in the baseline situation.
Source of data used:	Table III.H.1 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), d), e), f).

Data / Parameter:	$S_{final,BL,y}$
Data unit:	tons
Description:	Amount of dry matter in the final sludge generated by the baseline wastewater treatment systems in the year *y*
Source of data used:	Historical data or measurement campaign. For Greenfield and capacity addition projects: (i) the value obtained from measurement campaign of comparable existing wastewater plant; (ii) the value provided by the manufacturer/designer of Greenfield wastewater treatment plant using the same technology, demonstrated to be conservative.
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$MCF_{s,BL,final}$
Data unit:	Fraction
Description:	Methane correction factor of the disposal site that receives the final sludge in

	the baseline situation
Source of data used:	Methodological tool "Emission from solid waste disposal sites" (Version 06.1.0).
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default values of the methodological tool "Emission from solid waste disposal sites" (Version 06.1.0) shall be used by CPAs. CPAs shall apply a model correction factor of 0.85 for humid/wet conditions or 0.80 for dry conditions.
Any comment:	Calculation of baseline emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$EF_{EL,j,y}$
Data unit:	$tCO2_e/MWh$
Description:	Emission factor for electricity generation for source *j* during the year *y*
Source of data used:	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01)
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01).
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$TDL_{j,y}$
Data unit:	Fraction
Description:	Average technical transmission and distribution losses for providing electricity to source j
Source of data used:	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01).
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01).
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$MCF_{ww,treatment,PJ,k}$
Data unit:	Fraction
Description:	Methane correction factor for project activity wastewater treatment system *k*
Source of data used:	Table III.H.1 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), e), f).

Data / Parameter:	UF_{PJ}
Data unit:	Fraction
Description:	Model correction factor to account of model uncertainty
Source of data used:	Paragraph 29 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	1.12
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$MCF_{s,treatment,PJ,l}$
Data unit:	Fraction
Description:	Methane correction factor for project activity sludge treatment system *l*
Source of data used:	Table III.H.1 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), e), f).

Data / Parameter:	$MCF_{ww,PJ,discharge}$
Data unit:	Fraction
Description:	Methane correction factor based on discharge pathway in the project activity situation
Source of data used:	Table III.H.1 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), e), f).

Data / Parameter:	$MCF_{s,PJ,final}$
Data unit:	Fraction
Description:	Methane correction factor of the disposal site that receives the final sludge in the project activity situation.
Source of data used:	Estimated in accordance with the methodological tool "Emission from solid waste disposal sites" (Version 06.1.0)
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	CFE_{ww}
Data unit:	Fraction
Description:	Capture efficiency of the biogas recovery equipment in the wastewater treatment systems
Source of data used:	Paragraph 30 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	0.9
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions.

	This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	CFE_s
Data unit:	Fraction
Description:	Capture efficiency of the biogas recovery equipment in the sludge treatment systems
Source of data used:	Paragraph 30 of Approved SSC Methodology AMS-III.H (Version 16)
Value applied:	0.9
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$PE_{flaring,ex\text{-}ante,y}$
Data unit:	tCO_2e
Description:	Ex-ante estimation of methane emissions due to incomplete flaring in year *y*
Source of data used:	Historical data or measurement campaign. For Greenfield and capacity addition projects: (i) the value obtained from measurement campaign of comparable existing wastewater plant; (ii) the value provided by the manufacturer/designer of Greenfield wastewater treatment plant using the same technology, demonstrated to be conservative.
Value applied:	CPA specific
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions. Calculated according to Equation 2 from Paragraph 20 and Equation 3 from Paragraph 21 of the Approved SSC Methodology AMS-III.H (Version 16) for ex-ante estimation. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	MM_{CH4}
Data unit:	kg/kmol
Description:	Molecular mass of methane
Source of data used:	Methodological tool “Project emissions from flaring" (Version 02.0.0)
Value applied:	16.04

Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions

Data / Parameter:	MM_{N2}
Data unit:	kg/kmol
Description:	Molecular mass of nitrogen
Source of data used:	Methodological tool "Project emissions from flaring" (Version 02.0.0)
Value applied:	28.01
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions

Data / Parameter:	R_u
Data unit:	$Pa.m^3/kmol.K$
Description:	Universal ideal gas constant
Source of data used:	Methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0)
Value applied:	8,314
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with baseline and monitoring methodology.
Any comment:	Calculation of project emissions

B.5.2. Ex-ante calculation of emission reductions:

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EQUATIONS TO BE USED FOR CALCULATION OF EMISSION REDUCTIONS OF A CPA:
[delete as appropriate]

Please note that definitions provided to individual parameters continue to be applicable in equations subsequent to the equation in which the definition was provided unless newly defined in an equation.

Baseline

1. Wastewater and sludge treatment systems equipped with a biogas recovery facility in the baseline shall be excluded from the baseline emission calculations.

2. Baseline emissions for the systems affected by the project activity may consist of:

   (i) Emissions on account of electricity or fossil fuel used ($BE_{power,y}$);

   (ii) Methane emissions from baseline wastewater treatment systems ($BE_{ww,treatment,y}$);

   (iii) Methane emissions from baseline sludge treatment systems ($BE_{s,treatment,y}$);

   (iv) Methane emissions on account of inefficiencies in the baseline wastewater treatment systems and presence of degradable organic carbon in the treated wastewater discharged into river/lake/sea ($BE_{ww,discharge,y}$);

   (v) Methane emissions from the decay of the final sludge generated by the baseline treatment systems ($BE_{s,final,y}$).

$$BE_y = \{BE_{power,y} + BE_{ww,treatment,y} + BE_{s,treatment,y} + BE_{ww,discharge,y} + BE_{s,final,y}\} \quad \textbf{(1)}$$

Where:

BE_y	Baseline emissions in year y (tCO_2e)
$BE_{power,y}$	Baseline emissions from electricity or fuel consumption in year y (tCO_2e)
$BE_{ww,treatment,y}$	Baseline emissions of the wastewater treatment systems affected by the project activity in year y (tCO_2e)
$BE_{s,treatment,y}$	Baseline emissions of the sludge treatment systems affected by the project activity in year y (tCO_2e)
$BE_{ww,discharge,y}$	Baseline methane emissions from degradable organic carbon in treated wastewater discharged into sea/river/lake in year y (tCO_2e).
$BE_{s,final,y}$	Baseline methane emissions from anaerobic decay of the final sludge produced in year y (tCO_2e). If the sludge is controlled combusted, disposed in a landfill with biogas recovery, or used for soil application in the baseline scenario, this term shall be neglected

3. Baseline emissions from electricity and fossil fuel consumption (BEpower,y) are calculated as follows:

$$BE_{power,y} = BE_{EC,y} + BE_{FC,j,y} \quad \textbf{(2)}$$

Where:

$BE_{power,y}$	=	Baseline emissions from electricity or fuel consumption in year y (tCO_2e)
$BE_{EC,y}$	=	Baseline emissions from electricity consumption in year y (tCO_2e)
$BE_{FC,j,y}$	=	Baseline emissions from fossil fuel combustion in process j during the year y (tCO_2e)

$$BE_{EC,y} = \sum_k \{EC_{BL,k,y} * EF_{EL,k,y} * (1 + TDL_{k,y})\} \quad \textbf{(3)}$$

Where:

$EC_{BL,k,y}$	=	Quantity of electricity that would be consumed by the baseline electricity consumption source *k* during the year *y* (MWh)
$EF_{EL,k,y}$	=	Emission factor for electricity generation for source *k* during the year *y* (tCO_2/MWh)
$TDL_{k,y}$	=	Average technical transmission and distribution losses for providing electricity to source *k* during the year *y*
k	=	Sources of electricity consumption in the baseline scenario

$$BE_{FC,j,y} = \sum_i (FC_{i,j,y} * COEF_{i,y}) \quad \textbf{(4)}$$

Where:

$FC_{i,j,y}$	=	Quantity of fuel type *i* combusted in process *j* during the year *y* (mass or volume unit)
$COEF_{i,y}$	=	CO_2 emissions coefficient of fuel type *i* during the year *y* (tCO_2/mass or volume unit)
i	=	Are the fuel types combusted in process *j* during the year *y*

The CO_2 emission coefficient $COEF_{i,y}$ is calculated based on the chemical composition of the fossil fuel type i, using the following approach:

If $FC_{i,j,y}$ is measured in a mass unit: $COEF_{i,y} = w_{C,i,y} * 44/12$ **(5)**

If $FC_{i,j,y}$ is measured in a volume unit: $COEF_{i,y} = w_{C,i,y} * \rho_{i,y} * 44/12$ **(6)**

Where:

$COEF_{i,y}$	=	CO_2 emissions coefficient of fuel type *i* (tCO_2/mass or volume unit)
$w_{C,i,y}$	=	Weighted average mass fraction of carbon in fuel type i in year y (tC/mass unit of the fuel)
$\rho_{i,y}$	=	Weighted average density of fuel type i in year y (mass unit/volume unit of the fuel)
i	=	Fuel types combusted in process *j* during the year *y*

The energy consumption shall include all equipment/devices in the baseline treatment facility. If recovered biogas in the baseline is used to power auxiliary equipment it should be taken into account accordingly, using zero as its emission factor.

4. Methane emissions from the baseline wastewater treatment systems affected by the project ($BE_{ww,treatment,y}$) are determined using the COD removal efficiency of the baseline plant:

$$BE_{ww,treatment,y} = \sum_i (Q_{ww,i,y} * COD_{\inf low,i,y} * \eta_{COD,BL,i} * MCF_{ww,treatment,BL,i}) * B_{o,ww} * UF_{BL} * GWP_{CH4} \quad \textbf{(7)}$$

Where:

$Q_{ww,i,y}$	Volume of wastewater treated in baseline wastewater treatment system *i* in year *y* (m^3). For *ex ante* estimation, forecasted wastewater generation volume or the designed capacity of the wastewater treatment facility can be used. However, the *ex post* emissions reduction calculation shall be based on the actual monitored volume of treated wastewater
$COD_{\inf low,i,y}$	Chemical oxygen demand of the wastewater inflow to the baseline treatment system *i* in year *y* (t/m^3). Average value may be used through sampling with the confidence/precision level 90/10
$\eta_{COD,BL,i}$	COD removal efficiency of the baseline treatment system *i*, determined as per the paragraphs 10, 11 or 12 below
$MCF_{ww,treatment,BL,i}$	Methane correction factor for baseline wastewater treatment systems *i* (*MCF* values as per Table 3)
i	Index for baseline wastewater treatment system
$B_{o,ww}$	Methane producing capacity of the wastewater (IPCC value of 0.25 kg CH_4/kg COD)[6]
UF_{BL}	Model correction factor to account for model uncertainties (0.89)
GWP_{CH4}	Global Warming Potential for methane (value of 21)

If the baseline treatment system is different from the treatment system in the project scenario, the monitored values of the COD inflow during crediting period will be used to calculate the baseline emissions *ex post*.

5. The Methane Correction Factor (*MCF*) shall be determined based on the following table:

Table 3: IPCC default values for Methane Correction Factor (*MCF*)

Type of wastewater treatment and discharge pathway or system	***MCF* value**
Discharge of wastewater to sea, river or lake	0.1
Aerobic treatment, well managed	0.0
Aerobic treatment, poorly managed or overloaded	0.3
Anaerobic digester for sludge without methane recovery	0.8
Anaerobic reactor without methane recovery	0.8
Anaerobic shallow lagoon (depth less than 2 metres)	0.2
Anaerobic deep lagoon (depth more than 2 metres)	0.8
Septic system	0.5

[6] Project activities may use the default value of 0.6 kg CH_4/kg BOD, if the parameter $BOD_{5,20}$ is used to determine the organic content of the wastewater. In this case, baseline and project emissions calculations shall use BOD instead of COD in the equations, and the monitoring of the project activity shall be based in direct measurements of $BOD_{5,20}$, i.e. the estimation of BOD values based on COD measurements is not allowed.

6. Methane emissions from the baseline sludge treatment systems affected by the project activity are determined using the methane generation potential of the sludge treatment systems:

$$BE_{s,treatment,y} = \sum_j (S_{j,BL,y} * MCF_{s,treatment,BL,j}) * DOC_s * UF_{BL} * DOC_F * F * 16/12 * GWP_{CH4} \quad \textbf{(8)}$$

Where:

$S_{j,BL,y}$	Amount of dry matter in the sludge that would have been treated by the sludge treatment system *j* in the baseline scenario (t). For *ex ante* estimation, forecasted sludge generation volume or the designed capacity of the sludge treatment facility can be used. However, the *ex post* emissions reduction calculation shall be based on the actual monitored volume of treated sludge
j	Index for baseline sludge treatment system
DOC_s	Degradable organic content of the untreated sludge generated in the year *y* (fraction, dry basis). Default values of 0.257 for industrial sludge shall be used
$MCF_{s,treatment,BL,j}$	Methane correction factor for the baseline sludge treatment system *j* (*MCF* values as per Table 3)
DOC_F	Fraction of DOC dissimilated to biogas (IPCC default value of 0.5)
F	Fraction of CH_4 in biogas (IPCC default of 0.5)

If the sludge is composted, the following equation shall be applied:

$$BE_{s,treatment,y} = \sum_j S_{j,BL,y} * EF_{composting} * GWP_{CH4} \quad \textbf{(9)}$$

Where:

$EF_{composting}$	Emission factor for composting organic waste (t CH_4/t waste treated). The IPCC default value of 0.01 t CH_4/ t sludge treated on a dry weight basis shall be used

7. If the baseline wastewater treatment system is different from the treatment system in the project scenario, the sludge generation rate (amount of sludge generated per unit of COD removed) in the baseline may differ significantly from that of the project scenario. For example, it is known that the amount of sludge generated in aerobic wastewater systems is larger than in anaerobic systems, for the same COD removal efficiency. Therefore, for these cases, the monitored values of the amount of sludge generated during the crediting period will be used to estimate the amount of sludge generated in the baseline, as follows:

$$S_{j,BL,y} = S_{l,PJ,y} * \frac{SGR_{BL}}{SGR_{PJ}} \quad \textbf{(10)}$$

Where:

$S_{l,PJ,y}$	Amount of dry matter in the sludge treated by the sludge treatment system *l* in year *y* in the project scenario (t)
SGR_{BL}	Sludge generation ratio of the wastewater treatment plant in the baseline scenario (tonne of dry matter in sludge/t COD removed). This ratio will be determined as per paragraphs 10, 11 or 12 below
SGR_{PJ}	Sludge generation ratio of the wastewater treatment plant in the project scenario (tonne of dry matter in sludge/t COD removed). Calculated using the monitored values of COD removal and sludge generation in the project scenario

8. Baseline methane emissions from degradable organic carbon in treated wastewater discharged in e.g. a river, sea or lake in the baseline situation are determined as follows:

$$BE_{ww,discharge,y} = Q_{ww,discharge,BL,y} * GWP_{CH4} * B_{o,ww} * UF_{BL} * COD_{ww,discharge,BL,y} * MCF_{ww,BL,discharge} \quad \textbf{(11)}$$

Where:

$Q_{ww,discharge,BL,y}$	Volume of treated wastewater discharged in year *y* (m^3) in the baseline scenario
$COD_{ww,discharge,BL,y}$	Chemical oxygen demand of the treated wastewater discharged into sea, river or lake in the baseline situation in the year *y* (t/m^3).
$MCF_{ww,BL,discharge}$	Methane correction factor based on discharge pathway in the baseline situation (e.g. into sea, river or lake) of the wastewater (fraction) (*MCF* values as per Table 3)

To determine $COD_{ww,discharge,BL,y}$: if the baseline treatment system(s) is different from the treatment system(s) in the project scenario, the monitored values of the COD inflow during crediting period will be used to calculate the baseline emissions *ex post*. The outflow COD of the baseline systems will be estimated using the removal efficiency of the baseline treatment systems, estimated as per paragraphs 10, 11, and 12 below.

9. Methane emissions from anaerobic decay of the final sludge produced in the baseline situation are determined as follows:

$$BE_{s,final,y} = S_{final,BL,y} * DOC_s * UF_{BL} * MCF_{s,BL,final} * DOC_F * F * 16/12 * GWP_{CH4} \quad \textbf{(12)}$$

Where:

$S_{final,BL,y}$	Amount of dry matter in the final sludge generated by the baseline wastewater treatment systems in the year *y* (t). If the baseline wastewater treatment system is different from the project system, it will be estimated using the monitored amount of dry matter in the final sludge generated by the project activity ($S_{final,PJ,y}$) corrected for the sludge generation ratios of the project and baseline systems as per equation 10 above
$MCF_{s,BL,final}$	Methane correction factor of the disposal site that receives the final sludge in the baseline situation. A model correction factor of 0.85 shall be used for humid/wet conditions or 0.80 for dry conditions in accordance with the methodological tool "Emission from solid waste disposal sites" (Version 06.1.0)

10. In determining baseline emissions using equation 1, historical records of at least one year prior to the project implementation shall be used. This shall include for example the COD removal efficiency of the wastewater treatment systems, the amount of dry matter in sludge, power and electricity consumption per m^3 of wastewater treated the amount of final sludge generated per tonne of COD removed, and all other parameters required for determination of baseline emissions.

11. For wastewater treatment plant that has been operating for at least three years and if one year of historical data is not available, the following procedures shall be followed:

(a) All the available data in determining the required parameters (COD removal efficiency, specific energy consumption and specific sludge production) shall be used to determine the baseline emissions in year *y*;

(b) An *ex ante* measurement campaign shall be implemented to determine the required parameters (COD removal efficiency, specific energy consumption and specific sludge production). The measurement campaign shall be implemented in the baseline wastewater systems for at least 10 days. The measurements should be undertaken during a period that is representative for the typical operation conditions of the systems and ambient conditions of the site (temperature, etc). Average values from the measurement campaign shall be used and the result shall be multiplied by 0.89 to account for the uncertainty range (30% to 50%). The parameters from the measurement campaign are used to calculate the baseline emission in year *y*;

(c) The baseline emissions in year *y* is taken as the minimum between the result of (a) and (b).

12. In the case of Greenfield and capacity addition projects, or existing plant without three year operating history, the following procedures shall be used to determine the baseline emissions:

(1) For existing plant without three year operating history, procedures in paragraph 11 shall be followed;

(2) For Greenfield and capacity addition projects, one of the following procedures shall be used:

(a) Value obtained from a measurement campaign in a comparable existing wastewater treatment plant i.e. having similar environmental and technological circumstances for example treating similar type of wastewater. Average values from the measurement campaign shall be used and the result shall be multiplied by 0.89 to account for the uncertainty range (30% to 50%) associated with this approach. The treatment plant and wastewater source can be considered as similar as the baseline plant, whereby the measurement campaign can be implemented when following conditions can be fulfilled:

(i) The two sources of wastewater (wastewater treated in the selected plant and from the project activity) are of the same type, e.g. either domestic or industrial wastewater;

(ii) The selected plant and the baseline plants employ the same treatment technology, and the hydraulic retention times in their biological and physical treatment systems do not vary by more than 20%; and

(iii) For project activity treating industrial wastewater, both industries have the same raw material and final products, and apply the same industrial technology. Alternatively, different industrial wastewaters may be considered as similar if the following requirements are fulfilled:

- The ratio COD/BOD (related to the proportion of biodegradable organic matter) does not differ by more than 20%; and
- The ratio total COD / soluble COD (related to the proportion of suspended organic matter, and therefore to the sludge generation capacity) does not differ by more than 20%.

(b) Value provided by the manufacturer/designer of a Greenfield wastewater treatment plant using the same technology, demonstrated to be conservative, e.g. average values from the top 20 percent plants with lowest emission rate per ton COD removed among the plants installed in the last five years designed for the same country/region to treat the same type of wastewaters as the project activity.

Project Activity Emissions

13. Project activity emissions from the systems affected by the project activity are:

(i) CO_2 emissions from electricity and fuel used by the project facilities ($PE_{power,y}$);

(ii) Methane emissions from wastewater treatment systems affected by the project activity, and not equipped with biogas recovery in the project scenario ($PE_{ww,treatment,y}$);

(iii) Methane emissions from sludge treatment systems affected by the project activity, and not equipped with biogas recovery in the project situation ($PE_{s,treatment,y}$);

(iv) Methane emissions on account of inefficiency of the project activity wastewater treatment systems and presence of degradable organic carbon in treated wastewater ($PE_{ww,discharge,y}$);

(v) Methane emissions from the decay of the final sludge generated by the project activity treatment systems ($PE_{s,final,y}$);

(vi) Methane fugitive emissions due to inefficiencies in capture systems ($PE_{fugitive,y}$);

(vii) Methane emissions due to incomplete flaring ($PE_{flaring,y}$);

(viii) Methane emissions from biomass stored under anaerobic conditions which would not have occurred in the baseline situation ($PE_{biomass,y}$).

$$PE_y = \begin{Bmatrix} PE_{power,y} + PE_{ww,treatment,y} + PE_{s,treatment,y} + PE_{ww,discharge,y} + PE_{s,final,y} + \\ PE_{fugitive,y} + PE_{biomass,y} + PE_{flaring,y} \end{Bmatrix} \quad \textbf{(13)}$$

Where:

PE_y	Project activity emissions in the year *y* (tCO_2e)
$PE_{power,y}$	Emissions from electricity or fuel consumption in the year *y* (tCO_2e). These emissions shall be calculated as per paragraph 14, for the situation of the project scenario, using energy consumption data of all equipment/devices used in the project activity wastewater and sludge treatment systems and systems for biogas recovery and flaring/gainful use
$PE_{ww,treatment,y}$	Methane emissions from wastewater treatment systems affected by the project activity, and not equipped with biogas recovery, in year *y* (tCO_2e).
$PE_{s,treatment,y}$	Methane emissions from sludge treatment systems affected by the project activity, and not equipped with biogas recovery, in year *y* (tCO_2e).
$PE_{ww,discharge,y}$	Methane emissions from degradable organic carbon in treated wastewater in year *y* (tCO_2e).
$PE_{s,final,y}$	Methane emissions from anaerobic decay of the final sludge produced in year *y* (tCO_2e).
$PE_{fugitive,y}$	Methane emissions from biogas release in capture systems in year *y*, calculated as per paragraph 19 (tCO_2e)
$PE_{flaring,y}$	Project emissions from flaring of the residual gas in year *y,* calculated as per paragraph 20 (tCO_2e)
$PE_{biomass,y}$	Methane emissions from biomass stored under anaerobic conditions. CPAs shall not store biomass under anaerobic conditions in the project if such storage does not occur in the baseline scenario. Accordingly, the parameter $PE_{biomass,y}$ is zero for all CPAs. (tCO_2e)

14. Emissions from electricity or fuel consumption in the year *y* in the project scenario (PEpower,y) are calculated as follows:

$$PE_{power,y} = PE_{EC,y} + PE_{FC,l,y} \quad \textbf{(14)}$$

Where:

$PE_{power,y}$	=	Project emissions from electricity or fuel consumption in year *y* (tCO_2e)
$PE_{EC,y}$	=	Project emissions from electricity consumption in year *y* (tCO_2e)
$PE_{FC,l,y}$	=	Project emissions from fossil fuel combustion in process *l* during the year *y* (tCO_2e)

$$PE_{EC,y} = \sum_j \{EC_{PJ,j,y} * EF_{EL,j,y} * (1 + TDL_{j,y})\} \quad \textbf{(15)}$$

Where:

$EC_{PJ,j,y}$	=	Quantity of electricity consumed by the project electricity source *j* during the year *y* (MWh)
$EF_{EL,j,y}$	=	Emission factor for electricity generation for source *j* during the year *y* (tCO_2/MWh)
$TDL_{j,y}$	=	Average technical transmission and distribution losses for providing electricity to source *j* during the year *y*
j	=	Sources of electricity consumption in the baseline project scenario

$$PE_{FC,l,y} = \sum_{k} (FC_{k,l,y} * COEF_{k,y}) \quad \textbf{(16)}$$

Where:

$FC_{k,l,y}$	=	Quantity of fuel type *k* combusted in process *l* during the year *y* (mass or volume unit)
$COEF_{,k,y}$	=	CO_2 emissions coefficient of fuel type *k* during the year *y* (tCO_2/mass or volume unit)
k	=	Are the fuel types combusted in process *l* during the year *y*

The CO_2 emission coefficient $COEF_{k,y}$ is calculated based on the chemical composition of the fossil fuel type *k*, using the following approach:

If $FC_{k,l,y}$ is measured in a mass unit: $COEF_{k,y} = w_{C,k,y} * 44/12$ **(17)**

If $FC_{k,l,y}$ is measured in a volume unit: $COEF_{k,y} = w_{C,k,y} * \rho_{k,y} * 44/12$ **(18)**

Where:

$COEF_{k,y}$	=	CO_2 emissions coefficient of fuel type *k* (tCO_2/mass or volume unit)
$w_{C,k,y}$	=	Weighted average mass fraction of carbon in fuel type *k* in year y (tC/mass unit of the fuel)
$\rho_{k,y}$	=	Weighted average density of fuel type *k* in year y (mass unit/volume unit of the fuel)
k	=	Fuel types combusted in process *l* during the year *y*

The energy consumption shall include all equipment/devices used in the project activity treatment systems and systems for biogas recovery and flaring/gainful use.

15. Methane emissions from the project wastewater treatment system ($PE_{ww,treatment,y}$) are determined using the COD removal efficiency of the project plant:

$$PE_{ww,treatment,y} = \sum_{k} (Q_{ww,k,y} * COD_{\inf low,k,y} * \eta_{COD,PJ,k} * MCF_{ww,treatment,PJ,k}) * B_{o,ww} * UF_{PJ} * GWP_{CH4} \quad \textbf{(19)}$$

Where:

$Q_{ww,k,y}$	Volume of wastewater treated in project wastewater treatment system *k* in year *y* (m^3). For *ex ante* estimation, forecasted wastewater generation volume or the designed capacity of the wastewater treatment facility can be used. However, the *ex post* emissions reduction calculation shall be based on the actual monitored volume of treated wastewater
$COD_{\inf low,k,y}$	Chemical oxygen demand of the wastewater inflow to the project treatment system *k* in year *y* (t/m^3). Average value may be used through sampling with the confidence/precision level 90/10
$\eta_{COD,PJ,k}$	COD removal efficiency of the project treatment system k, measured based on inflow COD ($COD_{\inf low,k,y}$) and outflow COD ($COD_{outflow,k,y}$) in system k

$MCF_{ww,treatment,PJ,k}$	Methane correction factor for project wastewater treatment systems *k* (*MCF* values as per Table 3)
k	Index for project wastewater treatment system
UF_{PJ}	Model correction factor to account for model uncertainties (1.12)

16. Methane emissions from the project sludge treatment systems ($PE_{s,treatment,y}$) are determined using the methane generation potential of the sludge treatment systems:

$$PE_{s,treatment,y} = \sum_{l}(S_{l,PJ,y} * MCF_{s,treatment,PJ,l}) * DOC_s * UF_{PJ} * DOC_F * F * 16/12 * GWP_{CH4} \quad \textbf{(20)}$$

Where:

$S_{l,PJ,y}$	Amount of dry matter in the sludge that is treated by the sludge treatment system *l* in the project scenario (t). For *ex ante* estimation, forecasted sludge generation volume or the designed capacity of the sludge treatment facility can be used. However, the *ex post* emissions reduction calculation shall be based on the actual monitored volume of treated sludge
l	Index for baseline sludge treatment system
$MCF_{s,treatment,PJ,l}$	Methane correction factor for the project sludge treatment system *l* (*MCF* values as per Table 3 above)

If the sludge is composted, the following equation shall be applied:

$$PE_{s,treatment,y} = \sum_{l} S_{l,PJ,y} * EF_{composting} * GWP_{CH4} \quad \textbf{(21)}$$

17. Project methane emissions from degradable organic carbon in treated wastewater discharged in e.g. a river, sea or lake in the project situation are determined as follows:

$$PE_{ww,discharge,y} = Q_{ww,discharge,PJ,y} * GWP_{CH4} * B_{o,ww} * UF_{PJ} * COD_{ww,discharge,PJ,y} * MCF_{ww,PJ,discharge} \quad \textbf{(22)}$$

Where:

$Q_{ww,discharge,PJ,y}$	Volume of treated wastewater discharged in year *y* (m^3) in the project scenario
$COD_{ww,discharge,PJ,y}$	Chemical oxygen demand of the treated wastewater discharged into sea, river or lake in the project situation in the year *y* (t/m^3).
$MCF_{ww,PJ,discharge}$	Methane correction factor based on discharge pathway in the project situation (e.g. into sea, river or lake) of the wastewater (fraction) (*MCF* values as per Table 3 above

18. Methane emissions from anaerobic decay of the final sludge produced in the project situation are determined as follows:

$$PE_{s,final,y} = S_{final,PJ,y} * DOC_s * UF_{PJ} * MCF_{s,PJ,final} * DOC_F * F * 16/12 * GWP_{CH4} \quad \textbf{(23)}$$

Where:

$S_{final,PJ,y}$	Amount of dry matter in the final sludge generated by the project wastewater treatment systems in the year *y* (t).
$MCF_{s,PJ,final}$	Methane correction factor of the disposal site that receives the final sludge in the project situation. A model correction factor of 1shall be used in accordance with the methodological tool "Emission from solid waste disposal sites" (Version 06.1.0)

19. Project activity emissions from methane release in capture systems are determined as follows:

(a) Based on the methane emission potential of wastewater and/or sludge:

$$PE_{fugitive,y} = PE_{fugitive,ww,y} + PE_{fugitive,s,y} \quad \textbf{(24)}$$

Where:

$PE_{fugitive,ww,y}$	Fugitive emissions through capture inefficiencies in the anaerobic wastewater treatment systems in the year *y* (tCO_2e)
$PE_{fugitive,s,y}$	Fugitive emissions through capture inefficiencies in the anaerobic sludge treatment systems in the year *y* (tCO_2e)

$$PE_{fugitive,ww,y} = (1 - CFE_{ww}) * MEP_{ww,treatment,y} * GWP_{CH4} \quad \textbf{(25)}$$

Where:

CFE_{ww}	Capture efficiency of the biogas recovery equipment in the wastewater treatment systems (a default value of 0.9 shall be used)
$MEP_{ww,treatment,y}$	Methane emission potential of wastewater treatment systems equipped with biogas recovery system in year *y* (t)

$$MEP_{ww,treatment,y} = \sum_{k} (Q_{ww,k,y} * COD_{\inf low,k,y} * \eta_{COD,PJ,k} * MCF_{ww,treatment,PJ,k}) * B_{o,ww} * UF_{PJ} \quad \textbf{(26)}$$

Where:

$Q_{ww,k,y}$	Volume of wastewater treated in project wastewater treatment system *k* equipped with biogas recovery in the year *y* (t/m^3)
$COD_{\inf low,k,y}$	Chemical oxygen demand of the wastewater inflow to the project treatment system *k* equipped with biogas recovery in the year *y* (t/m^3)
$\eta_{COD,PJ,k}$	COD removal efficiency of the project treatment system k, measured based on inflow COD ($COD_{\inf low,k,y}$) and outflow COD ($COD_{outflow,k,y}$) in system k equipped with biogas recovery in the year *y*
$MCF_{ww,treatment,PJ,k}$	Methane correction factor for the project wastewater treatment system *k* equipped with biogas recovery equipment (*MCF* values as per Table 3)

$$PE_{fugitive,s,y} = (1 - CFE_{s}) * MEP_{s,treatment,y} * GWP_{CH4} \quad \textbf{(27)}$$

Where:

CFE_{s}	Capture efficiency of the biogas recovery equipment in the sludge treatment systems (a default value of 0.9 shall be used)

$MEP_{s,treatment\ ,y}$ Methane emission potential of the sludge treatment systems equipped with a biogas recovery system in year *y* (t)

$$MEP_{s,treatment,y} = \sum_{l}(S_{l,PJ,y} * MCF_{s,treatment,PJ,l}) * DOC_s * UF_{PJ} * DOC_F * F * 16/12 \quad \textbf{(28)}$$

Where:

$S_{l,PJ,y}$ Amount of dry matter in the sludge that is treated by the sludge treatment system *l* equipped with biogas recovery equipment in the project scenario (t).

$MCF_{s,treatment\ ,PJ,l}$ Methane correction factor for the project sludge treatment system *l* equipped with biogas recovery equipment (*MCF* values as per Table 3 above)

(b) Optionally a default value of 0.05 m³ biogas leaked/m³ biogas produced may be used as an alternative to calculations per equation 24 to 28.

20. Project activity emissions due to incomplete flaring in year *y* (tCO_2e) are calculated as follows:

For *ex ante* estimation of $PE_{flaring,y}$, baseline emission calculation for wastewater and/or sludge treatment can be used but without the consideration of GWP for CH4.

For *ex post* emission reduction calculations, $PE_{flaring,y}$ shall be calculated as per the methodological tool "Project emissions from flaring" (Version 02.0.0) by using actual monitored data as follows:

$$PE_{flaring,y} = GWP_{CH4} \times \sum_{m=1}^{525600}\{F_{CH4,RG,m} \times (1-\eta_{flare,m})\} \times 10^{-3} \quad \textbf{(29)}$$

Where:

$PE_{flaring,y}$ = Project emissions from flaring of the residual gas in year *y* (tCO_2e)

GWP_{CH4} = Global warming potential of methane valid for the commitment period (tCO_2e/tCH_4)

$F_{CH4,RG,m}$ = Mass flow of methane in the residual gas in the minute m (kg)

$\eta_{flare,m}$ = Flare efficiency in minute m

The flare efficiency in minute *m* ($\eta_{flare,m}$) is determined as the average of two measurements of the flare efficiency made in year y ($\eta_{flare,y}$) as follows:

$$\eta_{flare,y} = 1 - \frac{1}{2}\sum_{t=1}^{2}\left(\frac{F_{CH4,EG,t}}{F_{CH4,RG,t}}\right) \quad \textbf{(30)}$$

Where:

$\eta_{flare,y}$ = Flare efficiency in year *y*

$F_{CH4,EG,t}$ = Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the time period *t* (kg)

$F_{CH4,RG,t}$ = Mass flow of methane in the residual gas in the time period *t* (kg)

t = The two time periods in year *y* during which the flare efficiency is measured, each a minimum of one hour and separated by at least six months

Mass flow of methane in the residual gas in minute *m* ($F_{CH4,RG,m}$) is calculated using the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0).

According to the methodological tool "Project emissions from flaring" (Version 02.0.0), the parameter $F_{CH4,RG,m}$ shall be determined as the mass flow during minute m and shall be measured on a dry basis. This represents Option D of Table 1 of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0).

$$F_{CH4,RG,m} = V_{m,db} * v_{CH4,m,db} * \rho_{CH4,m} \quad \textbf{(31)}$$

Where:

$F_{CH4,RG,m}$	=	Mass flow of methane in the residual gas in minute *m* (kg)
$V_{m,db}$	=	Volumetric flow of the residual gas in minute *m* on a dry basis (m^3 dry gas/h)m^3 of dry gas)
$v_{CH4,m,db}$	=	Volumetric fraction of CH4 in the residual gas in minute *m* on a dry basis (m^3 CH4/m^3 of dry gas)
$\rho_{CH4,m}$	=	Density of CH4 in the residual gas in minute *m* (kg CH4/m^3 CH4)

$$\rho_{CH4,m} = \frac{P_m * MM_{CH4}}{R_u * T_m} \quad \textbf{(32)}$$

Where:

$\rho_{CH4,m}$	=	Density of CH4 in the residual gas in minute *m* (kg gas *i* / m^3 gas *i*)
P_m	=	Pressure of the residual gas in minute *m* (Pa)
MM_{CH4}	=	Molecular mass of CH4 (kg / kmol)
R_u	=	Universal ideal gases constant (Pa.m^3 / kmol.K)
T_m	=	Temperature of the residual gas in minute *m* (K)

$$V_{m,db} = M_{m,db} / \rho_{m,db} \quad \textbf{(33)}$$

Where:

$V_{m,db}$	=	Volumetric flow of the residual gas in minute *m* on a dry basis (m^3 dry gas/h)
$M_{m,db}$	=	Mass flow of the residual gas in minute *m* on a dry basis (kg/h)
$\rho_{m,db}$	=	Density of the residual gas in minute *m* on a dry basis (kg dry gas / m^3 dry gas)

$$\rho_{m,db} = \frac{P_m * MM_{m,db}}{R_u * T_m} \quad \textbf{(34)}$$

Where:

$\rho_{m,db}$	=	Density of the residual gas in minute *m* on a dry basis (kg dry gas / m^3 dry gas)
P_m	=	Pressure of residual gas in minute *m* (Pa)
$MM_{m,db}$	=	Molecular mass of the residual gas in minute *m* on a dry basis (kg dry gas / kmol dry gas)
R_u	=	Universal ideal gases constant (Pa.m^3 / kmol.K)
T_m	=	Temperature of the residual gas in minute *m* (K)

$$MM_{m,db} = \sum_k (v_{k,m,db} * MM_k) \quad \textbf{(35)}$$

Where:

$MM_{m,db}$	=	Molecular mass of the residual gas in minute *m* on a dry basis (kg dry gas / kmol dry gas
$v_{k,m,db}$	=	Volumetric fraction of gas k in the residual gas in minute m on a dry basis (m^3 gas k / m^3 dry gas)
MM_k	=	Molecular mass of gas *k* (kg / kmol)
k	=	N_2, CH_4 (in accordance with the simplification outlined in Option 1 of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (Version 02.0.0).

The value for $F_{CH4,RG,t}$ is calculated using in accordance with the formulae for $F_{CH4,RG,m}$ and consists of the sum of methane flow in the minutes *m* that make up the time period *t*.

Leakage

21. If the technology is using equipment transferred from another activity, leakage effects at the site of the other activity are to be considered and estimated (LE_y).

Emission Reduction

22. Emission reductions shall be estimated *ex ante* in the PDD using the equations provided in the baseline, project and leakage emissions sections above. Emission reductions shall be estimated *ex ante* as follows:

$$ER_{y,ex\ ante} = BE_{y,ex\ ante} - \left(PE_{y,ex\ ante} + LE_{y,ex\ ante}\right) \quad \textbf{(36)}$$

Where:

$ER_{y,ex\ ante}$	*Ex ante* emission reduction in year *y* (tCO_2e)
$LE_{y,ex\ ante}$	*Ex ante* leakage emissions in year *y* (tCO_2e)
$PE_{y,ex\ ante}$	*Ex ante* project emissions in year *y* calculated as paragraph 13 (tCO_2e)
$BE_{y,ex\ ante}$	*Ex ante* baseline emissions in year *y* calculated as per paragraph 2 (tCO_2e)

23. *Ex post* emission reductions shall be determined for the case outlined in paragraph 1 (a) and 1 (e) of the Approved SSC Methodology AMS-III.H. (Version 16) as per paragraph 4. For cases outlined in paragraph 1 (b), 1 (c), 1 (d) and 1 (f) of the Approved SSC Methodology AMS-III.H. (Version 16), *ex post* emission reductions shall be based on the lowest value of the following, as per paragraph 18:

(i) The amount of biogas recovered and fuelled or flared (MD_y) during the crediting period, that is monitored *ex post*;

(ii) *Ex post* calculated baseline, project and leakage emissions based on actual monitored data for the project activity.

24. For cases 1 (b), 1 (c), 1 (d) and 1 (f) as outlined in paragraph 1 of the Approved SSC Methodology AMS-III.H. (Version 16): it is possible that the project activity involves wastewater and sludge treatment systems with higher methane conversion factors (*MCF*) or with higher efficiency than

the treatment systems used in the baseline situation. Therefore the emission reductions achieved by the project activity is limited to the *ex post* calculated baseline emissions minus project emissions using the actual monitored data for the project activity. The emission reductions achieved in any year are the lowest value of the following:

$$ER_{y,ex\ post} = \min((BE_{y,ex\ post} - PE_{y,ex\ post} - LE_{y,ex\ post}), (MD_y - PE_{power,y} - PE_{biomass,y} - LE_{y,ex\ post})) \quad \textbf{(37)}$$

Where:

$ER_{y,ex\ post}$	Emission reductions achieved by the project activity based on monitored values for year *y* (tCO_2e)
$BE_{y,ex\ post}$	Baseline emissions calculated as per paragraph 2 using *ex post* monitored values
$PE_{y,ex\ post}$	Project emissions calculated as per paragraph 13 using *ex post* monitored values
MD_y	Methane captured and destroyed/gainfully used by the project activity in the year *y* (tCO_2e)

25. In the case of flaring/combustion MD_y will be measured using the conditions of the flaring process:

$$MD_y = BG_{burnt,y} * w_{CH4,y} * D_{CH4} * FE * GWP_{CH4} \quad \textbf{(38)}$$

Where:

$BG_{burnt,y}$	Biogas flared/combusted in year *y* (m^3)
$w_{CH4,y}$	Methane content[13] of the biogas in the year *y* (volume fraction)
D_{CH4}	Density of methane at the temperature and pressure of the biogas in the year *y* (t/m^3)
FE	Flare efficiency in year *y* (fraction). If the biogas is combusted for gainful purposes, e.g. fed to an engine, an efficiency of 100% may be applied

26. For the cases listed in paragraph 1 of the Approved SSC Methodology AMS-III.H. such as:

(a) Substitution of an aerobic wastewater or sludge treatment system with an anaerobic treatment system with methane recovery and combustion; and

(b) Introduction of an anaerobic wastewater treatment system with methane recovery and combustion to an untreated wastewater stream.

The emission reduction achieved by the project activity (*ex post*) will be the difference between the baseline emissions and the sum of the project emissions and leakage.

$$ER_y = BE_{y,ex\ post} - \left(PE_{y,ex\ post} + LE_{y,ex\ post}\right) \quad \textbf{(39)}$$

The historical records of electricity and fuel consumption, the COD content of untreated and treated wastewater, and the quantity of sludge produced by the replaced units will be used for the baseline calculation.

In case (a), if the volumetric flow and the characteristic properties (e.g. COD) of the inflow and outflow of the wastewater are equivalent in the project and the baseline scenarios (i.e. the project and baseline systems have the same efficiency for COD removal for wastewater treatment), then the higher energy consumption and sludge generation in the baseline scenario are the only significant differences contributing to emissions reductions in the project case. In this case, the emission reductions can be calculated as the difference between the historical energy consumption of the replaced unit and the recorded energy consumption of the new system, plus the difference in emissions from sludge treatment and/or disposal. Project emissions from fugitive emissions and incomplete flaring ($PE_{fugitive,y}$, $PE_{flaring,y}$) shall also be considered in the calculation of the emission reductions, however the emissions from the wastewater outflow and sludge ($PE_{ww,discharge,y}$, $PE_{s,final,y}$) may be disregarded, if they are equivalent in the baseline and project scenarios.

To make it more clear, the ex-ante estimation and the ex-post calculation of ER for the CPAs which adopt different measure/technology is summarized in the following Table 4.

Table 4. ER calculation for the CPAs which adopt different measure/technology

	For CPA adopts measure/ technology (a)	For CPA adopts measure/ technology (b)	For CPA adopts measure/ technology (c)	For CPA adopts measure/ technology (d)	For CPA adopts measure/ technology (e)	For CPA adopts measure/ technology (f)
Ex-ante estimation of ER	Using the equations (1)~(36) above	Using the equations (1)~(36) above	Using the equations (1)~(36) above	Using the equations (1)~(36) above	Using the equations (1)~(36) above	Using the equations (1)~(36) above
Ex-post calculation of ER	Using the equations (39) above	Using the equations (37) and (38) above	Using the equations (37) and (38) above	Using the equations (37) and (38) above	Using the equations (39) above	Using the equations (37) and (38) above

B.5.3. Summary of the ex-ante estimation of emission reductions:

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Year	Estimation of project activity emissions (tonnes of CO_2 e)	Estimation of baseline emissions (tonnes of CO_2 e)	Estimation of leakage (tonnes of CO_2 e)	Estimation of overall emission reductions (tonnes of CO_2 e)
20XX	XXX	XXX	XXX	XXX
20XX	XXX	XXX	XXX	XXX
20XX	XXX	XXX	XXX	XXX
20XX	XXX	XXX	XXX	XXX
20XX	XXX	XXX	XXX	XXX
20XX	XXX	XXX	XXX	XXX
20XX	XXX	XXX	XXX	XXX
Total (tonnes of CO_2 e)	XXX	XXX	XXX	XXX

B.6.1. Description of the monitoring plan:

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The CPA adopts the monitoring methodology in accordance with approved SSC Methodology AMS-III.H. (Version 16) "Methane recovery in wastewater treatment".

The monitoring plan is designed to ensure that the Designated Operational Entity (DOE) is able to verify the data from the CPA.

1. Management Structure and responsibilities

The CPA implementer appoints a person who is responsible for ensuring that monitoring equipment is maintained and operated in accordance with manufacturer specifications. This person will also receive training from the manufacturer on how to operate the monitoring equipment and perform maintenance on the monitoring equipment before the commissioning of the CPA. The person appointed by the CPA implementer is XXX.

2. Data Collection

The CPA will use continuous flow meters and equipment to monitor the quantity of wastewater and monitor all other parameters required including the chemical oxygen demand of the wastewater before and after the treatment system affected by the project activity, the amount of dry matter in the sludge, flare efficiency at the CPA site as required by the monitoring methodology.

The equipment will be serviced, calibrated and maintained in accordance with manufacturer's instructions and complete records of such service, calibration and maintenance will be kept. Measurement data will be recorded electronically.

100% of the data should be monitored if not indicated otherwise.

3. Data calibration

All measurements are taken utilising calibrated measurement equipment according to international industry standards.

4. Data handling

The CPA implementer, with the help of the managing/coordinating entity will develop and implement a protocol for adequate record keeping and data monitoring systems. The data recorded by the CPA implementer will be transmitted to the managing/coordinating entity within ten business days after the end of each calendar month.

5. Data quality control

All data transmitted by the CPA implementer to the managing/coordinating entity will be checked by the managing/coordinating entity to ensure the accuracy and completeness of the data. In case of mistakes, corrective action will be taken to avoid similar mistakes in the future.

6. Reporting

The CPA implementer transmits copies of completed worksheets on a regular basis while maintaining originals on file. The CPA implementer should prepare a brief annual report which should include:

information on overall project performance, emission reductions generated and verified and comparison with targets, etc. The report can be combined with the periodic verification report.

The coordinating/managing entity will use the collected data to calculate emission reductions. The coordinating/managing entity will also be responsible for the preparation of the data for verification.

7. Data archiving

All data collected as part of monitoring will be archived electronically and be kept at least for 2 years after the end of the last crediting period. Data will be kept electronically by the managing/coordinating entity, which ensures that data can centrally be made available to a Designated Operational Entity (DOE) upon request.

8. Training

At least three (3) technicians will be trained for this CPA on the operation and maintenance of the monitoring equipment by the manufacturer before the commissioning of the project. This training will ensure that trained technicians are able to operate the equipment properly and perform routine maintenance procedures on the monitoring equipment in order to ensure that the parameters listed in this section can be monitored accurately and in accordance with individual parameter requirements.

The managing/coordinating entity will liaise with the CPA implementer to ensure that ongoing training will be provided by the manufacturer of the monitoring equipment to ensure that a sufficient number of technicians are adequately trained to operate and maintain the monitoring equipment in accordance with manufacturer requirements and this monitoring plan. The initial training of technicians has to be performed before the start of the first monitoring period of the CPA.

[provide additional information as relevant to the particular CPA]

The following parameters will be monitored: [delete as appropriate]

Data / Parameter:	$EC_{PJ,j,y}$
Data unit:	MWh
Description:	Quantity of electricity consumed by the project electricity source *j* during the year *y*
Source of data to be used:	Electricity meters installed at CPA site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Continuous measurements taken. Measured by an electricity meter.
QA/QC procedures to be applied:	The electricity meter will be calibrated and maintained according to manufacturer specifications and national standards. Data is recorded and stored in accordance with methodological requirements.

Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$FC_{k,l,y}$
Data unit:	mass or volume unit
Description:	Quantity of fuel type k combusted in process l during the year y
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Continuous measurements taken. Use either mass or volume meters. In cases where fuel is supplied from small daily tanks, rulers can be used to determine mass or volume of the fuel consumed, with the following conditions: The ruler gauge must be part of the daily tank and calibrated at least once a year and have a book of control for recording the measurements (on a daily basis or per shift); Accessories such as transducers, sonar and piezoelectronic devices are accepted if they are properly calibrated with the ruler gauge and receiving a reasonable maintenance; In case of daily tanks with pre-heaters for heavy oil, the calibration will be made with the system at typical operational conditions.
QA/QC procedures to be applied:	The consistency of metered fuel consumption quantities should be cross-checked by an annual energy balance that is based on purchased quantities and stock changes. Where the purchased fuel invoices can be identified specifically for the CDM project, the metered fuel consumption quantities should also be cross-checked with available purchase invoices from the financial records. Data is recorded and stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$w_{c,k,y}$
Data unit:	tC/mass unit of the fuel
Description:	Weighted average mass fraction of carbon in fuel type k in year *y*
Source of data to be used:	Values provided by the fuel supplier in an invoice (preferable source). If this is not available, then measurements by the CPA owner.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	The mass fraction of carbon should be obtained for each fuel delivery, from which weighted average annual values should be calculated. Measurements are undertaken in line with national or international fuel standards.
QA/QC procedures to be applied:	Data is recorded and stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. Preferable data source should be used for $w_{c,k,y}$. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$\rho_{c,k,y}$
Data unit:	mass unit / volume unit of the fuel
Description:	Weighted average density of fuel type k in year y
Source of data to be used:	Values provided by the fuel supplier in an invoice (preferable source). If this is not available, then measurements by the CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	The density of the fuel should be obtained for each fuel delivery, from which weighted average annual values should be calculated. Measurements are undertaken in line with national or international fuel standards.
QA/QC procedures to be applied:	The flow meters will be calibrated and maintained according to manufacturer specifications. Data is recorded and stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. Applicable where $FC_{k,l,y}$ is measured in a volume unit. Preferable data source should be used for $\rho_{c,k,y}$. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$Q_{ww,k,y}$
Data unit:	m^3

Description:	Volume of wastewater treated in project wastewater treatment system *k* in year *y*
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measurements are undertaken using flow meters.
QA/QC procedures to be applied:	Monitored continuously (at least hourly measurements are undertaken, if less, confidence/precision level of 90/10 shall be attained). The flow meter will be calibrated and maintained according to manufacturer specifications. Data is recorded and stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), e), f).

Data / Parameter:	$COD_{\inf low,k,y}$
Data unit:	tons/m³
Description:	Chemical oxygen demand of the wastewater inflow to the project treatment system *k* in year *y* (t/m^3).
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measure the COD according to national or international standards. COD is measured through representative.
QA/QC procedures to be applied:	Samples and measurements shall ensure a 90/10 confidence/precision level. COD measurements are cross-checked at least once a year in an external laboratory to confirm onsite measurements. All equipment used in the measurement of COD shall be calibrated and maintained in according to manufacturer specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), e), f)

Data / Parameter:	$COD_{outflow,k,y}$
Data unit:	t COD/m³
Description:	Chemical oxygen demand of the wastewater outflow after the project treatment system *k* in year *y* (t/m^3).
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measure the COD according to national or international standards. COD is measured through representative sampling.
QA/QC procedures to be applied:	Samples and measurements shall ensure a 90/10 confidence/precision level. COD measurements are cross-checked at least once a year in an external laboratory to confirm onsite measurements. All equipment used in the measurement of COD shall be calibrated and maintained in according to manufacturer specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), e), f).

Data / Parameter:	$S_{l,PJ,y}$
Data unit:	tons
Description:	Amount of dry matter in the sludge that is treated by the sludge treatment system *l* in the project scenario
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measure the total quantity of sludge on a wet basis. The volume (m^3) and density or direct weighing may be used to determine the sludge amount (wet basis). Representative samples are taken to determine the moisture content to calculate the total sludge amount on dry basis. If the methane emissions from anaerobic decay of the final sludge are to be neglected because the sludge is controlled combusted, disposed of in a landfill with methane recovery, or used for soil application, then the end-use of the final sludge will be monitored during the crediting period. If the baseline emissions include the anaerobic decay of final sludge generated by

	the baseline treatment systems in a landfill without methane recovery, the baseline disposal site shall be clearly defined, and verified by the DOE.
QA/QC procedures to be applied:	Monitoring of 100% of the sludge amount through continuous or batch measurements and moisture content through representative sampling to ensure the 90/10 confidence/precision level. All weight measurement equipment used shall be calibrated and maintained in according to manufacturer specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), e), f).

Data / Parameter:	$Q_{ww,discharge,PJ,y}$
Data unit:	m³
Description:	The volume of treated wastewater discharged in year *y* (m^3) in the project scenario
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measurements are undertaken using flow meters.
QA/QC procedures to be applied:	Monitored continuously (at least hourly measurements are undertaken, if less, confidence/precision level of 90/10 shall be attained). The flow meter will be calibrated and maintained according to manufacturer specifications. Data is recorded and stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), e), f).

Data / Parameter:	$COD_{ww,discharge,PJ,y}$
Data unit:	tons /m³
Description:	The chemical oxygen demand of the wastewater discharged to river/water/lake after the treatment system affected by the project activity in year *y*
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected	CPA specific

emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Measure the COD according to national or international standards. COD is measured through representative sampling.
QA/QC procedures to be applied:	Samples and measurements shall ensure a 90/10 confidence/precision level. COD measurements are cross-checked at least once a year in an external laboratory to confirm onsite measurements. All equipment used in the measurement of COD shall be calibrated and maintained in according to manufacturer specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), d), e), f).

Data / Parameter:	$S_{final,PJ,y,}$
Data unit:	tons
Description:	Amount of dry matter in the sludge generated by the project wastewater treatment systems in the year *y*
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measure the total quantity of sludge on a wet basis. The volume (m^3) and density or direct weighing may be used to determine the sludge amount (wet basis). Representative samples are taken to determine the moisture content to calculate the total sludge amount on dry basis. If the methane emissions from anaerobic decay of the final sludge are to be neglected because the sludge is controlled combusted, disposed of in a landfill with methane recovery, or used for soil application, then the end-use of the final sludge will be monitored during the crediting period. If the baseline emissions include the anaerobic decay of final sludge generated by the baseline treatment systems in a landfill without methane recovery, the baseline disposal site shall be clearly defined, and verified by the DOE
QA/QC procedures to be applied:	Monitoring of 100% of the sludge amount through continuous or batch measurements and moisture content through representative sampling to ensure the 90/10 confidence/precision level. All weight measurement equipment used shall be calibrated and maintained in according to manufacturer specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions

	This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$F_{CH4,EG,t}$
Data unit:	kg
Description:	Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the time period *t*
Source of data to be used:	Measurements undertaken by a third party accredited entity
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measured on a bi-annual basis. Values to be averaged at a one-minute interval or shorter time interval. Measure the mass flow of methane in the exhaust gas according to an appropriate national or international standard e.g. UKs Technical Guidance LFTGN05. The time period *t* over which the mass flow is measured must be at least one hour. The average flow rate to the flare during the time period *t* must be greater than the average flow rate observed for the previous six months.
QA/QC procedures to be applied:	According to the standard applied. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$M_{m,db}$
Data unit:	kg/h
Description:	Mass flow of the residual gas in minute *m* on a dry basis.
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Continuous measurements taken.
QA/QC procedures to be applied:	Calibration and frequency of calibration is according to manufacturer's specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in

	Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	T_m
Data unit:	K
Description:	Temperature of the residual gas in minute *m*
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Continuous measurements taken. Instruments with recordable electronic signal (analogical or digital) are required. Examples include thermocouples, thermo resistance, etc
QA/QC procedures to be applied:	Periodic calibration against a primary device provided by an independent accredited laboratory is mandatory. Calibration and frequency of calibration is according to manufacturer's specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter must be monitored continuously to assure the applicability condition related to the gaseous stream flow temperature being below 60ºC is met.This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	P_m
Data unit:	Pa
Description:	Pressure of the residual gas in minute *m*
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Continuous measurements taken. Instruments with recordable electronic signal (analogical or digital) are required, such as pressure transducers, etc
QA/QC procedures to be applied:	Periodic calibration against a primary device must be performed and records of calibration procedures must be kept available as well as the primary device and its calibration certificate. Pressure transducers (either capacitive or resistive) must be calibrated monthly. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. Provided all parameters are converted to normal conditions during the monitoring

	process, this parameter may not be needed except for moisture content determination and therefore it should be metered only when performing such measurements (with same frequency). This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$v_{CH4,m,db}$
Data unit:	m^3 CH_4/m^3 dry gas
Description:	Volumetric fraction of methane in the residual gas in minute *m* on a dry basis
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Continuous measurements taken by a gas analyser operating in dry-basis.
QA/QC procedures to be applied:	Calibration should include zero verification with an inert gas and at least one reading verification with a standard gas (single calibration gas or mixture calibration gas). All calibration gases must have a certificate provided by the manufacturer and must be under their validity period. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. The mass flow shall be measured on a dry basis in accordance with Option D of Table 1 of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream"(Version 02.0.0). This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$v_{N2,m,db}$
Data unit:	m^3 N_2/m^3 dry gas
Description:	Volumetric fraction of nitrogen in the residual gas in minute *m* on a dry basis
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Continuous measurements taken by a gas analyser operating in dry-basis.
QA/QC procedures to	Calibration should include zero verification with an inert gas and at least one

be applied:	reading verification with a standard gas (single calibration gas or mixture calibration gas). All calibration gases must have a certificate provided by the manufacturer and must be under their validity period. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. The mass flow shall be measured on a dry basis in accordance with Option D of Table 1 of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream"(Version 02.0.0). This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$T_{EG,m}$
Data unit:	°C
Description:	Temperature in the exhaust gas of the enclosed flare in minute *m*
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measured once per minute. Measure the temperature of the exhaust gas in the flare by an appropriate temperature measurement equipment. Measurements outside the operational temperature specified by the manufacturer may indicate that the flare is not functioning correctly and may require maintenance. Flare manufacturers must provide suitable monitoring ports for the monitoring of the temperature of the flare. These would normally be expected to be in the middle third of the flare. Where more than one temperature port is fitted to the flare, the flare manufacturer must provide written instructions detailing the conditions under which each location shall be used and the port most suitable for monitoring the operation of the flare according to manufacturers specifications for temperature.
QA/QC procedures to be applied:	Temperature measurement equipment should be replaced or calibrated in accordance with their maintenance schedule. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. Unexpected changes such as a sudden increase/drop in temperature can occur for different reasons. These events should be noted in the site records along with any corrective action that was implemented to correct the issue. Monitoring of this parameter is applicable in case of enclosed flares. Measurements are required to determine if manufacturer's flare specifications for operating temperature are met. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$Flame_m$

Data unit:	Flame on or Flame off
Description:	Flame detection of flare in the minute m
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measured once per minute. Detection of flame recorded as a minute that the flame was on, otherwise recorded as a minute that the flame was off. Measure using a fixed installation optical flame detector: Ultra Violet detector or Infra Red or both.
QA/QC procedures to be applied:	Equipment shall be maintained and calibrated in accordance with manufacturer's recommendations. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. Applicable to all flares. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$Maintenance_y$
Data unit:	Calendar dates
Description:	Maintenance events completed in year *y*
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	Measured annually. Record the date that maintenance events were completed in year *y*. Records of maintenance logs must include all aspects of the maintenance including the details of the person(s) undertaking the work, parts replaced, or needing to be replaced, source of replacement parts, serial numbers and calibration certificates.
QA/QC procedures to be applied:	Records must be kept in a maintenance log for two years beyond the life of the flare. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. Monitoring of this parameter is required for the case of enclosed flares and the project participant selects Option B to determine flare efficiency. These dates are required so that they can be compared to the maintenance schedule to check that maintenance events were completed within the minimum time between maintenance events specified by the manufacturer (SPEC,flare). This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: a), b), c), d), e), f).

Data / Parameter:	$BG_{burnt,y}$
Data unit:	m^3
Description:	Biogas volume in year
Source of data to be used:	Measured with continuous flow meters
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable for ex-ante estimations
Description of measurement methods and procedures to be applied:	In all cases, the amount of biogas recovered, fuelled, flared or otherwise utilized (e.g. injected into a natural gas distribution grid or distributed via a dedicated piped network) shall be monitored *ex post*, using continuous flow meters. If the biogas streams flared and fuelled (or utilized) are monitored separately, the two fractions can be added together to determine the total biogas recovered, without the need to monitor the recovered biogas before the separation. The methane content measurement shall be carried out close to a location in the system where a biogas flow measurement takes place
QA/QC procedures to be applied:	Monitored continuously (at least hourly measurements are undertaken, if less, confidence/precision level of 90/10 shall be attained) All flow meters used shall be calibrated and maintained in according to manufacturer specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: b), c), d), f)

Data / Parameter:	$w_{CH4,y}$
Data unit:	%
Description:	Methane content in biogas in the year *y*
Source of data to be used:	The fraction of methane in the gas should be measured with a continuous analyser or, alternatively, with periodical measurements at a 90/10 confidence/precision level.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable for ex-ante estimations
Description of measurement methods and procedures to be applied:	The fraction of methane in the gas should be measured with a continuous analyser or, alternatively, with periodical measurements at a 90/10 confidence/precision level. It shall be measured using equipment that can directly measure methane content in the biogas - the estimation of methane content of biogas based on measurement of other constituents of biogas such as CO_2 is not permitted. The methane content measurement shall be carried out close to a location in the system where a biogas flow measurement takes place

QA/QC procedures to be applied:	Monitored continuously (at least hourly measurements are undertaken, if less, confidence/precision level of 90/10 shall be attained) All flow meters used shall be calibrated and maintained in according to manufacturer specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: b), c), d), f).

Data / Parameter:	D_{CH4}
Data unit:	tons / m^3
Description:	Density of methane at the temperature and pressure of the biogas in the year *y*
Source of data to be used:	Continuous measurement
Value of data applied for the purpose of calculating expected emission reductions in section B.5	CPA specific
Description of measurement methods and procedures to be applied:	The temperature and pressure of the gas is required to determine the density of the methane combusted. If the biogas flow meter employed measures flow, pressure and temperature and displays or outputs the normalised flow of biogas, then there is no need for separate monitoring of pressure and temperature of the biogas
QA/QC procedures to be applied:	Shall be measured at the same time when methane content in biogas ($w_{CH4,y}$) is measured. All equipment used shall be calibrated and maintained in according to manufacturer specifications. The data shall be stored in accordance with methodological requirements.
Any comment:	Calculation of project emissions. This parameter is applicable to the following technologies/measures listed in Section A.4.2.2: b), c), d), e), f).

C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

☐ Please tick if this information is provided at the PoA level. In this case sections C.2. and C.3. need not be completed in this form.

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

>>

[this information is CPA specific and is therefore elaborated upon in the specific CPAs]

C.3. Please state whether an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA), in accordance with the host Party laws/regulations:

>>

[this information is CPA specific and is therefore elaborated upon in the specific CPAs]

SECTION D. Stakeholders' comments

>>

D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

☐ Please tick if this information is provided at the PoA level. In this case sections D.2. to D.4. need not be completed in this form.

D.2. Brief description how comments by local stakeholders have been invited and compiled:

>>

[describe stakeholder consultation process here]

D.3. Summary of the comments received:

>>

[describe stakeholder responses here]

D.4. Report on how due account was taken of any comments received:

>>

[Either:]

Given that no negative comments were received by Stakeholders, no further measures were required.

[or]

Given that negative stakeholder comments were received in the following areas:

[list of areas]

the following measures were taken to address those concerns:

[list of measures taken]

Annex 1

CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE SMALL-SCALE CPA

Organization:	XXX
Street/P.O.Box:	XXX
Building:	XXX
City:	XXX
State/Region:	XXX
Postfix/ZIP:	XXX
Country:	XXX
Telephone:	XXX
FAX:	XXX
E-Mail:	XXX
URL:	XXX
Represented by:	XXX
Title:	XXX
Salutation:	XXX
Last Name:	XXX
Middle Name:	XXX
First Name:	XXX
Department:	XXX
Mobile:	XXX
Direct FAX:	XXX
Direct tel:	XXX
Personal E-Mail:	XXX

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding from Parties is provided for this CPA

Annex 3

BASELINE INFORMATION

The baseline for this CPA was venting of all methane into the atmosphere without capture and destruction or utilisation.

Annex 4

MONITORING INFORMATION

No additional information provided here.

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