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:

Regional Biogas PoA – CPA [XX] (name of mill)
Version : [X.X]
Date : [DD/MM/YYYY]

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

The CPA for Regional Biogas PoA – CPA [XX] (name of mill) is developed by [Name of Project Implementer] (hereafter referred to as the "project host") who will act as "CPA Implementer". It is a biogas recovery and utilization project. The CPA will be developed under the PoA of "Regional Biogas PoA" and it is located in [district, state, country] ("host country"). It is an [existing/Greenfield] mill with a capacity to process up to [XX] metric tonnes of Fresh Fruit Bunch (FFB) per hour. The palm oil extraction process generates about [X.XXX] m^3 of palm oil mill effluent (POME) for each metric tonnes of FFB processed. In order to reduce the impact on the environment, the discharge limits of POME are currently reduced by treatment in a series of lagoons in Effluent Treatment Plant ("ETP"). It consists of several steps including [type of treatment systems involved] systems to reduce the [BOD or COD] to a level acceptable for [river discharge or land application]. There treated effluent is not [land application / discharge to water course way] of the treated effluent.

Purpose of project activity:

This project aims to mitigate methane emissions, a highly potent Greenhouse Gas (GHG) resulting from anaerobic digestion of palm oil mill effluent (POME) in the open [lagoons or tanks] treatment system (baseline). It involves the [type of treatment system to be introduced]. While the existing open anaerobic [lagoons or tanks] will be [closed or remained to treat the POME]. The newly [constructed or modified or upgraded] anaerobic covered [lagoons or tanks] system comes with biogas recovery and combustion facilities where the captured biogas will be utilized in [gas engine(s) / boiler(s) and type of displacement such as PKS, diesel, electricity, etc]. [Description of usage of generated electricity if applicable] while excess biogas will be flared in [open or enclosed] flaring system. Currently there are no mandatory laws or regulations in [host country] that require biogas recovery at wastewater open lagoons system and to destroy or use it for any purpose. It is estimated that the CPA will reduce an average of [XX,XXX] tCO_2e annually throughout the first crediting period. The proposed project activity is expected to be commissioned on [expected date].

The project activity will reduce GHG emissions by capture and destruction of methane from anaerobic decomposition of biogenic organic matter in an open [lagoons or tanks] treatment system, and potentially by displacing [fossil fuel that would be used for electricity generation in the absence of the project activity].

Environmental criterion

- [descriptions]

Social criterion

- [descriptions]

Economic criterion

- [descriptions]

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

[Name of Project Implementer] is the entity responsible of the CPA "Regional Biogas PoA – CPA [XX] (name of mill)", hence forth referred to as CPA implementer. [Name of Project Implementer] is [also / not] a Project Participant of the PoA.

[Name of CME] is the CME responsible for the inclusion of this CPA.

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

Technology Description:

The project activity includes the following systems:

a) The methane capture in newly built covered [lagoons / tanks]:

[Detail technical description of the CPA]

Table A.1: Specifications of covered anaerobic reactors

Specifications	
Nominal volume of Anaerobic reactor(s)	[Description]
Type reactor	[Description]
COD removal efficiency	XX%
Lining for cover of reactors	[Description]

[flow diagram]

Figure A.1: Flow diagram of proposed covered anaerobic reactors

b) Flaring system:

[Detail technical description of the CPA, including either open or enclosed flaring system]

c) Gainful use of biogas

The technology that will be used is environmentally safe and sound: the renewable based captive power plant that will be installed will improve the security on site by controlling methane emissions. The recovered biogas will be gainfully use and it is depending on the final requirement of energy by the mill.

[Detail technical description of the CPA]

d) Onsite energy consumption

Electrical power requirement to run the equipment installed at the project activity will be taken from the [mill / on-site generation]. [Detail technical description of the CPA].

The electricity consumed by the project activity during the crediting period will be monitored and recorded in electricity meter(s) and accounted as PE (for portion that generated from diesel gensets and grid, if any). For additionality assessment, electricity consumed by the project activity is [considered free/accounted].

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

A.4.1.1. Host Party:

Malaysia

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

Table A.2: Details of the geographic reference of CPA

Name of entity responsible for CPA	[Description]
Contact details of entity responsible for CPA	[Description]
City/Town/Community	[Description]
Region/State/Province	[Description]
Country	[host country]
Geographic coordinates of the site	XX° YY' ZZ.ZZ" N/S, XX° YY' ZZ.ZZ" E/W, OR X.XXXX, Y.YYYY

A map indicating the location of the CPA site is given below:

[MAP]

Figure A.2: Location of the Project Activity

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

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

[DD/MM/YYYY (first date on which contract/purchase order is awarded for the CPA [e.g. earthworks/mechanical of biogas system, any related project equipment], corresponding to the first financial commitment on implementation of the project).

The start date of the CPA is not or will not be, prior to the commencement of validation of the PoA, which was 20/03/2012.

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

The operational lifetime of the CPA will be [XX] years, [description if any].

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

[Renewable or Fixed] crediting period

A.4.3.1. Starting date of the crediting period:

[DD/MM/YYYY] or the date of its inclusion in the PoA, whichever is later

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

The length of the [first] crediting period of the CPA[3] will be [XX] years.

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

Years	Annual estimation of emission reductions in tonnes of CO_{2e}
[YYYY]	
[YYYY]	
[YYYY]	
[YYYY]	
[YYYY]	
[YYYY]	
[YYYY]	

[3] Please note that the duration of crediting period of any CPA shall be limited to the end date of the PoA regardless of when the CPA was added.

[YYYY]	
[YYYY]	
[YYYY]	
Total estimated reductions (tonnes of CO_{2e})	
Total number of crediting years	**[7 / 10]**
Annual average over the crediting period of estimated reductions (tonnes of CO_{2e})	

A.4.5. Public funding of the CPA:

The project has not received and will not be seeking public funding from Annex 1 countries. [In case the CPA uses any public funding, the information regarding the public funding will be provided in Section A.4.5 and Annex 2]

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.

   The CPA implementer is [description of project activities that implement by same project implementer, if any] at the closest point. Therefore the proposed CPA is not a de-bundled component of a large scale project activity as it does not satisfy any of the above provisions.

Table A.3: List of similar projects implemented by CPA Implementer [if any]

No.	Project Name	Type of CDM	Location & Coordinates	UNFCCC Reference No.

[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

2. If a proposed small-scale CPA of a PoA is deemed to be a debundled component in accordance with paragraph 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.

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 CME has taken a declaration from the CPA implementer that the small-scale CPA is neither registered as an individual CDM project activity or as CPA in another PoA.

The project information of this CPA has been checked against the PoA and CDM database available on UNFCCC website and no duplicate entries were identified. It is confirmed that the proposed CPA is neither registered as an individual CDM project activity nor is part of another PoA. This has also been confirmed by the project implementer [name of CPA implementer].

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:

Regional Biogas PoA
UNFCCC Ref. : XXXX
Version : [X.X]
Date : DD/MM/YYYY

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

Table B.1: Eligibility of CPA to be included in the Registered PoA

N°	Criteria	Justification
a	The geographical boundary of the CPA including any time-induced boundary consistent with geographical boundary set in the PoA.	The proposed Regional Biogas PoA – CPA [XX] (name of mill) is located in the [location of project activity – state, country] with GPS coordinates of XX° YY' ZZ.ZZ" N/S, XX° YY' ZZ.ZZ" E/W, OR X.XXXX, Y.YYYY. A declaration from CME has been issued to confirm the compliances.
b	Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g.	The CDM database (http://cdm.unfccc.int/Projects/registered.html, http://cdm.unfccc.int/ProgrammeOfActivities/re

	programme logo).	gistered.html) has been checked and it can be confirmed that the proposed CPA is not already included in another PoA or developed as a stand-alone CDM project. The proposed CPA is identified through a unique title and reference number #[XX]. Refer Section A.4.6 of r-CPA-DD.
c	The specifications of technology / measure including the level and type of service, performance specifications including compliance with testing/certifications.	The technology to be installed is biogas recovery and utilization for [electricity / combusted in biomass boiler and/or flaring] based on the [proposals and awarded contracts for the similar POME biogas projects implemented] by the PP. No emission reductions will be claimed for biomass displacement.
d	Conditions to check the start date of the CPA through documentary evidence.	Starting date of the CPA is [DD/MM/YYYY], corresponding to the earliest date at which a contract for implementation of the project has been awarded (description). In accordance with the CDM glossary, this date corresponds to the earliest date on implementation of the project. The start date of the CPA is not prior to the commencement of validation of the PoA (20/03/2012).
e	Conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs.	The methodologies applied in this CPA are AMS-III.H (version 16 or latest version if available) and [AMS-I.D (version XX) or AMS-I.F (version XX) or AMS-I.A (version XX) or AMS-I.C (version XX)]. Additional eligibility criteria applicable for AMS-III.H (version 16 or latest version if available) and [AMS-I.D (version XX) or AMS-I.F (version XX) or AMS-I.A (version XX) or AMS-I.C (version XX)] has been added under Table [B.X]. The applicability of the methodologies applied by the CPA is described and justified in Table [B.X] below. A declaration from CME has been issued to confirm the compliances.
f	The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality as specified in Section A of EB 65 Annex 3	The CPA meets the requirement pertaining to the demonstration of additionality, as demonstrated in details under Section B.3 of CPA-DD. A declaration from CME has been issued to confirm the compliances.
g	The PoA specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations	Stakeholder consultation has been organized on [DD/MM/YYYY] and it is prior to the CPA inclusion (supporting evidences such as

	and environmental impact analysis.	invitation, photographs, list of attendance etc. are available). The proposed CPA is compliant with the Host Country requirement in terms of EIA (no EIA required) (Refer Section C.2 & C.3 of r-CPA-DD). Biogas recovery facility is not listed as [description of the related regulation].
h	Conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance	The proposed CPA has not received and will not be seeking public funding from Annex 1 countries, as confirmed by the CPA Implementer and by the Annex I Party Project Participant to the PoA.
i	Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, grid-connected/off-grid) and distribution mechanisms (e.g. direct installation).	[justification by CPA implementer if applicable]
j	Where applicable, the conditions related to sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys.	For wastewater sampling for COD tests, the samples and measurements shall ensure a 90/10 confidence/precision level as per [applied methodology(ies)].
k	Where applicable, the conditions that ensure that every CPA in aggregate meets the small-scale or microscale threshold criteria and remains within those thresholds throughout the crediting period of the CPA.	The proposed CPA will install [gas engines or any equipment] with maximum capacity up to [XX] MW and methane avoidance of less than 60,000 tCO_2/yr for AMS-III.H (as estimated ex-ante), thus it meets the small-scale criteria.
l	Where applicable, the requirements for the debundling check, in case CPAs belong to small-scale (SSC) or microscale project categories.	The proposed CPA is not a debundled component of a large activity as described in section A.4.6 and confirmed by both the CPA Implementer and the CME.
m	The consideration of all applicable national and/or sectoral policies and regulations of each host parties, within the boundary of all host country.	[Justification and description] that gives comparative advantages to less emissions-intensive technologies over more emissions-intensive technologies. This E- policy is not taken into account in the development of the baseline scenario and in the additionality assessment of the proposed CPA[6]. As per Para 45(b), Annex 5 EB65, National and/or sectoral policies or regulations described in Para 44(b) (E- policy) that have been implemented since the adoption by the COP of the CDM M&P (decision 17/CP.7, 11 November 2001) need not be taken into account in establishing a baseline scenario. For further details, refer Section B.3.

[6] As per EB65, Annex 5, Para 44(b) and 45(b).

Additional eligibility criteria applicable for AMS-III.H, version 16:

Table B.2: Eligibility criteria applicable for AMS-III.H

Applicability Criteria	Reference	Comments
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)	AMS – III.H., Point 1	The CPA is applying Option [(d) or (f)]: [Description of the proposed CPA].
In cases where baseline system is anaerobic lagoon the methodology is applicable if: (a) The lagoons are ponds with a depth greater than two meters, without aeration. The value for depth is obtained from engineering design documents, or through direct measurement, or by dividing the surface area by the total volume. If the lagoon filling level varies seasonally, the average of the highest and lowest levels may be taken. (b) Ambient temperature above 15°C, at least during part of the year, on a monthly average basis.	AMS – III.H., Point 2	a) The anaerobic lagoons are all having the depth of [XX]m, which is more than 2m and without aeration. b) The ambient temperature of [location of project activity] is above [XX]°C throughout the

(c) The minimum interval between two consecutive sludge removal events shall be 30 days		year, on a monthly average basis. c) The interval between two consecutive sludge removal events was more than [days/months/years].
The recovered biogas from the above measures may also be utilised for the following applications instead of combustion/flaring:	AMS – III.H., Point 3	-
Thermal or mechanical, electrical energy generation directly.	AMS – III.H., Point 3(a)	The recovered biogas will be used for [type of generation] generation through combustion in [name of equipment]. Excess biogas, if any, will be flared. This in compliance with only AMS-III.H, paragraph 3(a) and not the others. [Relevant Type-I methodology(ies)] will be applied as the generated [description of output]. For [type of biomass] displacement, no emission reductions will be claimed as the [type of biomass] is carbon neutral biomass.
Thermal or mechanical, electrical energy generation after bottling of upgraded biogas, in this case additional guidance provided in Annex 1 shall be followed	AMS – III.H., Point 3(b)	Not applicable. The proposed project activity is not involving bottling of upgraded biogas.
Thermal or mechanical, electrical energy generation after upgrading and distribution, in this case additional guidance provided in Annex 1 shall be followed:		
(i) Upgrading and injection of biogas into a natural gas distribution grid with no significant transmission constraints;	AMS – III.H., Point 3(c)(i)	Not applicable. The proposed project activity is not involving upgrading and distribution.
(ii) Upgrading and transportation of biogas via a dedicated piped network to a group of end users; or	AMS – III.H., Point 3(c)(ii)	Not applicable. The proposed project activity is not involving upgrading and distribution.
(iii) Upgrading and transportation of biogas (e.g. by trucks) to distribution points for end users.	AMS – III.H., Point 3(c)(iii)	Not applicable. The proposed project activity is not involving upgrading and distribution.
Hydrogen production	AMS – III.H., Point 3(d)	Not applicable. The proposed project activity not involving hydrogen production.
Use as fuel in transportation applications after upgrading.	AMS – III.H., Point 3(e)	Not applicable. The proposed project activity not involving transportation applications after upgrading.
If the recovered biogas is used for project activities covered under paragraph 3(a), that	AMS – III.H., Point 4	The recovered biogas is planned to be used for [type of generation]

component of the project activity can use a corresponding methodology under Type I.		generation in the CPA. The approved baseline and monitoring methodology [relevant Type-I methodology(ies) is/are] used for the [description of the usage of recovered biogas].
For project activities covered under paragraph 3(b), if bottles with upgraded biogas are sold outside the project boundary, the end-use of the biogas shall be ensured via a contract between the bottled biogas vendor and the end-user. No emission reductions may be claimed from the displacement of fuels from the end use of bottled biogas in such situations. If however the end use of the bottled biogas is included in the project boundary and is monitored during the crediting period CO_2 emissions avoided by the displacement of fossil fuel can be claimed under the corresponding Type I methodology, e.g. AMS-I.C "Thermal energy production with or without electricity".	AMS-III.H., points 5	Not applicable. The proposed project activity is not involving any of upgraded biogas.
For project activities covered under paragraph 3(c)(i), emission reductions from the displacement of the use of natural gas are eligible under this methodology, provided the geographical extent of the natural gas distribution grid is within the host country boundaries.	AMS-III.H., points 6	Not applicable. The proposed project activity is not involving upgrading and distribution.
For project activities covered under paragraph 3(c)(ii), emission reductions for the displacement of the use of fuels can be claimed following the provision in the corresponding Type I methodology e.g. AMS-I.C..	AMS-III.H., points 7	Not applicable. The proposed project activity is not involving upgrading and distribution.
In particular, for the case of 3(b) and (c)(iii), the physical leakage during storage and transportation of upgraded biogas, as well as the emissions from fossil fuel consumed by vehicles for transporting biogas shall be considered. Relevant procedures in paragraph 11 of Annex 1 of AMS-III.H. "Methane recovery in wastewater treatment" shall be followed in this regard.	AMS-III.H., points 8	Not applicable. The proposed project activity is not involving upgrading and distribution.
For project activities covered under paragraph 3(b) and (c), this methodology is applicable if the upgraded methane content of the biogas is in accordance with relevant national regulations (where these exist) or, in the absence of national regulations, a minimum of 96% (by volume).	AMS-III.H., points 9	Not applicable. The proposed project activity is not involving upgrading and distribution.

If the recovered biogas is utilized for the production of hydrogen (project activities covered under paragraph 3(d)), that component of the project activity shall use corresponding methodology AMS-III.O.	AMS-III.H., points 10	Not applicable. The proposed project activity not involving hydrogen production.
If the recovered biogas is used for project activities covered under paragraph 3(e), that component of the project activity shall use corresponding methodology AMS-III.AQ.	AMS-III.H., points 11	Not applicable. The proposed project activity not involving transportation applications after upgrading.
New facilities (Greenfield projects) and project activities involving a change of equipment resulting in a capacity addition of the wastewater or sludge treatment system compared to the designed capacity of the baseline treatment system are only eligible to apply this methodology if they comply with the relevant requirements in the "General guidelines to SSC CDM methodologies". In addition the requirements for demonstrating the remaining lifetime of the equipment replaced, as described in the general guidelines shall be followed.	AMS-III.H., points 12	[Applicable/Not applicable]. The project activity [is not/is] a Greenfield project and [does not/is] involves any change of equipment resulting in a capacity addition to the wastewater compared to the designed capacity of the baseline treatment system.
The location of the wastewater treatment plant as well as the source generating the wastewater shall be uniquely defined and described in the PDD.	AMS-III.H., point 13	The palm oil mill is the only source which generates the wastewater of the present project activity. Please refer to section A.4., Figure A.1 of flow diagram and A.4.1.2 for details GPS coordinates.
Measures are limited to those that result in aggregate emissions reductions of less than or equal to 60 $ktCO_2$ equivalent annually from all Type III components of the project activity.	AMS-III.H., point 14	The emission reductions for the type III component will remain below 60 $ktCO_{2e}$/yr throughout the entire crediting period. See section A.4.4 and B.5 of CPA-DD for the number of emission reductions.

Additional eligibility criteria applicable in case of CPA that gainfully use of biogas for electrical and/or thermal energy generation

[Justification by CPA implementer if applicable for the relevant methodology(ies)]

Table [B.X]: Applicability Criteria for AMS-I.A, Version 14

Applicability Criteria	Reference	Justification
This category comprises renewable electricity generation units that supply individual households /users or groups of households/users included in the project boundary. The applicability is limited to individual households	AMS – I.A, Point 1	Applicable. The project activity involves in supplying renewable electricity to individual households / users, mostly mill workers that live nearby the mill, who are not

and users that do not have a grid connection except when; a) A group of households or users are supplied electricity through a standalone minigrid powered by renewable energy generation unit(s) where the capacity of the generating units does not exceed 15 MW (i.e., the sum of installed capacities of all renewable energy generators connected to the mini-grid is less than 15 MW) e.g., a community based stand-alone off-the-grid renewable electricity systems; or b) The emissions reduction per renewable energy based lighting system is less than 5 tonnes of CO_{2e} a year and where it can be shown that fossil fuel would have been used in the absence of the project activity by; (i) A representative sample survey (90% confidence interval, ±10% error margin) of target households; or (ii) Official statistics from the host country government agencies. The renewable energy generation units include technologies such as solar, hydro, wind, biomass gasification and other technologies that produce electricity all of which is used onsite/locally by the user, e.g., solar home systems, wind battery chargers . The renewable generating units may be new installations (Greenfield) or replace existing onsite fossil-fuel-fired generation. To qualify as a smallscale project, the total output of the unit(s) shall not exceed the limit of 15 MW.		grid connected. a) The capacity of the renewable energy generating units is [XX]MW and it is below 15MW. b) Not applicable for this project activity. i) The renewable electricity is generated by combustion of recovered biogas in [type of renewable energy generation unit], where the generated renewable electricity is supply to individual households / users, thus displacing fossil fuel used in genset(s). ii) [type of renewable energy generation unit] can be new installation (Greenfield) where existing fossil fuel fired genset(s) can act as standby unit(s) or replace existing onsite fossil fuel fired gensets(s). iii) The total installed capacity of the [type of renewable energy generation unit] is [XX]MW and less than 15MW.
Hydro power plants with reservoirs that satisfy at	AMS – I.A,	Not applicable. The project activity

least one of the following conditions are eligible to apply this methodology: • The project activity is implemented in an existing reservoir with no change in the volume of reservoir; • The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m^2; • The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m^2.	Point 2	is not a hydro power plant.
Combined heat and power (cogeneration) systems are not eligible under this category.	AMS – I.A, Point 3	The project activity is not a cogeneration system, hence it is applicable.
If the unit added has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	AMS – I.A, Point 4	[Applicable/Not applicable]: The project activity [does not/is] incorporate a mix of renewable and non-renewable components. [Description of install capacity if it is incorporate a mix of renewable and non-renewable components] The project activity does not involve co-fires unit.
Project activities that involves retrofit or replacement of an existing facility for renewable energy generation are included in this category. To qualify as a small-scale project, the total output of the modified or retrofitted unit shall not exceed the limit of 15 MW.	AMS – I.A, Point 5	Not applicable. The project activity is not [retrofit/replacement] of existing facility for renewable energy generation.
In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	AMS – I.A, Point 6	Not applicable. The project activity does not involve addition of renewable energy generation units to an existing renewable power generation facility.

Table [B.X]: Applicability Criteria for AMS-I.C, Version 19

Applicability Criteria	Reference	Justification
This methodology comprises renewable energy	AMS – I.C.,	Applicable. The project activity is

technologies that supply users with thermal energy that displaces fossil fuel use. These units include technologies such as solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass and other technologies that provide thermal energy that displaces fossil fuel.	Point 1	combusting recovered biogas in [type of equipment] for thermal energy generation that displaces [type of biomass/Fossil fuel]. [Description on the displaced biomass/fossil fuel].
Biomass-based co-generating systems are included in this category. For the purpose of this methodology "cogeneration" shall mean the simultaneous generation of thermal energy and electrical energy in one process. Project activity that produces heat and power in separate element processes (for example, heat from a boiler and electricity from biogas engine) does not fit under the definition of co-generation project.	AMS – I.C., point 2	Not applicable. The project activity is not a co-generating system.
Emission reductions from a biomass cogeneration system can accrue from one of the following activities: (a) electricity supply to a grid; (b) electricity and/or thermal energy (steam/heat) production for on-site consumption or for consumption by other facilities; (c) combination of (a) and (b).	AMS – I.C., point 3	Not applicable. The project activity is not a co-generating system.
The total installed/rated thermal energy generation capacity of the project equipment is equal to or less than 45 MW thermal (see paragraph 6 for the applicable limits for cogeneration project activities).	AMS – I.C., Point 4	Applicable. The total installed thermal energy generation capacity is [XX]MW and lower than 45 MW.
For co-fired systems, the total installed thermal energy generation capacity of the project equipment, when using both fossil and renewable fuel shall not exceed 45 MW thermal (see paragraph 6 for the applicable limits for cogeneration project activities).	AMS-I.C, point 5	Not applicable. The project activity does not involve co-firing.
The following capacity limits apply for biomass cogeneration units: (a) if the project activity includes emission reductions from both the thermal and electrical energy components, the total installed energy generation capacity (thermal and electrical) of the project equipment shall not exceed 45 MW thermal. For the purpose of calculating this capacity limit the conversion factor of 1:3 shall be used for converting electrical energy to thermal energy (i.e. for renewable energy project	AMS-I.C., point 6	Not applicable. The project activity is not a co-generating system.

activities, the maximal limit of 15 MW(e) is equivalent to 45 MW thermal output of the equipment or the plant); (b) if the emission reductions of the cogeneration project activity are solely on account of thermal energy production (i.e., no emission reductions accrue from electricity component), the total installed thermal energy production capacity of the project equipment of the cogeneration unit shall not exceed 45 MW thermal; (c) if the emission reductions of the cogeneration project activity are solely on account of electrical energy production (i.e., no emission reductions accrue from thermal energy component), the total installed electrical energy generation capacity of the project equipment of the cogeneration unit shall not exceed 15 MW.		
The capacity limits specified in the above paragraphs apply to both new facilities and retrofit projects. In the case of project activities that involve the addition of renewable energy units at an existing renewable energy facility, the total capacity of the units added by the project should comply with capacity limits in paragraphs 4 to 6, and should be physically distinct from the existing units.	AMS-I.C., point 7	[Applicable. The project activity does involve the installation of new facilities of [XX] MW which is compliant with the capacity limits specified above]. [Not applicable. The project activity does not involve retrofit project]. [Applicable/Not applicable]. [The project activity involves capacity addition compared to the baseline scenario and has comply the relevant requirements in the "General guidelines to SSC CDM methodologies"].[List all the relevant requirements as per guidelines if applicable].
Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category.	AMS-I.C., point 8	Not applicable. The project activity does not involve retrofit or modification of an existing facility for renewable energy generation.
New Facilities (Greenfield projects) and project activities involving capacity additions compared to the baseline scenario are only eligible if they comply with the related and relevant equirements in the "General Guidelines to SSC CDM methodologies".	AMS-I.C., point 9	[Applicable/Not applicable]. [Description of the Greenfield projects / project activity with capacity addition if applicable, and complying relevant requirements in the "General guidelines to SSC

		CDM methodologies"].
If solid biomass fuel (e.g. briquette) is used, it shall be demonstrated that it has been produced using solely renewable biomass and all project or leakage emissions associated with its production shall be taken into account in the emissions reduction calculation.	AMS-I.C., point 10	Not applicable. The project activity is not using solid biomass fuel.
Where the project participant is not the producer of the processed solid biomass fuel, the project participant and the producer are bound by a contract that shall enable the project participant to monitor the source of the renewable biomass to account for any emissions associated with solid biomass fuel production. Such a contract shall also ensure that there is no double-counting of emission reductions.	AMS-I.C., point 11	Not applicable. The project activity is not using solid biomass fuel.
If electricity and/or steam/heat produced by the project activity is delivered to a third party i.e. another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered into that ensures there is no double-counting of emission reductions.	AMS-I.C., point 12	Not applicable. The project activity does not involve delivering generated heat to a third party.
If the project activity recovers and utilizes biogas for power/heat production and applies this methodology on a stand alone basis i.e. without using a Type III component of a SSC methodology, any incremental emissions occurring due to the implementation of the project activity (e.g. physical leakage of the anaerobic digester, emissions due to inefficiency of the flaring), shall be taken into account either as project or leakage emissions.	AMS-I.C., point 13	Not applicable. The project activity combines the utilization of biogas for power/heat production with Type III methodology (AMS-III.H) and it is not a stand alone project activity.
Charcoal based biomass energy generation project activities are eligible to apply the methodology only if the charcoal is produced from renewable biomass sources provided: (a) Charcoal is produced in kilns equipped with methane recovery and destruction facility; or (b) If charcoal is produced in kilns not equipped with a methane recovery and destruction facility, methane emissions from the production of charcoal shall be considered. These emissions shall be calculated as per the procedures defined in the approved methodology AMS-III.K. Alternatively, conservative emission factor	AMS-I.C, point 14	Not applicable. The project activity does not involve using charcoal based biomass for energy generation.

values from peer reviewed literature or from a registered CDM project activity can be used, provided that it can be demonstrated that the parameters from these are comparable e.g. source of biomass, characteristics of biomass such as moisture, carbon content, type of kiln, operating conditions such as ambient temperature.		

Table [B.X]: Applicability criteria applicable for AMS-I.D. version 17.

Applicability Criteria	Reference	Justification
This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: a) Supplying electricity to a national or a regional grid; b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.	AMS-I.D., point 1	Applicable: The proposed project activity is based on biogas recovered from anaerobic bio-digester, a renewable energy generation source. [The proposed project shall supply electricity to the national grid]. [Other description of the usage of generated electricity, if any]
This methodology is applicable to project activities that: (a) Install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) Involve a capacity addition; (c) Involve a retrofit of (an) existing plant(s); (d) Involve a replacement of (an) existing plant(s).	AMS-I.D., point 3	Applicable to [options (a) – (d)] where the proposed project activity shall [description of the project activity].
Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology.	AMS-I.D., point 4	Not applicable. The project activity is a biogas recovery and utilization project.
If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15MW.	AMS-I.D., point 5	[Applicable/Not applicable]: The project activity [does not/is] incorporate a mix of renewable and non-renewable components. [Description of install capacity if it is incorporate a mix of renewable and non-renewable components] The project does not involve co-fires unit.

Combined heat and power (co-generation) systems are not eligible under this category.	AMS-I.D., point 6	Applicable: There is no combined heat and power component in the project activity.
In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	AMS-I.D., point 7	Not applicable: The project activity does not involve the addition of renewable energy generation units at an existing facility.
In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	AMS-I.D., point 8	[Applicable/Not applicable]: The project activity [does not/is] involving retrofit or replacement an existing facility [and is not exceed 15MW].

Table [B.X]: Applicability Criteria for AMS-I.F, Version 02

Criteria	Reference	Comments
This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to user(s). The project activity will displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit i.e. in the absence of the project activity, the users would have been supplied electricity from one or more sources listed below: (a) A national or a regional grid (grid hereafter); (b) Fossil fuel fired captive power plant; (c) A carbon intensive mini-grid.	AMS-I.F, point 1	Applicable. Project activity involves installation of biogas engine(s) and the generated power will be exported to [mini grid or displacement of electricity from national/regional grid/mini grid or fossil fuel fired captive power plant].
For the purpose of this methodology, a mini-grid is defined as small-scale power system with a total capacity not exceeding 15 MW (i.e. the sum of installed capacities of all generators connected to the mini-grid is equal to or less than 15 MW) which is not connected to a national or a regional grid.	AMS-I.F, point 2	Applicable. The total capacity of the mini grid is not exceed 15 MW, and is not be connected to national / regional grid.
Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: • The project activity is implemented in an	AMS-I.F, point 4	Not applicable. The project activity is a biogas recovery and utilization project.

existing reservoir with no change in the volume of reservoir; • The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the project emissions section, is greater than 4 W/m^2; • The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m^2.		
For biomass power plants, no other biomass other than renewable biomass are to be used in the project plant.	AMS-I.F, point 5	Applicable. Biogas generated from degradation of POME in anaerobic condition is the renewable biomass to be used in the project activity.
This methodology is applicable for project activities that: (a) Install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) Involve a capacity addition, (c) Involve a retrofit of (an) existing plant(s); or (d) Involve a replacement of (an) existing plant(s).	AMS-I.F, point 6	Applicable. [Description of the options].
In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	AMS-I.F, point 7	Not applicable. Project activity is not involves capacity addition of renewable energy generation units at an existing renewable power generation facility.
In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	AMS-I.F, point 8	Not applicable. The project activity involves new installation (Greenfield) for renewable energy generation.
If the unit added has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	AMS-I.F, point 9	[Applicable/Not applicable]. The capacity for renewable component of the project activity is [XX]MW which is less than 15 MW capacity (for CPA involves added units with both renewable and non-renewable components (such as new biogas engine(s) and new fossil fuel fired genset(s) that acts as standby unit).

		Co-fires unit is not applicable for the SSC-CPA in this PoA.
Combined heat and power (co-generation) systems are not eligible under this category.	AMS-I.F, point 10	Applicable. The project activity is not a cogeneration system.
If electricity and/or steam/heat produced by the project activity is delivered to a third party i.e. another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered that ensures that there is no double counting of emission reductions.	AMS-I.F, point 11	[Applicable/Not applicable]. [Description if involves delivering to third party].

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

[Description of the host country information on the palm oil related activities].

There is no financial incentive for the palm oil mill owners to invest into biogas capture projects, particularly when there is no requirement under existing, pending, or planned national, state or local regulatory. This is partly related to the fact that there are a lot of attractive and competing investments in the sector. However, the PP has undertaken to set up this project in order to reduce the GHG emissions and contribute his mite to the global GHG emission reduction.

The project is a small scale project activity. As such, the provisions of *Guidelines on the Demonstration of Additionality of Small-Scale Project Activities* (version 09.0) of the *simplified modalities and procedures for small-scale CDM project activities* will apply to this project. The '*indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories*' require the project proponents to demonstrate that the project activity would not have occurred anyway due to *at least one* of the following barriers:

a) *Investment barrier*: a financially more viable alternative to the project activity would have led to higher emissions;

b) *Technological barrier*: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;

c) *Barrier due to prevailing practice*: prevailing practice or existing regulatory or policy requirements would have led to the implementation of a technology with higher emissions;

d) *Other barriers*: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

Subsequently, in its 35th Meeting, the EB had issued '*Non-binding best practice examples to demonstrate additionality for SSC project activities*', wherein EB had given best practice examples of each of the aforementioned category of barriers.

The project participant has chosen Investment Barrier to demonstrate the additionality, which is discussed in the following paragraphs:

Investment barrier:

The most important of all the barriers faced by the company is the investment barrier. The investment analysis reveals that the project is not financially attractive. The additionality tool permits the use of [simple cost analysis or investment comparison analysis or benchmark analysis] to demonstrate the additionality of the project.

As the project activity generates revenue (other than CDM revenue) by the [sales of biomass/diesel saving/electricity sales, etc], simple cost analysis cannot be used. Of the remaining, PP has chosen the benchmark analysis to demonstrate the financial unattractiveness of the project activity without carbon credits. As explained in the above, [descriptions on the prevailing practice for oil palm industry to treat the POME]. The benchmark analysis approach is therefore suited where the baseline does not require further investment[7].

[Description on national and/or sectoral policies or regulations, if any].

[Project/Equity IRR or other indicators] has been chosen as the financial indicator for the financial analysis of the project activity as the equity capital invested is [XX]% total invested in the project. The [Project/Equity IRR or other indicators] has to be compared with a benchmark rate of return to demonstrate the additionality of the project. The Guidelines on the Assessment of Investment Analysis (Version 05, point 12) [or its latest version] states, "In cases where a benchmark approach is used the applied benchmark shall be appropriate to the type of IRR calculated. Local commercial lending rates or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR. Required/expected returns on equity are appropriate benchmarks for an equity IRR. Benchmarks supplied by relevant national authorities are also appropriate if the DOE can validate that they are applicable to the project activity and the type of IRR calculation presented".

In line with the [description] is selected as the benchmark, with is [XX]%. The logic of choosing this rate as benchmark is that, the project should yield a return at least equivalent to the [expected returns of equity/lending rate] to merit consideration.

For making the investment analysis, the following assumptions have been made:

Table B.4: Investment Analysis (all values presented in [Malaysian Ringgit / USD / EUR])

Sl No	Description	Value	Basis
1	Budgeted CAPEX: - [Descriptions]		
	Total		

[7] As per EB62, Annex 5, Para 19.

2	Financing pattern - Term loan - Equity		
3	Terms of loan - Rate of interest - Repayment period - Initial grace period		
~~4~~	Energy generated from biogas		
5	Electricity generation		
6	Annual maintenance costs.		
~~5~~7	Manpower cost.		
~~6~~8	Escalation in salary [XXXX].		
~~7~~9	Price of [displaced biomass/fossil fuel, if any]		
10~~8~~	RE tariff export to [grid/mini grid, if applicable] (currency/kWh)		
~~9~~11	Industrial/residential/commercial electricity tariff [if applicable] (currency/kWh)		
~~10~~12	Diesel/Furnace oil/biomass cost		
~~11~~13	Laboratory Cost.		
~~12~~14	Insurance premium per year (% of CAPEX)		
~~13~~15	Inflation Rate		
~~14~~16	Escalation in biomass/fossil fuel cost (%)		
~~15~~17	Depreciation		
	- Initial allowance		
	- Annual allowance		
~~16~~18	Project technical life time		
~~17~~19	Residual value: a fair value		
20	Bio gas engine/s capacity		
~~18~~21	[Equipment] PLF		
22	Boiler capacity		
~~19~~23	Other parameters		
~~20~~24	Corporate Tax (%)		

Based on the above assumption, the equity/project IRR works out to be [X.XX]% in contrast to the benchmark rate of [X.XX]%. Thus, the analysis proves that the project is not financially attractive. With CERs revenue, the equity/project IRR becomes [X.XX]%. The worksheets are enclosed

Sensitivity Analysis

A sensitivity analysis has also been conducted to test the robustness of the conclusions drawn. [X] factors have been identified as critical to IRR of the project: [list of factors]. All of these parameters constitute more than 20% of the total project cost or total project revenues. Besides [list factor], has also been subjected to sensitivity analysis, though it constitutes less than 20% of project cost or total project revenues. A variation of +/-[XX]% has been applied, in accordance with the UNFCCC guidance. The results of sensitivity analysis are given below:

Table [B.X]: Sensitivity Analysis

FACTORS	EQUITY IRR		
	-[XX]%	0%	+[XX]%
[Description]			
[Description]			
[Description]			
[Description]			

It could be seen from the above that even under the most optimistic conditions, the project activity would not yield a positive IRR, let alone crossing the benchmark. Therefore the project is not a business-as-usual scenario and it is additional

Prior Consideration of CDM

As per "Guidelines for the Demonstration and Assessment of Prior Consideration of the CDM", EB 60 Annex 26, Para 3, CPA with start date after the publication of the global stakeholder consultation of the SSC-PoA-DD do not have to follow the guidelines. As per CDM Glossary of Terms, the start date of the project activity is [DD/MM/YYYY] which is after the start date of validation of the PoA, which is 20/03/2012.

Conclusion

The conclusion of the investment analysis remains identical to reasonable variations of the critical assumptions (sensitivity analysis). Therefore the project activity IRR remains lower than the benchmark. In the above background, it is demonstrated that the project faces investment barrier and CER income is necessary to make the project self sustaining in nature.

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.

A) Determination of the project boundary of AMS-III.H.

The project boundary is defined as the physical, geographical site where the wastewater treatment takes place in the baseline and project situation. It covers all facilities affected by the project activity including

sites where the processing, transportation and application or disposal of waste products as well as biogas takes place[8].

The implementation of the project activity will affect certain sections of the wastewater treatment systems while others will remain unaffected[9]. The details are provided here below:

Table [B.X]: Description of affected/unaffected sections of the baseline wastewater treatment system

Sections of treatment systems	Comments	Included in project boundary (Y/N)
[Description of treatment system]	[Description]	[Y/N]
[Description of treatment system]	[Description]	[Y/N]

B) [Determination of the project boundary of AMS-I.A.]

The project boundary is the physical, geographical site of the renewable energy generating unit and the equipment that uses the electricity produced delineates the project boundary.

C) [Determination of the project boundary of AMS-I.C.]

The spatial extent of the project boundary encompasses:

a) All plants generating power and/or heat located at the project site, whether fired with biomass, fossil fuels or a combination of both;
b) All power plants connected physically to the electricity system (grid) that the project plant is connected to;
c) Industrial, commercial or residential facility, or facilities, consuming energy generated by the system and the processes or equipment affected by the project activity;
d) The processing plant of biomass residues, for project activities using solid biomass fuel (e.g. briquette), unless all associated emissions are accounted for as leakage emissions;
e) The transportation itineraries, if the biomass is transported over distances greater than 200 kilometres, unless all associated emissions are accounted for as leakage emissions;
f) The site of the anaerobic digester in the case of project activity that recovers and utilizes biogas for power/heat production and applies this methodology on a stand alone basis i.e. without using a Type III component of a SSC methodology.

~~B)~~D) **[Determination of the project boundary of AMS-I.D.]**

The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to [give the detail], which is the national grid of Peninsular of Malaysia .

[8] AMS-III.H, point 15

[9] AMS-III.H, point 16

~~C)~~E) [Determination of the project boundary of AMS-I.F.]

The project boundary is the spatial extent of the project boundary includes industrial, commercial facilities consuming energy generated by the system. In the case of electricity generated and supplied to distributed users (e.g. residential users) via mini/isolated grid(s) the project boundary may be confined to physical, geographical site of renewable generating units. The boundary also extends to the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to.

[Diagram of project boundary]

Figure [B.X]: Project Boundary with indicative metering points

The emission sources and type of GHG which are included or excluded within the project boundary are shown in the following table:

Table [B.X]: Emission Sources and Type of GHG

	Source	Gas	Included	Justification / Explanation
Baseline	Emissions due to electricity or fossil fuel used	CO_2	[Yes/No]	[Description]
		CH_4	No	Not significant. Excluded for simplification and conservativeness
		N_2O	No	Not significant. Excluded for simplification and conservativeness
	Emissions from wastewater treatment system	CO_2	No	Neutral CO_2 emissions from biomass decaying
		CH_4	Yes	Methane emissions from anaerobic treatment process
		N_2O	No	Not significant. Excluded for simplification and conservativeness
	Emissions due to treated wastewater discharged into river/lake/sea	CO_2	No	Neutral CO_2 emissions from biomass decaying
		CH_4	[Yes/No]	[Description]
		N_2O	No	Not significant. Excluded for simplification and conservativeness
	Emissions from the decay of the final sludge generated	CO_2	No	Neutral CO_2 emissions from biomass decaying
		CH_4	[Yes/No]	[Description]
		N_2O	No	Not significant. Excluded for simplification and conservativeness
	Emissions from electrical energy generation	CO_2	[Yes/No]	[Description]
		CH_4	No	Not significant. Excluded for simplification and conservativeness
		N_2O	No	Not significant. Excluded for simplification and conservativeness
~~Proj~~ ect Acti~~vity~~	Emissions from electricity and fuel	CO_2	[Yes/No]	[Description]
		CH_4	No	Not significant. Excluded for simplification and

	used by the project facilities			conservativeness
		N_2O	No	Not significant. Excluded for simplification and conservativeness
	Emissions from wastewater treatment systems affected by the project activity, without biogas recovery system	CO_2	No	Neutral CO_2 emissions from biomass decaying
		CH_4	[Yes/No]	[Description]
		N_2O	No	Not significant. Excluded for simplification and conservativeness
	Emissions due to treated wastewater discharged into river/lake/sea	CO_2	No	Neutral CO_2 emissions from biomass decaying
		CH_4	[Yes/No]	[Description]
		N_2O	No	Not significant. Excluded for simplification and conservativeness
	Emissions from the decay of the final sludge generated	CO_2	No	Neutral CO_2 emissions from biomass decaying
		CH_4	[Yes/No]	[Description]
		N_2O	No	Not significant. Excluded for simplification and conservativeness
	Emissions due to inefficiencies in capture systems	CO_2	No	Neutral CO_2 emissions from biomass decaying
		CH_4	[Yes/No]	[Description]
		N_2O	No	Not significant. Excluded for simplification and conservativeness
	Gas engine(s) (biogas combustion)	CO_2	No	Neutral CO_2 emissions from biogas combustion
		CH_4	No	Not significant and excluded from calculation. Biogas combustion efficiency is considered 100%[10]
		N_2O	No	Not significant. Excluded for simplification and conservativeness
	Biomass boilers (biogas combustion)	CO_2	No	Neutral CO_2 emissions from biogas combustion
		CH_4	No	Not significant and excluded from calculation. Biogas combustion efficiency is considered 100% in boiler[11].
		N_2O	No	Not significant. Excluded for simplification and conservativeness
	Enclosed/open flaring system	CO_2	No	Neutral CO_2 emissions from biogas combustion
		CH_4	Yes	CH_4 emissions due to incomplete combustion in enclosed / open flare
		N_2O	No	Not significant. Excluded for simplification and conservativeness
	Emissions from biomass stored under anaerobic conditions	CO_2	No	Neutral CO_2 emissions from biogas combustion
		CH_4	[Yes/No]	[Description]
		N_2O	No	Not significant. Excluded for simplification and conservativeness

[10] AMS-III.H, paragraph 35

[11] AMS-III.H, paragraph 35

The CPA is implemented at the address below:
[Address of the project activity]

The site is located at [State, Country] with GPS coordinates XX° YY' ZZ.ZZ" N/S, XX° YY' ZZ.ZZ" E/W, OR X.XXXX, Y.YYYY (refer also Section A.4.1.2) and thus is located within the geographical boundary of the PoA.

B.5. Emission reductions:

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

Data / Parameter:	**[**to be completed by CPA implementer]
Data unit:	
Description:	
Source of data used:	
Value applied:	
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

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

The *ex ante* emission reductions are calculated based on AMS-III.H., version 16 as per equations explained in section E.6.2. of PoA-DD, "Regional Biogas PoA". [The ex-ante calculation of emission reductions shown here are for Year [X] only].

Calculation for AMS-III.H

Baseline emissions:

Source of baseline emissions	**Reference**	**Applicable (Y/N)**	**Comments**
Wastewater and sludge treatment systems equipped with a biogas recovery facility shall be excluded from the baseline	AMS-III.H Point 17	[Y/N]	[Description]
Emissions on account of electricity or fossil fuel used ($BE_{power,y}$)	AMS-III.H Point 18 (i)	[Y/N]	[Description]
Methane emissions from baseline wastewater treatment systems ($BE_{ww,treatment,y}$)	AMS-III.H Point 18 (ii)	[Y/N]	[Description]
Methane emissions from baseline sludge treatment systems ($BE_{s,treatment,y}$)	AMS-III.H Point 18 (iii)	[Y/N]	[Description]

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 ($BE_{ww,discharge,y}$)	AMS-III.H Point 18 (iv)	[Y/N]	[Description]
Methane emissions from the decay of the final sludge generated by the baseline treatment systems ($BE_{s,final,y}$)	AMS-III.H Point 18 (v)	[Y/N]	[Description]

A) Calculation of baseline emissions:

$$BE_y = \{BE_{power,y} + BE_{ww,treatment,y} + BE_{s,treatment,y} + BE_{ww,discharge,y} + BE_{s,final,y}\}$$

Abbreviation	*Description*	*Value*	*Source*
BE_y	Baseline emissions in year *y* (tCO_{2e})		Calculated
$BE_{power,y}$	Baseline emissions of diesel genset in year *y*, tCO_{2e}/year		
$BE_{ww,treatment,y}$	Baseline emissions of the wastewater treatment systems, tCO_{2e}/year		
$BE_{s,treatment,y}$	Baseline emissions of the sludge treatment systems affected by the project activity in year *y*, tCO_{2e}/year		
$BE_{ww,discharge,y}$	The methane emissions from degradable organic carbon in treated wastewater discharged, tCO_{2e}/year		
$BE_{s,final,y}$	Baseline methane emissions from anaerobic decay of the final sludge produced in year *y*, tCO_{2e}/year		

A.1a) Baseline emissions

$$BE_{power,y} = E_{BL,y} * EF_{CO2}$$

Abbreviation	*Description*	*Value*	*Source*
$BE_{power,y}$	Baseline emissions on account of fossil fuel used in diesel genset (tCO_{2e}/year)		Calculated
$E_{BL,y}$	Annual energy baseline in year *y* (MWh)		Calculated
EF_{CO2}	CO_2 emission factor (tCO_2/MWh)		IPCC 2006 default value

A.1b) Baseline emissions

$BE_{power,y} = EC_{PJ,j,y} * EF_{grid,y}$			
Abbreviation	*Description*	*Value*	*Source*
$PE_{power,y}$	Baseline emissions from electricity consumption in the year *y* (tCO_{2e}/yr)		Calculated
$EC_{PJ,j,y}$	Power consumption from the grid when the mill is not operating (MWh / year)		
$EF_{grid,y}$	Grid Emission factor (tCO_2 / MWh)		

A.2) Baseline emissions			
$BE_{ww,treatment,y} = Q_{ww,y} *\{(COD_{inflow,1,y} * \eta_{COD,BL,1} * MCF_{ww,treatment,BL,1}) + (COD_{inflow,2,y} * \eta_{COD,BL,2} * MCF_{ww,treatment,BL,2})\} * B_{o,ww} * UF_{BL} * GWP_{CH4}$			
Abbreviation	*Description*	*Value*	*Source*
$BE_{ww,treatment,y}$	Baseline emissions of the wastewater treatment systems (tCO_{2e}/year)		Calculated
$Q_{ww,y}$	Volume of wastewater treated in baseline wastewater treatment system *i* in year *y* (m^3/year)		
$COD_{inflow,1,y}$	Chemical oxygen demand of the wastewater inflow to the baseline treatment system (anaerobic) in year *y* (tCOD / m^3)		
$\eta_{COD,BL,1}$	COD removal efficiency of the baseline treatment system (anaerobic) (%)		
$COD_{inflow,2,y}$	Chemical oxygen demand of the wastewater inflow to the baseline treatment system (aerobic) in year *y* (tCOD / m^3)		
$\eta_{COD,BL,2}$	COD removal efficiency of the baseline treatment system (aerobic) (%)		
$MCF_{ww,treatment,BL,1}$	Methane correction factor for baseline wastewater anaerobic treatment systems		
$MCF_{ww,treatment,BL,2}$	Methane correction factor for baseline wastewater aerobic treatment systems		
$B_{o,ww}$	Methane producing capacity of the wastewater (kg CH_4/kg COD)	0.25	IPCC 2006
UF_{BL}	Model correction factor to account for model uncertainties	0.89	Methodology AMS-III.H / FCCC/SBSTA/2003/10/Add .2, page 25
GWP_{CH4}	Global Warming Potential for methane	21	Methodology AMS-III.H / IPCC 2006 21 for the first commitment period. Shall be updated

			according to any future COP/MOP decisions

A.3) Methane emissions from baseline sludge treatment systems			
$\sum_j$ $BE_{s,treatment,y} = S_{j,BL,y} * MCF_{s,treatment,BL,j} * DOC_s * UF_{BL} * DOC_f * F * 16/12 * GWP_{CH4}$			
Abbreviation	*Description*	*Value*	*Source*
$S_{j,BL,y}$	Amount of dry matter in the sludge that would have been treated by the sludge treatment system *j* in the baseline scenario		Calculated
$MCF_{s,treatment,BL,j}$	Methane correction factor for the baseline sludge treatment system *j* (MCF values as per Table III.H.1)		
DOC_s	Degradable organic content of the untreated sludge generated in the year *y* (fraction, dry basis). Default values of 0.5 for domestic sludge and 0.257 for industrial sludge shall be used		
UF_{BL}	Model correction factor to account for model uncertainties	0.89	Methodology AMS-III.H / FCCC/SBSTA/2003/10/Add .2, page 25
DOC_f	Fraction of DOC dissimilated to biogas	0.5	IPCC 2006
F	Fraction of CH_4 in biogas	0.5	IPCC 2006
GWP_{CH4}	Global Warming Potential for methane	21	

A.4) The methane emissions from degradable organic carbon in treated wastewater discharged			
$BE_{ww,discharge,y} = Q_{ww,y} * GWP_{CH4} * B_{o,ww} * UF_{BL} * COD_{ww,discharge,BL,y} * MCF_{ww,BL,discharge}$			
Abbreviation	*Description*	*Value*	*Source*
$BE_{ww,discharge,y}$	The methane emissions from degradable organic carbon in treated wastewater discharged (tCO_{2e}/year)		Calculated
$Q_{ww,y}$	Volume of treated wastewater discharged in year *y* (m^3/year)		
GWP_{CH4}	Global warming potential of methane	21	IPCC 2006
$B_{o,ww}$	Methane producing capacity of the treated wastewater ($kgCH_4$ / kgCOD)	0.25	IPCC 2006
UF_{BL}	Model correction factor to account for model uncertainties	0.89	Methodology AMS-III.H / FCCC/SBSTA/2003/10/Add .2, page 25
$COD_{ww,discharge,BL,y}$	Chemical oxygen demand of the treated wastewater discharged into sea, river or		

	lake in the baseline situation in the year *y* (tonnes/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)		

A.5) Methane emissions from the decay of the final sludge generated by the baseline treatment systems			
$\boldsymbol{BE_{s,final,y} = S_{final,BL,y} * DOC_s * UF_{BL} * MCF_{s,BL,final} * DOC_f * F * 16/12 * GWP_{CH4}}$			
Abbreviation	*Description*	*Value*	*Source*
$S_{final,BL,y}$	Amount of dry matter in the final sludge generated by the baseline wastewater treatment systems in the year *y*. 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 5.		Calculated
$MCF_{s,BL,final}$	Methane correction factor of the disposal site that receives the final sludge in the baseline situation, estimated as per the procedures described in the "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site".		
DOC_s	Degradable organic content of the untreated sludge generated in the year *y* (fraction, dry basis). Default values of 0.5 for domestic sludge and 0.257 for industrial sludge9 shall be used		
DOC_f	Fraction of DOC dissimilated to biogas	0.5	IPCC 2006
F	Fraction of CH_4 in biogas	0.5	IPCC 2006
UF_{BL}	Model correction factor to account for model uncertainties	0.89	Methodology AMS-III.H / FCCC/SBSTA/2003/10/Add .2, page 25
GWP_{CH4}	Global Warming Potential for methane	21	Methodology AMS-III.H / IPCC 2006 21 for the first commitment period. Shall be updated according to any future

			COP/MOP decisions

Project activity emissions:

The project activity emission sources as per the methodology and their relevance with respect to the proposed CDM project activity are given below in a tabular format:

Source of project activity emission	Reference	Applicable (Y/N)	Comments
CO_2 emissions on account of power and fossil fuel used by the project activity facilities ($PE_{power,y}$)	AMS-III.H, point 29(i)	[Y/N]	[Description]
Methane emissions from wastewater treatment systems affected by the project activity, and not equipped with biogas recovery in the project situation ($PE_{ww,treatment,y}$)	AMS-III.H, point 29 (ii)	[Y/N]	[Description]
Methane emissions from sludge treatment systems affected by the project activity, and not equipped with biogas recovery in the project situation ($PE_{s,treatment,y}$)	AMS-III.H, point 29 (iii)	[Y/N]	[Description]
Methane emissions on account of inefficiency of the project activity wastewater treatment systems and presence of degradable organic carbon in treated wastewater ($PE_{ww,discharge,y}$)	AMS-III.H, point 29 (iv)	[Y/N]	[Description]
Methane emissions from the decay of the final sludge generated by the project activity treatment systems ($PE_{s,final,y}$)	AMS-III.H, point 29 (v)	[Y/N]	[Description]
Methane fugitive emissions on account of inefficiencies in capture systems ($PE_{fugitive,y}$)	AMS-III.H, point 29 (vi)	[Y/N]	[Description]
		[Y/N]	[Description]
Methane emissions due to incomplete flaring ($PE_{flaring,y}$)	AMS-III.H, point 29 (vii)	[Y/N]	[Description]
Methane emissions from biomass stored under anaerobic conditions which	AMS-III.H, point 29 (viii)	[Y/N]	[Description]

does not take place in the baseline situation ($PE_{biomass,y}$)			

B) Calculation of project emissions:

$$PE_y = PE_{power,y} + PE_{ww,treatment,y} + PE_{s,treatment,y} + PE_{ww\ discharge,\ y} + PE_{s,final,y} + PE_{fugitive,\ y} + PE_{biomass,y} + PE_{flaring,\ y}$$

Abbreviation	*Description*	*Value*	*Source*
PE_y	Project activity emissions in the year *y* (tCO_{2e}/yr)		
$PE_{power,y}$	CO_2 emissions on account of power used by the project activity facilities (tCO_{2e}/yr)		
$PE_{ww,treatment,y}$	Methane emissions from wastewater treatment systems affected by the project activity, and not equipped with biogas recovery, in year *y* (tCO_{2e}/yr)		
$PE_{s,treatment,y}$	Methane emissions from sludge treatment systems affected by the project activity, and not equipped with biogas recovery, in year *y* (tCO_{2e}/yr)		
$PE_{ww,discharge,y}$	Methane emissions on account of inefficiency of the project activity wastewater treatment systems and presence of degradable organic carbon in treated wastewater (tCO_{2e}/yr)		
$PE_{s,final,y}$	Methane emissions from anaerobic decay of the final sludge produced in year *y* (tCO_{2e}/yr)		
$PE_{fugitive,y}$	Methane fugitive emissions on account of inefficiencies in capture systems (tCO_{2e}/yr)		
$PE_{biomass,y}$	Methane emissions from biomass stored under anaerobic conditions which would not have occurred in the baseline situation (tCO_{2e}/yr)		
$PE_{flaring,y}$	Methane emissions due to incomplete flaring (tCO_{2e}/yr)		

B.1) Project emissions from CO_2 emissions on account of power and fuel used by the project activity facilities in year "y" in tCO_{2e}/year			
$PE_{power,y} = EC_{PJ,j,y} * EF_{grid,y}$			
Abbreviation	Description	Value	Source
$PE_{power,y}$	Project emissions from electricity consumption in the year *y* (tCO_{2e}/yr)		Calculated
$EC_{PJ,j,y}$	Power consumption from the grid (MWh / year)		
$EF_{grid,y}$	Grid Emission factor (tCO_2 / MWh)		

B.2) Methane emissions from wastewater treatment systems affected by the project activity, and not equipped with biogas recovery in the project situation in year "y" in tCO_{2e}			
$PE_{ww,treatment,y} = Q_{ww,k,y} * COD_{inflow,k,y} * \eta_{PJ,k,y} * MCF_{ww,treatment,PJ,k}) * B_{o,ww} * UF_{PJ} * GWP_{CH4}$			
Abbreviation	*Description*	*Value*	*Source*
$PE_{ww,treatment,y}$	Methane emissions from wastewater treatment systems affected by the project activity, and not equipped with biogas recovery in the project situation (tCO_{2e}/yr)		Calculated
$Q_{ww,k,y}$	Volume of wastewater treated in project activity wastewater treatment system *k* in year *y* (m^3/year)		
$COD_{inflow,k,y}$	Chemical oxygen demand of the wastewater inflow to the project activity treatment system *k* in year *y* (tonnes COD / m^3)		
$\eta_{PJ,k,y}$	Chemical oxygen demand removal efficiency of the project wastewater treatment system *k* in year *y* (t/m3), measured based on inflow COD and outflow COD in system *k*		
$MCF_{ww,treatment,PJ,k,}$	Methane correction factor for project wastewater treatment system *k* (MCF values as per table III.H.1.)		
$B_{o,ww}$	Methane generation capacity of the treated wastewater (kg CH_4/kg COD)	0.25	IPCC 2006
UF_{PJ}	Model correction factor to account for model uncertainties	1.12	IPCC 2006

GWP_{CH4}	Global warming potential of methane	21	IPCC 2006

B.3) Methane emissions from sludge treatment systems affected by the project activity, and not equipped with biogas recovery, in year "y" in tCO_{2e}

$$PE_{s,treatment,y} = S_{l,PJ,y} * MCF_{s,treatment,l} * DOC_s * UF_{PJ} * DOC_f * F * 16/12 * GWP_{CH4}$$

Abbreviation	*Description*	*Value*	*Source*
$PE_{ww,treatment,y}$	Methane emissions from wastewater treatment systems affected by the project activity, and not equipped with biogas recovery in the project situation (tCO_{2e}/yr)		Calculated
$S_{l,PJ,y}$	Amount of dry matter in the sludge treated by the sludge treatment system *l* in the project scenario in year *y* (mt/yr)		
$MCF_{s,treatment,l}$	Methane correction factor for the project sludge treatment system *l* (MCF values as per Table III.H.1)		
DOC_s	Degradable organic content of the untreated sludge generated in the year *y* (fraction, dry basis). Default values of 0.5 for domestic sludge and 0.257 for industrial sludge9 shall be used		
UF_{PJ}	Model correction factor to account for model uncertainties	1.12	IPCC 2006
DOC_f	Fraction of DOC dissimilated to biogas	0.5	IPCC 2006
F	Fraction of CH_4 in biogas	0.5	IPCC 2006
GWP_{CH4}	Global Warming Potential for methane	21	IPCC 2006

B.4) Methane emissions on account of inefficiency of the project activity wastewater treatment systems and presence of degradable organic carbon in treated wastewater in the year "*y*" (tonnes)

$$PE_{s,final,y} = S_{final,PJ,y} * DOC_s * UF_{PJ} * MCF_{s,PJ,final} * DOC_F * F * 16/12 * GWP_{CH4}$$

Abbreviation	*Description*	*Value*	*Source*
$PE_{ww,discharge,y}$	Methane emissions from degradable organic carbon in treated wastewater (tCO_{2e}/yr)		Calculated
$Q_{ww,y}$	Quantity of wastewater treated in year *y* (m^3/year)		
$COD_{ww,discharged,PJ,y}$	Chemical oxygen demand of the treated		

	wastewater discharged into river in the project situation in year *y* (tCOD / m^3)		
$MCF_{ww,PJ\ discharge}$	Methane correction factor based on discharge pathway in the project situation (river) of the wastewater (fraction)		
$B_{o,ww}$	Methane generation capacity of the treated wastewater (kg CH_4/kg COD)	0.25	IPCC 2006
UF_{PJ}	Model correction factor to account for model uncertainties	1.12	IPCC 2006
GWP_{CH4}	Global warming potential of methane	21	IPCC 2006

B.5) Methane emissions from anaerobic decay of the final sludge produced in year *y* (tCO_{2e}/yr)			
$\boldsymbol{PE_{s,final,y} = S_{final,PJ,y} * DOC_s * UF_{PJ} * MCF_{s,PJ,final} * DOC_F * F * 16/12 * GWP_{CH4}}$			
Abbreviation	*Description*	*Value*	*Source*
$PE_{s,final,y}$	Methane emissions from anaerobic decay of the final sludge produced in year *y* (tCO_{2e}/yr)		Calculated
$S_{final,PJ,y}$	Amount of dry matter in final sludge generated by the project wastewater treatment systems in the year *y*		
$MCF_{s,PJ,final}$	Methane correction factor of the disposal site that receives the final sludge in the project situation, estimated as per the procedures described in the "*Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site*".		
DOC_s	Degradable organic content of the untreated sludge generated in the year *y* (fraction, dry basis). Default values of 0.5 for domestic sludge and 0.257 for industrial sludge9 shall be used		
DOC_F	Fraction of DOC dissimilated to biogas	0.5	IPCC 2006
F	Fraction of CH_4 in biogas	0.5	IPCC 2006
UF_{PJ}	Model correction factor to account for model uncertainties	1.12	IPCC 2006
GWP_{CH4}	Global Warming Potential for methane	21	IPCC 2006

B.6.1) Methane fugitive emissions on account of inefficiencies in capture systems in the year "*y*" (tonnes)			
$PE_{fugitive,ww,y} = (1 - CFE_{ww}) * MEP_{y,ww,treatment} * GWP_{CH4}$			
Abbreviation	*Description*	*Value*	*Source*
$PE_{fugitive,y}$	Methane fugitive emissions on account of inefficiencies in capture systems (tCO_{2e}/yr)		Calculated
CFE_{ww}	Capture efficiency of the biogas recovery equipment in the wastewater treatment systems	0.9	AMS-III.H, Version 16
$MEP_{y,ww,treatment}$	Methane emission potential of wastewater treatment systems equipped with biogas recovery system in year *y* (tCH_4/yr)		Refer Equation 11 of AMS-III.H, version 16
GWP_{CH4}	Global warming potential of methane	21	IPCC 2006

B.6.2) Methane emission potential of wastewater treatment plant in the year "*y*" (tonnes)			
$MEP_{ww,treatment,y} = Q_{ww,y} * B_{o,ww} * UF_{PJ} * (COD_{removed,PJ,k,y} * MCF_{ww,treatment,PJ,k})$			
Abbreviation	*Description*	*Value*	*Source*
$MEP_{ww,treatment,y}$	Methane emission potential of wastewater treatment systems equipped with biogas recovery system in year *y* (tonnes CH_4/yr)		Calculated
$Q_{y,ww}$	Quantity of wastewater treated in year *y* (m^3/year)		
$B_{o,ww}$	Methane generation capacity of the treated wastewater (kg CH_4/kg COD)	0.25	IPCC 2006
$COD_{removed,PJ,y}$	The chemical oxygen demand removed by the treatment anaerobic system of the project activity equipped with biogas recovery in the year *y* (tCOD / m^3)		
$MCF_{ww,treatment,PJ}$	Methane correction factor for the project wastewater treatment system *k* equipped with biogas recovery equipment		
UF_{PJ}	Model correction factor to account for model uncertainties	1.12	IPCC 2006

B.6.3) Methane fugitive emissions on account of inefficiencies in capture systems (sludge treatment system) in the year "*y*" (tonnes)			
$PE_{fugitive,s,y} = (1 - CFE_s) * MEP_{s,treatment,y} * GWP_{CH4}$			
Abbreviation	*Description*	*Value*	*Source*

$PE_{fugitive,s,y}$	Methane fugitive emissions on account of inefficiencies in capture systems (tCO_{2e}/yr)		Calculated
CFE_s	Capture efficiency of the biogas recovery equipment in the sludge treatment systems	0.9	AMS-III.H, Version 16
$MEP_{ww,treatment,y}$	Methane emission potential of sludge treatment systems equipped with a biogas recovery system in year *y* (tonnes CH_4/yr)		Refer Equation 11 of AMS-III.H, version 16
GWP_{CH4}	Global warming potential of methane	21	IPCC 2006

B.6.4) Methane emission potential of sludge treatment plant in the year "*y*" (tonnes)

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

Abbreviation	*Description*	*Value*	*Source*
$MEP_{s,treatment,y}$	Methane emission potential of sludge treatment systems equipped with biogas recovery system in year *y* (tonnes CH_4/yr)		Calculated
$S_{l,PJ,y}$	Amount of sludge treated in the project sludge treatment system *l* equipped with a biogas recovery system (on a dry basis) in year *y*		
$MCF_{s,treatment,PJ,l}$	Methane correction factor for the sludge treatment system equipped with biogas recovery equipment (MCF values as per Table III.H.1)		
DOC_s	Degradable organic content of the untreated sludge generated in the year *y* (fraction, dry basis). Default values of 0.5 for domestic sludge and 0.257 for industrial sludge9 shall be used		
UF_{PJ}	Model correction factor to account for model uncertainties	1.12	
DOC_F	Fraction of DOC dissimilated to biogas	0.5	IPCC 2006
F	Fraction of CH_4 in biogas	0.5	IPCC 2006

For $PE_{biomass,y}$, will be determined by using "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site" if storage of biomass under anaerobic conditions takes place in the project and does not occur in the baseline.

B.7) Methane emissions due to incomplete flaring in the year "*y*" (tonnes)

$$PE_{flaring,y} = TM_{flared,y} * (1 - \eta_{flare,y}) * GWP_{CH4}$$

Abbreviation	*Description*	*Value*	*Source*
$PE_{flaring,y}$	Methane emissions due to incomplete flaring (tCO_{2e}/yr)		Calculated
$TM_{flared,h}$	Mass flow rate of methane flared in dry basis in the hour, *h* (tCH_4 / yr)		Calculated
$\eta_{flare,y}$	Flare efficiency in hour, *h* based on default values.		Tools for methane flaring
GWP_{CH4}	Global warming potential of methane	21	IPCC 2006

Leakage emissions:

No leakage emission will occur in the project activity since the technology to be installed is not using equipment transferred from another activity.

→**$LE_{y,1}$ = [X]**

Emission reductions:

$ER_{y, ex\ ante} = BE_{y, ex\ ante} - (PE_{y, ex\ ante} + LE_{y, ex\ ante})$			
Abbreviation	*Description*	*Value*	*Source*
$ER_{y1, ex\ ante}$	*Ex ante* emission reduction in year *y* (tCO_{2e})		
$BE_{y1, ex\ ante}$	*Ex ante* baseline emissions in year *y* (tCO_{2e})		
$PE_{y1, ex\ ante}$	*Ex ante* project emissions in year *y* (tCO_{2e})		
$LE_{y1, ex\ ante}$	*Ex ante* Leakage emissions in year *y* (tCO_{2e})		

[Description of relevant Type-I methodologies if applicable]

[Calculation for AMS-I.D]

Baseline emissions:

Electricity generated from biogas engines will be exported to [description]. The baseline emissions are described in AMS-I.D. (Version 17, EB 61) as the "product of electrical energy baseline expressed in MWh of electricity produced by the renewable energy generating unit multiplied by an emission factor".

Baseline emissions due to electricity exported to the grid in the year "*y*" (tonnes)			
$BE_{EG,y} = EG_{BL,y} * EF_{CO2,grid,y}$			
Abbreviation	*Description*	*Value*	*Source*
$BE_{EG,y}$	Baseline emissions in year *y* (tCO_{2e}/yr)		Calculated
$EG_{BL,y}$	Quantity of net electricity supplied to the grid as a result of the implementation of the project activity in year y (MWh / yr)		Calculated
$EF_{CO2,grid,y}$	CO_2 emission factor of the grid in year (tCO_2/MWh)		

Project Activity Emissions

As per AMS-I.D. (Version 17, EB 61) project emissions for renewable energy project activities are zero.

$PE_{EG,y} = 0$

Leakage
If the energy generating equipment is transferred from another activity, leakage is to be considered.

No leakage emission will occur in the project activity since the technology to be installed is not using equipment transferred from another activity. **→$LE_y = 0$**

Emission reductions:

$ER_y = BE_y – PE_y - LE_y$			
Abbreviation	*Description*	*Value*	*Source*
ER_y	Emission reduction in year *y* (tCO_{2e}/y)		
BE_y	Baseline emissions in year *y* (tCO_{2e}/y)		
PE_y	Project emissions in year *y* (tCO_{2e}/y)		
LE_y	Leakage emissions in year *y* (tCO_{2e}/y)		

[Calculation for AMS-I.F]

Baseline emissions:

Baseline emissions for other systems are the product of amount electricity displaced with the electricity produced by the renewable generating unit and an emission factor.

For a mini-grid system where all generators use exclusively fuel oil and/or diesel fuel, the baseline emissions is the annual electricity generated by the renewable energy unit times an emission factor for a modern diesel generating unit of the relevant capacity operating at optimal load as per Table I.F.1.

Baseline emissions			
$\boldsymbol{BE_{EG,y} = EG_{BL,y} * EF_{CO2,y}}$			
Abbreviation	*Description*	*Value*	*Source*
$BE_{EG,y}$	Baseline emissions in year *y* (tCO_{2e}/yr)		Calculated
$EG_{BL,y}$	Quantity of net electricity displaced as a result of the implementation of the CDM project activity in year *y* (MWh / yr)		Calculated
$EF_{CO2,grid,y}$	CO_2 emission factor (tCO_2/MWh)		

Project Activity Emissions

As per AMS-I.F. (Version 02, EB 61) project emissions for renewable energy project activities are zero.

$PE_{EG,y} = 0$

Leakage
If the energy generating equipment is transferred from another activity, leakage is to be considered.

No leakage emission will occur in the project activity since the technology to be installed is not using equipment transferred from another activity. **→$LE_y = 0$**

Emission reductions:

$\boldsymbol{ER_y = BE_y – PE_y - LE_y}$			
Abbreviation	*Description*	*Value*	*Source*
ER_y	Emission reduction in year *y* (tCO_{2e}/y)		
BE_y	Baseline emissions in year *y* (tCO_{2e}/y)		
PE_y	Project emissions in year *y* (tCO_{2e}/y)		
LE_y	Leakage emissions in year *y* (tCO_{2e}/y)		

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

Year	Estimation of project activity emissions (tCO_{2e})	Estimation of baseline emissions (tCO_{2e})	Estimation of leakage (tCO_{2e})	Estimation of overall emission reductions (tCO_{2e})
[YYYY]				
[YYYY]				
[YYYY]				
[YYYY]				
[YYYY]				
[YYYY]				
[YYYY]				
[YYYY]				
[YYYY]				
[YYYY				
Total (tCO_2)				

B.6. Application of the monitoring methodology and description of the monitoring plan:

B.6.1. Description of the monitoring plan:

The parameters to be monitored are listed below and the Source of Data is ex-ante values currently applied for CERs estimation and shall be monitored ex-post during the crediting period:

Please note that the amount of methane recovered and fuelled or flared (MD_y) is calculated as follows:

$MD_y = TM_{fuelled,y} + TM_{flared,y}$		**Equation A**
Where	*Description*	*Units*
MD_y	Quantity of methane recovered and fuelled or flared in the year *y*	tonnes CH_4/year
$TM_{fuelled,y}$	Quantity of methane fuelled in the year *y*	tonnes CH_4/year
$TM_{flared,y}$	Quantity of methane flared in year *y*	tonnes CH_4/year

Where:

$TM_{fuelled,y} = \sum_{h=1}^{8,760} (FV_{fuelled,h} * fv_{CH4,h} * \eta_{fuelled,h} * \rho_{CH4,n}) / 1,000$		**Equation B**
Where	*Description*	*Units*
$TM_{fuelled,y}$	Quantity of methane fuelled in the year *y*	tonnes CH_4/year

$FV_{fuelled,h}$	Volumetric flow rate of the fuelled biogas gas at normal conditions in hour *h*	Nm^3 biogas/hour
$\eta_{fuelled,h}$	100% for gainful purpose[12]	%
$fv_{CH4,h}$	Volumetric fraction of methane in the biogas gas in the hour *h*	%
$\rho_{CH4,n}$	Density of methane at normal conditions	$kgCH_4/Nm^3CH_4$

And;

$TM_{flared,y} = \sum_{h=1}^{8,760} (FV_{flared,h} * fv_{CH4,h} * \eta_{flare,h} * \rho_{CH4,n}) / 1,000$		**Equation C**
Where	*Description*	*Units*
$TM_{flared,y}$	Quantity of methane flared in year *y*	tonnes CH_4/year
$FV_{flared,h}$	Volumetric flow rate of the flared biogas gas at normal conditions in hour *h*	Nm^3 biogas/hour
$\eta_{flare,h}$	Flare efficiency in the hour *h*	%
$fv_{CH4,h}$	Volumetric fraction of methane in the biogas gas in the hour *h*	%
$\rho_{CH4,n}$	Density of methane at normal conditions	$kgCH_4/Nm^3CH_4$

Data / Parameter:	[to be completed by CPA implementer]
Data unit:	
Description:	
Source of data:	
Value of data	
Brief description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied (if any):	
Any comment:	

A final monitoring plan will be prepared prior the initial verification based on the as-built project activity. It will address the following aspects:

Obligations of the CME

The CME is responsible for the development and implementation of the management and operational system for this CPA and will meet the requirements of the Monitoring Plan (MP). The monitoring plan details the necessary actions to monitor and record all the data parameters required by the applied methodology for the CPA. It will describe the management systems and procedures to be implemented by CME upon implementation of the CPA. Monitoring will be carried out by the site operators (or any third party, as relevant) at the site and CME will ensure consistency in monitoring, processing and reporting of

[12] AMS-III.H. point 35

data required for the calculation of emission reductions achieved by the CPA. The CME will act as overall supervisor of the CPA implementer and will carry out data checking of the monitored data by the CPA implementer, analyzing and preparing a monitoring report.

The CME will be in charge of communication with DOE during the verification. The CME may appoint a CDM consultant or any third party, as relevant, to perform the verification. The CPA implementer will be responsible for implementing appropriate operation and maintenance procedures to ensure the monitoring equipment meet the CDM requirements and to submit a periodic report on the monitored parameters to CME.

MONITORING PARAMETERS

The parameters to be monitored are described in the tables above.

DATA LOGGING AND STORAGE

The data measured by the instruments will be collected and stored in a data logging system. The data will be retrieved remotely by modem or directly on site.

If data cannot be retrieved, no emissions reductions will be claimed for the period of data failure. The data collected will be recorded in a central data base. Access to production data will be restricted. All records and data (hard copy and soft copy) will be archived up to two years after the end of the crediting period or the last issuance of CERs for this project activity whichever occurs later.

CALIBRATION AND MAINTENANCE PROCEDURES, MALFUNCTION OF EQUIPMENT

Maintenance includes all preventive and corrective actions necessary for the good functioning of the equipment, such as:

- Visual control of the equipment state and real-time check of displayed parameters,
- Cleaning up the equipment and the sensors,
- Adding lubricant,
- Replacement and change of defective parts.

Calibration of equipment consists in verifying, by comparison with a standard, the accuracy of a measuring instrument.

Measuring instruments will be periodically and appropriately calibrated according to the procedures, timing and methods recommended by the manufacturer, or national/international standards, as available.

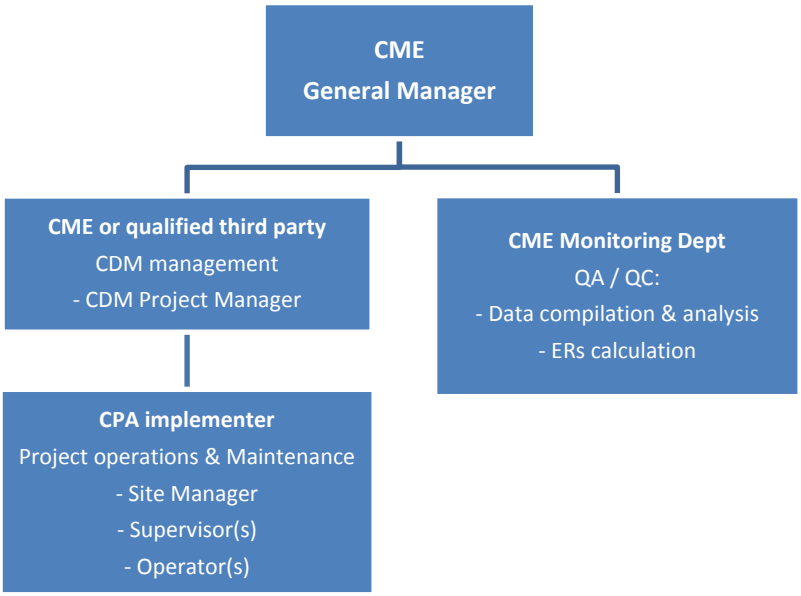
General malfunction of equipment:
Daily inspections of the equipment will allow controlling equipment failure. If equipment fails, the supplier will be notified and repairs will be carried out. If the damaged equipment cannot be repaired, it will be replaced at the earliest. In some cases, portable tools will be used in order to carry out daily monitoring of the missing parameter(s). In such case, this data will be recorded manually.

Discrepancies:
To avoid discrepancies between projected data in the PDD and actual data (e.g. due to deferred starting date, malfunction of equipment), cross-checks between internal meter readings and external sources (e.g. electricity invoices) will be carried out. Any source of inconsistencies will be clarified.

Case of emergency:
For the case of emergency (earthquakes, explosions, fires etc.), an emergency preparedness plan will be adapted to the project activity. All employees involved in the project on-site will be trained in the code of conduct and required actions at time of commissioning of the plant.

OPERATIONAL AND MANAGEMENT STRUCTURE

The CDM monitoring team will be composed by the following staff:



ROLES AND RESPONSIBILITIES OF PERSONNEL

The allocation of responsibility to ensure compliance with the monitoring requirement of the methodology is proposed here below (optimization will be performed during operation):

#	Tasks description	Operator	Supervisor	Site Manager	CDM Project Manager	Monitoring Department
Monitoring activity						
1	Recording of data					
Quality Assurance & Quality Control						
2	Identification of non-conformities					

3	Ensuring adequate training of staff					
4	Ensuring adequate maintenance					
5	Ensuring calibration of monitoring instruments					
6	Data archiving: ensuring adequate storage of data monitored (integrity and backup)					
7.	Monitoring plan improvement					
8	Emergency procedures (e.g. missing data)					
9	External audit					
Calculation of GHG emission reductions and reporting						
10	Processing of data and calculation of emission reductions					
11	Monitoring report: management review of monitoring report (internal audit)					

TRAINING OF MONITORING PERSONNEL

The maintenance will be conducted in-house by staff employed and trained by the Project Participants. Employees involved in the monitoring will be trained internally and/or externally. Training may include *inter alia*:

a) Review of equipment and captors
b) Calibration requirement
c) Configuration of monitoring equipment

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.

Individual CPAs under this PoA will be implemented at different geographical locations and involve different type of technologies. Environmental analysis therefore is to be conducted at individual CPA level.

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

[Description]

The project activity is actually an environmental improvement project which will reduce local pollution resulting from the uncontrolled emission of methane and will also contribute in abatement of global warming through reduction in greenhouse gas emissions. The positive effects of the project activity on key environmental parameters are briefly described below.

Positive environmental impact:

Environmental Impact	Affected Means	Value of the impact	Comments
Contributes to the generation of employment	Socio-economic, generation of employment.		
Reduction on GHGs	Atmosphere, quality of the air		
Improvement of the quality of life of the population	Socio-economic		

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:

[Description on host country's requirements]

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 CPA level. In this case sections D.2. to D.4. need not be completed in this form.

Stakeholder consultation will be undertaken at the CPA level and for each CPA so as to ensure that a wider group of stakeholders is reached since each CPA affects different geographical positions and different groups of stakeholders.

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

The stakeholders' meeting was conducted at the [location/address] on [DD/MM/YYYY]. There were [XX] stakeholders attending the consultation. [Posters/advertisement/invitation letters] were [methods of inviting/newspaper/etc] [XX] days before the stakeholder consultation to inform the locals stakeholders.

[Description on the organization/individual/NGOs/government departments/etc who attended the meeting].

During the meeting, presentations were made by the project owner to outline the proposed project activity in a non-technical manner (including environmental, social and technological considerations), climate change, and the role of the CDM. Attendees were given opportunity to raise their concern and opinion about the proposed project activity during the question and answer session.

[Photos during stakeholder consultation]

D.3. Summary of the comments received:

Below are the questions raised during the stakeholders' meeting:

NAME	QUESTION

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

Below are the answers to the questions asked during the stakeholder meeting:

QUESTION	ANSWER

Annex 1

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

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

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

[Description, if any]

Annex 3

BASELINE INFORMATION

[Description, if any]

Annex 4

MONITORING INFORMATION

[Description, if any]