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

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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:

>>
[Project title] (CPA No.xxx)
Version: [xx]
Date of completion: dd/mm/yyyy

Version of the generic CPA template: 3
Date of completion: 31/05/2012

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

>>
[Composting technology] at [Mills location], hereafter referred as Project Activity, is a small-scale CDM programme activity (CPA) involving the installation and operation of a [Composting technology] plant at PT [Company name] Crude Palm Oil Mill (Mill Facility). The Project Activity will be constructed at the mill facility which has capacity to process Fresh Fruit Bunches (FFB) of [FFB processing capacity] tons/hour. The Project Activity is located at [Region], [Province] Province, Indonesia.

In the process of producing CPO, the mill facility has four types of waste: Empty Fruit Bunches (EFB), fibers, palm kernel shells (PKS), and liquid waste known as palm oil mill effluent (POME). While fiber and a proportion of PKS is used as fuel for the mill boilers to generate heat and electricity for the whole plant, the EFBs are discharged as waste and left to decay in an unmanaged dumpsite. POME is treated in a series of open air anaerobic and aerobic ponds before being discharged into a local waterway.

The Project Activity utilizes both EFB and POME for the co-composting process, and the output of the co-composting process is organic compost which will be [final compost product proposal]. Therefore the Project Activity will reduce the methane emissions from anaerobic digestion of POME treatment by avoiding the current open air anaerobic wastewater treatment method. Moreover it will also avoid methane emissions from the EFB solid waste that is currently disposed off and left to decay in unmanaged solid waste disposal sites situated in the oil palm plantation area..

[Composting technology additional short information]

Contribution to Sustainable Development

[Company short introduction]

Furthermore, the Project Activity will have a positive contribution to the Sustainable Development of Indonesia as defined by the Designated National Authority which is listed in the PoA-DD section A.2.

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

>>
[Company name] is responsible entity for the small-scale CPA.

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

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

>>
The technology used in the Project Activity is an [short description of composting technology]

How will the system ensure the aerobic conditions in the compost?

[Description on how the composting technology ensures the aerobic condition]

How does the system ensure that there is no run off or leakage?

[Description on how the composting technology ensures no run off or leakage]

The [Composting technology] **Process:**

[Description in detail on how the composting technology produces final compost]

A.4.1.1. Host Party:

>>
Republic of Indonesia

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

>>
The Project Activity is located at [name of mill] crude palm oil mill, [name of village] village, [name of district] district, [name of regency] regency, and [name of province] province, Indonesia. The project location is about [xx] hours from [name of city near the project location] city and has geographical location of [xx]°[xx]' [xx]. [xx]"- [xx]°[xx]' [xx]. [xx]" E and [xx]°[xx]' [xx]. [xx]" - [xx]°[xx]' [xx]. [xx]" N.

The map of the project location is shown in following figure[3]:

[3] Source from http://maps.google.co.id/

[Project map location]

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

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

>>
[DD/MM/YYYY]

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

>>
[xx] years

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

[Renewable or fix] crediting period

A.4.3.1. Starting date of the crediting period:

>>
[DD/MM/YYYY] or registration date, whichever is later

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

>>
This CPA is the [subsequent -1st/2nd /3rd] CPA under PoA named Co-composting Programme of Activities in Indonesia; therefore the length of crediting period [renewable /3x7 years/21 years or fix 10 years] is below than the length of the PoA (28 years).

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

>>

Compost product generated by the Project Activity is expected to be [xx,xxx] ton/year. This might be achieved through utilization of [xx,xxx] ton EFB and [xx,xxx] m^3 POME per year, therefore the Project Activity would have emission reductions of approximately [xx,xxx] ton CO_2 per year by avoiding the emissions of methane to the atmosphere from organic matter that would have otherwise been left to decay anaerobically in a solid waste (EFB) disposal site including the wastewater (POME) treatment. The total GHG emission reductions over the first crediting period are estimated of [xxx,xxx] ton CO_2.

Annual emission reduction is listed in table below:

Year	Estimation of annual emissions reductions in tones of CO_2
[YYYY]	[xx,xxx]
[YYYY]	[xx,xxx]
[YYYY]	[xx,xxx]
[YYYY]	[xx,xxx]
[YYYY]	[xx,xxx]
[YYYY]	[xx,xxx]
[YYYY]	[xx,xxx]
Total reductions over the crediting period (tons CO_2)	[xxx,xxx]
Annual average of the estimated reductions over the crediting period (tons CO_2)	[xx,xxx]

A.4.5. Public funding of the CPA:

>>
No public funding is involved in the Project Activity.

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

>>
As per EB 54 annex 13, following information demonstrate that the proposed Project Activity is not a debundled component of a large scale activity as there are no Activities:

1. that have 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 technology/measure, and;.
2. which are within 1 km from the proposed small-scale CPA, at the closest point.

Moreover, as per PoA section A.4.4.1, PT [Company name] has released a certificate in writing to inform that the proposed CPA is not a debundled part of a bigger project.

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 proposed Project Activity is not registered as an individual CDM project and is not part of another registered PoA. In addition as per the PoA-DD section A.4.4.1, PT [Company name] have certified in writing that the Project Activity is not and will not be registered as an individual CDM project, nor be included within another PoA.

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

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

>>

Co-composting and Composting Program of Activities for Palm Oil Mills in Indonesia

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

>>

No	Criteria of technology/measure under approved methodology AMS-III.F version 10	Project Description
1.	This methodology comprises measures to avoid the emissions of methane to the atmosphere from biomass or other organic matter that would have otherwise been left to decay anaerobically in a solid waste disposal site (SWDS), or in an animal waste management system (AWMS), or in a wastewater treatment system (WWTS). In the Project Activity, controlled aerobic treatment by composting of biomass is introduced.	Project Activity will utilize solid waste (EFB) and wastewater (POME) for co-composting process.
2.	The Project Activity does not recover or combust landfill gas from the disposal site (unlike AMS-III.G "Landfill methane recovery"), and does not undertake controlled combustion of the waste that is not treated biologically in a first step (unlike AMS-III.E "Avoidance of methane production from decay of biomass through controlled combustion, gasification or mechanical/thermal treatment"). Project activities that recover biogas from wastewater treatment shall use methodology AMS-III.H "Methane recovery in wastewater treatment". Project activities involving co-digestion of organic matters shall apply methodology AMS-III.AO "Methane recovery through controlled anaerobic digestion".	Project Activity, which is the co-composting process, belongs neither to one of the following types: a. Recover or combust landfill gas from the disposal site; b. Undertake controlled combustion of the waste that is not treated biologically in first step; c. Recover biogas from wastewater treatment, and without co-digestion of organic matters.

3.	Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO_2 equivalent annually.	Project Activity will reduce approximately emissions of [xx,xxx] tons CO_2 per year. This is well below the maximum of 60,000 tCO_2 per annum.
4.	This methodology is applicable to the composting of the organic fraction of municipal solid waste and biomass waste from agricultural or agro-industrial activities including manure.	The Project Activity is co-composting process.
5.	This methodology includes construction and expansion of treatment facilities as well as activities that increase capacity utilization at an existing facility. For project activities that increase capacity utilization at existing facilities, project participant(s) shall demonstrate that special efforts are made to increase the capacity utilization, that the existing facility meets all applicable laws and regulations and that the existing facility is not included in a separate CDM Project Activity. The special efforts should be identified and described.	Project Activity is newly built co-composting plant.
6.	This methodology is also applicable for co-composting wastewater and solid biomass waste, where wastewater would otherwise have been treated in an anaerobic wastewater treatment system without biogas recovery. The wastewater in the project scenario is used as a source of moisture and/or nutrients to the biological treatment process e.g. composting of empty fruit bunches (EFB), a residue from palm oil production, with the addition of palm oil mill effluent (POME) which is the wastewater co-produced from palm oil production.	The Project Activity is co-composting which would utilize solid waste (EFB) and wastewater (POME) for co-composting process.
7.	In case of co-composting, if it can not be demonstrated that the organic matter would otherwise been left to decay anaerobically, baseline emissions related to such organic matter shall be accounted for as zero, whereas project emissions shall be calculated according to the procedures presented in this methodology for all co-composted substrates.	In the baseline condition, the shredded solid waste (EFB) is directly dumped in the plantation. This demonstrates that the organic matter would otherwise been left to decay anaerobically.
8.	Project participants shall apply the procedures related to the competing use for the biomass" according to the latest "General guidance on leakage in biomass project activities".	Project Activity does not comprise the biomass utilization.
9.	The location and characteristics of the disposal site of the biomass, animal manure and co-composting wastewater in the baseline condition shall be	The EFB's dump site and open lagoons of wastewater treatment in the baseline condition is clearly located and

	known, in such a way as to allow the estimation of its methane emissions, using the provisions of AMS-III.G, AMS-III.E (concerning stockpile), AMS-III.D "Methane recovery in animal manure management systems" or AMS-III.H respectively.	characterized.
10.	The project participants shall clearly define the geographical boundary of the region referred in paragraph 9 (b), and document it in the CDM-PDD. In defining the geographical boundary of the region, project participants should take into account the source of the waste i.e. if waste is transported up to 50 km, the region may cover a radius of 50 km around the Project Activity. In addition, it should also consider the distance to which the final product after composting will be transported. In either case, the region should cover a reasonable radius around the Project Activity that can be justified with reference to the project circumstances but in no case it shall be more than 200 km. Once defined, the region should not be changed during the crediting period(s).	The maximum distance for transporting the waste utilized by the Project Activity is 50 km; therefore the geographical boundary of the Project Activity is within radius of 50 km around the Project Activity location.
11.	In case produced compost is handled aerobically and submitted to soil application, the proper conditions and procedures (not resulting in methane emissions) must be ensured.	The compost product will be directly applied to plantation; this ensures no methane emissions occur.
12.	In case produced compost is treated thermally/mechanically, the provisions in AMS-III.E related to thermal/mechanical treatment shall be applied.	The produced compost will not be treated thermally/mechanically.
13.	In case produced compost is stored under anaerobic conditions and/or delivered to a landfill, emissions from the residual organic content shall to be taken into account and calculated as per the latest version of the "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site".	The produced compost will not be stored under anaerobic condition and/or delivered to landfill. The produced compost would be directly applied to plantation by a spreader machine.

Following table demonstrates the project activity satisfies all eligibility criteria listed in the PoA:

No	Eligibility criteria as per PoA DD Section A.4.2.2	Project Description
1.	**Boundary**: (i) **Physical Boundary**: The entire boundary of the CPA project activity must be physically located	[project description]

	within the territory of the Republic of Indonesia as set out in section A.4.1.2 of this PoA-DD. (ii) **Time Induced Boundary**: No CPA shall commence before the Start Date of the PoA, as set out in section B.1. of this PoA-DD. In addition, no CPA shall commence later than 28 years after the start date of the PoA-DD as set out in section B.1. of this PoA-DD.	
2.	**Double counting**: To avoid double counting of emission reductions each CPA must: Provide specific geographic GPS coordinates for the Project Activity to enable unique identification of the Project activity.	[project description]
3.	**Cooperation Agreement**: Each CPA owner must enter into a cooperation agreement with the Coordinating entity which includes at a minimum the matters set out in section A.4.4.1(iv), ie that: i. The CPA Owner is aware and voluntarily agrees that the CPA will be subscribed to the present PoA under the conditions as required by the approved PoA and the contractual arrangement between the CPA Owner and the Coordinating Entity. ii. Certifies the CPA has not been and will not be registered as a single CDM project activity nor as a CPA under another PoA, nor any voluntary scheme and warrants on an ongoing basis that they will not seek to have the project activity which forms the basis of the proposed CPA registered as a CDM project or registered under any other scheme that earns carbon credits for the emission reductions achieved while the project is included in a CPA or proposed CPA under the present PoA. iii. The CPA Owner will certify in writing that the proposed CPA is not a debundled part of a bigger project. iv. CPA Owner cedes all rights to independently claim and own emission reductions under the Clean Development Mechanism of the UNFCCC or any voluntary scheme other than through the managing entity of the present	[project description]

	PoA as agreed.	
4.	**No Pre-existing Co-composting or Composting at Site**: Each CPA shall be implemented at a Palm Oil Mill site where no composting or co-composting activity was taking place before the Project Activity.	[project description]
5.	**Technology and compliance with Methodology**: Each CPA must be a newly developed, co-composting or composting facility using composting technology that (i) Uses Palm Oil Mill Organic waste as inputs and via an aerobic composting process within the parameters set out in section A.4.2.1 of the PoA-DD produces organic compost for reapplication to land as organic fertilizer (ii) Meets the requirements of approved methodology AMS-III.F version 10, including applicability criteria, its relevant assessment tools and guidelines, (iii) In addition in order ensure the environmental integrity of each co-composting facility that is brought under this PoA and to ensure that the co-composting facility does not become a source of environmental pollution itself, each facility must: v. Locate the main composting facility upon an impermeable composting pad / floor of concrete or some other impermeable material (This ensures leaching from the compost does not take place directly into the soil below and improves the composting process); vi. Incorporates a system / process to adequately deal with any run-off or leachate from the compost itself and / or ensure any liquid discharge would be diluted or treated to environmentally acceptable levels before entering the surrounding environment.	[project description]

6.	**Start date**: Each CPA Owner must be able to provide documentary evidence to verify the start date of the CPA.	[project description]
7.	**Additionality**: Each CPA must be able to demonstrate that the Project Activity which forms the CPA would not have occurred anyway due to an investment barrier by following and applying all steps of the additionally assessment as set out in sections E.5.1 and E.5.2 of this PoA-DD.	[project description]
8.	**PoA Specific Requirements:** (i) **Environmental Impact Analysis (EIA)**: Each CPA which involves the implementation of a Compost Facility with a compost output capacity i. Greater than or equal to 100 tons per day shall provide a copy of their EIA which has been submitted to, and approved by the Indonesian Ministry of the Environment. ii. less than 100 tons per day, shall provide a copy of the Environmental Management and Monitoring Plan (EMMP) that was submitted and approved by the responsible Indonesian authorities. **(ii) Compliance with Relevant National Standards:** Each CPA Project Activity must comply with the relevant Indonesian National or Regional Environmental Standard (i.e. licenses and or permits that might be required other than EIA and EMMP). **(iii) Stakeholder Consultation:** Each CPA must be able to demonstrate with appropriate documentary evidence that Stakeholder Consultation has been undertaken in accordance with the	[project description]

	requirements of CDM rules and procedures.	
9.	**Debundling**: To ensure A CPA is not a debundled component of a large scale activity, the Project Activity under each CPA must not: (i) have the same activity implementer as the proposed small scale CPA or a coordinating or managing entity, which also manages a large scale PoA of the same technology/measure which is within 1 km of the boundary of the proposed small-scale CPA, at the closest point.	[project description]
10.	**SSC Threshold Criteria**: Each CPA shall not reduce more than 60 kt CO_2e annually.	[project description]
11.	**Use of Development or Assistance Funds:** Each CPA must certify in writing whether any Development Aid or Assistance funds have been used for funding the construction and operation of the Project Activity which forms the PoA. If any Development Aid or Assistance funds have been used, then before inclusion in the PoA, the CPA owner must provide evidence to confirm that such funds do not result in a diversion of any official development assistance funds.	[project description]

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

>>

With awareness of the importance of CDM incentive to the Project Activity, [Company name]'s management decided to proceed with the project after having input from CDM consultant concerning the quantity of the emission reduction from the project.

Below table shows the CDM consideration steps for the Project Activity.

Date	Event	Source of document
Date/month/year	[Even description]	[Source of document]
Date/month/year	[Even description]	[Source of document]
Date/month/year	[Even description]	[Source of document]
Date/month/year	[Even description]	[Source of document]
Date/month/year	[Even description]	[Source of document]
e.t.c	e.t.c	e.t.c

In accordance with key criteria and data for assessing additionality of a SSC-CPA listed in the PoA section E.5.2, following information are the main economic parameters or indicators to be applied in the project's financial analysis.

Project Data	Data and Unit	Source
Technical lifetime	[xx] years	[source]
Investment Decision Date	[date/month/year]	[source]
Date project starts operating	[date/month/year]	[source]
Annual compost production t/year	[xx,xxx] tons/year	[source]
Estimated Fertilizer savings (If compost reapplied to plantation belong to the same company as the mill and not purchased)	[xx,xxx.xx] million IDR	[source]
Currency	1 USD = [xx,xxx] IDR 1 Euro = [xx,xxx] IDR 1 GBP = [xx,xxx] IDR	Bank Indonesia currency rate calculator (middle rate dated [date/month/year])
Capital and Equipment costs (Note this will be broke down appropriately into subcomponents)	[xx,xxx] million IDR	[source]
CER revenue	[xx,xxx] million IDR	[source]
Operation & Maintenance cost: Comprises the following major sub-components set out below	[xx,xxx] million IDR	[source]
Fuel and Electricity Costs (includes any fuel and power costs directly related to the Project Activity)	IDR	[source]
Labour Costs – (includes additional labour costs	IDR	[source]

directly as a result of the Project Activity)		
Maintenance costs – (includes any electrical, mechanic, civil maintenance and or equipment maintenance costs directly related to the Project Activity)	IDR	[source]
Land Rental Costs – (includes any rental costs for land directly used for Project Activity)	IDR	[source]
Feedstock Costs – (Includes any costs for any raw material feedstock inputs into the Compost Facility)	IDR	[source]
Ongoing licensing / royalty costs – (includes any ongoing royalty or licensing costs required to be paid by the CPA owner directly in relation to the Project Activity)	IDR	[source]
Insurance.	% of CAPEX or IDR	[source]
Project IRR (without CER revenue)	[xx.xx] %	[source]
Project IRR (including CER revenue)	[xx.xx] %	[source]

Benchmark determination

As per PoA section E.5.2, the benchmark adopted for financial indicators is 12.5%.

Sensitivity analysis

As specified in the excel spreadsheet supplied to the DOE, a sensitivity analysis will be also conducted using assumptions that are conservative from the point of view of analyzing additionality, i.e. the ”bestcase” conditions for the project IRR were assumed by altering the following parameters: (1) project revenues; (2) total investment, and (3) O&M by +/- 10%.

The full result of each sensitivity analysis is listed in the following table:

Table 7: Sensitivity analysis of IRR project without revenue from CDM

Factor	Variation		
	-10%	0%	10%

Project revenue	[xx.xx] %	[xx.xx] %	[xx.xx] %
Project investment	[xx.xx] %	[xx.xx] %	[xx.xx] %
O&M Cost	[xx.xx] %	[xx.xx] %	[xx.xx] %

Below are the likelihood scenarios where the IRR would meet the benchmark by adjusting project revenue, project investment, and O&M cost;

a. **The project revenue is increased by** [xx.xx] **%**: [likelihood scenarios].

b. **The project investment is reduced by** [xx.xx] **%**: [likelihood scenarios]

c. **The O&M costs are reduced by** [xx.xx] **%**: [likelihood scenarios]

Within a reasonable variation of the project revenue, the project investment, and operation and maintenance cost, the calculated pre-tax project IRR result remains consistently below the benchmark. Thus the project is financially unfeasible and therefore the project is deemed additional.

The revenue from CER makes the pre-tax project IRR become [xx.xx] %. [Additional information of the additionality]

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

>>

The project boundary of the Project Activity is defined in below figure:

[Boundary figure]

The GHG emission sources included in or excluded from the project boundary are as follows:

	Source	Gas	Included?	Justification/Explanation
Baseline	Biomass disposed in an unmanaged landfill / dumpsite	CO_2	No	CO2 emissions from biomass decomposition at solid waste disposal sites are considered as GHG neutral
		CH_4	Yes	Methane emission from decomposition of EFB left in the solid waste disposal site.
		N_2O	No	Excluded for simplification. This is conservative.
	POME Treatment in open lagoons	CO_2	No	CO2 emissions from anaerobic digestion of POME are considered as GHG neutral.
		CH_4	Yes	Methane emissions from anaerobic digestion of POME in open air lagoons.

		N_2O	No	Excluded for simplification. This is conservative.
Project Activity	Composting Process	CO_2	No	CO2 emissions from composting process are considered as GHG neutral. Expected to be minimum and excluded for simplification
		CH_4	No	The Project Activity involves the forced aerated system, online oxygen monitoring system, online temperature monitoring system, and online methane monitoring system. This means overall co-composting process will be maintained in aerobic condition.
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small.
	Emission from runoff water from the composting yard	CO_2	No	Excluded for simplification. This emission source is assumed to be very small.
		CH_4	No	The Project Activity involves the roofed bunker system. The roof will cover the co-composting from the rain.
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small.
	Electricity	CO_2	No	[Will depends on the mills condition]
		CH_4	No	Excluded for simplification. This emission source is assumed to be very small.
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small.
	Incremental use of fossil fuels for transportation, auxiliary equipment due to project	CO_2	Yes	[Will depends on the mills condition]
		CH_4	No	Excluded for simplification. This emission source is assumed to be very small.
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small.

B.5. Emission reductions:

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

>>

Data / Parameter:	**Φ**
Data unit:	-
Description:	Model correction factor to account for model uncertainties
Source of data used:	-
Value applied:	[Will depends on the mills condition]
Justification of the choice of data or description of measurement methods and procedures actually applied :	[Will depends on the mills condition]
Any comment:	[Will depends on the mills condition]

Data / Parameter:	**OX**
Data unit:	-
Description:	Oxidation factor (reflecting the amount of methane from SWDS that is oxidized in the soil or other material covering the waste)
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories, Volume 5, chapter 3.
Value applied:	[Will depends on the mills condition]
Justification of the choice of data or description of measurement methods and procedures actually applied :	[Will depends on the mills condition]
Any comment:	-

Data / Parameter:	**F**
Data unit:	-
Description:	Fraction of methane in the SWDS gas (volume fraction)
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value applied:	[Will depends on the mills condition]
Justification of the choice of data or description of measurement methods and procedures actually applied :	[Will depends on the mills condition]
Any comment:	[Will depends on the mills condition]

Data / Parameter:	**DOC_f**
Data unit:	-
Description:	Fraction of degradable organic carbon (DOC) that can decompose
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value applied:	[Will depends on the mills condition]
Justification of the choice of data or description of measurement methods and procedures actually applied :	[Will depends on the mills condition]
Any comment:	-

Data / Parameter:	**MCF**
Data unit:	-
Description:	Methane correction factor
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value applied:	[Will depends on the mills condition]
Justification of the choice of data or description of measurement methods and procedures actually applied :	[Will depends on the mills condition]
Any comment:	[Will depends on the mills condition]

Data / Parameter:	**DOC_j**
Data unit:	-
Description:	Fraction of degradable organic carbon (by weight) in the waste type *j*
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Tables 2.4 and 2.5)
Value applied:	[Will depends on the mills condition]
Justification of the choice of data or description of measurement methods and procedures actually applied :	[Will depends on the mills condition]
Any comment:	-

Data / Parameter:	**k_j**
Data unit:	-
Description:	Decay rate for the waste type *j*
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from

	Volume 5, Table 3.3)
Value applied:	[Will depends on the mills condition]
Justification of the choice of data or description of measurement methods and procedures actually applied :	[Will depends on the mills condition]
Any comment:	

Data / Parameter:	$\eta_{COD,BL,i}$
Data unit:	-
Description:	COD removal efficiency of the baseline treatment system i
Source of data used:	Calculation, based on COD historical data of wastewater entering and leaving the baseline wastewater treatment system.
Value applied:	[Will depends on the mills condition]
Justification of the choice of data or description of measurement methods and procedures actually applied :	[Will depends on the mills condition]
Any comment:	[Will depends on the mills condition]

Data / Parameter:	$NCV_{diesel\ oil}$
Data unit:	TJ/Gg
Description:	Net Calorific Value of Diesel Oil
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value applied:	[Will depends on the mills condition]
Justification of the choice of data or description of measurement methods and procedures actually applied :	[Will depends on the mills condition]
Any comment:	-

Data / Parameter:	$EF_{CO2,\ diesel\ oil}$
Data unit:	kg/TJ
Description:	CO_2 emission factor of Diesel Oil
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value applied:	[Will depends on the mills condition]
Justification of the choice of data or	[Will depends on the mills condition]

description of measurement methods and procedures actually applied :	
Any comment:	-

Data / Parameter:	**Density$_{diesel\ oil}$**
Data unit:	kg/litre
Description:	Density of Diesel Oil
Source of data used:	[Will depends on the mills condition]
Value applied:	[Will depends on the mills condition]
Justification of the choice of data or description of measurement methods and procedures actually applied :	[Will depends on the mills condition]
Any comment:	-

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

>>

A. Baseline Emission

Following equation is to determine baseline emission according to AMS-III.F version 10:

$$BE = BE_{CH4,SWDS,y} + BE_{ww,y} + BE_{CH4,manure,y} - MD_{y,reg} * GWP_CH_4$$

Where:

$BE_{CH4,SWDS,y}$ Yearly methane generation of potential solid waste composted by the Project Activity during the years x from the beginning of the Project Activity (x=1) up to the year y estimated as per the latest version of the "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site" (tCO_{2e}). The tool may be used with the factor "f=0.0" assuming that no biogas is captured and flared. With the definition of year x as 'the year since the Project Activity started diverting wastes from landfill disposal, x runs from the first year of crediting period (x=1) to the year for which emissions are calculated (x=y)'

$MD_{y,reg}$ Amount of methane that would have to be captured and combusted in the year y to comply with the prevailing regulations (ton)

$BE_{CH4,manure,y}$ Where applicable, baseline emissions from manure composted by the project activities, as per the procedures of AMS-III.D

$BE_{ww,y}$ Where applicable, baseline emissions from the wastewater co-composted, calculated as per the procedures in AMS-III.H

GWP_CH4 GWP for CH4 (value of [xx] is used)

Baseline emission due to methane generation potential of the solid waste composted:

$$BE_{CH4,SWDS,y} = \varphi \bullet (1-f) \bullet GWP_{CH4} \bullet (1-OX) \bullet \frac{16}{12} \bullet F \bullet DOC_f \bullet MCF \bullet \sum_{x=1}^{y} \sum W_{j,x} \bullet DOC_j \bullet e^{-k_j(y-x)} \bullet (1-e^{-k_j})$$

Where:

$BE_{CH4,SWDS,y}$ Methane emissions avoided due to prevention of waste disposal at the solid waste disposal site (SWDS) during the year y, from the start of Project Activity to the end (tCO_{2e})

φ Model correction factor to account for model uncertainties ([xx])

f Fraction of methane captured at the SWDS and flared, combusted or used in another manner ([xx])

GWP_{CH4} Global Warming Potential (GWP) of methane ([xx])

OX Oxidation factor (reflecting the amount of methane on SWDS that is oxidised in the soil or other material cover the waste) ([xx])

F Fraction of methane in the SWDS gas (volume fraction) ([xx])

DOC_f Fraction of degradable organic carbon (DOC) that can decompose ([xx])

MCF Methane correction factor ([xx])

$W_{j,x}$ Amount of organic waste type j prevented from disposal to the SWDS in year x ([xx,xxx.xx]ton)

DOC_j Fraction of degradable organic carbon (by weight) in the waste type j ([xx])

k_j Decay rate for the waste type j ([xx])

j Waste type category (index)

x Year during the crediting period: x runs from the first year of the first crediting period (x=1) to the year y for which avoided emission calculated (x=y) ([xx])

y Year for which methane emission are calculated ([xx])

Therefore:

$BE_{CH4,SDWS,y}$ = [xx,xxx.xx] tCO_{2e}

As per AMS-III.H version 16, baseline emission from the wastewater co-composted may comprise of methane emissions from baseline wastewater treatment systems ($BE_{ww,treatment,y}$) and methane emissions on account of inefficiencies in the baseline wastewater treatment systems and the presence of degradable organic carbon in the treated wastewater discharged into river/lake/sea ($BE_{ww,discharge,y}$).

Baseline emission due to methane emission from baseline wastewater treatment system:

$$BE_{ww,treatment,y} = \sum_i \left(Q_{ww,i,y} * COD_{inflow,i,y} * \eta_{COD,BL,i} * MCF_{ww,treatment,BL,i}\right) * B_{o,ww} * UF_{BL} * GWP_{CH4}$$

Where:

$Q_{ww,i,y}$	Volume of wastewater treated in baseline wastewater treatment system i in year y. For ex ante estimation, forecasted wastewater generation volume or the designed capacity of the wastewater treatment facility can be used. ([xx,xxx.xx] m^3)
$COD_{inflow,i,y}$	Chemical oxygen demand of the wastewater inflow to the baseline treatment system i in year y ([xx.xx] t/m^3)
$\eta_{COD,BL,i}$	COD removal efficiency[4] of the baseline treatment system i ([xx.xx] %)
$MCF_{ww,treatment,BL,i}$	Methane correction[5] factor for baseline wastewater treatment systems i ([xx])
i	Index for baseline wastewater treatment system
$B_{o,ww}$	Methane producing capacity of the wastewater (IPCC value of [xx] kg CH4/kg COD)
UF_{BL}	Model correction factor to account for model uncertainties ([xx])
GWP_{CH4}	Global Warming Potential for methane (value of [xx])

Therefore:

$BE_{ww,treatment,y}$ = [xx,xxx.xx] tCO_{2e}

Baseline emission due to methane emissions on account of inefficiencies in the baseline wastewater treatment systems and presence of degradable organic carbon in the treated wastewater discharged into river/lake/sea:

[4] Determined based on paragraph 26,27 or 28 of methodology AMS-III.H version 16

[5] MCF values as per Table III.H.1 in the methodology AMS-III.F version 16

$$BE_{ww,discharge,y} = Q_{ww,y} * GWP_{CH4} * B_{o,w} * UF_{bl} * COD_{ww,discharge,BL,y} * MCF_{ww,discharge,y}$$

Where:

$Q_{ww,y}$	Volume of treated wastewater discharged in year y ([xx,xxx.xx] m^3)
UF_{BL}	Model correction factor to account for model uncertainties ([xx])
$COD_{ww,discharge,BL,y}$	Chemical oxygen demand of the treated wastewater discharged into sea, river or lake in the baseline situation in the year y ([xx,xxx.xx] t/m^3).
$MCF_{ww,BL,discharge,y}$	Methane correction factor based on discharge pathway in the baseline situation [6](river) of the wastewater ([xx])

Therefore:

$BE_{ww,discharge,y}$ = [xx] tCO_{2e}

B. Project Emission

Project emissions that might occur due to the co-composting process is listed as following:

a. CO_2 emissions due to incremental transportation distances;
b. CO_2 emissions from electricity and/or fossil fuel consumption by the Project Activity facilities;
c. Methane emissions during composting process;
d. Methane emissions from runoff water;
e. In case the compost is stored under anaerobic conditions and/or delivered to a landfill: the methane emissions from the disposal/storage of compost.

Thus, total project emission from co-composting process is summarized using equation below:

$$PE_y = PE_{y,transp} + PE_{y,power} + PE_{y,comp} + PE_{y,runoff} + PE_{y,reswaste}$$

Where:

PE_y	Project Activity emissions in the year y ($tCO2_e$)
$PE_{y,transp}$	Emissions from incremental transportation in the year y ($tCO2_e$)
$PE_{y,power}$	Emissions from electricity or fossil fuel consumption in the year y ($tCO2_e$)
$PE_{y,comp}$	Methane emissions during composting process in the year y ($tCO2_e$)
$PE_{y,runoff}$	Methane emissions from runoff water in the year y ($tCO2_e$)

[6] MCF values as per Table III.H.1 in the methodology AMS-III.H version 16

$PE_{y,reswaste}$ In case the compost produced is subjected to anaerobic storage or disposed in a landfill: methane emissions from the anaerobic decay of the residual organic content ($tCO2_e$)

Project emission from incremental transportation:

[Detail description how the project emission from incremental transportation is considered in the Project Activity]

Following equation is to determine the project emission from transportation:

$$PE_{y,transp} = (Q_y / CT_y) * DAF_w * EF_{CO2} + (Q_{y.treatment} / CT_{y,treatment}) * DAF_{treatment} * EF_{CO2}$$

Where:

Q_y Quantity of raw waste/manure treated and/or wastewater co-treated in the year y ([xx,xxx.xx]ton)

CT_y Average truck capacity for transportation ([xx] ton/truck)

DAF_w Average incremental distance for raw solid waste/manure and/or wastewater transportation ([xx] km/truck)

EF_{CO2} CO_2 emission factor from fuel use due to transportation ($kgCO_2$/km, IPCC default values or local values may be used)

$Q_{y,treatment}$ Quantity of compost produced in year y ([xx,xxx.xx] ton)

$CT_{y,treatment}$ Average truck capacity for compost transportation ([xx] ton/truck)

$DAF_{treatment}$ Average distance for compost transportation ([xx] km/truck)

Therefore:

$$PE_{y,transp} = ([xx, xxxx] / [x]) * [x] * EF_{CO2} + ([xx, xxxx] / [x]) * [x] * EF_{CO2}$$

$PE_{y,transp}$ = [xx]

Project emissions from electricity or fossil fuel consumption:

[Detail description how the project emission from electricity or fossil fuel combustion is considered in the Project Activity]

Project emissions due to methane emission during composting activity:

[Detail description how the project emission due to methane emission during composting activity is considered in the Project Activity]

Project emissions from runoff water from the composting yard:

[Detail description how the project emission from runoff water from the composting yard is considered in the Project Activity]

Project emission due to methane emissions from anaerobic storage and/or disposal in a landfill:

[Detail description how the project emission due to methane emissions from anaerobic storage and/or disposal in a landfill is considered in the Project Activity]

C. Leakage Emission

Project technology implemented is brand new and not transferred from another facility, hence the leakage emission is considered as zero.

D. Emission Reduction

The emission reduction achieved by the Project Activity will be measured as the difference between the baseline emission and the sum of the project emission and leakage, described as following equation:

$$ER_y = BE_y - (PE_y + LE_y)$$

Where:

ER_y Emission reduction in the year y (tCO_{2e})

BE_y Baseline emission in the year y (tCO_{2e}) ([xx,xxx])

PE_y Project emission in the year y (tCO_{2e}) ([xx])

LE_y Leakage emissions in year y (tCO_{2e}) ([xx])

Therefore:

$$ER_y = [xx,xxx] - ([xx,xxx] + [xx,xxx])$$

ER_y = [xx,xxx] tCO_{2e}

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

>>

Year	Estimation for Project Activity Emissions (tCO_2 e)	Estimation of Baseline Emissions (tCO_2 e)	Estimation of Leakage (tCO_2 e)	Estimation of overall emissions reductions (tCO_2 e)
[YYYY]	[xx,xxx]	[xx,xxx]	[xx,xxx]	[xx,xxx]
[YYYY]	[xx,xxx]	[xx,xxx]	[xx,xxx]	[xx,xxx]
[YYYY]	[xx,xxx]	[xx,xxx]	[xx,xxx]	[xx,xxx]

[YYYY]	[xx,xxx]	[xx,xxx]	[xx,xxx]	[xx,xxx]
[YYYY]	[xx,xxx]	[xx,xxx]	[xx,xxx]	[xx,xxx]
[YYYY]	[xx,xxx]	[xx,xxx]	[xx,xxx]	[xx,xxx]
[YYYY]	[xx,xxx]	[xx,xxx]	[xx,xxx]	[xx,xxx]
Total (tons of CO_2 e)	[xx,xxx]	[xx,xxx]	[xx,xxx]	[xx,xxx]

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

B.6.1. Description of the monitoring plan:

>>
This section describes in detail the steps taken to monitor the GHG emissions reductions from the Project Activity on a regular basis. If necessary, this Monitoring Plan can be updated and adjusted to meet operational requirements, provided that such modifications are approved by a Designated Operational Entity during the process of verification.

This monitoring plan is provided to accomplish the adopted monitoring methodology AMS-III.F version 10 and to accommodate monitoring plan prescribed in the PoA DD section E.7.2.

Operational and Performance Obligations

[Detail description the operational and performance obligation of the company during Project Activity operation]

Monitoring Data and Archiving

All parameters for Project Activity purposes will be recorded at the appropriate frequency. The document controller will be responsible for managing the collection, storing and archiving all monitored parameters and records. All relevant data will be archived electronically, and backed up regularly. The archive data will be kept for at least two years after the end of the crediting period or the last issuance of CERs of this project, whichever occurs last.

All measuring devices in the co-composting plant will be periodically calibrated based on manufacturers specifications, international standard or national standard if available. The calibration is to be conducted by an accredited party.

Quality Assurance and Quality Control

The monitoring plant officers will report the monthly emission reduction calculation to the CDM project coordinator. The emission reductions will be based on the data that are collected by co-composting operators. To keep quality assurance and control, the report will be reviewed by the CDM project coordinator who will take a lead for the corrective action that should be taken. The implementation of the corrective action by the monitoring plant officer and/or co-composting plant employees will be included in the annual final report to the management of PT [company name]. In order to maintain and upgrade the capability and skill of the operator, training related to co-composting system is to be performed.

On Site Procedures

To ensure a proper operation and emission reduction monitoring, procedures are to be established and based on the responsibilities of personnel involved. Procedures of emergency cases, such as procedures in case of fuel leak and procedure in case of fire is provided on site.

Parameters to be monitored in the Project Activity are listed as follow:

Data / Parameter:	$W_{j,x}$
Data unit:	Tons
Description:	Amount of organic waste type j prevented from disposal in the SWDS in year x
Source of data to be used:	Data from [measurement device]
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[xx,xxx]
Description of measurement methods and procedures to be applied:	[description the measurement of data]
QA/QC procedures to be applied:	[Measurement device] will undergo maintenance/calibration based on manufacturer specification or international standard or at least once per year. Calibration is to be conducted by accredited party.
Any comment:	[Comment]

Data / Parameter:	$Q_{y,\ treatment}$
Data unit:	Tons
Description:	Quantity of produced compost
Source of data to be used:	Data from [measurement device]
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[xx,xxx]
Description of measurement methods and procedures to be applied:	[Measurement method]. Data will be recorded daily in a log sheet and aggregated weekly and monthly.
QA/QC procedures to be applied:	The [measurement device] will undergo maintenance/calibration subject to manufacturer specification or international standard or at least once per year.

	Calibration is to be conducted by accredited party.
Any comment:	[Comment]

Data / Parameter:	$FC_{diesel\ oil,y}$
Data unit:	Kg
Description:	Fossil fuel (diesel oil) consumption in year y
Source of data to be used:	[measurement device]
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[xx,xxx]
Description of measurement methods and procedures to be applied:	[measurement method]
QA/QC procedures to be applied:	[Measurement device] will undergo maintenance/calibration based on manufacturer specification or international standard or at least once per year. Calibration is to be conducted by accredited party.
Any comment:	[Comment]

Data / Parameter:	***Oxygen content***
Data unit:	%
Description:	Percentage of dissolvent oxygen content
Source of data to be used:	[measurement device]
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[xx.xx]
Description of measurement methods and procedures to be applied:	[measurement method]
QA/QC procedures to be applied:	[Measurement device] will undergo maintenance/calibration based on manufacturer specification.
Any comment:	[Comment]

Data / Parameter:	$Q_{ww,i,y}$
Data unit:	m^3
Description:	Volume of wastewater treated in baseline wastewater treatment system i in year y

Source of data to be used:	Flow meter
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[xx,xxx]
Description of measurement methods and procedures to be applied:	[Measurement method]. Monitored data will be aggregated monthly and annually.
QA/QC procedures to be applied:	Flow meters will undergo maintenance/calibration based on manufacturer specification or international standard once per year. Calibration is to be conducted by accredited party.
Any comment:	[Comment]

Data / Parameter:	$COD_{inflow,i,y}$
Data unit:	t/m^3
Description:	Chemical oxygen demand of the wastewater inflow to the baseline treatment system i in year y
Source of data to be used:	Measurement is conducted by accredited third party.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[x.xxx]
Description of measurement methods and procedures to be applied:	Measurement is to be conducted once in a month.
QA/QC procedures to be applied:	-
Any comment:	For ex-ante purpose, the value of [x.xxx] is taken based on campaign measurement procedure in the paragraph 27 AMS-III.H version 16.

Data / Parameter:	$COD_{ww,discharge,BL,y}$
Data unit:	t/m^3
Description:	Chemical oxygen demand of the treated wastewater discharged into the river in the baseline situation in the year y
Source of data to be used:	Calculated based on $\eta_{COD,BL,i}$ and $COD_{inflow,i,y}$.
Value of data applied	[x.xxxxxx]

for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Calculation is to be conducted once in a month by monitoring officer.
QA/QC procedures to be applied:	Calculation shall be done in a spread sheet and checked by the CDM coordinator
Any comment:	[Comment]

[In accordance with AMS-III.F version 10, there are further parameters to be monitored during the crediting periods listed as below:

1. Check of aerobic conditions of the composting process

Each CPA must ensure the aerobic conditions of the composting process. Oxygen content of the gas phase inside the windrows /compost needs to be monitored, and it can be done via multiple sample measurements throughout different stages of the composting process, with maximum margin of error of 10% at a 90% confidence level. For this purpose a portable oxygen meter can be used with lancets of at least 1 m length to measure oxygen in representative points within the spatial dimensions of windrow. In the case of forced aerated in-vessel and forced aerated pile composting systems continuous measurements may also be done using online sensors. O_2-measurement instrument will be subject to periodic calibration (in accordance with stipulation of instrument-supplier). CPAs under this PoA may implement different co-composting technology, therefore this aerobic condition monitoring will be detail described in the CPA-DD level.

2. Parameters related to emissions from electricity and/or fuel consumption

Each CPA shall conduct the monitoring of related parameters to be monitored in the "*Tool to calculate baseline, project and/or leakage emissions from electricity consumption*" version 1.0. In cases where a CPA is using fuel consumption for electricity generation; the monitoring of related parameters to be monitored in the "*Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion*" version 2.0 shall be applied. Alternatively it shall be assumed that all relevant electrical equipment operate at full rated capacity, plus 10% to account for distribution losses, for 8760 hours per annum. And since CPAs under this PoA may have different power sources, this will be described in detail at the CPA-DD level.

3. Parameters related to baseline emissions from wastewater co-composted

Each CPA shall conduct monitoring of related parameters to be monitored in the AMS-III.H version 16 ", and this will also described in detail at the CPA-DD level.]

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

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

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

>>
The Project Activity involves a co-composting plant constructed at the mill facility which has capacity to process Fresh Fruit Bunches (FFB) of [xx,xxx] tons/hour. [Environment impact assessment or environment management monitoring plan]

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:

>>
In accordance with the Decree of the Minister of the Environment (*MENLH* [latest ministry regulation number]) of the Republic of Indonesia, the Project Activity will [yes or not] require an "Environmental Impact Assessment (*AMDAL*)".

SECTION D. Stakeholders' comments

>>

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

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

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

>>
[Stakeholder Consultation Meeting description]

D.3. Summary of the comments received:

>>
[Stakeholder Consultation Meeting notes]

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

>>
[Stakeholder Consultation Meeting notes]

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

There is no public funding involved in the Project Activity

Annex 3

BASELINE INFORMATION

Annex 4

MONITORING INFORMATION

This is according to Section B.6.1

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