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

CONTENTS

Annexes

NOTE:

(i) This form is for the submission of CPAs that apply a large scale methodology using provisions of the proposed PoA.

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

A.1. Title of the CPA:

>>

MSW Intermediate Treatment Programmatic CDM for Depok City

A.2. Description of the CPA:

>>

One of the significant environmental concerns of the growing urban areas in Indonesia has been the management of municipal solid wastes (MSW). So far as disposal of MSW is concerned, the common practice in Indonesia is to dispose the wastes in landfills (mostly open dumpsites) wherein landfill gasses are not extracted. These landfills thus generate and emit significant amount of methane to the atmosphere, as well as environmental pollutants to the ambient area. The goal of the program is to avoid methane emissions from municipal solid waste landfills by introducing MBT of the wastes in the cities/prefectures in West Java Province. The project activities involves the sorting and recovering of the recyclable, reusable and recoverable resources from mixed municipal waste generated in West Java Province, and aerobic treatment of the organic waste utilizing composting technology. Besides the emission reduction, this process is also expected to realize a drastic reduction in waste disposal amount.

This CPA is being proposed under the West Java MSW Intermediate Treatment PoA, and represents the Municipal Waste Composting Activity in Depok city in West Java Province. The CPA will be implemented as per the same implementation framework as described the West Java MSW Intermediate Treatment PoA-DD.

Depok city is one of the major municipalities of West Java Province. Solid waste management is an important responsibility of Depok city council. Currently, about 1,200 tons of MSW is generated within the city daily, of which about 35 % (420 ton/day) are collected by city council. Those collected wastes are primarily landfilled in the Cipayung landfill site, as a result of which, significant amount of methane is emitted to the atmosphere. The purpose of this CPA is to avoid such methane emissions by processing the organic fractions of the waste aerobically in a MBT plant. This CPA proposes to set up a MBT facility in Depok City for mechanical / manual segregation and aerobic compost for processing the wastes in an environmentally friendly and sustainable way.

Besides climate change mitigation, the project will contribute to the sustainable development of Indonesia in the following aspects:

Environmental well-being

- The project will promote sanitization of landfill site.
- The project will reduce current environmental and health impacts deriving from landfill sites in the region of the Project site as the result of reducing the load of MSW, particularly the contained organics disposed of at landfill sites

Economic and social well-being

- The project will extend operational lifetime of the landfill site.
- The project will improve local economy by providing job opportunity to local people for the operation of the facility.

- The project will contribute the development of the sustainable society in Depok City which is suit to the national policy of Indonesia.

It is proposed to handle 300 tons of waste per day. About 31,000 tons of compost would be generated per annum resulting in a total of about 277,000 tCO2e emission reduction in the first 7 year crediting period.

A.3. Entity/individual responsible for CPA:

City Council, Depok City represented by the officer of Planning Department

A.4. Technical description of the CPA:

A.4.1. Identification of the CPA:

>>
The CPA is undertaken at Depok City in West Java Province

A.4.1.1. Host Party:

>>
Republic of Indonesia

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

Depok City located in West Java Province, within coordinates of 6019’00” - 6028’00” Lintang Selatan and 106043’00” - 106055’30” Bujur Timur. West Java Province is located on Java Island, and borders Jakarta and Banten province to the west, and Central Java to the east. To the north is Java Sea. The map of West Java Province showing Depok city is given below. The MBT facility is located in the existing landfill site, Cipayung, as shown in Figure 2.

Figure 1: Map of West Java Province

Figure 2: Map of Depok City and Project Site

The contact details of the agency responsible for the CPA are;
XXXXXX

A.4.2. Duration of the CPA:

A.4.2.1. Starting date of the CPA:

>>
The CPA is expected to be in operational in January 2010.

A.4.2.2. Expected operational lifetime of the CPA:

>>
The project would have a life span of 25 years

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

Renewable crediting period

A.4.3.1. Starting date of the crediting period:

>>
1st January 2010

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

>>
7 years

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

>>

Table 1: Estimation of emission reductions

Year	Annual estimation of emission reductions in tonnes of CO2e
2010	15,500
2011	27,323
2012	36,059
2013	42,716
2014	47,861
2015	51,935
2016	55,274
Total estimated reductions (tonnes of CO2e)	276,668
Total number of years in first crediting period	7
Annual average estimated reductions, first crediting period (tonnes of CO2e)	39,524

A.4.5. Public funding of the CPA:

>>

The CPA will not receive any national or international public funding for the development of the proposed project.

A.4.6. Confirmation that CPA is neither registered as an individual CDM project activity nor is part of another Registered PoA:

>>

The project is not registered as an individual CDM project and is not part of another PoA.

SECTION B. Eligibility of CPA and Estimation of emissions reductions

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

>>

MSW Intermediate Treatment Programmatic CDM in West Java
This CPA is part of the request for registration of the above mentioned PoA.

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

>>

The project is eligible to be included in the proposed PoA as

a. The CPA is from a city in West Java Province.
b. The government of Depok City has land designated for the MBT plant.
c. The government of Depok City has signed a cooperation agreement with BPLHD, as CME, to participate in the program, and to share the financial benefit with the BPLHD.
d. The government of Depok City has taken responsibility for operating the MBT facility and landfill, as per the guidelines and training provided in the program.

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

>>

Table 2. Eligibility of the CPA as per eligibility criteria in PoA

No	Eligibility Criteria as per PoA	Situation in Depok city
1	There should not be any commercially and continuously-operating composting plants of similar size in the city / prefecture. The facilities built and operated with subsidies from the central/local government or foreign grant would be excluded.	There are no existing composting plant of similar size, which are built and being operated commercially and continuously, without any subsidies and grant from the governmental agencies.
2	The common practice for waste disposal should be land filling.	The common practise of waste disposal is land filling.
3	The barrier analysis of composting operations should prove the project to be unviable with out carbon revenue.	The barrier analysis presented below shows that the project is unviable without carbon revenues.
4	There should not be any composting plants which receive tipping fee higher than the estimated value used in the cost analysis for the proposed CDM	There are no composting plants which receive the tipping fee for MSW treatment higher than 4 USD/ton.

Composting of organic waste in Depok city faces investment and technological barriers, and barriers due to prevailing practice.

1) Investment barrier

Although this program plans to collect tipping fee for the treatment of solid waste (about 4USD/ton), this fee is insufficient to cover the costs of implementation of new alternative waste treatment (compost) in Indonesia. Hence, this program activity can be feasible only with additional income such as revenue from composting sales and CER sales.

However, compost derived from municipal solid waste is unvalued in Indonesia and cannot be a source of income for the project. Since the compost standard set by the Government of Indonesia is quite high, it would be very difficult for compost from solid waste to meet the standard. In addition, there are social barriers due to the perceived image of the Indonesian people that compost from municipal waste is dirty and dangerous. Therefore, it has significantly lower market price and a limited use such as improving soil in park and forest, or final cover for landfills. Consequently, compost product cannot be a big source of income for this project, and the project is not economically attractive without CER revenue.

2) Technical barrier

The technology to develop a large scale compost plant has not been well developed in Indonesia. At present, some composting plants with domestically-produced equipments have already been developed and operated in Indonesia. However, most of these plants are in small scale for trial, and there are no large scale compost plants in Indonesia to treat municipal solid wastes which are commercially operated. To develop such a large scale plants, most of equipments with adequate capacity cannot be supplied from the domestic market, but should be imported from overseas, which would be very expensive.

In addition, the technology of the aerobic composting process in Depok city is not well developed. The lower level of the technology is the root cause of the low efficiency, high investment and poor product quality in the composting process. On the other hand, the compost standard set by Indonesian Government is quite high, most of domestically produced compost cannot meet the standard.
So it faces a number of technical barriers, such as the lack of technical know-how and lack of availability of equipment. It is determined that, without CDM, the current practice of waste land filling will be continued.

The proposed project is thus proved to be additional based on the barrier analysis.

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

>>

The project boundary is the site of the project activity where the waste is segregated and composted as shown in Figure below. This includes the facilities for sorting, aerobic conversion and composting. The project boundary does not include facilities for waste collection, prior sorting (before reaching project site) nor transport to the project site.

The project activity avoids methane emissions by diverting organic waste to a MBT facility instead of dumping the waste at a landfill, where methane emissions are generated due to anaerobic processes. Since

the composting process is basically aerobic, no methane is generated. The GHG involved in the baseline and project emissions are CO_2, CH_4 and N_2O as shown in Table below.

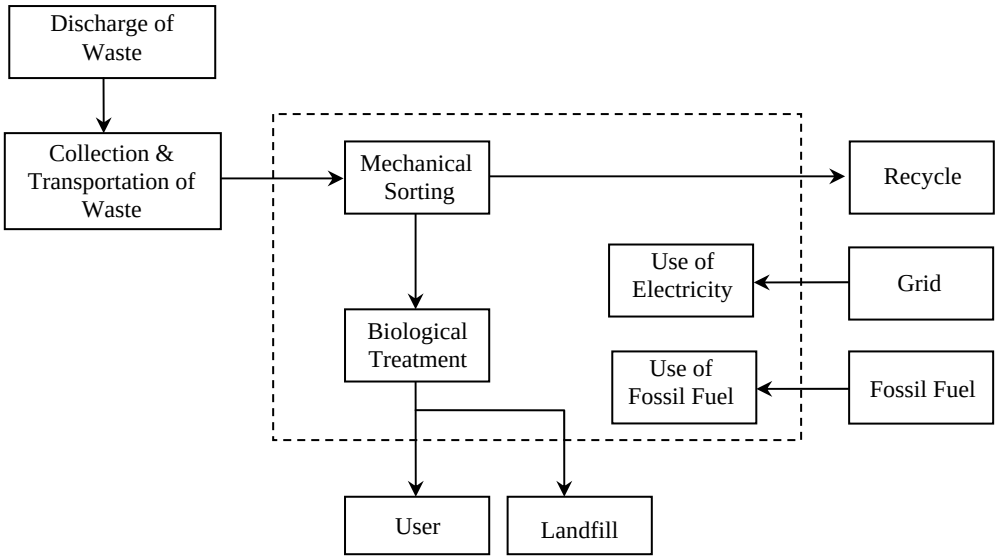

Figure 3: Project Boundary

The gases and sources relevant to the Project are listed below based on the AM0025 methodology.

Table 3: The Greenhouse Gases included in or excluded from the Project Boundary

	Source	Gas		Justification / Explanation
Baseline	Emissions from decomposition of waste at the landfill site	CH_4	Included	The major source of emissions in the baseline from the landfill.
		N_2O	Excluded	N_2O emissions are small compared to CH_4 emissions from landfills. This is conservative.
		CO_2	Excluded	Not accounted for.
	Emissions from electricity consumption	CO_2	Included	There is no electricity consumption at the project site in the absence of the project activity.
		CH_4	Excluded	Excluded for simplification. This is conservative.
		N_2O	Excluded	Excluded for simplification. This is conservative.
	Emissions from thermal energy generation	CO_2	Included	There is no thermal energy generation at the project site in the absence of the project activity.
		CH_4	Excluded	Excluded for simplification. This is conservative.
		N_2O	Excluded	Excluded for simplification. This is conservative.
Project Activity	On-site fossil	CO_2	Included	May be an important emission source.

	Source	Gas		Justification / Explanation
	fuel consumption due to the project activity other than for electricity generation	CH_4	Excluded	Excluded for simplification. This emission source is assumed to be very small.
		N_2O	Excluded	Excluded for simplification. This emission source is assumed to be very small.
	Emissions from on-site electricity use	CO_2	Included	Operation of the anaerobic digester.
		CH_4	Excluded	Excluded for simplification. This emission source is assumed to be very small.
		N_2O	Excluded	Excluded for simplification. This emission source is assumed to be very small.
	Direct emissions from the waste treatment processes	N_2O	Included	May be an important emission source for composting activities.
		CH_4	Included	The composting process may not be complete and result in anaerobic decay.
		CO_2	Excluded	CO2 emissions from the decomposition of organic waste are not accounted.

B.5. Emission reductions:

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

Data / Parameter:	$\boldsymbol{CEF_{elec}}$
Data unit:	tCO_2/MWh
Description:	The emission factor for electricity generation corresponding to electricity used in the project activity.
Source of data used:	Data for power plants in the interconnected grid provided by the Ministry of Energy and Natural Resources, or other official data source.
Value applied:	0.754
Justification of the choice of data or description of measurement methods and procedures actually applied :	Determined using the "Tool to calculate the emission factor for an electricity system"
Any comment:	

Data / Parameter:	$\boldsymbol{NCV_{fuel}}$
Data unit:	MJ/l
Description:	Net calorific value of fuel
Source of data used:	IPCC
Value applied:	36.3

Justification of the choice of data or description of measurement methods and procedures actually applied :	Adjusted by multiplying 0.844 kg/l (density of diesel) to the NCV value in TJ/Gg (43.0 TJ/Gg) provided for Gas/Diesel in the IPCC guideline.
Any comment:	

Data / Parameter:	EF_{fuel}
Data unit:	tCO_2/MJ
Description:	Emission factor for the fuel
Source of data used:	IPCC
Value applied:	0.000074
Justification of the choice of data or description of measurement methods and procedures actually applied :	Diesel is a standard fuel, for which IPCC is a reliable data source.
Any comment:	All equipment on site for project activity would use diesel as fuel.

Data / Parameter:	$EF_{C,N2O}$
Data unit:	tN_2O/t compost
Description:	Emission factor for N_2O from the composting process
Source of data used:	AM0025
Value applied:	0.000043
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value given in the approved methodology AM0025, based on Schenk et al., 1997
Any comment:	

Data / Parameter:	GWP_{N2O}
Data unit:	-
Description:	Global Warming Potential of nitrous oxide
Source of data used:	Kyoto Protocol
Value applied:	310
Justification of the choice of data or description of measurement methods and procedures actually applied :	Valid for the First Commitment Period
Any comment:	

Data / Parameter:	GWP_{CH4}
Data unit:	-
Description:	Global Warming Potential of methane
Source of data used:	Kyoto Protocol
Value applied:	21
Justification of the choice of data or description of measurement methods and procedures actually applied :	Valid for the First Commitment Period
Any comment:	

Data / Parameter:	ϕ
Data unit:	-
Description:	Model correction factor to account for model uncertainties of the "Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site"
Source of data used:	"Tool to determine the methane emissions avoided from dumping waste at a solid waste disposal site"
Value applied:	0.9
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	f
Data unit:	-
Description:	Fraction of methane captured at the SWDS and flared, combusted or used in another manner
Source of data used:	AM0025
Value applied:	0
Justification of the choice of data or description of measurement methods and procedures actually applied :	Already accounted for as AF (Adjustment Factor)
Any comment:	

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:	Assessed according to site visit and the "Tool to determine the methane emissions avoided from dumping waste at a solid waste disposal site"
Value applied:	0
Justification of the choice of data or description of measurement methods and procedures actually applied :	The site for the proposed project activity is an unmanaged solid waste disposal site that is not covered with soil.
Any comment:	

Data / Parameter:	***F***
Data unit:	-
Description:	Fraction of methane in the SWDS gas (volume fraction)
Source of data used:	"Tool to determine the methane emissions avoided from dumping waste at a solid waste disposal site"
Value applied:	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	A default value recommended by the IPCC.
Any comment:	

Data / Parameter:	DOC_f
Data unit:	-
Description:	Fraction of degradable organic carbon (DOC) that can decompose
Source of data used:	"Tool to determine the methane emissions avoided from dumping waste at a solid waste disposal site"
Value applied:	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	***MCF***
Data unit:	-
Description:	Methane correction factor
Source of data used:	"Tool to determine the methane emissions avoided from dumping waste at a solid waste disposal site"
Value applied:	0.8

Justification of the choice of data or description of measurement methods and procedures actually applied :	Value applied for **unmanaged solid waste disposal site – deep and/or with high water table** stated in the "Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site". Assessed according to site visit.
Any comment:	

Data / Parameter:	DOC_j
Data unit:	-
Description:	Fraction of degradable organic carbon (by weight) in the waste type *j*
Source of data used:	"Tool to determine the methane emissions avoided from dumping waste at a solid waste disposal site"
Value applied:	Following values are applied for each waste type *j* according to the values provided in the "Tool to determine the methane emissions avoided from dumping waste at a solid waste disposal site".
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

Waste Type *j*	DOC_j (% wet waste)	DOC_j (% dry waste)
Food	15	38
Garden	20	49
Wood and Straw	43	50
Paper	40	44
Textiles	24	30
Disposable nappies	24	30

Data / Parameter:	k_j
Data unit:	-
Description:	Decay rate for the waste type j
Source of data used:	"Tool to determine the methane emissions avoided from dumping waste at a solid waste disposal site"

Value applied:	Following values are applied for each waste type *j* according to the values provided in the "Tool to determine the methane emissions avoided from dumping waste at a solid waste disposal site". The conditions for the project site is tropical (MAT>20°C) and wet (MAP>1000mm), and the decomposition of waste is very fast (Rapidly degrading).

Waste Type *j*	Tropical (MAT>20°C) Wet (MAP>1000mm)
Food	0.4
Garden	0.17
Wood and Straw	0.035
Paper	0.07
Textiles	0.07
Disposable nappies	0.17

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 emission reductions are calculated according to methodology AM0025 "Avoided emissions from organic waste through alternative waste treatment process", Version 11 (EB44). The ex-ante calculation of emission reductions are completed with the following steps.

Project Emissions

$$PE_y = PE_{elec,y} + PE_{fuel,on-site,y} + PE_{c,y} \quad (1)$$

Where:

PE_y is the project emissions during the year y (tCO_2e/yr)

$PE_{elec,y}$ is the emissions from electricity consumption due to the project activity during the year y (tCO_2/yr)

$PE_{fuel,on-site,y}$ is the emissions on-site due to fuel consumption on-site in year y (tCO_2/yr)

$PE_{c,y}$ is the emissions during the composting process in year y (tCO_2e/yr)

PE_y	$PE_{elec,y}$	$PE_{fuel,on-site,y}$	$PE_{c,y}$
tCO_2e/yr	tCO_2/yr	tCO_2/yr	tCO_2e/yr
796	211	171	414

The MBT facility will be located within the landfill site, where the waste would have been land filled and thus there is no additional transport of wastes to the composting site and the project emission due to increased transport of waste is zero.

Emissions from electricity use ($PE_{elec,y}$)

$$PE_{elec,y} = EG_{PJ,EF,y} \times CEF_{elec} \quad (2)$$

Where:

$PE_{elec,y}$ is the emissions from electricity consumption due to the project activity during the year y (tCO_2/yr)

$EG_{PJ,EF,y}$ is the amount of electricity generated in an on-site fossil fuel fired power plant or consumed from the grid in the project activity, measured using an electricity meter (MWh)

CEF_{elec} CO_2 emission factor for electricity generation in the project activity (tCO_2/MWh)

$PE_{elec,y}$	$EG_{PJ,EF,y}$	CEF_{elec}
tCO_2/yr	MWh	tCO_2/GWh
211	279	0.754

Emissions from fuel use on-site ($PE_{fuel,on-site,y}$)

$$PE_{fuel,on-site,y} = F_{cons,y} \times NCV_{fuel} \times EF_{fuel} \quad (3)$$

Where:

$PE_{fuel,on-site,y}$ is the CO_2 emissions due to on-site fuel combustion in year y (tCO_2/yr)

$F_{cons,y}$ is the fuel consumption on site in year y (l)

NCV_{fuel} is the net calorific value of the fuel (MJ/l)

EF_{fuel} is the CO_2 emission factor of the fuel (tCO_2/MJ)

$PE_{fuel,on-site,y}$	$F_{cons,y}$	NCV_{fuel}	EF_{fuel}
tCO_2/yr	l	MJ/l	tCO_2/MJ
171	24,008	36.3	0.000074

Emissions from Composting ($PE_{c,y}$)

$$PE_{c,y} = PE_{c,N2O,y} + PE_{c,CH4,y} \quad (4)$$

Where:

$PE_{c,y}$ is the emissions during the composting process in year y (tCO_2e/yr)

$PE_{c,N2O,y}$ is the N_2O emissions during the composting process in year y (tCO_2e/yr)

$PE_{c,CH4,y}$ is the emissions during the composting process due to methane production through anaerobic conditions in year y (tCO_2e/yr)

$PE_{c,y}$	$PE_{c,N2O,y}$	$PE_{c,CH4,y}$
tCO_2e/yr	tCO_2e/yr	tCO_2e/yr
414	414	0

N_2O emissions

$$PE_{c,N2O,y} = M_{compost,y} \times EF_{c,N2O} \times GWP_{N2O} \quad (5)$$

Where:

$PE_{c,N2O,y}$	is the N_2O emissions during the composting process in year *y* (tCO_2e/yr)
$M_{compost,y}$	is the total quantity of compost produced in year y (tonnes/yr)
$EF_{c,N2O}$	is the emission factor for N_2O from the composting process (tN_2O/t compost)
GWP_{N2O}	is the Global Warming Potential of nitrous oxide, (tCO_2/tN_2O)

$PE_{c,N2O,y}$	$M_{compost,y}$	$EF_{c,N2O}$	GWP_{N2O}
tCO_2e/yr	tonnes/yr	tN_2O/t compost	tCO_2/tN_2O
414	31,054	0.000043	310

CH_4 emissions

$$PE_{c,CH4,y} = M_{compost,y} \times GWP_{N2O} \times S_{a,y} \quad (6)$$

Where:

$PE_{c,CH4,y}$	is the project methane emissions due to anaerobic conditions in the composting process in year *y* (tCO_2e)
$M_{compost,y}$	is the total quantity of compost produced in year y (tonnes/yr)
GWP_{CH4}	is the Global Warming Potential of methane, (tCO_2/tCH_4)
$S_{a,y}$	is the share of the waste that degrades under anaerobic conditions in the composting plant during year *y* (%)

$PE_{c,CH4,y}$	$M_{compost,y}$	GWP_{CH4}	$S_{a,y}$
tCO_2e/yr	tonnes/yr	tCO_2/tCH_4	%
0	31,054	21	0

$$S_{a,y} = S_{OD,y} / S_{total,y} \quad (7)$$

Where:

$S_{a,y}$	is the share of the waste that degrades under anaerobic conditions in the composting plant during year *y* (%)
$S_{OD,y}$	is the number of samples per year with an oxygen deficiency (i.e. oxygen content below 10%)
$S_{total,y}$	is the total number of samples taken per year, where $S_{total,y}$ should be chosen in a manner that ensures the estimation of $S_{a,y}$ with 20% uncertainty at a 95% confidence level.

$S_{a,y}$	$S_{OD,y}$	$S_{total,y}$
%	-	-
0	0	5,000

Baseline Emissions

$$BE_y = MB_y - MD_{reg,y} + BE_{EN,y} \quad (8)$$

Where:

BE_y	is the baseline emissions in year y (tCO_2/yr)
$MB_{reg,y}$	is the methane produced in the landfill in the absence of the project activity in year y (tCO_2e/yr)
$MD_{reg,y}$	is the methane that would be destroyed in the absence of the project activity in year y (tCO_2e/yr)
$BE_{EN,y}$	Baseline emissions from generation of energy displaced by the project activity in year y (tCO_2/yr)

Year y	BE_y	MB_y	$MD_{reg,y}$	$BE_{EN,y}$
	tCO_2/yr	tCO_2e/yr	tCO_2e/yr	tCO_2/yr
2010	16,296	16,296	0	0
2011	28,119	28,119		
2012	36,855	36,855		
2013	43,512	43,512		
2014	48,657	48,657		
2015	52,731	52,731		
2016	56,070	56,070		

Adjustment Factor (AF)

$$MD_{reg,y} = MB_y \times AF \quad (9)$$

Where:

AF	is the Adjustment Factor for MB_y (%)

$MD_{reg,y}$	MB_y	AF
tCO_2e/yr	tCO_2e/yr	%
0	See table above	0

Methane generation from the landfill in the absence of the project activity (MB_y)

$$MB_y = BE_{CH4,SWDS,y} \quad (10)$$

$$BE_{CH4,SWDS,y} = \varphi \cdot (1-f) \cdot (1-OX) \cdot \frac{16}{12} \cdot F \cdot DOC_f \cdot MCF \cdot \sum_{x=1}^{y} \sum_{j} W_{j,x} \cdot DOC_j \cdot e^{-kj \cdot (y-x)} \cdot (1-e^{-kj}) \quad (11)$$

Where:

MB_y	is $BE_{CH4,SWDS,y}$ (tCO_2e/yr)
$BE_{CH4,SWDS,y}$	is the methane emissions avoided during the year y from preventing waste disposal at the solid waste disposal site (SWDS) during the period from the start of the project activity to the end of the year y (tCO_2e/yr)
φ	is the model correction factor to account for model uncertainties (0.9)
f	is the fraction of methane captured at the SWDS and flared, combusted or used in another manner
GWP_{CH4}	is the Global Warming Potential (GWP) of methane, valid for the relevant commitment period
OX	is the oxidation factor (reflecting the amount of methane from SWDS that is oxidised in the soil or other material covering the waste)
F	is the fraction of methane in the SWDS gas (volume fraction) (0.5)
DOC_f	is the fraction of degradable organic carbon (DOC) that can decompose
MCF	is the methane correction factor
$W_{j,x}$	is the amount of organic waste type j prevented from disposal in the SWDS in the year x (tonnes)
DOC_j	is the fraction of degradable organic carbon (by weight) in the waste type j
k_j	is the decay rate for the waste type j
j	is the waste type category (index)
x	is the year during the crediting period: x runs from the first year of the first crediting period (x=1) to year y for which avoided emissions are calculated (x=y)
y	is the year for which methane emissions are calculated

$$W_{j,x} = W_x \times \frac{\sum_{n=1}^{z} P_{n,j,x}}{z} \quad (12)$$

Where:

$W_{j,x}$	is the amount of organic waste type j prevented from disposal in the SWDS in the year x (tonnes)
W_x	is the total amount of organic waste prevented from disposal in year x (tonnes)
$P_{n,j,x}$	is the weight fraction of the waste type j in the sample n collected during the year x
z	is the number of samples collected during the year x

Year y	MB_y	$BE_{CH4,SWDS,y}$
	tCO_2e/yr	tCO_2e/yr
2010	16,296	16,296
2011	28,119	28,119

2012	36,855	36,855
2013	43,512	43,512
2014	48,657	48,657
2015	52,731	52,731
2016	56,070	56,070

ϕ	f	GWP_{CH4}	OX	F	DOC_f	MCF
-	-	-	-	-	-	-
0.9	0	21	0	0.5	0.5	0.8

Waste type j	$W_{j,x}$	DOC_j	k_j
	tons/yr	%	1/yr
Food	50,370	0.15	0.4
Garden	6,023	0.20	0.17
Wood and Straw	1,643	0.43	0.035
Paper	19,601	0.40	0.07
Textiles	4,818	0.24	0.07
Disposable nappies	3,395	0.24	0.17

Year	W_x
	tons/yr
2010	77,636
2011	77,636
2012	77,636
2013	77,636
2014	77,636
2015	77,636
2016	77,636

Waste Type	$P_{n,j,x}$
	%
Food	46.0
Garden	5.5
Paper	17.9
Wood	1.5
Textile	4.4
Nappies	3.1
Plastics, other inert	21.6

Baseline emissions from generation of electricity displaced by the project activity

This section is not applicable since the proposed project activity does not involve any electricity generation.

Baseline emissions from electricity and heat cogeneration that is displaced by the project activity

This section is not applicable since the proposed project activity does not involve electricity or heat cogeneration.

Leakage

$$L_y = L_{t,y} + L_{r,y} + L_{s,y} \quad (13)$$

Where:

L_y is the leakage emissions during the year y (tCO_2e/yr)
$L_{t,y}$ is the leakage emissions from increased transport in year y (tCO_2e/yr)
$L_{r,y}$ is the leakage emissions from the residual waste from the anaerobic digester, the gasifier, the processing/combustion of RDF/stabilized biomass, or compost in case it is disposed of in landfills in year y (tCO_2e/yr)
$L_{s,y}$ is the leakage emissions from end use of compost in year y (tCO_2e/yr)

L_y	$L_{t,y}$	$L_{r,y}$	$L_{s,y}$
tCO_2e/yr	tCO_2e/yr	tCO_2e/yr	tCO_2/yr
0	0	N/A	0

Since the degradable organic carbon and the decay rate of the compost disposed in the landfill is very small, the leakage emissions from compost is assumed to be negligible. The DOC and k value will be monitored in the project activity.

Emission Reduction

$$ER_y = BE_y - PE_y - L_y \quad (14)$$

Where:

ER_y is the emissions reductions in year y (tCO_2e)
BE_y is the emissions in the baseline scenario in year y (tCO_2e)
PE_y is the emissions in the project scenario in year y (tCO_2e)
L_y is the leakage in year y (tCO_2e)

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

>>

Year	Estimation of project activity emissions (tonnes of CO_2 e)	Estimation of baseline emissions (tonnes of CO_2 e)	Estimation of leakage (tonnes of CO_2 e)	Estimation of overall emission reductions (tonnes of CO_2 e)
2010	796	16,296	0	15,500
2011	796	28,119	0	27,323
2012	796	36,855	0	36,059
2013	796	43,512	0	42,716
2014	796	48,657	0	47,861
2015	796	52,731	0	51,935
2016	796	56,070	0	55,274
Total (tonnes of CO_2 e)	5,572	282,240	0	276,668

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

B.6.1. Description of the monitoring plan:

>>

The monitoring plan as described in section E.7 of the West Java MSW Intermediate Treatment PoA-DD, under which this CPA is being proposed, will be followed.

SECTION C. Environmental analysis

>>

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.

Environmental analysis will be undertaken at CPA level. The laws and regulations related to EIA in the Indonesia stipulate the project to prepare and submit necessary documents per area. Complying with this provision, the project will take necessary actions at CPA level.

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

>>

The project might have some environmental impacts such as air pollution, noise and odour emissions, etc. which may occur along with construction and operation of the facility. However, the project's overall impact on environment will be small, and be reduced to minimum by implementation of project.

Negative impacts that may occur on environment during construction and operation include as follows;

<Construction>

- Air pollution, through the use of fossil fuel on vehicles required for transportation of construction materials, and machinery required for construction.
- Generation of noise to some extent, due to material transportation, number of worker increase, installing of facilities, etc.

<Operation>

- Generation of noise due to facility operation
- Generation of unpleasant smells, due to the storage and treatment of organic wastes.
- Generation of wastes (or residue) through the sorting and treatment process

These negative impacts shall be reduced by taking the appropriate mitigation measures. In addition, all the potential negative impacts were taken into account in the environmental management plan which was developed in accordance with the Environmental Impact Assessment System defined by the Law on Environmental Protection.

Positive environmental impacts of the project activity are as follows;

- Significant decrease of methane generation due to organic waste degradation in the landfill, which contributes to avoiding the GHG emissions
- Decrease of leachate generation and of its contaminant load in the landfill site
- Extension of the landfill life time due to smaller amount of disposed waste

- Decrease of fire and explosions risk in the landfill site caused by methane emissions from disposed organic waste
- Recovery of recycling materials

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

>>

In Indonesia, EIA procedure is stipulated in Laws on Environmental Management (Number 4 of 1982) and the Decree of State Minister for the Environment on Types of Business and/or Activity Plans that are required to be completed with the Environmental Impact Assessment (Number 17 of 2001). According to these laws and regulations, construction of the facility with capacity over 10 ha is required to prepare an EIA report called AMDAL, and those with capacity below 10 ha is not required AMDAL, but is required a simplified environmental management plan (UKL) and environmental monitoring plan (UPL).

Capacity of the MBT facilities to be constructed under the proposed CPA is planned to be about 1.8 ha, which is below the predetermined capacity. Thus the proposed CPA is not required an EIA report, but is required a simplified environmental management plan (UKL) and environmental monitoring plan (UPL).

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.

The stakeholder consultation is undertaken at the PoA level, to collect comments from national / local government agencies. The stakeholder consultation for residents around the project site will be undertaken at the CPA level.

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

>>

The target of the stakeholder consultation at the CPA level is local community, who live near the project site. A meeting with local community will be arranged and carried out before the project implementation.

D.3. Summary of the comments received:

>>

To be collected.

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

>>

The comments received from the stakeholders will be incorporated into the design of the program including the implementation arrangements.

Annex 1

CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE CPA

Organization:	
Street/P.O.Box:	
Building:	
City:	Depok 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

No funds from public national or international sources will be used in any aspect of the proposed project.

Annex 3

BASELINE INFORMATION

Annex 4

MONITORING INFORMATION

Table 4.1 Details of data to be collected in order to monitor emissions from project activity

ID No.	Data variable	Data source	Data unit	Measured (m), calculated (c), or estimated (e)	Recording frequency	How will the data be archived (electronic / paper)	For how long is archived data to be kept?	Comment
1.1	Electricity consumed ($EG_{PJ,EF,y}$)	Electric meter, Bills	MWh	Measured	Monthly	Electronic and paper	Crediting period + 2 years	Aggregated monthly & annually
1.2	Fuel Consumption ($F_{cons,y}$)	Bills	Kilo litres	Calculated	Monthly	Electronic and paper	Crediting period + 2 years	Aggregated monthly & annually
1.3	Quantity of compost produced ($M_{compost,y}$)	Record of compost facility	tonnes	Measured	Quarterly	Electronic and paper	Crediting period + 2 years	Measured by truck scale
1.4	Number of samples taken per year with an oxygen deficiency ($S_{OD,y}$)	On-site measurement	-	Measured	Periodically	Electronic and paper	Crediting period + 2 years	Oxygen concentration will be measured using a portable oxygen analyzer.
1.5	Total number of sampling taken ($S_{totaly,}$)	On-site measurement	-	Measured	Periodically	Electronic and paper	Crediting period + 2 years	Frequency of measurement and the number of samples taken will be decided so as to comply with the statistical requirements.
1.6	Total amount of organic waste	On-site measurement	tonnes	Measured	Daily	Electronic and paper	Crediting period + 2 years	This amount will be measured at the truck scale

ID No.	Data variable	Data source	Data unit	Measured (m), calculated (c), or estimated (e)	Recording frequency	How will the data be archived (electronic / paper)	For how long is archived data to be kept?	Comment
	prevented from disposal ***(W_x)***							which will be located at the entrance of the facility.
1.7	Weight fraction of the waste type J in the sample ***($P_{n,j,x}$)***	On-site measurement	%	Measured	Quarterly	Electronic and paper	Crediting period + 2 years	Volume of waste to be sampled and the frequency of sampling will be adjusted in the project activity to meet the statistical requirements.
1.8	Number of samples taken per year for determination of 1.7	On-site measurement	-	Measured	Quarterly	Electronic and paper	Crediting period + 2 years	