



Monitoring report form for CDM project activity
(Version 07.0)

Complete this form in accordance with the instructions attached at the end of this form.

MONITORING REPORT

Title of the project activity	Gwangju metropolitan city sanitary landfill LFG power plant CDM project	
UNFCCC reference number of the project activity	4294	
Version number of the PDD applicable to this monitoring report	6.0	
Version number of this monitoring report	1.0	
Completion date of this monitoring report	07/07/2019	
Monitoring period number	5th Monitoring period	
Duration of this monitoring period	01/01/2018 – 31/12/2018	
Monitoring report number for this monitoring period	N/A	
Project participants	Environmental Corporation of Gwangju, PANAX ENERGY Co.,Ltd, Gwangju Metropolitan City, Ecoeye Co.,Ltd	
Host Party	Republic of Korea	
Applied methodologies and standardized baselines	AMS-III.G. ver.06 (Landfill methane recovery) AMS-I.D. ver.16 (Grid connected renewable electricity generation)	
Sectoral scopes	1: Energy industries (Renewable - / non-renewable sources) 13: Waste handling and disposal	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	0	15,008
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	32,384	

SECTION A. Description of project activity

A.1. General description of project activity

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- **Purpose of the project activity and the measures taken for GHG emission reductions**

The proposed project includes LFG(landfill gas) collection and electricity generation with grid connection. The main purpose of this project is to recover landfill gas generated from landfill site and use it to generate electricity. It does not include LFG flaring. The second purpose of this project is to prevent global warming by combusting methane which is emitted to the atmosphere. Moreover, the project activity improves environmental quality and contributes to green domestic electricity supply.

- **Brief description of the installed technology and equipment**

The project facilities consist of three systems which are LFG collection system, LFG pre-treatment system, and electricity generation system. Generator was installed total 2MW¹ in this project site.

Item	Gwangju
Generator capacity	2MW(1MW x 2EA)
Manufacturer	STAMFORD
Generator type	HCI 634 K2
Working principle	4-Stroke

- **Relevant dates for the project activity**

In the beginning stage of project design, total capacity was planned to 2MW installation. Plant capacity of 1MW has been operated from 2010 and another 1MW was added in 2013.

Item		Completion of Construction	Electricity equipment test period	Starting Date of Operation
Date	1# generator	28/01/2010	25/01/2010	15/01/2010
	2# generator	31/07/2013	31/07/2013	25/07/2013

- **Total emission reductions achieved in this monitoring period**

Total emission reductions by the project is calculated as 15,008tCO₂e

A.2. Location of project activity

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Project activity landfill site is located in #26, Yanggwa-Dong, Nam-Gu, Gwangju Metropolitan City, which is the province located in the south-western part of Korea. 35° 05' 18.84" N / 126° 53' 10. 79" E (35.088567°/126.886331°)

¹ Refer to the IRR, the generator capacity was written as respectively 1,060kW by plant and economic evaluation was performed reflecting 1,060kW. But when PP registered PDD, PP simply marked generator capacity as 1MW.



A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Republic of Korea (Host)	Public entity: Environmental Corporation of Gwangju	NO
	Private entity: PANAX ENERGY Co.,Ltd	
	Public entity: Gwangju Metropolitan City	
	Private entity: Ecoeye Co. Ltd	

A.4. References to applied methodologies and standardized baselines

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- **The applied methodology(ies):**

The version 06 of AMS III.G. "Landfill methane recovery"

The version 16 of AMS I.D. "Grid connected renewable electricity generation"

- **The applied tools:**

"Tool to calculate the emission factor for an electricity system Ver.2"

"Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site Ver.4"

"Tools for the demonstration and assessment of additionality" Ver.5.2"

A.5. Crediting period type and duration

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- Type : Fixed
- Start date : 21/02/2011
- Length of the crediting period : 10y(21/02/2011 ~ 20/02/2021)
- 5 monitoring period: 01/01/2018 ~ 31/12/2018

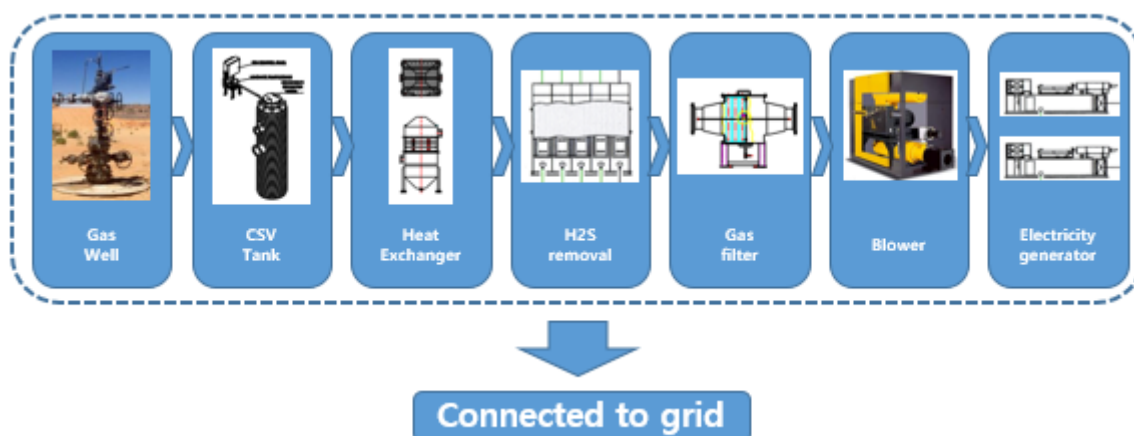
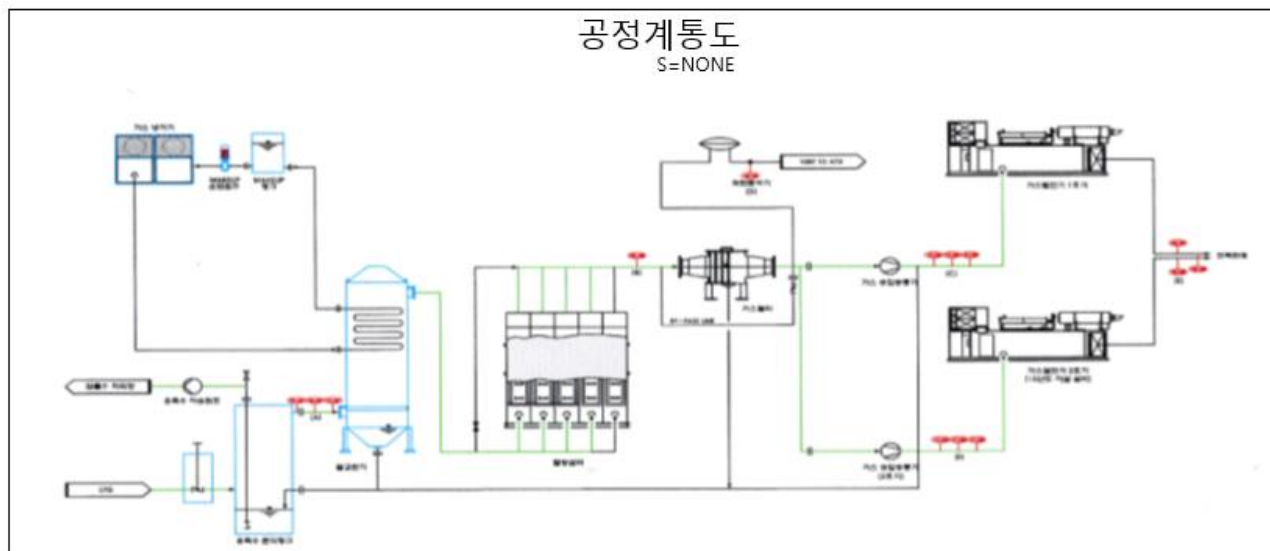
SECTION B. Implementation of project activity

B.1. Description of implemented project activity

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• Technical process

The proposed project includes LFG(landfill gas) collection and electricity generation with grid connection. The project facilities consist of three systems, which are LFG collection system, LFG pre-treatment system, and electricity generation system. The project activity does not include LFG flaring system and existing flaring tips have not been operated since the project began. Therefore, the whole amount of captured LFG is used for electricity generation only. For preventing methane leakage from LFG collection pipes and power generation system, a block system is installed.



• Installed technology

Type	Details	Quantity
Gas Well	<ul style="list-style-type: none"> material : PE pipe main pipe : 100A(3EA), 150A(3EA), ,200A(3EA), 250A(3EA) Pipe connection : 50A Gas collection extract tablet : 150A(204EA) 	204well
CSV Tank	<ul style="list-style-type: none"> material : High Density Poly Ethylene weight : Approx 1450kg size : DIA/L : 1,000/4,215mm pump type: Positive Displacement flow operating of pump: 80L/min 	1
Heat Exchanger	<ul style="list-style-type: none"> material : STS304, STC302 weight : 815kg size : 1,835x1,635x3,652 volume : 2,000m³/h design pressure : -15Kpa/MAX 	1

H ₂ S removal set	<ul style="list-style-type: none"> · type : dry process · H₂S density of input gas : 500ppm · H₂S density of exhaust gas : 50ppm · size : 2,500x1,600x2700mm · volume : 1,200Nm³/hr · max internal pressure : -20kpa 	1
Gas Filter	<ul style="list-style-type: none"> · material : STS304, STC302 · weight : 250kg · size : 1,600x1210x949 · fluid flow : methane · capacity : 1,000m³/h · design pressure : 150KGF/CM²G 	1
Blower	<ul style="list-style-type: none"> · type : SP 125 IM · no : 3099418 · capacity : 17m³/min · speed : 1770RPM · discharge pressure : 0.1kg/cm² 	2
Generator	<ul style="list-style-type: none"> · manufacturer : STAMFORD · type : HCI 634 K2 · volume : 1,060kW · voltage : 480v · speed : 1,800rpm 	2

• Information on the implementation and actual operation of the project activity

Item	Gwangju	
Overhaul	- 1# Generator	
	Date	details
	02/02/2018 ~ 05/02/2018	General maintenance
	05/07/2018 ~ 30/07/2018	Semi-overhaul
	29/08/2018 ~ 02/09/2018	Emergency maintenance
	01/10/2018 ~ 04/10/2018	Emergency maintenance
	- 2# Generator	
	Date	details
	08/05/2018 ~ 10/05/2018	General maintenance
	20/06/2018 ~ 24/06/2018	General maintenance
	01/08/2018 ~ 14/08/2018	Emergency maintenance
	15/08/2018 ~ 20/08/2018	General maintenance
	07/11/2018 ~ 30/11/2018	Emergency maintenance
Downtime	- 1# Generator	
	Date	details
	01/01/2018 ~ 11/01/2018	Leanox Control of deviation exceeded
	22/01/2018 ~ 31/01/2018	Generator trip of reverse power
	08/02/2018 ~ 16/02/2018	dT/dt Mixture Temperature Maximum TIRP
	19/02/2018 ~ 26/02/2018	Mains Failure
	27/02/2018 ~ 11/03/2018	dT/dt Mixture Temperature Maximum TIRP
	- 2# Generator	
	Date	details
	07/04/2018 ~ 15/04/2018	Ignition Trigger Pickup Missing
	18/04/2018 ~ 20/04/2018	Mains Failure
	23/04/2018 ~ 25/04/2018	Leanox Control of deviation exceeded
	03/05/2018 ~ 06/05/2018	Leanox Control of deviation exceeded
	25/06/2018 ~ 04/07/2018	Soaring of bearing temperature
	23/08/2018 ~ 28/08/2018	dT/dt Mixture Temperature Maximum TIRP
03/09/2018 ~ 10/09/2018	Jacket Water Pressure Low	
11/09/2018 ~ 14/09/2018	Knocking Failure	
15/09/2018 ~ 19/09/2018	Ignition Reset Pickup Missing	

		Ignition System Failure
	05/10/2018 ~ 20/11/2018	Oil filter diff pressure high
Equipment exchange	-	

• **Events of situations which may impact on the applicability of the methodology**

There are no events of situations that occurred during the monitoring period that may impact the applicability of the applied methodology.

B.2. Post-registration changes

B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents

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N/A

B.2.2. Corrections

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N/A

B.2.3. Changes to the start date of the crediting period

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N/A

B.2.4. Inclusion of monitoring plan

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N/A

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

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N/A

B.2.6. Changes to project design

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The following changes have been made in the registered PDD ver.6.0 and the request for approval submitted with the 1st monitoring report.

1. Technical specifications of installed equipment
2. Unit of measurement of a monitored parameter, $LFG_{burnt,y}$
3. Information of PP in the registered PDD

The request for post-registration changes was approved on 06 Jan 16, and can be found by reference number PRC-4294-001.

There is one temporary deviation found in 4th monitoring report.

1. Failure of Gas analyser (Duration of temporary deviation From 14/08/2017 to 04/11/2017)
- Can be found by reference number PRC-4294-002.

B.2.7. Changes specific to afforestation or reforestation project activity

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N/A

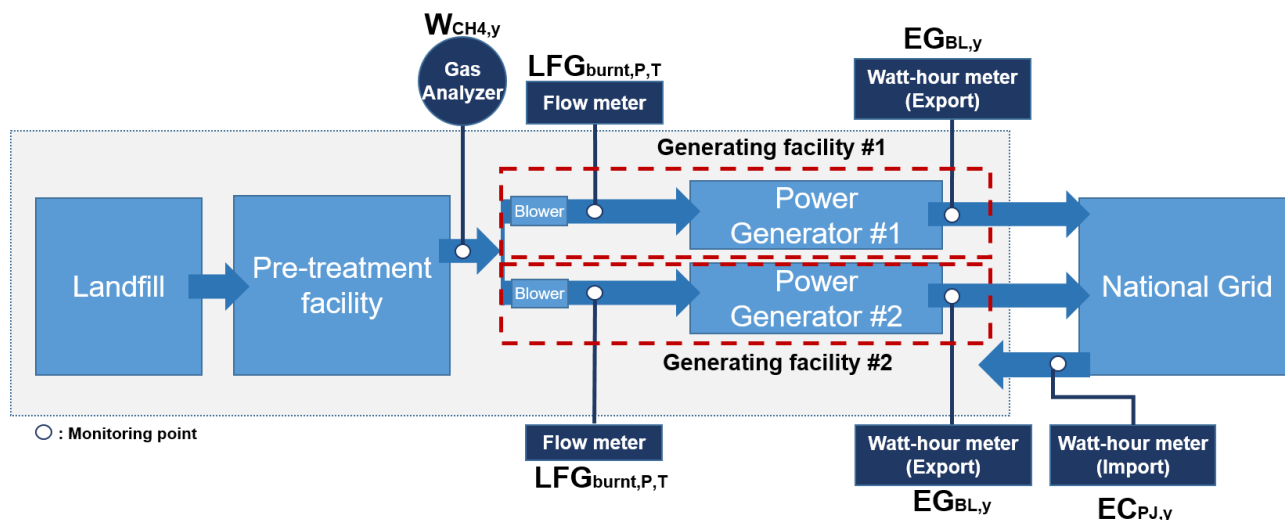
SECTION C. Description of monitoring system

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- **Date collection procedure and Monitoring Point for the project**

There are 2 monitoring points located between the blower and the generator of each generating facility. Mainly 2 gas flow meters installed at each monitoring point and measuring LFG flow rate and one spare meter is used when either of meters have been through calibration or broken down. The gas flow meter measures the temperature, pressure, and the amount of collected LFG automatically and displays normalized volume in standard cubic meter.

A continuous methane analyzer is used to measure the fraction of methane in LFG fed into the gas engine. Watthour meters were installed for measuring the electricity export and electricity import separately.



• Operational and management structure



• Quality Control(QC) / Quality Assurance(QA) and Emergency procedure

1. Monitoring equipment

- 1-1. Electricity measuring meters were set up transparently in accordance with “Measures Act” and “Rules on the operation of the electricity market” and sealed after the affirmation of Korea Power Exchange(hereinafter referred to as KPX).
- 1-2. Other monitoring equipments were installed and operated in accordance with AMS I.D and AMS III.G.
- 1-3. The monitoring equipments were certified when they were produced. Since then, periodic calibration has been implemented as stated in B.7.1 of the registered PDD. Calibration frequency is determined in accordance with domestic and UNFCCC regulations. If any monitoring equipment were considered to be performing abnormally, appropriate actions should be made immediately.

2. Electricity monitoring

- 2-1. The amount of electricity exported to the grid is measured automatically by established meter. The measured data are also checked by central control system of KPX.
- 2-2. The measured data of the electricity export are collected electronically in daily, weekly, and monthly basis. The measured data of the electricity import are collected by monthly bill issued by Korea Electric Power Corporation (hereinafter referred to as KEPCO).
- 2-3. The collected electricity production data as in article 2-2 are compared with those of KPX.
- 2-4. If the collected data differ from the data provided by KPX, when the data were being compared as stated in article 2-3, project site manager shall identify the reason for the difference. As the source of issue identified, monitoring report shall specify how to treat the concern data in calculation of the amount of emission reduction. In case of errors to meters internal investigation and correction procedure shall be followed by the site manager.

3. Other parameters monitoring

- 3-1. The major parameters measured automatically by metering equipment ($LFG_{burnt,y}$, $W_{CH_4,y}$ etc.) are monitoring continuously and recorded automatically in computer.

3-2 Other monitoring parameters are monitoring in accordance with B.7.1 of the registered PDD.

4. Training & guideline for CDM monitoring

- 4-1. All employees directly involved in the monitoring process are training for monitoring and managing its data and equipment. The engineers at the project site is in touch with the CDM consultants to get proper guideline for monitoring activity. In addition, the separate monitoring manual is prepared for the engineers to implement monitoring and managing monitoring equipment appropriately.

The monitored data will be archived until 2 years after the end of the period of the project activity.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	ϵ_{BL}
Unit	%
Description	Destruction efficiency of the baseline system(fraction)
Source of data	Survey for estimating GHG emission and establishing statistics in landfill, August 2006, Ministry of Environment
Value(s) applied	5.2%
Choice of data or measurement methods and procedures	Sourced from the research document.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	N/A

Data/parameter:	CE
Unit	%
Description	LFG capturing efficiency of the proposed project LFG collection system
Source of data	Seohee Construction Co. Ltd.
Value(s) applied)	55%
Choice of data or measurement methods and procedures	Technological survey of Seohee Construction Co. Ltd.
Purpose of data	Calculation of baseline emissions
Additional comments	N/A

Data/parameter:	D_{CH_4}
Unit	$tCH_4/m^3 CH_4$
Description	Methane density

Source of data	ACM0001 version 05
Value(s) applied)	0.0007168tCH ₄ /m ³ CH ₄
Choice of data or measurement methods and procedures	At standard temperature and pressure(0 degree Celsius and 1,013 bar) the density of methane is 0.0007168 tCH ₄ /m ³ CH ₄
Purpose of data	Calculation of baseline emissions
Additional comments	N/A

Data/parameter:	EF _{Grid,CM,y}
Unit	tCO ₂ e/MWh
Description	CO ₂ emission factor for electricity grid in baseline
Source of data	Calculated
Value(s) applied)	0.6018 tCO ₂ e/MWh
Choice of data or measurement methods and procedures	This value was calculated according to “Tool for calculation of emission factor for electricity system “. Applied value was calculated using Statistics of Electric Power in KOREA (2006,2007,2008, KEPCO) and Status of Generation facility(2008) (Korea Power Exchange)
Purpose of data	Calculation of baseline emissions
Additional comments	This value corresponds to EF _{CO2} in ER calculation.

Data / Parameter:	EF _{Grid,OM,y}
Unit:	tCO ₂ e/MWh
Description:	CO ₂ Operating Margin emission factor of the grid
Source of data:	Calculated
Value(s) applied):	0.6816 tCO ₂ e/MWh
Choice of data or measurement methods and procedures	This value was calculated according to “Tool for calculation of emission factor for electricity system”. Applied value was calculated using Statistics of Electric Power in KOREA (2006,2007,2008, KEPCO) and Status of Generation facility(2008) (Korea Power Exchange).
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

Data / Parameter:	EF _{Grid,BM,y}
Unit:	tCO ₂ e/MWh
Description:	CO ₂ Build Margin emission factor of the grid
Source of data:	Calculated
Value(s) applied):	0.5221 tCO ₂ e/MWh
Choice of data or measurement methods and procedures	This value was calculated according to “Tool for calculation of emission factor for electricity system “.Applied value was calculated using Statistics of Electric Power in KOREA (2006,2007,2008, KEPCO) and Status of Generation facility(2008) (Korea Power Exchange).
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

Data / Parameter:	Ø
Unit:	N/A
Description:	Model correction factor to account for model uncertainties
Source of data:	“Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site Ver.4”
Value(s) applied):	0.9

Choice of data or measurement methods and procedures	The above default value is suggested in "Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site Ver.4"
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

Data / Parameter:	OX
Unit:	N/A
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:	Use the IPCC 2006 Guidelines for National Greenhouse Gas Inventories for the choice of the value to be applied.
Value(s) applied:	0.1
Choice of data or measurement methods and procedures	For managed solid waste disposal sites which are covered with oxidizing material such as soil or compost. As Gwangju landfill has daily soil cover, OX is 0.1
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

Data / Parameter:	DOC _i														
Unit:	%														
Description:	Fraction of degradable organic carbon (by weight) in the waste type j														
Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Tables 2.4, and 2.5)														
Value(s) applied:	<table border="1"> <thead> <tr> <th>Waste type j</th><th>DOC_j(% wet waste)</th></tr> </thead> <tbody> <tr> <td>Wood and wood product</td><td>43%</td></tr> <tr> <td>Pulp, paper and cardboard(other than sludge)</td><td>40%</td></tr> <tr> <td>Food, food waste, beverages and tobacco</td><td>15%</td></tr> <tr> <td>Textiles</td><td>24%</td></tr> <tr> <td>Garden, yard and park waste</td><td>20%</td></tr> <tr> <td>Glass, plastic, metal, other inert waste</td><td>0%</td></tr> </tbody> </table>	Waste type j	DOC _j (% wet waste)	Wood and wood product	43%	Pulp, paper and cardboard(other than sludge)	40%	Food, food waste, beverages and tobacco	15%	Textiles	24%	Garden, yard and park waste	20%	Glass, plastic, metal, other inert waste	0%
Waste type j	DOC _j (% wet waste)														
Wood and wood product	43%														
Pulp, paper and cardboard(other than sludge)	40%														
Food, food waste, beverages and tobacco	15%														
Textiles	24%														
Garden, yard and park waste	20%														
Glass, plastic, metal, other inert waste	0%														
Choice of data or measurement methods and procedures	The above default value is suggested in "Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site Ver.4".														
Purpose of data:	Calculation of baseline emissions														
Additional comment:	N/A														

Data / Parameter:	DOC _f
Unit:	%
Description:	Fraction of degradable organic carbon (DOC) that can decompose
Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied:	0.5
Choice of data or measurement methods and procedures	The above default value is suggested in "Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site Ver.4".
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

Data / Parameter:	MCF
Unit:	N/A
Description:	Methane correction factor

Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied:	1.0
Choice of data or measurement methods and procedures	The project site is categorized as „anaerobic managed solid waste disposal site“.
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

Data / Parameter:	$W_{i,x}$
Unit:	%
Description:	Amount of organic waste type j prevented from disposal in the SWDS in the year x (tons)
Source of data:	The project site(Gwangju landfill)-specific data collected by Gwangju Environmental Installations Co.
Value(s) applied:	Refer to the separate calculation sheet.
Choice of data or measurement methods and procedures	Since the landfill operation started, Gwangju Environmental Installations Co. has collected the waste amount and composition data by monitoring and analyzing the waste received.
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

Data / Parameter:	K _j																
Unit:	N/A																
Description:	Decay rate for the waste type j																
Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Tables 3.3)																
Value(s) applied:	<table><tr><th colspan="2">Waste type j</th><th>K_j Dry (MAP/PET < 1)</th></tr><tr><td rowspan="2">Slowly Degrading</td><td>Pulp, paper, cardboard(other than sludge), textiles</td><td>0.04</td></tr><tr><td>Wood, wood products and straw</td><td>0.02</td></tr><tr><td>Moderately degrading</td><td>Other (non-food) organic putrescible garden and park waste</td><td>0.05</td></tr><tr><td>Rapidly degrading</td><td>Food, food waste, beverages and tobacco (other than sludge)</td><td>0.06</td></tr></table>			Waste type j		K _j Dry (MAP/PET < 1)	Slowly Degrading	Pulp, paper, cardboard(other than sludge), textiles	0.04	Wood, wood products and straw	0.02	Moderately degrading	Other (non-food) organic putrescible garden and park waste	0.05	Rapidly degrading	Food, food waste, beverages and tobacco (other than sludge)	0.06
Waste type j		K _j Dry (MAP/PET < 1)															
Slowly Degrading	Pulp, paper, cardboard(other than sludge), textiles	0.04															
	Wood, wood products and straw	0.02															
Moderately degrading	Other (non-food) organic putrescible garden and park waste	0.05															
Rapidly degrading	Food, food waste, beverages and tobacco (other than sludge)	0.06															
Choice of data or measurement methods and procedures	The above default values applicable for the region where Mean Annual Temperature (MAT) is below 20°C and mean annual precipitation(MAP) is less than Potential evapo-transpiration(PET), according to the “Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site.” The MAT of Gwangju city is 13.9°C which is consistent with the above condition. It is assumed that MAP is less than PET in conservative manner because there is no information about PET in Gwangju.																
Purpose of data:	Calculation of baseline emissions																
Additional comment:	10 years mean value (1996~2005) MAT(Mean Annual Temperature) : 13.9 MAP(Mean Annual Precipitation): 1524.6 mm PET(Potential evapo-transpiration): N/A Based on data observed at meteorological observatory in Gwangju Data source :Korea Meteorological Association																

Data / Parameter:	F
Unit:	N/A
Description:	Fraction of methane in the SWDS gas (volume faction)
Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied:	0.5

Choice of data or measurement methods and procedures	This factor reflects the fact that some degradable organic carbon doesn't degrade, or degrades very slowly, under anaerobic conditions in the SWDS. A default value of 0.5 is recommended by IPCC
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

Data / Parameter:	f
Unit:	N/A
Description:	Fraction of methane captured at the SWDS and flared, combusted or used in another manner
Source of data:	Written information from the operator of the solid waste disposal site and/or site visits at the solid waste disposal site
Value(s) applied:	0
Choice of data or measurement methods and procedures	According to the AMS.III.G, this value corresponds to zero. $MD_{reg,y}$ is considered in the ER calculation.
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

D.2. Data and parameters monitored

Data/Parameter	$MG_{PR,1}$
Unit	tCH ₄
Description	Amount of methane generated during the first year of the project activity estimated using the actual amount of waste disposed in the landfill
Measured/calculated/default	Calculated using "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site Ver.4"
Source of data	Calculated from the data collected by the Environmental Corporation of Gwangju
Value(s) of monitored parameter	1,276.31tCH ₄
Monitoring equipment	N/A
Measuring/reading/recording frequency	Continuous measuring and reading, hourly recording
Calculation method (if applicable)	N/A
QA/QC procedures	As per "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site Ver.4"
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	This parameter was measured at 1 st monitoring period to calculate $\epsilon_{PR,1}$.

Data/parameter:	$MD_{PR,1}$
Unit	tCH ₄
Description	Amount of methane destroyed by the project activity during the first year of the project activity
Measured/calculated/default	Calculated from the monitoring data.
Source of data	Using the value of the first year collected through the monitoring equipment(flow meter & gas analyser)
Value(s) of monitored parameter	958.43tCH ₄

Monitoring equipment	N/A
Measuring/ reading/ recording frequency:	Continuous measuring and reading, hourly recording
Calculation method (if applicable):	N/A
QA/QC procedures:	Related monitoring equipments (flow meter & gas analyser) are subject to a regular maintenance and testing regime to ensure accuracy.
Purpose of data:	Calculation of baseline emissions
Additional comments:	This parameter was measured at 1 st monitoring period to calculate $\epsilon_{PR,1}$.

Data/parameter:	LFG _{burnt,y}														
Unit	Nm ³														
Description	Landfill gas flared or used as fuel in the year y														
Measured/ calculated/ default	Measured by flow meter Measured and archived continuously in form of electronic data file														
Source of data	Data of acquisition for Flow meter														
Value(s) of monitored parameter	<table border="1"> <thead> <tr> <th>Date</th><th>#1</th><th>#2</th><th>total</th></tr> </thead> <tbody> <tr> <td>01/Jan/18 ~ 31/Dec/18</td><td>758,199Nm³</td><td>1,681,220Nm³</td><td>2,439,419Nm³</td></tr> <tr> <td>total</td><td>758,199Nm³</td><td>1,681,220Nm³</td><td>2,439,419Nm³</td></tr> </tbody> </table> <p>Total LFG_{burnt,y} is the sum of the data measured from 2 monitoring points(details are below) and each of data is the amount of LFG used in each power generating facility in this project.</p>			Date	#1	#2	total	01/Jan/18 ~ 31/Dec/18	758,199Nm ³	1,681,220Nm ³	2,439,419Nm ³	total	758,199Nm ³	1,681,220Nm ³	2,439,419Nm ³
Date	#1	#2	total												
01/Jan/18 ~ 31/Dec/18	758,199Nm ³	1,681,220Nm ³	2,439,419Nm ³												
total	758,199Nm ³	1,681,220Nm ³	2,439,419Nm ³												

Monitoring equipment	<p>- Equipment: Flow meter</p> <p>- Quantity: 3 (Main-flow meter: 2, Sub-flow meter: 1)</p> <p>- Details:</p> <p>There are 2 monitoring points located at the front of each power generator (#1, 2) to measuring the amount of landfill gas used by each of the generating facility. There are 3 flow meters used in rotation (2 main meters and 1 spare meter) and normally 2 flow meters are installed to each monitoring point and 1 flow meter is kept for maintenance or calibration in rotation. The specific date which meter used for each monitoring point during the monitoring period is below.</p> <p>a) LFG #1</p> <table border="1"> <thead> <tr> <th>Used period</th> <th>Serial number</th> </tr> </thead> <tbody> <tr> <td>20/07/2018 ~ Present</td> <td>13121202</td> </tr> <tr> <td>02/02/2018 ~ 09/06/2018</td> <td>13121202</td> </tr> <tr> <td>26/10/2016 ~ 28/01/2018</td> <td>23082001</td> </tr> </tbody> </table> <p>Deducted date: From 29/01/2018 to 01/02/2018</p> <p>b) LFG #2</p> <table border="1"> <thead> <tr> <th>Used period</th> <th>Serial number</th> </tr> </thead> <tbody> <tr> <td>20/07/2018 ~ Present</td> <td>23082001</td> </tr> <tr> <td>10/06/2018 ~ 19/07/2018</td> <td>13121202</td> </tr> <tr> <td>26/10/2016 ~ 09/06/2018</td> <td>28041404</td> </tr> </tbody> </table> <p>Detailed specification for each flow meter is below.</p> <p>* Main flow meter 1</p> <table border="1"> <tbody> <tr> <td>Model</td> <td>8840MP-SSS-133-DC24-6"-LFG</td> </tr> <tr> <td>Accuracy class</td> <td>± 1.0%</td> </tr> <tr> <td>Serial number</td> <td>28041404</td> </tr> <tr> <td>Calibration frequency</td> <td>2years</td> </tr> <tr> <td>Date of the calibration certificate</td> <td>10/06/2016</td> </tr> <tr> <td>Used period</td> <td>26/10/2016 ~ 09/06/2018 (LFG #2)</td> </tr> <tr> <td>Validity period</td> <td>10/06/2016 ~ 09/06/2018</td> </tr> </tbody> </table> <p>* Main flow meter 2</p> <table border="1"> <tbody> <tr> <td>Type</td> <td>8840MP-SSS-133-DC24-6"-LFG</td> </tr> <tr> <td>Accuracy class</td> <td>± 1.0%</td> </tr> <tr> <td>Serial number</td> <td>23082001</td> </tr> <tr> <td>Calibration frequency</td> <td>2years</td> </tr> <tr> <td>Date of the calibration certificate</td> <td>19/07/2018 29/01/2016</td> </tr> <tr> <td>Used period</td> <td>20/07/2018 ~ 31/12/2018 (LFG #2) 26/10/2016 ~ 02/02/2018 (LFG #1)</td> </tr> <tr> <td>Validity period</td> <td>29/01/2016 ~ 28/01/2018</td> </tr> </tbody> </table> <p>* Sub-flow meter 1</p> <table border="1"> <tbody> <tr> <td>Type</td> <td>8840MP-SSS-133-DC24-6"-LFG</td> </tr> <tr> <td>Accuracy class</td> <td>± 1.0%</td> </tr> <tr> <td>Serial number</td> <td>13121202</td> </tr> <tr> <td>Calibration frequency</td> <td>2years</td> </tr> <tr> <td>Date of the calibration certificate</td> <td>02/02/2018</td> </tr> <tr> <td>Used period</td> <td>20/07/2018 ~ 31/12/2018 (LFG #1) 10/06/2018 ~ 19/07/2018 (LFG #2) 02/02/2018 ~ 09/06/2019 (LFG #1)</td> </tr> <tr> <td>Validity period</td> <td>02/02/2018 ~ 01/02/2020</td> </tr> </tbody> </table>	Used period	Serial number	20/07/2018 ~ Present	13121202	02/02/2018 ~ 09/06/2018	13121202	26/10/2016 ~ 28/01/2018	23082001	Used period	Serial number	20/07/2018 ~ Present	23082001	10/06/2018 ~ 19/07/2018	13121202	26/10/2016 ~ 09/06/2018	28041404	Model	8840MP-SSS-133-DC24-6"-LFG	Accuracy class	± 1.0%	Serial number	28041404	Calibration frequency	2years	Date of the calibration certificate	10/06/2016	Used period	26/10/2016 ~ 09/06/2018 (LFG #2)	Validity period	10/06/2016 ~ 09/06/2018	Type	8840MP-SSS-133-DC24-6"-LFG	Accuracy class	± 1.0%	Serial number	23082001	Calibration frequency	2years	Date of the calibration certificate	19/07/2018 29/01/2016	Used period	20/07/2018 ~ 31/12/2018 (LFG #2) 26/10/2016 ~ 02/02/2018 (LFG #1)	Validity period	29/01/2016 ~ 28/01/2018	Type	8840MP-SSS-133-DC24-6"-LFG	Accuracy class	± 1.0%	Serial number	13121202	Calibration frequency	2years	Date of the calibration certificate	02/02/2018	Used period	20/07/2018 ~ 31/12/2018 (LFG #1) 10/06/2018 ~ 19/07/2018 (LFG #2) 02/02/2018 ~ 09/06/2019 (LFG #1)	Validity period	02/02/2018 ~ 01/02/2020
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	.
Measuring/ reading/ recording frequency:	Continuous measuring and reading, hourly recording
Calculation method (if applicable):	N/A
QA/QC procedures:	Flow meters should be subject to a regular maintenance and testing regime to ensure accuracy. Calibrated every two years
Purpose of data:	Calculation of baseline emissions
Additional comments:	N/A

Data/parameter:	W _{CH4,y}															
Unit	m ³ CH ₄ /m ³ LFG															
Description	Methane content in landfill gas in the year y															
Measured/ calculated/ default	Measured by gas analyser Measured and archived continuously in form of electronic data file.															
Source of data	Data of acquisition for Gas analyser															
Value(s) of monitored parameter	<table><tr><td>Date</td><td>Average</td><td>#1</td><td>#2</td></tr><tr><td>01/Jan/18 ~ 31/Dec/18</td><td>32.1%</td><td>30.6%</td><td>33.6%</td></tr><tr><td>total</td><td>32.1%</td><td>30.6%</td><td>33.6%</td></tr></table>				Date	Average	#1	#2	01/Jan/18 ~ 31/Dec/18	32.1%	30.6%	33.6%	total	32.1%	30.6%	33.6%
	Date	Average	#1	#2												
	01/Jan/18 ~ 31/Dec/18	32.1%	30.6%	33.6%												
total	32.1%	30.6%	33.6%													
	For calculating of baseline emission, each generating facility used daily value of W _{CH4,y} considering the operation of generating facility. W _{CH4,y} #1, 2 in the upper table is the representative value calculated backward from LFG _{burnt,y} of each facility.															
Monitoring equipment	- Equipment: Gas analyser															
	- Quantity: 2 (one is original analyser another is potable analyser)															
	- Details:															
	* Main analyser															
	Tag	AN-101														
	Type	ZRJF4C15-BUXRX-RYYLVAY-A														
	Accuracy class	± 1.0%														
	Serial number	A9K5306T														
	Calibration frequency	3years														
	Date of the calibration certificate	06/01/2015, 10/01/2018														
Validity period	06/01/2015 ~ 05/01/2018 10/01/2018 ~ 09/01/2021															
	* Portable analyser															
	Tag	Portable analyser														
	Type	Biogas 5000														
	Accuracy class	± 0.5%														
	Serial number	G504526														
	Calibration frequency	3years														
	Date of the calibration certificate	02/03/2017														
	Validity period	02/03/2017 ~ 01/03/2020														
	Using date: From 14/08/2017 to 04/11/2017															
Measuring/ reading/ recording frequency:	Continuous measuring and reading, hourly recording In case of portable analyser once a one day measuring and recording															
Calculation method (if applicable):	N/A															

QA/QC procedures:	The gas analyzer is subject to a regular maintenance and testing regime to ensure accuracy. Calibrate the meter every three years
Purpose of data:	Calculation of baseline emissions
Additional comments:	N/A

Data / Parameter:	T
Unit:	°C
Description:	Temperature of the landfill gas
Measured/ Calculated / Default:	Measured to determine the density of methane D_{CH_4} No separate monitoring of temperature will be done as the project LFG flow meter automatically measures temperature and pressure, expressing LFG volumes in normalized cubic meters
Source of data:	Data of acquisition for Temperature Gauges
Value(s) of monitored parameter:	Reference data
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	Continuous measuring and reading, hourly recording
Calculation method (if applicable):	N/A
QA/QC procedures:	Measuring instruments should be subject to a regular maintenance and testing regime in accordance to appropriate national/international standards
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

Data / Parameter:	P
Unit:	Pa
Description:	Pressure of the landfill gas
Measured/ Calculated / Default:	Measured to determine the density of methane D_{CH_4} No separate monitoring of temperature will be done as the project LFG flow meter automatically measures temperature and pressure, expressing LFG volumes in normalized cubic meters
Source of data:	Data of acquisition for Pressure Gauges
Value(s) of monitored parameter:	Reference data
Monitoring equipment:	N/A2
Measuring/ Reading/ Recording frequency:	Continuous measuring and reading, hourly recording
Calculation method (if applicable):	N/A
QA/QC procedures:	Measuring instruments should be subject to a regular maintenance and testing regime in accordance to appropriate national/international standards
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

Data / Parameter:	$EG_{BL,y}$
Unit:	MWh
Description:	Total amount of electricity exported to the grid by the project activity

Measured/ Calculated / Default:	Measured by watt-hour meter																															
Source of data:	Measured by Watt-hour meters installed at the project site																															
Value(s) of monitored parameter:	<table border="1"> <thead> <tr> <th>Date</th> <th>#1</th> <th>#2</th> <th>total</th> </tr> </thead> <tbody> <tr> <td>01/Jan/18 ~ 31/Dec/18</td> <td>897.939MWh</td> <td>2,000.459MWh</td> <td>2,898.398MWh</td> </tr> <tr> <td>total</td> <td>897.939MWh</td> <td>2,000.459MWh</td> <td>2,898.398MWh</td> </tr> </tbody> </table>				Date	#1	#2	total	01/Jan/18 ~ 31/Dec/18	897.939MWh	2,000.459MWh	2,898.398MWh	total	897.939MWh	2,000.459MWh	2,898.398MWh																
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total	897.939MWh	2,000.459MWh	2,898.398MWh																													
Monitoring equipment:	<p>- Equipment: watt-hour meter - Quantity: 2 - Details:</p> <table border="1"> <tr> <td>Tag</td> <td>WH-101(1# generator)</td> </tr> <tr> <td>Type</td> <td>SCE8711</td> </tr> <tr> <td>Accuracy class</td> <td>± 0.5%</td> </tr> <tr> <td>Serial number</td> <td>53048181</td> </tr> <tr> <td>Calibration frequency</td> <td>3years</td> </tr> <tr> <td>Date of the latest calibration</td> <td>04/04/2019</td> </tr> <tr> <td>Validity period</td> <td>04/04/2019 ~ 03/04/2022 27/07/2015 ~ 26/07/2018</td> </tr> </table> <p>Deducted date: From 27/07/2018 to 03/04/2019</p> <table border="1"> <tr> <td>Tag</td> <td>WH-201(2# generator)</td> </tr> <tr> <td>Type</td> <td>TWR-ALM1</td> </tr> <tr> <td>Accuracy class</td> <td>± 0.5%</td> </tr> <tr> <td>Serial number</td> <td>4349712</td> </tr> <tr> <td>Calibration frequency</td> <td>3years</td> </tr> <tr> <td>Date of the latest calibration</td> <td>04/04/2019</td> </tr> <tr> <td>Validity period</td> <td>04/04/2019 ~ 03/04/2022 24/12/2015 ~ 23/12/2018</td> </tr> </table> <p>Deducted date: From 27/07/2018 to 03/04/2019</p>				Tag	WH-101(1# generator)	Type	SCE8711	Accuracy class	± 0.5%	Serial number	53048181	Calibration frequency	3years	Date of the latest calibration	04/04/2019	Validity period	04/04/2019 ~ 03/04/2022 27/07/2015 ~ 26/07/2018	Tag	WH-201(2# generator)	Type	TWR-ALM1	Accuracy class	± 0.5%	Serial number	4349712	Calibration frequency	3years	Date of the latest calibration	04/04/2019	Validity period	04/04/2019 ~ 03/04/2022 24/12/2015 ~ 23/12/2018
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Date of the latest calibration	04/04/2019																															
Validity period	04/04/2019 ~ 03/04/2022 24/12/2015 ~ 23/12/2018																															
Measuring/ Reading/ Recording frequency:	Continuous measuring and reading, hourly recording																															
Calculation method (if applicable):	N/A																															
QA/QC procedures:	The watt-hour meter is subject to a regular maintenance and testing regime to ensure accuracy.																															
Purpose of data:	Calculation of baseline emissions																															
Additional comment:	N/A																															

Data / Parameter:	$EC_{PJ,y}$
Unit:	MWh
Description:	Electricity supplied from the grid by the project activity during the year y
Measured/ Calculated / Default:	The electricity for the project activity is from the grid. If any, corresponding amount will be monitored and considered as $PE_{EC,y}$. Measured by watt-hour meter.
Source of data:	Data of acquisition for electronic bills

Value(s) of monitored parameter:	<p>There is 1 monitoring point for measuring total amount of electricity supplied from the grid, $EC_{PJ,y}$.</p> <p>Total: 50,640kWh</p> <p>$EC_{PJ,y}$ #1, 2 in below tables is determined by operation of each generating facility.</p> <p>Generator #1:</p> <table border="1"> <tr> <td>01/Jan/18 ~ 31/Dec/18</td><td>15,689kWh</td></tr> <tr> <td>Total</td><td>15,689kWh</td></tr> </table> <p>Generator #2:</p> <table border="1"> <tr> <td>01/Jan/18 ~ 31/Dec/18</td><td>34,951kWh</td></tr> <tr> <td>Total</td><td>34,951kWh</td></tr> </table>	01/Jan/18 ~ 31/Dec/18	15,689kWh	Total	15,689kWh	01/Jan/18 ~ 31/Dec/18	34,951kWh	Total	34,951kWh										
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01/Jan/18 ~ 31/Dec/18	34,951kWh																		
Total	34,951kWh																		
Monitoring equipment:	<ul style="list-style-type: none"> - Equipment: watt-hour meter - Quantity: 1 - Details: <p>watthour meter which collects electricity supplied from the grid was replaced by a new device on 19 Dec 2016.</p> <table border="1"> <tr> <td></td><td>After replacement</td></tr> <tr> <td>Tag</td><td>WH-102</td></tr> <tr> <td>Type</td><td>OMWH-3405H</td></tr> <tr> <td>Accuracy class</td><td>± 1.0%</td></tr> <tr> <td>Serial number</td><td>26141004722</td></tr> <tr> <td>Calibration frequency</td><td>3years</td></tr> <tr> <td>Installation date</td><td>16/12/2016</td></tr> <tr> <td>Date of the latest calibration</td><td>01/12/2016</td></tr> <tr> <td>Validity period</td><td>01/12/2016 ~ 30/11/2019</td></tr> </table>		After replacement	Tag	WH-102	Type	OMWH-3405H	Accuracy class	± 1.0%	Serial number	26141004722	Calibration frequency	3years	Installation date	16/12/2016	Date of the latest calibration	01/12/2016	Validity period	01/12/2016 ~ 30/11/2019
	After replacement																		
Tag	WH-102																		
Type	OMWH-3405H																		
Accuracy class	± 1.0%																		
Serial number	26141004722																		
Calibration frequency	3years																		
Installation date	16/12/2016																		
Date of the latest calibration	01/12/2016																		
Validity period	01/12/2016 ~ 30/11/2019																		
Measuring/ Reading/ Recording frequency:	Real-time measurement and monthly records.																		
Calculation method (if applicable):	N/A																		
QA/QC procedures:	<p>The watt-hour meter is subject to a regular maintenance and testing regime to ensure accuracy.</p> <p>Calibrate the meter every three years</p>																		
Purpose of data:	Calculation of baseline emissions																		
Additional comment:	N/A																		

Data / Parameter:	$PE_{EC,y}$
Unit:	tCO ₂ e/yr
Description:	Project emissions from the electricity generated by (an) off-grid fossil fuel fired captive power plant(s).
Measured/ Calculated / Default:	The project is planning to use no electricity from (an) off-grid fossil fuel fired captive power plant(s) in doing project activity. If such electricity is used, corresponding amount will be monitored and calculated according to the latest version of "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"
Source of data:	N/A
Value(s) of monitored parameter:	0

Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	If such electricity is used, corresponding amount will be monitored and calculated according to the latest version of "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"
Calculation method (if applicable):	N/A
QA/QC procedures:	If applicable, related monitoring equipment are subject to regular maintenance and testing regime to ensure accuracy.
Purpose of data:	Calculation of project emissions
Additional comment:	N/A

Data / Parameter:	$PE_{FC,j,y}$
Unit:	tCO ₂ e/yr
Description:	Project emissions from fossil fuel combustion in process j for the project activity during the year y
Measured/ Calculated / Default:	The project is planning to use no fossil fuel in doing project activity. If any fossil fuel is used, corresponding amount will be monitored and calculated according to the latest version of "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"
Source of data:	N/A
Value(s) of monitored parameter:	0
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	If any fossil fuel is used, corresponding amount will be monitored and calculated according to the latest version of "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"
Calculation method (if applicable):	N/A
QA/QC procedures:	If applicable, related monitoring equipment are subject to regular maintenance and testing regime to ensure accuracy.
Purpose of data:	Calculation of project emissions
Additional comment:	N/A

Data/parameter:	GWP _{CH₄}
Unit	tCO ₂ /tCH ₄
Description	Global warming potential for methane (CH ₄)
Source of data	Default value in IPCC & ACM0001 version 5
Value(s) applied)	25
Choice of data or measurement methods and procedures	Refer the decisions under UNFCCC and the Kyoto Protocol (Decision 24/CP.19)
Purpose of data	Calculation of baseline emissions
Additional comments	N/A

D.3. Implementation of sampling plan

>>
N/A

SECTION E. Calculation of emission reductions or net anthropogenic removals

E.1. Calculation of baseline emissions or baseline net removals

>>

1. Baseline emission

$$BE_y = MD_y - MD_{reg,y} + BE_{electricity,y}$$

Where:

- MD_y Methane captured and destroyed/gainfully used by the project activity in the year "y" (tCO₂e).
- $MD_{reg,y}$ Methane emissions that would be captured and destroyed to comply with national or local safety requirement or legal regulations in the year "y" (tCO₂e).
- $BE_{electricity,y}$ The baseline emission from the electricity generation in the absence of the Project activity at year y (tCO₂e). This parameter is calculated according to AMS I.D while other parameters in this equation are calculated according to AMS III.G.

• Generator #1

Period	BE_y (tCO ₂ e)	MD_y (tCO ₂ e)	$MD_{reg,y}$ (tCO ₂ e)	$(EG_{BL,y} - EC_{PJ,y})$ (MWh)	EF_{CO_2} (tCO ₂ e/MWh)
2018	4,399	4,156	288	882	0.6018
Total	4,399				

• Generator #2

Period	BE_y (tCO ₂ e)	MD_y (tCO ₂ e)	$MD_{reg,y}$ (tCO ₂ e)	$(EG_{BL,y} - EC_{PJ,y})$ (MWh)	EF_{CO_2} (tCO ₂ e/MWh)
2018	10,609	10,128	701	1,966	0.6018
Total	10,609				

$$MD_y = LFG_{burnt,y} \times W_{CH_4,y} \times D_{CH_4} \times GWP_{CH_4}$$

Where:

- $LFG_{burnt,y}$ Landfill gas flared or used as fuel in the year "y" (Nm³)
- $W_{CH_4,y}$ Methane content in landfill gas in the year "y"
- D_{CH_4} Density of methane at the temperature and pressure of the landfill gas^s
- GWP_{CH_4} Global warming potential of CH₄

• Generator #1

Period	MD_y (tCO ₂ e)	$LFG_{burnt,y}$ (Nm ³)	$W_{CH_4,y}$ (%)	D_{CH_4} (tonCH ₄ /Nm ³ CH ₄)	GWP_{CH_4}
2018	4,156	758,199	30.6	0.0007168	25
Total	4,156				

• Generator #2

Period	MD_y (tCO ₂ e)	$LFG_{burnt,y}$ (Nm ³)	$W_{CH_4,y}$ (%)	D_{CH_4} (tonCH ₄ /Nm ³ CH ₄)	GWP_{CH_4}
2018	10,128	1,681,220	33.6	0.0007168	25
Total	10,128				

$$MD_{reg,y} = MD_y \times AF_y$$

Where:

- AF_y Adjustment factor for year y

Period	$MD_{reg,y}$ (tCO ₂ e)	MD_y (tCO ₂ e)	AF (%)
2018	989	14,284	6.92%
Total	989		

$$AF_y = \varepsilon_{BL} / \varepsilon_{PR,1}$$

Where:

- ε_{BL} Destruction efficiency of the baseline system(fraction)
- $\varepsilon_{PR,1}$ Destruction efficiency of the system used in the project activity that will remain fixed for

the whole crediting period(fraction)

AF	ϵ_{BL}	$\epsilon_{PR,1}$
6.92%	5.2%	75%

2. Emission reduction

$$ER_y = MD_y - MD_{reg,y} + (EC_{BL,y} - EC_{PJ,y}) \times EF_{CO_2} - PE_y - Leakage$$

Where:

MD_y	Methane captured and destroyed by the project activity in the year “y”(tCO ₂ e)
$MD_{reg,y}$	Methane emissions that would be captured and destroyed to comply with national or local safety requirement or legal regulations in the year “y” (tCO ₂ e)
$EC_{BL,y}$	Total amount of electricity exported to the grid by the project activity in the year y (MWh)
$EC_{PJ,y}$	Electricity supplied from the grid for the project activity in the year y (MWh)
EF_{CO_2}	CO ₂ Emission Factor in year y; tCO ₂ e/MWh. EF_{CO_2} value corresponds to $EF_{grid,CM,y}$
PE_y	Project emissions in year y (tCO ₂ e/yr)
Leakage	If the methane recovery technology is equipment transferred from another activity or if the existing equipment is transferred to another activity, leakage effects are to be considered. The project leakage is zero.

E.2. Calculation of project emissions or actual net removals

>>

As the project activity is not supplied any electricity from (an) off-grid fossil fuel fired captive power plant(s) or not used any fossil fuel during the activity, project emissions not to be calculated.

$$PE_y = PE_{EC,y} + PE_{FC,j,y}$$

Where:

$PE_{EC,y}$	Project emissions from the electricity generated by (an) off-grid fossil fuel fired captive power plant(s). The project emissions from electricity consumption ($PE_{EC,y}$) will be calculated following the latest version of “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”.
$PE_{FC,j,y}$	Project emissions from fossil fuel combustion in process <i>j</i> for the project activity during the year <i>y</i> . The project emissions from fossil fuel combustion ($PE_{FC,j,y}$) will be calculated following the latest version of “Tool to calculate project or leakage CO ₂ emissions from fossil fuel combustion”.

$$PE_y = 0$$

E.3. Calculation of leakage emissions

>>

As the methane recovery technology is not equipment transferred from another activity, leakage is not to be considered.

$$LE_y = 0$$

E.4. Calculation of emission reductions or net anthropogenic removals

	Baseline GHG emissions or baseline net GHG removals (t CO ₂ e)	Project GHG emissions or actual net GHG removals (t CO ₂ e)	Leakage GHG emissions (t CO ₂ e)	GHG emission reductions or net anthropogenic GHG removals (t CO ₂ e)		
				Before 01/01/2013	From 01/01/2013	Total amount
Total	15,008	0	0	0	15,008	15,008

E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

Amount achieved during this monitoring period (t CO ₂ e)	Amount estimated ex ante for this monitoring period in the PDD (t CO ₂ e)
15,008	32,384

E.5.1. Explanation of calculation of “amount estimated ex ante for this monitoring period in the PDD”

>>

The annual emission reduction estimated in the PDD is 32,384tons.

This monitoring period(01/01/2018 ~ 31/12/2018) is 365days. therefore, amount estimated ex-ante for this monitoring period in the PDD is 32,384tons.

E.6. Remarks on increase in achieved emission reductions

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The actual amount of emission reduction in the monitoring period are 15,008 tCO₂e, which are about 53% lower than estimated 2018y in the PDD.

E.7. Remarks on scale of small-scale project activity

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Generator was installed total 2MW. (No other changes)

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
07.0	31 May 2019	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 02.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period; • Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods; • Make editorial improvements.
06.0	7 June 2017	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Make editorial improvements.
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: <ul style="list-style-type: none"> • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.

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