NANHAI MSW INCINERATION II PROJECT

Document Prepared by Climate Bridge Ltd.

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Project Title	Nanhai MSW Incineration II Project
Version	3.0
Report ID	2098-01
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Project ID	VCS 2098
Monitoring Period	01-June-2011 to 31-December-2018 (the first and last days included)[1]
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[1] The emission reductions from the period of 27-February-2012 to 28-February-2015 has been issued as CERs under CDM program, which has been considered as zero under VERRA. And the PP voluntarily gives up the emission reductions achieved during the period from 01-June-2011 to 26-February-2012（Both days included）. Thus, in this monitoring period, the emission reductions achieved in the period from 01-March-2015 to 31-December-2018 (both days included) will be claimed by the PP.

CONTENTS

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Nanhai MSW Incineration II Project (hereafter referred to as the project) is located at Shougouling, Shishan Forestry Centre, Shishan Town, Nanhai District, Foshan City, Guangdong Province, P.R. China. The Project is invested, constructed and operated by Foshan Nanhai Green Renewable Energy Co., Ltd. (hereafter referred to as the project owner).

With three 500t/d MSW combustion production lines, the project will treat 1,500 tons of MSW per diem. The combustion system is composed of three 500t/d mechanical grate incinerators, matched with two sets of 15MW steam turbine and two sets of 20MW generators. The project will process 495,000 tons[2] of MSW every year, and consume 168 tons of 0# light diesel as auxiliary fuel. The MSW combustion line will work 8,000hours every year, generating 168,655 MWh electricity, of which 134,924 MWh will be exported to the South China Power Grid (SCPG) to which the project activity is connected. Since the incinerators will be started one by one and under test run during 2011, the project is expected to be running at 50% of its full capacity in the first year of operation. The construction of the project started on 08-May- 2009. The project started electricity generation in 01-June- 2011. During this monitoring period from 01-March-2015 to 31-December-2018, the implementation of the project is consistent with the description of the registered VCS PD (version 3.0) and CDM PDD (version 11), and no special event occurred.

By combusting MSW that would otherwise be disposed of at landfill, the proposed project activity avoids the emission of methane that would be generated under landfill condition. In the meanwhile, by utilizing the waste heat from the combustion of MSW, the boilers can produce steam to generate power to replace the electricity that would otherwise be generated by fossil-fuel fired power plants which are connected to SCPG. The baseline scenario of this project is the same as the scenario prior to the implementation of the project, namely the landfill gas is vented directly and the equivalent power is supplied by the SCPG. It is estimated that in the first crediting period of the project (from 01-June-2011 to 31-May-2021), the average annual GHG emission reduction will be 212,736 tCO_2e, with the total emission reduction of 2,127,360tCO_2e.

Before the implementation of the project, the local MSW was usually disposed of at nearby landfill, where no landfill gas capturing system erected and the landfill gases are released to atmosphere directly. The equivalent power generated by the project was supplied by the SCPG. The baseline scenario identified in section B.4 is the same as the scenario existing prior to the start of implementation of the project activity. The implementation of the project will meet the requirement of local MSW harmless treatment, and significantly improve local environment.

[2] According to the BOT agreement between project owner and Nanhai Municipal Administration Bureau.

Also, the proposed project fits the priority development sector of integrated utilization of resource and energy saving of China, and helps reduce GHG emission that would occur in baseline scenarios such as power generating by fossil-fuel fired plants and MSW treatment at landfill.

This monitoring period covers the period from 01-June-2011 to 31-December-2018. For the emission reductions generated from 27-February-2012 to 28-February-2015 (both days included) by the project has been issued as CER under CDM program, which has been considered as zero under VERRA. And the project participant voluntarily gives up the emission reductions achieved in the period from 01-June-2011 to 26-February-2012（Both days included）. Thus, in this monitoring period, the emission reductions achieved in the period from 01-March-2015 to 31-December-2018 (both days included) will be claimed by the PP. The actual emission reductions achieved from 01-March-2015 to 31-December-2018 (both days included) are 960,750 tCO_2e.

1.2 Sectoral Scope and Project Type

sector scope 1: energy industries and sector

scope 13: Waste handling and disposal.

The project is not a grouped project.

1.3 Project Proponent

Organization name	Foshan Nanhai Green Renewable Energy Co., Ltd.
Contact person	Tang Yonghua
Title	Engineer
Address	Dalan Branch, Shishan Forest Farm, Nanhai District, Foshan, Guangdong, China
Telephone	+86 13923176432
Email	tanyonghua@grandblue.cn

1.4 Other Entities Involved in the Project

Organization name	Climate Bridge Ltd.
Role in the project	VCU buyer
Contact person	Gao Zhiwen

Title	General Manager
Address	Block B, Level 24, Jiangong Mansion, 33 Fushan Road, Pudong New Area, Shanghai, China 200120
Telephone	+86-2162462036
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1.5 Project Start Date

01-June-2011 *(operation start date).*

1.6 Project Crediting Period

This project adopts renewable crediting periods of 30 years (from 01-June-2011 to 31-May-2041), and the first 10-year crediting period is from 01-June-2011 to 31-May-2021 (both days included).

1.7 Project Location

The project is located within Nanhai District, Foshan City, Guangdong Province. The geographical coordinates are east longitude 113.0328°E and north latitude 23.1575°N, Figure 1-1 shows the geographic location of the project.

1.8 Title and Reference of Methodology

The project is applicable to the approved baseline and monitoring methodology AM0025 "Avoided emissions from organic waste through alternative waste treatment processes"(Version 12).

The methodology also refers to the latest approved versions of the following tools:

- Tool for the demonstration and assessment of additionality (Version 05.2);
- Tool to calculate the emission factor for an electricity system (Version 2.1.0);
- Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (Version 05);
- Tool to determine project emissions from flaring gases containing methane (Version 01).

The above mentioned methodologies and tools are all available at:
http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

1.9 Participation under other GHG Programs

The project has been registered as a Clean Development Mechanism (CDM) project in UNFCCC on 27-February-2012 (UNFCCC Ref. 5297), with the first 7 years crediting period started from 27-February-2012 and can be renewed twice. Total GHG emission reductions of 423,133 tCO_2 generated from 27-February-2012 to 28-February-2015 (both days included) by the project has been issued as CER under CDM program, which has been considered as zero under VERRA in this monitoring period from 01-June-2011 to 31-December-2018. And the project participant voluntarily gives up the emission reductions achieved in the period from 01-June-2011 to 26-February-2012（Both days included）.

Please refer to the following link for details:

https://cdm.unfccc.int/Projects/DB/Germanischer1317298382.09/view?cp=1

Except for CDM, the project did not register under any other GHG program.

1.10 Other Forms of Credit

The project hasn't sought or received another form of environmental credits.

1.11 Sustainable Development

The Project will contribute to sustainable development in the following ways:

- Reduce GHG emission compared to common practice.
- Relieve the pressure of power demand, and improve the innovation in urban resource integrated utilization sector.
- Provide a solution to local MSW sanitary treatment.
- Reduce pollutant release in power sector, compared to common practice.
- Create job opportunities for local government during the construction and operation of the project.

2 SAFEGUARDS

2.1 No Net Harm

The Environment Impact Assessment (EIA) was completed by the South China Environmental Science Research Institute of Ministry of Environmental Protection of the People's Republic of China. On 28 November 2008, the Ministry of Environmental Protection of China approved the EIA of the Project ([2008]471). According to the EIA, the project may have the following potential

influence on local environment, and the Project owner have prepared corresponding plans to control these risks:

By applying advanced imported mechanical grate incinerators and corresponding smoke and wastewater treatment measures, the pollutant emission can satisfy the requirement of the "MSW Incineration Pollution Control Standards" (GB18485-2001) and the requirement of Japan National Standards. Zero wastewater emission will be achieved by the project activity. During the operation of the project, environmental risk can be controlled as long as reasonable and effective measures are taken to manage and monitor pollutant emissions such as smoke, wastewater, noise and solid waste.

Waste gas control:

The major air pollutants that the project emits are acid gas (NO_x, SO_2, HCL, CO...etc), particles, heavy metals and their compounds, as well as organic pollutants (dioxin and furan). The design and operation management of a high effective and efficient waste gas filtration system is the key to anti-pollution for MSW incineration projects. The project employs widely-used semi-dry process that takes advantage of high efficiency and no need to treat the reaction products. After the waste gas goes through the reactor, chemical spray system and the bag de-dust system, the pollutant in the waste gas is controlled to satisfy corresponding standards and regulations. The gas will eventually be vented to the air through a chimney of 120m high. Monitoring devices are installed in the chimney to monitor the concentration of NO_2, SO_2, HCL, dust and dioxin.

The MSW storage tank of the project is air tight with blower installed to keep a negative air pressure in the storage tank, hence prevent the emission of stench gas. In the meanwhile, the tank gas is led into the incinerator during MSW combustion, thus the stench gas is flared. Medicine spray system is also designed to control the growth of microbes. The stench concentration within the site boundary is controlled and satisfies level II standard of the "Stench emission standard" (GB14554-93).

Solid waste control:

The main solid waste that the project generates includes combustion residuals, ashes and the dusts captured in the waste gas filtration system. The dusts collected by the waste gas filtration system will be stored in the dust warehouse and disposed of by qualified firms. The combustion residual will be treated by a qualified company appointed by Nanhai Municipal Administration Bureau.

Wastewater treatment:

After treated, the wastewater generated by the project will meet the requirement of "Water pollutant emission limit" issued by Guangdong Province, and will be re-used for cooling and greening use. Specific anti-leakage measures are taken in the MSW storage tank and the leachete tank to prevent potential pollutions to the ground water.

Noise control:

The major noise sources of the project are the turbine generators, boilers, cooling tower, and pumps. The project employs advanced mechanical equipments with minor noise. In the meanwhile, the plant and workshops are allocated reasonably so that the noise sources are physically concentrated. Noise-proof construction structure is applied in the control room and operation room. Greening is widely spread within the plant area to alleviate noise.

In conclusion, the project employs clean integrated resource utilization technology to generate electricity whose environmental impacts comply with relevant laws and regulations of the host country. Environmental impacts are considered not significant.

In this monitoring period, no negative environmental impacts are expected to result from the project activity. In fact, the implementation of the project will fulfill reductions of greenhouse gas emission and protect the ecological environment.

Meanwhile, the implementation of the project will improve local socio-economic development through creating career opportunities and paying taxes.

2.2 Local Stakeholder Consultation

Local Stakeholder Consultation during the project preparation stage:

The main stakeholders of the project are local residents and employees that include company staff. In order to investigate the potential impact that the project may have on local ecosystem and environment as well as understanding local government and stakeholders' comment for the construction of the project, Foshan Nanhai Green Renewable Energy Co., Ltd. carried out a questionnaire survey during 25-February-2009 to 27-February-2009 and hosted a stakeholder meeting on 04-March-2009 to understand the attitude and requirement of the public. The number of samples was 40, questionnaire response rate was 100%.

The questionnaires mainly focus on the following issues:

Your opinion on local environmental status.

What's your main economic source?

What do you think is the main problem with local environmental condition?

How is local power supply?

What do you think is the main barrier for local economic development?

Is the construction of the project beneficiary for local development?

Do you think the construction of the project will bring positive influence on you? Please elaborate.

Your biggest environmental concern with the construction of the Project.

Your any other comment or advice for the Project.

On 04-March-2009, the Project developer hosted a consultancy stakeholder meeting in Nanhai to have a discussion with the stakeholders about the construction of the Project and application of CDM. The main topics were as follows:

1. Introduction of meeting participants
2. Introduction of CDM background information and the application status of the Project
3. Introduction of the Project
4. Q&A
5. Meeting summary

In the meeting, the representative of local government as well as 14 individuals had a clear understanding of CDM. They were all supportive to the Project's application for CDM, and considered the application of CDM would result in a better environment for local residents to live in.

The meeting notification was published on Nanhai Daily and the website of Nanhai Development Co., Ltd, which is the parent company of Nanhai Green Renewable Energy Co., Ltd.

Local Stakeholder Consultation during the project implementation stage:

Communications with Local stakeholders are being carried out at periodic intervals. Key implementation schedules or changes of the project will be communicated to the local authority, who will inform the neighbourhood committee and the local residents, the comments and suggestions from residents will be collected by the local authority meanwhile. And the local government agencies and competent authorities will conduct spot checks on the implementation of the project from time to time, and give suggestions on the involved rectification problems. There are no negative comments received for the project. In line with VCS requirements all the processes have been implemented to receive comments from local stakeholders as well as communicate with them at periodic intervals.

2.3 AFOLU-Specific Safeguards

The project is a non-AFOLU project.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The technical parameters of the turbines and generators installed on site are consistent with that described in the registered PDD. The key technical parameters are listed in the table below.

Table 3-1 Key technical indicators of major equipment

Items	Parameters	Unit
Incinerator		

Quantity	3	set
Type	Reciprocating mechanical grate incinerator	
Treatment capacity	500	ton
Annual operation time	≥8,000	hour
Service life of the Grate	15	year
Boiler		
Quantity	3	set
Type	CG-500-50.5/4.0/400-LJ	
Annual operation time	≥8,000	hour
Pressure of the superheated steam	4	MPa
Temperature of the superheated steam	400	°C
Efficiency	≥80	%
Service life	31	year
Steam-turbine Generator		
Steam-turbine		
Quantity	2	set
Type	N15-3.8/395	
Rated power	15	MW
Service year	≥30	year
Generator		
Quantity	2	set
Type	QF_2W-20-2	
Rated power	20	MW
Rated voltage	10.5	kV
Rotational speed	3,000	r/min
Power factor	0.8	
Efficiency	97.4	%

Service life	≥30	years

The implementation timeline is listed in table B-2 below. Operation of the project in the monitoring period from 01-June-2011 to 31-December- 2018 followed the monitoring plan described in the PD. During the monitoring period, all equipment worked well and no error or accident occurred, no events or situation that may affect the applicability of the methodology occurred.

Table 3-2 Implementation timeline of the project

Implementation status	Date
Project Construction date	08-May-2009
Operation start date/Project start date	01-June-2011
Crediting period start date	01-June-2011
The Environmental Completion Acceptance Inspection approval for environmental protection	09-October-2012

3.2 Deviations

3.3.1 Methodology Deviations

There is no methodology deviation applied to this monitoring period.

3.3.2 Project Description Deviations

In the CDM registered PDD (version 11), the monitoring equipment weighing machine that measured the parameter of "$A_{msw,y}$" will be calibrated every 3 months. There is a deviation for the monitoring frequency of weighing machine. According to the industrial regulation of "Digital Indicating Weighing Instruments (JJG539-2016)", the calibration frequency for digital displayed scale is once a year, thus, in the monitoring report, the calibration frequency of weighing machine is revised annually in line with industrial regulation.

There is also a deviation for the monitored parameter W_x (total amount of organic waste prevented from disposal in year x), according to registered CDM PDD (version 11), the W_x is same with $A_{MSW,y}$ and A_i. However, in the monitoring report, for conservative manner, the W_x is calculated as $A_{MSW,y}$ multiplied by $P_{n,j,y}$ (95% confidence level low), that is used for baseline emission reduction, and A_i is calculated as $A_{MSW,y}$ multiplied by $P_{n,j,y}$ (95% confidence level high), that is used for project emission reduction, the manner of which is in line with previous monitoring periods of the project.

3.3 Grouped Projects

The Project is not a grouped project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

In this monitoring report, the parameters ($EF_{grid,OM,y}$, $EF_{grid,BM,y}$, $FC_{i,y}$, $F_{i,j,y}$, $NCV_{i,y}$, $EF_{CO2,i,y}$, EG_{y}, $EF_{Coal,Adv,y}$, $EF_{Oil,Adv,y}$, $EF_{Gas,Adv,y}$, and $CAP_{i,j,y}$, Electricity import) used for calculation of the baseline gird emission factor (CEF_{d} and CEF_{ELEC}) available at validation in the CDM registered PDD are replaced by the parameter of CEF_{d} and CEF_{ELEC} directly here.

Considering the actual situation of the Project, data and parameters that are available at validation are summarized in below tables.

Data / Parameter	GWP_{CH4}
Data unit	tCO_2e/ tCH_4
Description	Global warming potential of CH_4
Source of data	4/CMP.7
Value applied	25
Justification of choice of data or description of measurement methods and procedures applied	25 tCO_2/tCH_4 for the 2nd commitment of the Kyoto Protocol as per 4/CMP.7.
Purpose of Data	Calculation of baseline emission and project emission
Comments	-

Data / Parameter	GWP_{N2O}
Data unit	tCO_2e/tN_2O
Description	Global warming potential of N_2O
Source of data	4/CMP.7
Value applied	298
Justification of choice of data or description of measurement methods and procedures applied	298 tCO_2/tN_2O for the 2nd commitment of the Kyoto Protocol as per 4/CMP.7.

Purpose of Data	Calculation of project emission
Comments	–

Data / Parameter	EF_{CH4}
Data unit	g CH_4/t MSW
Description	Aggregated CH_4 emission factor
Source of data	IPCC 2006 guidelines for National Greenhouse Gas Inventories, Volume 5 Waste, Chapter 5 Incineration and Open Burning of Waste, Table 5.3, CH_4 Emission Factor for Incineration of MSW. Type of Incineration/Technology: Continuous Incineration, Stoker.
Value applied	0.2
Justification of choice of data or description of measurement methods and procedures applied	2006 IPCC default value
Purpose of Data	Calculation of project emission
Comments	-

Data / Parameter	EF_{N2O}
Data unit	g N_2O/ t MSW
Description	Aggregated N_2O emission factor
Source of data	IPCC 2006 guidelines for National Greenhouse Gas Inventories, Volume 5 Waste, Chapter 5 Incineration and Open Burning of Waste, Table 5.4, N_2O Emission Factor for Incineration of MSW. Type of Incineration/Technology: Continuous Incineration, Stoker.
Value applied	47
Justification of choice of data or description of measurement methods and procedures applied	2006 IPCC default value
Purpose of Data	Calculation of project emission
Comments	-

Data / Parameter	B_0
Data unit	-
Description	Maximum methane producing capacity

Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories./ Methodology AM0025 (version 12)
Value applied	0.265
Justification of choice of data or description of measurement methods and procedures applied	2006 IPCC default value
Purpose of Data	Calculation of project emission from waste water treatment.
Comments	This parameter is applied only in case the wastewater is treated anaerobically or released untreated.

Data / Parameter	φ
Data unit	tCH_4/ tCOD
Description	Model correction factor to account for model uncertainties
Source of data	Default value from Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (version 05)
Value applied	0.9
Justification of choice of data or description of measurement methods and procedures applied	Default value from Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (version 05)
Purpose of Data	Calculation of baseline emission
Comments	-

Data / Parameter	OX
Data unit	-
Description	Oxidation factor
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories.
Value applied	0.1
Justification of choice of data or description of measurement methods and procedures applied	2006 IPCC default value
Purpose of Data	Calculation of baseline emission
Comments	-

Data / Parameter	F
Data unit	-
Description	Fraction of Methane in the landfill gas (volume fraction)
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories.
Value applied	0.5
Justification of choice of data or description of measurement methods and procedures applied	2006 IPCC default value
Purpose of Data	Calculation of baseline emission
Comments	-

Data / Parameter	DOC_f
Data unit	-
Description	Fraction of degradable organic carbon (DOC) that can decompose
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories.
Value applied	0.5
Justification of choice of data or description of measurement methods and procedures applied	2006 IPCC default value
Purpose of Data	Calculation of baseline emission
Comments	-

Data / Parameter	MCF
Data unit	-
Description	Methane conversion factor
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories.
Value applied	1.0
Justification of choice of data or description of measurement methods and procedures applied	2006 IPCC default value
Purpose of Data	Calculation of baseline emission
Comments	-

Data / Parameter	DOC_j
Data unit	-
Description	Fraction of degradable organic carbon (by weight) in the waste type j
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories.
Value applied	Apply the following values for the different waste type j:

Waste Type j	DOC_j (% wet waste)
Wood and wood product	43
Pulp, paper and cardboard	40
Food, food waste, beverage and tobacco	15
Textiles	24
Gardens, yard and park waste	20
Plastic	0
Glass, metal and other inert waste	0
Rubber and leather	0

Justification of choice of data or description of measurement methods and procedures applied	2006 IPCC default value
Purpose of Data	Calculation of baseline emission
Comments	The value should be updated as per the latest version IPCC Guidelines for National Greenhouse Gas Inventories when the crediting period is updated.

Data / Parameter	k_j
Data unit	-
Description	Decay rate for waste type j
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5, Chapter 3, Table 3.3.
Value applied	Apply the following values for the different waste types j:

Waste Type j	K_j
Wood and wood product	0.035

	Pulp, paper and cardboard	0.07
	Food, food waste, beverage and tobacco	0.4
	Textiles	0.07
	Gardens, yard and park waste	0.17
	Plastic	0
	Glass, metal and other inert waste	0
	Rubber and leather	0
Justification of choice of data or description of measurement methods and procedures applied	2006 IPCC default value	
Purpose of Data	Calculation of baseline emission	
Comments	The value should be updated as per the latest version IPCC Guidelines for national Greenhouse Gas Inventories when the crediting period is updated.	

Data / Parameter	CF
Data unit	-
Description	Conservativeness factor
Source of data	Approved methodology AM0025 (version 12), table 3.
Value applied	1.37
Justification of choice of data or description of measurement methods and procedures applied	Default value from approved methodology AM0025 (version 12)
Purpose of Data	Calculation of project emission from waste incineration.
Comments	-

Data / Parameter	MCF_p
Data unit	-
Description	Methane conversion factor for waste water treatment
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories,

	Volume 5, Chapter 6, Table 6.3.
Value applied	0.8
Justification of choice of data or description of measurement methods and procedures applied	2006 IPCC default value
Purpose of Data	Calculation of project emission from wastewater treatment.
Comments	-

Data / Parameter	CEF_d
Data unit	tCO_2/MWh
Description	Emission factor for the displaced electricity by the project activity
Source of data	Calculated based on "Tool to calculate the emission factor for an electricity system"
Value applied	0.78795
Justification of choice of data or description of measurement methods and procedures applied	Calculated ex-ante in the registered PDD, in line with the "Tool to calculate the emission factor for an electricity system"
Purpose of Data	Calculation of baseline emission from electricity generation displaced by the project activity.
Comments	Ex ante calculated and fixed in the first crediting period.

Data / Parameter	CEF_{elec}
Data unit	tCO_2/MWh
Description	Emission factor for the on-site use of electricity in the project activity
Source of data	Calculated based on "Tool to calculate the emission factor for an electricity system"
Value applied	0.78795
Justification of choice of data or description of measurement methods and procedures applied	Calculated ex-ante in the registered PDD, in line with the "Tool to calculate the emission factor for an electricity system"
Purpose of Data	Calculation of project emission from electricity on-site use by the project activity.
Comments	Ex ante calculated and fixed in the first crediting period.

4.2 Data and Parameters Monitored

The PP voluntarily gives up the emission reductions generated during period from 01–June-2011 to 26-February-2012. And ERs generated from 27-February-2012 to 28-February-2015 has been issued under CDM program, which has been considered as zero also under VERRA. The value of following parameters does not include both above periods.

<table>
<tr><td>Data / Parameter</td><td>$F_{cons,y}$</td></tr>
<tr><td>Data unit</td><td>The mass of the fuel consumed (ton)</td></tr>
<tr><td>Description</td><td>Amount of fuel consumed on-site during year y within the crediting period.</td></tr>
<tr><td>Source of data</td><td>Monthly report</td></tr>
<tr><td>Description of measurement methods and procedures to be applied</td><td>The data can be acquired from the operation log of the project, and can be double checked according to the procurement invoice. The fossil fuel consumption on-site will be measured annually.</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Accumulated monthly</td></tr>
<tr><td>Value monitored</td><td>Exclude the value in periods of 01-June-2011~26-February-2012, and 27-Feb-2012 ~28-Feb-2015, the $F_{cons,y}$ is listed below:
<table>
<tr><th>Year</th><th>Value</th></tr>
<tr><td>01-Mar-2015~31-May-2015</td><td>1.786</td></tr>
<tr><td>01-Jun-2015~31-May-2016</td><td>64.615</td></tr>
<tr><td>01-Jun-2016~31-May-2017</td><td>116.065</td></tr>
<tr><td>01-Jun-2017~31-May-2018</td><td>84.370</td></tr>
<tr><td>01-Jun-2018~31-Dec-2018</td><td>45.918</td></tr>
<tr><td>Total</td><td>312.754</td></tr>
</table>
Please refer to ER spreadsheet for monthly values.</td></tr>
<tr><td>Monitoring equipment</td><td>This parameter is measured with a gauge height meter.
Type: EJA100a
Serial No.: S4L8C06352
Accuracy: 0.1%
Calibration frequency: Annually
Date of last calibration: 15-Nov-2014, 15-Nov-2015, 15-Nov-2016, 15-Nov-2017,15-Nov-2018.
Validity: 14-Nov-2019</td></tr>
</table>

QA/QC procedures to be applied	Fuel purchase invoices for cross-check.
Purpose of the data	Calculation of the project emission from fuel use on-site.
Calculation method	The 0# light diesel was used as auxiliary fuel, the density of which is 0.84kg/L according to the registered PDD. The amount of diesel consumed on-site in the period of 01-Mar-2015~31-May-2015, 01-Jun-2015~31-May-2016, 01-Jun-2016~31-May-2017, 01-Jun-2017~31-May-2018, and 01-Jun-2018~31-Dec-2018 was calculated as followed: 01-Mar-2015~31-May-2015: 2,126L*0.84kg/L=1.786 ton; 01-Jun-2015~31-May-2016: 76,923L *0.84kg/L=64.615 ton; 01-Jun-2016~31-May-2017: 138,172 L*0.84kg/L=116.065 ton; 01-Jun-2017~31-May-2018: 100,441L*0.84kg/L=84.370 ton; 01-Jun-2018~31-Dec-2018: 54,664 L*0.84kg/L=45.918 ton.
Comments	-

Data / Parameter	-
Data unit	MJ
Description	Energy generated by auxiliary fossil fuel added in the incinerator.
Source of data	Monthly report
Description of measurement methods and procedures to be applied	This parameter is estimated multiplying the amount of auxiliary fossil fuel added in the incinerator to the net calorific value of this auxiliary fossil fuel.
Frequency of monitoring/recording	-
Value monitored	13,845,620
Monitoring equipment	-
QA/QC procedures to be applied	-
Purpose of the data	Calculation of the project emission from fuel use on-site.
Calculation method	Calculated based on $F_{cons,y}$ and NCV_{fuel}. 01-Mar-2015~31-May-2015: 1.786t*44.27MJ/kg=79,066 MJ;

	01-Jun-2015~31-May-2016: 64.615t *44.27MJ/kg = 2,860,506 MJ; 01-Jun-2016~31-May-2017: 116.065t*44.27MJ/kg = 5,138,198 MJ; 01-Jun-2017~31-May-2018: 84.370t*44.27MJ/kg = 3,735,060 MJ; 01-Jun-2018~31-Dec-2018: 45.918t*44.27MJ/kg = 2,032,790 MJ.
Comments	The energy generated by the auxiliary fuel of diesel respectively in the period of 01-Mar-2015~31-May-2015, 01-Jun-2015~31-May-2016, 01-Jun-2016~31-May-2017, 01-Jun-2017~31-May-2018, and 01-Jun-2018~31-Dec-2018 is 79,066 MJ, 2,860,506 MJ, 5,138,198MJ, 3,735,060 MJ and 2,032,790 MJ. The electricity supplied to the grid is accordingly 33,686.400MWh, 134,816.000MWh, 134,983.200 MWh, 134,589.400 MWh and 80,828.000 MWh, around $1.213*10^8$ MJ, $4.853*10^8$ MJ, $4.859*10^8$ MJ, $4.845*10^8$ MJ and $2.910*10^8$ MJ (i.e. $33,686.400*10^3$KWh×3.6MJ/KWh=$1.213*10^8$MJ). The fraction of energy generated by auxiliary fuel is 0.07%, 0.59%,1.06%,0.77% and 0.70% of the total energy generated in the incinerator respectively in the period of 01-Mar-2015~31-May-2015, 01-Jun-2015~31-May-2016, 01-Jun-2016~31-May-2017, 01-Jun-2017~31-May-2018, and 01-Jun-2018~31-Dec-2018. Thus, the fraction of energy generated by fossil fuel is no more than 50% of the total energy generated in the incinerator.

Data / Parameter	EF
Data unit	Fraction
Description	Combustion efficiency for waste
Source of data	2006 IPCC Guideline for National Greenhouse Gas Inventories (Section 5.4.1.3, Chapter 5, Volume 5 Waste)
Description of measurement methods and procedures to be applied	No country or project specific data are available. Therefore, using 2006 IPCC Guidelines for default value.
Frequency of monitoring/recording	Confirmed annually
Value monitored	100%
Monitoring equipment	-

QA/QC procedures to be applied	-
Purpose of the data	Calculation of the project emission from waste incineration.
Calculation method	-
Comments	-

Data / Parameter	NCV_{fuel}
Data unit	MJ/kg
Description	Net caloric value of the fuel used in the project
Source of data	Device Technical Agreement of Incinerators
Description of measurement methods and procedures to be applied	-
Frequency of monitoring/recording	Confirmed annually
Value monitored	44.27
Monitoring equipment	-
QA/QC procedures to be applied	This value is compared with 43.0 MJ/kg in 2006 IPCC Guideline for National Greenhouse Gas Inventories (Volume 2 Energy, Chapter 1, Table 1.2), and 42. 652 MJ/kg in the latest version of China Energy Statistical Yearbook 2011, the conservative value 44.27 MJ/kg is used in the ER calculation.
Purpose of the data	Calculation of the project emission from fuel use on site.
Calculation method	-
Comments	-

Data / Parameter	EF_{fuel}
Data unit	tCO_2/ MJ
Description	CO_2 emission factor of the fuel used
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories.
Description of measurement methods	This data will be updated as per published IPCC report.

and procedures to be applied	
Frequency of monitoring/recording	-
Value monitored	Diesel: 74.8×10^{-6}
Monitoring equipment	-
QA/QC procedures to be applied	-
Purpose of the data	Calculation of the project emission from fuel use on site.
Calculation method	-
Comments	-

Data / Parameter	FCF_i
Data unit	%
Description	Fraction of fossil carbon in total carbon of waste type i.
Source of data	Monitoring reports by certified institute dated 10-Mar-2015, 15-Jun-2015, 28-Sep-2015, 08-Dec-2015, 29-Mar-2016,14-Jun-2016, 25-Sep-2016, 18-Nov-2016, 20-Mar-2017, 03-Jul-2017, 27-Sep-2017, 31-Dec-2017, 06-Apr-2018, 01-Jul-2018, 30-Sep-2018 and 09-Dec-2018.
Description of measurement methods and procedures to be applied	The following standards should be used to estimate fossil carbon fraction of waste type i: • ASTM D6866-08: "Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis"; • ASTM D7459-08: "Standard Practice for Collection of Integrated Samples for the Speciation of Biomass (Biogenic) and Fossil Derived Carbon Dioxide Emitted from Stationary Emissions Sources".
Frequency of monitoring/recording	The size and frequency of sampling is statically significant with a maximum uncertainty range of 20% at a 95% confidence level. As a minimum, sample has been undertaken four times per year.
Value monitored	Please refer to ER calculation for details.
Monitoring equipment	-
QA/QC procedures to be applied	Monitored by an accredited testing laboratory, BETA Analytic Inc. As a minimum, sample has been undertaken four times per year.

Purpose of the data	Calculation of baseline emission.
Calculation method	-
Comments	-

Data / Parameter	$A_{MSW,y}$ (It also referred to as $Q_{biomass,y}$)
Data unit	Tons/yr
Description	Amount of MSW fed into the waste incineration plant.
Source of data	Monthly report
Description of measurement methods and procedures to be applied	This parameter is calculated by weighing each truck's load before entry into the plant. The data will be aggregated monthly and annually. The weighing machine is calibrated regularly according to the plan made by the project proponent. The receipt for the revenue gained by MSW treatment can be a proof for double check.
Frequency of monitoring/recording	Continuously and aggregated monthly
Value monitored	Exclude the value in periods of 01-June-2011~26-February-2012, and 27-Feb-2012 ~28-Feb-2015, the $A_{MSW,y}$ is listed below:

Year	Value
01-Mar-2015~31-May-2015	117778.91
01-Jun-2015~31-May-2016	493143.87
01-Jun-2016~31-May-2017	494299.81
01-Jun-2017~31-May-2018	491186.78
01-Jun-2018~31-Dec-2018	290325.78
Total	1886735.15

Monitoring equipment

This parameter is measured with weighbridges.

	W1	W2
Type	SCS-80	SCS-80
Serial No.	201008028	201008029
Accuracy	III	III

	Calibration frequency	Annually	Annually
	Date of calibration	05-Feb-2015; 17-Nov-2015; 09-Nov-2016; 10-May-2017; 17-Nov-2017; 04-Jun-2018	05-Feb-2015; 17-Nov-2015; 09-Nov-2016; 10-May-2017; 17-Nov-2017; 04-Jun-2018
	Validity	03-Jun-2019	03-Jun-2019
QA/QC procedures to be applied	According to the industrial regulation of "Digital Indicating Weighing Instruments (JJG539-2016)", the calibration frequency for digital displayed scale is once a year. Sales receipts are used to cross-checked		
Purpose of the data	Calculation of baseline emission and project emission.		
Calculation method	-		
Comments	-		

Data / Parameter	CCW_i	
Data unit	%	
Description	Total carbon fraction in waste type i	
Source of data	2006 IPCC Guideline for National Greenhouse Gas Inventories (Volume 5 Waste, Chapter 2, Table 2.4).	
Description of measurement methods and procedures to be applied	Default value, annually check the latest IPCC document.	
Frequency of monitoring/recording	This data is updated as per published IPCC report.	
Value monitored	Waste type	CCW_i
	Food waste	38
	Paper and cardboard	46

	Wood and wood products	40
	Plastic	75
	Textiles	50
	Glass and metal	0
	Rubber and leather	67
	Ash	3
Monitoring equipment	-	
QA/QC procedures to be applied	-	
Purpose of the data	Calculation of project emission from waste incineration.	
Calculation method	-	
Comments	-	

Data / Parameter	$EG_{PJ,FF,y}$
Data unit	MWh
Description	Amount of electricity consumed from the grid as a result of the project activity during the year y.
Source of data	Monthly report
Description of measurement methods and procedures to be applied	The grid electricity consumed by the project is monitored using the electricity meter installed at the substation. The readings of electricity meter is aggregated monthly and annually, and archived during the crediting period and two years after.
Frequency of monitoring/recording	Continuously and aggregated monthly
Value monitored	Exclude the value in periods of 01-June-2011~26-February-2012, and 27-Feb-2012 ~28-Feb-2015, the $EG_{PJ,FF,y}$ is listed below:

Year	Value
01-Mar-2015~31-May-2015	2.200
01-Jun-2015~31-May-2016	1320.000
01-Jun-2016~31-May-2017	154.000

	01-Jun-2017~31-May-2018: 468.600 01-Jun-2018~31-Dec-2018: 125.400 Total: 2070.200
Monitoring equipment	The monitoring meters are bidirectional meters.

	Main meter M3	Main meter M4
Type	ZMD405	ZMD405
Serial No.	EDC00001819	EDC00001755
Accuracy	0.5S	0.5S
Calibration frequency	At least annually	At least annually
Date of calibration	27-Oct-2014; 27-Oct-2015; 21-Oct-2016; 05-Aug-2017; 01-Aug-2018	27-Oct-2014; 27-Oct-2015; 21-Oct-2016; 05-Aug-2017; 01-Aug-2018
Validity	31-Jul-2019	31-Jul-2019

	Backup meter M3'	Backup meter M4'
Type	ZMD405	ZMD405
Serial No.	EDC00001634	EDC00001858
Accuracy	0.5S	0.5S
Calibration frequency	At least annually	At least annually
Date of calibration	17-Oct-2014; 27-Oct-2015; 21-Oct-2016; 05-Aug-2017; 01-Aug-2018	17-Oct-2014; 27-Oct-2015; 21-Oct-2016; 05-Aug-2017; 01-Aug-2018

	Validity	31-Jul-2019	31-Jul-2019
QA/QC procedures to be applied	The electricity meter is calibrated according to the industrial standard "Technical administrative code of electric energy metering (DL/T448-2016). Data measured by the meter are cross-checked with the electricity invoice or electricity transaction note.		
Purpose of the data	Calculation of the project emission from electricity use on site.		
Calculation method	-		
Comments	-		

Data / Parameter	$A_{residual}$
Data unit	ton
Description	The amount of the residual waste from the incinerator.
Source of data	Monthly report
Description of measurement methods and procedures to be applied	Measured with weighing machine, the data is aggregated monthly and annually and archived during the crediting period and two years after.
Frequency of monitoring/recording	Continuously and aggregated monthly
Value monitored	Exclude the value in periods of 01-June-2011~26-February-2012, and 27-Feb-2012 ~28-Feb-2015, the $A_{residual}$ is listed below:

Year	Value
01-Mar-2015~31-May-2015	32256.44
01-Jun-2015~31-May-2016	134123.52
01-Jun-2016~31-May-2017	131471.52
01-Jun-2017~31-May-2018	130342.96
01-Jun-2018~31-Dec-2018	73883.05
Total	502077.49

Monitoring equipment	This parameter is measured with weighbridges.	
	W1	W2

	Type	SCS-80	SCS-80
	Serial No.	201008028	201008029
	Accuracy	III	III
	Calibration frequency	Annually	Annually
	Date of calibration	05-Feb-2015; 17-Nov-2015; 09-Nov-2016; 10-May-2017; 17-Nov-2017; 04-Jun-2018	05-Feb-2015; 17-Nov-2015; 09-Nov-2016; 10-May-2017; 17-Nov-2017; 04-Jun-2018
	Validity	03-Jun-2019	03-Jun-2019
QA/QC procedures to be applied	According to the industrial regulation of "Verification regulation of Digital Displayed Scale (JJG539-2016)", the calibration frequency for digital displayed scale is once a year. Sales receipts are used for cross-check.		
Purpose of the data	Calculation of baseline emission and project emission.		
Calculation method	-		
Comments	-		

Data / Parameter	$FC_{residual}$
Data unit	%
Description	Fraction of residual carbon in the residual waste of MSW incinerator
Source of data	Monitoring reports by certified institute dated 04-Feb-2015,17-Mar-2015,25-Jun-2015,25-Sep-2015,23-Dec-2015,03-Apr-2016, 24-AJun-2016,20-Sep-2016, 26-Dec-2016, 15-Mar-2017, 29-Jun-2017, 24-Sep-2017, 22-Dec-2017, 24-Mar-2018, 30-Jun-2018, 30-Sep-2018, and 20-Dec-2018.
Description of measurement methods and procedures to be	Sample test by a certified institute.

applied	
Frequency of monitoring/recording	The size and frequency of sampling is statically significant with a maximum uncertainty range of 20% at a 95% confidence level. As a minimum, sample has been undertaken four times per year.
Value monitored	Please refer to ER calculation for details.
Monitoring equipment	-
QA/QC procedures to be applied	Monitored by Guangzhou Institute of Energy Conversion Chinese Academy of Science, which is a qualified and independent organization. As a minimum, sample has been undertaken four times per year.
Purpose of the data	Calculation of leakage.
Calculation method	-
Comments	-

Data / Parameter	MB_y
Data unit	tCH_4
Description	Amount of methane produced in the landfill in the absence of the project activity in year y.
Source of data	Calculated as per the "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal".
Description of measurement methods and procedures to be applied	-
Frequency of monitoring/recording	-
Value monitored	Exclude the value in periods of 01-June-2011~26-February-2012, and 27-Feb-2012 ~28-Feb-2015, the MB_y is listed below:

Year	Value
01-Mar-2015~31-May-2015	23,288
01-Jun-2015~31-May-2016	270,345
01-Jun-2016~31-May-2017	293,879
01-Jun-2017~31-May-2018	311,445

	01-Jun-2018~31-Dec-2018: 189,470 Total: 1,088,426 Please refer to ER calculation sheet for details.
Monitoring equipment	-
QA/QC procedures to be applied	-
Purpose of the data	Calculation of baseline emission.
Calculation method	-
Comments	-

Data / Parameter	AF
Data unit	Fraction
Description	Methane destroyed due to regulatory or other requirements.
Source of data	Local and/or national authorities.
Description of measurement methods and procedures to be applied	Derived from or based upon local or national guidelines. This parameter will be renewed at the renewal of crediting period
Frequency of monitoring/recording	-
Value monitored	0
Monitoring equipment	-
QA/QC procedures to be applied	-
Purpose of the data	Calculation of baseline emission.
Calculation method	-
Comments	The parameter will be renewed at the renewal of crediting period.

Data / Parameter	$EG_{d,y}$
Data unit	MWh

<table>
<tr><td>Description</td><td>Amount of electricity generated utilizing the combusted heat from incineration in the project activity displacing electricity in the baseline during the year y.</td></tr>
<tr><td>Source of data</td><td>Monthly report</td></tr>
<tr><td>Description of measurement methods and procedures to be applied</td><td>The readings of electricity meter is aggregated monthly and annually, and archived during the crediting period and two years after.</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Continuously and aggregated monthly</td></tr>
<tr><td>Value monitored</td><td>Exclude the value in periods of 01-June-2011~26-February-2012, and 27-Feb-2012 ~28-Feb-2015, the $EG_{d,y}$ is listed below:
<table>
<tr><th>Year</th><th>Value</th></tr>
<tr><td>01-Mar-2015~31-May-2015</td><td>33686.40</td></tr>
<tr><td>01-Jun-2015~31-May-2016</td><td>134816.00</td></tr>
<tr><td>01-Jun-2016~31-May-2017</td><td>134983.20</td></tr>
<tr><td>01-Jun-2017~31-May-2018</td><td>134589.40</td></tr>
<tr><td>01-Jun-2018~31-Dec-2018</td><td>80828.000</td></tr>
<tr><td>Total</td><td>518903.000</td></tr>
</table></td></tr>
<tr><td>Monitoring equipment</td><td>The monitoring meters are bidirectional meters.
<table>
<tr><th></th><th>Main meter M3</th><th>Main meter M4</th></tr>
<tr><td>Type</td><td>ZMD405</td><td>ZMD405</td></tr>
<tr><td>Serial No.</td><td>EDC00001819</td><td>EDC00001755</td></tr>
<tr><td>Accuracy</td><td>0.5S</td><td>0.5S</td></tr>
<tr><td>Calibration frequency</td><td>At least annually</td><td>At least annually</td></tr>
<tr><td>Date of calibration</td><td>27-Oct-2014;
27-Oct-2015;
21-Oct-2016;
05-Aug-2017;
01-Aug-2018</td><td>27-Oct-2014;
27-Oct-2015;
21-Oct-2016;
05-Aug-2017;
01-Aug-2018</td></tr>
</table></td></tr>
</table>

	Validity: 31-Jul-2019 / 31-Jul-2019 Backup meter M3' / Backup meter M4' Type: ZMD405 / ZMD405 Serial No.: EDC00001634 / EDC00001858 Accuracy: 0.5S / 0.5S Calibration frequency: At least annually / At least annually Date of calibration: 17-Oct-2014; 27-Oct-2015; 21-Oct-2016; 05-Aug-2017; 01-Aug-2018 / 17-Oct-2014; 27-Oct-2015; 21-Oct-2016; 05-Aug-2017; 01-Aug-2018 Validity: 31-Jul-2019 / 31-Jul-2019
QA/QC procedures to be applied	The electricity meter is calibrated according to the industrial standard "Technical administrative code of electric energy metering (DL/T448-2016). Data measured by the meter are cross-checked with the electricity invoice or electricity transaction note.
Purpose of the data	Calculation of baseline emission.
Calculation method	-
Comments	-

Data / Parameter	f
Data unit	%
Description	Fraction of methane captured at the solid waste disposal site (SWDS) and flared, combusted or used in another manner
Source of data	Written information from the operator of the solid waste disposal site dated on 13-Aug-2014,13-Aug-2015,13-Aug-2016, 13-Aug-2017 and 13-Aug-2018.
Description of	-

measurement methods and procedures to be applied	
Frequency of monitoring/recording	Annually
Value monitored	0
Monitoring equipment	-
QA/QC procedures to be applied	-
Purpose of the data	Calculation of baseline emission.
Calculation method	-
Comments	-

Data / Parameter	W_x
Data unit	tons
Description	Total amount of organic waste prevented from disposal in year x
Source of data	Monthly report
Description of measurement methods and procedures to be applied	According to registered CDM PDD (version 11), the parameter is same with $A_{MSW,y}$ and A_i. However, in the monitoring report, for conservative manner, the W_x is calculated as $A_{MSW,y}$ multiplied by $P_{n,j,y}$ (95% confidence level low), that is used for baseline emission reduction, and A_i is calculated as $A_{MSW,y}$ multiplied by $P_{n,j,y}$ (95% confidence level high), that is used for project emission reduction, the manner of which is in line with previous monitoring periods of the project.
Frequency of monitoring/recording	This parameter will be monitored continuously, aggregated at least annually.
Value monitored	The W_x in this monitoring period is 1734713.23 tons, while A_i is 2038757.09 tons. Details please refer to table 5-2 and table 5-9.
Monitoring equipment	This parameter is measured with weighbridges.

	W1	W2
Type	SCS-80	SCS-80
Serial No.	201008028	201008029

	Accuracy	III	III
	Calibration frequency	Annually	Annually
	Date of calibration	05-Feb-2015; 17-Nov-2015; 09-Nov-2016; 10-May-2017; 17-Nov-2017; 04-Jun-2018	05-Feb-2015; 17-Nov-2015; 09-Nov-2016; 10-May-2017; 17-Nov-2017; 04-Jun-2018
	Validity	03-Jun-2019	03-Jun-2019
QA/QC procedures to be applied	Regularly testing and analysis by the project proponent is carried out.		
Purpose of the data	Calculation of baseline emission and project emission.		
Calculation method	-		
Comments	-		

Data / Parameter	$P_{n,j,y}$
Data unit	Fraction
Description	Weight fraction of the waste type j in the sample n collected during the year y.
Source of data	Sample reports by certified institute dated 04-Feb-2015,16-Apr-2015,18-Aug-2015,13-Nov-2015, 18-Feb-2016,16-May-2016,16-Aug-2016, 10-Nov-2016, 10-Feb-2017, 15-May-2017, 19-Aug-2017, 15-Nov-2017, 10-Feb-2018, 24-May-2018, 14-Aug-2018 and 10-Nov-2018.
Description of measurement methods and procedures to be applied	Sample the waste prevented from disposal, using the waste categories j
Frequency of monitoring/recording	The size and frequency of sampling is statically significant with a maximum uncertainty range of 20% at a 95% confidence level. As a minimum, sample has been undertaken four times per year.

Value monitored	Please refer to ER calculation for details.
Monitoring equipment	-
QA/QC procedures to be applied	Monitored by Guangzhou Institute of Energy Conversion Chinese Academy of Science, which is a qualified and independent organization. As a minimum, sample has been undertaken four times per year.
Purpose of the data	Calculation of baseline emission.
Calculation method	-
Comments	-

Data / Parameter	Z
Data unit	-
Description	Number of samples collected during the year x
Source of data	Project participant
Description of measurement methods and procedures to be applied	-
Frequency of monitoring/recording	The size and frequency of sampling is statically significant with a maximum uncertainty range of 20% at a 95% confidence level. As a minimum, sample has been undertaken four times per year.
Value monitored	During this monitoring period, 15 times of the sample was conducted for $P_{n,j,y,}$ 16 times of the sample for $FC_{residual}$ and FCF_i from 01-Mar-2015 to 31-Dec-2018 totally.
Monitoring equipment	-
QA/QC procedures to be applied	-
Purpose of the data	Calculation of baseline emission.
Calculation method	-
Comments	-

Data / Parameter	$Q_{COD,y}$

<table>
<tr><td>Data unit</td><td>m^3</td></tr>
<tr><td>Description</td><td>Amount of wastewater treated anaerobically or released untreated from the project activity in year y</td></tr>
<tr><td>Source of data</td><td>Monthly report</td></tr>
<tr><td>Description of measurement methods and procedures to be applied</td><td>Measured value by flow meter.</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Monitored continuously and aggregated monthly and annually.</td></tr>
<tr><td>Value monitored</td><td>Exclude the value in periods of 01-June-2011~26-February-2012, and 27-Feb-2012 ~28-Feb-2015, the $Q_{COD,y}$ is listed below:
<table>
<tr><th>Year</th><th>Value</th></tr>
<tr><td>01-Mar-2015~31-May-2015</td><td>12784.00</td></tr>
<tr><td>01-Jun-2015~31-May-2016</td><td>47280.00</td></tr>
<tr><td>01-Jun-2016~31-May-2017</td><td>39730.00</td></tr>
<tr><td>01-Jun-2017~31-May-2018</td><td>44341.00</td></tr>
<tr><td>01-Jun-2018~31-Dec-2018</td><td>24809.00</td></tr>
<tr><td>Total</td><td>168944.00</td></tr>
</table></td></tr>
<tr><td>Monitoring equipment</td><td>This parameter is measured by flow meter.
<table>
<tr><td>Type</td><td>50P80-EH2A1AA0AAAA</td></tr>
<tr><td>Serial No</td><td>JA08CD18000</td></tr>
<tr><td>Accuracy</td><td>0.5%</td></tr>
<tr><td>Date of last calibration</td><td>08-Jan-2015;
08-Jan-2017</td></tr>
<tr><td>Calibration frequency</td><td>two years</td></tr>
<tr><td>Calibration validity</td><td>07-Jan-2019</td></tr>
</table></td></tr>
<tr><td>QA/QC procedures to be applied</td><td>The monitoring instrument is subject to annual maintenance and testing to ensure accuracy.</td></tr>
</table>

Purpose of the data	Calculation of project emission from wastewater treatment.
Calculation method	-
Comments	-

Data / Parameter	$P_{COD,y}$
Data unit	$tCOD/m^3$
Description	Chemical Oxygen Demand (COD) of wastewater
Source of data	Monthly report
Description of measurement methods and procedures to be applied	Measured by project participant.
Frequency of monitoring/recording	Monitored monthly and aggregated annually.
Value monitored	Exclude the value in periods of 01-June-2011~26-February-2012, and 27-Feb-2012 ~28-Feb-2015, the $P_{COD,y}$ is listed below:
Monitoring equipment	This parameter is measured by project participant.
QA/QC procedures to be applied	The qualified laboratory engineer who has the Occupational Qualification Certificate of the Laboratory Technician for wastewater monitoring.
Purpose of the data	Calculation of project emission from wastewater treatment.
Calculation method	-
Comments	-

Year	Value
01-Mar-2015~31-May-2015	0.024279
01-Jun-2015~31-May-2016	0.023545
01-Jun-2016~31-May-2017	0.023949
01-Jun-2017~31-May-2018	0.024288
01-Jun-2018~31-Dec-2018	0.024122
Average	0.023980

<table>
<tr><td>Data / Parameter</td><td>T_{flare}</td></tr>
<tr><td>Data unit</td><td>°C</td></tr>
<tr><td>Description</td><td>Temperature of the exhaust gas of the incinerators</td></tr>
<tr><td>Source of data</td><td>Monthly report</td></tr>
<tr><td>Description of measurement methods and procedures to be applied</td><td>Measure the temperature of the exhaust gas stream in the incinerator by thermocouples. A temperature above 500 ° C indicates that the incinerator is operating.</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Measured continuously, read and recorded monthly.</td></tr>
<tr><td>Value monitored</td><td>910-979</td></tr>
<tr><td>Monitoring equipment</td><td>Thermocouple (each incinerators with two Thermocouple)
<table>
<tr><td>Type</td><td>WRP-331</td></tr>
<tr><td>Serial No</td><td>121114002, 121114004, 121114005,
121114011,
121114012,
121114015,</td></tr>
<tr><td>Accuracy</td><td>II</td></tr>
<tr><td>Date of last calibration</td><td>16-May-2015
16-May-2016
16-May-2017
16-May-2018</td></tr>
<tr><td>Calibration frequency</td><td>annually</td></tr>
<tr><td>Calibration validity</td><td>15-May-2019</td></tr>
</table></td></tr>
<tr><td>QA/QC procedures to be applied</td><td>The monitoring instrument is subject to annual maintenance and testing to ensure accuracy.</td></tr>
<tr><td>Purpose of the data</td><td>To judge whether the incinerators is operating while calculation of emissions from waste water treatment.</td></tr>
</table>

Calculation method	-
Comments	The methane generated from the anaerobic waste water treatment system is combusted by the enclosed incinerators. According to the manufacturer's specifications of the incinerator, during the operation of the incinerators, the exhaust gas from the incinerators will be no less than 850°C and the residence time will be no less than 2 seconds (as per Table A-1), auxiliary fuel is used to keep the temperature at this level when the Lower Heat Value of MSW is too low to ensure this temperature, which is ensure that the methane destruction efficiency is higher than the default value of the enclosed flare when the flare temperature is above 500 ℃ and the flare operates complying with the manufacturer's specifications[3].

Data / Parameter	$RATE^{Compliance}_{y}$
Data unit	Number
Description	Rate of compliance
Source of data	National Report on Environmental Statistic (2018)
Description of measurement methods and procedures to be applied	The compliance rate is based on the annual reporting of the municipal bodies issuing these reports. The state-level aggregation involves all landfill sites in the country. If the rate exceeds 50%, no CERs will be claimed. This parameter will be monitored annually
Frequency of monitoring/recording	Annually
Value monitored	0
Monitoring equipment	NA
QA/QC procedures to be applied	NA
Purpose of the data	Calculation of baseline emission
Calculation method	-
Comments	-

[3] Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories gives a standard value for the fraction of carbon oxidised for gas combustion of 99.5% (Reference Manual, Table 1.6, page 1.29).

4.3 Monitoring Plan

1. Monitoring system installation

The flow chart and monitoring locations of the project

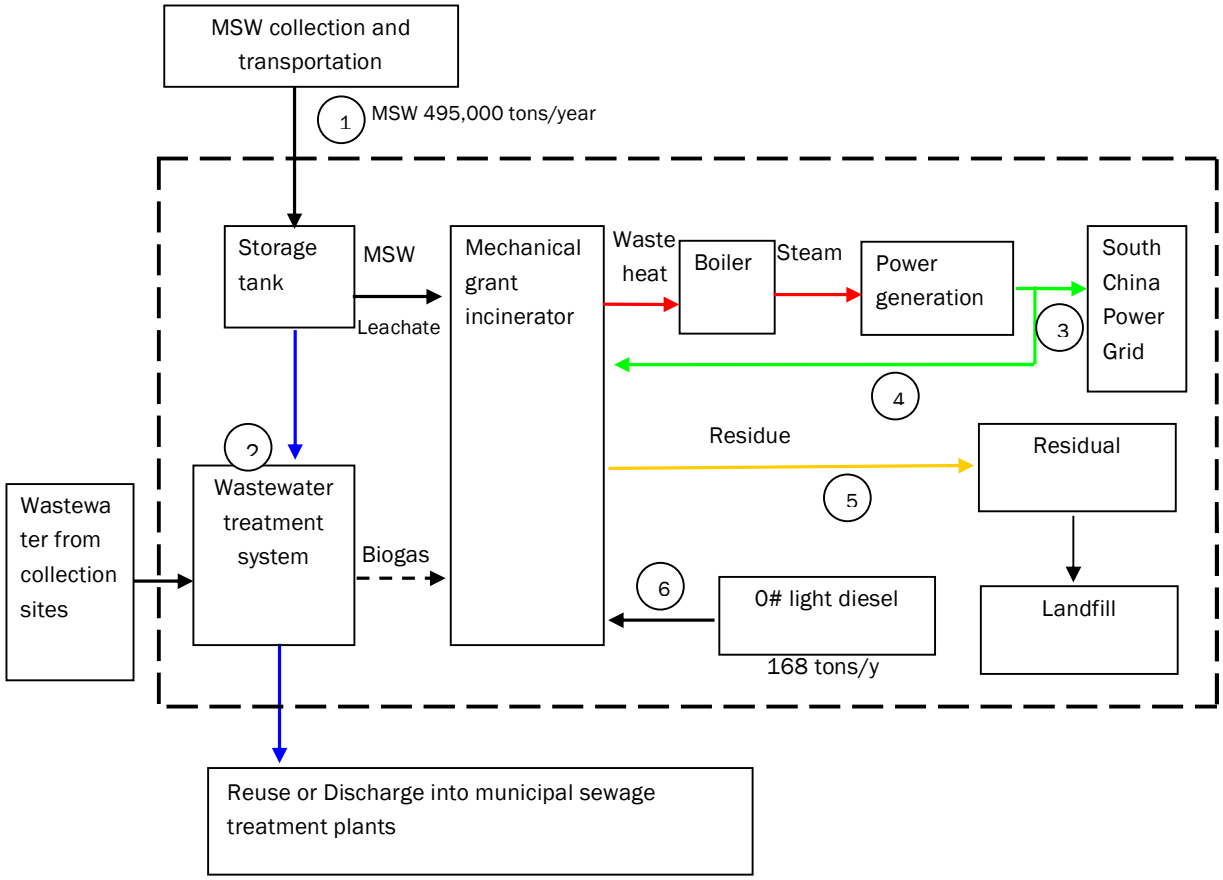

Figure 4-1 The flow chart and monitoring locations of the project

1	The amount of MSW fed into the project monitored by the weighbridge
2	Amount of waste water treated anaerobically monitored by flow meter and chemical oxygen demand (COD) of wastewater measured by a qualified laboratory technician based on the national laboratory standard "Water Quality-Determination of the chemical oxygen demand-Dichromate method" (HJ828-2017).
3	The amount of electricity supplied to the SCPG monitored by meter M3 and M4.
4	The amount of electricity consumed by the project monitored by M3' and M4'.

5	Amount of the residue waste monitored by weighbridge and fraction of residual carbon by sampling
6	Amount of fossil fuel consumption on-site monitored by oilcan.

2. Data recording and collection procedures

The data that needs to be monitored includes accumulated data and periodical sampling data.

1) Accumulated data collecting (MSW amount, residue waste, electricity supplied to the grid, fuel consumption, waste water, temperature of the exhaust gas of the incinerators)

The data was continuously monitored and recorded monthly. The MSW was sent to the project site by truck. The residue waste was sent to Landfill site by truck. The weight of each truck entering and leaving the project site was recorded. And then the MSW amount and residue waste were calculated based on the weight difference of the truck. The data was accumulated monthly on the monthly report and the sales invoice with local environmental sanitation department is provided for cross check.

Electricity exported to and imported by the project was monitored continuously by main electricity meters and recorded monthly. At the end of each month, the project owner and the grid company read the meter records together. The data was recorded on the monthly report and the sales receipts were issued based on the monthly data confirmed by the both party. When the main meters work out of order, readings from the backup meters will be used. And when the main transmission line is out of order, the backup transmission line can be used. Such emergency period shall be recorded and reported in the monitoring report.

The diesel oil consumed in the project site was measured by gauge height meter. The amount of oil consumption was recorded in the daily log and accumulated monthly in the monthly report. The waste water was sent to the waste water treatment system. A flow meter was used to monitor the amount of waste water continuously and the flow meter data was recorded monthly in the monthly report.

The temperature of the exhaust gas of the incinerator was continuously monitored by the thermocouples, each incinerator with two thermocouples.

2) Periodical sampling data ($P_{n,j,y}$, FCF_i , $FC_{residual}$ and $P_{COD,y}$)

According to the registered PD, as a minimum, sampling should be undertaken four times per year. During the forty-six months of the monitoring period, sampling was undertaken by the third party randomly 15-16 times[4].

[4] According to the registered PD, as a minimum, sampling for $P_{n,j,y}$, FCF_i and $FC_{residual}$ should be undertaken four times per year. During the 1402 days of the period (from 01-Mar-2015 to 31-Dec-2018), sampling should be undertaken 1402/365*4≈ 15times as a minimum. Therefore, 15 times of sampling for $P_{n,j,y}$, and 16 times of sampling for FCF_i and $FC_{residual}$ at this monitoring period were undertaken.

The MSW composition ($P_{n,j,y}$) is monitored through sampling by a qualified third party in accordance with the industry standards (CJ/T313-2009). The waste for the sampling is chosen randomly at the entry point of the project site. The fraction of residual carbon in the residual waste of MSW incinerator is monitored through sampling by a third party randomly in accordance with "Technical code for Projects of Municipal Waste Incineration" (CJJ90-2009).

The fraction of fossil carbon in total carbon of waste type i (FCF_i) is monitored by sampling by a qualified lab according to the following standards: ASTM D6866-12 (an updated version of ASTM D6866-08): "Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis".

The Chemical Oxygen Demand (COD) of the wastewater ($P_{COD,y}$) is measured once every month according to the national laboratory method "Water quality-Determination of the chemical oxygen demand-Dichromate method" (HJ828-2017), the sampling and the monitoring is conducted by the laboratory technician who has the Occupational Qualification Certificate of the Laboratory Technician for wastewater monitoring, which is in accordance with the CDM registered PDD (version 11) and VCS registered PD (version 3.0).

3. Monitoring Structure

The monitoring structure is shown by Figure 2 and implemented by the project owner.

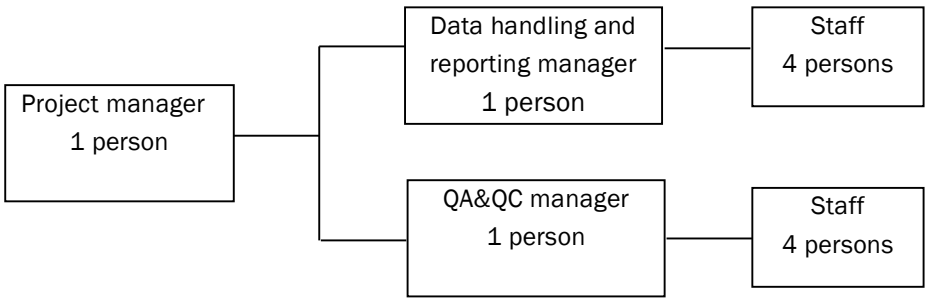

Figure 4-2. Monitoring structure of the Project

The project manager is responsible for 1) implementation and supervision of the monitoring activity; 2) periodical training on the staff of the whole monitoring system ;3) liaison of this vcs project.

The data handling and reporting staffs are responsible for managing, processing and submitting data.

The QA & QC and Data Storage staffs are responsible for calibration of meters and supervision of the whole process quality, and storage of the data.

4. QA/QC and emergency procedure

1) All monitoring equipment was installed based on the related industrial standards and good practice. The equipment was calibrated by qualified institute periodically to ensure the good

operation.

2) Records were checked by manager before archived to ensure no error in the data recording and collecting.

3) If the equipment is detected malfunctioning, the data for this emergency period would be monitored by backup equipment if any; if the accuracy and reliable of data for this period cannot be ensured, no emission reductions would be claimed.

4) Staff received trainings to ensure they are qualified for the work.

5) Written data and documents, including receipts for cross-checking of data, will be copied and archived with an explanation of the department or company where the original copy is kept, and kept for at least two years after the end of the last crediting period.

5. The implementation of sampling approaches

Waste component of the different waste categories ($P_{n,j,y}$), fraction of fossil carbon in total carbon of waste type i (FCF_i), and fraction of residual carbon in the residual waste of MSW incinerator ($FC_{residual}$) are sampled according to the requirements of the methodology. The size and frequency of sampling are statistically significant with a maximum uncertainty range of 20% at a 95% confidence level. As stated in the registered CDM PDD (version 11), sample is undertaken four times per year at a minimum. The MSW composition is measured in accordance with the "Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site" (Version 4). The following waste streams are to be distinguished:

- Kitchen waste
- Paper
- Wood
- Plastics
- Textiles
- Glass and metal
- Rubber and leather
- Ash

Fraction of fossil carbon in total carbon of waste type i (FCF_i) is monitored by sampling by a qualified testing laboratory according to the following standards: ASTM D6866-12 (an updated version of ASTM D6866-08): "Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis".

The emissions reductions are calculated in a conservative approach. The high level values at the 95% confidence level are used for the Fraction of fossil carbon in total carbon of waste type i (FCF_i) and Fraction of residual carbon in the residual waste of MSW incinerator ($FC_{residual}$).

Regarding the calculation of baseline emissions, the highest uncertainty of the statistical

uncertainty of the $P_{n,i,y}$ is deducted; and when calculating project emissions, the highest uncertainty of the statistical uncertainty of the $P_{n,i,y}$ is added.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

According to the AM0025 (Version 12), baseline emission of the project is calculated as follows:

$$BE_y = (MB_y - MD_{reg,y}) + BE_{EN,y} \quad (1)$$

Where,

BE_y = the baseline emissions in year y (t CO_2)

MB_y = the methane produced in the landfill in the absence of the project activity in year y (t CO_2)

$MD_{reg,y}$ = methane that would be destroyed in the absence of the project activity in year y (t CO_2)

$BE_{EN,y}$ = Baseline emissions from generation of energy displaced by the project activity in year y (tCO_2)

$$MD_{reg,y} = MB_y * AF$$

Where,

AF = Adjustment Factor for MB_y (%)

As analyzed in the registered PDD, AF is zero and will be monitored at renewal of crediting period.

Therefore, $BE_y = MB_y + BE_{EN,y}$

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

$$MB_y = BE_{CH4,SWDS,y} =$$

$$\varphi \times (1 - f) \times GWP_{CH4} \times (1 - OX) \times \frac{16}{12} \times F \times DOC_f \times MCF \times \sum_{X=1}^{y} \sum_{j} W_{j,x} \times DOC_j \times e^{-kj \times (y-x)} \times (1 - e^{-kj}) \quad (2)$$

Table 5-1Values for baseline emission from decomposition of waste at the landfill site

<table>
<tr><th>Parameter</th><th>Description</th><th>Value</th><th>Data source</th></tr>
<tr><td>φ</td><td>model correction factor to account for model uncertainties</td><td>0.9</td><td>AM0025 (Version 12)</td></tr>
<tr><td>F</td><td>fraction of methane captured at the landfill and flared, combusted or used in another manner</td><td>0</td><td>AM0025 (Version 12)</td></tr>
<tr><td>GWP_{CH4}</td><td>Global Warming Potential of methane</td><td>25</td><td>4/CMP.7</td></tr>
<tr><td>OX</td><td>Oxidation factor</td><td>0.1</td><td>IPCC 2006</td></tr>
<tr><td>F</td><td>Fraction of methane in the SWDS gas</td><td>0.5</td><td>AM0025 (Version 12)</td></tr>
<tr><td>DOC_f</td><td>fraction of degradable organic carbon that can decompose</td><td>0.5</td><td>IPCC 2006</td></tr>
<tr><td>MCF</td><td>Methane correction factor</td><td>1.0</td><td>IPCC 2006</td></tr>
<tr><td>$W_{j,x}$</td><td>Amount of organic waste type j prevented from disposal in the SWDS in the year x</td><td>Please refer to table 5-2</td><td>Waste type monitoring report</td></tr>
<tr><td>DOC_j</td><td>Fraction of degradable organic carbon (by weight) in the waste type j</td><td><table><tr><th>Waste type j</th><th>DOC_j</th></tr><tr><td>Kitchen</td><td>15%</td></tr><tr><td>Paper</td><td>40%</td></tr><tr><td>Wood</td><td>43%</td></tr><tr><td>Plastics</td><td>0%</td></tr><tr><td>Textiles</td><td>24%</td></tr><tr><td>Glass and metal</td><td>0%</td></tr><tr><td>Rubber and leather</td><td>0%</td></tr><tr><td>Ash</td><td>0%</td></tr></table></td><td>IPCC 2006</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>K_j</td><td>Decay rate for the waste type j</td><td>
<table>
<tr><td>Waste type j</td><td>K_j</td></tr>
<tr><td>Kitchen</td><td>40%</td></tr>
<tr><td>Paper</td><td>7%</td></tr>
<tr><td>Wood</td><td>3.5%</td></tr>
<tr><td>Plastics</td><td>0%</td></tr>
<tr><td>Textiles</td><td>7%</td></tr>
<tr><td>Glass and metal</td><td>0%</td></tr>
<tr><td>Rubber and leather</td><td>0%</td></tr>
<tr><td>Ash</td><td>0%</td></tr>
</table>
</td><td>IPCC 2006</td></tr>
</table>

Table 5-2 The annual values of $P_{n,j,y}$ and $W_{j,x}$

Waste type j	$P_{n,j,y}$ (%)				
	95% confidence level low				
	01-Mar-2015~31-May-2015	01-Jun-2015~31-May-2016	01-Jun-2016~31-May-2017	01-Jun-2017~31-May-2018	01-Jun-2018~31-Dec-2018
Kitchen	48.83%	45.42%	46.74%	45.41%	43.79%
Paper	10.76%	13.32%	10.02%	10.96%	9.62%
Wood	8.82%	8.16%	8.89%	10.00%	8.68%
Plastics	5.91%	6.54%	5.53%	6.16%	5.67%
Textiles	5.73%	6.15%	5.44%	5.16%	5.68%

Glass and metal	2.53%	3.45%	3.84%	3.87%	4.72%
Rubber and leather	0.00%	0.00%	0.00%	0.00%	0.00%
Ash	9.17%	10.17%	11.65%	10.98%	10.45%
Waste type j	$W_{j,x}$ (tons)				
	01-Mar-2015~31-May-2015	01-Jun-2015~31-May-2016	01-Jun-2016~31-May-2017	01-Jun-2017~31-May-2018	01-Jun-2018~31-Dec-2018
Kitchen	57508.71	224002.08	231016.12	223034.17	127141.06
Paper	12676.18	65663.34	49516.49	53843.81	27933.78
Wood	10393.14	40247.65	43933.54	49102.72	25198.44
Plastics	6963.15	32235.20	27320.08	30239.13	16456.44
Textiles	6754.47	30304.75	26889.07	25346.72	16482.20
Glass and metal	2984.93	17008.92	18987.85	19008.11	13690.62
Rubber and leather	0	0	0	0	0
Ash	10799.62	50140.39	57585.14	53955.51	30349.70

Exclude the periods of 01-June-2011~26-February-2012, and 27-Feb-2012~28-Feb-2015, the result of MB_y ($BE_{CH4,SWDS,y}$) is as follows.

Table 5-3 Calculation of MB_y ($BE_{CH4,SWDS,y}$)

Year	MB_y ($BE_{CH4,SWDS,y}$)
	tCO_2e
01-Mar-2015~31-May-2015	23,288
01-Jun-2015~31-May-2016	270,345
01-Jun-2016~31-May-2017	293,879
01-Jun-2017~31-May-2018	311,445
01-Jun-2018~31-Dec -2018	189,470
Total	**1,088,426**

(2) The Baseline Emissions from electricity generation displaced by the project activity

$$BE_{elec,y} = EG_{d,y} * CEF_d \quad (3)$$

Where,

$EG_{d,y}$ = the amount of electricity generated utilizing the combustion heat from incineration in the project activity and exported to the grid during the year y (MWh)

CEF_d = the carbon emissions factor for the displaced electricity source in the project scenario (tCO_2/MWh)

$$CEF_d = EF_{y\ CM\ grid} \quad (4)$$

Exclude the periods of 01-June-2011~26-February-2012, and 27-Feb-2012~28-Feb-2015, the $BE_{elec,y}$ is calculated as below.

Table 5-4 The calculation of $BE_{elec,y}$

Year	$EG_{d,y}$	CEF_d	$BE_{elec,y}$
	MWh	tCO_2e/MWh	tCO_2e
01-Mar-2015~31-May-2015	33,686.400	0.78795	26,543
01-Jun-2015~31-May-2016	134,816.000	0.78795	106,228
01-Jun-2016~31-May-2017	134,983.200	0.78795	106,360
01-Jun-2017~31-May-2018	134,589.40	0.78795	106,050
01-Jun-2018~31-Dec -2018	80,828.000	0.78795	63,688
Total	518,903.000		408,870

As a summary, the baseline emission is as table 5-5.

Table 5-5 Summary of baseline emission

Year	MB $_y$ ($BE_{CH4,SWDS,y}$)	$BE_{elec,y}$	$BE_{,y}$
	tCO_2e	tCO_2e	tCO_2e
01-Mar-2015~31-May-2015	23,288	26,543	49,831
01-Jun-2015~31-May-2016	270,345	106,228	376,573
01-Jun-2016~31-May-2017	293,879	106,360	400,239
01-Jun-2017~31-May-2018	311,445	106,050	417,494
01-Jun-2018~31-Dec -2018	189,470	63,688	253,158

Total	**1,088,426**	**408,870**	**1,497,295**

Thus, the baseline emission in the calendar year is calculated as the following table.

Table 5-6 The baseline emission in the calendar year

Year	$BE_{,y}$
	tCO_2e
01-Mar-2015~31-Dec-2015	270,013 [5]
01-Jar2016~31-Dec-2016	391,052 [6]
01-Jar-2017~31-Dec-2017	410,356 [7]
01-Jar-2018~31-Dec-2018	425,875 [8]
Total	**1,497,295**

5.2 Project Emissions

According to the AM0025 (Version 12), project emissions of the project are calculated as follows:

$$PE_y = PE_{elec,y} + PE_{fuel,on-site,y} + PE_{i,y} + PE_{w,y} + PE_{co-firing,y} \quad (5)$$

Where,

PE_y = is the project emissions during the year *y* (tCO_2e)

$PE_{elec,y}$ = is the emissions from electricity consumption on-site due to the project activity in year y (tCO_2e)

$PE_{fuel,on-site,y}$ = is the CO_2 emissions due to on-site fuel combustion in year y (tCO_2e)

$PE_{i,y}$ = is the emissions from waste incineration in year *y* (tCO_2e)

$PE_{w,y}$ = is the emissions from wastewater treatment in year y (tCO_2e)

[5] 270,013 tCO_2e=49,831 tCO_2e+376,573 tCO_2e*214days/366days

[6] 391,052 tCO_2e =376,573 tCO_2e *152 days /366 days +400,239 tCO_2e *214 days /365 days

[7] 410,356 tCO_2e =400,239 tCO_2e *151 days /365 days +417,494 tCO_2e *214 days /365 days

[8] 425,875 tCO_2e =417,494 tCO_2e *151 days /365 days +253,158 tCO_2e

$PE_{co\text{-}firing,y}$ = is the emissions from thermal energy generation/electricity generation from on-site fossil fuel consumption during co-firing in year y (tCO_2e)

(1) *Emissions from electricity use on site* ($PE_{elec,y}$)

$$PE_{elec,y} = EG_{PJ,FF,y} * CEF_{elec} \quad (6)$$

Where,

$EG_{PJ,FF,y}$ = the amount of electricity consumed from the grid as a result of the project activity, measured using an electricity meter (MWh)

CEF_{elec} = the carbon emissions factor for electricity generation in the project activity (tCO_2/MWh)

Exclude the periods of 01-June-2011~26-February-2012, and 27-Feb-2012~28-Feb-2015, the result of $PE_{elec,y}$ is as table 5-7.

Table 5-7 The calculation of $PE_{elec,y}$

Year	$EG_{PJ.FF,y}$	CEF_{elec}	$PE_{elec,y}$
	MWh	tCO_2e/MWh	tCO_2e
01-Mar-2015~31-May-2015	2.200	0.78795	2
01-Jun-2015~31-May-2016	1,320.000	0.78795	1,041
01-Jun-2016~31-May-2017	154.000	0.78795	122
01-Jun-2017~31-May-2018	468.600	0.78795	370
01-Jun-2018~31-Dec -2018	125.400	0.78795	99
Total	2,070.200		**1,634**

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

Emissions from consumption of the light diesel oil are calculated below.

$$PE_{fuel,on\text{-}site,y} = F_{cons,y} * NCV_{fuel} * EF_{fuel} \quad (7)$$

Where,

$F_{cons,y}$ = the fuel consumption on site in year y (kg).

NCV_{fuel} = the net caloric value of fuel (MJ/kg).

EF_{fuel} = the CO_2 emissions factor of the fuel (tCO_2/MJ).

Exclude the periods of 01-June-2011~26-February-2012, and 27-Feb-2012~28-Feb-2015, the result of $PE_{fuel,on\text{-}site,y}$ is as table 5-8.

Table 5-8 The calculation of $PE_{fuel,on\text{-}site,y}$

Year	$F_{cons,y}$	NCV_{fuel}	EF_{fuel}	$PE_{fuel,on\text{-}site,y}$
	kg	MJ/kg	tCO_2e/MJ	tCO_2e
01-Mar-2015~31-May-2015	1,786	44.27	0.0000748	6
01-Jun-2015~31-May-2016	64,615	44.27	0.0000748	214
01-Jun-2016~31-May-2017	116,065	44.27	0.0000748	385
01-Jun-2017~31-May-2018	84,370	44.27	0.0000748	280
01-Jun-2018~31-Dec -2018	45,918	44.27	0.0000748	153
Total	**312,754**			**1,038**

(3) Emissions from waste incineration ($PE_{i,y}$)

$$PE_{i,y} = PE_{i,f,y} + PE_{i,s,y} \quad (8)$$

Where,

$PE_{i,f,y}$ = is the fossil-based waste CO_2 emissions from waste incineration in year y (tCO_2e)

$PE_{i,s,y}$ = is the N_2O and CH_4 emissions from the final stacks from waste incineration in year y (tCO2e)

- **Emission from fossil-based waste ($PE_{i,f,y}$)**

$$PE_{i,f,y} = \sum_i A_i * CCW_i * FCF_i * EF_i * 44/12 \quad (9)$$

Where,

$A_{i,y}$ = the amount of MSW fed into the waste incineration plant (t/yr)

FCF_i = the fraction of fossil carbon in MSW (fraction)

EF_i = the combustion efficiency for waste (fraction)

CCW_i =the fraction of carbon content in waste type i(fraction)

12/44 = the conversion factor (tCO_2/tC)

$$A_i = A_{MSW,y} \frac{\sum_{n=1}^{z} pn,i,y}{z} \quad (10)$$

Where,

A_i = Is the amount of waste type i fed into the gasifier or RDF/stabilized biomass combustor or into the waste incineration plant (t/yr)

$A_{MSW,y}$ = Is the amount of MSW fed into the gasifier or RDF/stabilized biomass combustor or into the waste incineration plant (t/yr)

$p_{n,j,y}$ = Is the weight fraction of the waste type i in the sample n collected during the year y

Z = Number of samples collected during the year y

Table 5-9 The annual values of $P_{n,j,y}$ and A_i

Waste type j	$P_{n,j,y}$ (%)				
	95% confidence level high				
	01-Mar-2015~31-May-2015	01-Jun-2015~31-May-2016	01-Jun-2016~31-May-2017	01-Jun-2017~31-May-2018	01-Jun-2018~31-Dec-2018
Kitchen	52.94%	49.52%	51.80%	50.69%	51.18%
Paper	12.82%	14.97%	11.85%	12.65%	12.48%
Wood	11.81%	10.37%	11.53%	11.43%	12.39%
Plastics	7.49%	7.95%	7.09%	7.28%	7.52%
Textiles	7.22%	7.94%	6.64%	6.47%	7.54%
Glass and metal	3.63%	4.23%	5.29%	5.46%	6.00%
Rubber and leather	0.00%	0.00%	0.00%	0.00%	0.00%
Ash	12.33%	11.82%	13.69%	13.49%	14.28%
Waste type j	A_i (tons)				
	01-Mar-	01-Jun-	01-Jun-	01-Jun-	01-Jun-

	2015~31-May-2015	2015~31-May-2016	2016~31-May-2017	2017~31-May-2018	2018~31-Dec-2018
Kitchen	62356.85	244213.36	256058.68	248971.77	148600.69
Paper	15094.12	73838.84	58595.11	62117.21	36237.90
Wood	13906.61	51131.91	56994.24	56125.86	35973.21
Plastics	8825.11	39213.13	35068.80	35776.37	21818.18
Textiles	8499.86	39138.13	32822.34	31802.86	21889.19
Glass and metal	4272.22	20864.53	26149.96	26803.24	17432.30
Rubber and leather	0.00	0.00	0.00	0.00	0.00
Ash	14522.84	58285.51	67662.19	66246.08	41447.87
Waste type j	**FCF_i (%)**				
	95% confidence level high				
	01-Mar-2015~31-May-2015	01-Jun-2015~31-May-2016	01-Jun-2016~31-May-2017	01-Jun-2017~31-May-2018	01-Jun-2018~31-Dec-2018
Kitchen	0%	0%	0%	0%	0%
Paper	0%	0%	0%	0%	0%
Wood	0%	0%	0%	0%	0%
Plastics	100%	100%	100%	100%	100%
Textiles	15.55%	15.00%	16.42%	15.55%	15.77%
Glass and metal	NA	NA	NA	NA	NA
Rubber and leather	20%	20%	20%	20%	20%
Ash	100%	100%	100%	100%	100%

Table 5-10 Input values for the calculation of $PE_{i,f,y}$

Waste type	Fraction ($P_{n,j,y}$)	Dry matter content in %	CCW_i(%)	FCF_i(%)	EF_i

		of wet weight			
Kitchen	Please refer to table 5-9	40%	38%	Please refer to table 5-9	1
Paper		90%	46%		1
Wood		40%	40%		1
Plastics		100%	75%		1
Textiles		80%	50%		1
Glass and metal		100%	0%		1
Rubber and leather		84%	67%		1
Ash		90%	3%		1
Data source	Waste type sampling report	IPCC 2006	IPCC 2006	Monitoring report	IPCC 2006

Exclude the periods of 01-June-2011~26-February-2012, and 27-Feb-2012~28-Feb-2015, the result of $PE_{i,f,y\ y}$ is as table 5-11.

Table 5-11 The calculation result of $PE_{i,f,y}$

Year	$PE_{i,f,y}$
	tCO_2e
01-Mar-2015~31-May-2015	27,645
01-Jun-2015~31-May-2016	122,217
01-Jun-2016~31-May-2017	111,042
01-Jun-2017~31-May-2018	112,195
01-Jun-2018~31-Dec -2018	69,166
Total	**442,265**

- **N_2O and CH_4 Emission from waste incineration ($PE_{i,s,y}$)**

$$PE_{i,s,y}= Q_{biomass,y}*(EF_{N2O}* GWP_{N2O}+ EF_{CH4}* GWP_{CH4})*10^{-3}* CF \quad (11)$$

Where,

$Q_{biomass,y}$= the amount of waste incinerated in year y (tons/d).

EF_{N2O} = the aggregate N_2O emission factor for waste combustion (kgN_2O/tonne of waste).

GWP_{N2O} = the Global Warming Potential of nitrous oxide (tCO_2/tN_2O)

EF_{CH4} = the aggregate CH4 emission factor for waste combustion (kgCH_4/tonne of waste).

GWP_{CH4} = the Global Warming Potential of methane (tCO_2/tCH_4)

CF = the conservativeness factor.

Exclude the periods of 01-June-2011~26-February-2012, and 27-Feb-2012~28-Feb-2015, the result of $PE_{i,s,y}$ is as table 5-12.

Table 5-12 The calculation of $PE_{i,s,y}$

Year	$Q_{biomass,y}$	EF_{N2O}	GWP_{N2O}	EF_{CH4}	GWP_{CH4}	CF	$PE_{i,s,y}$
	tonne	kg N_2O/tonne	tCO_2e/MJ	kg CH_4/tonne	tCO_2/tN_2O		tCO_2e
01-Mar-2015~31-May-2015	117,778.91	0.047	298	0.0002	25	1.37	2,261
01-Jun-2015~31-May-2016	493,143.87	0.047	298	0.0002	25	1.37	9,466
01-Jun-2016~31-May-2017	494,299.81	0.047	298	0.0002	25	1.37	9,489
01-Jun-2017~31-May-2018	491,186.78	0.047	298	0.0002	25	1.37	9,429
01-Jun-2018~31-Dec -2018	290,325.78	0.047	298	0.0002	25	1.37	5,573
Total	**1,886,735**						**36,218**

(4) Emissions from wastewater treatment ($PE_{w,y}$)

$$PE_{w,y} = Q_{COD,y} * P_{COD,y} * B_O * MCF_P * GWP_{CH4} * (1 - \eta_{flare,h}) \quad (12)$$

Where,

$PE_{CH4,w,y}$ =Methane emissions from the waste water treatment in year y (tCH_4/y)

$Q_{COD,y}$ =Amount of wastewater treated anaerobically or released untreated from the project activity in year y (m^3/yr), which shall be measured monthly and aggregately annually

$P_{COD,y}$ =Chemical Oxygen Demand (COD) of wastewater ($tCOD/m^3$),which will be measured monthly and averaged annually

Bo =Maximum methane producing capacity ($tCH_4/tCOD$)

MCF_P =Methane conversion factor (fraction), preferably local specific value should be sued. In absence of local value, MCF_P default values can be obtained from table 6.3, chapter 6, volume 5 from IPCC 2006 guidelines.

Exclude the periods of 01-June-2011~26-February-2012, and 27-Feb-2012~28-Feb-2015, the result of $PE_{w,y}$ is as table 5-13.

Table 5-13 The calculation of $PE_{w,y}$

Year	$Q_{COD,y}$	$P_{COD,y}$	B_O	MCF_P	GWP_{CH4}	$\eta_{flare,h}$	T_{flare}	$PE_{w,y}$
	m^3	tonne/m^3	$tCH_4/tCOD$	-	tCO_2/tN_2O	%	°C	tCO_2e
01-Mar-2015~31-May-2015	12,784	0.024279	0.265	0.8	25	0.9	918-955	165
01-Jun-2015~31-May-2016	47,280	0.023545	0.265	0.8	25	0.9	910-962	590
01-Jun-2016~31-May-2017	39,730	0.023949	0.265	0.8	25	0.9	915-976	505
01-Jun-2017~31-May-2018	44,341	0.024288	0.265	0.8	25	0.9	913-967	571
01-Jun-2018~31-Dec -2018	24,809	0.024122	0.265	0.8	25	0.9	915-979	318
Total								**2,149**

(5) Emissions from thermal energy generation/electricity generation (from on-site fossil fuel consumption during co-firing) ($PE_{co\text{-}firing,y}$)

The project activity doesn't utilize any fossil fuel for co-firing besides the diesel used as ignition fuel and auxiliary fuel in the incinerators, thus $PE_{co\text{-}firing,y}$=0 tCO_2 e.

As a summary, the project emission is as follows:

Table 5-14 Summary of project emission

Year	$PE_{ELEC,y}$	$PE_{fuel,on\text{-}site,y}$	$PE_{i,f,y}$	$PE_{i,s,y}$	$PE_{w,y}$	$PE_{,y}$
	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e
01-Mar-2015~31-May-2015	2	6	27,645	2,261	165	30,079
01-Jun-2015~31-May-2016	1,041	214	122,217	9,466	590	133,528
01-Jun-2016~31-May-2017	122	385	111,042	9,489	505	121,543
01-Jun-2017~31-May-2018	370	280	112,195	9,429	571	122,845
01-Jun-2018~31-Dec -2018	99	153	69,166	5,573	318	75,309
Total	**1,634**	**1,038**	**442,265**	**36,218**	**2,149**	**483,304**

Hence, the project emission in the calendar year is calculated as the following table.

Table 5-15 The project emission in the calendar year

Year	$PE_{,y}$
	tCO_2e
01-Mar-2015~31-Dec-2015	108,153 [9]
01-Jan-2016~31-Dec-2016	126,715 [10]
01-Jan-2017~31-Dec-2017	122,306 [11]

[9] 108,153 tCO_2e=30,079 tCO_2e+133,528 tCO_2e*214days/366days

[10] 126,715 tCO_2e =133,528 tCO_2e *152 days /366 days +121,543 tCO_2e *214 days /365 days

[11] 122,306 tCO_2e =121,543 tCO_2e *151 days /365 days +122,845 tCO_2e *214 days /365 days

01-Jan-2018~31-Dec-2018	126,130 [12]
Total	**483,304**

5.3 Leakage

According to the AM0025 (Version 12), the leakage emissions are calculated as follows:

$$L_y = L_{t,y} + L_{r,y} + L_{i,y} + L_{s,y}$$

Where,

$L_{t,y}$ = the leakage emissions from increased transport in year y (tCO_2);

$L_{r,y}$ =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_2);

$L_{i,y}$ =the leakage emission from the residual waste from MSW incinerator in year y (y (tCO_2);

$L_{s,y}$ =the leakage emissions from end of stabilized biomass.

According to the registered PDD, the project activity utilized the waste incineration technology, then $L_{r,y}$ =0, $L_{s,y}$ =0. And due to the distance between the location of the project site and collection points, is smaller than the distance between collection points and the landfill site. Therefore, the leakage emission caused by increasing transportation is 0, $L_{t,y}$ =0

Therefore, $L_y = L_{i,y}$

Leakage Emissions from the residual waste from MSW incineration ($L_{i,y}$)

Exclude the periods of 01-June-2011~26-February-2012, and 27-Feb-2012~28-Feb-2015, the result of $L_{i,y}$ is as table 5-16.

Table 5-16 The calculation of $L_{i,y}$

Year	$A_{residual,y}$	$FC_{residual,y}$	$L_{i,y}$
	ton	%	tCO_2e

[12] 126,130 tCO_2e =122,845 tCO_2e *151 days /365 days +75,309 tCO_2e

01-Mar-2015~31-May-2015	32256.44	2.86%	3,383
01-Jun-2015~31-May-2016	134123.52	2.86%	14,048
01-Jun-2016~31-May-2017	131471.52	2.93%	14,132
01-Jun-2017~31-May-2018	130342.96	2.90%	13,838
01-Jun-2018~31-Dec -2018	73883.05	2.89%	7,840
Total			**53,241**

The leakage in the calendar year is calculated as follows.

Table 5-17 The leakage in the calendar year

Year	$L_y = L_{i,y}$
	tCO_2e
01-Mar-2015~31-Dec-2015	11,597 [13]
01-Jan-2016~31-Dec-2016	14,120 [14]
01-Jan-2017~31-Dec-2017	13,960 [15]
01-Jan-2018~31-Dec-2018	13,565 [16]
Total	53,241

5.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
01-June-2011~26-Feb-2012[17]	0	0	0	0

[13] 11,597 tCO_2e=3,383 tCO_2e+14,048 tCO_2e*214days/366days

[14] 14,120 tCO_2e =14,048 tCO_2e *152 days /366 days +14,132 tCO_2e *214 days /365 days

[15] 13,960 tCO_2e =14,132 tCO_2e *151 days /365 days +13,838 tCO_2e *214 days /365 days

[16] 13,565 tCO_2e =13,838 tCO_2e *151 days /365 days +7,840 tCO_2e

27-Feb-2012~28-Feb-2015[18]	0	0	0	0
01-Mar-2015~31-Dec-2015	270,013	108,153	11,597	150,263
01-Jan-2016~31-Dec-2016	391,052	126,715	14,120	250,217
01-Jan-2017~31-Dec-2017	410,356	122,306	13,960	274,090
01-Jan-2018~31-Dec-2018	425,875	126,130	13,565	286,180
Total	**1,497,295**	**483,304**	**53,241**	**960,750**

Comparison of actual emission reductions with estimates during validation:

As stated above, the emission reductions generated from 27-February-2012 to 28-February-2015 (both days included) by the project has been issued as CER under CDM program, which has been considered as zero under VERRA. And the project participant voluntarily gives up the emission reductions achieved in the period from 01-June-2011 to 26-February-2012（Both days included. The actual emission reductions of 960,750 tCO_2e achieved in the period from 01-March-2015 to 31-December-2018 is 0.94% [19] lower than the estimated emission reductions 969,873 tCO_2e[20] which is calculated in line with the registered PD, which is in the normal fluctuation range.

[17] The PP voluntarily gives up the emission reductions achieved during the period from 01-June-2011 to 26-February-2012（Both days included）in the monitoring period from 01-June-2011 to 31-December-2018.

[18] The emission reductions from the period of 27-February-2012 to 28-February-2015 has been issued as CERs under CDM program, which has been considered as zero under VERRA in the monitoring period from 01-June-2011 to 31-December-2018.

[19] (960,750 tCO_2e -969,873 tCO_2e)/ 969,873 tCO_2e =-0.94%

[20] As per the VCS registered PD, the annual emission reduction in 2015, 2016, 2017 and 2018 is respectively 215,642 tCO_2e, 242,707 tCO_2e, 264,313 tCO_2e, and 282,068 tCO_2e, and it covers 306 days from 01-March-2015 to 31-December-2015 in the whole year of 2015, thus the estimated emission reduction in the period from 01-March-2015 to 31-December-2018 is 969,873 tCO_2e, ie. 969,873=215,642 tCO_2e *306days /365days+242,707 tCO_2e+264,313 tCO_2e+ 282,068 tCO_2e.