Gold Standard for the Global Goals

TEMPLATE

KEY PROJECT INFORMATION & PROJECT DESIGN DOCUMENT (PDD)

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VERSION **v. 1.2**

RELATED SUPPORT

– **TEMPLATE GUIDE Key Project Information & Project Design Document v.1.2**

This document contains the following Sections

KEY PROJECT INFORMATION

GS ID of Project	397
Title of Project	Suzhou Qizi Mountain Landfill Gas Recovery Project
Time of First Submission Date	Before 08/09/2008
Date of Design Certification	22/04/2009
Version number of the PDD	2.0
Completion date of version	25/01/2021
Project Developer	Everbright Environment and Energy (Suzhou) Landfill Gas to Energy Co., Ltd.
Project Representative	South Pole Carbon Asset Management Ltd.
Project Participants and any communities involved	Everbright Environment and Energy (Suzhou) Landfill Gas to Energy Co., Ltd. South Pole Carbon Asset Management Ltd.
Host Country (ies)	China
Activity Requirements applied	☐ Community Services Activities ☒ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Scale of the project activity	☐ Micro scale ☐ Small Scale ☒ Large Scale
Other Requirements applied	N/A
Methodology (ies) applied and version number	ACM0001 "Flaring or use of landfill gas", Version 19.0
Product Requirements applied	☒ GHG Emissions Reduction & Sequestration ☐ Renewable Energy Label ☐ N/A
Project Cycle:	☐ Regular ☒ Retroactive

Table 1 – Estimated Sustainable Development Contributions

Sustainable Development Goals Targeted	SDG Impact (defined in Error! Reference source not found.)	Estimated Annual Average	Units or Products
13 Climate Action (mandatory)	Emissions Reductions	88,874	VERs
7 Ensure access to affordable, reliable, sustainable and modern energy for all (Affordable and Clean Energy)	MWh of renewable energy generated	15,945	MWh/yr
	Number of jobs created	7	/
8 Promote inclusive and sustainable economic growth, employment and decent work for all (Decent Work and Economic Growth)	Number of trainings	Periodically (at least one time a year)	Times
	Average salary	Average salary is above the latest lowest level of local area	RMB/yr

SECTION A. DESCRIPTION OF PROJECT

A.1. Purpose and general description of project

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The Suzhou Qizi Mountain Landfill Gas Recovery Project, which is developed by Everbright Environment and Energy (Suzhou) Landfill Gas to Energy Co., Ltd., is located at Qizi Mountain Landfill, Suzhou, Jiangsu Province, China. The proposed project applies for Gold Standard VER. The purpose of the proposed project is to utilize landfill gas (LFG) for electricity generation It is a combination project including LFG collection, LFG processing system and electricity generation. LFG collected will be used for electricity generation with internal combustion engines and generators.

There are 4 units in the project. Each unit has an installation capacity of 1.25 MW. Power generation by proposed project will be supplied to East China Power Grid. These 4 units are separated into two phases. For each phase, there is a respective processing system, whose description is in the following context. Both of phases share a landfill gas collection system, which could guarantee the proper operation of these four units. The first stage, which is not the same as the two phases of the proposed project, of landfill site (15m-80m above sea level) will be closed in 2008, with 15 years operation period. The second stage of landfill gas will be set up vertically above the first phase, with 15 years operation period as well.

During the third crediting period, the project is expected to collect 3,033 tonnes CH_4 per year on average. The exported electricity is estimated to be 15,945 MWh a year on average. The electricity generated will replace equivalent amount of electricity from East China Power Grid. In absence of the project, equivalent amount of electricity exported to the grid by the proposed project would have otherwise been supplied by East China Power Grid. Greenhouse gas (GHG) emissions will be reduced by avoiding CO2 emissions from those fuel-based power plants connected to the grid and by avoiding GHG emissions from releasing LFG into atmosphere at the landfill site. The expected average annual emission reductions are 97,975 tCO_2e during the third crediting period. Emission reductions from steam generation with waste heat are not counted for a conservative approach.

The project is owned by Everbright Environment and Energy (Suzhou) Landfill Gas to Energy Co., Ltd.. The controlling company, China Everbright International Limited, is a company listed in Hong Kong Stock Exchange. Early in 2006, the project failed to apply for CDM LoA from Chinese DNA due to China's not issuing CDM LoAs to Hong Kong listed companies. Hence the project owner continued to develop the project as a Gold Standard VER project with South Pole Carbon Asset Management Ltd.

This project has been registered as GS project with ID of 397. The first crediting period is from 22/04/2007 to 21/04/2014. The second crediting period is from 22/04/2014 to 21/04/2021. The project is applying for crediting period. The third crediting period will be from 22/04/2021 to 21/04/2028.

A.1.1. Eligibility of the project under Gold Standard

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The project activity meets the eligibility criteria as per section 3.1.1 of GS4GG Principles & Requirements document as described below:

•Types of project:

The project type is power generation using landfill gas which is an eligible project type as it is in accordance with 2.1.2 a) and 2.1.2 b) of the Eligible Project Types & Scope under Renewable Energy Activity Requirements.

•Location of the project:

The project is located in China. Thus, the project is eligible.

•Project Area, Project Boundary and Scale:

The project is located in Suzhou, Jiangsu province, China. The location and boundary is clearly defined in A.2.

The estimated annual emission reductions of the project activity is 97,975 tCO_2e in the third crediting period, which is greater than 10,000 tCO_2eq, above microscale threshold, which is considered as Non microscale project.

•The project has not and will not claim in any other voluntary or compliance standards programme except GS.

• The project is in compliance with applicable China's legal, environmental, ecological and social regulations.

• The project is not registered with any other voluntary or compliance schemes.

• The activity is located in Suzhou, Jiangsu, China. China does not have an emission reduction cap enforced or has the possibility to trade emissions that include the scope of the proposed project.
• The full and uncontested legal ownership is demonstrated and listed in A.1.2.
• The project applies methodology ACM0001, Version 19.0, which is an approved methodology.
• The project activity results in displacement of electricity from fossil fuel power stations while contributing to sustainable development of China. Hence, the project contributes to the Gold Standard Vision and Mission.
• Landfill gas is an approved project type and does not require approval from Gold Standard.
• The project does not involve any ODA financing. This project is not eligible of receiving ODA.

A.1.2. Legal ownership of products generated by the project and legal rights to alter use of resources required to service the project

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The project owner (Everbright Environment and Energy (Suzhou) Landfill Gas to Energy Co., Ltd.) has full and uncontested legal ownership of the emission reductions that are generated under this Gold Standard project, and has legal rights concerning changes in use of resources required to service the project. The legal ownership of the project can be demonstrated via the following documents:

1. Project FSR approval by Jiangsu DRC
2. EIA approval by Jiangsu EPC

A.2. Location of project

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The project is located on Qizi Mountain, Mudu County, Wuzhong District, Suzhou City, Jiangshu Province, P.R.China. It is 13km far from the centre of Suzhou City. The exact location of the project is 31°14’15’’N 120°33’9’’E. A map indicating the location of the project site is provided in Figure 1:

Figure 1 Geographical locations of the project

A.3. Technologies and/or measures

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Most of the equipment, which is technically very advanced, is imported from Germany and other foreign countries. Therefore, the project activity introduces new technology to the host country. The process works as follows:

Landfill gas collection system

Through an extraction system, the landfill gas is extracted from the landfill site. The extraction technology applied will basically consist of vertical wells, collectors and piping.

• Vertical wells drilled into the waste to extract the LFG with function of extracting pipe;
• The gas extracting pipe consists of pipes that connect groups of gas wells to the manifolds, and each pipe was drilled with loophole to maximize gas collection. The manifolds are primary connected into a main pipe and then into the main header pipe;
• The main header pipe designed with HDPE to prevent air and transfer the LFG to the processing system,

Processing system

For the extracting LFG containing water and impurities, it will be pre-treated by the processing system. This includes:

• Water segregator removes the moisture;
• A high efficiency particular air filter removes the impurities;
• The condensate separator is equipped to ensure that the concentration of methane in the LFG remains high;
• The pressure regulator is installed between processing system and power generation system to make sure the gas flow has a stable pressure.
• The pre-treated LFG will finally fulfill the operation requirements of power generator.

Energy generation system

In the power generator system, the LFG is combusted to produce heat energy, which is converted into electric energy. There are 4 Container engine units installed to generate electricity and the total installed capacity is 5MW. Then the generated electricity is transferred to the distribution and controlling system. Finally it is connected Suzhou City local power grid, which is part of East China Power Grid (ECPG).

Table A.1 Details of electricity generating system

Manufacture	Deutz Power Systems GmhH&Co.,KG
Name	Engine
Type	TBG620V16K
Installed capacity	1294KW
Technical description	Modern stationary 4-stroke Otto gas engine with lean-mix combustion; 16 cylinder V-engine

Manufacture	AVK Deutschland GmbH & Co.KG
Name	Generator
Type	DIG 120 i/4
Installed capacity	1250KW
Technical description	Rotary current internal pole synchronous generator. Three phase, brushless, self-exciting, self regulating

Manufacture	Deutz Power Systems GmhH&Co.,KG
Name	TEM EVO System
Technical description	The DEUTZ Total Electronic Management(TEM) system includes the control and monitoring of all functions of a gas engine auxiliary drive in one unit.

In addition, there is a waste heat recovery system connected with the generators in the 2nd phase. The gas vented from generators with 455 ☐C temperature is recovered to heat water in hot water boiler. Therefore, it is different from the utilization of LFG and heat generation from flaring. No LFG is intended to be used for heat generation. For the proposed project, this part of waste heat will not be calculated in the emission reduction.

Figure 2 shows the process of the project activity.

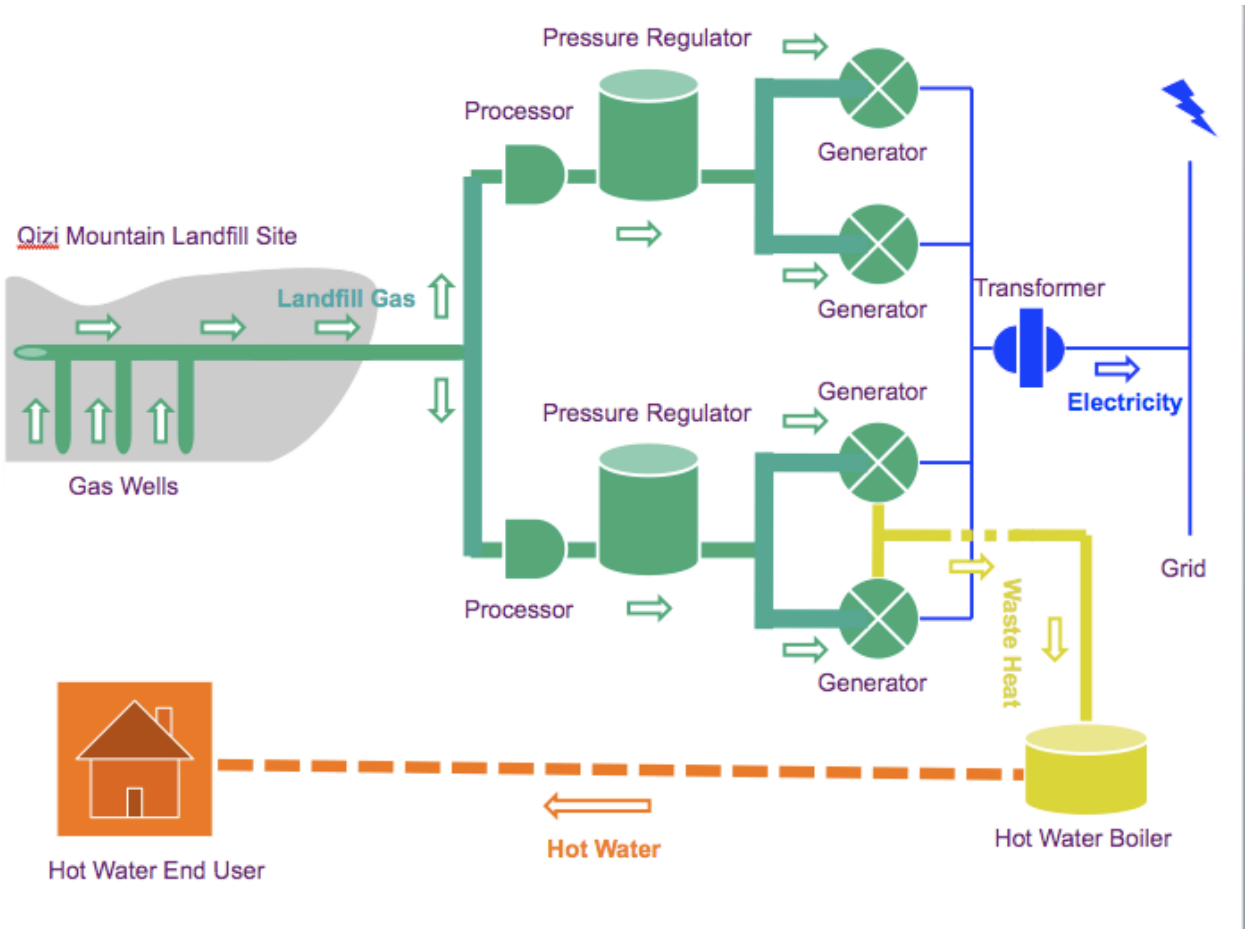

Figure 2 Schematic Diagram of Suzhou Qizi Mountain Landfill Gas Recovery, electricity generation and hot water production

A.4. Scale of the project

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According to Gold Standard Rules and Procedures Updates and Clarifications, the new threshold is 60'000 VERs p.a. for SSC projects. Therefore, it is counted as a large-scale project.

A.5. Funding sources of project

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The project is financed by the project owner.

There is no public funding from Annex 1 countries and no Official Development Assistance (ODA) involved in the project activity.

SECTION B. APPLICATION OF APPROVED GOLD STANDARD METHODOLOGY (IES) AND/OR DEMONSTRATION OF SDG CONTRIBUTIONS

B.1. Reference of approved methodology (ies)

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The approved large-scale consolidated methodology ACM0001 "Flaring or use of landfill gas" (Version 19.0) is applied to the project activity.

Sectoral Scope: 01 and 13

The methodology was applied with the following tools:

• Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period (version 03.0.1)

• Tool to calculate the emission factor for an electricity system (version 07.0)

• Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (Version 03.0)

• Emissions from solid waste disposal sites (version 8.0)

• Tool to determine the mass flow of a greenhouse gas in a gaseous stream-v3.0

• Project emissions from flaring-v3.0

• Tool to determine the mass flow-v3.0

• Tool to identify baseline and additionality-v7.0

Further information pertaining to the methodology can be obtained at:
http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

B.2. Applicability of methodology (ies)

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Justification for the choice of the selected methodology is given below :

The methodology referenced above is applicable to this project activity because the following criteria are met:

• The project activity installed a new LFG capture system in an existing SWDS where no LFG capture system was installed prior to the implementation of the project activity;

• The project activity uses the captured LFG for generating electricity;

• No organic waste would be recycled in the absence of the project activity;

- In the absence of the project activity, LFG would be released into the atmosphere, which complies with regulations;
- LGF collected is used for electricity generation with internal combustion engines and generators, and the electricity generated is supplied to East China Power Grid;
- The methodology is not in combination with other approved methodologies;

The management of the SWDS in the project activity is not changed during the crediting period compared to the situation prior to the implementation of the project activity.

B.3. Project boundary

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As per ACM0001 (Version 16.0), the project boundary of the project activity includes the following:

(a) Sites where the LFG is flared or used (e.g. flare, power plant, boiler, air heater, glass melting furnace, kiln, natural gas distribution network or biogas processing facility);

For this case, it is the landfill site of Qizi Mountain Landfill.

(c) Captive power plant(s) or power generation sources connected to the grid, which are supplying electricity in the baseline that is displaced by electricity generated by captured LFG in the project activity.

Here the extended project boundary includes all the power generation sources connected to the grid to which the project activity is connected. For this case, it is the East China Power Grid, to which the electricity will be exported.

According to the methodology, overview of emission sources included in or excluded from the project boundary is provided in the following table:

	Source	Gas	Included/Excluded	Justification/Explanation
Baseline scenario	Emissions from decomposition of waste at the SWDS site	CH_4	Yes	The major source of emissions in the baseline
		N_2O	No	N_2O emissions are small compared to CH_4 emissions from SWDS. This is conservative.
		CO_2	No	CO_2 emissions from decomposition of organic waste are not accounted since the CO_2 is also released under the project activity.
	Emissions from electricity generation	CO_2	Yes	Major emission source if power generation is included in the project activity.
		CH_4	No	Excluded for simplification. This is conservative.
		N_2O	No	Excluded for simplification. This is conservative.
	Emissions from heat generation	CO_2	No	No heat generation from LFG in the project activity
		CH_4	No	Excluded for simplification. This is conservative.
		N_2O	No	Excluded for simplification. This is conservative.
	Emissions from the use of natural gas	CO_2	No	Excluded for simplification. This is conservative.
		CH_4	No	No LFG supply through natural gas distribution network or using trucks in the project activity
		N_2O	No	Excluded for simplification. This

				is conservative.
Project Scenario	Emissions from fossil fuel consumption for purposes other than electricity generation or transportation due to the project activity	CO_2	No	There is no fossil fuel used in project activity. Therefore, there is no CO_2 emission.
		CH_4	No	Excluded for simplification. This emission source is assumed to be very small.
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small.
	Emissions from electricity consumption due to the project activity	CO_2	No	Excluded for simplification. This emission source is assumed to be very small.
		CH_4	No	Excluded for simplification. This emission source is assumed to be very small.
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small.
	Emissions from flaring	CO_2	No	Emissions are considered negligible
		CH_4	Yes	May be an important emission source
		N_2O	No	Emissions are considered negligible
	Emissions from distribution of LFG using trucks	CO_2	No	The project does not include LFG distribution through using trucks. Therefore, there is no CO_2 emission.
		CH_4	No	The project does not include LFG distribution through using

				trucks. Therefore, there is no CH_4 emission.
		N_2O	No	Emissions are considered negligible

Figure 3. Flow diagram of the project

B.4. Establishment and description of baseline scenario

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The baseline scenario identification is not changed from the registered PDD.
The original baseline scenario is: Atmospheric release of the landfill gas; equivalent amount of electricity is supplied from Ease China Power Grid.

For the third crediting period, the continued validity of the original baseline should be assessed.

In line with the methodology ACM0001 (Version 19.0), a stepwise procedure according to the "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" Version03.0.1 is applied here to assess the continued validity of the baseline at the renewal of a crediting period:

Step 1: Assess the validity of the current baseline for the next crediting period

The "Procedures for the renewal of the crediting period of a registered CDM project activity" approved by the CDM Executive Board require assessing the impact of new relevant national and/or sectoral policies and circumstances on the baseline.
The validity of the current baseline is assessed using the following Sub-steps:

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

1) The Suzhou Qizi Mountain Landfill in the project activity started construction in 1992, at which the Technical code for municipal solid waste sanitary landfill (CJJ17-88)[1] was available. CJJ17- 88 specified concentration limits of methane in the air and measurements should be taken to vent methane. It mainly focuses on safety concerns and has no mandatory requirement on LFG flaring or utilization. The landfill met the national and local standards and regulations during construction and has been in compliance since its operation, LFG from the landfill has directly released to the atmosphere through vertical extraction trenches to meet the landfill safety requirements before the implementation of project activity, which is also the traditional management and operation way of landfills in China. Hence, atmospheric release and no flaring of LFG occurred at Suzhou Qizi Mountain Landfill in the baseline scenario.

2) CJJ17-88 was replaced by the most update GB50869-2013[2]. Besides requirements for methane concentration limits and methane venting measurements, GB50869-2013 also states (in clause 11.1.3 and clause 11.5.1) that landfill gas should be utilized (for gas that can be utilized) or flared (for gas that cannot be utilized). This statement can also be seen in the other two national regulations (GB16889-2008[3] and CJJ133-2009[4]), which were issued and taken into effective since July 2008 and July 2010 respectively. However, the statement is only a recommendation, not a compulsory requirement. As long as the landfill fulfils the safety requirements, the government must not enforce the utilization of LFG.

3) Although China government encouraged the collection and utilization of LFG from waste dumps in the past few years, due to financial and technological difficulties most of the landfills just release LFG directly into the atmosphere without any recovery and flaring system. In February 2007, the Ministry of Construction issued "Circular on the Outcome of Nationwide Inspection on Hazard-free Treatment of Domestic Waste Landfill Sites"[5]. At present, a very small percentage of plants in China have landfill gas recovery and utilization facilities. Only the landfills in CDM mode or few with investment from the government count have LFG flaring or utilization systems in operation. Moreover,

[1] Published by China Ministry of Construction dated on 15, February 1989 (CJJ17-88).
[2] Published by China Ministry of Housing and Urban-Rural Development on 8, August 2013 (GB50869-2013), and taken into effect in March 2014.
[3] Standard for Pollution Control on the Landfill Site of Municipal Solid Waste, published by China Ministry of Environment Protection on 2, April 2008 (GB16889-2008).
[4] Technical code for projects of landfill gas collection treatment and utilization, published by China Ministry of Housing and Urban-Rural Development on 9, November 2009 (CJJ133-2009).
[5] http://www.huanke.com.cn/08/article.asp?articleid=416

according to the "Development Report on China Treatment Industry of Urban Domestic Refuse in 2013"[6], until 2012 there were 795 prefectural and municipal domestic waste landfills in operation, with only 50 landfills having LFG recovery and utilization facilities by the end of year 2013.Therefore, it is obvious that LFG gas flaring or utilization is still exceptional and that under common practice conditions the LFG is not flared in China in baseline conditions. Therefore, it is justifiable to conclude that the specific requirements on LFG recovery and utilization as prescribed in the above mentioned regulations have not been systematically enforced and that non-compliance with those requirements, namely uncontrolled emission of LFG to the atmosphere without any recovery and utilization, has been and is still widespread in China.

Therefore, LFG collection and utilization is not enforced in China, the landfill operator would continue release the LFG from the landfill sites directly to atmosphere without any collection, and this is the zero cost way for LFG treatment without economically attractive, also without obligatory restriction by the new issued regulations.

In conclusion, on the basis of above evidences, the flaring and utilization of LFG in GB16889-2008, CJJ133-2009 and GB50869-2013 have been systematically not enforced and non-compliance with those policies, namely uncontrolled emission of LFG to the atmosphere without any recovery and utilization, has been and is still widespread in China, which have come into effect after the submission of the project activity for validation or the submission of the previous request for renewal of the crediting period and are applicable at the time of requesting renewal of the crediting period. The LFG directly released into atmosphere is the baseline scenario of the project activity in the second crediting period, which is the same as the first crediting period.

Step 1.2: Assess the impact of circumstances

The baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment. Baseline emissions are primarily derived from the release of LFG to the atmosphere from the landfill. The project activity recoveries and utilises the LFG from an existing landfill, Suzhou Qizi

[6] http://wenku.baidu.com/link?url=dvEeDfqy08N8TfqSTg15ZnUlL7l5mMagy6TmjK3B9p0duyfHom8axvefDGbuJH_aVV3Ok1HYixJGa9kIJB8M0rL8CWX6usg9q0PsH7zZl_a

Mountain Landfill. At the time of requesting renewal of the crediting period, the landfill is still in operation. So the release of LFG continues. Market characteristics do not otherwise impact the baseline emissions from the release of LFG.

In conclusion, the conditions used to determine the baseline emissions in the previous crediting period are still valid. The availability of new fuels or raw materials or the level of fuel prices has no impact on the identification of the current practice for the baseline emissions. The current baseline does not need to be updated for the second crediting period.

Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.

As per "Tool to determine the remaining lifetime of equipment" Version 01, the Option (c) use default values for the technical lifetime and determine the remaining lifetime as the difference of the technical lifetime and the operational time.

This option can only be applied if:
(i) The project participants can demonstrate that the equipment has been operated and maintained according to the recommendations of the equipment supplier;
(ii) There are no periodic replacement schedules or scheduled replacement practices specific to the industrial facility, that require early replacement of equipment before the expiry of the technical lifetime; and
(iii) The equipment has no design fault or defect and did not have any industrial accident due to which the equipment cannot operate at rated performance levels.

The first commissioning of equipment(s) in the project activity is in January 2007, the information on the operational history of the equipment(s) showed that the situation of the project is applied for (i), (ii) and (iii) of this Option.

The main equipment adopted in the project activity is described in table A.1. The design lifetime adopted the default value 25 years from the "Tool to determine the remaining lifetime of equipment" including all the equipment(s) in the extraction system, the processing system and the electricity generation system. As the project activity started

commissioning on 01/01/2007, and the first and second crediting period last for 14 years, so the remaining technical lifetime of the equipment(s) is over 10 years, which exceeds the third crediting period.

Therefore, the continuation of use of current baseline equipment(s) is the most likely scenario for the renewal of the crediting period.

Step 1.4: Assessment of the validity of the data and parameters

The IPCC default value of Model correction factor (φ) and Global warming potential of CH4 (GWP_{CH4}) are updated for the third crediting period as described in Section B.5, which were only determined at the start of the crediting period and not monitored during the crediting period.

The emission factors are updated for the third crediting period as described in Section B.5 and in Section E.4, which were only determined at the start of the crediting period and not monitored during the crediting period.

As in Step 1.4 some data and parameters are not valid for the subsequent crediting period, then the baseline, data and parameters are updated for the third crediting period.

Step 2: Update the current baseline and the data and parameters
This step is only applicable if any of the Steps 1.1, 1.2, 1.3 and/or 1.4 showed that the current baseline needs to be updated.

Step 2.1: Update the current baseline
The current baseline emissions for the third crediting period are updated based on the latest ACM0001 Version 19.0 applicable to the project activity.

Step 2.2: Update the date and parameters
The default value of Model correction factor (φ), Global warming potential of CH4 (GWP_{CH4}) and combined margin CO_2 emission factor for grid connect power generation are updated for the third crediting period as described in Section B.5 and in Section E.4.

Conclusion regarding the assessment of the validity of the original/current baseline

In accordance with the procedures for renewal of crediting period of a registered project activity, the original baseline scenario remains valid taking new relevant national and/or sectoral policies into account; and the baseline emissions are updated in accordance with step 1.2 and 2.2 for the third crediting period.

B.5. Demonstration of additionality

This section has been assessed and validated in the first crediting period.

B.5.1. Prior Consideration

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As this project was registered as per GS standard version 1.0, no limit on the time span between project start data and first submission.

The project starts operation on 01/01/2007. And entering into GS pipeline before 2009.

B.5.2. Ongoing Financial Need

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Carbon revenues derived from Gold Standard certification have been playing a very important role in helping PO to contribute to SDGs, e.g preserving 7 jobs and providing renewable electricity.

B.6. Sustainable Development Goals (SDG) outcomes

Relevant Target/Indicator for each of the three SDGs

Sustainable Development Goals Targeted	Most relevant SDG Target	SDG Impact
		Indicator (Proposed or SDG Indicator)
13 Climate Action (mandatory)	N/A	Emissions Reductions

7 Affordable and Clean Energy	Target 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix	MWh of renewable energy generated
8 Decent Work and Economic Growth	Target 8.5: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	Number of jobs created Number of trainings Average salary is above the latest lowest level of local area

B.6.1. Explanation of methodological choices/approaches for estimating the SDG Impact

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SDGs	Method
SDG 7 Affordable and Clean Energy	Target 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix Indicator: MWh of renewable energy generated Monitoring Parameter: $EC_{PJ,j,y}$ Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/yr)
SDG 8 Decent Work and Economic Growth	Target 8.5: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value Indicator: Number of jobs created; number of trainings provided to the employees per year; average salary of the employees Monitoring Parameter: Quantitative employment and income generation; Quality of employment Monitoring Method: Training Attendance sheets, Employee Records, Salary Record of the employees Calculation Method: N/A

SDG 13 Climate Action	Indicator: Emissions Reductions in tCO_2e from the project activity. Monitoring Parameter: ER_y emission reductions in year y and monitoring parameters under SDG7 Monitoring Method: Electricity meters Calculation Method: Details as below.

For SDG 13, the applied methodology ACM0001 is applied in the project in the following four steps:

1. Project Emission

In accordance to methodology ACM0002, the project emissions are calculated as follows:

$PEy = PE_{EC,y} + PE_{FC,y} + PE_{DT,y}$

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

Where:

PE_y	=	Project emissions in year y (tCO_2/yr)
$PE_{EC,y}$	=	Emissions from consumption of electricity due to the project activity in year y (tCO_2/yr)
$PE_{FC,y}$	=	Emissions from consumption of fossil fuel due to the project activity, for purpose other than electricity generation, in year y (tCO_2/yr)
$PE_{DT,y}$	=	Emissions from the distribution of compressed/liquefied LFG using trucks, in year y (tCO_2/yr)

The project emissions from consumption of electricity by the project activity ($PE_{EC,y}$) shall be calculated using the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption". When applying the tool:

(i) $EC_{PJ,k,y}$ in the tool is equivalent to the amount of electricity consumed by the project activity in year y ($EC_{PJ,y}$); and
(ii) If in the baseline a proportion of LFG is destroyed ($F_{CH4,BL,y} > 0$), then the electricity consumption in the tool ($EC_{PJ,j,y}$) should refer to the net quantity of

electricity consumption (i.e. the increase due to the project activity). The determination of the amount of electricity consumed in the baseline shall be transparently documented in the PDD.

Considering when electricity generators will be under regular maintenance and sometimes shut down, the electricity will be purchased from the Ease China Power Grid during this period of time. For ex ante calculation, ECPJ,y = 0 as simplified consideration since it is estimated to be small amount in the project implementation and it will be monitored during the crediting period. As per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption", emissions from consumption of electricity due to the project activity in year y will be calculated as follows:

Where:
$PE_{EC,y}$ = Project emissions from electricity consumption in year y(tCO2/yr)
$EC_{PJ,j,y}$ = Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/yr)
$EF_{EL,j,y}$ = Emission factor for electricity generation for source j in year y (tCO2/MWh)
$TDL_{j,y}$ = Average technical transmission and distribution losses for providing electricity to source j in year y
j = Sources of electricity consumption in the project

For the determination of $EF_{EL,y}$, Option A1 is chosen as:
Option A1: Calculate the combined margin emission factor of the applicable electricity system, using the procedures in the latest approved version of the "Tool to calculate the emission factor for an electricity system" ($EF_{EL,j,y} = EF_{grid,CM,y}$).

There is no fossil fuel consumption in the project activity, therefore $PE_{FC,y} = 0$.

There is no distribution of compressed/liquefied LFG using trucks involved in the project activity, therefore $PE_{DT,y} = 0$.

Therefore, project emissions can be ex ante calculated as:PEy = 0.

2. Baseline Emission

As per the methodology, the baseline emissions for the year y shall be determined as follows:

$$BEy = BE_{CH4,y} + BE_{EC,y} + BE_{HG,y} + BE_{NG,y} \quad (1)$$

Where:

BE_y = Baseline emissions in year y (tCO_2e/yr)

$BE_{CH4,y}$= Baseline emissions of methane from the SWDS in year y (tCO_2e/yr)

$BE_{EC,y}$ = Baseline emissions associated with electricity generation in year y (tCO_2e/yr)

$BE_{HG,y}$ = Baseline emissions associated with heat generation in year y (tCO2e/yr)
$BE_{NG,y}$ = Baseline emissions associated with natural gas use in year y (tCO2e/yr)

Supply of LFG through a natural gas distribution network is not included in the project activity. Moreover, the project participants do not intend to utilize the LFG for heat generation and nature gas use. Therefore, $BE_{HG,y}=0$ and $BE_{NG,y}=0$; and baseline emissions shall be calculated as below:

$$BE_y = BE_{CH4,y} + BE_{EC,y} \quad (2)$$

i) Baseline emissions of methane from the SWDS ($BE_{CH4,y}$)

Baseline emissions of methane from the SWDS are determined as follows, based on the amount of methane that is captured under the project activity and the amount that would be captured and destroyed in the baseline (such as due to regulations). In addition, the effect of methane oxidation that is present in the baseline and absent in the project is taken into account:

$$BE_{CH4,y} = ((1 - OX_{top\_layer}) \times F_{CH4,PJ,y} - F_{CH4,BL,}y) \times GWP_{CH4} \quad (3)$$

Where:
$BE_{CH4,y}$= Baseline emissions of methane from the SWDS in year y (tCO_2e/yr)

OX_{top_layer}	=	Fraction of methane in the LFG that would be oxidized in the top layer of the SWDS in the baseline (dimensionless)
$F_{CH4,PJ,y}$	=	Amount of methane in the LFG which is flared and/or used in the project activity in year y (tCH_4/yr)
$F_{CH4,BL,y}$	=	Amount of methane in the LFG that would be flared in the baseline in year y (tCH_4/yr)
GWP_{CH4}	=	Global warming potential of CH_4 (tCO_2e/tCH_4)

Ex post determination of $F_{CH4,PJ,y}$

According to ACM0001, during the crediting period, $F_{CH4,PJ,y}$ shall be determined ex post as follows:

$$F_{CH4,PJ,y} = F_{CH4,flared,y} + F_{CH4,EL,y} + F_{CH4,HG,y} + F_{CH4,NG,y} \quad (4)$$

Where:

$F_{CH4,PJ,y}$	=	Amount of methane in the LFG which is flared and/or used in the project activity in year y (tCH_4/yr)
$F_{CH4,flared,y}$	=	Amount of methane in the LFG which is destroyed by flaring in year y (tCH_4/yr)
$F_{CH4,EL,y}$	=	Amount of methane in the LFG which is used for electricity generation in year y(tCH_4/yr)
$F_{CH4,HG,y}$	=	Amount of methane in the LFG which is used for heat generation in year y (tCH_4/yr)
$F_{CH4,NG,y}$	=	Amount of methane in the LFG which is sent to the natural gas distribution network and/or to the trucks in year y (tCH_4/yr)

As there is no heat generation and natural gas distribution network involved in the project activity, $BE_{HG,y}$ =0 and $BE_{NG,y}$=0. The equation (4) could be simplified as equation (5):

$$F_{CH4,PJ,y} = F_{CH4,flared,y} + F_{CH4,EL,y}. \quad (5)$$

$F_{CH4,EL,y}$ is determined using the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" and monitoring the working hours of the power plant(s), boiler(s), air heater(s), glass melting furnace(s) and kiln(s), so that no emission reduction are claimed for methane destruction during non-working hours. This is taken into account by monitoring the hours that the equipment utilizing the LFG is operating in year y ($OP_{j,h,y}$).

$$F_{CH4,flared,y} = F_{CH4,sent\_flare,y} - PE_{flare,y} / GWP_{CH4} \quad (6)$$

Where:

$F_{CH4,flared,y}$	=	Amount of methane in the LFG which is destroyed by flaring in year y (tCH_4/yr)
$F_{CH4,sent\_flare,y}$	=	Amount of methane in the LFG which is sent to the flare in year y(tCH_4/yr)

$PE_{flare,y}$	=	Project emissions from flaring of the residual gas stream in year y (tCO_2e/yr)
GWP_{CH4}	=	Global warming potential of CH_4(tCO_2e/tCH_4)

An ex ante estimate of $F_{CH4,PJ,y}$ is required to estimate baseline emission of methane from the SWDS (according to equation (3) in order to estimate the emission reductions of the proposed project activity. It is determined as follows:

$$F_{CH4,PJ,y} = \eta_{PJ} \times BE_{CH4,SWDS,y} / GWP_{CH4} \quad (7)$$

Where:

$F_{CH4,PJ,y}$	=	Amount of methane in the LFG which is flared and/or used in the project activity in year y (tCH_4/yr)
$BE_{CH4,SWDS,y}$	=	Amount of methane in the LFG that is generated from the SWDS in the baseline scenario in year y(tCO_2e/yr)
η_{PJ}	=	Efficiency of the LFG capture system that will be installed in the project activity
GWP_{CH4}	=	Global warming potential of CH_4(tCO_2e/tCH_4)

$BE_{CH4,SWDS,y}$ determined using the methodological tool "Emissions from solid waste disposal sites" (version 08.0)

$$BE_{CH4,SWDS,y} = \varphi_y \times (1 - f_y) \times GWP_{CH4} \times (1 - OX) \times \frac{16}{12} \times F \times DOC_{f,y} \times MCF_y \times \sum_{x=1}^{y} \sum_{j} (W_{j,x} \times DOC_j \times e^{-k_j \times (y-x)} \times (1 - e^{-k_j})) \quad (8)$$

Where:

$BE_{CH4,SWDS,y}$	=	Baseline methane emissions occurring in year *y* generated from waste disposal at a SWDS during a time period ending in year *y*(tCO_2e/yr)
x	=	Years in the time period in which waste is disposed at the SWDS, extending from the first year in the time period (*x* = 1) to year y (*x* = *y*)
y	=	Year of the crediting period for which methane emissions are calculated (*y* is a consecutive period of 12 months)

$DOC_{f,y}$	=	Fraction of degradable organic carbon (DOC) that decomposes under the specific conditions occurring in the SWDS for year *y* (weight fraction)
$W_{j,x}$	=	Amount of solid waste type *j* disposed or prevented from disposal in the SWDS in the year *x* (t)
φ_y	=	Model correction factor to account for model uncertainties for year *y*
f_y	=	Fraction of methane captured at the SWDS and flared, combusted or used in another manner that prevents the emissions of methane to the atmosphere in year *y*
GWP_{CH4}	=	Global warming potential of CH_4(tCO_2e/tCH_4)
OX	=	Oxidation factor (reflecting the amount of methane from SWDS that is oxidized in the soil or other material covering the waste)
F	=	Fraction of methane in the SWDS gas (volume fraction)
MCF_y	=	Methane correction factor for year *y*
DOC_j	=	Fraction of degradable organic carbon in the waste type *j* (weight fraction)
k	=	Decay rate for the waste type j (1 / yr)
j	=	Type of residual waste or types of waste in the MSW

The following guidance has been taken into account when applying the tool:
(a) fyin the tool shall be assigned a value of 0 because the amount of LFG that would have been captured and destroyed is already accounted for in equation 3;
(b) In the tool, x begins with the year that the SWDS started receiving wastes (e.g. the first year of SWDS operation); and
(c) Sampling to determine the fractions of different waste types is not necessary because the waste composition can be obtained from previous studies.

Determination of $F_{CH4,BL,y}$

This step provides a procedure to determine the amount of methane that would have been captured and destroyed (by flaring) in the baseline due to regulatory or contractual requirements, to address safety and odour concerns, or for other reasons (collectively referred to as requirement in this step). The four cases in the Table below are

distinguished. The appropriate case should be identified and the corresponding instructions followed.

Table 1. Cases for determining methane captured and destroyed in the baseline

Situation at the start of the project activity	Requirement to destroy methane	Existing LFG capture and destruction system
Case 1	No	No
Case 2	Yes	No
Case 3	No	Yes
Case 4	Yes	Yes

There was no regulation or standard that enforces methane destruction in LFG when Qizi Mountain Landfill began operating. Besides, Qizi Mountain Landfill didn't collect and utilize the LFG prior to the implementation of the project activity, and no landfill gas capture and destruction system existing. Therefore, this project activity is satisfied with the situation of Case 1: No requirement to destroy methane exits and no existing LFG capture and destruction system.

In this situation: $F_{CH4,BL,y} = 0$

ii) Baseline emissions associated with electricity generation (BEEC,y)

The baseline emissions associated with electricity generation in year y (BEEC,y) shall be calculated using the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption". When applying the tool:

(i) The electricity sources k in the tool correspond to the sources of electricity generated identified in the selection of the most plausible baseline scenario; and

(ii) ECBL,k,y in the tool is equivalent to the net amount of electricity generated using LFG in year y (EGPJ,y).

Where:

$BE_{EC,y}$ = Baseline emissions from electricity consumption in year y(tCO_2/yr)

$EC_{BL,k,y}$	=	Quantity of electricity that would be consumed by the baseline electricity consumption source *k* in year *y* (MWh/yr)
$EF_{EL,k,y}$	=	Emission factor for electricity generation for source k in year y (tCO_2/MWh)
$TDL_{k,y}$	=	Average technical transmission and distribution losses for providing electricity to source *k* in year *y*
k	=	Sources of electricity consumption in the baseline

Due to the fact that the baseline scenario is the LFG from Qizi Mountain Landfill if released directly into atmosphere and equivalent electricity generation by the project activity was supplied by East China Power Grid), Scenario A of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" applies. $EF_{EL,k,y}$ shall therefore be determined in accordance with Option A1 of the tool, i.e. the applied emission factor shall be the combined margin emission factor of the Ease China Power Grid, calculated in accordance with the "Tool to calculate the emission factor of an electricity system" Version 07.0 ($EF_{EL,k,y}$ = $EF_{grid,CM,y}$). For details of the calculation please see below.

Emission Reduction from Landfill Gas Recovery

Table 2. Emission Reduction from Landfill Gas Recovery

Year	Emission Reduction by Methane recovery from the landfill in the absence of the project activity during the second crediting period (tCO_2e) ($BE_{CH4,SWDS,y}$)
22/4/2021-31/12/2021 (254days)	39,097
2022	89,265
2023	115,754

2024	109,854
2025	104,265
2026	98,970
2027	93,954
1/1/2028-21/4/2028(112days)	34,666
Total (tones of CO_2e)	685,825

Emission Factor

The Baseline Emission Factor is calculated as a Combined Margin, using the weighted average of the operating margin and build margin.

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

$EF_{grid,OM,y}$ Operating Margin Emission Factor (tCO_2e/MWh)

$EF_{grid,BM,y}$ Build margin emission factor (tCO_2e/MWh)

w_{OM} Weighting of operating margin emissions factor

w_{BM} Weighting of build margin emissions factor

Based on 'Tool to calculate the emission factor for an electricity system （v07.0）', *For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.*

Based on 2019 China's regional power grid emission factor published on 29/12/2020, the operating margin emission factor ($EF_{grid,OM,y}$) of ECPG is 0.7921 tCO_2e/MWh and the build margin emission factor ($EF_{grid,BM,y}$) in the second crediting period is 0.6861 tCO_2e/MWh. The defaults weights for LFG power plant are used as specified in the emission factor tool: w_{OM} = 0.25; w_{BM} = 0.75 for the third crediting period. The result of the Baseline Emission Factor ($EF_{grid,CM,y}$) calculation is 0.7126 tCO_2e/MWh. The

calculations are presented in Appendix III.

3. Leakage
According to ACM0001-v19.0, no leakage emissions are considered.

4. Emission reductions
Emission reductions of the project are calculated as follows:

$ER_y = BE_y - PE_y$

Where:

ER_y = Emission reductions in year y (tCO_2e/yr)

BE_y = Baseline emissions in year y (tCO_2/yr)

PE_y = Project emissions in year y (tCO_2e/yr)

B.6.2. Data and parameters fixed ex ante

SDG13

Data/parameter	$\mathbf{EF_{grid,OM,y}}$
Unit	tCO_2/MWh
Description	Simple operating margin CO_2 emission factor in year y
Source of data	"2019 Baseline Emission Factors for Regional Power Grids in China" issued by China DNA[7]
Value(s) applied	0.7921
Choice of data or Measurement methods and procedures	Official public data from NDRC
Purpose of data	Calculation of baseline emissions
Additional comment	/

[7] http://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/202012/t20201229_815386.shtml

Data/parameter	$EF_{grid,BM,y}$
Unit	tCO_2/MWh
Description	Build margin CO_2 emission factor in year y
Source of data	"2014 Baseline Emission Factors for Regional Power Grids in China" issued by China DNA [8]
Value(s) applied	0.6861
Choice of data or Measurement methods and procedures	Official public data from NDRC
Purpose of data	Calculation of baseline emissions
Additional comment	/

Data/parameter	w_{OM}
Unit	%
Description	Weighting of operating margin emissions factor
Source of data	"Tool to calculate the emission factor for an electricity system" (Version 07.0)
Value(s) applied	25
Choice of data or Measurement methods and procedures	Based on the requirements of "Tool to calculate the emission factor for an electricity system" (Version 07.0)
Purpose of data	Calculation of baseline emissions
Additional comment	

[8] http://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/201812/t20181220_685481.shtml

Data/parameter	w_{BM}
Unit	%
Description	Weighting of build margin emissions factor
Source of data	"Tool to calculate the emission factor for an electricity system" (Version 07.0)
Value(s) applied	75
Choice of data or Measurement methods and procedures	Based on the requirements of "Tool to calculate the emission factor for an electricity system" (Version 07.0)
Purpose of data	Calculation of baseline emissions
Additional comment	

Data/parameter	OX_{top_layer}
Unit	Dimensionless
Description	Fraction of methane that would be oxidized in the top layer of the SWDS in the baseline
Source of data	Consistent with how oxidation is accounted for in the methodological tool "Emissions from solid waste disposal sites"
Value(s) applied	0.1
Choice of data or Measurement methods and procedures	
Purpose of data	Calculation of baseline emissions
Additional comment	/

Data/parameter	GWP_{CH4}

Unit	tCO_2e/tCH_4
Description	Global warming potential of CH_4
Source of data	IPCC
Value(s) applied	28
Choice of data or Measurement methods and procedures	Default value
Purpose of data	Calculation of baseline emissions
Additional comment	/

Data/parameter	NCV_{CH4}
Unit	TJ/t CH_4
Description	Net calorific value of methane at reference conditions
Source of data	Technical literature
Value(s) applied	0.0504
Choice of data or Measurement methods and procedures	Public value
Purpose of data	Calculation of baseline emissions
Additional comment	/

Data/parameter	η_{PJ}
Unit	Dimensionless
Description	Efficiency of the LFG capture system that will be installed in the project activity
Source of data	/

Value(s) applied	Technical specifications of the LFG capture system to be installed (if available) or a default value of 50 per cent
Choice of data or Measurement methods and procedures	/
Purpose of data	Calculation of baseline emissions
Additional comment	/

Data/parameter	**D_{CH4}**
Unit	tCH_4/m_3CH_4
Description	Methane Density
Source of data	
Value(s) applied	At standard temperature and pressure (0 degree Celsius and 1.013 bar) the density of methane is 0.0007168 tCH_4/m_3CH_4
Choice of data or Measurement methods and procedures	/
Purpose of data	Calculation of baseline emissions
Additional comment	/

Data/parameter	**$BE_{CH4,SWDS,y}$**
Unit	tCO_2e
Description	Methane generation from the landfill in the absence of the project activity at year *y*
Source of data	Calculated as per the Methodological tool of "Emissions from solid waste disposal sites" (Version 07.0).

Value(s) applied	As per the "Tool to determine methane emissions avoided from dumping waste at a solid waste disposal site"
Choice of data or Measurement methods and procedures	/
Purpose of data	Calculation of baseline emissions
Additional comment	/

Data/parameter	φ
Unit	-
Description	Model correction factor to account for model uncertainties
Source of data	Methodology
Value(s) applied	0.75
Choice of data or Measurement methods and procedures	Default value
Purpose of data	Calculation of baseline emissions
Additional comment	/

Data/parameter	F
Unit	-
Description	Fraction of methane in the SWDS gas (volume fraction)
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied	0.5

Choice of data or Measurement methods and procedures	Default value
Purpose of data	Calculation of baseline emissions
Additional comment	This factor reflects the fact that some degradable organic carbon does not degrade, or degrades very slowly, under anaerobic conditions in the SWDS. A default value of 0.5 is recommended by IPCC.

Data/parameter	DOCf
Unit	-
Description	Fraction of degradable organic carbon (DOC) that can decompose in the SWDS
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied	0.5
Choice of data or Measurement methods and procedures	Default value
Purpose of data	Calculation of baseline emissions
Additional comment	This factor reflects the fact that some degradable organic carbon does not degrade, or degrade very slowly, in the SWDS.

Data/parameter	MCF
Unit	-
Description	Methane correction factor
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories

Value(s) applied	In case that the SWDS does not have a water table above the bottom of the SWDS and in case of application A, then select the applicable value from the following: • 1.0 for anaerobic managed solid waste disposal sites. These must have controlled placement of waste (i.e., waste directed to specific deposition areas, a degree of control of scavenging and a degree of control of fires) and will include at least one of the following: (i) cover material; (ii) mechanical compacting; or (iii) leveling of the waste. • 0.5 for semi-aerobic managed solid waste disposal sites. These must have controlled placement of waste and will include all of the following structures for introducing air to waste layer: (i) permeable cover material; (ii) leachate drainage system; (iii) regulating pondage; and (iv) gas ventilation system. • 0.8 for unmanaged solid waste disposal sites – deep. This comprises all SWDS not meeting the criteria of managed SWDS and which have depths of greater than or equal to 5 meters. • 0.4 for unmanaged-shallow solid waste disposal sites or stockpiles that are considered SWDS. This comprises all SWDS not meeting the criteria of managed SWDS and which have depths of less than 5 metres. This includes stockpiles of solid waste that are considered SWDS (according to the definition given for a SWDS).
Choice of data or Measurement methods and procedures	Default value
Purpose of data	Calculation of baseline emissions
Additional comment	The methane correction factor (MCF) accounts for the fact that unmanaged SWDS produce less methane from a given amount of waste than managed SWDS, because a larger

	fraction of waste decomposes aerobically in the top layers of unmanaged SWDS.

Data/parameter	DOC_j
Unit	-
Description	Fraction of degradable organic carbon (by weight) in the waste type j (weight fraction)
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Tables 2.4 and 2.5)
Value(s) applied	For MSW, the following values for the different waste types j should be applied: Default values for DOCj

Waste type j	**DOCj (% wet waste)**
Wood and wood products	43
Pulp, paper and cardboard (other than sludge)	40
Food, food waste, beverages and tobacco (other than sludge)	15
Textiles	24
Garden, yard and park waste	20
Glass, plastic, metal, other inert waste	0

If a waste type, prevented from disposal by the proposed project activity, can not clearly be attributed to one of the waste types in the table above, project participants should choose among the waste types that have similar characteristics that waste type where the values of DOCj and kj result in a conservative estimate (lowest emissions), or request a revision of / deviation from this

	methodology. For example, in the case of empty fruit bunches (EFB), as their characteristics are similar to wood in terms of cellulose, hemi-cellulose, and lignin content, the parameters correspondent of wood should be used.
Choice of data or Measurement methods and procedures	Default value
Purpose of data	Calculation of baseline emissions
Additional comment	According to 2nd FSR, page 10, wet waste is treated in the proposed project.

Data/parameter	k_j
Unit	1/yr
Description	Decay rate for the waste type j
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Table 3.3)
Value(s) applied	Apply the following default values for the different waste types *j*: Default values for the decay rate (kj)

Waste type j		**Boreal and Temperate (MAT≤20°C)**		**Tropical (MAT>20°C)**	
		Dry (MAP/PET <1)	**Wet (MAP/PET >1)**	**Dry (MAP< 1000mm)**	**Wet (MAP> 1000mm)**
Slowly degrading	Pulp, paper and cardboard (other than sludge), Textiles	0.04	0.06	0.045	0.07
	Wood,	0.02	0.03	0.025	0.035

	wood products and straw				
Moderately degrading	Other (non-food) organic putrescible garden, yard and park waste	0.05	0.10	0.065	0.17
Rapidly degrading	Food, food waste, sewage sludge, beverages and tobacco	0.06	0.185	0.085	0.40

NB: MAT – mean annual temperature, MAP – Mean annual precipitation, PET – potential evapotranspiration. MAP/PET is the ratio between the mean annual precipitation and the potential evapotranspiration.

If a waste type disposed in a SWDS can not clearly be attributed to one of the waste types in the table above, project participants should choose, among the waste types that have similar characteristics, the waste type where the values of DOCj and kj result in a conservative estimate (lowest emissions), or request a revision of / deviation from this methodology.

In the case of empty fruit bunches (EFB), as their characteristics are similar to garden waste, the parameter values correspondent of garden waste shall be used. In case of sludge from pulp and pater industry, a conservative value of 0.03 shall be used for all precipitation and temperature combinations

Choice of data or Measurement	Default value

methods and procedures	
Purpose of data	Calculation of baseline emissions
Additional comment	Document in the CDM-PDD the climatic conditions at the SWDS site (temperature, precipitation and, where applicable, evapotranspiration). Use long-term averages based on statistical data, where available. Provide references. The effective reference is not available; therefore the conservative value is determined for each waste type.

Data/parameter	$R_{LFG,y}$
Unit	%
Description	The ratio between the LFG collected and the LFG used within the engines on average each year.
Source of data	The actual layout of the entire collection pipelines, which covers from the well to electricity generator.
Value(s) applied	Higher than 65%. It is close to 100%
Choice of data or Measurement methods and procedures	The actual layout of the entire collection pipelines, which covers from the well to electricity generator will be checked by DOE carefully.
Purpose of data	Calculation of baseline emissions
Additional comment	/

B.6.3. Ex ante estimation of SDG Impact

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SDGs	**Ex ante estimation of outcomes**
SDG 7 Affordable and Clean Energy	Baseline outcomes: 0

	Project outcomes: The net generation supplied by the project to the grid is estimated to be 125945 MWh/yr, which could replace the equivalent electricity from fossil fuel based grid.
SDG 8 Decent Work and Economic Growth	Baseline outcomes: 0 Project outcomes: The project provides 7 employment opportunities for women and men. The project provides healthy working environment and trainings periodically (at least one time a year) for the employee on the technology and the monitoring of the plant operation, and the emergency and safety procedures, etc. The average salary is above the latest lowest salary level of local area.
SDG 13 Climate Action	Baseline outcomes: 0 Project outcomes: The project will directly contribute by reducing 97,975 tons of CO_2 equivalent every year. The estimation is as below.

Project Emissions

The project emission for ex-ante is zero (PE_y=0).

Leakage

Based on ACM0001, no leakage calculation is considered, thus leakage is considered to be zero (0tCO_2e).

Baseline Emissions

Based on calculation,

$BE_{EC,y}$	Baseline emissions associated with electricity generation in year y	13,029	MWh/year
$BE_{CH4,y}$	Baseline emissions of methane from the SWDS in year y	3,033	tCO_2e/MWh
BE_y	Baseline emissions in year y	97,975	tCO_2e/year

B.6.4. Summary of ex ante estimates of each SDG Impact

SDG13

Year	Baseline estimate	Project estimate	Net benefit
22/4/2021-31/12/2021 (254days)	0	39,097 tCO_2e	39,097 tCO_2e
2022	0	89,265 tCO_2e	89,265 tCO_2e
2023	0	115,754 tCO_2e	115,754 tCO_2e
2024	0	109,854 tCO_2e	109,854 tCO_2e
2025	0	104265 tCO_2e	104265 tCO_2e
2026	0	98970 tCO_2e	98970 tCO_2e
2027	0	93954 tCO_2e	93954 tCO_2e
1/1/2028-21/4/2028(112days)		34,666 tCO_2e	34,666 tCO_2e
Total	**0**	**685,825tCO_2e**	**685,825tCO_2e**
Total number of crediting years	7		
Annual average over the crediting period	0	97,975 tCO_2e	97,975 tCO_2e

SDG7

Year	Baseline estimate	Project estimate	Net benefit
22/4/2021-31/12/2021 (254days)	0	6,473 MWh	6,473 MWh
2022	0	14,054 MWh	14,054 MWh
2023	0	19,165MWh	19,165MWh
2024	0	18,188MWh	18,188MWh
2025	0	17,262 MWh	17,262 MWh
2026	0	16,386 MWh	16,386 MWh
2027	0	15,555MWh	15,555MWh
1/1/2028-21/4/2028(112days)		4,532 MWh	4,532 MWh
Total	**0**	**111,615 MWh**	**111,615 MWh**
Total number of crediting years	7		
Annual average over the crediting period	0	15,945 MWh	15,945 MWh

SDG8

Year	Baseline estimate	Project estimate	Net benefit
Year 1	0 job, 0 salary, 0 training	7 jobs and the salary is above the latest local lowest level. At least 1 time of training each year	7 jobs and the salary is above the latest local lowest level. At least 1 time of training each year
Year 2	0 salary, 0 training	7 jobs and the salary is above the latest local lowest level. At least 1 time of training each year	7 jobs and the salary is above the latest local lowest level. At least 1 time of training each year
Year 3	0 salary, 0 training	7 jobs and the salary is above the latest local lowest level. At least 1 time of training each year	7 jobs and the salary is above the latest local lowest level. At least 1 time of training each year
Year 4	0 salary, 0 training	7 jobs and the salary is above the latest local lowest level. At least 1 time of training each year	7 jobs and the salary is above the latest local lowest level. At least 1 time of training each year
Year 5	0 salary, 0 training	7 jobs and the salary is above the latest local lowest level. At least 1 time of training each year	7 jobs and the salary is above the latest local lowest level. At least 1 time of training each year
Year 6	0 salary, 0 training	7 jobs and the salary is above the latest local lowest level. At least 1 time of training each year	7 jobs and the salary is above the latest local lowest level. At least 1 time of training each year

Year 7	0 salary, 0 training	7 jobs and the salary is above the latest local lowest level. At least 1 time of training each year	7 jobs and the salary is above the latest local lowest level. At least 1 time of training each year
Total number of crediting years	7		
Annual average over the crediting period	0 salary, 0 training	7 jobs and the salary is above the latest local lowest level. At least 1 time of training each year	7 jobs and the salary is above the latest local lowest level. At least 1 time of training each year

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

SDG 13

Data / Parameter	**ER_y**
Unit	tCO_2/yr
Description	Emission reduction in year y
Source of data	Calculated
Value(s) applied	97,975
Measurement methods and procedures	The ex-post emission reduction is calculated according to the registered PDD description.
Monitoring frequency	Each verification
QA/QC procedures	/
Purpose of data	/
Additional comment	/

SDG 7

Data / Parameter	$EG_{facility,y}$
Unit	MWh
Description	Quantity of net electricity supply of the Project activity to the grid in year y.
Source of data	Measured by electricity meters.
Value(s) applied	15945
Measurement methods and procedures	Directly measured by electricity meters The project owner is responsible for the monitoring activities.
Monitoring frequency	Continuous measurement and at least monthly recording
QA/QC procedures	Cross check measurement results with sales receipt. The electricity meters are calibrated periodically.
Purpose of data	Calculation of baseline emissions
Additional comment	/

SDG 8

Data / Parameter	**Employment**
Unit	Persons
Description	Number of jobs created in the operations of the project and their average salary is above the latest lowest salary level of local area.
Source of data	HR records or report
Value(s) applied	7 employees
Measurement methods and procedures	HR records
Monitoring frequency	Each monitoring period
QA/QC procedures	The employee name list and salary are recorded and kept by HR department of the PO, and will be provide to VVB for verification.

Purpose of data	/
Additional comment	/

Data / Parameter	**Livelihood of the poor**
Unit	Persons
Description	In the project, wages will be monitored.
Source of data	HR records or report
Value(s) applied	/
Measurement methods and procedures	HR records
Monitoring frequency	Each monitoring period
QA/QC procedures	The employee name list and salary are recorded and kept by HR department of the PO, and will be provide to VVB for verification.
Purpose of data	/
Additional comment	/

Data / Parameter	Human and institutional capacity
Unit	/
Description	The project organizes trainings for the staff on the technology and the monitoring of the plant operation, and the emergency and safety procedures, etc.
Source of data	HR records
Value(s) applied	The project owner provides trainings periodically (at least one time a year) for the workers
Measurement methods and procedures	HR records
Monitoring frequency	Each monitoring period

QA/QC procedures	The trainings are recorded and the record are signed by the trainees. All the records are kept by the PO and will be provided to VVB for verification.
Purpose of data	/
Additional comment	/

Data / Parameter	**WQy**
Unit	N/A
Description	Water quality
Source of data	Monitored by third party
Value(s) applied	N/A
Measurement methods and procedures	Monitored according to national standards
Monitoring frequency	Annually
QA/QC procedures	Monitored by qualified third party. The project should meet the relevant environment standards during operation.
Purpose of data	/
Additional comment	/

Data / Parameter	**AQy**
Unit	/
Description	Air quality
Source of data	Monitored by third party
Value(s) applied	/
Measurement methods and procedures	Monitored according to national standards
Monitoring frequency	Annually

QA/QC procedures	Monitored by qualified third party. The project should meet the relevant environment standards during operation.
Purpose of data	/
Additional comment	/

B.7.2. Sampling plan

>>

N/A

B.7.3. Other elements of monitoring plan

>>

Operational and Management Structure

The operational and management structure of the project is summarized within Table 4 below.

Table 4. Operational and Management Structure

Name	Organization	Responsibility
Mr. Yunyue Zhang	Everbright Environment and Energy (Suzhou) Landfill Gas to Energy Co., Ltd.	Mr. Zhang is the chairman of Everbright Environment and Energy (Suzhou) Landfill Gas to Energy Co., Ltd. He has extended knowledge about both the Kyoto Protocol and GS VERs and takes the responsibility of overall project management.
Mr. Kai Wu	Everbright Environment and Energy (Suzhou) Landfill Gas to Energy Co., Ltd.	Mr. Wu is the monitoring manager of the plant. He is responsible for the training of the monitoring personnel. Training courses will be held for monitoring staff about basic knowledge and operational procedures of all monitors and the data processing system. Previously, South Pole Carbon Asset Management Ltd. has

		provided training about GHG, GS VER and requirements.
		Mr. Wu is the monitoring system engineer of Everbright Environment and Energy (Suzhou) Landfill Gas to Energy Co., Ltd. He is in charge of data recording, processing and reporting for the project. The data will be either automatically recorded or manually recorded by operators. All data will be imported to an Excel sheet for validation or verification. Please see Section B.7.1 for more details of procedures of monitoring and recording.
	South Pole Carbon Asset Management Co., Ltd.	South Pole Carbon Asset Management Co., Ltd. Will provide review of reported data before submitting to DOE for verification.
Mr. Kai Wu	Everbright Environment and Energy (Suzhou) Landfill Gas to Energy Co., Ltd.	Mr. Wu is the manager for safety and environment. He is responsible of validation, registration and verification from the plant owner's part under assistance of South Pole Carbon Asset Management Ltd.

Monitoring Equipment and Program

To determine these variables, the following parameters have to be monitored:

- The amount of landfill gas power plant(s) ($LF_{Gelectricity,y}$) (in m^3, using a continuous flow meter).

- The fraction of methane in the landfill gas ($w_{CH4,y}$) should be measured with a continuous analyzer or, alternatively, with periodical measurements, at a 95% confidence level , using calibrated portable gas meters and taking a statistically valid number of samples and accordingly the amount of land fill gas from $LFG_{electricity,y}$, shall be monitored in the same frequency. The continuous methane analyser should be the preferred option Methane fraction of the landfill gas to be measured on wet basis;
- Temperature (T) and pressure (p) of the landfill gas are required to determine the density of methane in the landfill gas;
- The quantity of electricity internal consumption, in the baseline and the project situation, to meet the requirements of the project activity, if any;
- Relevant regulations for LFG project activities shall be monitored and updated at renewal of each credit period. Changes to regulation should be converted to the amount of methane that would have been destroyed/combusted during the year in the absence of the project activity ($MD_{BL,y}$).Project participants should explain how regulations are translated into that amount of gas;
- The operating hours of the energy plant(s).
- RLFG,y The ratio between the LFG collected and the LFG used within the engines on average each year must be monitored.

The measurement equipment for gas quality (humidity, particulate, etc.) is sensitive, so a strong QA/QC procedure for the calibration of this equipment is needed.

Electricity Generation

According to the Chinese national standard "Technical Management Code for Electricity Metering" (DL/T448-2000), the electricity metering equipment will be properly configured and the metering equipment will be checked by both the project owner and the grid company before the project is in operation.

Meter M1, M2 and M3, which are with an accuracy of 0.5Sand bidirection electronic meters, are installed to measure gross power generation of generators. M4 will be installed to measure power generation of the fourth generator. M5 and M6, which are with an accuracy of 2, measure electricity imported from the grid by the project. M7, M8, M9 and M10 are gateway meters for this project and the incineration project, measuring electricity exported from the project and incineration project to the grid and

imported electricity of the project and incineration project from grid. M11 and M12 are the electricity generation meters for the incineration project.M1, M2, M3, M4, M5 and M6 are the key meters for monitoring data and emission reduction calculation. When readings from M1, M2, M3, M4, M5 and M6 are questionable (due to abnormal circumstances) or not possible (due to meter failure or meter reparation), reading of M7, M8, M9, M10 and separated meters (M11 and M12)of incineration project are used for crosscheck. Incineration project and the project share two 10.5 kv transmission lines. Please see Fig. D.1 for the simplified diagram of electric layout.

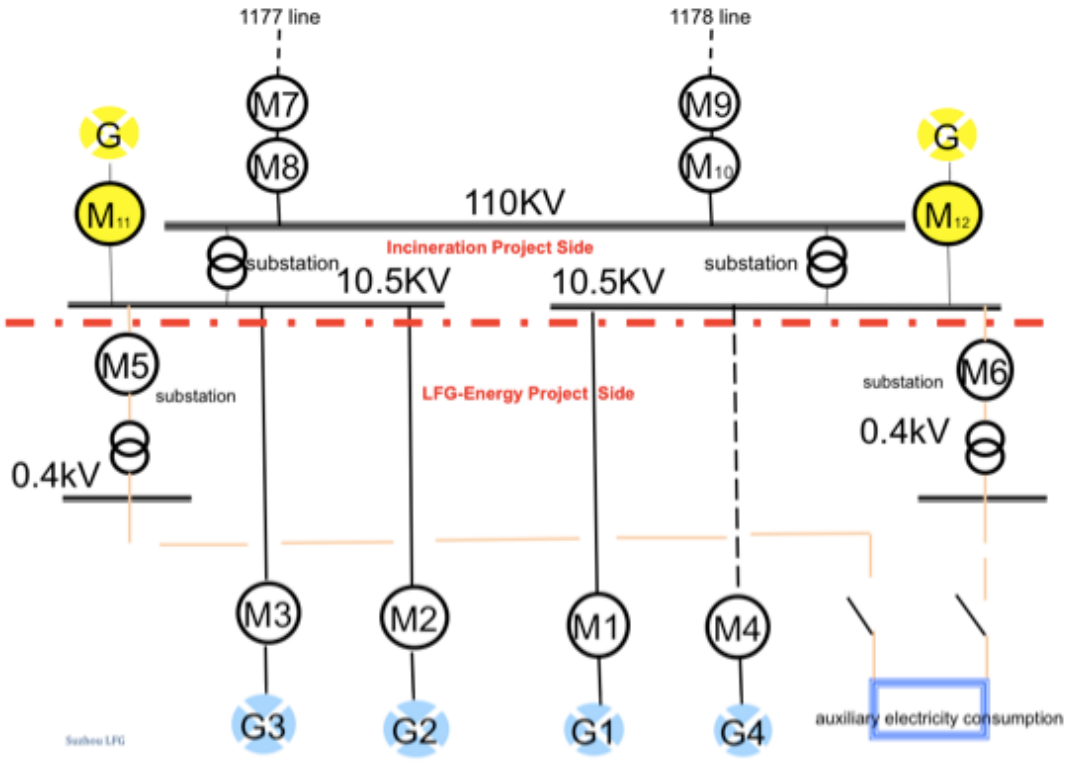

Fig. D.1 Simplified Diagram of the Electric Layout

LFG utilization

Temperature (T) and pressure (p) of the landfill gas are required to determine the density of methane in the landfill gas. Therefore temperature and pressure meters are installed between gas treatment package and generator sets. The accuracyof temperature meter is 1.5%; The accuracy of pressure meter is 2.5%. For the purpose of crosscheck, additional temperature and pressure meters will be installed at the same location.

At the same location, flow volume meter, whose accuracy is 0.5%, and methane percentage analyzer, whose accuracy is 0.5%.

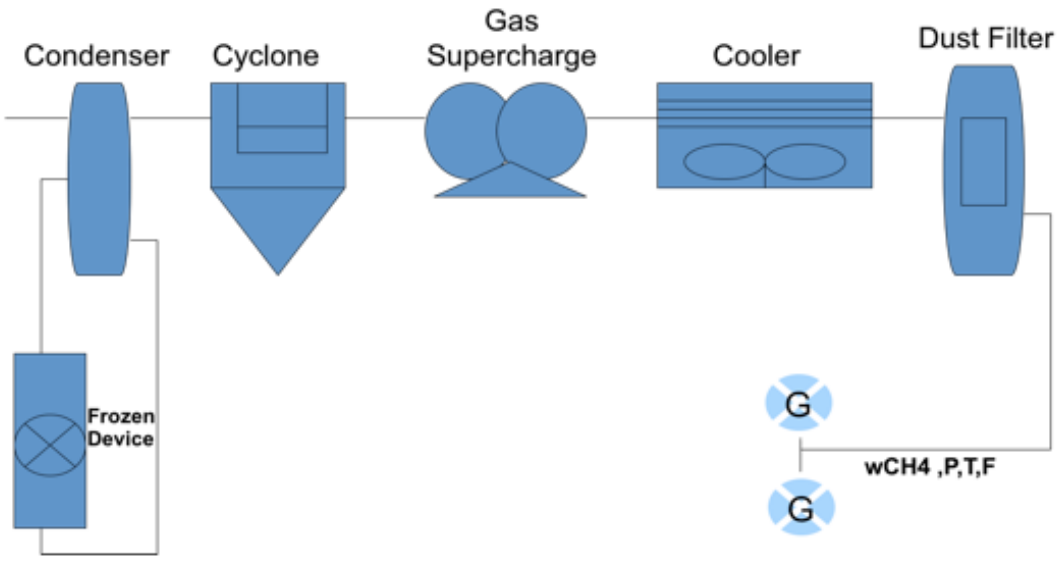

Fig. D.2, the simplified diagram of pre-processing treatment layout.

According to GS requirements , potential mitigation and/or compensation measures from the EIA

In section F of PDD, noise impact and impacts on aquatic environment and air quality can be evaluated. The institute which wrote the EIA, and the Environmental Protection Agency are conducting the reevaluation monitoring for the first phase since the first two generators started operation.

The project should meet the following environment standards during operation:
-Air Quality Standard (GB3095-1996)
-Aquatic Environment standard (GB3838-2002)
-Noise Controlling Standard (GB3096-93)

After that, the local EPA will be responsible for the further monitoring, but this is not conducted annually. As the project's environmental impact will only differ from the outcomes of the first reevaluation if changes in the project design happen. These aspects will be monitored for the first verification, and later only if project design changes happen.

The ratio (RLFG,y) between the LFG collected and the LFG used within the engines on average each year must be a monitoring parameter. If there is no other way, such as flaring or venting, to treat the collected LFG besides generating electricity, this ratio can be nearly close to 100%, at least higher than 65%. The actual layout of the entire collection pipelines, which covers from the wells to electricity generators will be checked by DOE carefully during each verification.

Data Collection:

Data related to LFG

The project owner is responsible for operation monitoring of the main meters and guarantee that the measuring equipments are in good operation and completely sealed.

The main monitoring process is as follows:

i Methan fraction and flow volume are continuously recorded and measured by project participants using certified equipment. Temperature and pressure are measured continuously and recorded hourly.

ii The project owner keeps the records of the main meter's data readings for verification by the DOE.

If inaccuracy of the reading data from the main meter exceeds the allowable tolerance, when the meter operates abnormally during a month or any other unexpected problems occur, the amount of LFG generated shall not be counted.

Data related to Electricity Generation

The project owner and the Grid Company are responsible for operation monitoring of the main meters and guarantee that the measuring equipments are in good operation and completely sealed.

The electricity recorded by the main meter alone will suffice for the purpose of billing and emission reduction verification as long as the main meter error is within the allowable tolerance. The main monitoring process is as follows:

iii The project owner and Grid Company read and check the main meter and record the data at 00:00 am on the second to last day of every month;
iv The project owner sells the electricity to the Grid Company;
v The project owner provides an electricity sales invoice to the Grid Company. A copy of the invoice is stored by the project owner, together with a record of the payment by the grid company.
vi The Grid Company provides an electricity receipt confirmation to the project owner and the confirmation is stored by the project owner.
vii The project owner records the net electricity supplied to the grid electronically;
viii The project owner keeps the records of the main meter's data readings for verification by the DOE.

If inaccuracy of the reading data from the main meter exceeds the allowable tolerance, when the meter operates abnormally during a month or any other unexpected problems occur, the net amount of electricity exported to the grid shall be determined by:
ii Using readings from the backup meter (taking potential transmission losses into consideration), unless a test by either party reveals it is inaccurate;
iii If the backup system is not within acceptable limits of accuracy or performed improperly, the project owner and the Grid Company shall, based on mutual agreement, determine the amount of supplied electricity to the grid during the period of the occurred distortion or mal-function of backup meters by means of referring to voltage and current data in accordance with relevant rules; and
iv If the project owner and the Grid Company fail to reach an agreement concerning the amount of supplied electricity to the grid during the period of the occurred distortion or mal-function of backup meter, then the matter will be submitted for arbitration according to agreed procedures.

The meter readings will be readily accessible for the DOE. Calibration test records will be maintained for verification.

Calibration
The verification and calibration of electricity meters will be carried out periodically according to relevant national electric industry standards and regulations. After verification and calibration, meters will be sealed. Meters related to the electricity generation will be jointly inspected and sealed on behalf of the project owner and Grid

Company and shall not be accessible by either party except in the presence of the other party or its accredited representatives.

The meters, which is related to the electricity generation, installed will be tested by the qualified metrical organization co-authorized by the project owner and the Grid Company within 10 days after:

i The detection of a difference larger than the allowable tolerance in the readings of the main meter and/or the backup meters;

ii Repair to the faulty meter caused by improper operation.

In addition, the flow volume meter, temperature meter and pressure meter will be calibrated periodically as well according to relevant national standards and regulations.

Data Management

Data will be archived at the end of each month using electronic spreadsheets. The electronic files will be stored on hard disk and CD-ROM. In addition, a hard copy printout will be archived.

The project owner will also collect sales receipts for the power delivered to the grid as a crosscheck. At the end of each crediting year, a monitoring report will be compiled detailing the metering results backed up by sales receipts.

Physical documentation will be collected and stored by the project owner in a central place, together with the monitoring plan. In order to facilitate the auditor's reference, monitoring results will be indexed. All data records will be kept for a period of 2 years following the end of the crediting period.

SECTION C. DURATION AND CREDITING PERIOD

C.1. Duration of project

C.1.1. Start date of project

>>

26/11/2005 (Start of construction 1st Stage)

C.1.2. Expected operational lifetime of project

>>

25 years and 0 months

C.2. Crediting period of project

C.2.1. Start date of crediting period

>>

The start date of third crediting period is 22/04/2021. The first crediting period is from 22/04/2007 to 21/04/2014. The second crediting period is from 22/04/2014 to 21/04/2021.

C.2.2. Total length of crediting period

>>

Seven years for the 3rd crediting period.

SECTION D. SUMMARY OF SAFEGUARDING PRINCIPLES AND GENDER SENSITIVE ASSESSMENT

D.1. Safeguarding Principles that will be monitored

A completed Safeguarding Principles Assessment is in Appendix 1, ongoing monitoring is summarized below.

Principles	Mitigation Measures added to the Monitoring Plan
Principle 9.4	Refer to B.7.1 AQ_y
Principle 9.4	Refer to B.7.1 WQ_y
Principle 2.2, 6.1	Refer to B.7.1 livelihood of the poor
Principle 6.1	Refer to B.7.1 Employment
Principle 2.2, 6.1	Refer to B.7.1 Human and institutional capacity

D.2. Assessment that project complies with GS4GG Gender Sensitive requirements

Question 1 - Explain how the project reflects the key issues and requirements of Gender Sensitive design and implementation as outlined in the Gender Policy?	The project is a renewable energy project and it does not discriminate among gender. The project does not adversely impact women or men. During the project implementation, the project provides employment opportunities equally to men and women. During the CDM stakeholder consultation on 15/12/2006, and during the GS Stakeholder consultation on 10/04/2008, both men and women are included. For the stakeholder interviews in

	previous monitoring periods and verifications, both men and women were involved as well. In the project design and implementation, fair chance and gender equality to access the source, information and to reflect their opinions is taken as a main consideration by the project owner.
Question 2 - Explain how the project aligns with existing country policies, strategies and best practices	The project is aligned with the labor policies which does not discriminate on gender[9]. The project also abides the rules of equality accordingly and does not involve and is not complicit in any form of discrimination. Specifically regarding the gender equality, detailed enforcement rules are regulated in '*Law of the People's Republic of China on the Protection of Women's Rights*' [10] and in case of lawsuit occurrence, legal aid could be provided as per this law.
Question 3 - Is an Expert required for the Gender Safeguarding Principles & Requirements?	No. The project is a renewable energy project and it does not discriminate among gender.
Question 4 - Is an Expert required to assist with Gender issues at the Stakeholder Consultation?	No. The project is a renewable energy project and it does not discriminate among gender.

SECTION E. SUMMARY OF LOCAL STAKEHOLDER CONSULTATION

Since the proposed project is located in an existing landfill site, according to the regulation of EIA in China, it is not necessary to hold a stakeholder consultation for EIA in this case. However, being concerned about the interests of the local stakeholders, the project owner still collected opinions from them in various occasions and forms. Early in 2006, an initial stakeholder consultation for CDM was held by project owner and another CDM developer.

Initial Stakeholder Consultation for GS VER

The invitations of the GS initial stakeholder consultation were sent on 28thMarch 2008. South Pole Carbon Asset Management Co., Ltd. invited international stakeholders through emails. Recipients of invitation included Gold Standard, local supporters of Gold

[9] http://www.gov.cn/flfg/2007-06/29/content_669394.htm

[10] http://www.gov.cn/banshi/2005-05/26/content_980.htm

Standard, Greenpeace and WWF in China. Meanwhile, plant owner invited representatives of local habitants, plant employees, policy makers and local media. Public hearing was held on 10thApril 2008, introduction of the project was made and comments were collected.

Internet Stakeholder Consultation
South Pole Carbon Asset Management Co., Ltd. made public the non-technical descriptions of the project design document and potential environmental impacts through its website on http://www.southpolecarbon.com/goldstandard_consultations.htm. Comments from stakeholders through the Internet were invited.

2nd Stakeholder Consultation for GS VER

Before the oral hearing for local stakeholders, an invitation was prepared for the 2nd Round Local Stakeholder Consultation including basic information and procedures of the meeting. This invitation, along with the non-technical description of the project, the non-technical description of the project EIA and the Appendix E of Gold standard (the checklist in both English and Chinese) and the Gold Standard Sustainable Development Assessment Matrix, in both English and Chinese, were attached for comments.
The plant owner invited head of county, head of village, representative of villagers committee, and representatives of plant staff by phone call. The local residents near plant site were invited by invitations, which were posted on the billboard of villagers committee and the billboard along the main street of the village.

Meanwhile, South Pole Carbon sent invitations via email on 25th September 2008, to Gold Standard supporting organizations in China, with a copy to the Gold Standard. In addition, South Pole Carbon sent invitations via email again to some of supporting organizations in China on 6th October 2008, in order to receive more confirmations and comments before the oral hearing for local stakeholders. In the end, South Pole Carbon received manual email reply from Gold Standard, auto-reply message from Greenpeace China and phone call from GEI China. Due to limited resources, Greenpeace China and GEI China are not able to participate in this consultation.

The meeting was held at Landfill field of Qizi Mountain on 15th October 2008

Internet Stakeholder Consultation
South Pole Carbon Asset Management Co., Ltd. made public the non-technical descriptions of the project design document and potential environmental impacts through its website on http://www.southpolecarbon.com/goldstandard_consultations.htm. Comments from stakeholders through the Internet were invited.

Main Stakeholder Consultation

It took 2 months on website
http://www.southpolecarbon.com/goldstandard_consultations.htm.
South Pole Carbon Asset Management Co., Ltd was responsible for replying comments and questions by interested stakeholders via email (info@southpolecarbon.com). Interested stakeholders could review PDD, non-technical summary, local stakeholders report and so on. They could send their comments to South Pole Carbon Asset Mgt. freely.

GS Stakeholder Consultation for the renewal of the crediting period

The GS Stakeholder Consultation for the renewal of the crediting period started on October 8, 2015 and ended on November 8, 2015. Some invitations were sent via email by South Pole Carbon Asset Management Ltd. to collect comments from NGOs, and some invitations were conducted through posting announcement or making phone calls by the project owner to collect comments from the local stakeholders. The local stakeholders include not only the ones who attended the last stakeholder consultation meeting, but also the other local villagers. Documents related to the project were published on South Pole Carbon Asset Management Ltd. official website:
http://www.thesouthpolegroup.com/gold-standard-and-other-stakeholder-consultations
The documents that were posted on the invitation email and website were: the updated PDD and a non-technical summary of the project in local language.

Following NGOs are specifically invited by email to comment on the project:

NGO Invited	Email address
Gold Standard	info@goldstandard.org
WWF	Bella.Roscher@wwf.ch
Climate Group	lhe@theclimategroup.org
Helio International	helio@helio-international.org
Mercy Corps	dnicholson@dc.mercycorps.org
REEEP	Katrin.harvey@reeep.org

E.1. Summary of stakeholder mitigation measures

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Initial Stakeholder Consultation for GS VER

Hearing of the initial stakeholder consultation for the project applying for a GS VER project was conducted on 10thApril 2008. 17 questionnaires were collected and no negative comments and opinions were found from them. Officer from EPA Ms. Zhou said that this project was in compliance with the Nation Environment Protection Index; she hoped that the project owner could continue to strengthen the monitoring of the environment, and control the situation at anytime. Several villagers live in Gusu and Mudu said that this project shows excellent economical and environmental benefits. Since the construction of Everbright EP industrial park, the atmospheric pollution apparently decreased. They extremely support this project. A workers' representative said that the noise control of this project is good and work place can be kept silent; the odor of the site can be well monitored and controlled; domestic sewage is the main discharge in this project, but with regular control, the amount of water is small.The government will support the project.

Internet Stakeholder Consultation

No comment has been received from internet.

2nd Stakeholder Consultation for GS VER

Mr. Chen from Everbright said this project changes waste to valuable, not only improves the environment but also generates electricity and heat. However, they are sourcing additional revenue to keep the operation of the plant properly, due to the increasing

operation and maintenance cost and low electricity tariff. The VER project application is the only way, which they can find out, to get rid of the financial problem.

Head of Mudu County Mr. Qian said that this project obviously improves the surrounding environment, especially the air quality; From the county government prospective, they will continue to support this project and take responsibility to monitor the relevant criteria of sustainable development.

A worker's representative said they are completely in line with health and safety standard during operation. The noise control of this project is good and work place can keep silence; the odor of site place can be well monitored and controlled;

Many villagers said that this project environment benefit and create some employment positions. Since the construction of Everbright EP industrial park, the atmospheric pollution apparently decreased. They have no reason to against this project.

Internet Stakeholder Consultation

No comment has been received from internet.

Main Stakeholder Consultation

No comment has been received from internet.

GS Stakeholder Consultation for the renewal of the crediting period

There have been no comments received up to the date of the completion of the consultation for the renewal of the crediting period.

E.2. Final continuous input / grievance mechanism

Method	Include all details of Chosen Method (s) so that they may be understood and, where relevant, used by readers.
Continuous Input / Grievance Expression Process Book (mandatory)	Grievance expression book in local villages, kept by the leader of the villages

GS Contact (mandatory)	help@goldstandard.org
Other	Telephone access +86-512-66316090 (project owner) +86 158 1052 7065 (GS expert) Local stakeholders can call the working staff of the project owner and GS expert to express their comments, suggestion and complaint. Internet/email access lizhihua@ebchinaintl.com.cn (for project owner) annyta.luo@goldstandard.org (for GS expert) Local stakeholders can send email to the project owner and GS expert to express their comments, suggestion and complaint.

APPENDIX 1 - SAFEGUARDING PRINCIPLES ASSESSMENT

Complete the Assessment below and copy all Mitigation Measures for each Principle into SECTION D above. Please refer to the instructions in the Guide to Completing this Form below.

Assessment Questions/ Requirements	Justification of Relevance (Yes/potentially/no)	How Project will achieve Requirements through design, management or risk mitigation.	Mitigation Measures added to the Monitoring Plan (if required)
Principle 1. Human Rights			
1. The Project Developer and the Project shall respect internationally proclaimed human rights and shall not be complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights 2. The Project shall not discriminate with regards to participation and inclusion	No	The project respects internationally proclaimed human rights. China has its own legislation in place prohibiting the violation of human rights principle and it actively enforces the compliance of such principle. China has ratified two UN human rights treaties— 1. the International Covenant on Civil and Political Rights, the International Covenant on Economic, Social, and Cultural Rights. China has published relevant regulations and practice into line with the treaties, such as Labor Contract Law[11]. 2. This project does not discriminate with regards to participation and inclusion. The project abides the	N/A

[11] http://www.gov.cn/flfg/2007-06/29/content_669394.htm

		rules of equality accordingly and does not involve and is not complicit in any form of discrimination. Specifically regarding the gender equality, detailed enforcement rules are regulated in 'Women's Rights Protection Law [12] to provide support and benefits to women.	
Principle 2. Gender Equality			
1. The Project shall not directly or indirectly lead to/contribute to adverse impacts on gender equality and/or the situation of women. 2. Projects shall apply the principles of non discrimination, equal treatment, and equal pay for equal work 3. The Project shall refer to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks	No	1. As a project combined of positive environmental, economic, and sustainable development benefits, the project is to generate clean electricity from the wind sources to replace fossil fuel power. The project abides the rules of equality accordingly and does not involve and is not complicit in any form of discrimination. Specifically regarding the gender equality, detailed enforcement rules are regulated in 'Women's Rights Protection Law[13] to provide support and benefits to women. 2. Qualified local residents, both men and women, are recruited to work for the project. During stakeholders' consultation process, comments were collected from the local people, including both men and women. The details can be seen in registered passport. During previous monitoring periods, stakeholder interviews were conducted to collect comments	

[12] http://www.gov.cn/banshi/2005-05/26/content_980.htm
[13] http://www.gov.cn/banshi/2005-05/26/content_980.htm

4. (where required) Summary of opinions and recommendations of an Expert Stakeholder(s)		about impacts of the project from the local people, including both men and women. The details can be seen in previous verification report. 3. The project abides the rules of equality accordingly. Regarding the gender equality, detailed enforcement rules are regulated in 'Labor Contract Law' and Women's Rights Protection Law. 4. No expert required.	
Principle 3. Community Health, Safety and Working Conditions			
1. The Project shall avoid community exposure to increased health risks and shall not adversely affect the health of the workers and the community	No	The Project's purpose is to supply electricity from the methane recovery of landfill gas to replace fossil fuel power. It is beneficial to local people. The Project has DCS system. Therefore, most of the employees work in indoor environment (at the office), instead of having to stand outside. In case of on-site monitoring and device maintenance, the project owner provides safety protection equipment.	N/A
Principle 4.1 Sites of Cultural and Historical Heritage			
Does the Project Area include sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture?	No	According to the EIA reports, the Project area does not include sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture.	N/A
>>			

Principle 4.2 Forced Eviction and Displacement			
Does the Project require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial)?	No	As described in the EIA reports, the Project is constructed distanced to residential area, thus the Project does not require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial).	No
>>			
Principle 4.3 Land Tenure and Other Rights			
Does the Project require any change, or have any uncertainties related to land tenure arrangements and/or access rights, usage rights or land ownership?	No	The project area belongs the unused collective land of Mudu County, Suzhou City. There is no need of resettlement. The land application for the project construction has been approved by Department of Land and Resources Bureau. There are no uncertainties related to land tenure arrangements and access rights,	N/A

>>		usage rights or land ownership. The project owner has paid the compensation fee to Mudu County. Thus, there are no uncertainties related to land tenure arrangements and access rights, usage rights or land ownership.	
Principle 4.4 Indigenous Peoples			
Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?	No	According to the EIA reports, no indigenous peoples present in or within the area of influence of the Project.	N/A
>>			
Principle 5. Corruption			
1. The Project shall not involve, be complicit in or	No	The project is owned by a private equity company, and there is no governmental subsidy to the project.	N/A

inadvertently contribute to or reinforce corruption or corrupt Projects		Therefore, the project does not involve and is not complicit in corruption and is not prone to entrusted power abuse nor corruption. Moreover, China was ranked 41 out of 100 countries surveyed in Transparency International's Worldwide Corruption Perceptions Index[14].	
Principle 6.1 Labour Rights			
1. The Project Developer shall ensure that all employment is in compliance with national labour occupational health and safety laws and with the principles and standards embodied in the ILO fundamental conventions 2. Workers shall be able to establish and join labour organisations 3. Working agreements with all individual workers shall be documented and implemented and include:	No	1. The Project complies with national labour and occupational health and safety laws, obligations under international law, and the principles and standards embodied in the International Labour Organization (ILO) fundamental conventions. Labour rights are protected in the Labour Contract Law[15]. The project fully respects the employees' rights in accordance with all labour related laws endorsed within China. Law compliance is subject to government's inspection and ruling. 2. The rights to unionize, bargain collectively are highly protected by Labor Contract Law[16]. The project fully respects the employees' rights in accordance with all labour related laws endorsed within China. Law compliance is subject to government's inspection and ruling. 3. Working agreements between the company and individual workers are documented and	N/A

[14] https://www.transparency.org/en/countries/china
[15] http://www.gov.cn/flfg/2007-06/29/content_669394.htm
[16] http://www.gov.cn/flfg/2007-06/29/content_669394.htm

a) Working hours (must not exceed 48 hours per week on a regular basis), AND b) Duties and tasks, AND c) Remuneration (must include provision for payment of overtime), AND d) Modalities on health insurance, AND e) Modalities on termination of the contract with provision for voluntary resignation by employee, AND f) Provision for annual leave of not less than 10 days per year, not including sick and casual leave. 4. No child labour is allowed (Exceptions for children working on their families' property requires an Expert Stakeholder opinion) 5. The Project Developer shall ensure the use of appropriate equipment,		implemented, including working hours, duties and tasks, remuneration, modalities on health insurance, modalities on termination of contract, provision for annual leave, etc. The employment model applied is locally and culturally appropriate. 4. China has published protection laws on the minors[17]. Employment regulations are described in this Law. The Project requires skilled employees to operate, maintain, and manage the biogas plant, as opposed to manufacturing industries, which may require abundant low-skilled labour. Therefore, the project does not employ and is not complicit in any form of child labour. According to the Employee list, it could be confirmed that the Project does not employ any child labour. 5. All equipment in the Project are operated properly according to the work procedures and safety regulation rules. The Project organizes employee training with topics on technical, environmental/safety code, and operational/maintenance procedures. The Project has established guard again and response procedure, which also regulates the documentation and reporting of accidents and incidents. Thus the Project owner ensures the use of appropriate equipment, training of workers, documentation and	

[17] http://www.npc.gov.cn/zgrdw/npc/zfjc/zfjcelys/2014-05/08/content_1862530.htm

training of workers, documentation and reporting of accidents and incidents, and emergency preparedness and response measures		reporting of accidents and incidents, and emergency preparedness and response measures.	
Principle 6.2 Negative Economic Consequences			
1. Does the project cause negative economic consequences during and after project implementation?	No	The project could supply job opportunities to local people, which is good to local economy. As the Project's purpose is to supply energy from the landfill gas recovery, there is no potential risks of the project to the local economy.	N/A
>>			
Principle 7. Climate and Energy			
Principle 7.1 Emissions			
Will the Project increase greenhouse gas emissions over the Baseline Scenario?	No	The Project will reduce the emission of 97,975tCO_2e compared to the Baseline Scenario as it replaces electricity generated from fossil fuel fired power plants with electricity from the landfill gas recovery.	N/A
>>			
Principle 7.2 Energy Supply			
Will the Project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource	No	The Project's purpose is to supply electricity from the landfill gas recovery. It may use some electricity from the national grid when the equipment are in maintenance. It does not use energy from a local grid or	N/A

(such as wood, biomass) that provides for other local users?		power supply or fuel resource that provides for other local users.	
>>			
Principle 8. Water			
Principle 8.1 Impact on Natural Water Patterns/Flows			
Will the Project affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?	No	The Project's purpose is to supply electricity from the landfill gas recovery. According to the EIA report, the impact of the Project on the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) is negligible.	N/A
>>			
Principle 8.2 Erosion and/or Water Body Instability			
Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion?	No	The Project's purpose is to supply electricity from the landfill gas recovery. Therefore, the impact of the Project on the erosion and/or water body stability is negligible.	N/A
>>			
Principle 9. Environment, ecology and land use			
Principle 9.1 Landscape Modification and Soil			

Does the Project involve the use of land and soil for production of crops or other products? >>	No	The project is a landfill gas recovery and utilization project. And the project uses waste land. It does not involve the use of land and soil for production of crops or other products. In fact, the project brings landscape benefits. The areas near the turbines are replanted.	N/A
Principle 9.2 Vulnerability to Natural Disaster			
Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions? >>	No	The Project's purpose is to supply electricity from the landfill gas recovery. Therefore, the Project is not susceptible to and does not lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions.	N/A
Principle 9.3 Genetic Resources			
Could the Project be negatively impacted by or involve genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development, or take place in facilities or farms that include GMOs in their processes and production)? >>	No	The Project's purpose is to supply electricity from the landfill gas recovery. Therefore, the Project is not negatively impacted by the use of GMOs.	N/A

Principle 9.4 Release of pollutants			
Could the Project potentially result in the release of pollutants to the environment?	No	The Project's purpose is to supply electricity from the landfill gas recovery. Therefore, the Project does not potentially result in release of pollutants to the environment. The project actually reduces CH4, SOx, NOx and TSP emissions deriving from the electricity generated in the grid-connected fossil fuel fired power plants.	N/A
>>			
Principle 9.5 Hazardous and Non-hazardous Waste			
Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials?	No	The Project's purpose is to supply electricity from the landfill gas recovery. Therefore, the Project does not involve the manufacture, trade, release, and/or use of hazardous and non-hazardous chemicals and/or materials.	N/A
>>			
Principle 9.6 Pesticides & Fertilisers			
Will the Project involve the application of pesticides and/or fertilisers?	No	The project is a landfill gas recovery and utilization project. Therefore, the Project does not involve the application of pesticides and/or fertilizers.	N/A
>>			
Principle 9.7 Harvesting of Forests			
Will the Project involve the harvesting of forests?	No	The project is a landfill gas recovery and utilization project. It does not involve the harvesting of forests.	N/A
>>			

Principle 9.8 Food			
Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?	No	The Project's purpose is to supply electricity from the landfill gas recovery. Therefore, the Project does not modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives.	N/A
>>			
Principle 9.9 Animal husbandry			
Will the Project involve animal husbandry?	No	The Project's purpose is to supply electricity from the landfill gas recovery. Therefore, the Project does not involve animal husbandry.	N/A
>>			
Principle 9.10 High Conservation Value Areas and Critical Habitats			
Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified?	No	The project is a landfill gas recovery and utilization project. According to the EIA reports, it does not physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified.	N/A
>>			
Principle 9.11 Endangered Species			
Are there any endangered species identified as potentially being present within the Project	No	According to the EIA report, there are no endangered species identified as potentially being present within the Project boundary (including those that may route	N/A

boundary (including those that may route through the area)? AND/OR Does the Project potentially impact other areas where endangered species may be present through transboundary affects?		through the area), and the project would not potentially impact other areas where endangered species may be present through transboundary affects.	
>>			

APPENDIX 2- CONTACT INFORMATION OF PROJECT PARTICIPANTS

Organization name	Everbright Environment and Energy (Suzhou) Landfill Gas to Energy Co., Ltd.,
Registration number with relevant authority	/
Street/P.O. Box	Qizi Mountain, Mudu County, Wuzhong District, Suzhou City
Building	/
City	Suzhou City
State/Region	Jiangsu province
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Title	Manager
Salutation	Mr
Last name	Li
Middle name	/
First name	Zhihua
Department	/
Mobile	/
Direct tel.	+86 512-66316090
Personal e-mail	lizhihua@ebchinaintl.com.cn

Organization name	South Pole Carbon Asset Management Ltd.
Registration number with relevant authority	/
Street/P.O. Box	Technoparkstr. 1
Building	/
City	Zurich
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Postcode	8005
Country	Switzerland
Telephone	+86-(0)10-6268 2508
E-mail	registration@southpolecarbon.com
Website	/
Contact person	Renat Heuberger
Title	/
Salutation	Mr.
Last name	Heuberger
Middle name	/
First name	Renat
Department	/
Mobile	/
Direct tel.	/
Personal e-mail	/

APPENDIX 3- FURTHER BACKGROUND INFORMATION ON EX ANTE CALCULATION OF EMISSION REDUCTIONS

According to the "Tool to calculate the emission factor for an electricity system", six steps shall be applied for calculating the emission factor:

STEP 1. Identify the relevant electric system

For determining the electricity emission factors, identify the relevant project electricity system. The DNA has published a delineation of the project electricity system and connected electricity systems, therefore these delineations are used in accordance with the Tool:

- The project electricity system is the North East Power Grid (NEPG), consisting of six provincial grids: Shanghai city, Jiangsu province, Zhejiang province, Anhui province, Fujian province.

For the purpose of this tool, the reference system is the project electricity system. Hence electricity transfers from a connected electricity system to the project electricity system are defined as electricity imports while electricity transfers from the project electricity system to connected electricity systems are defined as electricity exports.

For the purpose of determining the build margin emission factor, the spatial extent is limited to the project electricity system, except where recent or likely future additions to the transmission capacity enable significant increases in imported electricity. In such cases, the transmission capacity may be considered a build margin source.

There are no recent or likely future additions to transmission capacity that would enable significant increases in imported electricity; the data that imports are relatively small and have not changed significantly in the period covered. Therefore, the transmission capacity is not considered a build margin source.

For the purpose of determining the operating margin emission factor, use one of the

following options to determine the CO_2 emission factor(s) for net electricity imports from a connected electricity system:

(a) 0 tCO_2/MWh; or

(b) The weighted average operating margin (OM) emission rate of the exporting grid, determined as described in Step 4 (d) below; or
(c) The simple operating margin emission rate of the exporting grid, determined as described in Step 4 (a), if the conditions for this method, as described in Step 3 below, apply to the exporting grid; or
(d) The simple adjusted operating margin emission rate of the exporting grid, determined as described in Step 4 (b) below.

There are no imports from Annex-I country (ies).

Electricity exports should not be subtracted from electricity generation data used for calculating and monitoring the electricity emission factors.

Electricity exports from the project electricity system to the connected electricity system are not subtracted from electricity generation data used for calculating and monitoring the electricity emission factors.

STEP 2: Choose whether to include off-grid power plants in the project electricity system (optional)

Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:
Option I: Only grid power plants are included in the calculation.
Option II: Both grid power plants and off-grid power plants are included in the calculation.
Following the calculations of the DNA, and the statistical data available, Option I is chosen.

STEP 3. Select a method to determine the operating margin (OM)

According to the tool, the calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods:
(a) Simple OM; or
(b) Simple Adjusted OM; or

(c) Dispatch data analysis OM; or
(d) Average OM

According to the Tool, the simple OM method (option a) can only be used if low-cost / must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.

This criterion is met and therefore the project participants chose to use the simple OM method (option a).
The Simple OM emissions factor can be calculated using either ex-ante or ex-post data vintages. The project participants have chosen to use the ex-ante option, and $EF_{grid,OM,y}$ is fixed for the duration of the first crediting period.

Ex ante option: If the ex-ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation.

STEP 4. Calculate the operating margin emission factor according to the selected method

(a) Simple OM
The Simple Operating Margin emission factor $EF_{grid,OM,y}$ is defined as the generation-weighted average emissions per unit net electricity generation (tCO_2/MWh) of all generating sources serving the system, not including low-operating cost and must-run power plants. Two options can be selected to calculate the simple OM:

Option A: Based on the net electricity generation and a CO_2 emission factor of each power unit; or
Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Option B can only be used if:

(a) The necessary data for Option A is not available; and
(b) Only nuclear and renewable power generation are considered as low-cost / must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
(c) Off-grid power plants are not included in the calculation (i.e. if Option I has been chosen in Step 2).

The criteria for Option B are met, as (a) the necessary data for Option A is not available as indicated in the calculations of the DNA, (b) only nuclear and renewable power generation are considered as low-cost / must-run power sources and the quantity of electricity supplied to the grid by these sources is known, and (c) Option I is chosen in Step 2.

Option B – Calculation based on total fuel consumption and electricity generation of the system
According to the Tool, where Option B is used, the simple OM emission factor is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including low-cost / must-run power plants / units, and total fuel consumption of the project electricity system, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{co_2,i,y}}{EG_y} \quad (4)$$

where
$EF_{grid,OMsimple,y}$ is the simple operating margin CO_2 emission factor in year y (tCO_2/MWh)
$FC_{i,y}$ is the amount of fossil fuel type i consumed in the project electricity system in year y (mass or volume unit)
$NCV_{i,y}$ is the net calorific value (energy content) of fossil fuel type i in year y (GJ/mass or volume unit)
$EF_{CO2,i,y}$ is the CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ)
EG_y is the net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost / must-run power plants / units, in year y (MWh)
i is all fossil fuel types combusted in power sources in the project electricity system in year y

y, when using the ex-ante option, is the three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation.

On the basis of the data available, the three-year average operating margin emission factor is calculated by the DNA as a full-generation-weighted average of the emission factors.

Based on '2019 China Regional Power Grid Emission Factor',

$EF_{grid,OMsimlpe,y} = 0.7921 tCO_2/MWh$ (5)

STEP 5. Calculate the build margin (BM) emission factor

In terms of vintage of data, project participants can choose between one of the following two options:

(a) Option 1: for the first crediting period, calculate the build margin emission factor ex ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. The option does not require monitoring the emission factor during the crediting period.

(b) Option 2: For the first crediting period, the build margin emission factor shall be updated annually, ex post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emission factor shall be calculated ex ante, as described in Option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

Option 1 is selected to calculate the build margin emission factor for the proposed project.

This is the third crediting period, so, BM is same with the second crediting period.

In accordance to the calculation method proposed by the Chinese NDRC[18] which was approved by CDM EB[19], since it is impossible to separate the different generation technology capacities based on coal, oil or gas fuel etc from the generic term "thermal power" in the present energy statistics, the following calculation measures is taken:
First, according to the energy statistics of the selected period in which approximately 20% capacity has been added to the grid, the ratio of CO_2 emissions produced by solid, liquid, and gas fuel consumption for power generation is determined; then this ratio is multiplied by the respective emission factors based on commercially available best practice technology in terms of efficiency. Finally, this emission factor for thermal power is multiplied with the ratio of thermal power identified within the approximation for the latest 20% (close but not lower than 20%) of installed capacity addition to the grid. The result is the BM emission factor of the grid. The sample group of power units chosen to calculate the build margin is therefore the set of power capacity additions in the electricity system that comprise 20% of the system capacity (in MW) that have been built most recently[20]. In terms of vintage of data, Option 1 is chosen.

BM emission factor of the grid is calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad (6)$$

Where:

$EF_{grid,BM,y}$ is the Build margin CO_2 emission factor in year y(t CO_2/MWh);

$EG_{m,y}$ is the Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh);

$EF_{EL,m,y}$ is the CO_2 emission factor of power unit m in year y (tCO_2/MWh);

m is the power units included in the build margin;

y is the most recent historical year for which power generation data is available

[18] The build margin calculations is derived from the "Bulletin on the baseline emission factor of the Chinese Electricity Grid", which has been published by the Chinese DNA (Office of National Coordination Committee on Climate Change) on 20/10/2011.

[19] This is in accordance with the request for guidance: Application of AM0005 and AMS-I.D in China, a letter from DNV to the Executive Board, dated 07/10/2005, available online at: http://cdm.unfccc.int/UserManagement/FileStorage/6POIAMGYOEDOTKW25TA20EHEKPR4DM. This approach has been applied by many registered CDM projects using methodology ACM0002 so far.

[20] Note: According to the Tool to calculate the emission factor for an electricity system "If 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation."

The CO_2 emission factor of each power unit m ($EF_{EL,m,y}$) should be determined as per the guidance in step 4 (a) for the simple OM, using options A1, A2 or A3, using for y the most recent historical year for which power generation data is available, and using for m the power units included in the build margin.

Due to the limited availability of data on individual power units, the DNA uses the deviation above to calculate the build margin emission factor and the CO_2 emission factor of thermal power units as follows.

The added generation capacity is taken instead of generation in formula (5) above, as with the determination of the group of plant included in the build margin. Therefore, the calculation following the deviation is as follows:

$$EF_{grid,BM,y} = \Sigma m\ (CAP_{m,y} \times EF_{EL,m,y}) / \Sigma m\ CAP_{m,y} = \Sigma m\ Share_{CAP,m,y} \times EF_{EL,m,y} \quad (7)$$

Where:

$EF_{grid,BM,y}$ is the build margin CO_2 emission factor in year y (tCO_2/MWh)

$CAP_{m,y}$ is the added generation capacity by plant type m in year y (MW)

$EF_{EL,m,y}$ is the CO_2 emission factor of plant type m in year y (tCO_2/MWh)

$Share_{CAP,m,y}$ is the share of added generation capacity by plant type m in year y (%)

m is the plant type included in the build margin (thermal, hydro, nuclear, other)

y is the most recent historical year for which electricity generation data is available

The CO_2 emission factor of plant types other than thermal power plants is taken as zero. The CO_2 emission factor of thermal power plants is the weighted average emission factor of the best thermal power plant technologies commercially available in China, as required by the approved deviation, using option A2.

Using the equation of option A2, the CO_2 emission factor of advanced (best commercially available) power plants using fuel type i can be calculated as follows:

$$EF_{m,Adv,y} = EF_{CO2,m,y} \times 3.6 / \eta_{m,y}. \quad (8)$$

Where:

$EF_{m,Adv,y}$ is the CO_2 emission factor of advanced power plants using fuel m in year y (tCO_2/MWh)

$EF_{CO2,m,y}$ is the average CO_2 emission factor of fuel type m in year y (tCO_2/GJ)

$\eta_{m,y}$ is the average net energy conversion efficiency of advanced power plants using fuel type m in year y (%)

m is the fuel type of thermal plant (coal/solid, oil/liquid, gas)

y is the relevant year as per the data vintage chosen

The weighted average CO_2 emission factor of thermal power plants is weighted on the basis of the emissions from each of these fuel types in the latest year for which data is available, and using the average net energy conversion efficiency for each fuel type of the best technologies commercially available in China.

$$EF_{thermal,}y = \Sigma m\ (EF_{m,Adv,y} \times \lambda_{m,y}) \qquad (9)$$

Where:

$EF_{thermal,y}$ is the weighted average CO_2 emission factor of thermal power plants in year y (tCO_2/MWh)

$EF_{m,Adv,y}$ is the CO_2 emission factor of advanced power plants using fuel type m in year y (tCO_2/MWh)

$\lambda_{m,y}$ is the share of emissions of fuel type m in year y (%)

m is the fuel type of thermal plant (coal/solid, oil/liquid, gas)

y is the relevant year as per the data vintage chosen

The build margin emission factor is calculated by the DNA using this methodology:

$EF_{grid,BM,y}$ = 0.6861 tCO_2/MWh. (10)

STEP 6. Calculate the combined margin (CM) emission factor

The calculation of the combined margin (CM) emission factor ($EF_{grid,CM,y}$) is based on one of the following methods:

(a) Weighted average CM; or

(b) Simplified CM.

The weighted average CM method (option a) should be used as the preferred option. The simplified CM method (option b) can only be used if:

- The project activity is located in a Least Developed Country (LDC) or in a country with less than 10 registered projects at the starting date of validation; and
- The data requirements for the application of step 5 above cannot be met.

Option a is the preferred option. Option b cannot be used as the project activity does not take place in an LDC or in a country with less than 10 registered CDM projects. Therefore, option a is chosen.

(a) Weighted average CM

The combined margin emissions factor is calculated as follows:

$EF_{grid,CM,y} = w_{OM} \times EF_{grid,OM,y} + w_{BM} \times EF_{grid,BM,y}$ (11)

Where

$EF_{grid,BM,y}$ is the build margin CO2 emission factor in year y (tCO_2/MWh)

$EF_{grid,OM,y}$ is the operating margin CO2 emission factor in year y (tCO_2/MWh)

w_{OM} is the weighting of operating margin emissions factor (%)

w_{BM} is the weighting of build margin emissions factor (%).

The default weights are used, i.e. for the landfill recovery projects in the second crediting period and the subsequent crediting period, wOM = 0.25 and wBM = 0.75.

On the basis of these weights for the second crediting period, the combined margin emission factor is calculated, and are fixed ex-ante for the duration of the second crediting period as follows:

	CO_2 emission factor (tCO2/MWh)	Weighting
Operating Margin Emissions Factor ($EF_{grid,OM,y}$)	0.7921	0.25
Build Margin Emissions Factor ($EF_{grid,BM,y}$)	0.6861	0.75
Baseline Emissions Factor ($EF_{grid,CM,y}$)	0.7126	

$EF_{grid,CM,y} = 0.7126\ tCO_2/MWh$

APPENDIX 4-SUMMARY OF APPROVED DESIGN CHANGES

No post registration design changes.

Revision History

Version	Date	Remarks
1.2	14 October 2020	Hyperlinked section summary to enable quick access to key sections Improved clarity on Key Project Information Inclusion criteria table added Gender sensitive requirements added Prior consideration (1 yr rule) and Ongoing Financial Need added Safeguard Principles Assessment as annex and a new section to include applicable safeguards for clarity Improved Clarity on SDG contribution/SDG Impact term used throughout Clarity on Stakeholder Consultation information required Provision of an accompanying Guide to help the user understand detailed rules and requirements
1.1	24 August 2017	Updated to include section A.8 on 'gender sensitive' requirements
1.0	10 July 2017	Initial adoption