CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

Annexes

SECTION A. General description of project activity

A.1. Title of the project activity:

Title: Linjiang Erqi MSW Incineration for Power Project
Version of PDD: 06
Date of Document: 15/03/2012

A.2. Description of the project activity:

Linjiang Erqi MSW Incineration for Power Project (hereinafter as the "Project"), located at Shatou Village, Linjiang Town, Ouhai District, Wenzhou City, Zhejiang Province, People's Republic of China, is developed by Zhejiang Weiming Environment Protection Co., Ltd. (hereinafter as the "project owner").The purpose of the project is to dispose the MSW from Wenzhou City through incineration, and simultaneously utilizing the thermal energy for power.

When the Project is in operation, it is going to realize a MSW treatment capacity of 1,200 tons per day, by two mechanical grate incinerators, each with a treatment capacity of 600 tons MSW per day; simultaneously the project will deliver 107,500 MWh to the Eastern China Power Grid (hereinafter as the "ECPG").

In the absence of the project, the MSW in the service area will be disposed in the local landfills, and the landfill gas will be released directly to the atmosphere without recovery and utilization. The baseline scenario for MSW treatment is waste disposed in landfill site without capturing landfill gas. Refer to the Section B.4 for more details.

The project leads to emission reduction through displacing of electricity from fossil fuel power plant connected to the ECPG and avoid the CH_4 emission from the organic MSW anaerobic disposal in landfill sites. About 1,757,098 tCO_2e emission reductions are expected to be achieved over the 10-year crediting period.

The Project will contribute to the sustainable development of the local as follows:

- **Improvement of local environment -**The project prevents waste from being left to decay, which would lead to uncontrolled methane emission and putrid odor. In the absence of the Project activity, waste is left to decay in landfills resulting in the emission of LFG that contains methane, a potent greenhouse gas and potential fire hazard.
- **Job creation –** A large number of local staff will be employed during the construction stage and also to operate and maintain the project. A number of these staff will receive comprehensive training in the technology to be used by the Project activity.
- **Fossil fuel consumption reduction -** By utilizing waste as the primary fuel for energy generation, the Project activity contributes to national goals of greater energy security by reducing the country's need to rely on imported fossil fuels.

A.3. Project participants:

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
People's Republic of China (host)	Zhejiang Weiming Environment Protection Co., Ltd.	No
United Kingdom of Great Britain and Northern Ireland	Eco-Frontier Carbon Partners Limited	No
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party (ies) involved is required.		

Refer to Annex 1 of the PDD for more details.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

People's Republic of China

A.4.1.2. Region/State/Province etc.:

Zhejiang Province

A.4.1.3. City/Town/Community etc.:

Shatou village, Linjiang Town, Ouhai District, Wenzhou City

A.4.1.4. Details of physical location, including information allowing the unique identification of this project activity (maximum one page):

The Project locates at the Shatou village, Linjiang Town, Ouhai District, Wenzhou City, Zhejiang Province. It is situated at 28°08'09"N and 120°32'59"E.

The detailed geographic location is shown in the maps below.

Figure A.1 The location of the Project Activity

A.4.2. Category(ies) of project activity:

The project activity includes two categories as follows:

Sectoral Scope 1: Energy industry (renewable - / non-renewable sources)
Sectoral Scope 13: Waste handling and disposal

A.4.3. Technology to be employed by the project activity:

The project will install two mechanical grate incinerators, each with treatment capacity of 600 tons MSW per day, the annual MSW treatment amount is 399,600 tons. The steam produced by the boilers will feed into two 12 MW condensing turbine generators. The project annual operation hour will be about 8,000, and the lifetime of the power plant is 25 years. Refer to the Table A.1 below for key parameters of the main equipments.

The generated electricity will be delivered to the ECPG through the Tengqiao Substation, the bidirectional electricity meter in the project site will be utilized to monitor the output and input electricity amount, and the annual net output power amount (the difference between output and input electricity) is estimated to be 107,500MWh (Refer to the Footnote 9 of the Section B.5 for details on the electricity output estimation). Weighbridge will be installed at the project site to monitor the amount of MSW treatment; the proportion of the MSW type and the fraction of the residual carbon will be monitored by a qualified monitoring organization. Refer to Section B.7.2 of the PDD for more details.

Following tables show the main equipment and their specifications.

Table A.1 the key parameters of the equipments

Parameter	Value	Unit
Incinerator &Boiler		
Number	2	-
MSW treatment capacity(single)	600	t/d
Rated steam outlet pressure	4.1	MPa (G)
Rated steam outlet temperature	415	°C
Evaporation flow	43.5	t/h
Lifetime	25	Years
Turbine		
Number	2	-
Model	N12-4.0	
Capacity	12	MW
Rotation rate	3,000	r/min
Rated inflow steam flow	61.64	t/h
Rated inflow steam temperature	400	°C
Rated inflow steam pressure	3.91	MPa
Lifetime	25	Years
Manufacturer	Hangzhou Steam Turbine Co., Ltd.	
Generator		
Model	QF-J12-2	
Capacity	12	MW
Rated Voltage	10.5	KV
Frequency	50	Hz
Power factor	0.8	-

Lifetime	25	Years
Manufacturer	Hangzhou Steam Turbine Co., Ltd.	

There is no technology transfer involved in the Project.

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

It is expected that the project activity will reduce GHG emission about 1,757,098 tCO_2e per year over a 10-years fixed crediting period.

Table A.2 Project Emission Reductions

Years	Annual estimation of emission reductions in tCO_2e
01/07/2012~30/06/2013	52,666
01/07/2013~30/06/2014	106,323
01/07/2014~30/06/2015	134,985
01/07/2015~30/06/2016	159,384
01/07/2016~30/06/2017	180,210
01/07/2017~30/06/2018	198,034
01/07/2018~30/06/2019	213,334
01/07/2019~30/06/2020	226,509
01/07/2020~30/06/2021	237,892
01/07/2021~30/06/2022	247,761
Total estimated reductions (tCO_2e)	**1,757,098**
Total number of crediting years	**10**
Annual average over the crediting period of estimated reductions (tCO_2e)	**175,710**

A.4.5. Public funding of the project activity:

The project does not receive any public funding. The project does not use ODA directly or indirectly. The project owner- Zhejiang Weiming Environment Protection Co., Ltd. will fund the project by itself.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity:

Approved baseline and monitoring methodology applied to the project activity is:

AM0025 "Avoided emissions from organic waste through alternative waste treatment processes" (Version 12.0, Annex 04, EB 55)

The project activity also refers to the latest approved version of the following tools:

"Tool for the demonstration and assessment of additionality" (Version 06.0.0, Annex 21, EB 65)
"Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site" (Version 05.1.0, Annex 10, EB 61)
"Tool to calculate the emission factor for an electricity system" (Version 02.2.1, Annex 19, EB 63)
"Tool to determine project emissions from flaring gases containing methane" (Annex 13, EB 28)

More information about the methodology can be obtained at:
http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

B.2. Justification of the choice of the methodology and why it is applicable to the project activity:

The Project activity meets all the applicability conditions in AM0025 (Version 12.0) as follows:

AM0025 Applicability	Applicable? Yes/No	Comments
• The project activity involves one or a combination of the following waste treatment options for the fresh waste that in a given year would have otherwise been disposed of in a landfill: (a) A composting process in aerobic conditions; (b) Gasification to produce syngas and its use; (c) Anaerobic digestion with biogas collection and flaring and/or its use. The anaerobic digester processes only the waste for which emission reductions are claimed in this methodology. If the biogas is processed and upgraded to the quality of natural gas and it is distributed as energy via natural gas distribution grid, project activities may use approved methodology AM0053 in conjunction with this methodology. In such cases the baseline scenario identification procedure and additionality assessment shall be undertaken for the combination of the two	**Yes**	• The project technology is the option (e) - fresh waste incineration to produce electricity then exported to the ECPG. • The incinerators installed are mechanical grate type.

components of the project activity i.e. biomethane emission avoidance and displacement of natural gas; (d) Mechanical/thermal treatment process to produce refuse-derived fuel (RDF)/stabilized biomass (SB) and its use. The thermal treatment process (dehydration) occurs under controlled conditions (up to 300 degrees Celsius). In case of thermal treatment process, the process shall generate a stabilized biomass that would be used as fuel or raw material in other industrial process. The physical and chemical properties of the produced RDF/SB shall be homogenous and constant over time; (e) Incineration of fresh waste for energy generation, electricity and/or heat. The thermal energy generated is either consumed on-site and/or exported to a nearby facility. Electricity generated is either consumed on-site, exported to the grid or exported to a nearby facility. The incinerator is rotating fluidized bed or circulating fluidized bed or hearth or grate type.		
• In case of anaerobic digestion, gasification or RDF processing of waste, the residual waste from these processes is aerobically composted and/or delivered to a landfill;	**Not related**	This applicability condition is not related to the Project.
• In case of composting, the produced compost is either used as soil conditioner or disposed of in landfills;	**Not related**	This applicability condition is not related to the Project.
• In case of RDF/stabilized biomass processing, the produced RDF/stabilized biomass should not be stored in a manner that may result in anaerobic conditions before its use;	**Not related**	This applicability condition is not related to the Project.
• If RDF/SB is disposed of in a landfill, project proponent shall provide degradability analysis on an annual basis to demonstrate that the methane generation, in the life-cycle of the SB is below 1% of related emissions. It has to be demonstrated regularly that the characteristics of the produced RDF/SB should not allow for re-absorption of moisture of more than 3%. Otherwise, monitoring the fate of the produced RDF/SB is necessary to ensure that it is not subject to anaerobic conditions	**Not related**	This applicability condition is not related to the Project.

in its lifecycle;		
• In the case of incineration of the MSW, the MSW should not be stored longer than 10 days. The MSW should not be stored in conditions that would lead to anaerobic decomposition and, hence, generation of CH_4;	**Yes**	The MSW will not be stored longer than 10 days before incineration. The storage condition would not lead to anaerobic decomposition.
• The proportions and characteristics of different types of organic waste processed in the project activity can be determined, in order to apply a multiphase landfill gas generation model to estimate the quantity of landfill gas that would have been generated in the absence of the project activity;	**Yes**	The proportions and characteristics of the MSW disposed in the project will be monitored by third party according to the AM0025.
• The project activity may include electricity generation and/or thermal energy generation from the biogas, syngas captured, RDF/stabilized biomass produced, combustion heat generated in the incineration process, respectively, from the anaerobic digester, the gasifier, RDF/stabilized biomass combustor, and waste incinerator. The electricity can be exported to the grid and/or used internally at the project site. In the case of RDF/SB produced, the emission reductions can be claimed only for the cases where the RDF/SB used for electricity and/or thermal energy generation can be monitored;	**Yes**	The combustion heat from the incinerator will be recovered and used to produce electricity by steam turbine generators. The electricity is for on-site use as well as export to the ECPG. No heat generation is involved in the Project.
• Waste handling in the baseline scenario shows a continuation of current practice of disposing the waste in a landfill despite environmental regulation that mandates the treatment of the waste, if any, using any of the project activity treatment options mentioned above;	**Yes**	There is no mandatory law or regulation requiring domestic waste to be treated by incineration or any other treatment options. Landfill is still the popular option for MSW treatment.
• The compliance rate of the environmental regulations during (part of) the crediting period is below 50%; if monitored compliance with the MSW rules exceeds 50%, the project activity shall receive no further credit, since the assumption that the policy is not enforced is no longer tenable;	**Yes**	There is no mandatory law or regulation requiring domestic waste to be treated by incineration or any other treatment options mentioned above. Landfill is still the popular option for MSW treatment. Therefore, there is no

		compliance rate regarding to such kind environmental regulations. The compliance rate will be monitored annually during the crediting period.
• Local regulations do not constrain the establishment of RDF production plants/thermal treatment plants nor the use of RDF/stabilized biomass as fuel or raw material;	**Not related**	This applicability condition is not related to the Project.
• In case of RDF/stabilized biomass production, project proponent shall provide evidences that no GHG emissions occur, other than biogenic CO_2, due to chemical reactions during the thermal treatment process (such as Chimney Gas Analysis report);	**Not related**	This applicability condition is not related to the Project.
• The project activity does not involve thermal treatment process of neither industrial nor hospital waste;	**Yes**	The Project does not involve the treatment of industrial or hospital waste.
• In case of MSW incineration, if auxiliary fossil fuel is added into the incinerator, the fraction of energy generated by auxiliary fossil fuel is no more than 50% of the total energy generated in the incinerator.	**Yes**	Approximately 200 tons light diesel will be used as on-site fossil auxiliary fuel. The fraction of energy generated by fossil fuel is far below 50% of the total energy generated in the incinerator[1].
• This methodology is not applicable to project activities that involve capture and flaring of methane from existing waste in the landfill. This should be treated as a separate project activity due to the difference in waste characteristics of existing and fresh waste, which may have an implication on the baseline scenario determination.	**Yes**	The project is designed only to incinerate fresh MSW and does not involve capture and flaring of landfill gas.

The project is in line with all the criteria described above and is therefore applicable to AM0025.

B.3. Description of the sources and gases included in the project boundary:

[1] Energy content of fossil fuel = $F_{cons, y} \times NCV_{fuel}$ = 200(t/yr) × 42.652(GJ/t) = 8,530.4 GJ
The net calorific of the MSW is 6,080kJ/kg, annual MSW treatment amount is 399,600 tons, thus:
The energy content of MSW=399,600(t/yr) × 6,080(kJ/kg) /1,000(GJ/MJ) = 2,429,568GJ
Ratio of the energy content of fossil fuel against MSW = 8,530.4/2,429,568 = 0.35% <50%

The spatial extent of the project boundary is the site of the project activity where the waste is treated. This includes the facilities for processing the waste, on-site electricity generation and/or consumption, onsite fuel use, wastewater treatment plant and the landfill site. The project boundary does not include facilities for waste collection, sorting and transport to the project site.

In the case that the project provides electricity to a grid, the spatial extent of the project boundary will also include those plants connected to the energy system to which the plant is connected.

The project boundary and the sources and gases included are shown in the figure and table below.

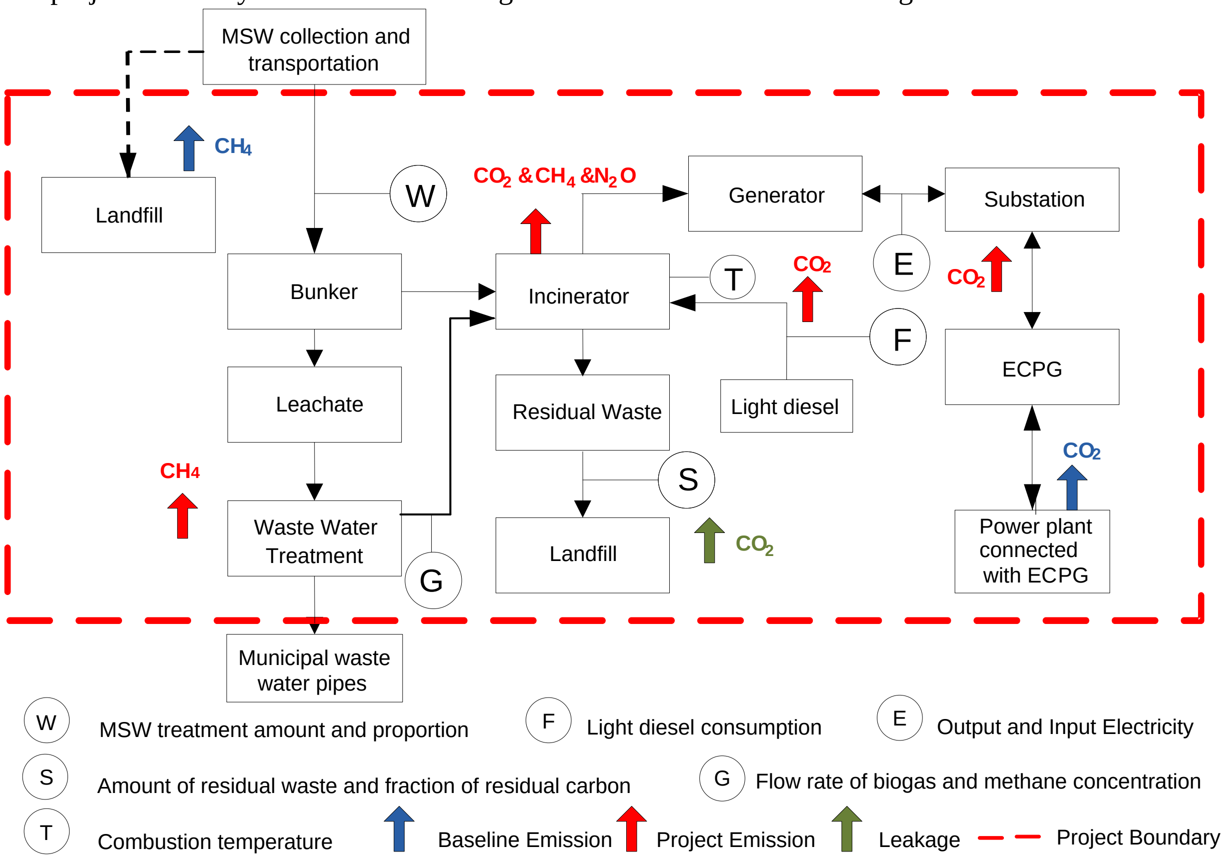

Figure B.1 the Project boundary

The greenhouse gases included in or excluded from the project boundary are shown in Table B.1.

Table B.1. Sources and gases included in the project boundary

	Source	Gas	Included/ Excluded	Justification/Explanation
Baseline	Emissions from decomposition of waste at the landfill site	CH_4	Included	The major source of emissions in the baseline.
		CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted.
		N_2O	Excluded	N_2O emissions are small compared to CH_4 emissions from landfills. Exclusion of this gas is conservative.

	Emissions from electricity consumption	CO_2	Included	Electricity is consumed from the ECPG in the baseline scenario.
		CH_4	Excluded	Excluded for simplification. This is conservative.
		N_2O	Excluded	Excluded for simplification. This is conservative.
Project Activity	On-site fossil fuel consumption due to the project activity other than for electricity generation	CO_2	Included	0# light diesel oil is used as auxiliary fuel. Therefore this emission source has been included.
		CH_4	Excluded	Excluded for simplification. This emission source is assumed to be very small.
		N_2O	Excluded	Excluded for simplification. This emission source is assumed to be very small.
	Emissions from on-site electricity use	CO_2	Included	May be an important emission source. The project activity will use self-generated electricity on-site. If the electricity is imported from the grid, it will be counted as the project emission.
		CH_4	Excluded	Excluded for simplification. This emission source is assumed to be very small.
		N_2O	Excluded	Excluded for simplification. This emission source is assumed to be very small.
	Direct emissions from the waste treatment processes	CO_2	Included	CO_2 emissions from incineration of fossil based waste are included. CO_2 emissions from the combustion of organic waste are not accounted for.
		CH_4	Included	CH_4 may be emitted from stacks from incineration and is therefore accounted.
		N_2O	Included	N_2O can be emitted from incineration and is therefore included.
	Emissions from waste water treatment	CO_2	Excluded	CO_2 emissions from the decomposition of organic waste are not accounted.
		CH_4	Included	Methane from the wastewater treatment plant to be combusted in the closed flare will be accounted for project emissions. They will be calculated based on the "*Tool to determine project emissions from flaring gases containing methane*" as per the methodology.
		N_2O	Excluded	Excluded for simplification. This emission source is assumed to be very small.

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

The procedure to define the baseline scenario is as follows:

Step 1. Identification of alternative scenarios

The alternatives for the Project are listed below.

Alternatives for the treatment of the fresh waste in the absence of the project activity to be analyzed should include, *inter alia*:

M1. The project activity, incineration of waste, not implemented as a CDM project;
M2. Disposal of the waste at a landfill where landfill gas captured is flared;
M3. Disposal of the waste on a landfill without the capture of landfill gas.

For the alternative **M1**, no mandatory laws or regulations prohibit disposing the waste through incineration. So, this alternative is a realistic and credible baseline alternative.

For the alternative **M2**, according to the instatement from local government, MSW generated in the service area will be disposed in landfill site before the implementation of the project. The landfill site did not install any landfill gas capture and utilizing facilities. However, newly installed, dedicated facilities for landfill gas capture and utilization will not only require huge investment without any revenue. Furthermore, only less than 3% of landfill sites have landfill gas recovery and utilization system due to the investment and technical constraints according to the '*Report for Chinese MSW Treatment and Fees Charging Status*[2]', issued by NDRC in 26th Jan. 2007. According to the latest statistic by government, the ratio of landfill sites without landfill gas recovery and utilization is still more than 90%[3]. Considering the current practice, the recommendation of methane destruction at landfill sites by the '*Technical Code for Municipal Solid Waste Sanitary Landfill* (CJJ17-2004)[4]' are not systematically enforced and that non-compliance with these requirements is widespread in China. Thus alternative **M2** is not a realistic and credible baseline alternative.

For the alternative **M3**, disposal of the waste at a landfill without the capture of landfill gas is the most common way currently. So this alternative is a realistic and credible baseline alternative.

The project activity also includes the production of the electricity using heat from incinerators, and the electricity output to the ECPG. In this case, the realistic and credible alternatives of power generation in the absence of the project activity may include, *inter alia*:

P1. Power generated from combustion heat from the waste incinerators, not undertaken as a CDM project activity;
P2. Existing or construction of a new on-site or off-site fossil fuel fired cogeneration plant;
P3. Existing or construction of a new on-site or off-site renewable based cogeneration plant;
P4. Existing or construction of a new on-site or off-site fossil fuel fired captive power plant;
P5. Existing or construction of a new on-site or off-site renewable based captive power plant;
P6. Existing and/or new grid-connected power plants.

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[2] http://www.sdpc.gov.cn/jggl/jgqk/t20070126_113814.htm

[3] http://www.gov.cn/jrzg/2010-04/19/content_1586850.htm

[4] According to the Chapter 8, it mentions that "Landfill site shall install effective landfill gas venting system. The passive gathering and transferring of landfill gas must be forbidden to prevent fire and explosion. In the case of no condition to utilize landfill gas, the landfill gas generated should be vented positively and flared collectively. The existing landfill gas sites which can't reach safe and stable status shall install effective landfill gas venting system and treatment facility."

Since there is no heat supply in the project activity, the alternative **P2** and **P3** are not the baseline alternatives to the project.

According to *Notice on strictly prohibiting the installation of the fuel-fired generators with the capacity of 135MW or below*[5] issued by State Council in 2002, thermal power plants with installed capacity less than 135MW are prohibited for construction in the areas covered by regional grids. Therefore, Alternative P4, construction of a new on-site or off-site fossil fuel fired captive power plant with the same generation capacity 24MW as the project, is not in compliance with Chinese regulations on construction of a thermal plant due to the project area is covered by ECPG. The alternative **P4** is not the baseline scenario to the project.

For the alternative **P5**, the Solar PV, geothermal, biomass and hydro are the possible grid-connected renewable energy options that could be applied in the Eastern China Power Grid. Due to the solar PV is suffered with low illumination intensity[6] in Zhejiang Province, it is not a good option to utilize solar energy for power. Regarding to the biomass power plant, China is still in the starting period and facing all kinds of difficulties, such as the difficulties of raw material collection, high investment and operation cost, immature technology and lack of correlative standards and regulations[7]. All these difficulties limit the development of biomass power plant in Zhejiang Province. Limited in terms of resource[8] and technological advancement[9], geothermal power plant is not realistic. Also, there is no insufficient hydro resource available at the project site for the same electricity generation as the Project. Therefore, **P5** cannot be a realistic and credible baseline alternative.

Due to there is no heat supply in the project activity, thus the alternative scenario with heat supply provides different service compare to the project activity thus is excluded.

Outcome of Step 1:

M1 and **M3** are applicable for further discussion. **M2** is not applicable for the Project.
P1and **P6** are applicable for further discussion. **P2, P3, P4** and **P5** are not applicable for the Project.

Step 2: Identify the fuel for the baseline choice of energy source taking into account the national and/or sectoral policies as applicable

Alternative P1 is to recover and utilize combustion heat from waste incineration to generate electricity and exported to the ECPG. According to the statistic data from local government, the daily generated MSW amount in the service area to be dumped was much more than the project's treatment capacity 1,200 tons in 2010 and keeps increasing annually. Therefore, there is no MSW source constraint to the project.

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[5] http://www.gov.cn/gongbao/content/2002/content_61480.htm

[6] http://cwera.cma.gov.cn/upload/b_3_left_02.jpg

[7] http://www.nengyuan.net/baike/zhishi/AH52AB3.html
Xu Yongjin, Chen Shuming. Discussing the development of straw (biomass)-fired generation in China.

[8] http://www.chinamining.com.cn/report/databank/files/energy_sources/m2-5-22.jpg

[9] http://www.cae.cn/cn/meitibaodao/meitizonghexinxi/20101220/cae10024.html

Alternative P6 is to provide the same amount of electricity by the ECPG which is dominated by thermal power. The fuel consumption for electric power generation on the ECPG is shown in Annex 3. The fuels consumed by the ECPG are conventional types and are available in abundance in the host country and there is no supply constraint.

In a word, there is no supply constraint for both alternative P1 and P6.

Step 3: Step 2 and/or Step 3 of the latest approved version of the "Tool for demonstration and assessment of additionality" shall be used to assess which of these alternatives should be excluded from further consideration (e.g. alternatives facing prohibitive barriers or those clearly economically unattractive).

Based on the analysis illustrated in Step 1 and Step 2 above, Alternatives **M1**, **M3**, **P1** and **P6** are consistent with mandatory laws and regulations.

The combination of alternative **M1** and **P1** is the project activity, not undertaken as a CDM project.

- **M1**: The project activity, incineration of waste, not implemented as a CDM project.
- **P1**: Power generated from combustion heat from the waste incinerators, not undertaken as a CDM project activity.

Without CDM revenue taken into account, the IRR of total investment of the project, a combination of Alternative M1 and Alternative P1, is 5.27% which is lower than the benchmark IRR 8%, with less economical attraction for project investors (Refer to section B.5 of the PDD for details). Consequently, the alternative M1 and P1 cannot be a realistic and credible baseline alternative.

The combination of alternative **M3** and **P6** is the current situation for MSW treatment and electricity supply.

- **M3**: Disposal of the waste on a landfill without the capture of landfill gas.
- **P6**: Existing and/or new grid-connected power plants.

It does not need any additional investment or activities and therefore is the only realistic and credible baseline scenario.

Step 4: Where more than one credible and plausible alternative remains, project participants shall, as a conservative assumption, use the alternative baseline scenario that results in the lowest baseline emissions as the most likely baseline scenario. The least emission alternative will be identified for each component of the baseline scenario. In assessing these scenarios, any regulatory or contractual requirements should be taken into consideration.

Only one credible and plausible alternative remains which is the combination of alternative **M3** and **P6**.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality):

The following steps from the *Tool for the Demonstration and Assessment of Additionality (Version 06.0.0)* are taken to demonstrate the additionality of the project.

Considering the unattractive financial index seriously, the project owner decided to apply for CDM and provided the Prior Consideration CDM Form to the DNA of China (NDRC) and EB within 6 months after the start date.

Table B.2 the timeline of the project

Time	Events
21st Jan. 2009	Signed the Build-Operate-Transfer (BOT) Agreement[10]
Aug. 2009	The EIA completed
30th Sep. 2009	The EIA got approved
Dec. 2009	The FSR completed
03rd Feb. 2010	The FSR got approved
15th Feb.2010	The project owner decided to apply for CDM assistance considering the unattractive financial index
20th Mar. 2010	**Signed the Equipment Purchase Contract (the start date of the project)**
04th Jun. 2010	Signed the Installation Contract
18th Jun. 2010	Submitted the CDM Consideration Notification to NDRC (China DNA)
20th Jun. 2010	Submitted the CDM Consideration Notification to UNFCCC secretariat
12th Jul. 2010	The CDM prior consideration form confirmed by the NDRC
26th Jul. 2010	The UNFCCC secretariat confirmed the CDM prior consideration form
05th Aug. 2010	Signed the Construction Contract
09th Oct. 2010	Signed ERPA
16th Nov. 2010	Signed the Bank Loan Contract
22rd Mar. 2011	Got the Chinese LoA
15th Jul. 2011	Got the UK's LoA
12ed Sep. 2011	Signed the Power Purchase Agreement(PPA)
Oct. 2011	Commission

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

Define realistic and credible alternatives to the project activity(s) through the following Sub-steps:

Sub-step 1a: Define alternatives to the project activity:

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[10] As per the latest Glossary of CDM terms (version 06), the start date of a CDM project activity is the earliest date at which either the implementation or construction or real action of a project activity begins. Regarding to the signed the BOT Agreement, it is just one of the indispensable documents as FSR and EIA Approval in line with the Chinese Regulation "Regulation on the BOT investment in the utilities sector" issued by the Ministry of Construction of China on 19th Mar. 2004, thus signed the BOT Agreement date cannot considered as the start date as per the Glossary of CDM terms.
More information can be obtained at: http://cdm.unfccc.int/Reference/Guidclarif/glos_CDM.pdf

More details about the possible alternatives respectively for disposal of fresh MSW, the power generation in section B.4.

Sub-step 1b: Consistency with mandatory laws and regulations:

Based on the analysis on B.4, the project undertaken without being registered as a CDM project and other realistic and credible alternative scenario are the combinations showing as below:

Scenario	**Alternative**		**Description**
	Waste	**Power**	
1	M1	P1	The project (MSW treated by incineration, while the power delivered to the ECPG) not implemented as a CDM project
2	M3	P6	The disposal of the waste in a landfill site without capturing landfill gas. The electricity is obtained from the ECPG.

For the alternative scenario combinations including disposal of fresh waste and the power generation, the analysis on the consistency of all the alternatives with mandatory laws and regulations as follows:

Scenario 1 represented the project, which is MSW incineration with power generation, which is in line with applicable laws and regulations.

Scenario 2 is in compliance with applicable laws and regulations, where fresh waste will be disposed in the landfill, the equivalent electricity generated by the project will be supplied by ECPG.

Step 2: Investment analysis

Determine whether the project activity is financially attractive or economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).To conduct the investment analysis, use the following Sub-steps:

Sub-step 2a: Determine appropriate analysis method

The "*Tool for the Demonstration and Assessment of Additionality (Version 06.0.0)"* suggests three analysis methods which are:

- (Option I) Simple Cost Analysis;
- (Option II) Investment Comparison Analysis;
- (Option III) Benchmark Analysis;

The combination of scenario 1 and scenario 2 will generate financial benefits from MSW tipping fee and power sales, so Option I – Simple Cost Analysis is not applicable.

Option II-Investment Comparison Analysis method is only applicable to projects whose alternatives are similar investment projects. The scenario 2 is not an investment project. Therefore Option II- Investment Comparison Analysis is not appropriate.

Due to Option I and Option II excluded, the project will apply **Option III – Benchmark Analysis** comparing the project IRR of total investment with the benchmark IRR of total investment applicable to

sector in China.

Sub-step 2b: Option III. Apply benchmark analysis

According to the *Interim Rules on Economic Assessment of Electric Engineering Retrofit Projects*, issued by Operation Department of Power Generation and Transmission, State Power Corporation in 9th Oct. 2002, the financial benchmark IRR of total investment applicable to the power industry in China is 8% (post tax). The project is a power generation project, therefore the benchmark 8% is applicable to the project.

Sub-step 2c: Calculation and comparison of financial indicators

The following parameters and values are applied for the calculation and comparison of the project financial indicator-IRR with and without CER revenue.

Table B.3 Parameters to determine the project IRR

Item	Value	Unit	Data Source
Annual MSW Treatment Amount	399.6	Thousand tons	FSR
Installed generator capacity	24	MW	FSR
Construction Period	2	Years	FSR
Operation Period	25[11]	Years	FSR
Electricity exported to ECPG	107,500[12]	MWh	FSR
Total investment	429.97[13]	Million CNY	FSR
Average annual O&M costs	53.92	Million CNY	FSR

[11] The project is a BOT (Build-Operate-Transfer) project, according to the BOT agreement signed between the project developer and the local government, the effective period is 27 years including two years' construction period. After the 25 years' operation period, the project will be transferred to the local government for free. The BOT Agreement has been provided to the DOE.

[12] The power generation estimation was based on the boilers' steam evaporation rate, steam consumption rate of turbine and the annual operation hours.
According to the FSR, the single boiler's steam evaporation rate at the design working condition is 43.5t/h, there are two boilers and the total steam evaporation rate is 87.0t/h. The generator's steam consumption rate is 5.26 kg/kWh, thus the hourly power generation amount = 87.0(t/h) ÷ 5.26 kg/kWh ×1,000(kg/t) =16,539.92 kWh/h. The annual operation hours is 8,000, thus the annual electricity generation=16,539.92 kWh/h ×8,000(h) ÷1,000 kWh/MWh =132,319MWh.
The annual total internal consumption amount was based on the estimated installed capacity equipments in FSR. The estimated internal consumption rate is 18.8%. The actual equipments' installed capacity is larger than the FSR value, thus the annual internal electricity consumption amount is conservative. Furthermore, the actual operation data of the other MSW incineration plants operated by the same project owner has been provided. These plants applied similar technology, it could be found that the actual internal consumption rate is around 19% which confirmed the estimation in the FSR is reasonable. The FSR and the actual equipments list have been provided.

[13] The total contract volume for equipment purchasing, installation and Construction is 360.23 million CNY which account for about 98.5% of the expected total construction investment of FSR (sum of the equipment purchase, installation and construction). The relevant contracts mentioned above have been provided to the DOE.

Electricity tariff (Including Tax)	0.5463[14]	CNY/KWh	FSR/BOT Agreement
Tipping fee	73.80[12]	CNY/ton MSW	FSR/BOT Agreement
Value Added Tax	17[15]	%	FSR/VAT Law
Income Tax	25[16]	%	FSR/Income Law
Urban Maintenance and Construction Tax	7[17]	%	FSR/National Regulation
Educational Sur-charge Tax	3[18]	%	FSR/National Regulation
Residual Rate	0[19]	%	FSR

The result of the financial analysis for the project is shown in the table below, with and without CERs taken into account. The calculated IRR value of the project without CERs would be 5.27%, which is far below the financial benchmark 8%. Thus without CERs revenue, the Project will face substantially financial hurdles and cannot be implemented.

After taking CERs revenue into account, the project's IRR of total investment can reach 8.22%, above the benchmark of 8%. Therefore, the Project is feasible and can be implemented.

Table B.4 Financial analysis results of the project

IRR	**%**
Without CERs	5.27

[14] According to the BOT agreement signed with local government, which is available when the investment decision was made, the Power Tariff (0.5463 CNY/kWh) and Tipping Fee (73.80 CNY/ton) was defined and will be constant in the operation period.

[15] According to the national financial regulation '*Notice on the VAT tax of comprehensive utilization products*' published by Ministry of Finance and State Taxation Administration on 9th Dec. 2008, the VAT imposed for electricity produced by MSW will be 100% refund. The VAT was not included in the cash flow for IRR calculation.
Data Source: http://www.chinatax.gov.cn/n8136506/n8136593/n8137537/n8138502/8714515.html
According to the national financial regulation '*Notice on the VAT Tax Regulation Adjustment*' published by Ministry of Finance and State Taxation Administration on 19th Dec. 2008, the input VAT due to equipment purchase will be included in the VAT tax calculation.
Data Source: http://www.chinatax.gov.cn/n8136506/n8136593/n8137537/n8138502/8745403.html

[16] According to the national regulation '*Income Tax Law of P.R. China*' published by State Council on 16th Mar. 2007, the income tax rate is 25%.
Data Source: http://www.js-n-tax.gov.cn/Page/StatuteDetail.aspx?StatuteID=7488

[17] The project locates at urban area, the Urban Maintenance and Construction Tax rate is 7% according to the national regulation'*Regulation on the Urban Maintenance and Construction Tax of P.R. China*' published by State Council on 8th Feb. 1985.
Data source: http://www.gov.cn/banshi/2005-08/19/content_24817.htm

[18] The Educational Sur-charge Tax rate is 3% according to the national regulation '*Regulation on the Education Sur-charge Tax of P.R. China*' published by State Council on 20th Aug. 2005.
Data Source: http://www.gov.cn/zwgk/2005-09/27/content_70440.htm

[19] Due to the project will be transferred to the local government freely, the residual rate is 0 which also in line with the relevant regulation.
Data Source: http://www.chinatax.gov.cn/n8136506/n8136563/n8136874/n8137366/9742419.html

With CERs	8.22

Sub-step 2d: Sensitivity analysis

The sensitivity analysis shall show whether the conclusion regarding the financial attractiveness is robust to reasonable variations. For the Project, five parameters were selected as sensitive factors:

1) Static investment
2) O&M Cost
3) Electricity tariff
4) Electricity output
5) Tipping fee

The result of the sensitivity analysis is shown in Table B.5 and Figure B.2.

Table B.5 Sensitivity Analysis of the project

Variation	-10%	-5%	0%	5%	10%
Static Investment	6.34%	5.78%	5.27%	4.80%	4.36%
O&M Cost	6.44%	5.87%	5.27%	4.65%	3.98%
Electricity Tariff	3.86%	4.60%	5.27%	5.91%	6.53%
Electricity Output	3.86%	4.60%	5.27%	5.91%	6.53%
Tipping Fee	4.59%	4.94%	5.27%	5.60%	5.93%

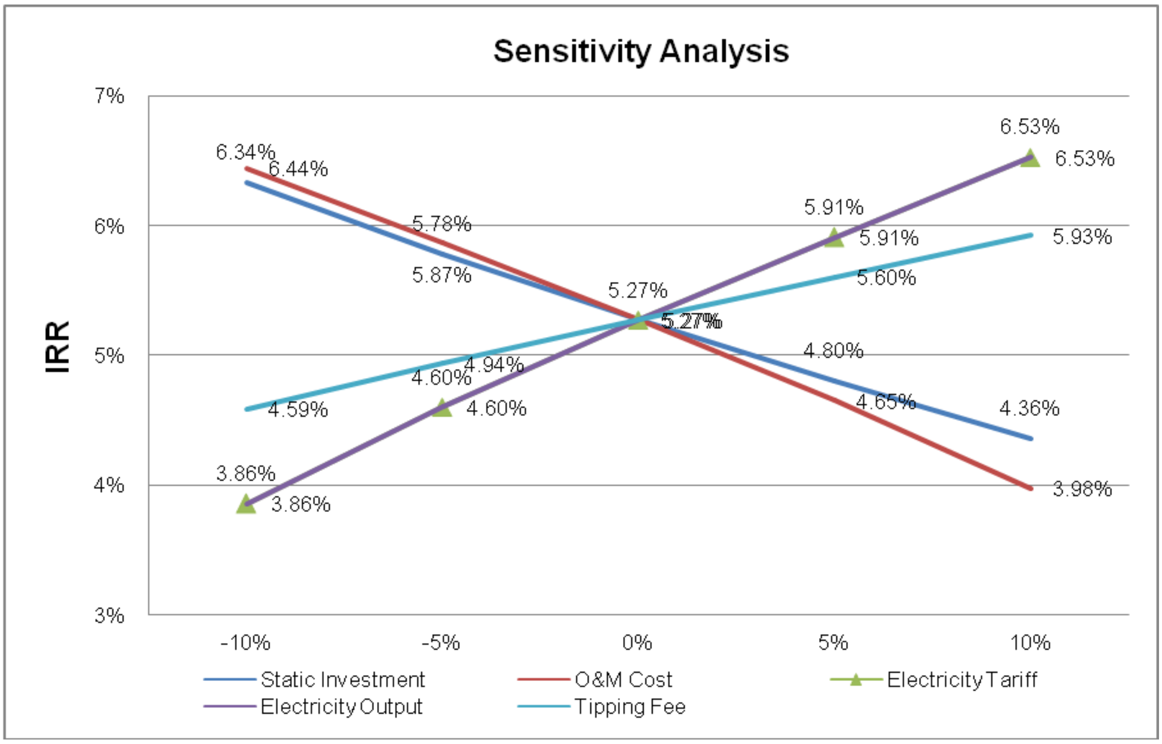

Figure B.2 Sensitivity Analysis of the project

As shown in the sensitivity analysis, even the above five factors reaches -10% or +10%, the project IRR could not reach the benchmark (8%). Therefore it is concluded that the Project is unlikely to be financial attractive.

Furthermore, the project IRR would reach the benchmark 8% if one of the following conditions were achieved:

Table B.6 Critical point when the Project IRR equal to the Benchmark IRR

Variation	Critical Point (%)
Static Investment	-22.83
O&M Cost	-24.25
Electricity Tariff	22.56
Electricity Output	22.56
Tipping Fee	44.11

However, none of these conditions can be achieved due to the following reasons:

1) Regarding the Static Investment

The parameters adopted from the FSR that finalized by the qualified third party and approved by Zhejiang Provincial Development and Reform Commission. The fixed assets investment estimated in the FSR is in line with national and local standards on engineering, construction and equipments. The actual contract price accounts for about 98.5% of the estimation of the FSR. Furthermore, according to the statistics published by the National Bureau of Statistics of China, the *Price Indices of Investment in Fixed Asset* [20] kept increasing since 2000, in spite of the global crisis influence, the indices only decrease 2.4% in 2009 which is the lowest value since 2000. Thus it is impossible that the static Investment decrease as much as 22.83%.

2) Regarding the O&M cost

According to the statistics published by the National Bureau of Statistics of China, the *Purchasing Price Indices for Raw Materials, Fuels and Power* raised 6% in 2006, 4.4% in 2007, and 10.5% in 2008[21]. That shows the upward tendency of the price of the raw materials obviously. And the amount of the raw materials consuming could be cross checked with the similar operating projects of the PP, which shows the consumptions of raw materials estimated in the FSR is reasonable and it is unlikely to decrease greatly during operation period.

Also according to the National Bureau of Statistics of China, the *Average Wage of Staff and Workers and Related Indices*[22], increased 14.4% in 2006, 20.4% in 2007 and 16.5% in 2008, which indicates the salary is keeping increase.
In sum, it seems unlikely that the O&M cost would decrease as much as 24.25%.

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[20] http://www.stats.gov.cn/tjgb/

[21] http://www.stats.gov.cn/tjsj/ndsj/2009/html/I0815e.htm

[22] http://www.stats.gov.cn/tjsj/ndsj/2009/html/E0422e.htm

3) Regarding the electricity tariff

Regarding the electricity tariff, the electricity tariff in the FSR was derived from the BOT Agreement. The project owner has signed the BOT Agreement with the local government to ensure purchasing all the electricity generated by the project on the basis of a long term fixed tariff. According to the BOT Agreement signed with local government, the electricity tariff of the project remain unchangeable during the operation period, the fixed tariff in BOT Agreement was also consistent with the PPA signed with local power grid company, so it's reasonable to considering the tariff would not increase as much as 22.56%.

4) Regarding the electricity output

The annual average electricity exported to the grid is mainly influenced by (a) MSW treatment amount, (b) the average MSW calorific value of each year and (c) Gross electricity efficiency, the plant consumption rate.

(a) As the annual maximum MSW treatment amount is strictly limited by of equipments' specifications, it is not technically feasible to increase the annual MSW treatment amount by 22.56%.

(b) The calorific value of the waste may increase, but is unlikely to increase to the extent to which power generation is 22.56% higher over the entire crediting period. According to the '*Study on method of estimating power generation during operation for waste-incineration power generation project*', published in Heilongjiang Electric Power in April 2008, the calorific value of waste is expected to rise by between 1% and 2% each year. This can also be substantiated from data showing that the annual average increase of MSW calorific values in Shanghai was about 1.6%[23] (during the period 1993-2008).

(c) As mentioned in the Sub-step 2c, the electricity generation amount and self electricity consumption amount was estimated based on the equipments' specifications and designing system, which are unlikely to be fluctuated significantly. Therefore, a significant increase by 22.56% in annual net electricity exported to the grid over all of the project lifespan is unlikely.

5) Regarding the tipping fee

According to the BOT Agreement, the MSW tipping fee can be adjust only facing force majeure events like significant inflation, operational cost greatly increase due to the policy adjustment, bank loan interest rate greatly increase and tariff lower than the expectation. It's reasonable to considering the MSW tipping fee would not to increase as much as 44.11% without other significant fluctuation of project cost.

In conclusion, without the consideration of the revenue from CERs, the project activities lacks of commercial attraction is evidenced, so the specific project is in shortage of commercial attraction.

Outcome of Step 2:

Scenario 2 is the realistic and credible baseline alternatives.

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[23] Methodology for allocating Municipal Solid Waste to biogenic and non-biogenic energy, May 2007, Energy Information Administration. Data Source: http://www.eia.gov/cneaf/solar.renewables/page/mswaste/msw.pdf

Step 3: Barrier analysis

Not applicable.

Step 4: Common practice analysis

As per *Tool for the Demonstration and Assessment of Additionality*, projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory frame-work, investment climate, access to technology, access to financing, etc. According to the *Tool for the Demonstration and Assessment of Additionality*, common practice analysis is presented through the following 4 steps.

Step 1: Calculate applicable output range as +/-50% of the design output or capacity of the proposed project activity.

As a MSW incineration project, the daily MSW treatment amount is chosen as an appropriate proxy for 'similar scale'. The capacity of daily MSW treatment of Linjiang Erqi project is 1,200 tons. Based on this indicator, MSW incineration projects with a daily treatment capacity between 600 and 1,800 tons is considered as similar size.

Step 2: In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project. Note their number N_{all}.

China is a very large country in which the economic development level, the industrial structure, the fundamental infrastructure, development strategy and the policy framework is different. As such a number of key economic factors vary from province to province. These include tariff rates of products, the cost of materials, the cost of electricity and other utilities such as water, the cost of labor and services and the types of loan that can be obtained. These factors all vary among provinces. Therefore, Zhejiang Province is selected as the region for common practice.

Projects located in Zhejiang province with the daily treatment capacity of 600 to 1800 tons, have started commercial operation before the start date of the project, are selected for further analysis. With the above mentioned criteria, a number of waste incineration projects under construction registered CDM project activities or projects activities undergoing validation are therefore not included in the table.

The project's start date is 20th Mar. 2010, thus the MSW incineration projects started operation before the start date of the project are selected for analysis. The table below shows the projects with a similar scale that have already been commissioned.

Table B.7 Similar Scaled Incineration Plant in Zhejiang Province

Project	MSW Treatment capacity (t/d)	Incinerator Type	Commission Year	Project developer
Xiaoshan Jinjiang WtE plant[24]	700	CFB	2007	Private

[24] http://www.cn-hw.net/html/27/201108/29102_2.html

Yuhang Jinjiang WtE plant[25]	800	CFB	2002	Private
Fuchunjiang WtE plant[26]	800	CFB (cogeneration)	2006	State-owned
Pinghu WtE plant[27]	760[28]	CFB	2009	Private
Buyun WtE plant[29]	700	CFB	2004	Private
YiwuWtE plant[30]	1,200	CFB	2003	Private
JinhuaWtE plant[31]	800	CFB (cogeneration)	2006	State-owned
FenglinWtE plant[32]	1,050	Grate[33]	2001	State-owned
Zhenhai WtE plant[34]	800	CFB	2006	State-owned
Shaoxing WtE plant[35]	800	CFB	2001	Private
Wenling WtE plant [36]	700	Grate	2009	State-owned
Linjiang Yiqi WtE plant[37]	600	Grate	2003	Private
Yongqiang WtE plant[38]	1,000	Grate	2005	Private

From the above table, the parameter N_{all} is 13.

Step 3: Within plants identified in Step 2, identify those that apply technologies different that the technology applied in the proposed project activity. Note their number N_{diff}.

The Circulating Fluidized Bed Combustor (CFB) requires co-firing with fossil fuels such as coal, the main fuel for this type of projects is not only MSW but also coal. While the Linjiang Erqi project utilized grate type incinerator that no coal would be co-fired and the main fuel for grate type incinerator is only

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25 http://www.jinjiang-group.com/company/hb1.htm

26 http://www.zhefuet.com/chinese/about.asp?tid=9&ClassName=富热简介

27 http://www.caepi.org.cn/industry-news/18424.shtml

28 The daily MSW Treatment amount includes 160 t/d rape straw.

29 http://www.jinjiang-group.com/news/news_display.asp?id=1405

30 http://www.eptchina.cn/html/thesis/2009-2/6/092622252634732_2.html

31 Refer to the Footnote 31.

32 http://www.nbge.cn/about.asp
http://www.caepi.org.cn/solid-waste-to-handle/2385.shtml
http://www.nbuci.com/index/About.aspx

33 The incinerators and turbine generators were imported from Germany.

34 http://www.nbcg.gov.cn/view_ebook.aspx?id=1165212423&catid=29

35 http://www.cn-hw.net/html/27/200807/7137.html

36 http://jjtzzx.cn/newarticle.asp?id=3092

37 http://www.wzxzzfj.gov.cn/art/2011/4/2/art_7056_68416.html

38 Refer to the footnote 38.

MSW. According to the *Tool for the Demonstration and Assessment of Additionality* different fuel is defined as criteria for different technology, thus the CFB type incinerator is regarded as different technology.

As shown in Table B.7, there are four MSW incineration projects in Zhejiang Province that apply mechanical grate incinerator with similar MSW treatment capacity, two of which, the project developers are state-owned company. In China, the state owned companies are easy to access the financial support from the bank and has favorable investment climate. Considering the project owner is a private company, thus the state-owned projects are considered to have different investment climate.

Taking into account the above mentioned reasons, there only two projects left. While through further study, there are essential distinctions between the Linjiang Erqi project and the remaining projects which are demonstrated below:

1. Linjiang Yiqi WtE plant

The Linjiang Yiqi WtE project (Hereinafter as the "Linjiang Yiqi") started operation in Apr. 2003, the daily MSW treatment amount is 600 tons with two 6MW steam turbine generators which is the first MSW incineration project using domestic equipment in China, which was obtained subsidy from government and regarded as a pioneer project listed in the "*State Plan for High-Tech Research and Development (863 program)*" by the Ministry of Science and Technology. The Linjiang Erqi Project developed only by PO without any capital assistance from other parties. Obviously, the Linjiang Yiqi project has more favorable financial environment than the project.

2. Yongqiang WtE plant

The project started construction in 2004 and started operation in June 2005. The project was listed as one of the "*National Special fund for technical renovation programs of the State*" by the NDRC which means it will be assisted by the fund raised from government Bond. Obviously, the project has more favorable financial environment than the project.

In conclusion, the projects listed in the table B.7 applied different technology compare with Linjiang Erqi project according to the criteria provided by the *Tool for the Demonstration and Assessment of Additionality*, the parameter N_{diff} is 13.

Step 4: Calculated factor $F=1-N_{diff}/N_{all}$ representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity.

Based on the above analysis, the parameter *F* representing the share of plants using technology similar to the technology used in the project activity in all plants that deliver the same output or capacity as the project activity, which is calculated by $1-N_{diff}/N_{all} = 0$.

Since F is less than 0.2, it can be concluded that the project is not a common practice and the project is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

The emission reductions will be calculated in accordance with the steps in AM0025 (Version 12.0):

1. Project emissions (PE_y)

$$PE_y = PE_{elec,y} + PE_{fuel,on\text{-}site,y} + PE_{c,y} + PE_{a,y} + PE_{g,y} + PE_{r,y} + PE_{i,y} + PE_{w,y} + PE_{co\text{-}firing,y} \quad (1)$$

Where:

PE_y	The project emissions during the year *y* (tCO_2e);
$PE_{elec,y}$	The emissions from electricity consumption on-site due to the project activity in year *y* (tCO_2e);
$PE_{fuel,on\text{-}site,y}$	The emissions on-site due to fuel consumption in year *y* (tCO_2e);
$PE_{c,y}$	The emissions during the composting process in year *y* (tCO_2e);
$PE_{a,y}$	The emissions from the anaerobic digestion process in year *y* (tCO_2e);
$PE_{g,y}$	The emissions from the gasification process in year *y* (tCO_2e);
$PE_{r,y}$	The emissions from the combustion of RDF/stabilized biomass in year *y* (tCO_2e);
$PE_{i,y}$	The emissions from MSW incineration in year *y* (tCO_2e);
$PE_{w,y}$	The emissions from waste water treatment in year *y* (tCO_2e);
$PE_{co\text{-}firing,y}$	The emission from thermal energy generation/electricity generation from fossil fuel consumption during co-firing in year *y* (tCO_2e);

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

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

Where:

$PE_{elec,y}$	The emissions from electricity consumption on-site due to the project activity in year *y* (tCO_2e);
$EG_{PJ,FF,y}$	The amount of electricity consumed from the grid as a result of the project activity, measured using an electricity meter (MWh);
CEF_{elec}	The carbon emissions factor for electricity generation in the project activity (tCO_2/MWh);

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

The 0# light diesel oil will be used as auxiliary fuel. According to the project FSR, the designed annual consumption of light diesel oil is approximately 200 t/a.

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

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

Where:

$PE_{fuel,on\text{-}site,y}$	The emissions on-site due to fuel consumption in year *y* (tCO_2e);
$F_{cons,y}$	The fuel consumption on site in year *y* (kg);
NCV_{fuel}	The net caloric value of fuel (MJ/kg);
EF_{fuel}	The CO_2 emissions factor of the fuel (tCO_2/MJ);

(3) Emissions during the composting process ($PE_{c,y}$)

The project does not involve the composting process,, so $PE_{c,y}$ **=0** tCO_2e.

(4) Emissions from the anaerobic digestion process ($PE_{a,y}$)

The project does not involve the anaerobic digestion, so $PE_{a,y}$ **=0** tCO_2e.

(5) Emissions from the gasification process ($PE_{g,y}$)

The project does not involve the gasification process, so $PE_{g,y}$ **=0** tCO_2e.

(6) Emissions from the combustion of RDF/stabilized biomass ($PE_{r,y}$)

The project does not involve the combustion of RDF/stabilized biomass, so $PE_{r,y}$ **=0** tCO_2e.

(7) Emissions from MSW incineration ($PE_{i,y}$)

$$PE_{i,y} = PE_{i,f,y} + PE_{i,s,y} \quad (4)$$

Where:

$PE_{i,f,y}$	The fossil-based waste CO_2 emissions from MSW incineration in year *y* (tCO_2e);
$PE_{i,s,y}$	The N_2O and CH_4 emissions from the final stacks from MSW incineration in year *y* (tCO_2e);

(7-1) Emissions from fossil-based waste ($PE_{i,f,y}$)

The CO_2 emissions are calculated based on the monitored amount of fossil-based waste fed into the MSW incineration plant, fossil-derived carbon content and combustion efficiency.

$$PE_{i,f,y} = A_{MSW,y} \times FCF_{MSW} \times EF \times 44/12 \quad (5\text{-}1)$$

Where:

$A_{MSW,y}$	The amount of MSW fed into the MSW incineration plant (t/yr);
FCF_{MSW}	The fraction of fossil carbon in MSW (fraction);
EF	The combustion efficiency for waste (fraction);
$44/12$	The conversion factor (tCO_2/tC);

(7-2) Emissions from MSW incineration ($PE_{i,s,y}$)

$$PE_{i,s,y} = Q_{biomass,y} \times (EF_{N2O} \times GWP_{N2O} + EF_{CH4} \times GWP_{CH4}) \times 10^{-3} \times CF \quad (5\text{-}2)$$

Where:

$Q_{biomass,y}$	The amount of waste incinerated in year *y* (t/yr);
EF_{N2O}	The aggregate N_2O emission factor for waste combustion (kgN_2O/t of waste);
GWP_{N2O}	The Global Warming Potential of nitrous oxide (tCO_2/tN_2O);
EF_{CH4}	The aggregate CH_4 emission factor for waste combustion ($kgCH_4$/t of waste);
GWP_{CH4}	The Global Warming Potential of methane (tCO_2/tCH_4);
CF	The conservativeness factor;

The level of the conservativeness factor ***CF*** depends on the uncertainty range of the estimate for the IPCC default N_2O and CH_4 emission factor. Refer to the Table B.8 for the value of the conservativeness factor CF.

Table B.8 Conservativeness factors

Estimated uncertainty range (%)	Assigned uncertainty band (%)	Conservativeness factor where higher values are more conservative
Less than or equal to 10	7	1.02
Greater than 10 and less than or equal to 30	20	1.06
Greater than 30 and less than or equal to 50	40	1.12
Greater than 50 and less than or equal to 100	75	1.21
Greater than 100	150	1.37

Due to there is no information on the uncertainty range and the conservativeness factor was used for the project emission calculation, thus the maximum conservative factor **1.37** will be utilized for calculation.

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

According to the FSR, the leachate from the waste bunker will be treated firstly in an anaerobic digester, after aerobic treatment, finally the treated water will be discharged into the municipal wastewater treatment system for further treatment. The CH_4 produced from the waste water anaerobic treatment process will be flared in the enclosed incinerator. Therefore, the emissions from the anaerobic leachate treatment process will be account for.

According to the equation in the methodology, the $PE_{CH4,w,y}$ could be calculated as follow:

$$PE_{CH4,w,y} = Q_{COD,y} \times P_{COD,y} \times B_0 \times MCF_P \qquad (6)$$

Where:

$PE_{CH4,w,y}$	Mass flow rate of methane in the residual gas in year *y* (tCH_4/y);
$Q_{COD,y}$	Amount of wastewater treated anaerobically or released untreated from the project activity in year *y* (m^3/yr);
$P_{COD,y}$	Chemical Oxygen Demand (COD) of wastewater ($tCOD/m^3$);
B_0	Maximum methane producing capacity ($tCH_4/tCOD$);
MCF_p	Methane conversion factor (fraction).

Since the methane generated would be fed into the incinerator for destruction, the 'Tool to determine project emissions from flaring gases containing methane' is used to estimate methane emissions. In this case, $PE_{w,y}$ will be calculated ex-ante as per equation (7). In order to estimate the emissions from flaring, the flare efficiency of 90% is applied for ex-ante calculation as per the 'Tool to determine project emissions from flaring gases containing methane'.

$$PE_{w,y} = PE_{CH4,w,y} \times (1-\eta_{flare}) \times GWP_{CH4} \qquad (7)$$

Where:

$PE_{w,y}$	Emissions from wastewater treatment in year y (tCO_2e);
η_{flare}	Flare efficiency;
GWP_{CH4}	Global Warming Potential of methane valid for the commitment period (tCO_2/tCH_4);

$PE_{w,y}$ will be monitored ex post during the crediting period as per equation (8) as follows:

$$PE_{W,y} = PE_{flare,y} = \sum_{h=1}^{8760} TM_{RG,h} \times (1 - \eta_{flare,h}) \times GWP_{CH4} \quad (8)$$

Where:

$TM_{RG,h}$	Mass flow rate of methane in the biogas generated from wastewater treatment system in the hour h ($kgCH_4/h$);
$\eta_{flare,h}$	Flare efficiency in hour *h*;

During the monitoring period, $TM_{RG,h}$ is calculated by following equation:

$$TM_{RG,h} = FV_{RG,h} \times fv_{CH4,RG,h} \times \rho_{CH4,n} \quad (9)$$

Where,

$FV_{RG,h}$	Volumetric flow rate of the biogas in at normal conditions in hour *h* (m^3/h);
$fv_{CH4,RG,h}$	Volumetric fraction of methane in the biogas in hour *h*;
$\rho_{CH4,n}$	Density of methane at normal conditions (0.716) (kg/m^3);

Due to the waste water from the MSW bunker and treatment process is treated in the enclosed incinerator , and any discharged air will be used as combustion air. Thus the CH_4 is regarded as treated with enclosed flares. In case of enclosed flares and use of the default value for the flare efficiency, the flare efficiency in the ($\eta_{flare,h}$) is:

- 0% if the temperature in the exhaust gas of the flare ($T_{flare,h}$) is below 500°C for more than 20 minutes during the hour *h*.
- 50%, if the temperature in the exhaust gas of the flare ($T_{flare,h}$) is above 500°C for more than 40 minutes during the hour h, but the manufacturer's specifications on proper operation of the flare are not met at any point in time during the hour *h*.
- 90%, if the temperature in the exhaust gas of the flare ($T_{flare,h}$) is above 500°C for more than 40 minutes during the hour h and the manufacturer's specifications on proper operation of the flare are met continuously during the hour *h*.

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

The Project does not co-fire fossil fuel for energy/electricity in the incineration process, so $PE_{co-firing,y} = 0$ **tCO_2e**.

2. Baseline emissions (BE_y)

Baseline emissions are calculated as follows:

$$BE_y = (MB_y - MD_{req,y}) + BE_{EN,y} \quad (10)$$

Where:

BE_y	Baseline emissions in the year *y* (tCO_2e);
MB_y	Methane produced in the landfill in the absence of the Project activity in the year *y* (tCO_2e);
$MD_{req,y}$	Methane that would be destroyed in the absence of the Project activity in the year *y*

	(tCO_2e);
$\boldsymbol{BE_{EN,y}}$	Baseline emissions from generation of energy displaced by the Project activity in the year *y* (tCO_2e);

(1) Methane that would be destroyed in the absence of the project activity in year *y* ($MD_{reg,y}$)

$$MD_{reg,y} = MB_y \times AF \quad (11)$$

Where:

$\boldsymbol{MD_{reg,y}}$	Methane that would be destroyed in the absence of the Project activity in the year *y* (tCO_2e);
$\boldsymbol{MB_y}$	Methane produced in the landfill in the absence of the Project activity in the year *y* (tCO_2e);
AF	Adjustment Factor for MB_y (%);

The parameter *AF* shall be estimated as follows:

- In cases where a specific system for collection and destruction of methane is mandated by regulatory or contractual requirements, the ratio between the destruction efficiency of that system and the destruction efficiency of the system used in the project activity shall be used;
- In cases where a specific percentage of the “generated” amount of methane is to be collected and destroyed has been is specified in the contract or mandated by the regulation, this percentage divided by an assumed efficiency for the collection and destruction system used in the project activity shall be used.

The project is none of the cases mentioned above. There is neither contractual requirement for this project nor local or national mandatory regulations for the destruction of a certain amount of methane from a landfill site. Therefore, AF is zero and will be monitoring at renewal of the crediting period.

Rate of compliance

In cases where there are regulations that mandate the use of one of the project activity treatment options and which is not being enforced, the baseline scenario is identified as a gradual improvement of waste management practices to the acceptable technical options expected over a period of time to comply with the MSW Management Rules. The adjusted baseline emissions ($BE_{y,a}$) are calculated as follows:

$$BE_{y,a} = BE_y \times (1 - RATE^{Compliance}{}_y) \quad (12)$$

Where:

$\boldsymbol{BE_y}$	The CO_2-equivalent emissions as determined from equation (14);
$RATE^{Compliance}{}_y$	The state-level compliance rate of the MSW Management Rules in that year *y*. The compliance rate shall be lower than 50%; if it exceeds 50% the project activity shall receive no further credit;

The compliance ratio $RATE^{Compliance}{}_y$ shall be monitored *ex post* based on the official reports for instance annual reports provided by municipal bodies.

There is no local or national mandatory regulations for destruction methane, thus the compliance ratio is zero for the ex-ante calculation.

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

The amount of methane generated each year (MB_y) is calculated as per the latest version of the approved *Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site*, considering the following additional equation:

$$MB_y = BE_{CH4,\,SWDS,\,y} \qquad (13)$$

Where:

MB_y	Methane produced in the landfill in the absence of the Project activity in year *y* (tCO_2e);
$BE_{CH4,SWDS,y}$	Methane generation from the landfill in the absence of the Project activity at year *y* that is methane emissions avoided during the year y from preventing waste disposal at the solid waste disposal site during the period from the start of the project activity to the end of the year *y* (tCO_2e), calculated as per the "*Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site*". The tool estimates methane generation adjusted for, using adjustment factor (*f*) any landfill gas in the baseline that would have been captured and destroyed to comply with relevant regulations or contractual requirements, or to address safety and odor concerns. As this is already accounted for in the baseline emissions calculated, "f" in the tool shall be assigned a value of 0.

$$BE_{CH4,\,SWDS,\,y} = \varphi \times (1-f) \times GWP_{CH4} \times (1-OX) \times \frac{16}{12} \times F \times DOC_f \times MCF \times \sum_{x=1}^{y}\sum_{j} W_{j,x} \times DOC_j \times e^{-k_j \times (y-x)} \times (1-e^{-k_j}) \qquad (14)$$

Where:

φ	Model correction factor to account for model uncertainties (0.9);
f	Fraction of methane captured at the SWDS and flared, combusted or used in another manner (0);
GWP_{CH4}	Global Warming Potential (GWP) of methane, valid for the relevant commitment period(21);
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) (0.5);
DOC_f	Fraction of degradable organic carbon (DOC) that can decompose(0.5);
MCF	Methane correction factor(0.8);
$W_{j,x}$	Amount of organic waste type *j* prevented from disposal in the SWDS in the year *x* (t);
DOC_j	Fraction of degradable organic carbon (by weight) in the waste type *j*;
k_j	Decay rate for the waste type *j*;
j	Waste type category (index);
x	Year during the crediting period: *x* runs from the first year of the first crediting period (x = 1) to the year *y* for which avoided emissions are calculated (x = y);
y	Year for which methane emissions are calculated;

Where different waste types *j* are prevented from disposal, determine the amount of different waste types ($W_{j,x}$) through sampling and calculate the mean from the samples, as follows:

$$W_{j,x} = W_x \times \frac{\sum_{n=1}^{z} p_{n,j,x}}{z} \qquad (15)$$

Where:

W_x	Total amount of organic waste prevented from disposal in year *x* (tons) ;
$P_{n,j,x}$	Weight fraction of the waste type *j* in the sample n collected during the year *x* (fraction);
z	Number of samples collected during the year *x*;

(3) Baseline emissions include CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity, calculated as follows:

$$BE_{EN,y} = BE_{elec,y} + BE_{thermal,y} \qquad (16)$$

Where:

$BE_{EN,y}$	Baseline emissions from generation of energy displaced by the Project activity in year *y* (tCO_2e);
$BE_{elec,y}$	Baseline emissions from electricity generated utilizing the combustion heat from incineration/stabilized biomass co-fired with fossil fuel in the Project activity and exported to the grid (tCO_2e);
$BE_{thermal,y}$	Baseline emissions from thermal energy produced utilizing the combustion heat from incineration/stabilized biomass co-fired with fossil fuel in the Project activity displacing thermal energy from onsite/offsite fossil fuelled boilers (tCO_2e);

The project does not involve utilizing the combustion heat from the MSW incineration displacing thermal energy from on-site/offsite fossil fuelled boilers, thus $BE_{thermal,y}$ **= 0 tCO_2e**.

$$BE_{elec,y} = EG_{d,y} \times CEF_d \qquad (17)$$

Where:

$BE_{elec,y}$	Baseline emissions from electricity generated utilizing the combustion heat from incineration in the Project activity and exported to the grid (tCO_2e);
$EG_{d,y}$	Amount of electricity generated utilizing the combustion heat from incineration in the Project activity and exported to the grid during the year *y* (MWh);
CEF_d	Carbon emissions factor for the displaced electricity source in the project scenario (tCO_2/MWh);

Determination of CEF_d

In case the generated electricity from the combustion heat from incineration displaces electricity that would have been generated by other power plants in the grid in the baseline, CEF_d should be calculated according to the *"Tool to calculate the emission factor for an electricity system" (Version 02.2.1).*

$$CEF_d = EF_{grid,CM,y} \qquad (18)$$

The methodological tool *"Tool to calculate the emission factor for an electricity system" (Version 02.2.1)* determines the CO_2 emission factor for the displacement of electricity generated by power plants in an electricity system, by calculating the "operating margin" (OM) and "build margin" (BM) as well as the "combined margin" (CM). The operating margin refers to a cohort of power plants that reflect the

existing power plants whose electricity generation would be affected by the proposed CDM project activity. The build margin refers to a cohort of power units that reflect the type of power units whose construction would be affected by the proposed CDM project activity.

The methodological tool *"Tool to calculate the emission factor for an electricity system" (Version 02.2.1)* provides procedures to determine the following parameters:

Table B.9 Descriptions of the Emission Factors

Parameter	Description
$EF_{grid, CM,y}$	Combined margin CO_2 emission factor for grid connected power generation in year *y* (tCO_2/MWh);
$EF_{grid, BM,y}$	Building margin CO_2 emission factor for grid connected power generation in year *y* (tCO_2/MWh);
$EF_{grid, OM,y}$	Operation margin CO_2 emission factor for grid connected power generation in year *y* (tCO_2/MWh);

The following steps are applied to calculate the emission factor for an electricity system:

- Step 1. Identify the relevant electricity systems
- Step 2. Choose whether to include off-grid power plants in the project electricity system (optional)
- Step 3. Select a method to determine the operating margin (OM)
- Step 4. Calculate the operating margin emission factor according to the selected method
- Step 5. Calculate the build margin (BM) emission factor
- Step 6. Calculate the combined margin (CM) emissions factor

Step 1: Identify the relevant electricity systems

Using the boundary definitions of the Chinese DNA, the spatial extent of the project boundary includes the project and all other power plants connected physically to the ECPG. ECPG is defined as the Project electricity system. The grid consists of independent province-level electricity systems including Shanghai, Jiangsu, Zhejiang, Anhui and Fujian province that are physically connected through transmission and distribution lines. In accordance with the tool the ECPG has been selected as the relevant electric power system, the Central China Power Grid (Hereinafter as "CCPG") and Northern China Power Grid (Hereinafter as "NCPG") as the connected electricity system.

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 calculation method publicized by Chinese DNA, the project participant choose option I, only grid power plants are included in the calculation.

Step 3: Select a method to determine the operation margin (OM)

The “*Tool to calculate the emission factor for an electricity system*” offers several options for the calculation of the OM emission factor. Of these, the option (c) - dispatch data analysis cannot be used, because dispatch data, let alone detailed dispatch data, are not available to the public or to the project participants. For the same reason, the option (b) -the simple adjusted OM cannot be used. The option (d) -average OM cannot be used, take into account the non-dispatchable nature of low-cost/must-run resources and as low-cost/must-run resources constitute less than 50% of total grid generation (refer to table B.7 for more details), the ***option (a)-Simple OM*** method is selected as the most appropriate method.

a) Simple OM,
b) Simple adjusted OM, or
c) Dispatch Data Analysis OM, or
d) Average OM.

From 2004 to 2008 in the composition of gross annual power generation for ECPG, the ratio of power generated by nuclear and other renewable-power low cost/compulsory resources is as following:

Table B.10 Ratio of power generated by hydro-power and other low cost/compulsory resources

Year	2004	2005	2006	2007	2008
The ratio of power generated by nuclear and other renewable-power low cost/compulsory resources (%)	9.75	11.40	11.44	10.92	12.32

Data Source: China Electric Power Yearbook 2005~2009

Based on these considerations, the OM has been calculated according to the Simple OM, because low cost/ must run resources account for far less than 50% of the power generation in ECPG in most recent years.

For simple OM, the emission factor can be calculated using either of the two following data vintages:

- Ex-ante option: A 3-year generation weighted average, based on the most recent data available at the time of submission of the CDM-PDD for validation, without requirement to monitor and recalculate the emissions factor during the crediting period, or
- Ex-post option: The year in which the project activity displaces grid electricity, requiring the emission factor to be updated annually during the crediting period. The data which require calculating the emission factor for year y is usually only available later than six months after the end of year y.

The “***ex-ante vintage***” will be employed for OM calculation of the project, without requirement to monitor and recalculate the emissions factor during the crediting period.

Step 4: Calculate the operating margin emission factor according to the selected method

The simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2e/MWh) of all generating power plants/units serving the system, not including low-cost/must-run power/units. It may be calculated:

- (Option A) Based on data on fuel consumption and net electricity generation of each power plant/unit, or
- (Option B) Based on data on the total net electricity generation of all power plants/units serving the

system and the fuel types and total fuel consumption of the project electricity system.

Option A should be preferred and must be used if fuel consumption data is available for each power plant /unit. However, in China, all power grids and power plants/units keep their specific net electricity generation and the fuel consumption data as business secrets, without these data, Option A is not available, thus only ***Option B*** can be used.

The simple OM using Option B is calculated as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \cdot NCV_{i,y} \cdot EF_{CO2,i,y}}{EG_y} \quad \textbf{(G-1)}$$

Where:

$EF_{grid,OMsimple,y}$	Simple operating margin CO_2 emission factor in year y (tCO_2/MWh);
$FC_{i,y}$	Amount of fossil fuel type *i* consumed in the project electricity system in year *y* (mass or volume unit);
$NCV_{i,y}$	Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ/mass or volume unit);
$EF_{co2,i,y}$	CO_2 emission factor of fossil fuel type *i* in year y (tCO_2/GJ);
EG_y	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	All fossil fuel types combusted in power sources in the project electricity system in year *y*;
y	Either the three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex ante option) or the applicable year during monitoring (ex post option), following the guidance on data vintage in step 2;

The Operating Margin emission factors for 2006, 2007 and 2008 are calculated. A 3-year generation-weighted average of the emission factors is calculated as the operating margin emission factor of the baseline, which is calculated ex-ante and will not be renewed in the first crediting period. $EF_{grid, OM, y}$, adopts the calculation process updated by China DNA on 20th Dec. 2010 (refer to Annex 3 for more details). The exact calculation process of $EF_{grid, OM, y}$ can be found from:
http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2550.xls

The Operation Margin Emission Factor of ECPG is **0.8592 tCO_2e/MWh**.

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:

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. This option does not require monitoring the emission factor during the crediting period.

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 latest year for which information is available. For the second crediting period, the build margin emissions 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.

The **Option 1** is chosen to calculate without requirement to monitor and recalculate the emissions factor during the crediting period.

The sample group of power units *m* used to calculate the build margin should be determined as per the following procedure, consistent with the data vintage selected above:

(a) Identify the set of five power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently ($SET_{5\text{-units}}$) and determine their annual electricity generation ($AEG_{SET\text{-}5\text{-units}}$, in MWh);

(b) Determine the annual electricity generation of the project electricity system, excluding power units registered as CDM project activities (AEG_{total}, in MWh). Identify the set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20% of AEG_{total} (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) ($SET_{\geq 20\%}$) and determine their annual electricity generation ($AEG_{SET\text{-}\geq 20\%}$, in MWh);

(c) From $SET_{5\text{-units}}$ and $SET_{\geq 20\%}$ select the set of power units that comprises the larger annual electricity generation (SET_{sample}); Identify the date when the power units in SET_{sample} started to supply electricity to the grid. If none of the power units in SET_{sample} started to supply electricity to the grid more than 10 years ago, then use SET_{sample} to calculate the build margin.

The build margin emissions (BM) factor is the generation-weighted average emission factor (tCO_2e/MWh) of all power units *m* during the most recent year *y* for which power generation data is available, calculated as follow:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \cdot EF_{EL,m,y}}{\sum_m EG_{m,y}} \qquad \textbf{(G-2)}$$

Where:

$EF_{grid,BM,y}$	Build margin CO_2 emission factor in year *y* (tCO_2e/MWh);
$EG_{m,y}$	Net electricity generated and delivered to the grid by power unit *m* in year *y* (MWh);
$EF_{EL,m,y}$	CO_2 emission factor of power unit m in the year *y* (tCO_2e/MWh);
m	Power units included in the build margin;
y	Most recent historical year for which power generation data is available;

In China, EB accepts[39] the following deviation in methodology application:

[39] 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:

1. The group of power plants to be considered for the determination the BM emission factor can't be selected as no plant specific generation data are available. Instead, the capacity addition from one year to another is used as basis for determining the build margin, i.e. the capacity addition over 1 - 3 years, whichever results in a capacity addition that is closest to 20% of total installed capacity.
2. Use proportional weights that correlate to the distribution of installed capacity in place during the selected period above, using plant efficiencies and emission factors of commercially available best practice technology in terms of efficiency. It is suggested to use the efficiency level of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy.

Since there is no way to separate the different generation technology capacities as coal, oil or gas etc from thermal power based on the present statistical data, the following calculating measures will be taken:

- Firstly, according to the energy statistical data of most recent one year, determine the ratio of CO_2 emissions produced by solid, liquid, and gas fuels consumption for power generation;
- Secondly, multiply this ratio 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% installed capacity addition to the grid. The result is the BM emission factor of the grid.

Sub-step a. Calculate the power generation emissions for solid, liquid and gas fuel and each share of total emissions based on the *Energy Balance Table* of the most recent year.

$$\lambda_{Coal,y} = \frac{\sum_{i \in COAL, j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \qquad \textbf{(G-3a)}$$

$$\lambda_{Oil,y} = \frac{\sum_{i \in OIL, j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \qquad \textbf{(G-3b)}$$

$$\lambda_{Gas,y} = \frac{\sum_{i \in GAS, j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \qquad \textbf{(G-3c)}$$

Where:

$F_{i,j,y}$	The amount of fuel *i* (in a mass or volume unit) consumed by power plant/unit *j* in year(s) *y*;
$NCV_{i,y}$	The net calorific value (energy content) of fossil fuel type *i* (coal, oil and gas) in year *y* (GJ/Mass or Volume unit);
$EF_{CO2,i,j,y}$	The CO_2 emission factor of fuel type *i* (coal, oil and gas) in year(s) *y* (tCO_2e/GJ);
Coal*, *Oil* and *Gas	Solid fuel, liquid fuel and gas fuel respectively;

Sub-step b. Calculate emission factor for thermal power of the grid based on the result of Step a. and the

http://cdm.unfccc.int/UserManagement/FileStorage/6POIAMGYOEDOTKW25TA20EHEKPR4DM.
This approach has been applied by several registered CDM projects using methodology ACM0002 so far.

efficiency level of the best technology commercially available in China.

$$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y} \quad \text{(G-4)}$$

Where $EF_{Coal, Adv,y}$, $EF_{Oil, Adv,y}$ and $EF_{Gas, Adv,y}$ refer to the emission factors of efficiency level of the best technology commercially utilized in power generation using coal, oil and gas in China.

Sub-step c. Calculate BM of the grid based on the result of Step b and the share of thermal power of recent 20% capacity additions.

$$EF_{BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \cdot EF_{Thermal} \quad \text{(G-5)}$$

Where:

CAP_{Total}	Total capacity additions(MW);
$CAP_{Thermal}$	Capacity additions of thermal power(MW);

As mentioned above, the build margin emission factor of the baseline is calculated ex-ante and will not be renewed in the first crediting period. $EF_{grid, BM, y}$ adopts the data updated by China DNA on 20th Dec. 2010(Refer to Annex 3 of the PDD for more details). The exact calculation process of $EF_{grid, BM, y}$ can be found at:
http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2551.doc

The published Build Margin Emission Factor is **0.6789 tCO_2e/MWh**.

The data resources for calculating OM and BM are:

- Installed capacity, power generation and the rate of internal electricity consumption of thermal power plants
  Source: *China Electric Power Yearbook* (2005-2009)
- Fuel consumption and net caloric value of thermal power plants
  Source: *China Energy Statistical Yearbook* (2007-2009)
- Carbon emission factor and carbon oxidation factor of each kind of fuel
  Source: *2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy*, Table 1.3 and Table 1.4 of Page 1.21-1.24 in Chapter one.

Step 6: Calculate the combined margin (CM) emissions factor

The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \cdot w_{OM} + EF_{grid,BM,y} \cdot w_{BM} \quad \text{(G-6)}$$

Where:

$EF_{grid,BM,y}$	Build margin CO_2 emission factor in year *y* (tCO_2e/MWh);
$EF_{grid,OM,y}$	Operating margin CO_2 emission factor in year *y* (tCO_2e/MWh);
w_{OM}	Weighting of the operating margin emission factor (%);
w_{BM}	Weighting of build margin emission factor (%);

According to the *2010 Baseline Emission Factors for Regional Power Grids in China* announced by

Department of Climate Change, NDRC(China DNA) on 20th Dec. 2010, the Operating Margin Emission Factor (***$EF_{grid,OM,y}$***) of ECPG is 0.8592 tCO_2e/MWh and the Build Margin Emission Factor (***$EF_{grid,BM,y}$***) is 0.6789 tCO_2e/MWh. The defaults weights value for other than wind and solar power generation projects are used as specified in the "*Tool to calculate the emission factor for an electricity system*" *(Version 02.2.1)* (w_{OM} = 0.5; w_{BM} = 0.5)[40] .

Using values mentioned above, the Combined Margin Emission Factor of ECPG (***$EF_{grid, CM, y}$***) corresponds to **0.76905** tCO_2e/MWh.

3. Calculate Leakage (L_y)

The sources of leakage considered in the methodology are CO_2 emissions from off-site transportation of waste materials in addition to CH_4 and N_2O emissions from the residual waste from the anaerobic digestion, gasification processes and processing/combustion of RDF. In case of waste incineration, leakage emissions from residual waste of MSW incinerator should be accounted for. Positive leakages that may occur through the replacement of fossil-fuel based fertilizers with organic composts are not accounted for. Leakage emissions should be estimated from the following equation:

$$L_y = L_{t,y} + L_{r,y} + L_{i,y} + L_{s,y} \quad \textbf{(19)}$$

Where:

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

The project does not include anaerobic digester, gasifier, combustion of RDF/ stabilized biomass, compost and any use of stabilized biomass, so **$L_{r,y}$=0 tCO_2e**; **$L_{s,y}$=0 tCO_2e**.

Leakage emissions from increased transport (*$L_{t,y}$*)

$$L_{t,y} = \sum_{i}^{n} NO_{vehicles,i,y} \cdot DT_{i,y} \cdot VF_{cons,i} \cdot NCV_{fuel} \cdot D_{fuel} \cdot EF_{fuel} \quad \textbf{(20)}$$

Where:

$L_{t,y}$	The leakage emissions from increased transport in year y (tCO_2e);
$NO_{vehicle,i,y}$	The number of vehicles for transport with similar loading capacity;
$DT_{i,y}$	The average additional distance travelled by vehicle type i compared to baseline in year y (km);
$VF_{cons,i}$	The vehicle fuel consumption in liters per kilometer for vehicle type i (l/km);
NCV_{fuel}	The Calorific value of the fuel (MJ/Kg or other unit);
D_{fuel}	The fuel density (kg/l), if necessary;

40 w_{OM} = 0.5 and w_{BM} = 0.5 for the crediting period.

EF_{fuel}	The Emission factor of the fuel (tCO_2/MJ);

Due to the project did not increase the transportation distance, thus the $L_{t,y}=0$ **tCO_2e.**

Leakage emissions from the residual waste from MSW incinerator ($L_{i,y}$)

If the residual waste from the incinerator contains up to 5% residual carbon then:

$$L_{i,y} = A_{residual,y} \times FC_{residual} \times \frac{44}{12} \qquad (21\text{-}1)$$

If the residual waste from the incinerator contains more than 5% residual carbon then:

$$L_{i,y} = A_{residual,y} \times 0.05 \times \frac{44}{12} + A_{residual,y} \times (FC_{residual} - 0.05) \times \frac{16}{12} \times 21 \qquad (21\text{-}2)$$

Where:

$L_{i,y}$	The leakage emissions from the residual waste from MSW incinerator in year *y* (tCO_2e);
$A_{residual,y}$	The amount of the residual waste from the incinerator (t/yr);
$FC_{residual}$	The fraction of residual carbon contained in the residual waste (%);
44/12	Factor to convert from Carbon to Carbon Dioxide;
16/12	Factor to convert from Carbon to methane;
21	The Global Warming Potential of methane (tCO_2/tCH_4);

As for the project, the residual waste from the incinerator contains **3%** residual carbon which used for *ex ante* calculation.

4. Emission reductions(ER_y)

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - L_y \qquad (22)$$

Where:

ER_y	The emissions reductions in year *y* (tCO_2e);
BE_y	The emission in the baseline scenario in year *y* (tCO_2e);
PE_y	The emission in the project scenario in year *y* (tCO_2e);
L_y	The leakage in year *y* (tCO_2e).

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	CEF_{elec} and CEF_d
Data unit:	tCO_2/MWh
Description:	Carbon emissions factor for electricity generation in the project activity
Source of data used:	DNA publicized documents.
Value applied:	0.76905
Justification of the choice of data or description of	Calculated according to the *"Tool to calculate the emission factor for an electricity system" (Version 02.2.1).*

measurement methods and procedures actually applied :	
Any comment:	-

Data / Parameter:	***NCV_{fuel}***
Data unit:	MJ/kg
Description:	Net calorific value of 0# light diesel consumed by the project activity
Source of data used:	China Energy Statistical Yearbook 2009
Value applied:	42.652
Justification of the choice of data or description of measurement methods and procedures actually applied :	Due to the project specific data was not available, the value from China Energy Statistical Yearbook was applied.
Any comment:	-

Data / Parameter:	***EF_{fuel}***
Data unit:	tCO_2/MJ
Description:	Emission factor of 0# light diesel consumed by the project activity
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 5
Value applied:	0.0000741
Justification of the choice of data or description of measurement methods and procedures actually applied :	Due to the project specific data and country special data is not available, the value from IPCC 2006 Guidelines for National Greenhouse Gas Inventories was applied.
Any comment:	-

Data / Parameter:	***$Q_{COD,y}$***
Data unit:	m^3/y
Description:	Amount of wastewater treated anaerobically from the project activity
Source of data used:	Project FSR
Value applied:	81,918
Justification of the choice of data or description of measurement methods and procedures actually applied :	The project FSR was officially approved.
Any comment:	-

Data / Parameter:	***$P_{COD,y}$***
Data unit:	t COD/m^3

Description:	Chemical Oxygen Demand of wastewater
Source of data used:	Project FSR
Value applied:	0.05
Justification of the choice of data or description of measurement methods and procedures actually applied :	The project FSR was officially approved.
Any comment:	-

Data / Parameter:	B_o
Data unit:	tCH_4/t COD
Description:	Maximum methane producing capacity
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 5
Value applied:	0.265
Justification of the choice of data or description of measurement methods and procedures actually applied :	The value was determined as per the latest version IPCC Guidelines for National Greenhouse Gas Inventories.
Any comment:	-

Data / Parameter:	MCF_p
Data unit:	%
Description:	Methane conversion factor
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 5
Value applied:	0.8
Justification of the choice of data or description of measurement methods and procedures actually applied :	The value was determined as per the latest version IPCC Guidelines for National Greenhouse Gas Inventories.
Any comment:	-

Data / Parameter:	φ
Data unit:	-
Description:	Model correction factor to account for the model uncertainties
Source of data used:	Default value from *Tool to determine methane emissions avoided from disposal waste at a solid waste disposal site*
Value applied:	0.9
Justification of the choice of data or description of	Default value suggested in the tool

measurement methods and procedures actually applied :	
Any comment:	-

Data / Parameter:	***OX***
Data unit:	-
Description:	Oxidation factor
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	0
Justification of the choice of data or description of measurement methods and procedures actually applied :	The value for unmanaged landfills is used, as directed by the *Tool to determine methane emissions avoided from disposal waste at a solid waste disposal site*.
Any comment:	The value should be updated as per the latest version IPCC Guidelines for National Greenhouse Gas Inventories when the crediting period is updated.

Data / Parameter:	***F***
Data unit:	-
Description:	Fraction of Methane in the landfill gas (volume fraction)
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	Using 2006 IPCC Guidelines default value
Any comment:	The value should be updated as per the latest version IPCC Guidelines for National Greenhouse Gas Inventories when the crediting period is updated.

Data / Parameter:	DOC_f
Data unit:	-
Description:	Fraction of degradable organic carbon (DOC)that can decompose
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	Using 2006 IPCC Guidelines default value
Any comment:	The value should be updated as per the latest version IPCC Guidelines for National Greenhouse Gas Inventories when the crediting period is updated.

Data / Parameter:	***MCF***
Data unit:	-
Description:	Methane conversion factor
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	0.8
Justification of the choice of data or description of measurement methods and procedures actually applied :	To be conservative, choose the value of 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.
Any comment:	The value should be updated as per the latest version IPCC Guidelines for National Greenhouse Gas Inventories when the crediting period is updated.

Data / Parameter:	DOC_j
Data unit:	-
Description:	Fraction of degradable organic carbon (by weight) in the waste type *j*
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	Apply the following values for the different waste types *j*: (see table below)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Using 2006 IPCC Guidelines for default value
Any comment:	The value should be updated as per the latest version IPCC Guidelines for National Greenhouse Gas Inventories when the crediting period is updated.

Waste classification	DOC_j (%*wet waste*)	DOC_j (% *dry waste*)
Wood and wood products	43	50
Pulp, paper and cardboard (other than sludge)	40	44
Food, food waste, beverages and tobacco (other than sludge)	15	38
Textiles	24	30
Garden, yard and park waste	20	49
Glass, plastic, metal, other inert waste	0	0

Data / Parameter:	k_j
Data unit:	-
Description:	Decay rate for waste type *j*
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, volume 5, Table 3.3
Value applied:	(see table below)

Waste Type *j*	**Boreal and temperature (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, cardboard (other than sludge), textiles	0.04	0.06	0.045	0.07
	Wood, wood products and straw	0.02	0.03	0.025	0.035
Moderately degrading	Other (non-food) organic putrescible garden 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

According to the FSR(P.4), the local climate parameters as follows:
Mean Annual Temperature (MAT) = 17.5°C
Mean Annual Precipitation (MAP) =1,483 mm
Potential Annual Evaporation (PET) = 1,310.5 mm
Thus the MAP/PET >1
Based on this data, the climate is: **Boreal and temperature-Wet**

Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC default value was applied as local and national value cannot be accessed.
Any comment:	The value should be updated as per the latest version IPCC Guidelines for National Greenhouse Gas Inventories when the crediting period is updated.

Data / Parameter:	***CF***
Data unit:	-
Description:	Conservativeness factor
Source of data used:	Approved methodology AM0025 table 3
Value applied:	1.37
Justification of the choice of data or description of measurement methods and procedures actually applied :	To be conservative, according to AM0025, the estimated uncertainty range selected as greater than 100% and the assigned uncertainty band as 150%.
Any comment:	-

B.6.3. Ex-ante calculation of emission reductions:

1. <u>Baseline Emission</u>

Baseline emissions are claimed for the following sources:

- Emissions from decomposition of waste at the landfill site ($BE_{CH4.SWDS,y}$)
- Emissions from displaced grid electricity ($BE_{elec,y}$)

1) Emissions from decomposition of waste at landfill site($BE_{CH4.SWDS,y}$)

As described in equation (14) in the section B.6.1, the values in the follow table used for the CH_4 emission calculation:

Table B.11 value for baseline emission from decomposition of waste at landfill site

	Description	Value
φ	Model correction factor to account for model uncertainties	0.9
f	Fraction of methane captured at the SWDS	0
GWP_{CH4}	Global Warming Potential of methane	21
OX	Oxidation factor	0
F	Fraction of methane in the SWDS gas	0.5
DOC_f	Fraction of degradable organic carbon that can decompose	0.5
MCF	Methane correction factor	0.8
$W_{j,x}$	Amount of organic waste type *j* prevented from disposal in the SWDS in the year x	Refer to Annex 3 for details
DOC_j	Fraction of degradable organic carbon (by weight) in the waste type *j*	Refer to Annex 3 for details
K_j	Decay rate for the waste type *j*	Refer to Annex 3 for details
y	Year for which the methane emission calculated	10

The emissions from decomposition of waste at landfill site ($BE_{CH4.SWDS,y}$) as follows:

Year	$BE_{CH4.SWDS,y}$ (tCO_2e)
01/07/2012~30/06/2013	39,822
01/07/2013~30/06/2014	73,568
01/07/2014~30/06/2015	102,230
01/07/2015~30/06/2016	126,629
01/07/2016~30/06/2017	147,455
01/07/2017~30/06/2018	165,279
01/07/2018~30/06/2019	180,579
01/07/2019~30/06/2020	193,754
01/07/2020~30/06/2021	205,137
01/07/2021~30/06/2022	215,006

2) Emissions from displaced grid electricity($BE_{elec,\,y}$)

$BE_{elec,\,y} = EG_{d,\,y} \times CEF_d$ = 107,500× 0.76905 = 82,673 tCO_2e

2. Project emissions

As described in Section B.6.1, the project emissions PE_y is calculated by $PE_{elec,\,y}$, $PE_{fuel,on\text{-}site,y}$, $PE_{i,y}$ and $PE_{w,\,y}$.

$PE_y = PE_{elec,\,y} + PE_{fuel,\,on\text{-}site,\,y} + PE_{i,\,y} + PE_{w,\,y}$

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

For ex-ante calculation, the net electricity deliver to the grid is applied, so the power consumption has already deducted: $PE_{elec,\,y} = EG_{PJ,\,FF,\,y} \times CEF_{elec}$ = 0 tCO_2e

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

$PE_{fuel,\,on\text{-}site,\,y} = F_{cons,\,y} \times NCV_{fuel} \times EF_{fuel}$ = 200,000 × 42.652 ×0.0000741 = 632 tCO_2e

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

3-1) Emissions from fossil-based waste incineration ($PE_{i,\,f,\,y}$)

$PE_{i,\,f,\,y} = A_{MSW} \times FCF_{MSW} \times EF \times 44/12$ = 399,600 ×2.24% ×100% × 44/12 = 32,820 tCO_2e

3-2) Emissions from waste generation ($PE_{i,\,s,\,y}$)

$PE_{i,s,y} = Q_{biomass,\,y} \times (EF_{N2O} \times GWP_{N2O} + EF_{CH4} \times GWP_{CH4}) \times 10^{-3} \times U_i$
= 399,600× (0.05×310+0.0002 ×21) /1,000×1.37 = 8,488 tCO_2e

$PE_{i,\,y} = PE_{i,\,f,\,y} + PE_{i,\,s,\,y}$ = 32,820+ 8,488 = 41,308 tCO_2e

4) ***Emissions from waste water treatment***($PE_{w,y}$)

$PE_{w,\,y} = PE_{flare,\,y} = PE_{CH4,\,w,\,y} \times (1-\eta_{flare}) \times GWP_{CH4} = Q_{COD,y} \times P_{COD,y} \times B_0 \times MCF_P \times (1-\eta_{flare}) \times GWP_{CH4}$
= 81,918×0.05×0.265×0.8× (1-0.9) ×21 = 1,823 tCO_2e

Project emission $PE_y = PE_{elec,\,y} + PE_{fuel,\,on\text{-}site,\,y} + PE_{i,\,y} + PE_{w,\,y}$ = 0 + 632 + 41,308 +1,823= 43,763 tCO_2e

3. Leakage

As described in Section B.6.1, the leakage $L_y = L_{i,\,y} = A_{residual} \times FC_{residual} \times 44/12$
= 55,950 × 3% × 44/12 = 6,155 tCO_2e

4. Emission reduction

The annual emission reduction is estimated as the equation (22) mentioned in section B.6.1 above.

The calculation result is presented in the following section B.6.4.

B.6.4 Summary of the ex-ante estimation of emission reductions:

The project utilizes 10 years fixed crediting period from 01/07/2012 to 30/06/2021.The summary of the ex-ante estimation of emission reductions is presented in the following table.

Table B.12 *Ex-ante* estimated Project Emission Reductions (tCO_2e)

Year	Estimation of project activity emissions (tCO_2e)	Estimation of baseline emissions (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of overall emission reductions (tCO_2e)
01/07/2012~30/06/2013	43,763	102,584	6,155	52,666
01/07/2013~30/06/2014	43,763	156,241	6,155	106,323
01/07/2014~30/06/2015	43,763	184,903	6,155	134,985
01/07/2015~30/06/2016	43,763	209,302	6,155	159,384
01/07/2016~30/06/2017	43,763	230,128	6,155	180,210
01/07/2017~30/06/2018	43,763	247,951	6,155	198,034
01/07/2018~30/06/2019	43,763	263,251	6,155	213,334
01/07/2019~30/06/2020	43,763	276,426	6,155	226,509
01/07/2020~30/06/2021	43,763	287,810	6,155	237,892
01/07/2021~30/06/2022	43,763	297,679	6,155	247,761
Total (tCO_2e)	**437,630**	**2,256,278**	**61,550**	**1,757,098**

B.7. Application of the monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Data / Parameter:	$EG_{PJ,FF,y}$
Data unit:	MWh
Description:	Amount of electricity consumed from the grid as a result of the project activity
Source of data to be used:	Electricity meter
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0
Description of measurement methods and procedures to be applied:	The readings of electricity meter will measured continuously. Data will be recorded monthly and aggregated at least annually. It would be archived during the crediting period.
QA/QC procedures to be applied:	The receipt of electricity purchased by the project from the grid company will be available to cross check this parameter.

Any comment:	-

Data / Parameter:	$F_{cons,y}$
Data unit:	kg
Description:	Light diesel consumed by the project activity
Source of data to be used:	Purchase invoices
Value of data applied for the purpose of calculating expected emission reductions in section B.5	200,000 (FSR of the project)
Description of measurement methods and procedures to be applied:	The data of light diesel consumption will be recorded and aggregated annually.
QA/QC procedures to be applied:	The amount of fuel will be derived from the paid fuel invoices.
Any comment:	-

Data / Parameter:	$A_{MSW,y}$
Data unit:	t/yr
Description:	Amount of MSW fed into the MSW incineration plant
Source of data to be used:	Weighbridge
Value of data applied for the purpose of calculating expected emission reductions in section B.5	399,600(FSR of the project)
Description of measurement methods and procedures to be applied:	Continuously, aggregated at least annually.
QA/QC procedures to be applied:	Weighbridge will be subject to periodic calibration in accordance with manufacturer's technical specifications.
Any comment:	-

Data / Parameter:	FCF_{MSW}
Data unit:	Fraction
Description:	Fraction of fossil carbon in MSW
Source of data to be used:	Sample measurement
Value of data applied for the purpose of calculating expected	According to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Equation 5.10, Chapter 5, Volume 5, the FCF_{MSW} is *ex-ante* calculated as:

<table>
<tr><td>emission reductions in section B.5</td><td>

$$FCF_{MSW} = \sum_i (WF_i \times FCF_i)$$

Where,
WF_i Fraction of waste type *i* in MSW (%);
FCF_i Fraction of fossil carbon in the waste type *i* of the MSW (%);

According to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 2.4, Chapter 2, Volume 5, the ex-ante FCF_i is calculated as:

$$FCF_i = D_i \times CCW_{d,i} \times FCF_{c.i}$$

Where,
D_i Dry matter content of wet basis in waste type *i* (%);
$CCW_{d,i}$ Total carbon content of dry weight in waste type *i* (%)
$FCF_{c.i}$ Fossil carbon fraction of total carbon in waste type *i* (%)
The composition of MSW are showed below:

<table>
<tr><th>Waste type i</th><th>WF_i (%)</th><th>D_i (%)</th><th>$CCW_{d,i}$ (%)</th><th>$FCF_{c,i}$ (%)</th></tr>
<tr><td>Paper and cardboard</td><td>11.07</td><td>90</td><td>46</td><td>1</td></tr>
<tr><td>Textiles</td><td>1.28</td><td>80</td><td>50</td><td>20</td></tr>
<tr><td>Garden and park waste</td><td>0</td><td>40</td><td>49</td><td>0</td></tr>
<tr><td>Food waste</td><td>66.65</td><td>40</td><td>38</td><td>0</td></tr>
<tr><td>Wood and wood products</td><td>1.02</td><td>85</td><td>50</td><td>0</td></tr>
<tr><td>Glass and pottery</td><td>0.88</td><td>100</td><td>0</td><td>0</td></tr>
<tr><td>Plastic</td><td>2.22</td><td>100</td><td>75</td><td>100</td></tr>
<tr><td>Metal</td><td>0.98</td><td>100</td><td>0</td><td>0</td></tr>
<tr><td>Rubber</td><td>0</td><td>84</td><td>67</td><td>20</td></tr>
<tr><td>Other inert waste</td><td>15.9</td><td>90</td><td>3</td><td>100</td></tr>
</table>

FCF_{MSW} = 2.24%
</td></tr>
<tr><td>Description of measurement methods and procedures to be applied:</td><td>The following standards should be used:
• ASTM D6866-08:“Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis";
• ASTM D7459-08:“Standard Practice for Collection of Integrated Samples for the Speciation of Biomass (Biogenic) and Fossil-Derived Carbon Dioxide Emitted from Stationary Emissions Sources".
The size and frequency of sampling should be statistically significant with a maximum uncertainty range of 20% at a 95% confidence level. As a minimum, sampling should be undertaken four times per year. Samples need to be representative of all categories of waste. Project proponents are required to keep records of the composition of the waste sample sent for testing. Lab results reports for fossil carbon should also include the composition of the waste sample that was tested.</td></tr>
<tr><td>QA/QC procedures to be applied:</td><td>-</td></tr>
<tr><td>Any comment:</td><td>-</td></tr>
</table>

Data / Parameter:	***EF***
Data unit:	Fraction
Description:	Combustion efficiency for waste
Source of data to be used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value of data applied for the purpose of calculating expected emission reductions in section B.5	100%
Description of measurement methods and procedures to be applied:	Annually
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	$Q_{biomass,y}$
Data unit:	t/yr
Description:	Amount of waste incinerated in year *y*
Source of data to be used:	Weighbridge
Value of data applied for the purpose of calculating expected emission reductions in section B.5	399,600(FSR of the project)
Description of measurement methods and procedures to be applied:	Measured by weighbridge, aggregated at least annually.
QA/QC procedures to be applied:	Weighbridge will be subject to periodic calibration in accordance with manufacturer’s technical specifications.
Any comment:	-

Data / Parameter:	GWP_{N2O}
Data unit:	tCO_2/tN_2O
Description:	Global Warming Potential (GWP) of N_2O
Source of data to be used:	COP/MOP decisions
Value of data applied for the purpose of calculating expected emission reductions in	310 for the first commitment period

section B.5	
Description of measurement methods and procedures to be applied:	Updated for future commitment periods according to any future COP/MOP decisions.
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	***GWP_{CH4}***
Data unit:	tCO_2/tCH_4
Description:	Global Warming Potential (GWP) of methane
Source of data to be used:	COP/MOP decisions
Value of data applied for the purpose of calculating expected emission reductions in section B.5	21 for the first commitment period
Description of measurement methods and procedures to be applied:	Updated for future commitment periods according to any future COP/MOP decisions.
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	***EF_{N2O}***
Data unit:	kgN_2O/t of waste
Description:	Aggregate N_2O emission factor for waste combustion
Source of data to be used:	IPCC
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.05
Description of measurement methods and procedures to be applied:	The value was determined as per the latest version IPCC Guidelines for National Greenhouse Gas Inventories.
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	***EF_{CH4}***

Data unit:	$kgCH_4$/t of waste
Description:	Aggregate CH_4 emission factor for waste combustion
Source of data to be used:	IPCC
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.0002
Description of measurement methods and procedures to be applied:	The value was determined as per the latest version IPCC Guidelines for National Greenhouse Gas Inventories.
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	$FV_{RG,h}$
Data unit:	m^3/h
Description:	Volumetric flow rate of the biogas in dry basis at normal conditions in the hour *h*
Source of data to be used:	Flow meter
Value of data applied for the purpose of calculating expected emission reductions in section B.5	-
Description of measurement methods and procedures to be applied:	Ensure that the same basis (dry or wet) is considered for this measurement and the measurement of volumetric fraction of all components in the biogas when the biogas temperature exceeds 60ºC.
QA/QC procedures to be applied:	Flow meters will be periodically calibrated according to manufacturer’s recommendation.
Any comment:	-

Data / Parameter:	$fv_{CH4,RG,h}$
Data unit:	mg/m^3
Description:	Volumetric fraction of methane in the biogas in hour *h*
Source of data to be used:	Measurement by project participates using a continuous gas analyser
Value of data applied for the purpose of calculating expected emission reductions in section B.5	-

Description of measurement methods and procedures to be applied:	Ensure that the same basis (dry or wet) is considered for this measurement and the measurement of the volumetric flow rate of the residual gas ($FV_{RG,h}$) when the residual gas temperature exceeds 60ºC
QA/QC procedures to be applied:	Analysers will be periodically calibrated according to manufacturer's recommendation.
Any comment:	-

Data / Parameter:	T_{flare}
Data unit:	ºC
Description:	Temperature in the exhaust gas of the enclosed flare
Source of data to be used:	Measurement by project participates
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Measure the temperature of the exhaust gas stream in the flare by a thermocouple. A temperature above 500ºC indicates that a significant amount of gases are still being burnt and that the flare is operating.
Description of measurement methods and procedures to be applied:	Continuously
QA/QC procedures to be applied:	Thermocouples should be replaced or calibrated every year
Any comment:	An excessively high temperature at the sampling point (above 700ºC) may be an indication that the flare is not being adequately operated or that its capacity is not adequate to the actual flow.

Data / Parameter:	***Other flare operation parameters***
Data unit:	-
Description:	Including all data and parameters that are required to monitor whether the flare operates within the range of operating conditions according to the manufacturer's specifications
Source of data to be used:	Measurement by project participates
Value of data applied for the purpose of calculating expected emission reductions in section B.5	-
Description of measurement methods and procedures to be applied:	Continuously
QA/QC procedures to be applied:	-

Any comment:	-

Data / Parameter:	***T***
Data unit:	ºC
Description:	Temperature of the biogas
Source of data to be used:	Measurement by project participates
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Measured to determine $FV_{RG,h}$ and $fv_{CH4,RG,h}$. No separate monitoring of temperature is necessary if using flow meters in automatically measure temperature and pressure, expressing biogas volumes in normalized cubic meters.
Description of measurement methods and procedures to be applied:	Continuously
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	***P***
Data unit:	Pa
Description:	Pressure of the biogas
Source of data to be used:	Measurement by project participates
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Measured to determine $FV_{RG,h}$ and $fv_{CH4,RG,h}$. No separate monitoring of temperature is necessary if using flow meters in automatically measure temperature and pressure, expressing biogas volumes in normalized cubic meters.
Description of measurement methods and procedures to be applied:	Continuously
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	MB_y
Data unit:	tCH_4
Description:	Methane produced in the landfill in the absence of the project activity in year *y*
Source of data to be used:	Calculated as per the *“Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site”*
Value of data applied for the purpose of calculating expected	Calculated as per the *“Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site”*

emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	As per the *"Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site"*
QA/QC procedures to be applied:	As per the "*Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site*"
Any comment:	-

Data / Parameter:	$RATE^{Compliance}_{y}$
Data unit:	fraction
Description:	Rate of compliance
Source of data to be used:	Municipal bodies
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0
Description of measurement methods and procedures to be applied:	Annually
QA/QC procedures to be applied:	-
Any comment:	The compliance rate is based on the annual reporting of the municipal bodies issuing these reports. The state-level aggregation involves all landfill sites in the country. If the rate exceeds 50%, no CERs can be claimed.

Data / Parameter:	f
Data unit:	Fraction
Description:	Fraction of methane captured at the SWDS and flared, combusted or used in another manner
Source of data to be used:	Written information from the operator of the solid waste disposal site and/or site visits at the solid waste disposal site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0
Description of measurement methods and procedures to be applied:	The data is to be annually monitored.
QA/QC procedures to	-

be applied:	
Any comment:	-

Data / Parameter:	W_x
Data unit:	tons
Description:	Total amount of organic waste prevented from disposal in year *x*
Source of data to be used:	Weighbridge
Value of data applied for the purpose of calculating expected emission reductions in section B.5	399,600 (FSR of the project)
Description of measurement methods and procedures to be applied:	Monitored by weighbridge, aggregated at least annually
QA/QC procedures to be applied:	Weighbridge will be subject to periodic calibration in accordance with manufacturer's technical specifications
Any comment:	-

Data / Parameter:	$P_{n,j,x}$
Data unit:	fraction
Description:	Weight fraction of the waste type *j* in the sample *n* collected during the year *x*
Source of data to be used:	Sample measurements
Value of data applied for the purpose of calculating expected emission reductions in section B.5	(see table below)
Description of measurement methods and procedures to be applied:	The size and frequency of sampling should be statistically significant with a maximum uncertainty range of 20% at a 95% confidence level. As a minimum, sampling should be undertaken four times per year
QA/QC procedures to be applied:	-
Any comment:	-

Waste type *i*	$P_{n,j,x}$ **(%)**
Paper and cardboard	11.07
Textiles	1.28
Garden and park waste	0
Food waste	66.65
Wood and wood products	1.02
Glass and pottery	0.88
Plastic	2.22
Metal	0.98
Rubber	0
Other inert waste	15.9

Data / Parameter:	***z***
Data unit:	-
Description:	Number of samples collected during the year *x*
Source of data to be used:	Project participants
Value of data applied for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	As a minimum, sampling will be undertaken four times per year.
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	$EG_{d,y}$
Data unit:	MWh
Description:	Amount of electricity generated utilizing the combustion heat from incineration in the project activity displacing electricity in the baseline during the year '*y*'.
Source of data to be used:	Electricity meter in the project site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	107,500
Description of measurement methods and procedures to be applied:	The data is to be continuously monitored, and monthly recorded.
QA/QC procedures to be applied:	The electricity sales invoice will be available to cross check this data.
Any comment:	-

Data / Parameter:	$A_{residual}$
Data unit:	t/yr
Description:	The amount of the residual waste from the incinerator
Source of data to be used:	Weighbridge
Value of data applied for the purpose of calculating expected emission reductions in	55,950 (FSR of the project)

section B.5	
Description of measurement methods and procedures to be applied:	Aggregated at least annually
QA/QC procedures to be applied:	-
Any comment:	Weighbridge will be subject to periodic calibration in accordance with manufacturer's technical specifications.

Data / Parameter:	$FC_{residual}$
Data unit:	%
Description:	Fraction of residual carbon in the residual waste of MSW incinerator
Source of data to be used:	Sample measurement
Value of data applied for the purpose of calculating expected emission reductions in section B.5	3% (FSR of the project)
Description of measurement methods and procedures to be applied:	The size and frequency of sampling should be statistically significant with a maximum uncertainty range of 20% at a 95% confidence level. As a minimum, sampling should be undertaken four times per year.
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	-
Data unit:	MJ
Description:	Energy generated by auxiliary fossil fuel added in the incinerator
Source of data to be used:	8,530,400MJ. This parameter will be estimated by multiplying the amount of auxiliary fossil fuel added in the incinerator to the net calorific value of this auxiliary fossil fuel.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Refer to footnote 1 for details on the calculation
Description of measurement methods and procedures to be applied:	Annually calculated.
QA/QC procedures to be applied:	-
Any comment:	-

B.7.2. Description of the monitoring plan:

This Monitoring Plan will set out a number of monitoring tasks in order to ensure that all aspects of projected greenhouse gas (GHG) emission reductions for the project are controlled and reported.

This requires an ongoing monitoring of the project to ensure performance according to its design and that claimed CERs are actually achieved.

1. Monitoring Management

The General Manager of the Project Entity will appoint a CDM project manager or a chief officer. The operational and monitoring manager of the plant, the Financial Chief, and the Technical Chief are responsible for the collection of the data and information required in the Monitoring Plan. The collected information will be documented and sent to the CDM manager or responsible staffs of the Project Entity monthly. The CDM manager will be in charge of the implementation of the Monitoring Plan and report to the General Manager of the Project Entity. The General Manager of the Project Entity will confirm the monitoring, calculation data and reports.

2. Data to be monitored

The data to be monitored include MSW composition, property, quantity, electricity exported to the ECPG, auxiliary fuel, and etc. In addition, monitoring of laws and regulations are also included. The following table shows monitoring parameters.

Table B.13 Data to be monitored

Parameter	Description
-	Energy generated by auxiliary fossil fuel added in the incinerator
Other flare operation parameters	Including all data and parameters that are required to monitor whether the flare operates within the range of operating conditions according to the manufacturer's specifications
$A_{MSW,y}$	Amount of MSW fed into the waste incineration plant
$A_{residual}$	The amount of the residual waste from the incinerator
EF	Combustion efficiency for waste
EF_{CH4}	Aggregate CH_4 emission factor for waste incineration
GWP_{CH4}	Global Warming Potential (GWP) of methane
EF_{N2O}	Aggregate N_2O emission factor for waste incineration
GWP_{N2O}	Global Warming Potential (GWP) of N_2O
$EG_{d,y}$	Amount of electricity generated utilizing combustion heat from incineration in the project activity displacing electricity in the baseline during the year y
$EG_{PJ,FF,y}$	Amount of electricity consumed from the grid as a result of the project activity
f	Fraction of methane captured at the SWDS and flared, combusted or used in another manner
FCF_{MSW}	Fraction of fossil carbon in MSW
$F_{cons,y}$	Fuel consumption on-site during year *y* of the crediting period
$FC_{residual}$	Fraction of residual carbon in the residual waste of MSW incinerator

$fv_{CH4,h}$	Volumetric fraction of methane in the biogas in dry basis in the hour h
$FV_{RG,h}$	Volumetric flow rate the biogas in dry basis at normal (NTP) conditions in the hour h
T	Temperature of the biogas
P	Pressure of the biogas
MB_y	Methane produced in the landfill in the absence of the project activity in year y
$P_{n,j,x}$	Weight fraction of the waste type *i* in the sample n collected during the year y
$Q_{biomass,y}$	Amount of waste incinerated in year y
$RATE^{Compliance}_{y}$	Rate of compliance
T_{flare}	Temperature in the exhaust gas of the enclosed flare
z	Number of samples collected during the year *x*
W_x	Total amount of organic waste prevented from disposal in year x

3. Installation and calibration of the monitoring equipment

The main monitoring equipment includes weighbridge and electricity meters.

The weighbridge will be installed at project site. The accuracy, installation and calibration of the weighbridge should be consistent with manufacturer's technical specifications. The project owner will be responsible for the operation and maintenance of the weighbridge in accordance with manufacturer's technical specifications and requirements.

Electricity imported from and exported to the grid can be recorded simultaneously. The metering equipment will be properly installed and calibrated according to *Verification Regulation of Electrical Energy Meters with Electronics (JJG596-1999)*. The accuracy of the electricity meters is no less than 0.5. The metering equipment will be properly calibrated annually for accuracy. The calibration will be done according to the national and/or local standards and regulations. Refer to Figure B.3 for details on the location of the electricity meters.

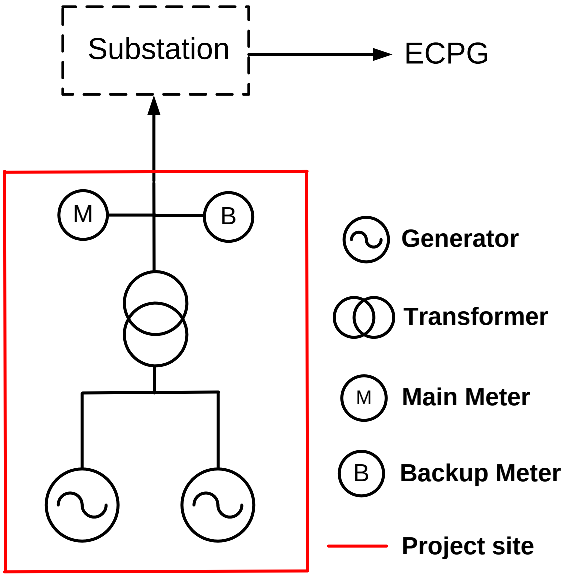

Figure B.3 Location of the electricity meters

MSW composition will be analyzed in accordance with the national standards, these data will be analyzed periodically as per the methodology, and the average value will be used for calculation.

Consumed quantity of diesel as auxiliary fuel will be monitored by purchasing invoice.

Flow meter and gas analyzer will be installed to continuously monitor the biogas flow and volumetric fraction of methane. The calibration will be done according to the national and/or local standards and regulations.

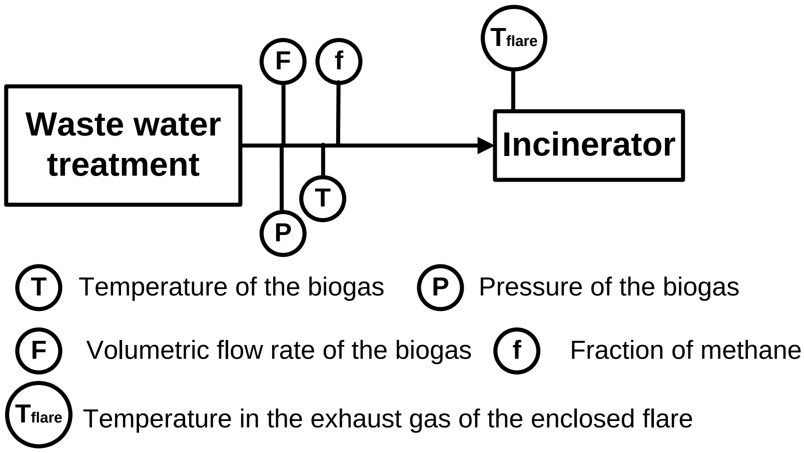

Figure B.4 monitoring meters of the waste water treatment system

Laws and regulations regarding MSW treatment in China, reports published by authorities will be archived. Check and update the default value used to the project.

4. Method of dealing with abnormity or errors

The CDM technical staffs will take real-time monitoring on the operation status of metering meters to ensure that any abnormity could be detected and the corresponding measures of processing, reporting and recording will be taken in time. The abnormal meters will be repaired immediately and must be calibrated by a qualified third party before being put into use again.

When the main meter M in abnormal, the backup meter B will be used for data recording. Problem occurred in monitoring and measurement process will be recorded and reported to the CDM manager. Consequently, the corrective resolution will be adopted to deal with the problem and to avoid it occur again in future.

5. Data and document management

- The data recorded by the monitoring equipment will be aggregated monthly. The sales record of the electricity and the purchase invoice of auxiliary fuel will be preserved.

- The monitoring data will be aggregated monthly. The relevant department will aggregate the data periodically and report to the CDM manager. All data records will be kept for two years after the end of the crediting period.

6. Monitoring Report

The Monitoring Report is for the purpose of describing the implementation of the Monitoring Plan, presenting the monitoring results and data, calculating the actual emission reductions and summarizing the Monitoring Plan. The monitoring report will be submitted by the CDM manager, and the contents will include, but are not limited to, the following:

- Calibration report of the monitoring equipments (including relevant laws and regulations).
- Summary report of the monitoring results.
- Process and results of the emission reduction calculation.
- Other information related to the monitoring plan.

The project participants will offer all the information as required by DOE for verification, include monitoring data, monitoring report and other information.

7. Training program

The relative staffs will be trained before operation of the Project. The training will contain CDM knowledge, operational regulations, quality control (QC) standard, data monitoring requirements and data management regulations etc.

B.8. Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies):

Date of completion of baseline and monitoring study: 24/01/2012

Name of entity determining the baseline and monitoring methodology:

Beijing Karbon Energy Consulting Co., Ltd
E-mail: info@karbon.com.cn
Tel: +86-10-6858-2198;

The entity listed above is not a project participant.

SECTION C. Duration of the project activity / crediting period

C.1. Duration of the project activity:

C.1.1. Starting date of the project activity:

20/03/2010 (Signed Equipment Purchasing Contract)

C.1.2. Expected operational lifetime of the project activity:

25 years, 0 month

C.2. Choice of the crediting period and related information:

C.2.1. Renewable crediting period:

C.2.1.1. Starting date of the first crediting period:

Not applicable.

C.2.1.2. Length of the first crediting period:

Not applicable.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

01/07/2012 or registration date, whichever is later.

C.2.2.2. Length:

10 years, 0 month

SECTION D. Environmental impacts

D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

The Environmental Impact Assessment (EIA) of the Project was conducted by Environmental Science Research & Design Institute of Zhejiang Province and approved by Zhejiang Environmental Protection Bureau on Sep. 30th, 2009 (Serial No. Zhehuanjian [2009] 114).

The outcome of EIA indicated that there are no significant environmental impacts caused by development and implementation of the project activity. Furthermore, during project construction and operation, all mitigation measures recommended by the EIA will be implemented, and the following key aspects addressed:

Air Pollution

Dusks produced at construction period will be treated by measures like sprinkling. The main air pollutants in the operating period comprise acid gases (SO_2, HCl, and HF), heavy metals, dioxins and NO_x from the flue gas generated during the incineration process, and dust and odor from MSW tanks. In addition to ensuring a high level control of the incineration condition, the flue gases will be treated through the introduction of multiple gas control technologies including the semi-dry washing, activated carbon adsorption and cloth-bag dusting. In order to prevent the emission of odor, the exhaust blowers will be installed on the top of the MSW tanks to create negative pressure conditions inside and the odor will be pumped into the incinerators for combustion supporting.

Waste water

The waste water produced during the construction period is very limited and will be recycled for the onsite use. When operating, the waste water of the project is leachate from the MSW tanks, domestic waste water and industrial waste water. The treatment technologies applying for leachate comprise: Biochemical + MBR+ NF. The domestic waste water and the industrial waste water will be treated in septic tankers. In accordance with the quality standards of grade III in "*Standard for pollution control on the landfill site for domestic waste* ", the effluent will be discharged into the municipal pipe network.

Noise Pollution

The noise in the construction phase of the project is not significant for the local community according to the EIA. During the operating period, noise is mainly caused by the induced-supply fans of the incineration, crushers, cooling tower, pumps, gas flow, incineration exhaust and the MSW trucks, where soundproof equipments such as silencers will be installed. In addition to this, a soundproof barrier is to be built in the plant. The noise at the project boundary meets the requirements as set out in *"Standards of noise at boundary of industrial enterprises (GB12348-90)"*.

Solid Waste

The slag and the fly ash are solid MSW from the Project. The slag will be reused as raw materials for brick making. The fly ash as hazardous solid waste will be solidified with cement and chelating agent, the solidified fly ash will be measured through dipping water test by a professional entity. According to the national standard ’*Standard for pollution control on the storage and disposal site for general industrial solid wastes*’ (GB18599-2001), the constituents’ concentration in the dipping water are lower

than the highest discharge amount stated in the national standard '*Integrated wastewater discharge standard*'(GB8978-1996), the solidified fly ash can be disposed in normal landfill sites.

In conclusion, the development of the Project will contribute to the sustainable development in the way of GHG emission reduction, local air-pollution reduction, the improvement of local living standards etc. The concerns regarding the environmental impacts have been clarified in the EIA. All the measures set out in the EIA will be implemented. Therefore, the Project is feasible from the environmental point of view.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

The Project has no significant environmental impacts during the construction phase and the operation phase. The Project Developer will take measures to avoid the negative environmental impacts. The EIA of the project have been approved by the local environmental protection authority (Documents No. Zhehuanjian [2009] 114).

SECTION E. Stakeholders' comments

E.1. Brief description how comments by local stakeholders have been invited and compiled:

To investigate the impacts on the local ecological environment and the opinions of potential stakeholders, a public survey was organized and implemented by the Project Entity in 1st -30th Jun. 2010 in the form of questionnaire. The staff of the Project Entity conducting the survey would explain questions to the public when necessary. The objects of the survey are farmers, staff of enterprises, related entities around the project site, and so on. The survey followed the randomized principle in order to make the survey fair and objective.

The stakeholders consist of the following participants.

Basic Information	Items	Percentage (%)
Gender	Male	76
	Female	24
Age	below 20 years old	0
	between 20 to 35 years old	32
	between 36 to 50 years old	59
	above 51 years old	9
Education	below Middle school	0
	Middle school	6
	Specialized secondary school	32
	High school	14
	Junior college and above	48
Career	Officer	14
	Staff	32
	Worker and farmer	43
	Others	11

The survey focused on the following issues:
- Whether stakeholders know the Project.
- The stakeholders' attitude to the Project.
- Whether there exists any impact on the environment.
- Whether the Project can improve the local economy and the employment opportunity.

E.2. Summary of the comments received:

By completing questionnaires, all the participants gained a better understanding of both the project and the CDM, and expressed their fully support for the development of the Project.
The outcome of the survey indicated that it is generally believed that the constructions of the Project will contribute to the local environment and to the development of the enterprises and local employment situation.

Question	Answer	Percentage (%)
• What is your attitude toward the project?	support	92
	oppose	0
	have no comment	8
• Do you think what impacts the project will have on the local economy?	positive	87
	have no major influence	13
	negative	0
• Do you think what impacts the project will have on the local living?	improve the living standard	86
	have no major influence	14
	reduce the living standard	0
• Do you think whether the project will increase the job opportunities?	increase	83
	don't increase	11
	have no influence	6
• Which environmental impacts do you care most on the project?	odor	35
	noise	11
	waste water	29
	solid waste	8
	ecological environment	25
• What impacts do you think the project will have on the local environment?	improve the environment	92
	have no negative impact	6
	the negative impact will be controlled and avoided through effective measures	2

The survey shows that the Project receives strong support from the local community, which is closely linked to the fact that the majority of local residents have some understandings of the Project.

All the respondents believe that the Propose Project will have an overall positive impact on their livelihoods with an increase in job opportunities, an increase in income and other benefits. The concerns regarding the environmental impacts have been clarified in the EIA. All the measures set out in the EIA will be implemented. Most of the investigated people are supportive of the project construction. The government and authorities at all levels support the project construction actively, confirming its social and environmental benefits.

E.3. Report on how due account was taken of any comments received:

Considering full support from the local stakeholder, there is no need to make adjustments on the design and implementation of the project. Meanwhile, the Project Entity expressed that they would take full advantage of the CDM opportunity to facilitate the development of the Project and also express their wishes to welcome local stakeholders to monitor the course of the construction and implementation of the Project.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Project Owner/Host

Organization:	Zhejiang Weiming Environment Protection CO., Ltd.
Street/P.O.Box:	Grade Railway Station Road
Building:	Gaolian Building 8F
City:	Wenzhou
State/Region:	Zhejiang Province
Postcode/ZIP:	325014
Country:	People's Republic of China
Telephone:	86-0577-86050619
FAX:	86-0577-86051888
E-Mail:	pchengc@163.com
URL:	
Represented by:	
Title:	
Salutation:	Mr.
Last name:	Cheng
Middle name:	-
First name:	Peng
Department:	
Mobile:	13868658180
Direct FAX:	86-0577-86051888
Direct tel:	86-0577-86050619
Personal e-mail:	pchengc@163.com

CERs Buyer

Organization:	Eco-Frontier Carbon Partners Limited
Street/P.O.Box:	
Building:	One Fleet Place
City:	London
State/Region:	
Postcode/ZIP:	EC4M 7WS
Country:	United Kingdom of Great Britain and Northern Ireland
Telephone:	0082-2-3153-7700
FAX:	0082-2-3153-7703
E-Mail:	leesy@ecofrontier.com
URL:	http://www.ecofrontier.com/eng/main.asp
Represented by:	Sooyong Lee
Title:	-
Salutation:	Mr.
Last name:	Lee
Middle name:	-
First name:	Sooyong
Department:	
Mobile:	0082-10-6408-2718
Direct FAX:	
Direct tel:	0082-2-3153-7855
Personal e-mail:	leesy@ecofrontier.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

here is no public funding from Annex I Parties for the project.

Annex 3

BASELINE INFORMATION

Amount of organic waste type *j* prevented from disposal in the SWDS in the year x:

Waste type *j*	**$W_{j,x}$(t/yr)**
Paper and cardboard	44,235.7
Textiles	5,114.9
Garden and park waste	0
Food waste	266,333.4
Wood and wood products	4,075.9
Glass and pottery	3,516.5
Plastic	8,871.1
Metal	3,916.1
Rubber	0
Other inert waste	63,536.4
Sum	**399,600**

Fraction of degradable organic carbon (by weight) in the waste type *j*

Waste type *j*	**DOC_j**
Paper and cardboard	0.40
Textiles	0.24
Garden and park waste	0.20
Food waste	0.15
Wood and wood products	0.43
Glass, metal and other inert waste	0.00

Decay rate for the waste type *j*

Waste type *j*	**K_j**
Paper and cardboard	0.06
Textiles	0.06
Garden and park waste	0.10
Food waste	0.185
Wood and wood products	0.03
Glass, metal and other inert waste	0.00

Table A1 2006 ECPG OM												
Fuel	**Unit**	**Shanghai**	**Jiangsu**	**Zhejiang**	**Anhui**	**Fujian**	**Total of Fuel ($FC_{i,y}$)**	**Carbon content**	**Oxidation Rate**	**Effective CO_2 emission factor ($EF_{CO2,i,y}$)**	**Average low Caloric Value ($NCV_{i,y}$)**	**CO_2 emission**
								(tC/TJ)	**(%)**	**($kgCO_2$/TJ)**	**(MJ/t,km^3)**	**(tCO_2e)**
		A	**B**	**C**	**D**	**E**	**G=A+…+E**	**H**	**I**	**J**	**K**	**$L=G\times I\times J\times K/10^7$ (in mass) $L=G\times I\times J\times K/10^6$ (in volume)**
Raw coal	10^4 t	2,744.45	10,945.42	6,065.00	3,455.20	2,369.63	**25,579.70**	25.8	100	87,300	20,908	466,898,181
Cleaned coal	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	25.8	100	87,300	26,344	0
Other washed coal	10^4 t	0.00	150.54	0.00	23.06	0.00	**173.60**	25.8	100	87,300	8,363	1,267,436
Briquette	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	26.6	100	87,300	20,908	0
Coke	10^4 t	1.71	3.13	0.23	0.71	0.00	**39.07**	29.2	100	95,700	28,435	1,063,184
Coke oven gas	10^8 m^3	84.64	106.54	3.28	25.12	0.00	**5.78**	12.1	100	37,300	16,726	360,603
Other coal gas	10^8 m^3	2,744.45	10,945.42	6,065.00	3,455.2	2,369.63	**219.58**	12.1	100	37,300	5,227	4,281,088
Crude oil	10^4 t	0.00	0.00	20.30	0.00	0.00	**20.30**	20.0	100	71,100	41,816	603,543
Gasoline	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	18.9	100	67,500	43,070	0
Diesel	10^4 t	2.13	3.70	4.11	1.21	1.11	**12.26**	20.2	100	72,600	42,652	379,635
Fuel oil	10^4 t	44.51	3.77	71.98	0.02	4.50	**124.78**	21.1	100	75,500	41,816	3,939,439
LPG	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	17.2	100	61,600	50,179	0
Refinery gas	10^4 t	0.29	0.40	0.00	2.95	0.00	**3.64**	15.7	100	48,200	46,055	80,803
Natural gas	10^8 m^3	3.20	13.50	9.18	0.00	0.00	**25.88**	15.3	100	54,300	38,931	5,470,911
Other petroleum products	10^4 t	18.82	3.57	0.00	0.00	0.00	**22.39**	20.0	100	72,200	41,816	675,980
Other coke products	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	25.8	100	95,700	28,435	0
Other energy	10^4 t-tce	6.66	2.80	27.45	3.21	0.00	**40.12**	0.0	0	0	0	0
Total												**485,020,803**

Data source: ***China Energy Statistical Yearbook 2007***

Note:

The electricity import from CCPG and NCPG in 2006 is 24,029,150 MWh and 11,150,820MWh, and the simple OM emission factor of CCPG and NCPG in 2006 is 1.12157 tCO_2e/MWh and 0.99702 tCO_2e/MWh, so the total CO_2 emission of ECPG in 2006 is 485,020,803 + 1.12157×24,029,150 + 0.99702 × 11,150,820 = 523,088,703 tCO_2e.

Table A2 2006 ECPG Coal Firing Power Generation				
Province	**Electricity Generation (10^8 kWh)**	**Electricity Generation (MWh)**	**Plant own consumption (%)**	**Power Supplying to Grid (MWh)**
Shanghai	720.33	72,033,000	5.06	68,388,130
Jiangsu	2,512.58	251,258,000	5.69	236,961,420
Zhejiang	1,403.49	140,349,000	5.62	132,461,386
Anhui	718.67	71,867,000	6.05	67,519,047
Fujian	555.80	55,580,000	4.51	53,073,342
Total		**591,087,000**		**558,403,325**

Data source: ***China Electric Power Yearbook 2007***

Note:

When calculating simple OM emission factor of ECPG in 2006, the electricity import from CCPG and NCPG in 2006 is 24,029,150 MWh and 11,150,820MWh, so the total thermal power generation of ECPG in 2006 is 558,403,325 + 24,029,150 + 11,150,820 = 593,583,295 MWh.

Table A3 2007 ECPG OM												
Fuel	**Unit**	**Shanghai**	**Jiangsu**	**Zhejiang**	**Anhui**	**Fujian**	**Total of Fuel ($FC_{i,y}$)**	**Carbon content**	**Oxidation Rate**	**Effective CO_2 emission factor ($EF_{CO2,i,y}$)**	**Average low Caloric Value ($NCV_{i,y}$)**	**CO_2 emission**
								(tC/TJ)	**(%)**	**($kgCO_2$/TJ)**	**(MJ/t,km^3)**	**(tCO_2e)**
		A	**B**	**C**	**D**	**E**	**G=A+…+E**	**H**	**I**	**J**	**K**	**L=G×I×J×K/10^7 (in mass) L=G×I×J×K/10^6 (in volume)**
Raw coal	10^4 t	2,754.04	11,060.78	7,350.00	3,929.90	3,097.87	**28,192.59**	25.8	100	87,300	20,908	514,590,436
Cleaned coal	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	25.8	100	87,300	26,344	0
Other washed coal	10^4 t	0.00	459.17	0.00	29.32	0.00	**488.49**	25.8	100	87,300	8,363	3,566,416
Briquette	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	26.6	100	87,300	20,908	0
Coke	10^4 t	0.00	0.00	35.06	0.00	0.00	**35.06**	29.2	100	95,700	28,435	954,063
Coke oven gas	10^8 m^3	0.89	9.73	0.22	1.56	0.75	**13.15**	12.1	100	37,300	16,726	820,402
Other coal gas	10^8 m^3	98.92	70.45	3.41	36.30	1.71	**210.79**	12.1	100	37,300	5,227	4,109,712
Crude oil	10^4 t	0.00	0.00	15.15	0.00	0.00	**15.15**	20.0	100	71,100	41,816	450,427
Gasoline	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	18.9	100	67,500	43,070	0
Diesel	10^4 t	1.23	5.37	2.76	0.00	1.01	**10.37**	20.2	100	72,600	42,652	321,111
Fuel oil	10^4 t	40.76	1.55	29.52	0.00	2.04	**73.87**	21.1	100	75,500	41,816	2,332,156
LPG	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	17.2	100	61,600	50,179	0
Refinery gas	10^4 t	0.20	0.63	0.00	2.55	0.00	**3.38**	15.7	100	48,200	46,055	75,031
Natural gas	10^8 m^3	4.61	19.17	11.01	0.00	0.00	**34.79**	15.3	100	54,300	38,931	7,354,444
Other petroleum products	10^4 t	20.39	2.78	0.00	0.00	0.00	**23.17**	20.0	100	72,200	41,816	699,529
Other coke products	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	25.8	100	95,700	28,435	0
Other energy	10^4 t-tce	6.89	28.88	44.93	7.52	9.43	**97.65**	0.0	0	0	0	0
Total												**535,273,726**

Data source: ***China Energy Statistical Yearbook 2008***

Note:
The electricity import from CCPG and NCPG in 2007 is 31,823,310 MWh and 12,773,620 MWh, and the simple OM emission factor of CCPG and NCPG in 2007 is 1.10197tCO_2e/MWh and 0.97254tCO_2e/MWh, so the total CO_2 emission of ECPG in 2007 is 535,273,726 + 31,823,310 × 1.10197+12,773,620 × 0.97254 = 582,765,074 tCO_2e.

Table A4 2007 ECPG Coal Firing Power Generation				
Province	**Electricity Generation (10^8 kWh)**	**Electricity Generation (MWh)**	**Plant own consumption (%)**	**Power Supplying to Grid (MWh)**
Shanghai	726	72,600,000	4.72	69,173,280
Jiangsu	2709	270,900,000	5.55	255,865,050
Zhejiang	1723	172,300,000	5.83	162,254,910
Anhui	848	84,800,000	5.92	79,779,840
Fujian	723	72,300,000	5.59	68,258,430
Total		**672,900,000**		**635,331,510**

Data source: ***China Electric Power Yearbook 2008***

Note:

When calculating simple OM emission factor of ECPG in 2007, the electricity import from CCPG and NCPG in 2007 is 31,823,310 MWh and 12,773,620 MWh, so the total thermal power generation of ECPG in 2007 is 635,331,510+ 31,823,310 + 12,773,620 = 679,928,440 MWh.

Table A5 2008 ECPG OM

Fuel	Unit	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Total of Fuel ($FC_{i,y}$)	Carbon content	Oxidation Rate	Effective CO_2 emission factor ($EF_{CO2,i,y}$)	Average low Caloric Value ($NCV_{i,y}$)	CO_2 emission
								(tC/TJ)	(%)	($kgCO_2$/TJ)	($MJ/t,km^3$)	(tCO_2e)
		A	B	C	D	E	G=A+…+E	H	I	J	K	$L=G\times I\times J\times K/10^7$ (in mass) $L=G\times I\times J\times K/10^6$ (in volume)
Raw coal	10^4 t	2964.04	10890.2	7316.17	4887.18	3264.88	**29322.47**	25.8	100	87,300	20,908	535,213,779
Cleaned coal	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	25.8	100	87,300	26,344	0
Other washed coal	10^4 t	0.00	513.34	0.00	33.49	0.00	**546.83**	25.8	100	87,300	8,363	3,992,351
Briquette	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	26.6	100	87,300	20,908	0
Coke	10^4 t	0.00	0.00	31.12	0.00	0.00	**31.12**	29.2	100	95,700	28,435	846,847
Coke oven gas	10^8 m^3	0.5	11.65	0.13	5.62	0.31	**18.21**	12.1	100	37,300	16,726	1,136,085
Other coal gas	10^8 m^3	98.42	77.84	3.57	0.00	6.36	**186.19**	12.1	100	37,300	5,227	3,630,092
Crude oil	10^4 t	0.00	0.00	8.31	0.00		**8.31**	20.0	100	71,100	41,816	247,066
Gasoline	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	18.9	100	67,500	43,070	0
Diesel	10^4 t	5.85	4.04	2.05	0.00	1.04	**12.98**	20.2	100	72,600	42,652	401,930
Fuel oil	10^4 t	24.43	0.39	13.48	0.00	1.81	**40.11**	21.1	100	75,500	41,816	1,266,316
LPG	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	17.2	100	61,600	50,179	0
Refinery gas	10^4 t	0.05	0.28	0.00	1.5	0.57	**2.4**	15.7	100	48,200	46,055	53,276
Natural gas	10^8 m^3	3.65	25.14	8.99	0.00	0.19	**37.97**	15.3	100	54,300	38,931	8,026,681
Other petroleum products	10^4 t	21.33	3.09	0.00	0.00	0.00	**24.42**	20.0	100	72,200	41,816	737,268
Other coke products	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	25.8	100	95,700	28,435	0
Other energy	10^4 t-tce	15.88	62.57	34.54	0.00	8.99	**121.98**	0.0	0	0	0	0
Total												**555,551,691**

Data source: ***China Energy Statistical Yearbook 2009***

Note:

The electricity import from CCPG and NCPG in 2008 is 35,684,610MWh and 16,903,640MWh separately, and the simple OM emission factor of CCPG and NCPG in 2008 is 1.04205tCO_2e/MWh and 1.004945tCO_2e/MWh, so the total CO_2 emission of ECPG in 2008 is 555,551,691 + 1.04205 × 35,684,610 + 1.004945 × 16,903,640 = 609,724,008 tCO_2e.

Table A6 2008 ECPG Coal Firing Power Generation				
Province	**Electricity Generation**	**Electricity Generation**	**Plant own consumption**	**Power Supplying to Grid**
	(10^8 kWh)	**(MWh)**	**(%)**	**(MWh)**
Shanghai	794	79,400,000	4.88	75,525,280
Jiangsu	2735	273,500,000	5.51	258,430,150
Zhejiang	1748	174,800,000	5.77	164,714,040
Anhui	1074	107,400,000	5.72	101,256,720
Fujian	748	74,800,000	5.61	70,603,720
Total				**670,529,910**

Data source: ***China Electric Power Yearbook 2009***

Note:

When calculating simple OM emission factor of ECPG in 2009, the electricity import from CCPG and NCPG is 35,684,610MWh and 16,903,640MWh separately, so the total thermal power generation of ECPG in 2008 is 670,529,910 + 35,684,610 + 16,903,640 = 723,118,160 MWh.

Table A7 Weighted Emission Factor of ECPG			
Year		**Power Supplying(MWh)**	**Total Emission(tCO_2e)**
		A	**B**
1	2006	593,583,295	523,088,703
2	2007	679,928,440	582,765,074
3	2008	723,118,160	609,724,008
Weighted OM (tCO_2/MWh)=(B1+B2+B3)/(A1+A2+A3)			**0.85924**

Table 8 2008 Calculation of λ_s for the calculation of the BM, ECPG											
Fuel	Unit	Shanghai ($F_{i,j,y}$)	Jiangsu ($F_{i,j,y}$)	Zhejiang ($F_{i,j,y}$)	Anhui ($F_{i,j,y}$)	Fujian ($F_{i,j,y}$)	Total of Fuel	Average low Caloric Value ($NCV_{i,y}$)	Effective CO2 emission factor ($EF_{CO2,i,y}$)	Oxidation Rate	CO_2 emission
								(MJ/t,km³)	(kgCO₂/TJ)	(%)	(tCO_2e)
		A	B	C	D	E	G=A+…+E	H	I	J	K=G×H×I×J/10⁷（in mass） K=G×H×I×J /10⁶ (in volume)
Raw coal	10^4 t	2,964.04	10,890.20	7,316.17	4,887.18	3,264.88	**29,322.47**	20,908	87,300	100	535,213,779
Cleaned coal	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	26,344	87,300	100	0
Other washed coal	10^4 t	0.00	513.34	0.00	33.49	0.00	**546.83**	8,363	87,300	100	3,992,351
Briquette	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	20,908	87,300	100	0
Coke	10^4 t	0.00	0.00	31.12	0.00	0.00	**31.12**	28,435	95,700	100	846,847
Other coke products	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	28,435	95,700	100	0
Coal, total											***540,052,976***
Crude oil	10^4 t	0.00	0.00	8.31	0.00	0.00	**8.31**	41,816	71,100	100	247,066
Gasoline	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	43,070	67,500	100	0
Diesel	10^4 t	5.85	4.04	2.05	0.00	1.04	**12.98**	42,652	72,600	100	401,930
Fuel oil	10^4 t	24.43	0.39	13.48	0.00	1.81	**40.11**	41,816	75,500	100	1,266,316
Other petroleum products	10^4 t	21.33	3.09	0.00	0.00	0.00	**24.42**	41,816	72,200	100	737,268
Oil, total											***2,652,580***
Natural gas	10^7 m^3	36.50	251.40	89.90	0.00	1.90	**379.70**	38,931	54,300	100	8,026,681
Coke oven gas	10^7 m^3	5.00	116.50	1.30	56.20	3.10	**182.10**	16,726	37,300	100	1,136,085
Other coal gas	10^7 m^3	984.20	778.40	35.70	0.00	63.60	**1,861.90**	5,227	37,300	100	3,630,092
LPG	10^4 t	0.00	0.00	0.00	0.00	0.00	**0.00**	50,179	61,600	100	0
Refinery gas	10^4 t	0.05	0.28	0.00	1.50	0.57	**2.40**	46,055	48,200	100	53,276
Gas, total											***12,846,135***
Total											***555,551,691***

Data source: ***China Energy Statistical Yearbook 2008***

Table A9 Best Practice Commercialized Technology Emission Factors						
	Variable	Efficiency of advanced thermal power plant additions	Fuel Emission Factor	Oxidation Factor	Emission Factor	CO_2 Emission amount of 2008 comparing to the total emission
		(%)	($kgCO_2/TJ$)	(%)	(tCO_2/MWh)	(%)
		A	**B**	**C**	**D=B*C*3.6/A /10^6**	**λ**
Coal Firing power plants	$EF_{Coal, Adv}$	39.08%	87,300	100	***0.8042***	97.21%
Gas Firing Power Plants	$EF_{Gas, Adv}$	51.46%	75,500	100	***0.5282***	0.48%
Oil Firing Power Plants	$EF_{Oil, Adv}$	51.46%	54,300	100	***0.3799***	2.31%
Thermal Emission Factor (tCO_2/MWh)	$EF_{Thermal} = \sum_i (D_i \times \lambda_i)$				**0.7931**	

Data source: ***Statistics from China Electricity Council***

Table A10 The Calculation of BM Emission Factor for the ECPG					
	Installed Capacity in 2006	**Installed Capacity in 2007**	**Installed Capacity in 2008**	**2006～2008 Incremental Capacity Installation[41]**	**New Installed Capacity Percentages in the total Capacity Increment**
	A	**B**	**C**	**D**	**E**
Thermal(MW)	128,828	138,650	148,700	32,640	***85.60%***
Hydro(MW)	18,463	19,970	22,240	2,972	7.79%
Nuclear(MW)	3,066	5,070	5,070	2,004	5.26%
Wind Power and Others(MW)	547	1,095.6	1,060	513	1.35%
Total(MW)	**150,904**	**164,785.6**	**177,070**	**38,129**	**100%**
Installed capacity comparing to 2008 capacity	***85.22%***	***93.06%***	***100.00%***	***21.53%***	

Data source: ***China Electric Power Yearbook 2007-2009***

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[41] The value is calculated in considering the capacity of the incremental and shut down power stations.

Table A10-1 Installed Capacity 2008 in ECPG							
Installed Capacity	**Unit**	**Shanghai**	**Jiangsu**	**Zhejiang**	**Anhui**	**Fujian**	**Total**
Thermal	MW	16,780	50,680	40,990	24,820	15,430	**148,700**
Hydro	MW	0	1,140	8,960	1,560	10,580	**22,240**
Nuclear	MW	0	2,000	3,070	0	0	**5,070**
Wind Power and Others	MW	40	610	150	0	260	**1,060**
Total	**MW**	**16,820**	**54,430**	**53,170**	**26,380**	**26,270**	**177,070**

Data source: China Electric Power Yearbook 2009

Table A10-2 Installed Capacity 2007 in ECPG							
Installed Capacity	**Unit**	**Shanghai**	**Jiangsu**	**Zhejiang**	**Anhui**	**Fujian**	**Total**
Thermal	MW	14,150	53,340	39,490	17,760	13,910	**138,650**
Hydro	MW	0	140	8,520	1,510	9,800	**19,970**
Nuclear	MW	0	2,000	3,070	0	0	**5,070**
Wind Power and Others	MW	269	518	40	0	269	**1,096**
Total	**MW**	**14,419**	**55,998**	**51,120**	**19,270**	**23,979**	**164,786**

Data source: ***China Electric Power Yearbook 2008***

Table A10-3 Installed Capacity 2006 in ECPG							
Installed Capacity	**Unit**	**Shanghai**	**Jiangsu**	**Zhejiang**	**Anhui**	**Fujian**	**Total**
Thermal	MW	14,526	51,776	35,391	14,134	13,001	**128,828**
Hydro	MW	0	136	8,369	1,001	8,957	**18,463**
Nuclear	MW	0	0	3,066	0	0	**3,066**
Wind Power and Others	MW	253	162	43	0	89	**547**
Total	**MW**	**14,779**	**52,074**	**46,869**	**15,135**	**22,047**	**150,904**

Data source: ***China Electric Power Yearbook 2007***

$$EF_{BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal} = 85.60\% \times \mathbf{0.7931} = 0.6789\ \mathbf{(tCO_2/MWh)}$$

According to "*Tool to calculate the emission factor for an electricity system*" (Version 02.2.1), the default weight of all the projects other than wind and solar power generation projects is (W_{OM} = 0.5; W_{BM} = 0.5):

Table A11 Weighted Combined Margin Emission Factor of ECPG	
Weighted OM (tCO_2/MWh)	**0.8592**
Weighted BM (tCO_2/MWh)	**0.6789**
Weighted CM (tCO_2/MWh)	**0.76905**

Annex 4

MONITORING INFORMATION

Please refer to section B.7. No need to complement more information here.

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