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

CONTENTS

SECTION A. General description of project activity

A.1. Title of the project activity:

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Wanzhou Kehua Cement WHR to 13.5MW Electricity Project in Wanzhou District
Document Version: 5.0
Document Date: 4/1/2009

A.2. Description of the project activity:

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The Waste Heat Recovery and Utilisation for power generation project (hereafter, the "Project Activity") is developed by Chongqing Municipality Wanzhou Kehua Cement Co. Ltd. (hereafter referred to as CWKC or the project developer or the project entity). The project activity is a waste heat utilisation power generation project which will be implemented in two phases at two clinker production lines at the cement factory of CWKC, Wenquan Village, Yongcheng Town, Qijiang County, Chongqing Municipality, China – hereafter referred to as the "Host Country".

Waste heat from two cement production lines of CWKC, the first one with a production capacity of 2,500 tons clinker/day (in operation since 2005) and the second one with a production capacity of 5,000 tons clinker / day kiln (under construction), will be utilized for power generation in project activity. In the past, the waste heat from cement production line was emitted to the atmosphere. The project activity will utilize the waste heat which would have been emitted to the atmosphere to generate electric power, without affecting the heat recycling utilization in the production process. To effectively utilize the waste heat carried by the exit gases from the Suspension Pre-heater (SP) and the Air Quenching Chamber (AQC) in cement line and solid waste process line, the project developer plans to construct 4.5 MW and 9 MW captive power stations based purely on waste heat recovery from the 2,500t/d clinker line and the 5,000t/d clinker line respectively.

Electricity generated by the 4.5 MW and 9 MW captive power plants will be consumed by CWKC in order to substitute part of the electricity purchased from the Central China Power Grid for the cement production process. This will lead to CO_2 emission reductions attributed to reduced electricity consumption from fossil fuel based power plants connected to the Central China Power Grid. The capacity of planned WHR totals 13.5 MW, and average electricity generation capacity is 12.06MW, the annual operation hours of cement production line is 7,200 hrs/yr. This will result in annual electricity generation of approximately 86,832MWh. Subtracting the consumption of the WHR power plant itself, 81,969MWh electricity from the grid, which is required by the cement production line, will be replaced. This consequently mitigates CO_2 emission; after the construction is completed, the annual CO_2 emission reductions will reach 81,719t.

It is firmly believed by the project participants that the project activity will promote sustainable economic and industrial growth in the long run, help conserving natural resources, and consequently contribute to a cleaner and healthier environment. There are various benefits associated with the project activity:

Social Benefits

Project activity will provide working places for skilled labour and professionals in the region by offering direct and indirect employment for power plant construction and operation. During operation, ca. 65 staffs will be employed.

To offset power shortage and increase economic income

The project activity will act as a direct supplement to CWKC's process power, so the project developer will become less dependent on the grid power supply, which will increase economic independence for the local community.

Environmental Well-being

A major share of Central China Power Grid is generated from fossil fuel sources, mostly from coal based thermal power plants. By substituting a part of the electricity supply from these plants, the project activity will save fossil fuel sources and reduce GHGs emissions e.g. CO_2, SO_2 and NO_X, thereby mitigating negative impacts from the excessive exploitation and depleting of the natural resource coal.

A.3. Project participants:

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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)	Chongqing Municipality Wanzhou Kehua Cement Co. Ltd. (Project Owner)	No
Switzerland	South Pole Carbon Asset Management Ltd. (Purchaser of CERs)	No

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

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A.4.1.1. Host Party(ies):

>> People's Republic of China

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

>> Chongqing Municipality

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

>> Sanzhouxi Village, Wanzhou District

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

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The project is located in Sanzhouxi Village, Wanzhou District, Chongqing Municipality. The specific site location is at longitude 108°25´58´´ E and latitude 30°44´43´´N. The project is on the South bank of Yangtze River, and 10km far from the main city of Wanzhou, 3km away from 318 state highway. The

location of the project is shown in the map Figure A.1 and A.2.

Figure A.1 and A.2 The geographical location of the project activity

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

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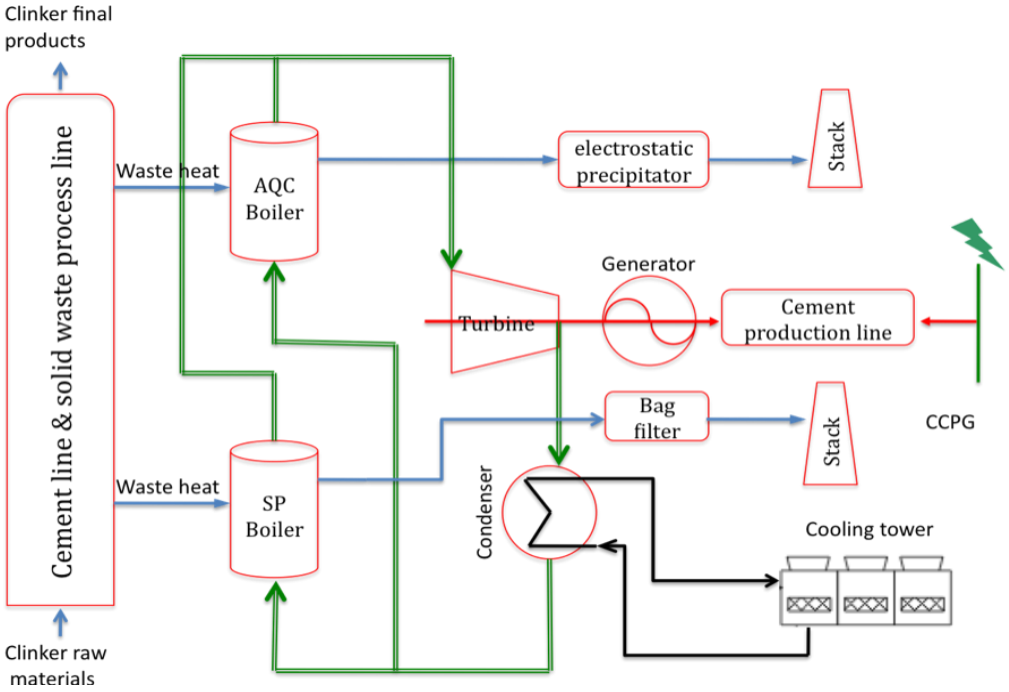
The project activity falls under Scope Number 1-Energy Industries (renewable/non-renewable sources) and Scope Number 4-Manufacturing industries.

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

The cement raw material production coming from industrial solid waste and the clinker production, which involves passing the raw meal through a pre-heater stack containing cyclone heaters to a long rotating kiln to create raw material and clinker, and then cooling this in the clinker cooler, requires a large portion of the energy consumption. Waste heat generated therefrom is vented to the atmosphere without utilization and electricity required by cement production line is imported from CCPG, for both 4.5MW and 9MW unit, this scenario is the most applicable baseline scenario (Detail in section B.4); the 2500t/d cement production line has been operated for 3 years and the 5000t/d cement production line is under construction, hence the existing scenario of 4.5MW unit is the same with the baseline scenario, existing scenario of the 9MW unit is the construction of cement production line. The portion of directly emitted heat accounts for over 35% of the total heat consumed by the clinker calcining system and solid waste processing system. If this part of heat energy is captured and used for power generation, as the Project activity scenario, a part of the power supplies from the coal-fired power resources will be substituted and significant GHGs emission will be reduced.

The proposed WHR system will effectively utilize the low temperature waste heat of the exit gases from the SP and the AQC in cement production and solid waste processing. The WHR captive power plant consists of WHR boilers (SP boiler and AQC boiler), steam turbine generator, controlling system, water-circulation system and dust-removal system etc. The steam from SP boiler and AQC boiler will be fed to steam turbine generator to produce power. The operation, controlling, most monitoring and data logging for the system will be made by one set of distributed control system (DCS), only the electricity meters will be manually read by the operator and recorded in the daily operation report and the monthly report. In project activity, quantity of net electricity generation must be monitored and recorded. Two electricity meters will be installed in the distribution room to monitor the total electricity generation and electricity consumed by auxiliary equipments (Detail in section B.7). The thermodynamic system of the project activity is demonstrated in Figure A.3.

Figure A.3 Thermodynamic system of the project activity



The major devices which will be employed in the project activity are described in table A.1 below:

Table A.1 Technical parameter of the major facilities in project activity

4.5MW Unit		
Name	Quantity	Technical parameter
Generator	1	Type: QF-J4.5-2 Rated power: 4.5MW Rated speed: 3000r/min Rated voltage: 10.5KV Lifetime: 20 years
Condensing Steam Turbine	1	Type: BN4.5 - 0.9/0.2 Rated power: 4.5MW Rated speed: 3000r/min Rated inlet steam pressure: 0.9MPa Rated inlet steam temperature: 310℃ Standard flow of main gas: 25t/h Rated exhaust pressure: 0.007MPa Lifetime: 20 years
SP boiler	1	Waste gas inlet temperature: 310~350℃ Flow rate of waste gas: 180000Nm^3/h Dustiness degree: 60g/m^3 Main steam parameter: 12.5t/h-1MPa-300℃ Feed Water Temperature: 100℃ Lifetime: 20 years
AQC Boiler	1	Waste gas inlet temperature: 350~420℃ Flow rate of waste gas: 90000Nm^3/h Dustiness degree: 15~20g/m^3 Main steam parameters: 8.5t/h-1MPa-340℃ Feed Water Temperature: 100℃ Lifetime: 20 years
9MW Unit		
Name	Quantity	Technical parameter
Generator	1	Model number: QF-9-2 Rated power: 9MW Rated speed: 3000r/min Output voltage: 5.6KV Lifetime: 20 years

Condensing Steam Turbine	1	Model number: Rated power: Rated rotational speed: Inlet pressure of steam: Inlet temperature of steam: Rated steam flow: Rated exhaust pressure: Lifetime:	N9 - 1.27 9MW 3000r/min 1.27 MPa 310℃ 50t/h 0.007 MPa 20 years
SP boiler	1	Inlet waste gas parameter: Outlet waste gas Temperature: Steam parameter: Feed Water Temperature: Designed efficiency: Lifetime:	384200Nm^3/h-320~350℃ 220℃ 29.6t/h-1.6MPa-320℃ (overheat) 104℃ 95% 20 years
AQC Boiler	1	Inlet waste gas parameter: Outlet waste gas Temperature: Steam parameter: Designed efficiency: Lifetime:	167100Nm^3/h-360~420℃ 110℃ 14.6/h-1.6MPa-320℃ (overheat) 95% 20 years

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

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The estimation of the emission reductions in the first crediting period is presented in table A.2.

Table A.2 The estimation of the emission reductions in the first crediting period

Year	The estimation of annual emission reductions (tCO2e)
2009	39,898
2010	79,797
2011	79,797
2012	79,797
2013	79,797
2014	79,797
2015	79,797
2016	79,797
2017	79,797
2018	79,797
2019	39,899
The estimation of total emission reductions in the first crediting	**797,970**
Total number of crediting years	10
The estimation of annual average emission reductions in the first crediting period	**79,797**

A.4.5. Public funding of the project activity:

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No public funding from parties included in Annex I of the convention is used to finance the project activity.

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:

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Title: "*Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects*"

Reference: UNFCCC Approved consolidated baseline and monitoring methodology ACM0012, Version 03

Sectoral Scope: 01-Energy industries (renewable-/ non-renewable sources).
04-Manufacturing industries

The ACM0012 methodology refers to the Version 01 of the "*Tool to calculate the emission factor for an electricity system*" and Version 05.2 of the "*Tool for the Demonstration and Assessment of Additionality*".

For detailed information on the methodology and related tools please refer to:
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:

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The approved consolidated methodology ACM0012 Version 03 is applicable to the project due to following reasons summarized in Table B.1 and B.2 below:

Table B.1 Type Applicability of the Methodology to the Project

Type	Applicable Conditions of the Methodology	Conditions of the Proposed Project
Type-1	All the waste energy in identified WECM stream/s, that will be utilized in the project activity, is, or would be flared or released to atmosphere in the absence of the project activity at the existing or new facility. The waste energy is an energy source for: Cogeneration; or Generation of electricity; or Direct use as process heat source; or For generation of heat in element process (e.g. steam, hot water, hot oil, hot air); or For generation of mechanical energy.	The proposed project utilized all the waste heat from cement production for power generation. Therefore, the project activity is applicable for Type-1 category;
Type-2	An existing industrial facility, where the project activity is implemented, that captures and utilizes a portion of the waste gas stream(s) considered utilized in the project activity	No waste heat is captured to be utilized prior to the implementation of proposed project

Table B.2 Applicability of the Methodology to the Project

Serial No.	Applicable Conditions of the Methodology	Conditions of the Proposed Project
1	If the project activity is based on the use of waste pressure to generate electricity, electricity generated using waste pressure should be measurable;	**N/A.** The proposed project utilized the waste energy based on the waste heat, not waste pressure
2	Energy generated in the project activity may be used within the industrial facility or exported from the industrial facility;	**Pass.** Energy generated in the project activity will be used within the industrial facility of CWKC
3	The electricity generated in the project activity may be exported to the grid or used for captive purposes;	**Pass.** The electricity generated by the Project activity is used within the industrial facility of CWKC for captive purpose (substitute part of the electricity purchased from the Central China Power Grid for the cement production process),
4	Energy in the project activity can be generated by the owner of the industrial facility producing the waste energy or by a third party (e.g. ESCO) within the industrial facility;	**Pass.** Electricity in the project activity will be generated by the owner of the industrial facility.
5	Regulations do not constrain the industrial facility that generates waste energy from using fossil fuels prior to the implementation of the project activity;	**Pass.** At present, no regulations constrain the industrial facility generating waste gas or heat from using fossil fuels in China.
6	The methodology covers both new and existing facilities. For existing facilities, the methodology applies to existing capacity. If capacity expansion is planned, the added capacity must be treated as a new facility;	**Pass.** The Project utilizes the waste gas produced by existing cement production line of CWKC for power generation, and there is no expansion planned.
7	The waste gas/pressure utilized in the project activity was flared or released into the atmosphere in the absence of the project activity at existing facility. This shall be proven by either direct measurements, or energy balance, or energy bills, or process, or on site checks by DOE prior to project implementation.	**Pass.** In the absence of the project activity the waste heat is released into the atmosphere. The plant owner will provide the original schemes of the plant process to the DOE.
8	The emission reductions are claimed by the generator of energy using waste energy;	**Pass.** The owner of the industrial facility itself is the generator and will claim credits from the proposed project.
9	In cases where the energy is exported to other facilities, an official agreement exists between the owners of the project energy generation plant (henceforth referred to as generator, unless specified otherwise) with the recipient plant(s) that the emission reductions would not be claimed by recipient plant(s) for using a zero-emission energy source;	**Pass.** The electricity would be utilized by the project owner themselves and would not be exported to other facilities

10	For those facilities and recipients included in the project boundary, that prior to implementation of the project activity (current situation) generated energy on-site (sources of energy in the baseline), the credits can be claimed for minimum of the following time periods: The remaining lifetime of equipments currently being used; and Credit period.	**Pass.** The credit period of 10 years is chosen because it is shorter than the remaining lifetime of equipments currently being used.
11	Waste energy that is released under abnormal operation (for example, emergencies, shut down) of the plant shall not be accounted for.	**Pass.** In case of the abnormal operation, waste gas is released directly the atmosphere, the generator is stopped therefore the waste energy will not be accounted for

The project activity complies with all applicability conditions of methodology ACM0012 (Version03).

Demonstration of use of waste energy in absence of CDM project activity

For type-1 project activity, to demonstrate that the waste energy utilized in the project activity was flared or released into the atmosphere in the absence of the project activity, on site checks conducted by the DOE prior to project implementation will confirm that no equipment for waste energy recovery and utilization, on the WECM stream recovered under the project activity, had been installed prior to the implementation of the CDM project activity.

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

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As per ACM0012, the geographical extent project boundary shall include the following and as Figure B.1:

1. The industrial facility where waste gas/heat/pressure is generated (generator of waste energy). For the proposed project, it is the cement production line where waste heat is generated in Chongqing Municipality Wanzhou Kehua Cement Co. Ltd.

2. The facility where process heat/steam/electricity in element process are generated (generator of process heat/steam/electricity). Equipment providing auxiliary heat to the waste heat recovery process shall be included within the project boundary. For the proposed project, it is the WHR facilities in Chongqing Wanzhou Kehua Cement Co. Ltd.

3. The facility/s where the process heat/steam/electricity in element process is used (the recipient plant(s)) and/or grid where electricity is exported, if applicable. For this case, it is the Central China Power Grid, from which the electricity will be replaced. According to the latest guidelines issued on 9th August 2007 by China's DNA, the geographical boundary of Central China Power Grid covers Henan Province Power Grid, Hubei Province Power Grid, Hunan Province Power Grid, Jiangxi Province Power Grid, Sichuan Province Power Grid and Inner Chongqing Municipality Power Grid. The spatial scope of the project boundary also covers all power plants physically connected to Central China Power Grid.

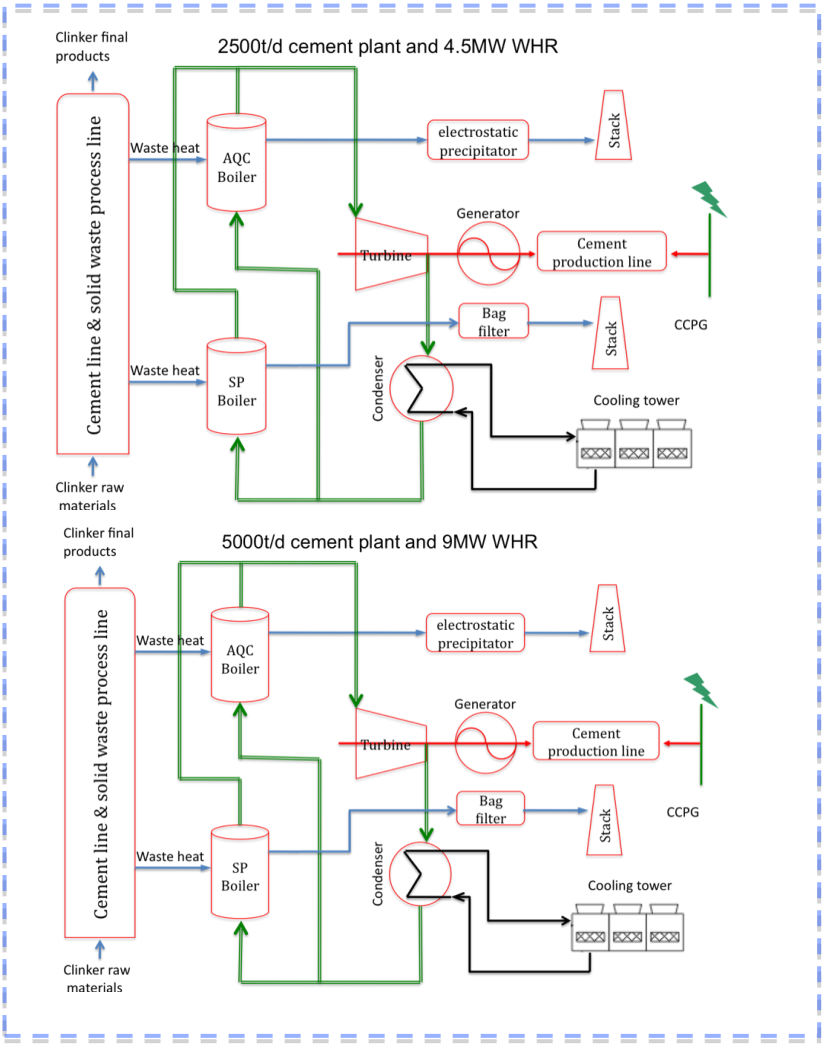

Figure B.1 Flow diagram of the project boundary

Spatial extent of the grid is as defined in the "*Tool to calculate the emission factor for an electricity system*", Version 01. The PDD will discuss the spatial extent of the grid in section B.4 in details.

Overview of emission sources included in or excluded from the project boundary is provided in the following table B.3:

Table B.3 Summary of Gases and Sources Included in the Project Boundary

	Source	Gas	Included/ Excluded	Justification / Explanation
Baseline	Central China Grid electricity generation	CO_2	**Included**	Main emission source
		CH_4	Excluded	Excluded for simplification. This is conservative.
		N_2O	Excluded	Excluded for simplification. This is conservative.
	Fossil fuel consumption in	CO_2	Excluded	There is no fossil fuel consumption

	boiler for thermal energy			in the proposed project.
		CH_4	Excluded	There is no fossil fuel consumption in the proposed project.
		N_2O	Excluded	There is no fossil fuel consumption in the proposed project.
	Fossil fuel consumption in cogeneration plant	CO_2	Excluded	This is not a cogeneration plant.
		CH_4	Excluded	This is not a cogeneration plant.
		N_2O	Excluded	This is not a cogeneration plant.
	Baseline emissions from generation of steam used in the flaring process, if any	CO_2	Excluded	There is no emission from generation of steam used in the flaring process.
		CH_4	Excluded	There is no emission from generation of steam used in the flaring process.
		N_2O	Excluded	There is no emission from generation of steam used in the flaring process.
Project Activity	Supplemental fossil fuel consumption at the project plant	CO_2	Excluded	There is no supplemental fossil fuel.
		CH_4	Excluded	There is no supplemental fossil fuel.
		N_2O	Excluded	There is no supplemental fossil fuel.
	Supplemental electricity consumption	CO_2	**Included**	Main emission source
		CH_4	Excluded	Excluded for simplification.
		N_2O	Excluded	Excluded for simplification.
	Electricity import to replace captive electricity, which was generated using waste gas in absence of project activity	CO_2	Excluded	Only in case captive electricity in the baseline is replaced by import electricity
		CH_4	Excluded	Only in case captive electricity in the baseline is replaced by import electricity
		N_2O	Excluded	Only in case captive electricity in the baseline is replaced by import electricity
	Project emissions from cleaning of gas	CO_2	Excluded	Electricity was consumed in gas cleaning equipment in the baseline as well, project emissions due to electricity consumption for gas cleaning can be ignored
		CH_4	Excluded	Electricity was consumed in gas cleaning equipment in the baseline as well, project emissions due to electricity consumption for gas cleaning can be ignored
		N_2O	Excluded	Electricity was consumed in gas cleaning equipment in the baseline as well, project emissions due to electricity consumption for gas cleaning can be ignored

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

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As per ACM0012, the baseline scenario is identified as the most plausible baseline scenario among all realistic and credible alternative(s). Realistic and credible alternatives should be determined for:

- Waste gas/heat/pressure use in the absence of the project activity; and
- Power generation in the absence of the project activity; and
- Steam/heat generation in the absence of the project activity

In line with the methodology ACM0012, a stepwise determination of the baseline scenario for the proposed project is determined as follows:

Step 1: Define the most plausible baseline scenario for the generation of heat and electricity using the following baseline options and combinations.

For the use of waste gas/heat/pressure, ACM0012 provides four alternatives for consideration as described in Table B.4 below:

Table B.4 Discussion of Alternatives of Use of Waste Heat/Pressure

ID	Alternatives from ACM0012	Justification/Explanation	Plausible/ Not
W1	WECM is directly vented to atmosphere without incineration or waste heat is released to the atmosphere or waste pressure energy is not utilized	Directly venting waste gas which generated in the cement production process to the atmosphere without cleaning is in conflict with the relevant item in the *Emission Standard of Air Pollutants for Cement Industry* GB4915 - 2004, which requires that waste gas to be cleaned before being vented. The waste gas contains dust, SO2 and NOx which are higher than the permitted emission concentration and needs to be pre-cleaned. It is common practice in cement industry for the waste gas to be cleaned by a specified incineration facility. Thus W1 is excluded from further consideration.	N
W2	WECM is released to the atmosphere (for example after incineration) or waste heat is released to the atmosphere or waste pressure energy is not utilized;	Waste heat being released to the atmosphere after cleaning is the current situation. This is the original design of the process and the emission of the waste heat meets the national environmental standards. The original design documents and EIA report of the plant with approval will be shown to DOE during site validation upon request. Hence, W2 is a plausible alternative.	Y
W3	Waste gas/heat is sold as an energy source	As there are no users of heat located near to the cement production facility. Therefore, transport of heat over long distances is not economical. To conclude, W3 is not a plausible alternative.	N
W4	Waste energy is used for	The major energy demand of CWKC is electricity.	Y

	meeting energy demand;	Waste heat cannot be directly used to meet electricity demand. While waste heat can be utilized for electricity generation. This is project activity not undertaken as a CDM project discussed in P1 below. Therefore, W4 is plausible.	
W5	A portion of the waste gas produced at the facility is captured and used for captive electricity generation, while the rest of the waste gas produced at the facility is vented/flared;	The project is Type-1 project, there is no existing industrial facility where the project activity is implemented, that captures and utilizes a portion of the waste gas considered in the project. Therefore, this is not recommended as part of the baseline scenario for the project.	N
W6	All the waste gas produced at the industrial facility is captured and used for export electricity generation	The project is Type-1 project, there is no existing industrial facility where the project activity is implemented, that captures and utilizes a portion of the waste gas considered in the project. Therefore, this is not recommended as part of the baseline scenario for the project.	N

For power generation, the baseline alternatives presented in ACM0012 are discussed below in Table B.5:

Table B.5 Discussion of Alternatives of Power Generation

ID	Alternatives from ACM0012	Justification/Explanation	Plausible/ Not
P1	Proposed project activity not undertaken as a CDM project activity;	The proposed project activity not undertaken as a CDM project is not against any laws or regulations of China. According to the *Feasibility Study Report*, the project activity is technically feasible (although poses poor economical factors). Hence, P1 is a plausible alternative.	Y
P2	On-site or off-site existing/new fossil fuel fired cogeneration plant	The proposed project activity generates electricity only; it is not cogeneration. P2 is not parallel to the proposed project; hence this option is not applicable.	N
P3	On-site or off-site existing/new renewable energy based cogeneration plant	There is no renewable energy resource available at the site of the proposed project; The project activity generates electricity only. P3 is not an applicable alternative.	N
P4	On-site or off-site existing/new fossil fuel based existing captive or identified plant	There is no existing fossil fuel based captive plant or identified plant that can directly provide electricity to plant owner; According to Chinese regulations, coal-fired power plants with capacity less than 135MW are prohibited for construction in the areas covered by the large grids such as provincial grids, and the fossil fuel power units with less than 100MW is strictly regulated for	N

		installation[1]. Considering that the capacity of the proposed project activity is only 12 MW, a new fossil fuel based captive plant with equivalent amount of capacity is now allowed in China. As a conclusion, P4 is not plausible.	
P5	On-site or off-site existing/new renewable energy based existing captive or identified plant	As mentioned previously in P3, there is no renewable energy resource available at the site of the proposed project. P5 is not plausible.	N
P6	Sourced Grid-connected power plants	This is current situation and common practice of cement industry. The grid is Central China Power Grid. P6 is plausible.	Y
P7	Captive Electricity generation from waste gas (if project activity is captive generation with waste gas, this scenario represents captive generation with lower efficiency than the project activity)	There is no such technology to generate electricity with lower efficiency and financially attractive at same time. P7 is not plausible.	N
P8	Cogeneration from waste gas (if project activity is cogeneration with waste gas, this scenario represents cogeneration with lower efficiency than the project activity)	Not parallel since the project activity does not involve cogeneration. P8 is not plausible.	N
P9	Existing power generating equipment (used previous to implementation of project activity for captive electricity generation from a captured portion of waste gas) is either decommissioned to build new more efficient and larger capacity plant or modified or expanded (by installing new equipment), and resulting in higher efficiency, to produce and only export electricity generated from	Previous to the implementation of project activity, no waste gas is captured for power generation. P9 is not plausible	N

[1] This regulation has been valid since 2002, the notification is available on the Internet: http://www.gov.cn/gongbao/content/2002/content_61480.htm.

	waste gas. The electricity generated by existing equipment for captive consumption is now imported from the grid		
P10	Existing power generating equipment (used previous to implementation of project activity for captive electricity generation from a captured portion of waste gas) is either decommissioned to build new more efficient and larger capacity plant or modified or expanded (by installing new equipment), and resulting in higher efficiency, to produce electricity from waste gas (already utilized portion plus the portion flared/vented) for own consumption and for export;	Previous to the implementation of project activity, no waste gas is captured for power generation. P10 is not plausible	N
P11	Existing power generating equipment is maintained and additional electricity generated by grid connected power plants.	No existing power generating equipment in CWKC, all the electricity required by CWKC is purchased from the Central China Power Grid	N

For heat generation, the methodology ACM0012 presents 9 alternatives for discussion. However, for the specific case of the proposed project, they are all not applicable/plausible due to the following reasons discussed in Table B.6:

Table B.6 Discussion of Alternatives of Heat Generation

ID	Alternatives from ACM0012	Justification/Explanation	Plausible/ Not
H1-H9	Alternatives from H1 to H9 in ACM0012 for heat generation	The proposed project activity does not involve heat generation; the alternatives for heat generation are not parallel to the project activity. As per ACM0012, if the methodology is to be applicable where the waste heat is used for generating one form of energy only (electricity or heat), then the baseline too should be only generation of one form of energy (electricity or	N

		heat respectively). Hence, alternatives from H1 to H9, which are for heat generation, are not plausible.	

For mechanical energy generation, the methodology ACM0012 presents 5 alternatives for discussion. While for the specific case of the proposed project, they are all not applicable/plausible due to the following reasons discussed in Table B.7:

Table B.7 Discussion of Alternatives of Mechanical Energy Generation

ID	Alternatives from ACM0012	Justification/Explanation	Plausible/ Not
M1-M5	Alternatives from M1 to M5 in ACM0012 for Mechanical Energy generation	The proposed project activity does not involve mechanical energy generation; the alternatives for mechanical energy generation are not parallel to the project activity. Hence, alternatives from M1 to M5, which are for Mechanical Energy generation, are not plausible.	N

Based on discussion above, the plausible alternatives are:

- W2: WECM is released to the atmosphere (for example after incineration) or waste heat is released to the atmosphere or waste pressure energy is not utilized;
- W4: Waste energy is used for meeting energy demand;
- P1: Proposed project activity not undertaken as a CDM project activity;
- P6: Sourced Grid-connected power plants;

The plausible combinations of baseline options are summarized in Table B.6 as following:

Table B.8 Plausible Combinations of Baseline Options

ID	Baseline Options				Description of Combinations
	Waste Energy	Power	Heat	Mechanical energy	
B1	W2	P6	/	/	Waste heat from cement production line is released to the atmosphere as usual; equivalent amount of electricity is supplied from Central China Power Grid.
B2	W4	P1	/	/	Proposed project activity not undertaken as a CDM project activity.

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

Both alternative B1 and alternative B2 from *STEP 1* do not involve any direct consumption of fossil fuels. For baseline scenario B1, there is no electricity supply constraint in Central China Power Grid.

STEP 3: Application of Step 2 and/or Step 3 of the latest approved version of the "Tool for the demonstration and assessment of additionality"

Version 5.2 of "Tool for the demonstration and assessment of additionality" is used for the proposed project. According to the investment analysis in section B.5 below, alternative B1, which is also continuation of current situation, does not need any additional investment. However, the proposed project activity not undertaken as a CDM project poses poor financial indicator such as IRR of 6.85%, which is lower than the 11% benchmark.
As a conclusion, the proposed project activity not undertaken a CDM project is not financially attractive hence not a feasible baseline option. Alternative B1 remains as the only alternative.

Please refer to section B.5 for more details.

STEP 4: If more than one credible and plausible alternative scenario remain, the alternative with the lowest baseline emissions shall be considered as the most likely baseline scenario.

As a result of the analysis in preceding steps, there is only one credible and plausible scenario remains, which is:

Baseline Scenario: Waste heat from cement production line is released to the atmosphere directly and equivalent amount of electricity is obtained from Central China Power Grid.

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):

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Additionality of the Project is demonstrated based on Version 05.2 of "*Tool for the demonstration and assessment of additionality*".

Previously announced projects screen (early consideration of CDM)

The CDM registration will have, as its main impact, an increase in the commercial attractiveness of the project, raising the IRR above the benchmark and thus make the project feasible by helping to overcome the investment barrier.

Table B.9 provides an overview of key events in the development of the project, which indicates that the benefits from CDM have been taken into account in an early stage of the development of the waste heat recovery projects, before the start of the project activity defined in accordance with CDM Glossary and Terms

Table B.9 Overview of key events in the development of the project

Time	Key Event
March 2007	Beijing Yumu Consultation Corporation (BYC) contacted CWKC and reached an agreement on a possible CDM project cooperation.

Early June 2007	CWKC commissioned Chongqing Yujing Energy Technology Design Institute to conduct the feasibility study of the waste heat recovery project. Possible CDM revenues were taken into account in the economic analysis.
12th June 2007	The economic analysis of feasibility study report indicated that the project IRR is 6.85%, which is unlikely to be financially attractive, only in case that the project activity gets external financial support like CDM, the investment risk can be decreased. According to the simple estimation in FSR, the project IRR with CDM revenue can reach 13.36%. Based on the conclusion above in FSR, the board of CWKC made the decision to develop this WHR project as a CDM project.
22nd June 2007	Approval of Feasibility Study Report (FSR)
7th August 2007	Approval of Environment Impact Assessment (EIA)
September 2007	BYC invited buyer South Pole Carbon Asset Management Ltd. (SPC) to conduct site visit due diligence at CWKC's site.
18th October 2007	SPC signed Emission Reduction Purchase Agreement (ERPA) with CWKC.
22nd October 2007	Start of project activities (Boiler of 4.5MWpower plant contracted)
1st April 2008	Civil work and equipment installation of 4.5MW unit start
18th June 2008	Documents submission for DNA approval of China
28th August 2008	ERPA resigned due to floor price of China DNA
28th October 2008	LoA of China issued
December 2008	Equipment installation completion of 4.5MW unit
3rd January 2009	Commissioning of 4.5MW unit

Application of additionality tool (version 05.2)

As per ACM0012, the additionality of the project activity will be demonstrated and assessed using the latest version of the "*Tool for the demonstration and assessment of additionality*" agreed by the CDM Executive Board. Version 5.2 of the tool is the latest one.

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

Sub-step 1a. Define alternatives to the project activity:
As stated in preceding section B.4, the alternatives to the project activity are combinations of options for using waste heat and power generation. As a result, the plausible baseline scenario alternatives are:

Scenario B1: Waste heat from cement production line is released to the atmosphere as usual; equivalent amount of electricity is supplied from Central China Power Grid;
Scenario B2: Implementation of the proposed bundled project without consideration of CDM revenues B1 is also continuation of current situation.

Outcome of Step 1a: The realistic and credible alternative scenarios to the project activity are scenario B1 and B2 stated above. Please refer to section B.4 for more details of options identification.

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

Scenario B1, current operation of the plant, is in compliance with mandatory legislation and regulations applicable in Chongqing Province and China. CWKC has valid business license and tax registrations for operation of the cement plant; the company performed EIA and FSR prior to construction of the cement production line; as mentioned in section B.4, atmospheric release of the waste heat – although not encouraged by the Chinese authorities – is in compliance with existing policies and regulations.

Scenario B2, the proposed project activity undertaken without registered as a CDM project is also in compliance with mandatory legislation and regulations. The plant owner has performed EIA and FSR for the power generation facility in Aug. 2006 and July 2007 respectively; the plant has acquired approval of the EIA and FSR from local government.

All relevant documents and evidence are available to be shown to DOE by time of validation.

Outcome of Step 1b: Alternative scenarios B1 and B2 both are in compliance with mandatory legislation and regulations applicable in Chongqing Province and China. Neither of them is against any EB decisions on national and/or sectoral policies and regulations.

Step 2. Investment analysis

Determine whether the proposed project activity is not:

(a) The most economically or financially attractive; or
(b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).

In this PDD, method (a) will be utilized, investment analysis determines whether the proposed project activity is economically or financially less attractive than alternative B1, identified in step 1, without the revenue from the sale of certified emission reductions (CERs). To conduct the investment analysis, the PDD uses the following sub-steps:

Sub-step 2a. Determine appropriate analysis method

The "Tool for the Demonstration and Assessment of Additionality" provides three investment analysis methods for selection, which are simple cost analysis (Option I), investment comparison analysis (Option II) and benchmark analysis (Option III).

Besides the revenue from the CDM, the project activity does generate financial and economic benefits through reduction of electricity purchase from the grid. Therefore Option I "simple cost analysis" is not appropriate. Currently the plant owner does not have any investment options other than the proposed project activity, hence Option II "investment comparison analysis" is not preferable; the PDD here applies Option III "benchmark analysis" to perform the investment analysis and demonstrate that the proposed project activity is not likely to be the most financially attractive option.

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

The proposed project uses project IRR as the financial indicator and benchmark is derived from government-approved benchmark where such benchmarks are used for investment decisions; the official

benchmark IRRs are publicly available. According to "*The Economic Assessment Method and Parameters for Construction Projects (version 03)*[2]", the lowest cement production benchmark IRR is 11%.

The key figures and project IRR with and without revenue from CERs are listed in the following Table B.10. Without CERs revenue, the project IRR of the proposed project is 6.85%, lower than the benchmark IRR. While considering CERs revenue, the IRR of the proposed project is 13.36%, higher than the benchmark.

Table B.10 Key Financial figures and Project IRR with/without CERs Revenue

Parameter		Unit	Value	Source
Total Investment		Million RMB	90.67	FSR
Loan from Bank		Million RMB	63.47	FSR
Annual interest on bank loan		%	6.39%	FSR
Annual Operation Cost		Million RMB	22.24	FSR
Installation Capacity		MW	13.5	FSR
Annual Reduction of Power purchase		MWh	81,969	FSR
Electricity Purchase Tariff (Without tax)		RMB/ kWh	0.393	FSR
Lifetime of the project		Years	20	FSR
Building Depreciation		Years	30	FSR
Equipment Depreciation		Years	9	FSR
VAT		%	17%	FSR
VAT additional tax	Education surtax	%	3%	FSR
	City maintenance construction tax	%	7%	FSR
Income Tax*		%	33%	FSR
Annual CERs		tCO2e/ a	78,000	FSR
CERs Price		RMB/ tCO2e	82	FSR
Project Lifetime		a	20	FSR
IRR without CERs Revenue		%	6.85%	FSR
IRR without CERs Revenue*		%	6.87%	Calculation
IRR with CERs Revenue		%	13.36%	FSR

* Income tax: means the inclement of the income tax of CWKC by the increased profit from replacement of the electricity purchased from the grid

* IRR without CERs Revenue (Calculation): It is calculated by project proponents to use the original figures and method of FSR

Sub-step 2d. Sensitivity analysis:

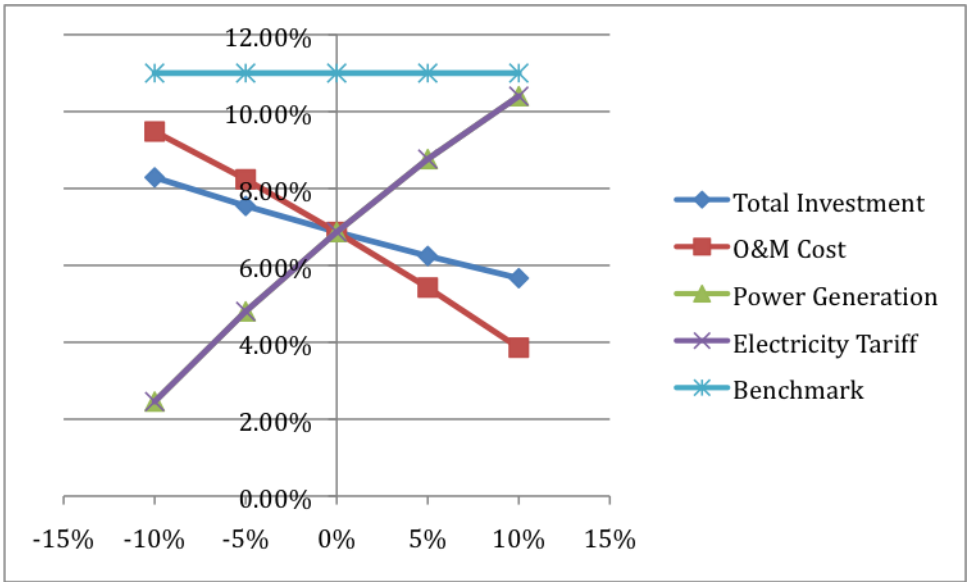
Purpose of sensitivity analysis is to show whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions. The variables chosen for sensitivity analysis

[2] Issued by the National Development and Reform Commission and the Ministry of Construction, published by China Planning Publishing House.

are total investment, cost of operation and maintenance (O&M), electricity purchase tariff and quantity of power generation.
Variations in IRR driven from fluctuation of total investment, O&M cost, electricity purchase tariff and quantity of power generation are summarized in Table B.11 as following:

Table B.11 Sensitive Analysis of IRR

Variable	-10%	-5%	0	+5%	+10%
O&M Cost	9.48%	8.24%	6.87%	5.42%	3.86%
Electricity purchase Tariff	2.46%	4.80%	6.87%	8.76%	10.40%
Power Generation	2.46%	4.80%	6.87%	8.76%	10.40%
Total Investment	8.29%	7.55%	6.87%	6.24%	5.67%



The analysis shows that the IRR is more sensitive to the electricity supply, while it is less sensitive to O&M cost. The IRR is always less than the benchmark of 11% when the two parameters fluctuate in the range of -10% to +10%.

The project owner has contracted with local grid company that in the first 4 years of 2500t/d cement production line operation period, the electricity purchase tariff is fixed as 0.393 RMB/kwh. Furthermore the possibility of the decrease of total investment and O&M cost is also very small due to the fast growth of commodity price in China. Therefore a situation with all considered sensitivity parameters having the most favorable value (best case scenario) is very unlikely to happen.

Outcome of Step 2:
Since after the sensitivity analysis it is concluded that the proposed CDM project activity is unlikely to be financially attractive, step 3 of "barrier analysis" is not required by the additionality tool.

Step 3. Barrier analysis
N/A

Step 4. Common practice analysis
Sub-step 4a – Analyze other activities similar to the proposed project activity

At present, approximately 4,700 cement plants are operating in China. Among these plants, a few cement plants are utilizing the waste heat to generate electricity. The list of the plants includes as table B.12 below, these WHR project obtain financial support from various kinds of ways, without these supports they also will face financial barrier.

Table B.12 WHR projects which obtain financial support from various kinds of ways

Plant Name	Location	Support by	How
Ningguo (6.48MW) [3]	Anhui	Japanese New Energy Development Organization (NEDO)	WHR equipments donation
Tongli (18MW) [4]	Henan	National debt supporting program	23 million RMB subsidies
Liwanbushen[5]	Sichuan	National debt supporting program	3.2 million RMB subsidies
Donghua[6]	Shandong	National debt supporting program	25.9 million RMB subsidies
Tianzhu[7]	Chongqing	National debt supporting program	Subsidies
Lafarge[8]	Chongqing	National debt supporting program	6.5 million RMB subsidies
Jinjiang[9]	Chongqing	2008 Fourth Quarter 100 billion Central investment program	Subsidies 8% of total investment and high electricity purchase tariff
Shenhe (3MW) [10]	Zhejiang	United Nations Development Program (UNDP) and Global Environment Fund (GEF)	Financial support by *GHG Reduction of China Township and village enterprise (TVE) Program*
Yufeng (5.7MW) [11]	Guangxi	Japan Kawasaki Group	40.4million RMB grant
Liulihe (12MW) [12]	Beijing	Beijing Government	13 million RMB subsidies

Besides these plants, there are also some plants that plan to utilize the waste heat to generate electricity. However those plants are excluded in the analysis since they are being conducted as CDM project

[3] http://www.bcluye.com/gl/rd/200803/47.html
[4] http://www.cbmm.com.cn/Info.aspx?ModelId=1&Id=21555
[5] http://www.gagyw.com/E_ReadNews.asp?NewsID=970
[6] http://www.zibo.net/shownews.asp?id=132
[7] http://wjj.cq.gov.cn/hyxx/jc/20081218260.HTM
[8] http://wjj.cq.gov.cn/jnhb/20080222201.HTM
[9] http://www.cq.xinhuanet.com/news/2008-12/19/content_15226054.htm
[10] http://www.jxet.net/gov/news/jxjm/200551084432.html
[11] http://www.smelz.gov.cn/news/3460.htm
[12] http://www.snsqw.com/news/schq/neiyuan/200610/13556.html

activities.

In 2008, the first cement WHR power plant of Chongqing was put into operation, until to the end of 2008, including project activity, totally 7 Cement Waste Heat Recovery power plants are constructing or operating in Chongqing region[13]. The rest 6 plants detail information is listed as Table B.13. Considering all these 6 projects, they all faced financial barrier and need financial support from various kinds of ways.

Table B.13 Waste Heat Recovery power plants which are constructing or operating in Chongqing region

Plant Name	Capacity	Location	Activty
Tianzhu[14]	9MW	Chongqing	Subsidies from National debt supporting program
Lafarge NanShan[15]	7.5MW	Chongqing	6.5 million RMB subsidies from National debt supporting program
Lafarge Teshuichang[16]	7.5MW	Chongqing	6.5 million RMB subsidies from National debt supporting program
Jinjiang[17]	/	Chongqing	Subsidies 8% of total investment from 2008 Fourth Quarter 100 billion Central investment program and high electricity purchase tariff
Runjiang[18]	13.5MW	Chongqing	Applying CDM
Jingjiu[19]	9MW	Chongqing	Applying CDM

Therefore, considering the number of cement plants in China especially Chongqing region and the current situation of waste heat power generation projects, it is considered that similar activities are not widely observed and commonly carried out in China and Chongqing Municipality.

Sub-step 4b – Discuss any similar options that are occurring

According to the existing information, there is one cement company, which is planning to implement WHR project activity in Jiangxi Province. The company's name is Jiangxi Wangnianqing Cement Co., Ltd. Because of above mentioned barriers and lack of financial attractiveness, Jiangxi Wannianqing Cement Co., Ltd has not implemented its WHR project yet but is preparing to implement it as a CDM project activity. The WHR project as CDM project activity has already been approved by China DNA[20].

Since the Sub-steps 4a and 4b are satisfied, the Project activity is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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[13] http://www.xbsn.com/news/ShowArticle.asp?ArticleID=25825
[14] http://info.6jc.cn/Article/n/cn/200809/3447.html
[15] http://www.chinacements.com/news/2008/10-10/C152934667.htm
[16] http://www.sinomach.com.cn/news/526454.html
[17] http://www.cq.xinhuanet.com/news/2008-12/19/content_15226054.htm
[18] http://www.cqyanjia.cn/cn/newsshow.asp?Id=265
[19] http://www.sinoma-ec.cn/info.aspx?ID=86
[20] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1320.pdf

1. Baseline Emissions

As per ACM0012, the baseline emissions for the year *y* shall be determined as follows:

$$BE_y = BE_{En,y} + BE_{flst,y} \quad (1)$$

Where:

BE_y are total baseline emissions during the year y in tons of CO2

$BEE_{n,y}$ are baseline emissions from energy generated by project activity during the year y in tons of CO2

$BE_{flst,y}$ baseline emissions from generation of steam, if any, using fossil fuel, that would have been used for flaring the waste gas in absence of the project activity (tCO2e per year). This is relevant for those project activities where in the baseline steam is used to flare the waste gas.

Calculation of $BE_{En,y}$

The calculation of baseline emissions ($BE_{En,y}$) depends on the identified baseline scenario. The ACM0012 provides two scenarios:

- Scenario 1 represents the situation where the electricity is obtained from a specific existing power plant or from the grid and heat from a fossil fuel based element process (e.g. steam boiler, hot water generator, hot air generator, hot oil generator).
- Scenario 2 represents the situation where the recipient plant(s) obtains electricity and/or heat generated (steam, hot air, hot oil or hot water, etc.) by a fossil fuel based existing/ new cogeneration plant.

Baseline scenario of the proposed project falls under *Scenario 1* above. As per the methodology, equation (*1a*) applies for calculation of $BE_{En,y}$:

$$BE_{En,y} = BE_{Elec,y} + BE_{Ther,y} \quad (1a)$$

Where:

$BE_{Elec,y}$ are baseline emissions from electricity during the year *y* in tons of CO2

$BE_{Ther,y}$ are baseline emissions from thermal energy (due to heat generation by element process) during the year *y* in tons of CO2

The waste heat of this project activity is belong to Type-1 category and used to generate electricity, formula of case-1 should be used to calculate the baseline emission, as per the methodology:

(a.i) Baseline emissions from electricity ($BE_{electricity,y}$) Type-1 activities:

Case-1: Waste energy is used to generate electricity

$$BE_{Elec,y} = f_{cap} * f_{wcm} * \sum_j \sum_i (EG_{i,j,y} * EF_{Elec,i,j,y}) \quad (1a\text{-}1)$$

Where:

$BE_{elec,y}$ are baseline emissions due to displacement of electricity during the year *y* in tons of CO_2

$EG_{i,j,y}$ is the quantity of electricity supplied to the recipient *j* by generator, which in the absence of the project activity would have been sourced from i^{th} source (*i* can be either grid or identified source) during the year *y* in MWh, and

$EF_{elec,i,j,y}$ is the CO2 emission factor for the electricity source *i* (*i*=gr (grid) or *i*=is (identified source)), displaced due to the project activity, during the year *y* in tons CO2/MWh

f_{wcm} Fraction of total electricity generated by the project activity using waste energy. This fraction is 1 if the electricity generation is purely from use of waste energy. If the boiler providing steam for electricity generation uses both waste and fossil fuels, this factor is estimated using equation (1d) of ACM0012. If the steam used for generation of the electricity is produced in dedicated boilers but supplied through common header, this factor is estimated using equation (1d/1e) of ACM0012. For the project activity, this fraction is 1 because the electricity generation are purely from use of the waste heat.

f_{cap} Energy that would have been produced in project year *y* using waste energy generated in base year expressed as a fraction of total energy produced using waste source in year *y*. The ratio is 1 if the waste energy generated in project year *y* is same or less than that generated in base year. The value is estimated using equations (1f), or (1f-1) or (1f-2), or (1g), (1g-1) or (1h)

For the proposed project activity, equation (1a-1) can be simplified as following:

$$BE_{Elec,y} = f_{cap} \times EG_y \times EF_{Grid,y} \quad (1a\text{-}1)$$

Calculation of $EF_{elec,i,j,y}$

For the proposed project, the displaced electricity is supplied by a connected grid system (CCPG). According to ACM0012, the CO2 emission factor of the electricity $EF_{elec,i,j,y}$ shall be determined following the guidance provided in the version 1 "Tool to calculate the emission factor for an electricity system".

Step 1. Identify the relevant electric power system

As per delineation of Chinese national electric system published by *National Development and Reform Commission*, which is also Chinese DNA, the relevant electric power system is *Central China Power Grid*. The Project's electricity generation unit is connected to the *Chongqing Power Grid* via local grid network, and thus finally to the *Central China Power Grid*. The *Central China Power Grid* is a large regional grid, which consists of six sub-grids *Henan Province Power Grid, Hubei Province Power Grid, Hunan Province Power Grid, Jiangxi Province Power Grid, Sichuan Province Power Grid and Inner Chongqing Municipality Power Grid*. There is substantial inter-grid power exchange among the above-mentioned sub-grids of the *Central China Power Grid*. The *Central China Power Grid* can be clearly identified as regional grid and information on the characteristics of this grid is publicly available. [21]

To determine the operating margin emission factor, use the simple operating margin emission rate of the exporting grid, determined as described in step 3 (a) to calculate the CO_2 emission factor(s) for net electricity imports ($EF_{grid,import,y}$) from a connected electricity system within the same host country(ies).

Step 2. Select an operating margin (OM) method

"Tool to calculate the emission factor for an electricity system" (Version 1) outlines four options for the calculation of the Operating Margin emission factor(s) ($EF_{OM,y}$):

[21] National Development and Reform Commission of China published delineation of the electricity grid of China. Please visit http://cdm.ccchina.gov.cn/web/index.asp for more details.

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

As per *"Tool to calculate the emission factor for an electricity system"* (Version 1), any of the four methods can be used. "Dispatch Data Analysis" method is not selected herein, because dispatch data are not available to the public or to the project participants. For the same reason, the simple adjusted OM methodology cannot be used.

The Simple OM method has been chosen instead. This is possible because low cost/ must run resources account for less than 50% of the power generation in the grid in most recent years. From 2001 to 2005, according to gross annual power generation statistics for the *Central China Power Grid*, the ratio of power generated by hydro-power and other low cost/compulsory resources was: 36.76%, 35.95%, 34.43% 38.54%, 38.67% and 36.97% for 2001, 2002, 2003, 2004, 2005 and 2006 respectively, Therefore, it can be shown that low-cost/compulsory resources constitute less than 50% of total grid generation in the *Central China Power Grid*. Thus, the simple OM method is applicable.[22]

The simple OM of the grid for the proposed project is calculated using the 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 to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period.

Step 3. Calculate the operating margin emission factor according to the selected method

The simple Operating Margin (OM) emission factor ($EF_{grid,OMsimple,y}$) is calculated as the generation-weighted average emissions per electricity unit (tCO2/MWh) of all generating sources serving the system, not including low-operating cost and must-run power plants. As per *"Tool to calculate the emission factor for an electricity system"* (Version 1), it may be calculated:

- Based on data on fuel consumption and net electricity generation of each power plant / unit (Option A), or
- Based on data on net electricity generation, the average efficiency of each power unit and the fuel type(s) used in each power unit (Option B), or
- Based on data on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system (option C)

Since neither the data of fuel consumption nor the net electricity generation for every single electricity generation plant/unit is publicly available for *Central China Power Grid*, the proposed project uses Option C for simple OM calculation. The calculation is based on the total net electricity generation and the fuel types and total fuel consumption of each provincial sub-grid of *Central China Power Grid*. A three-year average, based on the most recent fuel consumption statistics available at the time of PDD submission, is used ("ex-ante" approach).

The calculation equation of the Simple OM is as follows:

[22] *China Energy Year Book, 2002-2006*

$$EF_{Grid,OMsimple,y} = \frac{\sum_{i,m} FC_{i,m,y} \cdot NCV_{i,y} \bullet EF_{CO2,i,y}}{\sum_{m} EG_{m,y}} \qquad \text{Equation (1)}$$

Where:

$EF_{grid,OMsimple,y}$	Simple operating margin CO2 emission factor in year *y* (tCO2/MWh)
$FC_{i,m,y}$	Amount of fossil fuel type *i* consumed by power plant/unit m 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)
$EF_{CO2,i,y}$	CO2 emission factor of fossil fuel type *i* in year *y* (tCO2/GJ)
$EG_{m,y}$	Net electricity generated and delivered to the grid by power plant/unit *m* in year *y* (MWh)
m	All power plants/units serving the grid in year *y* except low-cost/must-run power plants/units [23]
i	All fossil fuel types combusted in power plant / unit m 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 2004, 2005 and 2006 are calculated separately and then the three-year average is calculated as a full-generation-weighted average of the emission factors. For details please refer to Annex 3. The result of the Operation Margin Emission Factor calculation is 1.2783 tCO_2e/MWh.

The operating margin emission factor of the baseline is calculated as a fixed ex-ante value and will not be renewed within the first crediting period of the project activity.

Step 4. Identify the cohort of power units to be included in the build margin

As per the emission factor tool, the sample group of power units m used to calculate the build margin consists of either:

(a) The set of five power units that have been built most recently, or

(b) The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

However, in China it is very difficult to obtain the data of the five existing power plants built most recently or the power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that were built most recently. Taking notice of this situation, EB accepts[24] the following deviation in methodology application:

[23] Here the proposed project uses each provincial sub-grid as an electricity plant/unit in this equation, since total electricity generation and fuels consumption is available for each sub-grid. Electricity imports from a connected electricity system should be considered as one power source j.

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

1) 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) Proportional weights that correlate to the distribution of installed capacity in place during the selected period above are applied, using plant efficiencies and emission factors of commercially available best practice technology in terms of efficiency. It is suggested to use the efficiency levels of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy.

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 the 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.

Project participants have chosen *Option 1* for BM calculation.

Step 5. Calculate the build margin emission factor

As per the method of Chinese NDRC accepted by EB, since there is no way to separate the different generation technology capacities based on coal, oil or gas fuel etc from the generic term “thermal power” in the present energy statistics, the following calculation measures will be taken:

First, according to the energy statistics of the selected period in which approximately 20% capacity has been added to the grid, determine the ratio of CO_2 emissions produced by solid, liquid, and gas fuel consumption for power generation; than 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 1
Calculate the proportion of CO_2 emissions related to consumption of coal, oil and gas fuel used for power generation as compared to total CO_2 emissions from the total fossil fuelled electricity generation (sum of CO_2 emissions from coal, oil and gas).

$$\lambda_{Coal} = \frac{\sum_{i \in COAL, j} F_{i,j,y} \cdot COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \cdot COEF_{i,j}} \quad \text{Equation (2)}$$

$$\lambda_{Oil} = \frac{\sum_{i \in OIL, j} F_{i,j,y} \cdot COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \cdot COEF_{i,j}} \quad \text{Equation (3)}$$

$$\lambda_{Gas} = \frac{\sum_{i \in GAS, j} F_{i,j,y} \cdot COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \cdot COEF_{i,j}} \quad \text{Equation (4)}$$

Where,

$F_{i,m,y}$, is the amount of fuel i (in a mass or volume unit) consumed by power sources j in year(s) y,

$COEF_{i,j,m}$ is the CO_2 emission coefficient of fuel i (tCO_2e/mass or volume unit of the fuel), taking into account the carbon content of the fuels used by power plants m and the oxidation percentage of the fuel in year(s) y,

Coal, *Oil* and *Gas* stands for solid, liquid and gas fuels respectively.

Sub-step 2: Calculate the operating margin emission factor of fuel-based generation.

$$EF_{Thermal} = \lambda_{Coal} \cdot EF_{Coal,Adv} + \lambda_{Oil} \cdot EF_{Oil,Adv} + \lambda_{Gas} \cdot EF_{Gas,Adv} \quad \text{Equation (5)}$$

Where,

$EF_{Thermal}$ is the weighted emissions factor of thermal power generation with the efficiency level of the best commercially available technology in China in the previous three years.

$EF_{Coal,Adv}, EF_{Oil,Adv}, EF_{Gas,Adv}$ are the emission factors of coal, oil and gas-fired power generation with efficiency levels of the best commercially available technology in China in the previous three years.

A coal-fired power plant with a total installed capacity of 600 MW is assumed to be the best commercially available technology in terms of efficiency, the estimated coal consumption of such a National Sub-critical Power Station with a capacity of 600MW is 329.94 gce/kWh, which corresponds to an efficiency of 37.28% for electricity generation.

For gas and oil power plants a 200MW powe r plant with a specific fuel consumption of 252 gce/kWh, which corresponds to an efficiency of 48.81% for electricity generation, is selected as the best commercially available technology in terms of efficiency.

The main parameters used for calculation of the thermal power plant emission factors $EF_{Coal,Adv}$, $EF_{Oil,Adv}$, $EF_{Gas,Adv}$ are provided in Annex3.

Sub-step 3: Calculate the Build Margin emission factor

$$EF_{grid,BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \cdot EF_{Thermal} \quad \text{Equation (6)}$$

Where,

CAP_{Total} is the total capacity addition of the selected period in which approximately 20% capacity has been added to the grid,

$CAP_{Thermal}$ is the total thermal power capacity addition of the selected period in which approximately 20% capacity has been added to the grid.

Detailed calculations are provided in Annex 3.

The result of the Build Margin emission factor calculation is 0.6687 tCO_2e/MWh.

As mentioned above, the build margin emission factor of the baseline is calculated as a fixed ex-ante value and will not be renewed within the first crediting period.

The data sources for calculating OM and BM are:

1. Installed capacity, power generation and the rate of internal electricity consumption of thermal power plants for the years 2004 to 2006
   Source: *China Electric Power Yearbook* (2005-2007)
2. Fuel consumption and the net caloric value of thermal power plants the years 2004 to 2006
   Source: *China Energy Statistics Yearbook* (figures are for 2005-2007)
3. Carbon emission factor and carbon oxidation factor of each fuel
   Source: *Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Workbook*, P1.23 and P1.24 in Chapter one.

Step 6. Calculate the combined margin emissions factor

The Baseline Emission Factor is calculated as a Combined Margin, using the weighted average of the Operating Margin and Build Margin.

$$EF_{grid,CM,y} = w_{OM} \cdot EF_{grid,OM,y} + w_{BM} \cdot EF_{grid,BM,y} \quad \text{Equation (7)}$$

The operating margin emission factor ($EF_{grid,OM,y}$) of Central China Power Grid is 1.2783 tCO_2e/MWh and the build margin emission factor ($EF_{grid,BM,y}$) is 0.6687 tCO_2e/MWh. The defaults weights are used as specified in the emission factor tool: $w_{OM} = 0.5; w_{BM} = 0.5$

The result of the Baseline Emission Factor (EF_y) calculation is 0.9735tCO_2e/MWh.

Capping of baseline emissions

As a measure of conservativeness, ACM0012 requires that baseline emissions should be capped. Three methods are outlined in the methodology for calculating this. For the proposed project, the 9MW unit is under construction, there is no 3 years historical data available. Therefore method one is not applicable. On the other side, due to technical limitations (i.e. high dust concentration in the air containing the waste heat and strong fluctuations in pressure and flow) in direct monitoring of the waste heat, hereby the proposed project activity is a "Case-2 type project" under the Method 3 as the energy is recovered from WECM and converted into final output energy through waste heat recovery equipment. For such cases f_{cap} should be the ratio of actual energy recovered under the project activity (direct measurement) divided by

the maximum theoretical energy recoverable using the project activity waste heat recovery equipment. For estimating the theoretical recoverable energy, manufacturer's specifications can be used. Alternatively, technical assessment can be conducted by independent qualified/certified external process experts such as chartered engineers.

$$f_{cap} = \frac{Q_{OE,BL}}{Q_{OE,y}} \qquad \text{Equation (8)}$$

Where:

$Q_{OE,BL}$ Output/intermediate energy that can be theoretically produced (in appropriate unit), to be determined on the basis of maximum recoverable energy from the WECM, which would have been released (or WECM would have been flared or energy content of WECM would have been wasted) in the absence of CDM project activity.

$Q_{OE,y}$ Quantity of actual output/intermediate energy during year y (in appropriate unit)

The proposed project generates electricity only, from FSR which is conducted by Chongqing Yujing Energy Technology Design Institute, the maximum electricity recovered from the waste heat is 81,969MWh; i.e. $Q_{OE,BL,elec}$=81,969MWh

We apply a value of 1 in subsequent calculations of emission reductions. The project entity will monitor electricity output ($Q_{OE,y,elec}$) of the proposed project activity in accordance with the methodology and f_{cap} will be updated ex-post in case the actual electricity and heat output exceeds the electricity and heat output which is theoretically available on the basis of the current baseline conditions.

b) Baseline emissions from thermal energy ($BE_{ther,y}$)

The proposed project activity generates electricity only; hence the baseline emissions from thermal energy are neglected.

$$BE_{ther,y} = 0$$

2. Project Emissions

Project Emissions include emissions due to combustion of auxiliary fuel to supplement waste gas and emissions due to consumption of electricity for cleaning of gas before being used for generation of heat/energy/electricity.

$$PE_y = PE_{AF,y} + PE_{EL,y} \qquad (2)$$

Where:

PE_y Project emissions due to project activity.

$PE_{AF,y}$ Project activity emissions from on-site consumption of fossil fuels by the cogeneration plants, in case they are used as supplementary fuels, due to non-availability of waste gas to the project activity or due to any other reason.

$PE_{EL,y}$ Project activity emissions from on-site consumption of electricity for gas cleaning equipment or other supplementary electricity consumption.

Note: In case the electricity was consumed in gas cleaning equipment in baseline as well, project emissions due to electricity consumption for gas cleaning can be ignored, hence $PE_{EL,y}$ indicates the emissions due to supplementary electricity consumption (as per Table B.3: Summary of gases and sources included in the project boundary).

1) Project emissions due to auxiliary fossil fuel
The proposed project does not involve any consumption of fossil fuel. Hence project emissions due to auxiliary fossil fuel is neglected.

2) Project emissions due to supplementary electricity consumption.
Project emissions from consumption of additional electricity by the project are determined as follows:

$$PE_{EL,y} = EC_{PJ,y} \times EF_{CO2,EL,y} \quad (2b)$$

Where:

$PE_{EL,y}$	Project emissions from supplementary electricity consumption of project activity (t CO2/yr)
$EC_{PJ,y}$	Supplementary electricity consumption in year y as a result of the implementation of the project activity (MWh)
$EF_{CO2,EL,y}$	CO2 emission factor for electricity consumed by the project activity in year y (t CO2/MWh)

The proposed project uses waste heat to generate electricity, no additional fuel will be used as auxiliary fuel, $PE_{AF,y}$ =0; Therefore for this project, $PE_y = PE_{EL,y} = EC_{PJ,y} \times EF_{CO2,EL,y}$

3. Leakage
There is no equipment transfer from/to another site involved in proposed project activity. Hence, there is no leakage in project activity.

4. Emission Reductions

$$ER_y = BE_y - PE_y \quad (3)$$

Where:

ER_y	Emission reductions by project activity in year *y*, tCO2e
BE_y	Baseline emissions in year *y*, MWh
PEy	Project emissions in year *y*, tCO2e/MWh

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

Data and Parameters related to capping of baseline emissions

Data / Parameter:	$Q_{OE,BL}$
Data unit:	*MWh*
Description:	Electricity output that can be theoretically produced (in appropriate unit), to be determined on the basis of maximum recoverable energy from the WECM, which would have been released (or WECM would have been flared or energy content of WECM would have been wasted) in the absence of CDM project activity.
Source of data used:	Feasibility Study Report
Value applied:	81,969MWh
Justification of the choice of data or	The data is from the feasibility study report and supplied by on-site specialists

description of measurement methods and procedures actually applied:	
Any comment:	This is to determine the f_{cap}

Data and Parameters related to baseline EF of Central China Power Grid

Data / Parameter:	$F_{i,j,y}$
Data unit:	10^4t/10^8m^3
Description:	The amount of fuel i (in a mass or volume unit) consumed by relevant power sources j in year(s) y
Source of data used:	China Energy Statistical Yearbook 2005-2007
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official released statistical data; publicly accessible and reliable data source
Any comment:	

Data / Parameter:	$EG_{m,y}$
Data unit:	MWh
Description:	Net electricity generated and delivered to the grid by power plant / unit *m* in year *y* or hour *h*
Source of data used:	China Energy Statistical Yearbook 2005-2007
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official released statistical data; publicly accessible and reliable data source
Any comment:	

Data / Parameter:	NCV_i
Data unit:	kj/kg or kj/ m^3
Description:	The net calorific value per mass or volume unit of a fuel i
Source of data used:	China Energy Statistical Yearbook 2006
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official released statistical data; publicly accessible and reliable data source
Any comment:	

Data / Parameter:	$GEN_{i,y}$
Data unit:	MWh
Description:	The electricity generation by thermal power source *j* in year *y* of each province connected to CCPG
Source of data used:	China Electrical Power Yearbook 2005~2007
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official released statistical data; publicly accessible and reliable data source
Any comment:	

Data / Parameter:	$e_{j,y}$
Data unit:	%
Description:	The internal use rate of thermal power source *j* in each province connected to CCPG.
Source of data used:	China Electrical Power Yearbook 2005~2007
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official released statistical data; publicly accessible and reliable data source
Any comment:	

Data / Parameter:	CAP_{Total}
Data unit:	MW
Description:	The total capacity addition of the selected period in which approximately 20% capacity has been added to the grid
Source of data used:	China Electric Power Yearbook 2005~2007
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistical data publicly accessible and reliable data source
Any comment:	

Data / Parameter:	$CAP_{Thermal}$
Data unit:	MW
Description:	The total thermal power capacity addition of the selected period in which

	approximately 20% capacity has been added to the grid.
Source of data used:	China Electric Power Yearbook 2005~2007
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistical data publicly accessible and reliable data source
Any comment:	

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

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Step 1: Baseline Emissions (*BEy*)

$BE_y = BE_{En,y} + BE_{flst,y}$, and $BE_{flst,y} = 0$

$BE_y = BE_{En,y} = BE_{Elec,y} + BE_{Ther,y}$

$BE_{Elec,y} = f_{wcm} * f_{cap} * EG * EF_{Elec}$

And no heat is generated in this project, therefore $BE_{Ther,y} = 0$

$BE_y = BE_{En,y} = BE_{Elec,y} = f_{wcm} * f_{cap} * EG * EF_{grid,CM}$

Step 2: Project emission

There is no combustion of auxiliary fuel to supplement waste gas, so it should not be regarded as the project emission caused by the project activity, so project emissions is equal to emission due to supplementary electricity consumption.

$PE_y = PE_{EL,y} = EC_{PJ,y} \times EF_{CO2,EL,y}$

Step 3: Leakage

According to the methodology, the leakage is zero, i.e., $Ly = 0$

Step 4: Emission reduction

$ER_y = BE_y - PE_y$

Ex-ante calculation of emission reductions and applied value of involved parameters are summarized in Table B.9 as following:

Table B.9 Ex-ante Calculation of Emission Reductions

	Parameter	Unit	Applied Value
Emission Factor	$EF_{grid,OM,y}$	tCO2e/MWh	1.2783
	$EF_{grid,BM,y}$	tCO2e/MWh	0.6687

	$EF_{CM,grid,y}$	tCO2e/MWh	0.9735
Baseline Emissions	EG_y	MWh/yr	86,832
	f_{cap}	-	1
	f_{wcm}	-	1
	BE_y	tCO2e/yr	84,531
Project Emissions	$EC_{PJ,y}$	MWh/yr	4,863
	PE_y	tCO2e/yr	4,734
Emission Reductions	ER_y	tCO2e/yr	79,797

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

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Table B.10 Summary of the ex-ante estimation of emission reductions

Year	Estimation of project activity emissions (tones of CO2 e)	Estimation of baseline emissions (tones of CO2 e)	Estimation of leakage (tones of CO2 e)	Estimation of overall emission reductions (tones of CO2 e)
2009	2,367	42,266	0	39,899
2010	4,734	84,531	0	79,797
2011	4,734	84,531	0	79,797
2012	4,734	84,531	0	79,797
2013	4,734	84,531	0	79,797
2014	4,734	84,531	0	79,797
2015	4,734	84,531	0	79,797
2016	4,734	84,531	0	79,797
2017	4,734	84,531	0	79,797
2018	4,734	84,531	0	79,797
2019	2,367	42,265	0	39,898
Total (tones of CO2e)	**47,340**	**845,310**	**0**	**797,970**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	f_{cap}
Data unit:	/
Description:	Energy that would have been produced in project year *y* using waste heat generated in base year expressed as a fraction of total energy produced using waste pressure in year *y*.
Source of data to be used:	Calculation data as Equation (8)
Value of data applied for the purpose of calculating expected emission	1

reductions in section B.5	
Description of measurement methods and procedures to be applied:	Please see equation 8 of section B.6.1 for method of calculation of f_{cap}.
QA/QC procedures to be applied:	N/A
Any comment:	In case the calculated value of f_{cap} is higher than 1, f_{cap} is set to 1.

Data / Parameter:	EG_y
Data unit:	MWh
Description:	Total power generation by the project activity in both plants during the year *y*
Source of data to be used:	Data used in the PDD is obtained from the Feasibility Study Report of the project. Actual value will be obtained from electric meters.
Value of data	86,832
Description of measurement methods and procedures to be applied:	Onsite measurement by electric meter, Continuously and aggregated monthly
QA/QC procedures to be applied:	EG_y will be measured with electric meter. Electric meter would be properly maintained with regular testing and calibration schedules in line with GB/T 17215-2002, GB/T17882-1999, DL/T 614-1997 and DL/T 645-1997. The accuracy of this meter is 1%
Any comment:	

Data / Parameter:	$EC_{PJ,y}$
Data unit:	*MWh*
Description:	Supplementary electricity consumption in year y as a result of the implementation of the project activity
Source of data to be used:	Data used in the PDD is obtained from the Feasibility Study Report of the project. Actual value will be obtained from electric meters.
Value of data	4,863
Description of measurement methods and procedures to be applied:	Onsite measurement by electric meter, Continuously and aggregated monthly
QA/QC procedures to be applied:	$EC_{PJ,y}$ will be measured with electric meter. Electric meter would be properly maintained with regular testing and calibration schedules in line with GB/T 17215-2002, GB/T17882-1999, DL/T 614-1997 and DL/T 645-1997. The accuracy of this meter is 1%
Any comment:	

Data / Parameter:	$Q_{OE,y}$
Data unit:	*MWh*
Description:	Quantity of actual electricity output during year y
Source of data to be used:	Data used in the PDD is obtained from the Feasibility Study Report of the project. Actual value is the difference between EG_y and $EC_{PJ,y}$ Which are

	obtained from electric meters in year y
Value of data	81,969
Description of measurement methods and procedures to be applied:	Calculated value from onsite measurement by electric meter
QA/QC procedures to be applied:	N/A
Any comment:	

Data / Parameter:	Emp_y
Data unit:	n/a
Description:	Employment opportunities generated by the project activity
Source of data to be used:	Accounting report by human resource office of the plant (Be responsible by Mr Gao sheng, the CDM manager of this project)
Value of data applied for the purpose of calculating expected emission reductions in section B.5	n/a
Description of measurement methods and procedures to be applied:	People engaged during the fiscal year will be recorded in the accounting system of the plant. The number of people engaged, the gender, the responsibilities of them and the training they take will all be covered in the report.
QA/QC procedures to be applied:	Pay roll of these employees will be provided as evidence for contribution in employment of local people
Any comment:	

Inapplicable data and parameters

The following data and parameters are mentioned in the ACM0012 methodology as data and parameters to be monitored, but are not applicable to this particular project activity:

Data / Parameter:	***FF***
Data unit:	NM^3 or ton
Description:	Quantity of fossil fuel type *i* combusted to supplement waste gas in the project activity during the year *y*, in energy or mass units
Source of data:	Not applicable. The project design does not include the firing of fossil fuels. Therefore no value is applied in the calculation of emission reductions due to the project activity and no monitoring is required.
Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	***WS***
Data unit:	

Description:	Fraction of total heat that is used by the recipient j in the project that in absence of the project activity would have been supplied by the i_{th} boiler.
Source of data to be used:	Not applicable. The proposed project activity does involve supply of heat to the recipient in the baseline. Therefore no value is applied in the calculation of emission reductions due to the project activity and monitoring is not required.
Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	$EF_{CO2,is,j}$
Data unit:	Tones CO_2/ TJ
Description:	CO_2 emission factor per unit of energy of the fossil fuel used in the baseline generation source i (i=is) providing energy to recipient j.
Source of data to be used:	Not applicable. The only baseline generation source is grid-generated electricity. Therefore no value is applied in the calculation of emission reductions due to the project activity and monitoring is not required.
Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	$EF_{CO2,COG}$
Data unit:	Tones CO_2/ TJ
Description:	CO_2 emission factor per unit of energy of the fuel that would have been used in the baseline cogeneration plant.
Source of data to be used:	Not applicable. The proposed project activity does not involve a cogeneration plant. Therefore no value is applied in the calculation of emission reductions due to the project activity and monitoring is not required.
Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	$HG_{i,y}$
Data unit:	TJ
Description:	Net quantity of heat supplied to the recipient plant j by the project activity during the year *y* in TJ. In case of steam this is expressed as difference of energy content between the steam supplied to the recipient plant and the condensate returned by the recipient plant(s) to element process of cogeneration plant. In case of hot water/oil this is expressed as difference in

	energy content between the hot water/oil supplied to and returned by the recipient plant(s) to element process of cogeneration plant).
Source of data to be used:	Not applicable. The proposed project activity does not supply heat to the recipient plant. Therefore this parameter is not applicable and will not be monitored
Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	$EF_{CO2,i,j}$
Data unit:	Tones CO_2/ TJ
Description:	CO_2 emission factor per unit of energy of the baseline fuel used in i_{th} boiler used by recipient j, in tCO_2/TJ, in absence of the project activity.
Source of data to be used:	Not applicable. The proposed project activity does not involve a boiler at the recipient site in the baseline (recipient relies on electricity from the grid). Therefore this parameter is not applicable and does not need to be monitored.
Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	$EF_{CO2,j}$
Data unit:	Tones CO_2/ TJ
Description:	CO_2 emission factor of fossil fuel (tCO_2/TJ) that would have been used at facility '*j*' for flaring the waste gas.
Source of data to be used:	Not applicable. The proposed project activity does not involve the flaring of waste gas at the facility in the baseline. Therefore no value is applied and no monitoring is required.
Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	$Q_{i,k}$
Data unit:	Nm^3 / h
Description:	Amount of individual fuel (waste gas and other fuel(s)) i consumed at the energy generation unit during hour h
Source of data:	Not applicable. The proposed project activity does not consume fuels at the energy generation. Therefore no value is applied and no monitoring is required.
Measurement procedures	Not applicable

(if any):	
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	$EG_{tot,y}$
Data unit:	TJ / year
Description:	Total annual energy produced at the cogeneration plants, with waste gas and fossil fuel.
Source of data:	Not applicable. The proposed project activity does not involve the construction of a cogeneration plant. Therefore no value is applied and no monitoring is required.
Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	$Q_{WG,h}$
Data unit:	Nm^3 / h
Description:	Quantity of waste gas used for energy generation per hour h
Source of data to be used:	Not applicable. The project activity does not involve the utilization of waste gas.
Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	NCV_{WG}
Data unit:	(TJ / Nm3)
Description:	Net Calorific Value of Waste Gas
Source of data to be used:	Not applicable. The proposed project activity does not involve the utilization of waste gas. Therefore no value is applied and no monitoring is required.
Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	$ST_{whr,y}$
Data unit:	kCal/kg or kJ/kg
Description:	Energy content of the steam generated in waste heat recovery boiler fed to

	turbine via common steam header
Source of data to be used:	Not applicable. The proposed project activity does not involve the utilization of a common steam header with multiple sources. Therefore no value is applied and no monitoring is required.
Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	$ST_{other,y}$
Data unit:	kCal/kg or kJ/kg
Description:	Energy content of the steam generated in other boilers fed to turbine via common steam header
Source of data to be used:	Not applicable. The proposed project activity does not involve the utilization of a common steam header with multiple sources. Therefore no value is applied and no monitoring is required.
Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	$EF_{heat,j,y}$
Data unit:	Tonnes CO_2 / TJ
Description:	CO_2 emission factor of the heat source that would have supplied the recipient plant j in absence of the project activity, expressed in tCO_2/TJ
Source of data to be used:	Not applicable. The proposed project activity does not involve heat supply to the recipient plant in the baseline. Therefore no value is applied and no monitoring is required.
Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	$FC_{EL,CP,k,v}$
Data unit:	Mass or volume unit
Description:	Quantity of fuel type *k* combusted in the captive power plant at the project site in year *y* where *k* are the fuel types fired in the captive power plant at the project site in year *y*
Source of data to be used:	Not applicable. The proposed project activity does not involve captive power in the baseline scenario. Therefore no value is applied and no monitoring is required.

Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	NCV_k
Data unit:	GJ / mass or volume unit
Description:	Net calorific value of fuel type *k* where *k* are the fuel types fired in the captive power plant at the project site in year *y*
Source of data to be used:	Not applicable.
Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	$EF_{CO2,k}$
Data unit:	tCO_2/GJ
Description:	Emission factor of fuel type *k* where *k* are the fuel types fired in the captive power plant at the project site in year *y*
Source of data to be used:	Not applicable. The proposed project activity does not involve captive power in the baseline scenario. Therefore no value is applied and no monitoring is required.
Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	$EC_{CP,y}$
Data unit:	MWh
Description:	Quantity of electricity generated in the captive power plant at the project site in year *y*
Source of data to be used:	Not applicable. The proposed project activity does not involve captive power in the baseline scenario. Therefore no value is applied and no monitoring is required.
Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data and parameters that are available at validation

Data / Parameter:	NCV_i
Data unit:	TJ / NM^3 or ton
Description:	Net calorific value of the fossil fuel *i*
Source of data to be used:	For this and other descriptions relating to this parameter, see the description in Section B.6.2, Data and parameters that are available at validation.
Measurement procedures (if any):	Not applicable
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
Any comment:	

Data / Parameter:	$EF_{elec,i,j,y}$ (also referred to as $EF_{elec,y}$)
Data unit:	tCO_2 / MWh
Description:	CO_2 emission factor for the electricity source i (i=gr (grid) or i=is (identified source), displaced due to the project activity, during the year *y* in tons CO_2/MWh
Source of data to be used:	Calculated in accordance with the latest approved version of ACM0002 on the basis of the latest available statistics and IPCC default values.
Measurement procedures (if any):	Calculated on an ex-ante basis. The emission factor will not be updated during the crediting period.
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	No further QA/QC procedures are considered necessary.
Any comment:	For this and other descriptions relating to this parameter, see the description in Section B.6.2, Data and parameters that are available at validation.

Data / Parameter:	$EF_{CO2,EL,y}$ (in the context of this project activity, identical $EF_{elec,y}$)
Data unit:	tCO_2 / MWh
Description:	CO_2 emission factor for electricity consumed by the project activity in year *y*.
Source of data to be used:	Calculated in accordance with the latest approved version of "Tool to calculate the emission factor for an electricity system" on the basis of the latest available statistics and IPCC default values.
Measurement procedures (if any):	The project only consumes electricity from the grid and the emission factor has been calculated ex-ante and will not be updated during the crediting period.
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	No further QA/QC procedures are considered necessary.
Any comment:	For this and other descriptions relating to this parameter, see the description in Section B.6.2, Data and parameters that are available at validation.

Data / Parameter:	$EF_{CO2,i}$
Data unit:	Tonnes CO_2 / TJ
Description:	CO_2 emission factor per unit of energy or mass of the fuel type *i*
Source of data to be used:	Data used are based on IPCC default values, multiplied by 44/16. See 2006

	IPCC Guidelines for National Greenhouse Gas Inventories.
Measurement procedures (if any):	The CO_2 emission factor is used in the calculation of the baseline emissions. The baseline emission factor is calculated ex-ante and will not be updated during the crediting period. Therefore monitoring of this parameter is not applicable.
Monitoring frequency	Not applicable
QA/QC procedures to be applied:	Not applicable
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 activity are controlled and reported. This requires an ongoing monitoring of the project to ensure performance according to its design and that claimed Certificated Emission Reduction (CERs) are actually achieved.

The monitoring plan of the project activity is a guidance document that provides the set of procedures for preparing key project indicators, tracking and monitoring the impacts of the project activity. The monitoring plan will be used throughout the defined crediting period for the project to determine and provide documentation of GHG emission impacts from the project activity. This monitoring plan fulfils the requirement set out by the Kyoto Protocol that emission reductions projects under the CDM have real, measurable and long-term benefits and that the reductions in emissions are additional to any that would occur in the absence of the certified project activity.

1. Monitoring Targets

(1) Monitoring of total electricity generation by project activity

Electricity meters are installed at the distribution room to measure the total quantity of power generated of the two units respectively, as shown in Figure B.1 electric meter M1 and M3. The meters will be operated and maintained by CWKC. The data measured by meters will be manually read by the operator and recorded in the daily operation report and the monthly report.

(2) Monitoring of Supplementary electricity consumption (Electricity consumed by auxiliary equipments)

Electricity meters are installed at the distribution room to measure the quantity of electricity consumed by auxiliary equipments of the two units respectively as well, as shown in Figure B.1 electric meter M2 and M4. The meters will be operated and maintained by CWKC. The data measured by meters will be manually read by the operator and recorded in the daily operation report and the monthly report.

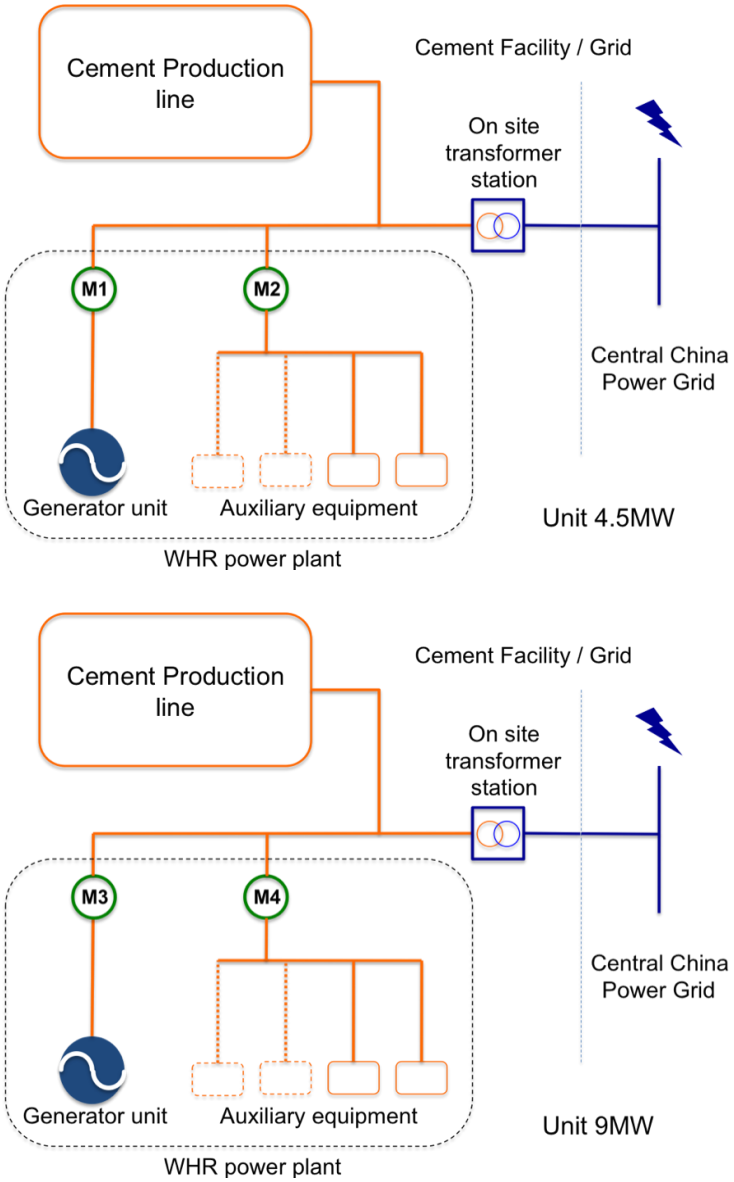

Figure B.1 Indicative electrical connection diagram of 4.5MW and 9MW

2. Monitoring Procedures

(1) Measurement

Data for total electricity generation and Electricity consumed by auxiliary equipments will be measured by calibrated meters. The accumulated data on electricity meter will be manually read by the operator and recorded in the daily operation report and the monthly report and kept at least two years after the last crediting period.

(2) Identification

The trained operators will identify the data whether it is reasonable in 24 hours. And they will go on a tour of inspection focusing on all the meters. If the operator finds out the data isn't credible, emergency plan will be used. The method of data identification and the detailed procedure are defined on CDM

Operational Manual.

(3) Calculation
The Emission Reduction Calculation will be executed by computer in the designed Excel sheet with the data archived, based on the defined formula of ACM0012. The calculation will be executed every month by CDM manager.

(4) Achievement
The operators will achieve the identified data and save them into computer.

3. Quality Assurance and Quality Control

(1) For measurement equipments——Calibration of Meters

Electricity meters will be calibrated once a year by qualified institution or entity after calibration, calibration report will be provided by qualified institution or entity and kept by CWKC. This will be in the charge of CDM manager. The process of Meter calibration should be reported. And all the monitoring meters will be checked monthly to prevent erroneous measurements.

(2) Damages to metering equipment—— Conservative Method or Not claim emission reductions

In case electric meter of total electricity generation is damaged and no reliable readings can be recorded, the project entity will not claim emission reductions;

In case electric meter, which monitors electricity consumed by auxiliary equipments, is damaged and no reliable readings can be recorded, the project entity will estimate net supply by the proposed project activity according to the following procedure:

1. The project entity will calculate total cement production over a period of 10 days prior to the moment of metering equipment damage, based on operational records of the cement production lines.
2. The project entity will calculate total net power supply (total electricity generation minuses auxiliary equipment consumption) by the waste heat utilization project to the cement production line over a period of 10 days prior to the moment of metering equipment damage, based on monitoring records.
3. The average net power supply per unit of cement production (in kWh/ton cement) will be calculated by dividing the result of step 2 by the result of step 1.
4. The net power supply on the days for which no record could be recorded will be estimated as follows:
   $EG_d = 0.75 * CP_d * EG_{average}$
   With:

EG_d	Estimated net power supply on day d for which no record could be recorded.
CP_d	Cement production by the cement production lines on day d.
$EG_{average}$	the average net power supply per unit of cement production, calculated as described in step 3.
0.75	A factor of 0.75 is applied to ensure conservativeness of the estimate.

(3) For Emergency Situation——Not claim emission reductions

In case of emergencies, the project entity will not claim emission reductions due to the project activity for

the duration of the emergency. The project entity will follow the following procedure for declaring the emergency period to be over:

1. The project entity will ensure that all requirements for monitoring of emission reductions have been re-established.
2. The monitoring officer and the head of operations of the cement production facility will both sign a statement declaring the emergency situation to have ended and normal operations to have resumed.

(4) For Human Resource Management——Training Plan

The training course should be performed according to the methodology ACM0012, *"Monitoring Plan", "CDM Operational Manual"* and conducted appropriately by CDM consultants. Relative documentation or other materials such as: the training plan, training materials, training report or test paper should be archived and provided to DOE. The contents and procedures of quality assurance and quality control is an on-going process which will be updated in the crediting period.

4. Management Structure

The project developer will establish a dedicated CDM team to take the responsibility of collecting data, supervising and verifying the procedure of measurement and record. The team member will receive the training and technical support from the project consulting company. The operational and management structure of the CDM workgroup is shown in the following table B.11.

Table B.11 Management Structure

Name	Organization	Responsibility
Mr. Zhu Xuefeng	Chongqing Wanzhou Kehua Cement	Mr. Zhu is the CEO of Chongqing Wanzhou Kehua cement Co. Ltd and CDM team leader. He has extended knowledge about Kyoto Protocol and is the project company's CDM authority and takes the responsibility of overall project management.
Mr. Gao Sheng	Chongqing Wanzhou Kehua Cement	Mr. Gao is the CEO assistant of Chongqing Wanzhou Kehua cement Co. Ltd and CDM manager. He is the supervisor of the operation team. He provides review to the monitoring report made by the operators. He is also responsible of validation and registration of the project. He is responsible for training of monitoring personnel. Training courses will be held for monitoring staff about basic knowledge and operational procedures of all monitors and the data processing system. Previously, South Pole Carbon Asset Management Ltd. has provided sufficient training about Kyoto, CDM and requirements of them.
Mr. Yong Hanlin	South Pole Carbon Asset Management Ltd.	South Pole Carbon Asset Management Ltd. Will provide review of reported data before they are submitted to DOE for validation or verification.

The monitoring staffs are responsible for recording and archiving the monitoring data in line with the monitoring manual. They ensure normal operation of the equipments and perform necessary maintenance. Report will be made in case of emergency or abnormal situations. Automatic monitoring systems are

installed for both plants. Readings of all meters and status of equipments are collected automatically. Operators only need to collect data from screen display and make a hardcopy backup of the data.

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 the baseline study and monitoring methodology: 04/01/2009

Name of persons determining the baseline and monitoring methodology:

Mr. Harry Yong, South Pole Carbon Asset Management Ltd.
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All persons listed above are project participates.

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:

>>

22/10/2007 (Contract agreement of boiler of 4.5MW unit)

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

>>
20 years

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:

>> N/A

C.2.1.2. Length of the first crediting period:

>>N/A

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
1.5.2009 or date of project registration, whichever comes later.

C.2.2.2. Length:

>>
10 years

SECTION D. Environmental impacts

>>

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

>>

Article 12 of the Kyoto Protocol requires that a CDM project activity contributes to the sustainable development of the host county. Assessing the project's positive and negative impacts on the local environment and on society is thus a key element for each CDM project.

The project activity has developed and passed full Environmental Impact Assessments (EIA) in line with the requirements of the Chinese Government. Therefore the EIA of the whole project has been approved by Chongqing Environmental Protection Bureau on 7th August, 2007. All the documents related to EIA of the project activity will be detailed in the final version of this PDD.

In order to illustrate environmental impacts of the project activity, the following phases of the project implementation have been considered:

- During Construction Phase and
- During Operation and Maintenance Phase

Construction Period

The major air pollutant during the construction period is dust. Several measures such as watering, and avoiding operation in windy weather are undertaken to reduce dust emission. The wastewater will be

treated and emitted in line with relevant national standards. The solid waste will be collected and delivered to a local solid waste treatment site. In general, the environmental impacts during the construction period are temporal and not significant.

Operation and Maintenance Phase

The project's environmental impacts include the impact to air environment, water environment, acoustical environment, ecological environment which would be discussed below:

Air environment

The project activity will have no negative impact but positive impact on the ambient air quality. Electrostatic precipitators collect the dust from the SP and AQC exit gas in the absence of the project activity. Once the project activity is implemented, it is expected to lead to reductions in air particles in the flue gas as the dust would be settled in SP boiler and AQC boiler before vented to electrostatic precipitator for further settlement. And it is expected to reduce the CO_2, SO_2 and NO_x emissions as reducing combustion of fossil fuel in Central China Power Grid after implementation of the project activity.

Waste water impact

Rainwater and sewage will be strictly branched off in the project activity. The wastewater will not be discharged outside and will be reused for the production line after being neutralised. Meanwhile, domestic sewage should be treated by using wastewater treatment equipment for recovery and will not affect the surrounding water environment.

Thermal Pollution

Thermal pollution is a serious influence of cement production as a great amount of heat is being vented to the atmosphere without utilization. In cement plant, more than 35% of the heat used in clinker burning process is discharged as waste heat to the surroundings without utilization. In the absence of project activity there is a considerable amount of thermal pollution in the surroundings. The project activity will utilize the waste heat for power generation and thereby reduce effects of thermal pollution, which will benefit the staff in the workplace.

Acoustical Environment Impact

Noise sources include construction noise and noise from the equipment installed during the construction phase. Noise from turbine, fans, centrifugal pumps, electric motors etc are the major noise sources after the implement of the project activity. The proper measures will be adopted to mitigate the influence of noise as follows:

- Noise from the blast blowers, the induce draft fans are reduced by providing silencers in the duct. Power generation equipments will be placed in noise-containing room so as to limit noise pollution to vicinity.
- The central control room, with a high concentration of management and operation personnel, will adopt noise-proof designs. The working area will be sealed away from the power generation equipment to reduce noise pollution, while greening measures will be applied to provide a natural noise silencer for the power station.

Solid Waste Management

A waste heat recovery based captive power plant would not have any significant effects as regards to solid waste generation.

Ecology

There are no endangered species located in and around the plant area as the project activity will not occupy any other land out of the boundary of the cement plant.

Conclusion

As a whole, there exist basical beneficial impacts to environment in the project activity and the net impact under environmental pollution category would be positive as all necessary abatement measures would be adopted and periodically monitored.

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:

>>

Not applicable, since the construction and operation of the proposed project are considered to have no significant environmental impacts.

SECTION E. Stakeholders' comments

>>

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

>>

The Stakeholder Consultation was held in the meeting room of Wanzhou Kehua Cement Co. Ltd. on 15 June 2007 and conducted by Yumu Solutions, an environmental management-consulting firm. Furthermore, from April 2007 to September 2007, same questionnaires utilised in this ISC were sent to the stakeholders who are involved. Including questionnaires in the ISC, totally 51 questionnaires were sent out and 51 were collected by September 15th 2007, characteristics of targeted stakeholders are summarized as follows**:**

A.

Total	Gender		Role			
	Male	Female	Civil servant	Residents	Staff	Unknown
51	22	29	2	25	24	0

Local residents are from Sanzhouxi Village where the project locates.

As per DOE's request, on 5th February 2009, 4 local villagers who live in the opposite side of Chialing River were invited to attend the additional stakeholder consultation. The detail invitation information is listed as following:

Participant Name	Gender	Job description	How to invited	Contact
Cheng Xuewei	Male	Villager of Xiaoling	By phone	+86 23 64881239
Chen Xianglin	Male	Villager of Xiaoling	By phone	+86 15023450785
Tai Xinghe	Male	Villager of Xiaoling	By phone	+86 13594464700
Zhang Jianping	Male	Villager of Xiaoling	By phone	+86 23 58542986

In the meeting, Mr. Gao the CEO assistant of Wanzhou Kehua gave a short description of the project and the non-technical Environmental Impact Assessment of the project, then same questionnaires were answered by these 4 stakeholders.

E.2. Summary of the comments received:

>>

Totally 55 questionnaires including the questionnaires answered on 5th February 2009 were collected, of which the major conclusions are summarized as follows:

	Positive /Yes	Negative /No	Unknown/Indifferent
Impacts on local employment and social living	55	0	0
Impacts on the living in the process of construction	55: No evident impact		
Holistic influence on the construction and implementation of the proposed project	55	0	0
Support of the proposed project	55	0	0

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

>>

The Project Entity has carried out relevant measures to solve the concerns of the stakeholders who were interviewed during the investigation for the project activity, including suggestions in Environmental Impact Assessment (EIA).

Regarding to the mitigation measures suggested in EIA, the project developer will ensure to achieve harmonization of environmental, social and economical benefits.

At the same time, the project developer will keep stakeholders informed regularly regarding the progress made in project construction and operation.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

The project owner

Organization:	Chongqing Municipality Wanzhou Kehua Cement Co. Ltd
Street/P.O.Box:	Sanzhou Village, Wuqiao Baianba Neigbourhood Office
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State/Region:	Chongqing Municipality
Postfix/ZIP:	404020
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E-Mail:	cqwzkh@163.com
URL:	N/A
Represented by:	ZHU Xuefeng; GAO sheng
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Salutation:	Mr.
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Middle Name:	N/A
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The Buyer

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Represented by:	Renat Heuberger
Title:	/
Salutation:	Mr.
Last Name:	Heuberger

Middle Name:	/
First Name:	Renat
Department:	/
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Direct tel:	+41 44 633 78 70
Personal E-Mail:	r.heuberger@southpolecarbon.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding from Annex I countries involved in the project activity.

Annex 3
BASELINE INFORMATION

OM Calculation

Calculation of simple OM emission factor of Central China Power Grid in 2003

Fuels	Units	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total	tial emission (tc/TJ)	OXID (%)	NCV (MJ/t,km3)	Emission(tCO2e) 'H*I*J*44/12/10000 (in ma
		A	B	C	D	E	F	A+B+C+D+E	H	I	J	K=G*H*I*J*44/12/1000 (in volume)
Raw coal	10000tones	1427.41	5504.94	2072.44	1646.47	769.47	2430.93	13851.66	25.8	100	20908	273,971,540
Washed coal	10000tones							0	25.8	100	26344	0
ther washed co	10000tones	2.03	39.63			106.12		147.78	25.8	100	8363	1,169,146
coke	10000tones				1.22			1.22	29.2	100	28435	37,142
coke oven gas	0.1billion m3			0.93				0.93	12.1	100	16726	69,013
other gas	0.1billion m3							0	12.1	100	5227	0
crude oil	10000tones		0.5	0.24			1.2	1.94	20	100	41816	59,490
Gasoline	10000tones							0	18.9	100	43070	0
Diesel	10000tones	0.52	2.54	0.69	1.21	0.77		5.73	20.2	100	42652	181,016
Fuel oil	10000tones	0.42	0.25	2.17	0.54	0.28	1.2	4.86	21.1	100	41816	157,229
LPG	10000tones							0	17.2	100	50179	0
Refinery gas	10000tones	1.76	6.53		0.66			8.95	15.7	100	46055	237,285
Natural gas	0.1billion m3					0.04	2.2	2.24	15.3	100	38931	489,223
petroleum pro	10000tones							0	20	100	38369	0
er coking produ	10000tones							0	25.8	100	28435	0
other energy	10000tCe		11.04			16.2		27.24	0	100	0	0
											total	276,371,085

China Energy Statistical Yearbook 2004

Thermal Power Generation within CCPG in 2003

	Power Generation (10^8 kWh)	Power Generation (MWh)	Auxiliary Power Consumption (%)	Power Delivered to the Grid (MWh)
Jiangxi	271.65	27165000	6.43	25,418,291
Henan	955.18	95518000	7.68	88,182,218
Hubei	395.32	39532000	3.81	38,025,831
Hunan	295.01	29501000	4.58	28,149,854
Chongqing	163.41	16341000	8.97	14,875,212
Sichuan	327.82	32782000	4.41	31,336,314
Total				225,987,719

China Electric Power Yearbook 2004

Total Emissions (tCO	276,371,085		
Total Power Supplied	225,987,719		
2003	OM	1.222947	

Calculation of simple OM emission factor of Central China Power Grid in 2004

Fuels	Units	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total	tial emission	OXID	NCV	Emission(tCO2e)
									(tc/TJ)	(%)	(MJ/t,m3)	*H*I*J*44/12/10000 (in ma
		A	B	C	D	E	F	A+B+C+D+E	H	I	J	K=G*H*I*J*44/12/1000 (in volume)
Raw coal	10000tones	1863.8	6948.5	2510.5	2197.9	875.5	2747.9	**17144.1**	25.8	100	20908	339,092,605
Washed coal	10000tones		2.34					**2.34**	25.8	100	26344	58,316
ther washed co	10000tones	48.93	104.22			89.72		**242.87**	25.8	100	8363	1,921,441
coke	10000tones		109.61					**109.61**	29.2	100	28435	3,337,011
coke oven gas	0.1billion m3			1.68		0.34		**2.02**	12.1	100	16726	149,900
other gas	0.1billion m3					2.61		**2.61**	12.1	100	5227	60,527
crude oil	10000tones		0.86	0.22				**1.08**	20	100	41816	33,118
Gasoline	10000tones		0.06			0.01		**0.07**	18.9	100	43070	2,089
Diesel	10000tones	0.02	3.86	1.7	1.72	1.14		**8.44**	20.2	100	42652	266,627
Fuel oil	10000tones	1.09	0.19	9.55	1.38	0.48	1.68	**14.37**	21.1	100	41816	464,893
LPG	10000tones							**0**	17.2	100	50179	0
Refinery gas	10000tones	3.52	2.27					**5.79**	15.7	100	46055	153,506
Natural gas	0.1billion m3						2.27	**2.27**	15.3	100	38931	495,775
petroleum pro	10000tones							**0**	20	100	38369	0
er coking produ	10000tones							**0**	25.8	100	28435	0
other energy	10000tCe		16.92		15.2	20.95		**53.07**	0	100	0	0
											total	346,035,810

China Energy Statistical Yearbook 2005

Thermal Power Generation within CCPG in 2004

	Power Generation	Power Generation	Auxiliary Power Consumption	Power Delivered to the Grid
	(10^8 kWh)	(MWh)	(%)	(MWh)
Jiangxi	301.27	30127000	7.04	28,006,059
Henan	1093.52	109352000	8.19	100,396,071
Hubei	430.34	43034000	6.58	40,202,363
Hunan	371.86	37186000	7.47	34,408,206
Chongqing	165.2	16520000	11.06	14,692,888
Sichuan	346.27	34627000	9.41	31,368,599
Toatal				249,074,186

China Energy Statistical Yearbook 2004

	Total Emissions (tCO	**346,035,810**
	Total Power Supplied	**249,074,186**
2004	OM	**1.389288**

Calculation of simple OM emission factor of Central China Power Grid in 2005

Fuels	Units	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total	tial emission (tc/TJ)	OXID (%)	NCV (MJ/t,km3)	Emission(tCO2e) *H*I*J*44/12/10000 (in ma
		A	B	C	D	E	F	A+B+C+D+E	H	I	J	K=G*H*I*J*44/12/1000 (in volume)
Raw coal	10000tones	1869.29	7638.87	2732.15	1712.27	875.4	2999.77	**17827.75**	25.8	100	20908	352,614,497
Washed coal	10000tones	0.02						**0.02**	25.8	100	26344	498
ther washed co	10000tones		138.12			89.99		**228.11**	25.8	100	8363	1,804,669
coke	10000tones		25.95		105			**130.95**	29.2	100	28435	3,986,695
coke oven gas	0.1billion m3			1.15		0.36		**1.51**	12.1	100	16726	112,054
other gas	0.1billion m3		10.2			3.12		**13.32**	12.1	100	5227	308,897
crude oil	10000tones		0.82	0.36				**1.18**	20	100	41816	36,185
Gasoline	10000tones		0.02			0.02		**0.04**	18.9	100	43070	1,194
Diesel	10000tones	1.3	3.03	2.39	1.39	1.38		**9.49**	20.2	100	42652	299,798
Fuel oil	10000tones	0.64	0.29	3.15	1.68	0.89	2.22	**8.87**	21.1	100	41816	286,959
LPG	10000tones							**0**	17.2	100	50179	0
Refinery gas	10000tones	0.71	3.41	1.76	0.78			**6.66**	15.7	100	46055	176,572
Natural gas	0.1billion m3						3	**3**	15.3	100	38931	655,209
petroleum pro	10000tones							**0**	20	100	38369	0
r coking produ	10000tones				1.5			**1.5**	25.8	100	28435	40,349
other energy	10000tCe		2.88		1.74	32.8		**37.42**	0	100	0	0
											total	360,323,575

China Energy Statistical Yearbook 2006

Thermal Power Generation within CCPG in 2005

	Power Generation (10^8 kWh)	Power Generation (MWh)	Auxiliary Power Consumption (%)	Power Delivered to the Grid (MWh)
Jiangxi	300	30000000	6.48	28,056,000
Henan	1315.9	131590000	7.32	121,957,612
Hubei	477	47700000	2.51	46,502,730
Hunan	399	39900000	5	37,905,000
Chongqing	175.84	17584000	8.05	16,168,488
Sichuan	372.02	37202000	4.27	35,613,475
Toatal				286,203,305

China Electric Power Yearbook 2006

Total Emissions (tCO	**360,323,575**		
Total Power Supplied	**286,203,305**		
2005	OM	**1.258978**	

Calculation of simple OM emission factor of Central China Power Grid in 2006

Fuels	Units	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total	tial emission (tc/TJ)	OXID (%)	NCV (MJ/t,km3)	Emission(tCO2e) *H*I*J*44/12/10000 (in ma
		A	B	C	D	E	F	A+B+C+D+E	H	I	J	K=G*H*I*J*44/12/1000 (in volume)
Raw coal	10000tones	1926.02	8098.01	3179.79	2454.48	1184.3	3285.22	20127.82	25.8	100	20908	398,107,508
Washed coal	10000tones					5.79		5.79	25.8	100	26344	144,295
ther washed co	10000tones	4.51	104.12		8.59	79.21		196.43	25.8	100	8363	1,554,036
briquette coal	10000tones						0.01	0.01	26.6	100	20908	204
coke	10000tones		17.23		0.32			17.55	29.2	100	28435	534,299
coke oven gas	0.1billion m3		0.52	1.07	4.24	0.38	0.01	6.22	12.1	100	16726	461,572
other gas	0.1billion m3	12.69	3.95		1.7	4.36	0.01	22.71	12.1	100	5227	526,655
crude oil	10000tones		0.49					0.49	20	100	41816	15,026
Gasoline	10000tones		0.01					0.01	18.9	100	43070	298
Diesel	10000tones	0.91	2.23	1.41	1.78	0.96		7.29	20.2	100	42652	230,298
Fuel oil	10000tones	0.51	1.26	1.31	0.8	0.57	3.49	7.94	21.1	100	41816	256,872
LPG	10000tones							0	17.2	100	50179	0
Refinery gas	10000tones	0.86	8.1	1	0.97			10.93	15.7	100	46055	289,780
Natural gas	0.1billion m3			0.28		0.16	18.63	19.07	15.3	100	38931	4,164,943
petroleum pro	10000tones							0	20	100	38369	0
r coking produ	10000tones						0.01	0.01	25.8	100	28435	269
other energy	10000tCe	17.45	37.36	31.55	18.29	29.35		134	0	100	0	0
											total	406,286,055

China Energy Statistical Yearbook 2007

Thermal Power Generation within CCPG in 2006

	Power Generation (10^8 kWh)	Power Generation (MWh)	Auxiliary Power Consumption (%)	Power Delivered to the Grid (MWh)
Jiangxi	344.49	34449000	6.17	32,323,497
Henan	1512.35	151235000	7.06	140,557,809
Hubei	548.41	54841000	2.75	53,332,873
Hunan	464.08	46408000	4.95	44,110,804
Chongqing	234.87	23487000	8.45	21,502,349
Sichuan	441.93	44193000	4.51	42,199,896
Toatal				334,027,226

China Electric Yearbook 2007

Total Emissions (tCO	408,776,270		Net Import from No	3028950
Total Power Supplied	337,056,176		Average EF of Nort	0.822137988
2006 OM	1.212784			

Weighted Average of 3 Years

1.2783

Power Generation and Delivered of CCPG 2003										
	Power Generation	Power Generation	Auxiliary Power Consumption	Total Power Delivered	Hydropower	Thermal Power	Others	Total		
	(10^8kWh)	(MWh)	(%)	(MWh)	(10^8kWh)	(10^8kWh)	(10^8kWh)	(MWh)		
Jiangxi	310.29	31029000	6.43	29,033,835	38.64	271.65				
Henan	1009.75	100975000	7.68	93,220,120	54.57	955.18				
Hubei	783.07	78307000	3.81	75,323,503	387.75	395.32				
Hunan	539.02	53902000	4.58	51,433,288	244.01	295.01				
Chongqing	202.92	20292000	8.97	18,471,808	39.51	163.41				
Sichuan	827.82	82782000	4.41	79,131,314	500	327.82				
Toatal				346,613,868				346613868.4		
Source: China Energy Statistical Yearbook 2004										

Power Generation and Delivered of CCPG 2004										
	Power Generation	Power Generation	Auxiliary Power Consumption	Total Power Delivered	Hydropower	Hydropower	Auxiliary Power Consumption	Total Power Delivered	Others	Total
	(10^8kWh)	(MWh)	(%)	(MWh)	(10^8kWh)	(MWh)	(%)	(MWh)	(10^8kWh)	(MWh)
Jiangxi	301.27	30127000	7.04	28,006,059	38.9	3890000	1.2	3843320		
Henan	1093.52	109352000	8.19	100,396,071	68.84	6884000	0.43	6854398.8		
Hubei	430.34	43034000	6.58	40,202,363	695.12	69512000	0.12	69428585.6		
Hunan	371.86	37186000	7.47	34,408,206	242.36	24236000	0.51	24112396.4		
Chongqing	165.2	16520000	11.06	14,692,888	56.7	5670000	2.09	5551497	725000	
Sichuan	346.27	34627000	9.41	31,368,599	589.02	58902000	0.39	58672282.2		
Toatal				249,074,186				168,462,480	725,000	418,261,666
Source: China Energy Statistical Yearbook 2005										

Power Generation and Delivered of CCPG 2005								
	Power Generation	Power Generation	Auxiliary Power Consumption	Total Power Delivered	Hydropower	Thermal Power	Others	Total
	(10^8kWh)	(MWh)	(%)	(MWh)	(10^8kWh)	(10^8kWh)	(10^8kWh)	(MWh)
Jiangxi	350	35000000	6.48	32,732,000	50	300		
Henan	1382.9	138300000	7.32	128,176,440	67	1315.9	10000	
Hubei	1291	129100000	2.51	125,859,590	814	477		
Hunan	640	64000000	5	60,800,000	241	399		
Chongqing	236.2	23620000	8.05	21,718,590	60.36	175.84		
Sichuan	1017	101700000	4.27	97,357,410	644.98	372.02		
Toatal				466,644,030				466,644,030
Source: China Energy Statistical Yearbook 2006								

Power Generation and Delivered of CCPG 2006								
	Power Generation	Power Generation	Auxiliary Power Consumption	Total Power Delivered	Hydropower	Thermal Power	Others	Total
	(10^8kWh)	(MWh)	(%)	(MWh)	(10^8kWh)	(10^8kWh)	(10^8kWh)	(MWh)
Jiangxi	436	43600000	6.17	40,909,880	91.51	344.49		
Henan	1583	158300000	7.06	147,124,020	70.65	1512.35		
Hubei	1308	130800000	2.75	127,203,000	759.59	548.41		
Hunan	748	74800000	4.95	71,097,400	283.92	464.08		
Chongqing	289	28900000	8.45	26,457,950	54.13	234.87		
Sichuan	1227	122700000	4.51	117,166,230	785.07	441.93		
Toatal				529,958,480				529,958,480
Source: China Energy Statistical Yearbook 2007								

Average emission factor of CCPG 2003	0.79734572
Average emission factor of CCPG 2004	0.82731897
Average emission factor of CCPG 2005	0.7721594
Average emission factor of CCPG 2006	0.77133641

BM calculation

	Proportion of CO2 emissions from solid fuels,liquid fuels and gas fuels against the total emission													
	Fuels	Units	Jiangsi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total	NCV	Emission factor	OXID	Emission	Portion
			A	B	C	D	E	F	G=A+B+C+D+E+F	H	I	J	K=F*H*I*G*44/12/100	
Solid	Raw coal	10000t	1926.02	8098.01	3179.79	2454.48	1184.3	3285.22	20127.82	20,908	25.8	100	398,107,508	-
	Washed coal	10000t	0	0	0	0	5.79	0	5.79	26,344	25.8	100	144,295	-
	Other washed coal	10000t	4.51	104.12	0	8.59	79.21	0	196.43	8,363	25.8	100	1,554,036	-
	Biquette coal	10000t	0	0	0	0	0	0.01	0.01	20,908	26.6	100	204	
	cole	10000t	0	17.23	0	0.32	0	0	17.55	28,435	29.2	100	534,299	-
	total	-	-	-	-	-				-	-	-	400,340,342	98.54%
Liquid	cruede oil	10000t	0	0.49	0	0	0	0	0.49	41,816	20	100	15,026	-
	Gasoline	10000t	0	0.01	0	0	0	0	0.01	43,070	18.9	100	298	-
	Kerosene oil	10000t	0	0	0	0	0	0	0	43,070	19.6	100	0	-
	Diesel	10000t	0.91	2.23	1.41	1.78	0.96	0	7.29	42,652	20.2	100	230,298	-
	Fuel oil	10000t	0.51	1.26	1.31	0.8	0.57	3.49	7.94	41,816	21.1	100	256,872	-
	other petroleum products	10000t	0	0	0	0	0	0	0	38,369	20	100	0	-
	other coke products	10000t	0	0	0	0	0	0.01	0.01	28,435	25.8	100	269	
	Total	-	-	-	-	-				-	-	-	502,763	0.12%
Gas	Natural gas	0.1billion m3	0	0	2.8	0	1.6	183.6	190.7	38,931	15.3	100	4,164,943	-
	Coke oven gas	0.1billion m3	0	5.2	10.7	42.4	3.8	0.1	62.2	16,726	12.1	100	461,572	-
	othe gas	0.1billion m3	126.9	39.5	0	17	43.6	0.1	227.1	5,227	12.1	100	526,655	-
	LPG	10000t	0	0	0	0	0	0	0	50,179	17.2	100	0	-
	Refinery gas	10000t	0.86	8.1	1	0.97	0	0	10.93	46,055	15.7	100	289,780	-
	Total	-	-	-	-	-	-	-	-	-	-	-	5,442,950	1.34%
	Total	-	-	-	-	-				-	-	-	406,286,055	100%

Optimal efficiency and emission factor of commercialized coal-fired, oil-fired and gas-fired power plant

Type of power plant	Variables	Power supply efficiency	Emission factor of fuels	Oxidation rate	Emission factor
		A	B	C	D=3.6/A/1000×B×C×44/12
Coal fire power plant	$EF_{Coal,Adv}$	37.28%	25.8	1	0.91352
Gas fired power plant	$EF_{Gas,Adv}$	48.81%	15.3	1	0.41377
Oil fired power plant	$EF_{Oil,Adv}$	48.81%	21.1	1	0.57062

$EF_{thermal,y}$	0.906411163	*tCO2/MWh*

Installed capacity of Central China Power Grid

	Installed capacity in 2004	Installed capacity in 2005	Installed capacity in 2006	Newly added installed capacity from 2004 till 2006	Proportion against newly added installed capacity
	A	B	C	D=C-A	
Thermal power	53825.7	60167.2	76658	22832.3	73.77%
Hydro-power	34642	38405.2	42719	8077	26.10%
Nuclear power	0	0	0	0	0.00%
Wind power	0	24	41	41	0.13%
Total	88467.7	98596.4	119418	30950.3	100.00%
share in 2006 installed capacity	74.08%	82.52%	100%		

$EF_{grid,BM,y}$	0.6687	*tCO2/Mwh*

Calculation of EF_{CM}

$EF_{CM} = (EF_{OM} + EF_{BM})/2 = 0.9735\ tCO_2/W/Mwh$

Annex 4

MONITORING INFORMATION

Please refer to relative information in section B7.2.

ANNEX 5

GOLD STANDARD INFORMATION

See next page.

Wanzhou Kehua Cement WHR to 13.5MW Electricity Project in Wanzhou District
Gold Standard PDD

Additional PDD Annex as required for Gold Standard validation

GS Annex Version 3, June 30th 2008
Contact person: Patrick Bürgi, South Pole Ltd., p.buergi@southpolecarbon.com, +41.44.633 78 76

Introductory Notes
This document contains the PDD Annex to validate the Project "Wanzhou Kehua Cement WHR to 13.5MW Electricity Project in Wanzhou District" against the Gold Standard. Gold Standard validation shall be carried out in parallel with regular CDM validation.

The project activity is a waste heat utilisation power generation project that will be implemented at the clinker production line at the cement factory of CWKC. The waste heat shall be used as thermal energy for electricity generation, displacing part of the electricity requirement of cement production line from the Central China Power Grid (CCPG). The project activity implies a series of sustainable development aspects including technological, environmental and social benefits.

By substituting a part of the electricity supply from CCPG, the project activity will save fossil fuel sources and reduce GHGs emissions, e.g. CO2, SO2 and NOx, thereby mitigating the negative impact that incurres by the excessive exploitation and depletion of natural resources like coal. Project activity also will provide working places for skilled labour and professionals in the region by offering direct and indirect employment for power plant construction and operation. It is firmly believed by the project participants that the project activity will promote sustainable economic and industrial growth in the long run, help conserving natural resources, and consequently contribute to a cleaner and healthier environment.

Project Type Eligibility Screen

GS Manual for CDM Project Developers: **Section 3.2**

The project activity falls under category "A.2. Energy Efficiency", sub-category "Industry Energy Efficiency", as specified in Appendix A of the Gold Standard Manual for CDM Project Developers.

The proposed project is a large-scale project; hence methodology ACM0012 has been applied in this project, corresponding to the small-scale methodology ASM III.Q.

Gold Standard Additionality Screen

Previously announced projects screen

GS Manual for CDM Project Developers: **Section 3.3.1**

There has been no public announcement of the project going ahead without the CDM, prior to any payment being made for the implementation of the project.

Prior to the implementation of the project activity, the project developer has considered CDM. CDM funds are a key element in the finance structure of the project activity and it would not be implemented without CDM.

UNFCCC Additionality Tool Version 05.2 (EB 36 Annex 13)

GS Manual for CDM Project Developers: **Section 3.3.2**

The Additionality Tool is featured in Section B.5 of the PDD.

ODA Additionality Screen

GS Manual for CDM Project Developers: **Section 3.3.2**

Project financing for this project activity will not use Official Development Assistance (ODA) Funds as defined in the Gold Standard Manual for Project Developers. There are no loans or grants being provided by International Finance Institutions, which include ODA.

Conservative Approach

GS Manual for CDM Project Developers: **Section 3.3.3**

The baseline scenario selection and the calculation of green house gas emission reductions have been carried out in a conservative manner:

Project proponents have used an approved methodology by CDM Executive Board (ACM0012 "*Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects*", Version 03) in order to determine the baseline scenario and calculate emission reductions.

- Likely baseline scenarios have been developed and assessed using guidance provided by the methodology ACM0012 and the "Tool for the demonstration and assessment of additionality". A set of quantified scenarios has been described and the most conservative baseline scenario has been selected.
- Calculations have been done in a transparent manner providing full documentation and references to data sources to the DOE.

Please refer to the PDD Sections B.3, B.4, B.5 and B.6 for more details on project boundary definition, baseline scenario selection and emission reductions calculation.

Sustainable Development

Sustainable Development Assessment

GS Manual for CDM Project Developers: **Section 3.4.1**

Besides its contribution to climate change mitigation, the Project contributes to sustainable development in China as follows:

- Leaves from Feasibility Study Report of these two phases are provided as reference to the justification here. Please see following documents attached for details.
  2.1-300087_Wanzhou_Cement_WHR_Contribution in Sustainable D and EI Description in FSR and EIA.pdf
- Asterisk * marks the indicators will be monitored in monitoring plan additionally to those monitored for ER calculation.
-

Component • *Indicators*	Score (-2 to +2)	Rational
Local / Regional / Global Environment		
• *Water quality and quantity*	0	The waste water sources of the Project Activity include the waste water from the cooling tower, the chemistry water treatment workshop, the periodic flashing of the boilers, etc. The waste water from project activity contains no toxic or poisoning materials, and is pre-treated and recycled, and the recycled ratio can reach 97.6%. From the waste water treatment proposal conducted by project owner, the waste water will be gathered in the preclarificator. After the precipitation, water could be recycled. And each year, the preclarificator will be cleaned; the precipitate could be utilized as raw material of cement. Therefore, the impact of the project activity on water environment will be insignificant and meet the nation standard "*Integrated Wastewater Discharge Standard" (GB8978)* Source: EIA Table 8-1, 11-1 and 11-2; FSR page 41~45
• *Air quality (emissions other than GHG)*	+1	Besides GHG emission reductions, implementation of the project also has other advantages over baseline scenario in terms of impacts on air quality. Electrostatic precipitators collect the dust from the SP and AQC exit gas in the absence of the project activity. Once the project activity is implemented, it is expected to lead to reductions in particles in the flue gas as the dust will be settled in SP boiler and AQC boiler before vented to electrostatic precipitator for further settlement. And it is expected to reduce the SO2 1273t annually and NOX emissions by reducing combustion of fossil fuel in Central China Power Grid after implementation of the project activity. Source: EIA Table 11-1 and 11-2; FSR page 41~45

• *Other pollutants (including, where relevant, toxicity, radioactivity, POPs, stratospheric ozone layer depleting gases)*	0	There is no significant difference between the project baseline and the project activity.
• *Soil condition (quality and quantity)*	+1	In the absence of project activity, the cement production factory uses the electricity from the power grid. In Central China Power Grid, most of the electricity is generated by coal; in this process waste solid is generated. But a waste heat recovery based power station would not have any significant solid waste generated. According to EIA, the quantity of waste solid generation is 17.1t/a in project activity and save coal 53028t/a, therefore in baseline scenario coal is used to generate electricity and waste solid (coal slag) production will at least reach 10000t/a. Source: EIA Table 8-1, 11-1 and 11-2; FSR page 41~45
• *Biodiversity (species and habitat conservation)*	0	As compared to the baseline, no significant change in biodiversity is expected since the project only takes place within the plant boundary, i.e. the factory site.
Sub Total	+2	
Social Sustainability and Development		
• *Employment (including job quality, fulfilment of labour standards)*	+1	The enterprise will pay more attention on the project activity, because it's a new technology, therefore the quality of the job will be improved, most of the work is automatic and controlled by computer, and the sophisticated monitoring data is also recorded by computer continuously. Compared with baseline, there is a big advance. Project manager and operators in the plant will learn new knowledge of sophisticated monitoring equipments and computer operations. Source: FSR page 59
• *Livelihood of the poor*	+1	Wanzhou Ditrict is a low developed place, the employment rate is less than 50%[25] and the

[25] http://news.xinhuanet.com/focus/2004-03/19/content_1371783.htm

(including poverty alleviation, distributional equity, and access to essential services)		average annual income per capita is RMB 8540 in 2005[26]. The project will increase income to average 34200RMB per year for people involved. Source: CNKI Data Search, FSR page 57
• *Access to energy services*	+1	Chongqing, especially Wanzhou District has been in lack of power for years due to its fast economy development. Big amount of enterprises have to give up their investment plan in Wanzhou due to the lack of electricity, this also causes the increase of unemployment rate, furthermore at least 10 enterprises with huge quantity of electricity requirement are under construction[27], therefore the situation of local grid is more and more serious. The project activity will add new capacity to grid and help improving electricity availability. Source: News form www.news.cn (Managed by government), FSR page 9
• *Human and institutional capacity (including empowerment, education, involvement, gender)*	0	People involved are trained with skills for operation of the power generation facility and knowledge of Kyoto Protocol. This is the first time local people are organised to work on a project under the Kyoto Protocol. Success of the project will contribute a team with experience of waste heat recovery to Chinese cement industry.
Sub Total	+3	
Economic and Technological Development		
• *Employment (numbers)*	+1	The project activity generates 65 employment opportunities during the project's construction and operation period. Preliminary design and feasibility study of the project also involved a lot of manpower. Project participants will monitor and record how much manpower demand is generated by construction and operation of the project. Source: FSR page 50~51

[26] http://number.cnki.net/show_result.aspx?searchword=%E4%B8%87%E5%B7%9E%E5%8C%BA%E4%BA%BA%E5%9D%87%E6%94%B6%E5%85%A5

[27] http://news.xinhuanet.com/focus/2004-03/19/content_1371783.htm

• *Balance of payments (sustainability)*	0	All equipments of the proposed project are purchased from domestic manufactures. No import and export is involved in the project activity. Hence, compared with baseline scenario there is no significant difference in terms of balance of payments.
• *Technological self reliance (including project replicability, hard currency liability, institutional capacity, technology transfer)*	0	Implementation of the project does not involve technology transfer. While the success of the project surely will encourage more clean production practice in cement production plants in China. Currently most of the cement production plants in China are still running with conventional technology and the waste heat is emitted into atmosphere directly without waste heat recovery. The proposed project will contribute in shifting the standard within the less developed cement industry in China.
Sub Total	+1	
Total	+6	

As can be seen from the matrix above the project activity shows a positive performance in all sustainable development categories. The project activity fulfils all Gold Standard criteria since none of the indicators above have a score of -2, there is no negative sub-total, and the total score is positive.

EIA requirements

GS Manual for CDM Project Developers: **Section 3.4.2**

EIA Gold Standard Requirements according to section 3.4.2 in the Gold Standard Manual apply to the project activity as follows:

1. Host country EIA requirements
   It is mandatory in China to conduct an EIA for this type of project activity. The EIA has been carried out and approved by Wanzhou EPA (Environment Protection Agency) of Chongqing Municipality on 07/08/2007. The outcomes of the EIA are summarized in Section D of the PDD.

2. Initial Stakeholder Consultation
   The Initial Stakeholder Consultation was held in the meeting room of Wanzhou Kehua Cement Co. Ltd. on 15 June 2007 and conducted by Yumu Solutions, an environmental management-consulting firm. The results of the Initial Stakeholders Consultation did not show any significant environmental and/or social impact (see Initial Stakeholder Consultation report below).

3. None of the indicators in the Sustainable Development Assessment Matrix scores -1.

Public consultation procedures

GS Manual for CDM Project Developers: **Section 3.4.3**

Initial Stakeholder Consultation

The initial stakeholder consultation was held in the meeting room of Wanzhou Kehua Cement Co. Ltd. on 15 June 2007 and conducted by Yumu Solutions, an environmental management-consulting firm. The meeting was attended by representatives from the local government, local residents, local entrepreneurs and employees of the project activity.

The overall response to the project, from all invited stakeholders, was encouraging and positive. It is evident from the stakeholder consultation process, that the project is perceived as a good example for the Chongqing Municipality in China and that it contributes to sustainable development of the region. No major environmental concerns were raised during the entire initial stakeholder consultation process. No adverse reaction/comments/clarifications related to socio-economic aspects have been sought/received during the Initial Stakeholder Consultation process.

A detailed report on the Initial Stakeholder Consultation is available in **Attachment 1** to this document.

Gold Standard Monitoring Criteria

GS Manual for CDM Project Developers: **Section 3.5.1**

The Sustainable Development Assessment Matrix shows that there are no indicators, which would be critical for a positive contribution of the project to Sustainable Development or that are particularly sensitive. Further, the initial stakeholder consultation has not demonstrated any concerns, which would require special monitoring.

Upon guidance by the Gold Standard on a similar project (Gold Standard communication dated 8 December 2006), the Gold Standard has recommended to monitor particulate matter emission levels as additional measure to regular CDM monitoring procedures.

Regular CDM monitoring procedures as specified in the PDD of the project activity account for:

- Determination of project emissions and emission reductions during the crediting period
- Determination of monitoring method (including data registration, monitoring, measurement and calibration) and the equipment applied
- Quality assurance and control procedures for the monitoring process
- Documentation of all relevant monitoring steps
- Employment opportunities generated by the project activity as sustainable development indicator

Qualitative and to some extent quantitative conclusions related to indicators from the Sustainable Development Matrix, such as Employment Generation and Livelihood of the Poor for example, can be derived from data contained in the regular CDM monitoring procedures (biomass supply sheets).

Therefore, no additional Gold Standard specific monitoring criteria have been added to the regular CDM monitoring plan.

Attachment 1 - Initial Stakeholder Consultation Report

Wanzhou Kehua Cement WHR to 13.5MW Electricity Project in Wanzhou District

Wanzhou, Chongqing, China

INITIAL STAKEHOLDER CONSULTATION REPORT

Procedure followed to invite stakeholder comments

A. Oral hearing for local stakeholders:

Place and date of the meetings

The Initial Stakeholder Consultation was held in the meeting room of Wanzhou Kehua Cement Co. Ltd. on 15 June 2007 and conducted by Yumu Solutions, an environmental management-consulting firm. Furthermore, from April 2007 to September 2007, same questionnaires utilised in this ISC were sent to the stakeholders who are involved. Including questionnaires in the ISC, totally 51 questionnaires were sent out and 51 were collected by September 15th 2007.

Meeting Participants

The mentioned meeting was attended by local residents and representatives from the following stakeholder categories:

1. Project Consultant
2. Local residents
3. Local government representatives
4. Local entrepreneurs
5. Employees

8 participants have followed the invitation and attended the meeting.

Participants	Organisation / Firm	Function
Mr. Zhu Xuefeng	Wanzhou Cement Co. Ltd.	Project Developer Representative
Mr. Zhou Qiming	Wanzhou Cement Co. Ltd.	Vice-President CDM Team Leader
Mr. Li Kang	Beijing Yumu Solutions	Project Consultant
Ms. Huang Runxiu	Local Resident Committee	Government Officer
Mr. Cheng Zhang	Wanzhou Cement Co. Ltd.	Employee
Ms. Meng Xuehua	Wanzhou Cement Co. Ltd.	Employee
Ms. Cheng Qizheng	Local Resident	Resident
Mr. He Chaoxing	Local Resident	Resident
Mr. Wei Jiaxiang	Local Resident	Resident
Mr. zhang Zhibing	Local Resident	Resident
Mr. He Chaoyun	Local Resident	Resident

Language

Documentation and meeting was held in Chinese (local language).

Meetings procedure

- Opening (5 min)
- Purpose of the consultation (5 min)
- Description of the project (15 min)
- Answering of questions (10 min)
- Completing checklists (40 min)
- General feedback (15 min)

Meeting protocols
On completion of the various meetings, the following documentation was collected and attested by the signatures of the stakeholders that were present:

1. Presence list with name, address and occupation
2. Filled out Questionnaires concerned with environmental, social, ecological and employee problems
3. Notes for additional comments on the project activity
4. Photographs of the meeting(s)

These documents are available as hardcopies and will be handed over to the designated operational entity (DOE) conducting the validation process.

Compilation of comments received

A. Oral hearing for local stakeholders:

The overall response to the Project, from 8 participating local stakeholders, was encouraging and positive. The greatest asset achieved by the project appears to be the positive effect on the environment. Stakeholders acknowledge that the very low dust, SO_2, NO_x emission levels of the flue gas and the utilization of the big amount of waste heat will be important for local energy resources and their life quality. The project is considered to be an example to reduce the local electricity demand, especially in the Three Gorges district, where currently the electric power availability is not sufficient at all or where WHR projects are not as advanced as in the proposed project due to high investment costs.

In the questionnaire, 5 questions were answered by the stakeholders as below:

1. What do you think about the impact of the WHR project to the environment, society, ecology and employees?
2. Is there negative influence to your living quality in the process of WHR project construction and operation?
3. What is the positive effect of the WHR project?
4. What is the negative effect of the WHR project?
5. What is your attitude concerned with the WHR project? Do you support the implementation of this project?

To sum up the answer of the stakeholders, the various benefits (as reported by local stakeholders) are listed below.

- It is beneficial to realize energy savings in the cement plant's energy performance by recovering the waste heat for power generation.
- It is beneficial to improve the local air quality by the installation of the waste heat boilers, as emission of ash in the flue gas of cement production could be effectively reduced.
- It is beneficial to improve the local environment by reducing harmful emissions (including SO_2, NO_x and dust) by WHR power generation comparing with the traditional fossil-fuel power generation.
- It is beneficial to reduce the thermal pollution in atmosphere through recovery of the heat by lowering the temperature of the waste flue gas.
- It is beneficial to create more new jobs for local people, also to train more professional technicians in cement WHR power generation.

Changes to Project design based on comments received

As no major concerns were raised during the entire initial stakeholder consultation process, it was not necessary to make any changes to the Project design.

Further, the initial stakeholder consultation demonstrated that it is not required to conduct an Environmental Impact Assessment (EIA) of the Project, which is also not requested by the CDM Executive Board. However, the project owner conducted an EIA process anyway as required by national regulations. The outcome of the EIA process was positive and in favor of the project.