CLEAN DEVELOPMENT MECHANISM
PROGRAM ACTIVITY DESIGN DOCUMENT FORM (CDM-CPA-DD)
Version 01

CONTENTS

Annexes

NOTE:

(i)This form is for the submission of CPAs that apply a large scale methodology using provisions of the proposed PoA.

(ii)The coordinating/managing entity shall prepare a CDM Programme Activity Design Document (CDM-CPA-DD)[1,2] that is specified to the proposed PoA by using the provisions stated in the PoA DD. At the time of requesting registration the PoA DD must be accompanied by a CDM-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-CPA-DD (using a real case). After the first CPA, every CPA that is added over time to the PoA must submit a completed CDM-CPA-DD.

[1] The latest version of the template form CDM-CPA-DD is available on the UNFCCC CDM web site in the reference/document section.

[2] At the time of requesting validation/registration, the coordinating managing entity is required to submit a completed CDM-POA-DD, the PoA specific CDM-CPA-DD, as well as one of such CDM-CPA-DD completed (using a real case).

SECTION A. General description of CDM programme activity (CPA)

A.1. Title of the CPA:

>>
Project Title: Waste Heat Recovery and Utilization for Power Generation in cement sector in Shanxi Province, China－CPA No.01 Jigang
Version No: 1
Date: 05/03/2010

A.2. Description of the CPA:

>>
Shanxi Jigang Cement Co., Ltd., CPA No. 01, is located in Beiyugu Village, Kaizha Town, Lvliang City, Shanxi Province, China.

It will introduce facilities for heat recovery and power generation of 9 MW in a newly-installed cement production line with 2,500 t/d and existing line with 2,500 t/d. Annual power generation is 53,000 MWh, of which 49,000 MWh is expected to be supplied to cement plants. Before launching the project activity, waste heat generated from cement plants are released to the air, and all electricity needed for cement production was all purchased from North China Grid. Implementation of this waste heat recovery and power generation project will not only supply a part of electricity demand but also reduce CO2 emissions by 44,000 tonnes per year.
The company will complete construction work of power generation facilities in 2010 and launch waste heat recovery and power generation on January 1st, 2011.
This project will contribute environmental, economical and social sustainability in the host country.

Environmental contribution:	Waste heat recovery and power generation will partly replace the conventional electricity supply from the grid, which will cut coal use in power generation as well as reducing air pollutants such as particles, SO2 and NOx.
Economic contribution:	By implementing this project activity, 49,000 MWh per year of electricity is generated. Converting this with national average of coal consumption for supply of electricity from thermal power plants, 350 g/kWh for general coal, 17,150 tonnes of general coal can be reduced, which leads to an effective energy utilization. 18 personnel are hired for implementing of this project activity, contributing job creation in Shanxi region.
Social contribution:	It can restrain explosion accident indirectly by reducing coal output.

A.3. Entity/individual responsible for CPA:

>> Here the information on the entity/individual responsible of the CPA shall be included, hence forth referred to as CPA implementer(s). CPA implementers can be project participants of the PoA, under which the CPA is submitted, provided the name is included in the registered PoA.

Project participants and Parties involved are listed in Table 1.

Table 1 Project Participants Information

Name of Party involved (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)
P. R. China（host）	Shanxi Jigang Cement Co., Ltd.	No

A.4. Technical description of the CPA:

A.4.1. Identification of the CPA:

>>
Waste Heat Recovery and Utilization for Power Generation in cement sector in Shanxi Province, China – CPA No.01 Jigang

A.4.1.1. Host Party:

>>
People's Republic of China

A.4.1.2. Geographic reference of other means of identification allowing the unique identification of the CPA (maximum one page):

>> Geographic reference or other means of identification[3], Name/contact details of the entity/individual responsible for the CPA , e.g. in case of stationary CPA geographic reference, in case of mobile CPAs means such as registration number, GPS devices.

The project activity in the CPA is located in Beiyugu Village, Kaizha Town, Lvliang City, Shanxi Province, China. The project activity is identified as below.

Plant (Project Activity)	Name of The Company/ Organization	City/ Town/ Village	Latitude	Longitude	Commissioning Date
001	Shanxi Jigang Cement Co., Ltd.	Lvliang/ Wenshui/ Kaizha/ Beiyugu	37.416	112.017	***

[3] E.g. in case of stationary CPA geographic reference, in case of mobile CPAs means such as registration number, GPS devices.

Figure 1. Location of Lvliang City, Shanxi

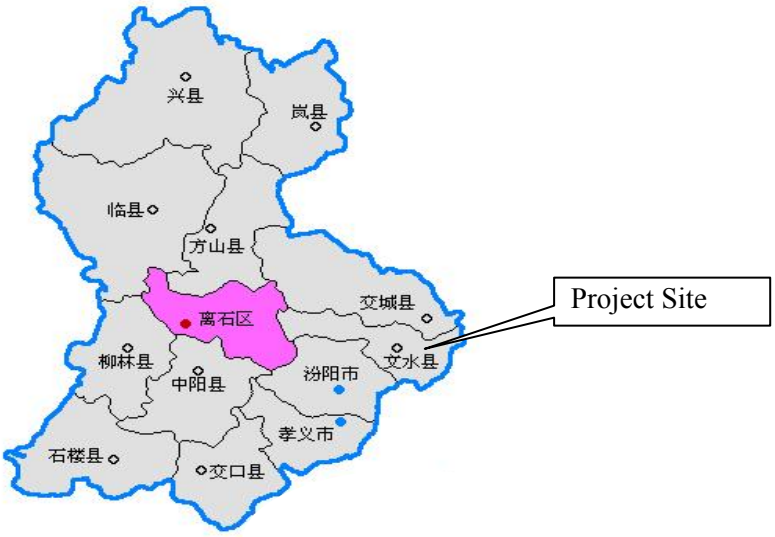

Figure 2. Location of the Project Activity site in Lvliang City

A.4.2. Duration of the CPA:

A.4.2.1. Starting date of the CPA:

>>

01/01/2011, start date for project construction permit.

A.4.2.2. Expected operational lifetime of the CPA:

>>
21years.

A.4.3. Choice of the crediting period and related information:

>>
Fixed Crediting period

A.4.3.1. Starting date of the crediting period:

>>
01/01/2011 or the date of registration, whichever is later.

A.4.3.2. Length of the crediting period, first crediting period if the choice is renewable CP:

>>
NOTE: Please note that the duration of crediting period of any *CPA* shall be limited to the end date of the *PoA* regardless of when the CPA was added.

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

>>
10-year fixed crediting period is applied to this project. The estimated amount of emission reductions are shown in Table 1.

Table 2 Estimation of emission reduction in the total crediting period

Years	Estimation of annual emission reductions in tones of CO2 e
2011	37,143[4]
2012	43,697
2013	43,697
2014	43,697
2015	43,697
2016	43,697
2017	43,697
2018	43,697
2019	43,697
2020	43,697
Total estimated reductions (tones of CO2 e)	430,418
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tones of CO2 e)	43,041.8

A.4.5. Public funding of the CPA:

>>

[4] According to FSR, the first year's operation rate is 85%.

No public funding is used to implement this CDM Programme of Activity (CPA).

A.4.6. Confirmation that CPA is neither registered as an individual CDM project activity nor is part of another Registered PoA:

>>

The CPA is neither registered as an individual CDM project activity nor part of another registered PoA. Name of the company/organization, location, the GPS points of the CPA are specified in Section A.4.1.2 and can be compared with any other registered PoA or an individual CDM project. Moreover, as there is no registered PoA in Shanxi Province, this project cannot be a part to constitute any other PoAs.

SECTION B. Eligibility of CPA and Estimation of emissions reductions

B.1. Title and reference of the Registered PoA to which CPA is added:

>>

Waste Heat Recovery and Utilization for Power Generation in cement sector in Shanxi Province, China－CPA No.01 Jigang

B.2. Justification of the why the CPA is eligible to be included in the Registered PoA :

>>

This CPA satisfies each eligibility requirements in Table A4.2.2. of PoA-DD.

Table 3 Eligibility requirements and Condition conformity in this CPA

NO	Eligibility requirements of PoA-DD	Condition conformity in this CPA
i	Each CPA must be implemented in cement plants located within the geographical boundary of Shanxi Province, China.	The project activity in the CPA is located in Beiyugu Village, Kaizha Town, Lvliang City, ShanXi Province, China.
ii	Each CPA must implement the baseline and monitoring methodology ACM0012 "Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects" Version 3.2.	The CPA implements the baseline and monitoring methodology ACM0012 "Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects" Version 3.2. Further details are given in Table 4.
iii	The coordinating entity will ensure that all CPAs under its PoA are neither registered as an individual CDM project activity nor included in another registered PoA, and that incorporation of the CPA into the PoA has been applied.	The CPA is neither registered as an individual CDM project activity nor part of another registered PoA. Name of the company/organization, location and the GPS points (latitude and longitude) of the CPA are specified in Section A.4.1.2 and can be compared with any other registered PoA or an individual CDM project.
iv	Each CPA shall be uniquely identified and defined in an unambiguous manner by providing geographic information on and facilities within the cement plant, and the exact start date and end date of the crediting period.	■ Location: The project activity in the CPA is located in Beiyugu Village, Kaizha Town, Lvliang City, ShanXi Province, China. ■ Facilities with cement plants: newly-installed cement production line with capacity of 2,500 t/d and existing line with 2,500 t/d. ■ Start of crediting period: 01/01/2011 or the date of registration, whichever is later. ■ Completion date of crediting period: 10 years after the crediting period starts.
v	Each CPA must ensure that leakage, additionality, establishment of the baseline scenario, baseline emissions, eligibility and double counting are unambiguously defined.	■ The CPA has no leakage. ■ For additionality, details are given in B.3. ■ In the baseline scenario, all waste heat generated from cement plant is vented to the atmosphere, and all electricity needed for cement production are purchased from North China Grid. ■ Baseline emissions are calculated in B.5.2.

vi	Each CPA must be approved by the coordinating entity and DOE prior to its incorporation into the PoA.	The CPA is to be approved by coordinating entity, Shanxi Building Material Industry Administration Office, and DOE.

This CPA satisfies each applicability conditions in ACM0012.

Table 4 Applicability conditions in ACM0012

	Applicability conditions in ACM0012	Condition conformity in this CPA
i	If the project activity is based on the use of waste pressure to generate electricity, electricity generated using waste pressure should be measurable.	This project does not use waste pressure to generate electricity.
ii	Energy generation in the project activity may be used with in the industrial facility or exported from the industrial facility.	All the energy (electricity) generated in the project activity is used within the industrial facility (Cement Production line including other equipments) of Shanxi Jigang Cement and the electricity isn't exported outside the industrial facility.
iii	The electricity generated in the project activity may be exported to the grid or used for captive purposes.	All the electricity generated in the project activity is used for captive purposes.
iv	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.	The waste energy in the project activity is generated by AQC and SP within the cement production line.
v	Regulations do not constrain the industrial facility that generates waste energy from using fossil fuels prior to the implementation of the project activity.	There are no such regulations that constrain the industrial facility generating waste energy from using the fossil fuels being used prior to the implementation of the project activity.
vi	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.	There are two cement lines in this project activity, which are newly-installed cement production line with capacity of 2,500 t/d and existing line with 2,500 t/d.
vii	The emission reductions are claimed by the generator of energy using waste energy.	The emission reductions are calculated by the project proponent, which generates electricity by using waste energy.
viii	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 the recipient plant(s) for using a zero-emission energy source.	All the energy (electricity) generated in the project activity is used within the industrial facility. The energy is not exported to any other facility.
ix	For those facilities and recipients included in the project boundary, that prior to	Existing cement line with the capacity of 2,500 t/d has already operated. Now the installation of

	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	generators for which generates electricity from waste heat is scheduled for 1/1/2011. The minimum remaining lifetime of the equipments currently used is over 15 years. Thus, the credits are claimed for the crediting period of 10 years.
x	Waste energy that is released under abnormal operation (for example, emergencies, shut down) of the plant shall not be accounted for.	Any waste heat that is released under abnormal operation of the plant has not been accounted for, because the calculation of the baseline emission depends on the measured amount of electricity generated by utilizing waste energy, not on the waste energy released.

B.3. Assessment and demonstration of additionality of the CPA, as per eligibility criteria listed in the Registered PoA:

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The latest version of "The Tool for the Demonstration and Assessment of Additionality" (Version 05.2), adopted in the 39th meeting of the CDM Executive Board, is applied as the UNFCCC additionality tool.

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

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

>>

According to ACM0012, the following alternatives to the proposed PoA have been identified:

Table 5 Alternative for waste heat utilization

	Alternative for waste heat utilization	Condition conformity in this CPA
W1	WECM is directly vented to atmosphere without incineration or waste heat is released to the atmosphere or waste pressure energy is not utilized;	The Project utilizes waste heat for power generation, and prior to the implementation of the Project the waste heat was released into the atmosphere. Therefore alternative W1 is feasible.
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;	The Project utilizes waste heat for power generation, and prior to the implementation of the Project the waste heat was released into the atmosphere. Since alternative W2 is the same with alternative W1, these alternatives are combined as alternative W1 for further discussion.
W3	Waste gas/heat is sold as an energy source;	There is no other heat load inside cement facilities or nearby villages or other industrial factories, also there is no any other economical and applicable way to utilize the waste heat from cement production. Therefore, W3 is not a possible alternative, which shall be excluded.
W4	Waste gas/heat/pressure is used for meeting energy demand;	Waste energy recovered by the Project is waste heat. Since there exists no heat demand in the Project Site,

		soW4 is not applicable.
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;	W5 is not applicable, as the proposed project activity does not utilize waste gas.
W6	All the waste gas produced at the industrial facility is captured and used for export electricity generation.	W6 is applicable. The proposed project activity utilizes waste gas for power generation.

Table 6 Alternative for power generation

	Alternative for power generation	Condition conformity in this CPA
P1	Proposed project activity not undertaken as a CDM project activity;	"The Project not undertaken as a CDM project activity" complies with legal and regulatory requirements, therefore alternative P1 is feasible.
P2	On-site or off-site existing/new fossil fuel fired cogeneration plant;[5]	There is no on-site or off-site existing fossil fuel fired cogeneration plant.
P3	On-site or off-site existing/new renewable energy based cogeneration plant; [6]	There is no on-site or off-site existing renewable energy based cogeneration plant.
P4	On-site or off-site existing/new fossil fuel based existing captive or identified plant;	There is no on-site or off-site existing fossil fuel based existing captive or identified plant.
P5	On-site or off-site existing/new renewable energy or other waste energy based [7] existing captive or identified plant;	There exists no renewable energy or other waste energy captive power plant for the Project Owner.
P6	Sourced Grid-connected power plants;	"Sourced grid-connected power plants" comply with legal and regulatory requirements, therefore alternative P6 is feasible.
P7	Captive Electricity generation using waste energy (if project activity is captive generation using waste energy, this scenario represents captive generation with lower efficiency than the project activity);	The project employs low temperature waste heat recovery for power generation technology which utilizes pure waste heat to generate electricity for own demand. There is no low temperature waste heat power generation technology with lower efficiency than that applied in the project, and alternative P7 is excluded.
P8	Cogeneration using waste energy (if project activity is cogeneration using waste energy, this scenario represents cogeneration with lower efficiency than the project activity);	It is excluded as the project involves no heat generation.
P9	Existing power generating equipment is either decommissioned to build new more efficient and larger capacity plant or modified or expanded, and resulting in higher efficiency, to produce and only	As there is no existing power generating equipment used previously for implementation of project activity, the scenarios of P9 are not credible and realistic and shall be excluded.

[5] Scenarios P2 and H2 are related to the same fossil fuel cogeneration plant.
[6] Scenarios P3 and H3 are related to the same renewable energy based cogeneration plant.
[7] This is not applicable to the Type-2 projects.

	export electricity generated from waste gas.[8] The electricity generated by existing equipment for captive consumption is now imported from the grid; [9]	
P10	Existing power generating equipment is either decommissioned to build new more efficient and larger capacity plant or modified or expanded, and resulting in higher efficiency, to produce electricity from waste gas for own consumption and for export;	As there is no existing power generating equipment used previously for implementation of project activity, the scenarios of P10 are not credible and realistic and shall be excluded.
P11	Existing power generating equipment is maintained and additional electricity generated by grid connected power plants.	As there is no existing power generating equipment used previously for implementation of project activity, the scenarios of P11 are not credible and realistic and shall be excluded.

Therefore, possible scenarios for the combination are as follows:

Table 7 Possible alternative project activity combinations

	P1	P6
W1 (W2)	Not applicable. This scenario is not internally consistent – if the waste heat is released in the atmosphere, it is not available for power generation.	**Alternatives combination I** Applicable. This scenario corresponds to the current practice at cement production facilities in the project area: power supply by the grid, and non-utilization of the waste heat.
W4	**Alternatives combination II** Applicable This scenario uses the waste heat to generate power to substitute power that would have been supplied by the grid, without the support of CDM	Not applicable. This scenario is not internally consistent – there would be no energy use for the waste heat.

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

>>

Therefore, there are two combinations that couldn't be excluded among the alternatives in waste gas heat utilization and electricity supply in cement sector.

Combination 1: to implement the proposed Project Activity, but not in CDM. In Shanxi Province, no laws and regulations exist to require cement companies to implement waste heat recovery for power generation.

Combination 2: the waste heat is vented to the atmosphere directly and the electricity is supplied for cement production by the China North Power Grid. In Shanxi Province, the use of waste gas from kiln and waste heat from cement production process for power generation are not mandatory.

[8] The portion used already for captive power generation PLUS the portion flared/vented.

[9] To replace the smaller amount of captive electricity previously generated for own use and now exported.

Step 2: Investment analysis
Sub-step 2a: Determine appropriate analysis method
>>
Option III: Benchmark analysis is applied.

The "Tool for the Demonstration and Assessment of Additionality" recommends three investment analysis methods including simple cost analysis (option I), investment comparison analysis (option II) and benchmark analysis (option III). The analysis will be analyzed through Option III of the additionality tool, i.e. benchmark analysis.

This method is applicable because:

Option I: Simple cost analysis is not applicable, because the project generates economic returns through cost savings from the displacement of power purchased from the grid.

Option II: Investment comparison analysis is not applicable, because the identified alternative (non-use of the waste heat and purchase of the power from the grid) does not need the investments.

Option III: Benchmark analysis is applicable, because there is one investment decision for which an IRR can be calculated and compared with a company benchmark.

Sub-step 2b – Option III: Apply benchmark analysis
>>
For the benchmark as criteria, 11% of the project IRR for cement industry is given in China's "Economic Assessment method and parameter of construction projects by SDPC and MOC". Currently, for cement projects in China, evaluation based on internal rate of return is conducted in general.

Sub-step 2c －option III: Calculation and comparison of financial indicators
>>
1) Financial indicators
The financial data provided in the Feasibility Study Report of the Project is as follows:

Table 8 Financial indicators

Installed capacity	9 MW
Net electricity supply	48,093MWh
Lifetime of the Project	21 years
Total investment	RMB 67,853,900 Yuan
Annual O&M cost	RMB 5,250,000 Yuan/year
Expected tariff	RMB 0.237 Yuan/KWh (excluding VAT)
Income tax rate	25%
Tax rate of city construction	7%
Tax rate of education	3%
Crediting period	10 years
Expected price of CERs	8.5 Euro/tCO2e (exchange rate of Euro and RMB is 1:10)

2) Comparison of IRR for the Project and the financial benchmark

In benchmark analysis, a project is determined as less attractive in economic aspect when internal rate of return (IRR) of the project is below benchmark. Below table shows IRRs for this project activity with/without CDM.

Table 9 IRRs for this project activity with/without CDM

	Project IRR (Before tax) Benchmark=11%
Without CDM	6.50 %
With CDM	11.44 %

In accordance with the benchmark analysis above, the project IRR would be 6.50% (pre-tax) if no CERs revenue is considered, which is much lower than the benchmark rate of 11%. Therefore, the proposed project will not be considered as financially attractive.

In contrast, the project IRR could be increased up to 11.4% if CERs revenue is considered, which is higher than the benchmark rate. Therefore, the project investment becomes attractive by the CERs sales after the CDM registration.

3) Sensitivity analysis

For the Project, following financial parameters were taken as uncertain factors for sensitive analysis of financial attractiveness:

- Total Investment
- Annual O&M Cost
- Tariff

In cases that tariff, annual O&M cost and total investment of the project vary from -10% to +10%, IRRs are analyzed in below table.

Table 10 IRR Sensitivity analysis for different Financial Parameters (IRRs without CDM)

Item	-10%	-5%	0%	5%	10%
Total investment	7.82%	7.13%	6.50%	5.92%	5.38%
Annual O&M Cost	7.48%	6.99%	6.50%	5.98%	5.46%
Tariff	4.16%	5.36%	6.50%	7.60%	8.66%

As shown in above table, both 6.50% for the case without credit and the IRR in the sensitivity analysis are below the benchmark (11%).

Step 3. Barrier Analysis

>>

This step shall be skipped.

Step 4. Common practice analysis

>>

Sub-step 4a. Analyze other activities similar to the proposed Project Activity

>>

There is no law and regulation to promote implementation of this PoA.
There is only one company (Shanxi Zhongtiaoshan New Material) that introduces and operates the waste heat recovery and utilization for power generation within Shanxi Province now. The company releases all of the waste heat into the atmosphere and purchases electricity from North China Power Grid.

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

>>

Shanxi Zhongtiaoshan New Material Company has operated the waste heat recovery and utilization for power generation because the company is a public enterprise which therefore has a good financial status, and aims at improvement of its company image. It is available for the public company to do this kind of project, while not available for private companies due to low profitability. Therefore, it is appropriate that the baseline scenario is considered as waste heat release into the atmosphere and purchase of all needed electricity for cement production from North China power Grid.

B.4. Description of the sources and gases included in the project boundary and proof that the CPA is located within the geographical boundary of the registered PoA.

>>

Table 11 Overview on emissions sources included in or excluded from the project boundary

	Source	Gases	Included?	Justification/Explanation
Baseline	North China Grid	CO2	Included	The main emissions
		CH4	Excluded	Excluded f Eastern China Power Grid or simplification，it's conservative
		N2O	Excluded	Excluded for simplification，it's conservative
	Fossil fuel consumption in boiler for thermal energy	CO2	Excluded	There is no fossil fuel direct utilization in boiler
		CH4	Excluded	There is no fossil fuel direct utilization in boiler
		N2O	Excluded	There is no fossil fuel direct utilization in boiler
	Fossil fuel consumption in cogeneration plant in the project cogeneration plant	CO2	Excluded	There is no cogeneration plant in the project
		CH4	Excluded	There is no cogeneration plant in the project
		N2O	Excluded	There is no cogeneration plant in the project
	Baseline emissions from generation of steam used in the flaring process, if any	CO2	Excluded	There is no such process in the project
		CH4	Excluded	There is no such process in the project
		N2O	Excluded	There is no such process in the project
Project Activity	Supplemental fossil fuel consumption at the project plant	CO2	Excluded	There is no supplemental fossil fuel in project
		CH4	Excluded	There is no supplemental fossil fuel in project

		N2O	Excluded	There is no supplemental fossil fuel in project
	Supplemental electricity consumption.	CO2	Included	The main emissions.
		CH4	Excluded	Excluded for simplification，it's conservative
		N2O	Excluded	Excluded for simplification，it's conservative
	Project emissions from cleaning of gas	CO2	Excluded	There is no such process in the project
		CH4	Excluded	There is no such process in the project
		N2O	Excluded	There is no such process in the project

B.5. Emission reductions:

B.5.1. Data and parameters that are available at validation:

Data / Parameter:	**1. $OXID_i$**
Data unit:	%
Description:	Carbon Oxygenation Rate of fuel i
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy
Value applied:	-
Justification of the choice of data or description of measurement methods and procedures actually applied:	-
Any comment:	2006 IPCC's Data is adopted because the real data is unavailable.

Data / Parameter:	**2.$EF_{elec,i,j.y}$**
Data unit:	tc/TJ
Description:	Carbon Emissions Factor of fuel i
Source of data:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, Energy
Value applied:	-
Justification of the choice of data or description of measurement methods and procedures actually applied:	-
Any comment:	2006 IPCC's Data is adopted because the real data is unavailable.

Data / Parameter:	$3.NCV_i$
Data unit:	MJ/t,km^3
Description:	Net Caloric Value of fuel i
Source of data used:	China Energy Statistical Yearbook 2006
Value applied:	-
Justification of the choice of data or description of measurement methods and procedures actually applied:	Refer to annex 3
Any comment:	-

Data / Parameter:	$4.EF_{OM}$
Data unit:	tCO_2/MWh
Description:	Operation Marginal Emission Factor
Source of data:	China Electric Power Yearbook (2009); China Energy Statistical Yearbook (2009) 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy; Value applied: 1.0069
Value applied:	-
Justification of the choice of data or description of measurement methods and procedures actually applied:	Refer to annex 3
Any comment:	It is updated according to China DNA.

Data / Parameter:	$5.EF_{BM}$
Data unit:	tCO_2/MWh
Description:	Build Marginal Emission Factor
Source of data:	China Electric Power Yearbook (2009); China Energy Statistical Yearbook (2009) 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy; Value applied: 0.7802
Value applied:	-
Justification of the choice of data or description of measurement methods and procedures actually applied:	Make the ex- ante estimation according to the weighted emission factor of 20% recently constructed power plants

Any comment:	It is updated according to China DNA.

Data / Parameter:	**6. $q_{WCM,product}$**
Data unit:	kg
Description:	Specific waste energy production per unit of product (departmental or plant product which most logically relates to waste energy generation) generated
Source of data:	Method-2 , source of data is from external expert.
Value applied:	-
Justification of the choice of data or description of measurement methods and procedures actually applied:	Estimated based on information provided by the external expert on the waste gas/heat/pressure generation per unit of product and volume or quantity of production.
Any comment:	-

Data / Parameter:	**7. $Q_{BL,product}$**
Data unit:	Tons/yr
Description:	The annual output for the cement clinker
Source of data:	weighing-appliance Keep monitoring
Value applied:	-
Justification of the choice of data or description of measurement methods and procedures actually applied:	Based on audited production records, balance sheets etc. Data for three years prior to project implementation.
Any comment:	Prove-reading according to the state regulations.

B.5.2. Ex-ante calculation of emission reductions:

>>

Emission factor and emission reductions are calculated below, by using Sections E.6.1. and B.5.1. of PoA-DD.

(1) Baseline emissions

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

Where:

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

$BE_{En,y}$ = The baseline emissions from energy generated by project activity during the year y in tons of CO2

$BE_{flst,y}$ = Baseline emissions from steam generation, if any, using fossil fuel that would have been used for flaring the waste gas in absence of the project activity (tCO2e per year), calculated as per equation 1c. This is relevant for those project activities where in the baseline steam is used to flare the waste gas

For the proposed project, $BE_{flst,y} = 0$.
$BE_y = BE_{En,y}$

For the proposed project, BEEn,y is divided into two conponents.
$BE_{En,y} = BE_{Elec,y} + BE_{Ther,y}$
Where:
BEElec,y = Baseline emissions from electricity during the year y in tons of CO2
BEther,y = Baseline emissions from thermal energy (due to heat generation by element process) during the year *y* in tons of CO2
For the proposed project, $BE_{Ther,y} = 0$.
$BE_y = BE_{Elec,y}$

According to ACM0012,

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

Where:
$BE_{elec,y}$ = Baseline emissions due to displacement of electricity during the year y in tons of CO2.
$EG_{i,j,y}$= The quantity of electricity supplied to the recipient j by generator, which in the absence of the project activity would have been sourced from ith source (i can be either grid or identified source) during the year y in MWh, and
$EF_{elec,i,j,y}$ = Tthe 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_{wg} = Fraction of total electricity generated by the project activity using waste gas. This fraction is 1 if the electricity generation is purely from use of waste gas.
f_{wcm} = Energy that would have been produced in project y year using waste gas/heat generated in base year expressed as a fraction of total energy produced using waste gas in year y. The ratio is 1 if the waste gas/heat/pressure generated in project year y is the same or less then that generated in the base year.

Annual operation of this CPA is set at 300 days per year (7,200 hours).

Average output of power generation capacity of the facility is 8,203 kW. However, since actual temperature of waste heat is around 300 degrees centigrade, below 320 degrees centigrade assumed in the FSR, it needs to decrease operating capacity by 10% or so. From this value, subtract 8% as in-house power consumption to obtain net power supply.

Therefore, EG_y = 8,203 kW x 7,200 h x (100%- 10%) x 92% = 48,903 MWh.

For emission factor of the grid is calculated based on "Tool to calculate the emission factor for an electricity system". The combined margin emissions factor is calculated as follows:

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

Where:
$EF_{grid,OM,y}$ = Operating margin CO_2 emission factor in year y (tCO_2/MWh)
$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year y (tCO_2/MWh)
w_{OM} = Weighting of operating margin emissions factor (%)

w_{BM} = Weighting of building margin emissions factor (%)

The emission factor of North China Grid released in 2009 is as follows:
$EF_{grid,OM,y}$ = 1.0069 tCO2/MWh
$EF_{grid,BM,y}$ = 0.7802 tCO2/MWh

In addition, since this project activity is not power generation using renewable energies, the proportion of OM and BM is as follows:
W_{OM} = 0.5
W_{BM} = 0.5

For the proposed project, the combined margin emissions factor is calculated as follows:
EF_y=0.89355 tCO2/MWh.

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

= 1 x 1 x 48,903 MWh/yr x 0.89355 tCO2/MWh
= 43,697 tCO2/yr

(2) Project emission

$PE_y = PE_{AF,y} + PE_{EL,y} + PE_{EL,Import,y}$
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 plant(s), 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.
$PE_{E,y}$= Project activity emissions from on-site consumption of electricity for gas cleaning equipment.
$PE_{EL,Import,y}$= Project activity emissions from import of electricity replacing captive electricity generated in the absence of the project activity for Type-2 project activities

For the proposed project, there are no auxiliary fossil fuels consumption on-site, and there is no electricity consumption for gas cleaning, there is no captive electricity in the absence of baseline scenario,
so PE_y＝0.

(3)Estimating leakage

According to ACM0012, the leakage effect of the project activity could be neglected.

(4)Estimate the Emission Reduction

$ER_y = BE_y - PE_y$
Where:
ER_y = Total emissions reductions during the year y in tons of CO2
PE_y = Emissions from the project activity during the year y in tons of CO2
BE_y = Baseline emissions for the project activity during the year y in tons of CO2.

$ER_y = BE_y - PE_y$＝43,697 tCO2e/yr – 0 tCO2e/yr＝43,697 tCO2e/yr

B.5.3. Summary of the ex-ante estimation of emission reductions:

>>

Estimated emission reductions from this project activity are as shown in the following table. For the first year, 85% of operation rate is conservatively assumed.

Table 12 Summary of GHG emission reductions

Year	Estimation of project activity emissions (tonnes of CO_2 e)	Estimation of baseline emissions (tonnes of CO_2 e)	Estimation of leakage (tonnes of CO_2 e)	Estimation of overall emission reductions (tonnes of CO_2 e)
2011	0	37,143	0	37,143
2012	0	43,697	0	43,697
2013	0	43,697	0	43,697
2014	0	43,697	0	43,697
2015	0	43,697	0	43,697
2016	0	43,697	0	43,697
2017	0	43,697	0	43,697
2018	0	43,697	0	43,697
2019	0	43,697	0	43,697
2020	0	43,697	0	43,697
2021	0	43,697	0	43,697
2022	0	43,697	0	43,697
2023	0	43,697	0	43,697
2024	0	43,697	0	43,697
2025	0	43,697	0	43,697
2026	0	43,697	0	43,697
2027	0	43,697	0	43,697
2028	0	43,697	0	43,697
2029	0	43,697	0	43,697
2030	0	43,697	0	43,697
2031	0	43,697	0	43,697
Total (tonnes of CO_2 e)	0	911,089	0	911,089

B.6. Application of the monitoring methodology and description of the monitoring plan:

B.6.1. Description of the monitoring plan:

>>

The monitoring plan will be responsibly implemented by the project owner; it will ensure the emission reductions of the project during crediting period.

(1) Monitoring organization

The project owner will set up a special CDM group to be in charge of data recordation, collection, supervision and verification. The group director will be trained and supported of technical issues by CDM consultation, the organization of the monitoring group is planned to be set up as follows:

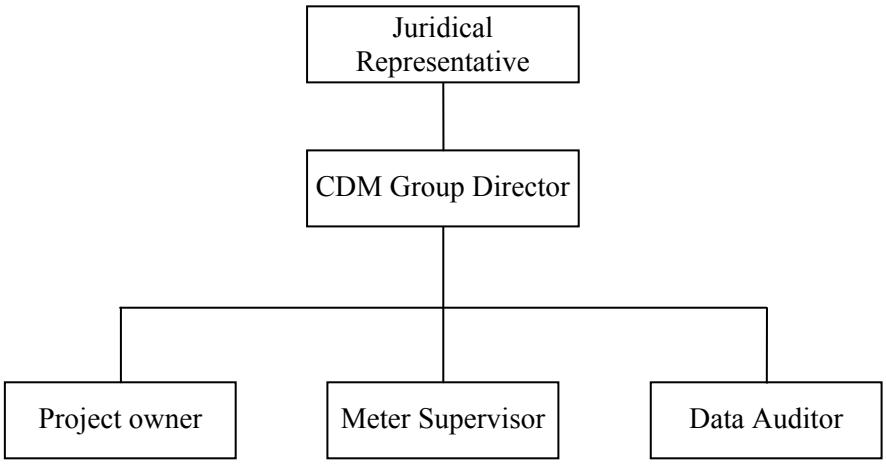

Figure 3 Monitoring organization

CDM Group Director:	Responsible for developing, operating, monitoring, maintaining and communicating for all the tasks related to the CDM project.
Data Keeper:	Responsible for recording monitored data and to compile periodically.
Meter Supervisor:	Responsible for examination and maintenance of monitored meters, inspection and lead sealing of meters with third party (power grid company).
Data Auditor:	Responsible for supervising and verifying monitored data with power grid company.

(2) Data to be monitored

The baseline emission factor is ex-ante calculated, electricity supplied and waste heat generated by power station of the project need to be monitored.

- For baseline emission factor, emission factor of North China Grid for 2009 (released by National Development and Reform Commission) is used.
- Waste heat volume in cement production line is measured in accordance with China's national standards.
- Electricity supplied from electricity plant is measured by monitoring.

(3) Monitoring equipment and installation

The electricity meter should be collocated according to the "Technique Management Regulation of Power Measure Equipment" (DL/T448-2000, issued by State Economic and Trade Commission on Nov. 03, 2000, and implemented on Jan. 1, 2001). Before the operation of the proposed project, the project owner and power grid company should check the electricity meter according to "Technique Management Regulation of Power Measure Equipment" (DL/T448-2000).

Three electricity ammeters shall be installed for the project. The first electricity ammeter (M1) shall be installed to measure electricity generated from the unit, which is managed by the project owner; the second electricity ammeter (M2) shall be installed to measure electricity used by the power station, which is managed by the project owner; the third electricity ammeter (M3) shall be installed to measure the net electricity supplied to cement production line. So, for the proposed project, the electricity supplied should be read on M3, while data from M1 and M2 shall be used for cross-check.
Simplified electrical diagram is demonstrated in the following figure:

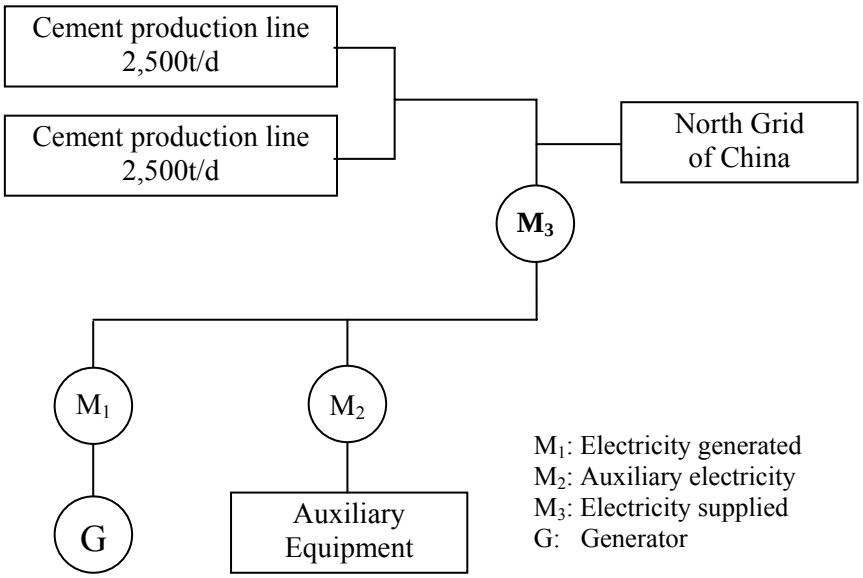

Figure 4 The location of monitoring electricity meter

The monitoring of waste heat generated shall be according to the national standards.

(4) Data collection

The project owner should read and record the data from M3 on daily basis in the forms of paper and electronic devices.

(5) QC

The electricity ammeter inspection and on-the-spot check should be implemented according to standard and regulations of state electric power industry. After inspection and on-the-spot check, electricity ammeters must be sealed. The project owner and power grid company should inspect and seal the electricity ammeter together: no one can remove the seal or modify the electricity ammeter when one party (or its representative) is absent.

(6) Data management

Monitoring data which is taken by CDM group should be kept periodically in the paper and electronic devices by oneself. These data are provided periodically to Shanxi Building Material Industry Administration Office which is the coordinating entity and makes monitoring report periodically based on these data. They also keep backup data of monitoring data provided by all CPA. All of the data shall be saved after 2 years of crediting period.

Correspondence to the verification by DOE should basically be implemented by Shanxi Building Material Industry Administration Office, which is coordinating entity, and project owner provides additional documents and accepts the site visit.

SECTION C. Environmental analysis

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C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

Environmental analysis shall be done at CPA level.

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

>>

(1) Standards applied in planning this project activity

Table 13 Standards to be satisfied for analysis of the environmental impacts

Standard	Code
"Environmental Quality Standard for Air"	GB3095-1996
"Emission Standard of Air Pollutants for Cement Industry"	GB4915-2004
"Emission Standard of Air Pollutants for Coal-burning Oil-burning Gas-fired Boiler"	GB13271-2001
"Standard for Noise of Industrial Enterprises"	GB12348-1990
"Standard of Environmental Noise in the Urban Area"	GB3096-1993
"Integrated Wastewater Discharge Standards"	GB8978-1996
"Environmental Quality Standards for Surface Water"	GB3838-2002

(2) Pollution sources and their standards

- **Waste air**

  Waste air from cement production line includes pollutants such as particles, NO2 and SO2 and is one of the reasons to cause air pollution. According to the Standard in China, "Emission standard of waste pollutants in GB13223-200x", emission standards of particles, NO2 and SO2 for thermal power plants constructed on or after January 1st, 2010, in Shanxi Province are as shown below.

Table 14 "Emission standard of waste pollutants in GB13223-200x" [mg/m3]

Air pollutants	Emission standard
Particle	30
NO2	200
SO2	400

- **Waste water**

  Waste water discharged from this project activity is mainly facility cooling water with some domestic waste water. For handling waste water in this project activity, the 1st class standard of "Integrated Wastewater Discharge Standards" (GB8978-1996) is applied.

Table 15 1st class standard in the Integrated Wastewater Discharge Standards (GB8978-1996)

Pollution	Scope	1st class standard
PH	All emission pollutant	6 - 9
Degree of colour (dilution rate)	All emission pollutant	50
Petroleum	All emission pollutant	5.0 mg/l
SS	Other emission pollutants	70 mg/l
BOD_5	Other emission pollutants	20 mg/l
COD_{cr}	Other emission pollutants	100 mg/l

- **Noise**

  For handling noise in this project activity, the Category III standard of "Standard for Noise of Industrial Enterprises" (GB12348-1990) is applied.

Table 16 Category III standard of "Standard for Noise of Industrial Enterprises" (GB12348-1990)

Category	Scope	dB – daytime (A)	dB – nighttime (A)
III	Industrial areas	65	55

Greening

Greening has positive effects in such as preventing pollution, controlling temperature/humidity, improving climate and mitigating noise pollution.

In this CPA, greening will be implemented in plants and its neighbourhood at construction stage at each CPA site.

Environmental management

After launching the CPA, environmental managers in plants will grasp facilities for environmental protection and occupational safety management. In production sites, some concurrent caretakers for environmental protection will be placed to work with the environmental managers.

C.3. Please state whether in accordance with the host Party laws/regulations, an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA),:

>>

This CPA satisfies each environmental standards given in C.2.

SECTION D. Stakeholders' comments

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D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

Stakeholder comments are invited at PoA level.

D.2. Brief description how comments by local stakeholders have been invited and compiled:

>>

N.A

D.3. Summary of the comments received:

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N.A

D.4. Report on how due account was taken of any comments received:

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N.A

Annex 1

CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE CPA

Organization:	Shanxi Jigang Cement Co., Ltd.
Street/P.O. Box:	Beiyugu Village, Kaizha Town
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State/Region:	Shanxi Province
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E-Mail:	shxjgc@163.com
URL:	www.jgbs.cn
Represented by:	Chen Muwen
Title:	vice-president
Salutation:	Mr
Last Name:	Chen
Middle Name:	NO
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Annex 3

BASELINE INFORMATION

Annex 4

MONITORING INFORMATION

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