CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAMME OF ACTIVITIES DESIGN DOCUMENT FORM
(CDM-SSC-PoA-DD) Version 01

CONTENTS

Annexes

NOTE:

(i) This form is for the submission of a CDM PoA whose CPAs apply a small scale approved methodology.

(ii) At the time of requesting registration this form must be accompanied by a CDM-SSC-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-SSC-CPA-DD (using a real case).

SECTION A. General description of small-scale programme of activities (PoA)

A.1 Title of the small-scale programme of activities (PoA):

Chongqing Waste Heat Recovery and Utilization Programme in Cement Industry

Version of document: 1.0

Date of document: 5/3/2010

A.2. Description of the small-scale programme of activities (PoA):

The following information shall be included here:

1. *General operating and implementing framework of PoA*
2. *Policy/measure or stated goal of the PoA*
3. *Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity.*

1. General operating and implementing framework of PoA

Chongqing Waste Heat Recovery and Utilization Programme in Cement Industry (hereafter referred as the proposed PoA) is aimed to recover and utilize the waste heat from the cement making process with a rotary kiln and generate electricity.

All of the Small-Scale CDM Programme Activity under the proposed PoA (hereafter referred as the SSC-CPA) employ same technology, namely install waste heat recovery system, which recover the low temperature waste heat of the exit gases from cement rotary kiln, and install steam turbine generator system at once. The generated electricity should be consumed in self-factory for cement production, and alternate with the power supply purchased from the Central China Power Grid (CCPG) dominated by fossil fuel.

The proposed PoA's Coordinating/Managing Entity (CME) is Chongqing Clean Development Mechanism Technical Service Center (hereafter referred as CDM Service Center). As the CME of the PoA, the CDM Service Center will develop new candidate CPA projects and contract with its project owner for affiliating to the proposed PoA. Moreover the CDM Service Center will also offer soft and technical consultant service of CDM including procedure of new CPA addition for each project owner, and necessary communication with the UNFCCC and China DNA and DOE.

Each project owner of the SSC-CPAs should cooperate with the proposed PoA and take responsibility for administration and monitoring of own project. Moreover, project owner should report monitoring results for the Service Center.

2. Policy/measure or stated goal of the PoA

China depends on coal for about 70% of the energy supply and faces a serious problem of energy shortage and environmental pollution. Hence, it is demanded that utilization of clean energy replaces fossil fuel in China.

Moreover, electricity shortage is a serious problem in Chongqing City. According to the news in China, more 1,000 MWh of electricity supply was short in summer, 2008 and Chongqing government decided to limit of the electricity supply.

On "11th Five-Years Plan of Cement Industry, Chongqing city" which is announced in December 2006, Chongqing City government provision, it recommends to install waste heat recovery and power generation system in NSP rotary kiln of cement production line. And according to "Chongqing City enforcement views for advancing adjustment of the cement industrial structure" which is announced in December 2008, Chongqing City government, it also recommends to install waste heat recovery and power generation system in new NSP rotary kiln as possible.

Therefore, the proposed PoA is applicable to the policy of Chongqing City government.

3. Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity.

As stated above, the installation of the waste heat recovery and power generation system in rotary kiln of cement production line is strongly recommended by Chongqing municipal government that. However, it is NOT mandatory, and there are NOT subsidies for supporting projects by the government, thus project owner must raise and invest project funds by oneself. Therefore, the proposed PoA is a voluntary and coordinated action conducted by CDM Service Center.

A.3. Coordinating/managing entity and participants of SSC-POA:

The following information shall be included here:
Coordinating or managing entity of the PoA as the entity which communicates with the Board
Project participants being registered in relation to the PoA. Project participants may or may not be involved in one of the CPAs related to the PoA.

The coordinating/managing entity of the proposed PoA is Chongqing Clean Development Mechanism Technical Service Center, which is the organization under the Science and Technology Committee of the Chongqing City . The main service of the CDM Service Center is development and consulting of the design of the industrial energy saving and CDM projects.

The project participants being registered in relation to the proposed PoA are as follows:

Name of Party involved ((host) indicates a host party)	Private and/or public entities Project participants	The Party involved wishes to be considered as project participant
People's Republic of China	Chongqing Clean Development Mechanism Technical Service Center	No
Japan	Tepia Corporation Japan Co., Ltd.*	No

* Tepia Corporation Japan Co., Ltd. is a company whose headquarter is located in Japan. It has been developing CDM projects in China since 2005 and contributes actively to GHG emission reduction through improving industrial energy efficiency and developing renewable energy.

A.4. Technical description of the small-scale programme of activities:

A.4.1. Location of the programme of activities:

A.4.1.1. Host Party(ies):

People's Republic of China

A.4.1.2. Physical/ Geographical boundary:

Definition of the boundary for the PoA in terms of a geographical area (e.g., municipality, region within a country, country or several countries) within which all small-scale CDM programme activities (SSC-CPAs) included in the PoA will be implemented, taking into consideration the requirement that all applicable national and/or sectoral policies and regulations of each host country within that chosen boundary;

The physical/geographical boundary of the proposed PoA is Chongqing City. It located in the Sichuan Basin eastern part of the Yangtze River upper reaches. It is the largest and most populated municipality of the China's provincial-level municipalities. Total area of Chongqing City is 82,400 km^2, there are 19 districts and 17 counties and four autonomous counties in Chongqing. Figure.1. shows the

physical/geographical boundary of the proposed PoA.

Figure.1. Boundary of the proposed PoA.

A.4.2. Description of a typical small-scale CDM programme activity (CPA):

A.4.2.1. Technology or measures to be employed by the SSC-CPA:

The Waste Heat Recovery (WHR) system will be proposed to effectively utilize the low temperature waste heat of the exit gases from Suspension Preheater (SP) and Air Quenching Chamber (AQC) in cement production. The steam from SP boiler and AQC boiler will be fed to steam turbine generator to produce power. Total capacity of the steam turbine generator, which are installed in such SSC-CPA is should be less than or equal to 15MW.

Design of the main thermal system of the SSC-CPA is demonstrated in the Figure.2.

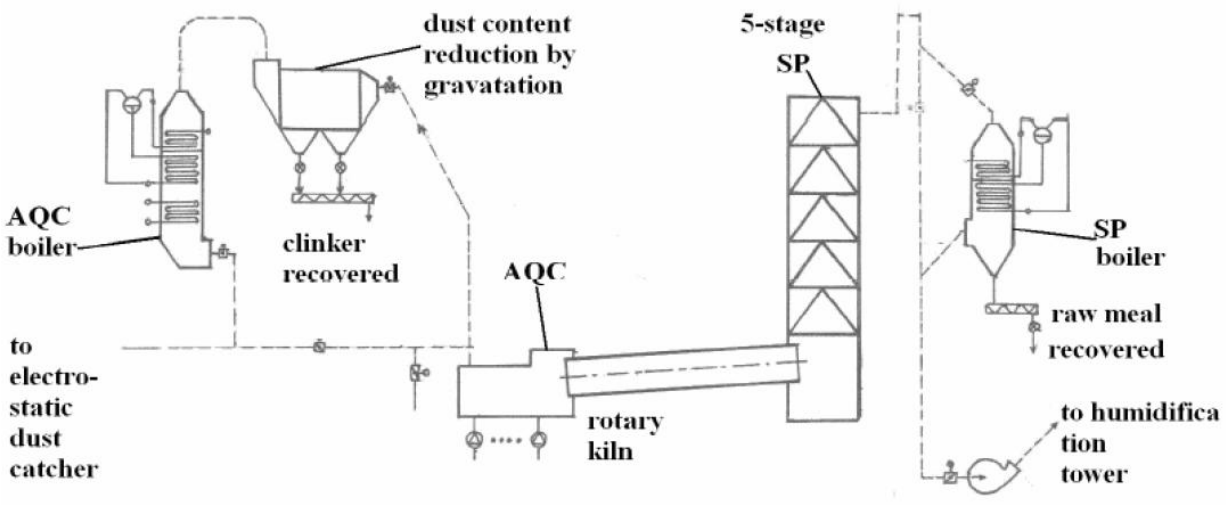

Figure.2. Main thermal system of the SSC-CPA

A.4.2.2. Eligibility criteria for inclusion of a SSC-CPA in the PoA:

Here only a description of criteria for enrolling the CPA shall be described, the criteria for demonstrating additionality of CPA shall be described in section E.5

The proposed PoA is applicable to install cement waste heat recovery systems in Chongqing, China. The SSC-CPA which can be included in the proposed PoA should have the following characteristics:

1. The SSC-CPA to be included in the proposed PoA should meet the applicability requirements of the methodology AMS-III.Q., and
2. The SSC-CPA should employ same technology, namely install waste heat recovery system and steam turbine generator system, and
3. The SSC-CPA should generate electricity only, no heat, mechanical energy, or other production, and
4. The capacity of the installed generator in the SSC-CPA should be less than or equal to 15MW, and
5. The generated electricity in the SSC-CPA should be consumed in self-factory for cement production, alternate the regional Central China Power Grid (CCPG) which is dominated by fossil fuel, and
6. The coordinating/managing entity of the SSC-CPA to be included in the proposed PoA should be Chongqing Clean Development Mechanism Technical Service Center, and
7. There are no mandatory requirements issued by Chinese government to implement the proposed PoA when the SSC-CPA is included in the proposed PoA, and
8. The SSC-CPA is implemented in Chongqing City and the physical/geographical boundary of the SSC-CPA does not exceed the physical/geographical boundary of the proposed PoA, and
9. Emission reductions of the SSC-CPA limited in less than or equal to 60 kt CO_2 equivalent annually.

A.4.3. Description of how the anthropogenic emissions of GHG by sources are reduced by a SSC-CPA below those that would have occurred in the absence of the registered PoA (assessment and demonstration of additionality):

The following shall be demonstrated here:

(i) The proposed PoA is a voluntary coordinated action;

(ii) If the PoA is implementing a voluntary coordinated action, it would not be implemented in the absence of the PoA;
(iii) If the PoA is implementing a mandatory policy/regulation, this would/is not enforced;
(iv) If mandatory a policy/regulation is enforced, the PoA will lead to a greater level of enforcement of the existing mandatory policy/regulation.

The information presented here shall constitute the demonstration of additionality of the PoA as a whole.

(i) The proposed PoA is a voluntary coordinated action;

The proposed PoA is a voluntary and coordinated action conducted by CDM Service Center. There are no mandatory requirements in China.

(ii) If the PoA is implementing a voluntary coordinated action, it would not be implemented in the absence of the PoA;

In Chongqing City, more than 35% of heat out of total heat consumed in the clinker calcinations process in cement plants, is commonly discharged as waste heat to the surroundings without utilization, therefore, a great deal of energy is wasted, and lead to the heat pollution. So, the waste heat recovery projects is a essential project for society needed project that

However, because there are financial barriers, the waste heat recovery project is infeasible in business as usual for each project owners. So, each project cannot be realized without the CER revenues.

Because the each project is too small and the owners lack the knowledge and capacity in CDM, it is difficult to apply as traditional small scale CDM projects in each, and thus it is necessary for the voluntary coordinator assist the implementation of each projects as a CDM.

The operating costs related to the proposed PoA coordination and management will be covered by revenues from each SSC-CPA in terms of CERs, and the proposed PoA will also be operated and managed by using these revenues.

(iii) If the PoA is implementing a mandatory policy/regulation, this would/is not enforced;

Not applicable.

(iv) If mandatory a policy/regulation is enforced, the PoA will lead to a greater level of enforcement of the existing mandatory policy/regulation.

Not applicable.

A.4.4. Operational, management and monitoring plan for the programme of activities (PoA):

A.4.4.1. Operational and management plan:

Description of the operational and management arrangements established by the coordinating/managing entity for the implementation of the PoA, including:

(i) A record keeping system for each CPA under the PoA,
(ii) A system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA,
(iii) The SSC-CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity.
(iv) The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA;

(i) A record keeping system for each CPA under the PoA

An exclusive agreement of consulting for the PoA which is conclude between the CPA owner and CDM Service Center will also cover record for each CPA under the PoA.

(ii) A system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA, and

(iii) The SSC-CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity

Before adding a new CPA, CDM Service Center shall confirm with the new CPA owner as the CPA has not been already registered either as a CDM project activity or as a CPA of another PoA. After it is confirmed that the new CPA is not double accounting, between the CPA owner and CDM Service Center will conclude an exclusive agreement, which including the responsibilities of each party concerning the project operation and monitoring implementation.

(iv) The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA

CDM Service Center is responsible for supervising and managing the whole CDM project operation in the operating period, as well as preparing monitoring reports periodically and submitting it to DOE. The CDM Service Center's responsibilities include: selecting and contracting cement company to be added in each CPA, providing technical service and organizing them to perform monitoring work, collecting recorded monitoring data from each CPA owners and file it.

A.4.4.2. Monitoring plan:

The following information shall be provided here:

(i) Description of the proposed statistically sound sampling method/procedure to be used by DOEs for verification of the amount of reductions of anthropogenic emissions by sources or removals by sinks of greenhouse gases achieved by CPAs under the PoA.

(ii) In case the coordinating/managing entity opts for a verification method that does not use sampling but verifies each CPA (whether in groups or not, with different or identical verification periods) a transparent system is to be defined and described that ensures that no double accounting occurs and that the status of verification can be determined anytime for each CPA;

(i) Description of the proposed statistically sound sampling method/procedure to be used by DOEs for verification of the amount of reductions of anthropogenic emissions by sources or removals by sinks of greenhouse gases achieved by CPAs under the PoA

CDM Service Center has opted to implement a verification system for the DOE that will individually verify each SSC-CPA in order to determine the abatement created by the PoA, it is not proposed that statistically sound sampling method/procedure.

(ii) In case the coordinating/managing entity opts for a verification method that does not use sampling but verifies each CPA (whether in groups or not, with different or identical verification periods) a transparent system is to be defined and described that ensures that no double accounting occurs and that the status of verification can be determined anytime for each CPA

The project database managed by CDM Service Center includes a data-set that can be directly attributable to each SSC-CPA, thereby allowing unambiguous determination of the emission reductions attributable to each SSC-CPA.CDM Service Center will produce a monitoring report for the DOE to verify corresponding to the preceding monitoring period of each SSC-CPA. This report will unambiguously set-

out the data relating to the emission reductions generated by that specific SSC-CPA during the monitoring period.

A.4.5. Public funding of the programme of activities (PoA):

The proposed PoA shall not utilize public fund from the Annex I Party.

SECTION B. Duration of the programme of activities (PoA)

B.1. Starting date of the programme of activities (PoA):

01/04/2010 or date of registration, whichever occurs later

B.2. Length of the programme of activities (PoA):

28 years

SECTION C. Environmental Analysis

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:

1. Environmental Analysis is done at PoA level ☐
2. Environmental Analysis is done at CPA level ☑

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

No applicable

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),:

No applicable

SECTION D. Stakeholders' comments

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

If local stakeholder comments are invited at the PoA level, include information on how comments by local stakeholders were invited, a summary of the comments received and how due account was taken of any comments received, as applicable.

1. Local stakeholder consultation is done at PoA level ☐
2. Local stakeholder consultation is done at CPA level ☑

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

No applicable

D.3. Summary of the comments received:

No applicable

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

No applicable

SECTION E. Application of a baseline and monitoring methodology

This section shall demonstrate the application of the baseline and monitoring methodology to a typical SSC-CPA. The information defines the PoA specific elements that shall be included in preparing the PoA specific form used to define and include a SSC-CPA in this PoA (PoA specific CDM-SSC-CPA-DD).

E.1. Title and reference of the approved SSC baseline and monitoring methodology applied to a SSC-CPA included in the PoA:

The approved SSC baseline and monitoring methodology should be approved for use in a PoA by the Board.

The approved methodology applied for the SSC-CPA under the proposed PoA is AMS III.Q. *"Waste Energy Recovery (gas/heat/pressure) Projects (Version 02)".*

Sectoral; Scope 04.

This methodology can be obtained in the below UNFCCC CDM website.

http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html

E.2. Justification of the choice of the methodology and why it is applicable to a SSC-CPA:

Methodology AMS-III.Q. is defined the requirements as follows;

1. *The category is for project activities that utilize waste gas and/or waste heat at existing facilities as an energy source for:*

(a) Cogeneration; or

(b) Generation of electricity; or

(c) Direct use as process heat; or

(d) For generation of heat in elemental process1 (e.g. steam, hot water, hot oil, hot air).

(e) For generation of mechanical energy

The SSC-CPA is cement kiln waste heat recovery projects, which use waste heat from cement kiln to generate electricity, therefore the SSC-CPA could only be applicable to the requirement (b) of the methodology.

2. *The category is also applicable to project activities that use waste pressure to generate electricity at existing facilities.*

None of the SSC-CPA under the proposed PoA could use waste pressure, this requirement is no applicable.

3. *The recovery of waste gas/heat may be a new initiative or an incremental gain in an existing practice.*

In the SSC-CPA, the recovery of waste gas/heat may be a new initiative or an incremental gain in an existing practice.

4. *In case the project activity is an incremental gain, the difference between the technology used before project activity implementation and the project technology should be clearly shown. It should be demonstrated why there are barriers for the project activity that did not prevent the implementation of the technology used before the project activity implementation.*

In case the project activity is an incremental gain, these are demonstrated in the each SSC-CPA-DD.

5. *Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO_2 equivalent annually. Wherever the measures lead to waste heat recovery which is incremental to an existing practice of waste heat recovery, only the incremental gains in GHG mitigation should be taken into account and such incremental gains shall result in emission reductions of less than or equal to 60 kt CO_2 equivalent annually.*

Emission reductions of the SSC-CPA limited in less than or equal to 60 kt CO_2 equivalent annually.

6. *The category is applicable under the following conditions:*

(a) The energy produced with the recovered waste gas/heat or waste pressure should be measurable.

The energy produced in the SSC-CPA is only electricity, that can be measured though meters installed by project developer.

(b) Energy generated in the project activity shall be used within the facility where the waste gas/heat or waste pressure is produced. An exception is made for the electricity generated by the project activity which may be exported to the grid.

The generated electricity should be consumed in self-factory for cement production, or should be supplied to the regional Central China Power Grid (CCPG) which is dominated by fossil fuel.

(c) The waste gas/heat or waste pressure utilized in the project activity would have been flared or released into the atmosphere in the absence of the project activity.

In Chongqing City, more than 35% of heat out of total heat consumed in the clinker calcinations process in cement plants is commonly discharged as waste heat to the surroundings without utilization, therefore, a great deal of energy is wasted. In the SSC-CPA, if it is not constructed that the waste heat power generation plant with rotary kiln cement product line, the waste heat is totally discharged too.

7. *For the purpose of this category waste energy is defined as: a by-product gas/heat/pressure from machines and industrial processes having potential to provide usable energy, for which it can be demonstrated that it was wasted. For example gas flared or released into the atmosphere, the heat or pressure not recovered (therefore wasted). Gases that have intrinsic value in a spot market as energy carrier or chemical (e.g. natural gas, hydrogen, liquefied petroleum gas, or their substitutes) are not eligible under this category.*

The proposed PoA is aimed to recovery waste heat from cement product kiln, which is a by-product waste heat from cement product processes.

E.3. Description of the sources and gases included in the SSC-CPA boundary

The proposed PoA is to generate electric power by recovering and utilizing the waste heat from cement kiln. In the absence of the proposed PoA, the same amount of electricity should be supplied from the regional grid system (CCPG) which is dominated by fossil fuel. Thus, the proposed PoA baseline emissions mainly arise CO_2 emissions from the power generation using the fossil fuel of the grid system (CCPG). And the proposed PoA will use the waste heat to generate power; no auxiliary fossil fuels are needed.

Overview of emission sources included in or excluded from the project boundary is provided in the

following table:

	Source	Gas	Including?	Justification / Explanation
Baseline	Grid Power generation	CO_2	Including	Main emission source
		CH_4	Excluded	Excluded for simplification. This is conservative
		N_2O	Excluded	Excluded for simplification. This is conservative
Project activity	Project activity	CO_2	Excluded	Project activity excluded the auxiliary fuel
		CH_4	Excluded	Excluded for simplification. This is conservative
		N_2O	Excluded	Excluded for simplification. This is conservative

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

Based on the information which provided in *Appendix B of the simplified modalities and procedures for small-scale CDM activities*, that the approved Revision Baseline methodology AMS-III.Q. (Version 02) is applicable to the proposed PoA.

The proposed PoA is cement kiln waste heat recovery projects, which use waste heat from cement kiln to generate electricity. Therefore the baseline of the proposed PoA is the equivalent electricity provided by the CCPG to the generation of the proposed PoA, and the CCPG is a regional power grid.

According to methodology AMS-III.Q., the baseline emissions equals to the power generated by waste energy (measured in MWh) multiplied by an emission coefficient (measured in tCO_2/MWh) of the replaced power of this project. The emission coefficient is calculated in a transparent and conservative manner. At the same time, the combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) can be decided according to the procedures prescribed in the approved "Tool to calculate the emission factor for an electricity system".

E.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the SSC-CPA being included as registered PoA (assessment and demonstration of additionality of SSC-CPA):

E.5.1. Assessment and demonstration of additionality for a typical SSC-CPA:

Here the PPs shall demonstrate, using the procedure provided in the baseline and monitoring methodology applied, additionality of a typical CPA.

According to Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities, project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers:

- Investment barrier:
- Technological barrier:
- Barrier due to prevailing practice:
- Other barriers

For the SSC-CPAs of the proposed PoA, investment barrier is chosen to demonstrate the additionality by using following steps.

Step 1: Apply benchmark analysis

According to the "Construction Project Economic Evaluation Methods and Parameters" (3rd edition) issued by the National Development and Reform Commission and the Ministry of Construction in December 2006, the SSC-CPA can be considered commercially viable only when the SSC-CPA's internal rate of return is higher than the baseline rate of return. The typical SSC-CPA is cement production line

energy-saving project, thus, the pre-tax benchmark internal rate of return before financing is confirmed as 11% for cement industry.

Step 2: Calculation and comparison of financial indicators

Calculate project IRR of the CPA in the absence of CER revenues in accordance with "Tool for the demonstration and assessment of additionality (Version 05.2)" (EB39, Annex 10) and "Guidance on the Assessment of Investment Analysis"(EB39, Annex 35).

The main parameters used to calculate IRR in t feasibility study are as follows:

parameter	unit	value
Installed capacity	MW	
Running hours	Hour/anual	
Power generation	MWh/year	
Self consumption rate	%	
Net electricity replace the grid power	MWh/year	
Static total investment	1,000 Yuan RMB	
Current capital	1,000 Yuan RMB	
Average price of electricity from grid (Historic date)	Yuan RMB/kWh	
Annual operation and maintenance cost	1,000 Yuan RMB/year	
Value added tax rate	%	
Urban maintenance and construction tax rate	%	
Education tax rate	%	
Income tax rate	%	
Credit owned by the Government of China	%	2
Expected CERs price	€/tCO2e	
Exchange rate	RMB/€	
Estimated annual emission reductions	tCO_2e /year	
Project Life Cycle	year	
Crediting period Length	year	

If the CDM project activity has a less favourable indicator (e.g. lower IRR) than the benchmark, then the CDM project activity cannot be considered as financially attractive.

Step 3: Sensitivity analysis

Include a sensitivity analysis that shows whether the conclusion regarding the financial/economic attractiveness is robust to reasonable variations in the critical assumptions.

Sensitivity analysis should be conducted to determine in which scenarios the project activity would pass the investment decision criteria of the SSC-CPA implementer or become more favourable than the alternative. Four impact factors are considered in the following sensitivity analysis:

1) Total investment
2) Operation and Maintenance Cost
3) Delivered electricity
4) Tariff of electricity

According to "Guidance on the Assessment of Investment Analysis", assuming the above three factors vary in the range of -10%-+10%, the IRR of the proposed project (without CERs revenue) varies in the different extent.

The investment analysis provides a valid argument in favour of additionality only if it consistently supports the conclusion that the project activity is unlikely to be the most financially/economically attractive or is unlikely to be financially/economically attractive.

E.5.2. Key criteria and data for assessing additionality of a SSC-CPA:

Here the PPs shall provide the key criteria for assessing additionality of a CPA when proposed to be included in the registered PoA. The criteria shall be based on additionality assessment undertaken in E.5.1 above. The project participants shall justify the choice of criteria based on analysis in above section.
It shall be demonstrated how these criteria would be applied to assess the additionality of a typical CPA at the time of inclusion.
Information provided here shall be incorporated into the PoA specific CDM-SSC-CPA-DD that shall be included in documentation submitted by project participants at registration of PoA.

According to Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities, project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers:

- Investment barrier:
- Technological barrier:
- Barrier due to prevailing practice:
- Other barriers

For the SSC-CPAs of the proposed PoA, investment barrier is chosen to demonstrate the additionality. The key criteria and data for assessing additionality for each CPA is shown as follow;

Key data	Criteria
Project IRR	The calculated IRR do not satisfy the investment decision criteria (11%)of the CPA implementer

Step 1: Apply benchmark analysis

The SSC-CPA is cement production line energy-saving project, thus, the pre-tax benchmark internal rate of return before financing applies latest cement industry benchmark, which was established by China government.

Step 2: Calculation and comparison of financial indicators

Calculate project IRR of the CPA in the absence of CER revenues in accordance with "Guidance on the Assessment of Investment Analysis, EB39, Annex 35".

Step 3: Sensitivity analysis

Sensitivity analysis should be conducted to determine in which scenarios the project activity would pass the investment decision criteria of the SSC-CPA implementer or become more favourable than the alternative. Four impact factors are considered in the following sensitivity analysis:

1) Total investment
2) Operation and Maintenance Cost
3) Delivered electricity
4) Tariff of electricity

The tariff is not considered in the sensitivity analysis because the tariff of electricity is regulated by the government and generally changed little. According to "Guidance on the Assessment of Investment Analysis", assuming the above three factors vary in the range of -10%-+10%, the IRR of the proposed project (without CERs revenue) varies in the different extent

E.6. Estimation of Emission reductions of a CPA:

E.6.1. Explanation of methodological choices, provided in the approved baseline and monitoring methodology applied, selected for a typical SSC-CPA:

The category of AMS-III.Q. (Version 02) is applicable for project activities that utilize waste gas and/or waste heat from existing facilities as an energy source for:

- Cogeneration; or
- Generation of electricity; or
- Direct use as heat of industry process; or
- For heat generation in elemental process (e.g. steam, hot water, hot oil, hot air).
- For supply the mechanical energy

The typical SSC-CPA; Chongqing Fufeng Cement 9MW Waste Heat Recovery for Power Generation Project is cement waste heat power generation project, that is waste heat utilization in power generation. This project meets the requirements of the methodology range. In accordance with all the items of applicability of methodology AMS-III.Q(Version 02), the description of relevant situation of the typical SSC-CPA and corresponding conclusions are showing as follow:

No.	Methodology AMS-III.Q (Version 02)	The Project	Applicable Yes/No
1	·Measures are limited to those projects that result in emission reductions of less than or equal to 60 kt CO_2 equivalent annually.	·The emission reductions of the proposed project is 50,412tCO_2e/yr, which is less than 60ktCO_2e. (Further details are provided in Part B6).	Yes
2	·The energy produced with the recovered waste gas/heat or waste pressure should be measurable.	·The energy produced in the project is only electricity, that can be measured though KWh meters installed by project developer.(Further details are provided in Part B7.2).	Yes
3	·Energy generated in the project activity shall be used within the facility where the waste gas/heat or waste pressure is produced.	·The proposed project will use the electricity generated by utilization of waste heat for cement production purpose only and within the project boundary.	Yes
4	·The waste gas/heat or waste pressure utilized in the project activity would have been combusted or discharged into the atmosphere in the absence of the project activity.	·The waste heat utilized in the project would be discharged into the atmosphere in the absence of the project.	Yes
Conclusion: Clearly the project activity is in line with all the applicability criteria and the consolidated baseline methodology AMS-III.Q is applicable.			

E.6.2. Equations, including fixed parametric values, to be used for calculation of emission reductions of a SSC-CPA:

CALCULATION OF THE BASELINE CO_2 EMISSION (BE_y)

Baseline scenario for the SSC-CPA only take electricity generation into account, hence, there is no thermal supply. Thus, according to the methodology AMS-III.Q., the baseline emissions formula is as follows:

$$BE_y = BE_{elec,y} \quad \text{(AMS-III.Q :1)}$$

Where:

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

$$BE_{elec,y} = f_{cap} * f_{wcm} * \sum_j \sum_i (EG_{i,j,y} * EF_{elec,i,j,y}) \quad \text{(AMS-III.Q :2)}$$

Where:

$EG_{i,j,y}$	The quantity of electricity supplied to the recipient *j* by generator, that 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
$EF_{elec,i,j,y}$	The 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
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.
f_{cap}	The maximum limit factor is to eliminate the impact of the increased waste heat usage rising from the increased project activity level in year *y*. The factor is related to the project activity level during baseline year before the project started, f_{cap} should be calculated on a basis of the relevant section of methodology ACM0012.

CALCULATION OF CO_2 EMISSION FACTOR ($EF_{elec,i,j,y}$)

According to the methodology AMS.III.Q.(Ver.02), 'Tool to calculate the emission factor for an electricity system' (Ver.02) (hereafter, referred as the Tool) must be used to calculate the project baseline emission factor. Based on the Tool, the calculation is followed as described below:

Step 1: Identify the relevant electric power system

According to the delineation of China DNA, Jiangxi, Henan, Hubei, Hunan, Chongqing and Sichuan are counted as CCPG. The SSC-CPA is in Chongqing City, the relevant electric power system of the proposed project activity is CCPG.

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

In Fufeng Company, the electricity for the cement product process has ever been supplied from CCPG, so the SSC-CPA should apply Option I: Only grid power plants are included in the calculation.

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

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

(a) Simple OM; or
(b) Simple adjusted OM; or
(c) Dispatch data analysis OM; or
(d) Average OM.

Taking dispatching data to analyze OM needs the data from CCPG. Those data needed are confidential and cannot be obtained from public channel that the way of (c) is not applicable for the the SSC-CPA.

Due to shortage of the CCPG load diagram data that the way of (b) is also not applicable. If the low-cost of CCPG / must-run resources constitute more than 50% of total grid generation, the average OM way could be taken. But the actual proportion of the two aspects are respectively 1.46% (2007), 1.52% (2006), 1.58% (2005), 1.64% (2004), 1.66% (2003), thus the way of (d) is not applicable. Because the proportion is lower than 50% that the way of (a) simple OM is applicable to calculate the baseline emission factor of operating margin ($EF_{OM,y}$) for the SSC-CPA.

The SSC-CPA will use ex-ante data (the lastest 3 years data of CCPG to calculate $EF_{OM,y}$. In the first crediting period, the emission factors will not be calculated and updated.

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

(a) Simple OM

The simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

The simple OM may be calculated:

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

Option B can only be used if:

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

The net electricity generation and a CO_2 emission factor of each power unit is not released in China, so it is not available. Moreover, only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known, and off-grid power plants are not included in the calculation. Therefore, Option B is applicable to calculate the operating margin emission factor according to the selected method for the SSC-CPA.

Under Option B, the simple OM emission factor is calculated based on the net electricity generation of each power unit and an emission factor for each power unit, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2i,y}}{EG_y} \qquad \text{(“Tool”: 7)}$$

Where:

$EF_{grid,OMsimple,y}$	Simple operating margin CO_2 emission factor in year y (tCO_2/MWH)
$FC_{i,y}$	Amount of fossil fuel type i consumed 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)
$EF_{CO2,i,y}$	CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ)
EG_y	Net electricity generated and delivered to the grid by power plant / unit m in year y (MWh)
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 3

For this approach (simple OM) to calculate the operating margin, the subscript m refers to the power plants / units delivering electricity to the grid, not including low-cost/must-run power plants / units, and including electricity imports to the grid. Electricity imports should be treated as one power plant *m*.

The Chinese DNA published the latest simple OM emission factor of CCPG, which is calculated according to the above formula will of be adopted in this CPA-DD and its value is 1.1255 (tCO2/MWh).The detail calculation is shown as Annex 3.

Step 5: Identify the cohort of power units to be included in the build margin

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

The CPA-DD identifies option (b) for sample group of power units *m*, as the information for five power units that have been built most recently is not available in China.

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.

Option 1 is selected.

As the crediting period for the proposed project is fixed 10 years, the build margin emission factor ex-ante will the only BM emission factor calculated for the proposed project.

Step 6: Calculate the build margin emission factor

The build margin emissions factor is the generation-weighted average emission factor (tCO_2/MWH) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

$$EF_{grid\ BM,y} = \frac{\sum_m EG_{m,y} * EF_{EL,m,y}}{\sum_m EG_{m,y}} \qquad \text{(“Tool”: 13)}$$

Where:

$EF_{grid,BM,y}$	Build margin CO_2 emission factor in year *y* (tCO_2/MWh)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
$EF_{EL,m,y}$	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
m	Power units included in the build margin
y	Most recent historical year for which power generation data is available

Same as the OM, The Chinese DNA published the latest BM emission factor of CCPG, which is calculated according to the above formula will be adopted in this CPA-DD and its value is 0.5802 (tCO_2/MWh) .The detail calculation is shown as Annex 3.

Step 7. Calculate the combined margin emissions factor

The combined margin emissions factor is calculated are as follows:

$$EF_y = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \quad \text{(“Tool”: 14)}$$

Where:

$EF_{grid,BM,y}$	Build margin CO2 emission factor in year *y* (tCO_2/MWh)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit m in year *y* (MWh)
$EF_{EL,m,y}$	CO2 emission factor of power unit m in year y (tCO_2/MWh)
m	Power units included in the build margin
y	Most recent historical year for which power generation data is available
$EF_{grid,BM,y}$	Build margin CO_2 emission factor in year *y* (tCO_2/MWh)
$EF_{grid,OM,y}$	Operating margin CO_2 emission factor in year *y* (tCO_2/MWh)
w_{OM}	Weighting of operating margin emissions factor (%)
w_{BM}	Weighting of build margin emissions factor (%)

The following default values should be used for w_{OM} and $w_{BM:}$

• Wind and solar power generation project activities: w_{OM} = 0.75 and w_{BM} = 0.25 (owing to their intermittent and non-dispatch able nature) for the first crediting period and for subsequent crediting periods;
• All other projects: w_{OM} = 0.5 and w_{BM} = 0.5 for the first crediting period , and w_{OM} = 0.25 and w_{BM} = 0.75 for the second and third crediting period, unless otherwise specified in the approved

Therefore, for the SSC-CPA, w_{OM} = 0.5 and w_{BM} = 0.5 are chosen. Then CO_2 emission factor for CCPG: $EF_{Elec,gr,j,y}$ is 0.85285 (tCO_2/MWh). (0.5*1.1255+0.5*0.5802=0.8712)

CALCULATION OF THE MAXIMUM LIMIT FACTOR (f_{cap})

According to description of methodology AMS-III-Q, f_{cap} will be calculated on a basis of the relevant sections in methodology ACM0012.

For a conservative estimate, the methodology requires the categories of project, whether planned, unplanned, or any real increase in production, changes in operating parameters and conditions, fuel type and amount changes, which caused the waste heat increase, should be the determined. For the scheduled increase-capacity project, it is required to apply CDM project individually for the increased part. f_{cap} should be calculated by the following 3 methods. If data sufficient, it is advised to take method 1. For the newly built plant or the built plant but without 3-year production data, it is advised to take method 2. For heat energy of the medium with evidence to prove the portable waste heat/waste pressure cannot be tested directly due to the technical condition limit, it is advised to take method 3.

Method 1: On the condition of a historical heat energy data existing, the baseline scenario emission can be prescribed a limit through the maximum waste heat quantity released to the environment in the past 3 years under a normal operation condition.

Method 2: Take the data from facility supplier to calculate the volume of waste heat/afterheat/residual pressure (typical data from a certain section or the whole plant is ok) produced by manufacturer's facilities. If the project changes or the facility suppliers have no relevant data, it's necessary to hire an independent qualified or certified external process specialist such as a registered engineer to evaluate it, and conservatively estimate the heat produced by unit product during process of producing waste heat/afterheat/residual pressure. Based on the f_{cap} estimated on above mentioned, the DOE responsible for the eligibility of the SSC-CPA will exam the assessment report.

Method 3: Usually, the waste heat (such as afterheat, moist heat, reaction heat, combustion heat, etc.), enthalpy contained in portable media or pressure is unlikely to be measured directly. Thus such projects have no relevant historical data. This case can be divided into the following two situations:

Situation 1: The energy is obtained from portable media and converts to final energy by waste heat recovery facility. For that case, use the theoretical maximum value, which can be recovered with the energy recovery equipment, to divide the actual energy generated by the project (can be measured directly), the outcome is $f_{cap.}$. Parameters provided by supplier can be used to calculate the theoretical recovery energy. Also it can be obtained by inviting a qualified or certified external process specialist such as a registered engineer to make an independent technical evaluation.

Situation 2: Energy is obtained from the portable media of the middle energy recovery equipment by intermediate medium. For example, intermediate medium of portable energy from initial portable media includes water, oil or air, etc., these intermediate medium can obtain waste energy from chemical substances (reaction heat) or solid (sensible heat). Those intermediate medium can be used to produce the final energy output in the last waste heat recovery equipment. In such condition, f_{cap} is the ratio of the theoretical maximum recovery energy and the actual energy generated by the project (can be measured directly). Also it can be obtained by hiring a qualified or certified external process specialist such as a registered engineer to make an independent technical evaluation.

According to relevant chapter of ACM0012, the cement production line was built and launched in the next half year of 2007 that there is no relevant historical data of last 3 years before the project started. Therefore, method 1 is unavailable. The collection efficiency of domestic dust removal plant is not high, but this project contains large amount of dust. The wear and tear speed of monitoring instrument for waste heat monitoring is too fast that it needs to change instrument frequently. So the method 2 is also unavailable for technology. The SSC-CPA utilizes waste heat boiler to convert waste heat to high-quality steam, and the steam will push turbine engine to generate electricity. Therefore, f_{cap} calculation adopts the method 3 of situation 2.

Calculation of f_{cap} is as follows:

$$f_{cap} = \frac{Q_{OE,BL}}{Q_{OE,y}} \qquad \text{("ACM0012": 1h)}$$

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 theoretically produced output energy or energy contained in portable medium. The value is the maximum energy recovered by portable medium theoretically. Those energy cannot be used and discharged directly into air (or portable medium be combusted or wasted) without project activity. For this project, the value is the usable steam heat in principle by steam turbine which can be calculated through steam turbine parameter..

$Q_{OE,y:}$ The actual output energy or the intermediate medium energy in year *y*. For the SSC-CPA, the value should be the steam heat used for power generation during the actual running process.

In this CPA-DD, f_{cap} takes 1 for the ex-ante calculation of emission reductions and its actual value is determined by ex-post monitoring.

CALCULATION OF THE LEAKAGE (LE_y)

According to the AMS-III.Q, the leak is not taken into consideration.

CALCULATION OF THE PROJECT EMISSION (PE_y)

According to the AMS-III.Q, project emissions include emissions due to combustion of auxiliary fuel to supplement waste gas and emissions due to consumption of electricity by the project activity.

If the waste gas contains carbon monoxide or hydrocarbons, other than methane, and the waste gas is vented to the atmosphere in the baseline situation, project emissions have to include CO_2 emissions due to the combustion of the waste gas.

CALCULATION OF THE EMISSION REDUCTION (ERy)

According to the methodology AMS-III.Q., the emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \qquad \text{(AMS-III.Q :8)}$$

Where:

ER_y	Emission reductions in year *y* (t CO2e/yr)
BE_y	Baseline emissions in year *y* (t CO2e/yr)
PE_y	Project emissions in year *y* (t CO2/yr)
LE_y	Leakage emissions in year *y* (t CO2/yr)

E.6.3. Data and parameters that are to be reported in CDM-SSC-CPA-DD form:

Data / Parameter:	$EG_{qrid,j,y}$
Data unit:	MWh
Description:	The quantity of electricity supplied to the recipient *j* by generator, that in the absence of the project activity would have been sourced from CCPG during the year *y*
Source of data used:	Feasibility study
Value applied:	
Justification of the choice of data or description of measurement methods and procedures actually applied :	

Any comment:	

Data / Parameter:	$EF_{grid,OM,y}$
Data unit:	tCO_2/MWh
Description:	Combined margin for CO_2 emission factor in year *y*
Source of data used:	Please refer to the Report on Determination of Baseline Grid Emission Factor by China DNA NDRC at http://cdm.ccchina.gov.cn.
Value applied:	1.1255
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the latest version of "Tool to calculate the emission factor for an electricity system (Ver.2)", the proposed project uses the specific national values.
Any comment:	

Data / Parameter:	$EF_{grid,BM,y}$
Data unit:	tCO_2/MWh
Description:	Build margin CO_2 emission factor in year *y*
Source of data used:	Please refer to the Report on Determination of Baseline Grid Emission Factor by China DNA NDRC at http://cdm.ccchina.gov.cn.
Value applied:	0.5802
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the latest version of "Tool to calculate the emission factor for an electricity system (Ver.2)", the proposed project uses the specific national values.
Any comment:	

Data / Parameter:	f_{wcm}
Data unit:	-
Description:	The proportion electricity generated by waste heat accounts for in the total electricity generated
Source of data used:	AMS-III.Q.
Value applied:	1
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to AMS-III.Q., this fraction is 1 if the electricity generation is purely from use of waste energy.
Any comment:	

Data / Parameter:	$Q_{OE,BL}$
Data unit:	MJ/h
Description:	Output 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
Source of data used:	Feasibility study
Value applied:	
Justification of the choice of	

data or description of measurement methods and procedures actually applied :	
Any comment:	Calculation used for f_{cap}

Data / Parameter:	$Q_{OE,y}$
Data unit:	MJ/h
Description:	Quantity of actual output energy during year *y* (in appropriate unit)
Source of data used:	Feasibility study
Value applied:	
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	Calculation used for f_{cap}

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

E.7.1. Data and parameters to be monitored by each SSC-CPA:

Data / Parameter:	$EG_{grid,j,y}$
Data unit:	MWh
Description:	The quantity of electricity supplied to the recipient *j* by generator, that in the absence of the project activity would have been sourced from CCPG during the year *y*
Source of data to be used:	Feasibility study
Value of data	
Description of measurement methods and procedures to be applied:	Ammeter operates online measurement of net generating capacity in power generation projects system (there is standby ammeter), the electricity operator of project company records and keep power generation data in the form of electronic document, the time for archive data is the crediting period and its following two years. Please refer the specific procedures to the CDM monitoring manual.
QA/QC procedures to be applied:	All ammeters should be calibrated by using the ammeter, according to ammeter "People's Republic of China national test measures a point of order" (JJG596-1999) requirements, with the qualified entity to conduct a calibration each year. Power measurement data recorded by the local power supply bureau of the ministry of finance data and supply of electricity sales invoices to carry out cross-validation.
Any comment:	

Data / Parameter:	$T_{steam,i,y}$
Data unit:	˚C
Description:	steam temperature into the steam engine
Source of data to be used:	Thermometer readings
Value of data	
Description of measurement methods and procedures to	The data is the hourly thermometer reading, monthly record. Keep the record for 2 years when the crediting period closed

be applied:	
QA/QC procedures to be applied:	Test and calibrate the thermometer according to relevant technical regulations regularly
Any comment:	Calculation used for f_{cap}

Data / Parameter:	$P_{steam,i,y}$
Data unit:	MPa
Description:	Steam pressure into the steam engine
Source of data to be used:	Manometer reading
Value of data	
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	
Any comment:	Calculation used for f_{cap}

Data / Parameter:	$F_{steam,i,y}$
Data unit:	t/h
Description:	Steam flow into the steamer
Source of data to be used:	Steam meter reading
Value of data	
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	
Any comment:	Calculation used for f_{cap}

Data / Parameter:	$T_{water,i,y}$
Data unit:	˚C
Description:	Hot water temperature into the waste heat boiler
Source of data to be used:	Temperature reading
Value of data	
Description of measurement methods and procedures to be applied:	The data is the hourly thermometer reading, monthly record. Keep the record for 2 years when the crediting period closed
QA/QC procedures to be applied:	Test and calibrate the thermometer according to relevant technical regulations regularly
Any comment:	Calculation used for f_{cap}

Data / Parameter:	$P_{water,i,y}$
Data unit:	MPa
Description:	Hot water pressure into the waste heat boiler
Source of data to be used:	Manometer reading
Value of data	
Description of measurement methods and procedures to	

be applied:	
QA/QC procedures to be applied:	
Any comment:	Calculation used for f_{cap}

Data / Parameter:	$F_{water,i,y}$
Data unit:	t/h
Description:	Hot water flow into the waste heat boiler
Source of data to be used:	Flowmeter reading
Value of data	
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	
Any comment:	Calculation used for f_{cap}

E.7.2. Description of the monitoring plan for a SSC-CPA:

The monitoring plan is based on AMS-III.Q. monitoring methodology developed by the requirements.

The purpose of the development of the monitoring plan

In order to obtain real, credible and certified emission reductions, it's necessary for corporate managers to ensure the normal operation of the project to obtain the required data for calculating emission reductions of the SSC-CPA.

To monitor the implementation of the program

The monitoring plan is carried out by the completion of the project owners with the help of Service Center.

With the approval by the DOE and buyers, during initial operation and the project cycle, project owners can modify and update the monitoring manual in accordance with the requirements of the project operation.

Monitoring System

The main monitoring content:

(1) Net power supply of generating units

All ammeters to be used should be calibrated ammeters, according to Chinese national standard, and the ammeter should be calibrated by the qualified entities each year.

(2) Waste heat utilized

To calculate the medium material enthalpy before entering into waste heat boiler in year *y* and material medium enthalpy of steamer supplied from the waste heat boiler through monitoring the medium's flow, temperature and pressure, etc. and the difference for those two numerical values is waste heat volume consumption in year *y*. Install a thermodynamic instrument group at inlet of the waste heat boiler. Record thermodynamic parameters of the medium entered into boiler, including flow, temperature and pressure. Install another thermodynamic instrument unit at inlet of the turbine. Record thermodynamic parameters of the medium from waste heat boiler, including flow, temperature and pressure.

Information collection and management

Project owner's responsibility is to provide required data for verification and certification. All measured data should be properly recorded and kept. All the changes within the project boundary, such as space or equipment changes should be recorded. And any change of emissions caused by these changes should also be recorded. Records of the information should be preserved and maintained with a backup by project owners and Service Center for the verification of DOE.

Management

CDM project manager will be appointed by general manager, with overall responsibility for project monitoring. CDM monitoring inspectors are responsible for monitoring electricity and recording the daily operation of power generation equipment. People in charge of monitoring should attend professional technical training. Someone in charge of checking coordinates with local power sector to check the measurement equipments including ammeter, and completes the work record. General manager of the project conducts inspection on records and reports on a regular basis.

Monitoring manual

Monitoring manual is required to include the following content:

- Establishing and maintaining a reliable system to monitor the project net generation and utilized waste heat.
- Quality control of measurement
- Calculation on GHG Emission reductions procedure on a regular basis
- Composition and responsibilities of monitoring staff
- Data collection and archiving system
- ·Cooperation with DOE for verification and certification works

To verify the results of monitoring

The major tasks to verify the results of the SSC-CPA monitoring are as follows:

• Sign the agreement with the DOE of who verify the project emission reductions, then follow the verification schedule required by the buyer and Executive Board of CDM in the project emission reduction crediting period.

• According to the DOE requirement, project owner needs to provide entire information of emission reduction for verification respectively before, during and after verification.

• The project owner actively cooperates with DOE to complete the verification work and designate a person as liaison officer for DOE, fully responsible for all issues of monitoring and verification.

E.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: 5/03/2010,

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Annex 1

CONTACT INFORMATION ON COORDINATING/MANAGING ENTITY and PARTICIPANTS IN THE PROGRAMME of ACTIVITIES

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The proposed PoA is not involved with the official development assistance funds of Annex I countries.

Annex 3

BASELINE INFORMATION

OM calculation

CCPG simple OM calculation in 2005

Fuel type	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Sub-total	Emission factor	Oxidation Rate	Fuel emission factor	Average NCV	CO_2 emission(tCO_2e)
									(tc/TJ)	(%)	($kgCO_2/TJ$)	(MJ/t, m^3)	L=G*J*K/10000 mass unit
		A	B	C	D	E	F	G=A+B+C +D+E+F	H	I	J	K	L= G*J*K /1000 volume unit
Raw coal	10*kt	1869.29	7638.87	2732.15	1712.27	875.4	2999.77	17827.75	25.8	100	87,300	20,908	325,404,287
Washed coal	10*kt	0.02						0.02	25.8	100	87,300	26,344	460
Other washed coal	10*kt		138.12			89.99		228.11	25.8	100	87,300	8,363	1,665,408
Coke	10*kt		25.95		105			130.95	29.2	100	95,700	28,435	3,563,450
Coke oven gas	100*Mm^3			1.15		0.36		1.51	12.1	100	37,300	16,726	94,206
Other coke gas	100*Mm^3		10.2			3.12		13.32	12.1	100	37,300	5,227	259,696
Crude oil	10*kt		0.82	0.36				1.18	20	100	71,100	41,816	35,083
Gasoline	10*kt		0.02			0.02		0.04	18.9	100	67,500	43,070	1,163
Diesel	10*kt	1.3	3.03	2.39	1.39	1.38		9.49	20.2	100	72,600	42,652	293,861
Fuel oil	10*kt	0.64	0.29	3.15	1.68	0.89	2.22	8.87	21.1	100	75,500	41,816	280,035
LPG	10*kt							0	17.2	100	61,600	50,179	0
Refinery gas	10*kt	0.71	3.41	1.76	0.78			6.66	15.7	100	48,200	46,055	147,842
Natural gas	100*Mm^3						3	3	15.3	100	54,300	38,931	634,186
Other oil	10*kt							0	20	100	75,500	41,816	0
Other coke	10*kt				1.5			1.5	25.8	100	95,700	28,435	40,818
Others	10*ktce		2.88		1.74	32.8		37.42	0	0	0	0	0
												Total (M)	**332,420,496**

Data source: China Energy Statistical Yearbook 2006.

CPG thermal generation in 2005

Province	Generation (MWh)	Self consumption rate (%)	Delivery generation (MWh)
Jiangxi	30,000,000	6.48	28,056,000
Henan	131,590,000	7.32	121,957,612
Hubei	47,700,000	2.51	46,502,730
Hunan	39,900,000	5	37,905,000
Chongqing	17,584,000	8.05	16,168,488
Sichuan	37,202,000	4.27	35,613,475
		Sub-total (N)	**286,203,305**

Data source: China Electric Power Yearbook 2006.

Total emission	(M)	332,420,496	tCO2e
Supply to the CCPG	(N)	286,203,305	MWh
OM Emission Factor of CCPG	(=M/N)	**1.16148**	tCO2e/ MWh

CCPG simple OM calculation in 2006

Fuel type	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Sub-total	Emission factor	Oxidation Rate	Fuel emission factor	Average NCV	CO_2 emission(tCO_2e)
									(tc/TJ)	(%)	($kgCO_2/TJ$)	(MJ/t, m^3)	L=G*J*K/10000 mass unit
		A	B	C	D	E	F	G=A+B+C +D+E+F	H	I	J	K	L= G*J*K /1000 volume unit
Raw coal	10*kt	1926.02	8098.01	3179.79	2454.48	1184.3	3285.22	20127.82	25.8	100	87,300	20,908	367,386,738
Washed coal	10*kt					5.79		5.79	25.8	100	87,300	26,344	133,160
Other washed coal	10*kt	4.51	104.12		8.59	79.21		196.43	25.8	100	87,300	8,363	1,434,116
Briquette coal	10*kt						0.01	0.01	26.6	100	87,300	20,908	183
Coke	10*kt		17.23		0.32			17.55	29.2	100	95,700	28,435	477,576
Coke oven gas	100*Mm^3		0.52	1.07	4.24	0.38	0.01	6.22	12.1	100	37,300	16,726	388,053
Other coke gas	100*Mm^3	12.69	3.95		1.7	4.36	0.01	22.71	12.1	100	37,300	5,227	442,770
Crude oil	10*kt		0.49					0.49	20	100	71,100	41,816	14,568
Gasoline	10*kt		0.01					0.01	18.9	100	67,500	43,070	291
Diesel	10*kt	0.91	2.23	1.41	1.78	0.96		7.29	20.2	100	72,600	42,652	225,737
Fuel oil	10*kt	0.51	1.26	1.31	0.8	0.57	3.49	7.94	21.1	100	75,500	41,816	250,674
LPG	10*kt							0	17.2	100	61,600	50,179	0
Refinery gas	10*kt	0.86	8.1	1	0.97			10.93	15.7	100	48,200	46,055	242,630
Natural gas	100*Mm^3			0.28		0.16	18.63	19.07	15.3	100	54,300	38,931	4,031,309
Other oil	10*kt							0	20	100	75,500	41,816	0
Other coke	10*kt						0.01	0.01	25.8	100	95,700	28,435	272
Others	10*ktce	17.45	37.36	31.55	18.29	29.35		134	0	0	0	0	0
												Total (M)	**375,028,077**

Data source: China Energy Statistical Yearbook 2007.

CCPG thermal generation in 2006

Province	Generation (MWh)	Self consumption rate (%)	Delivery generation (MWh)
Jiangxi	34,449,000	6.17	32,323,497
Henan	151,235,000	7.06	140,557,809
Hubei	54,841,000	2.75	53,332,873
Hunan	46,408,000	4.95	44,110,804
Chongqing	23,487,000	8.45	21,502,349
Sichuan	44,193,000	4.51	42,199,896
		Sub-total (N)	**334,027,226**

Data source: China Electric Power Yearbook 2007.

Imported power from NWPG	(N)	3,028,950	MWh
OM Emission Factor of NWPG	(O)	0.99148	tCO2e/ MWh
Total emission	(P=M+N*O)	378,031,235	tCO2e
Supply to the CCPG	(Q)	337,056,176	MWh
OM Emission Factor of CCPG	(=P/Q)	**1.12157**	tCO2e/ MWh

CCPG simple OM calculation in 2007

Fuel type	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Sub-total	Emission factor	Oxidation Rate	Fuel emission factor	Average NCV	CO_2 emission(tCO_2e)
									(tc/TJ)	(%)	($kgCO_2/TJ$)	(MJ/t, m^3)	L=G*J*K/10000 mass unit
		A	B	C	D	E	F	G=A+B+C +D+E+F	H	I	J	K	L= G*J*K /1000 volume unit
Raw coal	10*kt	2200.57	9357	3479.81	2683.81	1547.7	3239	22507.89	25.8	100	87,300	20,908	410,829,404
Washed coal	10*kt		3.07			3.8		6.87	25.8	100	87,300	26,344	157,998
Other washed coal	10*kt	0.04	87.16		2.06	96.42		185.68	25.8	100	87,300	8,363	1,355,631
Briquette coal	10*kt						0.01	0.01	26.6	100	87,300	20,908	183
Coke	10*kt							0	29.2	100	95,700	28,435	0
Coke oven gas	100*Mm^3	0.08	2.61	0.25	0.31	0.91		4.16	12.1	100	37,300	16,726	259,534
Other coke gas	100*Mm^3	29.17	25.79		24.69		23.98	103.63	12.1	100	37,300	5,227	2,020,444
Crude oil	10*kt		0.43					0.43	20	100	71,100	41,816	12,784
Gasoline	10*kt				0.04	0.01		0.05	18.9	100	67,500	43,070	1,454
Diesel	10*kt	0.98	3.21	2.51	2.83	1.93		11.46	20.2	100	72,600	42,652	354,863
Fuel oil	10*kt	0.42	1.25	1.33	0.63	0.64	1.74	6.01	21.1	100	75,500	41,816	189,742
LPG	10*kt							0	17.2	100	61,600	50,179	0
Refinery gas	10*kt	1.43	10.01	0.97	0.7			13.11	15.7	100	48,200	46,055	291,022
Natural gas	100*Mm^3		0.12	0.18		0.2	1.87	2.37	15.3	100	54,300	38,931	501,007
Other oil	10*kt							0	20	100	75,500	41,816	0
Other coke	10*kt							0	25.8	100	95,700	28,435	0
Others	10*ktce	23.43	63.65	35.95	29.46	23.21		175.7	0	0	0	0	0
												Total (M)	**415,974,066**

Data source: China Energy Statistical Yearbook 2008.

CCPG thermal generation in 2007

Province	Generation (MWh)	Self consumption rate (%)	Delivery generation (MWh)
Jiangxi	42,100,000	7.72	38,849,880
Henan	177,300,000	7.55	163,913,850
Hubei	60,900,000	6.69	56,825,790
Hunan	54,200,000	7.18	50,308,440
Chongqing	28,800,000	9.2	26,150,400
Sichuan	45,100,000	8.68	41,185,320
		Sub-total (N)	**377,233,680**

Data source: China Electric Power Yearbook 2008.

Imported power from NWPG	(N)	3,005,400	MWh
OM Emission Factor of NWPG	(O)	1.01129	tCO2e/ MWh
Total emission	(P=M+N*O)	419,013,395	tCO2e
Supply to the CCPG	(Q)	380,239,080	MWh
OM Emission Factor of CCPG	(=P/Q)	**1.10197**	tCO2e/ MWh

Finally, the weighted average emission factor of the three years is: $EF_{OM,y}$ = ***1.12553*** tCO_2/MWh.

BM calculation

Step (1): Calculation of the share of CO_2 emissions from solid, liquid and gaseous fuels.

Fuel type	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Sub-total	Average NCV (MJ/t, m^3)	Fuel emission factor ($kgCO_2/TJ$)	Oxidation Rate (%)	CO_2 emission (tCO_2e)	Ratio (%)
		A	B	C	D	E	F	G=A+B+C +D+E+F	H	I	J	K= G*H*I*J /1000	
Raw coal	10*kt	2200.57	9357	3479.81	2683.81	1547.7	3239	22507.89	20,908	87,300	100	410,829,404	
Washed coal	10*kt	0	3.07	0	0	3.8	0	6.87	26,344	87,300	100	157,998	
Other washed coal	10*kt	0.04	87.16	0	2.06	96.42	0	185.68	8,363	87,300	100	1,355,631	
Briquette coal	10*kt	0	0	0	0	0	0.01	0.01	20,908	87,300	100	183	
Coke	10*kt	0	0	0	0	0	0	0	28,435	95,700	100	0	
Other coke products	10*kt	0	0	0	0	0	0	0	28,435	95,700	100	0	
											Sub-total	412,343,216	99.13
Crude oil	10*kt	0	0.43	0	0	0	0	0.43	41,816	71,100	100	12,784	
Gasoline	10*kt	0	0	0	0.04	0.01	0	0.05	43,070	67,500	100	1,454	
Diesel	10*kt	0.98	3.21	2.51	2.83	1.93	0	11.46	42,652	72,600	100	354,863	
Fuel oil	10*kt	0.42	1.25	1.33	0.63	0.64	1.74	6.01	41,816	75,500	100	189,742	
Other oil products	10*kt	0	0	0	0	0	0	0	41,816	75,500	100	0	
											Sub-total	558,843	0.13
Natural gas	10*Mm^3	0	1.2	1.8	0	2	18.7	23.7	38,931	54,300	100	501,007	
Coke oven gas	10*Mm^3	0.8	26.1	2.5	3.1	9.1	0	4.16	16,726	37,300	100	259,534	
Other coke gas	10*Mm^3	291.7	257.9	0	246.9	0	239.8	1036.3	5,227	37,300	100	2,020,444	
LPG	10*kt	0	0	0	0	0	0	0	50,179	61,600	100	0	
Refinery gas	10*kt	1.43	10.01	0.97	0.7			13.11	46,055	48,200	100	291,022	
											Sub-total	3,072,007	0.74
											Total	**415,974,066**	**100**

ep (2): Calculating of Emission Factor for Various Power Plant

Type	Variable	Power supply efficiency (%)	Emission Factor (tc/TJ)	Oxidation Rate (%)	Emission Factor (tCO_2/MWh)
		A	B	C	D=3.6/A/1,000,000×B×C
Coal-fired	$EF_{Coal,Adv,y}$	38.10	87,300	100	0.8249
Gas-fuel	$EF_{Oil,Adv,y}$	49.99	75,500	100	0.5437
Oil-fuel	$EF_{Gas,Adv,y}$	49.99	54,300	100	0.3910

$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,\ Adv} + \lambda_{Oil} \times EF_{Oil,\ Adv} + \lambda_{Gas} \times EF_{Gas,\ Adv} = 0.8213\ tCO_2/MWh$

Step (3): Calculation BM in the Grid.

CCPG Installed Capacity in 2007

Installed Capacity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total
Thermal power	MW	9,270	38,540	13,040	13,360	6,370	12,000	92,580
Hydro	MW	3,570	2,740	24,020	9,220	2,240	19,860	61,650
Nuclear	MW	0	0	0	0	0	0	0
Wind farm and other	MW	0	0	10	17	24	0	51
Total	MW	12,840	41,280	37,070	22,597	8,634	31,860	154,281

Data source: China Electric Power Yearbook 2008.

CCPG Installed Capacity in 2006

Installed Capacity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total
Thermal power	MW	6,568	32,603	11,623	10,715	5,594	9,555	76,658
Hydro	MW	3,288	2,553	18,320	8,648	1,979	17,730	52,518
Nuclear	MW	0	0	0	0	0	0	0
Wind farm and other	MW	0	0	0	17	24	0	41
Total	MW	9,856	35,156	29,943	19,380	7,597	27,285	129,217

Data source: China Electric Power Yearbook 2007.

CCPG Installed Capacity in 2005

Installed Capacity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total
Thermal power	MW	5,906	26,267.8	9,526.3	7,211.6	3,759.5	7,496	60,167.2
Hydro	MW	3,019	2,539.9	17,888.9	7,905.1	1,892.7	14,959.6	48,205.2
Nuclear	MW	0	0	0	0	0	0	0
Wind farm and other	MW	0	0	0	0	24	0	24
Total	MW	8,925	28,807.7	27,415.2	15,116.7	5,676.2	22,455.6	108,396.4

Data source: China Electric Power Yearbook 2006.

CCPG BM Calculation

	Installed capacity of 2005	Installed capacity of 2006	Installed capacity of 2007	Newly installed capacity from 2005 to2007	Share of the Newly installed capacity
	A	B	C	D=C-A	
Thermal(MW)	60,167.2	76,658	92,580	32,412.8	70.64%
Hydro(MW)	48,205.2	52,518	61,650	13,444.8	29.30%
Nuclear(MW)	0	0	0	0	0.00%
Wind farm(MW)	24	41	51	27	0.06%
Total (MW)	**108,396.4**	**129,217**	**154,281**	**458,84.6**	**100.00%**
Percent of the installed capacity of 2007	70.26%	83.75%	100%		

$EF_{BM,y} = 0.8213 \times 70.642\% = 0.5802$ *tCO2e/MWh*

Annex 4

MONITORING INFORMATION

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