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

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SECTION A. General description of project activity

A.1. Title of the project activity:

>>
Jiangxi Xiajiang Hydropower Project
Document version: PDD, version 01
Completion date: 07/02/2012

A.2. Description of the project activity:

>>
Jiangxi Xiajiang Hydropower Project (hereinafter referred to as the "project") is invested and developed by Jiangxi CPI Xiajiang Power Generation Co., Ltd.

The proposed project is a seasonal regulation station with the power density of 11.41 W/m^2, located on the middle portion of Gan River, Xiajiang County of Jiangxi province, P.R.China. Prior to the implementation of the proposed project, local electricity demand in the absence of the project was supplied by the Central China Power Grid ("CCPG"), dominated by thermal power. Within the project activities, nine sets of water turbine and generating units, which are made and supplied by a domestic manufacturer, will be installed at the site with a total generation capacity of 360 MW (9*40 MW). The project is expected to generate an annual average of 1,141, 560MWh electricity and to deliver an annual average electricity of 1,061,730 MWh to the CCPG. The baseline scenario of the project activity is the same as the scenario existed prior to the implementation of the project activity.

The purpose of the project is to produce electricity with clean and renewable water sources and to displace the electricity generated by fossil fuel-fired plants connected to the CCPG. There is no greenhouse gases ("GHG") identified in the project activity since the power density of the project is 11.41 W/m^2, greater than 10 W/m^2. As a result, GHG emission reductions will be achieved. The estimated annual GHG emission reductions by the project activity are 769,117 tCO_2e, that is 5,383,819 tCO_2e during the first 7-year crediting period.

The proposed project will contribute to the sustainable development to the local environment, economy and society through the following aspects.

- Supplying clean electricity to the grid and reducing GHG emissions. Reduce emissions of environmental pollutants, such as CO_2, CO, SO_2 and dust derived from thermal power plants.
- Increase water resources utility efficiency. The construction of the proposed project can make full use of the water resources of Gan River.
- Create job opportunities during the project's construction and operation period.
- Highly enhance living conditions of the immigrants.

A.3. Project participants:

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Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant

		(Yes/No)
P.R.China (host)	Jiangxi CPI Xiajiang Power Generation Co., Ltd.	No
Japan	J-TEC Co., Ltd.	No

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

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A.4.1.1. Host Party(ies):

>>
People's Republic of China

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

>>
Jiangxi Province

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

>>
Baqiu Town, Xiajiang County, Ji'an City

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

>>
The project is located on the middle portion of Gan River, about 6km from Baqiu Town. The GPS coordinates of the project activity are 115^{o}07'32''East Longitude, and 27^{o}30'56'' North Latitude.

The location of the project is shown in the following figure:

Figure 1. Location of the Project

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

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Sectoral Scope 1: Energy industries (renewable sources)

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

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Prior to the implementation of the project activity, electricity was supplied by the CCPG which is dominated by thermal power. This is the baseline scenario to the project activity.

The proposed project is a run of river hydropower station with a power density of 11.41 W/m^2. The project will consist of a dam, a spillway weir, a power house and a switch station. The core equipments adopted by the project are nine sets of water-turbines generators with a total generation capacity of 360MW. These equipments are manufactured and supplied by a domestic manufacturer and designed to run 3,171 hours annually with an operational lifetime of 45 years.

The project will be connected to the CCPG via the substation by a transmission line. In addition, electricity metering systems are to be equipped both at the project site and at the transformer substation that the project is connected to, and they are categorized as backup and main monitoring systems separately.

The specific technical data of the project are listed in the table below.

Table A.4.3.-1 Technical data[1]

Parameter	Unit	Data
Station type	Run of river type	
Reservoir		
Normal water level	m	46
Submerged surface area of the reservoir	m^2	31,547,000
Power density	W/m^2	11.41
Turbine		
Units	set	9
Model		GZD615-WP-770
Generator		
Units	set	9
Model		SFWG40-84/8400
Rated capacity	MW	40

According to the applicable methodology, since the power density of the project is 11.41 W/m^2, greater than 10 W/m^2, CH_4 are negligible, and no other GHG is involved in the project activity. The electricity generated by the project will be delivered to the CCPG except a small quantity which will be utilized on-site for the operation and maintenance of equipments, or during shut down periods etc.

[1] Feasibility Study Report of the Project

The project will adopt domestic modern equipment and technology which are mature and advanced, No overseas technology will be involved in the project. The technology implemented by the proposed project is environmentally safe.

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

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The project applies a renewable crediting period. The first 7-year crediting period is expected to start on 01 Aug. 2013 till 31 July 2020. The emission reductions expected to be achieved by the project during the first crediting period are shown in Table A.4.4.-1.

Table A.4.4.-1 Project Emission Reductions

Years	Annual estimation of emission reductions in tonnes of CO_2e
01/08/2013-31/12/2013	320,465
01/01/2014-31/12/2014	769,117
01/01/2015-31/12/2015	769,117
01/01/2016-31/12/2016	769,117
01/01/2017-31/12/2017	769,117
01/01/2018-31/12/2018	769,117
01/01/2019-31/12/2019	769,117
01/01/2020-31/07/2020	448,652
Total estimated reductions (tonnes of CO2e)	5,383,819
Total number of crediting years	**7**
Annual average over the crediting period of estimated reductions (tonnes of CO2e)	769,117

A.4.5. Public funding of the project activity:

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There is no public fund from Parties included in Annex I of the UNFCCC involved in this project activity.

SECTION B. Application of a baseline and monitoring methodology

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

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- ACM0002 Consolidated baseline methodology for grid-connected electricity generation from renewable sources (version 12.2.0)
- Tool for demonstration and assessment of additionality (version 06.0.0)
- Tool to calculate the emission factor for an electricity system (version 02.2.1)

Above methodologies and Tools are available at
http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

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

>>
The project meets all applicability criteria as set out in the Methodology ACM0002 (version 12.2.0):

This methodology is applicable to grid-connected renewable power generation project activities that install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity.

- The project activity results in new reservoirs and the power density of the power plant is 11.41 W/m^2, greater than 4 W/m^2.
- The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available.
- Project activity does not involve switching from fossil fuels to renewable energy sources at the site of the project activity.

The project activity corresponds to the criteria described above and is therefore applicable to ACM0002.

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

>>
The project will generate electricity by water source and will be associated with the CCPG. As a result, the project boundary includes the project site, dam, factory pivot and substation, and all power plants connected to the CCPG, which covers Jiangxi, Henan, Hubei, Hunan, Sichuan and Chongqing provincial grids. In addition, the CCPG also imports electricity from NCPG and NWPG, therefore, NCPG and NWPG are also included in the project boundary. The sources and gases included in the project boundary are shown in the table B.3.-1 below.

Table B.3.-1: Sources and gases included in the project boundary

	Source	Gas	Included	Justification / Explanation
Baseline	Emission from electricity generation in fossil fuel fired power	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source

	plants connected to the CCPG that are displaced due to the project.			
Project Activity	Hydropower plant	CO_2	No	Minor emission source
		CH_4	No	The power density of the project is 11.41 W/m^2, which is greater than 10 W/m^2. Therefore, it is negligible.
		N_2O	No	Minor emission source

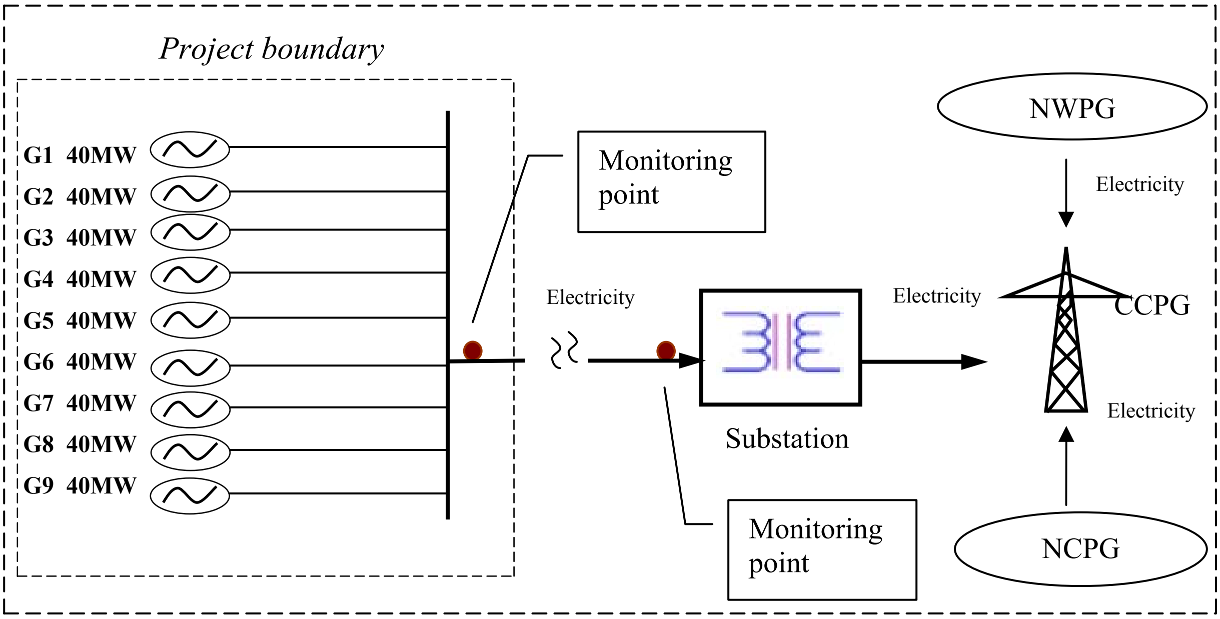

Figure 2. Diagram of project boundary

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

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According to ACM0002 (version 12.2.0), the proposed project activity is the installation of a new grid-connected renewable power plant/unit, therefore the baseline scenario is as following:

Electricity delivered to the grid by the project activity would be otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system(02.2.1)."

The proposed project will be connected to the CCPG. In this case, the only realistic and reasonable baseline scenario is to provide the same amount of electricity by the CCPG.

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

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Considering of CDM before the construction of the project

A timeline of the main events involved in the implementation of the proposed project is described in Table B.5.-1.

Table B.5.-1 Milestone of the project

Date	Main Events
August 2009	Environmental Impact Assessment (EIA) was finished.
30th October 2009	Environmental Impact Assessment (EIA) was approved.
April 2010	Feasibility study report (FSR) was finished.
15th July 2010	Feasibility study report (FSR) was approved.
16th August 2010	Meeting of project promoters for considering CDM.
1st September 2010	Meeting of project promoters for deciding CDM.
26th September 2010	The turbine and generator purchase contract was signed. This is determined as the starting date of the project activity.
8th October 2010	Construction Contract was signed between the project owner and the construction company.
22nd February 2011	The prior consideration of the project was received by UNFCCC.
14th March 2011	The prior consideration of the project was received and recorded by NDRC.
26th October 2011	The ERPA was signed between the PO and J-TEC Co., Ltd.

The events outlined in the above timeline clearly demonstrate that the project owner took CDM into serious consideration in the decision to carry out the project activity. And the project owner took successive actions to secure the CDM application in parallel with the construction works for the project.

The following steps from the "*Tools for the demonstration and assessment of additionality* (version 06.0.0)" are taken to demonstrate the additionality of the project.

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 ACM0002 (version 12.2.0), the proposed project activity is the installation of a new grid-connected renewable power plant/unit. For providing the same amount of electricity, the baseline scenario of the project can be selected from the following four alternatives:

- Alternative 1: Implementing the proposed project, but not as a CDM project;
- Alternative 2: Adding a new thermal plant providing the same annual electricity output;

- Alternative 3: Adding a new renewable power plant other than hydropower providing the same annual electricity output.
- Alternative 4: Providing the same amount of electricity by the CCPG

Besides water sources, Jiangxi Province also has abundant wind sources. However, the distribution of these wind sources is seriously disproportionate, because almost all technically exploitable amounts centralize in North area or area at high altitude within the province[2]. The project is located in the central, low altitude area where no wind resource or tidal energy is available. Furthermore, the project location is not an area has abundant solar resources for solar energy developing.[3] Therefore, Alternative 3 is not the realistic and credible alternative to the project activity and is eliminated.

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

In 2008, the average operation time of thermal power plant in Jiangxi Province is 4,677hour[4], and the effective operation time of proposed project is 3,171hour. To provide the same output as the proposed project, the alternative thermal power plant will has the capacity of 244 MW. However, according to "Guidance on Industrial Structural Adjustment 2005" [5]issued by the National Development and Reform Commission of China, which stipulates that thermal power plants with an installed capacity below 300MW may only be built in areas connected to the small power grids in Tibet, Xinjiang and Hainan. Therefore, alternative 2 is not in compliance with Chinese regulations on the construction of a thermal plant, it is not the baseline scenario for the project.

Step 2. Investment analysis

Sub-step 2a. Determine appropriate analysis method

The proposed project will receive proceeds from electricity sales as well as from emission reduction credits, so Option I-Simple Cost Analysis stated in *Tool for the Demonstration and Assessment of Additionality* is not applicable.

Furthermore, the alternative of providing the same amount of electricity by the CCPG is not a specific investment project. Therefore, Option II-Investment Comparison Analysis is not applicable.

As a result, Option III-Benchmark Analysis must be used, where the project IRR of total investment is compared with the benchmark IRR of total investment applicable to the power industry sector in China. Here, the benchmark analysis is selected.

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

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[2] http://www.cec.org.cn/zhengcefagui/2011-11-18/74445.html

[3] http://www.china.com.cn/economic/zhuanti/2007nyfz/2007-05/25/content_8303186.htm

[4] China Electric Power Yearbook 2010

[5] http://www.sdpc.gov.cn/zcfb/zcfbl/zcfbl2005/t20051222_54304.htm

With reference to *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects*[6] which is applicable to both new and modified power generation projects and still in effect in China, the financial benchmark IRR of the total investment in Chinese power industries is 8% (after tax).

Therefore, the benchmark IRR of total investment of 8% (after tax) is applicable and selected for financial analysis of the project.

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

The following parameters and values in the Table B.5.-2 below are applied for calculation and comparison of financial indicator, IRR.

Table B.5.-2 Parameters to determine the project IRR

Item	Value	Unit	Source
Capacity	360	MW	FSR
Total static investment	2,983.67	million CNY	FSR
Annual operational and maintenance costs	57.42	million CNY	FSR
Annual electricity delivered to the CCPG	1,061,730	MWh	FSR
Tariff (with VAT)	0.380	CNY/kWh	FSR
Comprehensive depreciation rate	2.22	%	FSR
Value Added Tax (VAT)	17	%	FSR
City construction and maintenance tax and educational surcharge	4	%	FSR
Income tax	25	%	FSR
Project operational lifetime	45	Year	FSR
Expected ER price	16	USD	Expected

The financial analysis for the proposed project is shown in the Table.5.-3 below, with and without CERs taken into account. The calculated IRR value of the project without CERs would be 6.71%, which is far below the 8% financial benchmark. Thus without CERs revenue, it is evident that this project will face substantial financial barriers and cannot be implemented.

After taking CERs revenue into consideration, the project IRR of total investment can reach 8.04%. Therefore, this project is financially feasible and can be implemented.

Table B.5.-3 Financial analysis results of the proposed project

	IRR (after tax) (%)
Without CERs revenue	6.71

[6] China Electric Power Press, 2003

With CERs revenue	8.04

Sub-step 2d. Sensitivity analysis:

A sensitivity analysis was conducted by altering the following parameters: investment, O&M costs, electricity sales and tariff. These parameters are selected as being most likely to fluctuate over time.

Financial analysis was performed by altering each of the above parameters by +10%/-10%, respectively, which is commonly used in China. The estimations of the impacts on the project IRR are shown in the Figure 3 below.

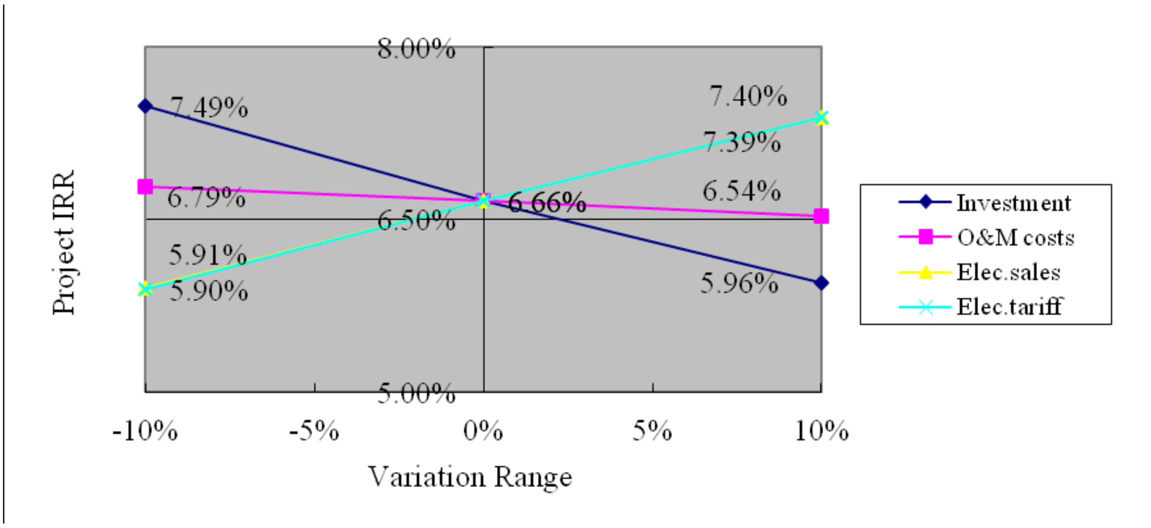

Figure 3 Sensitivity analysis of the project

Figure 3 shows that in the case of the fluctuation in investment, O&M costs, electricity sales, and tariff by 10%, the project IRR is still lower than the 8% benchmark. In addition, Figure 3 also shows that no matter by altering electricity sales or electricity tariff, their impacts on the project are sensitively the same.

Alternatively, when the project IRR is equal to the benchmark, the resultant changes to the critical parameters can be seen in the table B.5.-4 below.

Table B.5.-4 Parameter changes when project IRR is equal to the benchmark

Change of parameters	Investment	O&M costs	Elec. sales	Elec. Tariff
Project IRR = Benchmark	-15.4%	-107.5%	18.7%	18.6%

It shows that when the project IRR is equal to the benchmark, the O&M costs need to decrease by 107.5% or the investment decrease by 15.4%, or electricity tariff or tipping fee increase by 18.7% and 18.6%, respectively, situations that are unlikely to occur.

A decrease of 15.4% in investment and a decrease of 107.5% in O&M cost are unlikely to occur due to the continuous increase in material and labor costs, etc. in the host country of the proposed project. According to the National Bureau of Statistics of China, the procurement price index for material, fuel

and power increased by 6.0%[7], 4.4%[8] ,10.5%[9] and 9.6%[10] nationwide, during 2006, 2007 ,2008 and 2010 respectively. Therefore, the overall trend of price for material, fuel and power is increasing in recent years, and the decrease of investment or operation and maintenance cost is impossible.

As for the electricity sales, it is determined based on the electricity generation which is obtained based on the water resource data collected during the past 55 years (1953~2007)[11]. All water data which were used for the design of the project capacity came from the hydrometrical station. The amount of electricity generation is most unlikely to be increased. And the electricity sales can increase only 7.5% to reach the total electricity generation amount. Therefore, increase of electricity sales by 18.7% is hardly to happen.

As for the electricity tariff, if it increases by 18.6% that is 0.45CNY/kWh, the project IRR would be equal to the benchmark 8%. However, this is unlikely to occur because according to FSR, the average electricity tariff is no more than 0.36 CNY/kWh (incl. VAT) for hydropower stations in Jiangxi province, and the tariff for hydropower projects approved by the Jiangxi Price Bureau cannot achieve that high level. Therefore, the electricity tariff of 0.38 CNY/kWh (incl. VAT) applied for investment analysis of the project is in a higher level already, which is unlikely to be increased by 18.6%.

In sum, the above sensitivity analysis by altering four critical parameters clearly demonstrates that without CDM support, the proposed project cannot be implemented.

Step 3. Barriers analysis

The proposed project is additional in terms of financial attractiveness and is applicable to Step 2. Therefore, Step 3 is not developed.

Step 4. Common practice analysis

As the proposed project corresponds to paragraph 6 (b) of *Tool for the demonstration and assessment of additionality* (Version 06.0.0), the common practice analysis is demonstrated according to Paragraph 47 of the tool.

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

The capacity ranges from 180 MW to 540 MW (+/-50% of 360 MW which is the installed capacity of the proposed project) is applicable for the proposed project activity.

Sub-step 2: In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Sub-step 1, as the proposed project activity and have started commercial operation before the start date of the project. Note their number N_{all}. Registered CDM project activities and projects activities undergoing validation shall not be included in this step:

7 http://www.stats.gov.cn/tjgb/ndtjgb/qgndtjgb/t20070228_402387821.htm
8 http://www.stats.gov.cn/tjgb/ndtjgb/qgndtjgb/t20080228_402464933.htm
9 http://www.stats.gov.cn/tjgb/ndtjgb/qgndtjgb/t20090226_402540710.htm
10 http://www.stats.gov.cn/tjgb/ndtjgb/qgndtjgb/t20110228_402705692.htm
11 Feasibility Study Report

The applicable geographical area as Jiangxi Province was applied instead of the host country China which was set to be default, because the industrial development level, taxes, loan policy and electricity tariffs) are quite different among provinces. For example, the electricity tariffs of most hydropower stations are determined by provincial government according to the state regulations and policy[12].

There is not any hydropower project in Jiangxi Province with installed capacity between 180 MW and 540 MW for power generation and started commercial operation before September 26th, 2010 (the starting date of the project) in the Yearbook of China Water Resources (2003-2008), which is an authoritative publication.

Therefore, N_{all} is zero.

Sub-step3: Within plants identified in Sub-step 2, identify those that apply technologies different that the technology applied in the proposed project activity. Note their number N_{diff}.

Different technologies are technologies that deliver the same output and differ by at least one of the following (as appropriate in the context of the measure applied in the proposed CDM project and applicable geographical area):
(i) Energy source/fuel;
(ii) Feed stock;
(iii) Size of installation (power capacity):
- Micro (as defined in paragraph 24 of Decision 2/CMP.5 and paragraph 39 of Decision 3/CMP.6);
- Small (as defined in paragraph 28 of Decision 1/CMP.2);
- Large;
(iv) Investment climate in the date of the investment decision, inter alia:
Access to technology;
Subsidies or other financial flows;
Promotional policies;
Legal regulations;
(v) Other features

Because there is not any similar project activity identified in Sub-step 2, the number of hydropower projects that apply technologies different that the technology applied in the proposed project activity is 0 (N_{diff}=0)

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

(a) N_{diff}/N_{all} should be 1 since N_{diff} and N_{all} are identified the same as discussed above. Therefore, $F=1-N_{diff}/N_{all}=1-1=0$; and
(b) $N_{all}-N_{diff}=0$, which is smaller than 3.

Therefore, it is concluded that the proposed project is not a common practice and additional.

[12] http://www.sdpc.gov.cn/zcfb/zcfbtz/2009tz/t20091120_314530.htm

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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According to the approved consolidated baseline methodology ACM0002 (version 12.2.0), and the *Tool to calculate the emission factor for an electricity system (version 2.2.1),* the emission reductions of the proposed project are calculated as follows:

1. Project Emissions (PE_y)

For most renewable power generation project activities, PEy = 0. However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation:

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y} \quad (1)$$

Where:

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

$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year *y* (tCO_2/yr)

$PE_{GP,y}$ = Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year *y* (tCO_2e/yr)

$PE_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year *y* (tCO_2e/yr)

As the project is a hydropower project, the project emissions from fossil fuel consumption ($PE_{FF,y}$) and the operation of geothermal power plants due to the release of non-condensable gases ($PE_{GP,y}$) should not be considered. For hydropower project activities that result in new single or multiple reservoirs, project proponents shall account for CH_4 and CO_2 emissions from the reservoir ($PE_{HP,y}$), estimated as follows.

(a) If the power density of the single or multiple reservoirs (*PD*) is greater than 4 W/m^2 and less than or equal to 10 W/m^2:

$$PE_{HP,y} = \frac{EF_{Res} \cdot TEG_y}{1000} \quad (2)$$

Where:

$PE_{HP,y}$ = Project emission from water reservoirs (tCO_2e/yr)

EF_{Res} = Default emission factor for emissions from reservoirs of hydro power plants in year *y* ($kgCO_2e/MWh$), and the default value as per EB23 is 90 Kg CO_2e /MWh

TEG_y = Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y (MWh)

(b) If the power density of the project activity (*PD*) is greater than 10 W/m^2:

$$PE_{HP,y} = 0 \quad (3)$$

The power density of the project activity (*PD*) is calculated as follows:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}} \quad (4)$$

Where:

PD = Power density of the project activity in W/m^2.
Cap_{PJ} = Installed capacity of the hydro power plant after the implementation of the project activity (W).
Cap_{BL} = Installed capacity of the hydro power plant before the implementation of the project activity (W). For new hydro power plant, this value is zero.
A_{PJ} = Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m^2).
A_{BL} = Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero.

2. Baseline Emissions (BE_y)

$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$ (5)

Where:
BE_y = Baseline emissions in year y (tCO_2/yr).
$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y(MWh/yr).
$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "*Tool to calculated the emission factor for an electricity system*(02.2.1)"(tCO_2/MWh)

Calculation of $EG_{PJ,y}$

If the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, then:
$EG_{PJ,y} = EG_{facility,y}$ (6)

Where:
$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)
$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)

※ Calculation of $EF_{grid,CM,y}$ for CCPG based on the *Tool to calculated the emission factor for an electricity system（02.2.1）*

The electricity generated by the project activity will be delivered to the CCPG. The generation capacity installed will be 360MW throughout the crediting period. Data from the China Electric Power Yearbooks and China Energy Statistical Yearbooks are publicly available to calculate the Emission Factor of the

CCPG. The default values of calorific values for fuel types come from the *China Energy Statistical Yearbook 2009*, and the potential emission factor and fuel oxidation come from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Moreover, the Chinese DNA publishes emission factor of the CCPG on its website on December 20th 2010[13].

Step 1. Identify the relevant electricity systems

The project will be connected to the CCPG, which covers Jiangxi, Henan, Hubei, Hunan, Sichuan and Chongqing provincial grids. Therefore, the CCPG is identified as the relevant electric power system. In addition, the CCPG imported electricity from NCPG and NWPG. Therefore, the NCPG and NWPG will be taken into account for calculation of the emission factor of the CCPG.

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

The ***Option I****: Only grid power plants are included in the calculation* is chosen.

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

For the recent years (2005-2009) where data is available, the low-cost/must run resources constituted less than 50% of total power generation of the CCPG and the relevant ratios are respectively 38.6%， 35.1%， 35.5%， 39.5%,and 37.8% for the years 2005, 2006, 2007 ,2008 and 2009[14]. In this case, method (a) Simple OM is adopted for the project.

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

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

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

Option A: Based on data 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.

The project adopts Option B due to the following reasons,

a) The necessary data for option A is not available;
b) Only nuclear and renewable power generation is considered as low-cost/must-run power sources; the

[13] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2552.pdf
[14] China Electric Power Yearbook (2005-2009)

quantity of electricity supplied to the grid by above sources is known.

Where Option B is used, the simple OM emission factor is calculated as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_{i}(FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y})}{EG_y} \quad (7)$$

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 in the project electricity system in year y (mass or volume unit); Using country specific data from *China Energy Statistical Yearbook 2008--2010*.

$NCV_{i,y}$ Net calorific value (energy content) of fuel i in year y (GJ/ mass or volume unit); Using country specific data from *China Energy Statistical Yearbook 2009*.

$EF_{CO2,i,y}$ CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ); Using *2006 IPCC Guidelines for National Greenhouse Gas Inventories* for default values.

EG_y Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost/must-run power plants/units, in year y (MWh).

i All fossil fuel types combusted in power sources in the project electricity system in year y.

y Three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation.

According to the above steps and the emission factor of CCPG published by the Chinese DNA on its website, a 3-year average Simple OM emission factor of the CCPG is:

$EF_{OM\,y}$ = 1.0297 tCO_2e/MWh (See Annex 3 for details)

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

The set of power units that comprises the largest annual generation is selected. In terms of the vintage of data, Option 1 is selected for calculating the BM of the project. Option 1 is described as follows:

- For the first crediting period, the build margin emission factor is calculated *ex-ante* based on the most recent information available on units already built (or under construction) for sample *m* at the time of the 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 renewable 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.

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

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

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

(c) From $SET_{5\text{-units}}$ and $SET_{\geqslant 20\%}$ select the set of power units that comprises the larger annual electricity generation (SET_{sample});

Otherwise:

(d) Exclude from SET_{sample} the power units which started to supply electricity to the grid more than 10 years ago. Include in that set the power units registered as CDM project activity, starting with power units that started to supply electricity to the grid most recently, until the electricity generation of the new set comprises 20% of the annual electricity generation of the project electricity system (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) to the extent is possible. Determine for the resulting set ($SET_{sample\text{-}CDM}$) the annual electricity generation ($AEG_{SET\text{-}sample\text{-}CDM}$, in MWh);

Otherwise:

(e) Include in the sample group $SET_{sample\text{-}CDM}$ the power units that started to supply electricity to the grid more than 10 years ago until the electricity generation of the new set comprises 20% of the annual electricity generation of the project electricity system (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation);

(f) The sample group of power units m used to calculate the build margin is the resulting set ($SET_{sample\text{-}CDM\text{-}>10yrs}$).

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

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \qquad (8)$$

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).
$FE_{EL,m,y}$	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.

In China, data on either the five power plants that have been built most recently or the power plants capacity additions in the electricity system that comprise 20% of the system generation are classified as business confidential and are not publicly available. Therefore, EB accepted the following deviations[15]:

- Use of capacity additions during last 1~3 years for estimating the build margin emission factor for grid electricity.
- Use of weights estimated using installed capacity in place of annual electricity generation.

EB also suggests using the efficiency level of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy, for each fuel type in estimating the fuel consumption to estimate the build margin (BM).

According to the data published by Chinese DNA[16], the generating systems with a capacity of over 600MW share 40% of total installation capacity and represent the most advanced technology commercially used in domestic coal-fired plants. The combined cycle technology with a capacity of 200MW stands for the most advanced technology used in thermal plants fired by gas or oil in China. Therefore, the BM emission factor of the CCPG is calculated using the data from 2007~2009, based on the above best technology commercially available at the time of this PDD submission.

The calculation procedures are shown below.

$$\lambda_{Coal,y} = \frac{\sum_{i \in COAL,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \quad (9)$$

$$\lambda_{Oil,y} = \frac{\sum_{i \in OIL,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \quad (10)$$

$$\lambda_{Gas,y} = \frac{\sum_{i \in GAS,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \quad (11)$$

Where:

λ_{coal}, λ_{oil} and λ_{gas} represent the proportion of CO_2 emission of the solid, liquid and gas fuel in the total emission, respectively.

$F_{i,j,y}$ is the amount of fuel i consumed by relevant power sources *j* in year *y* (mass or volume).

$COEF_{i,j,y}$ is the CO_2 emission coefficient of fuel *i* (tCO_2 / mass or volume), taking into account the carbon content of the fuels used by relevant power sources *j* and the percent oxidation of the fuel in year *y*.

COAL, OIL and GAS are the mark aggregation of solid fuel, liquid fuel and gas fuel, respectively.

$$EF_{thermal} = \lambda_{coal} * EF_{coal,Adv} + \lambda_{oil} * EF_{oil,Adv} + \lambda_{gas} * EF_{gas,Adv} \quad (12)$$

[15] http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_QEJWJEF3CFBP1OZAK6V5YXPQKK7WYJ

[16] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2552.pdf

$EF_{thermal}$ is the emission factor of thermal power plant. $EF_{coal,Adv}$, $EF_{oil,Adv}$ and $EF_{gas,Adv}$ represent the CO_2 emission factor of the most advanced technology commercially used in coal-, oil- and gas-fired plants in China, respectively.

$$EF_{BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal} \quad (13)$$

CAP_{Total} Total newly capacity addition on different power sources connected to the CCPG.
$CAP_{Thermal}$ Newly capacity addition on thermal power sources connected to the CCPG.

According to the above steps and the emission factor of CCPG published by Chinese DNA on its website, the BM emission factor of the CCPG is calculated as follow:

$EF_{gird,BM,y}$ = 0.4191 tCO_2e/MWh (See Annex 3 for details)

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

$EF_{grid,CM,y}$ as the weighted average of the Operating Margin emission factor ($EF_{grid,OM,y}$) and the Build Margin emission factor ($EF_{grid,BM,y}$) is expressed as:

$$EF_{grid,CM,y} = w_{OM} \times EF_{grid,OM,y} + w_{BM} \times EF_{grid,BM,y} \quad (14)$$

W_{OM} Weighting of operating margin emission factor (%)
W_{BM} Weighting of build margin emission factor (%)

For hydropower project the weights w_{OM} and w_{BM}, by default, are 50% (i.e., $w_{OM} = w_{BM} = 0.5$) during the first crediting period. $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ are calculated as described in above and are expressed in tCO_2e/MWh.

The baseline emission of the project is

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} \quad (15)$$

$EG_{PJ,y}$, (i.e.: $EG_{facility,y}$) is the net electricity supplied by the grid of the project, MWh.

3. Leakage Emissions (L_y)

According to ACM0002(Version 12.2.0), leakage emissions (L_y) of the project is zero.

4. Emission reduction (ER_y)

Therefore, the emission reduction of the project is

$$ER_y = BE_y - PE_y - L_y \quad (16)$$

Where:

ER_y = Emission reductions in year *y* (t CO_2e/yr)
BE_y = Baseline emissions in year *y* (t CO_2/yr)
PE_y = Project emissions in year *y* (t CO_2e/yr)
L_y = Leakage emissions in year *y* (t CO_2e/yr)

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

Data / Parameter:	**$FC_{i,y}$**
Data unit:	Mass or volume
Description:	Fuel consumed by the CCPG
Source of data used:	*China Energy Statistical Yearbook (2008~2010)*
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	China Energy Statistical Yearbook is an authoritative publication.
Any comment:	-

Data / Parameter:	**$NCV_{i,y}$**
Data unit:	TJ/volume or TJ/mass
Description:	Net calorific value (energy content) per mass or volume unit of fuel i
Source of data used:	*China Energy Statistical Yearbook (2009)*
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	China Energy Statistical Yearbook is an authoritative publication.
Any comment:	-

Data / Parameter:	**$EF_{CO2,i,y}$**
Data unit:	tCO_2/GJ
Description:	CO_2 emission factor per unit of energy of fuel i
Source of data used:	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*, volume 2, page 1.23
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Using *2006 IPCC Guidelines for National Greenhouse Gas Inventories* value.

Any comment:	-

Data / Parameter:	**EG_y**
Data unit:	MWh
Description:	Net electricity generated by power plant/unit j connected to the CCPG in year y
Source of data used:	*China Electric Power Yearbook (2008~2010)*
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	China Electric Power Yearbook is an authoritative publication.
Any comment:	-

Data / Parameter:	**$GEN_{j,y}$**
Data unit:	MWh
Description:	Net electricity delivered to the CCPG by power plant/unit j in year y
Source of data used:	*China Electric Power Yearbook (2008~2010)*
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	China Electric Power Yearbook is an authoritative publication.
Any comment:	-

Data / Parameter:	**$GENE_{best,coal}$**
Data unit:	%
Description:	Best power supply efficiency by the most advanced technology commercially used in coal-fired plants in China
Source of data used:	Bulletin on Baseline Emission Factors of China's Regional Grids- the calculation of baseline Build Margin emission factor for China's Regional Grids http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2708.pdf
Value applied:	39.45%
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official data from Chinese DNA
Any comment:	-

Data / Parameter:	**$GENE_{best,oil,gas}$**
Data unit:	%
Description:	Best power supply efficiency by the most advanced technology commercially

	used in oil- and gas-fired plants in China
Source of data used:	Bulletin on Baseline Emission Factors of China's Regional Grids- the calculation of baseline Build Margin emission factor for China's Regional Grids http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2708.pdf
Value applied:	51.77%
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official data from Chinese DNA
Any comment:	-

Data / Parameter:	$\mathbf{CAP_{j,y}}$
Data unit:	MW
Description:	Installed generation capacity on different power sources connected to the CCPG
Source of data used:	*China Electric Power Yearbook (2008~2010)*
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	China Electric Power Yearbook is an authoritative publication.
Any comment:	-

Data / Parameter:	$\mathbf{EF_{Res}}$
Data unit:	$kgCO_2e/MWh$
Description:	Default emission factor for emissions from reservoirs.
Source of data used:	Decision by EB23,
Value applied:	90 $kgCO_2e/MWh$
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	-

Data / Parameter:	$\mathbf{Cap_{BL}}$
Data unit:	W
Description:	Installed capacity of the hydro power plant before the implementation of the project activity. For new hydro power plants, this value is zero.
Source of data used:	Project site
Value applied:	0
Justification of the choice of data or	Since the project is a new hydro power plant, the value of zero is determined as per ACM0002 (version 12.2.0).

description of measurement methods and procedures actually applied :	
Any comment:	-

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

>>

1. Project Emissions (PE_y)

The power density of the proposed project is:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}} = (360{,}000{,}000\text{-}0) / (31{,}547{,}000\text{-}0) = 11.41 W/m^2$$

The power density of the proposed project is 11.41 W/m^2, which is greater than 10 W/m^2. Therefore, the project emissions are:

$PE_y = PE_{HP,y} = 0\ tCO_2e/year$

2. Baseline Emissions (BE_y)

The baseline emission factor is:

$$EF_{grid,CM,y} = 0.5 \times EF_{grid,OM,y} + 0.5 \times EF_{grid,BM,y}$$
$$= 0.5 \times 1.0297 + 0.5 \times 0.4191 = 0.7244 tCO_2e/MWh$$

Hence, the baseline emission is:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} = 1{,}061{,}730 \times 0.7244 = 769{,}117\ tCO_2e/year$$

3. Leakage Emissions (L_y)

According to ACM0002 (12.2.0) , the leakage emission (L_y) of the project is zero.

4. Emission reductions (ER_y)

The emission reductions of the project are:

$$ER_y = BE_y - PE_y - L_y = 769{,}117\text{-}0\text{-}0 = 769{,}117\ tCO_2e/year$$

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

>>

Year	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
01/08/2013 ~31/12/2013	0	320,465	0	320,465
01/01/2014 ~31/12/2014	0	769,117	0	769,117
01/01/2015 ~31/12/2015	0	769,117	0	769,117
01/01/2016 ~31/12/2016	0	769,117	0	769,117
01/01/2017 ~31/12/2017	0	769,117	0	769,117
01/01/2018 ~31/12/2018	0	769,117	0	769,117
01/01/2019 ~31/12/2019	0	769,117	0	769,117
01/01/2020 ~ 31/07/2020	0	448,652		448,652
Total (tonnes of CO_2)	**0**	5,383,819	0	5,383,819

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

B.7.1 Data and parameters monitored:

Based on the ACM0002, the following data and parameters will be monitored during the project crediting period.

Data / Parameter:	**$EG_{facility,y}$**
Data unit:	MWh/yr
Description:	Quantity of net electricity generation supplied by the project plant/unit to the CCPG in year y
Source of data to be used:	Project activity site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	1,061, 730 MWh/yr
Description of measurement methods and procedures to be applied:	Measured using meter installed onsite. The data of electricity delivered to and imported from the grid will be measured continuously and recorded monthly.
QA/QC procedures to be applied:	The metering devices will be calibrated as stated in B.7.2. Data measured by meters will be cross checked by electricity sales receipt.
Any comment:	-

Data / Parameter:	**Cap_{PJ}**
Data unit:	W
Description:	Installed capacity of the hydro power plant after the implementation of the project activity.
Source of data to be	Project site

used:	
Value of data applied for the purpose of calculating expected emission reductions in section B.5	360,000,000W
Description of measurement methods and procedures to be applied:	Determination of the installed capacity according to the nameplate and yearly monitoring.
QA/QC procedures to be applied:	The data will be recorded and kept for 2 years after the end of the crediting period.
Any comment:	-

Data / Parameter:	$\mathbf{A_{PJ}}$
Data unit:	m^2
Description:	Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full.
Source of data to be used:	Project site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	31,547,000 m^2
Description of measurement methods and procedures to be applied:	The surface area will be yearly analyzed by applying the highest water level monitored as per the curve of water level & area of the reservoir.
QA/QC procedures to be applied:	The data will be recorded and kept for 2 years after the end of the crediting period.
Any comment:	-

All monitored data will be archived electronically and be kept during entire crediting period and at least two years after.

B.7.2. Description of the monitoring plan:

>>

The approved monitoring methodology ACM0002 is used for developing the monitoring plan. This monitoring plan was established to ensure the completion, coherence and accuracy of monitoring and calculation of the emission reductions from the project during the entire crediting period. Under the cooperation of the grid company, the project owner is responsible for implementing the monitoring plan.

1. Management organization

To ensure all data are reliable and transparent, the project owner will also establish Quality Assurance and Quality Control (QA&QC) measures to effectively control and manage data reading, recording, auditing

as well as archiving data and all relevant documents. This monitoring plan will be carried out by a CDM team, designated by the project owner, which consists of a team leader, an assistant and operators who are responsible for recording the metering readings (Figure 4).

The team leader will have the overall responsibility for the monitoring and verification process, training and managing all CDM team members, and will act as the focal point for the DOE, DNA and other organizations relating to CDM.

The assistant will help the team leader to supervise the operation of the project, including data monitoring, negotiations with the grid company, and to collect the electricity settlement receipts.

The operators will be responsible for inspecting and maintaining the equipments, measuring and recording relevant readings, collecting, checking, archiving and managing data, and making summary according to the CDM project's requirements in a regular basis, and so on.

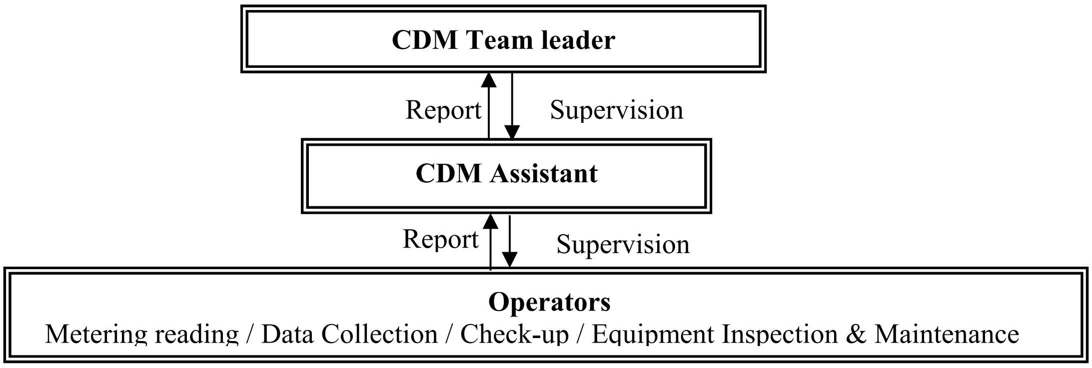

Figure 4. Organization Chart for Project Monitoring

2. Data to be Monitored

- Electricity delivered to/imported from the CCPG by the project ($EG_{facility,y}$)

Electricity delivered to/imported from the CCPG will be monitored by main metering devices installed on site. The electricity settlement receipts will be provided by the grid company for the project owner's double check of the amount of net electricity delivered and accepted by the CCPG. Detailed monitoring procedures to measure electricity supplied to the CCPG by the project will be established later between the project owner and the grid company in line with the Power Purchase Agreement.

- Installed generation capacity

The installed generation capacity of the project will be monitored yearly in accordance with the nameplate of each generator.

- Surface area of the reservoir

The surface area of the reservoir determined according to the water level will be yearly monitored to check the power density of the project plant.

Above monitored data will be archived and provided to DOE during the verification period.

3. Installation of Metering Devices

One set of metering systems will be equipped at the project site and another set of metering system will be equipped at the substation (see Figure 2). They are classified as main meter system and backup meter system, respectively. Both systems are bidirectional and capable of metering the imported and exported electricity by the project simultaneously.

The metering equipment will be properly calibrated yearly for accuracy. The calibration will be carried out by an accredited third party or the grid company.

The metering equipment will be properly calibrated yearly for accuracy. The calibration will be carried out according to the national standards by an accredited third party or the grid company.

4. Data Reading

- Electricity delivered to/imported from the CCPG by the project($EG_{facility,y}$)

The data will be measured continuously at the project site.
In addition, the representatives of the grid company and the project will jointly read the main meters monthly. The recorded data will be confirmed by both parties with signatures, which is used for monthly electricity settlement.

- Installed generation capacity

Before verification, the operators will confirm and record the amount of generator facilities and the installed capacity of each generator in the hydropower station. This record will be checked by the CDM team leader and provided to the DOE during the verification period.

- Area of the reservoir

The water level will be monitored and recorded. The surface area will be yearly determined as per the curve of water level & area of the reservoir.

5. Data Management System

Data of net electricity supplied to the CCPG will be archived in electronic spreadsheet by the end of each month. In addition, the electronic files will be stored on hard copy or other media periodically.

The data records of the installed capacity and the surface area of the reservoir related with the monitoring of the water levels will be archived in written document.

Hard copy documentation such as paper maps and diagrams will be collected in a central place, together with this monitoring plan. All hard copy information will be stored by the project owner with at least one copy.

All data records will be kept for 2 years after the end of the crediting period.

6. Abnormity handling

If the calibration is not conducted at the frequency specified in this plan, the net electricity delivered to the grid by the project will be determined by the follows in a conservative approach.

- If the results of the delayed calibration do not show any errors in the measuring equipment, or if the error is smaller than the maximum permissible error, maximum permissible error of the instrument to the measured values taken during the period between the scheduled date of calibration and the actual date of calibration will be applied.

- If the error is beyond the maximum permissible error of the measuring equipment, the error identified in the delayed calibration test will be applied.

The electricity recorded by the main metering system alone will be sufficient for the purpose of billing and emission reduction verification as long as the main meter system is under normal condition.

If any data error occurs during the crediting period, especially if the data of electricity sales is accidently damaged during the crediting period, the project owner and the grid company will deal with it as emergency. Meanwhile, the CDM team should be informed about the accidents occurred at the power station in time. The CDM team leader and assistant will analyze the rationality of the data according to conservative rules of CDM projects. The data will be recorded and archived.

7. Verification of monitoring results

The project owner will check and approve the monitoring reports periodically, which contain instrument maintenance, verification records, monitoring records and CER calculations and so on. The project owner will also provide the report to the DOE when verifying for the accuracy and rationality of the data. The data is expected to be verified every year.

8. Training

Specialized worker and graduates who studied related majors will be hired. In order to operate/maintain the hydropower station smoothly, training in the station will be conducted. Monitoring and Operation manual will be compiled and accessible to staff.

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

>>
Completion date: 07/02/2012

Name of entity/persons determining the baseline and the monitoring plan:

Shanghai Weitai Environment Co., Ltd.
Address: Room 1102, 480 Wulumuqi Road (N), Shanghai, China
Zip Code: 200040
Tel: +86-21-32525665
Fax: +86-21-32525670

None of the entity/ responsible persons mentioned above is project participant.

SECTION C. Duration of the project activity / crediting period

C.1. Duration of the project activity:

C.1.1. Starting date of the project activity:

>>

26/09/2010
(The turbine and generator purchase contract was signed.)

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

>>
45 years and 0 month.

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

C.2.1. Renewable crediting period:

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

>>
01/08/2013 or the effective registration date whichever is later.

C.2.1.2. Length of the first crediting period:

>>
7 years

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
Not applicable

C.2.2.2. Length:

>>
Not applicable

SECTION D. Environmental impacts

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

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An Environmental Impact Assessment (EIA) was conducted to ensure that the project complies with national, regional and local environmental regulations during its construction and operational period. The

EIA prepared and accomplished in August 2009 by Shanghai Survey and Design Institute which is a certified organization, was approved by National Ministry of Environmental Protection on 30th October 2009.

The main conclusions of the EIA are summarized as follows:

Potential environmental impacts and mitigation measures

In Construction Stage

Water Wastewater and sewage generated by site construction activities will be treated in a sedimentation tank after collection to meet discharge standard before being discharged; wastewater with oil will be treated by oil separator before being discharged; and wastewater generated by construction workers will be treated using wastewater treatment equipment and then discharged.

Air The main air pollutant is particulates (dust) which are released from construction activities and transportation and the emission from vehicles and construction machinery. Measures will be taken to mitigate this pollutant, such as spraying water at construction sites and on dusty roads, transporting material in covered vehicles or in closed containers, installing and using a wheel washing system, controlling vehicle speeds and operating with proper maintenance.

Noise Vehicles, construction machinery and explosion of dynamite will generate noise pollution. The mitigation measures to control this form of pollution include: installing in-situ sound barriers, selecting suitable equipment, correct operation and maintenance; limiting the speed of vehicles, and carrying out explosion activities strictly in compliance with safety regulations for explosion.

Solid waste The main forms of solid waste created by the project include: refuse generated on the construction site and waste generated by construction workers. These solid wastes will be collected and handled in time.

Ecology Measures for water and soil conservation will be prepared and carried out by the project owner to minimize the adverse impact on the ecological environment during the project construction. Rehabilitation of vegetation will be conducted after the construction work is completed.

Social The occupation of land for the project construction will lead to the relocation of local residents. The project owner prepared the Resettlement Plan and allocated special funds for compensation in accordance with national regulations related to resettlement and compensation, to ensure that the long-term livelihood of the affected people will be well protected.

In Operation Stage

Water Sewage will be treated in a treatment plant to meet discharge standard before being discharged.

Air No air pollution will be caused by the hydropower plant during the operation stage.

Noise Noise pollution will be generated mainly by machines during operation. The mitigation measures are: selecting low noise machines, locating noisy equipment closed workshops, *etc*.

Solid waste The main form of solid waste during the operation period will be domestic waste generated by the construction workers. These wastes will be collected and transported out to solid waste treatment plant.

The project has no potential adverse impact up on the local people or environment.

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

>>

The EIA of the Project was approved by National Ministry of Environmental Protection. Strict environmental monitoring and mitigation measures will be carried out during the construction and operation phases of the project. No significant environmental impacts are identified for the project.

SECTION E. Stakeholders' comments

>>

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

>>

The project owner carried out the public consultation for the social, economical and environmental effects of the project before its implementation. The invited stakeholders included related local inhabitants all around the project site, and village representatives from surrounding area of the project.

During this survey, a total of 680 questionnaires were sent out, 648 of which were completed, 95.3% participation was noted.

The characteristics of the participants are summarized in the table below:

Table E.1.1 Consultation participants

Item	Content	Vote	Proportion
Gender	Male	574	88.6%
	Female	74	11.4%
Education	Primary school	98	15.1%
	Junior high school	299	46.1%
	Senior high school or technical secondary school	153	23.6%

	Junior college	29	4.5%
	Junior college above	10	1.6%
	Not fill in	59	9.1%
Occupation	Farmer	469	72.4%
	Governmental staff	21	3.2%
	Junior management	55	8.5%
	Others	62	9.6%
	Not fill in	41	6.3%
Age	Below 18	3	0.5%
	18~29	33	5.1%
	30~39	127	19.6%
	40~49	196	30.2%
	50~60	213	32.9%
	Above 60	54	8.3%
	Not fill in	22	3.4%

Questions of the investigation are as follows:

- Did you hear or get about this project?
- Did you think if this project will improve the flood control and navigation condition of the middle and lower reaches of Gan River?
- Did you think how this project will affect the agriculture and industry water and inhabitant water located in the lower reaches of Gan River?
- Do you satisfied with the local supply of electricity and voltage stabilization?
- Did you think if this project will favor the local social and economic development?
- What kind of environmental quality do you think need to be improved?
- What kind of environmental impact need to be paid attention by this project?
- Do you agree to get the compensation arrange from the government according to the related policy, once your agriculture and forest land and removed house were required?
- What kind of arrangement do you want?
- Did you think if this project will improve your environment and the life quality?
- What is your attitude towards the project?

E.2. Summary of the comments received:

>>

The results of this survey show that:

- 69.9% of the participants have heard about the project, 29.9% know this project, 0.2% have not heard this project.
- 65.6% of the participants think this project will improve the flood control and navigation condition of the middle and lower reaches of Gan River, others don't know.
- 51.1% of the participants think this project will good to the agriculture and industry water and inhabitant water located in the lower reaches of Gan River, 35% of the participants think that there is no influence.
- 27% and 56.3% of the participants satisfy and basic satisfy with the local supply of electricity and

voltage stabilization, 15.7% have opposite view, 1% didn’t reply.

- 72% of the participants think this project will favor the local social and economic development, 26.9% don’t know.
- 48.8% and 26.8% of the participants think the water and ecological environment will need to be improved. 3.9% and 9.3% of the participants think the noise control and air will need to be improved. 5.2% think the other aspects will need to be improved. 6.0% didn’t reply.
- The environmental impact need to be paid attention by this project are: land flood (69.8%), soil erosion (30.9%), water pollution (32.6%), inconvenience traffic(29.3%), ecological damage(21%).
- 61.7% of the participants agree to get the compensation arrange from the government according to the related policy, if the agriculture and forest land and removed house were required. Most of the other participants don’t care. 1.5% of the participants didn’t reply.
- 43.8% of the participants hope to be arranged at local village, 19% of the participants hope to be arranged at the outside. 9.1% hope to be arranged at local country. 26.1% agreed to comply with the superior. 2% didn’t reply.
- 44.1% and 32% of the participants think this project will improve the environment and the life quality.
- 54.3% and 20.4% of the participants support and conditional support this project. 17% of the participants don’t care.

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

>>

The project owner took the comments and feedback of the stakeholders seriously and responded to it promptly and properly, particularly regarding noise pollution and the protection of ecological environment during the construction and operation period.

The survey showed that the local residents were very supportive for the project. As per the stakeholder’s comments, the project owner analyzed the issues, such as inundation and water and soil loss to be caused by the project. For protection of ecological environment, the project owner has prepared Environmental Impact Assessment forXiajiang Hydropower Project which was approved by National Ministry of Environmental Protection on 30th October 2009.

During the construction period, the project owner took proper and effective measures to prevent the water and soil erosion, and protect the ecological environment. For instance, barricade and other protective facilities will be built during and after the construction works; the temporary occupied land during the construction will be rehabilitated by soil covering, trees planting and other greening measures.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Project Owner/Host

Organization:	Jiangxi CPI Xiajiang Power Generation Co., Ltd.
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Annex I Project Participant

Organization:	J-TEC Co., Ltd.
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Represented by:	
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public fund from parties included in Annex I of the UNFCCC involved in this project activity.

Annex 3

BASELINE INFORMATION

Emission Factor of Central China Power Grid[17,18,19,20]

I. Operating Margin

Table 1. Fuel consumed by the CCPG in year 2007

Fuel Type	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Sub-total	Carbon Content (tc/TJ)	Oxidation (%)	Emission Factor ($kgCO_2/TJ$)	LHV (MJ/t,km3)	CO_2Emission (tCO_2e) K=F×I×J/100000(mass)
		A	B	C	D	E	F	F=A+B+C+D+E	G	H	I	J	K=F×I×J/10000
Raw coal	10^4tn	2200.57	9357	3479.81	2683.81	1547.7	3239	**22507.89**	25.8	100	87,300	20,908	410,829,404
Cleaned coal	10^4tn		3.07			3.8		**6.87**	25.8	100	87,300	26,344	157,998
Other washed coal	10^4tn	0.04	87.16		2.06	96.42		**185.68**	25.8	100	87,300	8,363	1,355,631
moulded coal	10^4tn						0.01	**0.01**	26.6	100	87,300	20,908	183
Coke oven	10^4tn							**0**	29.2	100	95,700	28,435	0
Coke oven gas	10^8m^3	0.08	2.61	0.25	0.31	0.91		**4.16**	12.1	100	37,300	16,726	259,534
Other gas	10^8m^3	29.17	25.79		24.69		23.98	**103.63**	12.1	100	37,300	5,227	2,020,444
Crude oil	10^4tn		0.43					**0.43**	20	100	71,100	41,816	12,784
Gasoline	10^4tn				0.04	0.01		**0.05**	18.9	100	67,500	43,070	1,454
Diesel oil	10^4tn	0.98	3.21	2.51	2.83	1.93		**11.46**	20.2	100	72,600	42,652	354,863
Fuel oil	10^4tn	0.42	1.25	1.33	0.63	0.64	1.74	**6.01**	21.1	100	75,500	41,816	189,742
LPG	10^4tn							**0**	17.2	100	61,600	50,179	0
Refinery gas	10^4tn	1.43	10.01	0.97	0.7			**13.11**	15.7	100	48,200	46,055	291,022
Natural gas	10^8m^3		0.12	0.18		0.2	1.87	**2.37**	15.3	100	54,300	38,931	501,007
Other petroleum product	10^4tn							**0**	20	100	72,200	41,816	0
Other coking products	10^4tn							**0**	25.8	100	95,700	28,435	0
Other energy	10^4tce	23.43	63.65	35.95	29.46	23.21		**175.7**	0	0	0	0	0
												Total	**415,974,066**

Table 2. Electricity generation and supply by the CCPG in year 2007

17 China Energy Statistical Yearbook 2008~2010

18 China Electric Power Yearbook 2008~2010

19 2006 IPCC Guidelines for National Greenhouse Gas Inventories

20 http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2708.pdf

Province	Generati	Generation	On-site u	Supply
	(10^8kWh	(MWh)	(%)	(MWh)
Jiangxi	421	42,100,000	7.72	38,849,880
Henan	1773	177,300,000	7.55	163,913,850
Hubei	609	60,900,000	6.69	56,825,790
Hunan	542	54,200,000	7.18	50,308,440
Chongqing	288	28,800,000	9.2	26,150,400
Sichuan	451	45,100,000	8.68	41,185,320
Total				377,233,680

Table 3. Fuel consumed by the CCPG in year 2008

Fuel Type	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Sub-total	Carbon Content	Oxidation	Emission Factor	LHV	CO_2Emission (tCO_2e)
									(tc/TJ)	(%)	($kgCO_2$/TJ)	(MJ/t,km3)	K=F×I×J/100000(mass)
		A	B	C	D	E	F	F=A+B+C+D+E	G	H	I	J	K=F×I×J/10000
Raw coal	10^4tn	2137.08	9480.74	2852.29	2620.44	1421.42	2727.61	**21239.58**	25.8	100	87,300	20,908	387,679,342
Cleaned coal	10^4tn		1.68			3.27		**4.95**	25.8	100	87,300	26,344	113,842
Other washed coal	10^4tn	0.04	80.54		2.06	101.75		**184.39**	25.8	100	87,300	8,363	1,346,213
moulded coal	10^4tn				6.12		0.01	**6.13**	26.6	100	87,300	20,908	111,889
Coke oven	10^4tn		0.78		0.92			**1.7**	29.2	100	95,700	28,435	46,261
Coke oven gas	10^8m^3	0.1	4.19	0.37	0.24	6.66	0.01	**11.57**	12.1	100	37,300	16,726	721,829
Other gas	10^8m^3	23.67	41.36		3.31	0.37	0.01	**68.72**	12.1	100	37,300	5,227	1,339,814
Crude oil	10^4tn		0.17					**0.17**	20	100	71,100	41,816	5,054
Gasoline	10^4tn							**0**	18.9	100	67,500	43,070	0
Diesel oil	10^4tn	0.88	7.02	2.82	3.41	1.59		**15.72**	20.2	100	72,600	42,652	486,775
Fuel oil	10^4tn	0.07	1.45		1.29		3.14	**5.95**	21.1	100	75,500	41,816	187,848
LPG	10^4tn							**0**	17.2	100	61,600	50,179	0
Refinery gas	10^4tn	0.21	3.91	2.78	0.71		0.01	**7.62**	15.7	100	48,200	46,055	169,153
Natural gas	10^8m^3		4.02	0.16		0.05	12.92	**17.15**	15.3	100	54,300	38,931	3,625,430
Other petroleum product	10^4tn			0.59				**0.59**	20	100	72,200	41,816	17,813
Other coking products	10^4tn						0.01	**0.01**	25.8	100	95,700	28,435	272
Other energy	10^4tce	18.16	68.11	62.35	11.42	64.87		**224.91**	0	0	0	0	0
												Total	395,851,534

Table 4. Electricity generation and supply by the CCPG in year 2008

Province	Generati	Generation	On-site u	Supply
	(10^8kWh	(MWh)	(%)	(MWh)
Jiangxi	405	40,500,000	6.5	37,867,500
Henan	1890	189,000,000	7.22	175,354,200
Hubei	553	55,300,000	6.62	51,639,140
Hunan	537	53,700,000	6.46	50,230,980
Chongqing	286	28,600,000		28,600,000
Sichuan	401	40,100,000	10.21	36,005,790
Total				379,697,610

Table 5. Fuel consumed by the CCPG in year 2009

Fuel Type	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Sub-total	Carbon content	Oxidation	Emission Factor	LHV	CO_2Emission (tCO_2e)
									(tc/TJ)	(%)	($kgCO_2$/TJ)	(MJ/t,m3)	L=G×J×K/100000 (mass)
		A	B	C	D	E	F	G=A+B+C+D+E+F	H	I	J	K	L=G×J×K/10000
Raw coal	10^4tn	2184.31	9339.64	2888.29	2810.69	1413.64	2817.31	**21453.88**	25.8	100	87,300	20,908	391,590,892
Cleaued coal	10^4tn		3.35					**3.35**	25.8	100	87,300	26,344	77,044
Other washed coal	10^4tn		59.93			136.75	97.94	**294.62**	25.8	100	87,300	8,363	2,150,991
moulded coal	10^4tn				2.63			**2.63**	26.6	100	87,300	20,908	48,005
coke oven	10^4tn		1.08	0.06	0.09			**1.23**	29.2	100	95,700	28,435	33,471
coke oven gas	10^8m^3	0.09	6.04	1.2		1.03		**8.36**	12.1	100	37,300	16,726	521,564
Other gas	10^8m^3	30.76	56.64		4.23	7.57		**99.2**	12.1	100	37,300	5,227	1,934,074
Crude oil	10^4tn		0.1					**0.1**	20	100	71,100	41,816	2,973
Gasoline	10^4tn							**0**	18.9	100	67,500	43,070	0
Diesel oil	10^4tn	0.69	4.28	1.23	1.55	1.19		**8.94**	20.2	100	72,600	42,652	276,830
Fuel oil	10^4tn	0.02	1.44	0.48	1.27	0.06	4	**7.27**	21.1	100	75,500	41,816	229,522
LPG	10^4tn							**0**	17.2	100	61,600	50,179	0
Refinery gas	10^4tn	0.25	2.18	0.82	1.91			**5.16**	15.7	100	48,200	46,055	114,544
Natural gas	10^8m^3		7.69	0.27		0.14	21.84	**29.94**	15.3	100	54,300	38,931	6,329,176
Other petroleum	10^4tn			0.29				**0.29**	20	100	72,200	41,816	8,755
Other coking products	10^4tn							**0**	25.8	100	95,700	28,435	0
Other energy	10^4tce	12.47	76.3	26.69	14.96	84.8		**215.22**	0	0	0	0	0
												小计	403,317,841

Table 6. Electricity generation and supply by the CCPG in year 2009

Province	Generation (10^8kWh)	Generation (MWh)	n-site us (%)	Supply (MWh)
Jiangxi	445	44,500,000	5.8	41,919,000
Henan	1985	198,500,000	6.62	185,359,300
Hubei	630	63,000,000	6.21	59,087,700
Hunan	634	63,400,000	6.39	59,348,740
hongqing	306	30,600,000		30,600,000
Sichuan	504	50,400,000	7.92	46,408,320
Total				422,723,060

In addition, during 2007～2009，the CCPG imported electricity from NCPG and NWPG which is covered by North China Power Grid. The imported electricity amount and emissions are shown below.

Table 7. Electricity and emission imported by the CCPG

		2007	2008	2009
1.1	Imported generation from NCPG Grid (MWh)		33,200	2,233,290
1.2	Emission factor of NCPG Grid (tCO2e/MWh)		1.00495	0.96418
1.3	Imported emissions from NCPG Grid (tCO2e)		33,367	2,153,294
2.1	Imported generation from NWPG (MWh)	3,005,400	3,144,070	3,262,010
2.2	Emission factor of NWPG (tCO2e/MWh)	1.01129	0.98254	1.00759
2.3	Imported emissions from NWPG (tCO2e)	3,039,329	3,089,177	3,286,768
3.1	Power supply from CCPG (MWh)	377,233,680	379,697,610	422,723,060
3.2	Emission from CCPG (tCO2e)	415,974,066	395,851,534	403,317,841
1.1+2.1+3.1	Total generation (MWh), Σ GEN	380,239,080	382,874,880	428,218,360
1.3+2.3+3.2	Total emissions (tCO2e), Σ Fi,m,y * COEFi,m	419,013,395	398,974,078	408,757,903

Therefore, OM emission factor of the CCPG is the average value of 2007～2009.

EF_{OM} =**Σ $F_{i,m,y}$ * $COEF_{i,m}$ /Σ GEN** = (419,013,395 + 398,974,078+408,757,903) / (380,239,080 + 382,874,880+428,218,360) = 1.0297 tCO_2e/MWh

II. Build Margin

The weighted value based on the lowest coal consumption by 30 sets of 600MW generating units installed in 2009 is calculated as 311.5gce/kWh, which also means the power supply efficiency of these plants is weighted as 39.45%.

The combined cycle technology with a capacity of 200MW stands for the most advanced technology used in thermal plants fired by gas or oil in China. Based on the statistics in 2009, the thermal plant with the maximum power supply efficiency 51.77% consumed the equivalent fuel of 237.4 gce/kWh.

Table 8. Emission factor of most advanced technology commercially used in China's domestic thermal power plants

	Parameters	**Power supply efficiency**(%)	**EF of fuel** ($kgCO_2/TJ$)	**Oxidation**	**Emission Fator** (tCO_2/MWh)
		A	B	C	D=3.6/A/10,000×B×C
Coal fire plant	$EF_{Coal,Adv,y}$	39.45	87,300	1	0.7967
Gas fire plant	$EF_{Oil,Adv,y}$	51.77	75,500	1	0.5250
Oil fire plant	$EF_{Gas,Adv,y}$	51.77	54,300	1	0.3776

Table 9: Fuel consumption and emission by the CCPG in 2009

		Jiangxi	Henan	Hubei	Hunan	CFhongqing	Sichuan	Sub-total	Calorific value	Emission Factor	Oxidation	Emission
Fuel-Type	Unit (10^4)	A	B	C	D	E	F	G=A+...+F	H	I	J	K=G×H×I×J/100,000
Raw-coal	t	2,184.31	9,339.64	2,888.29	2,810.69	1,413.64	2,817.31	21,453.88	20,908	87,300	1	391,590,892
Washed-coal	t	0	3.35	0	0	0	0	3.35	26,344	87,300	1	77,044
Other-washed coal	t	0	59.93	0	0	136.75	97.94	294.62	8,363	87,300	1	2,150,991
Moulded coal	t	0	0	0	2.63	0	0	2.63	20,908	87,300	1	48,005
Coke-coal	t	0	1.08	0.06	0.09	0	0	1.23	28,435	95,700	1	33,471
Other coking product	t	0	0	0	0	0	0	0.00	28,435	95,700	1	0
Sub-total								0.00				393,900,403
Crude-oil	t	0	0.1	0	0	0	0	0.1	41,816	71,100	1	2,973
Gasoline	t	0	0	0	0	0	0	0	43,070	67,500	1	0
Diesel oil	t	0.69	4.28	1.23	1.55	1.19	0	8.94	42,652	72,600	1	276,830
Fuel oil	t	0.02	1.44	0.48	1.27	0.06	4	7.27	41,816	75,500	1	229,522
Other petroleum product	t	0	0	0.29	0	0	0	0.29	41,816	72,200	1	8,755
Sub-total								0				518,081
Natural gas	10^3m^3	0	76.9	2.7	0	1.4	218.4	299.4	38,931	54,300	1	6,329,176

Coke oven gas	10^3m^3	0.9	60.4	12	0	10.3	0	83.6	16,726	37,300	1	521,564
Liquefied	10^3m^3	307.6	566.4	0	42.3	75.7	0	992	5,227	37,300	1	1,934,074
Petroleum gas	t	0	0	0	0	0	0	0	50,179	61,600	1	0
Refinery gas	t	0.25	2.18	0.82	1.91	0	0	5.16	46,055	48,200	1	114,544
Sub-total												8,899,358
Total												403,317,841

$$\lambda_{coal,y} = \frac{\sum_{i \in COAL,j} F_{i,j,y} * NCV_{i,y} * EF_{CO2,i,y}}{\sum_{i,j} F_{i,j,y} * NCV_{i,y} * EF_{CO2,i,y}} \qquad \lambda_{oil,y} = \frac{\sum_{i \in OIL,j} F_{i,j,y} * NCV_{i,y} * EF_{CO2,i,y}}{\sum_{i,j} F_{i,j,y} * NCV_{i,y} * EF_{CO2,i,y}} \qquad \lambda_{gas,y} = \frac{\sum_{i \in GAS,j} F_{i,j,y} * NCV_{i,y} * EF_{CO2,i,y}}{\sum_{i,j} F_{i,j,y} * NCV_{i,y} * EF_{CO2,i,y}}$$

$\lambda_{Coal,y}$ =97.66%，$\lambda_{Oil,y}$ =0.13%，$\lambda_{Gas,y}$ =2.21%

$$\mathbf{EF_{thermal} = \lambda_{coal} \times EF_{coal,Adv} + \lambda_{oil} \times EF_{oil,Adv} + \lambda_{gas} \times EF_{gas,Adv}}$$
$$\mathbf{= 0.7871\ tCO_2/MWh}$$

Additional capacity during the 2007～2009 on the CCPG

Table 10:Generation caocity of the CCPG installed in year 2009

Installed Capacity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total
Thermal	MW	11,500	43,100	15,670	15,900	6,800	12,270	105,240
Hydro	MW	3,770	3,650	30,010	11,460	4,530	25,810	79,230
Nuclear	MW	0	0	0	0	0	0	0
Other	MW	60	50	10	2	10	0	132
Total	MW	15,330	46,800	45,690	27,362	11,340	38,080	184,602

Table 11: Generation caocity of the CCPG installed in year 2008

Installed Capacity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total

Thermal	MW	9,340	42,680	14,210	14,430	6,660	12,770	100,090
Hydro	MW	3,710	3,020	29,050	10,650	4,060	22,240	72,730
Nuclear	MW	0	0	0	0	0	0	0
Other	MW	30	30	10	0	0	0	70
Total	MW	13,080	45,720	43,280	25,080	10,730	35,010	172,890

Table 12: Generation caocity of the CCPG installed in year 2007

Installed Capcity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqin g	Sichuan	Total
Thermal	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
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

Therefore, the Build Margin of Central China Power Grid is calculated as the table below：

Table 13: capacity addition of the CCPG during 2007~2009

	2007	2008	2009	2007-2009 Capacity Addition	2008-2009 Capacity Addition	Share in the capacity addition
	A	B	C	D	E	F
Thermal (MW)	92,580	100,090	105,240	20,280.4	10,467.5	53.25%

Hydro (MW)	61,650	72,730	79,230	17,726.9	6,500	46.54%
Nuclear (MW)	0	0		0	0	0.00%
Other (MW)	51	70	132	81	62	0.21%
Total (MW)	**154,281**	**172,890**	**184,602**	**38,088.3**	**17,029.5**	**100.00%**
Share in the capacity of 2009				20.63%	9.23%	

$EF_{BM,y}$=0.7871×53.25%=0.4191 tCO_2/MWh

Taking the default value of weights w_{OM} and w_{BM}, 50% respectively, the emission factor of Central China Power Grid is calculated as follows.

For more details of the basic data, please refer to http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2708.pdf on which all data are published by Chinese DNA.

	OM (tCO_2e/MWh)	**BM (tCO_2e/MWh)**	**EF (tCO_2e/MWh)**
Central China Power Grid	1.0297	0.4191	0.7244

Annex 4

MONITORING INFORMATION

Please refer to the section B.7 of this document for the monitoring information of the project.

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