CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM-SSC-PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

>>

Jiangxi Gongge 15MW Hydropower Project, China
Version number of the document: 01
Date: 2008-07-25

A.2. Description of the small-scale project activity:

>>

Jiangxi Gongge 15MW Hydropower Project (hereafter referred to as the Project) is located on Ganjiang River within Jian County, Jiangxi Province, People's Republic of China. The project is constructed and operated by Jian Gongge Hydropower Co., Ltd. The project is a reservoir power plant; it consists of river barrage, diversion tunnel and powerhouse. The reservoir is a daily regulating reservoir. The installed capacity is 15MW. The annual electricity generation is 58,212MWh, and the annual feed-in electricity to the grid is 55,301.4MWh. The electricity generated by the proposed project will be connected to Jiangxi Province Power Gird, finally to Central China Power Grid.

The purpose of the project is to utilize the hydrological resources to generate electricity which would be delivered to the Central China Power Grid. As Central China Power Grid is dominated by fossil fuel-fired power plants, the proposed project will achieve greenhouse gas (GHG) emission reductions by displacing part of the electricity generated by thermal power stations of Central China Power Grid. The annual emission reductions are 53,894 tCO_2e.

The project contributes to sustainable development to the local society and the host country, through following aspects:

- Reducing the fossil fuel consumption, promoting the use of renewable energy and the diversification of the energy structure in China compared to a business-as-usual scenario.
- Reducing the emission of other pollutants resulting from the power generation industry in China, compared to a business-as-usual scenario.
- Creating 33 local employment opportunities during the project operation period.
- Alleviating power shortage in the local areas, stimulating the local economy development.

A.3. Project participants:

>>

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
People's Republic of China (host)	Jian Gongge Hydropower Co., Ltd. (Project owner)	No
Japan	New Energy and Industrial Technology Development Organization	No

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

>>

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:

>>

Jian County

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity(ies):

>>

The proposed project is sited on Ganjiang River in Jian County Jiangxi Province. The project has geographical coordinates with east longitude of 114°32'56" and north latitude of 26°56'49". The dam is placed 400m away from Gongge Village of Aocheng Town Jian County, 40km away from Jian City. The powerhouse located at the river's right bank, about 5 km downstream of the dam site.

Figure 1 shows the location of Gongge Hydropower Project.

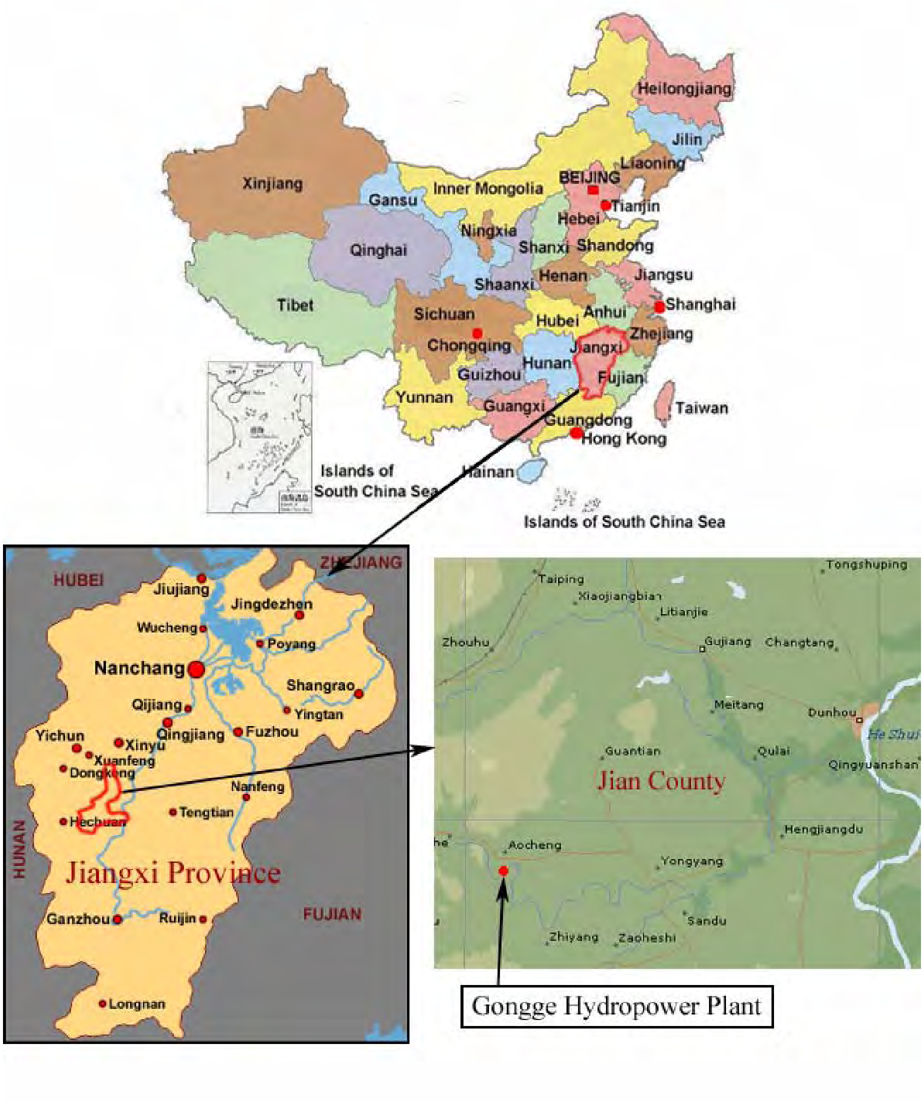

Figure 1 Location of the proposed project

A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

>>

According to Appendix B of the simplified procedures for small-scale activities, the type and category of the proposed project is as follow:

- Type I – Renewable Energy Project;
- Category I.D. – Grid Connected Renewable Electricity Generation.

The proposed project is a reservoir power plant hydropower plant. It consists of river barrage, diversion tunnel and powerhouse. The river barrage's length is 294.5m, overflow dam has a broken crest and its length is 122m, the retaining dam is a concrete gravity dam and the length is 172.5m. The length of the diversion tunnel is 1,233m with a trapeziform cross-section. The reservoir is a daily regulating reservoir. The powerhouse locates on river channel, the capacity is 15MW. Three domestic bulb tubular turbine generators will be installed. The type of three turbines is GZ995-WP-275, the type of the associated three generators is SFWG5000-32/3310, the project will build 7km of an 110kV transmission lines to transport the electricity to Jiangxi Power Grid, finally to Central China Power Gird.

Table1 Key technical indicators of the hydro turbine and the generator of the Project

Technical indicators		Value
Turbine	Quantity	3
	Turbine type	GZ995-WP-275
	Rated power	5,181 kW
	Rated flowing	56.18 m^3/s
	Rated water head	9.5 m
Generator	Quantity	3
	Turbine type	SFWG5000-32/3310
	Rated capacity	5,000 kW
	Rated voltage	6.3 kV
	Rated current	509 A
	Rated rotation speed	187.5 r/min

The main equipments used in the Project are produced domestically. No technology transferred from other countries is involved in this project activity. Hydro turbines and generators used in the Project are produced by Hangzhou Resource Power Equipment Co., Ltd. The manufacture is well-known in the Chinese hydropower equipment manufacture market, and the technology applied to the project is mature and environmental safe. The project developer is experienced in small hydropower development.

A.4.3. Estimated amount of emission reductions over the chosen crediting period:

>>

The renewable crediting period of 7*3 years is chosen. The first crediting period is from year 2008 to year 2015, the emission reductions are shown in table2. In the first crediting period, the total emission reductions are estimate to be 377,258 tCO_2e.

Table 2 Estimation of annual emission reductions in the first crediting period

Years	Estimation of annual emission reductions in tons of CO_2e
September ~ December, 2008	17,965
2009	53,894
2010	53,894
2011	53,894
2012	53,894
2013	53,894
2014	53,894
January ~ August, 2015	35,929
Total estimated reductions	377,258
Total number of crediting years	7
Annual average of the estimated reductions crediting period (tCO_2e)	53,894

A.4.4. Public funding of the small-scale project activity:

>>

No official development assistant from Annex I parties is involved in the proposed project.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

>>

The project participants confirm that the proposed project is not a debundled component of a larger project activity. There is no registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

- With the same project participants;
- In the same project category and technology/measure;
- Registered within the previous two years and
- Whose project boundary is within 1km of the project boundary of the proposed small-scale activity at the closest point.

SECTION B. Application of a baseline and monitoring methodology

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

>>

The methodology applied for the Project is the approved methodology for small-scale CDM project-“AMS.I.D. Grid connected renewable electricity generation” (version13), and “the tool to calculate the emission factor for an electricity system” (version 1). For more information regarding the methodologies, please refer to the link:
http://cdm.unfccc.int/methodologies/view?ref=AMS-I.D.

B.2 Justification of the choice of the project category:

>>

The methodology "AMS.I.D. Grid connected renewable electricity generation"(version13) is applicable to this small-scale CDM project activity because:

- The project activity is using hydropower, which is one of the several renewable energy projects that are eligible to use this methodology.
- The methodology applies to renewable energy generation units that supply electricity to an electricity grid, which is the case for Gongge hydropower plant.
- The capacity of the scheme is 15MW, which is within the limit of 15MW stipulated for the chosen (small-scale) methodology and this capacity will not change within the crediting period.

B.3. Description of the project boundary:

>>

Based on the methodology AMS.I.D., the project boundary encompasses the physical, geographical site of the project's river barrage, diversion tunnel, powerhouse and hydraulic turbine generators. The electricity displaced by the project should be the electricity generated by Jiangxi Power Gird, which belongs to Central China Power Grid. Therefore, the spatial scope of the project boundary covers the project site and all power plants connected physically into CCPG.

According to the guideline published on August.9, 2007 by China DNA, the geographical range of Central China Power Grid includes Henan Power Grid, Hubei Power Grid, Hunan Power Grid, Jiangxi Power Grid, Sichuan Power Grid and Chongqing Power Grid.

Table 3 The GHG source and type in project boundary

Source		Gas	Included?	Justification / Explanation
Baseline	Electricity supply of those fossil fuel-fired power plants connected into CCPG	CO_2	Yes	Main emission sources.
		CH_4	No	Excluded for simplification. This is conservative.
		N_2O	No	Excluded for simplification. This is conservative.
Project activity	Hydropower plant	CO_2	No	The project does not lead to CO_2 emission.
		CH_4	No	The project does not lead to CH_4 emission.
		N_2O	No	The project does not lead to N_2O emission.

B.4. Description of baseline and its development:

>>

According to the methodology AMS-I.D., the baseline emission is the electricity (kWh) produced by the renewable generating unit multiplied by an emission coefficient. The emission coefficient is calculated according to method 9(a) selected from the methodology AMS-I.D. (version 13) as: A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the tool to calculate the emission factor for an electricity system.

The baseline boundary of the proposed project is Central China Power Grid, so the boundary when calculating the baseline Operating Margin emission factor and the Build Margin emission factor are set with in Central China Power Grid. In all, the baseline emission is the product of electricity delivered by the project and the emission factor of CCPG. The calculation tables and parameters required are shown in Annex 3.

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 small-scale CDM project activity:

>>

Additionality of the proposed project is demonstrated based on the requirement of Attachment A to Appendix B to the Simplified Modalities and Procedures for small-scale CDM Project Activities. The additionality of the proposed project will be demonstrated from investment analysis.

According to “Economic evaluation code for small hydropower projects” (SL 16-95) issued by Ministry of Water Resources, the benchmark FIRR on total investment for hydro power project is 10%.

Based on the important parameters of the proposed project, the IRR change of the proposed project with CDM income and without CDM income is calculated. The main parameters are as follow.

Table 4 Main parameters for the calculation of financial indicators

Item	Unit	Value
Install capacity	MW	15
Annual grid-connected electricity generation	GWh	55.3
Electricity Tariff(including VAT)	Yuan/KWh	0.35
The total static investment	Million Yuan	118.5
Value Added Tax (VAT)		6%
Income tax		33%
Sales additional tax		4%
Annual O&M cost	Million Yuan	4.3
CERs crediting time	year	7*3
Expected CERs Price	USD/tCO_2e	11
Depreciation Rate		4%
Depreciable Life	years	25

According to these parameters, the FIRR of the proposed project without the income from CERs sale is 7.79%, lower than the benchmark FIRR set in SL 16-95, so the proposed project is financially unacceptable. With the income from CERs, the FIRR is increased to 11.74%, financially acceptable.

The objective of sensitivity analysis is to show whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions. The sensitive analysis is done in the following. Assuming the three factors such as total investment, annual operation and maintenance, and annual electricity generation cost vary in range of -10% ~ +10%, whether the proposed project is all the same unattractive without CDM. The influence of the three factors on FIRR of the project (without CDM) is shown as follows.

Table 5 Sensitivity analysis data

	-10%	-5%	0%	+5%	+10%
Total investment	9.09%	8.42%	7.79%	7.21%	6.68%
Annual O&M cost	8.23%	8.01%	7.79%	7.57%	7.35%
Annual electricity generation	6.51%	7.16%	7.79%	8.41%	9.01%

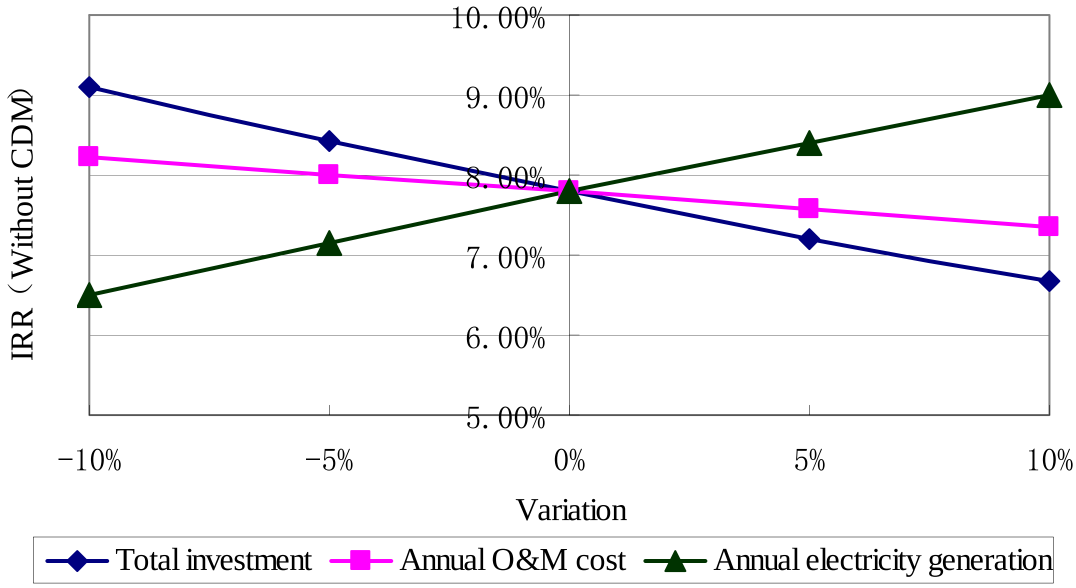

Figure 2 IRR curve of sensitivity analysis

The sensitivity analysis shows that even the fluctuation range of those factors in range of -10% ~ +10%, the IRR of the total investment of the proposed project could not reach the benchmark and the conclusion regarding that the proposed project is financially unattractive is still tenable.

To sum up, the proposed project has obvious investment barrier and was constructed for the project owner considered the income from CERs sale, so the proposed project fulfils the requirement of additionality.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

Baseline

The approved methodology AMS.I.D. is applicable to the project. According to the tool to calculate the emission factor for an electricity system, the emission coefficient of the proposed project is calculated as: A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM).

According to the tool to calculate the emission factor for an electricity system, baseline emission factors of operating margin ($EF_{grid,OM,y}$) and build margin ($EF_{grid,BM,y}$) were determined ex-ante based on the data of Central China Power Grid. The baseline emission factor ($EF_{grid,CM,y}$) is calculated as a combined margin (CM) of $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$.

The calculating of baseline emission factors are shown as following six steps:

Step1. Identify the relevant electric power system.

The electricity generated by the project will be delivered to the Jiangxi Power Grid, and finally to Central China Power Grid. The Central China Power Grid is composed of Henan Power Grid, Hubei Power Grid, Hunan Power Grid, Jiangxi Power Grid, Sichuan Power Grid and Chongqing Power Grid.

Step2. Select an operating margin (OM) method

According to the tool to calculate the emission factor for an electricity system, four alternatives could be used to calculate the OM:

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

According to the China Electric Power Yearbook 2002~ 2006, the proportions of low-cost/must run resources in the total electricity output in Central China Power Grid are shown in the following table.

Table 6 The proportions of low-cost/must run resources in the total electricity output in CCPG

Years	The proportions of low-cost/must run resources in the total electricity output in CCPG
2000	36.76%
2001	35.95%
2002	34.43%
2003	38.37%
2004	38.56%

According to the tool to calculate the emission factor for an electricity system, the method (a) is applicable to the project if the low-cost/must run resources constitute less than 50% of total grid generation in average of the five most recent years. The Simple OM method is chosen to calculate the $EF_{grid,OM,y}$ of the proposed project, and the simple OM emission factor is calculated using data vintage of:

Ex ante option: A 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period.

Step3. Calculate the operating margin emission factor according to the selected methods

According to the tool to calculate the emission factor for an electricity system, 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. It may be calculated:

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

The Option C is used, and the simple OM emission factor is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including low-cost / must-run power plants / units, and based on the fuel types and total fuel consumption of the project electricity system, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_y} \qquad (1)$$

Where:

$EF_{grid, OMsimole,y}$ = Simple operating margin CO_2 emission factor in year y (tCO_2/MWh)
$FC_{i,y}$ = Amount of fossil fule type i consumed in the project electricity system in year y (mass or volume unit)
$NCV_{i,y}$ = Net calorific value (energy content) of fossil fuel type *i* (GJ / mass or volume unit)
$EF_{CO2,i,y}$ =CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2/GJ)
EG_y = Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost / must-run power plants /units, in year *y* (MWh)
i = All fossil fuel types combusted in power sources in the project electricity system in year *y*
y = 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).

Step4. Identify the cohort of power units to be included in the build margin.

According to the tool to calculate the emission factor for an electricity system, 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.

Project participants should use the set of power units that comprises the larger annual generation. The option (b) is chosen.

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 build 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.

The result of BM emission factor in this project is base on the option 1: ex-ante calculation and the monitoring for the emission factor are not needed.

Step5. Calculate the build margin emission factor

According to the tool to calculate the emission factor for an electricity system, the build margin emission factor ($EF_{grid,BM,y}$) is calculated as 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:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad (2)$$

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, consist of the set of power capacity additions in the electricity system that comprise 20% of the system generation and that have been build most recently

y = Most recent historical year for which power generation data is available

Because some data can't be available, the BM calculation in this PDD adopts the modifications methods agreed by the CDM EB. First, calculate the newly added installed capacity and the various component technologies, then calculation of the weight of newly added installed capacity of each power generation technology. Finally the commercial and efficient level of each power generation technology is adopted to calculate BM emission factor.

Because the generating capacity of the coal-fired, oil-fired and gas-fired technology can not be separated from the existing statistical data, the BM calculation in this PDD adopts the following method: First, use the available data in the energy balance tables on the most recent year, then calculate the proportion of CO_2 emission from solid, liquid and gaseous fuels corresponding to the total emissions of CO_2 emissions; Second, the proportion used as the weight, based on the emission factors of the optimal efficient and commercial technologies, calculate the emission factor of the thermal power in each grid; Finally, this thermal emission factor is multiplied by the proportion of thermal power added capacity in the additional 20% capacity. The result is BM emission factor.

Concrete steps and the formula for BM are as follows:

The first step is calculation of proportion of CO_2 emissions from solid, liquid and gaseous fuels corresponding to the total emissions of CO_2 emissions.

$$\lambda_{Coal} = \frac{\sum_{i \in COAL, j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{\sum FC_{i,j,y} \times NVC_{i,y} \times EF_{CO2,i,y}} \quad (3)$$

$$\lambda_{Oil} = \frac{\sum_{i \in Oil, j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{\sum FC_{i,j,y} \times NVC_{i,y} \times EF_{CO2,i,y}} \quad (4)$$

$$\lambda_{Gas} = \frac{\sum_{i \in Gas, j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{\sum FC_{i,j,y} \times NVC_{i,y} \times EF_{CO2,i,y}} \quad (5)$$

Where:

$FC_{i,j,y}$ = The amount of fuel *i* (in a mass or volume unit) consumed by plant *j* in year *y*,

$NCV_{i,y}$ = Net calorific value (energy content) of fossil fuel type *i* (GJ / mass or volume unit) in year *y*.

$EF_{CO2,i,y}$ = CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2/GJ)

Coal, Oil and Gas is the feet for solid fuels, liquid fuels and gas fuels.

The second step is calculation the emission factor of thermal power.

$$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv} \quad (7)$$

$EF_{Coal,Adv}$, $EF_{Oil,adv}$ and $EF_{Gas,Adv}$ represent the emission factors of the optimal efficient and commercial coal-fired, oil-fuelled and fuelled technologies.

The third step is calculation of BM in the grid.

$$EF_{grid,BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal} \quad (7)$$

CAP_{Total} is the total added installed capacity;

$CAP_{Thermal}$ Is the total added installed capacity for thermal power.

Step6. Calculate the combined margin emissions factor

The baseline emission factor is the weighted average of the operating margin ($EF_{grid, OM,y}$) and build margin ($EF_{grid, BM,y}$):

$$EF_{grid,CM,y} = w_{OM} \cdot EF_{grid,OM,y} + w_{BM} \cdot EF_{grid,BM,y} \quad (8)$$

According to the tool to calculate the emission factor for an electricity system, the weight w_{OM} and w_{BM} are by default, are 50%. $EF_{gridmOM,y}$ and $EF_{grid,BM,y}$ are calculated in step 3 and step 5, the unit is tCO_2/MWh.

Emission Reductions

The baseline emission (BE_y) are calculated with baseline emission factor ($EF_{grid,CM,y}$) and net electricity supplied by the project to the grid (EG_y), as follow:

$$BE_y = EG_y \times EF_{grid,CM,y} \quad (9)$$

EG_y is the net electricity supplied by the project to the grid, calculated as:

$$EG_y = EG_{project,grid} - EG_{grid,project} \quad (10)$$

Where:
$EG_{project,grid}$ is the electricity supplied by the project to the grid;
$EG_{grid,project}$ is the electricity supplied by the grid to the project;

The emission reductions by the project activity are calculated as follows:

$$ER_y = BE_y - PE_y - L_y \quad (11)$$

Where:
PE_y is the project activity emission in year y, according to the methodology, $PE_y = 0$.
L_y is the leakage of the project activity. According to the methodology, no leakage needs to be considered in the project. $L_y = 0$.

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

>>

Data / Parameter:	**Power generation**
Data unit:	MWh
Description:	The total power generation and power generated by low-cost/must run power plants within CCPG in year 2001, 2002, 2003, 2004 and 2005.
Source of data used:	China Electric Power Yearbook 2002, 2003, 2004, 2005 and 2006.
Value applied:	Detailed in China Electric Power Yearbook 2002, 2003, 2004, 2005 and 2006.
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official released statistic; publicly accessible and reliable data source.
Any comment:	/

Data / Parameter:	EG_y
Data unit:	MWh
Description:	The power generation supplied to CCPG in year 2003, 2004 and 2005, excluding those generated by low-cost/must run power plants.
Source of data used:	China Electric Power Yearbook 2004, 2005 and 2006.
Value applied:	Detailed in Annex 3.
Justification of the choice of data or	Official released statistic; publicly accessible and reliable data source.

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

Data / Parameter:	**Installed Capacity**
Data unit:	MW
Description:	The installed capacity of different power sources within CCPG in year 2003, 2004 and 2005.
Source of data used:	China Electric Power Yearbook 2004, 2005 and 2006.
Value applied:	Detailed in Annex 3.
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official released statistic; publicly accessible and reliable data source.
Any comment:	/

Data / Parameter:	$FC_{i,j,y}$
Data unit:	10^4t or 10^8m^3
Description:	Different fossil fuel consumptions for power generation within CCPG in year 2003, 2004 and 2005.
Source of data used:	China Energy Statistical Yearbook 2004, 2005 and 2006.
Value applied:	Detailed in Annex 3.
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official released statistic; publicly accessible and reliable data source.
Any comment:	/

Data / Parameter:	NCV_i
Data unit:	MJ/t or MJ/10^3m^3
Description:	Average low calorific values of different fuels for electricity generation.
Source of data used:	China Energy Statistical Yearbook 2006.
Value applied:	Detailed in Annex 3.
Justification of the choice of data or description of measurement methods and procedures actually applied :	China-specific values are adopted.
Any comment:	/

Data / Parameter:	EF_{CO2}
Data unit:	tC/TJ
Description:	Emission factors of fuels for electricity generation.

Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories.
Value applied:	Detailed in Annex 3.
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC world-wide default values are adopted.
Any comment:	/

Data / Parameter:	**Best efficiency level of thermal power**
Data unit:	/
Description:	The efficiency level of the best coal-based, oil-based and gas-based power generation technology commercially available in China.
Source of data used:	"Notification on Determining Baseline Emission Factors of China Power Grid", issued by China's DNA on Aug 17th, 2007.
Value applied:	Detailed in Annex 3.
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the deviation accepted by EB, the efficiency level of the best technology commercially available in the national grid of China is used as a conservative value for the calculation of BM emission factor.
Any comment:	/

B.6.3 Ex-ante calculation of emission reductions:

>>

The Office of National Coordination Committee on Climate Change, which is China's DNA, issued "Notification on Determining Baseline Emission Factors of China Power Grid" on Aug. 17th, 2007.

For more information please refer to the link:

http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=2193

According to the notification, the results of baseline combined margin emission factor of Central China Power Grid are as follows:

- $EF_{grid,OM,y}$: 1.2899tCO_2e/MWh;
- $EF_{grid,BM,y}$: 0.6592tCO_2e/MWh;
- $EF_{grid,CM,y}$: 0.97455tCO_2e/MWh.

According to the feasibility study report of the project, the electricity output of project is estimated as 55,301.4 MWh per year, the electricity input of project is estimated as 0 MWh per year, therefore the annul baseline emissions of the project is estimated as:

$$BE_y = \left(EG_{project,grid} - EG_{grid,project}\right) \times EF_{grid,CM,y} = 53{,}894tCO_2e$$

Because both the project emissions and leakage emissions are zero, the annual emission reductions by the project are:

$$ER_y = BE_y - PE_y - L_y = 53{,}894 tCO_2 e$$

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

>>

The proposed project adopts the renewable crediting period of 7*3years. Emission reductions in the first crediting period are estimated as the following table.

Table 7 Estimation of annual emission reductions in the first crediting period

Year	Estimation of project activity emissions (tCO_2e)	Estimation of baseline emissions (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of overall emission reductions (tCO_2e)
2008.9~12	0	17,965	0	17,965
2009	0	53,894	0	53,894
2010	0	53,894	0	53,894
2011	0	53,894	0	53,894
2012	0	53,894	0	53,894
2013	0	53,894	0	53,894
2014	0	53,894	0	53,894
2015.1~8	0	35,929	0	35,929
Total (tCO_2e)	0	377,258	0	377,258

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

B.7.1 Data and parameters monitored:

>>

Data / Parameter:	$EG_{project, grid}$
Data unit:	MWh
Description:	Electricity supplied to the grid by the project.
Source of data to be used:	The ammeter data.
Value of data applied for the purpose of calculating expected emission reductions in section B.6	55,301.4
Description of measurement methods and procedures to be applied:	Measured continuously and recorded monthly.
QA/QC procedures to be applied:	According to national standards, meters will be calibrated every six months. Data measured by meters will be cross checked by electricity sales receipt. The meters will be jointly read frequently by the project developer and the grid company.
Any comment:	/

Data / Parameter:	$EG_{grid, project}$

Data unit:	MWh
Description:	Electricity purchased from the grid by the project.
Source of data to be used:	The ammeter data.
Value of data applied for the purpose of calculating expected emission reductions in section B.6	0
Description of measurement methods and procedures to be applied:	Measured continuously and recorded monthly.
QA/QC procedures to be applied:	According to national standards, meters will be calibrated every six months. Data measured by meters will be cross checked by electricity purchase receipt. The meters will be jointly read frequently by the project developer and the grid company.
Any comment:	/

B.7.2 Description of the monitoring plan:

>>

The purpose of the monitoring plan is to ensure that project activities during the period included the monitoring and emission reductions of integrity, consistent, clear, accurate, and is mainly responsible for the project owners, the power company to tie in with the implementation.

The Monitoring Plan for this project has been developed to ensure that during the crediting period, monitoring and calculating of the project's emission reductions will be complete, consistent, clear and exact. The project owner, Jian Gongge Hydropower Co., Ltd., will take the responsibility of the Monitoring Plan implementation, with cooperation from the Grid Company.

1. The monitored data

As the emission factors in this project are base on the ex-ante calculation, the monitoring for the emission factors are not needed. The monitored data is electricity supplied by the project to the grid and the electricity supplied by the grid to the project.

2. Monitoring organization

The project owner will appoint a Chief Monitoring Officer, who will be responsible for the supervision and confirmation the process of measuring and recording, and data collection (such as meter reading, electricity sales receipt), calculation of emission reductions, and writing monitoring report.

The Chief Monitoring Officer will receive technical support from Beijing Pacific Investment Consulting Center.

The monitoring structure of the project is shown in Figure 3.

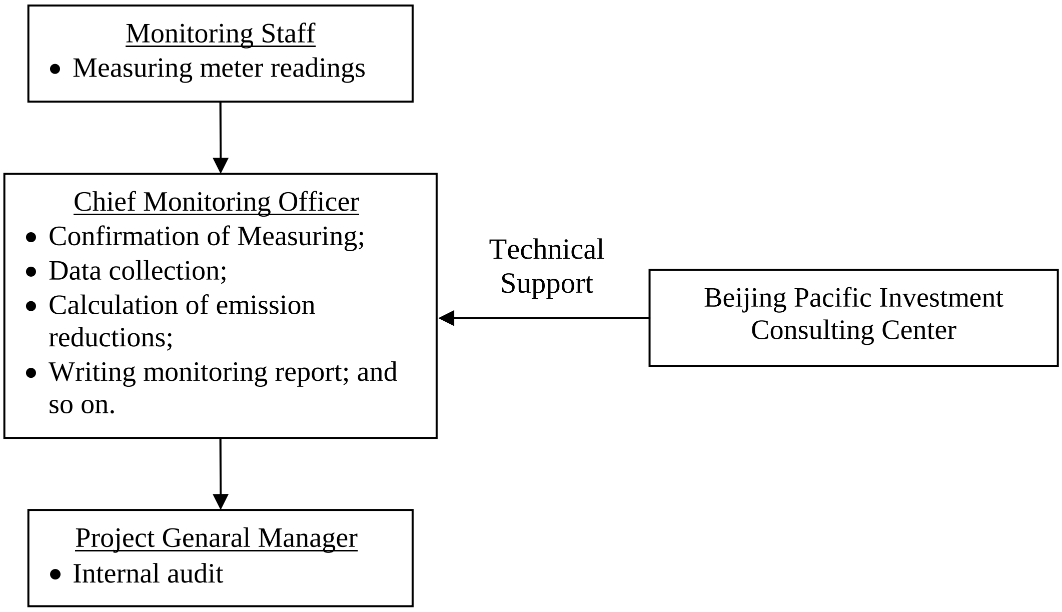

Figure 3 The monitoring structure of the project

3. Monitoring equipment and installation

The metering equipment should be equipped according to the requirements of the “Tech Administrative Code of Electric Energy Metering” (DL/T448-2000). The metering equipment will be examined according to the requirements of the “Tech Administrative Code of Electric Energy Metering” (DL/T448-2000) before operation by the project owner and the Grid Company.

Two two-way electricity meters with accuracy of 0.2 will be installed. The first electricity meter (Revenue Meter) will be installed at the Grid Company's substation. This electricity meter will be the revenue meter that measures the quantity of electricity supplied to the grid by the project as well as the electricity purchased from the grid company. The second electricity meter (Cross-Check Meter) will be located on the project site, allowing for potential losses, it will provide a useful cross check of the revenue meter.

4. Data collection

The project owner will be responsible for the operation and monitoring of the Cross-Check Meter, the Grid Company will be responsible for the operation and monitoring of the Revenue Meter, and ensure that all meters are undamaged, sealed up.

When the error of the Revenue Meter is within the allowable range, the Revenue Meter will be able to provide electricity sales receipt and verification of emission reductions. In this situation, the steps of monitoring net electricity supplied to the Grid are shown as follows:

i. At 0:00 of last day of each month, the project owner and the Grid Company will take their respective meters' reading and record these figures, and cross check with the figures;
ii. The Grid Company provides the project owner with the actual amount of electricity that the project supplied to the grid and the actual amount of electricity that the grid supplied to the project;
iii. The project owner provides the Grid Company with sales receipt, and keeps copy of the sales receipt;
iv. The Grid Company provides the project owner with sales receipt of the electricity supplied to the project, the project owner keeps the sales receipt;
v. The project owner records the net electricity supplied by the project to grid;
vi. The project owner provides the DOE with the record of the Revenue Meter's reading, the record of the Cross-Check Meter's reading, copy of sales receipt of the electricity supplied to the grid, and sales receipt of the electricity supplied to the project.

When the error of the Revenue Meter exceed the allowable range, or can't work normally, the net electricity supplied to the Grid should be calculated as follows:

i. The data from Cross-Check Meter will be used, with a minor adjustment to allow for historical potential loss rate, unless the Cross-Check Meter exceed the allowable range;
ii. In the event of the Cross-Check Meter failing, the project owner and the Grid Company should design a reasonable, appropriate and conservative monitoring method together, and provide sufficient evidence to demonstrate that the method is reasonable during DOE's verification.
iii. If the project owner and Grid Company can't achieve a consensus method, should arbitrate according to the process of agreement.

The project owner will fully cooperate with the DOE thought providing the DOE with all record of meter's reading, calibration and maintenance.

5. Calibration

In order to ensure the measurement accuracy of the meters, periodic checks should be conducted every six mouths. After check, the meters should be sealed by the project owner and the Grid Company, each party should not unseal or change the meters when the other one is absent.

Within 10 days after the following circumstances, all the meters installed should be tested by an accredited monitoring inspection organisation jointly appointed by the project owner and the Grid Company:

i. The error of the Revenue or the Cross-Check meter exceeds the allowable range specified in the national standard.
ii. The meter is repaired or replaced due to the faults of the meter parts.

6. Data and records management

At the end of each month, the monitoring data needs to be filed electronically. The electronic files need to have CD back-up and print-out. All written documentation such as maps, drawings, the EIA and etc. should be available to the verifier so that the reliability of the information may be checked. In order to make it easy for the verifier to retrieve the documentation and information in relation to the project emission reduction verification, the project owner should provide a document register.

All the data shall be kept until two years after the end of credit period, or the last issuance of CERs for this project activity, whichever occurs later.

7. Monitoring report

The project owner will keep the sales receipts, and compile a monitoring report for DOE's verification at the end of a year. The monitoring report includes the Monitoring and review report of the net electricity supplied by the project to the grid, the calculation of emission reduction, record of calibration and maintenance, and etc.

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

>>

Data of completion of baseline study and monitoring methodology: (DD/MM/YYYY)

20/02/2008

Name of person of determining baseline:

Mr. GUO Wei
Unit: Beijing Pacific Investment Consulting Center
Address: 1206 Central Tower, Junefield Plaza, Xuanwu, Beijing 100052, China
Tel: +86-10-63108335
Fax: +86-10-63108335
Beijing Pacific Investment Consulting Center is not one of the project participants.

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:

>>

01/04/2004.

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

>>

50years.

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:

>>

01/09/2008 or the date of the project is registered as CDM project, whichever occurs later

C.2.1.2. Length of the first crediting period:

>>

7y-0m.

C.2.2. Fixed crediting period:

>>

Not chosen

C.2.2.1. Starting date:

>>

C.2.2.2. Length:

>>

SECTION D. Environmental impacts

>>

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

>>

According to the Environmental Protection Law of the People's Republic of China, an environmental impact assessment (EIA) had been implemented by the project owner. The EIA report has been approved by Jiangxi Environmental Protection Bureau on the 21st Nov. 2007 (Document No.: GanHuanDu [2007] 356). According to the EIA, environmental impacts caused by the project are analyzed as follows:

Submerged land

The project submerged 104.3 Ha of farmland. 458 people were relocated due to the project. The project helped these people to resettle in two newly-built villages on the local area. The project has little effect on the production and the standard of living of the original residents and the settlers. With completion of the reservoir, irrigation conditions of the reservoir region are improved, and the productivity of farmland nearby are increased.

Water environment

During the construction phase, the main sources of water pollution included household wastewater and wastewater from production. After control measures were taken, so as to meet the first-level of GB8978-1996 "Integrated wastewater discharge Standard", the water quality of the receiving water body was less affected. And with the end of construction, pollution sources disappeared.

Reservoir nutrient loading was low; there will be no eutrophication after the reservoir was build.

Ecological environment

For the reservoir pool level is low, there are some regulatory role to the microclimate near the reservoir, but the overall climate in the region will not have a significant impact.

The construction of the project did some damage to vegetation, but most of the damaged vegetation was recovered with the implementation of water and soil conservation program.

There are no rare or endangered wild animal spreads in the reservoir basin.

Air pollution

There are few habitants near the project. The nearest residential area locates in the windward of the Gongge dam, and the distance is far. It had little impact on local people. In order to avoid the workers' healthy was harmed by the air pollution caused by construction, the project owner provided labour protection to the workers.

Noise by the construction

The project's dam, diversion tunnel and powerhouse are far from residential area, so the noise by the construction can be ignored. In order to reduce the noise's harm to the workers' healthy, the project owner provided labour protection to the workers.

Solid wastes

During the construction phase, the solid wastes mainly consisted of the construction's waste slag and builder's garbage. The construction's waste slag had been stacked in 5 dumping sites, and builder's garbage had been disposed, and no pollution was caused.

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 construction and operation of the proposed project have no significant environmental impacts. The EIA report of the proposed project is being checked by the Jiangxi Environmental Protection Bureau on the 21st Nov. 2007 (Document No.: GanHuanDu [2007] 356).

SECTION E. Stakeholders' comments

>>

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

>>

In order to learn the view and suggestion about the project, the project owner conducted survey to local habitants. Totally 60 questionnaires returned out of 60 with 100% response rate. Of the 60 respondents, male accounted for 91.7%, female accounted for 8.3%; peoples older than 40 years accounted for 71.7%, younger than 40 years accounted for 28.3%; the cadres accounting for 11.7%, the peasants take up 88.3%; 31.7% people have at least a senior high school education, 68.3% people are with junior high school education or below; transmigrants take up 33%.

The questions in the questionnaire are shown as follows:

1. Whether agree with the construction of the project or not?
2. Will the project boost local economy?
3. Will the project improve the local environment?
4. Whether know the compensation of land expropriation or not?
5. Whether satisfy with the resettle scheme or not?
6. Whether satisfy with the compensation of land expropriation?
7. What's the main influence of the proposed project on environment?
8. Whether support the project owner to take measures to reduce the influence on environment caused by the project?

E.2. Summary of the comments received:

>>

The following is a summary of the key findings based on 60 returned questionnaires.

(1) All (100%) of the respondents supported the construction of Gongge Hydropower plant, considered the project is helpful to stimulate the local economy development.

(2) The respondents know about the compensation of land expropriation and resettle scheme well (81.7%) or partially (18.3%).
(3) All (100%) transmigrants were satisfied to the resettlement and living conditions after resettlement.
(4) Most (85%) of the respondents considered the most important environment impact of the construction of the project is the occupation of cultivated land, secondly (12.5%) is water supply quantity of the reach those runoff is reduced, some (2.5%) of the respondents thought it's the impact to vegetation.

The result of the public survey shows that the construction of the project was supported by the public in the affected region; they considered that the project's location was reasonable, and the project would boost the local economy, and bring about social and environmental benefits.

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

>>

The public survey shows that, the local residents are all supportive of the project. Taking into account the comments from the questionnaires, the project owner took the following measures:

(1) According to the design of the EIA, the project will keep enough runoff to satisfy the ecological demand.
(2) The project owner has taken measures to recover the vegetation that damaged during construction period.
(3) The project owner helped the villagers to maintenance or build irrigation facilities, drinking water facilities, village roads and other water conservancy facilities, by offering funds, machinery and building materials.
(4) The project owner implemented the compensation of land expropriation and resettle scheme that improved the living environment of the transmigrants.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

The Project Owner

Organization:	Jian Gongge Hydropower Co., Ltd.
Street/P.O.Box:	Gongge village, Aocheng town, Jian County
Building:	-
City:	Jian City
State/Region:	Jiangxi Province
Postfix/ZIP:	343100
Country:	People’s Republic of China
Telephone:	+86-796-8732098
FAX:	+86-796-8732205
E-Mail:	jaggdz@21cn.com
URL:	-
Represented by:	Xiong Ni
Title:	General Manager Assistant and Office Director
Salutation:	Mrs.
Last Name:	Xiong
Middle Name:	-
First Name:	Ni
Department:	General Office
Mobile:	+86-13970455613
Direct FAX:	+86-796-8732205
Direct tel:	+86-796-8732098
Personal E-Mail:	Xiongmama_216@hotmail.com

The Buyer

Organization:	New Energy and Industrial Technology Development Organization (NEDO)
Street/P.O.Box:	1310 Omiya-cho, Saiwai-ku
Building:	Muza Kawasaki Central Tower, 18F
City:	Kawasaki City
State/Region:	Kanagawa
Postfix/ZIP:	212-8554
Country:	Japan
Telephone:	-
FAX:	-
E-Mail:	-
URL:	http://www.nedo.go.jp/
Represented by:	-
Title:	Director General
Salutation:	Mr.
Last Name:	Naruse
Middle Name:	-
First Name:	Shigeo
Department:	Kyoto Mechanisms Promotion Department
Mobile:	-
Direct FAX:	+81-44-520-5196
Direct tel:	+81-44-520-5185
Personal E-Mail:	narusesgo@nedo.go.jp

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding from Annex I Parties for the Project.

Annex 3

BASELINE INFORMATION

The baseline information for calculations of OM, BM and CM emission factors of Central China Power Grid is shown in the Report on Determination of Baseline Grid Emission Factor by China DNA at http://cdm.ccchina.gov.cn.

The concrete processes are shown in the following tables.

Table A1 Thermal power generation of Central China Power Grid in 2003

Province	Thermal power generation （MWh）	Rate of electricity self-consumption （%）	Thermal power generation connected to the grid （MWh）
Jiangxi	27,165,000	6.43	25,418,291
Henan	95,518,000	7.68	88,182,218
Hubei	39,532,000	3.81	38,025,831
Hunan	29,501,000	4.58	28,149,854
Chongqing	16,341,000	8.97	14,875,212
Sichuan	32,782,000	4.41	31,336,314
Total	—	—	**225,987,719**

Data Source: China Electric Power Yearbook 2004.

Table A2 Thermal power generation of Central China Power Grid in 2004

Province	Thermal power generation （MWh）	Rate of electricity self-consumption （%）	Thermal power generation connected to the grid （MWh）
Jiangxi	30,127,000	7.04	28,006,059
Henan	109,352,000	8.19	100,396,071
Hubei	43,034,000	6.58	40,202,363
Hunan	37,186,000	7.47	34,408,206
Chongqing	16,520,000	11.06	14,692,888
Sichuan	34,627,000	9.41	31,368,599
Total	—	—	**249,074,186**

Data Source: China Electric Power Yearbook 2005.

Table A3 Thermal power generation of Central China Power Grid in 2005

Province	Thermal power generation （MWh）	Rate of electricity self-consumption （%）	Thermal power generation connected to the grid （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	5.00	37,905,000
Chongqing	17,584,000	8.05	16,168,488
Sichuan	37,202,000	4.27	35,613,475
Total	—	—	**286,203,305**

Data Source: China Electric Power Yearbook 2006.

Table A4 Data of fuel consumed for electricity generation.

	Emission factor （tc/TJ）	Low calorific value （MJ/t,km^3）
Raw coal	25.8	20,908
Clean coal	25.8	26,344
Other washed coal	25.8	8,363
Coke	25.8	28,435
Coke oven gas	12.1	16,726
Other gas	12.1	5,227
Crude oil	20.0	41,816
Gasoline	18.9	43,070
Diesel	20.2	42,652
Fuel oil	21.1	41,816
LPG	17.2	50,179
Refinery gas	18.2	46055
Natural gas	15.3	38,931
Other petroleum products	20.0	38,369
Other Coke products	25.8	28,435
Other energy	0.0	0

Data sources: Low calorific values from China Energy Statistical Yearbook 2006. Emission factors from 2006 IPCC Guidelines for National Greenhouse Gas Inventories

Table A5 Emission and Power Supply Data of CCPG in 2003

Fuels	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total Fuel	Emission factor	NCV	Emission（tCO_2e）
		A	B	C	D	E	F	G=A+B+C +D+E+F	（tc/TJ） H	（MJ/t,km3） I	K=G*H*I* 44/12/100 (Solid or oil fuel) K=G*H*I* 44/12/10 (Gas fuels)
Raw coal	10^4t	1,427.41	5,504.94	2,072.44	1,646.47	769.47	2,430.93	13,851.66	25.8	20,908	273,971,539.89.10
Clean coal	10^4t							0.00	25.8	26,344	0.00
Other washed coal	10^4t	2.03	39.63			106.12		147.78	25.8	8,363	1,169,146.40
Coke	10^4t				1.22			1.22	25.8	28,435	32,817.40
Coke oven gas	10^8m^3			0.93				0.93	12.1	16,726	69,013.15
Other coal gas	10^8m^3							0.00	12.1	5,227	0.00
Crude oil	10^4t		0.50	0.24			1.20	1.94	20.0	41,816	59,490.23
Diesel	10^4t	0.52	2.54	0.69	1.21	0.77		5.73	20.2	42,652	181,015.94
Fuel oil	10^4t	0.42	0.25	2.17	0.54	0.28	1.20	4.86	21.1	41,816	157,229.00
LPG	10^4t							0.00	17.2	50,179	0.00
Refinery gas	10^4t	1.76	6.53		0.66			8.95	18.2	46,055	275,069.63
Natural gas	10^8m^3					0.04	2.20	2.24	15.3	38,931	489,222.52
Other petroleum products	10^4t							0.00	20.0	38,369	0.00
Other coke products	10^4t							0.00	25.8	28,435	0.00
Other energy	10^4tce		11.04			16.20		27.24	0.0	0	0.00
										Total	276,404,544.15
Total emission (tCO_2 e)						**276,404,544.15**					
Total fossil power supply (MWh)						**225,987,719.2**					

Data sources: China Energy Statistical Yearbook 2004.

Table A6 Emission and Power Supply Data of CCPG in 2004

Fuels	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total Fuel	Emission factor	NCV	Emission（tCO_2e）
		A	B	C	D	E	F	G=A+B+C +D+E+F	（tc/TJ） H	（MJ/t,km3） I	K=G*H*I*44/12/100 (Solid or oil fuel) K=G*H*I*44/12/10 (Gas fuels)
Raw coal	10^4t	1,863.8	6,948.5	2,510.50	2,197.90	875.50	2,747.90	1,7144.10	25.8	20,908	339,092,605.29
Clean coal	10^4t		2.34					2.34	25.8	26,344	58,316.13
Other washed coal	10^4t	48.93	104.22			89.72		242.87	25.8	8,363	1,921,441.23
Coke	10^4t		109.61					109.61	25.8	28,435	2,948,455.29
Coke oven gas	10^8m^3			1.68		0.34		2.02	12.1	16,726	149,899.53
Other coal gas	10^8m^3					2.61		2.61	12.1	5,227	60,527.09
Crude oil	10^4t		0.86	0.22				1.08	20.0	41,816	33,118.27
Gasoline	10^4t		0.06			0.01		0.07	18.9	43,070	2,089.33
Diesel	10^4t	0.02	3.86	1.70	1.72	1.14		8.44	20.2	42,652	266,627.32
Fuel oil	10^4t	1.09	0.19	9.55	1.38	0.48	1.68	14.37	21.1	41,816	464,893.14
LPG	10^4t							0.00	17.2	50,179	0.00
Refinery gas	10^4t	3.52	2.27					5.79	18.2	46,055	177,950.07
Natural gas	10^8m^3						2.27	2.27	15.3	38,931	495,577.61
Other petroleum products	10^4t							0.00	20.0	38,369	0.00
Other coke products	10^4t							0.00	25.8	28,435	0.00
Other energy	10^4tce		16.92		15.20	20.95		53.07	0.0	0	0.00
										Total	345,671,697.30
Total emission (tCO_2e)						345,671,697.30					
Total fossil power supply (MWh)						249,074,186.3					

Data sources: China Energy Statistical Yearbook 2005.

Table A7 Emission and Power Supply Data of CCPG in 2005

Fuels	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total Fuel	Emission factor	NCV	Emission（tCO_2e）
		A	B	C	D	E	F	G=A+B+C +D+E+F	（tc/TJ）	（MJ/t,km3）	K=G*H*I*44/12/100 (Solid or oil fuel)
									H	I	K=G*H*I*44/12/10 (Gas fuels)
Raw coal	10^4t	1,869.29	7,638.87	2,732.15	1,712.27	875.40	2999.77	17827.75	25.8	20,908	352,614,496.76
Clean coal	10^4t	0.02						0.02	25.8	26,344	498.43
Other washed coal	10^4t		138.12			89.99		228.11	25.8	8,363	1,804,669.00
Coke	10^4t		25.95		105.00			130.95	25.8	28,435	3,522,490.83
Coke oven gas	10^8m^3			1.15		0.36		1.51	12.1	16,726	112,053.61
Other coal gas	10^8m^3		10.20			3.12		13.32	12.1	5,227	308,896.88
Crude oil	10^4t		0.82	0.36				1.18	20.0	41,816	36,184.78
Gasoline	10^4t		0.02			0.02		0.04	18.9	43,070	1,193.90
Diesel	10^4t	1.30	3.03	2.39	1.39	1.38		9.49	20.2	42,652	299,797.78
Fuel oil	10^4t	0.64	0.29	3.15	1.68	0.89	2.22	8.87	21.1	41,816	286,959.09
LPG	10^4t							0.00	17.2	50,179	0.00
Refinery gas	10^4t	0.71	3.41	1.76	0.78			6.66	18.2	46,055	204,688.68
Natural gas	10^8m^3						3.00	3.00	15.3	38,931	655,208.73
Other petroleum products	10^4t							0.00	20.0	38,369	0.00
Other coke products	10^4t				1.50			1.50	0.0	28,435	40,349.27
Other energy	10^4tce		2.88		1.74	32.80		37.42	0.0	0	0.00
										Total	359,887,487.74

Total emission (tCO_2e)	359,887,487.74
Total fossil power supply (MWh)	**286,203,305**

Data sources: China Energy Statistical Yearbook 2006.

Table A8 The three years average OM emission factor of CCPG

Years	2003	2004	2005	three years average emission factor $EF_{grid,OM,y}$ (tCO_2e/ MWh)
Total CO_2 emission (tCO_2e)	276,404,544.15	345,671,697.30	359,887,487.74	1.2899102
The total fuel fired electricity connected to the grid (MWh)	225,987,719.20	249,074,186.30	286,203,304.60	

Table A9 CO_2 Emissions from solid fuels, liquid fuels and gas fuels of CCPG in 2005

Fuels	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total Fuel	Emission factor	NCV	Emission（tCO_2e）
		A	B	C	D	E	F	G=A+B+C+D+E+F	（tc/TJ） H	（MJ/t,km3） I	K=G*H*I*44/12/100 (Solid or oil fuel) K=G*H*I*44/12/100 (Gas fuels)
Raw coal	10^4t	1,869.29	7,638.87	2,732.15	1712.27	875.40	2,999.77	17,827.75	25.8	20,908	352,614,497
Clean coal	10^4t	0.02	0.00	0.00	0.00	0.00	0.00	0.02	25.8	26,344	498
Other washed coal	10^4t	0.00	138.12	0.00	0.00	89.99	0.00	228.11	25.8	8,363	1,804,669
Coke	10^4t	0.00	25.95	0.00	106.50	0.00	0.00	132.45	25.8	28,435	3,562,840
Total of soild fuels											**357,982,504**
Crude oil	10^4t	0.00	0.82	0.36	0.00	0.00	0.00	1.18	20.0	41,816	36,185
Gasoline	10^4t	0.00	0.02	0.00	0.00	0.02	0.00	0.04	18.9	43,070	1,194
Diesel	10^4t	1.30	3.03	2.39	1.39	1.38	0.00	9.49	20.2	42,652	299,798
Fuel oil	10^4t	0.64	0.29	3.15	1.68	0.89	2.22	8.87	21.1	41,816	286,959
Other petroleum products	10^4t	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.0	38,369	0
Total of liquid fuels											**624,136**
Naturel gas	10^7m^3	0.00	0.00	0.00	0.00	0.00	30.00	30.00	15.3	38,931	655,209
Coke oven gas	10^7m^3	0.00	0.00	11.50	0.00	3.60	0.00	15.10	12.1	16,726	112,054
Other gas	10^7m^3	0.00	102.00	0.00	0.00	31.20	0.00	133.20	12.1	5,227	308,897
LPG	10^4t	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.2	50,179	0
Refinery gas	10^4t	0.71	3.41	1.76	0.78	0.00	0.00	6.66	18.2	46,055	204,689
Total of gas fuels											**1,280,848**
Total											**359,887,488**

Data sources: China Energy Statistical Yearbook 2006.

Table A10 Emission factor of the most efficient commercial thermal power plants in 2005

	Variable	Efficiency of electricity supply (%)	Emission factor of the fuels (tc/TJ)	Emission factor (tCO_2e/MWh)
		A	B	D=3.6/A/1000*B*44/12
Coal-fired power plant	$EF_{Coal, Adv}$	35.82	25.8	0.9508
Gas-fired power plant	$EF_{Gas, Adv}$	47.67	15.3	0.4237
Oil-fired power plant	$EF_{Oil. Adv}$	47.67	21.1	0.5843

Table A11 Calculation of the emission factor of thermal power of CCPG

λ_{Coal}	λ_{Gas}	λ_{Oil}	$EF_{Thermal}$ (tCO_2e/MWh) ($EF_{Thermal}=\lambda_{Coal}*EF_{Coal, Adv}+EF_{Gas, Adv}*\lambda_{Oil}+EF_{Oil. Adv}*\lambda_{Gas}$)
99.47%	0.36%	0.17%	0.9508*99.47%+0.4237*0.36%+0.5843*0.17%=0.9482

Table A12 Capacity increase data of CCPG from 2002 to 2005

	Installed capacity in 2002	Installed capacity in 2003	Installed capacity in 2005	Newly added installed capacity between 2002 and 2005	Weight in newly added installed capacity
Thermal power（MW）	43,303.2	46,893.5	60,167.2	16,864.0	69.52%
Hydropower（MW）	31,034.8	32,357.0	38,405.2	7,370.5	30.38%
Nuclear power（MW）	0.0	0.0	0.0	0.0	0.00%
Wind power（MW）	0.0	0.0	24.0	24.0	0.10%
Total（MW）	74,337.9	79,250.5	98,596.4	24,258.5	100.00%
Share in 2005 installed capacity	75.40%	80.38%	100.00%	24.60%	-

Data source: China Electric Power Yearbook 2003, 2004 and 2006.

$EF_{grid,BM,y}$ = 0.9482*69.52% = 0.6592 tCO_2e/MWh

Annex 4

MONITORING INFORMATION

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

- - - - -