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

CONTENTS

Annexes

SECTION A. General description of project activity

A.1. Title of the project activity:

Title: Sichuan Pingshan Pingbian&Guanyintuo Hydropower Station
Version: 3.0
Date: 19/11/2008

Revision History of the PDD

Version	Date	Comments
Version 1.0	08 October 2006	Complete version of the PDD, prepared for the host country approval process
Version 2.0	06 April 2007	Revised draft PDD; prepared for GSP and validation, incorporating the latest NDRC emission factors information
Version 2.1	19 June 2007	Revised draft PDD, prepared on the basis of corrective action requests in the Validation protocol of SGS.
Version 2.2	25 April 2008	Revised PDD according to the latest requirements of EB
Version 3.0	19 November 2008	Revised PDD on the PDD for requesting registration as per the comments of review requested

A.2. Description of the project activity:

Summary:

The Sichuan Pingshan Pingbian&Guanyintuo Hydropower Stations Project (hereafter referred to as the ‘project’ or ‘proposed project’) involves the construction and operation of two hydropower stations with installed capacity of 20MW respectively. Both the Pingbian (dam-diversion type with daily regulating capacity) and Guanyintuo (run-of-river diversion type) hydropower stations are located in the Xining River Basin in Pingshan County, Yibin City, Sichuan Province of China.

The total installed capacity of the two hydropower stations is 40MW, with an average annual generation of 185,705MWh and electricity supplied to the grid of 154,303.5MWh. The generated electricity will be supplied to the local grid, then connected to the Sichuan Grid and, finally, to the Central China Power Grid (hereafter referred to as ‘CCPG’).

- The installed capacity of Pingbian hydropower station is 20MW, a total surface area of the new reservoir at full level is about 0.776km^2 [1], and the power density is 25.8W/m^2. Pingbian hydropower station was estimated to generate 94,105MWh annually, and 78,203.5MWh is delivered to the grid annually.
- The installed capacity of Guanyintuo hydropower station is 20MW, which directly draws water from the dam of Pingbian hydropower station. Guanyintuo hydropower station was estimated to generate 91,600MWh annually, and 76,100MWh is delivered to the grid annually.

The main objective of the project is to generate power from clean renewable hydropower in Sichuan Province and contribute to the sustainability of power generation of the CCPG.

[1] The value of total surface area of the new reservoir at full level is on Page 1-30, Preliminary Design Report of Pingbian Hydropower Station.

Contribution to sustainable development:

The project activity's contributions to sustainable development are:

- Reducing the dependence on exhaustible fossil fuels for power generation;
- Reducing air pollution by replacing coal-fired power plants with clean, renewable power;
- Bridging the gap between power supply and demand and reducing the deficiency of the local grid;
- Reducing the adverse health impacts from air pollution;
- Reducing the emissions of greenhouse gases, to combat global climate change;
- Contributing to local economic development through employment creation and improving the local energy generation infrastructure.

This project fits with the Chinese government objective to reduce the dependence on exhaustible fossil fuels for power generation, make the energy sector in general and the power sector in particular more sustainable.

A.3. Project participants:

The parties involved in the project are shown in Table A.1:

Table A.1 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）
China (host）	Pingshan Zhongxing Electrometallurgy Co., Ltd. (as the project owner)	No
The Netherlands	ENEL Trade SpA (as the CER buyer)	No

For more detailed contact information on participants in the project activities, please refer to Annex 1.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

The People's Republic of China

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

Sichuan Province

A.4.1.3. City/Town/Community etc:

Pingshan County, Yibin City

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

This project is located in the Xining River Basin, Pingshan County, Yibin City, Sichuan Province of China.

The Pingbian hydropower station is located in Pingbian Yi National Autonomous County, which is 63km from the Pingshan County Seat. The plant site is located at the confluence of the Yangsiba and Xining Rivers and the dam site is located at Baixiangkan which is 5.3km from Pingbian Town. The exact location of plant site is at longitude of 103°42'11" East and latitude of 28°34'29" North and the exact location of dam site is at longitude of 103°42'05" East and latitude of 28°34'30" North.

The Guanyintuo Hydropower Station is located in the Village of Xiaxi, which is 60km from the Pingshan County seat. The plant site is located on the right bank of the Manao River which is a branch of the Xining River. The exact location of the plant site is at longitude of 103°41'15" East and latitude of 28°39'40" North and the exact location of dam site is at longitude of 103°41'20" East and latitude of 28°37'10" North.

The exact location of the proposed project is shown in Fig.A.1.

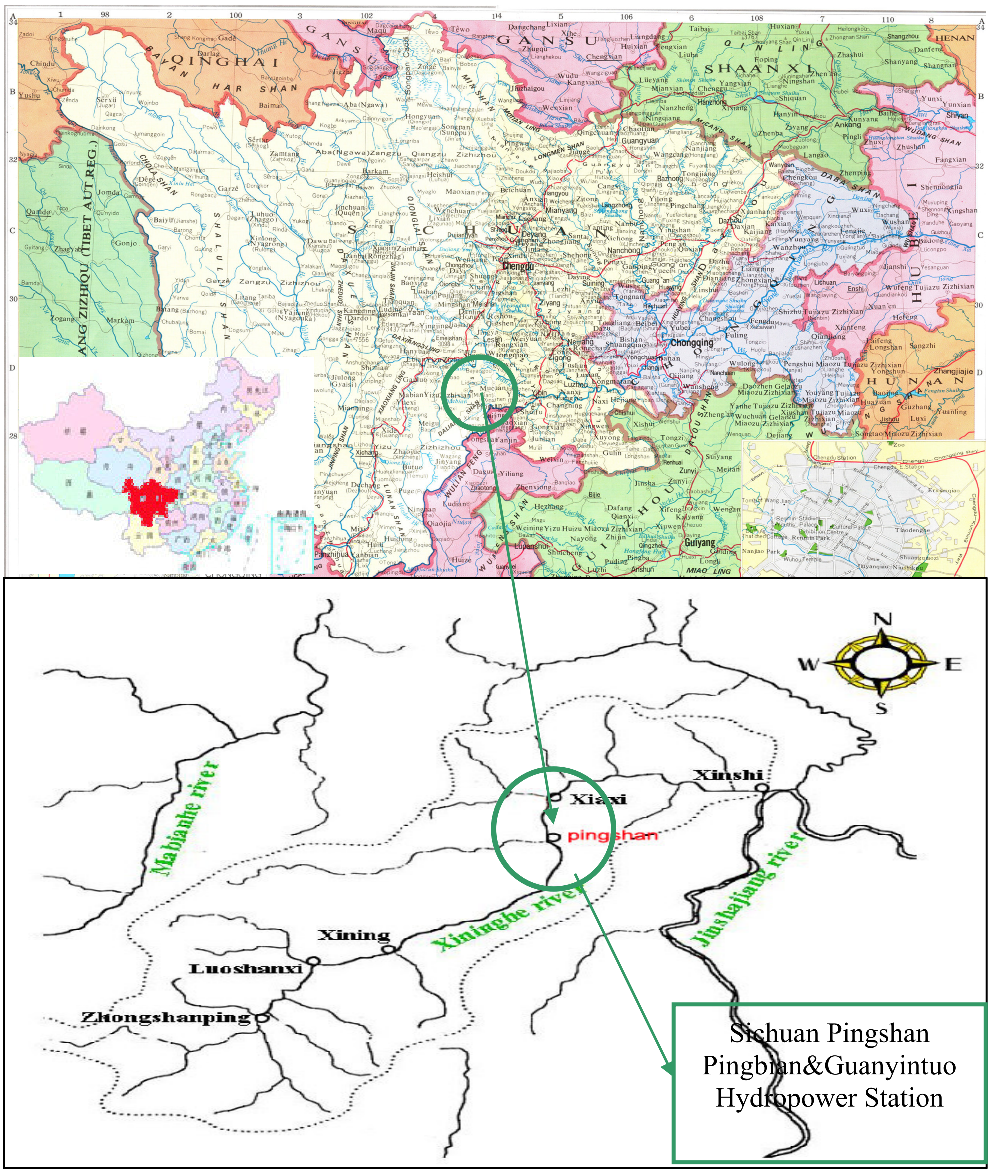


Fig A.1 the Location of Sichuan Pingshan Pingbian&Guanyintuo Hydropower Station

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

Sectoral Scope: Scope Number 1; Energy industries (renewable -/ non-renewable sources) - Electricity generation from renewable energy (hydropower)

The project activity falls under the category of grid-connected renewable power generation project activities by

Pingbian	New hydropower project with reservoirs having power densities greater than $4W/m^2$.
Guanyintuo	Run-of-river hydropower station.

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

The project involves the construction of two hydro power stations. The Pingbian hydropower station is a dam-diversion type with daily regulating capability and the Guanyintuo hydropower station is a run-of-river diversion type.

The Pingbian hydropower station utilizes water from Baixiangkan Dam (a gate dam) in the Baixiankan, Xining River where the normal water sea level is 634m. The diversion tunnel with pressure hole is located on the left bank of the Xining River. The length of the diversion tunnel is 4,636m with a 2.5×4.3m horseshoe-shaped section and a designed flow rate of 41.7m^3/s. Normal water level of the reservoir is 643m above sea level, total surface area at full reservoir level is 0.776km^2 and the power density is 25.8W/m^2.

The Guanyintuo hydropower station utilizes water from the Pingshan hydropower station at the Yangsi dam (a Low barriers dam) located in the Xining River where the normal water sea level is 587m. The length of the water tunnel is 5,058m with a 4.65×4.7m section gate tunnel structure. The designed reduced water flow is 47.8m^3/s.

The Guanyintuo and Pingbian hydropower stations will be jointly operated, and start to be built simultaneously.

Two power stations have the following features:

Table A.2 the features of two stations

		Pingbian	Guanyintuo
Hydraulic turbines	Units	2	2
	Type	HLA551-LJ-160	HLA551-LJ-180
	Rated capacity	10.417MW	10.417MW
	Rated flow	20.83m^3/s	23.90m^3/s
	Rated water head	54m	47m
	Manufacture	Kunming Electrical Machinery Co., Ltd.	
Generators	Units	2	2
	Type	SF10-16/3250	SF10-16/3250
	Capacity	10MW	10MW
	Rated voltage	10.5kV	10.5kV
	Rated rotate speed	375r/min	300r/min
Annual operation hours	4,705		4,582
Average annual electricity generation	94,105MWh		91,648MWh
Electricity supplied to grid	78,203.5MWh		76,100MWh

The electricity generated by the Pingbian hydropower station will first be transmitted to the Guanyintuo hydropower station via an 110kV transmission line of 5km length. Subsequently, the combined power will be sent in turn to the Oujia Village hydropower station via an 110kV transmission line of 9km length, the Yibin Boxi transformer substation via an 110kV transmission line of 81km length, Yibin Tianchi transformer substation via an 110kV transmission line of 11km length, the Sichuan grid and, finally, to the CCPG.

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

The project activity uses the renewable crediting period (renewable twice), and the estimated emission reductions during the first crediting period are presented in Table A.3. Estimated emission reductions in the first crediting period are 1,052,632tCO_2e.

Table A.3 the Estimation of the Emission Reductions in the Crediting Period

Years	Annual estimation of emission reductions (tCO_2e)
01/05/2009~30/04/2010	150,376
01/05/2010~30/04/2011	150,376
01/05/2011~30/04/2012	150,376
01/05/2012~30/04/2013	150,376
01/05/2013~30/04/2014	150,376
01/05/2014~30/04/2015	150,376
01/05/2015~30/04/2016	150,376
The estimated CO_2 reductions for the 1st crediting period（tCO_2e）	1,052,632
Total number of the 1st crediting years	7 years
Annual Average Reductions over Crediting Period	150,376

A.4.5. Public funding of the project activity:

There is no public funding from Annex I parties available to the project.

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:

Baseline methodology:

Approved consolidated baseline and monitoring methodology ACM0002 (Version 6): Consolidated baseline and monitoring methodology for grid-connected electricity generation from renewable sources (approved on 24th CDM EB conference on 19th of May, 2006)

The methodology draws upon the "Tool for the demonstration and assessment of additionality" (version 04, approved at EB36).

Monitoring methodology

Approved consolidated monitoring methodology ACM0002 (Version 6): Consolidated monitoring methodology for grid-connected electricity generation from renewable sources

For more information on the baseline and monitoring methodology we refer to the UNFCCC website: 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 baseline and monitoring methodology ACM0002 is applicable to the proposed project, because the project meets all the applicability criteria stated in the methodology:

The proposed project is a grid-connected renewable power generation project.

- The proposed project activities are electricity capacity additions from new hydro power projects, in which, the installed capacity of the Pingbian hydropower station is 20MW, the surface area of the new reservoir is $0.776km^2$, and power density of $25.8W/m^2$ which is greater than $4W/m^2$, and the Guanyintuo hydropower station is a run-of-river hydro power plant;
- The project does not involve an on-site switch from fossil fuels to a renewable source;
- The geographic and system boundaries for the relevant electricity grid, the CCPG, can be clearly identified and information on the characteristics of the grid is available;
- The methodology will be used in conjunction with the approved consolidated monitoring methodology ACM0002 (Consolidated monitoring methodology for grid-connected electricity generation from renewable sources).

The latest version of ACM0002 (version 6) has been applied.

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

According to the ACM0002 definition of project boundary, the project boundary includes the project site (the physical and geographical site of the project plant) and the electricity system where Pingbian and Guanyintuo hydropower stations are connected.

In this specific case, both stations are connected to the Sichuan Grid which is part of the CCPG. According to the above definition, it is justifiable to determine the CCPG as the right project boundary for this proposed project, considering substantial intergrid power exchange among the CCPG.

Table B.1 Description of How the Sources and Gases Included in the Project Boundary

	Source	Gas	Included?	Justification / Explanation
Baseline	Thermal power plants in CCPG	CO_2	Included	Based on ACM0002, project participants shall only take into account the CO_2 emissions
		CH_4	Excluded	Based on ACM0002, project participants shall only take into account the CO_2 emissions
		N_2O	Excluded	Based on ACM0002, project participants shall only take into account the CO_2 emissions
Project Activity		CO_2	Excluded	The project is electricity generation from renewable sources, without CO_2 emission.
		CH_4	Excluded	The power density of the Pingbian hydropower station is 25.8W/m^2 and Guanyintuo hydropower station is a run-of-river station, as per ACM0002, CH_4 emission is not considered.
		N_2O	Excluded	The project is electricity generation from renewable sources, without N_2O emission.

The project connects to the Sichuan Power Grid. The Sichuan Power Grid is part of the CCPG, which includes the provinces Chongqing, Sichuan, Henan, Hubei, Jiangxi, and Hunan. There is no net imported power to the CCPG (see table B.2 below).

Table B.2: Transfers to and from the CCPG

	2003	2004	2005
Total imports (100 GWh)	4.27	0.00	0
Total exports (100 GWh)	141.93	378.85	467.55
Total net transfers (100 GWh)	-137.66	-378.85	-467.55
Total Generation (100 GWh)	3,672.87	4,406.65	4,917.20
Net transfers /Total Generation (%)	-3.75	-8.60	-9.51

Data source: the website of State Power Information Network: http://www.sp.com.cn/zgdl/dltj/default.htm

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

Following baseline scenario options have been identified as realistic and credible alternatives to the project activity:

1. The specific project activity undertaken without being registered as a CDM project activity;
2. Thermal power plant with equivalent annual power generation;
3. Other renewable energy power plant with equivalent annual power generation;
4. The equivalent annual electricity is supplied by the CCPG.

The baseline scenario options described above are discussed individually considering relevant laws and regulations, as well as investment analysis:

First scenario, the specific project activity undertaken without being registered as a CDM project activity,

The first scenario is in compliance with the Chinese relevant laws and regulations and will furthermore review the project's economic feasibility in order to provide a more in depth analysis of the first scenario (provided in section B.5). The results show that The IRR of this project is only 7.82% and 7.56% for Pingbian and Guanyintuo hydropower stations respectively without CDM revenue which are all lower than the benchmark rate of 10%[2]; therefore, the project faces significant economic and financial risks without CDM revenue, so the first scenario is not feasible.

Second scenario, thermal power plant with equivalent annual power generation,

There is a great difference in the utilization hours and stability of water resources supply between a thermal power plant and a hydropower plant with equivalent installed capacity. As a result, there is a great gap between the power generation capacity and supply reliability of thermal power and hydropower. If we consider the capacity that can be generated by the same annual electricity generation as the alternative scenario for the proposed project, the installed capacity of the thermal plant would be less than 32MW. However, according to Chinese regulations, construction of coal-fired power plants whose installed capacity is less than 135MW is prohibited in the areas covered by large grids such as provincial grids [3].Therefore, the second alternative does not comply with Chinese relevant laws and regulations and is not a feasible alternative.

Third scenario, other renewable energy power plant with equivalent annual power generation,

There is not enough other renewable energy, such as wind sources, biomass, solar sources, wave and tidal sources or geothermal sources, to provide equivalent power generation in local area. So the scenario is not a feasible alternative.

Fourth scenario, the equivalent annual electricity is supplied by the CCPG

It is in compliance with relevant Chinese laws and regulations and does not face economic barriers.

Conclusion:

In conclusion, the fourth scenario is the only feasible and credible baseline scenario. Therefore, the baseline scenario of this project is: Electricity delivered to the CCPG by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources without the proposed project activity.

---

[2] The hydropower NO. [1995]186 documents of Ministry of Water Resources of the People's Republic of China which is The Revision of Economic Evaluation Code for Small Hydropower Project(SL16-95). The small hydropower project is defined as: the station with installed capacity is lower than 25MW and the building, revising, expansion, rebuilding of corresponding Grid of it. Middle scale hydropower stations with installed capacity of 50MW or lower 50MW in the rural area should follow these regulations. According to the hydropower No [2002]07 documents, Currently Effective Hydrotechnics Standards Announcement, by the Ministry of Water Resources of the People's Republic of China, the hydropower No [1995]186 document is still effective and enforceable.

[3] Notice on Strictly Prohibiting the Installation of Fuel fired Generators with the Capacity of 135MW or below issued by the General Office of the State Council, Decree No. [2006]6.

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):

The key events are listed in the below table (Table B.3) to show the important information, documents and events for investment analysis and CDM status of the project.

Table B.3 Key Events of the Project Activity and Real Actions on CDM Application

Date	Key Event
April 2005	Preliminary Design Report (PDR) of Pingbian and Guanyintuo hydropower station was completed.
13 May 2005	The project signed the Power Connection Intent Agreement (PCIA) with a grid tariff of 0.22Yuan RMB/kWh.
18 May 2005	Directorate decided to apply for CDM.
28 May 2005	Project owner trusted an agency to find a proper cooperator on CDM application.
1 June 2005	PDR of Pingbian hydropower station was approved.
30 June 2005	The project signed the Power Connection Agreement (PCA) with a grid tariff of 0.22Yuan RMB/kWh.
1 July 2005	The project owner trusted and confirmed Beijing Tianqing Power International CDM Consulting Co., Ltd (hereinafter refers “Tianqing Power”) to cooperate on CDM application of the project activity
24 October 2005	Tianqing Power signed a General Framework Agreement for the Development of CDM projects with Climate Expert Ltd. (hereinafter refers “CE”)
2 November 2005	PDR of Guanyintuo hydropower station was approved.
7 November 2005	EIAs of Pingbian and Guanyintou hydropower stations were approved.
24 November 2005	ENEL signed a Letter of Intent (LoI) to Tianqing about the project.
16 January 2006	The project owner and Tianqing Power signed CDM PDD Cooperation Agreement.
12 May 2006	Received Approval of supporting CDM application by local government
17 May 2006	The project owner held a stakeholders’ consultancy meeting about CDM application of the project
13 June 2006	**The project owner signed the Purchase Contracts of Turbines and Generators for Pingbian and Guanyintuo hydropower stations (the earliest starting date of project activity and the date of investment decision)**
7 November 2006	The CDM approval of the project was issued by Chinese DNA.
18 December 2006	Pingbian&Guanyintuo hydropower stations were approved to start construction.
11 April 2007	The date of publication of the CDM-PDD for global stakeholder process (GSP) by the DOE
May 2009	The project is expected to start commissioning.

The PDRs of Pingbian and Guanyintuo are both completed in April 2005. In the PDRs, the post-tax project IRRs are lower than the benchmark. Besides, in the Power Connect Intent Agreement (PCIA) signed on 13 May 2005, the grid tariff is only 0.22Yuan RMB/kWh with VAT, which is confirmed by the sequent Power Connection Agreement (PCA). As per the PDRs and the grid tariff in the PCIA, the project owner decided to apply for CDM at Directorate Meeting on 18 May 2005. In July 2005, the project owner trusted Tianqing Power to cooperate on CDM application of the project. About 3 months later, Tianqing

Power signed General Framework Agreement for the Development of CDM projects with CE on some CDM tasks for the project. Soon, ENEL was interested in the project and signed a LoI on 24 November 2005. In January 2006, the project owner and Tianqing Power signed CDM PDD Cooperation Agreement formally. Afterwards, the project owner tried to apply for the support of local government on CDM application work and also did some investigate to stakeholders. Till May 2006, the project owner finally got the Approval of supporting CDM application from local government and held a stakeholders' consultancy meeting about the CDM application of the project. After completion of above works on preparation of CDM application and the application of necessary approvals, the project owner finally signed the Purchase Contracts of Turbines and Generators for Pingbian and Guanyintuo hydropower stations on 13 June 2006, which is the earliest starting date of the project activity and the date of investment decision. The above events clearly demonstrate that the project owner was aware about the potential for CDM before the start of the CDM activity, and that it played a crucial role in overcoming the barriers towards the implementation of the project activity.

After the signed Purchase Contracts of Turbines and Generators for Pingbian and Guanyintuo hydropower stations, the project were submitted to Chinese DNA, and was approved by 7 November 2006. One month later, the project (both Pingbian and Guanyintuo hydropower stations) were approved to start construction. After checked by DOE, publication of the CDM-PDD for global stakeholder process was started on 11 April 2007. Since then, the DOE formally started the validation of the project. The project was supposed to start commissioning in November 2008, but it delayed to May 2009 because of the disasters of snow in January, the earthquake (level 8) in May and flood in August and September in Sichuan.

The additionality of the project activity is demonstrated by using the "Tool for the Demonstration and Assessment of Additionality" (version 04). See UNFCCC website:
http://cdm.unfccc.int/methodologies/PAmethodologies/AdditionalityTools/Additionality_tool.pdf

Step 1: Identification of Alternatives to the Project Activity Consistent with Current Laws and Regulations

Sub-Step1a. Define alternatives to the project activity

This methodological step requires a number of sub-steps, the first of which is the identification of realistic and credible alternatives to the project activity. There are only a few alternatives that are available and credible in the CCPG:

1. The specific project activity undertaken without being registered as a CDM project activity;
2. Thermal power plant with equivalent annual power generation;
3. Other renewable energy power plant with equivalent annual power generation;
4. The equivalent annual electricity is supplied by the CCPG.

The third alternative is not feasible since there is not enough other renewable energy, such as wind sources, biomass, solar sources, wave and tidal sources or geothermal sources, to provide equivalent annual power generation in local area.

Sub-Step1b. Consistency with mandatory laws and regulations

The second sub-steps involve the confrontation of the alternatives with China's applicable laws and regulations. Three of the four alternatives, all except for alternative 2, identified above are in compliance with China's relevant laws and regulations.

The proposed project activity is consistent with national policies for environmental protection, energy conservation and sustainable development. However, there are no binding legal and regulatory requirements for this project type. The Renewable Energy Law adopted by the National People's Congress on 28 February 2005 encourages and supports renewable-based power generation, but does not stipulate specific goals for local air quality improvement.

Conclusion: We conclude that three of the alternatives are in compliance with the relevant Chinese laws and regulations. As there are alternatives to the project activity that are in compliance with the relevant Chinese laws and regulations, the project may be additional. However, the third alternative, other renewable energy power plant with equivalent annual power generation, is not credible in absence of sufficient other renewable energy resources in Pingshan, and the first scenario is not feasible as a baseline scenario as we will argue in B.5, step 2 and 3.

Step 2: Investment Analysis

Sub-step 2a. Determine appropriate analysis method

There are three options to carry out investment analysis provided in the additionality tool, they are: simple cost analysis (Option I), investment comparison analysis (Option II) and benchmark analysis (Option III). The project has the income of electricity sales except CDM related income, so the option I is not suitable for the project. Furthermore, the fourth alternative, the equivalent annual electricity is supplied by the CCPG, is not a project thus option II is not suitable for the project. Therefore, we choose option □, i.e. benchmark analysis to this proposed project.

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

The proposed project is located in a rural area, and the installed capacity of each station is 20MW lower than 50MW. Therefore, based on the Chinese *Economic Evaluation Code for Small Hydropower Projects*(SL16-95), the IRR of 10% in the document (SL16-95) is applicable to the proposed project [4].

Sub-step 2c. Calculation and comparison of financial indicators (only applicable to options II and III):

The basic parameters for calculating key financial indexes are provided in TableB.4 and Table B.5 for Pingbian and Guanyintuo hydropower stations respectively. The data are from the Preliminary Design Report, with the exception of the grid tariff, which has been provided by the project owner on the basis of current power prices in the region. Furthermore, the annual operational cost was calculated by an expert from Beijing Tianqing Power International CDM Consulting Co., Ltd.

Table B.4 the Basic Financial Parameter of the Pingbian Hydropower Station

Financial Parameters	Value	Data Source
Installed capacity	20MW	Preliminary Design Report of

[4] The hydropower No [1995]186 documents, The Revision of Economic Evaluation Code for Small Hydropower Project(SL16-95), by the Ministry of Water Resources of the People's Republic of China. The small hydropower project is defined as: the station with installed capacity is lower than 25MW and the building, revising, expansion, rebuilding of corresponding Grid of it. Middle scale hydropower stations with installed capacity of 50MW or lower 50MW in the rural area should follow these regulations. According to the hydropower No [2002]07 documents, Currently Effective Hydrotechnics Standards Announcement, by the Ministry of Water Resources of the People's Republic of China, the hydropower No [1995]186 document is still effective and enforceable.

		Pingbian hydropower station (PDR of Pingbian)[5]
Annual electricity supplied to the grid	78,203.5MWh	PDR of Pingbian
Static Total Investment	13,002.89 ten thousand Yuan RMB	PDR of Pingbian
Loan Ratio	70%	PDR of Pingbian
Loan Interest	6.12%	PDR of Pingbian
Grid Tariff (with VAT)	0.22 Yuan RMB /kWh	Grid Connection Agreement
VAT	17%	PDR of Pingbian
Corporate Income Tax	15%	PDR of Pingbian
Operation period	20years	PDR of Pingbian
Annual operational cost	287.21 ten thousand Yuan RMB	IRR calculation sheet[6]

Table B.5 the Basic Financial Parameter of the Guanyintuo Hydropower Station

Financial Parameters	Value	Data Source
Installed capacity	20MW	Preliminary Design Report of Guanyintuo hydropower station (PDR of Guanyintuo)[7]
Annual electricity supplied to the grid	76,100MWh	PDR of Guanyintuo
Static Total Investment	12,693.78 ten thousand Yuan RMB	PDR of Guanyintuo
Loan Ratio	70%	PDR of Guanyintuo
Loan Interest	6.12%	PDR of Guanyintuo
Grid Tariff (with VAT)	0.22 Yuan RMB /kWh	Grid Connection Agreement
VAT	17%	PDR of Guanyintuo
Corporate Income Tax	15%	PDR of Guanyintuo
Operation period	30years	PDR of Guanyintuo
Annual operational cost	310.40 ten thousand Yuan RMB	IRR calculation sheet[8]

The IRR of this project is only 7.82% and 7.56% for Pingbian and Guanyintuo hydropower stations respectively without CDM revenue. Based on the regulations of the Economic Evaluation Code for Small Hydropower Projects, the IRR of small hydropower projects' total investment should not be lower than the threshold of 10%. It is therefore obvious that, without CDM revenue, the project faces financial risks.

Sub-step 2d. Sensitivity analysis (only applicable to options II and III):

The sensitivity analysis is conducted to check whether, under reasonable variations in the critical assumptions, the results of the analysis remain unaltered. We have used as critical assumptions:

1. Static total investment
2. Annual operational cost
3. Grid tariff

---

[5] PDR of Pingbian was made by a certified institute---Chengdu Design Institute of Water Conservancy & Hydro-electric Power, approved by Yibin Development and Reform Commission in 1 June 2005.

[6] Except grid tariff, other all data for calculating annual operation cost are from PDR of Pingbian.

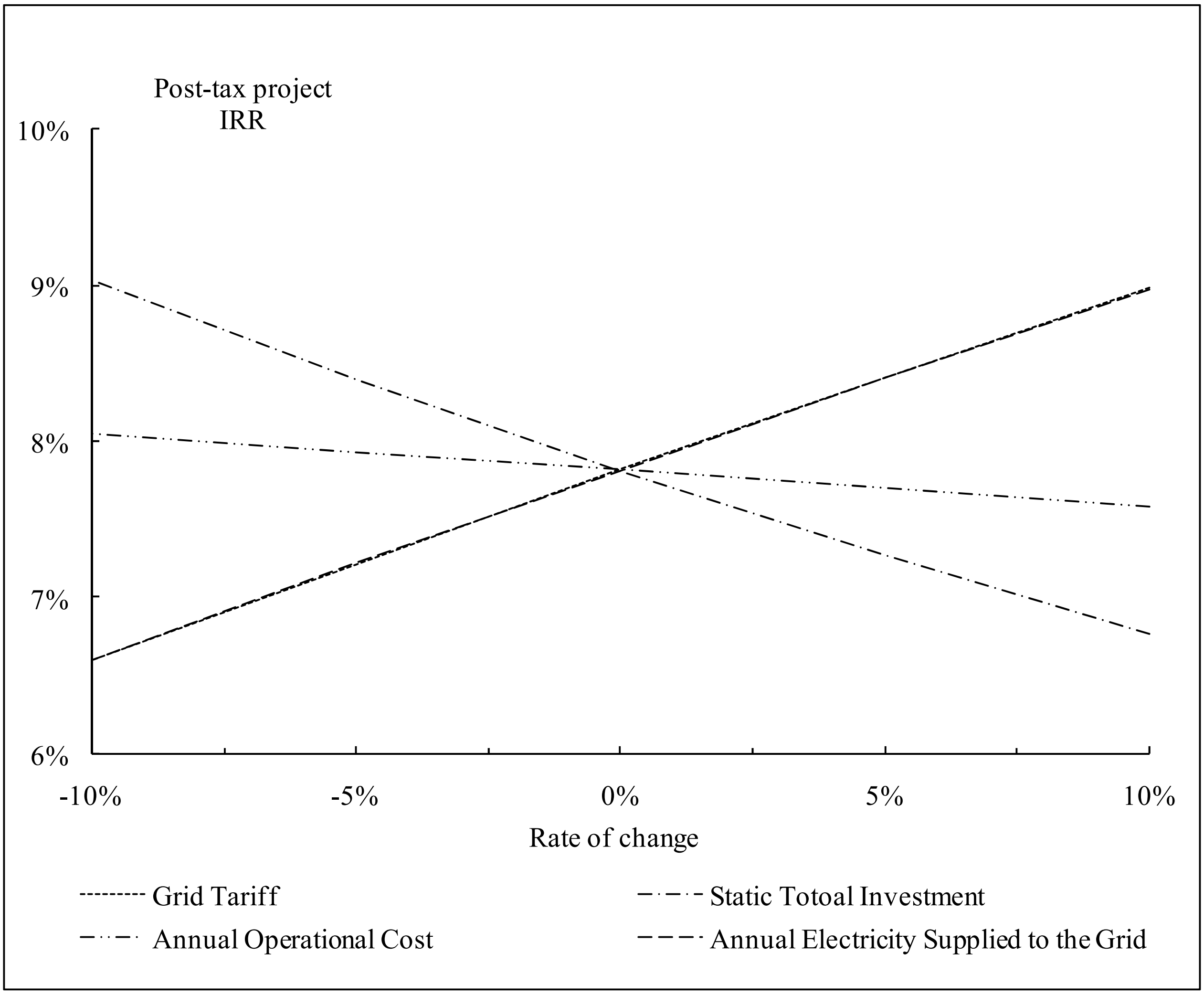
[7] PDR of Guanyintuo was made by a certified institute---Chengdu Design Institute of Water Conservancy & Hydro-electric Power, approved by Yibin Development and Reform Commission in 2 November 2005.

[8] Except grid tariff, other all data for calculating annual operation cost are from PDR of Guanyintuo.

Variations of ±10%[9] have been considered in the critical assumptions. Tables B.6 and B.7 summarizes the results of the sensitivity analysis for Pingbian and Guanyintuo hydropower station respectively, while Figures B.1 and B.2 provide a graphic depiction.

Table B.6 Impact of Variations in Critical Assumptions on IRR of Pingbian Hydropower Station

	-10%	-5%	0%	5%	10%
Grid tariff	6.60%	7.21%	7.82%	8.41%	8.99%
Static total investment	9.04%	8.40%	7.82%	7.27%	6.77%
Annual operational cost	8.05%	7.93%	7.82%	7.70%	7.58%
Annual electricity supplied to the grid	6.60%	7.22%	7.82%	8.41%	8.98%



[9] Variation of ±10% is taken from the financial analysis of the PDRs, and it is also consistent with the custom usage of financial analysis in China.

Fig B.1 the IRR Sensitivity Analysis of Pingbian Hydropower Station with changes of Static Total Investment, Annual Operational Cost, Grid Tariff or Annual Electricity Supplied to the Grid

Fig.B.1 shows that none of variations can raise the IRR of Pingbian hydropower station higher than the threshold of 10% and the sensitivity of the annual operational cost is very low.

Wider variations in the static investment are impossible due to the static investment can not be lowered: The project activity includes the constructions of a diversion tunnel of 4,636.29m length for water intake and discharge. It is necessary to develop a leak-prevention programme for the tunnel since there is a corrosion hole in the tunnel. The instability of the diversion tunnel will increase the total investment. Furthermore, there is nearly 10m silty clay under the sand and 5m thick cobble stone riverbed is needed for leakage prevention which will also increase the investment.

Table B.7 Impact of Variations in Critical Assumptions on IRR of Guanyintuo Hydropower Station

	-10%	-5%	0%	5%	10%
Grid tariff	6.46%	7.02%	7.56%	8.09%	8.61%
Static total investment	8.66%	8.08%	7.56%	7.07%	6.62%
Annual operational cost	7.87%	7.72%	7.56%	7.40%	7.24%
Annual electricity supplied to the grid	6.47%	7.02%	7.56%	8.09%	8.61%

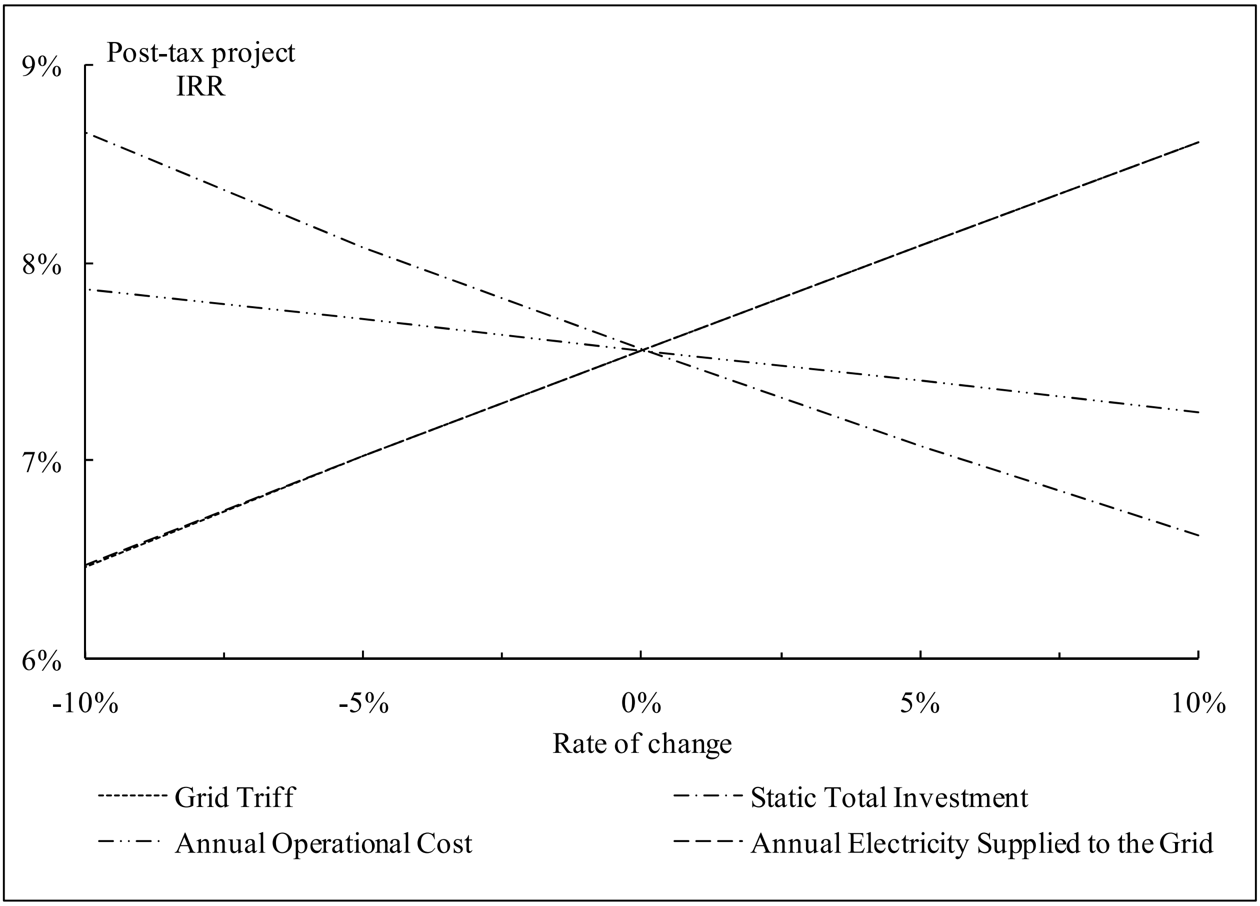


Fig B.2 the IRR Sensitivity Analysis of Guanyintuo Hydropower Station with changes of Static Total Investment, Annual Operational Cost, Grid tariff or Annual Electricity Supplied to the Grid

The post-tax project IRR of the project is 7.82% (Pingbian) and 7.56%(Guanyintuo) without CDM revenue which is lower than the threshold of 10%.

- ✧ With an increase in the grid tariff by close to 10%, the post-tax project IRR of the project is still 8.99% (Pingbian) and 8.61%(Guanyintuo), less than 10%. When an increase in grid tariff reaches 0.262Yuan RMB/kWh with VAT (Pingbian) and 0.272Yuan RMB/kWh with VAT (Guanyintuo), the IRR of the project can reach benchmark of 10%. However, the fixed grid tariff of 0.22Yuan RMB/kWh with VAT was taken from the Power Connection Intent Agreement (PCIA), and was also confirmed by the sequent Power Connection Agreement (PCA). In other words, the actual grid price will be 0.22Yuan RMB/kWh with VAT. Obviously, the post-tax project IRR calculated by the actual grid price is not over the threshold of 10%.

  In addition, in China, the tariff is strictly regulated by China government and it is established on strict regulation rather than the market mechanism, so it is hard to forecast the future tariff by the project owner. As the tariff is related tightly to the national economy and livelihood of people, the government of China has to make the tariff steady. Actually, the grid prices signed in Power Connection Agreement will not be adjusted for a long-term. Therefore, it is impossible for the project to become commercially attractive through an adjustment of the grid price.

- ✧ With a decrease in the static total investment by close to 10%, the post-tax project IRR is still 9.04% (Pingbian) and 8.66% (Guanyintuo). However, by 12 November 2008, the total investment of the completed partial projects (Pingbian and Guanyintuo) cost by the project owner is 166,930,000 Yuan RMB (Pingbian) and 133,422,000 Yuan RMB (Guanyintuo) [10], which are much higher than the sum of estimated ones from PDRs. Therefore, the post-tax project IRR will not be increase up to 10% by the decrease of the total static investment.

- ✧ With a decrease in the annual operational cost by close to 10%, the post-tax project IRR only raises by 0.23% (Pingbian) and 0.31% (Guanyintuo) which is very little, so it is difficult to adjust the annual operational cost to raise the post-tax project IRR obviously. Based on PDRs and hydropower No [1995]186 documents, the annual operational costs mainly include salary, welfare fund, overhaul cost and other cost. Of which, welfare fund, overhaul cost and other cost should use the fixed parameters based on the document No [1995]186, and only the salary of the employees may be fluctuated. Actually, as per “Payroll Records of the Project” the annual salary per employee has increased from 8,000 Yuan RMB in PDRs and 10,000Yuan RMB to 18,000 Yuan RMB. Obviously, it is impossible to meet the IRR of 10% through decrease of annual operational cost.

- ✧ With increase in annual electricity supplied to the grid by close to 10%, the post-tax project IRR increases to 8.98% (Pingbian) and 8.61%(Guanyintuo), lower than 10%. Only with an increase to 19.00% (Pingbian) and 23.65% (Guanyintuo) in the annual electricity supplied to the grid, the project IRR post-tax of the project could reach 10%. However, both of annual utilization hour of the project in the PDRs are limited by natural water resources, and was estimated as average long-term natural river flow as per 35-year historical values (1966~2000). Therefore, dramatically increase of electricity generation of the project in the whole crediting period will rarely happen. In other words, the post-tax project IRR is rarely to be impacted greatly, even over the threshold of 10%, by annual electricity

[10] The total investment of the completed partial projects (Pingbian and Guanyintuo) cost by the project owner refers to “Investment for the Completed Projects of Pingbian&Guanyintuo Hydropower Stations” in 12 November 2008.

generation.

Therefore, the results of the sensitivity analysis confirm that the project faces significant commercial and financial barriers without CDM revenue.

The above analysis indicates that the project faces significant economic and financial risks without CDM revenue. Consequently the first scenario is not feasible nor is the baseline scenario.

On the other hand, the whole investment IRR will increase greatly when the project receives the CERs revenues. If we take the CERs price as €8/tCO_2e into account, the IRR of the project reaches 10.28% and 10.02% respectively for Pingbian and Guanyintuo hydropower station (above to the 10% benchmark), assuming the CERs price of €8/tCO_2e (€1=10Yuan RMB), thus the repayment of capital and interest will be raised and the financial situation will be improved. It is obvious that the benefits come from the CDM which helps release the financing pressure that would otherwise obstruct the project activity.

Step 3: Barrier Analysis

Sub-step 3a. Identify barriers that would prevent the implementation of the proposed CDM project activity

Without CDM revenues, some barriers will interfere with the implantation of the project. They are:

Financial and Investment Environment

The installed capacity of this proposed project is 40MW , which is less than 50MW and the project owner is private company in central and western China, however, The national credit extension loan policy regulates that the bank should invest carefully in small scale projects, especially those under 50MW, and pay attention to choosing the best in excellence and be especially cautious with regard to investments in central and western China due to the low anti risk ability of the local private companies. In addition, as Pingshan is one of the poor counties in China, the project can not get the financing from local residents. As a result, without CER revenues, the project faces significant economic and financial barriers

Uncertainty of electricity generation

The construction of the local province grid cannot meet the needs of generation output of the project and the hydropower could be affected by hydrological conditions to a large extent thus the generation is instable, which will make it difficult to achieve the estimated annual operating hours. In addition, power generation will be greater in flood season, so the electricity supply of the grid operating company will exceed demands and the station will adjust the power generated according to the arrangements taken with the grid operating company. Therefore, the station can not be operated under full burden. The uncertainty of electricity sale reduces the commercial attraction even more.

On the contrary, the income of CERs will improve the project ability to overcome risks, and reduce the financing difficulty. Al though the repayment period is so short and the pressure of repayment will be great, the CDM income will reduce the repayment pressure every year. It will also diminish the investment risk on the uncertainty of electricity sales and grid tariff, and improve the attraction of the project, thus, the project will be carried out and operated.

Sub-step 3b. Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity):

From the above mentioned steps 1 and 2, the barriers can not have an impact on the fourth alternative, so the fourth alternative is feasible.

Step 4 Common Practice Analysis

Sub-step 4a. Analyze other activities similar to the proposed project activity

Basic information concerning existing, or under construction, hydropower plants with installed capacity between 15MW to 50MW, which are similar to the proposed activity is shown in Table B.8.

Table B.8 some existing or constructing hydropower stations similar to the proposed activity

Name of Hydropower Station	Installed Capacity (MW)	Location	Operation date	Investor	Applying CDM or not
Tanguanyao Hydropower Station	28	Jianwei County	2001	Developed by water resource system	NO
Boluo Hydropower Station	48	Dongxiang County	2003	Developed by water resource system	NO
Baishuihe Hydropower Station	26	Boundary of Ya'an City and Ganzi Prefecture	2004	Developed by water resource system	NO
Yongle hydro project	50	Leshan City	2003	Sichuan Provincial Electric Power Co. Ltd.	NO
Sanjiang hydro project	45	Mianyang County	2004	Meiya Electric Power Co. Ltd. (U.S.)	NO
Chenjiaheba 20MW Hydropower Project	20	Moxi town, Luding county	constructing	Sichuan Hongchang Electric power Co., Ltd.	Yes
Sichuan Zhaojiashan 20MW Hydropower Project	20	Luding county, Ganzi Tibetan autonomous prefectures	constructing	Sichuan Hongchang electric power Generation Co., Ltd.	Yes
Kangding Simaqiao 24MW Hydroelectric Project	24	Kangding County, Ganzi city	constructing	SichuanKangding County Zhedu ohe Electric Power Development Co., Ltd.	Yes
Wahei Hydropower Station	44	Yi Autonomous County of Mabian	-	Sichuan Mabian Xianjia Puhe Hydro-electric Co., Ltd.	Yes
Baiyangxi Hydropower Station	32	Linhe Village, Wanyuan Town, Dazhou City	Oct. 2008	Wanyuan Baiyangxi Hydropower Development Co., Ltd.	Yes

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

There are essential distinctions between the above existing hydropower projects and proposed Pingbian&Guanyintuo hydropower stations project. The main investors of the above projects are either foreign company or large state-owned firm or listed company which have much stronger financing capabilities and risk resistance capacities. Take water resource system for example, in 2005, the installed capacity of water resource system is 6,794.514MW[11], which account 45%[12] for the total installed capacity of Sichuan province. Except this, some of the projects are state-owned. Therefore they do not face similar barriers that the Pingbian&Guanyintuo hydropower station faces. In addition, there are other barriers encountered by the proposed project, such as the geological conditions.

On the contrary, the other projects, which are developed by private entity, are also applying CDM to overcome the barriers they face.

Therefore, these projects don't have to face the barriers that the proposed project has to face, and they have more commercial attraction, on the contrary, the proposed project lacks these advantages.

Conclusion:
The project faces several barriers which would prevent the implementation of the proposed project activity without CDM. CDM helps to overcome these barriers. If the project is not implemented, the power will be supplied by the CCPG. Hence, the proposed project activity isn't baseline scenario, but is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

According to methodology ACM0002, Baseline emissions are equal to the power supplied to the grid multiplied by the baseline emission factor EF_y. The baseline emission factor is equal to the combined margins: the equally weighted average of the operating margin emission factor ($EF_{OM,y}$) and the build margin emission factor ($EF_{BM,y}$).

According to the *Bulletin on China Grids Baseline Emission Factors Renewed* by the Office of National Coordination Committed on Climate Change on August 9, 2007[13], the Operating Margin Emission Factor ($EF_{OM,y}$) and the Build Margin Emission Factor ($EF_{BM,y}$) calculation for the CCPG is calculated as follows:

Baseline

The operating margin emission factor ($EF_{OM,y}$) and the build margin emission factor ($EF_{BM,y}$) calculation for the CCPG is as follows:

STEP 1 Calculate the Operating Margin emission factor ($EF_{OM,y}$)

ACM0002 (version 06) offer four options for the calculation of the Operating Margin emission factor(s) ($EF_{OM,y}$):

---

[11] Chinese Water Conservancy Yearbook, 2006, p 563

[12] The total installed capacity of Sichuan Province is 14,948.5MW, from page 411 of China Electric Yearbook, 2006

[13] *Bulletin on China Grids Baseline Emission Factors Renewed* by the Office of National Coordination Committed on Climate Change on August 9, 2007

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

As the methodology "Dispatch Data Analysis" should be the first methodological choice. However, the method is not selected for OM emission factor calculation, because dispatch data, let alone detailed dispatch data, are not available to the public or to the project participants. For the same reason, the simple adjusted OM methodology cannot be used.

From 2001 to 2005, in the composition of gross annual generation power for CCPG, the ratio of power generated by hydro-power and other low cost/compulsory resources is as following: 36.76% in 2001, 35.95% in 2002, 34.43% in 2003, 38.54% in 2004, 38.18% in 2005, obviously far lower than 50%. Based on these considerations, the OM has been calculated according to the Simple OM. Simple OM is appropriate, because low cost/ must run resources account for far less than 50% of the power generation in the CCPG in most recent years.The "ex-ante vintage" will be employed for OM calculation of the project.

Table B.9 Installed capacity and electricity generation of the CCPG, 2001-2005[14]

Year	Electricity generation (GWh)				
	Thermal	Hydro	Others	Total	% Low cost/must run
2001	178,156.00	103,554.00	n.a.	281,710	36.76%
2002	200,347.00	112,440.00	n.a.	312,787	35.95%
2003	240,839.00	126,448.00	n.a.	367,287	34.43%
2004	270,846.00	169,094.00	725.00	440,665	38.54%
2005	303,976.00	187,734.00	10.00	491,720	38.18%

The calculation equation is as follows:

$$EF_{OM,simple,y} = \frac{\sum_{i,j} F_{i,j,y} \times COEF_{i,j,y}}{\sum_{j} GEN_{j,y}} \qquad \text{Equation (B.1)}$$

Where

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

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

$GEN_{j,y}$ is the electricity (MWh) delivered to the grid by power sources j.

The CO_2 emission coefficient $COEF_i$ is obtained as

$$COEF_i = NCV_i \times EF_{CO_2,i} \times OXID_i \qquad \text{Equation (B.2)}$$

Where:

NCV_i is the net calorific value (energy content) per mass or volume unit of a fuel i, National fixed value;

[14] Numbers are calculated on the basis of data for Hubei, Henan, Hunan, Jiangxi, Sichuan and Chongqing. The same is true in other places where we refer to CCPG.

$OXID_i$ is the oxidation factor of the fuel ,2006 IPCC Guidelines for National Greenhouse Gas Inventories for default values;

$EF_{CO_2,i}$ is the CO_2 emission factor per unit of energy of the fuel i ,2006 IPCC Guidelines for National Greenhouse Gas Inventories for default values.

In addition, there is no net imported power to the CCPG.

The Operating Margin emission factors for 2003, 2004 and 2005 are calculated. The three-year average is calculated as a full-generation-weighted average of the emission factors. For details we can find in the bulletin mentioned above. The published Operation Margin Emission Factor as 1.2899tCO_2e/MWh.
The operating margin emission factor of the baseline is calculated ex-ante and will not be renewed in the first crediting period of the project activity.

STEP 2 Calculate the Build Margin emission factor ($EF_{BM,y}$)

According to ACM0002, the Build Margin Emission Factor is calculated as the generation weighted average emission factor (measured in tCO_2e/MWh) of a sample of *m* power plants. The calculation equation is as follows:

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \times COEF_{i,m,y}}{\sum_{m} GEN_{m,y}} \qquad \text{Equation (B.3)}$$

Where
$F_{i,m,y}$ is the amount of fuel i (in a mass or volume unit) consumed by power plants m in year(s) y,
$COEF_{i,j,m}$ is the CO_2 emission coefficient of fuel i (tCO_2e/mass or volume unit of the fuel), taking into account the carbon content of the fuels used by power plants m and the percent oxidation of the fuel(coal, oil and gas) in year(s) y; and
$GEN_{m,y}$ is the electricity (MWh) delivered to the grid by power plants m.

The methodology supplied the following two options:
Option 1: Calculate the Build Margin emission factor $EF_{BM,y}$ *ex-ante based on the most information available on plants already built for sample group m at the time of PDD submission.*

Option 2: For the first crediting period, the Build Margin emission factor $EF_{BM,y}$ *must be updated annually ex-post for the year in which actual project generation and associated emissions reductions occur. For subsequent crediting periods,* $EF_{BM,y}$ *should be calculated ex-ante, as described in option 1 above.*

Project participants have chosen Option 1.
The sample group *m* consists of either the five power plants that have been built most recently or the power plant capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built recently. Project participants should use from these two options that sample group that comprises the larger annual generation.

However, in China it is very difficult to obtain the data of the five existing power plants built most recently or the power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that were built most recently. Taking notice of this situation, EB accepts[15] the following deviation in methodology application:

1) Capacity addition from one year to another is used as basis for determining the build margin, i.e. the capacity addition over 1 - 4 years, whichever results in a capacity addition that is closest to 20% of total installed capacity.
2) Use proportional weights that correlate to the distribution of installed capacity in place during the selected period above, using plant efficiencies and emission factors of commercially available best practice technology in terms of efficiency. It is suggested to use the efficiency level of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy.

Since there is no way to separate the different generation technology capacities as coal, oil or gas fuel etc from thermal power based on the present statistical data, the following calculation measures will be taken: First, according to the energy balance sheet of the most recent year, we should calculate the ratio of different emissions of CO_2 produced by solid, liquid, and gas fuels for power generation which is part of the total CO_2 emissions; then take this ratio as the weight, take the emission factor based on the commercial optimal efficiency technology level as the base and calculate the emission factor of the thermal power for the grids; finally, multiply this emission factor for thermal power with the ratio of thermal power which is part of the 20% installed capacity addition for the grid, the result is the BM emission factor for the grid.

Sub-step 1
Calculate the proportion of CO_2 emissions of the solid, liquid and gas fuels used to generate power in the total CO_2 emissions of three fuels.

$$\lambda_{Coal} = \frac{\sum_{i \in COAL, j} F_{i,j,y} \times COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \times COEF_{i,j}} \qquad \text{Equation (B.4)}$$

$$\lambda_{Oil} = \frac{\sum_{i \in OIL, j} F_{i,j,y} \times COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \times COEF_{i,j}} \qquad \text{Equation (B.5)}$$

$$\lambda_{Gas} = \frac{\sum_{i \in GAS, j} F_{i,j,y} \times COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \times COEF_{i,j}} \qquad \text{Equation (B.6)}$$

Where,
$F_{i,m,y}$, is the amount of fuel i (in a mass or volume unit) consumed by power sources j in year(s) y,
$COEF_{i,j,m}$ is the CO_2 emission coefficient of fuel i (tCO_2e/mass or volume unit of the fuel), taking into account the carbon content of the fuels used by power plants m and the oxidation percentage of the fuel in year(s) y,
Coal, Oil and *Gas* is solid, liquid and gas fuels respectively.

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

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

$$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv} \qquad \text{Equation (B.7)}$$

Where,
$EF_{Coal,Adv}, EF_{Oil,Adv}, EF_{Gas,Adv}$ are the operating margin emission factors respectively consumed by coal-fired, oil-fired and gas-fired generation technology in the commercial optimization efficiency.

A coal-fired power plant with a total installed capacity of 600MW is assumed to be the commercially available best practice technology in terms of efficiency, the estimated coal consumption of such a National Sub-critical Power Station with a capacity of 600MW is 343.33gce/kWh, which corresponds to an efficiency of 35.82% for electricity generation.

For gas and oil power plants a 200MW power plant with a specific fuel consumption of 258gce/kWh, which corresponds to an efficiency of 47.67% for electricity generation, is selected as commercially available best practice technology in terms of efficiency.

The main parameters used for calculation of the thermal power plant emission factors $EF_{Coal,Adv}$, $EF_{Oil,Adv}$, $EF_{Gas,Adv}$ are provided in Annex 3.

Sub-step 3: Calculate the Build Margin emission factor

$$EF_{BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal} \qquad \text{Equation (B.8)}$$

Where,

CAP_{Total} is the total capacity addition, $CAP_{Thermal}$ is the total thermal power capacity addition.

For details we can find in the bulletin mentioned above. The published Build Margin emission factor is 0.6592tCO_2e/MWh.

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

The data resources for calculating OM and BM are:

1. Installed capacity, power generation and the rate of internal electricity consumption of thermal power plants
   Source: *China Electric Power Yearbook* (2002-2006)
2. Fuel consumption and the net caloric value of thermal power plants
   Source: *China Energy Statistical Yearbook* (2004-2006)
3. Carbon emission factor and carbon oxidation factor of each fuel
   Source: *2006 IPCC Guidelines for National Greenhouse Gas Inventories: Workbook*, Table 1-4 of Page 1.23 and 1.24 in Chapter one of Volume 2.

STEP 3 Calculate the Electricity Baseline Emission Factor (EF_y)

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

$$EF_y = w_{OM} \times EF_{OM,y} + w_{BM} \times EF_{BM,y} \qquad \text{Equation (B.9)}$$

The operating margin emission factor (EF_{OM}) of the CCPG is calculated as 1.2899tCO_2e/MWh and the build margin emission factor (EF_{BM}) is 0.6592tCO_2e/MWh. The defaults weights for hydro power projects are used as specified in the ACM0002 (version 06).

$$w_{OM} = 0.5; w_{BM} = 0.5$$

We calculate a Baseline Emission Factor of 0.97455tCO_2e/MWh.

Emission Reductions (ER_y)

The project activity mainly reduces carbon dioxide through substitution of grid electricity generation with fossil fuel fired power plants by renewable electricity. The emission reduction ER_y by the project activity during a given year y is the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (L_y), as follows:

$$ER_y = BE_y - PE_y - L_y$$ Equation (B.10)

where the baseline emissions (BE_y in tCO_2) are the product of the baseline emissions factor (EF_y in tCO_2/MWh) calculated in Step 3, times the net electricity supplied by the project activity to the grid (EG_y in MWh, see equation B.11) minus the baseline electricity supplied to the grid in the case of modified or retrofit facilities ($EG_{baseline}$ in MWh), as follows:

$$BE_y = (EG_y - EG_{baseline}) \times EF_y$$ Equation (B.11)

There is no modified or retrofit facilities, so $EG_{baseline}$ =0.

the net electricity supplied by the project activity to the grid (EG_y

The power density of Pingbian hydropower station is 25.8W/m^2 which is larger than 10W/m^2 and the Guanyintuo hydropower station is a run-of-river project, According to ACM0002, greenhouse gas emissions from the project activity are zero. Hence $PE_y = 0$;

Based on ACM0002, project participant does not need to consider leakage in applying ACM0002 methodology, i.e. Ly=0.

Therefore, the emission reductions of this proposed project are equal to the baseline emissions, i.e.

$$ER_y = BE_y = EG_y \times EF_y$$ Equation (B.12)

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

Data / Parameter:	$EGP_{y,j}$
Data unit:	MWh
Description:	The Power Generation of Sources j in the years y (2003-2005, including Chongqing, Sichuan, Henan, Jiangxi, Hubei and Hunan)
Source of data used:	*China Electric Power Yearbook 2004-2006*
Value applied:	Provided in Annex 3

Justification of the choice of data or description of measurement methods and procedures actually applied :	Official Statistical Data
Any comment:	To calculate the power delivered to the grid

Data / Parameter:	PR_y
Data unit:	%
Description:	The rate of electricity consumption of thermal power plants of Province m in the years y (2003-2005 including Chongqing, Sichuan, Henan, Jiangxi, Hubei and Hunan)
Source of data used:	*China Electric Power Yearbook 2004-2006*
Value applied:	Provided in Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official Statistical Data
Any comment:	To calculate the power delivered to the grid

Data / Parameter:	$F_{i,,j,y}$
Data unit:	10^4t/10^8m^3
Description:	The Fuel i Consumption of Power Sources j in the years y (2003-2005, including Chongqing, Sichuan, Henan, Jiangxi, Hubei and Hunan)
Source of data used:	*China Energy Statistical Yearbook 2004-2006*
Value applied:	Provided in Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official Statistical Data
Any comment:	To calculate OM and BM

Data / Parameter:	NCV_i
Data unit:	TJ/ fuel in a mass or volume unit
Description:	The NCV_i *of* Fuel i in a mass or volume unit
Source of data used:	*China Energy Statistical Yearbook 2006*
Value applied:	Provided in Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official Statistical Data
Any comment:	To calculate OM and BM

Data / Parameter:	$EF_{CO_2,i}$
Data unit:	tC/TJ
Description:	The *Emission Factor of* Fuel i in a mass or volume unit
Source of data used:	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
Value applied:	Provided in Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC Default Value
Any comment:	To calculate OM and BM

Data / Parameter:	$OXID_i$
Data unit:	%
Description:	The Oxidation Rate of Fuel i
Source of data used:	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
Value applied:	Provided in Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC Default Value
Any comment:	To calculate OM and BM

Data / Parameter:	$GENE_{best,coal}$
Data unit:	%
Description:	Commercially available coal-fired power plant corresponding to the best practice in terms of efficiency
Source of data used:	*China DNA: Bulletin on Baseline Emission Factors of the China Grids-the calculation of baseline Build Margin emission factor for the China Grids*
Value applied:	35.82%
Justification of the choice of data or description of measurement methods and procedures actually applied :	National Fixed Value
Any comment:	To calculate BM

Data / Parameter:	$GENE_{best,oil/gas}$
Data unit:	%
Description:	Commercially available oil and gas power plant corresponding to the best practice in terms of efficiency
Source of data used:	*China DNA: Bulletin on Baseline Emission Factors of the China Grids -the calculation of baseline Build Margin emission factor for the China Grids*
Value applied:	47.67%
Justification of the choice of data or description of measurement methods and procedures actually applied :	National Fixed Value
Any comment:	To calculate BM

Data / Parameter:	$CAP_{y,i}$
Data unit:	MW
Description:	The Installed Capacity of Power Sources j in the years y (2002-2005, including Chongqing, Sichuan, Henan, Jiangxi, Hubei and Hunan)
Source of data used:	*China Electricity Power Yearbook 2003-2006*
Value applied:	Provided in Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official Statistical Data
Any comment:	To calculate BM

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

According to Annex 3, the baseline emission factor of the project is 0.97455tCO_2e/MWh in the first crediting period. The annual electrical power supplied to the grid by the project is 154,303.5MWh.

Therefore, BE_y in the first crediting period is to be calculated as follows:

$$BE_y = EG_y \times EF_y = 150{,}392\text{tCO}_2\text{e}$$

Therefore, in the first crediting period, the annual emission reductions are 150,376tCO_2e.

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

The total emission reductions of the project are 1,052,632tCO_2e during the first crediting period.

Table B.10 Estimate of Emission Reductions Due to the Project

years	Project Emissions (tCO_2e)	Baseline Emissions (tCO_2e)	Leakage (tCO_2e)	Emission Reductions (tCO_2e)
01/05/2009~30/04/2010	0	150,376	0	150,376
01/05/2010~30/04/2011	0	150,376	0	150,376
01/05/2011~30/04/2012	0	150,376	0	150,376
01/05/2012~30/04/2013	0	150,376	0	150,376
01/05/2013~30/04/2014	0	150,376	0	150,376
01/05/2014~30/04/2015	0	150,376	0	150,376
01/05/2015~30/04/2016	0	150,376	0	150,376
Total(tCO_2e)	0	1,052,632	0	1,052,632

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

B.7.1. Data and parameters monitored:

In order to calculate emission of baseline, we need to monitor the electricity supplied to the grid of Pingbian hydropower station ($EG_{s,y,1}$) and Guanyingtuo hydropower station ($EG_{s,y,2}$), the electricity supplied by the grid to Pingbian hydropower station ($PE_{g,y,1}$) and Guanyingtuo hydropower station ($PE_{g,y,2}$), and according to the two data, the total net power supplied to the grid by the project (EG_y) will be calculated as $EG_y = (EG_{s,y,1} - PE_{g,y,1}) + (EG_{s,y,2} - PE_{g,y,2})$.

Table B.11 Data and parameters monitored ($EG_{s,y,1}$)

Data / Parameter:	$EG_{s,y,1}$
Data unit:	MWh
Description:	Electricity supplied by Pingbian hydropower station to the grid in year y
Source of data to be used:	Measured by meter 1
Value of data applied for the purpose of calculating expected emission reductions in section B.5	78,203.5MWh

Description of measurement methods and procedures to be applied:	Measured continuously and recorded on a monthly basis
QA/QC procedures to be applied:	The meters will be periodically checked according to the relevant national electric industry standards and regulations; Electricity supplied to the grid and triple checked according to electricity readings inform and sales invoice.
Any comment:	Refer to B.7.2. Description of the monitoring plan

Table B.12 Data and parameters monitored ($EG_{s,y,2}$)

Data / Parameter:	$EG_{s,y,2}$
Data unit:	MWh
Description:	Electricity supplied to the grid by Guanyintuo hydropower station in year y
Source of data to be used:	Measured by meter 2
Value of data applied for the purpose of calculating expected emission reductions in section B.5	76,100MWh
Description of measurement methods and procedures to be applied:	Measured continuously and recorded on a monthly basis
QA/QC procedures to be applied:	The meters will be periodically checked according to the relevant national electric industry standards and regulations; Electricity supplied to the grid and triple checked according to electricity readings inform and sales invoice.
Any comment:	Refer to B.7.2. Description of the monitoring plan

Table B.13 Data and parameters monitored ($PE_{g,y,1}$)

Data / Parameter:	$PE_{g,y,1}$
Data unit:	MWh
Description:	The electricity supplied by the grid to Pingbian hydropower station in year y
Source of data to be used:	Measured by meter 1
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0MWh
Description of measurement methods and procedures to be applied:	Measured continuously and recorded on a monthly basis
QA/QC procedures to be applied:	The meters will be periodically checked according to the relevant national electric industry standards and regulations; electricity use of power plant and double checked according to purchasing invoice.
Any comment:	Refer to B.7.2. Description of the monitoring plan

Table B.14 Data and parameters monitored ($PE_{g,y,2}$)

Data / Parameter:	$PE_{g,y,2}$
Data unit:	MWh

Description:	The electricity supplied by the grid to Guanyintuo hydropower station in year y
Source of data to be used:	Measured by meter 2
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0MWh
Description of measurement methods and procedures to be applied:	Measured continuously and recorded on a monthly basis
QA/QC procedures to be applied:	The meters will be periodically checked according to the relevant national electric industry standards and regulations; electricity use of power plant and double checked according to purchasing invoice.
Any comment:	Refer to B.7.2. Description of the monitoring plan

B.7.2. Description of the monitoring plan:

The objective of the monitoring plan is to insure the complete, consistent, clear, and accurate monitoring and calculation of the emissions reductions during the whole crediting period. The project owner is responsible for the implementation of the monitoring plan, and the Grid Company cooperates with the project owner.

1. Monitoring Objective

Because the baseline emission factor is fixed by Ex-ante calculation, the main monitoring data are electricity supplied to the grid and the electricity use of power plant supplied by the grid thus gets the net electricity supplied to the grid.

2. Monitoring Organization

The project owner will establish a specialized control centre for project monitoring. And a chief monitoring officer will be appointed by the project owner, who will be responsible for verification of the measurement, collection of electricity readings inform, sales invoice and purchases invoice, and the calculation of the emissions reductions. The monitoring officer will prepare operational reports of the project activity, recording the daily operation of the hydropower station including operating periods; electricity supplied to the grid; equipment defects, etc. The selection procedure, tasks and responsibilities of the monitoring officer are described in detail in Annex 4. Finally, the monitoring reports will be reviewed and internal audited by the General Manager of Pingshan Zhongxing Electrometallurgy Co., Ltd.

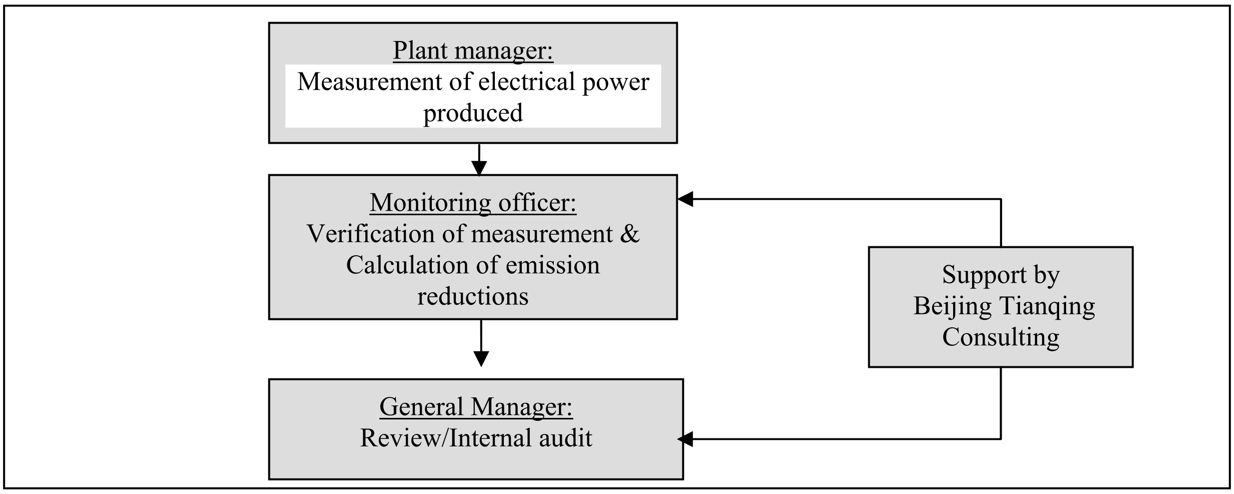


Figure B.2. Management structure in order to monitor emission reductions

3. Monitoring Equipment and Program

According to the *Technical Administrative Code of Electric Energy Metering (DL/T448 - 2000),* the electric energy metering equipment will be properly configured, and the metering equipment will be checked by both the project owner and the grid company before the project starts operation.

The project will be connected to the grid through two on-site transformer substations which increase the voltage of Pingbian and Guanyintuo hydropower stations to 110kV respectively. The project is then connected to the Oujiacun 220kV transformer substation which functions as a switching station to connect the project to the grid. The electricity supplied to the grid will be metered by the project owner at a point after electricity has been transformed to 110kV (M3 and M4 in figure B.3 as follows). Therefore, no further transformer losses will occur before the project is connected to the grid. In case of emergencies, the hydropower station could also receive electricity for auxiliary power consumption from the Oujiacun transformer substation which will be metered and deducted from electricity supplied to the grid.

The grid company will measure the electricity supplied to the grid at Oujiacun 220kV transformer station with its own metering equipment (meter M1 and M2). The grid company will issue on the basis of the readings of M1 and M2 an electricity readings inform for power received from the project and then the project owner provide a sales invoice to the grid company based on the electricity readings inform, and also a purchase invoice for power supplied by the grid company will be supplied to the project owner by the grid company. The regulations of the grid company require annual calibrations of both locations. Calibrations are carried out by the qualified metrical organization and the results will be submitted to the Grid Company and the project owner. After calibration, meter M1 and M2 will be sealed. The accuracy of the metering instruments M1 and M2 is Accuracy Class 0.5S. If there are any substantial discrepancies between the readings of the metering instruments throughout the year, both instruments will be recalibrated.

The electricity supply of the project to the grid will be measured by meter M3 and M4 for Pingbian and Guanyintuo hydropower stations respectively, which are located at the high-voltage side of the step-up transformer station that will be constructed at the project site. The metering instrument M3 and M4 will all record two readings, i.e. power supplied to the grid and power received from the grid. The project owner will log both readings and the difference, i.e. electricity supplied minus electricity received, will be taken as power supply through the main power line (note that for the calculation of total net supply).

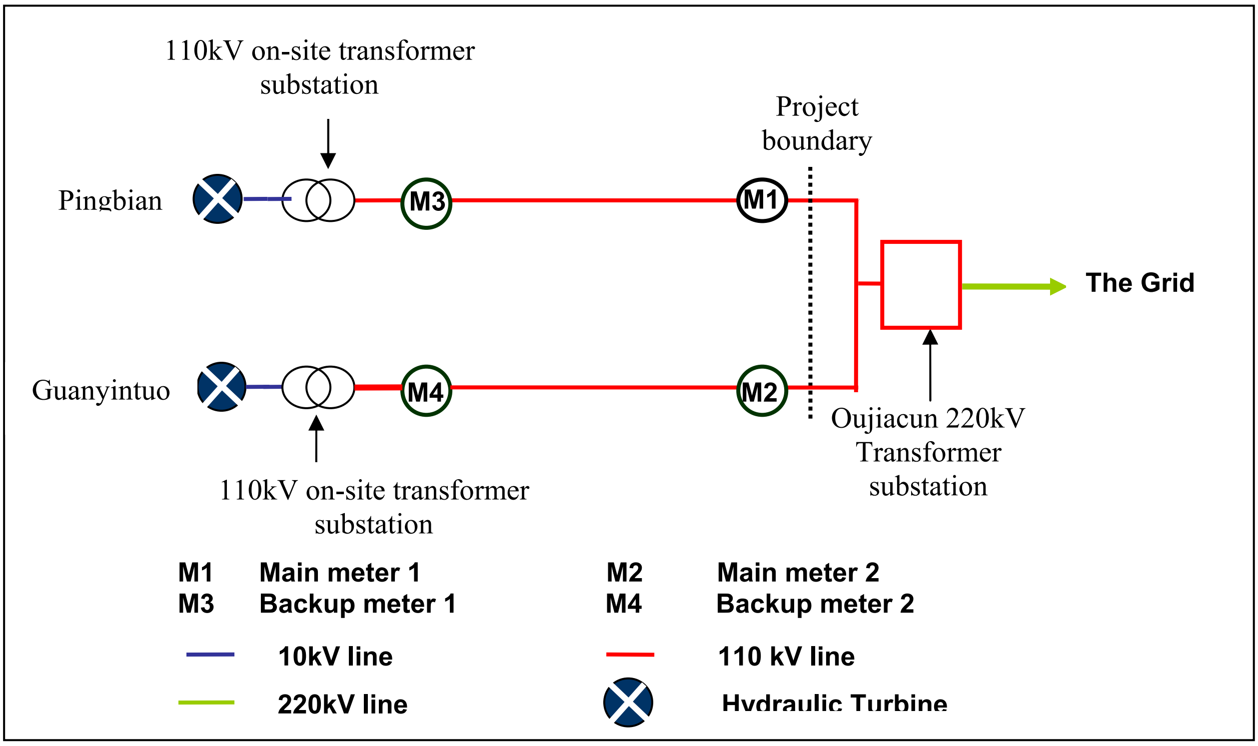


Figure B.3. Simplified electrical grid connection diagram

4. Data Collection:

The project owner and the Grid Company are responsible for monitoring of the backup meters and the main meters, and guarantee the measuring equipments are in good operation and with complete seal.

The electricity recorded by the main meter alone will suffice for the purpose of electricity readings inform, sales invoice, and emission reductions verification as long as the accuracy of the Main Meter is within the permissible tolerance. The main monitoring process is as follows:

- i The project owner and Grid Company read and check the backup meter and the main meter on the main lines, and records the data on 25th of every month;
- ii The Grid Company supplies the electricity readings inform to the project owner;
- iii The project owner provides an electricity sales invoice to the Grid Company. A copy of the invoice will be stored by the project owner, together with the electricity readings inform supplied by the grid company.
- iv The project owner receive an electricity purchases invoice supplied by the Grid Company provides, and the invoice is stored by the project owner.
- v The project owner records the net electricity supplied to the grid(electricity supplied minus electricity received);
- vi The project owner keeps and safeguards the records of the main meter's data readings for verification by the DOE.

If inaccuracy of the reading data from the main meter has exceeded the allowable tolerance or otherwise the meter functioned will operate in one certain month, or any other unexpected problems, the grid-connected electricity generated by this proposed project shall be followed by:

- i Reading the backup meter to obtain electricity supplied to the grid, unless a test by either party reveals it is inaccurate;

ii If the backup system is not within the acceptable tolerance limit or otherwise performed improperly, this proposed project owner and the Grid Company shall jointly prepare a new agreement for the correct reading; and

iii If this proposed project owner and the Grid Company fail to agree on the correct reading, the matter will be referred to arbitration according to agreed procedures.

The meter reading will be readily accessible for the DOE. Calibration test records will be maintained for verification.

5. Calibration

The verification of electric energy meter should be periodically carried out according to relevant national electric industry standards or regulations. After verification, meters should be sealed. All meters shall be jointly inspected and sealed on behalf of the project owner and Grid Company and shall not be accessible by either party except in the presence of the other party or its accredited representatives,

All the meters installed shall be tested by the qualified metrical organization co-authorized by the project owner and Grid Company within 10 days after:

i The detection of a difference larger than the allowable error in the readings of the main meter and the backup meter;

ii Repair the meter caused by the failure of operation.

6. Data Management

Data will be archived at the end of each month using electronic spreadsheets. The electronic files will be stored on hard disk and CD-ROM. In addition, a hard copy printout will be archived. In addition, the project owner will collect electricity readings inform, sales invoice and purchases invoice as a cross-check. At the end of each crediting year, a monitoring report will be compiled detailing the metering results and evidence (i.e. electricity readings inform, sales invoice and purchases invoice).

Physical documentation such as, paper-based maps, diagrams and environmental assessment, will be collected in a central place, together with the monitoring plan. In order to facilitate the auditor's reference, monitoring results will be indexed. All paper-based information will be stored by the project owner.

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

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

Date of completion: 19/11/2008
Name of persons determining the baseline:

Alex Yang, General Manager, Beijing Tianqing Power International CDM Consulting, Co., Ltd.
Tel: +86-10-62199416/62199450
Fax: +86-10-62166196/62164780
Email: aiminyang820@yahoo.com.cn
(Not Project Participant)

Mona Zheng, Beijing Tianqing Power International CDM Consulting, Co., Ltd.
Tel: +86-10-62199416/62199450
Fax: +86-10-62166196/62164780
Email: mona_22542@yahoo.com.cn
(Not Project Participant)

Tracy Yuan, Beijing Tianqing Power International CDM Consulting, Co., Ltd.

Tel: +86-10-62199416/62199450
Fax: +86-10-62166196/62164780
Email: abeautytracy@yahoo.com.cn
(Not Project Participant)

Dr. Naoki Matsuo
Climate Experts Ltd.
Ratio 1002, Tsukiji 1-10-11, Chuo-ku, Tokyo 104-0045, Japan
Phone : +81-70-55982236
Fax : +81-46-8771734
n_matsuo@climate-experts.info
(Not Project Participant)

Asako Yamamoto
Climate Experts Ltd.
Ratio 1002, Tsukiji 1-10-11, Chuo-ku, Tokyo 104-0045, Japan
Phone : +81-90-35219167
Fax : +81-46-8771734
asako_yamamoto@climate-experts.info
(Not Project Participant)

Yoshiji Kubo
Climate Experts Ltd.
RATIO 1002,Tsukiji 1-10-11,Chuo-ku,Tokyo 104-0045, Japan
Phone: 046-875-4138
Yoshi_kubo@climate-experts.info
(Not 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:

13/06/2006 (the date of the Purchase Contracts of Turbines and Generators for Pingbian and Guanyintuo hydropower stations, which is the earliest starting date of the project activity)

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

The expected operational lifetime is 20 and 30 years for the Pingbian and Guanyintuo hydropower stations respectively.

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:

01/05/2009 (The crediting period will not commence prior to the date of registration)

C.2.1.2. Length of the first crediting period:

7 years

C.2.2. Fixed crediting period:

Not applicable

C.2.2.1. Starting date:

C.2.2.2. Length:

SECTION D. Environmental impacts

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

According to the relevant environmental law and regulations, an environmental impact assessment had been carried out, and has been approved on Nov. 7th, 2005 by the Environmental Protection Bureau of Yinbin City. The main assessment conclusions are be provided below:

I. Environmental Impact Analysis during the Construction Period

1. Wastewater

The wastewater produced during the construction period will consist of industrial wastewater and domestic wastewater. The construction wastewater has a high content of suspended solids from washing the gravel aggregate. It is basically alkaline, but does not contain toxic substances. Therefore, industrial waste water will be collected in simple rectangular tanks for sedimentation, re-used as much as possible and finally discharged in the Xining River. As for domestic wastewater, a sufficient number of rest rooms will be provided along with their centralized fecal treatment facilities.

2. Impact on Ambient Air

The main concern about air pollution from the construction activity is exhaust from the construction equipment and dust from excavation and blasting of earth-rock, stone sieving and concrete mixing. However, as the concrete mixing plants and stone sieving facilities are set up at the construction sites of the power plants and dam which located far from residential areas, there will be little impact on local residents.

3. Noise

The noise from the construction period is mainly due to blasting, digging, drilling, stone sieving, concrete pouring, transportation vehicles and construction machines. This might have some impact on nearby residents.

In order to lower the noise level, low noise machines will be used. And working hours will be reasonably planed in order to reduce night time work including limit blasting activities during night time.

4. Solid waste

The solid waste consists of slag waste and domestic waste.
The Pingbian hydropower station will prepare 7 waste dumping fields with a total capacity of 322,000 m^3.
The Guanyintuo hydropower station will prepare 5 waste slag fields with a total capacity of 359,300 m^3.
According to soil and water conservation requirements, side slope disposal and vegetation replacement will be undertaken for all the dumping fields. The domestic waste produced during the construction period will be treated and disposed of sanitary fill.

5. Impact on Soil and Water Loss

The requisitioned land, exploitation of the slag material, waster slag piling, etc. which will occur during construction period will destroy and change the original landform and the surface vegetation in the working area. Engineering measures such as various slurry building to protect the slope, combined with small regional vegetation replacement measures, will be employed in order to soil and water loss.

6 Impact of Land Requisition on Land Utilization

The project is located in a remote mountain and gorge and there are no local residents around the project, thus, there are neither migrants nor any pollution that will affect local residents, and little negative impact on the environment.

The requisitioned land in the project can be divided into two parts: permanently requisitioned land and temporarily requisitioned land. The permanently requisitioned land for the Pingbian hydropower station is 5.2 hectares, and the temporarily requisitioned land 3.53hectares. The permanently requisitioned land for the Guanyintuo hydropower station is 5.92hectares and temporarily requisitioned land 4.15 hectares.

The tilled land requisitioned during the construction period is minimal. The requisitioned land is mostly woodland and wasteland which is otherwise difficult to utilize. Project participant will take necessary measures in order to minimize the negative impacts on temporarily requisitioned land, such as offer compensation for seedlings and other vegetation losses. Therefore, the negative impact on the life of local residents is very small.

7 Impact on ecosystem

The construction of this proposed project may have some impacts on the terrestrial and hydrophytic biology. However, there are no rare, precious or migrating fish. Therefore, the impact on fish resources in Xining is limited and will not affect biological diversity.

II. Environmental Impact Analysis during the Operation Period

The following permanent environmental impacts are foreseen:

The project activity may have an effect on terrestrial and aquatic life, especially fish. However, in the case of fish, the impact is quite limited because, as we can see in the existing power station dams, Oujiacun and Xuetuo in the lower reaches, fish in those sections are already scarce and there are no fishermen.

After protective measure are taken, it is possible for the waste discharged to reach acceptable standards thus, reducing to a minimum the influence on the ecosystem and contributing to controlling the quality of the environment. From the above analysis, the negative impact is negligible.

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:

All of project participants and host party involved considered that there is little negative environmental impact of this proposed project.

SECTION E. Stakeholders' comments

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

Before the meeting, questionnaires were given out to local residents in order to investigate their opinions on the construction of the Sichuan Pingshan Pingbian&Guanyintuo Hydropower Station.

In addition, a special stakeholder consultation meeting on the project was organized at 8:00-12:00 on May 17, 2006 in the City of Yibin, Sichuan Province, to collect opinions from all of the potential stakeholders such as local residents.In order to ensure the potential stakeholders obtain the information on the meeting, the project owner published a bulletin in the *Yibin Daily newspaper* on May 12, 2006 concerning the stakeholders' meeting, and also publicized the meeting bulletin via the following website, www.tqcdmchina.com on May 10, 2006. In the bulletin, the companies noted that all the potential stakeholders had access to the detailed information concerning the project. At the meeting, the project owner and the consultant invited the participants to express their concerns and comment concerning the project and the CDM. The representatives asked the following questions focusing on the CDM and the project and received satisfactory answers from experts.

Questions from the stakeholders to the project participants:
1. What impact will this project have on the local government, will we benefit from it?
2. What is the revenue policy of China concerning the CDM project?
3. Are there migrants and flooded areas as a result of this project?
4. Will the construction have some impacts on local residents such as noise and pollution of the drinking water?

Questions from the project participants to the stakeholders:
1. Were you familiar with the CDM before this meeting?
2. After the construction of the hydropower station is complete, will there be any impact on the income of local residents? Will there be any negative impact on income?
3. Is there any evidence proving that income will be increased?
4. Was it convenient to use electricity before? What major fuel is used by local residents in their daily activities?
5. If the electricity power supply is abundant, will local residents use electricity instead of burning fuel wood?
6. Do you support the Pinshan Zhongxing Electrometallurgy Co., Ltd. in their application for the CDM project?

E.2. Summary of the comments received:

We have reclaimed 20 questionnaires, the interviewees are all villagers of Pingbian, 40% are women, and 95% are junior high school graduates or inferior. 100%think that there is a shortage of electricity in the local area, of which 60% think the situation is serious; 100% think the construction of the hydropower station will bring benefits to their lives and all of them agree with the construction of the project.

From the questionnaires and stakeholders' meeting, we find that all, local government and residents, agree with the construction of the project. All stakeholders think that the hydropower station is located in remote mountains and canyon, so there is no impact due to flooding and no migration. There are no residents near the project, therefore, the local residents will not suffer from pollution, and the negative environmental impacts are limited. The construction of the Pingbian&Guanyintuo hydropower station will not only increase the local residents' incomes, but also will build new roads and bridges thus improve the transportation condition. The project will provide electricity power to residents for daily life and for manufacturing, improve the quality of life of local residents, such as, bring about an increase in their income and promote service industries, such as food, beverage, accommodation and retail. The impacts of the proposed project are positive, so all support the construction of this project.

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

Given the generally positive (or neutral) nature of the comments received, no action has been taken to address the comments received.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

The Project Entity:

Organization:	Pinshan Zhongxing Electrometallurgy Co., Ltd.
Street/P.O.Box:	Huilong Village, Pingshan Town
Building:	The fourth floor of the Jinjiang Passenger Station
City:	Pingshan County, Yibin City
State/Region:	Sichuan Province
Postfix/ZIP:	645350
Country:	China
Telephone:	+86-831-5725301
FAX:	+86-831-5725301
E-Mail:	sczhongxing@126.com
URL:	/
Represented by:	Huang zhijun
Title:	assistant general manager
Salutation:	Mr.
Last Name:	Huang
Middle Name:	/
First Name:	Zhijun
Department:	/
Mobile:	+86-13700930992
Direct FAX:	+86-831-5627849
Direct Tel:	+86-831-5627746
Personal E-Mail:	hzjhxhmy@126.com

The Buyer

Organization:	ENEL Trade SpA
Street/P.O.Box:	Viale Regina Margherita, 125
Building:	/
City:	Rome
State/Region:	/
Postfix/ZIP:	00198
Country:	Italy
Telephone:	+44-20-79848709
FAX:	+44-20-79848661
E-Mail:	/
URL:	http://www.enel.it
Represented by:	Eliano Russo
Title:	/
Salutation:	Mr.
Last Name:	Russo
Middle Name:	/
First Name:	Eliano
Department:	/
Mobile:	/
Direct FAX:	+39-06-83054394
Direct tel:	+39-06-83058506
Personal E-Mail:	Eliano.russo@enel.it

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding from Annex I parties used in the project activity.

Annex 3

BASELINE INFORMATION

Table1. Calculation of the Thermal Power supplied to the CCPG in 2003

Province	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan
Thermal power Generation (MWh)	27,165,000	95,518,000	39,532,000	29,501,000	16,341,000	27,879,000
Rate of Electricity Consumption of Power Plant (%)	6.43	7.68	3.81	4.58	8.97	4.41
Thermal power Supplied to the Grid (MWh)	25,418,290.5	88,182,217.6	38,025,830.8	28,149,854.2	14,875,212.3	31,336,313.8
Total Thermal Power Supplied to the CCPG (MWh)	225,987,719.2					

Data source: 2004 China Electric Power Yearbook.

Table2. Calculation of the Thermal Power supplied to the CCPG in 2004

Province	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan
Thermal Power Generation (MWh)	30,127,000	109,352,000	43,034,000	37,186,000	16,520,000	34,627,000
Rate of Electricity Consumption of Power Plant (%)	7.04	8.19	6.58	7.47	11.06	9.41
Thermal Power Supplied to the Grid (MWh)	28,006,059.2	100,396,071.2	40,202,362.8	34,408,205.8	14,692,888.0	31,368,599.3
Total Thermal Power Supplied to the CCPG (MWh)	249,074,186.3					

Data source: 2005 China Electric Power Yearbook.

Table3. Calculation of the Thermal Power supplied to the CCPG in 2005

Province	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan
Thermal power Generation (MWh)	30,000,000	131,590,000	47,700,000	39,900,000	17,584,000	37,202,000
Rate of Electricity Consumption of Power Plant (%)	6.48	7.32	2.51	5	8.05	4.27
Thermal Power Supplied to the Grid (MWh)	28,056,000.0	121,957,612.0	46,502,730.0	37,905,000.0	16,168,488.0	356,13,474.6
Total Thermal Power Supplied to the CCPG (MWh)	286,203,304.6					

Data Source: 2006 China Electric Power Yearbook.

Table 4. Energy Consumption Statistics of Power Generation of the CCPG in 2003

Fuel	Unit	Jiangxi A	Henan B	Hubei C	Hunan D	Chongqing E	Sichuan F	The CCPG G=A+B+C+D+E+F
Raw coal	Ten thousand Tons	1,427.41	5,504.94	2,072.44	1,646.47	769.47	2,430.93	13,851.66
Clean coal	Ten thousand Tons	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other washed coal	Ten thousand Tons	2.03	39.63	0.00	0.00	106.12	0.00	147.78
Coke	Ten thousand Tons	0.00	0.00	0.00	1.22	0.00	0.00	1.22
Coke oven gas	10^8 Cubic meter	0.00	0.00	0.93	0.00	0.00	0.00	0.93
Other gas	10^8 Cubic meter	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crude oil	Ten thousand Tons	0.00	0.50	0.24	0.00	0.00	1.20	1.94
Gasoline	Ten thousand Tons	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diesel oil	Ten thousand Tons	0.52	2.54	0.69	1.21	0.77	0.00	5.73
Fuel oil	Ten thousand Tons	0.42	0.25	2.17	0.54	0.28	1.20	4.86
LPG	Ten thousand Tons	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Refinery gas	Ten thousand Tons	1.76	6.53	0.00	0.66	0.00	0.00	8.95
Natural gas	10^8 Cubic meter	0.00	0.00	0.00	0.00	0.04	2.2	2.24
Other petroleum products	Ten thousand Tons	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other coking products	Ten thousand Tons	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Energy	Ten thousand Tce	0.00	11.04	0.00	0.00	16.2	0.00	27.24

Data Source: China Energy Statistical Yearbook 2004.

Table 5. Energy Consumption Statistics of Power Generation of the CCPG in 2004

Fuel	Unit	Jiangxi A	Henan B	Hubei C	Hunan D	Chongqing E	Sichuan F	The CCPG G=A+B+C+D+E+F
Raw coal	Ten thousand Tons	1,863.80	6,948.50	2,510.50	2,197.90	875.50	2,747.90	17,144.10
Clean coal	Ten thousand Tons	0.00	2.34	0.00	0.00	0.00	0.00	2.34
Other washed coal	Ten thousand Tons	48.93	104.22	0.00	0.00	89.72	0.00	242.87
Coke	Ten thousand Tons	0.00	109.61	0.00	0.00	0.00	0.00	109.61
Coke oven gas	10^8 Cubic meter	0.00	0.00	1.68	0.00	0.34	0.00	2.02
Other gas	10^8 Cubic meter	0.00	0.00	0.00	0.00	2.61	0.00	2.61
Crude oil	Ten thousand Tons	0.00	0.86	0.22	0.00	0.00	0.00	1.08
Gasoline	Ten thousand Tons	0.00	0.06	0.00	0.00	0.01	0.00	0.07
Diesel oil	Ten thousand Tons	0.02	3.86	1.7	1.72	1.14	0.00	8.44
Fuel oil	Ten thousand Tons	1.09	0.19	9.55	1.38	0.48	1.68	14.37
LPG	Ten thousand Tons	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Refinery gas	Ten thousand Tons	3.52	2.27	0.00	0.00	0.00	0.00	5.79
Natural gas	10^8 Cubic meter	0.00	0.00	0.00	0.00	0.00	2.27	2.27
Other petroleum products	Ten thousand Tons	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other coking products	Ten thousand Tons	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Energy	Ten thousand Tce	0.00	16.92	0.00	15.2	20.95	0.00	53.07

Data Source: China Energy Statistical Yearbook 2005.

Table 6. Energy Consumption Statistics of Power Generation of the CCPG in 2005

Fuel	Unit	Jiangxi A	Henan B	Hubei C	Hunan D	Chongqing E	Sichuan F	The CCPG G=A+B+C+D+E+F
Raw coal	Ten thousand Tons	1,869.29	7,638.87	2,732.15	1,712.27	875.40	2,999.77	17,827.75
Clean coal	Ten thousand Tons	0.02	0.00	0.00	0.00	0.00	0.00	0.02
Other washed coal	Ten thousand Tons	0.00	138.12	0.00	0.00	89.99	0.00	228.11
Coke	Ten thousand Tons	0.00	25.95	0.00	105.00	0.00	0.00	130.95
Coke oven gas	10^8 Cubic meter	0.00	0.00	1.15	0.00	0.36	0.00	1.51
Other gas	10^8 Cubic meter	0.00	10.20	0.00	0.00	3.12	0.00	13.32
Crude oil	Ten thousand Tons	0.00	0.82	0.36	0.00	0.00	0.00	1.18
Gasoline	Ten thousand Tons	0.00	0.02	0.00	0.00	0.02	0.00	0.04
Diesel oil	Ten thousand Tons	1.30	3.03	2.39	1.39	1.38	0.00	9.49
Fuel oil	Ten thousand Tons	0.64	0.29	3.15	1.68	0.89	2.22	8.87
LPG	Ten thousand Tons	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Refinery gas	Ten thousand Tons	0.71	3.41	1.76	0.78	0.00	0.00	6.66
Natural gas	10^8 Cubic meter	0.00	0.00	0.00	0.00	0.00	3.00	3.00
Other petroleum products	Ten thousand Tons	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other coking products	Ten thousand Tons	0.00	0.00	0.00	1.50	0.00	0.00	1.50
Other Energy	Ten thousand Tce	0.00	2.88	0.00	1.74	32.80	0.00	37.42

Data Source: China Energy Statistical Yearbook 2006.

Table 7. The Operation Margin Emission Factor Calculation of the CCPG in 2003

Fuel	Unit	Fuel Consumption of The Central China Grid in 2003 G	Emission Factor H (tc/TJ)	Oxidation Rate I (%)	Average NCV J (MJ/t,km^3)	CO_2 Emission(tCO_2e) K=G*H*I*J*44/12/10000 (for quality unit) K=G*H*I*J*44/12/1000 (for volume unit)
Raw coal	Ten thousand Tons	13,851.66	25.8	100.0	20,908	273,971,539.89
Clean coal	Ten thousand Tons	0.00	25.8	100.0	26,344	0.00
Other washed coal	Ten thousand Tons	147.78	25.8	100.0	8,363	1,169,146.40
Coke	Ten thousand Tons	1.22	25.8	100.0	28,435	32,817.40
Coke oven gas	10^8 Cubic meter	0.93	12.1	100.0	16,726	69,013.15
Other gas	10^8 Cubic meter	0.00	12.1	100.0	5,227	0.00
Crude oil	Ten thousand Tons	1.94	20.0	100.0	41,816	59,490.23
Gasoline	Ten thousand Tons	0.00	18.9	100.0	43,070	0.00
Diesel oil	Ten thousand Tons	5.73	20.2	100.0	42,652	181,015.94
Fuel oil	Ten thousand Tons	4.86	21.1	100.0	41,816	157,229.00
LPG	Ten thousand Tons	0.00	17.2	100.0	50,179	0.00
Refinery gas	Ten thousand Tons	8.95	18.2	100.0	46,055	275,069.63
Natural gas	10^8 Cubic meter	2.24	15.3	100.0	38,931	489,222.52
Other petroleum products	Ten thousand Tons	0.00	20.0	100.0	38,369	0.00
Other coking products	Ten thousand Tons	0.00	25.8	100.0	28,435	0.00
Other Energy	Ten thousand Tce	27.24	27.3	100.0	0	0.00
Total Emission (Q)		276,404,544.15tCO_2e				
Thermal Power supplied to the CCPG (P)		225,987,719.20MWh				
OM Emission Factor in 2003 [= Q/P]		1.223095tCO_2e/MWh				

Data sources: China Energy Statistical Yearbook 2004; 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Page 1.23 and 1.24 in Chapter one of Volume 2.

Table 8. The Operation Margin Emission Factor Calculation of the CCPG in 2004

Fuel	Unit	Fuel Consumption of the CCPG in 2003 G	Emission Factor H（tc/TJ）	Oxidation Rate I (%)	Average NCV J (MJ/t,km^3)	CO_2 Emission(tCO_2e) K=G*H*I*J*44/12/10000 (for quality unit) K=G*H*I*J*44/12/1000 (for volume unit)
Raw coal	Ten thousand Tons	17,144.10	25.8	100.0	20,908	339,092,605.29
Clean coal	Ten thousand Tons	2.34	25.8	100.0	26,344	58,316.13
Other washed coal	Ten thousand Tons	242.87	25.8	100.0	8,363	1,921,441.23
Coke	Ten thousand Tons	109.61	25.8	100.0	28,435	2,948,455.29
Coke oven gas	10^8 Cubic meter	2.02	12.1	100.0	16,726	149,899.53
Other gas	10^8 Cubic meter	2.61	12.1	100.0	5,227	60,527.09
Crude oil	Ten thousand Tons	1.08	20.0	100.0	41,816	33,118.27
Gasoline	Ten thousand Tons	0.07	18.9	100.0	42,652	2,089.33
Diesel oil	Ten thousand Tons	8.44	20.2	100.0	41,816	266,627.32
Fuel oil	Ten thousand Tons	14.37	21.1	100.0	50,179	464,893.14
LPG	Ten thousand Tons	0.00	17.2	100.0	46,055	0.00
Refinery gas	Ten thousand Tons	5.79	18.2	100.0	38,931	177,950.07
Natural gas	10^8 Cubic meter	2.27	15.3	100.0	38,369	495,774.61
Other petroleum products	Ten thousand Tons	0.00	20.0	100.0	28,435	0.00
Other coking products	Ten thousand Tons	0.00	25.8	100.0	0	0.00
Other Energy	Ten thousand Tce	53.07	27.3	0.0	0	0.00
Total Emission (Q)		345,671,697.30tCO_2e				
Thermal Power supplied to the CCPG (P)		249,074,186.30MWh				
OM Emission Factor in 2004 [= Q/P]		1.387826tCO_2e/MWh				

Data sources: China Energy Statistical Yearbook 2005; 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Workbook: Page 1.23 and 1.24 in Chapter one of Volume 2.

Table 9. The Operation Margin Emission Factor Calculation of the CCPG in 2005

Fuel	Unit	Fuel Consumption of the CCPG in 2003 G	Emission Factor H（tc/TJ）	Oxidation Rate I (%)	Average NCV J (MJ/t,km^3)	CO_2 Emission(tCO_2e) K=G*H*I*J*44/12/10000 (for quality unit) K=G*H*I*J*44/12/1000 (for volume unit)
Raw coal	Ten thousand Tons	17,827.75	25.8	100.0	20,908	352,614,496.76
Clean coal	Ten thousand Tons	0.02	25.8	100.0	26,344	498.43
Other washed coal	Ten thousand Tons	228.11	25.8	100.0	8,363	1,804,669.00
Coke	Ten thousand Tons	130.95	25.8	100.0	28,435	3,522,490.83
Coke oven gas	10^8 Cubic meter	1.51	12.1	100.0	16,726	112,053.61
Other gas	10^8 Cubic meter	13.32	12.1	100.0	5,227	308,896.88
Crude oil	Ten thousand Tons	1.18	20.0	100.0	41,816	36,184.78
Gasoline	Ten thousand Tons	0.04	18.9	100.0	43,070	1,193.90
Diesel oil	Ten thousand Tons	9.49	20.2	100.0	42,652	299,797.78
Fuel oil	Ten thousand Tons	8.87	21.1	100.0	41,816	286,959.09
LPG	Ten thousand Tons	0.00	17.2	100.0	50,179	0.00
Refinery gas	Ten thousand Tons	6.66	18.2	100.0	46,055	204,688.68
Natural gas	10^8 Cubic meter	3.00	15.3	100.0	38,931	655,208.73
Other petroleum products	Ten thousand Tons	0.00	20.0	100.0	38,369	0.00
Other coking products	Ten thousand Tons	1.50	25.8	100.0	28,435	40,349.27
Other Energy	Ten thousand Tce	37.42	27.3	100.0	0	0.00
Total Emission (Q)		359,887,487.74tCO_2e				
Thermal Power supplied to the CCPG (P)		286,203,304.60MWh				
OM Emission Factor in 2005 [= Q/P]		1.257454tCO_2e/MWh				

Data sources: China Energy Statistical Yearbook 2006; 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Workbook: Page 1.23 and 1.24 in Chapter one of Volume 2.

According to electricity supplied to the grid of fire power, the OM of latest three years should be weighted average, so the weighted average OM is:

$$EF_{OM,y} = \frac{(1.223095 \times 225{,}987{,}719.20 + 1.387826 \times 249{,}074{,}186.30 + 1.257454 \times 286{,}203{,}304.60)}{(225{,}987{,}719.20 + 249{,}074{,}186.30 + 286{,}203{,}304.60)} = 1.2899 tCO_2e / MWh$$

Table10. Calculation of CO_2 Emission of Solid, Liquid and Gas Fuel for Power Generation in 2005

Fuel	Unit	Jiangxi A	Henan B	Hubei C	Hunan D	Chongqing E	Sichuan F	Total G=A+B+C +D+E+F	NCV kJ/kg kJ/m^3 H	Emission Factor I	Oxidation Rate J	CO_2 emission (tCO_2e)	λ_{Coal}, λ_{Oil} λ_{Gas}
Raw coal	10^4 Tons	1,869.29	7,638.87	2,732.15	1,712.27	875.40	2,747.90	17,827.75	20,908	25.80	1.00	352,614,497	-
Clean coal	10^4 Tons	0.02	0.00	0.00	0.00	0.00	0.00	0.02	26,344	25.80	1.00	498	-
Other washed coal	10^4 Tons	0.00	138.12	0.00	0.00	89.99	0.00	228.11	8,363	25.80	1.00	1,804,669	-
Coke	10^4 Tons	0.00	25.95	0.00	106.50	0.00	0.00	132.45	28,435	25.80	1.00	3,562,840	
Subtotal	-	-	-	-	-	-	-	-	-	-	-	357,982,504	99.47%
Crude oil	10^4 Tons	0.00	0.82	0.36	0.00	0.00	0.00	1.18	41,816	20.00	1.00	36,185	-
Gasoline	10^4 Tons	0.00	0.02	0.00	0.00	0.02	0.00	0.04	43,070	18.90	1.00	1,194	-
Coal oil	10^4 Tons	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43,070	19.60	1.00	0	-
Diesel oil	10^4 Tons	1.30	3.03	2.39	1.39	1.38	0.00	9.49	42,652	20.20	1.00	299,798	-
Fuel oil	10^4 Tons	0.64	0.29	3.15	1.68	0.89	1.68	8.87	41,816	21.10	1.00	286,959	-
Other petroleum products	10^4 Tons	0.00	0.00	0.00	0.00	0.00	0.00	0.00	38,369	20.00	1.00	0	-
Subtotal	-	-	-	-	-	-	-	-	-	-	-	624,136	0.17%
Natural gas	10^7 m^3	0.00	0.00	0.00	0.00	0.00	30.00	30.00	38,931	15.30	1.00	655,209	-
Coke oven gas	10^7 m^3	0.00	0.00	11.50	0.00	3.60	0.00	15.10	16,726	12.10	1.00	112,054	-
Other gas	10^7 m^3	0.00	102.00	0.00	0.00	31.20	0.00	133.20	5,227	12.10	1.00	308,897	-
LPG	10^4 Tons	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50,179	17.20	1.00	0	-
Refinery gas	10^4 Tons	0.71	3.41	1.76	0.78	0.00	0.00	6.66	46,055	18.20	1.00	204,689	-
Subtotal	-	-	-	-	-	-	-	-	-	-	-	1,280,848	0.36%
Total	-	-	-	-	-	-	-	-	-	-	-	359,887,488	100%

Table11. Calculating of Emission Factor for Various Power Plant

	Variable	Power Supply Efficiency L	Emission Factor for Fuels (tc/TJ) I	Oxidation Rate J	Emission Factor (tCO_2e/MWh) O=3.6/L/1000*I *J*44/12
Coal-fired Power Plant	$EF_{Coal,Adv}$	35.82%	25.8	1	0.9508
Gas-fired Power Plant	$EF_{Oil,Adv}$	47.67%	15.3	1	0.4237
Oil-fired Power Plant	$EF_{Gas,Adv}$	47.67%	21.1	1	0.5843

Therefore, the emission factor of thermal power is:

$$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv} = 0.9482 tCO_2e/MWh$$

Table12. Installed Capacity of the CCPG in 2005

Installed Capacity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total
Thermal Power	MW	5,906.0	26,267.8	9,526.3	7,211.6	3,759.5	7,496.0	60,167.2
Hydro Power	MW	3,019.0	2,539.9	8,088.9	7,905.1	1,892.7	14,959.6	38,405.2
Nuclear Power	MW	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wind Power and others	MW	0.0	0.0	0.0	0.0	24.0	0.0	24.0
Total	MW	8,925.0	28,807.7	17,615.2	15,116.7	5,676.2	22,455.6	98,596.4

Data Source: 2006 China Electric Power Yearbook.

Table13. Installed Capacity of the CCPG in 2003

Installed Capacity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total
Thermal Power	MW	5,407.8	17,635.5	8,173.3	6,446.7	3,126.2	6,104.0	46,893.5
Hydro Power	MW	2,307.4	2,438.0	7,337.2	6,603.1	1,329.8	12,341.5	32,357.0
Nuclear Power	MW	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wind Power and others	MW	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	MW	7,715.2	20,073.5	19,710.5	13,049.8	4,456.0	18,445.5	79,250.5

Data Source: 2004 China Electric Power Yearbook.

Table14. Installed Capacity of the CCPG in 2002

Installed Capacity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total
Thermal Power	MW	5,128.8	15,904.5	8,147.8	4,975.6	3,004.5	6,142.0	43,303.2
Hydro Power	MW	2,197.4	2,438.0	7,213.9	6,135.3	1,195.5	11,854.6	31,034.7
Nuclear Power	MW	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wind Power and others	MW	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	MW	7,326.2	18,342.5	15,361.7	11,110.9	4,200.0	17,996.6	74,337.9

Data Source: 2003China Electric Power Yearbook.

Table15. The BM Calculation of the CCPG

	Installed Capacity in 2002	Installed Capacity in 2003	Installed Capacity in 2005	Capacity Addition Of 2002-2005	Ratio of Capacity Addition
Thermal Power（MW）	43,303.2	46,893.5	60,167.2	16,864.0	69.52%
Hydro Power（MW）	31,034.7	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%
Percent of Installed Capacity in2004	75.40%	80.38%	100.00%	-	-

Therefore, the BM was calculated as $EF_{BM,y} = 0.9485 \times 69.52\% = 0.6594 tCO_2e/MWh$.

The baseline emission factor was calculated as the weighted average of the OM Emission Factor (1.2899tCO_2e/MWh) and the BM Emission Factor（0.6592tCO_2e/MWh）. The defaults weights for hydropower projects are used as 0.5 respectively. We obtain a baseline emission factor of 0.97455tCO_2e/MWh.

Annex 4

MONITORING INFORMATION

Selection procedure:
The monitoring officer will be appointed by the general manager of Pinshan Zhongxing Electrometallurgy Co., Ltd. The monitoring officer will be selected from among the senior technical or managerial staff. Before he/she commences monitoring duties, he/she will receive training on monitoring requirements and procedures by Beijing Tianqing Power International CDM Consulting, Co., Ltd.

Tasks and responsibilities:
The monitoring officer will be responsible for carrying out the following tasks

- **Supervise and verify metering and recording:**
  The monitoring officer will coordinate with the plant manager to ensure and verify adequate metering and recording of data, including electricity supplied to the grid.
- **Collection of additional data, electricity readings inform, sales / purchases invoices:**
  The monitoring officer will collect electricity readings inform and sales invoice for power supplied to the grid, purchases invoice for power supplied by the grid to the hydropower station and additional data such as the daily operational reports of the hydropower station.
- **Calibration:**
  The monitoring officer will coordinate with staff of the project owner to ensure that calibration of the metering instruments is carried out periodically in accordance with regulations of the grid company.
- **Calculation of emission reductions:**
  The monitoring officer will calculate the annual emission reductions on the basis of net power supply to the grid. The monitoring officer will be provided with a calculation template in electronic form by the project's CDM advisors.
- **Preparation of monitoring report:**
  The monitoring officer will annually prepare a monitoring report which will include among others a summary of daily operations, metering values of power supplied to and received from the grid, copies of electricity readings inform, sales/purchases invoice, a report on calibration and a calculation of emission reductions.

Support:
The monitoring officer will receive support from Beijing Tianqing Power International CDM Consulting, Co., Ltd. in his/her responsibilities through the following actions:

- Initial training on CDM, monitoring methodology, monitoring procedures and requirements and archiving
- Provide the monitoring officer with a calculation template in electronic form for calculation of annual emission reductions
- Continuous advice to the monitoring officer on a need basis
- Review of monitoring reports