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

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Revision history of this document

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

SECTION A. General description of small-scale project activity

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

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Sichuan Heishui Zhawo No.1 Hydropower Project
Version number of the document: 2
Date: 04/06/2009

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

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The Sichuan Heishui Zhawo No.1 Hydropower Project (hereafter refers to the proposed project) is to utilize hydro resources for electricity generation through the installation and operation of Sichuan Heishui Zhawo No.1 hydropower station, which is downstream the first level right branch of Maoergai River-Daguxili Channel and located in Heishui County in Aba Tibetan and Qiang Autonomous Prefecture, Sichuan Province, P.R.China. The station is a run-of-river type small-scale hydropower station with the total installed capacity of 6.4MW (2×3200kW). The annual operating hour is 5,351 hours and the total power generation is 34,247MWh. The net power supply to the grid is 29,725MWh per year. The power generated from the proposed project will be sold to Sichuan Power Grid, an integral part of the Central China Power Grid.

Grid-connected fossil fuel-fired power plants are dominated in the Central China Power Grid. The proposed project activity will achieve obvious greenhouse gas (GHG) emission reductions by avoiding CO_2 emissions. The estimated average annual emission reduction of the proposed project will be 28,968tCO_2e in the first crediting period.

The proposed project contributes to the local sustainable development as follows:

1. GHG emission reduction
The proposed project activity will achieve obvious greenhouse gas (GHG) emission reductions by avoiding CO_2 emissions, as grid-connected fossil fuel-fired power plants are dominated in the Central China Power Grid. The annual emission reduction will be 28,968tCO_2e in the first crediting period.

2. Pollutants emission reduction through replacing fossil fuel combustion
The proposed project is to replace grid-connected fossil fuel-fired power plants in the Central China Power Grid, and thus reduce fossil fuel consumption and avoid pollutants emission, such as sulfur dioxide and dust, brought by fossil fuel combustion. Therefore, the proposed project has obvious environmental benefit.

3. Employment opportunities
The conducting of the proposed project will offer about 30 permanent job opportunities for local people; achieve the economic growth in the region.

4. Promote western region's development
The proposed project activity is located at Aba Tibetan and Qiang Autonomous Prefecture, Sichuan Province in western region, which is one of the under-developed and minority areas in China. The conducting of the proposed project will promote economic development in this area.

Furthermore, the proposed project plans to utilize domestic made state-of-the-art hydropower technology to promote Chinese hydropower industry by increasing its market share and the government revenue.

A.3. Project participants:

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Name of Party involved(*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Peoples' Republic of China (host)	Heishui Sanlian Hydropower Development Co., Ltd.	No
Netherlands	Rabobank International	No
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

Further contact information of project participants is provided in Annex 1.

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

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

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A.4.1.1. Host Party(ies):

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People's Republic of China

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

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Sichuan Province

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

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Heishui County, Aba Tibetan and Qiang Autonomous Prefecture

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

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The proposed project activity is located on downstream the first level right branch of Maoergai River-Daguxili Channel in Aba Tibetan and Qiang Autonomous Prefecture, Heishui County, Sichuan Province, P.R.China, which is 45km away from the centre of Heishui County. Its geographical co-ordinates are east longitude 103°08′30″ and north latitude 32°09′57″. Geographical location of the project is shown in Figure A1 and A2.

Figure A1. The proposed project in the map of P. R. China

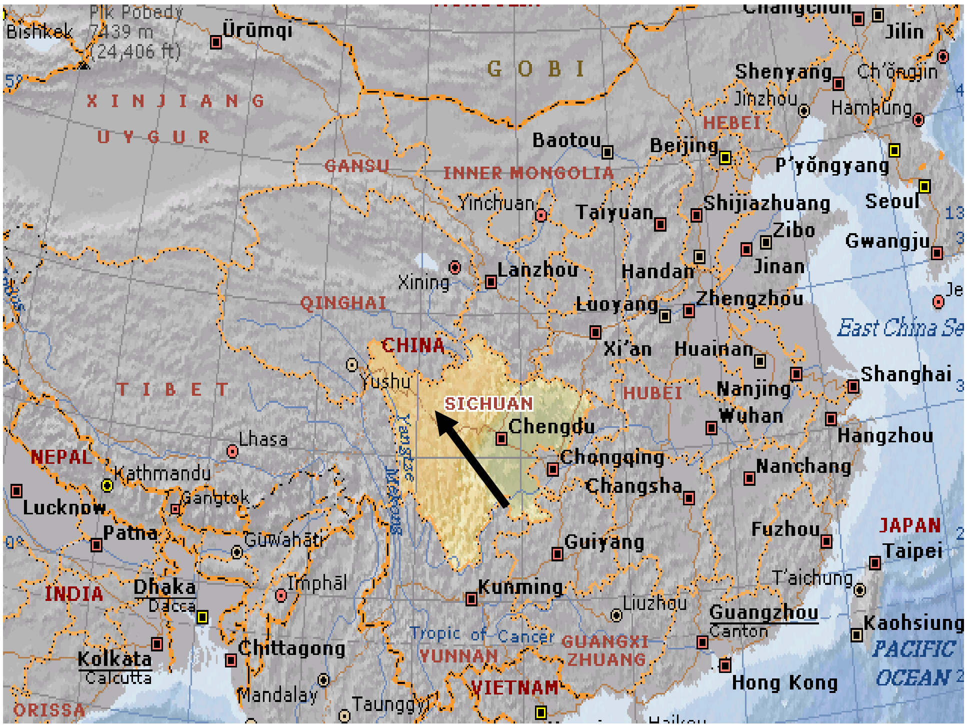
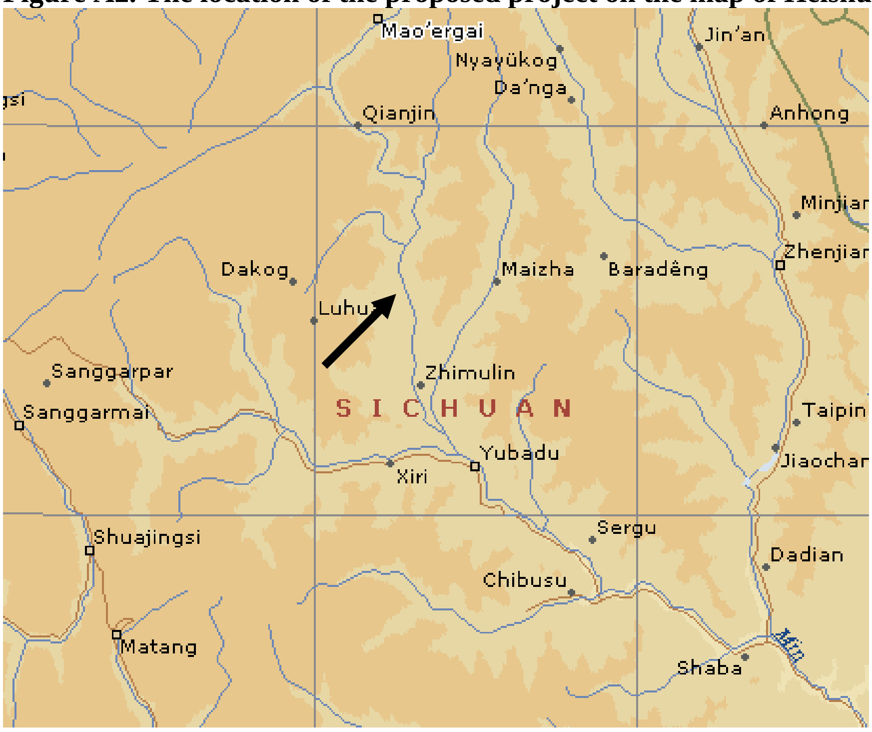


Figure A2. The location of the proposed project on the map of Heishui County



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

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Type and category(ies) of the small-scale project activity

The project activity utilizes hydropower for electricity generation, which falls into the category of renewable energy. According to the existing rules for small-scale CDM projects, the threshold capacity of the small-scale renewable energy projects should be under 15MW. Since the total installed capacity of the proposed project is 6.4MW, not exceeding the threshold capacity of 15MW, the project activity can be regarded as a small-scale CDM project activity. The capacity of the proposed project will remain under the limits for small-scale CDM project activity during every year over the crediting period.

The power generated is exported to the Central China Power Grid. Therefore, according to small-scale CDM modalities, the project activity falls under: Type – I Renewable Energy Projects, and Category I-D - Renewable Electricity Generation for a Grid.

Technology of the small-scale project activity

The construction of the proposed project consists mainly of dam, diversion structures and power plant. The proposed project is a hydropower project with an installed capacity of 6.4MW, consisting of two 3.2MW generators. The annual operational hour is 5,351 hours and the annual total power generation is 34,247MWh. Considering the efficient power coefficient[1] of 0.8975, the on-site consumed power ratio of 0.3% and the transmission loss ratio of 3%, the net power supply to the grid is thus 29,725MWh per year after subtracting all the power loss above. The model of Hydro-Turbine Engine is CJA475-W-115/2×11.5 and the model of Generator is SFW3200-10/1730. The main technical data of generator and hydro-turbine units are provided in the following table.

Main Technical Data		Value
Hydraulic turbines	Type	CJA475-W-115/2×11.5
	Units	2
	Rated rotation speed	600 r/min
	Rated water head	305m
	Rated flow rate	1.264m^3/s
	Efficiency	≥90%
Generators	Type	SFW3200-10/1730
	Units	2
	Rated capacity	3.2MW
	Rated rotation speed	600 r/min
	Load factor	0.8
	Efficiency	≥95%

The proposed project will not involve the construction of a reservoir but will build a low rolling dam and a water head is formed through the penstock, taking advantage of mechanical height drop in nature. The voltage of the generated power from the proposed hydropower station will be raised from 6.5kV to 35kV near the station. Then it will be connected to 35kV Substation in Heishui County, and finally be connected to Sichuan Provincial Power Grid, which is an integral part of Central China Power Grid. Grid-

[1] Efficient power coefficient is calculated based on the balance of quantity of electricity and electrical power. But most of the middle-size and small-size power station calculated it based on the actual situation of the hydropower station and the table of efficient power coefficient choice. The evidence has been provided to DOE.

connected electricity generated by the proposed project will be monitored through metering equipments (meter monitoring both electricity input and electricity output) at high voltage side in the 35kV substation which belongs to the Grid Company. The data can also be monitored and recorded at the on-site control centre using a computer system.

The proposed project utilizes domestic state-of-the-art hydropower technology, thus does not involve technology transfer.

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

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A crediting period of 7 (01/12/2009-30/11/2016) years (renewable twice) is selected for the project activity. An estimation of emissions reductions expected over the first crediting period is 202,776tCO_2e. The concrete estimation is provided in the table below.

Years	**Estimation of annual emission reductions in tonnes of CO_2e**
01/12/2009-30/11/2010	**28,968**
01/12/2010-30/11/2011	**28,968**
01/12/2011-30/11/2012	**28,968**
01/12/2012-30/11/2013	**28,968**
01/12/2013-30/11/2014	**28,968**
01/12/2014-30/11/2015	**28,968**
01/12/2015-30/11/2016	**28,968**
Total estimated reductions (tonnes of CO_2e)	**202,776**
Total number of crediting years	**7**
Annual average of the estimated reductions over the crediting period (tCO_2e)	**28,968**

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

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There is no public funding for the proposed project and there is no involvement of the public development funding in Annex 1.

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

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According to Annex 27 of EB 36th meeting-"Compendium of guidance on the debundling for SSC project activities", a proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

(a) With the same project participants;
(b) In the same project category and technology/measure; and
(c) Registered within the previous 2 years; and
(d) Whose project boundary is within 1 km of the project boundary of the proposed small scale activity at the closest point.

The project participants further confirm that they have not registered any small-scale CDM project activity or applied to register another small-scale CDM project activity within one kilometre of the project boundary of the proposed project at the closest point, in the same project category and technology/measure during recent two years. Consequently, the proposed project is not a debundled component of any large scale project activity.

SECTION B. Application of a baseline and monitoring methodology

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

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The approved methodology employed for the proposed project will be AMS-I.D. Renewable electricity generation for a grid, version 13. The methodology can be found from:

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

The approved "Tool to calculate the emission factor for an electricity system (version 01.1)" will be employed for calculating baseline emission factor. The methodology can be found from:

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

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

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The proposed project satisfies the applicable conditions of methodology AMS-I.D. which are listed as follows:

1. It is the hydropower station connected the Central China Power Grid;
2. The capacity is 6.4MW, lower than 15MW. The installed capacity of the proposed project will remain under the limits of small-scale project activity types during every year of the crediting period.

According to small-scale CDM modalities, the project chooses the approved methodology AMS-I.D..

B.3. Description of the project boundary:

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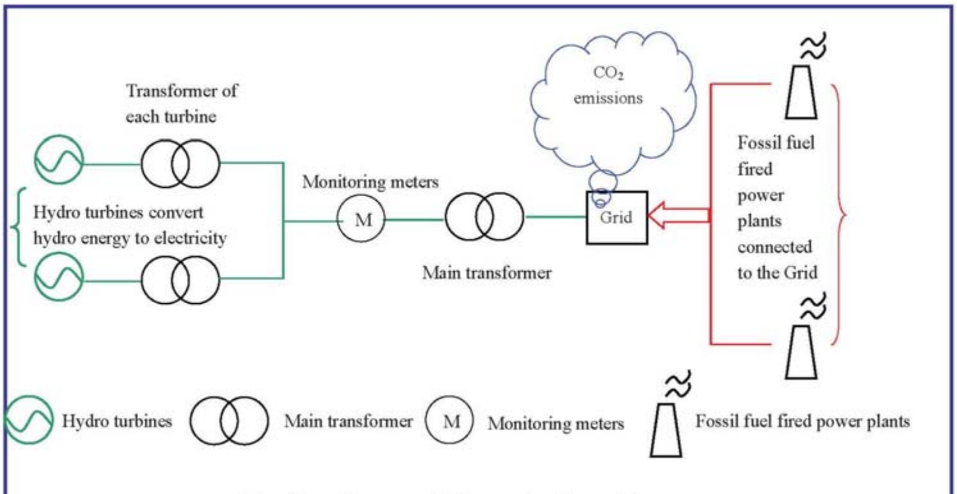
The specific project boundary, as stated in Appendix B of the simplified modalities and procedures for small-scale CDM project activities, encompasses the physical, geographical site of the renewable generation source.

In this specific case, the station will be connected to the Grid and then to the Sichuan Provincial Power Grid, and finally, to the Central China Power Grid. The Central China Power Grid is a larger regional grid, which consists of six sub-grids: Jiangxi, Henan, Hubei, Hunan, Chongqing and Sichuan Grids. The Central China Power Grid is identified as the correct project boundary for the proposed project.



The flow diagram of the project boundary

	Source	Gas	Included?	Justification / Explanation
Baseline	Fossil fuel-fired power plants in the Central China Power Grid	CO_2	Yes	Major emission sources
		CH_4	No	Excluded for simplification, it is conservative.
		N_2O	No	Excluded for simplification, it is conservative.
Project Activity	Hydropower Project	CO_2	No	No GHG emissions from hydropower projects.
		CH_4	No	There is no reservoir or flooded area, therefore, power density issue does not exist.
		N_2O	No	Excluded according to methodology

B.4. Description of baseline and its development:

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In absence of the proposed project, reasonable and credible baseline scenario alternatives to the proposed project that are in accordance with current laws and regulations include:
The proposed project not taken as CDM project;
Construction of a fossil fuel power plant with equivalent amount of annual electricity output;
Construction of a power plant using other source of renewable energy with equivalent amount of annual electricity output; and
Supply of equivalent annual power output by the Central China Power Grid to which the proposed project is connected.

Specific analysis on the four alternative scenarios in absence of the proposed project is as follows:
According to the investment barrier analysis in B5, the proposed project is a small-scale hydropower project in rural areas with an installed capacity of 6.4MW. Without CDM revenue, the Project IRR of the proposed project is only 8.12%, which is lower than the sector benchmark rate. Therefore, the development of the proposed project under a fully commercialized condition without CDM could not be financially attractive. Therefore, the Scenario 1) could not be considered as an alternative baseline scenario.

The alternative fossil fuel power plant with the equivalent power output as the proposed project will be less than 135MW, while coal-fired plants with a capacity of 135MW or less are prohibited from development in large grid such as provincial girds[2] and fossil fuel-fired plants with a capacity of 100MW or less are strictly prohibited from development[3] according to current regulations in China. Consequently, this is not a feasible alternative scenario to replace the proposed project.

Besides hydropower, solar PV, geothermal, biomass and wind power are the possible grid-connected renewable energy technologies that could be applied in the Central China Power Grid. Due to the technology development status and the high cost for power generation, solar PV[4], geothermal[5] and biomass[6] of the similar installed capacity as the proposed project are alternatives far from being attractive investment in the grid in China. And because of the lack of usable wind resources around the location of the proposed project[7], it impossible to develop wind power projects within the project boundary. Hence the Scenario 3) is not feasible as an alternative baseline scenario.

The alternative baseline scenario of supply of equivalent annual power output by the Central China Power Grid is in compliance with Chinese relevant laws and regulations, and without financial barrier. Hence, the alternative 4) is a feasible alternative baseline scenario.

According to the small scale methodology AMS-I.D. (Version 13), the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO_2e/kWh) calculated in a transparent and conservative manner as:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the ‘Tool to calculate the emission factor for an electricity system’.

OR

(b) The weighted average emissions (in kg CO_2e/kWh) of the current generation mix. The data of the year

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[2] Notice on Strictly Prohibiting the Installation of Fuel-fired Generation with the Capacity of 135MW or below issued by the General Office of the State Council, decree no. 2002-6

[3] Notice on Strictly Prohibiting the Installation and Equipments Production of Small Scale Fuel-fired Generation, decree no. 1995-2372

[4] Source: Page 50, *China Solar PV Report 2007*, China Environment Science Press. The cost of solar PV is 0.5 USD/kWh, which is around 3.7 RMB/kWh. The cost of solar PV is far higher than that of wind power, and thus not a attractive renewable energy technology for China at this moment

[5] Source: Page 6 of *Overview of Chinese Renewable Energy Development*, NDRC/GEF/Word Bank China Renewable Energy Development Project, 05/2004. Geothermal technology is still in demonstration stage in China.

[6] Source: Biomass generation needs policy supply due to the high investment cost http://finance.21cn.com/news/cydt/2007/06/28/3319602.shtml. The investment cost of the first biomass generation project (Shandong Shanxian Biomass Generation Project) which was put into delivery in 12/2006 is around 13 thousand RMB /kW. The investment cost of the proposed project is 8.96 thousand RMB /kW (total investment cost/installed capacity). Therefore, it can be seen clearly that the unit investment of biomass is higher than that of the proposed project.

[7] The average wind speed around the location of the proposed project is just 2.1m/s (Source: Page 1-2, Feasibility Study Report of the proposed project), but wind turbines normally require 3m/s for start-up.

in which project generation occurs must be used.

Therefore, the baseline of the proposed project is the net power supply produced by the proposed project multiplied by an emission coefficient calculated using Option (a).

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

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Considering CDM before the proposed project restarted

The Feasibility Study Report (FSR) of the proposed project was developed by Hydropower Design and Research Team in Aba Bureau of Agricultural Machinery and Hydropower in October 2004 and approved by the Development and Reform Commission of Aba Tibetan and Qiang Autonomous Prefecture on 8 August 2005. The proposed project started construction on 12 August 2005. But due to the increase of the price of raw materials and the construction work loads, the total investment cost increased a lot compared to the one estimated in the approved FSR. Considering the construction of the proposed project was hard to continue because of the shortage of funds, the board held a meeting on 26 October 2006 and decided to stop the construction[8]. The proposed project stopped construction on 7 November 2006[9]. But after several months, it was still difficult to raise money for the construction. So on 28 February 2007, the board held a meeting and decided to transfer the ownership of the proposed project besides all the shares of the project company, Heishui Sanlian Hydropower Development Co., Ltd[10].

Hearing this news, Beijing Energy Corporation, Ltd. wanted to grasp this chance. But based on the assessment upon the increased total investment cost of the proposed project (adjusted FSR) made by the same designer of the approved FSR in March 2007[11], Beijing Energy Corporation, Ltd. realized that the IRR of the proposed project was much lower than the benchmark and the investment return would also be low except seeking additional financial support from CDM to make the proposed project feasible. On 19 April 2007, Beijing Energy Corporation, Ltd. held a meeting discussing to develop the proposed project as CDM project after it was transferred[12]. On 27 June 2007, the Agreement of transferring the proposed project and 100% share of the project company was signed between the board of Heishui Sanlian Hydropower Development Co., Ltd. and Beijing Energy Corporation, Ltd[13]. Being the subsidiary company of Beijing Energy Corporation, Ltd., the project owner, Heishui Sanlian Hydropower Development Co., Ltd. restarted the construction of the proposed project in June 2007[14].

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[8] *Board decision on stopping the construction of the proposed project* was provided to the DOE.

[9] *Notice of stopping the construction of the proposed project* issued by the supervision company was provided to the DOE

[10] *Board decision on transferring the ownership of the proposed project* was provided to the DOE

[11] *The assessment on increased total investment cost* of the proposed project (adjusted FSR) was provided to the DOE

[12] *Meeting minutes of developing the proposed project as CDM project* was provided to the DOE

[13] *Agreement of transferring the proposed project* was provided to the DOE

[14] Evidence of restarting the proposed project was provided to the DOE.

Then the CDM Consulting Contract was signed on 18 September 2007, and the Application for China LoA was submitted to the China DNA on 16 January 2008. On 23 January 2008, the Term Sheet was signed between the project owner and Rabobank[15]. The PDD of the proposed project was uploaded for GSP on 1 April 2008.

Time schedule of the proposed project is as follow:

Time	Milestone
10/2004	Feasibility Study Report (FSR) developed
08/08/2005	FSR approved
12/08/2005	Construction started
26/10/2006	Board decision on stopping the construction of the proposed project came out
07/11/2006	Notice of stopping the construction of the proposed project issued by the supervision company
28/02/2007	Board decision on transferring the ownership of the proposed project came out
03/2007	The assessment on increased total investment cost of the proposed project (adjusted FSR) developed
19/04/2007	Meeting minutes of Beijing Energy Corporation, Ltd upon developing the proposed project as CDM project came out
19/05/2007	Hydro turbines purchase agreement signed[16]
20/06/2007	Meeting minutes of local People's Government regarding the transfer of the proposed project came out[17]
27/06/2007	Agreement of transferring the proposed project signed
06/2007	Construction restarted
18/09/2007	CDM Consulting Contract signed
01/12/2007	Development of the first version of the PDD started
16/01/2008	Application for China LoA was submitted to the China DNA
23/01/2008	The Term Sheet between the project owner and Rabobank signed
27/03/2008	Validation proposal signed
01/04/2008	The PDD uploaded for GSP
11/06/2008	China LoA obtained
26/08/2008	LoA of Netherlands obtained

[15] The CDM consulting contract, the application for China LoA and the Term Sheet were all provided to the DOE.

[16] The signed hydro turbines purchase agreement was provided to the DOE.

[17] *Meeting minutes of local People's Government regarding the transfer of the proposed project* was provided to the DOE.

From the analysis above, it is clearly that the CDM had been seriously considered by the project owner before continuing the construction of the proposed project.

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

(a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions;

(b) Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;

(c) Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;

(d) Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

The additionality of the proposed project is demonstrated and assessed by the investment analysis, which was carried out based on the "Tool for the demonstration and assessment of additionality" (Version 05.2)" Following steps include:

Investment analysis

With reference to the *Economic Evaluation Code for Small Hydropower Projects* (SL16-95)[18] promulgated by Ministry of Water Resources of People's Republic of China in June 1995, the financial benchmark IRR of Chinese small hydropower projects is 10% on total investment, which has been used widely in feasibility studies of small hydropower projects in China since 1995 and is still applicable at present. *Guidance on the Assessment of Investment Analysis* which has been recently published by EB is also referenced in the calculation.

The proposed project is a small-scale hydropower project. Due to the small installed capacity and low project IRR, the proposed project faces the obvious investment barrier. The calculation and analysis of financial indicators of the proposed project are as follows:

(1) Basic parameters for calculation of financial indicators
Based on the *Assessment on Increased Total Investment Cost* of the proposed project[19], basic parameters for calculation of financial indicators are as follows:
Installed capacity: 6.4MW (Source: *Assessment on Increased Total Investment Cost*, Page 2)
Annual output: 29.725MWh (Source: *Assessment on Increased Total Investment Cost*, Page 2)

[18] The code was approved by Water Resource Ministry of P. R. China. Source is from the literatures on the website of Wuhan University Library. http://apps.lib.whu.edu.cn/12/test/gfbz/2/j/xsdpj.html

[19] The *Assessment on Increased Total Investment Cost* of the proposed project was developed by the qualified organization, Hydropower Design and Research Team in Aba Bureau of Agricultural Machinery and Hydropower, in March 2007 to assess the economic status of the proposed project before it restarted.

Project lifetime: 22 years (2 year of construction and 20 years of operation) (Source: *Assessment on Increased Total Investment Cost*, Page 4)
Total investment: 49,657.5 thousand RMB (equity/debt ratio: 30/70) (Source: *Assessment on Increased Total Investment Cost*, Page 2)
O&M cost: 732.1 thousand RMB/year (Source: *Assessment on Increased Total Investment Cost*, Page 5)
Tariff: 0.22RMB/KWh (including VAT) (Source: *Assessment on Increased Total Investment Cost*, Page 4)
Depreciation rate: 4% (Source: *Assessment on Increased Total Investment Cost*, Page 4)
Tax: 6% (VAT), 5%(city tax), 3%(education tax) 25% (income tax) (*Assessment on Increased Total Investment Cost*, Page 5)
Expected CERs price: Euro 9.0/tCO_2e (Source: the project owner)

(2) Comparison of IRR for the proposed project and the financial benchmark
The proposed project will not be considered as financially attractive if its financial indicators (such as IRR) are lower than the benchmark rate.

Table 1 shows the fluctuating situation of IRR of the proposed project, with and without CDM revenues. Without the CDM revenue, the Project IRR is lower than the benchmark rate 10%. Thus without CDM revenues, the proposed project faces the obvious financial barrier and does not look financially attractive to the investors. However, with the CDM revenue, Project IRR is significantly improved and exceeds the benchmark rate. Therefore, the proposed project with the CDM revenue can be considered as financially viable to the investors.

Table 1. Financial indicators of the Sichuan Heishui Zhawo No.1 Hydropower project

	Project IRR (Benchmark=10%)
Without CDM revenue	8.12%
With CDM revenue	14.37%

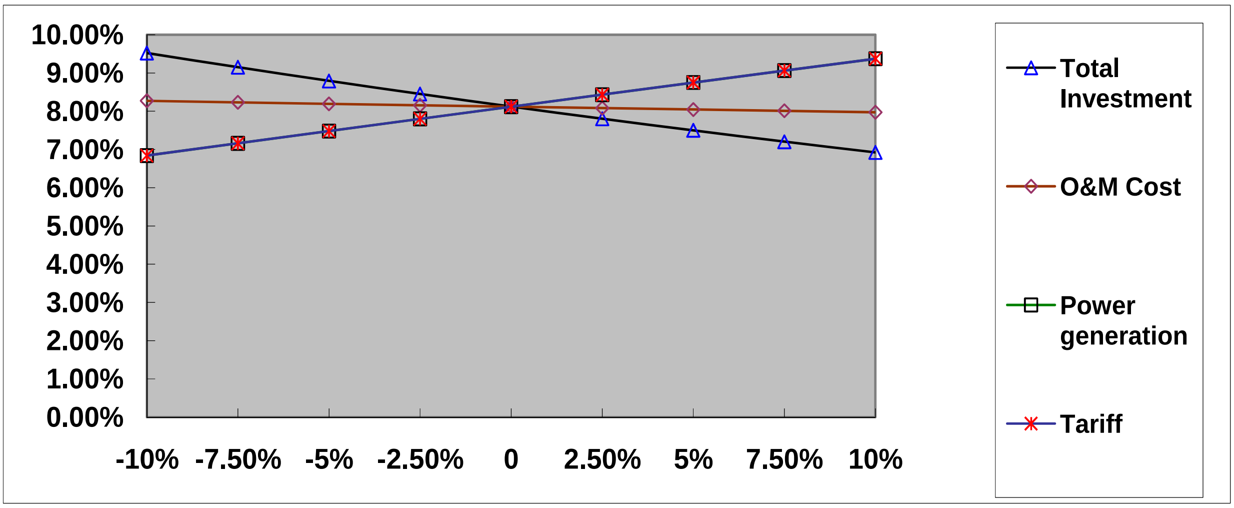
(3) Sensitivity analysis
Four financial parameters including: total investment, annual O&M cost, power generation and tariff were identified as the main variable factors for sensitive analysis of financial attractiveness. The impacts of the parameters changing between -10％ and 10％ on Project IRR were analyzed in this step.

For detailed results of sensitive analysis of the four indicators, please see Table 2.

Table 2. Sensitivity of Project IRR to different financial parameters

Range / Parameters	-10%	-7.50%	-5%	-2.50%	0	2.50%	5%	7.50%	10%
Total investment	9.52%	9.15%	8.79%	8.45%	8.12%	7.80%	7.50%	7.20%	6.92%
O&M cost	8.27%	8.23%	8.19%	8.15%	8.12%	8.08%	8.04%	8.01%	7.97%
Power generation	6.84%	7.16%	7.48%	7.80%	8.12%	8.43%	8.75%	9.06%	9.37%
Tariff	6.84%	7.16%	7.48%	7.80%	8.12%	8.43%	8.75%	9.06%	9.37%

Figure 2. Sensitivity of Project IRR to different financial parameters



From Table 2 and Figure 2, as the chosen parameters vary from -10% to 10%, the Project IRR is always below 10%, showing that the financial indicators have insignificant impact on IRR of the project. Thus, the sensitivity analysis confirms that the proposed project faces a rigorous financial barrier and hence presents a clear additionality.

As to the total investment, it needs to be decreased by 13%, the IRR will exceed the benchmark of 10%. Since the cost of materials is the main expense of the total investment during construction, a 13% decrease in investment costs is highly unlikely, given that the prices of materials, such as iron and cement, have been increasing in recent years[20]. According to the statistics of China Renewable Energy Ration Station, the construction and installation costs of hydropower stations raised. These increases demonstrate that a decrease in investment costs is unlikely realistic. Hence, the IRR of the project will not reach 10%.

As to the power generation, it needs to be increased by 15%, the IRR will exceed the benchmark of 10%. The power generation in the Feasibility Study Report (FSR) of the proposed project is calculated based on the monitored data of the local hydro resources[21] and standardized formula that are widely used[22]. And the power generation in the adjusted FSR was the same as that in the FSR. The calculated power generation is the average value over the project life time, and it has taken into account for the yearly variation in power generation, therefore, the power generation of the proposed project is not possible to increase 15%.

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[20] http://www.hydrocost.org.cn/price/priceIndex.jsp

[21] The hydro resources assessment of the proposed project was assessed by more than 40 years' hydrologic data from Heishui Hydrological Station. (Source: Chapter 2, Hydrology, Feasibility Study Report of the proposed project.)

[22] Standardized formula used to calculate the power generation of the proposed project. (Source: Chapter 4, Engineering Task and Scale, Feasibility Study Report of the proposed project.)

As for the fluctuation of the tariff, it needs to be increased by 15%, the IRR will exceed the benchmark of 10%. Considering it was regulated by the Heishui Power Company[23] and is even higher than the local electricity tariff in Aba Tibetan and Qiang Autonomous Region[24], it is also not possible for the tariff of the proposed project to increase 15%.

The impact of the annual O&M cost is slight as shown in the figure 1, when it decreases 100%, the IRR will still lower than the benchmark of 10%. And considering the fact that the material cost is increasing in the market, the possibility for O&M cost to decrease is not realistic. Hence, the Project IRR is not sensitive to total static investment, annual O&M cost, net electricity supply and tariff.

In conclusion of the sensitive analysis, as the financial indicators vary within reasonable range, the proposed project is unlikely to be financially attractive without CDM support. Hence, the Scenario 1) is not a realistic alternative.

Therefore, the proposed project is not the baseline scenario, but is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>
The GHG emission calculation of the proposed project was based on the instruction of "Tool to calculate the emission factor for an electricity system (version 01.1)".All the data employed in the calculation is based on the available data from Central China Power Grid. The baseline emission factor (EF_y) is calculated as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) factors according to the following six steps(OM and BM of the proposed project has been pre-determined):

STEP 1. Identify the relevant electric power system

The DNA of the host country has published a delineation of the project electricity system and connected electricity systems, this delineation is used. The project electricity system is the Central China Power Grid, which consists of Chongqing, Henan, Hubei, Hunan, Jiangxi and Sichuan. The proposed project is located in Sichuan Province and covered by the CCPG. Therefore, CCPG is chosen as the relevant electric power system.

STEP 2. Select an operating margin (OM) method

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

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

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[23] The supporting document, *Letter upon the on-grid electricity tariff* of the proposed project was issued by Heishui Power Company on 15 January 2007. It was provided to the DOE.

[24] The local electricity tariff regulated by the Price Bureau of Aba Tibetan and Qiang Autonomous Region is 0.193RMB/kWh. Supporting document was provided to the DOE.

(d) Average OM.

Without any nuclear source, the Central China Power Grid only possesses 38.2% of its total electricity generation that come from renewable energy sources in 2005, 38.4% in 2004, 34.4% in 2003, 35.9% in 2002 and 36.8% in 2001[25]. Hence, the low operating cost/must run sources is much less than 50% of the total grid generation, which accords with the defined condition of Option A.

Simple OM method is selected to calculate the Operating Margin emission factor of the proposed project.

STEP 3. Calculate the operating margin emission factor according to the selected method

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

- Based on data on fuel consumption and net electricity generation of each power plant / unit (Option A), or

- Based on data on net electricity generation, the average efficiency of each power unit and the fuel type(s) used in each power unit (Option B), or

- Based on data on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system (Option C).

For the proposed project activity, the required data for the exercise of Option A and B are not available, Considering nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources can be obtained from official sources, Option C is chosen to calculate the operating margin emission factor:

$$EF_{grid,OMsimple,y} = \frac{\sum_{i,m} FC_{i,y} \cdot NCV_{i,y} \cdot EF_{CO2,i,y}}{\sum_{m} EG_{y}}$$

Where:

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

[25] China Electric Power Yearbook (2002-2006)

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

The Simple OM can be calculated using either of the two following data vintages for years(s) y:

- (Ex-ante option) A 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period, or
- (Ex-post option) The year in which the project activity displaces grid electricity, requiring the emission factor to be updated annually during monitoring.

Here ex-ante vintage is chosen, and the $EF_{grid,OM}$ is fixed during the first crediting period.

STEP 4. Identify the cohort of power units to be included in the build margin

The sample group of power units *m* used to calculate the build margin consists of either:

(a) The set of five power units that have been built most recently, or

(b) The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

Project participants should use the set of power units that comprises the larger annual generation.

However, it is very difficult to obtain the data of the five power plants built most recently because these data are considered as confidential information by the company itself and the Grid in China. Therefore, a deviation approved by the EB is applied here in the calculation that is to calculate the new capacity additions and the proportion of each technology of power generation. Then the weighing of capacity additions of different technologies will be worked out. Finally the emission factor will be calculated by employing the efficiency factor representing the best technology commercially available.

STEP 5. Calculate the build margin emission factor

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

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

Where

$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year *y* (tCO_2 /MWh)

$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)

$EF_{EL,m,y}$ = CO_2 emission factor of power unit *m* in year *y* (tCO_2 /MWh)

m = Power units included in the build margin

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

As discussed in STEP 4, a deviation of this method is used to calculate build margin emission factors in China:

Deviated Calculation of Build Margin (BM):

Sub-step 1. Calculation of weights of CO_2 emissions of solid, liquid and gaseous fossil fuels in total emissions for power generation

$$\lambda_{Coal,y} = \frac{\sum_{i \in COAL,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}$$

$$\lambda_{Oil,y} = \frac{\sum_{i \in OIL,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}$$

$$\lambda_{Gas,y} = \frac{\sum_{i \in GAS,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}$$

Where:

$FC_{i,j,y}$ = Amount of fossil fuel type *i* consumed in province *j* in year *y* (mass or volume unit)

$NCV_{i,y}$ = Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ/t or GJ/m^3)

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

COAL, OIL and GAS refer to the group of solid, liquid, and gaseous fossil fuels, respectively.

Sub-step 2: Calculation of Emission Factor of Relevant Thermal Power

$$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y}$$

Where:

$EF_{Coal,Adv,y}$, $EF_{Oil,Adv,y}$ and $EF_{Gas,Adv,y}$ refers to the emission factors representing best technologies commercially available for coal, oil or gas fired power plants, respectively.

Sub-step 3: Calculation of BM of the Grid

$$EF_{grid,BM,y} = \frac{CAP_{Thermal,y}}{CAP_{Total,y}} \times EF_{Thermal,y} ,$$

Where:

$CAP_{Total,y}$ = The total newly added electricity generation capacity (MW)

$CAP_{Thermal,y}$ = The newly added electricity generation capacity of thermal power (MW)

The Simple OM can be calculated using either of the two following data vintages for years(s) y:

- (Ex-ante option) A 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period, or
- (Ex-post option) The year in which the project activity displaces grid electricity, requiring the emission factor to be updated annually during monitoring.

Here ex-ante vintage is chosen, and the $EF_{grid,OM}$ is fixed during the first crediting period.

STEP 6. Calculate the combined margin emission factor
The combined margin emission factor is calculated as follows:

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

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

The default values of w_{OM} and w_{BM} are:
$w_{OM} = w_{BM} = 0.5$

Baseline Emissions are calculated by multiplying the ex-ante Baseline Emission factor by annual power generation.

$$BE_y = EG_y \times EF_{grid,CM,y}$$

Where:
BE_y = Baseline emissions in year *y* (tCO_2 /yr)
EG_y = Electricity supplied by the project activity to the grid (MWh)
$EF_{grid,CM,y}$ = Combined margin emission factor for grid connected power generation in year *y* calculated using the latest version of the “Tool to calculate the emission factor for an electricity system (version 01.1)”.

Emissions from project activity

The Sichuan Heishui Zhawo No.1 Hydropower Project is a run-of-river Hydropower project and the project emission is zero.

Leakage
The project does not need to consider leakage according to the requirements of approved methodology AMS-I.D. applied.

Emission Reductions

The annual emission reductions ER_y for the project activity are calculated as the baseline emissions minus the project emissions. Being the project of a zero-emission activity the final GHG emission reductions are calculated as follows:

$ER_y = BE_y - PE_y - LE_y$

Where:

ER_y = Emission reductions in year *y* (tCO_2/year)
BE_y = Baseline emissions in year *y* (tCO_2/year)
PE_y = Project emissions in year *y* (tCO_2/year)
LE_y = Leakage emissions in year *y* (tCO_2/year)

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

Data / Parameter:	$FC_{i,m,y}$
Data unit:	tonnes or m^3
Description:	Amount of fossil fuel type *i* consumed by power plant / unit *m* in year *y*
Source of data used:	China Energy Statistical Yearbook（2004~2006）
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistical data
Any comment:	

Data / Parameter:	$NCV_{i,y}$
Data unit:	kJ/kg or kJ/m^3
Description:	Net calorific value (energy content) of fossil fuel type *i* in year *y*
Source of data used:	China Energy Statistical Yearbook（2006）
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistical data
Any comment:	

Data / Parameter:	$EF_{CO2,i,y}$
Data unit:	tc/TJ
Description:	CO_2 emission factor of fossil fuel type *i* in year *y*
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	See Annex 3 for details
Justification of the	IPCC default value

choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	**Installed Capacity**
Data unit:	MW
Description:	The Installed Capacity of the power plants in the grid in the year y
Source of data used:	China Electric Power Yearbook（2003~2006）
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistical data
Any comment:	

Data / Parameter:	**Electricity Generation**
Data unit:	MWh
Description:	The electricity generation of the power plants in the grid in the year y
Source of data used:	China Electric Power Yearbook（2003~2006）
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistical data
Any comment:	

Data / Parameter:	**Electricity self-consumption ratio**
Data unit:	%
Description:	The ratio of electricity self-consumption to the total electricity generation of the power plants
Source of data used:	China Electric Power Yearbook（2003~2006）
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistical data
Any comment:	

Data / Parameter:	**GENE** $_{best, coal}$
Data unit:	%
Description:	The optimum commercial, coal-fired power supply efficiency
Source of data used:	China DNA: Bulletin on Baseline Emission Factor of China Region Grid-the calculation of baseline Build Margin emission factor for China Grid on Aug 9, 2007
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** $_{best, gas/oil}$
Data unit:	%
Description:	The optimum commercial, coal-fired power supply efficiency
Source of data used:	China DNA: Bulletin on Baseline Emission Factor of China Region Grid-the calculation of baseline Build Margin emission factor for China Grid on Aug 9, 2007
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

B.6.3 Ex-ante calculation of emission reductions:

>>

As described in B.6, the emission reductions of the proposed project are calculated as follows:

Baseline emissions

Based on the *Assessment on Increased Total Investment Cost*, the net power generation of this proposed project will be 29,725 MWh annually.

The project uses the calculation of emission reductions publicized by China's DNA. The calculation result of the Central China Power Grid is as follows:

$EF_{grid,OM,y}$ =1.2899 tCO_2/ MWh
$EF_{grid,BM,y}$ =0.6592 tCO_2/ MWh

According to the calculation result above, the combined ex-ante baseline emission factor of the project is **0.97455**tCO_2/ MWh. The calculation equation is as follows:

$EF_{grid,CM,y} = 1.2899 \times 0.5 + 0.6592 \times 0.5 = 0.97455$ tCO_2/ MWh

Annual baseline emissions: **28,968**tCO_2. The calculation equation is as follows:

BE_y = 29,725 × 0.97455= 28,968 tCO_2

Project emissions

According to the approved methodology AMS-I.D., the GHG emission of the proposed project within the project boundary is as follow, i.e.
PE_y= 0

Leakage

According to the approved methodology AMS-I.D., the leakage of the proposed project is not considered,

$LE_y = 0$

Project Emission Reductions

Net emission reductions of the proposed project = Total baseline emissions – Total project emissions– Total Leakage Emissions

ER_y (tCO_2/yr) = BE_y - PE_y- LE_y

The total annual baseline emissions are **28,968**tCO_2
The total annual project emissions are **0** tCO_2.
The total annual leakage emissions are **0** tCO_2

ER_y **=** BE_y - PE_y - LE_y = 28,968– 0 – 0 = 28,968 tCO_2

The annual emission reductions are estimated to be: **28,968** tCO_2. The proposed project activity is expected to achieve **202,776**tCO_2e of net emission reductions during the first 7-year crediting period.

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

>>

Years	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (in tonnes of CO_2e)
01/12/2009-30/11/2010	**0**	**28,968**	**0**	**28,968**
01/12/2010-30/11/2011	**0**	**28,968**	**0**	**28,968**

01/12/2011-30/11/2012	**0**	**28,968**	**0**	**28,968**
01/12/2012-30/11/2013	**0**	**28,968**	**0**	**28,968**
01/12/2013-30/11/2014	**0**	**28,968**	**0**	**28,968**
01/12/2014-30/11/2015	**0**	**28,968**	**0**	**28,968**
01/12/2015-30/11/2016	**0**	**28,968**		**28,968**
Total estimated reductions (tonnes of CO_2e)	**0**	**202,776**	**0**	**202,776**

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

B.7.1 Data and parameters monitored:

Parameter:	**EG_y**
Unit:	MWh
Description:	Net electricity supplied to the Grid by the proposed project during year y
Source of data:	Electricity meter reading at the connection point between the proposed project and the Grid
Value of data applied for the purpose of calculating expected emission reductions in section B.5	29,725
Brief description of measurement methods and procedures to be applied:	The readings of the electricity meter will be hourly measured and daily recorded. Data will be archived for 2 years following the end of the last crediting period by means of electronic and paper backup. The accuracy of electricity meter is 0.2s. The national calibration standard will be applied in the proposed project. The calibration frequency is one time/year.
QA/QC procedures to be applied (if any):	The electricity generation from the plant will be monitored by the ammeter and be recorded at the on-site control centre using a computer system. The project operator is responsible for recording this set of data. Receipts from electricity sales will also be obtained for double check.
Any comment:	

Parameter:	**$EG_{import,y}$**
Unit:	MWh
Description:	Electricity purchased from the grid by the proposed project during year y
Source of data:	Electricity meter reading at the connection point between the proposed project and the Grid
Value of data applied for the purpose of calculating expected	4522

emission reductions in section B.5	
Brief description of measurement methods and procedures to be applied:	The readings of the electricity meter will be hourly measured and daily recorded. Data will be archived for 2 years following the end of the last crediting period by means of electronic and paper backup. The accuracy of electricity meter is 0.2s. The national calibration standard will be applied in the proposed project. The calibration frequency is one time/year.
QA/QC procedures to be applied (if any):	The electricity generation from the plant will be monitored by the ammeter and be recorded at the on-site control centre using a computer system. The project operator is responsible for recording this set of data. Receipts from electricity sales will also be obtained for double check.
Any comment:	

B.7.2 Description of the monitoring plan:

>>

This Monitoring plan will set out a number of monitoring tasks in order to ensure the complete、consistent、clear and accurate monitoring and the accurate calculation of the emission reduction in the crediting period. This plan is mainly implemented by the project owner with the cooperation of the grid company.

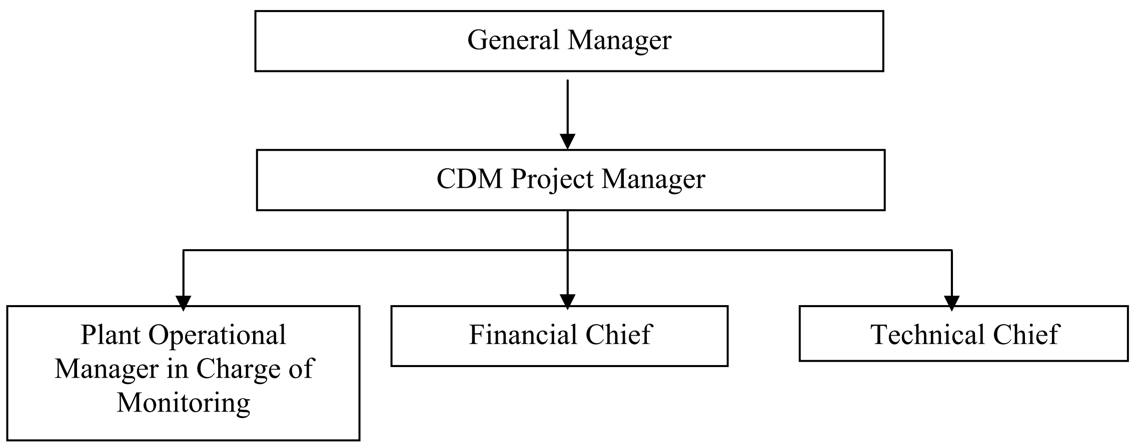
1. Monitoring Object

The main objective data is the net electricity supplied to the grid, which is to calculate the emission reduction of the project.

2. Monitoring Implementers

The General Manager of the project entity will appoint a CDM project manager or a chief officer. The operational and monitoring manager of the plant, the Financial Chief, and the Technical Chief are responsible for the collection of the data and information required in the monitoring plan. The collected information will be documented and sent to the CDM manager or responsible staffs of the project entity monthly. The CDM manager will in charge of the implementation of the Monitoring Plan and report to the General Manager of the company. The General Manager of the company will make the confirmations on monitoring, calculation data and reports.

The organization of the monitoring implementers is illustrated in the table below:



3. Monitoring Program and Equipments

Electricity supplied by the proposed project will be monitored through the bi-directional electricity meters. The proposed project will use joint gateway meter with another hydropower project(Zhawo No.2 hydropower station). The gateway meter(s) (hereafter referred as the meter M1) will be installed at the substation. The precision of the meter M1 is 0.2S.

Electricity supplied to the grid will be monitored by the meters when the proposed project is in operation. When it is not in normal operation, electricity will be imported from the grid. Electricity imported from the grid through the main power line can also be monitored by M1.

There is a meter M2 installed as the auxiliary meter connected with a 35kV transmission line to calculate the electricity supplied to the grid at the hydropower station. Similar situation is also occurred in another hydropower project (For the Zhawo No.2 hydropower station, there is a meter M3 installed). The precision of the meter is 0.2S.

In order to deal with the jointly-reading problem, the project owner and the grid company set up the procedure to calculate the electricity supplied to the grid. The net electricity supplied to the grid by the proposed project is calculated as followed:

$$EG_y = \frac{\sum EG_{A,y}}{\sum EG_{A,y} + \sum EG_{B,y}} \times EG_{output,y} - EG_{import,y}$$

Where:

EG_y	=	Net electricity supplied by the proposed project in the year *y*.
$EG_{output,y}$	=	Electricity supplied to the grid by the proposed project, *Zhawo No.2 Hydropower project*.in the year *y*.
$EG_{import,y}$	=	Electricity imported from the grid by the proposed project, *Zhawo No.2 Hydropower project*.in the year *y*.
$EG_{A,y}$	=	Electricity measured by meters installed at the 35kV transmission line at the proposed project.
$EG_{B,y}$		Electricity measured by meters installed at the 35kV transmission line at *Zhawo No.2 Hydropower project*.

This approach is flexible to accommodate potential future installations which also share transmission facilities with the proposed project.

A diagram shows how parameters are monitored is presented as follows:

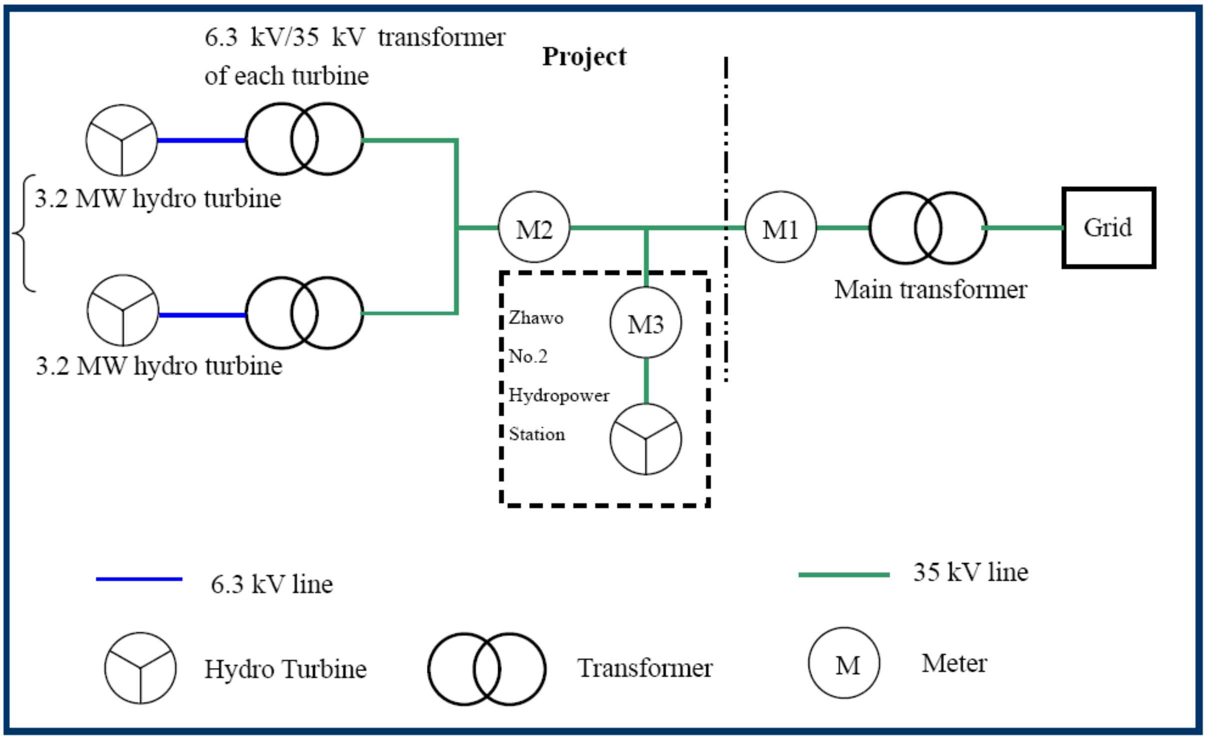


Figure 3. System connection diagram

Before the project is in operation, both the project owner and the grid company will check the equipments to ensure their work properly.

4. Data Collection
The verification will use the main meter's data as long as the inaccuracy of the meter is within the permissible tolerance. The main procedures are as follows:
I According to the requirements of power purchase/sales agreement, the project owner and the grid company should collect the two meters' data periodically, and check them at the same time.
II The project owner supplies the electricity to the grid company, and provides an electricity sales invoice to the Grid Company. A copy of the invoice is stored by the project owner, together with a record of the payment by the grid company.
III When the electricity generated by this project cannot meet the electricity requirement of the power plant, the grid company supplies the electricity to the project owner. The Grid Company provides an electricity sales invoice to the project owner and the invoice is stored by the project owner.
IV The project owner records the power supplied to and purchased from the grid, and hence calculate the net electricity supplied to the grid;
V The project owner keeps and safe keeps the records of the main meter's data readings for verification by the DOE.

If the fault of the main meter exceeds the allowable tolerance or its malfunction occurs, the grid-connected electricity generated by the proposed project will be resolved by following measures:
I Adopting the backup meter's data (after taking the line losses into consideration), unless a test by either party reveals it is inaccuracy;

II If the inaccuracy of the backup meter is not within the acceptable limits or it cannot work properly, the project owner and the grid company shall jointly prepare a new agreement of correct reading;
III If the project owner and the grid company fail to reach an agreement concerning the correct reading, this matter will be submitted for arbitration according to agreed procedures.

5. Calibration of Meters & Metering
The metering equipment will be properly calibrated and checked annually for accuracy. The project owner will prepare backup procedures to deal with any errors occurred to the meters. The calibration records carried out by the grid company should be provided to the proposed project owner, and these records will be maintained by the proposed project owner and the third party designated.

Meters should be tested by a qualified metric organization co-authorized by the project owner and the grid company within 10 days after:
I The detection of the reading difference between the main meter and the backup meter that exceeds the allowable tolerance.
II The equipments malfunction caused by improper operation
All the calibration test records should be maintained safely for the verification.

6. Data Management System
To keep safely the record of the data collected during monitoring, this project will set up a complete data management system. The project will perfect the whole monitoring procedure by developing the CDM manual: tracking information from the primary source to the end-data calculations in paper document format. It is the responsibility of the proposed project owner to provide additional necessary data and information for validation and verification requirements of respective DOE. Physical documentation such as paper-based maps, diagrams and environmental assessment will be collated in a central place, together with this monitoring plan. All paper-based information will be stored by the proposed project owner and kept at least one copy.

At the end of each month, the monitoring data will be filed in a spreadsheet and stored on a hard disk and CD-ROM, and the paper-based printout should be also archived. Furthermore, the project owner collects the sales receipts for the electricity supplied to the grid as a cross-check, and compiled the monitoring report including the monitoring data and relevant evidence at the end of each crediting year.

All the data will be kept for two years following the end of the last crediting period.

7. Monitoring Report
After the CDM project manager collects and sorts the monitored data, the monitoring report is prepared by the project owner alone or with designated third party. The project owner and/or the designated third party have to make sure that the format and content of the monitoring report are consistent with the monitoring methodology in the registered PDD.

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

>>
Date of completion of Baseline Study: 04/06/2009

Name of person/entity determining the baseline:

Ms. Lin, Wei

Easy Carbon Consultancy Co. Ltd.
13-801, Jianwai SOHO, 39 Dongsanhuan Zhonglu, Chaoyang District, Beijing 100022, P. R.China
Phone/fax: +86 1058697045-604/59000064
Email: tonilin@easy-carbon.com

Mr. Guan, Yisong
Easy Carbon Consultancy Co. Ltd.
13-801, Jianwai SOHO, 39 Dongsanhuan Zhonglu, Chaoyang District, Beijing 100022, P. R.China
Phone/fax: +86 1058697045-603/59000064
Email: gyisong@ easy-carbon.com

Above persons are not Project Participants.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>
19/05/2007 (Hydro turbines purchase agreement resigned)

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

>>
22 years (0 month)

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

C.2.1. Renewable crediting period

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

>>
01/12/2009

C.2.1.2. Length of the first crediting period:

>>
7 years

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
Not applicable

C.2.2.2. Length:

>>
Not applicable

SECTION D. Environmental impacts

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

>>

The Environmental Impact Assessment for this project was completed by the Environmental Protection Science and Technology Research Institute of Chengdu Science and Technology University and approved by Aba Tibetan and Qiang Autonomous Prefecture Environmental Protection Bureau of Sichuan Province in March 30th, 2006. A summary of the report is illustrated as follows:

Impact from waste water

The proposed project has impacts on the water environment mainly in the construction period. Waste water from construction is non-toxic and alkalescent with its pH about 12. Since direct discharge of the water will cause an increase of the amount of suspended substances in the river, it will be treated by a sedimentation pond for reuse and be discharged into the river with its quality in accordance with the first level standard prescribed in the *General Standard of Wastewater Discharge*. The household waste water will be treated by a set of facility such as sanitizing and sedimentation. Then it will be used for agricultural and forest irrigation after being collected and delivered by local farmers periodically and will not be discharged out.

Impact from noise

The noise in the construction area is mainly from engines of construction, blasting and vehicles. In the proposed project, a few of the equipments will make strong noise (>110dBA) and most of them will not be operated during nighttimes. Measures such as improvement on construction process, strengthening of equipment maintenance, application of sound insulation for crashing system, more strict control over dynamite and better time arrangement for explosion will lessen the influence to the sensitive objects effectively.

Impact from solid waste

The solid waste from the proposed project mainly includes waste earth and household waste. To reduce basic earthwork, the construction will be carried out on the basis of the engineering designs. The household waste will be collected and sorted, then the nonrecoverable part as well as the waste slag from the construction will be transported to the appointed landfill plant, which can reduce the damage to the original landscape and prevent soil erosion.

Impact on Bio-environment

The construction of power plants will cause some plants destroying, however within limited area. What's more, the detailed ecological recovery plan has been conducted to replant trees during the construction of the project.

Aquatic organisms in the water areas involved in this project are widely distributed in the other similar environments. So there will be no impact on the species in river or on the land during the construction and operation of the proposed project.

Impact on air

The impacting sources to the air during the construction phase are dusts brought by construction. In the construction, wet construction methods should be used to reduce dusts, and cover the material in powder form. Immediately replant the areas when the construction has completed, and sprinkling water on the

road frequently should be conducted. With the above methods taken, the dusts will only have limited impact to the construction area and have insignificant influence to the surrounding environment.

In summary, the construction of Sichuan Heishui Zhawo No.1 Hydropower Project has little negative impact on the environment.

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

>>

The environmental impacts of the Sichuan Heishui Zhawo No.1 Hydropower Project are not considered significant.

SECTION E. Stakeholders' comments

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

>>

The project owner has sent out questionnaires to the stakeholders in Heishui County for the comments of the proposed project construction in 22 June, 2007. Furthermore, the project owner also notified the stakeholders through the broadcast in Heishui County of holding stakeholders' meeting to further collect public opinion regarding the proposed project activity. Before the meeting, 30 copies of questionnaire were distributed, and 30 pieces of reply were received. The recovery ratio is 100%. Among the interviewees, there were 19 farmers, 8 worker, 3 cadres. 7 of them have educational level of middle school, 3 below elementary level, 6 elementary level, 9 high school, 5 technical school and above. The questions investigated were mainly as follows:

1. Whether do you know about the proposed project;
2. Will the proposed project improve local living standard;
3. What is the effect of the proposed project on local economy;
4. What is the effect of the proposed project on local ecological and social environment;
5. What is the most significant environmental impact of the proposed project;
6. What is the overall effect of the proposed project on local environment;
7. Whether do you support the proposed project.

E.2. Summary of the comments received:

>>

The summary of the survey is described as the following:

1. Among the interviewees, 50% of them knew the proposed project well, 43.3% knew it a little, and 6.7% didn't know it.
2. 63.3% interviewees thought the proposed project would help improve local life standard while 33.3% thought the effects are small, 3.4% thought there are no effects.
3. 93.3% of them thought the proposed project would benefit local economy, 6.7% thought it would just benefit local economy a little.
4. 63.3% of them thought the propose project would benefit local ecological and social environment, 30% thought there would be no effects, and 6.7% thought there would be adverse effects.
5. 23.3% interviewees thought the most significant environmental impact would be the disturbance on farmland, 30% thought it would be soil erosion, 30% thought it would be the impact on ecosystem, 10% thought it would the noise and dust from construction, and 6.7% thought it would be other impact.
6. 56.7% interviewees thought the overall impact on local environment would be positive, 36.7% thought there would be limited environmental impact that can be controlled or mitigated, 6.6% thought there would be no impact on environment.
7. 86.7% interviewees supported the proposed project, 13.3% were indifferent.

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

>>

Most of comments received on the project are positive comments which confirm the proposed project will make on the local economy and infrastructure. During the survey some people express their concerns about the environmental impacts of the project, such as soil erosion, ecologic system, noise issues during construction. These concerns have been well analysed and treated in the EIA report, and measures for mitigating the negative impacts on local bio-environment and domestic living of local people have been well planned. With good implementation of the above-mentioned measures, the proposed project will not

have significant negative impact on the local environment. There has, therefore, been no reason to modify the plans due to comments received.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Heishui Sanlian Hydropower Development Co., Ltd.
Street/P.O.Box:	No.16 yongandongli, Chaoyang District
Building:	22 Floor CBD international Mansion
City:	Beijing
State/Region:	
Postfix/ZIP:	100022
Country:	P.R.China
Telephone:	+86 10 85218655
FAX:	+86 10 85218650
E-Mail:	jngjcdm1@powerbeijing.com
URL:	
Represented by:	Kun Chen
Title:	
Salutation:	
Last Name:	Chen
Middle Name:	
First Name:	Kun
Department:	
Mobile:	
Direct FAX:	+86 10 85218650
Direct tel:	+86 10 85218655
Personal E-Mail:	jngjcdm1@powerbeijing.com

Organization:	Rabobank International
Street/P.O.Box:	One Queenhithe
Building:	Thames Court
City:	London
State/Region:	
Postfix/ZIP:	EC4V 3RL
Country:	UK
Telephone:	+44 (0) 20 7809 3000
FAX:	
E-Mail:	Domenic.Carratu@rabobank.com
URL:	www.rabobank.com
Represented by:	Domenic Carratu
Title:	Chief manager
Salutation:	Mr.
Last Name:	Carratu
Middle Name:	
First Name:	Domenic
Department:	Markets
Mobile:	+44 7979 046677
Direct FAX:	+44 (0)20 7809 3552
Direct tel:	+44 (0)20 7809 3000
Personal E-Mail:	Domenic.Carratu@rabobank.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding for the proposed project and there is no involvement of the public development funding in Annex 1.

Annex 3

BASELINE INFORMATION

All the tables related to the calculation of baseline emission reduction are presented below:
Calculation of Operating Margin (OM):

Table A4. Simple OM Emission Factor of Central China Power Grid in 2003

Fuel types	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Subtotal	Emission Factor (tc/TJ)	Average low Caloric value (MJ/t,km³)	CO_2 emission（tCO_2e） K=G*H*I*J*44/ 12/10000（unit of mass）
		A	B	C	D	E	F	G=A+B+C+D+E+F	H	J	K=G*H*I*J*44/ 12/1000 (unit of volume)
Raw coal	10000 ton	1427.41	5504.94	2072.44	1646.47	769.47	2430.93	**13851.66**	25.8	20908	273971539.89
Cleaned coal	10000 ton							**0**	25.8	26344	0.00
Other washed coal	10000 ton	2.03	39.63			106.12		**147.78**	25.8	8363	1169146.40
Coke	10000 ton				1.22			**1.22**	25.8	28435	32817.40
Coke oven gas	10^8m^3			0.93				**0.93**	12.1	16726	69013.15
Other coal gas	10^8m^3							**0**	12.1	5227	0.00
Crude oil	10000 ton		0.5	0.24			1.2	**1.94**	20	41816	59490.23
Gasoline	10000 ton							**0**	18.9	43070	0.00
Diesel	10000 ton	0.52	2.54	0.69	1.21	0.77		**5.73**	20.2	42652	181015.94
Fuel oil	10000 ton	0.42	0.25	2.17	0.54	0.28	1.2	**4.86**	21.1	41816	157229.00

LPG	10000 ton							**0**	17.2	50179	0.00
Refinery gas	10000 ton	1.76	6.53		0.66			**8.95**	18.2	46055	275069.63
Natural gas	10^8m^3					0.04	2.2	**2.24**	15.3	38931	489222.52
Other oil product	10000 ton							**0**	20	38368	0.00
Other coking product	10000 ton							**0**	25.8	28435	0.00
Other fuel	10000 tce		11.04			16.2		**27.24**	0	0	0.00
										Subtotal	276404544.15

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Table A5. Thermal Power Generation of Central China Power Grid in 2003

Province	**Power Generation （MWh)**	**Ratio of Self Power Consumption of Plant （%）**	**Power Supply （MWh)**
Jiangxi	27,165,000	6.43	25,418,291
Henan	95,518,000	7.68	88,182,218
Hubei	39,532,000	3.81	38,025,831
Hunan	29,501,000	4.58	28,149,854
Chongqing	16,341,000	8.97	14,875,212
Sichuan	32,782,000	4.41	31,336,314
Total			225,987,719

Table A6. Emission Factor of Central China Power Grid in 2003

	Parameter	**Unit**	**Value**	**Source**
A	Total Power Supply of Central China Power Grid	MWh	225,987,719	A=Total Power Generation of Central China Power Grid
B	Total Emissions of Central China Power Grid	tCO_2e	276,404,544	
C	Emission Factor of	tCO_2e/MWh	1.223095	C=B/A

	Central China Power Grid			

Table A7. Simple OM Emission Factor of Central China Power Grid in 2004

Fuel types	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Subtotal	Emission Factor (tc/TJ)	Average low Caloric value (MJ/t,km^3)	CO_2 emission (tCO_2e) K=G*H*I*J*44/12/10000 (unit of mass)
		A	B	C	D	E	F	G=A+B+C+D+E+F	H	J	K=G*H*I*J*44/12/1000 (unit of volume)
Raw coal	10000 ton	1863.8	6948.5	2510.5	2197.9	875.5	2747.9	**17144.1**	25.8	20908	339092605.29
Cleaned coal	10000 ton		2.34					**2.34**	25.8	26344	58316.13
Other washed coal	10000 ton	48.93	104.22			89.72		**242.87**	25.8	8363	1921441.23
Coke	10000 ton		109.61					**109.61**	25.8	28435	2948455.29
Coke oven gas	10^8m^3			1.68		0.34		**2.02**	12.1	16726	149899.53
Other coal gas	10^8m^3					2.61		**2.61**	12.1	5227	60527.09
Crude oil	10000 ton		0.86	0.22				**1.08**	20	41816	33118.27
Gasoline	10000 ton		0.06			0.01		**0.07**	18.9	43070	2089.33
Diesel	10000 ton	0.02	3.86	1.7	1.72	1.14		**8.44**	20.2	42652	266627.32
Fuel oil	10000 ton	1.09	0.19	9.55	1.38	0.48	1.68	**14.37**	21.1	41816	464893.14
LPG	10000 ton							**0**	17.2	50179	0.00
Refinery gas	10000 ton	3.52	2.27					**5.79**	18.2	46055	177950.07
Natural gas	10^8m^3						2.27	**2.27**	15.3	38931	495774.61
Other oil product	10000 ton							**0**	20	38368	0.00

Other coking product	10000 ton							**0**	25.8	28435	0.00
Other fuel	10000 tce		16.92		15.2	20.95		**53.07**	0	0	0.00
										Subtotal	345671697.30

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Table A8. Thermal Power Generation of Central China Power Grid in 2004

Province	**Power Generation （10^8kWh)**	**Power Generation （MWh)**	**Ratio of Self Power Consumption of Plant （%）**	**Power Supply （MWh)**
Jiangxi	301.27	30,127,000	7.04	28,006,059
Henan	1093.52	109,352,000	8.19	100,396,071
Hubei	430.34	43,034,000	6.58	40,202,363
Hunan	371.86	37,186,000	7.47	34,408,206
Chongqing	165.2	16,520,000	11.06	14,692,888
Sichuan	346.27	34,627,000	9.41	31,368,599
Total				249,074,186

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Table A9. Emission Factor of Central China Power Grid in 2004

	Parameter	**Unit**	**Value**	**Source**
A	Total Power Supply of Central China Power Grid	MWh	249,074,186	A=Total Power Generation of Central China Power Grid
B	Total Emissions of Central China Power Grid	tCO_2e	345,671,697	
C	Emission Factor of Central China Power Grid	tCO_2e/MWh	1.387826	C=B/A

Table A10. Simple OM Emission Factor of Central China Power Grid in 2005

Fuel types	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Subtotal	Emission Factor (tc/TJ)	Average low Caloric value (MJ/t,km^3)	CO_2 emission （tCO_2e） K=G*H*I*J*44/ 12/10000（unit of mass）
		A	B	C	D	E	F	G=A+B+C+D+E+F	H	J	K=G*H*I*J*44/ 12/1000 (unit of volume)
Raw coal	10000 ton	1869.29	7638.87	2732.15	1712.27	875.4	2999.77	**17827.75**	25.8	20908	352614496.76
Cleaned coal	10000 ton	0.02							25.8	26344	498.43
Other washed coal	10000 ton		138.12			89.99		**228.11**	25.8	8363	1804669.00
Coke	10000 ton		25.95		105			**130.95**	25.8	28435	3522490.83
Coke oven gas	$10^8 m^3$			1.15		0.36		**1.51**	12.1	16726	112053.61
Other coal gas	$10^8 m^3$		10.2			3.12		**13.32**	12.1	5227	308896.88
Crude oil	10000 ton		0.82	0.36				**1.18**	20	41816	36184.78
Gasoline	10000 ton		0.02			0.02		**0.04**	18.9	43070	1193..90
Diesel	10000 ton	1.3	3.03	2.39	1.39	1.38		**9.49**	20.2	42652	299797.78
Fuel oil	10000 ton	0.64	0.29	3.15	1.68	0.89	2.22	**8.87**	21.1	41816	286959.09
LPG	10000 ton								17.2	50179	0.00
Refinery gas	10000 ton	0.71	3.41	1.76	0.78			**6.66**	18.2	46055	204688.68
Natural gas	$10^8 m^3$						3	**3**	15.3	38931	655208.73
Other oil product	10000 ton								20	38368	0.00
Other coking product	10000 ton				1.5				25.8	28435	40349.27
Other fuel	10000 tce		2.88		1.74	32.8		**37.42**	0	0	0.00
										Subtotal	359887487.74

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Table A11. Thermal Power Generation of Central China Power Grid in 2005

Province	Power Generation （10^8kWh)	Power Generation （MWh)	Ratio of Self Power Consumption of Plant （%）	Power Supply （MWh)
Jiangxi	300	30,000,000	6.48	28,056,000
Henan	1315.9	131,590,000	7.32	121,957,612
Hubei	477	47,700,000	2.51	46,502,730
Hunan	399	39,900,000	5	37,905,000
Chongqing	175.84	17,584,000	8.05	16,168,488
Sichuan	372.02	37,202,000	4.27	35,613,475
Total				286,203,305

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Table A12. Emission Factor of Central China Power Grid in 2005

	Parameter	Unit	Value	Source
A	Total Power Supply of Central China Power Grid	MWh	286,203,305	A=Total Power Generation of Central China Power Grid
B	Total Emissions of Central China Power Grid	tCO_2e	359,887,487.74	
C	Emission Factor of Central China Power Grid	tCO_2e/MWh	1.257454	C=B/A

Table A13. Operating Margin Emission Factor of Central China Power Grid

		Year 2003	Year 2004	Year 2005	Total

A	Emissions (tCO_2/year)	276,404,544	345,671,697	359,887,487.74	981,963,729
B	Power Supply (MWh)	225,987,719	249,074,186	286,203,305	761,265,210
C	CO_2 Emission Factor (tCO_2/MWh)	C = A/B			**1.2899**

Calculation of Build Margin (BM):

Step 1. Calculation of weights of CO_2 emissions of solid, liquid and gas fuel in total emissions for power generation

$$\lambda_{Coal,y} = \frac{\sum_{i \in COAL,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}} \quad (2)$$

$$\lambda_{Oil,y} = \frac{\sum_{i \in OIL,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}} \quad (3)$$

$$\lambda_{Gas,y} = \frac{\sum_{i \in GAS,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}} \quad (4)$$

Where:

$FC_{i,j,y}$: Amount of fossil fuel type *i* consumed in province *j* in year *y* (mass or volume unit);

$NCV_{i,y}$: Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ/t or GJ/m^3);

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

COAL, OIL and GAS respectively refers to the group of solid, liquid, and gas fuels.

Table A14. CO_2 emissions of solid, liquid and gas fuel in Central China Power Grid in 2005

Fuel types	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Subtotal	Emission Factor (tc/TJ)	Average low Caloric value (MJ/t,km^3)	CO_2 emission （tCO_2e） K=G*H*I*J*44/ 12/10000（unit of mass）
		A	B	C	D	E	F	G=A+B+C+D+E+F	H	J	K=G*H*I*J*44/ 12/1000 (unit of volume)
Raw coal	10000 ton	1869.29	7638.87	2732.15	1712.27	875.4	2999.77	**17827.75**	25.8	20908	352614496.76
Cleaned coal	10000 ton	0.02							25.8	26344	498.43
Other washed coal	10000 ton		138.12			89.99		**228.11**	25.8	8363	1804669.00
Coke	10000 ton		25.95		106.5			**132.45**	25.8	28435	3562840
Sub-total											**357,982,504**
Crude oil	10000 ton		0.82	0.36				**1.18**	20	41816	36184.78
Gasoline	10000 ton		0.02			0.02		**0.04**	18.9	43070	1193..90
Diesel	10000 ton	1.3	3.03	2.39	1.39	1.38		**9.49**	20.2	42652	299797.78
Fuel oil	10000 ton	0.64	0.29	3.15	1.68	0.89	2.22	**8.87**	21.1	41816	286959.09
Sub-total											**624,136**
Refinery gas	10000 ton	0.71	3.41	1.76	0.78			**6.66**	18.2	46055	204688.68
Natural gas	10^8m^3						3	**3**	15.3	38931	655208.73
Coke oven	10^8m^3			1.15		0.36		**1.51**	12.1	16726	112053.61

gas											
Other coal gas	10^8m^3		10.2			3.12		**13.32**	12.1	5227	308896.88
Sub-total											**1,280,848**
Total											**359887488**

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Table A15. Weights of CO_2 emissions of solid, liquid and gas fuel in total emissions for power generation in Central China Power Grid in 2005

	Parameter	Value (%)	Source
A	λ_{Coal}	357,982,504 / 359887488=99.47	Table A11
B	λ_{Oil}	624,136 / 359887488=0.17	Table A11
C	λ_{Gas}	1,280,848 / 359887488=0.36	Table A11

Step 2: Calculation of Emission Factor of Relevant Thermal Power

$$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y} \quad (5)$$

Where: $EF_{Coal,Adv,y}$, $EF_{Oil,Adv,y}$ and $EF_{Gas,Adv,y}$ respectively refers to the emission factor representing best technology commercially available for fuel of coal, oil or gas fired power plants. For specific workings, see the following:

Table A16. Emission factor representing best technology commercially available for fuel of coal, oil or gas fired power plants

	Variable	Efficiency of Power Supply	Emission Coefficient of Fuel (tc/TJ)	Emissions (tCO_2/MWh)
		A	**B**	**D=3.6/A/1000*B*C*44/12**
Coal-fired Power Plant	$EF_{Coal,Adv,y}$	35.82%	25.8	0.9508

Gas-fired Power Plant	$EF_{Gas,Adv,y}$	47.67%	15.3	0.4237
Oil-fired Power Plant	$EF_{Oil,Adv,y}$	47.67%	21.1	0.5843

$$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y} = 0.9482 (tCO_2/MWh)$$

Step 3: Calculation of BM of the Grid

$$EF_{BM,y} = \frac{CAP_{Thermal,y}}{CAP_{Total,y}} \times EF_{Thermal,y}, \quad (6)$$

Where: $CAP_{Total,y}$ is the total of new capacity additions, and $CAP_{Thermal,y}$ is the new capacity addition of thermal power.

Table A17. Installed Capacity of Central China Power Grid in 2005

Installed Capacity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total
Thermal Power	MW	5906	26267.8	9526.3	7211.6	3759.5	7496	60167.2
Hydro Power	MW	3019	2539.9	8088.9	7905.1	1892.7	14959.6	38405.2
Nuclear Power	MW	0	0	0	0	0	0	0
Wind Power and Others	MW	0	0	0	0	24	0	24
Total	MW	8925	28807.7	17615.2	15116.7	5676.2	22455.6	98596.4

Source: China Power Yearbook 2006

Table A18. Installed Capacity of Central China Power Grid in 2003

Installed	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total

Capacity								
Thermal Power	MW	5407.8	17635.5	8173.3	6446.7	3126.2	6104	46893.5
Hydro Power	MW	2307.4	2438	7337.2	6603.1	1329.8	12341.5	32357
Nuclear Power	MW	0	0	0	0	0	0	0
Wind Power and Others	MW	0	0	0	0	0	0	0
Total	MW	7715.2	20073.5	15510.5	13049.8	4456	18445.5	72950.5

Source: China Power Yearbook 2004

Table A19.Installed Capacity of Central China Power Grid in 2002

Installed Capacity	Unit	Jiangxi	Henan	Hubei	Hunan	Chongqing	Sichuan	Total
Thermal Power	MW	5128.8	15904.5	8147.8	4975.6	3004.5	6142	43303.2
Hydro Power	MW	2197.4	2438	7213.9	6135.3	1195.5	11854.6	31034.7
Nuclear Power	MW	0	0	0	0	0	0	0
Wind Power and Others	MW	0	0	0	0	0	0	0
Total		7326.2	18342.5	15361.7	11110.9	4200	17996.6	74337.9

Source: China Power Yearbook 2003

Table A20. Newly added capacities of power plants in Central China Power Grid

	Installation in year 2002	Installation in year 2003	Installation in year 2005	New Additions from 2002 to 2005	Ratio in New Additions
	A	B	C	D=C-A	
Thermal Power（MW）	43303.2	46893.5	60167.2	16864	69.52%
Hydro Power（MW）	31034.7	32357	38405.2	7370.5	30.38%
Nuclear Power（MW）	0	0	0	0	0.00%
Wind Power（MW）	0	0	24	24	0.10%
Total（MW）	**74337.9**	**72950.5**	**98596.4**	**24258.5**	**100.00%**
Percentage compared with installation of 2005	75.40%	80.38%	100%		

Build Margin Emission Factor of Central China Power Grid : $EF_{BM,y}$=0.9482×69.52%=0.6592 tCO_2/MWh

Table A21. Baseline Emission Factor of Central China Power Grid

	Parameter	Unit	Amount
A	Operating Margin Emission Factor	tCO_2/MWh	1.2899
B	Build Margin Emission Factor	tCO_2/MWh	0.6592
C	Combined Emission Factor (C=0.5*A+0.5*B)	tCO_2/MWh	0.9746

Table A22. Electricity Generation Baseline Emissions

	Parameter	Unit	Amount	Source or Equation
A	Project installed capacity	MW	6.4	Feasibility Study
B	Annual electricity supplied	MWh	29,725	Feasibility Study
C	Baseline Emissions Factor	tCO_2/MWh	0.97455	Table A21
D	Electricity generation baseline emissions	tCO_2/year	**28,968**	D= B * C

Annex 4

MONITORING PLAN

Please refer to section B 7.2 in the PDD.