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:

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Project Title: Burqin River Chonghuer Hydropower Project in Xinjiang Uygur Autonomous Region

Version of document: Version 04

The date of the document: 12/05/2011

Revision History

Version of document	Date of the document	Reason for revision
Version 01	25/08/2010	Version submitted to the DOE for GSP
Version 02	13/10/2010	According to Initial Findings issued by DOE
Version 03.1	21/12/2010	Revised in accordance with the further comments and the Methodology updated
Version 04	12/05/2011	Revised in accordance with the EB's comments under the completeness check

A.2.Description of the project activity:

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The Burqin River Chonghuer Hydropower Project in Xinjiang Uygur Autonomous Region (hereafter refers to "the proposed project" or "the project") is located on the middle stream of Burqin River, in Chonghuer township, Burqin county of Altay Prefecture, Ili Khazakh Autonomous Prefecture, Xinjiang Uygur Autonomous Region, P.R. China. The project involves the construction and operation of an 110MW (27.5MW×4) hydropower plant consisting of a water-retaining rock dam thus forming a reservoir with the flooded area of 3.9km^2 and power density of 28.2W/m^2, a water release structure, a water intake system, a powerhouse, 2 main transformers and 4 sets of 220kV transmission lines. The proposed project is estimated to operate 3,555hours per year and produce power generation of 391GWh and evacuate electricity of 390.2GWh to Northwest China Power Grid (NWPG) annually.

The electricity generated by the project should have been supplied by the NWPG prior to the start of the implementation of the project activity, which is the same as the baseline scenario.

NWPG is dominated by thermal power plants. The proposed project will displace an equivalent amount of electricity currently generated by fossil-fuel power plants by making use of clean and renewable energy, thus achieving expected GHGs emission reductions of 325,442tCO_{2e} annually. The proposed project contributes to the local environmental protection and sustainable development as follows:

- Supply renewable and clean power to local region to offset power shortage;
- Enhance the proportion of clean and renewable energy sources and optimize electricity structure;
- Reduce the GHGs emission and other air pollutant, and speed up environment protection and eco-construction;
- Create Employments: maximum thousands of labors are needed at the peak time in the construction phase and 66 permanent positions will be provided during the operation phase; and
- Increase local income and improve local living condition.

A.3. Project participants:

Please list project participants and Party(ies) involved and provide contact information in Annex 1. Information shall be in indicated using the following tabular format.		
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)	Xinjiang Xinhua Chonghuer Hydropower Development Co., Ltd	No
UK	Europe New Energy Investment Capital Limited	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.		

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

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A.4.1.1. Host Party(ies):

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People's Republic of China

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

>>
Xinjiang Uygur Autonomous Region

A.4.1.3. City/Town/Community etc:

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Chonghuer Township, Burqin County, Altay Prefecture, Ili Khazakh Prefecture

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

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The proposed project is located on the middle stream of Burqin River, Chonghuer Township, Burqin County, Altay Prefecture, Yili Khazakh Prefecture, Xinjiang Uygur Autonomous Region, P.R.China., with its geographical coordinate of powerhouse at 87°09'09″E and 48°10'53″N, 70km away from Burqin county. Figures 1~2 below show the accurate location of the project.

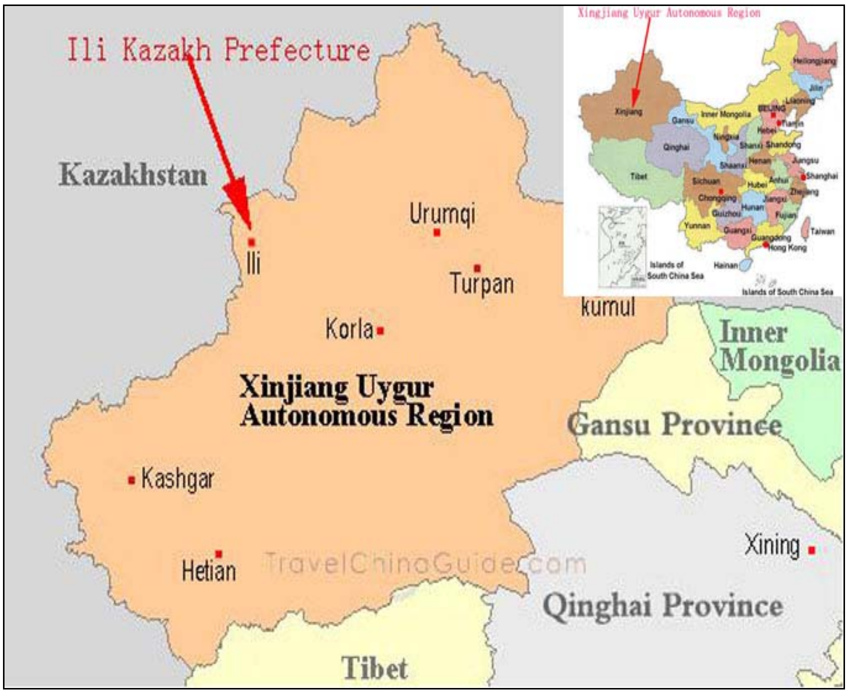

Figure 1: The Location of Ili Khazakh Prefecture of Xinjiang Uygur Autonomous Region

Figure 2: The location of the proposed project

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

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The proposed project falls into:
Sectoral Scope Number: 1. Energy Industry (Renewable resources)

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

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The electricity generated by the project should have been supplied by the NWPG, prior to the start of the implementation of the project activity, which is the same as the baseline scenario. The NWPG is dominated by electricity generated by fossil fuel fired plants, whose by products are GHGs (main emissions: CO_2 and CH_4).

Technology to be employed in the proposed project:
It is a hydropower plant with total installed capacity of 110MW (27.5MW×4). Based on the Feasibility Study Report (FSR), the project contains construction of a dam, spillway, water discharge channel and water diversion system, a powerhouse and step-up substation and adopts 4 sets of hydro turbines and associated generators to produce electricity without GHG emission via 110kV transmission lines to Burqin substation within NWPG. It is expected to operate 3,555hours per year with the plant load factor of 40.58%, and generate electricity of 391GWh and on-grid power of 390.2GWh to be connected to NWPG annually.

Table 1: Parameters of the key components of the proposed project

	Item	Parameter	Manufacturer
Rotator wheel turbine	Type	HLA551c-LJ-270	Fujian Nanping Nandian Hydropower Equipment Manufacturing Co., Ltd[1]
	Units	4	
	Designed Water Head	48.1m	
	Rated Rotate Speed	214.3r/min	
	Rated Flow	67.1m^3/s	
	Lifetime	30 years	
Generator	Type	SF27.5-28/590	
	Units	4	
	Rated Voltage	10.5 kV	
	Rated Rotate Speed	214.3r/min	
	Lifetime	30 years	

Besides the components and equipments mentioned above, some special measures will be settled during the construction and operation periods to protect the river from being polluted, and some other mitigation methods as specified in section D will also be adopted to alleviate the potential environment impact. In addition, all the employed equipments and technologies are widely used in China; the project is believed to be environmentally friendly.

All the equipments are produced domestically without foreign technology transfer.

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

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[1] http://www.fjnd.com.cn/

The proposed project chooses 3×7-year renewable crediting period, the annual emission reductions are 325,442 tCO_2e, resulting in a total GHGs mitigation of 2,278,094 tCO_2e throughout the first 7-year crediting period specified as follows:

Years	**Annual estimation of emission reductions in tonnes of CO_2 e**
01/06/2011~31/05/2012	325,442
01/06/2012~31/05/2013	325,442
01/06/2013~31/05/2014	325,442
01/06/2014~31/05/2015	325,442
01/06/2015~31/05/2016	325,442
01/06/2016~31/05/2017	325,442
01/06/2017~31/05/2018	325,442
Total estimated reductions (tonnes of CO_2e)	2,278,094
Total number of crediting years	7
Annual average of estimated reductions over the crediting period (tonnes of CO_2e)	325,442

A.4.5. Public funding of the project activity:

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No public fund from Annex I countries is involved in this 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:

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The proposed project adopts the approved consolidated baseline and monitoring methodology ACM0002: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 12.1)

Since the proposed project is a newly built hydropower plant, which does not concern fossil fuels combustion, the proposed project also refers to the following tools:
"Tool for the demonstration and assessment of additionality" (Version 05.2)
"Combined tool to identify the baseline scenario and demonstrate additionality" (Version 02.2)
"Tool to calculate the emission factor for an electricity system" (Version 02)

"Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" (Version 02) is not applied to the proposed project, because the project is a newly built hydropower plant causing no fossil fuels combustion in process.

For more information regarding the methodology and tools, please refer to:
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:

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The proposed project meets all applicability conditions of methodology ACM0002 which are listed as follows:
1) The proposed project is a newly built hydropower project;

2) The project activity results a new reservoir with power density of 28.2W/m^2 (flooded surface area of 3.9km^2), greater than the threshold of 4 W/m^2;

3) The proposed project does not involve switching from fossil fuels to renewable energy at the site;

4) The geographic and system boundaries of NWPG to which the proposed project will be connected can be clearly identified and information on the characteristics of the grid is available.

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

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The greenhouse gases and emission sources included in or excluded from the project boundary are shown in the table below:

	Source	Gas	Included ?	Justification/Explanation
Baseline	CO_2 emission from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.	CO_2	Yes	Main Emission Source
		CH_4	No	Minor emission source.
		N_2O	No	Minor emission source.

Project Activity	Emission from reservoir of the proposed project (inside the project boundary)	CO_2	No	Minor emission source.
		CH_4	No	The power density of this renewable energy project activity is 28.2W/m^2, large than 10W/m^2, thus the reservoir emissions do not have to be taken into account.
		N_2O	No	Minor emission source.

The Project is connected to NWPG, which will substitute equivalent amount of electricity by thermal power plants of NWPG. Therefore, the project boundary can be identified as NWPG and the Project site. The spatial scope of the project boundary covers the Project site and all power plants connected physically into NWPG. As a regional grid, NWPG consists of five provincial sub-grids: Gansu Province, Qinghai Province, Shaanxi Province, Ningxia and Xinjiang Autonomous Region. Moreover, NWPG is also defined as a regional grid according to the "Explain of confirming baseline emission factors of regional power grid in China" issued by China's DNA[2]. Also, the geographic boundary of the NWPG is clear. Therefore, NWPG is considered as the electricity system for the Project for determining the build margin (BM) and operating margin (OM) emission factors. The figure 3 below shows the structure of NWPG.

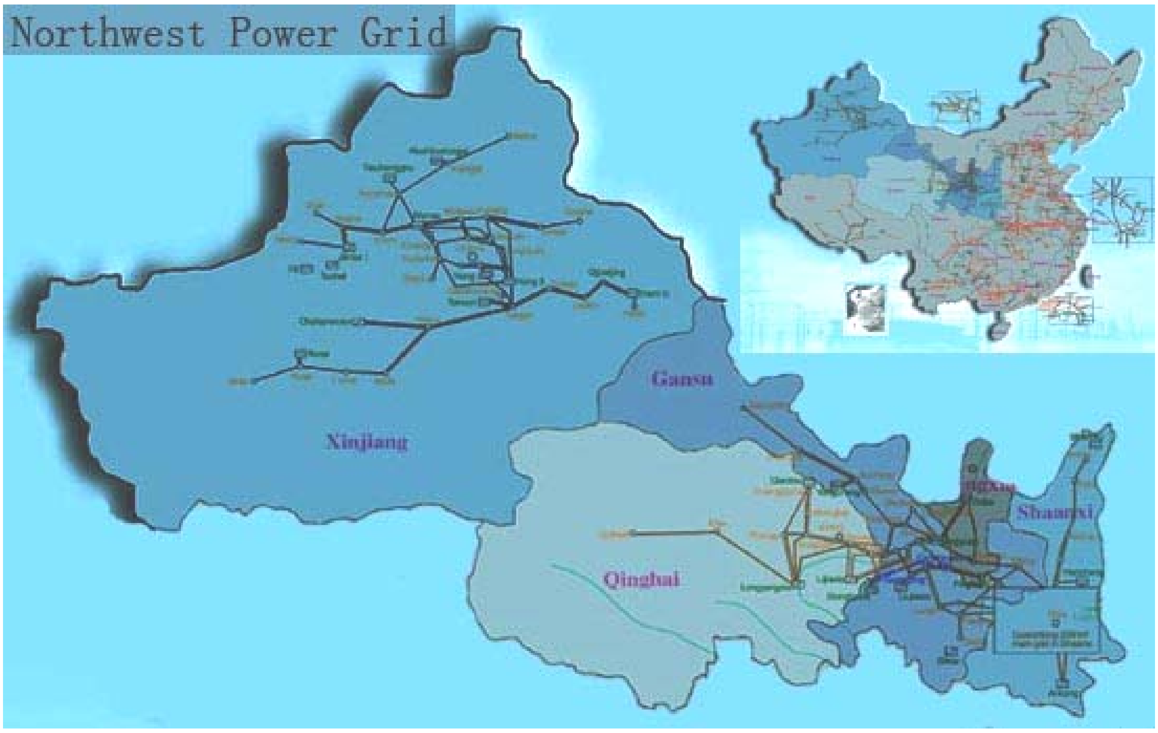

Figure 3: The Structure of Northwest Power Grid

The Project boundary included is shown in the figure 4 below:

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[2] *Notification on Determining Baseline Emission Factors of China Power Grid* issued by China's DNA on 3rd July, 2009 on http://qhs.ndrc.gov.cn/qjfzjz/t20090703_289357.htm

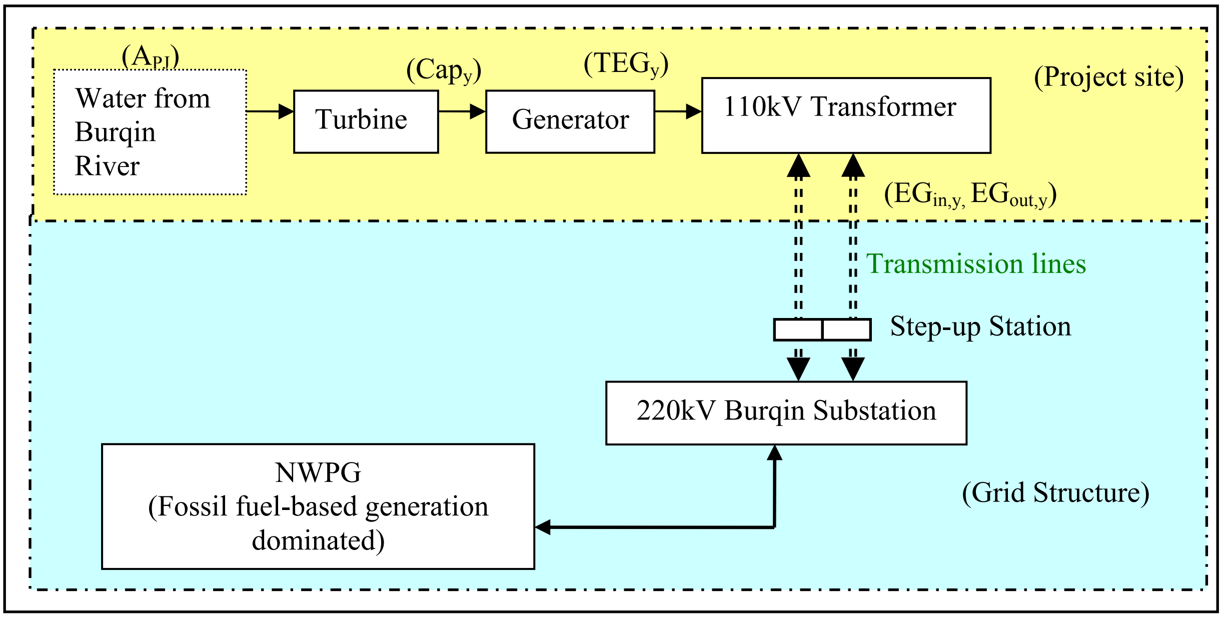

Figure 4: Structure of the project boundary

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

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According to the identification of the baseline scenario in ACM0002 (Ver.12.1), because the proposed project is the installation of a new grid-connected hydropower plant, the baseline scenario is the following: Electricity delivered to NWPG by the proposed project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources in NWPG, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system" (version 02).

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

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Activities to achieve the CDM

Table 2: Milestones of the Project

	Time	**Relevant activities**	**Evidence**
Prior Consideration CDM	09/2006	EIA finished	EIA
	11/10/2006	EIA approved	EIA Approval
	11/2006	FSR finished; (CDM development suggested in the FSR)	FSR
	15/11/2006	CDM Consulting Contract of Intent Signed with a former consulting company;	Contract of Intent
	19/06/2007	Project approved;	Project approval
	02/07/2007	Minutes of Board Meeting for serious Consideration of CDM application	Meeting records

Activities to secure the CDM Status	16/10/2007	Civil Construction Agreement signed[3] (Project Starting Date)	Project Construction Agreement
	23/10/2007	Announcement to start civil construction;;	Project Construction Announcement
	08/03/2008	Turbine and Generator Equipment Contract signed;	Equipment Contract
	27/08/2008	Former ERPA signed with a prior CER buyer;	Former ERPA
	(From 09/2007 to 08/2009)	CDM activities seriously delayed for the dereliction of the cooperation partners' duty	Clarification documents of Project Milestone Document
	10/08/2009	PP's internal meeting to terminate the prior ERPA;	Meeting note
	26/01/2010	Prior CDM-related Service Agreement terminated with the former CER buyer;	Termination Agreement
	12/03/2010	CDM consulting contract with current consulting company signed	Consulting Contract
	29/03/2010	ERPA with Europe New Energy Investment Capital Limited signed;	ERPA
	12/08/2010	LOA of Chinese Government received;	Chinese LOA
	27/08/2010	PDD published on the UNFCCC website;	-
	27/09/2010	Project on-site validation issued by the JCI;	-

As indicated in the table above, the EIA and FSR were finished separately in 09/2006 and 11/2006, and the project owner acquired the corresponding approval on 11/10/2006 and 19/06/2007. In the FSR, a negative conclusion regarding to the investment analysis was reached, and further financial incentives must be acquired to make the project feasible. And the financial supports generated from sales of emission reductions were considered to be a feasible solution in the FSR. Based on such conclusions, the project owner held a board meeting on 02/07/2007 to decide to develop the project as CDM project activity. All the attendants agreed that the company should speed up the research of Kyoto Protocol, get hold of CDM operational procedures and develop the project in accordance with CDM rules to combat the potential financial barriers. Then the relevant CDM works have been carried out successively.

While developing the project as a CDM project, the project's other works also went on simultaneously. After the Project Construction Agreement was signed on 16/10/2007, which is deemed as the starting date of the project activity for it represents the earliest date on which the real action begins. And then the project owner was immediately announced to start the construction on 23/10/2007. Later, the hydro-turbines purchasing agreements were signed on 08/03/2008. Unfortunately, something difficult happened between the PP and the prior CER buyer together with the former consulting company from 27/08/2008 (the prior ERPA signed) to 26/01/2010 (The prior ERPA terminated), but the CDM activity has been successfully implemented after cooperating with current consulting company. For instance, the Chinese LoA has been received on 12/08/2010, after the PDD was published on the UNFCCC from 27/08/2010, then the DOE-JCI has conducted the on-site validation from 27/09/2010.

[3] For the Project Construction Agreement is considered to the date on which the project participant has committed to expenditures related to the construction of the project activity, and no major contracts have been signed before it, thus it is deemed as the earliest date on which the real action occurs.

To sum up, if without the CDM revenues, the proposed project has obvious investment barrier and fulfils the requirement of additionality.

According to the latest version of Tool for the demonstration and assessment of additionality (version 05.2) approved by CDM EB, the following steps are used to demonstrate the additionality of the Project.

Step 1: Identification of alternatives of the project activity consistent with current laws and regulations

The step is to define realistic and credible alternatives to the proposed project activities that can be (part of) the baseline scenario through the following steps:

Sub-step 1a: Define alternatives to the project activities:

In the absence of the proposed project, the proposed alternatives would be as the follows:

Alternative I: Construction of a fossil fuel-fired plant with equivalent amount of annual electricity output;

Alternative II: Construction of a power plant using other renewable power sources with equivalent output;

Alternative III: The propose project not undertaken as CDM project activity; and

Alternative IV: Provision of equivalent amount of annual power output by the grid (Northwest China Power Grid) with which the Project connected.

For Alternative II, the project is located in inland area of Xinjiang Province, there is neither potential for wave or tidal energy nor for geothermal energy[4] in the project's site. And no biomass, solar PV and wind resources based power plant have previously been built in the region. In addition, the renewable energy of solar PV, geothermal and biomass are limited by the status of the technological advancement and high investment costs[5], which are also far from being economically attractive. And the wind resource of Xinjiang Uygur Autonomous Region in unevenly distributed, it is centralized in the Dabancheng Valley[6], while other regions has very low wind energy potential. Furthermore, the wind farms which will be developed do so only through the acquisition of CDM project revenue or national financial support for normal operation.

Therefore, alternative II is not financial attractive, and it is not a feasible baseline scenario.

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

For Alternative I, According to the Eleventh Five-Year Program for Energy Development, China is targeted to reduce energy consumption for unit GDP production by 20% in 2010, and reduce the total sulphur dioxide emission by 8.4 million tonnes and the carbon dioxide emission by 360 million tonnes in the recent 5 years[7]. Therefore, the Program encourages the construction of large scale thermal power plant with high efficient technology especially cogeneration power plant and super critical coal-fired power plant but discourage the construction of small scale ones. Correspondingly, some new power regulations

[4] http://www.newenergy.org.cn/html/0086/620817864.html (This report notes that the geothermal energy is concentrated in the Tibet, Tianjin and Xi'an City as well as some coastal areas in China.)

[5] http://ac.agri.gov.cn/ac/ViewContent.do?id=4affaa20110219f101116d279548047d&year=2007&month=3&right=!ENCODEtkc1vlOItllg1Oe

[6] Please refer to the Page 22 in China Wind Power Report 2008 with the relevant website of http://www.wwfchina.org/wwfpress/publication/climate/2008Chinawindpower.pdf

[7] http://www.ndrc.gov.cn/zjgx/P020070410516458967992.pdf

were established in order to cut down the existence and construction of small-scale thermal power. For example, it prescribes that thermal power plants with unit capacity less than 135 MW, if without special permission, are strictly prohibited in large layered grids[8]. And the new thermal power plants constructed should employ generators of unit capacity of 300 MW or above with high parameter and high efficiency since the Ninth Five-year period[9] (1996~2000). In addition, as defined in the regulation, a construction of a new thermal power plant should be installed at least 2 generation units[10] Therefore, alternative I is not a feasible and credible alternative to the proposed project.

For Alternative III, According to the Investment Analysis in B.5, without the CERs sales revenue from CDM, the proposed project is not financially attractive. Thus, Alternative III is not a credible baseline scenario.

For Alternative IV, Presently, the power shortage is offset by the electricity imported from NWCG. In the absence of the proposed project, the equivalent amount of electricity will be continued to be purchased from the Grid. And there are no significant barriers to block it from continuation. And this scenario is in compliance with all the laws and policies requirements. Therefore, Alternative IV is a credible baseline scenario.

Step 2: Investment Analysis
This section is used to analysis whether the proposed activity is not:
(1) The most economically or financially attractive; or
(2) Economical or financially feasible, without the additional revenue/funding from CDM revenues.
To conduct the investment analysis, the following sub-steps are involved:

Sub-step 2a: Determine appropriate analysis method
According to the "Tool for the demonstration and assessment of additionality", there are three options for investment analysis as following:

Option I: Simply cost analysis;
Option II: Investment comparison analysis; and
Option III: Benchmark analysis.

The simple cost analysis method (Option I) is not appropriate because the proposed project will get the revenues not only from the CDM but also from the electricity sales. The investment comparison analysis (Option II) is also not applicable for the proposed project, as the project owner has no investment options to compare with. The baseline scenario of the proposed project is the continuing operation of Northwest China Grid rather than a similar investment project alternative to the proposed project, so investment comparison analysis method (Option II) is neither appropriate. As a result, Apply benchmark analysis (Option III) is chosen to demonstrate and assess the additionality, since the data on the total investment IRR of Chinese power industry is available.

Sub-step 2b: Benchmark Analysis Method (Option Ⅲ)
According to *Interim rules on Economic Assessment of Electrical Engineering Retrofit Project* formulated by State Electric Power Corporation, the financial benchmark internal rate of return (IRR) of total investment for projects within the power sector is 8% (after tax). If the IRR of the Project is lower

[8] Notice on Strictly Prohibiting the Installation of Fuel-fired Generation with the Capacity of 135 MW or below issued by the General Office of the State Council, decree no. 2002-6.
[9] Temporary Stipulation of the Construction Management of Small Scale Units of Fuel-fired Power Generation (Aug., 1997) http://www.lawyee.net/Act/Act_Display.asp?RID=18734
[10] Opinion of Accelerating to Prohibit Small Scale units of Fuel-fired Power Generation, http://www.ndrc.gov.cn/zcfb/zcfbqt/2007qita/t20070131_115037.htm

than 8%, the project can be considered financially unattractive. Thus, the project is additional. This benchmark will be used for the financial appraisal of the Project.

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

1) Critical techno-economic parameters and assumptions

The critical techno-economic parameters and assumptions of the Project for calculation of financial indicators derived from the Approved FSR are presented below:

Parameters		Value
Installed Capacity (MW)		110
Annual Electricity Generation (MWh)		391,000
Self-consumed Rate		0.2%
Annual On-grid Power Generation (MWh)		390,218
Total Investment (million yuan)		844.02
Static investment (million yuan)		790.65
Project Lifetime (years)		33
Construction Period (years)		3
Operation & Maintenance Period (years)		30
Annual O&M cost (million yuan)		16.77
Bus-bar tariff(With VAT) (yuan/kWh)		0.25
VAT tax		17%
Income Tax Rate		33%
Fixed Asset Residual Rate		5%
Depreciation Rate		3.17%
Loan Interest Rate	for Long-term Loan	6.84%
	for Short-term Loan	6.12%

2) Calculation and comparison of IRR of the Project activity and the financial benchmark

	Without CDM revenue	Benchmark	With CDM revenue
Project IRR	5.78%	8%	8.86%

In accordance with the benchmark analysis, if the IRR of a project without CERs revenue are lower than the benchmark, the project is not considered financially attractive.

Sub-step 2d. Sensitivity analysis

The objective of the sensitivity analysis is to show whether the conclusion regarding financial attractiveness is robust to reasonable variations in the critical assumptions.

The following key parameters have been selected as sensitive indicators to test the financial attractiveness for the Project.

- Bus-bar tariff;
- Total static investment;
- Annual O&M cost; and
- On-gird power supply;

Table 3: Sensitivity analysis of the proposed project (without CDM)

Parameter \ Range	-10%	-5%	0%	5%	10%
Bus-bar Tariff	5.05%	5.42%	5.78%	6.15%	6.51%
Total Static Investment	6.52%	6.14%	5.78%	5.46%	5.17%
Annual O&M cost	6.03%	5.91%	5.78%	5.66%	5.53%
On-grid power supply	5.07%	5.42%	5.78%	6.14%	6.49%

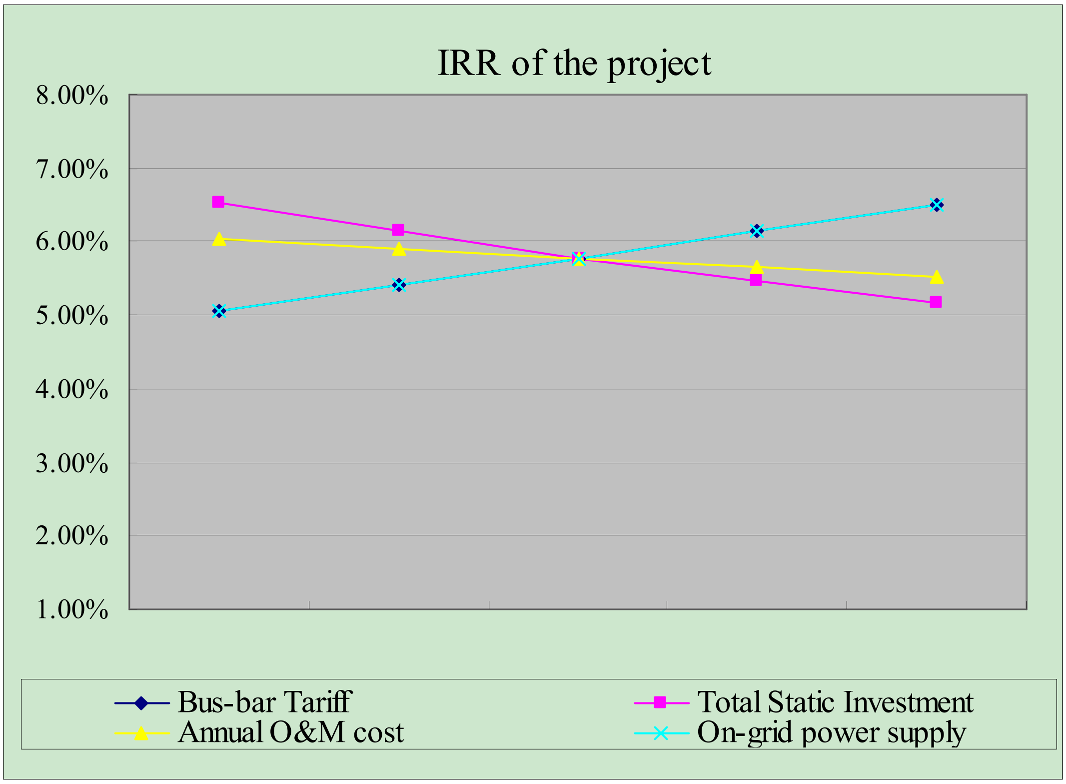

Figure5: IRR to sensitivity indicators of the proposed project (Without CERs Revenue)

Table 3 and Fig 5 show that when the four sensitivity indicators fluctuate in a reasonable range, from -10% to +10%, the IRR of the Project is still lower than the benchmark 8%. Thus the project is not financially attractive.

In order to obtain more reliable conclusion, the sensitivity analysis is further performed to assess the variations of the financial parameters when the project IRR reaches the benchmark 8%, which is analysed as follows:

Table 4-Variation of financial parameters to reach the benchmark

Sensitive factor	Benchmark	Percentage Variation to the Benchmark
Bus-bar tariff	8%	Increase 31.5%
Total Static Investment		Decrease 25.4%
Annual O&M cost		Decrease 94.55%
Annual Output		Increase 32%

From the sensitivity analysis result, it could be seen that the project IRR is almost equal to the benchmark IRR when the bus-bar tariff increase by 31.5%. For the electricity tariff in Xinjiang Province set by the official document of Municipal Price Bureau should comply with the national industrial regulations and guide rules. Document "Guide of Implementing Tariff Reform" published by NDRC indicates that the tariff should be kept in relatively stable.[11] Therefore, it is impossible to increase the tariff to make the project IRR achieve the benchmark.

Then, in the case that the total static investment decreased by 25.4%, the IRR of the proposed project begins to exceed the benchmark. According to the Statistical Communiqué of the People's Republic of China, the construction materials, such as steel, cement, fuel, have been increasing for the past 5 years[12]. Therefore, it is impossible to decrease the total investment by 25.4% for the proposed project.

The O&M cost mainly include staff charges (wages, welfare, insurance and housing fund), material cost and other costs, water resources fee, repair cost, insurance for fixed assets, which is an insensitive factor and strictly calculated according to the relevant national regulations from the approved FSR. But the staff charges, as a main component of the O&M cost, is the only unstable part which is easily influenced by the national development. And according to the information published by the National Bureau of Statistic Yearbook 2009, it indicates that the enterprises' wage has been on the rising tendency[13] since 1995, and it also demonstrates that the average payroll of the employees has been increased from 16,000 Yuan/person annually in early 2007 when the FSR finished to over 24,000 Yuan/person annually in 2008. It can be concluded that the operational cost will be increasing during the project operational period, as per conservative principle, the fixed input value of operational cost is reasonable and credible. In additional, the unitary O&M cost 0.0429 yuan/kWh for this project (the annual O&M cost divided by the annual power generation) has been confirmed to be a reasonable and conservative value according to the unitary operational cost range 0.04-0.09 yuan/kWh[14] for Hydropower plant in China. Therefore, it is also impossible to decrease the annual operational cost to improve IRR.

In addition, if the power delivered to the grid increases by 32%, the IRR will reach the benchmark. However, this is improbable, for the power generation as well as the annual utilization hours and installed capacity are all calculated on a long term and strong statistical basis, namely on 47 years of water flow measurements (from 1960 to 2007). Therefore, the possibility of a significant increase of 32% in annual output of the project is little and therefore this is not a realistic assumption.

Step 3: Barrier analysis

Investment analysis has argued that the project is the economically less attractive than other alternatives without the revenue from the sale of CERs. According to "*Tool for the Demonstration and Assessment of Additionality (version 05.2)*", this PDD skips the barrier analysis and argues the additionality.

Step 4: Common Practice Analysis

Common practice analysis is a credibility check to complement the investment analysis. The common practice analysis is identified and discussed through the following sub-steps:

[11] Refer to the Article 16 in the document: http://www.ndrc.gov.cn/zcfb/zcfbtz/zcfbtz2005/t20050613_6670.htm

[12] http://www.stats.gov.cn/tjsj/ndsj/2009/indexch.htm

[13] Data resources: http://www.stats.gov.cn/tjsj/ndsj/2009/html/E0423c.htm

[14] Please refer to the news published by Xinhua net:

http://news.xinhuanet.com/stock/2004-12/03/content_2290984.htm

Sub-step 4a: Analyze other activities similar to the proposed project activity
According to the "Tool for the demonstration and assessment of additionality" (Version 05.2), definition of similarity is outlined as "Projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc.". In accordance with this guidance, the detailed analysis steps are shown as following:

Firstly: Choose the similar area
Xinjiang Uygur Autonomous Region with an area of 166.49 ten thousand km^2, is comparatively and considerably large. According to the requirements of common practice, the projects with similar conditions, such as investment conditions and natural conditions (including geographical conditions, climate conditions, development conditions and so on), are necessary to be analyzed. Projects located in different provinces have not the similar investment conditions and natural conditions. In addition, Xinjiang Uygur Autonomous Region is an autonomous region, which has more different conditions from normal provinces like Shaanxi, Gansu and Qinghai provinces, which located in the NWPG. Therefore, the PDD selects geographical area, i.e. Xinjiang Uygur Autonomous Region, as a common practice region.

Secondly: Choose similar construction year
Hydropower plants operated before 2002 were all developed by the state-owned enterprises, and these plants were constructed with national or local governmental funds, or the governments provides the loan guarantee for the project developers, thus the developers didn't have any financing difficulties. Meanwhile, the government provided favourable policies for plant electricity tariff at that time, namely the electricity tariff of each power plant was determined according to the principles of full-cost recovery, so developers didn't have any investment risk. The ***Electric Power Sector Reform Programme*** issued on 10th February 2002 by the State Council, the main goal is to break the monopolization and optimize resource collocation, which means an open and competitive regional electricity market, however, without governmental funds, project of high investment cost and bad financial index are of lower financial attractive. Therefore, only the projects constructed after 2002 are considered as similar projects to our project since they were operated under a same scheme.

Thirdly: Choose similar installed capacity
In accordance with the *Classification & design safety standard of hydropower projects (DL5180-2003)* issued by State Economic and Trade Commission of People's Republic of China in 2003, the hydropower projects in China are classified into three types (large, medium and small scale hydropower projects) based on the installed capacity. And different types of projects share different technical requirements in design and construction. For proposed project, the common practice was conducted for similar scale hydropower plants with the installed capacity between 50-300MW.

In all, among the projects identified according to the above criteria and the situation described above, middle scale hydropower projects with installed capacity of 50-300MW in Xinjiang Uygur Autonomous Region which started construction after 10th February 2002 were selected as the similar projects for common practice analysis in the PDD.

After analyzing the other similar activities from the "Yearbook of China Water Resources 2006-2008", which is an official statistic issued by the China Water Conservancy and Hydro power Press, there is no similar project.

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

As concluded in sub-step 4a, there are no activities similar to the proposed project in Xinjiang Province. The project is not common practice. It is clear from the analysis in step 2 that the project activity is financially and economically unattractive. The events lists in the Table in the section B.5 clearly demonstrates that the Project

Entity was aware about the potential for the CDM before the start of the CDM activity, and that it played a crucial role in the barriers towards the implementation of the proposed project activity. Therefore, these distinctions demonstrate that the proposed project is not common in Xinjiang province and the existence of those projects cannot bring any influence on the additionality of the project.

From all these steps included in this section B.5., it can be concluded that the Project is additional, not (part of) the baseline scenario. Without CDM support, the Project would unlikely occur.

B.6. Emission reductions:

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B.6.1. Explanation of methodological choices:

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1. Project emissions (PE_y)

The project activity is the installation of a new hydropower plant that results in a reservoir. In accordance with ACM0002 (Version 12.1), the power density of the project activity is calculated as follows:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}} \qquad (1)$$

Where:

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

Since the created surface area of the reservoir at the flooded water level is identified to be $3.9km^2$, the power density of the project is calculated to be $28.2W/m^2$, which is greater than the threshold of 10 W/m^2. In accordance with methodology ACM0002, for hydropower project with power density larger than $10W/m^2$, the project emission is zero, so: $PE_y = 0$.

2. Baseline emission (BE_y)

Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants within NWPG that are displaced due to the Project activity, calculated as follows:

$$BE_y = EG_{PJ,y} \bullet EF_{grid,CM,y} \qquad (2)$$

Where:

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

As the Project activity is the installation of a new hydropower plant where no renewable power plant was operated prior to the implementation of the project activity, then

$$EG_{PJ,y} = EG_{facility,y}$$

Where:

$EF_{facility,y}$ = Quantity of net electricity generation supplied by the Project activity to the grid in year *y* (MWh).

Thus, formula (2) above is transformed to:

$$BE_y = EG_{facility,y} \bullet EF_{grid,CM,y} \qquad (3)$$

Where:

$$EG_{facility,y} = EG_{out,y} - EG_{in,y}$$

where:

$EG_{out,y}$ = Electricity supplied by the Project activity to the grid (MWh).

$EG_{in,y}$ = Electricity purchased by the Project activity from the grid (MWh).

The Combined margin CO_2 emission factor ($EF_{grid,CM,y}$) is calculated by applying the following six steps in accordance with the "Tool to calculate the emission factor for an electricity system".

Step 1. Identify the relevant electric power system

According to the *Tool to calculate the emission factor for an electricity system*, if the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used. Since Chinese DNA has published a delineation of the project electricity system and connected electricity systems, these delineations should be applied for the proposed project. According to the delineations, the NWPG is identified as the project electric power system of the proposed project, which includes the grids of Shaanxi Grid, Gansu Grid, Qinghai Grid, Ningxia Grid, and Xinjiang Grid; and NWPG are connected to the project electricity system by transmission lines, which should be taken as connected electricity system. For the proposed project, the project electric system should be NWPG.

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

Following two options to calculate the operating margin (OM) and build margin (BM) emission factor can be chosen:

Option I: Only grid power plants are included in the calculation;

Option II: Both grid power plants and off-grid power plants are included in the calculation.

For the proposed project, Option I is chosen in the PDD to calculate the operating margin (OM) and build margin (BM).

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

There are four options to calculate the operating margin

(a) Simple OM; or

(b) Simple adjusted OM, or

(c) Dispatch Data Analysis OM, or

(d) Average OM.

For the Project activity, because the dispatch data of the Grid (including the NWPG) in China is not available to the public, options (b) and (c) can't be adopted. Furthermore, since low-cost/must-run power sources are less than 50% of the NWPG from 2003~2007, option (a) (simple OM) is the only reasonable and feasible method among the four options.

Constitute of low-cost/must run resources in NWPG during year 2003~2007

Year	Electricity Generation (GWh)					
	Thermal	Hydro	Wind	Others	Total	% Low-cost/must run
2003	113,093	25,899	---	242	139,235	18.77%
2004	123,130	29,820	346	456	153,752	19.92%
2005	128,682	42,778	467	477	172,404	25.36%
2006	149,438	47,817	719	518	198,491	24.71%
2007	176,704	51,659	1,135	440	229,938	23.15%

This PDD chooses ex-ante method to calculate the OM emission factor of NWPG by using the latest 3 years data vintage.

Step 4. Calculate the OM emission factor according to the selected method

The Simple OM emission factor ($EF_{OM,simple,y}$) is calculated as the generation-weighted average emissions per electricity unit (tCO_2/MWh) of all generating sources serving the system, excluding those low-cost/must-run power plants/units. It may be calculated:

- Based on the net electricity generation and a CO_2 emission factor of each power unit (Option A), 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 B).

Option B is only feasibly and selected to calculate OM emission factor of NWPG due to the following reasons:

- The necessary data for option A is not available such as data of net electricity generation of each power plant/unit serving the system;
- Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
- Off-grid power plants are not included in the calculation (Option I has been chosen in Step 2).

According option B, the simple OM emission factor is calculated based on the net electricity supplied to NWPG by all power plants serving the NWPG, not including low-cost/must-run power plants/units, and based on the fuel type(s) and total fuel consumption of NWPG, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_y} \quad (4)$$

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*;

y : The relevant years as per the data vintage chosen in step 3

This PDD calculates the Operating Margin (OM) emission factors of NWPG in 2005, 2006 and 2007, respectively. Then, the OM emission factor of NWPG is calculated as the weighted average of the three years.

Step 5. Identify the group of power units to be included in the build margin (BM)

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[15].

Because it is very difficult to obtain the data of five most recently built power plants as these data are considered as confidential business information in China, the power plant capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently is selected as as the sample group *m*. The power plants which are CDM projects are not included in sample group m.

However, even for those built most recently power plants that comprise 20% of the system generation, it is also difficult to obtain the specific data regarding to fuel consumption and electricity generation additions by each power sources as confidential reason. Considering this situation, the following clarifications are given by EB for deviation in use of methodology AM0005 and AMS-I.D by several project activities in China when estimating *BM* emission coefficient:

1) Use of capacity additions during the last 1~3 years for estimating the build margin emission factor for grid electricity;
2) Use of weights estimated using installed capacity in place of annual electricity generation; and
3) 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, for each fuel type in estimating the fuel consumption.

Thus, the most recent built power plants are calculated as the difference of total installed power capacities in the year 2007 and 2005, respectively (see Table B2 in Annex 3). So the calculation by using the data in the years 2007 and 2005 satisfies the requirements.

In terms of vintage of data, ex-ante method is employed in this PDD to calculate the BM emission factor for the first crediting period based on the most recent data available in NWPG from 2004~2006.

Step 6. Calculate the Build Margin (BM) emission factor

The BM Emission Factor is, according to the “Tool to calculate the emission factor for an electricity system”, calculated as the generation-weighted average emission factor (tCO_2/MWh) of all power units *m* during the most recent year *y* for which data is available, using equation:

[15] If 20% falls on part capacity of a unit, that unit is fully included in the calculation.

$$EF_{Grid,BM,y} = \frac{\sum_{m} EG_{m,y} \times EF_{EL,m,y}}{\sum_{m} EG_{m,y}} \quad (5)$$

Where:

$EF_{grid,BM,y}$: the build margin CO_2 emission factor in year *y*(tCO_2/MWh);

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

$FE_{EL,m,y}$: the CO_2 emission factor of power unit *m* in year *y* (tCO2/MWh);

m: the power units included in the build margin, and;

y: the most recent historical year for which power generation data is available.

The main steps for BM calculation are as following:

Sub-step 1: Calculation of weights of CO_2 emissions by coal-fired, oil-fired and gas-fired plants in total CO_2 emissions of NWPG.

$$\lambda_{coal,y} = \frac{\sum_{i\in COAL,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \quad (6)$$

$$\lambda_{Oil,y} = \frac{\sum_{i\in OIL,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \quad (7)$$

$$\lambda_{Gas,y} = \frac{\sum_{i\in GAS,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \quad (8)$$

Where:

$F_{i,j,y}$: the total amount of fuel *i* (in a mass or volume unit) consumed by Province j in NWPG for power generation in year y;

$NCV_{i,y}$: 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);

This PDD employs the CO_2 emission weights by coal-fired, oil-fired and gas-fired plants of total CO_2 emission of NWPG in 2007. As result, the λ_{coal}, λ_{oil} and λ_{gas} are calculated as 98.14%, 0.08% and 1.77%, respectively.

Sub-step 2: Calculation of emission factor of thermal power ($EF_{thermal\ power}$) of NWPG.

The $EF_{thermal\ power}$ is calculated as a weighted emission factor as the following formula:

$$EF_{Thermal,y} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv} \quad (9)$$

Where:

$EF_{Coal,Adv}$, $EF_{Oil,Adv}$ and $EF_{Gas,Adv}$ are the emission factors of the best technology for coal, oil, gas fired power plants commercially available in China, which are calculated based on the efficiency level of the best technology for each fuel type commercially available in China (see details in Table B2 Annex 3).

According to the data issued by China DNA, the efficiency levels of domestic sub-critical 600 MW coal power unit and the 200 MW combined cycle power unit are taken as the efficiency levels of the best technology for coal-fired power plants, and oil and gas fired power plants commercially available in China, which are at 38.10% and 49.99%, respectively.

Sub-step 3: Calculation of Build Margin (BM) emission factor of NWPG.

Finally, weighted average build margin emission factor (EF_BM,y) are calculated by multiplying the $EF_{thermal\ power}$ with the weight of new capacity addition by thermal power of total capacity addition in NWPG.

$$EF_{BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal} \qquad (10)$$

Where:

CAP_{Total} : the total capacity addition of NWPG between 2005~2007;

$CAP_{Therma:}$ the capacity addition by thermal power of NWPG between 2005~2007.

The method of OM and BM calculation above refer to official website: http://qhs.ndrc.gov.cn/qjfzjz/t20090703_289357.htm issued by China DNA.

Step 7. Calculate the combined margin (CM) emissions factor

The final step is to calculate the weighted average baseline emission factor of the Project as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM} \qquad (11)$$

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 (%); and
w_{BM} : Weighting of build margin emissions factor (%).

For the Project, w_{OM} and w_{BM}, by default, are 50% (i.e., $w_{OM} = w_{BM} = 0.5$), and $EF_{OM,y}$ and $EF_{BM,y}$ are calculated as described in Steps 3 and 5 above.

3. Leakage (LE_y)

According to the methodology ACM0002 (Ver 12.1), no leakage emission are considered. The main emission potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emission from fossil fuel use (e.g. extraction, processing, transport). There emissions sources are neglected.

4. Emission reductions (ERy)

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y \qquad (12)$$

Where:

ER_y = Emission reductions in year *y* (t CO_{2e}/yr).
BE_y = Baseline emissions in year *y* (t CO_{2e}/yr).
PE_y = Project emissions in year *y* (t CO_2/yr).

Since the project emissions for hydropower is zero, and leakages need not be considered. So, the emission reduction is equal to baseline emission BE_y, which is the product of the baseline emissions factor (EF_y) calculated in Step 3, times the annul electricity supplied by the project activity to the grid ($EG_{facility,y}$), i.e.:

$$ER_y = BE_y = EG_{facility,y} \bullet EF_{grid,CM,y} = (EG_{out,y} - EG_{in,y}) \bullet EF_{grid,CM,y} \quad (13)$$

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

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Data / Parameter:	$FC_{i,y}$
Data unit:	10^4t, 10^8m^3
Description:	The quantity of fuel *i* (in a mass or volume unit) consumed in NWPG for power generation in year y.
Source of data used:	China Energy Statistical Yearbook
Value applied:	As in Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data used are from Chinese authorities
Any comment:	For OM and BM calculation.

Data / Parameter:	$NCV_{i,y}$
Data unit:	Mj/Kg or Mj/m^3
Description:	The net calorific value (energy content) of fossil fuel type *i* in year *y*;
Source of data used:	China Energy Statistical Yearbook
Value applied:	As in Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data used are from Chinese authorities
Any comment:	For OM and BM calculation.

Data / Parameter:	$EF_{CO2,i,y}$
Data unit:	tCO_2/TJ
Description:	The CO_2 emission factor per unit of energy of the fuel *i*
Source of data used:	Table1.3 Default Value of Carbon Content, Page 1.21, Page 1.22 Chapter 1, Volume 2 2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	As in Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data is based on IPCC default.
Any comment:	For OM and BM calculation.

Data / Parameter:	$F_{i,j,y}$
Data unit:	Ton or m^3
Description:	The total amount of fuel *i* (in a mass or volume unit) consumed in NWPG for power generation in year y.
Source of data used:	China Electric Power Yearbook
Value applied:	See Annex 3.

Justification of the choice of data or description of measurement methods and procedures actually applied :	Data used are from Chinese authorities
Any comment:	For OM and BM calculation.

Data / Parameter:	EG_y
Data unit:	MWh
Description:	The electricity delivered to the grid by source *j* in year(s) *y*.
Source of data used:	China Electric Power Yearbook
Value applied:	As in Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data is from official statistics.
Any comment:	For OM calculation.

Data / Parameter:	$CAP_{i,y}$
Data unit:	MW
Description:	The installed capacity of power sources j in year y in NWPG
Source of data used:	China Electric Power Yearbook (2006~2008)
Value applied:	See Annex 3.
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data is from official statistics.
Any comment:	For BM calculation.

Data / Parameter:	CPR
Data unit:	%
Description:	Electricity consumed by power plant in each province of NWPG
Source of data used:	China Electric Power Yearbook (2006~2008)
Value applied:	As in Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data is from official statistics.
Any comment:	For OM calculation.

Data / Parameter:	$EF_{Coal,Adv,y}$, $EF_{Oil,Adv,y}$, $EF_{Gas,Adv,y}$,
Data unit:	%
Description:	The efficiency level of the best technology for each fuel type commercially available in China.
Source of data used:	Official website of China DNA: http://qhs.ndrc.gov.cn/qjfzjz/W020090703644239079814.doc

Value applied:	Coal: 38.01%; Oil: 49.99%; Gas: 49.99% (As in Annex 3)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data is from official statistics.
Any comment:	For BM calculation.

Data / Parameter:	EF_{Res}
Data unit:	$KgCO_2e/MWh$
Description:	Default emission factor for emissions from reservoirs
Source of data used:	Decision by EB23
Value applied:	90 $KgCO_2e/MWh$
Any comment:	-

Data / Parameter:	Cap_{BL}
Data unit:	W
Description:	Installed capacity of the hydro power plant before the implementation of the project activity. For new hydropower plants, this value is zero.
Source of data used:	Project site
Value applied:	Determine the installed capacity based on recognized standards
Any comment:	-

Data / Parameter:	A_{BL}
Data unit:	m^2
Description:	Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new hydropower plants, this value is zero
Source of data used:	Project site
Value applied:	Measured from topographical surveys, maps, satellite pictures, etc.
Any comment:	-

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

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1. $EF_{simple,OM}$ of NWPG

According to the OM calculation of China DNA, the Simple OM emission factor of Northwest China Grid is at is 1.0246 tCO_{2e}/MWh (See details from Table A in Annex 3).

2. $EF_{simple, BM}$ of NWPG

According to BM calculation of China DNA, based on the formula (2) and (5) in B.6.1, the $EF_{thermal\ power}$ of NWPG is at 0.8170 tCO_2/MWh（See details in table B2 in Annex 3）.

The new capacity addition of thermal power in NWPG accounts for 78.74% of total capacity addition between 2005~2007. Thus, based on formula (6) above, the build margin emission factor is calculated as 0.6433 tCO_{2e}/MWh (See details from table B in Annex 3).

3. $EF_{grid,CM}$ of NWPG

According to equation 9, the baseline combine emission factor = 1.0246 x 0.5+0.6433 x 0.5 =0.8340tCO_{2e}/MWh.

4. Emission reduction (ER_y) by the Project activity

According to formula (13): $ER_y = BE_y = EG_{facility,y} \times EF_{grid,CM,y}$ =390,218×0.8340=325,442tCO_{2e}

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

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Year	Estimation of project activity emission (tCO_2e)	Estimation of baseline emission (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of emission reductions (tCO_2e)
01/06/2011~31/05/2012	0	325,442	0	325,442
01/06/2012~31/05/2013	0	325,442	0	325,442
01/06/2013~31/05/2014	0	325,442	0	325,442
01/06/2014~31/05/2015	0	325,442	0	325,442
01/06/2015~31/05/2016	0	325,442	0	325,442
01/06/2016~31/05/2017	0	325,442	0	325,442
01/06/2017~31/05/2018	0	325,442	0	325,442
Total (tCO_{2e})	0	2,278,094	0	2,278,094

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

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B.7.1. Data and parameters monitored:

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Data / Parameter:	$EG_{out,y}$
Data unit:	MWh
Description:	Electricity supplied by the project activity to NWPG.
Source of data to be used:	Project activity site.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Electricity meters
Description of measurement methods and procedures to be applied:	Continuous measurement and at least monthly recording
QA/QC procedures to be applied:	The metering equipments (M1&M2 with accuracy of 0.2s) are calibrated and checked annually for accuracy by the qualified third party in accordance with industry standards (Chinese electric industry regulation DL/T448). Monthly net generation data will be approved and signed off by CDM manager before it is accepted and stored. Electricity supplied to the grid is double-checked against sales receipts.
Any comment:	-

Data / Parameter:	$EG_{in,y}$
Data unit:	MWh
Description:	Electricity purchased from NWPG by the project activity for plant operation
Source of data to be used:	Project activity site.

Value of data applied for the purpose of calculating expected emission reductions in section B.5	Electricity meters
Description of measurement methods and procedures to be applied:	Continuous measurement and at least monthly recording
QA/QC procedures to be applied:	The metering equipments (M1&M2 with accuracy of 0.2s) are calibrated and checked annually for accuracy by the qualified third party in accordance with industry standards (Chinese electric industry regulation DL/T448). Monthly net generation data will be approved and signed off by CDM manager before it is accepted and stored. Electricity purchased from NWPG by the project activity for plant operation. Double check by receipt of sales.
Any comment:	-

Data / Parameter:	TEG_y
Data unit:	MWh/yr
Description:	Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y
Source of data to be used:	Project activity site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Electricity meters
Description of measurement methods and procedures to be applied:	Continuous measurement and at least monthly recording
QA/QC procedures:	-
Any comment:	Not Applicable (For it applicable to hydropower project activities with a power density of the project activity greater than $4W/m^2$ and less than or equal to $10W/m^2$)

Data / Parameter:	A_{PJ}
Data unit:	M^2
Description:	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full.
Source of data to be used:	Project site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	In accordance with the FSR designed by the Design Institute. Photographs of the reservoir at several key locations will be taken when the project becomes operational to check whether the actual reservoir does not deviate substantially for the design.
Description of measurement methods and procedures to be applied:	Yearly
QA/QC procedures:	The uncertainty level of this data is low.
Any comment:	Accurate, for calculation of power density then for PE_y

Data / Parameter:	Cap_y
Data unit:	MW
Description:	Installed capacity of the proposed project.
Source of data to be used:	Project site.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Measured from the nameplate of the Generator by qualified entity.
Description of measurement methods and procedures to be applied:	Yearly
QA/QC procedures to be applied:	The uncertainty level of this data is low.
Any comment:	-

B.7.2. Description of the monitoring plan:

>>
The project owner is responsible for the implementation of this monitoring plan and will set up a CDM Team responsible for the project registration, monitoring and other CDM activities. The project owner must maintain credible, transparent, and adequate data estimation, measurement, collection, and tracking systems to maintain the information required for an audit of an emission reduction project. These records and monitoring systems are needed to allow the selected DOE to verify project performance as part of the verification and certification process. This process also reinforces that CO_2 reductions are real and credible to the buyers of the Certified Emissions Reductions (CERs).

Emission reductions will be achieved through avoided power generation of fossil fuel plant due to the power generated by the Project. The grid-connected output, the electricity purchased from grid, the installed capacity and the area of the reservoir are therefore defined as the key data to monitor.

Operational and Management Structure for Monitoring

The monitoring of the emissions reductions will be carried out according to Figure 6 below. The General Manager will hold the overall responsibility for the monitoring process, but as indicated below parts of the process are delegated:

The first step is the measurement of the electrical energy supplied to the grid and reporting of daily operations, which will be carried out by the plant manager.

The project owner will appoint a monitoring officer who will be responsible for verification of the measurement, collection of sales receipts, collection of billing receipts of the power supplied by the grid to the project and the calculation of the emissions reductions. Besides collection of the supporting documentations and execution of quality control (QC) and quality assurance (QA) procedures, the monitoring officer will prepare operational reports of the project activity, recording the daily operation of the project, including operating periods, power generation, power delivered to the grid, equipment defects, etc.

Finally, the monitoring reports will be reviewed by the General Manager.

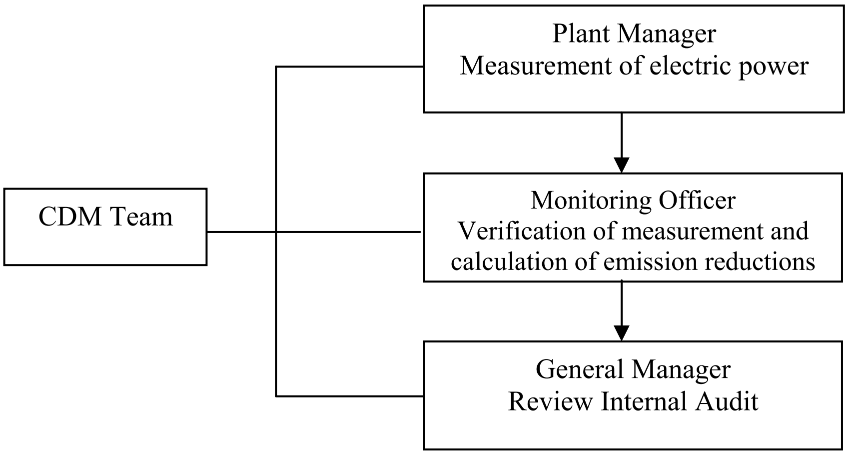


Figure 6: Monitoring and Management Structure

Monitoring Plan

Monitoring tasks must be implemented according to the monitoring plan in order to ensure that the real, measurable and long-term greenhouse gas (GHG) emission reduction for the Project is monitored and reported.

1. Responsibility

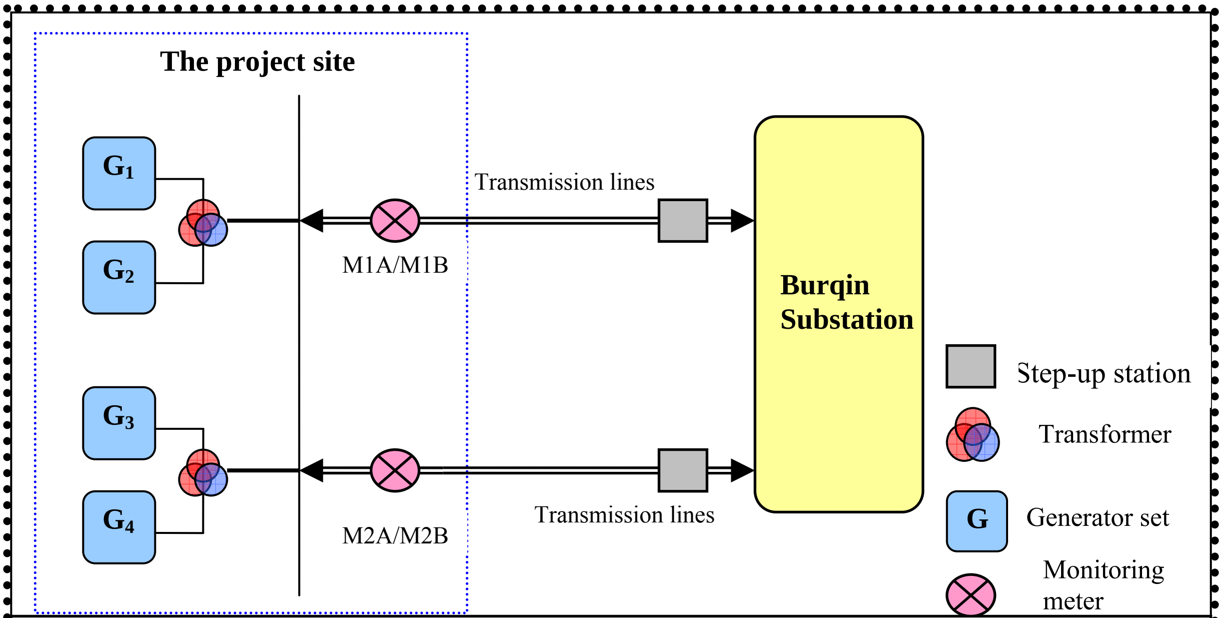
Overall responsibility for daily monitoring and reporting lies with the project owner. A monitoring team will be established by the project owner to carry out the monitoring work.

2. **Personnel training**

The personnel involved in the CDM team will receive sufficient training regarding to monitoring before the project operation, the manager of the CDM team is responsible for organizing the training. The training consists of two sections as follows:

- Training on project operation, which includes reading and calibration of meters, recording, adjustment and reporting of the readings, and corresponding solving methods; and
- Training on validation, registration and verification regarding to CDM to ensure the emission reductions generated by the project can be monitored, recorded and reported accurately.

3. Installation of meters



Note:
Specification of the meters

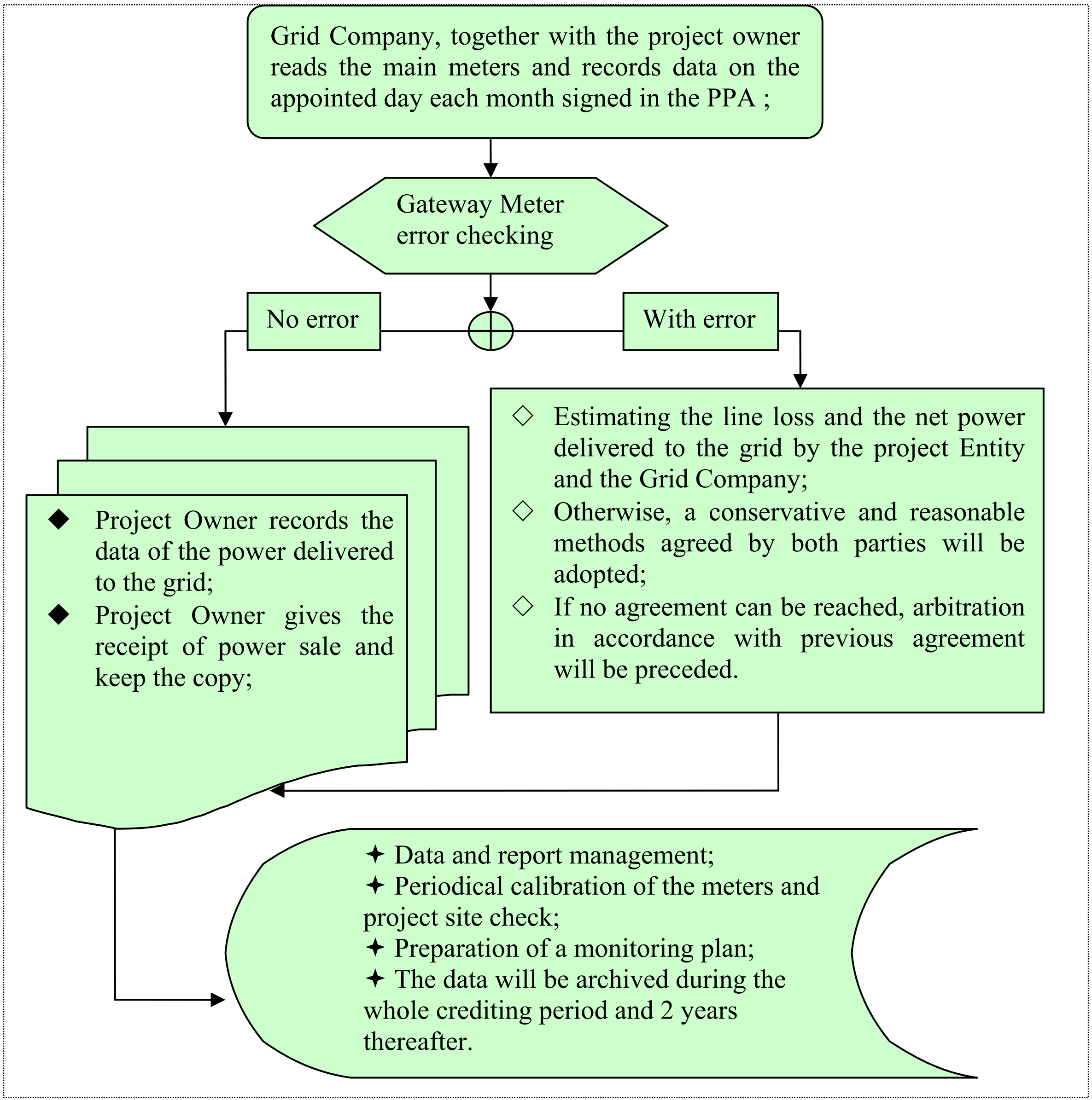
Meter	Location	Accuracy
M1A/M1B	Onsite; High voltage side of the step-up station.	0.2s
M2A/M2B		0.2s

Figure 7: Diagram of the Grid Connection

As indicated in the figure 7 above:
The project is connected to the grid through on-site booster transformer substation that increases the voltage then through 2 sets of double-circuit transmission lines and finally connected to the Burqin 220kV Substation. The electricity will be monitored by the main Meters (M1A&M2A) installed in the project site. These meters can measure the bi-directional electricity flows, which include the electricity supplied to the gird by the project ($EG_{out,y}$) and electricity purchased from the gird by the project for plant operation ($EG_{in,y}$). The relevant backup Meters ((M1B&M2B) are installed in the same measurement point as the main Meters in substations for crosscheck. It also has the same model and function with the main Meters. When the main Meters are out of order, the readings from the backup Meters will be used for reference.

The metering equipment will be properly configured and checked annually according to the requirement from technical administrative code of electric energy metering (DL/T448-2000).

4. Data collection &Reporting
The procedure for data collection and reporting is as follows:



5. Meter Maintenance &Calibration
All meters shall be jointly inspected and sealed on behalf of the parties concerned and shall not be interfered with by either party except in the presence of the other party or its accredited representatives. And all the meters shall be calibrated specified as follows:

- The metering equipments are calibrated periodically for accuracy; and
- All the meters installed shall be tested by a third party within 10 days after:
  (a) Detection of a difference larger than the allowable error in the readings of both meters;
  (b) The repair of all or part of meter caused by the failure of one or more parts to operated in accordance with the specifications.

Calibration is carried out by qualified third parties with the records being supplied to the project owner, and these records will be preserved and maintained both by the project owner and the appointed third parties. The metering equipment shall have sufficient accuracy so that any error resulting from such equipment shall not exceed the allowable error of full-scale rating.

6. Quality Control and Quality Assurance

All monitoring data and monitoring report will be adopted by the internal control of owners and external verification procedures to achieve quality control and quality assurance.

a) Internal Control Procedures

- As for the institutional setup and personnel allocation , the owner will set up a reasonable management structure and scientific functional division to ensure that all monitoring data and monitoring reports will reviewed internally at least twice separately by the monitoring officer and general manager, and thus to fully guarantee the accuracy of all data and information;
- Technically, all the monitoring equipments will be installed and maintained properly, and periodically tested by the professional institution to ensure the authenticity and reliability of the monitoring data. In addition, all monitoring data to read the report and monitoring. All will be well prepared by the professional training of relevant officers to ensure the accuracy of the data.

b) External Verification Procedures

- First of all, the meter data read by the owners will be rechecked with the one provided by the Grid company, only the correspondant data will be considered to be true;
- Second, all meter data will be checked with the sales invoices to ensure that the reliability of all monitoring data.

7. The Compilation of the Monitoring Report & Data management system

The project owner is responsible for compiling the monitoring report, including the data statistics of the $EG_{in,y}$ and $EG_{out,y}$, the plant maintenance, and calibration of meters and so on. Installed capacity of the hydropower plant after the implementation of the project activity will be monitored by checking the generator nameplate. Area of the reservoir when the reservoir is full, after the implementation of the project activity, is annually monitored by calculations based on relevant maps by qualified parties.

All data collected as part of monitoring will be archived electronically. All information will be stored by the technology department of the project owner and all the material will have a physical copy for backup. In order to facilitate DOE' reference of relevant literature relating to the project, the project materials and monitoring results will be indexed. And all data including calibration records is kept until 2 years after the end of the total credit time of the CDM project.

8. Verification of monitoring results

The project owner should complete the monitoring report periodically, which contains the monitoring records and CER calculation etc. And the project owner will fully cooperate with the DOE and instruct its staff and management to be available for interviews and response to all the questions from the DOE.

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)

>>

The baseline study and monitoring plan of the proposed project were completed on 25/08/2010by the Beijing Changjiang River International Holding.

Ms. Lisa Tu, E-mail: tuli0424@yahoo.com.cn Tel: +86-10-65101881

Mr. Youchun Ge, E-mail: geyouchun@crihholding.cn Tel: +86-10-65101889

The entity and the persons listed above are not considered as 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:

>>

16/10/2007 (the date of Project Construction Agreement signed, on which the project owner has committed to expenditures related to the project construction)

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

>>

30 years

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:

>>

01/06/2011 or the date on which a complete request for registration is submitted, whichever is earlier

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

>>

Xinjiang Water Conservation& Hydropower Survey & Planning Research Institute delegated by the project owner carried out the Environmental Impact Assessment (EIA) for this Project. The EIA was then approved by the Environmental Protection Administration of Xinjiang Uygur Autonomous Region on 11/10/2006.

According to the EIA report, the impacts arising from the proposed project were identified. And the corresponding mitigation methods are illustrated as follows:

Wastewater

During construction phase, wastewater mainly consists of construction wastewater including waste water from sand-rock mixing, concrete mixing, machine and vehicles washing and daily sewage generated by construction labour. As to the wastewater generated during the construction will be discharged to the near the pits nearby in quarry which will work as sedimentation tank. As the leakage coefficient of grit is large, so the water will leak while sand and soil will precipitate. As about the oily water caused by machine operation and maintaining, it will be discharged to a two-level sedimentation tank. In the first sedimentation tank, the sand and soil will precipitate, and oil will be recycled from the wastewater. Then the water will be discharged to a second sedimentation tank. After the above treating, the water will meet the discharge standard o Integrated Wastewater Discharge Standard (GB8978-1996) II and Standards for irrigation water quality (GB5084-92) II at SS≤70mg/l, and can be used for irrigation or road wetting.

During operation phase, in accordance with Environmental quality standards for surface water (GB 3838-2002) III, sewage produced by operation staff will be disposed through biological septic tank and then be used for greening.

Noise

In construction period, noise pollution is mainly from construction machines and transport vehicles. According to Noise Limit for Construction Site (GB12523-90), necessary measures will be taken to weaken the noise, for example, adopt low-noise device, reduce siren and limit speed of the transport vehicles when passing through inhabited area, equip the labour with cotton in ears etc. Since the construction period is temporary, the impact on the local sound environment will be limited.

Exhaust gas and dust

During construction phase, the exhaust gas mainly comes from fuel-burning while the dust mainly comes from architectural excavation, gravel processing, concrete mixing system and vehicles transport. According to Ambient air quality standard (GB3095-1996) II, some alleviation measures will be adopted to protect the working staff and local residents, including watering regularly, use cross ventilation method in the tunnel drilling, adopt hybrid type airiness remove dust in explosion, protect the working personnel with mask and glasses etc.

Solid wastes

In construction period, solid wastes mainly include waste slag rising from project construction and the labour’s daily garbage. The waste slag will be dumped and compacted in a well-selected site and used for soil and water conservation after construction while the daily garbage will be transported to appointed place and be used for sanitary landfill.

Ecological environment

The project will occupy some land, most of which is pasture and wasteland. In addition, no large rare and endangered protected species are identified in the project site. So the construction of the Project will not induce any displacement of residents. And the impact on local species is little.

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 proposed project are not considered to be significant due to the mitigation methods mentioned above.

SECTION E. Stakeholders' comments

>>

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

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In order to make the public better know the proposed project and acquired the public's the attitude and comment toward the proposed project, in late September 2007, the project owner conducts a survey in the form of distributing questionnaires to local stakeholder, including the representative of local authorities and experts, local entities, social entities and local residents. The survey was arranged through a one-page questionnaire, which was designed to be easily filled in with the following sections:

1) Project introduction;
2) Respondent's basic information (Gender&Age) and the occupation;
3) Questions on:
    - ♦ Do you know this proposed project in Burqin County?
    - ♦ Do you support the construction of the proposed project?
    - ♦ Do you think the proposed project will promote local economic development?
    - ♦ What do you think of the impact on the ecosystem and environment from the proposed project?
    - ♦ What do you think of the impact on the water from the proposed project?
    - ♦ What do you think of the noise impact of the proposed project on local residents' daily life?
    - ♦ What do you think of the impact of the soil erosion?
    - ♦ What other positive or negative impacts do you think the proposed project will bring?
4) Space for the respondents' signature and date.

E.2. Summary of the comments received:

>>

80 questionnaires are distributed and all are collected back. The following is the summery of the comments received:

For this proposed project:

1. All of the respondents know about this project;
2. All of the respondents are supportive of the project;
3. 96.25% of the respondents think that the proposed project will promote local economic development, the rest have no idea;
4. 95% of the respondents consider that the impact on the ecosystem and environment from the proposed project is little, the rest have no idea;
5. 97.5% of the respondents hold that the impact on the water rising from the proposed project is little, the rest have no idea;
6. All of the respondents deem that the noise impact is little;
7. All of the respondents think that the impact of soil erosion is little.

All stakeholders showed their strong support toward the proposed project. Most of them deeply believed the project will bring multiple social-economic benefits, improving their living quality, promoting the economic development, increasing local income etc. They will benefit a lot from the proposed project.

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

>>

The local residents and authorities are all supportive of the proposed project. Therefore, the project will be implemented without modification to the original procedures and measures.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Direct tel:	+44 (0)7837928526
Personal E-Mail:	christina.sterling@capitalene.com

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

>>
No Public Fund from Annex I countries is involved in the proposed project.

Annex 3

BASELINE INFORMATION

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Please refer to the following official websites issued by DNA for the procedure of OM and BM calculation of Northwest China Grid:
http://qhs.ndrc.gov.cn/qjfzjz/t20090703_289357.htm

Table A Calculation of simple OM emission Factor of NWPG
Table A1-1 Electricity generation by thermal power in NWPG in 2005

Province	Electricity generation and supply by thermal power plants		
	Electricity generation (MWh)	Power self-consumption rate (%)	Power supply to the Grid (MWh)
Shaanxi	41,100,000	7.16%	38,157,240
Gansu	33,106,000	4.23%	31,705,616
Qinghai	5,500,000	2.69%	5,352,050
Ningxia	27,643,000	5.73%	26,059,056
Xinjiang	26,560,000	8.80%	24,222,720
Sum	133,909,000	—	125,496,682
Electricity Import (MWh)	0	Total power supply (MWh)	125,496,682

Datasource: China Electric Power Year Book 2006

Table A1-2 Calculation of simple OM emission factor of NWPG in 2005

Type	Unit	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Total	Carbon Emission Factors	OXIDi	CO_2 Emission Factors	NCV	Emission（tCO_2e）
								（tc/TJ)	（%）	($kgCO_2/TJ$)	(MJ/t,km^3)	K=F×I×J/100000（Mass）
		A	B	C	D	E	F=A+B+C+D+E	G	H	I	J	K=F×I×J/10000 (Volume)
Raw coal	10^4t	2461.28	1597	345.1	1467.7	1358.09	**7229.17**	25.8	100	87,300	20908	131,951,756
Clean coal	10^4t	16.22					**16.22**	25.8	100	87,300	26344	373,033
Other washed coal	10^4t	35.56			101.95	10.2	**147.71**	25.8	100	87,300	8363	1,078,416
Coke	10^4t	3.23					**3.23**	29.2	100	95,700	28435	87,896
Coke oven gas	(10^8m^3)						**0**	12.1	100	37,300	16726	0
Other gas	(10^8m^3)						**0**	12.1	100	37,300	5227	0
Crude oil	10^4t					0.18	**0.18**	20	100	71,100	41816	5,352
Gasoline	10^4t	0.02				0.01	**0.03**	18.9	100	67,500	43070	872
Diesel	10^4t	2.24	0.46	0.06		0.5	**3.26**	20.2	100	72,600	42652	100,947
Fuel oil	10^4t	0.01	0.57			0.25	**0.83**	21.1	100	75,500	41816	26,204
Natutal gas	10^4t						**0**	17.2	100	61,600	50179	0
LPG	10^4t					7.71	**7.71**	15.7	100	48,200	46055	171,151
Refinery gas	(10^8m^3)	1.46	0.52	1.33		7.81	**11.12**	15.3	100	54,300	38931	2,350,716
Other petroleum product	10^4t						**0**	20	100	75,500	38369	0
Other coke product	10^4t						**0**	25.8	100	95,700	28435	0
Other energy（renewable energy or waste heating）	10^4tce	8.24	1.3				**9.54**	0	0	0	0	0
Total emission of the NWPG (tCO2e)	136,146,341											
Fossil power generation of the NWPG(MWh)	125,496,682											
OM emission factor of the NWPG(tCO2e/MWh)	1.08486											

Data source: China Energy Statistical Yearbook 2006; 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy, Chapter 1 1.21-1.24, Figure 1.3 and Figure 1.4.

Table A2-1 Electricity generation by thermal power in NWPG in 2006

Province	Electricity generation and supply by thermal power plants		
	Electricity generation （MWh）	Power self-consumption rate (%)	Power supply to the Grid (MWh)
Shaanxi	54,482,000	6.97%	50,684,605
Gansu	35,738,000	4.29%	34,204,840
Qinghai	7,204,000	2.57%	7,018,857
Ningxia	36,731,000	0.00%	36,731,000
Xinjiang	29,901,000	8.02%	27,502,940
Sum	164,056,000	—	156,142,241
Electricity Import (MWh)	0	Total power supply (MWh)	156,142,241

Datasource: China Electric Power Year Book 2007

Table A2-2 Calculation of simple OM emission factor of NWPG in 2006

Type	Unit	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Total	Carbon Emission Factors	OXIDi	CO_2 Emission Factors	NCV	Emission（tCO_2e）
								（tc/TJ）	（%）	($kgCO_2/TJ$)	（$MJ/t,km^3$）	K=F×I×J/100000（Mass）
		A	B	C	D	E	F=A+B+C+D+E	G	H	I	J	K=F×I×J/10000 (Volume)
Raw coal	10^4t	2834.44	1660.92	421.86	1833.72	1547.69	**8298.63**	25.8	100	87,300	20908	151,472,271
Clean coal	10^4t						**0**	25.8	100	87,300	26344	0
Other washed coal	10^4t				112.7	8.45	**121.15**	25.8	100	87,300	8363	884,504
Coke	10^4t				0.01		**0.01**	29.2	100	95,700	28435	272
Coke oven gas	(10^8m^3)	0.2				0.08	**0.28**	12.1	100	37,300	16726	17,469
Other gas	(10^8m^3)	0.1					**0.1**	12.1	100	37,300	5227	1,950
Crude oil	10^4t					0.02	**0.02**	20	100	71,100	41816	595
Gasoline	10^4t	0.01					**0.01**	18.9	100	67,500	43070	291
Diesel	10^4t	1.14	0.24	0.61		1.25	**3.24**	20.2	100	72,600	42652	100,328
Fuel oil	10^4t		0.6			0.11	**0.71**	21.1	100	75,500	41816	22,415
Natutal gas	10^4t						**0**	17.2	100	61,600	50179	0
LPG	10^4t						**0**	15.7	100	48,200	46055	0
Refinery gas	(10^8m^3)	1.59	0.56	1.06		7.49	**10.7**	15.3	100	54,300	38931	2,261,930
Other petroleum product	10^4t						**0**	20	100	75,500	38369	0
Other coke product	10^4t	1.86					**1.86**	25.8	100	95,700	28435	50,615
Other energy（renewable energy or waste heating）	10^4tce	33.57	8.81			2.2	**44.58**	0	100	0	0	0
Total emission of the NWPG (tCO2e)	154,812,639											
Fossil power generation of the NWPG(MWh)	156,142,241											
OM emission factor of the NWPG(tCO2e/MWh)	0.99148											

Data source: China Energy Statistical Yearbook 2007; 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy, Chapter 1 1.21-1.24, Figure 1.3 and Figure 1.4.

Table A3-1 Electricity generation by thermal power in NWPG in 2007

Province	Electricity generation and supply by thermal power plants		
	Electricity generation （MWh）	Power self-consumption rate (%)	Power supply to the Grid (MWh)
Shaanxi	59,100,000	6.77%	55,098,930
Gansu	42,400,000	5.89%	39,902,640
Qinghai	9,700,000	7.19%	9,002,570
Ningxia	43,500,000		43,500,000
Xinjiang	34,600,000	9.20%	31,416,800
Sum	189,300,000		178,920,940
Electricity Import (MWh)	0	Total power supply (MWh)	178,920,940

Datasource: China Electric Power Year Book 2008

Table A3-2 Calculation of Simple OM Emission Factor of NWPG in 2007

Type	Unit	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Total	OXIDi	CO2 Emission Factor	NCV	Emission（tCO_2e）
								（%）	($kgCO_2/TJ$)	（MJ/t,km3）	K=F×I×J/100000（Mass）
		A	B	C	D	E	F=A+B+C+D+E	H	I	J	K=F×I×J/10000 (Volume)
Raw Coal	10^4t	3303.44	1969.03	470.85	2165.8	1762.11	**9671.23**	100	87,300	20908	176,525,905
Refined Coal	10^4t						**0**	100	87,300	26344	0
Other Washed Coal	10^4t	3.73			124.31	7.73	**135.77**	100	87,300	8363	991,243
Briquettes	10^4t	3.53					**3.53**	100	87,300	20908	64,432
Coke	10^4t						**0**	100	95,700	28435	0
Other Coking Products	10^4t						**0**	100	95700	28435	0
Crude Oil	10^4t					0.09	**0.09**	100	71,100	41816	2,676
Gasoline	10^4t	0.02					**0.02**	100	67,500	43070	581
Diesel Oil	10^4t	1.12	0.26	0.42		1.77	**3.57**	100	72,600	42652	110,546
Other Petroleum Products	10^4t						**0**	100	75,500	41816	0
Fuel Oil	10^4t	0.01	1.05	0.04		0.05	**1.15**	100	75,500	41816	36,307
PlG	10^4t						**0**	100	61,600	50179	0
Coke Oven Gas	(10^8m^3)	0.52	0.65			0.26	**1.43**	100	37,300	16726	89,215
Other Gas	(10^8m^3)	14.14	0.71				**14.85**	100	37,300	5227	289,526
Refinery Gas	10^4t					5.99	**5.99**	100	48,200	46055	132,969
Natural Gas	(10^8m^3)	1.68	0.49	1.93		8.66	**12.76**	100	54,300	38931	2,697,404
Other Energy	10^4tce	94.36	9.73				**104.09**	0	0	0	0
Total emission of the NWPG (tCO2e)	180,940,805										
Fossil power generation of the NWPG(MWh)	178,920,940										
OM emission factor of the NWPG(tCO2e/MWh)	1.01129										

Data source: China Energy Statistical Yearbook 2008; 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy, Chapter 1 1.21-1.24, Figure 1.3 and Figure 1.4.

Table A4 Simple OM emission factor of NWPG

CO2 Emission of NWPG (tCO2e)			Power Supply of NWPG (MWh)		
2005	2006	2007	2005	2006	2007
136,146,341	154,812,639	180,940,805	125,496,682	156,142,241	178,920,940
Total	471,899,785		Total	460,559,863	
EF_OM (tCO2/MWh)	1.02462				

Table B Calculation of BM emission factor of NWPG

Table B1-1 Installed capacity of NWPG in 2005

	Installed capacity（MW）				
	Hydro power	Fuel-fired power	Nuclear power	Other	Total
Shaanxi	1,578.00	9,132.10	0.00	46.00	10,756.10
Gansu	4,036.20	5,715.00	0.00	109.10	9,860.30
Qinghai	4,825.00	886.80	0.00	0.00	5,711.80
Ningxia	428.50	4,577.00	0.00	112.20	5,117.70
Xinjiang	1,352.10	5,051.70	0.00	132.20	6,536.00
Sum	12,219.80	25,362.60	0.00	399.50	37,981.90
Share	32.17%	66.78%	0.00%	1.05%	-

Datasource: China Electric Power Year Book 2006

Table B1-2 Installed capacity of NWPG in 2006

	Installed capacity（MW）				
	Hydro power	Fuel-fired power	Nuclear power	Other	Total
Shaanxi	2,165.00	9,723.00	0.00	0.00	11,888.00
Gansu	4,291.00	6,448.00	0.00	199.00	10,938.00
Qinghai	5,423.00	1,517.00	0.00	0.00	6,940.00
Ningxia	429.00	6,002.00	0.00	11.00	6,442.00
Xinjiang	1,766.00	5,937.00	0.00	189.00	7,892.00
Sum	14,074.00	29,627.00	0.00	399.00	44,100.00
Share	31.91%	67.18%	0.00%	0.90%	100.00%

Datasource: China Electric Power Year Book 2007

Table B Calculation of BM emission factor of NWPG

Table B1-3. Basic data of the NWPG in 2007

	Installed capacity（MW）				
	Hydro power	Fuel-fired power	Nuclear power	Other	Total
Shaanxi	1,790.00	12,290.00	0.00	72.50	14,152.50
Gansu	4,400.00	7,840.00	0.00	346.00	12,586.00
Qinghai	5,830.00	1,900.00	0.00	0.00	7,730.00
Ningxia	430.00	7,030.00	0.00	50.00	7,510.00
Xinjiang	2,140.00	6,560.00	0.00	330.00	9,030.00
Sum	14,590.00	35,620.00	0.00	798.50	51,008.50
Share	28.60%	69.83%	0.00%	1.57%	100.00%

Datasource: China Electric Power Year Book 2008

Table B2 Emission factor of thermal power in NWPG

	Power Supply Efficiency of The Best Power Technology	EF_{CO2} ($kgCO_2/TJ$)	OXIDi	Emission Factor of Best Techonology (tCO2e/MWh)	The mix of thermal power capacity of CCPG in 2006	EF thermal power (tCO2e/MWh)
	A	**B**	**C**	**D=3.6/A/1,000,000×B×C**	**E**	**H**
Standard Coal	38.10%	87,300	1	0.8249	98.14%	0.8170
Fuel Oil/diesel	49.99%	75,500	1	0.5437	0.08%	
Natrual Gas	49.99%	54,300	1	0.3910	1.77%	

Data source: China Energy Statistical Yearbook 2008; 2006 IPCC Guidelines for National Greenhouse Gas Inventories

Table B3 Weighted Average Build Margin Emission Factor of NWPG

	Installed Capacity 2005	Installed Capacity 2006	Installed Capacity 2007	New Capacity Additions	Percentage of Total New Installed Capacity	Emission Factor of Newly Bulit Thermal Power Plants	Weighted Average Build Margin Emission Factor EFBM,y
	(MW)	(MW)	(MW)	(MW)	(MW)	(tCO2e/MWh)	(tCO2e/MWh)
	A	**B**	**C**	**D**	**E**	**F**	**G**
Source	Table B1-2	Table B1-3	Table B1-3	D=C-A	E=D/Total D	Table B2	G=F*E
Hydro Power Plant	12,219.80	14,074.00	14,590.00	2,370.20	18.20%	0.8170	
Thermal Power Plant	25,362.60	29,627.00	35,620.00	10,257.40	78.74%		0.6433
Nuclear Power	0.00	0.00	0.00	0.00	0.00%		
Others	399.50	399.00	798.50	399.00	3.06%		
Total	**37,981.90**	**44,100.00**	**51,008.50**	**13,026.60**	100.00%		
Percentage of the Installed Capacity of 2007	74.46%	86.46%	100.00%	25.54%			

Table C Baseline Emission Factor of the Project

EF_OM (tCO2e/MWh)	EF_BM (tCO2e/MWh)	EF_CM (tCO2e/MWh)
1.0246	0.6433	0.8340

Annex 4

MONITORING INFORMATION

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See Section B.7.2.