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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Xinjiang Dabancheng Wind Farm Phase I Project
Version number of the document: 3
Date: 18/05/2012

History of the PDD versions

Version number	Date	Nature of the revision
1	06/01/2012	Completed version for the GSP procedure
2	24/03/2012	Revised according to the draft validation report
3	18/05/2012	Revised according to DOE's comments

A.2. Description of the project activity:

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Xinjiang Dabancheng Wind Farm Phase I Project (hereafter refers to the proposed project) is to utilize wind resources for electricity generation through the construction of a wind farm with a total capacity of 49.5MW and an 110kV transmission station in Dabancheng District, Urumqi City, Xinjiang Uygur Autonomous Region, P. R. China. The proposed project involves the installation of 33 wind turbines with capacities of 1,500kW each, which amount to a total installed capacity of 49.5MW. The electricity generated from the project will be supplied to the Northwest China Power Grid (NWCPG). The estimated annual net electricity output and emission reductions of the proposed project are 129,195 MWh and 115,803 tCO_2e, respectively. The proposed project is a grid-connected renewable energy project.

The proposed project makes contribution to the local sustainable development as follows:

1. GHG emission reduction
The proposed project activity will achieve greenhouse gas (GHG) emission reductions by reducing CO_2 emissions, as grid-connected fossil fuel-fired power dominates in the Northwest China Power Grid.

2. Pollutants emission reduction through replacing fossil fuel combustion
The proposed project is to reduce grid-connected fossil fuel-fired power plants in the Northwest 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 job opportunities for local people. The temporary work includes assembly and installation of the wind turbines and the long-term work can be the maintenance of the facilities, etc.

4. Contribution to the Development of the local Region
The construction and operation of the project will be favourable to the economic growth of the local city with expected revenues.

A.3. Project participants:

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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)**
People's Republic of China (host)	China Water Investment Xinjiang Dabancheng Wind Power Co., Ltd.	Yes

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.:

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Xinjiang Uygur Autonomous Region

A.4.1.3. City/Town/Community etc:

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Dabancheng District, Urumqi City

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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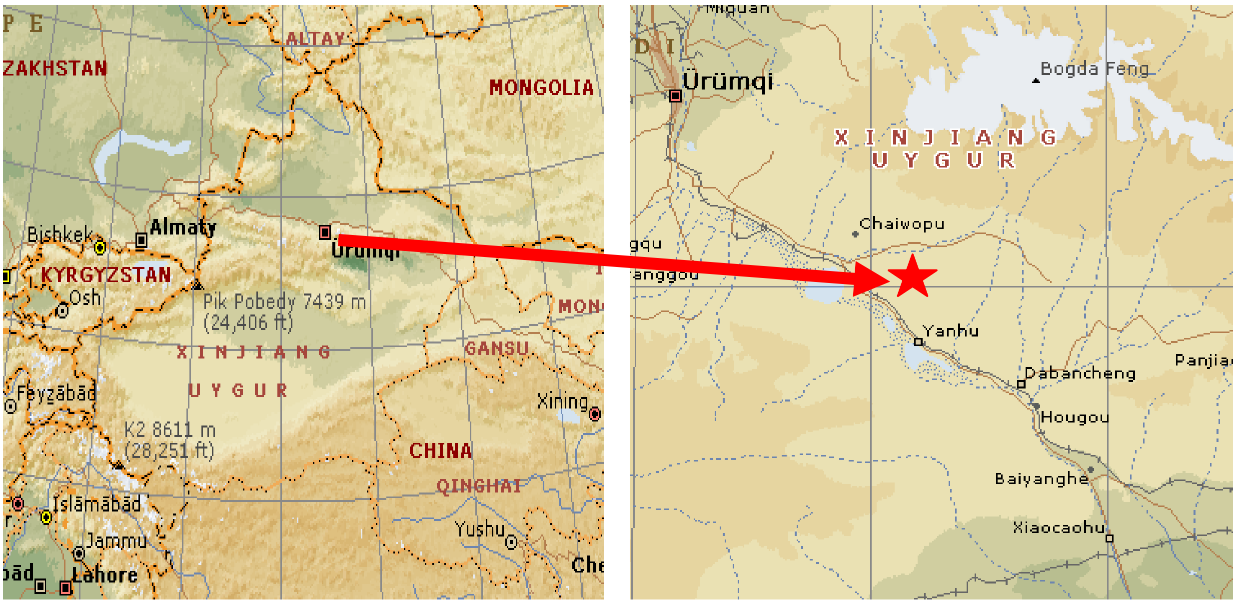
The proposed project is located in Dabancheng District, Urumqi City, Xinjiang Uygur Autonomous Region, P. R. China. The project has the geographical coordinates with east longitude of 88°02'41.14″E～88°05'37.85″E and north latitude of 43°31'41.92″N～43°34'19.13″N. The central geographical coordinate of the proposed project is with east longitude of 88°04'9.49"E and north latitude of 43°33'0.52"N[1].

[1] The geographical coordinates of the proposed project are based on the document evidence given by Xinjiang Wind Power Co., Ltd., which compiled the FSR of the proposed project.

Figure 1. The proposed project in the map of P. R. China

Figure 2. The proposed project in the map of Xinjiang Uygur Autonomous Region, P. R. China



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

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Category: Renewable electricity in grid connected applications
Sectoral Scope: 1 Energy industries

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

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The proposed project is to utilize wind resources for electricity generation in Dabancheng District, Urumqi City, Xinjiang Uygur Autonomous Region, P. R. China. The proposed project is a grid-connected renewable energy to electricity project. The proposed project will achieve obvious greenhouse gas (GHG) emission reductions through the displacement of mainly fossil-fuel dominated grid connected power generation in Northwest China Power Grid.

Prior to the start of implementation of the project activity, there is no power generation unit at the site of the proposed project. The scenario is Northwest China Power Grid providing the same electricity service as the proposed project. Northwest China Power Grid is dominated by the fossil-fuel fired power plants.

The project scenario is the implementation of the proposed project and replaces the same amount of electricity generated by Northwest China Power Grid, which is dominated by the fossil-fuel fired power plants.

The baseline scenario of the proposed project is the same as the scenario prior to the start of the implementation of the project activity.

The proposed project involves the installation of 33 sets of wind turbines with a capacity of 1,500kW each, which amounts to a total installed capacity of 49.5MW. The selected wind turbines are the models of GW70/1500 according to the wind turbine purchase contract. The estimated net annual power supplied to the grid is 129,195 MWh. The expected effective operating hour amount to 2,610h per year and the plant load factor is 29.8%[2].

The main technical specifications of the wind turbine are provided in the following table.

Parameter	Units	Data[3]
Quantity		33
Height of hub	m	65
Number of blades		3
Rated wind speed	m/s	11.7

[2] According to Annex 11 of EB 48 Report, Guideline for the reporting and validation of plant load factors(version 01), the plant load factor shall be defined ex-ante in the CDM-PDD according to one of the following three options: (a) The plant load factor provided to banks and/or equity financiers while applying the project activity for project financing, or to the government while applying the project activity for implementation approval; (b) The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company). The plant load factor of the proposed project is 29.8% according to the Feasibility Study Report (FSR), which is determined by the accredited designing institute, Xinjiang Wind Power Co., Ltd., which is the third party contracted by the project participants.

[3] Values of the parameters in the table are based on the wind turbine purchase contract.

Cut-in wind speed	m/s	3
Cut-off wind speed	m/s	25
Rated Power	kW	1,500
Rated voltage	V	620
Life time	year	20

The proposed project will set up a main transformer in a 110 kV substation at the project site. The wind power generated will be switched through a 110 kV substation at the project site, and then connected to the Yanhu 220kV Substation, then transmitted to the Northwest China Power Grid finally.

The bi-direction electricity meters will be used to monitor the electricity supplied to the grid by the proposed project, the electricity imported from the grid to the project site, the electricity purchased via the 10kV spare line. The main meter (M1) and the backup meter (M2) will be installed between the Project 110kV Substation and the Yanhu 220kV Substation (The exact position of the meters M1 and M2 will be determined by the power purchase agreement signed between the project owner and the power grid company), the meter M3 will be installed on the 10kV spare line. The accuracy of the meters M1 and M2 will be no lower than 0.5S. The accuracy of the meter M3 will be no lower than 2.0.

The proposed project will use domestic wind turbines. Hence, it does not involve technology transferred to the host parties.

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

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A crediting period of 7 years (01/08/2012-31/07/2019) is selected for the project activity. An estimation of emissions reductions expected over the crediting period is provided in the table below.

Years	Annual estimation of emission reductions in tonnes of CO_2e
01/08/2012~31/07/2013	115,803
01/08/2013~31/07/2014	115,803
01/08/2014~31/07/2015	115,803
01/08/2015~31/07/2016	115,803
01/08/2016~31/07/2017	115,803
01/08/2017~31/07/2018	115,803
01/08/2018~31/07/2019	115,803
Total estimated reductions (tonnes of CO_2e)	**810,621**
Total number of the first crediting years	**7**
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	**115,803**

A.4.5. Public funding of the project activity:

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There is no public funding for 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 approved methodology applied in the proposed project activity is ACM0002 (version 12.3.0) – "Consolidated baseline methodology for grid-connected electricity generation from renewable sources".
Reference:
http://cdm.unfccc.int/UserManagement/FileStorage/4W1SCKX3EMPO6AYGRJUTD7BQ8IVN0H

"Tool for the Demonstration and Assessment of Additionality (version 06.0.0)"
Reference:
http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.0.0.pdf

"Tool to calculate the emission factor for an electricity system (version 02.2.1)"
Reference:
http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.2.1.pdf

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 is a grid-connected renewable power generation project activity that installs a new power plant at a site where no renewable power was operated prior to the implementation of the project activity (greenfield plant). It meets all applicability conditions of methodology ACM0002 (version 12.3.0) which is listed as follows:

1) The proposed project is a grid-connected renewable new wind power project; and it does not involve capacity addition, retrofit or replacement;

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

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

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	Source	Gas	Included?	Justification / Explanation
Baseline	CO_2 emissions from electricity generation in fossil fuel-fired power plants that is displaced due to the project activity.	CO_2	Yes	Main emission sources
		CH_4	No	Minor emission source.
		N_2O	No	Minor emission source.
Project Activity	The wind power plant	CO_2	No	According to ACM0002, the proposed project generates electricity by wind, a kind of renewable energy, thus No GHG emissions emitted.

		CH_4	No	According to ACM0002, the proposed project generates electricity by wind, a kind of renewable energy, thus No GHG emissions emitted.
		N_2O	No	According to ACM0002, the proposed project generates electricity by wind, a kind of renewable energy, thus No GHG emissions emitted.

The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the proposed CDM project power plant is connected to, i.e. Northwest China Power Grid (NWCPG). The project site includes the power plant, turbines themselves and auxiliary electric equipments that are used to support the turbines operation. The proposed project is connected to the NWCPG. Therefore, the NWCPG including all power plants connected is selected as the project boundary.

The NWCPG is the project electricity system, which is defined by the spatial extent of the power plants that can be dispatched without significant transmission constraints. In determining this project electricity system, such causes below are taken into account.

According to the "Tool to calculate the emission factor for an electricity system" (version 02.2.1), the delineation of grid boundaries as provided by the DNA[4] of China is used. In accordance with the *2011 Baseline Emission Factors for Regional Power Grids in China* issued by Chinese DNA on 20/10/2011, NWCPG consists of Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang Power Grids, which covers Xinjiang Uygur Autonomous Region where the proposed project located.

The flow diagram of the proposed project is illustrated as below:

[4] Source: 2011 Baseline Emission Factors for Regional Power Grids in China

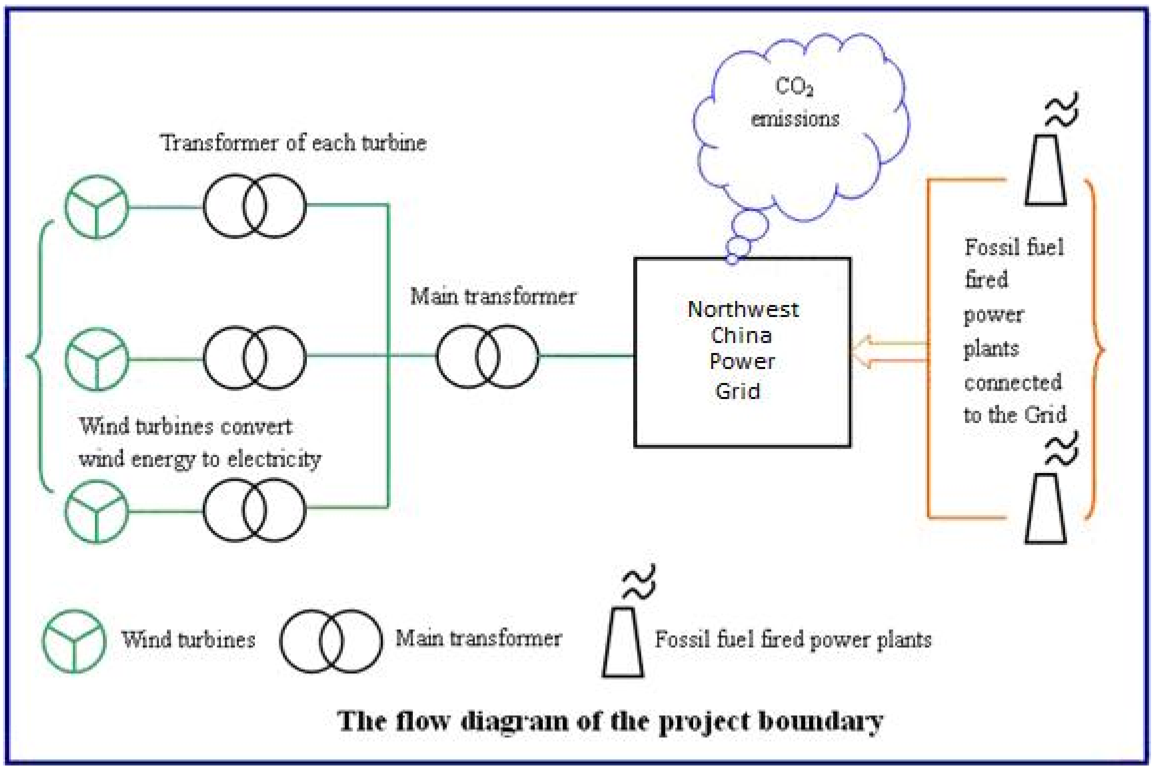

Figure 3. The flow diagram of the project boundary

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

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According to ACM0002 (version 12.3.0), if the project activity is the installation of a new grid-connected renewable power plant/ unit, the baseline is the following:

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

Parameters used to determine the baseline emission are listed in the following table:

Parameter	Data	Source
$EF_{grid,OM,y}$ (tCO_2/MWh)	1.0001	Calculated in Annex 3
$EF_{grid,BM,y}$ (tCO2/MWh)	0.5851	Calculated in Annex 3
$EF_{grid,CM,y}$ (tCO2/MWh)	0.89634	Calculated in Annex 3

Therefore, supply of equivalent annual power output by the Northwest China Power Grid is the baseline scenario for the proposed project activity.

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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Consideration of CDM before construction started

Time	Milestones
January 2010	Environmental Impact Assessment (EIA) developed by Xinjiang Uygur Autonomous Region Environmental Protection Technology Consulting Center
09/04/2010	EIA approved by Xinjiang Uygur Autonomous Region Environmental Protection Bureau
April 2011	Feasible Study Report (FSR) developed by Xinjiang Wind Power Co., Ltd.
09/06/2011	FSR approved by Xinjiang Uygur Development and Reform Commission
13/06/2011	The board decision made
20/06/2011	The CDM project consultancy contract signed
30/06/2011	The local stakeholder consultation meeting held
13/07/2010	Prior consideration of the CDM form submitted to EB
15/07/2011	Construction contract signed (starting date)
20/07/2011	The order to commence acquired
25/07/2011	Main transformer contract signed
22/07/2011	35kV box transformer contract signed
28/07/2011	Wind turbine purchase contract signed
28/07/2011	Prior consideration of the CDM form submitted to Chinese DNA
29/07/2011	Prior consideration of the CDM form confirmed by Chinese DNA
01/08/2011	Project substation construction contract signed
19/09/2011	Prior consideration of the CDM form acknowledged by EB
20/01/2012	The LoA of China acquired

In January 2010, EIA was developed by Xinjiang Uygur Autonomous Region Environmental Protection Technology Consulting Center. On 09/04/2010, EIA was approved by Xinjiang Uygur Autonomous Region Environmental Protection Bureau. In April 2011, the FSR of the proposed project was developed by Xinjiang Wind Power Co., Ltd.. On 09/06/2011, FSR was approved by Xinjiang Uygur Development and Reform Commission. Based on the FSR, the project developer found the project IRR was much lower than the benchmark 8% (post-tax) without revenue from CERs. The proposed project was thus financially unattractive to investors. Then, the project owner made board decision on 13/06/2011 and decided to seek additional financial support from CDM to make the proposed project feasible. On 20/06/2011, the CDM project consultancy contract was signed. On 13/07/2011, the prior consideration of the CDM form was submitted to EB. On 15/07/2011, the construction contract was signed, which was considered as the starting date of the proposed project. On 20/07/2011, the order to commence was acquired. On 25/07/2011, the main transformer contract was signed. On 22/07/2011, 35kV box transformer contract was signed. On 28/07/2011, the wind turbine purchase contract was signed. On 28/07/2011, the prior consideration of the CDM form was submitted to Chinese DNA and confirmed by Chinese DNA on

29/07/2011. On 19/09/2011, the prior consideration of the CDM form was acknowledged by EB. On 20/01/2012, the LoA of China was acquired.

The additionality of the proposed project is demonstrated and assessed by the approved “Tool for the Demonstration and Assessment of Additionality (Version 06.0.0)”. Following steps include:

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

Due to the proposed project is an installation of a new grid-connected renewable power plant, and is not a capacity addition, retrofit or replacement of existing grid-connected renewable power plant/unit, the baseline scenario, according to the methodology of ACM0002 (version 12.3.0), is the following:

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

According to *Tool for the demonstration and assessment of additionality (Version 06.0.0)*, project activities that apply this tool in context of approved consolidated methodology ACM0002, only need to identify that there is at least one credible and feasible alternative that would be more attractive than the proposed project activity. Therefore, the credible and feasible alternative to the proposed project is the identified baseline scenario.

Step 2. Investment analysis

The purpose of this step is to determine whether the proposed project activity is economically or financially less attractive than the alternative without an additional funding that may be derived from the CDM project activities. The investment analysis was conducted in the following steps:

Sub-step 2a. Determine appropriate analysis method

The three analysis methods suggested by *Tools for the demonstration and assessment of additionality* are simple cost analysis (Option I), investment comparison analysis (Option II) and benchmark analysis (Option III). Since the proposed project will earn revenues from not only the CDM but also the electricity output, Option I is not appropriate. Investment comparative analysis method is only applicable to the case that alternative baseline scenario is similar to the proposed projects, so that comparative analysis can be conducted. The alternative baseline scenario of the proposed project is to supply electricity from the Northwest China Power Grid rather than a new investment project. Therefore, Option II is not an appropriate method either. The proposed project will use benchmark analysis method (Option III) based on Project IRR.

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

With reference to *Interim Rules on Economic Assessment of Electric Engineering Retrofit Projects* (Guo Dian Fa [2002] No. 623) issued by the State Power Corporation of China in 2002, the benchmark of project financial internal rate of return (IRR) of China electricity industry is 8%[5], and only if the IRR of the project is higher than or equivalent to this benchmark, the proposed project is financially feasible to investors. Therefore, 8% is adopted as the relevant benchmark, which is in line with the approved project Feasibility Study Report. As the wind farm technology applied is a mature new technology available in the wind turbine market, and thus it is applicable to use this benchmark of 8%. In addition, this benchmark is also commonly applied in China’s CDM projects for the benchmark of power industry.

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[5] The benchmark 8% is post-tax. In the following analysis in the PDD, the IRRs are all post-tax.

Sub-step 2c. Calculation and comparison of financial indicators (only applicable to Options II and III)
Based on the above-mentioned benchmark, the calculation and comparative analysis of financial indicators for the proposed project are carried out in sub-step 2c.

(1) Basic parameters for calculation of financial indicators
Based on the FSR of the proposed project, basic parameters for calculation of financial indicators are as follows:

NO.	Parameters	Value	Unit	Data source
1	Installed capacity	49.5	MW	FSR
2	Annual power supplied to NWCPG	129,195	MWh	FSR
3	Project lifetime	21 (1 year for construction and 20 years for operation)	years	FSR
4	Total static investment	497.88	Million RMB	FSR
5	Annual O&M Cost[6]	16.66	Million RMB	FSR
6	Tariff (Incl. VAT)	0.51	RMB/kWh	FSR
7	VAT of electricity sale[7&8]	17	%	FSR
8	Income tax[9]	25	%	FSR
9	Tax of city construction[10]	5	%	FSR
10	Education surtax rate[11]	3	%	FSR
11	Expected CERs price	10.5	Euro/tCO_2e	Expected price

(2) Comparison of IRR for the proposed project and the financial benchmark
In accordance with the benchmark analysis (Option III), the proposed project will not be considered as financially attractive if its financial indicators (such as IRR) are lower than the benchmark.

The following table shows the IRR of the proposed project, with and without CDM-related revenue. Without CDM-related revenue, the project IRR is lower than the benchmark 8% and the proposed project is not financially attractive to the investors. With it, the Project IRR is significantly improved and exceeds

[6] Annual O&M costs contain the maintenance expense, employee payroll and welfare fund, insurance, material cost and miscellaneous costs.

[7] Source: State Council Order [2008]538 (http://www.chinaacc.com/new/63_67_/2008_11_17_wa808851520171l180021980.shtml)

[8] Source: Cai Shui [2008]156 (http://www.chinatax.gov.cn/n8136506/n8136593/n8137537/n8138502/8714515.html)

[9] Source: The Enforcement Regulation of Business Income Tax Law of PRC, State Council Decree No.512 (http://www.gov.cn/zwgk/2007-12/11/content_830645.htm)

[10] Source: An official document The provisional regulation of city construction tax of PRC (http://www.gxxhcpa. Com/Article.asp?id=762)

[11] Source: Decree No. 448 of the State Council of the People's Republic (http://www.gov.cn/zwgk/2005-09/27/content_70440.htm)

the benchmark rate. Therefore, the proposed project with CDM revenue can be considered as financially viable to the investors.

	Project IRR (benchmark=8%)
Without CDM-related income	6.04%
With CDM-related income	8.97%

Sub-step 2d. Sensitivity analysis (only applicable to options II and III):
The purpose of the sensitivity analysis is to examine whether the conclusion regarding the financial /economic attractiveness is robust to reasonable variations in the critical assumptions. The investment analysis provides a valid argument in favour of additionality only if it consistently supports (for a realistic range of assumptions) the conclusion that the project activity is unlikely to be the most financially /economically attractive or is unlikely to be financially/economically attractive.

According to the Guidance for sensitivity analysis in "Tool for the demonstration and assessment of additionality" (Version 06.0.0), only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation. Hence, for a wind farm project without CDM funding, the factors that influences the IRR of the Project IRR mainly includes:

1) Total static investment
2) Annual O&M cost
3) Annual power supply
4) Tariff

The sensitivity analysis covers a range of -10% to +10%, which is in accordance with the Guidance in "Tool for the demonstration and assessment of additionality" (Version 06.0.0) and has also been applied in the approved Feasibility Study Report of the wind farm project. Their impacts on IRR of total investment were analyzed accordingly in this step.

For detailed results of sensitive analysis of the three indicators, please see the following table.

Parameter	Range				
	-10%	-5%	0%	5%	10%
Total static investment	7.47%	6.73%	6.04%	5.41%	4.83%
Annual O&M cost	6.54%	6.29%	6.04%	5.79%	5.54%
Annual power supply	4.45%	5.27%	6.04%	6.80%	7.54%
Tariff	4.45%	5.27%	6.04%	6.80%	7.54%

Parameter	Variation point to which 8% benchmark is reached
Total static investment	-13.29%

Annual O&M cost	-40.43%
Annual power supply	13.13%
Tariff	13.13%

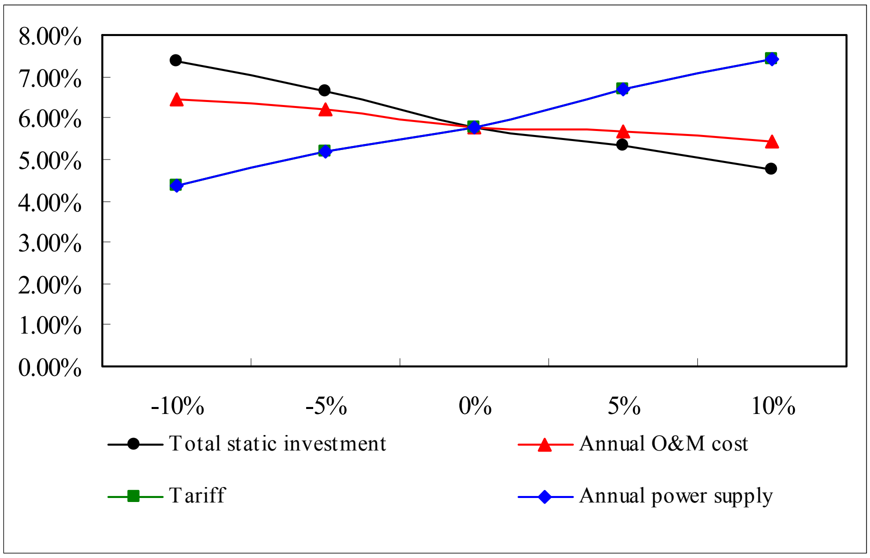

Figure 4. Sensitivity of Project IRR to different financial parameters

As shown by the results of sensitivity analysis and Figure 4, the Project IRR of the proposed project varies to different extents, when the above four financial indicators fluctuated within the reasonable range from -10% to +10% and the Project IRR does not surpass the benchmark of 8%.

Total static investment

Only where the total static investment decrease by 13.29% does the Project IRR reach the benchmark. According to the statistic data of wind power projects registered as CDM projects in Xinjiang Uygur Autonomous Region, the unit total static investment is in the range of 7682 RMB/kW (Ref. No.2031) to 10305 RMB/kW (Ref. No. 4001). For the proposed project, the unit total static investment estimated by a qualified design institute is 10058 RMB/kW, which is in the statistical range. Therefore, the total static investment of the proposed project could be considered reasonable and reliable. Simultaneously, some contracts for the proposed project have been signed. Recently, the total contracted value has already been amounted to 433.72 million RMB, which are 87.11% of the total static investment estimated by FSR. Therefore, the total static investment couldn’t be cut down by 13.29% to make the project IRR to reach the benchmark.

Annual O&M cost

Only where the annual O&M cost decrease by 40.43% does the Project IRR reach the benchmark. O&M cost consists of five basic parameters, which are maintenance expense, raw material cost, employee salary and welfare, insurance and miscellaneous. According to the statistic data of wind power projects registered as CDM projects in Xinjiang Uygur Autonomous Region, the annual O&M cost accounted for the total static investment is in the range of 2.13% (Ref. No.4047) to 5.78% (Ref. No.2537). For the proposed project, the annual O&M cost is 16.66 million RMB, which accounts 3.35% for the total static investment. Therefore, the annual O&M cost could be considered reasonable and reliable. In addition, according to the *China Statistic Yearbook 2011*, from the year 2008 to 2010, the Price Indices for electricity industry were 101.8, 102.3 and 102.0, respectively; the Purchasing Price Indices for building materials were 109.5, 101.1 and 103.8, respectively; the Total Wage Bill Indices of Employed Persons were 119.7, 114.2 and 117.3, respectively[12]. The above statistic data indicated that the investment for facilities, materials, wage, and so on are always increasing these years, thus, the annual O&M cost are unlikely to be decreased by 40.43% to make the project IRR to reach the benchmark.

Annual power supply

Only where the annual power supply increase by 13.13% does the project IRR reach the benchmark. The amount of power supplied to the grid is determined by the operation hours of the proposed project. According to the statistic data of wind power projects registered as CDM projects in Xinjiang Uygur Autonomous Region, the operation hours are in the range of 2114h (Ref. No.4573) to 2969h (Ref. No.1244). For the proposed project, the operation hours are 2610h, which are in the statistical range. Therefore, the operation hours and the annual power supplied to the grid could be considered reasonable and reliable. Additionally, according to the FSR of the proposed project, the power generation is estimated basing on the long term weather statistic data (1979-2008) provided by local meteorological station and wind resources measurement, which first using professional software WAsP to select the rich wind source area, then using software WindFarmer to optimize the location of each turbine for maximize power generation. Therefore, the probability that the annual power supply is 13.13% higher than the estimated value is very small.

Tariff

The tariff needs to increase by 13.13% when the project IRR meets the benchmark of 8%. According to Fa Gai Jia Ge [2009] No. 1906[13] published by NDRC on 20/07/2009, the site of the proposed project belongs to resource region I, and the tariff of the wind power project in this region is fixed at 0.51 RMB/kWh (Incl. VAT). Moreover, the tariff of the proposed project was 0.51 RMB/kWh (Incl. VAT) in Xin Fa Gai Neng Jia [2011]No.3278, which was approved by Xinjiang Uygur Autonomous Region Development and Reform Commission on 25/10/2011. Additionally, according to *Information note on the highest tariffs applied by the EB in its decisions on registration of projects in the People's Republic of China (version 2)*[14] published by the EB, for the project activity category, wind power projects, the highest tariff in Xinjiang Uygur Autonomous Region is 0.533 RMB Yuan/kWh (including VAT). In line with the highest tariff, the project IRR without CDM is 6.72%, which is still below the benchmark IRR of 8%. Therefore, it is unlikely that the tariff of the proposed project could increase by 13.13%.

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.

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[12] Data source: http://www.stats.gov.cn/tjsj/ndsj/2011/indexch.htm

For these Indices, the Index value for a specific year is based on the one for the year before the specific year. In the calculation process, the Index value for the year before the specific year is assumed as 100. Therefore, if the Index value for a specific year is higher than 100, it means that the Index value is higher than the one for the year before.

[13] http://www.sdpc.gov.cn/zcfb/zcfbtz/2009tz/t20090727_292827.htm

[14] http://cdm.unfccc.int/Reference/Notes/reg_note07.pdf

Step 3. Barrier analysis

The barrier analysis is not employed for the proposed project.

Step 4. Common practice analysis

The proposed project will achieve obvious greenhouse gas (GHG) emission reductions through the displacement of electricity delivered by NWCPG, which is a fossil-fuel dominated grid. Therefore, according to the "Tool for the Demonstration and Assessment of Additionality" (version 06.0.0), the measure of the proposed project belongs to "Switch of technology with or without change of energy source (including energy efficiency improvement as well as use of renewable energies)", which is defined in para 6 of Tool. Thus, the four sub-steps of para 47 are adopted to take the common practice analysis.

Step 1. Calculate applicable output range as +/-50% of the design output or capacity of the proposed project activity.

The design capacity of the project activity is 49.5MW. Therefore, the applicable output range is from 24.75 MW to 74.25MW.

Step 2. In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Sub-step 4a, as the proposed project activity and have started commercial operation before the start date of the project. Note their number N_{all}. Registered CDM project activities and projects activities undergoing validation shall not be included in this step.

According to the "Tool for the Demonstration and Assessment of Additionality" (version 06.0.0), the applicable geographical area covers the entire host country as a default. However, in China, the general environment of wind power projects such as the wind resources, tariff, and investment climate are only similar and comparable in the same province. As per the Procedures of Wind Power Development and Construction Management (Fa Gai Neng Yuan [2005] 1204)[15], which was issued by National Development and Reform Commission on 04/07/2005, the Provincial Development and Reform Commission takes charge of local wind farm projects construction and management. Besides, the Provincial Price Bureau should supervise the implementation of the on-grid tariff of local wind power projects, which is published by the Price Department of the State Council according to the regional condition. Therefore, the applicable geographical area for common practice analysis is provincial and Xinjiang Uygur Autonomous Region is chosen for the proposed project.

Furthermore, the start date of the proposed project is 15/07/2011. Therefore, all wind plants delivering the same output or capacity, within the applicable output range calculated in Sub-step 4a and starting commercial operation before 15/07/2011 are identified in Xinjiang Uygur Autonomous Region and the number of all the wind projects is defined as N_{all}.

According to the "Tool for the Demonstration and Assessment of Additionality" (version 06.0.0), registered CDM project activities and project activities undergoing validation shall not be included in this common practice analysis.

With reference to *Statistic of installed capacity of China's Wind Farms* published in recent years (2007-2011)[16], UNFCCC[17] and VCS[18], in Xinjiang Uygur Autonomous Region, there is one project

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[15] http://www.ndrc.gov.cn/nyjt/nyzywx/t20050810_41378.htm

[16] Reference: 2007: http://www.cwea.org.cn/upload/20080324.pdf
2008: http://www.cwea.org.cn/upload/20090305.pdf

delivering the same capacity within the range of 24.75-74.25MW, which is taken into commercial operation before 15/07/2011 and has not been developed as CDM projects. The project is listed in the following table.

Project Title	Installed Capacity (MW)
Dabancheng Sangecunzhuang (No.1) Wind Farm	40.26

Hence, N_{all} =1

Step 3: Within plants identified in Step 2, identify those that apply technologies different that the technology applied in the proposed project activity. Note their number N_{diff}.

According to the "Tool for the Demonstration and Assessment of Additionality" (version 06.0.0), different technologies are technologies that deliver the same output and differ by at least one of the following (as appropriate in the context of the measure applied in the proposed CDM project and applicable geographical area):
(a) Energy source/fuel;
(b) Feed stock;
(c) Size of installation (power capacity):
 (i) Micro;
 (ii) Small;
 (iii) Large;
(d) Investment climate in the date of the investment decision, inter alia:
 (i) Access to technology;
 (ii) Subsidies or other financial flows;
 (iii) Promotional policies;
 (iv) Legal regulations;
(a) Other features, inter alia:
 (i) Unit cost of output (unit costs are considered different if they differ by at least 20%);

Dabancheng Sangecunzhuang (No.1) Wind Farm was supported by the 4th Special Fund for Treasury bond[19], which is the demonstration project enjoys favourable treatments and not be available for the proposed project. Therefore,
N_{diff} =1

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

Based on the analysis in Sub-step 4b and Sub-step 4c,

$F=1-N_{diff}/N_{all}=0$

2009: http://www.cwea.org.cn/upload/201006102.pdf
2010: http://www.xindianli.com/xinnenyuan/201103/24-259555.html
2011: http://www.cnwpem.com/22/12/12356.html

[17] Data source: http://cdm.unfccc.int

[18] Data source: http://www.v-c-s.org

[19] http://www.dlwg.net/news/news_view.asp?newsid=954

N_{all}-N_{diff}=1-1=0

According to the "Tool for the Demonstration and Assessment of Additionality" (version 06.0.0), if the factor F is greater than 0.2 and N_{all}-N_{diff} is greater than 3, then the proposed project activity is a "common practice".

For the proposed CDM project, F=0 and N_{all}-N_{diff}=0, thus, the project is not common practice within the region.

In conclusion, the proposed project is additional and the CDM revenue plays the key role to make the proposed project financially feasible. The CDM was seriously considered in the decision to implement the project activity.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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The key methodological steps are as follows:

1. Calculating the Baseline Emission (BE_y)
2. Calculating the Project Emission (PE_y)
3. Calculating the Leakage Emission (LE_y)
4. Calculating the Emission Reduction (ER_y)

1. Calculating the Baseline emissions

The baseline emissions (BE_y) is the product of the baseline emissions factor ($EF_{grid,CM,y}$ in tCO_2e/MWh) calculated, times the electricity supplied by the project activity to the grid ($EG_{PJ,y}$ in MWh), as follows:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} \quad (1)$$

Calculation of the baseline emissions factor

Following ACM0002, the baseline emission factor (EF_y) is calculated as a combined margin ($EF_{grid,CM}$), consisting of the combination of operating margin ($EF_{grid,OM}$,) and build margin ($EF_{grid,BM}$,) factors according to the following six steps defined in the "Tool to calculate the emission factor for an electricity system" (version 02.2.1). Data for the calculations are based on official national statistics books: *China Energy Statistical Yearbook* and *China Electric Power Yearbook*.

STEP 1. Identify the relevant electric power system

For determining the electricity emission factors, a project electricity system is defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity (e.g. the renewable power plant location or the consumers where electricity is being saved) and that can be dispatched without significant transmission constraints.

Similarly, a connected electricity system, e.g. national or international, is defined as an electricity system that is connected by transmission lines to the project electricity system. Power plants within the connected electricity system can be dispatched without significant transmission constraints but transmission to the project electricity system has significant transmission constraint.

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.

The DNA of China has published a delineation of the project electricity system and connected electricity systems, which is used by the proposed project. According to the DNA delineation, the project electricity system is the Northwest China Power Grid, which includes Shannxi power grid, Gansu power grid, Qinghai power grid, Ningxia power grid and Xinjiang power grid. The proposed project is located in Xinjiang Uygur Autonomous Region and covered by the NWCPG. Therefore, NWCPG is chosen as the relevant electric power system.

Electricity transfers form connected electricity systems to the project electricity system are defined as electricity imports and electricity transfers to connected electricity systems are defined as electricity exports.

For the purpose of determining the build margin emission factor, the spatial extent is limited to the project electricity system, except where recent or likely future additions to transmission capacity enable significant increases in imported electricity. In such cases, the transmission capacity may be considered a build margin source.

There is no electricity imported from other Power Grids from 2007 to 2009[20]. Therefore, the spatial extent is limited to NWCPG for the purpose of determining the build margin emission factor.

For the purpose of determining the operating margin emission factor, use one of the following options to determine the CO_2 emission factor(s) for net electricity imports ($EF_{grid,import,y}$) from a connected electricity system within the same host country(ies):

0 tCO_2/MWh; or

(a) The weighted average operating margin (OM) emission rate of the exporting grid, determined as described in step 4 (d) below; or
(b) The simple operating margin emission rate of the exporting grid, determined as described in step 4 (a), if the conditions for this method, as described in step 3 below, apply to the exporting grid; or
(c) The simple adjusted operating margin emission rate of the exporting grid, determined as described in step 4 (b) below.

In the PDD, option b) is selected for the proposed project.

STEP 2. Choose whether to include off-grid power plants in the project electricity system (optional)
The proposed project does not include off-grid power plants in the project electricity system; only grid power plants are included in the calculation apply to "Tool to calculate the emission factor for an electricity system".

STEP3. Select a method to determine the operating margin (OM)
The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on the following methods:

[20] China Electric Power Yearbook 2008-2010

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

Detailed information to carry out a dispatch data analysis is not publicly available; therefore, method (b) and method (c) is not suitable for the proposed project.

According to ACM0002, the Simple OM method is applicable to the project if the low-cost resources constitute less than 50% of total grid generation on average in the five most recent years or based on long-term averages for hydroelectric production.

The share of low-cost/must-run generation in NWCPG is 29.786% in 2009, 21.820% in 2008, 22.426% in 2007, 24.731% in 2006 and 27.445% in 2005[21]. The Simple OM method, therefore, is selected to calculate the Operating Margin emission factor of the proposed project.

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

• (Ex-ante option): If the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation.
• (Ex-post option): If the ex post option is chosen, the emission factor is determined for 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. 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-cost / must-run power plants / units. The simple OM may be calculated:

- Option A: Based on the net electricity generation and a CO_2 emission factor of each power unit, or
- Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

For the proposed project activity, the required data for the exercise of Option A is not available and those of Option B can be obtained from official sources, and off-grid power plants are not included in the calculation, therefore, Option B is chosen to calculate the operating margin emission factor:

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

[21] China Electric Power Yearbook *2006-2010*

$$EF_{grid,OMsimple,y} = \frac{\sum_{i,m} FC_{i,y} \cdot NCV_{i,y} \cdot EF_{CO2,i,y}}{\sum_{m} EG_{y}} \quad (2)$$

Where:

$EF_{grid,OMsimple,y}$	=	Simple operating margin CO_2 emission factor in year *y* (tCO_2e/MWh)
$FC_{i,y}$	=	Amount of fossil fuel type *i* consumed in the project electricity system in year *y* (tonnes or m^3)
$NCV_{i,y}$	=	Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ/t or m^3)
$EF_{CO2,i,y}$	=	CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2e/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 year as per the data vintage chosen in Step 3

For this approach (simple OM) to calculate the operating margin, the simple OM emission factor is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including low-cost / must-run power plants / units, and including electricity imports to the grid. Electricity imports should be treated as one power plant source.

Regarding parameter selection, local values of $NCV_{i,y}$ and $EF_{CO2,i,y}$ should be used where available. If no such values are available, IPCC default values are preferable. The Net Calorific Value ($NCV_{i,y}$) of each type of fossil fuel used in the calculation comes from China Energy Statistic Yearbook 2010. Emission factors ($EF_{CO2,i,y}$) of each type of fossil fuel come from IPCC 2006 default values.

On the basis of the data available, the three-year average operating margin emission factor is calculated by the DNA as a full-generation-weighted average of the emission factors:

$EF_{grid,OMsimlpe}$ = 1.0001 tCO_2e/MWh

Step 5. Calculate the build margin emission factor

In terms of vintage of data, project participants can choose between one of the following two options:

Option 1: For the first crediting period, calculate the build margin emission factor ex ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

Option 2: For the first crediting period, the build margin emission factor shall be updated annually, ex post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex ante, as described in Option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

In this PDD, Option1 is chosen to 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:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad (3)$$

Where:

$EF_{grid,BM,y}$	=	Build margin CO_2 emission factor in year *y* (tCO_2e/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_2e/MWh)
m	=	Power units included in the build margin
y	=	Most recent historical year for which power generation data is available

Currently, it is very difficult to get the capacity margin data of power plants in China, since these data as well as net quantity of electricity generated and delivered to the grid and fuel consumption data in power unit *m* are regarded as commercial secrets or only for internal usage. Then the following deviation approved by the EB was adopted to calculate the Build Margin emission factor.

According to the guidance from the CDM Executive Board for a deviation of the baseline methodology of AM0005, which had combined into the baseline methodology of ACM0002, the following deviation was adopted to calculate the Build Margin emission factor.

1) Use the efficiency level of the best technologies commercially available in the provincial/regional or national grid of China, as a conservative proxy, for fuel *i* consumption estimation to estimate the $EF_{grid,BM,y}$.

2) Use capacity additions during last several years for estimating the $EF_{grid,BM,y}$, i.e. the capacity addition over last several years, whichever results in a capacity addition that is closest to 20% of total installed capacity. For the proposed project, the data from Year 2007 to 2009 is used to calculate $EF_{grid,BM,y}$.

3) Use installed capacity to replace annual power generation to estimate weights.

The BM emission factor in this PDD is calculated as following sub-steps.

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

$$\lambda_{Coal,y} = \frac{\sum_{i \in COAL,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}} \tag{4}$$

$$\lambda_{Oil,y} = \frac{\sum_{i \in OIL,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}} \tag{5}$$

$$\lambda_{Gas,y} = \frac{\sum_{i \in GAS,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}} \tag{6}$$

Where:

$FC_{i,j,y}$ = Amount of fossil fuel type *i* consumed in province *j* in year *y* (tonnes or m^3)

$NCV_{i,y}$ = 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_2e/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

$$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y} \tag{7}$$

Where:

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

Sub-step 3: Calculation of BM of the Grid

Using the share of different type of capacity in total capacity addition as weight, the weighted average of emission factors of different type capacity is calculated as the Build Margin emission factor $EF_{grid,BM,y}$ of North China Power Grid.

$$EF_{grid,BM,y} = \frac{CAP_{Thermal,y}}{CAP_{Total,y}} \times EF_{Thermal,y} \tag{8}$$

Where:

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

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

Following the four steps above, the build margin emission factor $EF_{grid,BM,y}$ of the NWCPG is calculated to be: 0.5851tCO_2e/MWh (see Annex 3 for more details).

Step 6. Calculate the combined margin emission factor

The baseline emissions factor (EF_{CM}) is calculated as the weighted average of the Operating Margin emission factor and Build Margin emission factors following ACM0002. For wind projects, the default weights are as follows: w_{OM} = 0.75 and w_{BM} = 0.25:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \quad (9)$$

Where:

$EF_{grid,BM,y}$	=	Build margin CO_2 emission for the project electricity system factor in year *y* (tCO_2e/MWh)
$EF_{grid,OM,y}$	=	Operating margin CO_2 emission factor for the project electricity system in year *y* (tCO_2e/MWh)
w_{OM}	=	Weighting of operating margin emissions factor (%)
w_{BM}	=	Weighting of build margin emissions factor (%)

On the basis of these weights for the first crediting period, the combined margin emission factor is calculated, and fixed ex-ante:

$EF_{grid,CM,y}$ = 1.0001× 0.75 + 0.5851× 0.25 = 0.89634 tCO_2/MWh

Baseline emissions (BE_y) now can be calculated as the combined margin CO_2 emission factor ($EF_{grid,CM,y}$) multiplied by the annual net generation of the Proposed Project ($EG_{PJ,y}$).

Calculation of $EG_{PJ,y}$

The proposed project is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, then:

$$EG_{PJ,y} = EG_{facility,y} \quad (10)$$

where:

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

2. Calculating the Project Emission (PE_y)

According to ACM0002 (Version 12.3.0), for most renewable power generation project activities, PE_y = 0.

3. Calculating the Leakage Emission (LE_y)

According to ACM0002 (Version 12.3.0), no leakage is considered. The main emissions potentially giving rise to leakage are neglected.

4. Calculating the Emission Reduction (ER_y)

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

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

where:

ER_y	=	Emission reductions in year *y* (t CO_2e)
BE_y	=	Baseline emissions in year *y* (t CO_2e)
PE_y	=	Project emissions in year *y* (t CO2e)

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

Data / Parameter:	$FC_{i,y}$
Data unit:	tonnes or m^3
Description:	Amount of fossil fuel type *i* consumed in year *y*
Source of data used:	China Energy Statistical Yearbook（2008~2010）
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:	Applied for calculating OM and BM

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* in the North China Power Grid
Source of data used:	China Energy Statistical Yearbook（2010）
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:	Applied for calculating OM and BM

Data / Parameter:	$EF_{CO2,i,y}$
Data unit:	tc/TJ
Description:	CO_2 emission factor of fossil fuel type *i* in year *y* in the North China Power Grid
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC default value
Any comment:	Applied for calculating OM and BM

Data / Parameter:	Installed Capacity
Data unit:	MW
Description:	The Installed Capacity of the power plants in the grid in the year y in the North China Power Grid
Source of data used:	China Electric Power Yearbook (2008-2010)
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:	Applied for calculating BM

Data / Parameter:	GEN_y
Data unit:	MWh
Description:	The electricity generation of the power plants in the grid in the year y in the North China Power Grid
Source of data used:	China Electric Power Yearbook (2008~2010)
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:	Applied for calculating BM

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 (2008~2010)
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:	Applied for calculating BM

Data / Parameter:	Efficiency of the best technology commercially
Data unit:	%
Description:	Best commercial available efficiency of coal, gas, oil fuel power plant
Source of data used:	Chinese DNA’s Guideline of emission factors of Chinese grids
Value applied:	Best efficiency for coal plant is 39.45%

	Best efficiency for oil plant is 51.77% Best efficiency for gas plant is 51.77%
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistic value
Any comment:	Applied for calculating BM

B.6.3 Ex-ante calculation of emission reductions:

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As described in B.6.1, the emission reductions of the proposed project are calculated as follows:

Baseline emissions

Annual generation (net of auxiliary power i.e. the on-site electricity usage for the operation of the wind farm) is estimated as 129,195 MWh.

$EF_{grid,OM,y}$=1.0001 t CO_2/ MWh
$EF_{grid,BM,y}$ =0.5851 t CO_2/ MWh

$EF_{grid,CM,y}$ = 1.0001 × 0.75 +0.5851 × 0.25 =0.89634 tCO_2/MWh
BE_y = 129,195× 0.89634=115,803 tCO_2e

The ex-ante baseline emission factor: 0.89634 tCO_2/ MWh
Annual baseline emissions: 115,803 tCO_2e (details in Annex 3)

Project emissions

According to ACM0002 (Version 12.3.0), for most renewable power generation project activities, PE_y = 0.

Leakage

According to ACM0002 (Version 12.3.0), no leakage is considered. The main emissions potentially giving rise to leakage are neglected.

Project Emission Reductions

$ER_y = BE_y - PE_y$

The total annual baseline emissions are 115,803 tCO_2.
The total annual project emissions are 0 tCO_2.

$ER_y = BE_y - PE_y$ = 115,803 – 0 = 115,803 tCO_2

The annual emission reductions are estimated to be 115,803 tCO_2. The proposed project activity is expected to achieve 810,621 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:

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Year	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
01/08/2012~31/07/2013	0	115,803	115,803
01/08/2013~31/07/2014	0	115,803	115,803
01/08/2014~31/07/2015	0	115,803	115,803
01/08/2015~31/07/2016	0	115,803	115,803
01/08/2016~31/07/2017	0	115,803	115,803
01/08/2017~31/07/2018	0	115,803	115,803
01/08/2018~31/07/2019	0	115,803	115,803
Total (tonnes of CO_2e)	**0**	**810,621**	**810,621**

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

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Data / Parameter:	$EG_{export,y}$
Data unit:	MWh
Description:	Electricity supplied by the project activity to the grid in year y.
Source of data to be used:	Monitored by the readings of the main electricity meter M1 or the backup electricity meter M2
Value of data applied for the purpose of calculating expected emission reductions in section B.6	129,195
Description of measurement methods and procedures to be applied:	The data will be continuously measured and monthly recorded. All monitoring data and records will be kept at least for 2 years after the end of the last crediting period or the last issuance of CERs, whichever occurs later.
QA/QC procedures to be applied:	The accuracy of electricity meter is no lower than 0.5S. The meter would be calibrated according to the appropriate national standard, such as Relative Technical Administrative Code of Electric Energy Metering (DL/T448-2000) or Electrical Energy Meters with Electronics (JJG596-1999). The calibration interval is once a year. Electricity supplied to the grid will be cross checked according to the electricity sales receipts.
Any comment:	

Data / Parameter:	$EG_{import,y}$
Data unit:	MWh
Description:	Electricity purchased from the grid by the proposed project during year y.
Source of data to be used:	Monitored by the readings of the main electricity meter M1 or the backup electricity meter M2

Value of data applied for the purpose of calculating expected emission reductions in section B.6	0
Description of measurement methods and procedures to be applied:	The data will be continuously measured and monthly recorded. All monitoring data and records will be kept at least for 2 years after the end of the last crediting period or the last issuance of CERs, whichever occurs later.
QA/QC procedures to be applied:	The accuracy of electricity meter is no lower than 0.5S. The meter would be calibrated according to the appropriate national standard, such as Relative Technical Administrative Code of Electric Energy Metering (DL/T448-2000) or Electrical Energy Meters with Electronics (JJG596-1999). The calibration interval is once a year. Electricity supplied to the grid will be cross checked according to the electricity purchased receipts.
Any comment:	

Data / Parameter:	$\mathbf{EG_{spare,y}}$
Data unit:	MWh
Description:	Electricity purchased from the grid via the 10kV spare line by the proposed project during year y.
Source of data to be used:	Monitored by the readings of the electricity meter M3 on the 10kV spare line
Value of data applied for the purpose of calculating expected emission reductions in section B.6	0
Description of measurement methods and procedures to be applied:	The data will be continuously measured and monthly recorded. All monitoring data and records will be kept at least for 2 years after the end of the last crediting period or the last issuance of CERs, whichever occurs later.
QA/QC procedures to be applied:	The accuracy of electricity meter is no lower than 2.0. The meter would be calibrated according to the appropriate national standard, such as Relative Technical Administrative Code of Electric Energy Metering (DL/T448-2000) or Electrical Energy Meters with Electronics (JJG596-1999). The calibration interval is once a year. Electricity supplied to the grid will be cross checked according to the electricity purchased receipts.
Any comment:	

Data / Parameter:	$\mathbf{EG_{facility,y}}$
Data unit:	MWh
Description:	Quantity of net electricity generation supplied by the project plant/unit to the Grid in year y.
Source of data to be used:	Monitored by the project participant with the calculation by $EG_{export,y}$ $-EG_{import,y}-EG_{spare,y}$

Value of data applied for the purpose of calculating expected emission reductions in section B.5	129,195
Description of measurement methods and procedures to be applied:	The net electricity supplied to the Grid by the proposed project will be calculated through electricity supplied by the project to the grid ($EG_{export,y}$) minus electricity purchased from the Grid ($EG_{import,y}$) minus electricity purchased via the 10kV spare line ($EG_{spare,y}$).
QA/QC procedures to be applied:	The electricity generation by the proposed project will be monitored and recorded. The project operator is responsible for recording such data.
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, which is calculated according to the generated electricity and the purchased electricity and supplied to the grid, thus 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:

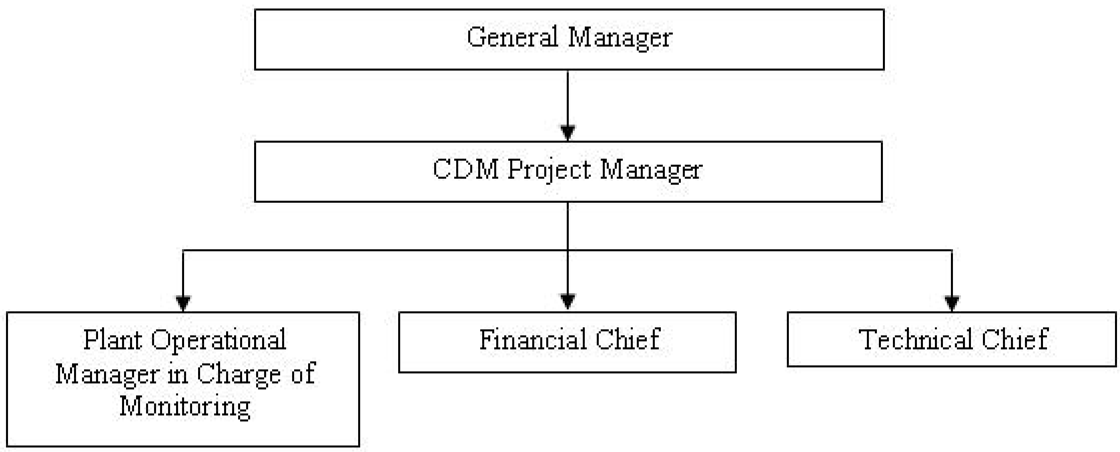

Figure 5. The organization of the monitoring implementers

3. **Monitoring Equipment**

The electricity supplied to the grid by the project activity, the electricity imported from the grid to the project site, and the electricity purchased via the 10kV spare line will be monitored through the bi-directional electricity meter(s). The main meter (M1) and the backup meter (M2) will be installed between the Project 110 kV Substation and the Yanhu 220kV Substation (The exact position of the meters M1 and M2 will be determined by the power purchase agreement signed between the project owner and the power grid company), the meter M3 will be installed on the 10kV spare line. The accuracy of the meters M1 and M2 will be no lower than 0.5S. The accuracy of the meter M3 will be no lower than 2.0.

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

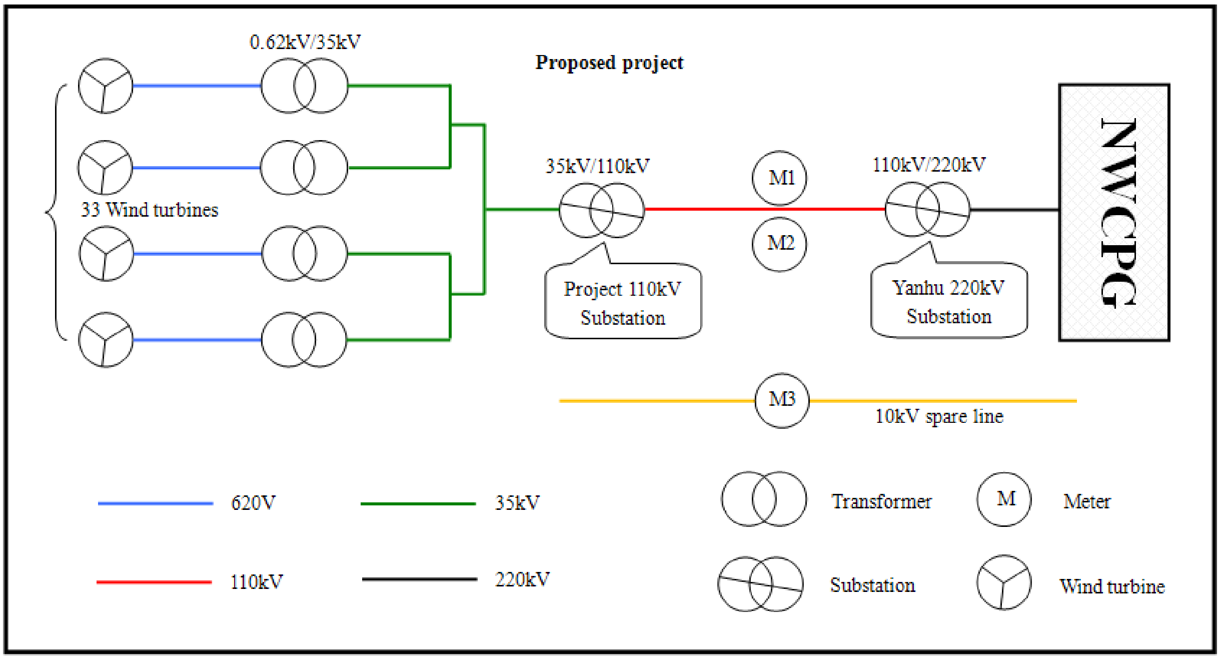

Figure 6. The diagram of monitoring plan

4. Monitoring procedure

The electricity supplied to the grid and the electricity imported from the grid will be monitored by the meter readings of the main meter (M1) or the backup meter (M2) installed between the Project 110kV Substation and the Yanhu 220kV Substation (The exact position of the meters M1 and M2 will be determined by the power purchase agreement signed between the project owner and the power grid company), the meter M3 will be installed on the 10kV spare line. The net electricity supplied to the grid is calculated by $EG_{export,y}$-$EG_{import,y}$-$EG_{spare,y}$. The electricity exchanged between the proposed project and NWCPG is cross checked by the project owner and the grid company.

The electricity sales receipts and electricity purchased receipts will be used for cross checked with the electricity supplied to the grid, the electricity imported from the grid, and the electricity imported from the grid via the 10kV spare line, respectively. The records of electricity sold/purchased will be issued based on the power purchase agreement signed between the project entity and the power grid company and the readings from the metering equipments.

5. Quality Assurance and Quality Control

The workers are trained to be competent and the metering equipments are calibrated and sealed as per the industry practices at regular intervals, with the purpose to provide credible, accurate, transparent and conservative monitoring data and ensure the real, measurable, long-term GHG emission reduction from this project.

Monthly net on-grid electricity supplied data will be approved and signed off by the Manager before it is accepted and stored. This audit will check compliance with monitoring procedures in this monitoring plan. This internal audit will also identify potential improvements to procedures to improve monitoring and reporting in future years. The purpose of training is to assure those staffs are competent to conduct the monitoring plan, thus to make the monitored data accurate.

Emergency Procedure:

If the reading of the main meter (M1) in a certain month is so inaccurate as to be out of the error range or the meter does not work normally, the net electricity supplied to the grid will be calculated based on the reading of the backup meter (M2).

If the readings of the main meter (M1) and the backup meter (M2) are all beyond allowable error, the project owner and Power Grid Company shall jointly prepare a reasonable and conservative estimate of correct reading.

6. Calibration of Meters & Metering

The metering equipment are calibrated and checked for accuracy so that the metering equipment shall have sufficient accuracy within the agreed limits. The metering equipments are calibrated and checked annually by qualified third party for accuracy according to the appropriate national standard, such as Relative Technical Administrative Code of Electric Energy Metering (DL/T448-2000) or Electrical Energy Meters with Electronics (JJG596-1999). The records will be supplied to the wind farm operator, and maintained by the operator.

If any error is detected, the party owning the meter shall repair, recalibrate or replace the meter giving the other party sufficient notice to allow a representative to attend during any corrective activity.

7. 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. 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.

Furthermore, the project owner collects the electricity sales receipts and electricity purchased receipts for cross-check, and compiled the monitoring report including the monitoring data and relevant evidence at the end of each crediting year.

All monitoring data and records will be kept at least for 2 years after the end of the last crediting period or the last issuance of CERs, whichever occurs later.

8. Monitoring Report

After the CDM project manager collects and sorts the monitored data, the monitoring report is prepared by the project developer. The project developer has 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 study and monitoring methodology and the name of the responsible person(s)/entity(ies)

>>

Date of completion of Baseline Study: 18/05/2012

Name of person/entity determining the baseline:

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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:

>>
15/07/2011 (The date when construction contract signed)

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

>>
20 years operational lifetime

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

C.2.1. Renewable crediting period

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

>>
01/08/2012 (or the date of registration date whichever is later)

C.2.1.2. Length of the first crediting period:

>>
7 years

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
Not applicable

C.2.2.2. Length:

>>
Not applicable

SECTION D. Environmental impacts

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

>>

The environmental impact assessment for this project was developed by Xinjiang Uygur Autonomous Region Environmental Protection Technology Consulting Center in January 2010 and approved by Xinjiang Uygur Autonomous Region Environmental Protection Bureau on 09/04/2010 (Xin Huan Shen Han [2010]No.35). The EIA approval was renamed on 19/07/2011 (Xin Huan Ping Jia Han [2011]No.638). A summary of the report is illustrated as below:

Ambient air

The impact on ambient air quality of the proposed project is mainly from dust during construction stage, by sprinkling water frequently and timely clearing can reduce the dust pollution. When the project is in operational period, there will be no air pollutions. In conclusion, the proposed project will not pose any threat on the quality of ambient air.

Impact from noise

There is some noise during the operation of wind turbines. The equipments and techniques with lower noise will be chosen to apply. Improvement on construction process and strengthening of equipment maintenance is emphasized. *Noise Limits in Construction site (GB12523-90)* and *Industry Company and Factory Noise Standards (GB12348-2008)* Level II noise standard would be fulfilled during the construction and operational period. Consequently, the noise of operation has little impact to the surrounding environment. Hence, the noise will not impact the work and daily life of local residents.

Electromagnetic impact

The electromagnetic pollution generated from operation of the wind blades has limited effect within about 20m around, whereas no wireless communication facilities exist within, so the electronic magnetic pollution to the surrounding environment is insignificant.

Impact from Solid waste

There is mainly some waste of stone, bricks or domestic waste in the construction stage and basically no solid waste in the operational period. Solid waste will be collected and handled properly. Hence, it will not result any environmental impact.

Impact from Wastewater

Wastewater is mainly domestic wastewater. Wastewater quantity is fairly small and treatment methods will be applied for on-site primary treatment, and then the wastewater will be treated together with the local wastewater. Small-scale septic tanks should be built on the site, through which the discharging wastewater can reach the *Water quality standard for urban miscellaneous water consumption (GB/T18920-2002)*. Therefore, the impact of wastewater is limited and mitigated.

No migrating birds have been found in the project field. Therefore, the project is not located on the passage of migrating birds, and the project construction will not influence the migration of birds.

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:

>>

In the EIA of the proposed project, the environmental protection measures have been provided and will be strictly conducted by the project owner in the construction and operation period. The local environmental protection department will regularly monitor the implementation of environmental protection measures. Additionally, the type of land occupied by the proposed project is wasteland. Therefore, the proposed project will not involve the migration. Recently, the compensation for land occupied has been carried out and paid to the local administration of grassland.

The proposed project use clean renewable energy to generate electricity whose environmental impact comply with relevant environmental laws and regulations in the host country. The environmental impacts of the proposed 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 developer has sent out questionnaires to the stakeholders in the local area for the comments of the proposed project construction in June 2011. 50 copies of questionnaire were randomly distributed to the residents around the project site, and 50 pieces of reply were received. The recovery ratio is 100%. Among the interviewees, 6 of them are farmers, 18 of them are workers, 5 of them are government official, 3 of them are students and 18 of them are doing other work; 23 of them have educational level of middle school or below middle school, 11 of high school, 14 of college, and 2 of them have other educational level.

On 30/06/2011, several representatives of local stakeholders, including governmental officials of Local County and local residents, etc attended the meeting. At the meeting, the project owner introduced the situation of the proposed project and explained the necessity of applying CDM project. The stakeholders discussed the questionnaires collected and give the project owner some forward requirements and suggestions. There is no negative opinion on the construction of the project.

The questions regarding the proposed project were mainly as follows:

a) How do you think the general condition of the local environmental quality?
b) Do you currently experience electromagnetic interference when watching TV at home?
c) Are there any negative impacts of the proposed project on the everyday life of local residents?
d) Is the proposed project going to help improve the living and/or working environment?
e) How the proposed project impacts the acoustic environment (noise) quality?
f) Which is the environmental topic that concerns you the most during the construction and operation of the proposed project?
g) Do you support the proposed project?

E.2. Summary of the comments received:

>>
The summary of survey is listed as the following:

- 34 (68%) of them think the local environmental quality is very well, 16 (32%) of them think it is general;
- 35 (70%) of them currently do not experience electromagnetic interference when watching TV at home, 5 (10%) of them have experience electromagnetic interference, and the remainder is unsure;
- 44 (88%) of them think there will not be any negative impacts on their everyday life, and the remainder is unsure;
- 38 (72%) of them think the proposed project will help improve their living and/or working environment, 3 (6%) of them think the proposed project could not improve their living and/or working environment, and the remainder is unsure;
- 32 (64%) of them are unsure whether the proposed project will make noise, 13 (26%) of them think it will have the beneficial impact on the acoustic environment quality, and 5 (10%) of them think it will have the adverse impact on the acoustic environment quality;

- Regarding the construction and operation of the propose project, 19 (38%) of them are most concerned with electromagnetic interference, 13 (26%) of them are most concerned with the noise level, and 18 (36%) of them are most concerned with wastewater from the project;
- All (100%) of them support the implementation of the proposed project.

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

>>

During the survey, local residents support the propose project as they showed in the questionnaires. In addition, the implementation of the proposed project will be benefit for the local residents, such as building the road, the water well, and so on. Meanwhile, some job opportunities will also be provided to local residents in the construction and operation period.

About the environment impacts of the project, the requirements in the EIA report will be strictly conducted by the project owner and be supervised by the municipal environmental protection bureau. Therefore, the proposed project can be carried out as planned.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding for Xinjiang Dabancheng Wind Farm Phase I Project.

Annex 3

Emission Factor of Northwest China Power Grid

Calculation of Operating Margin (OM):

Table A1. Simple OM Emission Factor of Northwest China Power Grid in 2007

Fuel types	Unit	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Subtotal	Carbon Content (tc/TJ)	Oxidation rate (%)	Emission Coefficient of Fuel ($kgCO_2$/TJ)	Average low Caloric value (MJ/t,km3)	CO_2 emission (tCO_2e) K=F×I×J/100000 (unit of mass)
		A	B	C	D	E	F=A+B+C+D+E	G	H	I	I	K=F×I×J/10000 (unit of volume)
Raw coal	10000 ton	3303.44	1969.03	470.85	2165.8	1762.11	**9671.23**	25.8	100	87,300	20,908	176,525,905
Cleaned coal	10000 ton						**0**	25.8	100	87,300	26,344	0
Other washed coal	10000 ton	3.73			124.31	7.73	**135.77**	25.8	100	87,300	8,363	991,243
Coke	10000 ton	3.53					**3.53**	26.6	100	87,300	20,908	64,432
Coal Briquette	10000 ton						**0**	29.2	100	95,700	28,435	0
Coke oven gas	10^8m^3	0.52	0.65			0.26	**1.43**	12.1	100	37,300	16,726	89,215
Other	10^8m^3	14.14	0.71				**14.85**	12.1	100	37,300	5,227	289,526

coal gas												
Crude oil	10000 ton					0.09	**0.09**	20	100	71,100	41,816	2,676
Gasoline	10000 ton	0.02					**0.02**	18.9	100	67,500	43,070	581
Diesel	10000 ton	1.12	0.26	0.42		1.77	**3.57**	20.2	100	72,600	42,652	110,546
Fuel oil	10000 ton	0.01	1.05	0.04		0.05	**1.15**	21.1	100	75,500	41,816	36,307
LPG	10000 ton						**0**	17.2	100	61,600	50,179	0
Refinery gas	10000 ton					5.99	**5.99**	15.7	100	48,200	46,055	132,969
Natural gas	10^8m^3	1.68	0.49	1.93		8.66	**12.76**	15.3	100	54,300	38,931	2,697,404
Other oil product	10000 ton						**0**	20	100	72,200	41,816	0
Other coking product	10000 ton						**0**	25.8	100	95,700	28,435	0
Other fuel	10000 tce	94.36	9.73				**104.09**	0	0	0	0	0
											Subtotal	180,940,805

Source: China Energy Statistical Yearbook 2008

Table A2. Thermal Power Generation of Northwest China Power Grid in 2007

Province	Power Generation (MWh)	Ratio of Self Power Consumption of Plant (%)	Power Supply(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	0	43,500,000
Xinjiang	34,600,000	9.2	31,416,800
Total			178,920,940

Source: China Electric Power Yearbook 2008

Table A3. Emission Factor of Northwest China Power Grid in 2007

	Parameter	Unit	Value	Source
A	Total Power Supply of Northwest China Power Grid	MWh	178,920,940	China Electric Yearbook 2008
B	Total Emissions of Northwest China Power Grid	tCO_2e	180,940,805	China Electric Power Yearbook and China Energy Statistical Yearbook
C	Emission Factor of Northwest China Power Grid	tCO_2e /MWh	1.011289	C=B/A

Table A4. Simple OM Emission Factor of Northwest China Power Grid in 2008

Fuel types	Unit	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Subtotal	Carbon Content	Oxidation rate	Emission Coefficient of Fuel	Average low Caloric value	CO_2 emission（tCO_2e）
								（tc/TJ）	（%）	(kgCO2/TJ)	（MJ/t,km3）	K=F×I×J/100000（unit of mass）

		A	B	C	D	E	F=A+B+ C+D+E	G	H	I	J	K=F×I×J/10000 (unit of volume)
Raw coal	10000 ton	3,620.00	2,216. 90	507.44	2,330.7 2	1,924.9 0	**10,599.96**	25.8	100	87,300	20,908	193,477,720
Cleaned coal	10000 ton							25.8	100	87,300	26,344	0
Other washed coal	10000 ton	9.22			53.85	8.2	**71.27**	25.8	100	87,300	8,363	520,335
Coal Briquette	10000 ton						**0**	29.2	100	95,700	28,435	0
Coke	10000 ton							29.2	100	87,300	28,435	0
Coke oven gas	10^8 m^3	0.35	0.74			0.13	**1.22**	12.1	100	95,700	16,726	76,113
Other coal gas	10^8 m^3	18.38	0.2				**18.58**	12.1	100	37,300	5,227	362,249
Crude oil	10000 ton							20	100	37,300	41,816	0
Gasoline	10000 ton	0.05				0.01	**0.06**	18.9	100	71,100	43,070	1,744
Diesel	10000 ton	1.03	0.44	0.26	0.05	1.64	**3.42**	20.2	100	67,500	42,652	105,902
Fuel oil	10000 ton		0.86	0.04		0.02	**0.92**	21.1	100	72,600	41,816	29,045

LPG	10000 ton							17.2	100	75,500	50,179	0
Refinery gas	10000 ton					7.25	**7.25**	15.7	100	61,600	46,055	160,939
Natural gas	10^8 m^3	0.94	0.24	2.99		7.2	**11.37**	15.3	100	48,200	38,931	2,403,565
Other oil product	10000 ton					0.01	**0.01**	20	100	54,300	41,816	302
Other coking product	10000 ton							25.8	100	72,200	28,435	0
Other fuel	10000 tce	93.67	10.58		21.24		**125.49**	0	0	95,700	0	0
											Subtotal	197,137,915

Source: China Energy Statistical Yearbook 2009

TableA5. Thermal Power Generation of Northwest China Power Grid in 2008

Province	**Power Generation （MWh)**	**Ratio of Self Power Consumption of Plant （%）**	**Power Supply （MWh)**
Shaanxi	71,500,000	6.95	66,530,750
Gansu	46,800,000	6.4	43,804,800
Qinghai	10,700,000	7.14	9,936,020
Ningxia	44,000,000	7.57	40,669,200
Xinjiang	39,700,000	0	39,700,000

Total			200,640,770

Source: China Electric Power Yearbook 2009

Table A6. Emission Factor of Northwest China Power Grid in 2008

	Parameter	Unit	Value	Source
A	Total Power Supply of Northwest China Power Grid	MWh	200,640,770.0	China Electric Yearbook 2009
B	Total Emissions of Northwest China Power Grid	tCO_2e	197,137,929	China Energy Statistical Yearbook and China Electric Yearbook
C	Emission Factor of Northwest China Power Grid	tCO_2e /MWh	0.982542	C=B/A

Table A7.Simple OM Emission Factor of Northwest China Power Grid in 2009

Fuel types	Unit	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Subtotal	Carbon Content (tc/TJ)	Oxidation rate (%)	Emission Coefficient of Fuel ($kgCO_2/TJ$)	Average low Caloric value (MJ/t,km^3)	CO_2 emission (tCO_2e) K=F×I×J/100000（unit of mass）
		A	B	C	D	E	F=A+B+C+D+E	G	H	I	J	K=F×I×J/10000 (unit of volume)
Raw	10000	3,949.22	2,060.00	467.05	2,350.13	2,380.00	**11,206.4**	25.8	100	87,300	20,908	204,546,878

coal	ton						**0**					
Cleaned coal	10000 ton						**0.00**	25.8	100	87,300	26,344	0
Other washed coal	10000 ton	8.34			56.01	6.66	**71.01**	25.8	100	87,300	8,363	518,437
Coal Briquette	10000 ton						**0.00**	26.60	100	87,300	20,908	0
Coke	10000 ton						**0.00**	29.2	100	95,700	28,435	0
Coke oven gas	$10^8 m^3$	0.49	0.8			0.12	**1.41**	12.1	100	37,300	16,726	87,967
Other coal gas	$10^8 m^3$	18.37	0.44				**18.81**	12.1	100	37,300	5,227	366,733
Crude oil	10000 ton						**0.00**	20	100	71,100	41,816	0
Gasoline	10000 ton	0.02					**0.02**	18.9	100	67,500	43,070	581
Diesel	10000 ton	0.6	0.52	0.2	0.07	0.7	**2.09**	20.2	100	72,600	42,652	64,718
Fuel oil	10000 ton		0.25	0.08		0.06	**0.39**	21.1	100	75,500	41,816	12,313
LPG	10000 ton	0.02					**0.02**	17.2	100	61,600	50,179	618
Refinery gas	10000 ton					8.56	**8.56**	15.7	100	48,200	46,055	190,019
Natural gas	$10^8 m^3$	0.91	0.07	3.93		7.83	**12.74**	15.3	100	54,300	38,931	2,693,177
Other	10000						**0.00**	20	100	72,200	41,816	0

oil product	ton											
Other coking product	10000 ton						**0.00**	25.8	100	95,700	28,435	0
Other fuel	10000 tce	73.76	18.52		18.08		**110.36**	0	0	0	0	0
											Subtotal	208,481,440

Source: China Energy Statistical Yearbook 2010

Table A8. Thermal Power Generation of Northwest China Power Grid in 2009

Province	Power Generation (MWh)	Ratio of Self Power Consumption of Plant (%)	Power Supply(MWh)
Shaanxi	77,400,000	7.24	71,796,240
Gansu	44,100,000	6.88	41,065,920
Qinghai	10,700,000	7.01	9,949,930
Ningxia	44,700,000	7.76	41,231,280
Xinjiang	45,200,000	5.16	42,867,680
Total			206,911,050

Source: China Electric Power Yearbook 2010

Table A9. Emission Factor of Northwest China Power Grid in 2009

	Parameter	**Unit**	**Value**	**Source**
A	Total Power Supply of Northwest China Power Grid	MWh	206,911,050	China Electric Yearbook 2010
B	Total Emissions of Northwest China Power Grid	tCO_2e	208,481,440	China Electric Power Yearbook and China Energy Statistical Yearbook

C	Emission Factor of Northwest China Power Grid	tCO_2e /MWh	1.007590	C=B/A

Table A10. Operating Margin Emission Factor of Northwest China Power Grid

		Year 2006	Year 2007	Year 2008	Total
A	Emissions (tCO_2e /year)	180,940,805	197,137,915	208,481,440	586,560,160
B	Power Supply (MWh)	178,920,940	200,640,770	206,911,050	586,472,760
C	CO_2 Emission Factor (tCO_2e/MWh)	C = A/B			1.0001

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

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

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

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

Where:

$FC_{i,j,y}$: Amount of fossil fuel type *i* consumed in province *j* in year *y* (mass or volume unit, for solid and wet fuel, the unit is ton, for gas fuel, the unit is m^3);

NCV_{ij} : Net thermal value of fuel type *i* in year *y* (for solid and wet fuel, the unit is GJ/t, for gas fuel, the unit is 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.

Based on China Energy Statistical Yearbook 2009, the calculation of the weights of solid, liquid, and gas fuels in Northwest China Power Grid are:

λ_{Coal} =98.36%， λ_{Oil} =0.04%， λ_{Gas} =1.60%

Step 2: Calculation of Emission Factor of Relevant Thermal Power

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

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 A11. 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 **($kgCO_2$/TJ)**	Oxidation Rate	Emission Factor (tCO_2e/MWh)
		A	B	C	D=3.6/A/1,000,000×B×C
Coal-fired	$EF_{Coal,Adv,y}$	39.45%	87,300	1	0.7968

Power Plant					
Oil-fired Power Plant	$EF_{Oil,Adv,y}$	51.77%	75,500	1	0.5250
Gas-fired Power Plant	$EF_{Gas,Adv,y}$	51.77%	54,300	1	0.3776

$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv,y} + \lambda_{Oil} \times EF_{Oil,Adv,y} + \lambda_{Gas} \times EF_{Gas,Adv,y}$ =0.7899 (tCO_2e/MWh)

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

Table A12. Installed Capacity of Northwest China Power Grid in 2009

Installed Capacity	Unit	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Total
Thermal Power	MW	19,900	10,990	1,930	8,820	9,520	51,160
Hydropower	MW	1,920	5,940	8,740	430	2,430	19,460
Nuclear Power	MW	0	0	0	0	0	0
Wind Power and Others	MW	0	750	0	270	860	1,880
Total	MW	21,820	17,680	10,670	9,520	12,810	72,500

Source: China Electric Power Yearbook 2010

Table A13. Installed Capacity of Northwest China Power Grid in 2008

Installed Capacity	Unit	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Total

Thermal Power	MW	17,850.0	8,980.0	2,000.0	7,540.0	8,200.0	44,570.0
Hydro Power	MW	1,810.0	5,440.0	5,910.0	430.0	2,190.0	15,780.0
Nuclear Power	MW	0.0	0.0	0.0	0.0	0.0	0.0
Wind Power and Others	MW	0.0	600.0	0.0	170.0	510.0	1,280.0
Total	MW	19,660.0	15,020.0	7,910.0	8,140.0	10,900.0	61,630.0

Source: China Electric Power Yearbook 2009

Table A14. Installed Capacity of Northwest China Power Grid in 2007

Installed Capacity	**Unit**	Shaanxi	**Gansu**	**Qinghai**	**Ningxia**	**Xinjiang**	**Total**
Thermal Power	MW	12,290	7,840	1,900	7,030	6,560	35,620
Hydropower	MW	1,790	4,400	5,830	430	2,140	14,590
Nuclear Power	MW	0	0	0	0	0	0
Wind Power and Others	MW	72.5	346	0	50	330	798.5
Total	MW	14,152.5	12,586	7,730	7,510	9,030	51,008.5

Source: China Electric Power Yearbook 2008

Table A15. Calculation of BM of Northwest China Power Grid (MW)

	Installation in year 2007	**Installation in year 2008**	**Installation in year 2009**	**New Additions from 2007 to 2009***	**New Additions from 2008 to 2009***	**Ratio in New Additions**
	A	B	C	D	E	
Thermal Power（MW）	35,620.0	44,570.0	51,160	16,998	7,389	74.07%
Hydro Power（MW）	14,590.0	15,780.0	19,460	4,870	3,680	21.22%

Nuclear Power （MW）	0.0	0.0	0	0	0	0.00%
Wind Power and Others（MW）	798.5	1,280.0	1,880	1,082	600	4.71%
Total（MW）	51,008.5	61,630.0	72,500	22,950	11,669	
Percentage compared with installation of 2008				31.65%	16.10%	

* Calculation from installed capacity, shut-off, suspended and pumped storage capacity

$EF_{grid,BM,y}$ =0.7899×74.07%=0.5851 tCO_2/MWh

Table A16.   Baseline Emission Factor of Northwest China Power Grid

	Parameter	**Unit**	**Amount**
A	Operating Margin Emission Factor	tCO_2e/MWh	1.0001
B	Build Margin Emission Factor	tCO_2e/MWh	0.5851
C	Combined Emission Factor (C=0.75*A+0.25*B)	tCO_2e/MWh	**0.89634**

Table A17.   Electricity Generation Baseline Emissions

	Parameter	**Unit**	**Amount**	**Source or Equation**
A	Project installed capacity	MW	49.5	FSR
B	Annual electricity supplied	MWh	129,195	FSR
C	Baseline Emissions Factor	tCO_2e/MWh	0.89634	Table A16
D	Electricity generation baseline emissions	tCO_2e/year	**115,803**	D=B*C

Annex 4

MONITORING INFORMATION

Please refer to B.7.2 in the PDD.