



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

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**SECTION A. General description of project activity****A.1. Title of the project activity:**

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Inner Mongolia Ximeng Zheligentu Wind Farm Phase I Project

Version number of the document: 4

Date: 11 April 2010

Revision History of the PDD

Version	Date	Comments
1	21 July 2008	Completed version of the PDD, prepared for the GSP process.
2	11 March 2009	Revised according to the validation findings.
3	28 September 2009	Revised according to request for review
4	11 April 2010	Correction after under review.

A.2. Description of the project activity:

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Inner Mongolia Ximeng Zheligentu Wind Farm Phase I Project (hereinafter referred to as the proposed project) is to utilize wind resources for electricity generation through the construction of a wind farm with a total capacity of 48.75MW and a 220kV substation in Zhengxiangbai Qi, south Xilinguole League, Inner Mongolia Autonomous Region, P.R.China. The proposed project is constructed and operated by Beijing International New Energy Co., Ltd. The electricity generated from the project will be sold to West Inner Mongolia Power Grid, an integral part of the North China Power Grid. The estimated annual net electricity output and average annual emission reductions of the proposed project are 99.48GWh and 104,941tCO₂e, 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 obvious greenhouse gas (GHG) emission reductions by avoiding CO₂ emissions, as grid-connected fossil fuel-fired power dominates in the North China Power Grid.

2. Pollutants emission reduction through replacing fossil fuel combustion

The proposed project is to replace grid-connected fossil fuel-fired power plants in the North 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 16 job opportunities for local people.

4. Economy development



The region can achieve economic growth and booming of local tourism through the construction and operation of the project .Furthermore, the project will contribute to local government with more tax revenues and poverty eradication.

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 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)	Beijing International New Energy Co., Ltd.	No
UK	OneCarbon International B.V.	No

(*) In accordance with the CDM modalities and procedures, at the time of making the CDM PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.

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

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

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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Inner Mongolia Autonomous Region

A.4.1.3. City/Town/Community etc:

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Zhengxiangbai Qi, Xilinguole League

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 at Zhengxiangbai Qi, Xilinguole League, middle grassland of Inner Mongolia Autonomous Region, P. R. China. The project has geographical coordinates with east



longitude of 115°29'34" and north latitude of 42°28'15". Figures A1 and A2 show the geographical location of the proposed project.



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

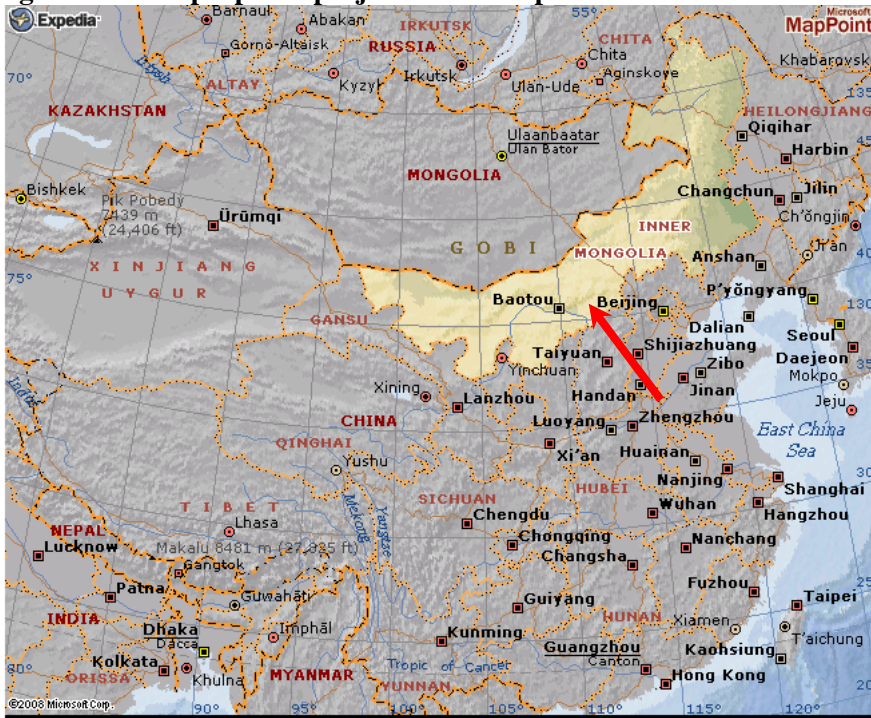


Figure A2. The location of the proposed project on the map of Xilingol Meng



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 involves the installation of 39 wind turbines with each capacity of 1250kW each, which amount to a total installed capacity of 48.75MW. The annual net electricity output is 99.48GWh. The wind turbines will be supplied by a domestic manufacturer–Shanghai Electric Wind Power Equipment Co., Ltd. and the selected model is SEC-1250. The main technical specifications of the wind turbine are provided in the following table.

Item	Unit	Index
Rated capacity	kW	1250
Number of blades		3
Rotor diameter	m	64
Swept area	m ²	3217
Cut-in speed	m/s	2.8
Rated wind speed	m/s	12.3
Safe wind speed	m/s	50.3
Cut-out speed	m/s	23
Height of hub	m	68
Rated voltage of generator	V	690
Rated capacity of generator	kW	1250

A 220kV substation will be set up at the site, which connects the proposed project to the 220kV Zhengxiangbai Qi Substation. Then the power produced in the wind farm can be transmitted to the West Inner Mongolia Power Grid which is part of North China Power Grid. The wind turbines employed in the proposed project are made in domestic, therefore it doesn't involve international technology transfer.

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

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A crediting period of 7 years (May 2010-April 2017, renewable twice) is selected for the project activity. An estimation of emissions reductions expected over the crediting period is provided in the table below¹.

Years	Annual estimation of emission reductions in tonnes of CO ₂ e
2010 (May - Dec)	69,960
2011	104,941
2012	104,941
2013	104,941
2014	104,941

¹ The proposed project is expected to be commissioned and registered in EB by the end of May 2010.



2015	104,941
2016	104,941
2017(Jan – Apr)	34,981
Total estimated reductions (tonnes of CO ₂ e)	734,587
Total number of the first crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO ₂ e)	104,941

A.4.5. Public funding of the project activity:

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

**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 07) – “Consolidated methodology for grid-connected electricity generation from renewable sources”. “Tool for the Demonstration and Assessment of Additionality (version 05.2)” and “Tool to calculate the emission factor for an electricity system (version 01.1)” are also applied in the proposed project.

For more information regarding the methodologies please refer to <http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>

B.2 Justification of the choice of the methodology and why it is applicable to the project activity:

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The proposed project meets all applicability conditions of methodology ACM0002 which are listed as follows:

- 1) The proposed project is a new wind power project;
- 2) The proposed project does not involve switching from fossil fuels to renewable energy at the site;
- 3) The geographic and system boundaries of North China Power Grid to which the proposed project will be connected can be clearly identified and information on the characteristics of the grid is available.

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

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	Source	Gas	Included?	Justification / Explanation
Baseline	Fossil fuel-fired power plants in the North China Power Grid	CO ₂	Yes	Major emission sources.
		CH ₄	No	Minor emission source.
		N ₂ O	No	Minor emission source.
Project Activity	The proposed wind power project	CO ₂	No	No GHG emissions from wind power projects.
		CH ₄	No	Excluded according to methodology.
		N ₂ O	No	Excluded according to methodology.

The spatial extent of the project boundary includes Inner Mongolia Ximeng Zheligentu Wind Farm Phase I Project site. The project site includes the power plants, turbines themselves and auxiliary electric equipments that are used to support the turbines operation. The Inner Mongolia Ximeng Zheligentu Wind Farm Phase I Project is connected to the North China Power Grid (NCPG) and the NCPG including all power plants connected is selected as the project boundary therefore.

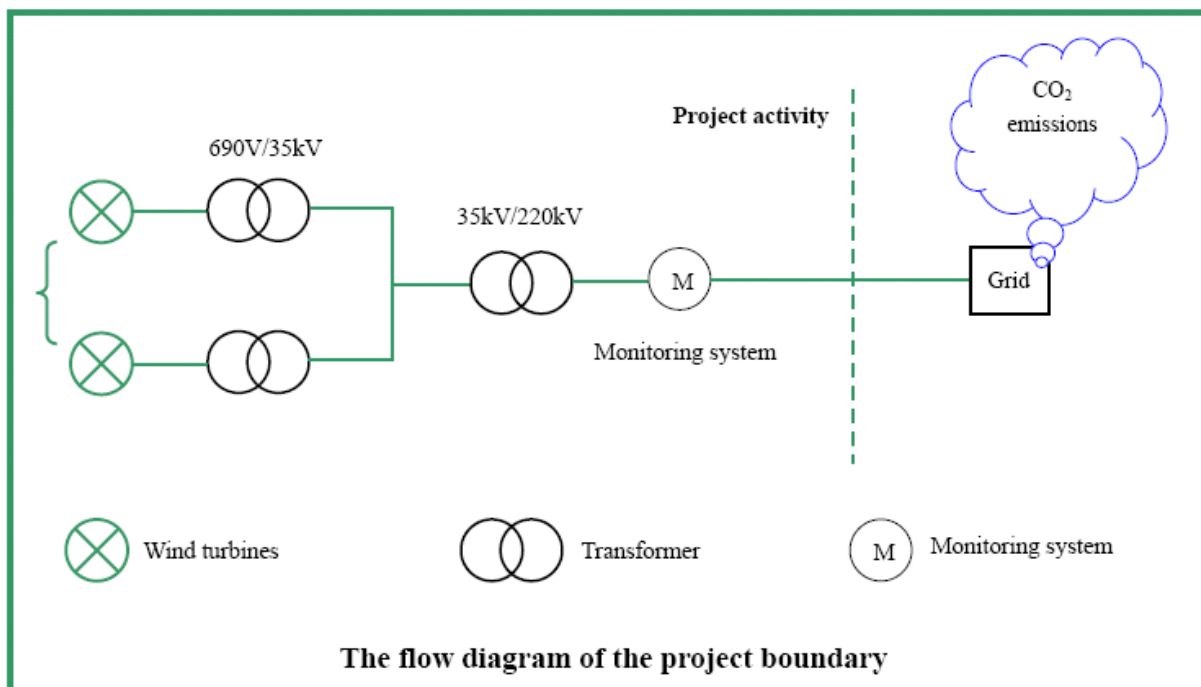
The NCPG is the project electricity system, which is defined by the spatial extent of the power plants that can be dispatched without significant transmission constraints. In determining this project

electricity system, such causes below are taken into account.

Using the boundary definitions published by the Chinese DNA², the NCPG consists of Beijing, Tianjin, Hebei, Shanxi, Shandong and Inner Mongolia Power Grids. The electricity transmission between different provinces in the North China Power Grid is large. The electricity transmission among the North China Power Grid and the other grids are very insignificant³. Hence, it is reasonable for the proposed project to regard the North China Power Grid as the project boundary.

In April 2002, China implemented the policy of "separate power plants from grids and compete in price for grid connection". The power sector reform started in 2002, and the six big power grids structured from then. Hence the grid data from Year 2004, 2005 and 2006 of the North China Power Grid applied in the PDD, which is after the power sector reform in China.

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



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

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² Source: <http://cdm.ccchina.gov.cn/english/NewsInfo.asp?NewsId=2871>

³ The electricity import and output between North China Power Grid and other grids (Northeast China Power Grid) is very insignificant and not necessary to be considered when calculating EF of grid. According to China Electric Power Yearbook 2006, North China Power Grid imported 23,423,000MWh power from Northeast China Power Grid in 2005, but the total power supply of North China Power Grid is 560,751,013MWh. (Source: The data from *China Electric Power Yearbook 2006* for the calculation of OM issued on <http://cdm.ccchina.gov.cn/english/NewsInfo.asp?NewsId=2871>)



In absence of the proposed project, reasonable and credible alternatives to the proposed project include:

- 1) The proposed project not undertaken as CDM project;
- 2) Construction of a fossil fuel power plant with equivalent amount of annual electricity output;
- 3) Construction of a power plant using other sources of renewable energy with equivalent amount of annual electricity output; and
- 4) Supply of equivalent annual power output by the Grid to which the proposed project is connected.

Specific analysis on the four alternative scenarios in absence of the proposed project is as follows:

- 1) According to the investment analysis in Section B.5., the IRR of total investment of the proposed project is only 6.11%. The development of the proposed project under fully commercialized conditions without CDM could not be financially attractive. Therefore, the Scenario 1 is not a feasible alternative.
- 2) The alternative fossil fuel-fired power plant for the proposed project would be less than 135MW. However, fossil fuel-fired power plant with a capacity of 135MW or less is strictly prohibited in large grids, such as provincial grids⁴. Furthermore, the manufacturing and construction of fossil fuel-fired generators of 100MW or less in small (detached) grid are strictly controlled⁵. Consequently, Scenario 2 is ruled out from being a feasible alternative.
- 3) Solar PV, geothermal, biomass and hydropower are the possible grid-connected renewable energy options that could be applied in the North China Power Grid besides wind energy. Limited by the status of technological advancement and high investment costs, solar PV, geothermal and biomass options are far from being economically attractive. And because of the lack of usable hydro resources in North China and the fact that proposed project is located on desert grassland with little biomass resources, both the hydropower and biomass options are less attractive within the project boundary. Hence, Scenario 3 is not a feasible alternative.
- 4) The installed capacity of North China Power Grid has been continuously increasing over the past. Moreover, this alternative complies with all applicable laws and is economically viable. Therefore, Scenario 4 is a feasible alternative baseline scenario.

As a result of the above discussion, electricity supply of equal amount as the proposed project from the North China Power Grid is selected as the baseline for the proposed project.

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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Prior Consideration of the CDM

⁴ Source: http://www.gov.cn/gongbao/content/2002/content_61480.htm

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

⁵ Source: <http://www.people.com.cn/item/flfgk/gwyfg/1997/220010199708.html>

Notice on Strictly Controlling the Manufacturing and Construction of Small-scale Fuel-fired Generators, Ref. No. [Jijiqing (1995) 2372]



Time	Project action	CDM action
09/2007	Completion of the Feasibility Study Report (FSR)	
22/10/2007		Board meeting made decision to seek CDM support
29/11/2007		CDM Consultant Contract signed
22/12/2007	Wind turbine purchasing contract signed	
26/02/2008	FSR approved	
14/04/2008		ERPA signed
05/2008	Wind turbine installation contract signed	
19/08/2008		Validation contract signed
23/09/2008		PDD made for public comments
02/2009		UK LoA issued
03/2009		China LoA issued

The Feasibility Study Report (FSR) was completed by *North China Power Engineering (Beijing) Co., Ltd.* in September 2007. In the FSR, the CDM support was suggested to make up the price gap between the target tariff (0.5757 RMB/kWh) aiming at the project IRR up to the benchmark of 8% and the tariff (0.51 RMB/kWh) in the Letter of Acceptance issued by tendering agency on 11 Jul 2007. Therefore, Beijing International New Energy Co., Ltd. held the Board meeting and decided to find a consultancy to develop the proposed project as a CDM project activity. On 29 November 2007, Easy Carbon Consultancy Co., Ltd. signed the contract and started the CDM application process for the proposed project. The Wind Turbine Purchase Agreement was signed on 22 December 2007 between the project developer and wind turbine supplier. The wind turbine installation contract was signed in May 2008. According to the EB's guidance on prior consideration of the CDM, the time of wind turbine purchase contract (22 December 2007) was considered as the starting date of the proposed project.

After the project started, the ERPA and validation contract was signed successively to secure the CDM status. The UK LoA was issued in February 2009 and the Chinese LoA was issued on March 2009.

The additionality of the proposed project is demonstrated and assessed by the approved "Tool for the Demonstration and Assessment of Additionality"(Version 05.2). Following steps include:

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

Define realistic and credible alternatives to the project activity(s) that can be (part of) the baseline scenario through the following sub-steps:

Sub-step 1a. Define alternatives to the project activity:

Identify realistic and credible alternative(s) available to the project participants or similar project developers that provide outputs or services comparable with the proposed CDM project activity. These alternatives are to include:

- 1) The proposed project not undertaken as CDM project;
- 2) Construction of a fossil fuel power plant with equivalent amount of annual electricity output;



- 3) Construction of a power plant using other source of renewable energy with equivalent amount of annual electricity output; and
- 4) Supply of equivalent annual power output by the Grid to which the proposed project is connected.

Solar PV, geothermal, biomass and hydropower are the possible grid-connected renewable energy options that could be applied in the North China Power Grid besides wind energy. Limited by the status of technological advancement and high investment costs, solar PV, geothermal and biomass options are far from being economically attractive. And because of the lack of usable hydro resources in North China and the fact that proposed project is located on desert grassland with little biomass resources, both the hydropower and biomass options are less attractive within the project boundary. Hence, Scenario 3 is not a feasible alternative.

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

There is a large difference between thermal power and wind farm in their annual operating hours and the stability of their operation. However, an alternative fossil fuel power plant that can provide the equivalent generation capacity with a comparable annual utilization rate of 5,612 hours (Reference: P 626 2007 China Electric Power Yearbook), which was the average utilization hours of the thermal units in China in 2006, would be one with installed capacity of less than 17MW. The alternative fossil fuel power plant with the equivalent power output as the proposed project will be less than 135MW, while coal-fired plants with a capacity of 135MW or less are prohibited from development in large grid such as provincial grids⁶, and the fossil fuel-fired power units with less than 100MW capacity is strictly regulated for installation⁷ according to current regulations in China. Consequently, alternative 2) is not a feasible alternative.

The alternative 1), 3) and 4) are in line with the existing Chinese laws and regulations.

However, for the alternative 3), limited by the status of technological advancement and high investment costs, solar PV, geothermal and biomass options are far from being economically attractive. Only hydropower is comparable to wind power in China. However, the proposed project location is located at desert steppe, where lacks of rainfall and suffers cold winter, thus the usable waterpower resource for developing is not available. Hence; Scenario 3) is not a feasible alternative.

Step 2. Investment analysis

The purpose of this step is to determine whether the proposed project activity is economically or financially less attractive than other alternatives 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, the simple cost analysis method is not appropriate. Investment comparative

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

⁷ Notice on Strictly Controlling the Manufacturing and Construction of Small-scale Fuel-fired Generators, Ref. No.[Jijiqing (1995) 2372]



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 baseline scenario of the proposed project is to supply equivalent annual power output from the North 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 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*, the financial benchmark IRR of Chinese electricity industry is 8% on Project (after tax), which has been used widely in feasibility studies of new power plants, including wind power projects in China.

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

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 Feasibility Study Report of the proposed project, basic parameters for calculation of financial indicators are as follows:

<i>Parameter</i>	<i>Data</i>	<i>Source</i>
Installed capacity	48.75 MW	Wind turbine contract
Annual output	99.48 GWh	Page 118 of the FSR
Project lifetime	25 years (1 year for construction and 24 years for operation)	Page 118 of the FSR
Total investment	439.18 million RMB	Page 117 of the FSR
Annual O&M cost	10.40 million RMB	Average value calculated according to the Total Cost Estimating Table on the attachment of the FSR
Tariff	0.51 RMB/kWh (Incl. VAT)	<i>Letter of Acceptance</i> issued by China Machinery & Equipment International Tendering Co., Ltd. on 11 July 2007
Depreciation period	12 years	Page 119 of the FSR
Residual	4%	Page 119 of the FSR
Tax rate	8.5% (VAT)	Page 119 of the FSR
	15% (Income tax)	
	5% (City tax)	
	3% (Education tax)	
Expected CERs price	13 Euro/tCO ₂ e	Project developer

Justification on the appropriate of the tariff applied to the proposed project

There are two situations to determine the tariff of wind farm projects, one is to determine the tariff through the concession tendering process and another is to determine the tariff through approval issued by government. Since the proposed project is not a concession project, before the implementation of the proposed project, the on-grid tariff of the project can only be estimated based on the already issued on-grid tariff of similar wind farms in the same region. The electricity generated by the proposed



project will be supplied to West Inner Mongolia Power Grid, and then the North China Power Grid. Furthermore, considering the different geographic environment, investment circumstance, accessibility for power grid and wind resources of different region, the West Inner Mongolia Power Grid covered by NCPG is defined as the reference region.

NDRC has issued the notifications about on-grid tariff of wind farm projects in West Inner Mongolia on 22nd December 2006⁸, 9th June 2007⁹, 3rd December 2007¹⁰, 23rd July 2008¹¹ and 20th July 2009¹², respectively. The details of the on-grid tariff in West Inner Mongolia issued by NDRC were listed in the following table.

Time	Code of Tariff Notification	Tariff issued in the Notification (RMB Yuan/kWh, including VAT)	Remarks
2004	Fagaijiage [2004] No.1093	0.55	Issued for Huitengxile Wind Farm Project
22 nd December 2006	Fagaijiage [2006] No.2908	0.579	Issued for Inner-Mongolia Ximeng Abag 49.5MW Wind Power Project
		0.5497	Issued for Inner Mongolia Wulatezhongqi Wind Farm Project
		0.548	Issued for Inner Mongolia Bailingmiao Wind Farm Project
9 th June 2007	Fagaijiage [2007] No.1260	0.51	Issued for Inner Mongolia Datang Zhuozi Wind Farm
3 rd December 2007	Fagaijiage [2007] No.3303	0.51	Issued for 28 projects in Inner Mongolia
23 rd July 2008	Fagaijiage [2008] No.1876	0.51	Issued for 6 projects in Inner Mongolia
20 th July 2009	Fagaijiage [2009] No.1906	0.51	Issued for the wind farm projects approved after 1 st August 2009.

When the the project owner was making the decision on 22/10/2007 whether to implement the proposed project or not, the tariff of wind farm projects in West Inner Mongolia issued by NDRC¹³ on 9th June 2007 was used as the latest tariff policy available, which is 0.51 RMB Yuan/kWh (including VAT).

⁸ Source: Fagaijiage [2006] No.2908. The document has been provided to DOE for validation.

⁹ Source: Fagaijiage [2007] No.1260. The document has been provided to DOE for validation.

¹⁰ Source: Fagaijiage [2007] No.3303. website: http://www.sdpc.gov.cn/jggl/zcfg/t20080218_193008.htm

¹¹ Source: Fagaijiage [2008] No.1876. website: http://www.sdpc.gov.cn/jggl/zcfg/t20080813_230726.htm

¹² Source: Fagaijiage [2009] No.1906. website: http://www.sdpc.gov.cn/zcfb/zcfbtz/2009tz/t20090727_292827.htm

¹³ Fagaijiage [2007] No.1260. The document has been provided to DOE for validation.



Since 2006, a series of policies (laws, regulations etc.) were issued to give the renewable energy industry more advantages. The following are the policies issued by China government:

- The Law of the People’s Republic of China on Renewable Energies
- The Tentative Management for Price and Sharing of Expenses for Electricity Generation from Renewable Energy (Fagaijiage [2006] No.7)
- The Notice for Stimulate Wind Power Development (Fagaijiage [2006] No.2535)
- Temporary Measures of Additional Income regulation of Renewable Energy Power

All the policies above are aiming to stimulate the development of renewable energy, especially the wind farms. With the implementation of the series of policies, the investment environment became more attractive to investors and the wind farm projects developed rapidly in China.

Furthermore, considering the tariff policy issued by NDRC, the tariff for wind farm projects in the same region became unified to be 0.51 RMB Yuan/kWh (including VAT) for the first 30000 equivalent full load hours, and after the 30,000 equivalent full load hours, the local average tariff would be adopted. By inputting the highest tariff of 0.579 Yuan/kWh (including VAT) in Inner Mongolia¹⁴ for first 30000 equivalent full load hours and tariff of 0.2659 Yuan/kWh (including VAT) after is 30000 equivalent full load hours, the Project IRR is 6.38%, which is still lower than the benchmark. Therefore, it is appropriate for the proposed project to apply the tariff of 0.51 RMB Yuan/kWh (including VAT).

(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.

Table 1 shows the IRRs of the proposed project, with and without CDM-related income. Without CDM-related income, the Project IRR is lower than the benchmark and the proposed project is not financially acceptable. With it, the Project IRR is better than the benchmark and therefore, the proposed project is financially acceptable.

Table 1. Financial indicators of the Proposed Project

	Project IRR (benchmark=8%)
Without CDM-related income	6.11%
With CDM-related income	10.26%

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

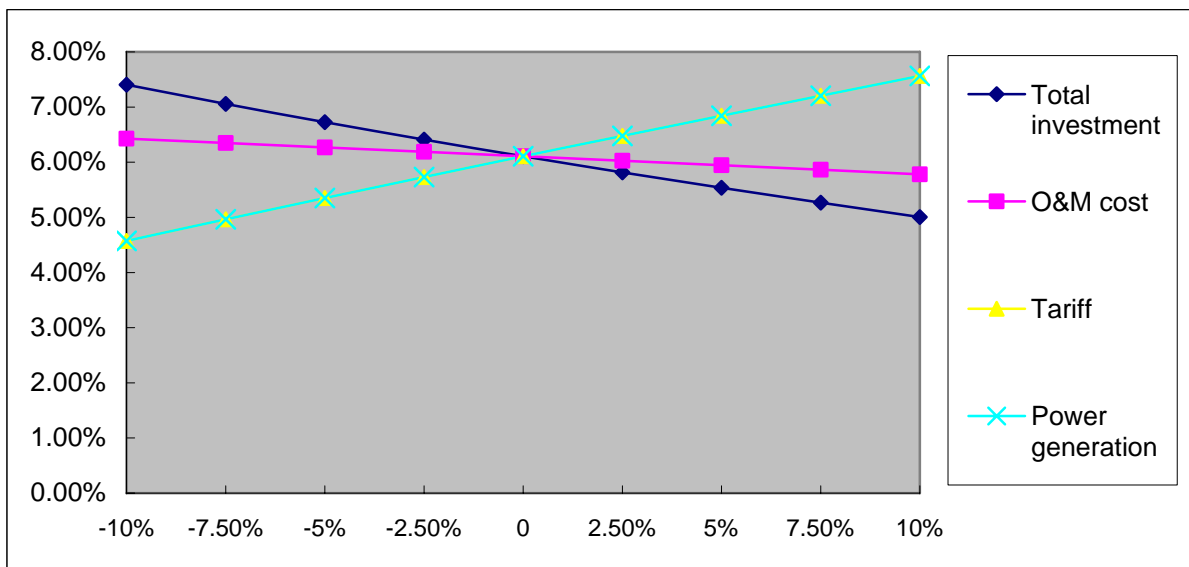
To show that the conclusion regarding the financial attractiveness of the proposed project is robust to reasonable variations of the critical assumptions, four financial parameters, i.e. total investment, annual O&M cost, tariff and power generation, are chosen for sensitive analysis. The chosen financial parameters are assumed to vary within a reasonable range from -10% to +10%, and accordingly, the total investment IRR (after tax and without CDM-related income) varies to different extents, as shown in Table 2 and Figure 2

¹⁴ Fagaijiage [2006] No.2908.

Table 2. Sensitivity of Project IRR to different financial parameters

Parameter	Range								
	-10%	-7.50%	-5%	-2.50%	0%	2.50%	5%	7.50%	10%
Total investment	7.40%	7.06%	6.73%	6.41%	6.11%	5.82%	5.54%	5.27%	5.01%
O&M cost	6.43%	6.35%	6.27%	6.19%	6.11%	6.03%	5.95%	5.86%	5.78%
Tariff	4.57%	4.96%	5.35%	5.73%	6.11%	6.48%	6.84%	7.21%	7.56%
Power generation	4.57%	4.96%	5.35%	5.73%	6.11%	6.48%	6.84%	7.21%	7.56%

Figure 2. Sensitivity of total investment IRR to different financial parameters



As shown in Table 2 and Figure 2, 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 exceed the benchmark of 8%.

The total investment needs to decrease by 14% when the Project IRR meets the benchmark of 8%. Due to the increasing pricing level of construction materials and equipments as well as manpower, the total investment of the proposed project is impossible to be decreased by over 14% to exceed benchmark.

The annual O&M cost needs to decrease by 61% when the Project IRR meets the benchmark of 8%, which is impossible.

The tariff needs to increase by 13%, which is as high as 0.58 RMB/kWh (Incl. VAT), when the Project IRR meets the benchmark of 8%. According to the Letter of Acceptance, 0.51 RMB/kWh (Incl. VAT) will be fixed for 30,000 hours of full load generation of wind farms, after that, the tariff will be down to the average tariff of local thermal power plants in NCPG, currently it is 0.2749 RMB/kWh (Incl. VAT)¹⁵,

¹⁵ Source: http://www.ndrc.gov.cn/zcfb/zcfbtz/2008tongzhi/t20080702_222220.htm



which is much lower. Considering the annual full operation hours of the proposed project around 2000 hours, 0.51 RMB/kWh (Incl. VAT) will be fixed for about 15 years. To be conservative, the PDD uses 0.51 RMB/kWh (Incl. VAT) for financial analysis of the whole lifetime. Therefore, it is impossible that the tariff of the proposed project could increase by 13%.

The power generation needs to increase by 13% when the Project IRR meets the benchmark of 8%. For the proposed project, the power generation is calculated based on the monitored data of the local wind resources over 30 years. The annual generation represents a long-term average power supply throughout the lifetime of wind farm, where the yearly-variations have already been taken into account. Therefore, the power generation of the proposed project is impossible to decrease by 13% to exceed benchmark.

In conclusion of the sensitive analysis, as the financial indicators vary within reasonable range, the proposed project remains financially unacceptable without CDM support. Therefore, Scenario 1 is not a feasible alternative.

Step 4. Common practice analysis

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

In April 2002, China implemented the policy "Separate power plants from network and compete in price to enter network". The objective of this power sector reform is to establish a more commercialized power market in China. Power project investment has to be under a more commercialized condition and considers project investment return more seriously. Since market condition for wind power project development changes much since 2002, this common practice analysis starts from April 2002.

According to the methodology ACM0002, projects with installed capacity of or below 15MW belongs to small scale projects, hence, this common practice analysis compares projects larger than 15MW.

Inner Mongolia Autonomous Region is the largest region of wind resources in China. And it also has the most wind power projects in the country. So it is chosen as the similar area.

Table 3 shows the similar projects (larger than 15 MW and within Inner Mongolia Autonomous Region) that have commissioned since 2002 without CDM support.

Table 3 Wind Farm Development within Inner Mongolia Autonomous Region¹⁶

Project	Commissioned in	Total capacity (MW)	Project developer	Remark
Dali Phase III Wind Farm Project ¹⁷	2004	31.2	East Power Maolin Wind Resources Development Co., Ltd.	Demonstration Project supported by national debt fund

¹⁶ Source: <http://www.gsec.gov.cn/ClassNews.asp?newsID=664>

Statistic of Installed Capacity of China's Wind Farms in 2007 issued by Chinese Wind Energy Association;

¹⁷ Source: <http://cangzhou.mofcom.gov.cn/column/print.shtml?/sjhbhaisq/200605/20060502338640>



Da Mao Qi Bailingmiao Wind Farm Project ¹⁸	2008	35	Hongteng Energy	Invested by foreign investors and validated as a VER project under Golden Standard program
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Sub-step 4b. Discuss any similar options that are occurring:

As shown in Table 3, within Inner Mongolia Autonomous Region, there are only two projects named Dali Phase III Wind Farm Project and Da Mao Qi Bailingmiao Wind Farm Project with the similar capacity (larger than 15 MW) as the proposed project and has been put into operation since April 2002 without CDM support. The Dali Phase III Wind Farm Project is a demonstration project and is supported by national debt fund. With the national debt fund, it is more financially viable than the proposed project. And the Da Mao Qi Bailingmiao Wind Farm Project is invested by foreign investors and has been validated as a VER project under Golden Standard program. Therefore, there's essential distinction between the projects above and the proposed project.

As stated above, it is concluded that the proposed project is not common practice within the region.

Therefore, the proposed project is additional.

B.6. Emission reductions:**B.6.1. Explanation of methodological choices:**

>>

The GHG emission calculation of the proposed project was based on the instruction of “Tool to calculate the emission factor for an electricity system (version 01.1)”. All the data employed in the calculation is based on the available data from North China Power Grid¹⁹. The baseline emission factor (EF_y) is calculated as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) factors according to the following three steps (OM and BM of the proposed project has been pre-determined):

Step 1. Identify the relevant electric power system

The DNA of the host country has published a delineation of the project electricity system and connected electricity systems, this delineation is used. The project electricity system is the North China Power Grid, which consists of Beijing, Tianjin, Hebei, Shanxi, Shandong and Inner Mongolia Autonomous Region Power Grids.

The connected power grids are: (i) the Northeast China Power Grid, which consists of Jilin, Liaoning and Heilongjiang provincial grids; (ii) the Central China Power Grid, which consists of Henan, Hubei, Hunan, Jiangxi, Sichuan provincial grids and Chongqing municipal grid. Considering there is

¹⁸ Source: <http://china.camcoglobal.com/zh/chinacasestudyview.obyx?cs=honiton.html>

¹⁹ Source: China Power Yearbook 2005-2007, China Energy Statistical Yearbook 2005-2007



electricity transferring from the connected power grid to the North China Power Grid, the CO₂ emission factor(s) of net electricity imports ($EF_{grid,import,y}$) from the connected electricity system should be determined using one of the following options for the purpose to determine the operating margin emission factor:

- (a) 0 tCO₂/MWh, or
- (b) The weighted average operating margin (OM) emission rate of the exporting grid, determined as described in step 3 (d) below; or
- (c) The simple operating margin emission rate of the exporting grid, determined as described in step 3 (a), if the conditions for this method, as described in step 2 below, apply to the exporting grid; or
- (d) The simple adjusted operating margin emission rate of the exporting grid, determined as described in step 3 (b) below.

Option (b) is chosen to calculate the CO₂ emission factor(s) of net electricity imports ($EF_{grid,import,y}$).

Considering the electricity imports from the Northeast China Power Grid and Central China Power Grid to the North China Power Grid didn't change significantly from 2004 to 2006, the spatial extent is limited to the project electricity system according to the tool for the purpose to determine the operating margin emission factor.

Step 2. Select an operating margin (OM) method

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

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

Without any nuclear source, the North China Power Grid only possesses 0.745% of its total electricity generation that comes from renewable energy sources in 2006, 0.749% in 2005, 0.708% in 2004, 0.862% in 2003, 0.889% in 2002 and 0.811% in 2001⁷. Hence, the electricity generated from the low operating cost/must run sources is much less than 50% of the total grid generation, which accords with the defined condition of Option A, but not Option D. Consequently, Simple OM method is selected to calculate the Operating Margin emission factor of the proposed project.

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

⁷ China Electric Power Yearbook 2002-2007

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

The Simple OM emission factor is calculated as the generation-weighted average CO₂ emissions per unit net electricity generation (tCO₂/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants / units. The data adopted in the proposed project comes from DNA of China. It may be calculated:

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

For the proposed project activity, the required data for the exercise of Option A and B are not available and those of Option C can be obtained from official sources, and therefore, Option C is chosen to calculate the operating margin emission factor:

$$EF_{grid,OMsimple,y} = \frac{\sum_{i,m} FC_{i,y} \cdot NCV_{i,y} \cdot EF_{CO_2,i,y}}{\sum_m EG_y}$$

Where:

- $EF_{grid,OMsimple,y}$ = Simple operating margin CO₂ emission factor in year y (tCO₂/MWh)
- $FC_{i,y}$ = Amount of fossil fuel type *i* consumed in the project electricity system in year y (mass or volume unit)
- $NCV_{i,y}$ = Net calorific value (energy content) of fossil fuel type *i* in year y (GJ / mass or volume unit)
- $EF_{CO_2,i,y}$ = CO₂ emission factor of fossil fuel type *i* in year y (tCO₂/GJ)
- EG_y = Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost / must-run power plants / units, in year y (MWh)
- i* = All fossil fuel types combusted in power sources in the project electricity system in year y
- y* = The three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation

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

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

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



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

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

Step 5. Calculate the build margin emission factor

The data adopted in the proposed project comes from DNA of China. The build margin emission factor is the generation-weighted average emission factor (tCO₂/MWh) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

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

Where:

- $EF_{grid, BM, y}$ = Build margin CO₂ emission factor in year y (tCO₂/MWh)
 $EG_{m, y}$ = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
 $EF_{EL, m, y}$ = CO₂ emission factor of power unit m in year y (tCO₂/MWh)
 m = Power units included in the build margin
 y = Most recent historical year for which power generation data is available

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

Deviated Calculation of Build Margin (BM)

Sub-step 1. Calculation of weights of CO₂ emissions of solid, liquid and gaseous fossil fuels in total emissions for power generation

$$\lambda_{Coal} = \frac{\sum_{i \in COAL, j} FC_{i, j, y} \times EF_{CO2, i, y}}{\sum_{i, j} FC_{i, j, y} \times EF_{CO2, i, y}}$$

$$\lambda_{Oil} = \frac{\sum_{i \in OIL, j} FC_{i, j, y} \times EF_{CO2, i, y}}{\sum_{i, j} FC_{i, j, y} \times EF_{CO2, i, y}}$$



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

Where:

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

$EF_{CO_2,i,y}$ = CO₂ emission factor of fossil fuel type i in year y (tCO₂ /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

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

Where:

$EF_{Coal,Adv}$, $EF_{Oil,Adv}$ and $EF_{Gas,Adv}$ 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

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

Where:

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

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

Step 6. Calculate the combined margin emission factor

The combined margin emission factor is calculated as follows:

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

Where:

$EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (tCO₂/MWh)

$EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (tCO₂/MWh)

w_{OM} = Weighting of operating margin emissions factor (%)

w_{BM} = Weighting of build margin emissions factor (%)

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

$$w_{OM} = 0.75 \text{ and } w_{BM} = 0.25$$

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



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

Where:

BE_y = Baseline emissions in year y (tCO₂ /yr)

EG_y = Electricity supplied by the project activity to the grid (MWh)

$EF_{\text{grid,CM},y}$ = Combined margin emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system”.

Project Emissions

According to the adopted methodology, the project emissions are zero.

Leakage

The project does not consider leakage according to the requirements of methodology applied.

Emission Reductions

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

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y = Emission reductions in year y (tCO₂e/year)

BE_y = Baseline emissions in year y (tCO₂e /year)

PE_y = Project emissions in year y (tCO₂e year)

LE_y = Leakage emissions in year y (tCO₂e /year)

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

>>

Data / Parameter:	$FC_{i,m,y}$
Data unit:	tonnes or m ³
Description:	Amount of fossil fuel type i consumed by power plant / unit m in year y
Source of data used:	China Energy Statistical Yearbook (2002~2007)
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistical data
Any comment:	



Data / Parameter:	NCV_{i,y}
Data unit:	kJ/kg or kJ/m ³
Description:	Net calorific value (energy content) of fossil fuel type <i>i</i> in year <i>y</i>
Source of data used:	China Energy Statistical Yearbook (2007)
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistical data
Any comment:	

Data / Parameter:	EF_{CO₂,i,y}
Data unit:	tc/TJ
Description:	CO ₂ emission factor of fossil fuel type <i>i</i> in year <i>y</i>
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:	

Data / Parameter:	Installed Capacity
Data unit:	MW
Description:	The Installed Capacity of the power plants in the grid in the year <i>y</i>
Source of data used:	China Electric Power Yearbook (2005-2007)
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistical data
Any comment:	

Data / Parameter:	
Data unit:	MWh
Description:	The electricity generation of the power plants in the grid in the year <i>y</i>
Source of data used:	China Electric Power Yearbook (2005-2007)
Value applied:	See Annex 3 for details
Justification of the choice of data or description of	Official statistical data



measurement methods and procedures actually applied :	
Any comment:	

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

Data / Parameter:	GENE_{best, coal}
Data unit:	
Description:	The optimum commercial, coal-fired power supply efficiency
Source of data used:	<i>China DNA: Bulletin on Baseline Emission Factor of 2008 China Region Grid-the calculation of baseline Build Margin emission factor for 2008 China Grid on July 18th 2008</i>
Value applied:	37.28%
Justification of the choice of data or description of measurement methods and procedures actually applied :	Statistical data issued by DNA
Any comment:	To calculate BM

Data / Parameter:	GENE_{best, gas/oil}
Data unit:	
Description:	The optimum commercial, coal-fired power supply efficiency
Source of data used:	<i>China DNA: Bulletin on Baseline Emission Factor of 2008 China Region Grid-the calculation of baseline Build Margin emission factor for 2008 China Grid on July 18th 2008</i>
Value applied:	48.81%
Justification of the choice of data or description of measurement methods and procedures actually applied :	Statistical data issued by DNA



Any comment:	To calculate BM
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B.6.3 Ex-ante calculation of emission reductions:
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As described in B.3., 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 99,480MWh.

$$EF_{\text{grid,OM,y}} = 1.1169 \text{ tCO}_2/\text{MWh}$$

$$EF_{\text{grid,BM,y}} = 0.8687 \text{ tCO}_2/\text{MWh}$$

$$EF_{\text{grid,CM,y}} = 1.1169 \times 0.75 + 0.8687 \times 0.25 = 1.0549 \text{ tCO}_2/\text{MWh}$$

$$BE_y = 99,480 \times 1.0549 = 104,941 \text{ tCO}_2\text{e}$$

The ex-ante baseline emission factor: **1.0549 tCO₂/MWh**

Annual baseline emissions: **104,941 tCO₂e** (details in Annex 3)

Project emissions

According to the baseline methodology ACM0002, the GHG emission of the proposed project within the project boundary is zero, i.e.

$$PE_y = 0$$

Leakage

According to the baseline methodology ACM0002, the leakage of the proposed project is not considered,

$$LE_y = 0$$

Project Emission Reductions

$$ER_y = BE_y - PE_y - LE_y$$

The total annual baseline emissions are 104,941 tCO₂.

The total annual project emissions are 0 tCO₂.

The total annual leakage emissions are 0 tCO₂.

$$ER_y = BE_y - PE_y - LE_y = 104,941 - 0 - 0 = 104,941 \text{ tCO}_2$$

The annual emission reductions are estimated to be: 104,941 tCO₂. The proposed project activity is expected to achieve 734,587 tCO₂e 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 ₂ e)	Estimation of baseline emissions (tonnes of CO ₂ e)	Estimation of leakage (tonnes of CO ₂ e)	Estimation of overall emission reductions (tonnes of CO ₂ e)
2010(May - Dec)	0	69,960	0	69,960
2011	0	104,941	0	104,941
2012	0	104,941	0	104,941
2013	0	104,941	0	104,941
2014	0	104,941	0	104,941
2015	0	104,941	0	104,941
2016	0	104,941	0	104,941
2017(Jan - Apr)	0	34,981	0	34,981
Total (tonnes of CO₂e)	0	734,587	0	734,587

B.7 Application of the monitoring methodology and description of the monitoring plan:**B.7.1. Data and parameters monitored:**

>>

Data / Parameter:	EG _y
Data unit:	MWh
Description:	Net electricity supplied to the Grid by the project activity in year y.
Source of data to be used:	Calculation by $EG_{export,y}$ minus $EG_{import,y}$
Value of data applied for the purpose of calculating expected emission reductions in section B.5	99,480
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 ($EG_{import,y}$)
QA/QC procedures to be applied:	Power supplied to the grid will be checked by internal verification procedure and electricity sales receipts.
Any comment:	

Data / Parameter:	EG _{export,y}
Data unit:	MWh
Description:	Electricity supplied to the grid by the proposed project during year y
Source of data to be used:	Bidirectional electricity meter reading
Value of data applied	99,480



for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	The readings of the electricity meter will be hourly measured and monthly recorded. Data will be archived for 2 years following the end of the last crediting period by means of electronic and paper backup. The accuracy of electricity meter is 0.2s. The calibration frequency is one time/year.
Monitoring frequency:	Hourly measurement and monthly recording
QA/QC procedures to be applied:	The electricity supplied by the project activity to the grid will be monitored and recorded at the central control room. The project operator is responsible for recording such data. Double check by receipt of sales.
Any comment:	The reading from the main meter is first choice. When the main meter is out of order, the reading from the backup meter will be used.

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:	Electricity meter reading
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0
Description of measurement methods and procedures to be applied:	The readings of the electricity meter will be hourly measured and monthly recorded. Data will be archived for 2 years following the end of the crediting period by means of electronic and paper backup. The accuracy of electricity meter is 0.2s. The calibration frequency is one time/year.
QA/QC procedures to be applied:	The electricity purchased from the grid will be monitored and recorded at the central control room. The project operator is responsible for recording such data. Double check by receipt of sales.
Any comment:	The reading from the main meter is first choice. When the main meter is out of order, the reading from the backup meter will be used.

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.

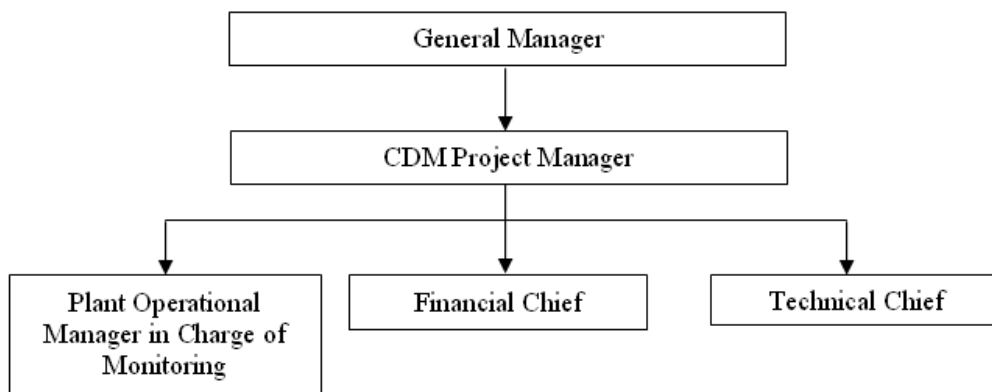
1. Monitoring Object

The main objective data is the power supplied to and purchased from the grid 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

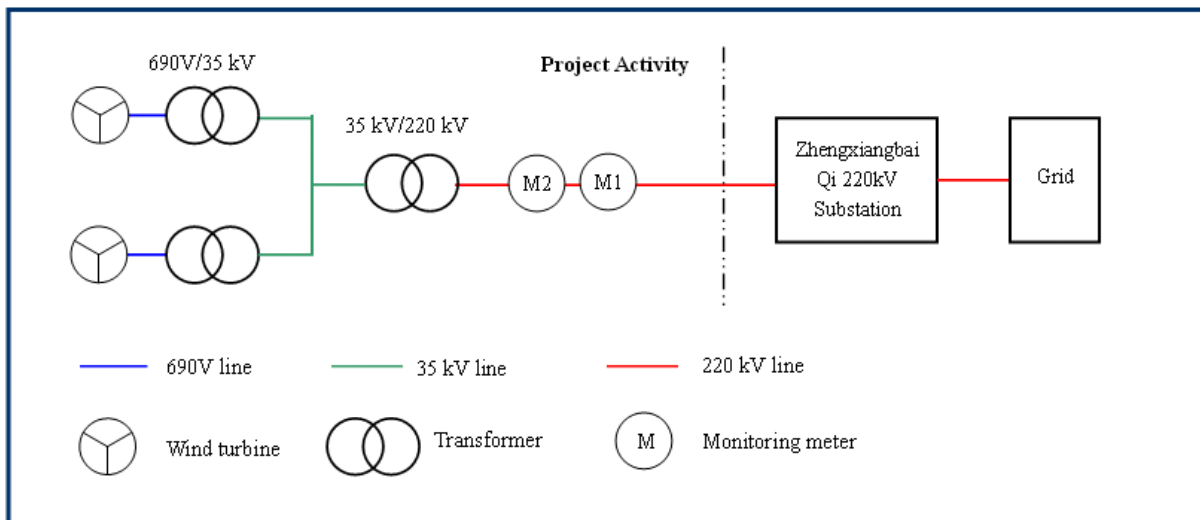
The General Manager of the project entity will appoint a CDM project manager or a chief officer. The operational and monitoring manager of the plant, the Financial Chief, and the Technical Chief are responsible for the collection of the data and information required in the monitoring plan. The collected 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:



3. Monitoring Program and Equipments

The power connection and monitoring system is shown as below.



Monitoring equipments includes two bidirectional meters M1 (main meter) and M2 (backup meter). Both meters are equipped at the project site. The project owner is responsible for conducting the monitoring.



M1 will be used to monitor the electricity exports to and imports from the grid as well as M2. The metering will be hourly measured and daily recorded. The metering of M2 will be used in case that M1 fails to work.

Both meters have an accuracy of 0.2s. They will be calibrated annually to ensure normal performance.

4. Data Collection

The verification will use the main meter's data as long as the inaccuracy of the meter is within the permissible tolerance. The main procedures are as follows:

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

If the fault of the main meter exceeds the allowable tolerance or its malfunction occurs, the grid-connected electricity generated by the proposed project will be resolved by following measures:

- I Adopting the backup meter's data (after taking the line losses into consideration), unless a test by either party reveals it is inaccuracy;
- II If the inaccuracy of the backup meter is not within the acceptable limits or it cannot work properly, the project owner and the grid company shall jointly prepare a new agreement of correct reading;
- III If the project owner and the grid company fail to reach an agreement concerning the correct reading, this matter will be submitted for arbitration according to agreed procedures.

5. Calibration of Meters & Metering

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

Meters should be tested by a qualified metric organization co-authorized by the project owner and the grid company within 10 days after:

- I The detection of the reading difference between the main meter and the backup meter that exceeds the allowable tolerance.
 - II The equipments malfunction caused by improper operation
- All the calibration test records should be maintained safely for the verification.

6. Data Management System

To keep safely the record of the data collected during monitoring, this project will set up a complete data management system. The project will perfect the whole monitoring procedure by developing the CDM manual, tracking information from the primary source to the end-data calculations in paper



document format. It is the responsibility of the proposed project owner to provide additional necessary data and information for validation and verification requirements of respective DOE. Physical documentation such as paper-based maps, diagrams and environmental assessment will be collated in a central place, together with this monitoring plan. All paper-based information will be stored by the proposed project owner and kept at least one copy.

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

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

7. Monitoring Report

After the CDM project manager collects and sorts the monitored data, the monitoring report is prepared by the project 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)
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>>

Date of completion of Baseline Study 21/07/2008

Name of person/entity determining the baseline:

Ms. Lin, Wei

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Phone/fax: +86 1058697044/59000064

Email: gyisong@easy-carbon.com

Above persons and entity 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:

>>

22/12/2007 (the date signing the wind turbine purchasing contract)

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

>>

24 years

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

C.2.1. Renewable crediting period

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

>>

01/05/2010 or the registered date whichever is later.

C.2.1.2. Length of the first crediting period:

>>

7 years 0 month

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:**

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The environmental impact assessment for this project was carried out by Inner Mongolia Electricity Survey and Design Institute on January 6th 2006 and approved by Inner Mongolia Environmental Protection Bureau on January 16th 2006. 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 the construction phase. The excavation work is the primary emission source, however, it is a ground source and the particle size is quite large so that dust will deposit quickly on the ground. Immediately replant the areas where construction has completed, and sprinkling water on the road frequently should be conducted. Therefore, 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. Meanwhile, the project site is very far from the village or resident. Consequently, the noise of operation has little impact to the surrounding environment. As a result, the noise will not impact the work and daily life of local residents.

Electromagnetic impact

The operation of the wind farm will generate electromagnetic pollution, whereas the pollution is slight. In addition, the project is very far from local residents and village. Therefore, the electronic magnetic pollution to the surrounding environment is insignificant.

Impact from Solid waste

Solid wastes generated from the proposed project activity are excavated earth material and municipal solid waste. Part of the excavated earth material will be backfilled, and the rest will be used for land levelling and road construction near the project site. The municipal solid waste will be collected and treated together with the waste from local residents. As the report indicates, solid waste is handled properly.

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 wastewater can meet the second degree standard of discharge after treatment. Therefore, the impact of wastewater is limited and mitigated.

Impact on natural environment



In order to protect the landscape, vehicles are prohibited from driving on the landscape randomly and timely afforestation is required; hunting wild animals is strictly forbidden at the same time. The lands permanently taken by wind farms are normally mountain ridges, where most of the vegetation is grass and shrub, without rare plants. Hence, the project construction has little impact on the mountain's eco-environment.

No migrating birds have been found in the project field till now. 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:

>>

The environmental impacts of the Inner Mongolia Ximeng Zheligentu Wind Farm Phase I Project are not considered as 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 County for the comments of the proposed project construction in March 6th, 2008. 50 copies of questionnaire were distributed, and 43 pieces of reply were received. The recovery ratio is 86%. Among the interviewees, there were 1 farmer, 6 workers, 17 government officials and 19 others. 8 of them have educational level of middle school or below middle school, 13 of high school, 21 of college and 1 other. The questions regarding the proposed project were mainly as follows:

1. Is the current living and/or working environment quiet?
1. Do you currently experience electromagnetic interference when watching TV at home?
2. Are there any negative impacts of the proposed project on the everyday life of local residents?
3. Is the proposed project going to help improve the living and/or working environment?
4. Do you think the construction of the proposed project will have any noise impact on the environment?
5. Which is the environmental topic that concerns you the most during the construction and operation of the proposed project?
6. Do you support the proposed project?

E.2. Summary of the comments received:

>>

The summary of survey is listed as the following:

- 72% of them consider their current living and/or working environment is quiet, another 28% is unsure and only one person think different;
- 72% of them currently do not experience electromagnetic interference when watching TV at home, while other 21% have the experience, and 7% don't know;
- 84% of them think there will not be any negative impacts on their everyday life, and the remainder is unsure;
- 88% of them think the proposed project will help improve local economics, while the other of them is unsure;
- 70% of them think the construction of the proposed project will have no noise impact on the environment while other 28% is not sure, and only one person think the construction of the proposed project will have noise impact on the environment;
- Regarding the construction and operation of the propose project, 21% of them are most concerned with the noise level, 30% of them are most concerned with electromagnetic interference, and 49% of them are most concerned with wastewater from the project;
- 93% of them support the implementation of the proposed project and the others are not sure.

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

>>

The local community possesses basically strong positive comments on the effects of the proposed project. During the survey some people express their concerns about the environmental impacts of the project, local residents were most concerned with noise level, some of them were concerned with electromagnetic interference, and some showed concern about wastewater. As discussed in the EIA report, these issues are well illuminated and specific instructions were given to mitigate the potential



impacts of these issues. As a result, wastewater quantity is fairly small and then the wastewater will be removed periodically. Therefore, the impact of wastewater is limited and mitigated. The noise will not impact the work and daily life of local residents. The level of the electromagnetic energy produced is very low. In addition, the distance between the project location and the local residents is far. Therefore, the electronic magnetic pollution to the surrounding environment is insignificant. With good implementation of the above-mentioned measures, the proposed project will not have significant negative impact on the local environment. 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 the Inner Mongolia Ximeng Zheligentu Wind Farm Phase I Project.

**Annex 3****BASELINE INFORMATION**

All the tables related to the calculation of baseline emission reduction are presented below:

Calculation of Operating Margin (OM)

Table A1. Simple OM Emission Factor of North China Power Grid in 2004

Fuel types	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Subtotal	Emission Factor (tc/TJ)	Oxidation rate (%)	Average low Caloric value (MJ/t,km ³)	CO ₂ emission (tCO ₂ e) K=G*H*I*J*44/12/10000 (unit of mass)
		A	B	C	D	E	F	G=A+B+C+D+E+F	H	I	J	K=G*H*I*J*44/12/1000 (unit of volume)
Raw coal	10000ton	823.09	1410	6299.8	5213.2	4932.2	8550	27228.29	25.8	100	20908	538,547,477
Cleaned coal	10000ton						40	40	25.8	100	26344	996,857
Other washed coal	10000ton	6.48		101.04	354.17		284.22	745.91	25.8	100	8363	5,901,191
Coke	10000ton					0.22		0.22	29.2	100	28435	6,698
Coke oven gas	10 ⁸ m ³	0.55		0.54	5.32	0.4	8.73	15.54	12.1	100	16726	1,153,187
Other coal	10 ⁸ m ³	17.74		24.25	8.2	16.47	1.41	68.07	12.1	100	5227	1,578,574



gas												
Crude oil	10000ton							0	20	100	41816	0
Gasoline	10000ton								18.9	100	43070	0
Diesel	10000ton	0.39	0.84	4.66				5.89	20.2	100	42652	186,070
Fuel oil	10000ton	14.66		0.16				14.82	21.1	100	41816	479,451
LPG	10000ton							0	17.2	100	50179	0
Refinery gas	10000ton		0.55	1.42				1.97	15.7	100	46055	52,229
Natural gas	10 ⁸ m ³		0.37		0.19			0.56	15.3	100	38931	122,306
Other oil product	10000ton							0	20	100	38369	0
Other coking product	10000ton							0	25.8	100	28435	0
Other fuel	10000tce	9.41		34.64	109.73	4.48		158.26	0	100	0	0
											Total	549,024,041

China Energy Statistical Yearbook 2005

Table A2. Thermal Power Generation of North China Power Grid in 2004



Province	Power Generation (MWh)	Ratio of Self Power Consumption of Plant (%)	Power Supply(MWh)
Beijing	18579000	7.94	17,103,827
Tianjin	33952000	6.35	31,796,048
Hebei	124970000	6.5	116,846,950
Shanxi	104926000	7.7	96,846,698
Inner Mongolia	80427000	7.17	74,660,384
Shandong	163918000	7.32	151,919,202
Total			489,173,110

China Energy Statistical Yearbook 2005

Table A3. Emission Factor of North China Power Grid in 2004

	Parameter	Unit	Value	Source
A	Net Import from Northeast China Power Grid to North China Power Grid (MWh)	MWh	4514550	China Power Yearbook 2005
B	Total Emissions of Northeast China Power Grid	tCO ₂ e	199,708,287	Calculation based on data from China Power Yearbook and China Energy Statistical Yearbook
C	Total Power Supply of Northeast China Power Grid	MWh	170132885	China Power Yearbook 2005
D	Average Emission Factor of Northeast China Power Grid	tCO ₂ e /MWh	1.17384	D=B/C
E	Total Power Supply of North China Power Grid	MWh	493687660	E=Total Power Generation of North China Power Grid + A



F	Total Emissions of North China Power Grid	tCO ₂ e	554,323,400	
G	Emission Factor of North China Power Grid	tCO ₂ e /MWh	1.12282	G=F/E

Table A4. Simple OM Emission Factor of North China Power Grid in 2005

Fuel types	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Subtotal	Emission Factor (tc/TJ)	Oxidation rate (%)	Average low Caloric value (MJ/tk m ³)	CO ₂ emission (tCO ₂ e) K=G*H*F*J*44/12/1000 (unit of mass)
		A	B	C	D	E	F	G=A+B+C+D+E+F	H	I	J	K=G*H*F*J*44/12/1000 (unit of volume)
Raw coal	10000ton	897.75	1675.2	6726.5	6176.45	6277.23	10405.4	32158.53	25.8	100	20908	636,062,536
Cleaned coal	10000ton						42.18	42.18	25.8	100	26344	1,051,186
Other washed coal	10000ton	6.57		167.45	373.65		108.69	656.36	25.8	100	8363	5,192,725
Coke	10000ton					0.21	0.11	0.32	29.2	100	28435	9,742
Coke oven gas	10 ⁸ m ³	0.64	0.75	0.62	21.08	0.39		23.48	12.1	100	16726	1,742,396
Other	10 ⁸ m ³	16.09	7.86	38.83	9.88	18.37		91.03	12.1	100	5227	2,111,027



coal gas												
Crude oil	10000 ton					0.73		0.73	20	100	41816	22,385
Gasoline	10000 ton			0.01				0.01	18.9	100	43070	298
Diesel	10000 ton	0.48		3.54		0.12		4.14	20.2	100	42652	130,786
Fuel oil	10000 ton	12.25		0.23		0.06		12.54	21.1	100	41816	405,690
LPG	10000 ton							0	17.2	100	50179	0
Refiner y gas	10000 ton			9.02				9.02	15.7	100	46055	239,141
Natural gas	10 ⁸ m ³	0.28	0.08			2.76		3.12	15.3	100	38931	681,417
Other oil product	10000 ton							0	20	100	38369	0
Other coking product	10000 ton							0	25.8	100	28435	0
Other fuel	10000 tce	8.58		32.35	69.31	7.27	118.9	236.41	0	100	0	0
											Total	647,649,331

China Energy Statistical Yearbook 2006

Table A5. Thermal Power Generation of North China Power Grid in 2005

Province	Power Generation (MWh)	Ratio of Self Power Consumption of Plant (%)	Power Supply(MWh)
Beijing	20880000	7.73	19,265,976
Tianjin	36993000	6.63	34,540,364
Hebei	134348000	6.57	125,521,336
Shanxi	128785000	7.42	119,229,153
Inner Mongolia	92345000	7.01	85,871,616



Shandong	189880000	7.14	176,322,568
Total			560,751,013

China Energy Statistical Yearbook 2006

Table A6. Emission Factor of North China Power Grid in 2005

	Parameter	Unit	Value	Source
A	Net Import from Northeast China Power Grid to North China Power Grid (MWh)	MWh	3,929,000	China Power Industry Statistics 2005
B	Total Emissions of Northeast China Power Grid	tCO ₂ e	207,254,040	Calculation based on data from China Power Yearbook and China Energy Statistical Yearbook
C	Total Power Supply of Northeast China Power Grid	MWh	179,031,569	China Power Yearbook 2006
D	Average Emission Factor of Northeast China Power Grid	tCO ₂ e /MWh	1.15764	D=B/C
E	Total Power Supply of North China Power Grid	MWh	564,680,013	E=Total Power Generation of North China Power Grid + A
F	Total Emissions of North China Power Grid	tCO ₂ e	652,197,698	
G	Emission Factor of North China Power Grid	tCO ₂ e /MWh	1.15499	G=F/E

Table A7. Simple OM Emission Factor of North China Power Grid in 2006



Fuel types	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Subtotal	Emission Factor (t/TJ)	Oxidation rate (%)	Average low Caloric value (MJ/t _k m ³)	CO ₂ emission (tCO ₂ e) K=G*H*F*J*44/12/1000 (unit of mass)
		A	B	C	D	E	F	G=A+B+C+D+E+F	H	I	J	K=G*H*F*J*44/12/1000 (unit of volume)
Raw coal	10000ton	796.63	1639.2	6867.99	6968.88	8404.05	10930.66	35607.41	25.8	100	20908	704,277,823
Cleaned coal	10000ton						39.77	39.77	25.8	100	26344	991,125
Other washed coal	10000ton	6.36		214.13	371.14	61.77	544.6	1198	25.8	100	8363	9,477,855
Coal Briquette	10000ton	7.97					27.77	35.74	26.6	100	20908	728,820
Coke	10000ton						3.23	3.23	29.2	100	28435	98,335
Coke oven gas	10 ⁸ m ³	0.38	0.63	5.8	22.32	0.64	5.79	35.56	12.1	100	16726	2,638,825
Other coal gas	10 ⁸ m ³	20.66	6.58	69.72	13.79	22.76	7.22	140.73	12.1	100	5227	3,263,593
Crude oil	10000ton					0.74		0.74	20	100	41816	22,692
Gasoline	10000ton			0.01				0.01	18.9	100	43070	298
Diesel	10000ton	0.21		3.01		0.07	6.32	9.61	20.2	100	42652	303,589
Fuel oil	10000ton	6.38		0.08			4.1	10.56	21.1	100	41816	341,633
LPG	10000ton						0.01	0.01	17.2	100	50179	316



Refiner y gas	10000 ton			2.43			2.32	4.75	15.7	100	46055	125,934
Natural gas	10 ⁸ m ³	3.41	0.73		0.53			4.67	15.3	100	38931	1,019,942
Other oil product	10000 ton						0.28	0.28	20	100	38369	7,878
Other coking product	10000 ton							0	25.8	100	28435	0
Other fuel	10000 tce	6.83		47.11	230.76	12.51	132.29	429.5	0	100	0	0
											Total	723,298,659

China Energy Statistical Yearbook 2007

Table A8. Thermal Power Generation of North China Power Grid in 2006

Province	Power Generation (MWh)	Ratio of Self Power Consumption of Plant (%)	Power Supply(MWh)
Beijing	20705000	7.51	19,150,055
Tianjin	35924000	6.86	33,459,614
Hebei	143888000	6.63	134,348,226
Shanxi	150250000	7.45	139,056,375
Inner Mongolia	139593000	7.58	129,011,851
Shandong	230922000	7.12	214,480,354
Total			669,506,473

China Energy Statistical Yearbook 2007

Table A9. Emission Factor of North China Power Grid in 2006

	Parameter	Unit	Value	Source
A	Net Import from	MWh	2,618,060	China Power Industry Statistics 2006



	Northeast China Power Grid to North China Power Grid (MWh)			
B	Total Emissions of Northeast China Power Grid	tCO ₂ e	229,226,818	Calculation based on data from China Power Yearbook and China Energy Statistical Yearbook
C	Total Power Supply of Northeast China Power Grid	MWh	196,444,400	China Power Yearbook 2007
D	Average Emission Factor of Northeast China Power Grid	tCO ₂ e /MWh	1.16688	D=B/C
E	Net Import from Central China Power Grid to North China Power Grid (MWh)	MWh	497,060	China Power Industry Statistics 2006
F	Total Emissions of Central China Power Grid	tCO ₂ e	408,776,270	Calculation based on data from China Power Yearbook and China Energy Statistical Yearbook
G	Total Power Supply of Central China Power Grid	MWh	529,958,480	China Power Yearbook 2007
H	Average Emission Factor of Central China Power Grid	tCO ₂ e /MWh	0.87599	H=F/G
I	Total Power Supply of North China Power Grid	MWh	672,621,593	E=Total Power Generation of North China Power Grid + A + E
J	Total Emissions of North China Power Grid	tCO ₂ e	726,789,038	
K	Emission Factor of	tCO ₂ e /MWh	1.08053	K=J/I



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

		Year 2004	Year 2005	Year 2006	Total
A	Emissions (tCO ₂ e /year)	554,323,400	652,197,698	726,789,038	1,933,310,136
B	Power Supply (MWh)	493,687,660	564,680,013	672,621,593	1,730,989,266
C	CO ₂ Emission Factor (tCO ₂ e /MWh)	C = A/B			1.1169

Calculation of Build Margin (BM):

Step 1. Calculation of weights of CO₂ emissions of solid, liquid and gas fuel in total emissions for power generation

$$\lambda_{Coal} = \frac{\sum_{i \in COAL, j} FC_{i,j,y} \times EF_{CO2,i,y}}{\sum_{i,j} FC_{i,j,y} \times EF_{CO2,i,y}}$$



$$\lambda_{Oil} = \frac{\sum_{i \in OIL, j} FC_{i,j,y} \times EF_{CO2,i,y}}{\sum_{i,j} FC_{i,j,y} \times EF_{CO2,i,y}}$$

$$\lambda_{Gas} = \frac{\sum_{i \in GAS, j} FC_{i,j,y} \times EF_{CO2,i,y}}{\sum_{i,j} FC_{i,j,y} \times EF_{CO2,i,y}}$$

Where:

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

$EF_{CO2,i,y}$: CO₂ emission factor of fossil fuel type i in year y (tCO₂ /GJ);

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

Based on China Energy Statistical Yearbook 2007, the calculation of the weights of solid, liquid, and gas fuels in North China Power Grid are:

$$\lambda_{Coal} = 98.93\%, \lambda_{Oil} = 0.09\%, \lambda_{Gas} = 0.98\%$$

Step 2: Calculation of Emission Factor of Relevant Thermal Power

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

Where: $EF_{Coal,Adv}$, $EF_{Oil,Adv}$ and $EF_{Gas, Adv}$ 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 (tc/TJ)	Oxidation Rate	Emission Factor (tCO ₂ e/MWh)



		A	B	C	D=3.6/A/1000*B*C*44/12
Coal-fired Power Plant	$EF_{Coal,Adv}$	37.28%	25.8	1	0.9135
Gas-fired Power Plant	$EF_{Gas,Adv}$	48.81%	15.3	1	0.4138
Oil-fired Power Plant	$EF_{Oil,Adv}$	48.81%	21.1	1	0.5706

$$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv} = 0.9083(\text{tCO}_2\text{e/MWh})$$

Step 3: Calculation of BM of the Grid

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

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 North China Power Grid in 2006

Installed Capacity	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total
Thermal Power	MW	3984	6512	26087	26661	28899	49395	141538
Hydropower	MW	1053	5	785	790	818	553	4004
Nuclear Power	MW	0	0	0	0	0	0	0
Wind Power and Others	MW	24	24	218	0	565	106	937
Total		5061	6541	27090	27451	30282	50054	146479

Source: China Power Yearbook 2007

**Table A13. Installed Capacity of North China Power Grid in 2005**

Installed Capacity	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total
Thermal Power	MW	3833.5	6149.9	22333.2	22246.8	19173.3	37332	111068.7
Hydropower	MW	1025	5	784.5	783	567.9	50.8	3216.2
Nuclear Power	MW	0	0	0	0	0	0	0
Wind Power and Others	MW	24	24	48	0	208	30.6	335.5
Total	MW	4882.5	6178.9	23165.7	23029.8	19950.2	37413.4	114620.5

Source: China Power Yearbook 2006

Table A14. Installed Capacity of North China Power Grid in 2004

Installed Capacity	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total
Thermal Power	MW	3458.5	6008.5	19932.7	17693.3	13641.5	32860.4	93594.9
Hydropower	MW	1055.9	5	783.8	787.3	567.9	50.8	3250.7
Nuclear Power	MW	0	0	0	0	0	0	0
Wind Power and Others	MW	0	0	13.5	0	111.7	12.3	137.5
Total	MW	4514.4	6013.5	20730	18480.6	14321.2	32923.5	96983.2

Source: China Power Yearbook 2005

Table A15. Calculation of BM of North China Power Grid

	Installation in year 2004	Installation in year 2005	Installation in year 2006	New Additions from 2005 to 2006	Ratio in New Additions
	A	B	C	D=C-B	
Thermal Power (MW)	93594.9	111068.7	141538	30469.3	95.64%



Hydropower (MW)	3250.7	3216.2	4004	787.8	2.47%
Nuclear Power (MW)	0	0	0	0	0.00%
Wind Power and Others (MW)	137.5	335.5	937	601.5	1.89%
Total (MW)	96983.1	114620.4	146479	31858.6	100.00%
Percentage compared with installation of 2006	66.21%	78.25%	100%		

Build Margin Emission Factor of North China Power Grid: $EF_{grid, BM, y} = 0.9083 \times 95.64\% = 0.8687 \text{ tCO}_2\text{e/MWh}$

Table A16. Baseline Emission Factor of North China Power Grid

	Parameter	Unit	Amount
A	Operating Margin Emission Factor	tCO ₂ e/MWh	1.1169
B	Build Margin Emission Factor	tCO ₂ e/MWh	0.8687
C	Combined Emission Factor ($C=0.75*A+0.25*B$)	tCO ₂ e/MWh	1.0549

Table A17. Electricity Generation Baseline Emissions

	Parameter	Unit	Amount	Source or Equation
A	Project installed capacity	MW	48.75	
B	Annual electricity supplied	MWh	99,480	
C	Baseline Emissions Factor	tCO ₂ /MWh	1.0549	Table A16
D	Electricity generation baseline emissions	tCO ₂ /year	104,941	$D = B * C$



Annex 4

MONITORING PLAN

Please refer to B.7.2 in the PDD.
