



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

CONTENTS

- A. General description of project activity
- B. Application of a baseline and monitoring methodology.
- C. Duration of the project activity / crediting period
- D. Environmental impacts
- E. Stakeholders' comments

Annexes

- Annex 1: Contact information on participants in the project activity
- Annex 2: Information regarding public funding
- Annex 3: Baseline information
- Annex 4: Monitoring information

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

>>

Project Title: Guohua Wulate Zhongqi Chuanjing Phase II Wind Farm Project

PDD Version: 02

Date: 24/11/2010

Revision History

Version	Date	Comments
Version 01	03/01/2010	Initial version; submitted for validation/global stakeholder comments
Version 02	24/11/2010	Revised PDD, based on the draft validation protocol

A.2. Description of the project activity:

>>

The objective of Guohua Wulate Zhongqi Chuanjing Phase II Wind Farm Project (hereinafter is referred to as the proposed project), developed by Guohua Bayannaoer (Wulate Zhongqi) Wind Power Co., Ltd., is to generate electricity by renewable wind resources.

The proposed project, located in Wulate Zhongqi, Bayannaoer City, Inner Mongolia Autonomous Region, People's Republic of China, will have a total installed capacity of 49.5MW consisting of 33 sets of 1.5MW wind turbines. After being put into operation, electricity generated by the proposed project will be fed into the North China Power Grid (NCPG). It is expected that the annual electricity delivered to the grid is 129,580 MWh¹.

The scenario prior to the start of implementation of the proposed project is that electricity delivered to the grid by the proposed project was generated by power plants connected to the NCPG, same as the baseline scenario identified in Section B.4.

As a clean energy power generation plant, the proposed project will generate no emission. The electricity delivered to the NCPG by the proposed project will substitute part of electricity generation in fossil fuel fired power plants connected to NCPG, the main emission source from which is CO₂. Therefore, compared to the baseline scenario, the proposed project can achieve the effect of emission reduction. It is estimated that the annual emission reductions will be 123,126 tCO₂e.

As wind resource employed for power generation is a clean and renewable energy, the proposed project will contribute to the local sustainable development in the following aspects:

- The development of the proposed project will help reduce GHG emission and other pollutants compared with fossil fuel fired power generation.
- The construction and operation of the proposed project will increase the local employment, improving living conditions of local people.
- The development of the proposed project will also contribute to the improvement of local power system structure and the promotion of renewable energy's utilization.

¹ As per the approved FSR, the annual total power generation is 130,890MWh with annual utilization hours of 2,644h. According to FSR, line loss rate is 1%, thus the annual net electricity supplied to the grid is expected to be 129,580MWh and corresponding plant load factor (PLF) of the project is 29.88%.

**A.3. Project participants:**

>>

The project participants are shown in Table A3-1.

Table A3-1 Project participants

Name of Party involved ((host) indicates a host party)	Private and /or public entity (ies) project participants (as applicable)	Kindly indicate if the party involved wishes to be considered as project participant (Yes/No)
China (host)	Guohua Bayannaoer (Wulate Zhongqi) Wind Power Co.,Ltd.	No
United Kingdom of Great Britain and Northern Ireland	Noble Carbon Credits Limited	No

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

A.4. Technical description of the project activity:**A.4.1. Location of the project activity:**

>>

A.4.1.1. Host Party(ies):

>>

People's Republic of China

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

>>

Inner Mongolia Autonomous Region

A.4.1.3. City/Town/Community etc:

>>

Bayannaoer City/Wulate Zhongqi

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

>>

The proposed project is located in the Wulate Zhongqi, Bayannaoer City, Inner Mongolia Autonomous Region, People's Republic of China. The central geographic coordinates of the proposed project location are north latitude 41°33'54'' and east longitude 108°31'31''. Figure A4-1 is the geographic location of the proposed project.



Figure A 4-1 the Geographic Location of the Proposed Project

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

>>

The category of the proposed project belongs to:
Sectoral Scope 1: Energy industries (Renewable Energy)
- Electricity generation by wind power

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

>>

Totally 33 sets of wind turbines with a unit capacity of 1.5MW will be installed for the proposed project, providing a total capacity of 49.5MW. The wind turbines were supplied by a domestic manufacturer, Gold Wind Co., Ltd. and the selected model of the wind turbine is GW 77/1500. The annual electricity delivered to the grid is 129,580 MWh and PLF of the plant is 29.88%². The key technical specifications of the wind turbines are as follows:

Table A 4-1 Key Technical Specifications of the Wind Turbines³

	Parameter	Value
Blade	Diameter	77 m
	Hub height	65 m
	Rated power	1500 kW
	Cut-in wind speed	3 m/s
	Cut-out wind speed	25 m/s
	Rated wind speed	14 m/s
	Designed product life	20 years

² The annual electricity output to the grid is taken from FSR which was carried out by a qualified third party East China Investigation and Design Institute, and finally approved by Development & Reform Department of Inner Mongolia Autonomous Region on 14/10/2008. It can be proved that PLF was determined by a third party contracted with the project owner, thus comply with the Guidelines for the Reporting and Validation of Plant Load Factors (version 1) (EB48, Annex 11).

³ The FSR, page 0-1, 0-2



Generator	Capacity	1500kW
	Voltage	690V

As all equipments used in the proposed project are domestically-made, there is no international technology transfer.

The scenario prior to the start of implementation of the proposed project is that electricity delivered to the grid by the proposed project was generated by power plants connected to NCPG with CO₂ being the main emission source, same as the baseline scenario identified in Section B.4. The project scenario is the implementation of the proposed project. After being put into operation, the electricity delivered by the proposed project which generates no emissions will be fed into the NCPG.

Two bidirectional meters with accuracy of 0.5s will be installed in the project site to measure the electricity supply to the grid by the proposed project.

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

>>

Renewable crediting period will be used for the proposed project. The estimation of the emission reductions in the first crediting period is presented in table A4-2.

Table A4-2 The estimation of the emission reductions in the first crediting period

Year	The estimation of emission reductions (tCO₂e)
01/04/2011-31/03/2012	123,126
01/04/2012-31/03/2013	123,126
01/04/2013-31/03/2014	123,126
01/04/2014-31/03/2015	123,126
01/04/2015-31/03/2016	123,126
01/04/2016-31/03/2017	123,126
01/04/2017-31/03/2018	123,126
The estimation of total emission reductions in the first crediting period	861,882
Total number of the first crediting years	7
The estimation of annual average emission reductions in the first crediting period	123,126

A.4.5. Public funding of the project activity:

>>

No public funding from the Annex I countries is provided to the proposed 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:

>>

1. Baseline & Monitoring methodology:

Approved consolidated baseline and monitoring methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (Version 11).

2. Tool:



“Tool for the demonstration and assessment of additionality” (Version 05.2).

“Tool to calculate the emission factor for an electricity system” (Version 02)

More information on the methodologies and tools listed above is available at the following website:
<http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>

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

>>

The methodology ACM0002 (Version 11) is applicable to the proposed project, because the proposed project meets all the applicability criteria stated in the methodology:

- The proposed project is the installation of a new grid-connected renewable wind power generation activity from wind source, and no renewable power plant was operated prior to the implementation of the project activity at the project site;
- The proposed project doesn't involve switching from fossil fuels to renewable energy sources at the project site.

Therefore, the project activity is in accordance with the applicability of methodology ACM0002 (Version 11).

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

>>

According to the definition of project boundary in ACM0002 (Version 11): “The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to”, and since the electricity generated by the proposed project will be connected to NCPG, the spatial extent of the project boundary of the proposed project includes the project power plants and all power plants connected physically to NCPG. The geological region of NCPG includes Beijing, Tianjin, Hebei, Shanxi, Shandong and Inner Mongolia⁴.

The project electricity system is connected to Northeast Power Grid (NEPG) and Center China Power Grid (CCPG). Electricity transmitted from NEPG and CCPG are taken into account in the calculation of emission factor.

The emission sources and gases included in the project boundary for the purposed of calculating project emissions and baseline emissions are shown in Table B3-1, and the flow diagram of the project boundary is presented as Figure B3-1.

Table B 3-1: the sources and gases included in the project boundary

	Source	Gas	Included?	Justification / Explanation
Baseline	CO ₂ emission from electricity generation in NCPG power plants that is displaced due to the project activity	CO ₂	Yes	Main emission source.
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source

⁴ <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2333.pdf>



Project activity	The proposed project	CO ₂	No	According to ACM0002, project emission is zero.
		CH ₄	No	
		N ₂ O	No	

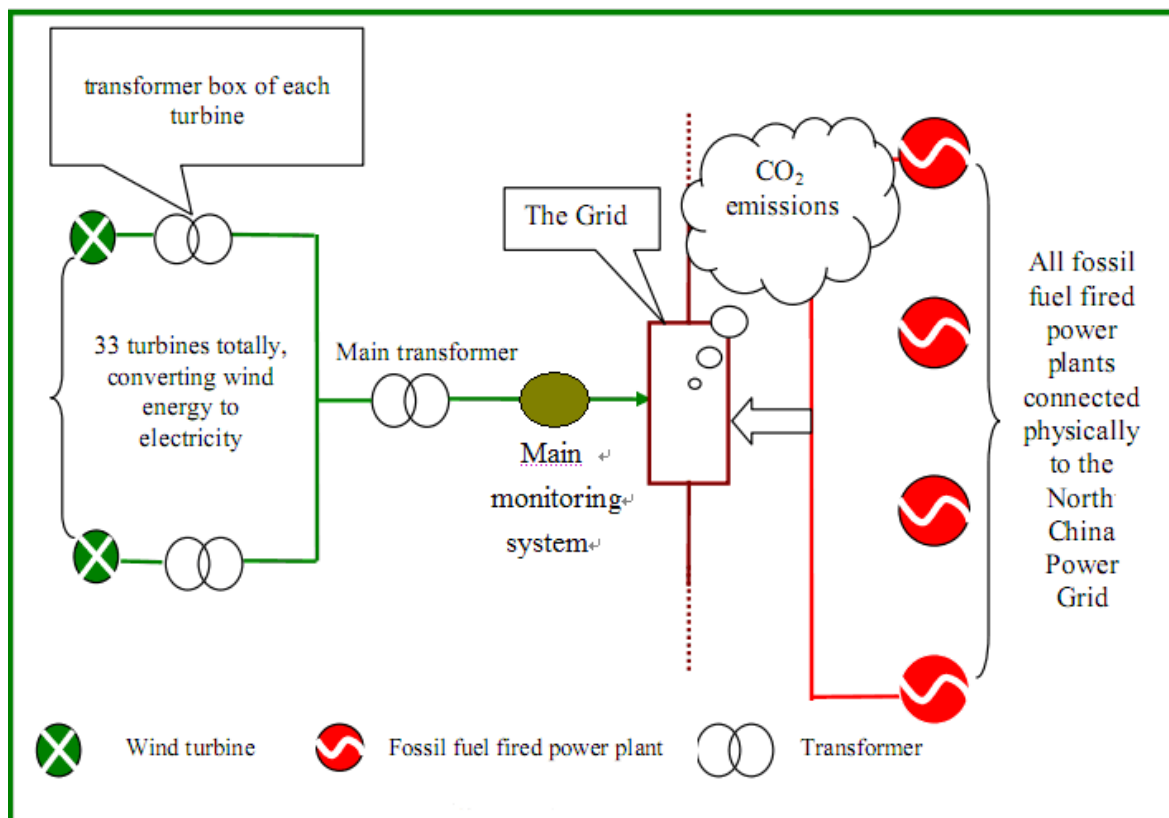


Figure B 3-1 Flow Diagram of the Project Boundary

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

>>

According to identification of the baseline scenario in ACM0002 (Version 11), the baseline scenario for a new grid-connected renewable power plant is as follows:

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).

According to the “Tool to calculate the emission factor for an electricity system” (Version 02), 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. Electricity generated by the proposed project will be delivered to NCPG. Therefore, in accordance with the “Tool to calculate the emission factor for an electricity system” (Version 02) and the delineation given by Chinese DNA, NCPG is defined as the project electricity system as well as the project boundary of the proposed project. The proposed project is the installation of a new grid-connected renewable power plant, thus the baseline scenario, in accordance with ACM0002 (Version 11), of the proposed project is as follows:

Electricity delivered to the grid by the project activity would have otherwise been generated by the



operation of power plants connected to NCPG and by the addition of new generation sources of NCPG.

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

>>

The timeline of implementation of the proposed project and events and actions which have been taken to achieve CDM registration of the proposed project are given in Table B5-1.

Table B 5-1 The timeline of implementation of the proposed project and events and actions which have been taken to achieve CDM registration of the proposed project

Date	Events	Notes
08/2008	The FSR of the project was finished.	It is clearly indicated in the FSR that the CDM development is urgently needed considering the unoptimistic financial status of the proposed project
14/10/2008	Inner Mongolia Development and Reform Commission Approved the Project	/
07/11/2008	The shareholder meeting of the project entity made investment decision to the proposed project.	
13/02/2009	Wind turbine's tower purchase contract was signed.	The starting date of the project
16/02/2009	The project owner informed in written Chinese DNA of its intention to seek CDM status.	/
20/02/2009	Chinese DNA confirmed in written the project owner's request to seek CDM status.	/
13/05/2009	Subscription of wind turbine foundation construction contract	
02/07/2009	The consulting contract with CDM developer was signed.	
10/2009	Contact UNFCCC secretariat by E-mail to enquire whether it is necessary to send a notification to secretariat as the version of <i>Guidelines on the demonstration and assessment of prior consideration of the CDM</i> has been updated	According to the reply of UNFCCC secretariat, the project owner need not to send a notification as they have submitted the project to China DNA before 01/08/2009 and received acknowledgement of receipt.
11/2009	The project was submitted to the NDRC for the application of Chinese LoA.	
22/11/2009	The first set of wind turbine was connected to the grid ⁵	The actual progress of works is consistent with the project development schedule in FSR

⁵ The project owner had successfully constructed Wulate Zhongqi Chuanjing Phase I Wind Farm Project and was full of experience. Besides, the work of land acquisition faced no difficulties. As a result, the project



30/01/2010	Letter of Approval from China DNA	
04/02/2010	PDD publication for global stakeholder comments ⁶ .	/
09/09/2010	Letter of Approval from UK DNA	

The following steps are used to demonstrate the additionality of the proposed project according to the “Tool for the demonstration and assessment of additionality (Version 05.2)” agreed by the Executive Board.

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

Realistic and credible alternatives to the project activity that can be part of the baseline scenario are defined through the following sub-steps:

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

In absence of the proposed project, plausible and credible alternatives available to the proposed project that provide outputs or services comparable to the proposed CDM project activity include:

1. The proposed project activity not undertaken as a CDM project activity.
2. Construction of a fossil fuel power plant with equivalent amount of annual electricity output;
3. Construction of other renewable energy power plant with equivalent amount of annual electricity output.
4. Supply of equivalent annual generated electricity output supplied by NCPG.

Besides wind energy, solar PV, geothermal, biomass and hydro are the possible grid-connected renewable energy technologies that could be applied in China. However, biomass power generation technology is still in the demonstration phase and can bring only poor economic benefits, which can not be operated without support from the national policies⁷. Due to the technology development status and the high cost for power generation, solar PV⁸ and geothermal⁹ with the similar installed capacity as the proposed project are far from being economically attractive. Only hydropower is comparable to wind power in China. However, there is lack of available hydro power resource to develop in the region of Inner-Mongolia Autonomous Region¹⁰. Therefore, the hydro and other

was constructed smoothly. The project owner made the investment decision on 07/11/2008. After that the Wind turbine's tower purchase contract was signed on 13/02/2009 and the wind turbine foundation construction contract was signed on 13/05/2009. The actual progress of works is consistent with the project development schedule in FSR.

⁶ <http://cdm.unfccc.int/Projects/Validation/DB/4VA4UC9S9QDQBS6D1RL88SALZQ7QNC/view.html>

⁷ <http://www.nongji.com.cn/news/viewNews.action?newsId=27133>

⁸ <http://finance.people.com.cn/GB/1038/59942/59949/6294546.html>

⁹ Source: Page 5 of Overview of Chinese Renewable Energy Development 2006, by Energy Bureau of NDRC, CRED(Center for Renewable Energy Development) of NDRC and CREIA(Chinese Renewable Energy Industries Association)

¹⁰ http://hzs.ndrc.gov.cn/gzdt/t20050711_30838.htm



kinds of renewable energy power plant are also not realistic alternative. As a result, the alternative 3 is not a plausible and credible one to the proposed project.

Sub-step 1b. Enforcement of applicable laws and regulations:

At present, a series of scheme, policies, laws and regulations have been made to promote the renewable energy development but they are not mandatory to the proposed project activity. Therefore, Alternative 1, the project activity undertaken without being registered as a CDM project activity, is consistent with current mandatory laws and regulations.

For alternative 2, generally speaking, the annual operation hours for a fossil-fired power plant are more than that of a wind power project. (In 2007, the average power generation hours of fossil-fired power plants in NCPG are 5613h¹¹, while that of the proposed project are 2644h¹².) Therefore, to supply the same annual electricity amount, the installed capacity of a fossil-fired power plant will be smaller than that of the proposed project, i.e. 49.5MW.

However, according to regulations instituted by the State Council of China, within the areas covered by the large grids, fossil-fired power units with the installed capacity less than 135MW are prohibited from constructing¹³, and the installation of fossil-fired power units with a unit capacity of less than 100MW are strictly controlled¹⁴. For these reasons, the possible alternative of building a fossil-fired power plant with equivalent amount of annual electricity output as the proposed project conflicts with Chinese regulations. So, alternative 2 is not feasible.

As to Alternative 4, NCPG as the provider for the same annual electricity output as the proposed project, it consists with the current laws and regulations of China.

Therefore, Alternative 1 and Alternative 4 comply with current Chinese laws and regulations.

Step 2. Investment Analysis

Sub-step 2a. Determine appropriate analysis method

Three analysis methods are suggested in the “Tools for the demonstration and assessment of additionality” (Version 05.2). They are simple cost analysis (option I), investment comparison analysis (option II) and benchmark analysis (option III).

Since the proposed project will have the income not only from CDM revenues but also the sale of electricity, the simple cost analysis method (option I) is not appropriate.

Investment comparison analysis method (option II) is applicable to projects whose alternatives are also investment projects. Only on such basis, comparison analysis can be conducted. The alternative baseline scenario of the proposed project is providing the same electricity output by the NCPG, which doesn't belong to investment projects. Therefore option II is not an appropriate method.

¹¹ *China electrical power yearbook 2008*, page 734

¹² The FSR, page 1-4

¹³ Notice on Strictly Prohibiting the Installation of Fuel-fired Generators with the Capacity of 135MW or below issued by the General Office of the State Council, decree guobanfamingdian no. 2002-6.

¹⁴ Interim Rules on the Installation and Management of Small-scale Fuel-fired Generators (issued in Aug. 1997)



The proposed project will use benchmark analysis method (option III) based on the consideration that the financial benchmark return rate of the Chinese power industry is available.

Sub-step 2b. Benchmark Analysis Method (Option III)

The proposed project adopts project IRR as the indicator to do the benchmark analysis since the *Interim Rules on Economic Assessment of Electric Power Engineering Retrofit Projects* has provided the financial benchmark return rate of Chinese power industry which is Project IRR 8% (excluding tax).

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

(1) Basic parameters for calculation of financial indicators

Basic parameters for calculation of financial indicators are shown in the following table:

Table B5-2: Basic parameters of the proposed project

Items	Unit	Amounts	Data source
Installed capacity	MW	49.5	P0-2, FSR
Annual net power output	GWh/year	129.58	P15-13, FSR
Project lifetime	Years	20	P15-1, FSR
Static total investment	RMB	510.9million	P15-10, FSR
Tariff (including tax)	RMB/kWh	0.5100 is implemented within 30000 operating hours, 0.2749 is implemented in the rest of operating hours	P15-4, FSR
Value Added Tax (VAT)	%	8.5	P15-3, FSR
Income tax for the 1 st operation year to 3 rd operation year	%	0 ¹⁵	P15-4, FSR
Income tax for the 4 th operation year to 6 th operation year	%	12.5	
Income tax for the rest operation year	%	25	
Tax on city building	%	5	P15-3, FSR
Tax on education	%	3	P15-3, FSR
Tax on local education	%	1	P15-3, FSR
Average O&M cost	RMB/year	8.91million	P15-11, FSR
Crediting period	Years	7*3 (Renewable)	
Depreciation period of Power Transmission Project	Year	20	P15-12, FSR
Depreciation rate of Power Transmission Project	%	5%	P15-3, FSR
Depreciation rate of Wind Farm Project	%	6.5%	P15-2, FSR
Residual value rate of Wind Farm Project	%	3%	P15-2, FSR
Interest rate	%	7.83%	P15-1, FSR
Expected CERs Price	€/tCO ₂ e	11	/

¹⁵ As per FSR, the project will benefit from income tax preferential policy for renewable energy project, i.e. three years' exemptions and three years' half tax benefits.

**(2) Comparison of Project IRR for the proposed project and the benchmark**

In accordance with benchmark analysis (Option III), if the financial indicators (project IRR) of the proposed project are lower than the benchmark, the proposed project is not considered financially attractive.

Table B5-3: Financial indicators of the proposed project

Project IRR (post tax)	%
Without CDM income	5.11%
With CDM income	9.08%

Table B5-3 shows the project IRR of the proposed project with and without CDM income. It is clearly shown in Table B5-3 that without CDM income, the project IRR is 5.11%, lower than the benchmark, therefore, the proposed project is not financially attractive, which means that the its undertaking without being registered a CDM project activity is not a feasible alternative. However, taking CDM income into consideration, the project IRR increases to 9.08%, exceeding the benchmark, which makes the proposed project become financially attractive to the project investor.

Sub-step 2d. Sensitivity analysis

For the proposed project, the following financial parameters are taken as uncertain factors for sensitive analysis of financial attraction:

- Static total investment
- Annual O&M cost
- Annual power output
- Tariff

When the above financial indicators fluctuate within the range of –10% to +10%, the project IRR of total investment of the proposed project varies to different extents. The impacts of the above parameters on the project IRR by (without considering CDM income) are shown in Table B5-4 and Figure B5-1:

Table B5-4 Sensitivity analysis of the proposed project IRR (total investment)

Fluctuation range of indicators	-10.00%	-5.00%	0.00%	5.00%	10.00%
Static Total Investment	6.68%	5.86%	5.11%	4.42%	3.77%
Annual O&M Cost	5.41%	5.26%	5.11%	4.96%	4.80%
Annual Power Output	3.63%	4.38%	5.11%	5.81%	6.50%
Tariff	3.48%	4.31%	5.11%	5.86%	6.60%

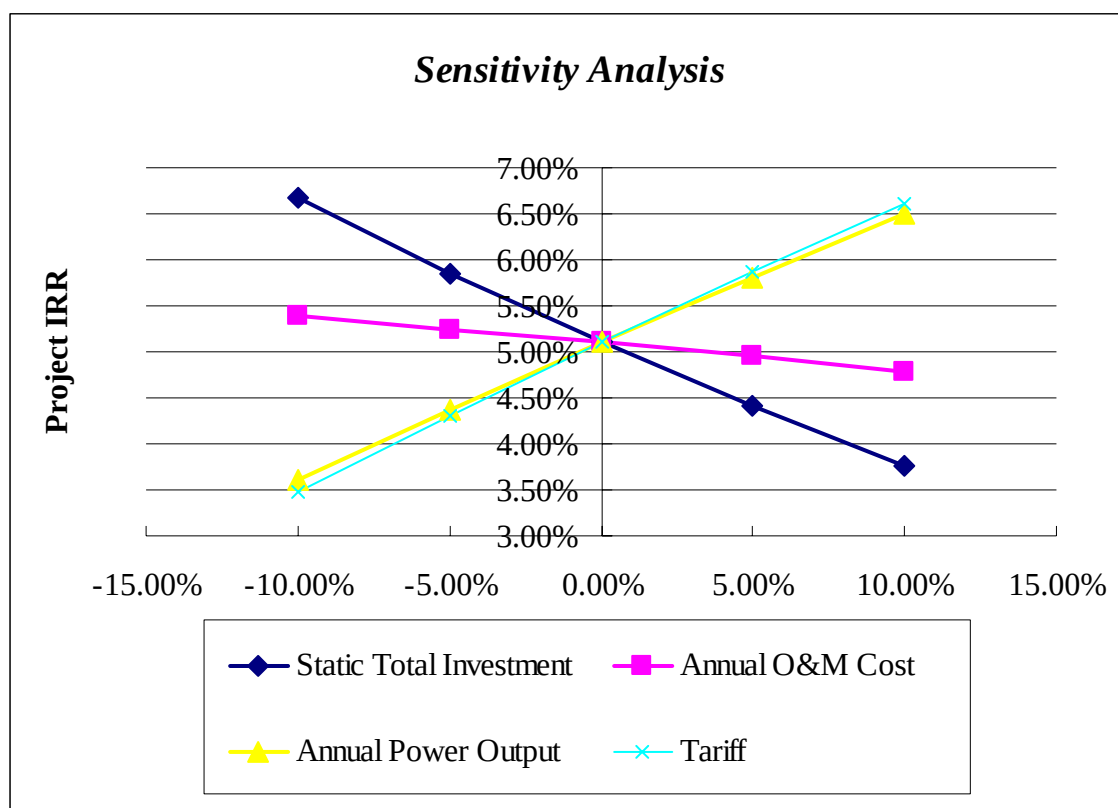


Figure B5-1 the impacts on Project IRR from the fluctuation of uncertain factors

It can be seen from Table B5-4 and Figure B5-1 that although the project IRR varies to different extents as the above sensitive parameters vary from -10% to +10%, it is always below the financial benchmark return rate.

Table B5-5 below summarizes the variation of each financial parameter that can make the project IRR reach 8%.

Table B5-5 Variation of financial parameters to reach the benchmark of project IRR (without the CDM revenue)

	Variation
Static total investment	-17.24%
Annual O&M costs	-104%
Annual power output	21.2%
Tariff	19.7%

1) Static total investment

The project IRR can reach the benchmark when the static total investment decreases by 17.24%. However, such condition cannot be occurred for the project. For a wind farm project, the costs of the equipments and engineering construction comprise the majority of total static investment. As prices of turbines and other related equipments, and raw materials have been increasing in recent years¹⁶, a decrease of the static total investment is unlikely occurred. As per the approved FSR, the

¹⁶ <http://energy.people.com.cn/GB/5720709.html> In the last 2 years, the demands for the turbines and its accessories exceeded the supply. Moreover the price of raw material such as steel and cooper is increasing, which results



static total investment is estimated as 510.91 million. According to the main equipments purchase contracts (i.e. turbines, towers, transformer, and related accessories) and contracts on major construction works¹⁷ currently available, the real investment of main equipments and construction works is 467.19 million RMB, which has already accounted for 91.44% of the total static investment estimated. Therefore, the static total investment of the project cannot decrease by 17.24%, which is unrealistic.

2) Annual O&M cost

As shown in Table B5-4, annual O&M cost has no significant impact on the IRR. Even if the O&M cost is considered zero, the IRR is still lower than the benchmark. The O&M cost mainly contains employee salary and welfare, maintenance fee, material expense, insurance fee and miscellaneous fee, which are essential to maintain the normal operation of the proposed project. Thus it is impossible to have the project IRR reached the benchmark by decreasing the annual O&M cost.

3) Annual power output

The project IRR can reach the benchmark when the annual power output increases by 21.2%. As mentioned above, the annual power output of 129,580MWh applied in the PDD is taken from the approved FSR which was finalized by a qualified third party East China Investigation and Design Institute as a top class design institute accredited by the government. The annual power output was calculated based on the data of the local wind resources for the most recent 53 years from 1954~2007 provided by Wulate Zhongqi Meteorological Station¹⁸ and 2.5-year wind resources measurement (from December 2005 to March 2008)¹⁹, with consideration of the turbine characteristics and turbine distribution optimized by software WindFarmer for maximizing power generation. The annual power output in the FSR represents a long-term average power supply throughout the lifetime of the project estimated according to historical data, where the yearly-variations have already been taken into account. Besides, according to the FSR, the annually average wind speed of the project sites tended to stable over the past 20 years. Therefore, the power output of the project is unlikely to increase 21.2%.

4) Tariff

The project IRR can reach the benchmark when tariff increases by 19.7%. However, the tariff would not be significantly changed. Before 2006, most of the tariff of wind power projects was approved by the provincial price bureau and was not released publicly. In 2006, China's Management Rules on Tariff was issued by NDRC²⁰, according to which the tariff of wind projects should be managed and approved by relevant national authority (NDRC). Inner Mongolia consists of east region and west region. From 2006 to now, according to the tariff approvals issued by NDRC (file No.[2007]1260, No.[2007]3303 and No.[2008]1876), 50 projects attained tariff approved by NDRC among which 34 projects are located in west region. The tariffs for the first 30,000 hours of these 34 projects located in west region are all 0.51 RMB/kWh²¹. The proposed project is located in Bayannaoer City which belongs to west region. Furthermore, according to the

in the price of wind turbines and equipments increasing, as demonstrated in *The Development of Wind Power*, published by People's Daily

¹⁷ Main equipments purchase contracts and contracts on major construction works have been provided to DOE.

¹⁸ FSR, page 2-3

¹⁹ FSR, page 2-7

²⁰ http://www.ndrc.gov.cn/zcfb/zcfbtz/tz2006/t20060120_57583.htm

²¹ http://www.hebwj.gov.cn/upfiles/xy_col32gjc_20070718164220007126.htm
http://jgs.ndrc.gov.cn/zcfg/t20080218_192021.htm
http://jgs.ndrc.gov.cn/zcfg/t20080813_230722.htm



latest policy regarding tariff of wind power issued by NDRC on 20/07/2009²², wind power projects in west Inner Mongolia should be applied the tariff of 0.51RMB/kWh (included VAT).

As for the tariff after 30,000 operational hours, according to the tariff approvals above, should be set at the average tariff of the local grid. In FSR, 0.2749RMB/kWh was applied after 30,000 operational hours, which was the tariff of newly commissioning desulphurized coal-fired generating units in West Inner Mongolia Power Grid subject to the Notification by NDRC (NO. [2008]1677). This tariff is higher than the average on-grid tariff of 0.26276 RMB/kWh in west Inner Mongolia²³. In order to be in accordance with the FSR, the higher tariff of 0.2749RMB/kWh was also used in PDD, which is deemed to be conservative.

If the tariff of 0.51 RMB/kWh is applied for the first 30,000 hours, the project IRR can reach the benchmark when the tariff after 30,000 operational hours increases by 139.4%, i.e. 0.658 RMB/kWh. However, this situation is not realisable. According to the tariff approvals issued by NDRC (file No.[2007]3303 and No.[2008]1876), the tariff after 30,000 operational hours should be determined by national price bureau. So the tariff will certainly not increase observably, such as increase by 139.4%

As a result, it is impossible for the proposed project to get a higher tariff that enable the project IRR reach the benchmark of 8%.

According to the information note of highest applicable wind tariffs in China released by the Executive Board, the highest tariff in Inner Mongolia is 0.54 RMB per kWh, which is on the basis of National Development and Reform Commission Tariff Document [2007] 1260. According to this tariff document, the wind tariff for the first 30,000 operation hours was approved as 0.54 RMB per kWh, while the tariff after 30,000 operational hours should be set at the average tariff of the local grid. By applying the tariff of 0.54RMB/kWh for the first 30,000 operation hours, the project IRR will be 5.81%.

Furthermore, according to National Development and Reform Commission Tariff Document [2006] 2908, there was a higher tariff for the first 30,000 operation hours of wind power project in West Inner Mongolia in 2006, i.e. 0.579 RMB/kWh (VAT included). As for the tariff after 30,000 operational hours, according to this tariff approvals, should be set at the average tariff of the local grid. Even by applying this tariff for the first 30,000 operation hours, the project IRR is 6.72%, which is still below the benchmark of 8%.

All in all, without the support of CDM, the conclusion that the proposed project is not financially attractive is always tenable.

Step 3. Barrier analysis

Not applicable.

Step 4. Common practice analysis

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

²² http://www.ndrc.gov.cn/jggj/jggs/t20090727_292846.htm

²³ China Power Tariff Implementation Status Report 2007 issued by State Electricity Regulatory Commission of People's Republic of China on 09/12/2008

http://www.serc.gov.cn/zwgk/jggg/200809/t20080912_10008.htm

**Choose the geographic area**

In China, wind power projects are governed by the relevant departments of the province/autonomous region which they connected. Since the investment climate and natural environment vary from province/autonomous region to province/autonomous region, the proposed project selects Inner Mongolia as the geographic region to do the common practice analyze.

Select a similar size

The installed capacity of the proposed project is 49.5MW, which falls into the scope of large-scale CDM project, therefore, the proposed project selects projects whose installed capacity belongs to large scale CDM project (i.e. larger than 15MW) to do the common practice analysis.

As per “Tool for the Demonstration and Assessment of Additionality (version 5.2)”, other CDM project activities (registered project activities and project activities which have been published on the UNFCCC website for global stakeholder consultation as part of the validation process) are not to be included in this analysis. Therefore, the analysis only considers projects that meet the following 2 conditions as the similar projects to the proposed project.

According to *China Wind Farm Installation Capacity Statistic of 2007*²⁴, projects with an installed capacity larger than 15MW in Inner Mongolia are summarized as follows²⁵:

Table B5-5 Similar projects in Inner Mongolia

Project Name	Construction Date	Installed Capacity (MW)	Remark
Huitengxile Chahaeryouyizhongqi Wind Farm Project	Oct. 1996(5.4MW) Oct. 1997(19.8MW)	25.2	The 5.4MW wind project is helped with loan from Denmark government. Another 19.8MW is supported as Shuangjia Demonstration Project by the State Economic & Trade Commission ²⁶ .
Keshiketeng Banner Dali Wind Farm Project(Phase III)	Dec. 2003 (10.2MW) Apr. 2004 (21MW)	31.2	Demonstration Project Supported by national debt fund ²⁷ .
Damao Qi Bailingmiao phase I Wind Power Project	December 2007	49.5	The project was investment and constructed by foreign-owned companies and has been developed into a project with gold standard for emission reduction (VER) ²⁸ .

Source: <http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=1063>
<http://cdm.unfccc.int/Projects/registered.html>
<http://cdm.unfccc.int/Projects/Validation/index.html>

²⁴ <http://www.cwea.org.cn/upload/20080324.pdf>

²⁵ The registered CDM projects and projects under GSP are not included as per EB's guidance.

²⁶ <http://www.nwtc.cn/Article/ShowArticle.asp?ArticleID=112>

²⁷ <http://news.eastday.com/eastday/node545/node12905/u1a153684.html>

²⁸ <https://gs1.apx.com/mymodule/ProjectDoc/EditProjectDoc.asp?id1=449>



<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2341.doc>

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

There are 3 similar projects in Inner Mongolia Autonomous Region which need to be discussed: Huitengxile Chahaeryouyizhongqi Wind Farm Project, Keshiketeng Banner Dali Wind Farm Project(Phase III) and Damao qi bailingmiao phase I wind power project.

The first 5.4MW of Huitengxile Chahaeryouyizhongqi Wind Farm Project enjoyed a favorable loan from Danish government. The second 19.8MW of Huitengxile Chahaeryouyizhongqi Wind Farm Project was promoted by Shuangjia Demonstration Project launched by the State Economic & Trade Commission aiming at promoting wind power industry.

Keshiketeng Banner Dali Wind Farm Project (Phase III) was one of those demonstration wind power projects subsidized by the national debt fund issued by the national government in 2000 with the aim of constructing wind power projects of 80 MW.

Thanks to the financial support coming from Danish or national government, both of these two projects were able to overcome the barriers mentioned above.

For the Damao Qi Bailingmiao phase I wind power project, which can not developed as a CDM project as being invested by a foreign-funded company subject to the relevant laws of China, it overcame its financial difficulties by developing as a project with gold standard for emission reduction (VER) to obtain additional financial support from the sale of emission reduction.

In conclusion, essential distinctions exist between the identified similar activities and the proposed project. Therefore, the proposed project without support of CDM is not common practice in Inner Mongolia Autonomous Region.

In conclusion, based on analysis above, since the proposed project is unlikely to occur and the relevant emission reductions will not be realized without the support of CDM, the proposed project is additional, not (part of) the baseline scenario.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:
--

>>

According to ACM0002 (Version 11), “Tool to calculate the emission factor for an electricity system” (Version 02) is adopted to calculate the baseline emission factor of the proposed project, applying the following steps:

1. Calculation of emission factor

STEP 1. Identify the relevant electricity systems.

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

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

STEP 4. Calculate the operating margin emission factor according to the selected method.

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

STEP 6. Calculate the build margin emission factor.

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



The detailed calculated processes are as follows:

STEP 1. Identify the relevant electricity systems

Using the boundary definitions of the Chinese DNA²⁹, the spatial extent of the project boundary includes Guohua Wulate Zhongqi Chuanjing Phase II Wind Farm Project and all power plants connected physically to the North China Power Grid that the proposed project power plant is connected to. North China Power Grid is defined as the project electricity system, which consists of independent province-level electricity systems including Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia and Shandong province that can be dispatched without significant transmission constraints. The connected electricity system is Northeast Power Grid and Central China Power Grid, which 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.

Electricity transfers from 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 determine the operation margin emission factor, according to “Tool to calculate the emission factor for an electricity system” (Version 02), one of the following options should be used to determine the CO₂ emission factor for net electricity imports from a connected electricity system within the same host country:

- (a) 0 t CO₂/MWh; or
- (b) The weighted average operation margin(OM) emission rate of the exporting grid, determined as described in Step 4 (d) below; or
- (c) The simple operation 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
- (d) The simple adjusted operation margin emission rate of the exporting grid, determined as described in Step 4 (b) below.

North China Power Grid has imported electricity from the Northeast China Power Grid and the Central China Power Grid³⁰. as per the methodological tool, referred to *2009 Baseline Emission Factors for Regional Power Grids in China* published by China DNA, option (c), the simple operating margin emission rate of the exporting grid, determined as described in Step 4(a) was selected to determine the CO₂ emission factor for net electricity imports from the Northeast China Power Grid and the Central China Power Grid.

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

Project participant may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I: only grid power plants are included in the calculation.

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

²⁹ <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2333.pdf>

³⁰ <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2331.xls>



Option I is chosen by the proposed project.

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

Based on one of the four following methods:

- (a) Simple *OM*, or
- (b) Simple adjusted *OM*, or
- (c) Dispatch data analysis *OM*, or
- (d) Average *OM*.

Among methods above, Method (a) can only be used where low-cost/must run resources³¹ constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term normals for hydroelectricity production.

During 2003-2007, the low-cost/must run resources constitute less than 50% of total amount grid generating output in NCPG where the proposed project is connected, which is in compliance with the applicability of Method (a). The detailed information could be seen in Table B6-1.

Table B6-1 Electricity Generation Proportion of Wind farm etc. of NCPG 2003-2007

No.	Year	Electricity generation (10 ⁸ kWh)			Proportion of wind farm etc.
		Total generation	Fuel-fired power	Wind farm etc.	
1	2003 ³²	4616.53	4576.74	39.79	0.862%
2	2004 ³³	5308.04	5267.72	40.32	0.760%
3	2005 ³⁴	6077.82	6032.31	45.51	0.749%
4	2006 ³⁵	7250	7189	61.4	0.847%
5	2007 ³⁶	8457.00	8380.7	76.30	0.902%

So, method (a) is selected for the calculation of OM emission factor ($EF_{grid, OM, y}$).

The Simple OM emission factor is calculated ex-ante. The Simple OM emission factor is calculated ex-ante, and it uses the available data in NCPG for the most recent 3 years (2005-2007).

STEP 4. Calculate the operating margin emission factor ($EF_{grid, OM, y}$) according to the selected method.

The Simple *OM* emission factor is calculated as the generation-weighted average emissions per electricity unit (tCO₂/MWh) of all generating sources serving the system, excluding those low-operating cost and must-run power plants. It may be calculated:

- Based on data on net electricity generation and a CO₂ emission factor of each power unit, the average efficiency of each power unit and the fuel type(s) used in each power unit (Option A), or
- 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 (option B).

³¹ The low-cost/must run resources include hydro power, geothermal sources, wind power, solar sources etc.

³² China Electric Power Yearbook 2004 P709

³³ China Electric Power Yearbook 2005 P474

³⁴ China Electric Power Yearbook 2006 P568

³⁵ China Electric Power Yearbook 2008 P709

³⁶ China Electric Power Yearbook 2008 P709



Option B can only be used if:

- (a) The necessary data for Option A is not available; and
- (b) Only nuclear and renewable power generation are considered as low low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
- (c) Off grid power plants are not included in the calculation (i.e. if Option I has been chosen in Step 2).

The data of each power plant /unit in the NCPG where the proposed project connected is not available publicly, thus Option A is not applicable. The low-cost/must run power resources in NCPG include only renewable power generation, and the quantity of electricity supplied to the grid by these sources is known. Besides, off grid power plants are not included in the calculation.

Therefore, Option B is selected for calculating the Simple *OM* emission factor 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.

The calculation is as follows:

$$EF_{grid,OM,simple,y} = \frac{\sum_i (FC_{i,y} \times NCV_{i,y} \times EF_{CO_2,i,y})}{EG_y} \quad (B.1)$$

Where:

- $EF_{grid,OM,simple,y}$ =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 (including power imported from the connected electricity 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 which data is available

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

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

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

Sample group that comprises the larger annual generation from these two options should be used. However, it is very difficult to obtain the data of the five power plants built most recently because these data are considered as confidential business matter in China. So, option 2 is selected.

The Build Margin emission factor $EF_{BM,y}$ is calculated ex-ante based on the most recent information available on plants already built for sample group m at the time of PDD submission.

**STEP 6. Calculate the build margin emission factor ($EF_{grid, BM, y}$)**

The Build Margin Emission Factor ($EF_{grid, BM, y}$) is calculated as follows:

$$EF_{grid, BM, y} = \frac{\sum_m EG_{m, y} \times EF_{EL, m, y}}{\sum_m EG_{m, y}} \quad (B.2)$$

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

Due to the data's unavailability, the BM calculation in this PDD follows the guidance provided by the EB in the deviation. Calculate first the newly installed capacity and its power generation technology mix, then the weights of different power technologies in the newly installed capacity, and finally the BM emission factor based on the emissions factors of different types of most advanced commercial generation technologies.³⁷

Because the capacity of the coal-fired, oil-fired and gas fired power plants can not be separated in the publicly available statistical data, the BM calculation in this PDD adopts the following method. First, use the available data in the energy balance sheets of the most recent year to calculate the proportions of the CO₂ emission from solid, liquid and gaseous fuels in the total CO₂ emissions related to power generation. Second, calculate the emissions factor of the fossil fuel-fired power generation in North China Power Grid using the above proportions as the weights and the emission factors of the most advanced commercial generation technologies as the reference. Finally, the BM emission factor is the product of this emission factor of fossil fuel-fired power generation and the proportion of fossil fuel-fired power plants in the newly installed 20% capacity. The detailed steps and the related formulas are as follows:

Sub-step 6a. Calculating the share of CO₂ emissions of different fuel-fired power plants in the total CO₂ emissions

$$\lambda_{Coal, y} = \frac{\sum_{i \in COAL, j} F_{i, j, y} \times NCV_{i, y} \times EF_{CO_2, i, j, y}}{\sum_{i, j} F_{i, j, y} \times NCV_{i, y} \times EF_{CO_2, i, j, y}} \quad (B.3)$$

$$\lambda_{Oil, y} = \frac{\sum_{i \in OIL, j} F_{i, j, y} \times NCV_{i, y} \times EF_{CO_2, i, j, y}}{\sum_{i, j} F_{i, j, y} \times NCV_{i, y} \times EF_{CO_2, i, j, y}} \quad (B.4)$$

³⁷ <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2333.pdf>

$$\lambda_{Gas,y} = \frac{\sum_{i \in GAS,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \quad (B.5)$$

Where:

$F_{i,j,y}$ is the amount of fuel i consumed (in a mass or volume unit) by relevant provincial sub-grids j in year y;

$NCV_{i,y}$ is net calorific value (energy content) of fossil fuel type i in year y (GJ / mass or volume unit);

$EF_{CO_2,i,j,y}$ is the CO₂ emission coefficient of fuel i (tCO₂/mass or volume unit of the fuel), taking into account the carbon content of the fuels used by relevant provincial sub-grids j and the percent oxidation of fuel in year y;

COAL, *OIL*, and *GAS* refers to all forms of coal, oil and gas

Sub-step 6b. Calculating the Emission Factor of fuel-fired power technology

$$EF_{Thermal} = \lambda_{Coal,y} \times EF_{Coal,Adv} + \lambda_{Oil,y} \times EF_{Oil,Adv} + \lambda_{Gas,y} \times EF_{Gas,Adv} \quad (B.6)$$

Where:

$EF_{Coal,Adv}$, $EF_{Oil,Adv}$ and $EF_{Gas,Adv}$ represent the related Emission Factor of the commercially available most advanced coal, oil and gas fired power technology, please refer to Annex 3 for more details.

Sub-step 6c. Calculating the $EF_{grid, BM, y}$ of NCPG

$$EF_{grid, BM, y} = \frac{CAP_{Thermal,y}}{CAP_{Total,y}} * EF_{Thermal,y} \quad (B.7)$$

Where:

$CAP_{Total,y}$ is the newly increment which is more than 20% of total installed capacity;

$CAP_{Thermal,y}$ is the newly increment of fuel-fired installed capacity.

The $EF_{grid, OM, y}$ and $EF_{grid, BM, y}$ of the first crediting period of the proposed project is calculated ex-ante and will not change during the first crediting period, but will be updated once the first crediting period is over.

STEP 7. Calculate the combined margin (CM) emissions factor ($EF_{grid, CM, y}$)

The combined margin emissions factor is calculated as follows:

$$EF_{grid, CM, y} = EF_{grid, OM, y} \times w_{OM} + EF_{grid, BM, y} \times w_{BM} \quad (B.8)$$

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 (%)

According to “Tool to calculate the emission factor for an electricity system” (Version 02), the weights of *OM* and *BM* for wind-farm projects are as follows:



$$w_{OM} = 0.75, w_{BM} = 0.25$$

2. Calculate the Baseline Emissions (BE_y) and Emission Reductions (ER_y)

According to ACM0002(version 11), the baseline emissions (BE_y) are calculated as:

$$BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y} \quad (B.9)$$

Where:

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

$EG_{PJ,y}$ = 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);

$EF_{grid,CM,y}$ = Combined margin CO₂ 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”.

According with ACM0002, if the project activity 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: $EG_{PJ,y} = EG_{facility,y}$. The proposed project is a new grid-connected power plants utilizing renewable energy, thus:

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

Where:

$EG_{facility,y}$ is the quantity of net electricity generation supplied by the project plant/unit to the grid in the year y (MWh);

The proposed project may import the electricity from NCPG, so the $EG_{facility,y}$ is calculated as follows:

$$EG_{facility,y} = EG_{export,y} - EG_{import,y} \quad (B.11)$$

Where

$EG_{export,y}$ is the electricity delivered to NCPG by the proposed project in the year y (MWh);

$EG_{import,y}$ is the electricity consumed by the proposed project which is imported from the NCPG in the year y (MWh);

In a given year, the emission reductions produced by the project activity (ER_y) is equal to baseline GHG emissions (BE_y) minus project direct emission during the same year:

$$ER_y = BE_y - PE_y \quad (B.12)$$

According to ACM0002 (version 11), the project emissions are taken as zero, thus:

$$ER_y = BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y} = EG_{facility,y} \cdot EF_{grid,CM,y} = (EG_{export,y} - EG_{import,y}) \cdot EF_{grid,CM,y} \quad (B.13)$$

$EG_{import,y}$ is ex-ante estimated as zero, and will be monitored after the implementation of the proposed project, hence:

$$ER_y = BE_y = EG_{facility,y} \cdot EF_{grid,CM,y} = EG_{export,y} \cdot EF_{grid,CM,y} \quad (B.14)$$

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

>>

Data / Parameter:	EG _v
Data unit:	kWh
Description:	Power Generation in each province of NCPG
Source of data used:	<i>China Electric Power Yearbook 2006-2008</i>
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	<i>China Electric Power Yearbook</i> is published by the editorial board of China Electric Power Yearbook, it is authorized.
Any comment:	Uncertainty level of data is low.

Data / Parameter:	Self- consumption rate of electricity
Data unit:	%
Description:	Self- consumption rate of electricity in each province of NCPG
Source of data used:	<i>China Electric Power Yearbook 2006-2008</i>
Value applied:	See annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	<i>China Electric Power Yearbook</i> is published by the editorial board of China Electric Power Yearbook, it is authorized.
Any comment:	Uncertainty level of data is low.

Data / Parameter:	Installed Capacity
Data unit:	kW
Description:	Installed capacity in each province of NCPG
Source of data used:	<i>China Electric Power Yearbook 2006-2008</i>
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	<i>China Electric Power Yearbook</i> is published by the editorial board of China Electric Power Yearbook, it is authorized.
Any comment:	Uncertainty level of data is low.

Data / Parameter:	FC _{Adv, coal}
Data unit:	gce/kWh
Description:	The coal consumption of power supply with the best thermal power technology commercially available.
Source of data used:	Bulletin about determining the Emission factors of Chinese Power Grids http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2333.pdf
Value applied:	322.5



Justification of the choice of data or description of measurement methods and procedures actually applied :	Authoritative government bulletin
Any comment:	Uncertainty level of data is low.

Data / Parameter:	$FC_{Adv, Oil}, FC_{Adv, Gas}$
Data unit:	gce/kWh
Description:	The oil, gas consumption of power supply with the best oil and gas fired power plant technology commercially available.
Source of data used:	Bulletin about determining the Emission factors of Chinese Power Grids http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2333.pdf
Value applied:	246
Justification of the choice of data or description of measurement methods and procedures actually applied :	Authoritative government bulletin
Any comment:	Uncertainty level of data is low.

Data / Parameter:	$FC_{i,y}$
Data unit:	10^4 t or 10^8 m^3
Description:	Amount of fossil fuel type i consumed in the project electricity system in year y
Source of data used:	<i>China Energy Statistics Yearbook 2006-2008</i>
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	<i>China Energy Statistics Yearbook</i> is published by China Statistics Press, it is authorized.
Any comment:	Uncertainty level of data is low.

Data / Parameter:	$NCV_{i,y}$
Data unit:	GJ/mass or volume unit
Description:	Net calorific value (energy content) of fossil fuel type i in year y
Source of data used:	<i>China Energy Statistics Yearbook 2006-2008</i>
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	<i>China Energy Statistics Yearbook</i> is published by China Statistics Press, it is authorized.



Any comment:	Uncertainty level of data is low.
Data / Parameter:	$EF_{CO_2,i,y}$
Data unit:	tCO ₂ /GJ
Description:	CO ₂ Emission Factor of fossil fuel type i in year y
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories (Volume 2, Chapter 1, p1.23)
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	The default value of IPCC.
Any comment:	Uncertainty level of data is low.

B.6.3 Ex-ante calculation of emission reductions:

>>

According to the 2009 Baseline Emission Factors for Regional Power Grids in China published by Chinese DNA³⁸(the details could be seen in Annex 3), the weighted average OM emission factors of NCPG from year 2005 to 2007 is:

$$EF_{grid,OM,y} = 1.0069 \text{ tCO}_2/\text{MWh}$$

The calculated Build Margin emission factor of NCPG is:

$$EF_{grid,BM,y} = 0.7802 \text{ tCO}_2/\text{MWh}$$

$$\begin{aligned} \text{Hence : } EF_{grid,CM,y} &= 0.75 * EF_{grid,OM,y} + 0.25 * EF_{grid,BM,y} \\ &= 0.75 * 1.0069 + 0.25 * 0.7802 \\ &= 0.9502 \text{ (tCO}_2/\text{MWh)} \end{aligned}$$

The amount of electricity to be delivered to the grid from the proposed project is

$$EG_{export,y} = 129,580 \text{ MWh.}$$

So the annual baseline emissions (BE_y) are: $BE_y = EG_{export,y} * EF_{grid,CM,y} = 123,126 \text{ tCO}_2$.

According to formula (B.14), the annual emission reductions due to the proposed project are:

$$ER_y = BE_y = EG_{export,y} * EF_{grid,CM,y} = 123,126 \text{ (tCO}_2\text{)}$$

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

>>

Table B6-2 Estimation of emission reductions due to the proposed project in the first crediting period

No.	Year	Estimation of project emission (PE_y)	Estimation of baseline emission (BE_y)	Estimation of emission reductions (ER_y) (tCO ₂ e)
-----	------	---	--	---

³⁸ <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2333.pdf>



		(tCO ₂ e)	(tCO ₂ e)	
1	01/04/2011-31/03/2012	0	123,126	123,126
2	01/04/2012-31/03/2013	0	123,126	123,126
3	01/04/2013-31/03/2014	0	123,126	123,126
4	01/04/2014-31/03/2015	0	123,126	123,126
5	01/04/2015-31/03/2016	0	123,126	123,126
6	01/04/2016-31/03/2017	0	123,126	123,126
7	01/04/2017-31/03/2018	0	123,126	123,126
Total		0	861,882	861,882

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

Data to be monitored in tables below shall be archived electronically and be kept at least for 2 years after the end of the last crediting period.

Data / Parameter:	$EG_{facility,y}$
Data unit:	MWh/yr
Description:	The net electricity supplied by the project activity to the grid in year y.
Source of data to be used:	Calculated based on the data of $EG_{export,y}$ and $EG_{import,y}$
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Net electricity supplied is expected to be 129,580MWh/y
Description of measurement methods and procedures to be applied:	$EG_{facility,y} = EG_{export,y} - EG_{import,y}$
QA/QC procedures to be applied:	The data will be double checked by receipt of sales or relevant commercial data.
Any comment:	

Data / Parameter:	$EG_{export,y}$
Data unit:	MWh/yr
Description:	Electricity delivered to NCPG by the proposed project in year y.
Source of data to be used:	Two electricity meters installed in parallel connection on project activity site
Value of data applied for the purpose of calculating expected emission reductions in	Electricity exported to the grid is expected to be 129,580MWh/y



section B.5	
Description of measurement methods and procedures to be applied:	The electricity delivered to NCPG by the proposed project in year y will be monitored and measured together by two meters installed in parallel connection on the project site. The readings of two electricity meters will be continuously measured and monthly recorded.
QA/QC procedures to be applied:	The meters will be calibrated by qualified third party according to the relevant regulations. The accuracy of electricity meters is no less than 0.5s. The data will be double checked by receipt of sales or relevant commercial data.
Any comment:	Uncertainty level of data is low.

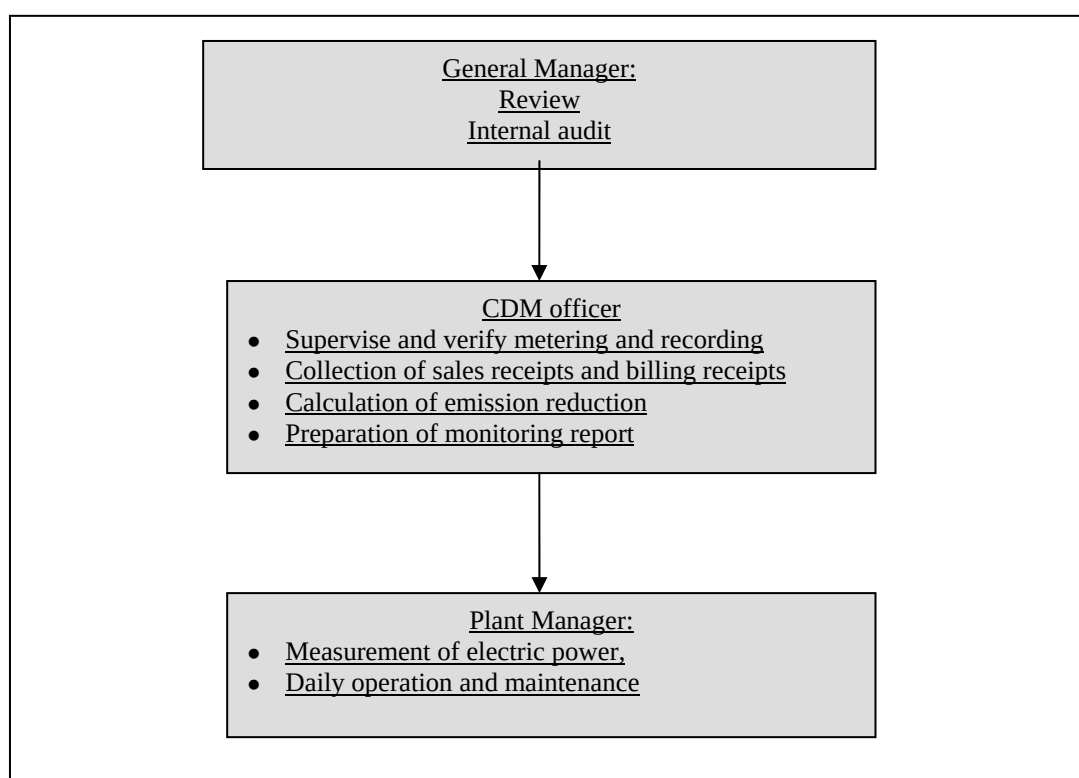
Data / Parameter:	$EG_{import,y}$
Data unit:	MWh/yr
Description:	Electricity consumed by the proposed project which is imported from the NCPG in year y.
Source of data to be used:	Two electricity meters installed in parallel connection on project activity site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0 MWh/yr
Description of measurement methods and procedures to be applied:	The electricity consumed by the proposed project which is imported from the NCPG in year y will be monitored and measured together by two meters installed in parallel connection on the project site.. The readings of two electricity meters will be continuously measured and monthly recorded.
QA/QC procedures to be applied:	The meters will be calibrated by qualified third party according to the relevant regulations. The accuracy of electricity meters is no less than 0.5s. The data will be double checked by receipt of sales or relevant commercial data.
Any comment:	Uncertainty level of data is low.

B.7.2. Description of the monitoring plan:

Monitoring plan is a division and schedule of a series of monitoring tasks. Monitoring tasks must be implemented according to the monitoring plan in order to ensure that the real, measurable and long-term GHG emission reduction for the proposed project is monitored and reported.

1. Operational and management structure for monitoring

The monitoring of the emission reductions will be carried out according to FigureB7-1 below.



FigureB7-1. The personnel structure of the project monitoring

Plant manager of wind farm will collect the information and data required by the Monitoring Plan. The collected information will be documented and sent to the CDM officer monthly. The CDM officer will be 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.

2. Monitoring apparatus and installation

Two bidirectional meters will be installed in the low pressure side of the booster station in accordance with Technology and Management Regulations for Power Metering Devices. The meters will be installed in parallel connection in the project site together to measure the electricity supply to the grid by the Project. The accuracy of the meters is no less than 0.5s and uncertainty level of the meters will not exceed 0.5%.

3. Calibration of Meters & Metering

An agreement should be signed between the proposed project owner and the local grid company that defines the metering arrangements and the required quality control procedures to ensure accuracy.

Calibration is carried out by the local grid company according to relevant regulations of electric industry at least once every year. Calibration report will be provided to the project owner.

4. Data monitoring

The readings of two meters installed in parallel connection in the project activity site will be used for calculating the emission reductions. The monitoring process is as follows:

- The data is measured continuously and recorded monthly;
- The project owner provides the grid company with sales receipt and keeps the copies of these sales receipts. The power grid company provides the project owner with the data of power imported from the power grid



- The project owner will provide DOE with record of net power generation data and copies of sales receipts

5 Quality Assurances and Quality Control

The quality assurance and quality control procedures for recording, maintaining and archiving data shall be improved as part of this CDM project activity. This is an on-going process which will be ensured through the CDM mechanism in terms of the need for verification of the emissions on an annual basis according to this PDD and the CDM manual.

6. Data Management System

All monitoring data and records will be archived in electronic documents as well as in paper. The electronic documents will be backed up in compact disc or hard disc form. The project owner will also keep the copies of sale receipts and prepare a monitoring report at the end of each year, which includes the net electricity generation, the monitoring data summary, the calibration records, and the emission reduction calculation.

7. Training program

The project owner and Beijing Keji consulting Co., Ltd. together with train all the related staffs before operation of proposed project. The project owner has invited experts from Beijing Keji consulting Co., Ltd. to give a training which included basic knowledge on CDM, project monitoring, the operation rules and quality controlling and management standard, data recording and archiving, etc.

8. Monitoring Report

The CDM manager will write the monitoring report including electricity produced and emission reduction every month and then submit it to the general manager, who will audit it internally. And all these documents can be verified by DOE.

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

>>

Date of completion of the application of the baseline study and monitoring methodology:
24/11/2010

Name of the person and entity determining the baseline and monitoring methodology:
Shi Chongqi/ Beijing Keji consulting Co., Ltd. (CDM developer)

Tel: 86-10-82253961

Fax: 86-10-82253952

Email: shi.chongqi@kejicc.com

Contributors:

Tao Huailiang	Beijing Keji consulting Co., Ltd.
Zhao Zhifang	Beijing Keji consulting Co., Ltd.
Yun Fu	Beijing Keji consulting Co., Ltd.
Zhang Guangwei	Beijing Keji consulting Co., Ltd.
Li Jia	Guohua Bayannaoer (Wulate Zhongqi) Wind Power Co.,Ltd.

Guohua Bayannaoer (Wulate Zhongqi) Wind Power Co.,Ltd. is a project participant of the proposed project, while Beijing Keji consulting Co., Ltd. is not.

**SECTION C. Duration of the project activity / crediting period****C.1 Duration of the project activity:****C.1.1. Starting date of the project activity:**

>>

13/02/2009 (The starting date of the proposed project is regarded as 13/02/2009, when the Nacelle and Tower purchasing contract was signed, as it is the earliest date of real action took place.)

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

>>

20 years 0 month.

C.2 Choice of the crediting period and related information:**C.2.1. Renewable crediting period****C.2.1.1. Starting date of the first crediting period:**

>>

01/04/2011 (or registered date, whichever is later)

C.2.1.2. Length of the first crediting period:

>>

7 year 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:

>>

In accordance with relevant laws and regulations on environmental protection, an Environmental Impact Assessment (EIA) of the proposed project has been implemented. The results of the EIA have been approved by the Environmental Protection Bureau of Inner Mongolia.

According to the EIA report, the main environmental impacts of the proposed project are summarised as follows:

1. Impact of noise

Noise during construction is mainly caused by equipment installation and operation. There are no



residential area, school, factory and hospital in the wind farm site. The nearest residential area is more than 500m far away from the wind machines. So it will not make significant impact to the sound quality of the environment of residents. Noise on the impact of small wild animals is also small. Therefore, the noise is acceptable during the construction.

2. Impact of waste residue

The solid waste produced during the construction period is mainly the domestic waste produced by the constructors, which will be consigned to the environmental health department to collect and carried out from the site. So the negative impact on the environment will not last.

Besides during the operation period the domestic waste produced by the working staff of the project will be periodically carried out by trucks. The project itself will not have any apparent influence on the environment.

3. Impact of sewage water

The sewage water produced during construction period includes mainly domestic sewage and construction waste water. The sewage will be treated to meet the national standard.

4. Main Ecological Impacts

The project site had only some drought-resistant grasses. There are no rare plants. The wind farm covers an area of mainly grassland, therefore, the project's overall impact on the local vegetation is not significant. According to the survey, this area has no large wild animals, mammals, mainly rabbits, rats and other small animals, and therefore, the impact on wildlife during the construction period will be minor.

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:

>>

According to the results of EIA and the reply from the Environmental Protection Bureau of Inner Mongolia Province, the proposed project has little impact on the environment.

SECTION E. Stakeholders' comments

>>

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

>>

In order to collect opinions from the stakeholder, the project owner held stakeholders' comment meeting in Wulate Zhongqi, Bayannaoer city, Inner Mongolia Autonomous Region, on 18/09/2008 after introduced the proposed project to them through poster and broadcast. Respondents included local residents, officials, engineers, workers and so on. The meeting consisted of four parts, which were summarised as follows:

1. Basic information introduction of the proposed project;
2. Introduction of CDM basic concept;
3. Free discussion, and;
4. Questionnaires survey.

The main content of the questionnaire are shown as follows:



- A. Brief introduction of the proposed project
- B. Basic knowledge of CDM
- C. Information to be collected
 - (a) Basic information of the informants
 - (b) Questions to be surveyed
 - 1) Acquaintance of the proposed project (Know; Know a little; Not at all);
 - 2) Impacts of the proposed project on local economic development (Promote; Slow down; Little impact);
 - 3) Impacts of the proposed project on the livelihood of the residents (Benefit; Disbenefit; No impact);
 - 4) Appropriateness of the project location (Appropriate; Not appropriate; Doesn't matter);
 - 5) The impacts of the proposed project on the local environment (Benefit; No impact; Disbenefit);
 - 6) Attitude towards the proposed project (Agree; Disagree; Doesn't matter);
 - 7) Other opinions to give
- D. The inquirer and the date

E.2. Summary of the comments received:

>>

The forum issued a total of 28 copies of the questionnaire. According with the result of the survey, all the residents agree and support the implementation of the proposed project.

The statistical data of the survey are shown as follows:

- The sex distribution of the informants: male (60.7%), female (39.3%);
- The age distribution of the informants: 18-30 (35.8%), 30-40 (32.1%), 40-55(32.1%);
- Education level of the informants: Primary school and below (7.1%); Junior high school (25%), senior high school or technical secondary school (21.4%), above senior high school (46.4%);
- 78.6% of the informants know the proposed project, 21.4% know a little.
- 100% of the informants deem that the proposed project promotes local economic development,
- 67.9% of the informants deem that the proposed project benefits the livelihood of the residents; 32.1% deem that it has no impact;
- 96.4% of the informants deem that the project location is appropriate; 3.6% deem that it doesn't matter;
- 71.4% of the informants deem that the proposed project benefits local environment; 28.6% deem it has no impact;
- 100% of the informants agree and support the construction of the proposed project.

To sum up, all of the local residents knew the proposed project and held a positive and supportive attitude towards its construction. They hope that the proposed project can be put into operation as soon as possible.

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

>>

Both local residents and government are supportive to the proposed project. According to the comments received from the stakeholders, it is not necessary to adjust the construction and operation of the proposed project currently.

**Annex 1****CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY****The Project Entity**

Organization:	Guohua Bayannaoer (Wulate Zhongqi) Wind Power Co., Ltd.
Street/P.O.Box:	No.3 South Road of Dongzhimen, Dongcheng District, Beijing, P.R.China
Building:	Guohua Investment Building
City:	Beijing
State/Region:	/
Postfix/ZIP:	/
Country:	China
Telephone:	010-58157586
FAX:	010-58157568
E-Mail:	cdmteam@guohua.com.cn
URL:	/
Represented by:	Li Jia
Title:	Engineer
Salutation:	Miss
Last Name:	Li
Middle Name:	/
First Name:	Jia
Department:	/
Mobile:	/
Direct FAX:	010-58157568
Direct tel:	010-58157586
Personal E-Mail:	cdmteam@guohua.com.cn

**The Buyer**

Organization:	Noble Carbon Credits Limited
Street/P.O.Box:	13 Gilford Road, Sandymount 4
Building:	1st Floor, Gilford Hall, Sandymount 4
City:	Dublin
State/Region:	/
Postfix/ZIP:	/
Country:	Ireland
Telephone:	+353 1 260 7660
FAX:	+353 1 260 7661
E-Mail:	thorstenansorg@noblecarbon.com
URL:	/
Represented by:	Thorsten Ansorg
Title:	/
Salutation:	Mr.
Last Name:	Ansorg
Middle Name:	/
First Name:	Thorsten
Department:	/
Mobile:	/
Direct FAX:	+353 1 260 7661
Direct tel:	+353 1 260 7660
Personal E-Mail:	thorstenansorg@noblecarbon.com



Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding from UNFCCC Annex 1 countries for the proposed project.



Annex 3

BASELINE INFORMATION

1. Information of Operating Margin (OM)

The calculation of simple *OM* emission factor of NCPG is shown in Table 3-1 to Table 3-9

Table 3-1 Calculate 2005 CO₂ emissions from fossil fired power generation of NCPG

Fuel Type	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Subtotal	Combustion Emission Factor (kgCO ₂ /TJ)	Average Low Electricity Generation (MJ/t,km ³)	CO ₂ emissions (tCO ₂ e) L=G×J×K/100000 (mass unit)
		A	B	C	D	E	F	G=A+B+C +D+E+F	J	K	L=G×J×K/10000 (volume unit)
Raw coal	10 ⁴ t	897.75	1675.2	6726.5	6176.45	6277.23	10405.4	32158.53	87,300	20,908	586,979,486
Cleaned Coal	10 ⁴ t						42.18	42.18	87,300	26,344	970,069
Other washed coal	10 ⁴ t	6.57		167.45	373.65		108.69	656.36	87,300	8,363	4,792,018
Coke	10 ⁴ t					0.21	0.11	0.32	95,700	28,435	8,708
Coke oven gas	10 ⁸ m ³	0.64	0.75	0.62	21.08	0.39		23.48	37,300	16,726	1,464,870
Other coal gas	10 ⁸ m ³	16.09	7.86	38.83	9.88	18.37		91.03	37,300	5,227	1,774,789
Crude oil	10 ⁴ t					0.73		0.73	71,100	41,816	21,704
Gasoline	10 ⁴ t			0.01				0.01	67,500	43,070	291
Diesel	10 ⁴ t	0.48		3.54		0.12		4.14	72,600	42,652	128,197
Fuel oil	10 ⁴ t	12.25		0.23		0.06		12.54	75,500	41,816	395,901
LPG	10 ⁴ t							0	61,600	50,179	0
Refinery gas	10 ⁴ t			9.02				9.02	48,200	46,055	200,231
Natural gas	10 ⁸ m ³	0.28	0.08		2.76			3.12	54,300	38,931	659,553
Other oil products	10 ⁴ t							0	75,500	41,816	0
Other coal chemicals	10 ⁴ t							0	95,700	28,435	0
Other energy	10 ⁴ tce	8.58		32.25	69.31	7.27	118.9	236.41	0	0	0
										Subtotal	597,395,812

Data source: China Energy Statistical Yearbook of 2006



Table 3-2 2005 Electricity generation from fossil fired power generation of NCPG

Province	Electricity Generation (MWh)	Self-use Electricity Rate (%)	Electricity Supply (MWh)
Beijing	20,880,000	7.73	19,265,976
Tianjin	36,993,000	6.63	34,540,464
Hebei	134,348,000	6.57	125,521,336
Shanxi	128,785,000	7.42	119,229,153
Inner Mongolia	92,345,000	7.01	85,871,616
Shandong	189,880,000	7.14	176,322,568
Total	603,231,000		560,751,013

Data source: *China Electric Power Year Book of 2006*

Table 3-3 Operating Margin (OM) of NCPG in 2005

Power transferred from the Northeast China Power Grid(MWh)	3,929,000
The OM emission factor of Northeast China Power Grid (tCO ₂ e/MWh)	1.16489
Power supplied by NCPG (MWh)	560,751,013
CO ₂ emission by NCPG (tCO ₂)	597,395,812
Total power supplied by NCPG (MWh)	564,680,013
Total CO ₂ emission by NCPG (tCO ₂)	601,972,682
SimpleOM of NCPG(tCO ₂ e/MWh)	1.06604

Data sources: *China Energy Statistical Yearbook 2006*; *China Electric Power Yearbook 2006*.

<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2331.xls>

Table 3-4 Calculate 2006 CO₂ emissions from fossil fired power generation of NCPG

Fuel Type	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Subtotal	Combustion Emission Factor	Average Low Electricity Generation	CO ₂ emissions (tCO ₂ e)
									(kgCO ₂ /TJ)	(MJ/t,km ³)	$L=G \times J \times K / 100000$ (mass unit)
		A	B	C	D	E	F	$G=A+B+C+D+E+F$	J	K	$L=G \times J \times K / 10000$ (volume unit)
Raw coal	10 ⁴ t	796.63	1639.2	6867.99	6968.88	8404.05	10930.66	35607.41	87,300	20,908	649,930,803
Cleaned Coal	10 ⁴ t						39.77	39.77	87,300	26,344	914,643
Other washed coal	10 ⁴ t	6.36		214.13	371.14	61.77	544.6	1,198	87,300	8,363	8,746,477
Briquette	10 ⁴ t	7.97					27.77	35.74	87,300	20,908	652,351
Coke	10 ⁴ t						3.23	3.23	95,700	28,435	87,896
Coke oven gas	10 ⁸ m ³	0.38	0.63	5.8	22.32	0.64	5.79	35.56	37, 300	16,726	2,218,517
Other coal gas	10 ⁸ m ³	20.66	6.58	69.72	13.79	22.76	7.22	140.73	37, 300	5,227	2,743,772
Crude oil	10 ⁴ t					0.74		0.74	71,100	41,816	22,110
Gasoline	10 ⁴ t			0.01				0.01	67,500	43,070	291
Diesel	10 ⁴ t	0.21		3.01		0.07	6.32	9.61	72,600	42,652	297,577
Fuel oil	10 ⁴ t	6.38		0.08			4.1	10.56	75,500	41,816	333,391
LPG	10 ⁴ t						0.01	0.01	61,600	50,179	309
Refinery gas	10 ⁴ t			2.43			2.32	4.75	48,200	46,055	105,443
Natural gas	10 ⁸ m ³	3.41	0.73		0.53			4.67	54,300	38,931	987,216
Other oil products	10 ⁴ t						0.28	0.28	75,500	41,816	0
Other coal chemicals	10 ⁴ t							0	95,700	28,435	0
Other energy	10 ⁴ tce	6.83		47.11	230.76	12.51	132.29	429.5	0	0	0
										Subtotal	667,049,525

Data source: China Energy Statistical Yearbook of 2007



Table 3-5 2006 Electricity generation from fossil fired power generation of NCPG

Province	Electricity Generation (MWh)	Self-use Electricity Rate (%)	Electricity Supply (MWh)
Beijing	20,705,000	7.51	19,150,055
Tianjin	35,924,000	6.86	33,459,614
Hebei	143,888,000	6.63	134,348,226
Shanxi	150,250,000	7.45	139,056,375
Inner Mongolia	139,593,000	7.58	129,011,851
Shandong	230,922,000	7.12	214,480,354
Total	721,282,000		669,506,473

Data source: *China Electric Power Year Book of 2007*

Table 3-6 Operating Margin (OM) of NCPG in 2006

Power transferred from the Northeast China Power Grid(MWh)	2,618,060
The OM emission factor of Northeast China Power Grid (tCO ₂ e/MWh)	1.14972
Power transferred from the Central China Power Grid(MWh)	497,060
The OM emission factor of Central China Power Grid (tCO ₂ e/MWh)	1.12157
Power supplied by NCPG (MWh)	669,506,473
CO ₂ emission by NCPG (tCO ₂)	667,049,525
Total power supplied by NCPG (MWh)	672,621,593
Total CO ₂ emission by NCPG (tCO ₂)	670,617,037
SimpleOM of NCPG(tCO ₂ e/MWh)	0.99702

Data sources: China Energy Statistical Yearbook 2007 China Electric Power Yearbook 2007

[http://cdm.ccchina.gov.cn/ WebSite/CDM/UpFile/File2331.xls](http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2331.xls)

Table 3-7 Calculate 2007 CO₂ emissions from fossil fired power generation of NCPG

Fuel Type	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Subtotal	Combustion Emission Factor (kgCO ₂ /TJ)	Average Low Electricity Generation (MJ/t,km ³)	CO ₂ emissions (tCO ₂ e)
											$L=G \times J \times K / 100000$ (mass unit)
		A	B	C	D	E	F	$G=A+B+C+D+E+F$	J	K	$L=G \times J \times K / 10000$ (volume unit)
Raw coal	10 ⁴ t	816,17	1753.99	7716.13	7510.06	10434.25	11884.83	40115.43	87,300	20,908	732,214,267
Cleaned Coal	10 ⁴ t						18.43	18.43	87,300	26,344	423,859
Other washed coal	10 ⁴ t	5.76		156.89	478.81	48.57	756.84	1446.87	87,300	8,363	10,563,452
Briquette	10 ⁴ t	7.93					42.86	50.79	87,300	20,908	927,054
Coke	10 ⁴ t			0.02			4.09	4.11	95,700	28,435	111,843
Coke oven gas	10 ⁸ m ³	0.07		3.13	25.46	2.58	13.61	45.57	37, 300	16,726	2,843,020
Other coal gas	10 ⁸ m ³	11.8		88.38	72.8	28.17	29.64	238.39	37, 300	5,227	4,647,821
Crude oil	10 ⁴ t							0	71,100	41,816	0
Gasoline	10 ⁴ t			0.01				0.01	67,500	43,070	291
Diesel	10 ⁴ t	0.33		2.35		0.62	5.08	8.38	72,600	42,652	259,490
Fuel oil	10 ⁴ t	4.74		0.18			2.35	7.27	75,500	41,816	229,522
LPG	10 ⁴ t							0	61,600	50,179	0
Refinery gas	10 ⁴ t	0.06		2.85			1.65	4.56	48,200	46,055	101,225
Natural gas	10 ⁸ m ³	5.03	0.73		0.54	4.22	0.01	10.53	54,300	38,931	2,225,993
Other oil products	10 ⁴ t	1.72						1.72	75,500	41,816	54,302
Other coal chemicals	10 ⁴ t	4.74						4.74	95,700	28,435	128,986
Other energy	10 ⁴ tce	11.94		77.25	360.26	30.75	163.48	643.68	0	0	0
										Subtotal	754,731,124

Data source: China Energy Statistical Yearbook of 2008



Table 3-8 2007 Electricity generation from fossil fired power generation of NCPG

Province	Electricity Generation (MWh)	Self-use Electricity Rate (%)	Electricity Supply (MWh)
Beijing	22,300,000	7.51	20,625,270
Tianjin	39,900,000	6.53	37,294,530
Hebei	163,300,000	6.67	152,407,890
Shanxi	173,400,000	7.99	159,545,340
Inner Mongolia	180,100,000	7.77	166,106,230
Shandong	259,100,000	7.23	240,367,070
Total	838,100,000		776,346,330

Data source: *China Electric Power Year Book of 2008*

Table 3-9 Operating Margin (OM) of NCPG in 2007

Power transferred from the Northeast China Power Grid(MWh)	1,789,750
The OM emission factor of Northeast China Power Grid (tCO ₂ e/MWh)	1.08186
Power transferred from the Central China Power Grid(MWh)	803,000
The OM emission factor of Central China Power Grid (tCO ₂ e/MWh)	1.10197
Power supplied by NCPG (MWh)	776,346,330
CO ₂ emission by NCPG (tCO ₂)	754,731,124
Total power supplied by NCPG (MWh)	778,930,080
Total CO ₂ emission by NCPG (tCO ₂)	757,552,268
SimpleOM of NCPG(tCO ₂ e/MWh)	0.97254

Data sources: China Electric Power Yearbook 2008 China Electric Power Yearbook 2008

[http://qhs.ndrc.gov.cn/ WebSite/CDM/UpFile/File2331.xls](http://qhs.ndrc.gov.cn/WebSite/CDM/UpFile/File2331.xls)

The weighted-average OM emission factor of the three years from 2005 to 2007 is:1.00689 tCO₂/MW



2. Information of Build Margin

Table3-10 Calculate the proportions of CO₂ emissions of power generation used solid, liquid and gaseous fuels in the total emissions

		Beijing	Tianjin	Hebei	Shanxi	Shandong	Inner Mongolia	Total	CV	Emission factor	Oxidation rate	Emissions
Fuel type	Unit	A	B	C	D	E	F	G=A+...+F	H	I	J	K=G×H×I/100,000 (volume unit)
Raw coal	10 ⁴ t	816.17	1,753.99	7,716.13	7,510.06	11,884.83	10,434.3	40,115.43	20,908	87,300	1	732,214,267
Cleaned Coal	10 ⁴ t	0	0	0	0	18.43	0	18.43	26,344	87,300	1	423,859
Other washed coal	10 ⁴ t	5.76	0	156.89	478.81	756.84	48.57	1,446.87	8,363	87,300	1	10,563,452
Briquette	10 ⁴ t	7.93	0	0	0	42.86	0	50.79	20,908	87,300	1	927,054
Coke	10 ⁴ t	0	0	0.02	0	4.09	0	4.11	28,435	95,700	1	111,843
Other coke products	10 ⁴ t	4.74	0	0	0	0	0	4.74	28,435	95,700	1	128,986
Subtotal												744,369,461
Crude oil	10 ⁴ t	0	0	0	0	0	0	0	41,816	71,100	1	0
Gasoline	10 ⁴ t	0	0	0.01	0	0	0	0.01	43,070	67,500	1	291
Diesel	10 ⁴ t	0.33	0	2.35	0	5.08	0.62	8.38	42,652	72,600	1	259,490
Crude oil	10 ⁴ t	4.74	0	0.18	0	2.35	0	7.27	41,816	75,500	1	229,522
Other petrolic products	10 ⁴ t	1.72	0	0	0	0	0	1.72	41,816	75,500	1	54,302
Subtotal												543,604
Natural gas	10 ⁷ m ³	50.3	7.3	0	5.4	0.1	42.2	105.3	38,931	54,300	1	2,225,993
Coke oven gas	10 ⁷ m ³	0.7	7.2	31.3	254.6	136.1	25.8	455.7	16,726	37,300	1	2,843,020
Other coal gas	10 ⁷ m ³	118	76	883.8	728	296.4	281.7	2,383.9	5,227	37,300	1	4,647,821
LPG	10 ⁴ t	0	0	0	0	0	0	0	50,179	61,600	1	0
Refinery gas	10 ⁴ t	0.06	0	2.85	0	1.65	0	4.56	46,055	48,200	1	101,225
Subtotal												9,818,059
Total												754,731,124

Data source: China Energy Statistical Yearbook of 2008

According to the above calculation, $\lambda_{Coal,y}$ = 98.63%, $\lambda_{Oil,y}$ = 0.07%, $\lambda_{Gas,y}$ = 1.30%



Table 3-11 Commercialized optimal efficiency and emission factors of coal, oil and gas fired power generation

	Variable	Electricity supply rate (%)	Fuel emission factor (kgCO ₂ /TJ)	Oxidation rate	Emission factor (tCO ₂ /MWh)
		A	B	C	D=3.6/A/1,000,000×B×C
Coal-fired power plant	$EF_{Coal,Adv,y}$	38.10	87,300	1	0.8249
Oil-fired power plant	$EF_{Oil,Adv,y}$	49.99	75,500	1	0.5437
Gas-fired power plant	$EF_{Gas,Adv,y}$	49.99	54,300	1	0.3910

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

$$= 0.8191 \text{ tCO}_2/\text{MWh}$$

Table 3-12 2007 installed capacity of NCPG

Installed capacity	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total
Fossil-fired power	MW	3,900	6,920	29,020	30,950	39,870	54,140	164,800
Hydropower	MW	1050	10	780	790	830	1,050	4,510
Nuclear power	MW	0	0	0	0	0	0	0
Wind power and etc.	MW	2.7	0	410	0	1,096.5	210	1,719.2
Total	MW	4,952.7	6,930	30,210	31,740	41,796.5	55,400	171,029.2

Data source: *China Electric Power Year Book of 2008*



Table 3-13 2006 installed capacity of NCPG

Installed capacity	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total
Fossil-fired power	MW	3,984	6,512	26,087	26,661	28,899	49,395	141,538
Hydropower	MW	1,053	5	785	790	818	553	4,004
Nuclear power	MW	0	0	0	0	0	0	0
Wind power and etc.	MW	24	24	218	0	565	106	937
Total	MW	5,061	6,541	27,090	27,451	30,282	50,054	146,479

Data source: *China Electric Power Year Book of 2007*

Table 3-14 2005 installed capacity of NCPG

Installed capacity	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total
Fossil-fired power	MW	3,833.5	6,149.9	22,333.2	22,246.8	19,173.3	37,332	111,068.7
Hydropower	MW	1,025	5	784.5	783	567.9	50.8	3,216.2
Nuclear power	MW	0	0	0	0	0	0	0
Wind power and etc.	MW	24	24	48	0	208.9	30.6	335.5
Total	MW	4,882.5	6,178.9	23,165.7	23,029.8	19,950.2	37,413.4	114,620.4

Data source: *China Electric Power Year Book of 2006*

Table 3-15 BM emission factor of NCPG

	2005 installed capacity	2006 installed capacity	2007 Installed capacity	Capacity addition of the three years from 2005 to 2007	Proportion in total capacity addition
	A	B	C	D=C-A	
Fossil-fired power	111,068.7	141,538	164,800	53,731.3	95.25%
Hydropower	3,216.2	4,004	4,510	1,293.8	2.29%
Nuclear power	0	0	0	0	0.00%
Wind power and etc.	335.5	937	1,719.2	1,383.7	2.45%
Total	114,620.4	146,479	171,029.2	56,408.8	100.00%
Proportion in 2007 installed capacity	67.02%	85.65%	100%		

$$EF_{BM,y} = 0.8191 \times 95.25\% = 0.7802 \text{ tCO}_2/\text{MWh}$$



Annex 4

MONITORING INFORMATION

There is no additional information.