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

CONTENTS

Annexes

SECTION A. General description of project activity

A.1. Title of the project activity:

Project Title: Guohua Wulate Zhongqi Phase I 49.5 MW Wind farm Project

Version No: 05

Completion Date: 24/02/ 2010

A.2. Description of the project activity:

Guohua Wulate Zhongqi Phase I 49.5 MW Wind farm Project (hereafter referred to as the proposed project) is located in Urad Zhongqi, Bayan Nur League, Inner Mongolia Autonomous Region, P. R. China. The proposed project will be constructed and operated by Guohua CWP（Bayannaoer）Wind Power Co., Ltd. The objective of the proposed project is to utilize the wind power for generating electricity, which will be sold into the North China Power Grid (NCPG). The total installed capacity of the proposed project is 49.5MW with 33sets of turbines and a unit capacity of 1500kW. The estimated electricity output to NCPG is 124,300MWh per year.

The proposed project activity will generate greenhouse gas (GHG) emission reductions by avoiding CO_2 emissions from electricity generation by fossil fuel power plants and will contribute to sustainable development of the local community and the host country by reducing GHG emissions of 133,685tCO_2e per year.

The scenario existing prior to the start of the implementation of the project activity is the same electricity service as the proposed project provided by the NCPG. The baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity.

The proposed project clearly fits into the development priority of China. It will not only supply renewable electricity to the grid, but also contribute to sustainable development of the local community, the host country and the world by means of:

- Creating local employment 15 job opportunities during the project construction and operation period;
- Supplying 124,300MWh green power to NCPG and easing the pressure on the local electricity ;
- Changing the structure of the local electricity supply and making the electricity structure diversification;
- Reducing greenhouse gas emissions carbon dioxide (CO_2) about 133,685 tons, sulfur dioxide (SO_2) about 494.5 tons, nitrogen oxides (such as NO_2) about 561.06 tons, carbon monoxide (CO) about 14.17 tons and hydrocarbons about 5.63 tons;

A.3. 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)
People's Republic of China (host)	Guohua CWP（Bayannaoer）Wind Power Co., Ltd	No
United Kingdom of Great Britain and Northern Ireland	Renaissance Carbon Investment Ltd	No

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:

Bayan Nur League /Urad 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 Urad Zhongqi, the north of Bayan Nur League and the west of Inner Mongolia Autonomous Region, P. R. China. The geographical coordinates of the proposed project is east longitude 108°19′15″-108°23′40″ and north latitude 41°54′48″-41°56′35″[1]. The average height of the wind farm is 1420 meters above sea level[2]. The figure below shows the location of the proposed project.

[1] Page 2 approved Feasibility Study Report (FSR)

[2] As above.

Figure 1. The location of Inner Mongolia Autonomous Region in China

Figure2. The location of the proposed project in Bayan Nur League

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

Sectoral Scope: 1 Energy industries

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

The purpose of the proposed project is to generate zero-emission wind power and deliver it to the NCPG. For the proposed project,

- The scenario existing prior to the start of the implementation of the project activity is NCPG providing the same electricity service as the proposed project;
- The project scenario is the implementation of the proposed project, the installation and operation of 33 sets of wind turbines with a total capacity of 49.5MW, which will supply an average annual generation of 124,300MWh to NCPG and replace the same amount of electricity generated by fossil fuel fired power plants connected to NCPG;
- The baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity.

The wind turbines adopted by the proposed project will be supplied by domestic manufacture – Gold Wind Scientific and Innovative Wind Power Equipment Co., Ltd.As stipulated in the Equipment Purchase Agreement (EPA), the manufacturer provides the technical training and maintenance for the project. According to the turbine layout, each turbine will be equipped with one transformer. The electricity to be generated will be delivered to the newly-built on-site substation by 35kV transmission lines, and then transmitted to the Urad Zhongqi Wengeng Substation, and finally connected to the NCPG. Therefore the proposed project can replace electricity generated from fossil fuel fired power plant connected to the Grid and reduce GHG emissions. As a result, 133,685 tCO_2 emission reductions will be generated annually.

The main parameters of wind turbine are described as follows.

TableA-1.Parameters of wind turbine

No	Item	Uniy	Value
1	Type	kw	1500
2	Diameter	m	77
3	Covering Area	m^2	4657
4	Rotation speed of wind wheel	r/min	11.1~22.2 r
5	Cut in wind speed	m/s	3.0
6	Nominal wind speed	m/s	12
7	Cut out wind speed	m/s	22
8	Hub height	m	65
9	Nominal voltage	v	690

The project used domestic technology and equipment, and do not involve international technology transfer

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

A crediting period of 7 (seven) years (renewable twice) is selected for the project activity. The total emission reductions during the first crediting period are 935,793tCO_2e. The estimated amount of emission reductions over the chosen crediting period is summarized as follows:

Years	Annual estimation of emission reductions in tonnes of CO2e
2010	133,685
2011	133,685
2012	133,685
2013	133,685
2014	133,685
2015	133,685
2016	133,685
Total estimated reductions (tonnes of CO2e)	935,793
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	133,685

A.4.5. Public funding of the project activity:

There is no public funding from Annex I parties for 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:

The following approved baseline and monitoring methodology is applied to the proposed project:

The approved consolidated baseline and monitoring methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", Version 09
Tool for the demonstration and assessment of additionality, Version 05.2
Tool to calculate the emission factor for an electricity system; Version 01.1

For more information on these 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:

The project is a grid-connected renewable power generation project activity which meets all the applicability criteria stated in methodology:

1） The proposed project is a new 49.5 MW wind energy plant by using renewable wind resources to generate electricity, which will be connected to NCPG.
2） The proposed project does not involve switching from fossil fuels to renewable energy at the site

of the project activity.

3） The geographic and system boundaries for NCPG can be clearly identified and information on the characteristics of the grid is available.

Therefore approved consolidated baseline and monitoring methodology ACM0002 (Version 09) is applicable to the proposed project.

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

Emission sources:

The greenhouse gases and emission sources included in or excluded from the project boundary are shown in Table B-1.

Table B-1: Emission sources included in or excluded from the project boundary

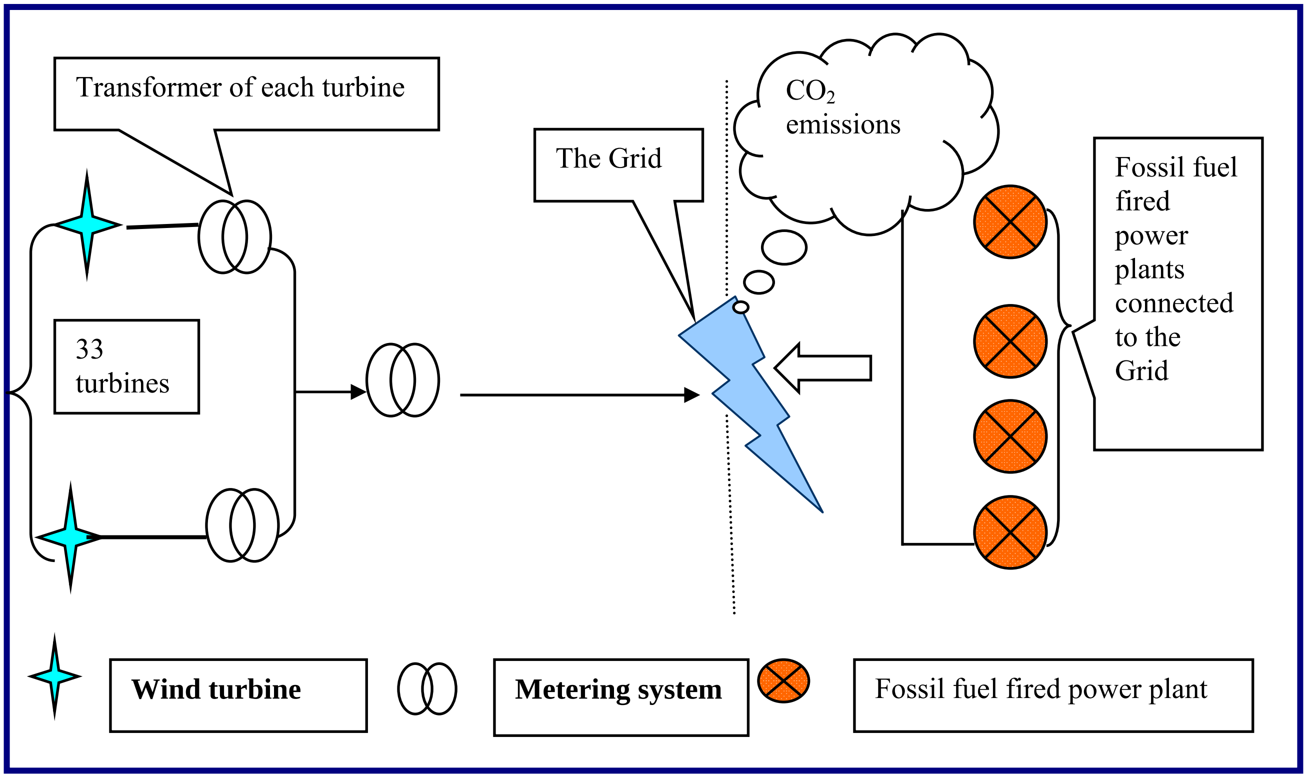
	Source	Gas	Included?	Justification / Explanation
Baseline	Grid electricity generation	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
Project Activity	Project Emission.	CO_2	No	The Project is a wind power project that the project emissions should not be considered as per ACM0002 (Version 09).
		CH_4	No	
		N_2O	No	

Spatial boundary:

As per ACM0002 (Version 09), the spatial extent of the proposed project boundary includes the proposed project power plant and all power plants connected physically to NCPG that the proposed project power plant is connected to. As per Grid Connect Agreement, the proposed project will connect to NECPG. Therefore, the boundary of the proposed project includes the physical and geographical boundaries of the proposed project and all power plants connected physically to NCPG that the proposed project is connected to. In accordance with the *Notification on Determining Baseline Emission Factor of China's Grid* issued by China DNA on 09/08/07[3], NCPG is composed of Beijing Power Grid, Tianjin Power Grid, Hebei Power Grid, Shanxi Power Grid, Shandong Power Grid and Inner Mongolia Power Grid.

Figure B-1: Flow diagram of the project boundary

[3] . http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1364.pdf



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

The project activity is the installation of a new grid-connected renewable power plant/unit. The baseline scenario in accordance with ACM0002 (Version 09) for grid-connected electricity generation from renewable energy sources is the following:
"Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system, version 01.1"
Therefore, the baseline for the proposed project is the equivalent annual generated electricity supplied by 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 project owner seriously considered CDM in the decision to proceed with the investment in the project prior to the start of the project activity. The starting date of the project is before the date of validation. Therefore, according to Annex 46 "Guidance on the demonstration and assessment of prior consideration of the CDM" of EB 41st Meeting Report, the prior consideration of CDM is demonstrated as follows:

Events	Underlying project	CDM consideration
FSR finalization including CDM		08/2007
FSR approved by local DRC		17/09/2007
Board meeting deciding to seek CDM status		09/10/2007
CDM Service Agreement with CREIA		10/12/2007
Equipment purchase agreement signed	15/04/2008	
PDD for global stakeholder comments		26/04/2008
Construction Agreement	10/06/2008	

Feasibility Study Report (FSR) of the proposed project was completed by Inner-Mongolian Investigation and Design Institute of Water Conversancy and Hydropower in August 2007and then was approved by Inner Mongolia DRC on 17/09/2007[4].

As concluded in the FSR, the proposed project is unlike to be financial attractive and CDM support can help reduce the adverse influences brought by the low on-grid tariff and make the proposed project financial feasible.

Based on the approved FSR, a final resolution of CDM development on the proposed project was made on the Board meeting by the project owner on 09/10/2007[5], which decided that the proposed project shall take CDM development to gain additional revenue to make financially attractive.

Subsequently, the project owner signed the CDM consultant agreement with Chinese Renewable Energy Industries Association (CREIA) formally in 10/12/2007. Under the great efforts by the Consultant, the proposed project PDD was finished in 29/01/2008 and the proposed project smoothly moved into business negotiation. The PDD was published on the UNFCCC CDM website starting from 26/04/2008[6]. Meanwhile, in April 2008, the PDD with relevant documents were submitted to China's DNA. Soon, the project owner attended the 47th assessing meeting of China's DNA on 13/05/2008[7] and got the LOA on 30/07/2008[8]. On 10/03/2009, the proposed project got the LoA from UK government.

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[4] Letter of approval for FSR of Guohua Wulate Zhongqi Phase I 49.5 MW Wind Farm Project on 17/09/2007, and approval number is DRC of Inner-Mongolia Energy No. [2007]1902

[5] Board Resolution by Guohua Wulate Zhongqi Wind Power Co., Ltd on 09/10/2007

[6] http://cdm.unfccc.int/Projects/Validation/DB/JUGT5Z6RA1PRT9K220HD781WRCKHJL/view.html

[7] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1777.pdf

[8] Letter of Approval for the proposed project was submitted to auditor.

The project owner signed the Equipment Purchasing Agreement soon on 15/04/2008[9], and then the Ground construction contract in 10/06/2008, among which the earlier one is the starting date of the project activity.

Thus it can be concluded that the incentive of CDM has been seriously considered prior to start of construction and the continuing and real actions were taken to secure CDM status for the project in parallel with its implementation. All the relevant evidences have been submitted to DOE.

The approved consolidated baseline and monitoring methodology ACM0002 (Version09) requires the use of the latest "Tool for the demonstration and assessment of additionality, Version05.2" agreed by the Executive Board to demonstrate and assess the addtionality of the proposed project.

Step1. Identification of alternatives to the proposed 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 policies[10] .Due to the technology development status and the high cost for power generation, solar PV[11] and geothermal[12] 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 Region[13]. Therefore, the hydro and other kinds of renewable

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[9] Equipment purchasing agreement signed with Goldwind Science & Technology Creation Wind Power Equipment Co. Ltd on 15/04/2007

[10] http://www.nongji.com.cn/news/viewNews.action?newsId=27133

[11] http://finance.qq.com/a/20070920/002031.htm

[12] 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)

[13] http://hzs.ndrc.gov.cn/gzdt/t20050711_30838.htm

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:

The annual utilization hour of thermal units in the NCPG is approximately 5472 hours[14], while that of the proposed project is 2135 hours. Therefore, the alternative 2 thermal power plant with equivalent power output as the proposed project corresponds to an installed capacity of 21MW or less, however according to *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*,）coal-fired plants with a capacity of 135MW or less are prohibited from development in large grid such as provincial girds[15], and the fossil fuel-fired power units with less than 100MW capacity is strictly regulated for installation5 according to current regulations in China[16]. Consequently, alternative 2 is not a feasible alternative scenario to the proposed project.

Scenario 1 and 4 comply with current laws and regulations, but are not mandatory.

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 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（Version 05.2）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 from electricity output, the simple cost analysis method is not appropriate. 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* issued by former State Power Corporation of China in 2002, the financial benchmark rate of return of Chinese power industry is 8% of the total investment, which has been used widely for Feasibility Studies of the power project investments, including the wind power project in China.

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

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[14] The annual electricity output of thermal units in the NCPG is 1286.82×108kWh(China Electric Power Yearbook 2006, P572), and the annual total installed capacity of coal-fired plants in the NCPG is 2351.45×104kW(China Electric Power Yearbook 2006, P571), therefore, the annual utilization hour of the thermal units in NCPG is 5472 hours.

[15]http://www.zjjmw.gov.cn/zcfg/gjfg/2002/10/10/9318.shtml

[16] Interim Rules on the Installation and Management of Small-scale Fuel-fired Generators issued in August 1997, as for more detailed information please refer to http://www.sdpc.gov.cn/zcfb/zcfbqt/2007qita/t20070131_115037.htm

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

The investment estimation in the Feasibility Study Report, carried out by an independent design institute, Inner-Mongolian Investigation and Design Institute of Water Conversancy and Hydropower, in August 2007. The analysis is based on the national regulation and the material and equipment price level,in accordance with the prescription of the "Codes on Compiling Feasibility Study Report of Wind Farms"issued by NDRC.

The FSR was approved by Development and Reform Committee of Inner Mongolia Autonomous Region on 17/09/2007. The project start date is 15/04/2008, thus the time between the approval of FSR and the investment decision is only seven months, and all the input values are valid and applicable at the time of the investment decision.

Therefore, all the input values and calculations used in the PDD are derived from the FSR, and basic parameters for calculation of financial indicators are summarized as follows:

TableB-2. The financial indicators for the proposed project

Indicator	Unit	Value	Source
Installed capacity	MW	49.5	P 116 of approved FSR
Annual output	MWh/a	124,300	
Static Total Investment	Million Yuan	502.6472	
Average Annual O&M Cost	Million Yuan	11.2279	
On-grid Tariff (including tax)	RMB/kWh	0.51	
Value added tax rate	%	8.5	P114 of approved FSR
Income tax	%	25	
Education Tax	%	3	
City Build Tax	%	5	
Project lifetime	year	20	
Expected CERs price	EURO/ t CO_2e	10	Market price

Tariff

The expected on-grid tariff used for the financial analysis in the FSR refers to the most recent tariffs for wind farms installed on the same grid at the time of writing the FSR (August 2007). The FSR referred to the tariff letter issued by NDRC in June 2007 (Fa Gai Jia Ge [2007]1260])[17], which indicated that the unified tariff was 0.51 RMB/kWh (incl. VAT). Therefore, given that 0.51 RMB/kWh was the most recent tariff approved at the time of writing the FSR it is appropriate and reasonable to use this value, and no other value could credibly be used.

Since June 2007, the tariff in West Inner Mongolia has been maintained at 0.51 Yuan/kWh in all tariff notifications issued by NDRC to other projects (Fa Gai Jia Ge [2007]3303 dated 3/12/2007 and Fa Gai Jia Ge [2008]1876 dated 23/07/2008). At the end of July 2009, (NDRC) released the "Circular on Improving Wind Power On-grid Tariff Policy" (Fagaijiage [2009]1906), which clarified the policy for wind farms tariff. The Circular explained that four different wind resource regions were defined based on wind resource status and project construction conditions with corresponding guiding tariffs. Tariff determination system for wind power projects finally stabilized due to this regulation. The tariff in western Inner Mongolia again was maintained at 0.51 RMB/kWh.

Additionally, according to the tariff notifications by NDRC, the tariff of the wind farm projects officially approved were two-phase tariffs. The tariff for the first phase (the first 30,000 full load hours) will be fixed (i.e. 0.51 Yuan/kWh), the tariff after 30,000 full load hours will be set at the average tariff of the local grid which was 0.26276 Yuan/kWh (incl. VAT) in 2007[18], i.e. significantly below the tariff level granted for the initial period. The simplified tariff adopted in the investment analysis, using just one single tariff of 0.51 RMB/kWh for the lifetime of the project, therefore, is conservative.

The tariff of the proposed project has been approved as 0.51 RMB/kWh (incl. VAT) in the tariff notification Neifagaijiage [2009]2013 dated 4/09/2009[19].

Furthermore, even considering the highest tariff in the West Inner Mongolia and the corresponding notification ([2006]2098) for the Project:

- 0.579 Yuan/kWh (including VAT) for the first 30,000 full load hours, not for the whole assessment period, this is clearly stated in the notification;
- The local average tariff for the rest period of the lifetime which is 0.26276Yuan/kWh (incl. VAT) (Ref-35) in 2007.

The IRR using the highest tariff in the same region is 5.66%, and still lower than the benchmark of 8%.

According to of Annex 3 EB 22, this guidance is used to determine the baseline scenario. As the indication from paragraph 6(b) Annex 3 EB 22, "National and/or sectoral policies or regulations that

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17 Notification of electricity tariff for wind power projects (Fa Gai Jia Ge [2007]1260) issued by NDRC on 09 June 2007.

18 The tariff after 30,000h is referred to China Electricity Price executive report 2007 issued by State Electricity Regulatory Commission of People's Republic of China, which indicated that the average on-grid tariff of Western Inner Mongolia in 2007 was 0.26276 Yuan/kWh (adopted in other 7 years).

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

19 The tariff approval letter by Inner Mongolia DRC, dated 4 September 2009, Neifagaijiage [2009] 2013

give comparative advantages to less emissions-intensive technologies over more emissions-intensive technologies (e.g. public subsidies to promote the diffusion of renewable energy or to finance energy efficiency programs)" which is called E-Policies. And from paragraph 7(b) Annex 3 EB 22, the key date for determine the treatment of E-Policies is the date of adoption of the Marrakech Accords (11 November 2001), i.e. National and/or sectoral policies or regulations under paragraph 6(b) that have been implemented since the adoption by the COP of the CDM M&P (11 November 2001) need not be taken into account in developing a baseline scenario.

As indicated clearly in the "*Study Report on Development of Policy of Chinese Wind Power Tariff*" issued by China-Danish Wind Energy Development Program Office and Chinese Renewable Energy Industry Association in November, 2009, China's grid-connected wind power first started to be developed in the late 1980s, and grew rapidly during the 11th Five-year Plan (2006-2010), with the total installed capacity increasing from 4.2MW in end of 1989 to 12,000MW in 2008. Due to the growth in installed capacity of wind power in China, the country has moved up to fourth biggest wind power producer in the world by the end of 2006, which marks the start of the stage of scaling up the wind industry in China. There have been three stages in the development of grid-connected wind farms, namely initial demonstration (pilot) stage, industrialization stage, scaling up and turbines localization stage(after 2003).

In the 1990s, China started to explore domestic equipment manufacturing to further promote wind power development. i.e. The Chengfeng Plan and Shuangjia Plan[20] were introduced with aim to import foreign advanced technologies and to promote technology transformation in wind power production. Several demonstration wind farms were constructed with the government support. The wind power equipment was imported for special usage of these demonstration projects.

Nevertheless, the unified Chinese feed-in tariff system has been implemented after 11 Nov 2001.Prior to this time, the Chinese power sector was not reformed[21] and was composed of large vertically integrated power companies. A handful of demonstration wind projects which implemented prior to that date, were often funded through overseas aid. Even though, the higher tariff may achieved by particular projects in some region, this couldn't be regarded as a result of government policy, but due to foreign support in terms of finance or soft loan and was given on a project-by-project basis. By given these analyses, prior to 11 November, 2001, no exactly policy was issued for wind power industry in China, and obviously, there is no E- policies for wind power projects which existed at that time.
According to paragraph 6(b) Annex 3 EB 22, "give comparative advantages to less emissions intensive technologies over more emissions-intensive technologies" which are so called E-Policies, E- Policies for China wind farm projects have been implemented after 11 November 2001 which has been dedicated to the development of wind power industry, here illustrates the wind power development process as follows:

1) Law of the People's Republic of China on Renewable Energies issued in 2005[22]

[20] http://www.hailinagri.gov.cn/view.asp?id=1564

[21] During 2002, a reform for electric power system in China, Electric Power System Reform was issued by China State Council dated 10/02/2002, which breaks the state-monopoly of the electric supply system, separates electric power generation and electric grid operation into sectors, so that promotes market competition.

[22] Law of the People's Republic of China on Renewable Energies issued by China's government

2) The Tentative Management Measures for Price and Sharing of Expenses for Electricity Generation from Renewable Energy were issued by China NDRC in Jan. 2006[23]aiming to stimulate the development of renewable power project including wind power project. It is stated that the tariff of wind power should be guided by government.
3) In July 2009, the tariff approval document about the on-grid tariff of the wind power projects in China was issued by NDRC[24], it is clearly informed that the tariff for wind power projects should be determined according to which resource region it located, and four wind resource regions were identified in China based on the analysis on the Wind Energy Resources and Standard for Engineering Construction.

To conclude, as shown above, China wind industry development was in the period of exploratory and demonstration before year 2001 which has no national and sectoral policies, i.e. any E-Policies didn't exist prior to the date of 11 November 2001 in China. Since 2002, especially after 2005, there have been a lot of E-policies of Chinese government which encourage the development of renewable energy and be in line with the indication of paragraph 6(b) Annex 3 EB 22. According to the key date for determine the treatment of E-Policies from paragraph 7(b) Annex 3 EB 22, these E-policies need not be taken into account in developing a baseline scenario.

There is no national and sectoral policies to China wind power projects which existed as at 11November 2001 in China.
A handful of wind power projects prior to that time which received a higher tariff or other preferential treatment are demonstration projects in China, often funded through overseas aid or domestic funds. This couldn't be regarded as a result of government policy, but due to foreign support in terms of finance or soft loan, meanwhile, no specifically policies were issued for wind power projects at that time.

The feed in tariffs awarded to wind farm projects "give comparative advantages to less emissions-intensive technologies over more emissions-intensive technologies". The feed in tariffs have no impact on the price levels for conventional thermal power plant. Therefore, the feed in tariffs for wind can not be construed in any way to "give comparative advantages to more emissions-intensive technologies or fuels over less emissions-intensive technologies or fuel". At whichever level the feed-in tariff is set, these tariffs are Epolicies according to paragraph 6(b) Annex 3 EB 22. An increase in the tariff leads to a greater comparative advantage to less emissions-intensive technologies, and a reduction in the tariff is merely a smaller comparative advantage to less emissions-intensive technologies.
Therefore, referring to the concern indicated in EB49 paragraph 48 (b), as shown above, previous feed in tariffs were E- policies implemented after 11 November 2001 and need not be taken into account, the incentives for the wind industry are not reduced as evidenced from the rapid growth of the sector, and whichever level the feed in tariffs are they give a comparative advantage to less emissions-intensive technology and not to more emissions-intensive technologies.

The net return to the investor has not been affected by the reduction in the tariff as a result of

[23] Tentative Management Measures for Price and Sharing of Expenses for Electricity Generation from Renewable Energy (Document No. NDRC [2006]7)
[24] Tariff Approval to wind power projects in China by NDRC,Document No. (NDRC Pricing 2009 No. 1906). Web link: http://www.sdpc.gov.cn/zcfb/zcfbtz/2009tz/t20090727_292827.htm

other changes.

Nearly all wind power projects in western Inner Mongolia implemented since 2002 have received the same tariff, 0.51 RMB/kWh. While a few projects which were installed in the early years received slightly higher levels of feed in tariffs, the tariff has now been stable for several years. The stated policy of encouraging increased competitiveness, the maturing of the sector and the tariff mechanism, as well as the introduction of domestic turbines mean that small change in the tariff has not reduced the incentive for investment in renewable energy projects.

No	Project	tariff	Investment cost per kW	annual O&M costs per MWh	IRR
		Yuan/kWh	(Incl. VAT)	Yuan/kW Yuan/MWh	
1	Huitengxile Windfarm Project	0.55	Not available		
2	Inner-Mongolia Ximeng Abag 49.5MW Wind Power Project	0.579	11,503	98	7.53%
3	Inner Mongolia Wulatezhongqi Wind farm	0.5497	10,489	70	6.10%
4	Inner Mongolia Bailingmiao Wind-farm	0.548	11,027	96	6.59%
Average value of above projects		0.5589	11,006	88	
5	The project	0.51	10,155	90	6.35%

All the four projects have been supported by carbon finance and would have been financial unfeasible without carbon finance to secure the financial feasible (IRR without carbon finance lower than the benchmark 8%).
Compared to the average value of project No.2 to No.4 in Table 3, the tariff of the Project is 8.75% lower and the O&M costs are 2.27% higher, and the investment costs is 7.73% lower.

By introducing the average basic parameters of project No. 2 to No.4 in Table 3, i.e. the tariffs, the investment cost per unit of installed capacity and annual O&M costs per MWh, into the financial analysis of the Project to calculate the hypothetic IRR when the Project faced the same situation with the three projects with higher tariffs, the hypothetic IRR of the Project is 6.60%, still lower than the benchmark 8%.

In conclusion, the applied tariff in the investment analysis in the FSR and PDD is appropriate, taking into account national/local/sectoral policies and measures in line with EB guidance.

(2) Comparison of the IRR for the proposed project and the financial indicators benchmark

In accordance with the benchmark analysis (Option III), the proposed project will be financially unattractive if the financial indicators of the proposed project (e.g. project IRR) are lower than the benchmark rate.

As shown from TableB-3, the project IRR of the proposed project is 6.35% (Incl. VAT) in absence of CDM revenues, which is lower than the benchmark rate of 8%. And therefore the project is unattractive to the investor, as well as not applicable commercially, as well as not applicable commercially. However, with the CDM revenue, project IRR is significantly improved and exceeds the benchmark rate. Table B-3 shows the fluctuating situation of project IRR, with and without CDM revenues.

TableB-3. Financial indicators of the proposed project

	IRR (Total investment) Benchmark rate =8%
Without CDM revenue	6.35%
With CDM revenue	9.94%

Sub-step 2d. Sensitivity analysis

The purpose of the sensibility analysis is to examine whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumption. The investment analysis provides a valid argument in favour of additionality only if it consistently supports (for a realistic range of assumptions) the conclusion that the project activity is unlikely to be the most financially attractive or is unlikely to be least financially attractive.

As for the proposed project, four financial parameters of total static investment, annual O&M cost, on-grid tariff and annual power generation were identified as the main variable factors for sensitive analysis of financial attractiveness, because total investment, annual power generation and on-grid tariff were considered as three main financial parameters for sensitive analysis in approved FSR. And according to the conservative principle, annual O&M cost was also considered as one of the main parameters for sensitive analysis in PDD. Their impacts on project IRR were analyzed in this step. The fluctuation range from -10%~ +10% is consistent with the approved FSR and is a reasonable range commonly used in FSR for sensitivity analysis of construction project in China.

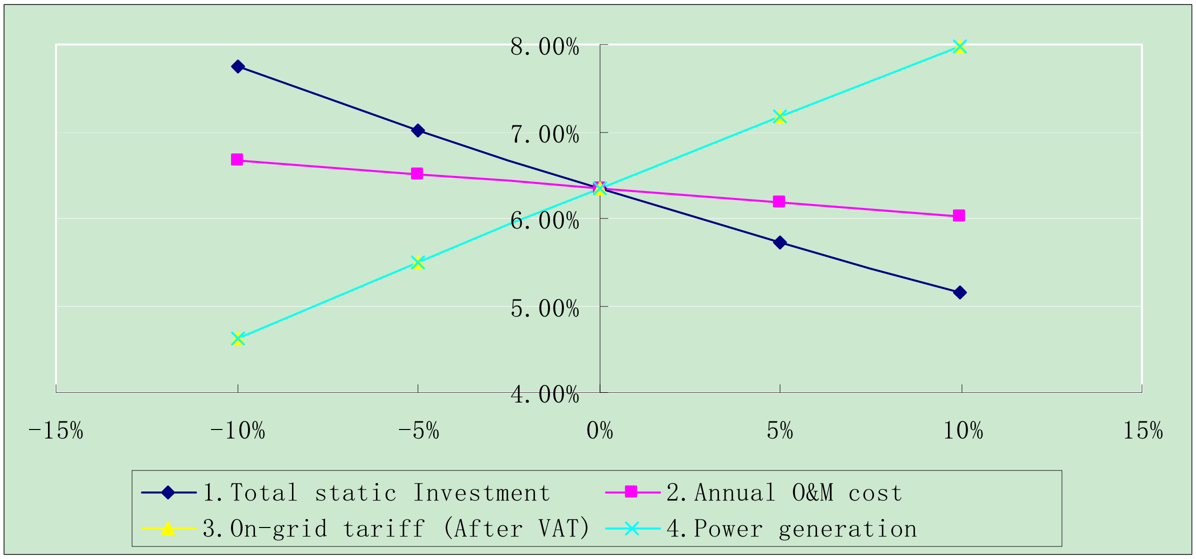
For detailed results of sensitive analysis of the three indicators, please see Table B-4.

Table B-4. Sensibility analysis of financial indicator for the proposed Project

(Project IRR without the CDM revenue)

	-10%	**-5%**	**0**	**+5%**	**+10%**
Power Generation	7.75%	7.02%	6.35%	5.73%	5.16%

Static total investment	6.67%	6.51%	6.35%	6.19%	6.03%
Annual O&M costs	4.63%	5.50%	6.35%	7.17%	7.97%
Annual Power Generation	4.63%	5.50%	6.35%	7.17%	7.97%



FigureB-2. Sensibility analysis of financial indicator

As shown in TableB-4 and Figure B-2, the project IRR varies to different extents, when the above four financial indicators fluctuated within the range from -10% to +10%. In comparison, the impact of on-grid tariff and annual power generation on IRR is most significant, following by total static investment, and annual O&M cost. When the on-grid tariff or annual power generation increases by 10%, project IRR is 7.97%, lower than the benchmark 8%. When the total static investment decreases by 10%, the project IRR is 7.75%, also lower than the benchmark. When the annual O& M costs deceased by 10%, the project IRR is 6.67%, lower than the benchmark.

Table B-5: Variation of financial parameters to make the project IRR reach 8%

Variation of the parameters to make IRR reach the benchmark 8%	Total statistic investment	Annual Power Generation	On-grid tariff	Annual O&M cost
	-11.6%	+10.2%	+10.2%	-53%

- **Static total investment.**

In the case that the total investment decreases by 11.6%, the project IRR begins to exceed the benchmark. The majority of total investment is wind turbines equipment purchasing and installing, which is accounting for 90.1% [25]of total statistic investment. Since price of wind turbines equipment has increasing in recent years[26], it is very difficult to be lower the total investment of the proposed project.

-Annual electricity generation
If the electricity generation increases by 10.2 %, the project IRR can reach 8%. However, large variation of annual electricity generation is also impossible. The wind resource analysis of the proposed project is based on 36-year climate monitoring data and one-year records from 2 wind measuring towers in the wind farm area. The 36-year climate monitoring data shows that the wind speed in the wind farm area decreased, e.g. 3.1m/s from 1971 to 2006, while 2.9m/s from 1981 to 2006.. Therefore, the annual equivalent operation hour which is assumed on the analysis couldn't vary a lot, and is more likely to decrease following the change of wind speed. Moreover, because of the difficulties of dispatch, most of big wind farms in China couldn't operate with full efficiency. Thus, the annual equivalent operation hour of the proposed project is not likely to increase.

-On-grid tariff
When on-grid tariff increases by 10.2% and the feed in tariff is 0.6215 RMB/kWh, the project IRR can reach 8.00%. However, according to the current regulation on tariff of wind power project[27], the tariff should be regulated by government with reference to the bidding tariff; as a result much lower tariff was endorsed to local wind farms since 2006[28]. In December 2007, a still lower bidding tariff was set to local wind farm projects[29] . Therefore, the on-grid tariff of the proposed project is impossible to increase beyond 10%. Even considering the previous highest feed in tariff of 0.579 RMB/kWh, the proposed project will not be cross the benchmark rate and is still addition as we demonstrated in the response to the question under review.

-Annual O&M cost
Since the price of equipments, raw materials and wage standard in China has been continued rising over the years[30], annual O&M cost thus would only increase rather than decrease. Therefore, it is impossible for the annul O&M cost to decrease even beyond 53%.

After above sensitive analysis, when financial indicators change within reasonable range, the proposed

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[25] Feasibility Study Report of the proposed project, Page179

[26] China Government Establish Policy to Promote Windturbine Manufactory, reported by China New Energy Website, http://www.gzkj.gov.cn/kjxx/newsDetail.jsp?infoId=79934

[27] Provisional Administrative Measure on Pricing and Cost Sharing for Renewable Energy Power Generation issued by NDRC on 4 January 2006, http://www.ndrc.gov.cn/jggl/zcfg/t20060120_57586.htm

[28] Letter of Approval of on-grid tariff for wind power projects issued by Provincial Development and Reform Commission of Inner Mongolia on 8 August 2006, Num. [2006] 1394
http://www.checc.cn/news/news.jsp?type=100&new_id=5623

[29] *Notification of on-grid tariff for wind power projects of Hebei Zhangjiawan, Heilongjiang Wuerguli Mountain and etc.* issued by NDRC in 03/12/2007. (ducument No.Fagai Jiage[2007]3303.)
According to the latest Notification, for cumulative electricity production within utilization hours of 30,000, 0.54 RMB/kWh (including VAT) will be endorsed. For the rest, the average tariff of local grid at that time will be applied.

[30] http://www.stats.gov.cn/was40/reldetail.jsp?docid=402315740

project is not financially feasible without CDM support. Therefore, alternative 1 is not a feasible alternative baseline scenario.

Step 3: Barrier analysis

The proposed project does not adopt barrier analysis.

Step 4: Common practice analysis

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

As per the "*Tool for the demonstration and assessment of additionality" (Version 05.2)*, the other activities that are operational and that are similar to the proposed project activity were selected according to the follow rules:

- The activities should be located in the same province. The activities in the same province have the similar wind resource, grid structure, geological and transportation conditions, economic developing status. Those factors affected the annual electricity output and the total investment respectively. Therefore, Inner Mongolia Autonomous Region was chosen as the scope of common practice
- The activities should be implemented after 2002[31]. The wider power sector reforms happened in China since 2002, which led to diversification in the ownership of power generation. As a result, new generation, including wind power, was expected to compete under more commercial conditions. More over, the Chinese Government launched the Wind Concession Program in 2002[32], which was designed to bring wind power development in China onto a new commercial footing.

All the wind farm projects list in table below are from " Statistics of domestic wind farm installation c apacity in 2008", Shi Pengfei, excluding the CDM project activities (registered project and project acti vities which have been publish on the UNFCCC website for global stakeholder consultation as part of the validation process[33].

Table B-6. Wind farm projects similar to the proposed project in Inner Mongolia Autonomous Region

No	Project title	Commissioning Date	Total Capacity (MW)	Project Owner	Remarks
1	Chifeng Dali Wind Power Project Phase III	2004	31.2	Dongdian Maolian Wind Power Development Company	Demonstration Project Supported by national debt fund

[31] http://www.china5e.com/law/lawshow.aspx?lawid=2746c8be-6d3c-4008-8b51-3f2165bc16ad

[32] A study on the Price Policy of Wind Power in China issued by Chinese Renewable Energy Industries Association (CREIA), GREENPEACE and Global Wind Energy Council (GWEC) dated 10/2006.

[33] *http://www.nwtc.cn/Article/ShowArticle.asp?ArticleID=1131*
http://cdm.unfccc.int/Projects/registered.html; http://cdm.unfccc.int/Projects/Validation/index.html

2	Da Mao Qi Bailingmiao Wind Farm	2008	50	Honiton Energy (Baotou) Co., Ltd	Carbon finance support

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

In 2007, wind farms accounted for only 0.148% of total power generation of NCPG[34]. It is obvious that wind power is not common practice. Chifeng Dali Wind Power Project PhaseIII is one of demonstration wind power projects subsidized by the national debt fund issued by the national government in 2000[35], hence it is more financially viable. However, there is no such good policy environment faced by the proposed project. Da Mao Qi Bailingmiao Wind Farm Project[36] was applying for gold standard VER revenue to overcome it financial barriers. Therefore, there is essential distinction between these two wind farms and the proposed project.

In conclusion, the proposed project is not a common practice in the region. **The proposed project is financially unattractive and additional.**

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

I. Baseline emissions

$$BE_y = (EG_y - EG_{baseline}) * EF_{grid,CM,y}$$

Where,

BE_y Baseline emissions in year *y* (tCO_2/yr);

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

$EG_{baseline}$ Baseline electricity supplied to the grid in the case of modified or retrofit facilities (MWh). For new power plants this value is taken as zero;

$EF_{grid.CM.y}$ Combined margin CO_2 emission factor for grid connected power generation in year *y*, calculated using the latest version of the "*Tool to calculate the emission factor for an electricity system, Version 01.1*".

[34] Data source: Page 748 of China Electric Power Yearbook, 2007

[35] http://www.nmg.xinhuanet.com/mscz/2005-08/24/content_4963758.htm

[36] http://www.honitonenergy.com/chinese/resources/pdf/NO.2-BLM2-PDD-Summary-CH.pdf

According to *"Tool to calculate the emission factor for an electricity system" (Version 01.1)*, the baseline emission factor(EF_y)is calculated as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) factors according to the following six steps. The baseline emission factor is calculated by the method of ex-ante, which will be fixed during the first crediting period. Data for the calculation are based on official national statistics books: China Energy Statistical Yearbook and China Electric Power Yearbook.

STEP1. Identify the relevant electric power system

In accordance with the *Tool to Calculate the Emission Factor for an Electricity System, Version 01.1*, the project relevant electric power system of the proposed project is identified by the delineation of the project electricity system and connected electricity systems published by China's DNA.

Electricity generated by the proposed project will be delivered to the NCPG. According to the *Notification on Determining Baseline Emission Factor of China's Grid* issued by China's DNA on 09/08/07[37] , the project electric power system is NCPG, consisting of Beijing Power Grid, Tianjin Power Grid, Hebei Power Grid, Shanxi Power Grid, Shandong Power Grid and Inner Mongolia Power Grid.

STEP2. Select an operating margin (OM) method

The Operating Margin emission factor ($EF_{grid,OM,y}$) is calculated based on one of the four following methods:

1. Simple OM, or
2. simple adjusted OM, or
3. Dispatch data analysis OM, or
4. Average OM.

Simple adjusted OM needs the annual load duration curve of the gird. The data required by this method is not available in public. Therefore, method 2 is not applicable. Dispatch data analysis OM requires the detailed operating and dispatch data of power plants within the grid, but the dispatch data for NCPG is not available in public. Therefore, method 3 is not applicable, either.

From 2001 to 2005, the low cost/ must run generation in NCPG account for 0.85%, 0.89%, 0.86%, 0.76% and 0.75% (See table 9). Therefore the generation from low cost/must run resources constitute is less than 50% of the total generation. Therefore the generation from low cost/must run resources constitute is less than 50% of the total generation, which accords with the defined condition of Option 1, but not Option 4.

Table 9. Power generation mix of NCPG for most recent five years

[37] http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=1889

Energy Source	2001	2002	2003	2004	2005
Total Power Generation(GWh)	361119	407544	461653	530804	607789
Total Low-cost/must run resources (Hydro) (GWh)	2927	3455	3798	3758	4093
Total Low-cost/must run resources (Nuclear) (GWh)	126	170	181	274	458
Percentage of Lowcost/ must run resources % of the total grid generation(GWh)	0.85	0.89	0.86	0.76	0.75

Data Sources: China Electric Power Yearbook (2002-2006)

The Simple OM can be calculated using either of the two following data vintages for year y;

- Ex ante option: A 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period, or

- Ex post option: The year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. If the data required to calculate the emission factor for year y is usually only available later than six months after the end of year y,

Based on the most recent statistics available of the project activity at the time of PDD submission, the first data vintages (ex-ante) for the calculation of the OM emission factor was chosen for this project.

STEP3. Calculate the operating margin emission factor according to the selected method

According to "*Tool to calculate the emission factor for an electricity system, (Version.01.1)*", the simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants / units. 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)

Since the data of each power plant /unit is unavailable, Option A and B is not applicable to the proposed project. The proposed project adopts Option C to calculate the emission factor ($EF_{grid,OM,y}$) of NCPG.

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

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

$EF_{grid,OMsimple,y}$: Simple operating margin CO_2 emission factor in year y (tCO_2/MWh)

$FC_{i,y}$: Amount of fossil fuel type i consumed in the project electricity system in year y (mass or volume unit)

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

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

EG_y : Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost / must-run power plants / units, in year y (MWh)

i : All fossil fuel types combusted in power sources in the project electricity system in year y

y : Either the three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex ante option) or the applicable year during monitoring (ex post option), following the guidance on data vintage in step 2

The NCPG will not import electricity from other Grids. The fuel consumption and the total electricity generation of thermal plants connected to NCPG can be obtained from China Energy Statistical Yearbook and China Electric Power Yearbook. More than 10 types of fuel are used in the power plants in NCPG; and tables with consumption figures for such fuel for each of the three years are presented in Annex 3.

The $NCV_{i,y}$ can be obtained from China Energy Statistical Yearbook (2006). The $EF_{CO_2,i,y}$ and $OXID_i$ of the fuels adopted are obtained from Page1.21 and 1.23 of the default values in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: workbook.

Based on these data, the operating margin emission factor ($EF_{grid,OMsimple,y}$) of NCPG is 1.1208tCO_2/MWh (refer to Annex 3 for details).

STEP4. Identify the cohort of power units to be included in the build margin

According to "*Tool to calculate the emission factor for an electricity system, Version 01.1*", 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.

The option with more annual generation power should be used. In terms of NCPG, Option (b) is chosen since it would represent a larger, more representative of annul generation.

In terms of vintage of data, there are also two options:

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

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

And option 1 is used for the proposed project.

STEP5. Calculate the build margin emission factor ($EF_{grid,BM,y}$)

In accordance with "*Tool to calculate the emission factor for an electricity system, Version 01.1*", the build margin emissions factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

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

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

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

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

m : Power units included in the build margin

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

According to the EB' guidance on DNV deviation request "Request for clarification on use of approved methodology AM0005 for several projects in China", the EB accepted the following deviation:[38]

1） Use of capacity additions during the last 1-3years for estimating the build margin emission factor for gird electricity,

2） Use of weights estimated using installed capacity in place of annual electricity generation.

3) Use the efficiency level of the best technology commercially available in the provincial/ regional or national grid of China, as a conservative proxy, for each fuel type in estimating the fuel consumption to estimate the build margin.

The build margin calculations featured below is derived from the *Notification on Determining Baseline Emission Factor of China's Grid* issued by China DNA on 09/08/2007[39].

Since there is no way to separate the different generation technology capacities as fuel coal, fuel oil, fuel gas etc from thermal power based on the present statistical data, the following calculating measures will be taken: First, according to the energy statistical data of 2006, determine the ratio of CO_2 emissions from solid, liquid, and gas fuel consumption for power generation; then multiply this ratio by the respective emission factors based on commercially best technology to calculate the thermal emission factor. Finally, this emission factor for thermal power is multiplied by the ratio of thermal power identified within the approximation for the latest 20% installed capacity addition to the grid. The result is the BM emission factor of the grid.

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

$$\lambda_{Coal} = \frac{\sum_{i \in COAL, j} F_{i,j,y} \times COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \times COEF_{i,j}} \quad (3)$$

$$\lambda_{Oil} = \frac{\sum_{i \in OIL, j} F_{i,j,y} \times COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \times COEF_{i,j}} \quad (4)$$

$$\lambda_{Gas} = \frac{\sum_{i \in GAS, j} F_{i,j,y} \times COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \times COEF_{i,j}} \quad (5)$$

where:

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[38] http://cdm.unfccc.int/Project/Deviation

[39] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1875.pdf

$F_{i,j,y}$ is the amount of fuel i (in a mass or volume unit) consumed by province j in year(s) y,

$COEF_{i,j}$ is the CO_2 emission coefficient of fuel i (tCO_2/GJ), taking into account the carbon content of the fuels (coal, oil and gas) used by province j and the percent oxidation of the fuel in year(s) y,

and COAL, OIL and GAS are footnote group for solid fuels, liquid fuels and gas fuels.

Step b. Calculate emission factor for thermal power of NCPG

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

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.

Step c. Calculate BM of the NECPG

$$EF_{BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal} \quad (7)$$

Where $CAP_{Thermal}$ is capacity additions of thermal power while CAP_{Total} is total capacity additions.

In accordance with the *Notification on Determining Baseline Emission Factor of China's Grid* issued by China DNA on 09/08/07[40], a coal-fired power plant with a total installed capacity of 600MW is assumed to be the commercially available best practice technology in terms of efficiency. The estimated coal consumption of such a National Sub-critical Power Station with a capacity of 600MW is 343.33gce/kWh, which corresponds to an efficiency of 35.82% for electricity generation.

For gas and oil power plants a 200MW power plant with a specific fuel consumption of 258gce/kWh, which corresponds to an efficiency of 47.67% for electricity generation, is selected as commercially available best practice technology in terms of efficiency.

Based on above the data, the Build Margin emission factor ($EF_{grid,BM,y}$) of the NCPG is 0.9397 tCO2e/MWh.

As mentioned above, the build margin emission factor of the baseline is calculated ex-ante and will not be renewed in the first crediting period.

STEP6: Calculate the combined margin emissions factor ($EF_{grid,CM,y}$)

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[40] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1875.pdf

Combined Margin emission factor ($EF_{grid,CM,y}$) is calculated as the weighted average of the operating margin emission factor ($EF_{grid,OM,y}$) and the build margin emission factor ($EF_{grid,BM,y}$), where the weights ω_{OM} and ω_{BM} ,by default, are 0.75 and 0.25 in the first crediting period, and $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ are calculated as described above and are expressed in tCO_2/MWh.

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

EF_y =1.1208*0.75+0.9397*0.25=1.075527 (tCO_2e/MWh)

II. Project emissions (PE_y)

The proposed project is a wind power plant and the project emissions should not be taken into account according to ACM0002 (Version 09), i.e. PE_y =0tCO_2e.

III. Project leakage (LE_y)

No leakage is identified as the project is a wind project, and any electricity usage is taken into account in the net electricity generation from the proposed project, i.e. L_y =0 tCO_2e.

IV. Emission reductions (ER_y)

The project activity will generate GHG emission reductions by avoiding CO_2 emissions from electricity generation by fossil fuel power plants of NCPG. The emission reduction (ER_y) is calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

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

Data / Parameter:	NCV_i
Data unit:	TJ per mass or volume unit of fuel i
Description:	The net calorific value (energy content) per mass or volume unit of a fuel i
Source of data used:	China Energy Statistical Yearbook 2006
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data is obtained from the *China Energy Statistical Yearbook 2006* and is reliable.
Any comment:	---

Data / Parameter:	$OXID_i$
Data unit:	%
Description:	Oxidation rate of the fuel i
Source of data used:	2006 IPCC guidelines for National Greenhouse Gas Inventories
Value applied:	1
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data are collected from the IPCC.
Any comment:	---

Data / Parameter:	$EF_{CO_2,i,y}$
Data unit:	t CO_2/GJ
Description:	CO_2 emission factor of fossil fuel i in year y
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data is obtained from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories and is reliable.
Any comment:	---

Data / Parameter:	$FC_{i,y}$
Data unit:	t or m^3
Description:	Amount of fossil fuel type i consumed in the project electricity system in year y
Source of data used:	China Energy Statistical Yearbook 2004-2006
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data is obtained from the *China Energy Statistical Yearbook 2004- 2006* and is reliable.
Any comment:	---

Data / Parameter:	Electricity Generation

Data unit:	MWh/year
Description:	The electricity supplied by NCPG in the year y.
Source of data used:	China Electric Power Yearbook, 2004-2006
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data is obtained from the China Electric Power Yearbook 2004-2006 and is reliable.
Any comment:	---

Data / Parameter:	Electricity self-consumption ratio
Data unit:	%
Description:	The auxiliary electricity consumption rate of the power plants in NCPG
Source of data used:	China Electric Power Yearbook, 2004-2006
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data is obtained from the *China Electric Power Yearbook 2004-2006* and is reliable.
Any comment:	---

Data / Parameter:	$\eta_{best,i}$
Data unit:	%
Description:	The efficiency of best technology commercially available for coal-, gas- and oil-fired power in Chin
Source of data used:	*Notification on Determining Baseline Emission Factor of China's Grid* issued by China's DNA on 09/08/07,for more detain information please refer tohttp://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1875.pdf
Value applied:	The efficiency of best technology commercially available for coal is 35.82%, for gas is 47.67%; and for oil is47.67%
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data is obtained from China DNA, Office of National Coordination Committee on Climate Change and is reliable.

Data / Parameter:	Installed capacity
Data unit:	MW
Description:	Installed capacity of NEPG of 2000, 2001 and 2007
Source of data used:	China Electric Power Yearbook Edition, 2000, 2001 and 2007

Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data is obtained from the China Electric Power Yearbook of 2000, 2001 and 2007 and is reliable.

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

I. Estimated baseline emissions

According to the Feasibility Study Report, the annual power generation is estimated to be 124,300MWh.The baseline emission factor is 1.075525tCO2e/MWh and the annual baseline emission of the project is 133,685tCO_2e as calculated below.

$BE_y = EG_y \times EF_y$ =124,300*1.0755=133,685tCO_2e

II. Estimated project emissions

The proposed project is a wind power plant that the project emissions should not be taken into account according to ACM0002, i.e.

PE_y =0tCO_2e.

III. Calculate the project leakage

According to ACM0002, the proposed project needn't consider leakages, i.e. L_y =0tCO_2e.

IV. Calculate the emission reductions

The project activity will generate GHG emission reductions by avoiding CO_2 emissions from electricity generation by fossil fuel power plants. The emission reduction (ER_y) is calculated as follows:

$ER_y = BE_y \times PE_y - L_y$ =133,685-0-0=133,685tCO_2e

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

Year	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
2010	0	133,685	0	133,685
2011	0	133,685	0	133,685
2012	0	133,685	0	133,685
2013	0	133,685	0	133,685

2014	0	133,685	0	133,685
2015	0	133,685	0	133,685
2016	0	133,685	0	133,685
Total (tonnes of CO2e)	0	935,793	0	935,793

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 should be archived electronically and be kept at least for 2 years after the end of the last crediting period.

Data / Parameter:	EG_y
Data unit:	MWh
Description:	Net electricity supplied to the NCPG by the project in period y
Source of data to be used:	Electricity meter
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Net supplied power is expected to be 124,300MWh/y.
Description of measurement methods and procedures to be applied:	The net electricity supplied to the grid will be monitored through the electricity meter installed at the on-site substation.
Monitoring frequency	Hourly measurement and monthly recording
QA/QC procedures to be applied:	The meter will be calibrated by qualified third party. The accuracy of the meter is no less than 0.5%. The data measured by the electricity meter will be double checked by receipt of sales.
Any comment:	Uncertainty level of data is low.

Data / Parameter:	$EG_{export,y}$
Data unit:	MWh
Description:	The electricity exported to the NCPG by the project in period y
Source of data to be used:	Electricity Meter
Value of data applied for the purpose of	The electricity exported to the grid is expected to be 124,300MWh/y.

calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	The electricity exported to the grid will be monitored and measured by the electricity meter installed at the on-site substation.
Monitoring frequency	Hourly measurement and monthly recording
QA/QC procedures to be applied:	The electricity meter will be calibrated annually. The data measured by the electricity meter will be double checked by receipt of sales.
Any comment:	Uncertainty level of data is low.

Data / Parameter:	$EG_{import,y}$
Data unit:	MWh
Description:	The electricity imported by the proposed project to NCPG in year y
Source of data to be used:	Electricity Meter
Value of data applied for the purpose of calculating expected emission reductions in section B.5	The value in the PDD was assumed as 0
Description of measurement methods and procedures to be applied:	The electricity imported from the grid will be monitored and measured by the electricity meter installed at the on-site substation.
Monitoring frequency	Hourly measurement and monthly recording
QA/QC procedures to be applied:	The electricity meter will be calibrated annually. The data measured by the electricity meter will be double checked by receipt of sales.
Any comment:	Uncertainty level of data is low.

B.7.2. Description of the monitoring plan:

The proposed project adopts the approved consolidated monitoring methodology ACM0002 (Version09) "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" to determine the emission reductions due to the net electricity supply to NCPG by the proposed project.

1. The users --- who use the monitoring plan

The proposed project owner will use this document as guideline in monitoring of the project emission reduction performance and will adhere to the guidelines set out in this monitoring plan. This plan should be modified according to actual conditions and requirements of DOE in order to ensure that the monitoring is credible, transparent and conservative.

2. Operational and management structure for monitoring

The monitoring of the emission reductions will be carried out according to Figure4 below.

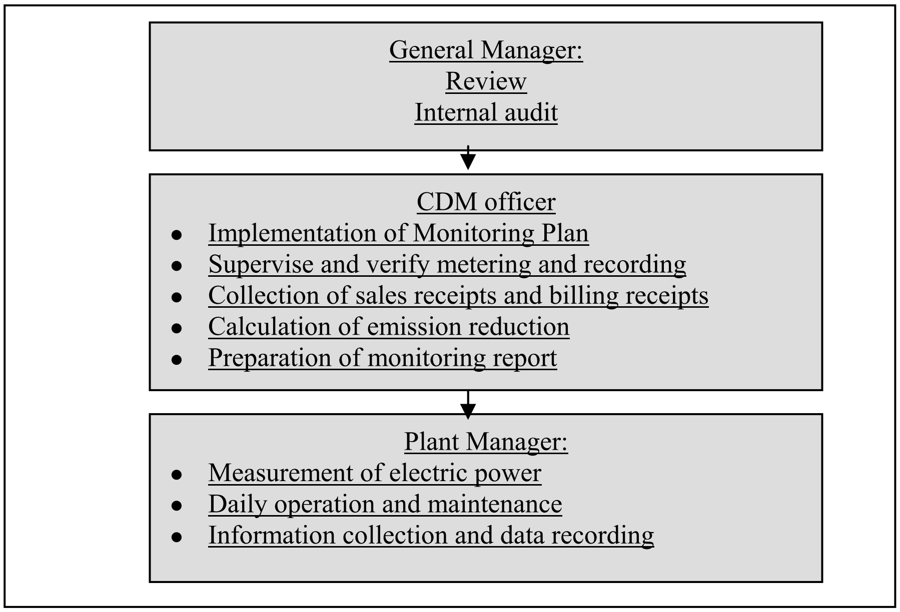


Figure4. The personnel structure of the project monitoring

Plant manager of wind farm is responsible for recording and collecting the information and data required by the Monitoring Plan. The required information and data will be documented and sent to the CDM officer monthly. The CDM officer works out the monitoring plan, charges of its implementation and reports to the General Manager of the company. The General Manager of the company will make the confirmations on monitoring calculation data and reports.

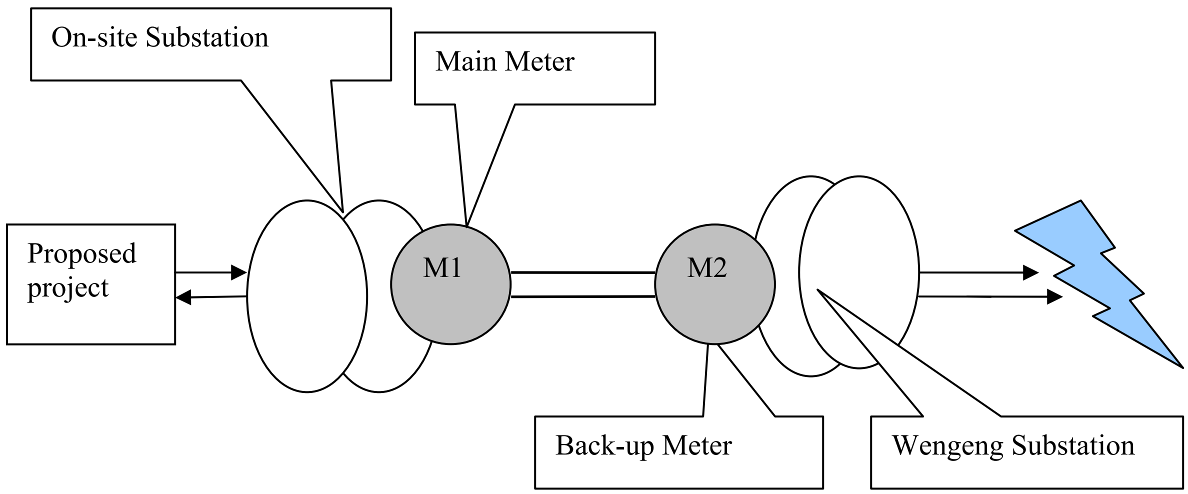
The project owner and CREIA will work together to train relevant staffs of the wind power plant for data monitoring and data management. The training contains CDM knowledge, operational regulations, quality control (QC) standard, data monitoring and data management etc.

3. Metering

The net electricity delivered to the power grid shall be metered through the main meter installed at on-site substation of the proposed project. The main meter will be owned, operated and maintained by the project owner. The main meter with accuracy of no less than 0.5% is bidirectional and has two-way metering, recording both the electricity exported to the grid ($EG_{export,y}$) and imported from the grid ($EG_{import,y}$); net electricity supplied to the grid (EG_y) is calculated as exports minus imports. This data will be cross checked by the receipt of sales.

A back-up meter will be installed at the Wengeng substation, which will be owned, operated and maintained by the grid company. The accuracy of the back-up meter is also no less than 0.5%.

The location of the main meter and back-up meter is as the following chart.



4. Calibration of Meters & Metering

The main meter will be owned, operated and maintained by the proposed project owner, and the back-up meter will be owned, operated and maintained by the Grid Company. The main meter are calibrated and checked for accuracy:

1) The main meter equipment shall have sufficient accuracy so that error resulting from such equipment shall not exceed ±0.5% of full-scale rating.
2) All the meters installed shall be tested within 10 days after:
   (a) The detection of a difference larger than the allowable error in the reading of both meters
   (b) The repair of all or part of the meter caused by the failure of one or more parts to operate in accordance with the specifications.

Calibration is carried out by the qualified third party, and the calibration report should be provided to the project owner.

5. Data management system

Physical document such as paper-based maps, diagrams and environmental assessments will be collated in a central place, together with this monitoring plan. In order to facilitate auditors' reference of relevant literature relating to the proposed project activity, the project material and monitoring results will be indexed. All paper-based information will be stored by the technology department of the project owner and all material will have a copy for backup.

And all data including calibration records is kept until 2 years after the end of the total crediting period of the CDM project.

6. Monitoring Report

The CDM officer 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)

The completion of the baseline methodology is 14/04/2009

The technicians determining the baseline methodology include:

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   None of the people above is the project participants.

SECTION C. Duration of the project activity / Crediting period

C.1. Duration of the project activity:

C.1.1. Starting date of the project activity:

15/04/2008 (the Equipment Purchasing Agreement signed)

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

20 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:

01/04/2010 or the registration date (which is latter)

C.2.1.2. Length of the first crediting period:

7 years 0 months

C.2.2. Fixed crediting period:

n/a

C.2.2.1. Starting date:

n/a

C.2.2.2. Length:

n/a

SECTION D. Environmental impacts

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

An Environmental Impact Assessment (EIA) for the proposed project was completed in March 2007 by Inner Mongolia Institute of Water and Electricity Surveying & Designing. A summary of the impacts is presented below.

Analysis of environmental impacts during construction duration

Ecological environmental impact analysis
There is no endangered species living in this area. The project owner will strictly control the on-site construction scope, take vegetation protection into account; meanwhile, restore vegetation generation based on restoration framework, so it will not influence the ecological environment very much.

Atmospheric environmental impact analysis
The largest impact scope of dust emission is 420 meters. The closest distance between construction site and local village is 500 meters. Therefore, there is not so much environmental impact on local air quality.

The dust will make the greatest impact to the atmospheres during construction duration. Construction of the atmospheric environment is the impact of dust. The effective prevention measures such as sprinkling water in time, stamping sail heap on the construction site, will be implemented so as to reduce the impact on the environment. The scale of the project construction is small so that the construction is relatively simple and construction period is short. The period of excavation and transport is short, so partial impact on the region's air quality does not have a greater influence.

Water environmental impact analysis
The source of wastewater duration is mainly from construction wastewater and sewage wastewater. The construction wastewater will be handled directly by sedimentation tanks. Clear water can be emitted directly and sedimentation mud can be deal with construction garbage. Sewage wastewater will be handled with the construct wastewater so that the standard will accord with "Urban Sewage Treatment Plant Pollution Emission Standards." Therefore surface water will not be polluted.

Noise environmental impact analysis

Noise during construction is mainly caused by equipment installation and operation. There are a few households in the wind farm site, so it is the best to set up the wind machines far from 250m, which will not make the significant impact to the sound quality of the environment of these residents. Noise on the impact of small wild animals is small. Therefore, the noise is acceptable during the construction.

Solid waste

Solid waste will be reasonably treated, which include clean up the extra earth in time, clam the landscape, recover the previous plants, protect the natural environment with less destruction, so the destruction level of local natural environment by this project implementation is controlled relatively low, therefore the project implementation doesn’t have obvious impacts on local natural environment.

Analysis of environmental impacts after put into production

Atmospheric environmental impact analysis
During the production period, office building and employers houses will be warmed by electric heating equipment so there is no pollution source for the atmosphere and it will not cause health damage to local people.

Surface water environmental impact analysis

The wastewater will be handled by sedimentation tanks. The standard will accord with "Urban Sewage Treatment Plant Pollution Emission Standards.", so the clear water on surface can be emitted directly. Therefore, the wastewater will cause little impact to surface water.

Noise environmental impact analysis

After the project is put into production, the equipments are functioning stably and noise impact tends to smooth, especially outside 600m, sound environmental condition is better. Therefore, there are less noise impact to nearby residents and wildlife during the production.

Solid waste

The project will not produce waste during the production so this project will not influence the local ecological environment

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

The proposed project has no significant impacts on the environment. The EIA of the proposed project has been approved by Inner Mongolia Environment Protection Administration on 27 July 2007[41].

SECTION E. Stakeholders' comments

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

In order to collect suggestions from the stakeholder, the project owner introduces to the project by poster and broadcast. Furthermore, the stakeholder comment meeting was held in Urad Zhongqi, Bayan Nur League, Inner Mongolia Autonomous Region, on 14/012008. The meeting consist of four parts, which were summarised as follows:

- The project basic information introduced by project owner,
- The CDM basic concept introduced by Mr. Wang Weiquan from Chinese the Renewable Energy Industries Association;
- Free discussion, and;
- The participants filled out questionnaires.

The questionnaire includes below contents:

1. Do you know this project?
2. Do you think the proposed project will be helpful to improve the local economy?
3. Will the project impact your livelihood positively or negatively?
4. Do you think the location of the proposed project is reasonable or unreasonable?

[41] Approval of Environment Impact Assessment for Guohua Wulater Zhongqi Phase I 49.5 MW Wind Farm Project on 27/06/2007. Document No. Menghuanbiao [2007]126

5. Will the proposed project impact the environment?
6. Do you support the construction of the project?

There are specific people responsible for records filed for the representative speech and recovery the questionnaire and do some statistics work. Part.E.2. summarized questionnaire statistics result.

E.2. Summary of the comments received:

The forum issued a total of 30 copies of the questionnaire, 30 recoveries, 100% recovery rate. There were 6 items to be interviewed in this public investigation and interview comments are summarized as follows.

- 97% of the respondents know the proposed project; 3% of the respondents know a little about the propose project
- 100% of the respondents argue that the proposed project will promote the local economic;
- 69% agree that the proposed project will affect their life positively; and 31% believe that the proposed project has no effects on their life;
- 100% think that the proposed project is located reasonably;
- 56% think that the proposed project has good impact on the environment and 44% think that the
- proposed project has no bad impact on the environment;
- 100% of the respondents support the proposed project.

The background information of interviewee is summarized in the following table:

Interviewees		30	%
Gender	Male	22	73
	Female	8	27
Age	18-35	14	47
	36-50	12	40
	Above 50	4	13
Occupation	High official	1	3.4
	Official	9	30
	Worker	16	53.3
	Farmer	4	13.3
Education	College	6	20
	High school	8	26.7

	Middle school	14	46.7
	Primary school	2	6.8

Conclusion

From the comments above, it can be concluded most representatives think the proposed project will do good to local environment and economy and all support it.

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

Both the local resident and government gave strong support to the construction of the proposed project. According to comments from the stakeholders, it is not necessary to adjust the design, construction or operation of the proposed project.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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E-Mail:	
URL:	
Represented by:	
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Salutation:	Mr.
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Middle Name:	
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding from Annex I parties for the proposed project.

ANNEX 3
BASELINE INFORMATION

Table A1- A10 below shows the data and calculation process of the simple operating margin emission factor of the North China Power Grid. Table A11 to A16 show data used to calculate $EF_{BM,y}$.

Table A 1. Thermal Power to North China Power Grid in 2003

Province	Electricity Generation (MWh)	Used by the Power Plant (%)	Electricity to the Grid (MWh)
Beijing	18608000	7.52	17208678
Tianjin	32191000	6.79	30005231
Hebei	108261000	6.5	101224035
Shanxi	93962000	7.69	86736322
Inner Mongolia	65106000	7.66	60118880
Shandong	139547000	6.79	130071759
Total			**425364906**

《China Electric Power Yearbook2004》

Thermal power imported from the North East Power Grid is **4,244,380** MWh, and therefore the total thermal power to the grid is **429,609,286** MWh.

Table A 2. Thermal Power to North China Power Grid in 2004

Province	Electricity Generation (MWh)	Used by the Power Plant (%)	Electricity to the Grid (MWh)
Beijing	18579000	7.94	17103827
Tianjin	33952000	6.35	31796048
Hebei	124970000	6.5	116846950
Shanxi	104926000	7.7	96846698
Inner Mongolia	80427000	7.17	74660384
Shandong	163918000	7.32	151919202
Total			**489173110**

《China Electric Power Yearbook2005》

Thermal power imported from the North East Power Grid is **4,514,550** MWh, and therefore the total thermal power to the grid is **493,687,660** MWh

Table A 3. Thermal Power to North China Power Grid in 2005

Province	Electricity Generation (MWh)	Used by the Power Plant (%)	Electricity to the Grid (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 Electric Power Yearbook2006》

Thermal power imported from the North East Power Grid is **23,423,000**MWh, and therefore the total thermal power to the grid is **584,174,013** MWh.

Table A 4. Emissions of North China Power Grid in 2003

Fuel Type	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total	Emission Factor	Oxidate	low caloric value(MJ/t, m3,tce)	CO_2 emission (tCO_2)
									(tc/TJ)	(%)	(MJ/t,km3)	K=G*H*I*J*44/12/10000(m)
		A	B	C	D	E	F	G=A+B+C+D+E+F	H	I	J	K=G*H*I*J*44/12/1000 (v)
Raw Coal	10^4t	714.73	1052.74	5482.64	4528.5	3949.32	6808	**22535.94**	25.8	100	20908	445737636.11
Cleaned Coal	10^4t						9.41	**9.41**	25.8	100	26344	234510.60
Other Washed Coal	10^4t	6.31		67.28	208.21		450.9	**732.7**	25.8	100	8363	5796681.31
Coke	10^4t					2.8		**2.8**	25.8	100	28435	75318.63
Coke Oven Gas	10^8m^3	0.24	1.71		0.9	0.21	0.02	**3.08**	12.1	100	16726	228559.67
Other Gas	10^8m^3	16.92		10.63		10.32	1.56	**39.43**	12.1	100	5227	914399.71
Crude Oil	10^4t						29.68	**29.68**	20	100	41816	910139.18
Gasoline	10^4t						0.01	**0.01**	18.9	100	43070	298.48
Diesel	10^4t	0.29	1.35	4		2.91	5.4	**13.95**	20.2	100	42652	440693.26
Fuel Oil	10^4t	13.95	0.02	1.11		0.65	10.07	**25.8**	21.1	100	41816	834672.45
PLG	10^4t							**0**	17.2	100	50179	0.00
Refinery Gas	10^4t			0.27			0.83	**1.1**	18.2	100	46055	33807.44
Natural Gas	10^8m^3		0.5				1.08	**1.58**	15.3	100	38931	345076.60
Other Petroleum Products.	10^4t							**0**	20	100	38369	0.00
Other Coking Products.	10^4t							**0**	25.8	100	28435	0.00
Other Energy	10^4tce	9.83					39.21	**49.04**	0	100	0	0.00
												455551793.43

《China Energy Statistical Yearbook 2004》

Table A5. Emission due to import from Northeast Power Grid in 2003

Thermal Power Generation from Northeast Power Grid (MWh)	Emission Factor of Northeast Power Grid	Emissions due to Electricity Imported (tCO_2)
4,244,380	1.1366	4,823,987

North China Power Grid imported 4,244,380 MWh from North East Power Grid in 2003 and the emission factor of North East Power Grid is 1.1366tCO_2e /MWh according to the data issued by the DNA of China[42], which is calculated with the same way as this PDD.

The total emissions in 2003 is 460,375,781 tCO_2

Table A 6. Emissions of North China Power Grid in 2004

Fuel Type	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total	Emission Factor	Oxidate	low caloric value(MJ/t, m3,tce)	CO_2 emission (tCO_2)
									(tc/TJ)	(%)	(MJ/t,km3)	K=G*H*I*J*44/12/10000(m)
		A	B	C	D	E	F	G=A+B+C+D+E+F	H	I	J	K=G*H*I*J*44/12/1000 (v)
Raw Coal	10^4t	823.09	1410	6299.8	5213.2	4932.2	8550	**27228.29**	25.8	100	20908	538547476.6
Cleaned Coal	10^4t						40	**40**	25.8	100	26344	996856.96
Other Washed Coal	10^4t	6.48		101.04	354.17		284.22	**745.91**	25.8	100	8363	5901190.882
Coke	10^4t					0.22		**0.22**	25.8	100	28435	5917.8922
Coke Oven Gas	10^8m^3	0.55		0.54	5.32	0.4	8.73	**15.54**	12.1	100	16726	1153187.451
Other Gas	10^8m^3	17.74		24.25	8.2	16.47	1.41	**68.07**	12.1	100	5227	1578574.385
Crude Oil	10^4t							**0**	20	100	41816	0
Gasoline	10^4t								18.9	100	43070	0

[42] http://cdm.ccchina.gov.cn/web/index.asp

Diesel	10^4t	0.39	0.84	4.66				**5.89**	20.2	100	42652	186070.4874
Fuel Oil	10^4t	14.66		0.16				**14.82**	21.1	100	41816	479451.3838
PLG	10^4t							**0**	17.2	100	50179	0
Refinery Gas	10^4t		0.55	1.42				**1.97**	18.2	100	46055	60546.05223
Natural Gas	10^8m^3		0.37		0.19			**0.56**	15.3	100	38931	122305.6296
Other Petroleum Products.	10^4t							**0**	20	100	38369	0
Other Coking Products.	10^4t							**0**	25.8	100	28435	0
Other Energy	10^4tce	9.41		34.64	109.73	4.48		**158.26**	0	100	0	0
												549031577.7

《China Energy Statistical Yearbook 2005》

Table A7. Emission due to import from Northeast Power Grid in 2004

Thermal Power Generation from Northeast Power Grid (MWh)	**Emission Factor of Northeast Power Grid**	**Emissions due to Electricity Imported (tCO_2)**
4,514,500	1.17411	**5,300,571**

North China Power Grid imported 4514550 MWh from North East Power Grid in 2004 and the emission factor of North East Power Grid is 1.17411tCO_2e /MWh according to the data issued by the DNA of China[43], which is calculated with the same way as this PDD.

The total emissions in 2004 are 554,332,148tCO_2.

Table A 8. Emissions of North China Power Grid in 2005

Fuel Type	**Unit**	**Beijing**	**Tianjin**	**Hebei**	**Shanxi**	**Inner Mongolia**	**Shandong**	**Total**	**Emission Factor**	**Oxidate**	**low caloric value(MJ/t,**	**CO_2 emission (tCO_2)**

[43] http://cdm.ccchina.gov.cn/web/index.asp

											m3,tce)	
									(tc/TJ)	**(%)**	**(MJ/t,km3)**	**K=G*H*I*J*44/ 12/10000(m)**
		A	**B**	**C**	**D**	**E**	**F**	**G=A+B+ C+D+E+F**	**H**	**I**	**J**	**K=G*H*I*J*44/ 12/1000 (v)**
Raw Coal	10^4t	897.75	1675.2	6726.5	6176.5	6277.23	10405.4	**32158.53**	25.8	100	20908	636062535.8
Cleaned Coal	10^4t						42.18	**42.18**	25.8	100	26344	1051185.664
Other Washed Coal	10^4t	6.57		167.45	373.65		108.69	**656.36**	25.8	100	8363	5192725.191
Coke	10^4t					0.21	0.11	**0.32**	25.8	100	28435	8607.8432
Coke Oven Gas	10^8m^3	0.64	0.75	0.62	21.08	0.39		**23.48**	12.1	100	16726	1742396.483
Other Gas	10^8m^3	16.09	7.86	38.83	9.88	18.37		**91.03**	12.1	100	5227	2111027.27
Crude Oil	10^4t					0.73		**0.73**	20	100	41816	22385.49867
Gasoline	10^4t			0.01				**0.01**	18.9	100	43070	298.4751
Diesel	10^4t	0.48		3.54		0.12		**4.14**	20.2	100	42652	130786.3867
Fuel Oil	10^4t	12.25		0.23		0.06		**12.54**	21.1	100	41816	405689.6325
PLG	10^4t							**0**	17.2	100	50179	0
Refinery Gas	10^4t			9.02				**9.02**	18.2	100	46055	277221.0107
Natural Gas	10^8m^3	0.28	0.08		2.76			**3.12**	15.3	100	38931	681417.0792
Other Petroleum Products.	10^4t							**0**	20	100	38369	0
Other Coking Products.	10^4t							**0**	25.8	100	28435	0
Other Energy	10^4tce	8.58		32.35	69.31	7.27	118.9	**236.41**	0	100	0	0
												647686276.3

Table A9. Emission due to import from Northeast Power Grid in 2005

Thermal Power Generation from Northeast Power Grid (MWh)	**Emission Factor of Northeast Power Grid**	**Emissions due to Electricity Imported (tCO_2)**

23,423,000	1.1578	**27,119,149**

North China Power Grid imported 23,423,000 MWh from North East Power Grid in 2005 and the emission factor of North East Power Grid is 1.1578 tCO_2e /MWh according to the data issued by the DNA of China[44], which is calculated with the same way as this PDD.

The total emissions in 2005 are 674,805,425 tCO_2.

Table A10. OM Emission Factor

	Total emissions	**Total thermal power to the grid**	**Average Emission Factor**
2003	460,375,781	429,609,286	
2004	554,332,148	493,687,660	
2005	674,805,425	584,174,013	
Average Emission Factor	1,689,513,354	1,507,470,959	**1.12078**

[44] http://cdm.ccchina.gov.cn/web/index.asp

TableA10. Calculating the proportion of solid fuel, liquid fuel and gas fuel in the total emission.

		Beijing	**Tianjin**	**Hebei**	**Shanxi**	**Shangdong**	**Inner Mongolia**	**Total**	**Calorific value**	**Emission Factors**	**Oxidation rate**	**Emission**
Fuel Type	**Units**	**A**	**B**	**C**	**D**	**E**	**F**	**G=A+B+C+D+E+F**	**H**	**I**	**J**	**H=G*H*I*J*44/12/100**
Raw Coal	10^4t	897.75	1675.2	6726.5	6176.45	10405.4	6277.23	32158.53	20908	25.8	1	636,062,536
Cleaned Coal	10^4t	0	0	0	0	42.18	0	42.18	26344	25.8	1	1,051,186
Other Washed Coal	10^4t	6.57	0	167.45	373.65	108.69	0	656.36	8363	25.8	1	5,192,725
Coke	10^4t	0	0	0	0	0.11	0.21	0.32	28435	25.8	1	8,608
Sub-total												**642,315,054**
Crude Oil	10^4t	0	0	0	0	0	0.73	0.73	41816	20	1	22,385
Gasoline	10^4t	0	0	0.01	0	0	0	0.01	43070	18.9	1	298
Kerosene	10^4t	0	0	0	0	0	0	0	43070	19.6	1	0
Diesel	10^4t	0.48	0	3.54	0	0	0.12	4.14	42652	20.2	1	130,786
Fuel	10^4t	12.25	0	0.23	0	0	0.06	12.54	41816	21.1	1	405,690
Other oil products	10^4t	0	0	0	0	0	0	0	38369	20	1	0
Sub-total												**559,160**
Natural Gas	10^8m^3	2.8	0.8	0	27.6	0	0	31.2	38931	15.3	1	681,417
Coke Oven Gas	10^8m^3	6.4	7.5	6.2	210.8	0	3.9	234.8	16726	12.1	1	1,742,396
Other Gas	10^8m^3	160.9	78.6	388.3	98.8	0	183.7	910.3	5227	12.1	1	2,111,027
LPG	10^4t	0	0	0	0	0	0	0	50179	17.2	1	0

Refinery gas	10^4t	0	0	9.02	0	0	0	9.02	46055	18.2	1	277,221
Sub-total												**4,812,062**
Total												**647,686,276**

According to the data and equation (2),(3),(4), λ_{Coal} =99.17%, λ_{Oil} =0.08%, λ_{Gas} =0.74%。

Table A11. Emission factor of the best technologies commercialization

	Variables	**The efficiency of power supply**	**Fuel emissions factor(tc/TJ)**	**Oxidation rate**	**Emission Factors(tCO_2/MWh)**
		A	**B**	**C**	**D=3.6/A/1000*B*C*44/12**
Coal-fired Power Plant	$EF_{Coal,Adv}$	35.82%	25.8	1	0.9508
Gas-fired Power Plant	$EF_{Gas,Adv}$	47.67%	15.3	1	0.4237
Oil-fired Power Plant	$EF_{Oil,Adv}$	47.67%	21.1	1	0.5843

Emission factor of thermal power is calculated based on the following equation.

$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Coal,Adv} + \lambda_{Gas} \times EF_{Gas,Adv}$ =0.9508*99.17%+0.4237*0.08%+0.5843*0.74=0.9465 tCO_2/MWh

Table A12. Installed capacity of the North China Grid in 2003

	Beijing	**Tianjin**	**Hebei**	**Shanxi**	**Inner Mongolia**	**Shandong**	**Total**
Thermal power (MW)	3833.5	6149.9	22333.2	22246.8	19173.3	37332	111068.7
Hydro power (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	24	24	48	0	208.9	30.6	335.5

Other (MW)							
Total (MW)	4882.5	6178.9	23165.7	23029.8	19950.2	37413.4	114620.5

《China Electric Power Yearbook 2004》

Table A13. Installed capacity of the North China Power Grid in 2004

	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
Hydro power (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 Other (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

《China Electric Power Yearbook 2005》.

Table A14. Installed capacity of the North China Power Grid in 2005

	Beijing	**Tianjin**	**Hebei**	**Shanxi**	**Inner Mongolia**	**Shandong**	**T**
Thermal power (MW)	3347.5	6008.5	17698.7	15035.8	11421.7	30494.4	84006.6
Hydro power (MW)	1058.1	5	764.3	795.7	592.1	50.8	3266
Wind power and Other (MW)	0	0	0	0	0	0	0
Nuclear Power(MW)	0	0	13.5	0	76.6	0	90.1
Total (MW)	4405.6	6013.5	18476.5	15831.5	12090.4	30545.2	87362.7

《China Electric Power Yearbook 2006》.

Table A15. Calculation of BM emission factor of the North China Power Grid

	Installed capacity in 2003 (MW) A	Installed capacity in 2004 (MW) B	Installed capacity in 2005 (MW) C	Capacity additions from 2003 to 2005 (MW) D=C-A	Share in total capacity additions
Thermal power (MW)	84006.6	93594.9	111068.7	27062.1	99.28%
Hydro power (MW)	3266.0	3250.7	3216.2	-49.8	-0.18%
Nuclear power	0	0	0	0	0.00%
Wind power and Other (MW)	90.1	137.5	335.5	245.4	0.90%
Share in total installed capacity of 2005	76.22%	84.61%	100%		

$EF_{BM,y}$ =0.9465×99.28%=**0.9397 tCO_2/MWh.**

Annex 4

Monitoring Information

No further information on the monitoring information.