

INNER MONGOLIA CHIFENG GAOFENG WIND POWER PROJECT

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

CONTENTS

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

Annexes

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

SECTION A. General description of project activity

A.1. Title of the project activity:

Inner Mongolia Chifeng Gaofeng Wind Power Project

Version: 5.0

Date: 19/09/ 2010

A.2. Description of the project activity:

Inner Mongolia Chifeng Gaofeng Wind Power Project (hereafter referred to as the proposed project) is a grid connected renewable energy project developed by Chifeng Xinsheng Wind Power Co. Ltd. The proposed project located in Songshan District, Chifeng City, Inner Mongolia Autonomous Region, China. The proposed project involves the installation of 25 wind turbines (Vestas V80-2000kW of Denmark), each of which has the capacity of 2000kW, for a total installed capacity of 50MW. The purpose of the proposed project is to generate electricity using wind power resources in the project region and to sell into and replace the same amount of power generation in Northeast Power Grid (NEPG) which is dominated by the fossil fuel fired power plants, as identified both the baseline scenario and the scenario existing prior to the start of the implementation of the proposed project activity which is that 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”.

It is estimated that the electricity delivered to the grid by the project activity will be 131,700MWh, and as a result, 150,915 tonnes of CO2 emission reductions will be generated annually.

The contributions of the proposed project to sustainable development goal are summarized as follows:

- Being located in a power grid dominated by fossil fuel fired power plants, development of the proposed project will not only reduce GHG emissions but also mitigate local environmental pollution caused by air emissions from fossil fuel fired power plants;
- New jobs will be generated during the operation periods;
- Development of the proposed project could contribute to meeting local electricity demand and increase employment opportunities, then boost the economy in the local region.

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)
China (host)	Chifeng Xinsheng Wind Power Co. Ltd	No
France	EDF Trading Limited	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.:

Songshan District, Chifeng City

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 at northwest of Songshan District, Chifeng City, Inner Mongolia Autonomous Region, China. The geographical co-ordinates are: east longitude 118 °43'26", and northern latitude 42 °23'2", and the elevation is 1601 meters. The specific location is shown in Figure 1.

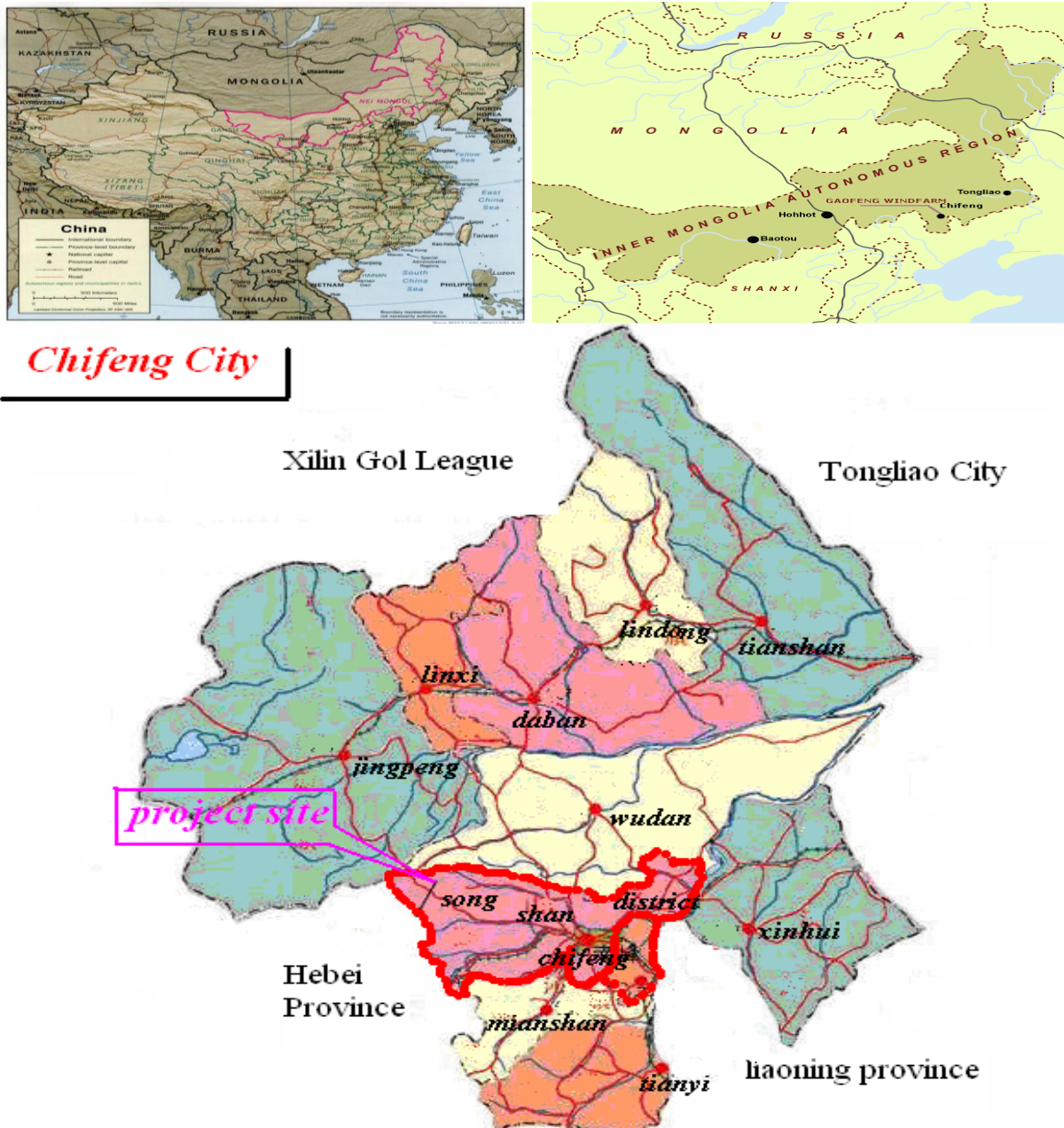


Figure 1: Location of the proposed project

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

The project activity falls under the following scope and category.

Sectoral Scope: 1. Energy Industries

Category: Grid-connected electricity generation from renewable energy sources

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

The proposed project is the installation of a new grid-connected zero-emission renewable power

generation activity. The purpose of the proposed project is to generate electricity using wind power resources in the project region and to sell into Northeast Power Grid (NEPG) and replace the same amount of power generation (131,700 MWh each year) in it. Prior to the implementation of the project activity, there were 36,216 MW of thermal power plants, 6,126 MW of hydropower plants, 530 MW of wind power plants and 22 MW of other power plants in operation in Northeast Power Grid (NEPG)¹. The amount of electricity delivered to the grid by the project activity would have otherwise been generated by the operation of these grid-connected power plants and by the addition of new generation sources.

The plant load factor of the proposed project is 30.0% determined by a third party contracted by the project participant (e.g. Xinjiang wind power design & consult Co., Ltd.)

The proposed project is to install and operate 25 wind turbines (Vestas V80-2000kW of Denmark) with a unit capacity of 2000 kW, for a total capacity of 50 MW. The proposed project will adopt a unit connection mode of one-turbine-one-transformer. Each turbine will have a 690V to 35kV transformer, from which a 35kV line will link into the 35kV transformer at the Sunjiaying 35kV-to-220kV switch station. By the 220 kV line, the electricity generated by the proposed project is delivered to the Chifeng Power Grid which is an integral part of Northeast Power Grid. The main technical specifications are as follows:

Table 1: Technical parameters of V80-2000kW Wind Turbines

Rotor 2000 kW	
Type	3-bladed, horizontal axis
Diameter	80m
Area Swept	5027m ²
Nominal revolutions	16.7rpm
Operational interval	9-19rpm
Operational data	
Cut-in wind speed	4m/s
Nominal wind speed	15m/s
Cut-out wind speed	25m/s
Generator	
Type	Double-fed Asynchronous Generator
Nominal Power	2000kW
Operational data	50Hz/690V
Towers	
Hub heights(approx)	67m
Technical Lifetime	20 years

(Data sources from: http://www.vestas.cn/pdf/product_brochures/V80_chinese.pdf)

The auxiliary electric system of the proposed project includes on-site control, protection, measure, signalling and surveillance in central control room at the site. The targets to be controlled and monitored

¹ China Electric Power Yearbook 2007

include 25 wind turbines and transformers. The wind farm will be dispatched by regional dispatch centre and wind turbines could be measured and signalled remotely by Internet.

The development of the project will contribute to promoting the transfer of wind power technology, and to boost the manufacturing technology of wind turbine, and to enhance the level of operation and maintenance of the wind power technology.

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

A renewable crediting period is adopted for the proposed project activity. The total estimation of emission reductions in the first crediting period is 1056405 tCO₂e, as shown in the table below.

Years	Annual estimation of emission reductions(in tons of CO ₂ e)
01/06/2010-31/12/2010	88033
2011	150915
2012	150915
2013	150915
2014	150915
2015	150915
2016	150915
01/01/2017-31/05/2017	62882
Total estimated reductions(tons of CO₂e)	1056405
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tons of CO₂e)	150915

A.4.5. Public funding of the project activity:

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

Approved consolidated baseline and monitoring methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”- ACM 0002 Version 10

The methodology also refers to the latest approved versions of the following tools:

- ◆ Tool to calculate the emission factor for an electricity system (version 02);
- ◆ Tool for the demonstration and assessment of additionality (version 5.2);

For more information regarding the methodology and the tools as well as their consideration by the Executive Board please refer to <http://cdm.unfccc.int/goto/MPappmeth>.

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

The proposed project can meet the applicability criteria of the baseline methodology (ACM0002 version10); therefore, the methodology is applicable to the proposed project.

- ◆ The proposed project is the installation of a new grid-connected zero-emission renewable power generation activity from wind source;
- ◆ The proposed project is not an activity that involves switching from fossil fuels to renewable energy sources at the site of the project activity;
- ◆ The geographic and system boundaries for the relevant electricity grid (Northeast Power Grid) can be clearly identified and information on the characteristics of the grid is available.

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

The spatial extent of the project boundary includes Inner Mongolia Chifeng Gaofeng Wind Power Project and all power plants connected physically to the Northeast Power Grid that the CDM project power plant is connected to. Northeast Power Grid is defined as the project electricity system, which consists of independent province-level electricity systems including Liaoning, Jilin and Heilongjiang province that can be dispatched without significant transmission constraints. The connected electricity system is North China Power Grid, which is connected by transmission lines to the project electricity system. Northeast Power Grid has the net electricity export to North China Power Grid. The flow diagram of the project boundary is as in figure 2.

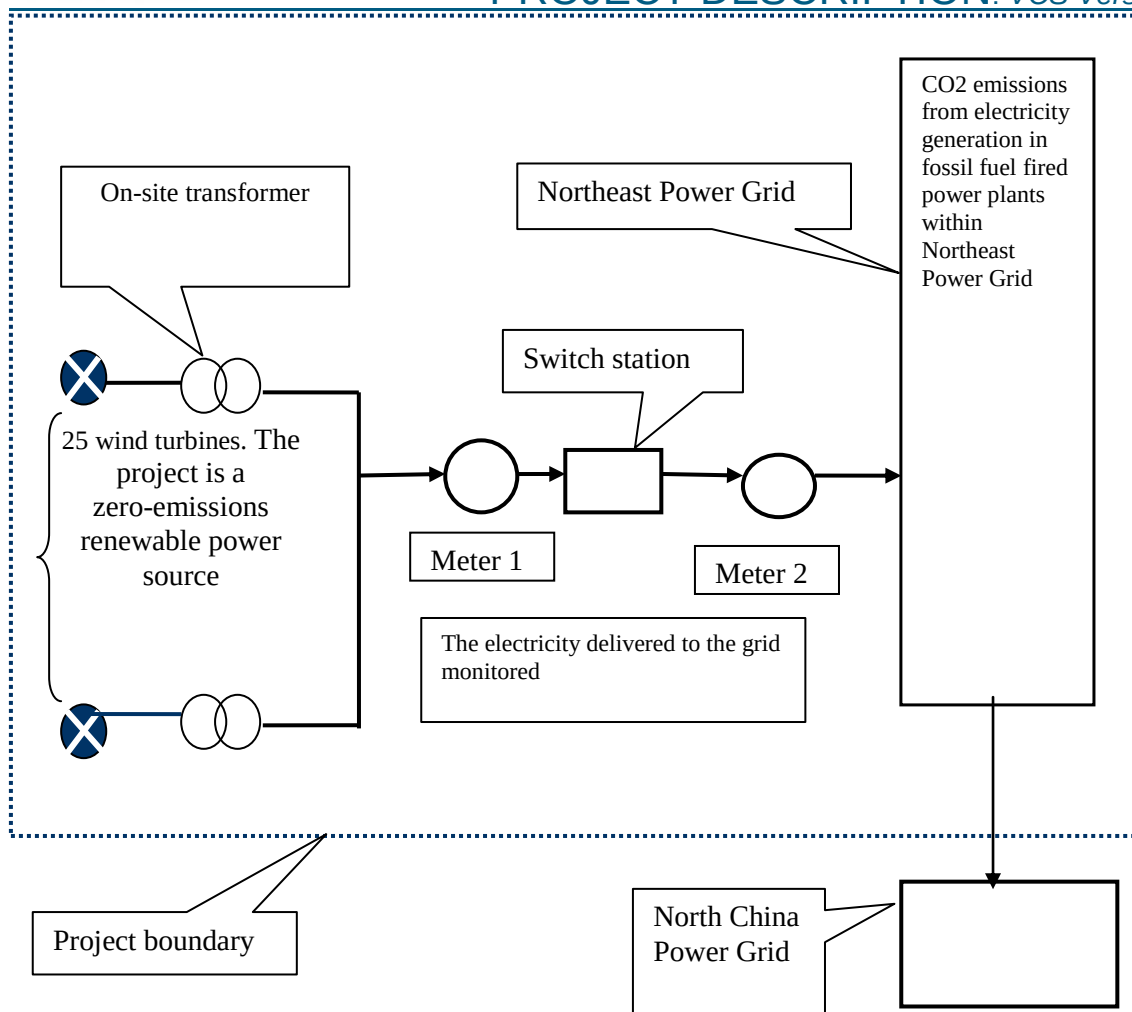


Figure 2: The diagram of the project activity boundary

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

	Source	Gas	Included?	Justification / Explanation
Baseline	CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.	CO2	Yes	Main emission sources
		CH4	No	Minor emission source
		N2O	No	Minor emission source
Project Activity	The project is a zero-emissions renewable power source	CO2	No	Minor emission source
		CH4	No	Minor emission source
		N2O	No	Minor emission source

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

The proposed project is the installation of a new grid-connected zero-emission renewable power generation activity. The purpose of the proposed project is to generate electricity using wind power resources in the project region and to sell into Northeast Power Grid (NEPG) and replace the same amount of power generation (131,700 MWh each year) in it. Prior to the implementation of the project activity, there were 36,216 MW of thermal power plants, 6,126 MW of hydropower plants, 530 MW of wind power plants and 22 MW of other power plants in operation in Northeast Power Grid (NEPG)². The amount of electricity delivered to the grid by the project activity would have otherwise been generated by the operation of these grid-connected power plants and by the addition of new generation sources.

Thus the baseline scenario is the following as per ACM0002:

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”.

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 implementation timeline of the proposed project activity:

Event	Date	Description
EIA	02/08/ 2006	EIA finished.
EIA approval	09/08/2006	EIA approval by Inner Mongolia Environmental Protection Bureau.
FSR	06/2006	With the capacity of 49.3 MW and 58 wind turbines
Approval for the FSR	09/11/2006	—
Advices of Tendering Company	13/01/2007	In the market, the demand of the wind turbines with the capacity of 850KW exceeded supply. At that time, the project owner must think two ways to implement the project: 1. To wait the wind turbines with the capacity of 850KW 2. To choice other wind turbines instead of the wind turbines with the capacity of 850KW.
Meeting of the Board of	25/01/2007	According the technological

² China Electric Power Yearbook 2007

Directors for replacing the wind turbines		comparisons in the FSR and advices of Tendering Company, the project owner thought to replace the wind turbines to implement the proposed project. Moreover, the FSR should revised based on new wind turbines determined.
Adjusted FSR (AFSR)	12/03/2007	With the capacity of 50.0 MW and 25 wind turbines (Vestas V80-2000kW of Denmark) and CDM consideration
Meeting of the Board of Directors for the CDM development	15/05/2007	According the IRR of Adjusted FSR with new wind turbines, the project owner thought that the project was additional and lack of Financial attractive. The project owner planed to apply for CDM.
CDM development Consultant Contract	16/07/2007	–
The development of PDD for the proposed project	08/2007	The project owner and the consultant company designed the PDD based on the data in the adjusted FSR that should be sent to the local government for checking and ratifying.
LOI	02/08/2007	–
GSP of PDD for the proposed project	25/08/2007	–
Starting date of the proposed project	25/08/2007	the permission data of the construction of the proposed project
Infrastructure construction contract for wind turbines	25/08/2007	
Conformation for Adjusted FSR by the government	10/01/2008	–
LOA of China	01/2008	–
Purchase contract for wind turbines	23/02/2008	–
Revised PDD for the proposed project	03/2008	Based on the data in confirmed Adjusted FSR
LOA of France	31/03/2008	–
Starting data of operation	12/2008	–
Eexpected registered date	01/03/2010	–

The feasibility study report of the proposed project was approved by Inner Mongolia DRC on 9th Nov. 2006, in which the total capacity for the project is 49.3MW with 58 wind turbines (each with 850kW). After that, the project owner began to implement the following steps including equipments tendering and shop drawing, etc. At that time, the demand of the wind turbines with the capacity of 850KW exceeded supply in the market. Tendering Company advised the project owner to choose other wind turbines instead of the wind turbines with the capacity of 850KW on 13rd Jan. 2007. According to the technological comparisons between the wind turbines with the different normal power in the FSR and the advices from Tendering Company, the project owner decided to choose the Vestas 80-2000kW of Denmark to implement the proposed project with the capacity of 50.0 MW and 25 wind turbines in the Meeting of the Board of Directors for replacing the wind turbines on 25th Jan. 2007. Due to this change and the national provisions for the investment projects, the FSR should be revised based on new wind turbines determined. At that time, the PDD development of the proposed project had to be ceased. To strive for the support from CDM, the project owner studied Methodology ACM0002 in detail and compared the comparative result of four types of wind turbines on technology and economy in the FSR. In the FSR, the comparative result on technology and economy showed that the investment for per kW.h was increasing with the increase of the capacity of wind turbines³. Therefore, according to the conservative rule in Methodology ACM0002, the project owner and CDM Company designed the PDD of the project based on the economic data in the FSR and the practical capacity of 50MW with new wind turbines without the approval adjustment FSR, and then the PDD of the proposed project was published on 25th Aug. 2007. Compared with the IRRs in the public PDD and final PDD, the IRR in the public of 7.18% is more conservative than the IRR in the final PDD of 6.98%. Therefore, the data used in the public PDD is conservative for the proposed project to evaluate the additionality.

According to the actual situation of the proposed project, the PDD was revised according to the data from the Adjusted FSR of the proposed project that was confirmed by the government on 10th Jan. 2008.

The project activity is not the baseline scenario and possesses additionality, which is demonstrated below in a step-wise manner using the latest version (5.2) of “Tool for demonstration and assessment of additionality”.

Step1. Identification of alternatives to the project activity consistent with current laws and regulations.

Realistic and credible alternatives to the project activity are defined through the following sub-steps:

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

The alternatives that provide outputs or services comparable with the proposed CDM project activity are

³ The FSR of the proposed project

to include:

- a) The proposed project activity undertaken without being registered as a CDM project activity;
- b) The thermal power plant with the same annual electricity output as the proposed project.
- c) Other renewable energy project with the same annual electricity output as the proposed project.
- d) To provide the same electricity output by Northeast Power Grid.

For the alternative c), besides wind energy, other kinds of energy like solar PV, geothermal, biomass and hydro are the possible grid-connected renewable energy technologies that could be applied in China. However, it is not feasible to develop hydropower plants due to the lack of exploitable hydro power resource in Chifeng City⁴. In addition, based on the technology development status and the high cost for power generation, solar PV, biomass and geothermal of the same annual electricity output as the proposed project are alternatives far from being attractive investment in China power grid⁵. So the alternative c) couldn't be considered as an alternative.

Sub-step1b. Consistency of mandatory laws and regulations

The mandatory laws and regulations for the proposed project include laws, central government regulations, local regulations, departmental rules and disciplines related to electricity and environment protection.

The related laws and regulations can be found and downloaded on the website of State Electricity Regulatory Commission (SERC) and National Development and Reform Commission (NDRC): <http://nyj.ndrc.gov.cn> and <http://www.serc.gov.cn/opencms/export/serc/laws/index.html>

The alternative b) should be eliminated from the following consideration because it does not comply with the national regulation for controlling small scale thermal power plant. The average generation hours for fossil fuel fired power plants are 5,916 hours⁶ in Inner Mongolia in 2006 while the effective generation hours for proposed project are 2,634 hours⁷, to provide the same output as the proposed project, the alternative baseline scenario for the proposed project should be a grid-connected fossil fuel fired power plant with installed capacity of about 22.3 MW. However, according to Chinese regulations, thermal power plants of less than 135 MW are prohibited for construction within the grid connected area⁸. Consequently, the scenario b) is not a feasible alternative.

⁴ <http://www.chifeng.gov.cn/cfgl/zrzy.htm>

⁵ http://www.ndrc.gov.cn/xxfw/hyyw/t20070628_144686.htm

⁶ China Electric Power Yearbook 2007

⁷ Feasibility Study of the proposed project

⁸ Notice of the General Office of the State Council concerning the Strict Prohibition for Construction of Thermal Power Plants with the Capacity of less than 135 MW within the Grid Connected Area, GUOBANFAMINGDIAN (2002) Document No.6

The other alternatives described in sub-step 1a are all in compliance with mandatory laws and regulations as required by the methodology used.

To summarize, the potential realistic and creditable alternatives that can provide the same output or services as the proposed project are a) and d). The investment analysis in Step 2 will show the proposed project undertaken without being registered as a CDM project activity (alternative a) is financially unattractive.

Step2. Investment analysis

Sub-step 2a. Determine appropriate analysis method

Three options can be applied for the investment analysis: the simple cost analysis, the investment comparison analysis and the benchmark analysis.

The simple cost analysis is not applicable for the proposed project because the project activity will produce economic benefit (from electricity sale) other than CDM related income.

Out of the remaining options, project participants selected Option III: Benchmark analysis.

Sub-step 2b. Apply benchmark analysis

According to the “Economical assessment and parameters for construction project, 3rd edition”, a project will be financially acceptable when the Internal Return Rate (IRR) is better than the benchmark IRR.

The financial benchmark Internal Return Rate (after tax) on total investment of Chinese power industry is 8%⁹, which has been used widely for Feasibility Studies of the power project investments.

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.

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

Basic parameters for calculation of financial indicators

Table 2 Main parameters for the calculation of financial indicators

Items	Unit	Amount	Note
Capacity	MW	50	The Adjusted Feasibility Study Report (AFSR)
Total Static Investment	Million RMB	469.31	AFSR
Annually output	MW • h/a	131,700	AFSR
Operation cost	Million RMB	324.66	AFSR
Electricity Tariff (Excluding VAT)	RMB/kWh	0.4977	AFSR
Value Added Tax (VAT)	%	8.5	AFSR
Income tax	%	0 in the first two years, 15 in the following three years and 33 in	AFSR

⁹ Interim Rules on Economic Assessment of Electric Engineering Retrofit Projects

		the other years	
Expected CERs Price	EUR/tCO ₂	10.35	LOI
Project construction period	Year	1	AFSR
Project operation period	Year	20	AFSR

For the proposed project, the FSR was completed by Xinjiang Consult & Design Institute in June 2006 with the tariff of 0.5544 Yuan/KWh. There was no public tariff notification for wind power projects in East Inner Mongolia at the time FSR was being written. In the FSR, the tariff used was referred in to the Letter of Acceptance for Tariff of Saihanba East 45.05 MW Wind Farm Project issued by Inner Mongolia Autonomous Regional Development and Reform Commission in 2005 (Code: NFGJZ[2005] No.389), in which the tariff was granted in principle as 0.55 Yuan/KWh before the tariff is approved by state government. The Letter is not publicly available and was just sent to the developer of the Saihanba East 45.05 MW Wind Farm Project.

However, for the proposed project, the tariff is of 0.54 RMB/kWh used in the AFSR was referred in to the latest guidance tariff for the same projects in East Inner Mongolia during 2006-2007.

In China, the approved letter to FSR from the government is an authorization of the legality of projects, including the exploit right of PP, the capacity of projects, the location and investment of projects. Moreover, there is no an official approval to exact tariff in the approved letter to FSR from the government. The actual tariff depends on PPA signed with Power Grid Company. The government only gives a guiding tariff based on the region local economic development environment, national policy regulations and the specific condition circumstances¹⁰ in the area and power grids where the proposed projects are located in. For the project owner, the guiding tariff by the government is just a weight of successful negotiation with Power Grid to get a contract tariff in the PPA.

The following table shows all wind farm projects in East Inner Mongolia since 2002 whose tariffs are publicly available based on the above documents:

Time of Wind Turbine Installed	Project Title	Time of Public Available Information for Tariff	Source	Tariff (with VAT)
Dec.2003	Dali Maolin Wind Farm	Apr. 2001	Nei ji jia zhi[2001]259	0.76 ¹¹ (Demonstration Project,desripted in common practices)
Oct, 2005	Inner Mongolia Chifeng Saihanba West 30.6 MW Wind farm Project	Jun, 2007	Fa Gai Jia Ge[2007]1260	0.54
For the proposed project, the tariff of 0.5544 Yuan/KWh used in the FSR was referred in to the Letter of Acceptance for Tariff of Saihanba East 45.05 MW Wind Farm Project issued by Inner Mongolia Autonomous Regional Development and Reform Commission in 2005 (Code:				

¹⁰ <http://www.chinalawedu.com/huangye/viewArticle.asp?id=1964>

<http://www1.china.com.cn/chinese/law/798072.htm>

¹¹ <http://www.fsou.net.cn/html/text/lar/169071/16907181.html>

NFGJZ[2005] No.389), in which the tariff was granted in principle as 0.55 Yuan/KWh before the tariff is approved by state government.				
Oct, 2006	Inner Mongolia Sunjiaying 50.25MW Wind Power Project	Jun, 2007	Fa Gai Jia Ge[2007]1260	0.54
Oct, 2006	Inner Mongolia Wudaogou 50.25MW Wind Power Project	Jun, 2007	Fa Gai Jia Ge[2007]1260	0.54
Nov, 2006	Guohua Hulunbeier Xinbaerhu Youqi Wind Farm Project	Jun, 2007	Fa Gai Jia Ge[2007]1260	0.54
Dec, 2006	Inner Mongolia Chifeng Dongshan 49.3 MW Wind Power Project	Jun, 2007	Fa Gai Jia Ge[2007]1260	0.54
Dec, 2006	Saihanba North 45.05 MW Windfarm Project	Jun, 2007	Fa Gai Jia Ge[2007]1260	0.54
Dec, 2006	Saihanba East 45.05 MW Wind farm Project	Jun, 2007	Fa Gai Jia Ge[2007]1260	0.54
For the proposed project, the tariff is of 0.54 RMB/kWh used in the AFSR was referred in to the same projects in East Inner Mongolia during 2006-2007.				
Jun, 2007	Inner Mongolia Chifeng Dongshan Phase II 50MW Wind Power Project	Dec, 2007	Fa Gai Jia Ge[2007]3303	0.54
Oct, 2007	Chifeng Sunjiaying Wind Power Project	Dec, 2007	Fa Gai Jia Ge[2007]3303	0.54
Dec, 2007	Inner Mongolia Chifeng Bolike 50MW Wind Power Project	Dec, 2007	Fa Gai Jia Ge[2007]3303	0.54
Dec, 2007	Inner Mongolia Keshiketeng County Wutaohai South Wind Farm 49.5 MW Project	Dec, 2007	Fa Gai Jia Ge[2007]3303	0.54
Dec, 2007	Inner Mongolia Dali Phase IV 49.5MW Wind Power Project	Jul, 2008	Fa Gai Jia Ge[2008]1876	0.54
Dec, 2007	Inner Mongolia Chifeng Daguangdingzishan Wind Power Project	Jul, 2008	Fa Gai Jia Ge[2008]1876	0.54
Dec, 2007	Inner Mongolia Chifeng Daheishan Wind Power Project	Jul, 2008	Fa Gai Jia Ge[2008]1876	0.54
after Dec 31, 2007	Inner Mongolia Mangniuhai Wind Farm Project	Dec, 2007	Fa Gai Jia Ge[2007]3303	0.54
after Dec 31, 2007	Guohua Tongliao Kezuo Zhongqi Phase I 49.5 MW Wind Farm Project	Dec, 2007	Fa Gai Jia Ge[2007]3303	0.54
after Dec 31, 2007	Inner Mongolia Keyouqianqi Wind Farm Project	Dec, 2007	Fa Gai Jia Ge[2007]3303	0.5325
after Dec 31, 2007	Inner Mongolia Wengniute Banner Wudaogou Wind Power Project (II)	Dec, 2007	Fa Gai Jia Ge[2007]3303	0.54
after Dec 31, 2007	Inner Mongolia Meiyaoshan Wind Farm Project	Dec, 2007	Fa Gai Jia Ge[2007]3303	0.54
after Dec 31, 2007	Inner Mongolia Chifeng Gaofeng Wind Power Project	Dec, 2007	Fa Gai Jia Ge[2007]3303	0.54
after Dec 31, 2007	Inner Mongolia Tongliao Baolongshan 49.5MW Wind Power Project	Dec, 2007	Fa Gai Jia Ge[2007]3303	0.54
after Dec 31, 2007	Inner Mongolia Dali Phase V 49.5MW Wind Power Project	Dec, 2007	Fa Gai Jia Ge[2007]3303	0.54
after Dec 31, 2007	Inner Mongolia Tongliao Beiqinghe 300MW wind power project	Dec, 2008	CHINA WIND POWER REPORT 2008	0.521 6

Note:

1. Dali III Wind Power Project built in December 2003 as listed in the Statistics by Shi Pengfei was a

Demonstration Project and supported by national debt¹² and the tariff of Dali III Wind Power Project is not publicly available, so it is not comparable to the proposed project.

2. Huadian Tongliao Beiqinghe 300 MW Wind Farm Project built in 2008 as mentioned in China Wind Power Report 2008 is a bidding project with tariff of 0.5216 Yuan/KWh issued in November 2007¹³ and therefore is not comparable to the proposed project¹⁴.

As shown in the table above, before October 2006 when the FSR was completed, there were no publicly available tariff notifications issued by government for wind farm projects in East Inner Mongolia. The earliest tariff notification available publicly for wind power projects in East Inner Mongolia was issued on 09/06/2007 ([2007]1260), in which the tariff was approved as 0.54 Yuan/KWh, and this tariff had been stable in the notification issued by NDRC in December 2007 ([2007]3303) and July 2008 ([2008]1876). It also can be found that the tariff used in AFSR and PDD is in line with the tariff approved in the NDRC notification [2007]3303.

In conclusion, the project owner can confirm that the tariff assumed in PDD is appropriate and conservative.

According to the VVM, the O&M costs of the proposed project had been clarified further as follow:

The input values on O&M cost used in the investment analysis in the PDD were from the Adjusted FSR that was completed by an authorized third party of Xinjiang Wind Power Design Institute which is officially approved by NDRC.

For O&M cost of the proposed project than the ones of the similar projects in Chifeng, it is based on the following reasons:

It was not common to use new wind turbine (V80-2000) in wind power plants in Chifeng area. According to the statistics of similar project in Chifeng, only one project named *Inner Mongolia Wengniute Banner Wudaogou Wind Power Project (II)* (Ref. No. 3325) used the same turbine ((V80-2000) with the proposed project. Under this condition, the project owner was lack of the experiences on operation and construction of this wind turbine .Moreover, there is few experiences about it for reference by the project owner in Chifeng.

Referring to the project named *Inner Mongolia Wengniute Banner Wudaogou Wind Power Project (II)* (Ref. No. 3325), the rate of the annual O&M cost to total investment of the proposed project is of 3.46% is lower than the rate of 3.6% of Project (3325) ,which is more conservative and reasonable.

According to the VVM, the O&M cost are cross-checked against third-party and publicly available sources ,as described below:

i. Comparing O&M costs of the proposed project with that of all registered projects located in Chifeng City, it is shown that the O&M costs of the proposed project is conservative within the reasonable scale. As shown in table below, the value of O&M cost, being crosschecked, is within the proper range of O&M cost of similar wind power projects (with UNFCCC Reference Numbers)

¹² <http://www.chifeng.gov.cn/html/2008-11/3130.shtml>

¹³ http://www.sdpc.gov.cn/gzdt/t20071207_177484.htm

¹⁴ China Wind Power Report 2008 published by China Renewable Energy Institute Association (CREIA) and WWF in October 2008

in Chifeng. The rate of annual O&M cost to total investment for the proposed project is 3.46%, which is within the statistic range of 1.59%-4.01%.

Furthermore, according to the statistics as shown in the table below, only one project named *Inner Mongolia Wengniute Banner Wudaogou Wind Power Project (II)* (Ref. No. 3325) used the same turbine ((V80-2000) with the proposed project, of which the rate of the annual O&M cost to total investment is 3.6%. Compared with that project mentioned, the rate of the annual O&M cost to total investment of the proposed project is of 3.46% that is conservative and reasonable under the common conditions.

Project name	Ref. No.	Installed capacity	Location	Total static investment	Annual O&M	Annual O&M / Total investment
		(MW)	City	(10000 Yuan)	(10000 Yuan)	(%)
Saihanba East 45.05 MW Windfarm Project	561	45.05	Chifeng	47694	N/A	N/A
Saihanba North 45.05 MW Windfarm Project	576	45.05	Chifeng	45724	N/A	N/A
Inner Mongolia Chifeng Dongshan 49.3 MW Wind Power Project	689	49.3	Chifeng	51495	N/A	N/A
Inner Mongolia Chifeng Saihanba West 30.6 MW Windfarm Project	994	30.6	Chifeng	29043	660	2.27%
Inner Mongolia Dali Phase IV 49.5MW Wind Power Project	1628	49.5	Chifeng	54695	2192	4.01%
Inner Mongolia Dali Phase V 49.5MW Wind Power Project	1629	49.5	Chifeng	58010	1420	2.45%
Inner Mongolia Chifeng Bolike 50MW Wind Power Project	1830	50	Chifeng	51862	869.85	1.68%
Inner Mongolia Chifeng Dongshan Phase II 50MW Wind Power Project	1869	50	Chifeng	50901	811	1.59%
Inner Mongolia Meiyaoshan Wind Farm Project	2381	49.92	Chifeng	46126	1164	2.52%
Inner Mongolia Chifeng Saihanba Qingmachang Wind Power Project	2617	49.5	Chifeng	46478	1278	2.75%
Datang Chifeng Bolike II Wind Power Project	3105	50	Chifeng	50824	948	1.87%
Inner Mongolia Chifeng Daguangdingzishan Wind Power Project	3116	49.3	Chifeng	49615	1710	3.45%
Inner Mongolia Wengniute Banner Wudaogou Wind Power Project (II)	3325	50	Chifeng	47878	1721.25	3.60%
Inner Mongolia Chifeng Saihanba Tashanzi Wind Power Project	2615	49.5	Chifeng	45857	1323.67	2.89%
Inner Mongolia Chifeng Yihegong Windfarm Project	2811	49.5	Chifeng	48323	1021.66	2.11%
Inner Mongolia Wudaogou 50.25MW Wind Power Project	1487	50.25	Chifeng	47266	1131.93	2.39%
Inner Mongolia Sunjiaying 50.25MW Wind Power Project	1488	50.25	Chifeng	50616	1196.5	2.36%
The proposed project	3439	50	Chifeng	46931	1623.32	3.46%

Sources: <http://cdm.unfccc.int/Projects/registered.html>

- ii. Based on the annual financial audit statement, the O&M cost of the proposed project

in Year 2009 was 2153(10000Yuan)¹⁵ that is 32.66% higher than the calculated average value of 1623 (10000Yuan) of O&M cost of the proposed project. Moreover, the main part of the O&M cost was used for the Maintenance of equipments due to the lack of operation experience.

iii. According to the document "Wind Energy Operations & Maintenance Report"¹⁶, \$0.027/kWh or €0.019/kWh is the average value of O&M costs obtained from report surveys. Based on the figure mentioned, the annual O&M costs of the proposed project is calculated as 2252.07(10000Yuan)¹⁷ that is higher than the annual O&M costs of 1623.32(10000Yuan) in the IRR calculation worksheet.

In summary, the value of "maintenance costs" used in the investment analysis is reasonable, insensitive and conservative.

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

In accordance with the benchmark analysis, if the financial indicator of the project, such as IRR is lower than the benchmark IRR, the project is not considered as financially attractive.

Table 3 shows the IRR of the proposed project with and without CERs revenues. Without CERs the IRR of the project is 7.61%, lower than the benchmark rate 8%. Thus the project is not considered as financially attractive. However, taking into account the CERs revenues, the IRR on the total investment is 10.45%, which is significantly improved and higher than the financial benchmark rate the proposed project is financially acceptable.

Table 3 Comparison of financial indicators with and without CERs revenues

Scenario	IRR(total investment)
Project without CERs revenues	7.61%
Benchmark	8%
Project with CERs revenues	10.45%

Sub-step 2d. Sensitivity analysis

The objective of this sub step is to show the conclusion regarding the financial attractiveness is robust to reasonable variations of the critical assumptions.

Four factors are considered in following sensitivity analysis:

- 1) Static total investment
- 2) Annual O & M costs

¹⁵ The annual financial audit statement issued by Zhongjianghai Certified Public Accountants Co.,Ltd

¹⁶ <http://www.wind-watch.org/documents/wind-energy-operations-maintenance-report/>

¹⁷ The calculated annual O&M costs of the proposed project = €0.019/kWh*131700MWh(EG_y)*9(ERU:RMB)

- 3) Tariff (excluding VAT)
- 4) Plant load factor (PLF) (Electricity supplied)

What the project IRR (without income from selling CERs) varies with fluctuation of above factors is shown in below.

The impact of the static total investment on IRR

Variation (%)	-10	-7.5	-5	-2.5	-2.5	0	+2.5	+5	+7.5	+10
IRR (%)	9.16	8.75	8.35	8.00	7.98	7.61	7.26	6.93	6.61	6.29

The impact of the annual O & M costs on IRR

Variation (%)	-11.0	-10	-7.5	-5	-2.5	0	+2.5	+5	+7.5	+10
IRR (%)	8.00	7.97	7.88	7.79	7.70	7.61	7.52	7.43	7.34	7.25

The impact of PLF on IRR

Variation (%)	-10	-7.5	-5	-2.5	0	+2.5	2.55	+5	+7.5	+10
IRR (%)	6.05	6.45	6.84	7.23	7.61	7.99	8.00	8.37	8.75	9.12

The impact of tariff on IRR

Variation (%)	-10	-7.5	-5	-2.5	0	+2.5	2.55	+5	+7.5	+10
IRR (%)	6.05	6.45	6.84	7.23	7.61	7.99	8.00	8.37	8.75	9.12

As shown in the above tables, the most important factor affecting the financial attractiveness of the proposed project is the static total investment. In the case that the static total investment decreases by about 2.5%, the IRR of the proposed project begins to exceed the benchmark. For a wind power project, the majority of the static total investment is on wind turbines, whose price has been determined under the equipment purchasing agreement¹⁸. The rest of the static investment, due to the increasing trend of construction material costs¹⁹, is also unrealistic to be lowered down. It is known that, in the past few years, wind power equipment supply are unable to meet the demand, coupled with the rising of steel, copper and other raw materials prices, the equipment price has a rising trend²⁰, and, the current international wind turbine orders have been placed to 2009, and the prices have risen up by 25%²¹. Therefore, it is very unlikely for the static investment have a reduction of 2.5% on the value from the AFSR.

As shown in the above tables, the tariff is the most important factor affecting the financial attractiveness of the proposed project. In the case that the tariff increases by 2.55%, the FIRR of the proposed project begins to exceed the benchmark. According to the market rules of Northeast China power market, the

¹⁸ EPA of the project

¹⁹ Financial Report issued by Central Bank of China

²⁰ Shi Pengfei (The development of Wind Power)

²¹ Situation on wind turbine orders and prices

trend of tariff for wind power projects in the same regions is stable since 2002²². For the proposed project, the guiding tariff is of 0.4977 RMB/kWh (excluding VAT) issued by the government on 29 Feb. 2008²³. Therefore it is impossible that the expected tariff of the proposed project could increase 2.55% again, so the proposed project is always lack of financial attractiveness.

The sensitivity analysis of PLF is equivalent to the sensitivity analysis of tariff (both impact the turnover the same way). In the case that the PLF increases by 2.55%, the FIRR of the proposed project begins to exceed the benchmark. According to the Chinese Renewable Energy Law enacted on January 1st 2006, wind power generation should be purchased fully by the grid²⁴. Therefore, the PLF reflects the annual generation output of the proposed project, which depends on the average wind speed at the project site for a specific wind turbine. According to the feasibility study report of the proposed project, the annual output is estimated basing on the long term weather statistic data provided by local meteorological station and wind resources measurement, which first using professional software WAsP to select the rich wind source area, then using software Wind Farmer to optimize the location of each turbine for maximize power generation. As per the National Standard of GB/T 18710-2002²⁵ and GB/T 18709—2002²⁶, the project owner conducted wind resource measurements for the whole year (May 2005 to April 2006). The data from above wind resource measurement was correct based on the historical meteorological data of 30 years (from 1976 to 2005)²⁷, provided by local weather station. Moreover, according to the Adjusted FSR, the average annual output is estimated basing on the 30-year wind statistic data from 1976 to 2005 provided by local meteorological station. As shown in the 30-year wind statistic data from 1976 to 2005, the average wind speed of 30-year is 4.1m/s, the average wind speed of 20-year is 4.0m/s, the average wind speed of 10-year is 3.96m/s. Compared with the 30-year wind statistic data, the wind speed is decreasing and trending to be stable²⁸, as shown in Figure 2.

²² CHINA WIND POWER REPORT 2008

²³ <http://www.86wind.com/info/detail/37-5758.html>

²⁴ http://www.gov.cn/ziliao/flfg/2005-06/21/content_8275.htm

²⁵ <http://www.docin.com/p-16338054.html#>

²⁶ <http://wenku.baidu.com/view/2a72cf24ccbff121dd3683d1.html>

²⁷ The FSR of the proposed project

²⁸ The Feasibility Study Report of the proposed project.

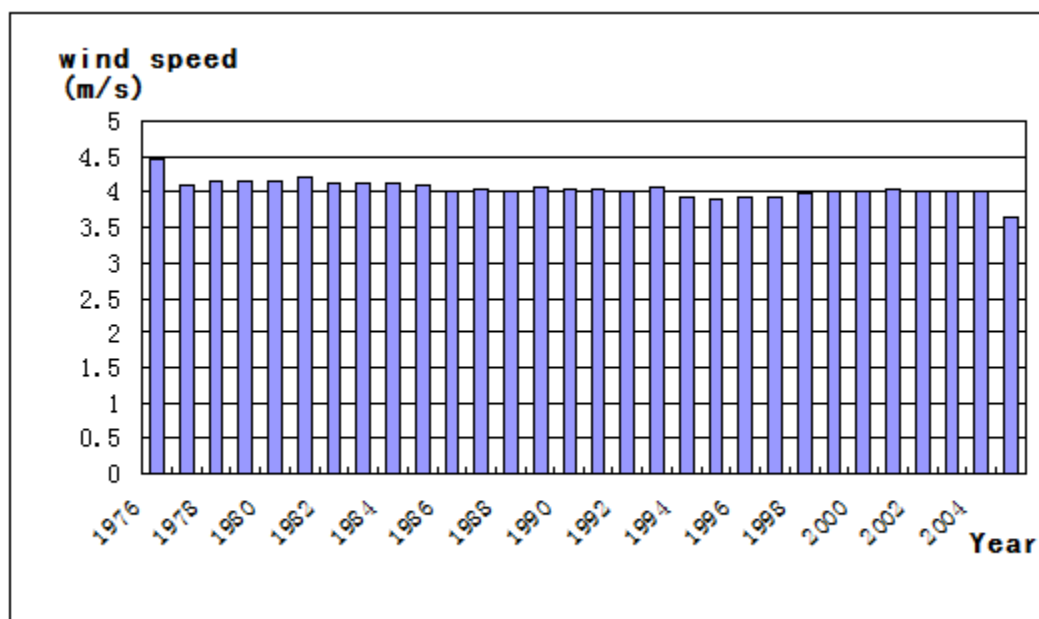


Figure 2 The Average Wind speed provided by local meteorological station

According to the VVM and EB 41, Annex 45, paragraph 17, the compared statistics of similar projects in Chifeng City and the actual electricity generation in Year 2009 been provided a cross-check on the suitability of the assumptions used in the development of the investment analysis.

- i. According to the net electricity generation in Year 2009 confirmed by power grid company, the actual net electricity generation of 128720MWh²⁹ from that is about 2.26% lower than the estimated power generation of 131700 MWh in the PDD.
- ii. Comparing PLF of the proposed project with that of all registered projects located in Chifeng City, it is shown that the PLF of the proposed project is 30% that is higher than the average value of 28% of all registered projects located in Chifeng.

Project name	Ref. No.	Installed capacity	Location	EG	PLF	Operating hours
		(MW)	City	(MWh)	(%)	(h)

²⁹ The statistics of total net electricity generation in 2009 by the grid power company

Saihanba East 45.05 MW Windfarm Project	561	45.05	Chifeng	110640	28.04%	2455.94
Saihanba North 45.05 MW Windfarm Project	576	45.05	Chifeng	110640	28.04%	2455.94
Inner Mongolia Chifeng Dongshan 49.3 MW Wind Power Project	689	49.3	Chifeng	122614	28.39%	2487.10
Inner Mongolia Chifeng Saihanba West 30.6 MW Windfarm Project	994	30.6	Chifeng	74850	27.92%	2446.08
Inner Mongolia Dali Phase IV 49.5MW Wind Power Project	1628	49.5	Chifeng	123390	28.46%	2492.73
Inner Mongolia Dali Phase V 49.5MW Wind Power Project	1629	49.5	Chifeng	110242	25.42%	2227.11
Inner Mongolia Chifeng Bolike 50MW Wind Power Project	1830	50	Chifeng	122848	28.05%	2456.96
Inner Mongolia Chifeng Dongshan Phase II 50MW Wind Power Project	1869	50	Chifeng	124073	28.33%	2481.46
Inner Mongolia Meiyaoshan Wind Farm Project	2381	49.92	Chifeng	107440	24.57%	2152.24
Inner Mongolia Chifeng Saihanba Qingmachang Wind Power Project	2617	49.5	Chifeng	122448	28.24%	2473.70
Datang Chifeng Bolike II Wind Power Project	3105	50	Chifeng	125102	28.56%	2502.04
Inner Mongolia Chifeng Daguangdingzishan Wind Power Project	3116	49.3	Chifeng	127500	29.52%	2586.21
Inner Mongolia Wengniute Banner Wudaogou Wind Power Project (II)	3325	50	Chifeng	135600	31%	2712
Inner Mongolia Chifeng Saihanba Tashanzi Wind Power Project	2615	49.5	Chifeng	121382	28%	2452.16
Inner Mongolia Chifeng Yihegong Windfarm Project	2811	49.5	Chifeng	111,637	26%	2255
Inner Mongolia Wudaogou 50.25MW Wind Power Project	1487	50.25	Chifeng	124,660	28%	2481
Inner Mongolia Sunjiaying 50.25MW Wind Power Project	1488	50.25	Chifeng	120940	27%	2407
AVERAGE					28%	2442.63
The proposed project	3439	50	Chifeng	131,700	30%	2634

Sources: <http://cdm.unfccc.int/Projects/registered.html>

In conclusion, it is impossible for the proposed project that PLF (the net electricity generation) increases about 2.55% than the estimated value throughout the whole project operation period.

The impact of the annual O&M cost is the slightest. The FIRR of the proposed project could reach the benchmark when the annual O&M cost decreases by 11%. According to the Economical Assessment Method and Parameters for Construction Project (3rd edition) issued by NDRC and Ministry of Construction of China, the detailed operation costs is composed of Maintenance Fee, Salary and Welfare Fee, Material and other Cost, Insurance Fee. In the recent years, the price of material and salaries of the employees are gradually increasing in China³⁰, especially the price rising of steels³¹ that is the main material of the proposed project. At the same time, the wind turbines demand exceeds supply in the whole world³² at present, which leads to the price increasing and the shortage of accessorial equipments of wind turbines. Under this condition, the maintenance costs for accessorial equipments of wind turbines are also

³⁰ <http://info.bm.hc360.com/2007/12/03102559376.shtml>

http://www.chinadaily.com.cn/hqgj/2007-09/03/content_6075777.htm

³¹ <http://www.c-bm.com/hydt/lianjie1.asp?id=33552>

³² <http://www.86wind.com/info/detail/4-5335.html>

<http://energy.people.com.cn/GB/5720709.html>

increasing during the operation period. As above description, the annual O&M cost is gradually increasing during the operation period for the proposed project.

According to the VVM and EB 41, Annex 45, paragraph 17, the actual O&M cost in Year 2009 been provided a cross-check on the suitability of the assumptions used in the development of the investment analysis.

Based on the annual financial audit statement, the O&M cost of the proposed project in Year 2009 was of 2153(10000Yuan)³³ that is 32.66% higher than the calculated average value of 1623(10000Yuan) of O&M cost of the proposed project. Moreover, the main part of the O&M cost was used for the Maintenance of equipments due to the lack of operation experiments.

Therefore, it is impossible that the annual O&M cost could decrease 11%, so the proposed project is always lack of financial attractiveness within the reasonable range of annual O&M cost.

To conclude, under the reasonable variations in the critical assumptions, the conclusion regarding the financial additionality is robust and supported by sensitivity analysis.

Step 3. Barrier analysis

Not applicable

Step 4. Common practice analysis

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

Before 2002, China wind farm often received high tariffs as no bidding process was required and power companies and grid companies share the same interests³⁴. So the wind power plants were demonstration projects and enjoyed higher price than the present project³⁵, which are essential distinctions between the present project and the parts of existing similar projects. Thus they had no restrictions in power grid connection.

According to the definitions of other activities similar to the proposed project activity in “Tool for the Demonstration and Assessment of Additionality (version 5.2)”, the similar projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc.

³³ The annual financial audit statement issued by Zhongjianguhua Certified Public Accountants Co.,Ltd

³⁴ <http://61.159.10.158/detail.cfm?id=12524>

<http://www.grchina.com/gb/greenpower/advise-0-5.htm>

³⁵ <http://www.grchina.com/gb/greenpower/advise-0-5.htm>

Due to the Northeast China Power Grid is the baseline **scenario for the proposed project, the** similar projects should be considered in the scope of the Northeast China Power Grid, which is the area of 120 sq.km³⁶. In the scope of Northeast China Power Grid, the different provinces had differences in the several aspects including the tariff and construction conditions and geographical environments and financing conditions. According to the above analyses and the definitions of other activities similar to the proposed project activity in “Tool for the Demonstration and Assessment of Additionality (version 5.2)”, the scope of the similar projects should be limited in the Inner Mongolia Power grid and the similar projects determined in this scope are more representational with the same grassland region and similar construction conditions and same geographical environments (wind resources and climate).

A comparable size to the project activity is defined as the range from 50% to 150% of the rated capacity of the project plant mentioned in ACM0013³⁷. According to the description for the comparable size to the project activity approved by EB, a similar scale to the proposed project is limited with the capacity of 25-75MW.

Therefore, the existing similar wind farms in Inner Mongolia Autonomous Region are listed in the following table:

Table 8 Similar Wind Farms in Inner Mongolia

Project Title	Commissioning Date	Capacity	Note
Huitengxile 25.2MW Wind Farm	1996.10-1997.10	25.2 MW	Soft loan from Denmark government and Supported as Shuangjia Demonstration Project
Dali Wind Farm	2003.12-2004.04	31.2 MW	Demonstration Project Supported by national debt fund

Data source: Shi Pengfei (Deputy Director, Chinese Wind Energy Association), Statistics on China Wind Farm Installed Capacity 2006.

<http://www.nwtc.cn/Article/ShowArticle.asp?ArticleID=814><http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=1063>

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

The existing similar wind farm projects do not call into question the claim that the proposed project is financially unattractive as discussed in Step 2.

Huitengxile 25.2MW wind project is partly funded with soft loan from Denmark government (5.4MW) and partly supported as Shuangjia Demonstration Project by State Economic and Trade Commission (19.8MW)³⁸. Dali Wind Farm is a demonstration project supported as the fourth issue of national debt

³⁶ http://law.baidu.com/pages/chinalawinfo/5/11/453feafe7d1b8eb1c23979205d75551b_0.html

³⁷ http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_JD73SPVZEDDN6IY8M6WFC7WIOBMNRN

³⁸ <http://www.nwtc.cn/Article/ShowArticle.asp?ArticleID=814>

special fund project³⁹. Therefore, there are essential distinctions between the proposed project and the two wind farm projects in terms of sources of investment and operation environment, e.g., they enjoy favourable treatments which are not be available for the proposed project.

Moreover, some similar wind farms in Inner Mongolia have been registered as CDM projects by EB in the last few years, and others are applying for CDM registration⁴⁰, because they are financially unattractive without the additional income from CER sales, and face barriers.

To conclude, the proposed project activity is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

The proposed project is the installation of a new grid-connected renewable power plant, and the baseline scenario 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”.

Baseline emissions

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity, calculated as follows:

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

(1)

Where:

BE_y = Baseline emissions in year y (tCO₂/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 CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” (version 01.1).

The methodological tool “Tool to calculate the emission factor for an electricity system” (version 02) determines the CO₂ emission factor for the displacement of electricity generated by power plants in an electricity system, by calculating the “operating margin” (OM) and “build margin” (BM) as well as the “combined margin” (CM). The operating margin refers to a cohort of power plants that reflect the existing

³⁹ <http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=1063>

⁴⁰ <http://cdm.ccchina.gov.cn/web/index.asp>

power plants whose electricity generation would be affected by the proposed CDM project activity. The build margin refers to a cohort of power units that reflect the type of power units whose construction would be affected by the proposed CDM project activity.

The methodological tool “Tool to calculate the emission factor for an electricity system” (version 02) provides procedures to determine the following parameters:

Parameter	SI Unit	Description
$EF_{grid,CM,y}$	tCO ₂ /MWh	Combined margin CO ₂ emission factor for grid connected power generation in year y
$EF_{grid,BM,y}$	tCO ₂ /MWh	Build margin CO ₂ emission factor for grid connected power generation in year y
$EF_{grid,OM,y}$	tCO ₂ /MWh	Operating margin CO ₂ emission factor for grid connected power generation in year y

The following six steps are applied to calculate the emission factor for an electricity system:

- STEP 1: Identify the relevant electric power system.
- STEP 2: Select an operating margin (OM) method.
- STEP 3: Calculate the operating margin emission factor according to the selected method.
- STEP 4: Identify the cohort of power units to be included in the build margin (BM).
- STEP 5: Calculate the build margin emission factor.
- STEP 6: Calculate the combined margin (CM) emissions factor.

Step1: Identify the relevant electric power system.

Using the boundary definitions of the Chinese DNA⁴¹, the spatial extent of the project boundary includes Inner Mongolia Chifeng Gaofeng Wind Power Project and all power plants connected physically to the Northeast Power Grid that the CDM project power plant is connected to. Northeast Power Grid is defined as the **project electricity system**, which consists of independent province-level electricity systems including Liaoning, Jilin and Heilongjiang province that can be dispatched without significant transmission constraints. The **connected electricity system** is North China Power Grid, which is connected by transmission lines to the project electricity system.

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

Since the Northeast Power Grid has the electricity exports to the North China Power Grid, the spatial extent is limited to the project electricity system (Northeast Power Grid).

Step2: Select an operating margin (OM) method

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

- (a) Simple OM, or
- (b) Simple adjusted OM, or

⁴¹ <http://cdm.ccchina.gov.cn/web/index.asp>.

- (c) Dispatch data analysis OM, or
- (d) Average OM

The simple OM method (option a) can only be used if low-cost/must-run resources ⁴² constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.

For the simple OM, the simple adjusted OM and the average OM, the emissions factor can be calculated using either of the two following data vintages:

- ◆ 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 calculating the emission factor for year y is usually only available later than six months after the end of year y , alternatively the emission factor of the previous year ($y-1$) may be used. If the data is usually only available 18 months after the end of year y , the emission factor of the year proceeding the previous year ($y-2$) may be used. The same data vintage (y , $y-1$ or $y-2$) should be used throughout all crediting periods.

For the dispatch data analysis OM, use the year in which the project activity displaces grid electricity and update the emission factor annually during monitoring.

The data vintage chosen should be documented in the CDM-PDD and not be changed during the crediting periods.

Power plants registered as CDM project activities should be included in the sample group that is used to calculate the operating margin if the criteria for including the power source in the sample group apply.

The justifications of the choice of method to calculate OM emission factor are as follows.

Method (c): The dispatch data analysis OM emission factor is determined based on the power units that are actually dispatched at the margin during each hour h where the project is displacing electricity. This method requires the dispatch order of each power plant and the dispatched electricity generation of all the power plants in the power grid during each hour. Since the dispatch data, power plants operation data are considered as confidential materials and only for internal usage and are not available publicly. Thus, method (c) is not applicable for the proposed project.

Method (b): Method (b) requires the annual load duration curve of the power grid and the load data of every hour data during the whole year on the basis of the time order. As mentioned above, the dispatch data and detailed load curve data are not available publicly. Therefore, method (b) is not applicable for the proposed project as well.

In terms of Method (d) and Method (a): The average OM emission factor (option d) is calculated as the average emission rate of all power plants serving the grid, using the methodological guidance as described under (a) above for the simple OM, but including in all equations also low-cost/must-run power

⁴² Low-cost/must-run resources are defined as power plants with low marginal generation costs or power plants that are dispatched independently of the daily or seasonal load of the grid. They typically include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation. If coal is obviously used as must-run, it should also be included in this list, i.e. excluded from the set of plants.

plants. The simple OM method (option a) can only be used if low-cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production. Low operating cost and must run resources typically include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation. If coal is obviously used as must-run, it should also be included in this list, i.e. excluded from the set of plants. Considering the low-cost/ must run resources only constitute 7.07%, 5.44%, 4.72%, 6.45% and 8.28% of total generation of Northeast Power Grid from the year 2001 to 2005, respectively (China Electric Power Yearbooks 2002-2006). Therefore, method (a) is chosen to calculate OM emission factor for the proposed project.

In conclusion, the Ex ante option of the data vintages is chosen to calculate the emission factor of the Northeast Power Grid by using the simple OM method (option a) for the proposed project.

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

The simple OM emission factor is calculated as the generation-weighted average CO₂ emissions per unit net electricity generation (tCO₂/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants / units. 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)

Option A should be preferred and must be used if fuel consumption data is available for each power plant / unit. In other cases, option B or option C can be used. For the purpose of calculating the simple OM, Option C should only be used if the necessary data for option A and option B is not available and can only be used if only nuclear and renewable power generation are considered as low-cost / must-run power sources and if the quantity of electricity supplied to the grid by these sources is known.

For the proposed project, the data on fuel consumption, net electricity generation and the average efficiency of each power unit are unavailable, thus option A and option B cannot be used. Nevertheless, the 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 are available, and, nuclear and renewable power generation are considered as low-cost / must-run power sources and the quantity of electricity supplied to the grid by these sources is known, therefore, Option C can be used.

On Option C, 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:

$$EF_{grid,OMsimple,y} = \frac{\sum FC_{i,y} \times NCV_{i,y} \times EF_{CO_2,y}}{EG_y}$$

(2)

Where:

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

For this approach (simple OM) to calculate the operating margin, the simple OM emission factor is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including low-cost / must-run power plants / units, and including electricity imports to the grid⁴³. Electricity imports should be treated as one power plant source.

Regarding parameter selection, local values of $NCV_{i,y}$ and $EF_{CO2,i,y}$ should be used where available. If no such values are available, IPCC world-wide default values are preferable. The Net Calorific Value ($NCV_{i,y}$) of each type of fossil fuel used in the calculation comes from China Energy Statistic Yearbook 2007. Emission factors ($EF_{CO2,i,y}$) of each type of fossil fuel come from IPCC 2006 default values.

As chosen in step 2, the simple OM emission factor is calculated by using Ex-ante option of data vintages, i.e. 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.

The data of installed capacity, electricity generation and fuel consumptions are all from China Energy Statistical Yearbooks 2004-2006 and China Electric Power Yearbooks 2004-2006.

Given the above, the simple operating margin CO2 emission factor ($EF_{grid,OMsimple,y}$) of Northeast Power Grid is **1.2402 tCO2/MWh**. The detailed calculations and data are listed in the annex 3 (The baseline emission factor OM is same as that provided by Chinese DNA, the website is <http://cdm.ccchina.gov.cn/web/index.asp>).

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

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

- (a) The set of five power units that have been built most recently, or

⁴³ An import from a connected electricity system should be considered as one power source.

- (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 recently⁴⁴.

The set of power units that comprises the larger annual generation should be used.

A power unit is considered to have been built at the date when it started to supply electricity to the grid.

Power plant registered as CDM project activities should be excluded from the sample group *m*. However, if group of power units, not registered as CDM project activity, identified for estimating the build margin emission factor includes power unit(s) that is (are) built more than 10 years ago then:

- (i) Exclude power unit(s) that is (are) built more than 10 years ago from the group; and
- (ii) Include grid connected power projects registered as CDM project activities, which are dispatched by dispatching authority to the electricity system.

Capacity additions from retrofits of power plants should not be included in the calculation of the build margin emission factor.

In terms of vintage of data, one of the following two options can be chosen:

- 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.

For the proposed project, option 1 is chosen to calculate Build Margin emission factor.

Step 5: Calculate the build margin emission factor

The build margin emissions factor is the generation-weighted average emission factor (tCO₂/MWh) of all power units *m* during the most recent year *y* for which power generation data is available, calculated as follows:

⁴⁴ If 20% falls on part capacity of a unit, that unit is fully included in the calculation

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

(3)

Where:

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

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

$EF_{EL,m,y}$ = CO2 emission factor of power unit m in year y (tCO2/MWh)

m = Power units included in the build margin

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

No matter which options for calculating BM factor mentioned in step 4 was adopted for the proposed project; the same issue on data availability must be addressed. Currently, it is very difficult to get the capacity margin data of power plants in China, since these data as well as net quantity of electricity generated and delivered to the grid and fuel consumption data in power unit m are regarded as commercial secrets or only for internal usage. Then the following deviation was adopted to calculate the Build Margin emission factor.

1. The breakdown data by power plants are not while the aggregate data by different types of fuels are available. Considering this situation, the m sample group will consist of capacity addition by power sources with same fuel instead of by power plants. For the proposed project the m sample group will consist of fossil fuel fired capacity addition, hydropower capacity addition and other capacity addition;
2. Assuming that all the power plants with same fuel type have equal annual operation hours, and identify the starting year t_0 which the power capacity additions from t_0 to t (i.e. the recent year of which the latest data is available) in the electricity system that comprise 20% of the system generation (in MWh).

For the proposed project, the most recent year of which data is available is 2005, and the sample group m consists of installed capacity addition during 1998 to 2005. The total capacity addition during 1998 to 2005 accounts for 21.34% of total installed capacity in 2005, while that during 1999 to 2004 accounts for 18.66% of total installed capacity in 2005. The weight of installed capacity additions for thermal power plant accounts for 91.31% of total installed capacity additions. (See Annex 3 for detailed calculation)

3. To be conservative, zero emission factors were selected for hydropower capacity and other capacity. Moreover, since specific data on coal fired capacity, oil fired capacity, and gas fired capacity could not be separated from current statistical data on fossil fuel fired capacity, the following approach was adopted for calculating the emission factor of fossil fuel fired capacity addition:

(1) With the energy balance sheet in China Energy Statistical Yearbook for the most recent year, calculating the respective percentages of CO2 emissions from coal fired power generation, oil fired power

generation, and gas fired power generation against total CO2 emissions from fossil fuel fired power generation:

$$\lambda_{Coal,y} = \frac{\sum_{i \in COAL,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j,y}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j,y}} \quad (4)$$

$$\lambda_{Oil,y} = \frac{\sum_{i \in OIL,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j,y}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j,y}} \quad (5)$$

$$\lambda_{Gas,y} = \frac{\sum_{i \in GAS,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j,y}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j,y}} \quad (6)$$

Where:

$FC_{i,j,y}$ = The amount of fuel i (in a mass or volume unit) consumed by province j in year y ;

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

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

$COAL, OIL, and GAS$ = The aggregation of various kinds of coal, oil, and gas as fossil fuels.

(2) Calculating the corresponding emission factor for fossil fuel fired power generation:

$$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv} \quad (7)$$

Where:

$EF_{Coal,Adv}$, $EF_{Oil,Adv}$ and $EF_{Gas,Adv}$ are the emission factors for the best commercially available technology of coal fired power generation, oil fired power generation, and gas fired power generation, respectively (See Annex 3 for detailed calculation).

- Using the share of different type of capacity in total capacity addition as weight, the weighted average of emission factors of different type capacity is calculated as the Build Margin emission factor $EF_{grid,BM,y}$ of Northeast Power Grid (See Annex 3 for detailed calculation):

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

Where:

CAP_{Total} = The total capacity addition

$CAP_{Thermal}$ = The fossil fuel fired capacity addition

Following the four steps above, the build margin emission factor $EF_{grid,BM,y}$ of the Northeast Power Grid is calculated to be **0.8632tCO₂/MWh**. The detailed calculations and data are listed in the annex 3 (The build margin emission factor BM is same as that provided by Chinese DNA, the website is <http://cdm.ccchina.gov.cn/web/index.asp>).

Step 6: Calculate the combined margin emissions factor

The combined margin emissions factor is calculated as follows:

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

Where:

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

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

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

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

Wind project activities: $w_{OM} = 0.75$ and $w_{BM} = 0.25$ (owing to their intermittent and non dispatchable nature) for the first crediting period and for subsequent crediting periods.

The default weights are adopted for the proposed project, the baseline emission factor is:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} = 1.1459 \text{ tCO}_2/\text{MWh}$$

Project emissions

For wind power project activities, $PE_y = 0$

Leakage

For wind power project activities, $LE_y = 0$

Emission reductions

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \quad (10)$$

Where:

ER_y = Emission reductions in year y (t CO₂e/yr).

BE_y = Baseline emissions in year y (t CO₂e/yr).

PE_y = Project emissions in year y (t CO₂/yr).

LE_y = Leakage emissions in year y (t CO₂/yr).

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

Data / Parameter:	$FC_{i,y}, FC_{i,j,y}$
Data unit:	Mass or volume unit
Description:	Amount of fossil fuel type i (in a mass or volume unit) consumed by power plant/unit (or in the project electricity system in case of $FC_{i,y}$) in year y , or the amount of fuel type i (in a mass or volume unit) consumed by province j in year y .
Source of data used:	China Energy Statistical Yearbook 2004-2006
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Simple OM: For each crediting period using the most recent three historical years (i.e. 2003-2005) for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex-ante option). BM: For the first crediting period, following the EB guidance. For the second and third crediting period, only once ex-ante at the start of the second crediting period.
Any comment:	

Data / Parameter:	$EG_{m,y}, EG_y$
Data unit:	MWh
Description:	Net electricity generated and delivered to the grid by power plant / unit m (or in the project electricity system in case of EG_y) in year y
Source of data used:	China Electric Power Yearbook 2004-2006
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Simple OM: For each crediting period using the most recent three historical years (i.e. 2003-2005) for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex-ante option) BM: For the first crediting period, following the EB guidance. For the second and third crediting period, only once ex-ante at the start of the second crediting period.
Any comment:	

Data / Parameter:	$NCV_{i,y}$
Data unit:	GJ/ mass or volume unit
Description:	Net calorific value (energy content) of fossil fuel type i in year y
Source of data used:	China Energy Statistical Yearbook 2006
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Simple OM: For each crediting period using the most recent three historical years (i.e. 2003-2005) for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex-ante option) BM: For the first crediting period, following the EB guidance. For the second

applied :	and third crediting period, only once ex-ante at the start of the second crediting period.
Any comment:	

Data / Parameter:	$EF_{CO_2,i,y}$
Data unit:	tCO ₂ /GJ
Description:	CO ₂ emission factor of fossil fuel type i in year y
Source of data used:	2006 IPCC default values
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	2006 IPCC values have been used for fuel types since no country specific CO ₂ emission factors are available Simple OM: For each crediting period using the most recent three historical years (i.e. 2003-2005) for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex-ante option) BM: For the first crediting period, following the EB guidance. For the second and third crediting period, only once ex-ante at the start of the second crediting period.
Any comment:	

Data / Parameter:	CAP_y
Data unit:	MW
Description:	The installed capacity in the project electricity system in year y
Source of data used:	China Electric Power Yearbook 1999-2006
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Use of capacity additions for estimating the build margin emission factor for grid electricity under the guidance of EB.
Any comment:	

Data / Parameter:	$\eta_{coal,adv}$
Data unit:	%
Description:	Best electricity supply efficiency for coal fired plant
Source of data used:	http://cdm.ccchina.gov.cn/web/index.asp
Value applied:	35.82
Justification of the choice of data or description of measurement methods and procedures actually applied :	Country specific value
Any comment:	

Data / Parameter:	$\eta_{oil,adv}$
Data unit:	%

Description:	Best electricity supply efficiency for oil fired plant
Source of data used:	http://cdm.ccchina.gov.cn/web/index.asp
Value applied:	47.67
Justification of the choice of data or description of measurement methods and procedures actually applied :	Country specific value
Any comment:	

Data / Parameter:	$\eta_{gas,adv}$
Data unit:	%
Description:	Best electricity supply efficiency for gas fired plant
Source of data used:	http://cdm.ccchina.gov.cn/web/index.asp
Value applied:	47.67
Justification of the choice of data or description of measurement methods and procedures actually applied :	Country specific value
Any comment:	

Data / Parameter:	$EF_{grid,CM,y}$
Data unit:	tCO ₂ /MWh
Description:	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 02)
Source of data used:	http://cdm.ccchina.gov.cn/web/index.asp
Value applied:	1.1459(Chinese DNA)
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per the “Tool to calculate the emission factor for an electricity system” (version02)
Any comment:	

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

According to the baseline methodology ACM0002, the GHG emission of the proposed project within the project boundary is zero, i.e. $PE_y = 0$.

According to the baseline methodology ACM0002, the leakage of the proposed project is not considered, i.e. $LE_y = 0$.

Therefore, the proposed project activity emissions are zero, i.e. $PE_y + LE_y = 0$.

According to the descriptions and calculation in section B. 6.1, the combined baseline emission factor of the Northeast Power Grid is:

$$EF_{grid,CM,y} = 1.1459 \text{ tCO}_2/\text{MWh}.$$

According to the Feasibility Study Report of the proposed project, the estimated annual electricity generation delivered to the power grid will be:

$$EG_y = 131,700 \text{ MWh}.$$

The annual emissions of the baseline scenario will be:

$$BE_y = EG_y \times EF_{grid,CM,y} = 150,915 \text{ tCO}_2$$

The annual emission reductions of the proposed project will be:

$$ER_y = BE_y - PE_y - LE_y = 150,915 \text{ tCO}_2$$

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

Year	Estimation of baseline emissions (tons of CO ₂ e)	Estimation of project activity emissions(tons of CO ₂ e)	Estimation of leakage (tons of CO ₂ e)	Estimation of overall emission reductions (tons of CO ₂ e)
01/06/2010-31/12/2010	88033	0	0	88033
2011	150915	0	0	150915
2012	150915	0	0	150915
2013	150915	0	0	150915
2014	150915	0	0	150915
2015	150915	0	0	150915
2016	150915	0	0	150915
01/01/2017-31/05/2017	62882			62882
Total(tons of CO₂e)	1056405	0	0	1056405

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

B.7.1. Data and parameters monitored:

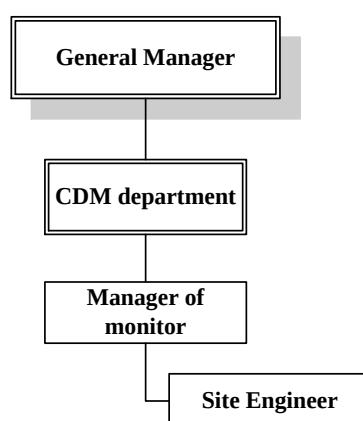
Data / Parameter:	EG_y
Data unit:	MWh
Description:	Net electricity supplied by the project activity to the grid during the year y

Source of data to be used:	Electricity meter reading at project boundary
Value of data applied for the purpose of calculating expected emission reductions in section B.5	131,700
Description of measurement methods and procedures to be applied:	The meter (accuracy degree is not less than 0.5) is installed at the transformer station, which measures the electricity supplied to the grid. The meter has two-way metering and can record exports to the grid and imports from the grid. The readings of electricity meter will be hourly measured and monthly recorded. Data will be archived for 2 years following the end of the crediting period by means of electronic and paper backup. The metering equipment will be properly configured and checked annually according to the requirement from Technical administrative code of electric energy metering (DL/T448 — 2000). The monitoring personnel of the project owner are responsible for reading and calibration of the meter, recording of the readings, and reporting of readings.
QA/QC procedures to be applied:	The electricity output from each turbine will be monitored and recorded at the on-site control centre using a computer system. The project operator is responsible for recording this set of data. Electricity sales invoices will also be obtained for double check.
Any comment:	Electricity supplied by the project activity to the grid. Double check by receipt of sales.

B.7.2. Description of the monitoring plan:

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

1. Management structure and training



The general manager makes the overall policy decision while the CDM department is responsible for the concrete implementation of the Monitoring Plan. The monitor manager is responsible for supervising and

checking the whole data record process and the calibration of meters. Another main task of the monitor manager is facilitating the verification through providing the DOE with all required necessary information. The site engineer will collect monitoring data (e.g. electric meter data), keep receipt of sales, calculate emission reduction and prepare the monitor report. Before the start of the monitor, all members in the CDM department should have received well training on CDM issues.

2. Calibration and Arrangement of Meters

- ◆ An agreement should be signed between the project owner and Power Grid Company that define the metering arrangements and the required quality control procedures to ensure accuracy.
- ◆ For the proposed project, two meters (accuracy degree is not less 0.5, bidirectional) were installed in the loops to directly monitor the electricity exported to and imported from the power grid.
- ◆ The metering equipments for electricity will be properly configured and calibrated annually under the requirements of Technical Administrative Code of electric energy metering (DL/T448 — 2000).. The metering equipments will be checked by the project owner and Power Grid Company before operation.
- ◆ The verification of electric metering equipments should be periodically carried out according to relevant national electric industry standards or regulations. After verification, meters should be sealed. The meters shall be jointly inspected and sealed on behalf of the parties concerned and shall not be accessible by either party except in the presence of the other party or its accredited representatives.
- ◆ the meters installed shall be tested by the qualified metrical agency co-authorized by the project owner and Power Grid Company, after:
 - 1) The detection of a difference larger than the allowable error in the reading of meter, when considering the reactive loss of electrical wire;
 - 2) The need for repair or replacement due to the damage of the meters in whole or in parts in accordance with the specifications.
- ◆ The project owner and Power Grid Company should have a remedial measure for the estimation of the correct reading according to agreed procedures under the signed agreement (PPA is to be signed).

3. Monitoring Parameters

All relevant parameters listed in Section B 7.1 will be monitored according to the methodology requirements and description of measurement methods and procedures to be applied. The electricity supplied to and imported from the grid should be measured continuously and recorded monthly as required by the methodology applied. The data and meter reading will be well documented and be readily accessible for DOE.

4. Data Recording

The project owner is responsible for the operation of the first metering equipments, and Power Grid Company responsible for the operation of the second metering equipment, to ensure that all meters are in good conditions and the net electricity supplied to the grid will be valid and be able to achieve emission reduction calculation. Under such circumstances, the specific steps for data collection and reporting are listed below:

- a) The project owner directly monitors two meters installed in the loops to determine the net electricity generation supplied to the power grid by the proposed project
- b) The readings of two meters are measured hourly and then recorded monthly at the end of each month (expected) or the date determined by the project owner and the power grid .
- c) The project owner provides the records of two meters monthly to the local Electric Power Company.
- d) The local Electric Power Company checks the records based on the whole meters system, and then provides the relevant reckoning documents or evidences to the project owner.
- e) The project owner provides the sale evidences to the local Power Grid Company.
- f) The project owner keeps the records of the meters and photocopies of the evidences and provides them to DOE for verification.

Should any previous months reading of the meter be inaccurate by more than the allowable error, or otherwise functioned improperly, the electricity generation supplied to the grid by the proposed project shall be determined by:

Several processes required to meet the requirements for emissions reduction monitoring include:

- If either party finds any reading of the Meters more than the allowable error or the monitoring equipment functions improperly, it should inform the other party immediately. The project owner and the local Power Grid Company should retain a qualified measure institute together to check the meters or equipment, solve the problems and get everything into normal condition; In the mean time, both sides shall jointly prepare an acceptable estimation method according to *Regulations and Rules of Power Supply*⁴⁵ issued by State Electricity Regulatory Commission of China to calculate the electricity exported to the Grid, and provide evidence to DOE for the verification to show the estimation is reasonable and conservative.
- For the handling of disputes between the proposed project owner and the Grid, measures will be adopted according to relevant articles of *Interim Measures for Settlement of Electricity Charges between the Power Generating Enterprises and the Grid Enterprises*⁴⁶ issued by State Electricity Regulatory Commission of China.

5. Quality Assurance and Quality Control

The project activities will use high-precision monitoring equipment to monitor the electricity from and to the grid. The meter will be calibrated and sealed as per the industry practices at regular intervals. Hence,

⁴⁵ http://www.serc.gov.cn/flfg/bmgz/200802/t20080220_5931.htm

⁴⁶ <http://www.chinapower.com.cn/article/1130/art1130580.asp>

high quality is ensured. Electricity sale invoices will be used to test the consistency of the recorded data.

6. Data Management System

All parameters monitored under the monitoring plan will be archived electronically and be kept at least for 2 years after the end of last crediting period. The monitored data will be presented to the verification agency or DOE to whom verification of emission reductions is assigned.

The documents in paper format, such as maps, tables, and the EIA report, will be used in conjunction with the monitoring plan to check the authenticity of the information, and be kept at least one copy by the project owner.

7. Verification

The main objective of the verification is to independently verify that the project has achieved the emission reductions as reported.

The responsibilities for verification of the project are as follows:

- ◆ Sign a service agreement about verification with specific DOE and agree to a time framework for carrying out verification activities. The project owner will make the arrangements for the verification and will prepare for the audit and verification process to the best of its abilities.
- ◆ The project owner will facilitate the verification through providing the DOE with all required necessary information, before, during and, in the event of queries, after the verification.
- ◆ The project owner will fully cooperate with the DOE for interviews and respond honestly to all questions from the DOE.

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

Date of completion of baseline study: 23/12/ 2009

Names of person/entity determining the baseline are listed as follows:

Gang Li, China Fulin Wind Power Development Corporation.

Address: Part C Floor 7, International Investment Building, No.6-9 Fuchengmen North Street, Xicheng District, Beijing 100034

Telephone: +8610-66091326

Email: ligang@clypg.com.cn

(Not the project participants listed in Annex 1)

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:

25/08/2007 (the permission data of the construction of the proposed project)

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

20 years

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

The project will use a renewable crediting period.

C.2.1. Renewable crediting period

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

01/06/2010

C.2.1.2. Length of the first crediting period:

7 years

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

Not applicable

C.2.2.2. Length:

Not applicable

SECTION D. Environmental impacts

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

The Environmental Impact Assessment Report of the project has been approved in Aug 2006 by the Environmental Protection Administration of Inner Mongolia Autonomous Region, referred as “Inner Mongolia Autonomous Region Environment (Table) [2006] No.56”. A summary of the report is illustrated as follows:

● **Main Potential Environmental Impacts Associated with the project**

- Impacts from the construction of the wind farm include construction noise, dust as well as water and soil loss etc;
- Impacts on native vegetation and environment as a result of construction activities for windmill towers, transformers and access roads;
- Impacts on socio-economy from the construction and operation of the project.

Impacts on Air Environment

The major air pollution sources in construction phase are dust generated from constructing building foundations, tower foundations, exhaust gas from vehicles and other emissions from ordinary workers' activities. Although the construction area is dispersed, the pollution sources are intermittent, mobile and small in intensity, several measures will still be taken in order to control and reduce the air pollution. Water should be sprinkled on the mounds of soil exposed in the air to prevent the dust blowing. The soil dug from groundwork should be transported without delay. No overloading of the vehicles should be permitted to avoid any material falling down along the way.

There are no air pollution sources in operation phase for the proposed project.

Impacts on Noise Environment

The noise of the project in construction phase is from vehicles and machines on-site. According to the monitoring data from the construction site, the noise is at a level between 80-110 dB. Based on the formula of declining of sound emitted from a non-directional source, it is estimated that the maximum noise effective distance of the project is 50m in daytime and 300m at night. Moreover, the magnitude of the impacts during the construction period will only exist temporarily, and disappear with the completing of the construction period. However, operational noise from the rotating blades is expected to be minimal due to the higher background noise caused by strong winds. The closest residential area to the site of the project is over 500m away. Therefore, the noise of the project will not have impact on nearby residents.

Impacts on Water and Solid Waste

The wind-farm does not consume any water, nor does it generate any wastewater in the operation phase. The possible negative impacts are the household wastewater and solid waste produced by builders and staff, and the waste earth from digging of the foundation in the construction phase. Under normal conditions with highly automated monitoring and control system, the household wastewater will be first treated in a septic tank, and then be disinfected to discharge for circumjacent virescence. Moreover, the amount of household solid waste will be very little, which will not have impact on the environment. Besides, the solid waste will be collected and moved to the appointed landfill site. Following the suggestion, the water and solid waste should have no significant impact on the environment.

Impacts on Ecosystem Environment

A serious potential concern for wind farms is their impact on vegetation, animals and migrating birds. The land occupied by the project activity is unfertile. Therefore the water and soil loss does not happen during the construction of the project. Moreover, the installed height of turbines is lower than the winged height of the birds. So there are no significant impacts on migratory birds / endangered species in the region of the project activity. Therefore, the activities to be carried out will not generate any negative impact on the ecological environment.

Socio-Economic Impacts

The project is estimated to supply annually 120.05GW•h of electricity power to the Chifeng Power Grid and to save about 46600tce. So the project generates eco-friendly, GHG free power that contributes to sustainable development of the region. Moreover, the locals have benefited economically through land

sales and revenues. The project activity not only helps the uplift of skilled and unskilled manpower in the region, but also improves employment rate and livelihood of local populace in the vicinity of the project.

Conclusion

In conclusion, being as a typical type of clean renewable energy, the proposed project has no significant impacts on local environment and will greatly contribute to achievement of sustainable development objective and promote local environmental protection.

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 construction and operation of the proposed project have no significant environmental impacts, and the proposed project is definitely an environmentally more friendly way of providing power than other power plants.

SECTION E. Stakeholders' comments

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

According to the requirement by the *Measures for Operation and Management of Clean Development Mechanism Projects in China* and PDD, the staff of Chifeng Xinsheng Wind Power Co., Ltd held an open public survey and stakeholders' conference on the local villagers and residents. In the public survey and conference, the stakeholder representatives are respectively from the local Environmental Protection Bureau, Local Development and Reform Commission, local Electricity Supply Company and local villagers and residents where the project is located. The project participants informed them about the project and asked for their comments.

- Public survey: during Jul. 2007- Aug.2007, one-page questionnaire was used to carry out a survey on the local stakeholders.
- Stakeholder conference: the meeting was held in Aug. 2007 in Chifeng City to explain CDM, better understand the stakeholders' interests and obtain their comments.
- **Stakeholder Meeting**

In the meeting, the project owner introduced the proposed project and the CDM to stakeholder representatives, and obtained their comments. The presentations were followed by a question and answer section and further discussion. The 8 representatives respectively expressed their opinions on the construction and operation of the proposed project.

Questions and topics for discussion are as follows:

- 1) The influences on their surrounding environment and livelihoods during construction and operation of the project;
- 2) The suggestions to the project owner regarding the project;
- 3) Whether or not agree with the construction of the project.

Every stakeholder representative expressed their comments on the proposed project. No opposing comment was received. The summary of the comments is as follows:

- ◆ The proposed project has been approved by the Development and Reform Commission and Environmental Protection Bureau of Inner Mongolia Autonomous Region, which shows that the construction and operation of the proposed project will have little impacts on the local environment. The local government highly supports the proposed project, and expects the increase of local financial revenues and new employment opportunities through the implementation of the proposed project.
- ◆ Wind power is renewable energy and is helpful in diversifying power mix of local power grid. Furthermore, wind power takes up a small share in the local power grid and will not have much impact.
- ◆ The proposed project site is located at wasteland. There are no residents with 210 m around the proposed project. Therefore, there is no issue on noise disturbance and residents migration. Moreover, the project owner has made compensation for the land occupied by the proposed project. The local residents also benefit from the employment opportunities for construction and operation of the proposed project.

■ Questionnaire Survey

A one page questionnaire was designed to be easily filled in with the following sections:

- 1) Project introduction
- 2) Respondent's basic information and education level
- 3) Questions on:
 - What is their opinion on their living environment?
 - Do they have any knowledge or understanding about wind farm projects?
 - Will the project bring improvements to their livelihoods?
 - Will the project have negative impacts on their livelihoods?
 - What special issues should be considered to reduce the negative impacts during construction and operation of the project?
 - What would the overall influence be for the construction and implementation of the project?
 - Do they agree with the construction of the project?
 - What other comments and suggestions do the respondents have for the company regarding the Project?
- 4) Space for the respondents' signature and date

E.2. Summary of the comments received:

The summary of the comments (22 questionnaires and 8 representatives) received is listed in the following sections:

- Education level of the respondents: primary level (20%), middle level (55%), higher level (25%) and 60% of males and 40% of females.

- Most respondents (87.5%) are satisfied with their living conditions and surrounding environment.
- 18 (60%) persons of the respondents know well about wind power, and 12 (40%) persons know a little.
- All the persons of the respondents support the construction of the proposed project.
- The respondents consider construction and operation of the proposed project may improve living level (100%), increase employment opportunities (96%), and income (93%), mitigate air pollution (93%).
- 100% of the respondents deemed that the construction of the proposed project will have overall positive impacts on their livelihoods.

All the persons of the respondents support the construction of the proposed project.

The survey shows that the proposed project receives very strong support from local people who believe the project will have positive impacts in many aspects.

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

The residents and local government are all very supportive of the proposed project therefore there has been no need to modify the project due to the comments received. Moreover, the local stakeholders have strong positive comments on the effects that the proposed project will boost the local economy and society. However, to control and avoid negative impacts on the local environment produced from the construction of the proposed project, the project owner should adopt relative measures as follow:

- 1) The project owner should guarantee and suitably add the investment of environmental protection.
- 2) The construction processes should be strictly implemented according to the national environment criterions.
- 3) The measures of environmental protection should been carried out to mitigate the environmental impacts.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

The Project Owner:

Organization:	Chifeng Xinsheng Wind Power Co., Ltd.
Street/P.O.Box:	No.6-9 Fuchengmen North Street, Xicheng District, Beijing 100034, China
Building:	Floor 8, Tower C, International Investment Building
City:	Beijing
State/Region:	Beijing
Postfix/ZIP:	100034
Country:	China
Telephone:	010-66091366
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E-Mail:	ququ15@126.com
URL:	/
Represented by:	Huang Qun
Title:	Vice President CHINA LONG YUAN ELECTRIC POWER GROUP CORP.
Salutation:	Mr
Last Name:	Huang
Middle Name:	/
First Name:	Qun
Department:	CDM Department
Mobile:	/
Direct FAX:	010-66091396
Direct tel:	010-66091317
Personal E-Mail:	ququ15@126.com

CERs Buyer:

Organization:	EDF Trading Limited
Street/P.O.Box:	71 High Holborn
Building:	
City:	London
State/Region:	
Postfix/ZIP:	WC1V 6ED
Country:	United Kingdom of Great Britain and Northern Ireland
Telephone:	+44 (0)20 7061 4207
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E-Mail:	franck.bernard@edftrading.com
URL:	www.edftrading.com
Represented by:	Franck Bernard
Title:	Environmental Product Manager
Salutation:	Mr.
Last Name:	Bernard
Middle Name:	
First Name:	Franck
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Annex 2**INFORMATION REGARDING PUBLIC FUNDING**

No public funding from Annex I countries is involved in the proposed project.

Annex 3**BASELINE INFORMATION**

The Annex 3 provides the basic data and results of the baseline emission factor in the Northeast China Power Grid. The information provided by the tables includes data, data resources and the underlying computation.

Table A-1~A-3 provides the Thermal power electricity generation in Northeast China Power Grid in the baseline scenario from 2003 to 2005, in which the main data sources come from China electric Power Yearbook 2004, 2005 and 2006.

Table A-1 Thermal power electricity generation in Northeast China Power Grid in 2003

Province	Generating capacity (MWh)	Rate of electricity consumption (%)	Power supply (MWh)
Liaoning	79751000	7.17	74,032,853.30
Jilin	29739000	7.32	27,562,105.20
Heilongjiang	48493000	8.48	44,380,793.60
Total (MWh)			145,975,752.10

《China Electric Power Yearbook 2004》P709, P670

Table A-2 Thermal power electricity generation in Northeast China Power Grid in 2004

Province	Generating capacity (MWh)	Rate of electricity consumption (%)	Power supply (MWh)
Liaoning	84543000	7.21	78,447,449.70
Jilin	33242000	7.68	30,689,014.40
Heilongjiang	53482000	7.84	49,289,011.20
Total (MWh)			158,425,475.30

《China Electric Power Yearbook 2005》P472, P474

Table A-3 Thermal power electricity generation in Northeast China Power Grid in 2005

Province	Generating capacity (MWh)	Rate of electricity consumption (%)	Power supply (MWh)
Liaoning	83697000	7.03	77,813,100.90
Jilin	35294000	6.59	32,968,125.40
Heilongjiang	58000000	7.96	53,383,200.00
Total (MWh)			164,164,426.30

《China Electric Power Yearbook 2006》

Key parameters for the emission factors calculation

The key parameters in OM and BM calculation include the net calorific values (NCVs), oxidation factors (OXIDs), and CO₂ emission factor per unit of energy (EF_{co2s}) of various types of fuels, and power supply efficiency of various power generation technologies.

Table A-4 NCVs, OXIDs, and EFco2s of various types of fuels

Fuel	NCV	EF _{co2} (tc/TJ)	OXID
Coal	20908 kJ/kg	25.80	1
Washed coal	26344 kJ/kg	25.80	1
Other Washed Coal ¹	8363 kJ/kg	25.80	1
Coke	28435 kJ/kg	29.20	1
Crude oil	41816 kJ/kg	20.00	1
Gasoline	43070 kJ/kg	18.90	1
Kerosene	43070 kJ/kg	19.60	1
Diesel	42652 kJ/kg	20.20	1
Fuel oil	41816 kJ/kg	21.10	1
Other petroleum products ²	38369 kJ/kg	20.00	1
Natural gas	38931 kJ/m ³	15.30	1
Coke oven gas ⁴⁷	16726 kJ/m ³	12.10	1
Other gas ⁴⁸	5227 kJ/m ³	12.10	1
LPG	50179 kJ/kg	17.20	1
Refinery gas	46055 kJ/kg	15.70	1

Data sources:

NCVs are from China Energy Statistical Yearbook 2006, P287.

EF_{co2} are from 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, Chapter 1, table 1-3.

OXID are from 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, Chapter 1, table 1-4.

Table A-5 Calculation of emission factor of advanced electricity generation technology

	variable	efficiency of electricity transmission	Emission Factor of fuel	Carbon oxidation rate	Emission Factor of power plant
		A	B	C	D=3.6/A/100*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%	21.2	1	0.5843

Step1 .Calculation of the Operating Margin Emission Factor (EF_{OM,y})

¹ Other washed coal includes middlings and slimes. The NCV value of middlings is adopted here, which is conservative because the NCV value of slimes is higher than that of middlings.

² The NCV value of other petroleum products are not provided in China Energy Statistical Yearbooks. This Annex calculates it as 38369 kJ/kg, i.e., 1.3108 tce/t, on the basis of Energy Balance Sheets (physical quantity) and conversion factor against SCE

⁴⁷ The NCV value here adopts the lower limit of the NCV value range, i.e., 16726-17981 kJ/m³, for coke oven gas provided in China Energy Statistical Yearbook 2005, P 365.

⁴⁸ The NCV value here adopts the lowest NCV value among those for gas by furnace, gas by heavy oil catalytic cracking, gas by heavy oil catalytic thermal cracking, gas by pressure gasification, and water coal gas, which are provided in China Energy Statistical Yearbook 2005, P 365.

According to the ACM0002 methodology, the Simple method OM was used to calculate the OM emission factors of the years 2003, 2004 and 2005, and then weighted average emission coefficient was calculated and selected as the $EF_{OM, y}$ for primary fuel input for thermal power supply to the North East China grid.

The power data and processes for the calculation of the $EF_{OM, y}$ in the Northeast China grid were shown in tables A-6~A-9. The detailed calculation formulas are described in the section B6.

Table A-6 The fuel consumption and total emissions of Northeast China Power Grid in 2003

Fuel	Unit	Liaoning	Jilin	Heilongjiang	Sub-Total	Carbon content (tc/TJ)	OXID (%)	NCV (MJ/t,m ³ ,tce)	CO ₂ emissions (tCO ₂ e)
		A	B	C	D=A+B+C	E	F	G	H=D*E*F*G*44/12/100
Raw coal	Mt	35.5651	20.0666	27.6362	83.2679	25.8	100	20908	164695313.0
Clean coal	Mt	0.7083	0	0.03	0.7383	25.8	100	26344	1839948.7
Other washed coal	Mt	6.1704	0.159	0.5341	6.8635	25.8	100	8363	5429988.0
Coke oven gas	Billion m ³	0.166	0	0	0.166	12.1	100	16726	123184.8
Other gas	Billion m ³	0.531	0	0	0.531	12.1	100	5227	123141.3
Crude oil	Mt	0.0339	0	0	0.0339	20	100	41816	103954.6
Diesel	Mt	0.0032	0.0034	0	0.0066	20.2	100	42652	20850.0
Fuel oil	Mt	0.1487	0.007	0.0432	0.1989	21.1	100	41816	643474.2
LPG	Mt	0.0155	0	0	0.0155	17.2	100	50179	49051.6
Refinery gas	Mt	0.0403	0	0.0046	0.0449	15.7	100	46055	119040.4
Natural gas	Billion m ³	0	0.004	0.447	0.451	15.3	100	38931	984997.1
Other energy	Mtce	0.2938	0	0	0.2938	0		29271.2	0.0
Total									174132943.7

Data sources: China Energy Statistical Yearbook 2004

Table A-7 The fuel consumption and total emissions of Northeast China Power Grid in 2004

Fuel	Unit	Liaoning	Jilin	Heilongjiang	Sub-Total	Carbon content (tc/TJ)	OXID (%)	NCV (MJ/t,m ³ ,tce)	CO ₂ emissions (tCO ₂ e)
		A	B	C	D= A+B+C	E	F	G	H=D*E*F*G*44/12/100
Raw coal	Mt	41.442	23.109	30.848	95.399	25.8	100	20908	188689376.8
Clean coal	Mt	0.8475	0.0109	0.0488	0.9072	25.8	100	26344	2260871.6
Other washed coal	Mt	5.7767	0.1426	0.61	6.5293	25.8	100	8363	5165589.1
Coke oven gas	Billion m ³	0.483	0.291	0	0.774	12.1	100	16726	574367.5
Other gas	Billion m ³	5.733	0.419	0	6.152	12.1	100	5227	1426676.9
Crude oil	Mt	0	0	0	0	20	100	41816	0.0
Diesel	Mt	0.0204	0.0116	0.0024	0.0344	20.2	100	42652	108672.7
Fuel oil	Mt	0.1281	0.0178	0.0286	0.1745	21.1	100	41816	564536.2
LPG	Mt	0.0219	0	0	0.0219	17.2	100	50179	69305.2
Refinery gas	Mt	0.0979	0	0.0114	0.1093	15.7	100	46055	289779.7
Natural gas	Billion m ³	0	0.003	0.253	0.256	15.3	100	38931	559111.4
Other energy	Mtce	0.2697	0.0507	0	0.3204	0		29271.2	0
Total									199708287.3

Data sources: China Energy Statistical Yearbook 2005

Table A-8 The fuel consumption and total emissions of Northeast China Power Grid in 2005

Fuel	Unit	Liaoning	Jilin	Heilongjiang	Sub-Total	Carbon content (tc/TJ)	OXID (%)	NCV (MJ/t,m3,tce)	CO ₂ emissions (tCO ₂ e)
		A	B	C	D=A+B+C	E	F	G	H=D*E*F*G*44/12/100
Raw coal	Mt	43.0541	24.4613	33.8321	101.3475	25.8	100	20908	200454895.9
Clean coal	Mt	0	0	0	0	25.8	100	26344	0.0
Other washed coal	Mt	5.2474	0.1926	0.2416	5.6816	25.8	100	8363	4494939.9
Coke oven gas	Billion m ³	0.103	0.357	0.068	0.528	12.1	100	16726	391816.6
Other gas	Billion m ³	1.262	0.837	0	2.099	12.1	100	5227	486767.7
Crude oil	Mt	0.0116	0	0	0.0116	20	100	41816	35571.5
Diesel	Mt	0.0118	0.0148	0.0057	0.0323	20.2	100	42652	102038.7
Fuel oil	Mt	0.0932	0.0246	0.0155	0.1333	21.1	100	41816	431247.4
LPG	Mt	0.0012	0	0	0.0012	17.2	100	50179	3797.5
Refinery gas	Mt	0.0548	0	0.0132	0.068	15.7	100	46055	180283.8
Natural gas	Billion m ³	0	0.084	0.224	0.308	15.3	100	38931	672681.0
Other energy	Mtce	0.1618	0	0	0.1618	0	100	29271.2	0.0
Total									207254040

Data sources: China Energy Statistical Yearbook 2006

Table A-9 The OM factor of Northeast China Power Grid

Years	Thermal generation delivered to Northeast China Power Grid	The emissions from Northeast China Power Grid	OM
	A	B	C=B/A
2003	145975752.1	174132943.7	1.192889512
2004	158425475.3	199708287.3	1.260581904
2005	164,164,426.30	207254040.0	1.262478386
Total	468565653.7	581095271.0	
Average OM			1.2402

Step 2. Calculation of the Build Margin Emission Factor ($EF_{BM,y}$)

According to the ACM0002 methodology, the Build Margin emission factor $EF_{BM,y}$ *ex-ante* was selected to identify sample group for calculating Build Margin emission factor. Based on the description of formulas in section B6, the Build Margin emission factor is calculated to be **0.8632** tCO₂/MW • h.

The power data and processes for the calculation of the $EF_{BM,y}$ in the North East China grid were shown in tables A-10~A-14. The detailed calculation formulas are described in the section B6.

Step 2a: calculating the respective percentages of CO₂ emissions from coal fired power generation, oil fired power generation, and gas fired power generation against total CO₂ emissions from fossil fuel fired power generation

Table A-10 Calculation of emission weight of solid fuel, liquid fuel and gas fuel in all fuel emission

Fuel	unit	Liaoning	Jilin	Heilongjiang	Total	NCV (MJ/t, km ³ , tce)	Emission Factor (Tc/TJ)	Carbon oxidation rate (%)	CO ₂ emission (tCO ₂ e)
		A	B	C	D=A+B+C	H	I	J	K=G*H*I*J*44/12/100
Raw coal	10 ⁴ t	4305.41	2446.13	3383.21	10134.75	20908	25.80	1	200,454,896
Clean coal	10 ⁴ t	0	0	0	0.00	26344	25.80	1	0
Other washed coal	10 ⁴ t	524.74	19.26	24.16	568.16	8363	25.80	1	4,494,940
coke	10 ⁴ t	0	0	0	0.00	28435	29.20	1	0
Sub-total									204,949,836
Crude oil	10 ⁴ t	1.16	0	0	1.16	41816	20.00	1	35,571
Gasoline	10 ⁴ t	0	0	0	0	43070	18.90	1	0
Kerosene	10 ⁴ t	0	0	0	0	43070	19.60	1	0
Diesel	10 ⁴ t	1.18	1.48	0.57	3.23	42652	20.20	1	102,039
Fuel oil	10 ⁴ t	9.32	2.46	1.55	13.33	41816	21.10	1	431,247
other petroleum product	10 ⁴ t	0	0	0	0	38369	20.00	1	0
Sub-total					0				568,858
Natural gas	10 ⁷ m ³	0	8.4	22.4	30.8	38931	15.30	1	672,681
COG	10 ⁷ m ³	10.3	35.7	6.8	52.8	16726	12.10	1	391,817
Other Gas	10 ⁷ m ³	126.2	83.7	0	209.9	5227	12.10	1	486,768
LPG	10 ⁴ t	0.12	0	0	0.12	50179	17.20	1	3,798
Refinery gas	10 ⁴ t	5.48	0	1.32	6.8	46055	15.70	1	180,284
Sub-total									1,735,347
Total									207,254,040

Data sources: China Energy Statistical Yearbook 2006

From above table and formulae (5),(6) and (7),the weights are as follows:

$$\lambda_{Coal}=98.89\%, \lambda_{Oil}=0.47\%, \lambda_{Gas}=0.84\%$$

Step 2b: calculating the corresponding emission factor for fossil fuel fired power generation

$$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv} = 0.9453.$$

Step 2c: calculating the $EF_{BM,y}$ of local grid

Table A-11 Installed capacity of Northeast China Power Grid in 2005

Installed capacity	unit	Liaoning	Jilin	Heilongjiang	total
Thermal Power	MW	15999	6359.4	11575.6	33934
Hydropower	MW	1403.9	3720.8	846.7	5971.4
Nuclear	MW	0	0	0	0
Wind power and other	MW	135.5	85.4	52.4	273.3
Total	MW	17538.4	10165.6	12474.7	40178.7

Data sources: 《China Electric Power Yearbook2006》

Table A-12 Installed capacity of Northeast China Power Grid in 1999

Installed capacity	unit	Liaoning	Jilin	Heilongjiang	total
Thermal Power	MW	12425.7	4583.1	10128.1	27136.9
Hydropower	MW	1240	3508.2	774.5	5522.7
Nuclear	MW	0	0	0	0
Wind power and other	MW	22.9	0	0	22.9
Total	MW	13688.6	8091.3	10902.6	32682.5

Data sources: 《China Electric Power Yearbook2000》

Table A-13 Installed capacity of Northeast China Power Grid in 1998

Installed capacity	unit	Liaoning	Jilin	Heilongjiang	total
Thermal Power	MW	12560.3	4428.6	9116	26104.9
Hydropower	MW	1223.1	3474.7	784.5	5482.3
Nuclear	MW	0	0	0	0
Wind power and other	MW	17	0	0	17
Total	MW	13800.4	7903.3	9900.5	31604.2

Data sources: 《China Electric Power Yearbook1999》

Table A-14 The new installed capacity from 1998-2005 in the Northeast China Power Grid

	Installed capacity in 1998	Installed capacity in 1999	Installed capacity in 2005	Addition capacity from 1998 to 2005	Addition share(%)
	A	B	C	D=C-A	
Thermal Power	26104.9	27136.9	33934	7829.1	91.31%
Hydropower	5482.3	5522.7	5971.4	489.1	5.70%
Nuclear	0	0	0	0	0.00%
Wind power	17	22.9	273.3	256.3	2.99%
Total (MW)	31604.2	32682.5	40178.7	8574.5	100.00%
Share of 2004 installed capacity	78.66%	81.34%	100.00%		

$$EF_{BM,y} = EF_{Thermal} \times CAP_{Thermal} / CAP_{Total} = 0.9453 \times 91.31\% = 0.8362$$

where:

CAP_{Total} is the total capacity addition,

$CAP_{Thermal}$ is the fossil fuel fired capacity addition.

Step 3. Calculation of the Baseline Emissions Factor (EF_y)

According to the baseline methodology (ACM0002), the baseline emission factor EF_y is calculated as the weighted average of the Operating Margin emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{BM,y}$), as shown in table A-15:

Table A-15 Baseline Emission factor (EF_y) of the Northeast China Power Grid

Calculation of the Key factors:

Operating Margin emission factor ($EF_{OM,y}$) (tCO ₂ /MWh) :	1.2402
Build Margin emission factor ($EF_{BM,y}$) (tCO ₂ /MWh) :	$0.9453 \times 91.31\% = 0.8632$
Baseline Emission factor (EF_y) (tCO ₂ /MWh) :	$1.2404 \times 0.75 + 0.8632 \times 0.25 = 1.1459$

Note: the latest version of ACM0002 (version 9) provides the following default weights for wind and solar projects:

Operating Margin, $W_{OM} = 0.75$; Build Margin, $W_{BM} = 0.25$.

Annex 4

MONITORING PLAN

Please refer to section B7.2 of the PDD.

Clarification of clauses 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13, to the VCS PD

According to clause 3.12.8 1) of the VCS Standard v3.2 which came into force on 1 February 2012, “for projects validated under the CDM, the cover page and sections 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13 of the *VCS Project Description Template* shall be completed.” Below are the clarifications of the designated clauses in latest *VCS Project Description Template v3.0* which issued on 8 March 2011.

1.2 Sectoral Scope and Project Type

The project is not a grouped project.

The Project comes under sectoral scope 1, Energy Industries renewable sources.

Project Category: Renewable electricity in grid connected applications

1.3 Project Proponent

Project Proponent	Chifeng Xinsheng Wind Power Co., Ltd
Attention	Wang Zhewei
Title	Project manager
Direct Tel	0451 51919055
Email address	wangzhewei@clypg.com.cn

1.5 Project Start Date

The Project Start Date is 11/12/2008, when it started commissioning.

1.6 Project Crediting Period

The Project crediting period is from 11/12/2008 to 24/10/2010, covering 3 years.

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Project	yes
Mega-project	no

Years	Estimated GHG emission reductions or removals (tCO ₂ e)
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2008	1,548
2009	132,939
2010	108,291
Total estimated ERs	242,778
Total number of crediting years	3
Average annual ERs	80,926

1.9 Project Location

The proposed project is located in Wengniute County, East Inner Mongolia, its geographical coordinates are north latitude 42°23'02"N, and east longitude 118°43'26"E, its altitude is about 1601m.

1.10 Conditions Prior to Project Initiation

The project is a renewable energy generation project, which discharges no emission during operation period. Thus, the project doesn't fall into categories that creating GHG emissions primarily for the purpose of its subsequent removal or destruction.

1.12.1 Right of Use

The project including the plant, equipment and its emissions reductions are owned by Chifeng Xinsheng Wind Power Co., Ltd. Relevant evidences for the ownership will be provide to the DOE, which involves business license of the project company, Approval of the project from Chinese National Development and Reform Commission (NDRC) and Letter of Approval for the project as a CDM project by Chinese NDRC.

1.12.2 Emissions Trading Programs and Other Binding Limits

The GHG emission reductions generated by the project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions.

1.12.3 Participation under Other GHG Programs

The project was registered as a CDM project on 25/10/2010, for which a renewable crediting period of 3×7 years will be used under the CDM GHG Program. Therefore, CO₂ emission reductions

generated by the project during the CDM crediting period will be verified as unique CERs but not VCUs to avoid double counting. As to the project under VCS Standard v3.2, only emission reductions achieved from 11/12/2008-24/10/2010 will be considered as VERs.

1.12.4 Other Forms of Environmental Credit

The project has not created another form of environmental credit, which will be verified by DOE.

1.13 Additional Information Relevant to the Project

Eligibility Criteria

The project is not a grouped project.

Leakage Management

According to the CDM baseline methodology ACM0002, the leakage of the proposed project is not considered for this project.

Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description.

Further Information

NA