Voluntary Carbon Standard

Project Description

Section 1: Project Design Document (UNFCCC Ref No 3356)

Section 2: Clarification of clauses 1.12, 1.13, 1.14, 8.1 and 8.2 to the VCS PD

Guyuan Wuhuaping 49.5 MW

Wind Power Project

Date: 10 February 2011

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

CONTENTS

SECTION A. General description of project activity

A.1 Title of the project activity:

>>
Guyuan Wuhuaping 49.5 MW Wind Power Project
Version number of the document: 03
Date: 17/12/2009

The version history of the PDD is summarized as below.

Version number of the document	Date	Purpose and/or main revision
01	01/05/2009	Prepared for and submitted to China's DNA to apply LOA
02	11/06/2009	Prepared for and submitted to DOE for public comments
03	17/12/2009	Revised based on validation protocol

A.2. Description of the project activity:

>>
Guyuan Wuhuaping 49.5 MW Wind Power Project (hereinafter referred to as the Project) is located within Pingdingbu Town, Guyuan County, Zhangjiakou City, Hebei Province, P.R.China. It is invested, constructed and operated by Construction Investment Yanshan (Guyuan) Wind Energy Co., Ltd.

The total installed capacity of the Project is 49.5 MW equipped with 33 sets of wind turbines with a unit capacity of 1,500 kW. The height of the hub is 80 m. The estimated electricity delivered to North China Grid by the Project is 117,216 MWh per year and the average annual operating hours is 2,368 h with a power load factor of 0.270[1]. Electricity generated by the Project will be delivered to North China Grid via a 110 kV transmission line.

North China Grid is dominated by thermal power plants. In the absence of the Project, equivalent amount of annual power output to the Project will be generated and supplied by North China Grid which the Project is connected to. This is the same with the baseline scenario of the Project. It is expected that the Project as a renewable energy source will generate emission reductions of about 123,645 tCO_2e per year by avoiding CO_2 emissions from the same amount of electricity generation from North China Grid, which is mainly composed of traditional thermal power plants.

The Project will not only supply renewable electricity to the grid, but also contribute to sustainable development of the local community, the host country and the world by means of:

- reducing greenhouse gas emissions compared to a business-as-usual scenario;
- diversifying power sources and mitigating the demand and supply contradiction;
- helping to stimulate the growth of the wind power industry and encourage and promote the technology progress and commercial popularization of grid-connected renewable power generation projects in China;
- reducing the emission of other pollutants resulting from the power generation industry in China, compared to a business-as-usual scenario;
- creating 10 employment opportunities for local community during the operation period of the Project and creating several employment opportunities for local community during the construction period of

1 Page 10 of the Feasibility Study Report (hereinafter referred to as the FSR) of the Project. The FSR is finalised by Hebei Electric Power Design & Research Institute, which is a third party contracted by the PP.

the Project.

A.3. Project participants:

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Project participants to the Project Activity are the following:

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)
P.R.China (host)	Construction Investment Yanshan (Guyuan) Wind Energy Co., Ltd. (the Project Owner)	Yes

Detailed contact information of the project participants is provided in Annex 1.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

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The host country is the People's Republic of China.

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

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Hebei Province

A.4.1.3. City/Town/Community etc:

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Guyuan County, Zhangjiakou City

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

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The Project is located within Pingdingbu Town, Guyuan County, Zhangjiakou City, Hebei Province, P.R.China. The center of the Project has geographical coordinates with east longitude of 115°45′08″ and north latitude of 41°36′36″. The area of the wind farm is about 55 km^2. Figure 1 shows the location of Hebei Province, Figure 2 shows the location of Zhangjiakou City. Figure 3 shows the location of the Project.

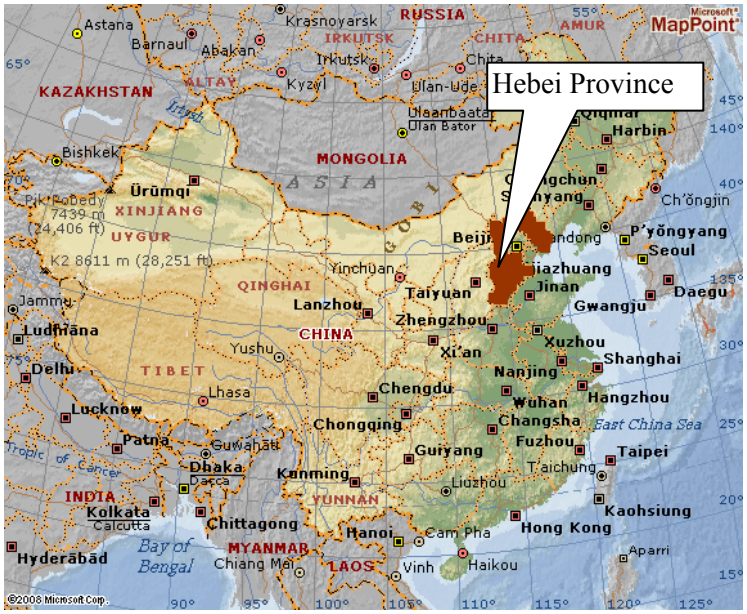

Figure 1. Location of Hebei Province

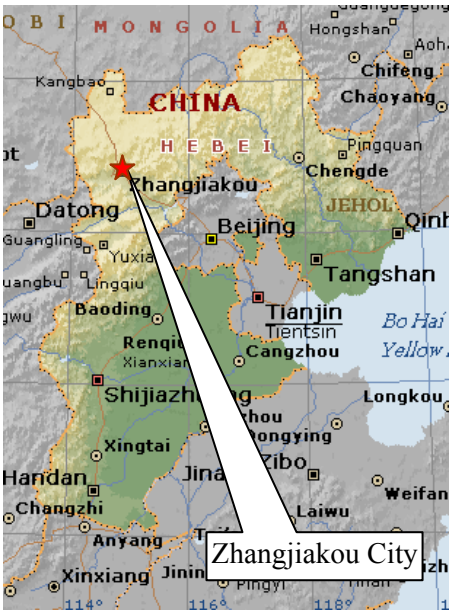

Figure 2. Location of Zhangjiakou City

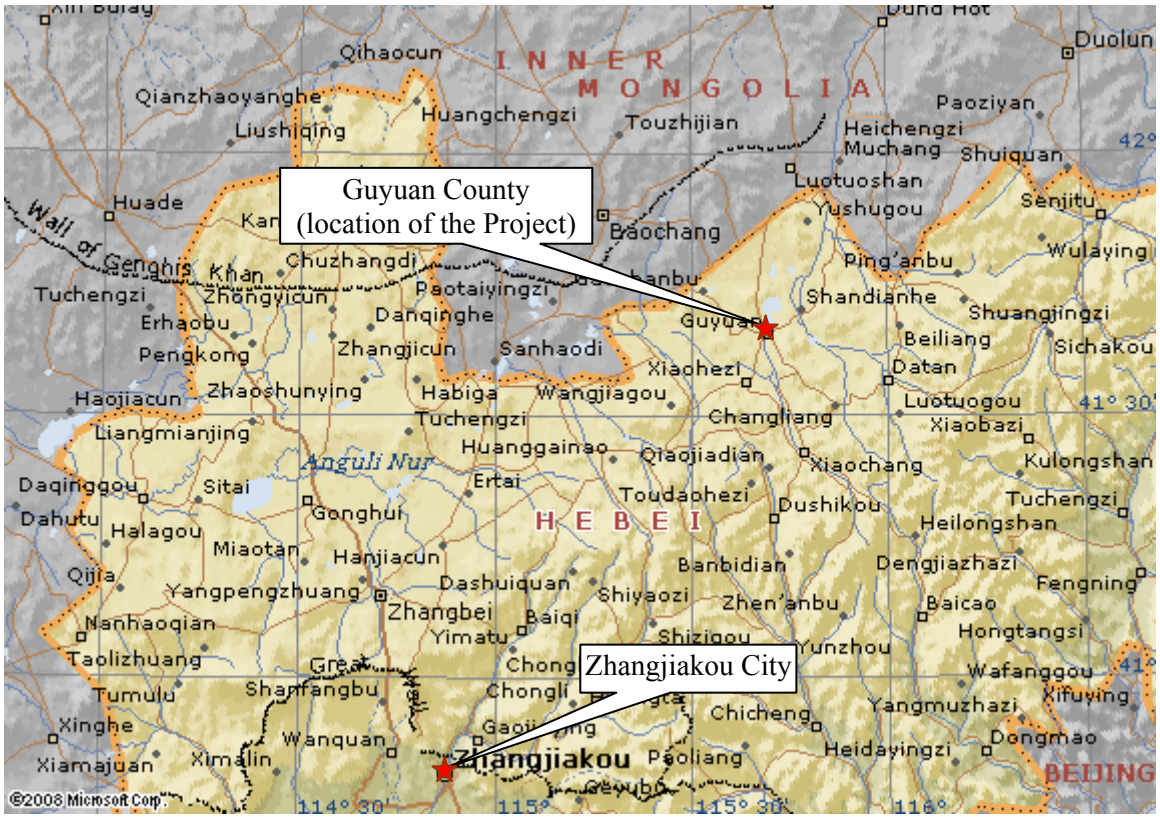

Figure 3. Location of the Project

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

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The Project falls into sectoral scope 1: energy industries (renewable sources).

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

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In the absence of the Project, equivalent amount of annual power output to the Project will be generated and supplied by North China Grid which the Project is connected to. This is the same with the baseline scenario of the Project. It is expected that the Project as a renewable energy source will generate emission reductions by avoiding CO_2 emissions from the same amount of electricity generation from North China Grid, which is mainly composed of traditional thermal power plants.

According to the meteorological data of the anemometer tower setup within the Project Site, there is abundant wind resource at the Project Site. The annual average wind speed is 7.4 m/s at 70 m height with stable prevailing wind direction. Thus it is suitable to build grid-connected wind power generation projects at the Project Site.

The total installed capacity of the Project is 49.5 MW equipped with 33 sets of wind turbines with a unit capacity of 1,500 kW. The estimated electricity delivered to North China Grid by the Project is 117,216 MWh per year and the average annual operating hours is 2,368 h with a power load factor of 0.270[2]. Electricity generated by the Project will be delivered to North China Grid via a 110 kV transmission line.

Table 1. Key technical parameters of main equipments in the Project

	Equipment	Quantity	Type	Technical parameters
Main mechanical and electrical equipments	Turbine	33 sets	GE1.5sle	Rated power: 1,500 kW Quantity of blades: 3 Height of the hub: 80 m Power factor of generator: ± 0.95 Lifetime: 20 yrs Annual operating hours: 2,368 h
Step-up substation	Main transformer	1 set	SZ9-50000/110	Capacity: 50 MVA Rated voltage: 110/35 kV

The Project employs turbines manufactured by GE, which involves no technology transfer from abroad.

Electricity delivered to North China Grid by the Project will be monitored with meter(s) installed on the main transmission line of the Project and cross-checked with receipt(s). The measurement precision of the meter(s) employed by the Project will be at least 0.5s.

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

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Renewable crediting period (7yrs×3) is adopted by the Project. It is expected that the Project Activity will generate emission reductions of about 865,515 tCO_2e over the first 7-year crediting period from May 1, 2010 to April 30, 2017.

2 Page 10 of the Feasibility Study Report (hereinafter referred to as the FSR) of the Project. The FSR is finalised by Hebei Electric Power Design & Research Institute, which is a third party contracted by the PP.

Years	Annual estimation of emission reductions in tonnes of CO_2e
May to December, 2010	82,430
2011	123,645
2012	123,645
2013	123,645
2014	123,645
2015	123,645
2016	123,645
January to April, 2017	41,215
Total estimated reductions (tonnes of CO_2e)	**865,515**
Total number of crediting years	**7**
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	**123,645**

A.4.5. Public funding of the project activity:

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There is no public funding from Annex I Parties for the Project.

SECTION B. Application of a baseline methodology

B.1. Title and reference of the approved baseline methodology applied to the project activity:

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Approved consolidated baseline and monitoring methodology ACM0002 (version 10): *Consolidated Baseline Methodology for Grid-Connected Electricity Generation from Renewable Sources* and monitoring methodology.

Tool to Calculate the Emission Factor for an Electricity System (version 02).

Tool for the Demonstration and Assessment of Additionality (version 05.2).

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

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

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The Project is a grid-connected renewable power generation project activity that installs a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity. Therefore the Project applies the methodology ACM0002 approved by EB to determine the project baseline and calculate emission reductions achieved by wind power generation. And the proposed project does not involve switching from fossil fuels to renewable energy at the site;

The Project meets the applicability conditions of the methodology ACM0002 as the Project is the installation of a wind power plant.

According to the methodology ACM0002, the emission factor of the electricity system is determined by using *Tool to Calculate the Emission Factor for an Electricity System*, and the additionality of the Project is demonstrated and assessed by using *Tool for the Demonstration and Assessment of Additionality*.

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

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The spatial extent of the Project Boundary includes the project power plant and all the power plants connected physically and geographically to North China Grid that the Project is connected to.

The project power plant includes the main control room, the multipurpose building, 33 sets of wind turbines with a unit capacity of 1,500 kW and relevant auxiliaries.

Electricity generated by the Project will be delivered to North China Grid. According to *China's Regional Grid Baseline Emission Factors* issued by China's DNA which provides the delineation of grid boundaries, North China Grid is the grid boundary of the Project. North China Grid is composed of Beijing Power Grid, Tianjin Power Grid, Hebei Power Grid, Shanxi Power Grid, Shandong Power Grid and Inner Mongolia Power Grid.

As described above, the spatial extent of the Project Boundary includes the wind farm, auxiliary facilities of the wind farm and all the power plants/units connected physically to Beijing Power Grid, Tianjin Power Grid, Hebei Power Grid, Shanxi Power Grid, Shandong Power Grid and Inner Mongolia Power

Grid.

Table 2. Emission sources included in or excluded from the Project Boundary

	Source	Gas	Included?	Justification/Explanation
Baseline	Electricity generation of North China Grid.	CO_2	Yes	Main emission sources.
		CH_4	No	Minor emission source.
		N_2O	No	Minor emission source.
Project activity	CO_2 emissions of the Project.	CO_2	No	Excluded as per the Methodology ACM0002.
		CH_4	No	Excluded as per the Methodology ACM0002.
		N_2O	No	Excluded as per the Methodology ACM0002.

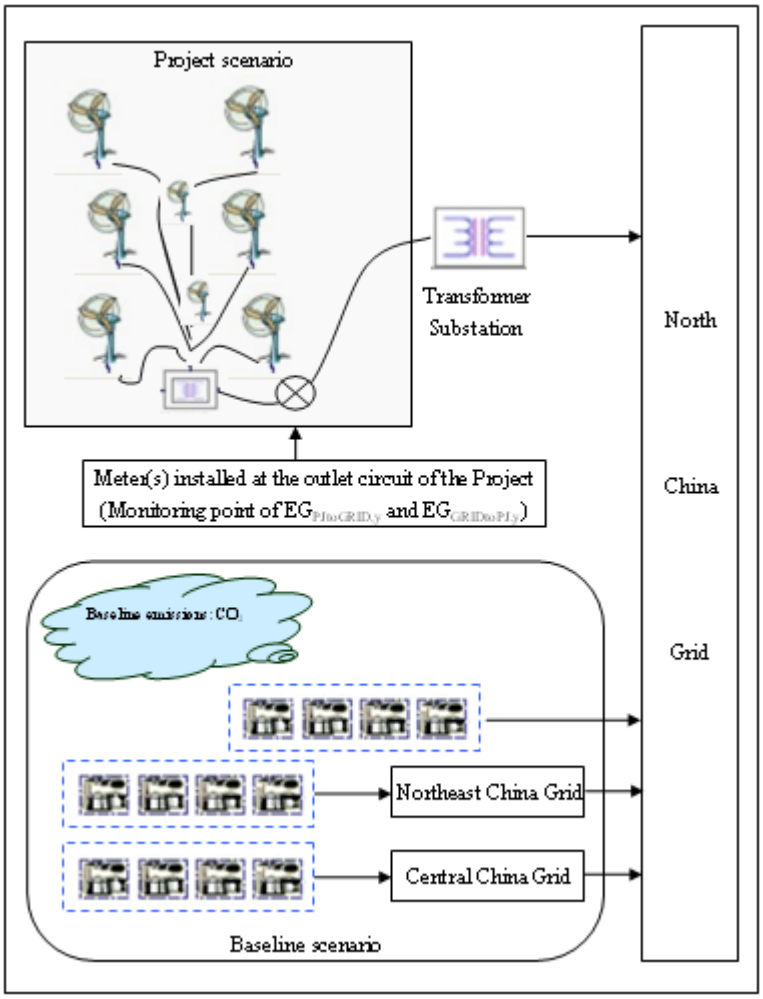

Figure 4. The Project Boundary and relevant emission sources

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

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According to the methodology ACM0002, if the Project Activity is the installation of a new grid-connected renewable power plant/unit, 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 *Tool to Calculate the Emission Factor for an Electricity System*.

According to the methodology ACM0002, the baseline scenario of the Project is "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 *Tool to calculate the emission factor for an electricity system*". According to *Tool to calculate the emission factor for an electricity system*, "if the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, the delineation should be used". The Project is the installation of a new grid-connected renewable power plant that connects with and delivers electricity to North China Grid. According to *China's Regional Grid Baseline Emission Factors* issued by China's DNA, the delineation of grid boundaries of the Project is North China Grid.

Therefore, the baseline scenario of the Project is "the provision of an equivalent amount of annual power output by North China Grid which the Project is connected to". For detailed analysis please refer to Section B.5.

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

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The additionality of the Project is demonstrated and assessed by using *Tool for the Demonstration and Assessment of Additionality* approved by EB.

Equipment Purchase Agreement which is the first one has been signed on March 18, 2009, *Civil Engineering Contract* has been signed on April 21, 2009, and construction of the Project was started on May 10, 2009. According to the definition of "the starting date of a CDM project activity" provided in paragraph 67 of EB41 meeting report, the starting date of the Project is March 18, 2009. China's DNA was informed on the intention to implement CDM development of the Project on April 13, 2009, and the confirmation was got on April 27, 2009. According to *Guidance on the Demonstration and Assessment of Prior Consideration of the CDM* (Annex 46 of EB41), as described above, CDM was seriously considered in the decision to implement the Project.

Table 3. Project schedule

Timeline	Progress
September, 2008	The Feasibility Study Report (hereinafter referred to as the FSR) of the Project was finished.
December, 2008	The FSR of the Project was approved by Hebei Development and Reform Commission.
January 20, 2009	The Project Owner decided to go through the CDM process for the Project.
March 18, 2009	The Project Owner signed *Equipment Purchase Agreement* of tower of wind turbine generator.
April 13, 2009	China's DNA was informed on the intention to implement CDM development of the Project.
April 21, 2009	The Project Owner signed *Civil Engineering Contract.*
May 10, 2009	The Project started construction.
May 15, 2009	The Project Owner signed *Equipment Purchase Agreement* of wind turbine generator.
June 3, 2009	The Project Owner submitted the application for the LOA of China's DNA.
June 15, 2009	The PDD was publicly available on UNFCCC website.
July, 2009	The Project Owner got the LOA of China's DNA.
March, 2010	It is estimated the Project will be put into operation.

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

The objective of Step 1 is to define realistic and credible baseline scenarios to the Project Activity that can be the baseline scenario through the following sub-steps:

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

Plausible and credible baseline scenarios available to the Project that provide outputs or services comparable to the proposed CDM project activity include:
Baseline scenario I: Construction of a thermal power plant with an equivalent amount of annual electricity generation;
Baseline scenario II: The Project undertaken without being registered as a CDM project activity;
Baseline scenario III: Construction of a power plant using other sources of renewable energy with equivalent amount of annual electricity generation; and
Baseline scenario IV: Provision of an equivalent amount of annual power output by North China Grid which the Project is connected to.

The straws from Guyuan County where the Project is sited are mainly used for raw feed in stock raising, and Guyuan County has no surplus biomass residues, so there are no economically exploitable biomass resources with a commensurate scale to the Project[3]. Hebei Province, where the Project is sited, is in great shortage of water resources, especially surface water resources, so there is no economically exploitable water resource with a commensurate scale to the Project [4]. For solar PV, since per kW investment of solar PV is about 40,000 RMB[5], much higher than the per kW investment of the Project, it is not feasible to construct solar PV farm instead of the Project. Furthermore, there is no economically exploitable geothermal resource[6] with a commensurate scale to the Project in Hebei Province. Therefore, Baseline scenario III is not feasible.

3 Http://www.zjk.heagri.gov.cn/zhangjk/inc/detail.jsp?id=7900&typeid=16,
http://www.agri.gov.cn/jjps/t20081218_1192353.htm.
4 Http://ghjh.mwr.gov.cn/dfxx/hb/1999tianjin/.
5 Http://market.ccidnet.com/pub/article/c1798_a135747_p1.html.
6 Http://www.chinamining.com.cn/cpc/show.aspx?id=99&cid=1.

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

For Baseline scenario I, the installed capacity of the Project is 49.5 MW, considering the same annual electricity generation, the baseline scenario of the Project should be a thermal power plant with an installed capacity not more than 49.5 MW. However, according to China's regulations, construction of thermal power plants with the installed unit capacity of 135 MW or below is prohibited in areas where can be covered by large grids such as provincial grids[7]. Therefore, Baseline scenario I is not feasible.

For Baseline scenario II, the Project is undertaken without being registered as a CDM project activity complies with current laws and regulations in China and does not belong to project types which are forced to be implemented.

For Baseline scenario IV, provision of an equivalent amount of annual power output by North China Grid which the Project is connected to complies with current laws and regulations in China and does not belong to project types which are forced to be implemented.

Therefore, further analysis only focuses on Baseline scenario II and Baseline scenario IV.

Step 2. Investment Analysis

Sub-step 2a. Determine appropriate analysis method

Tool for the Demonstration and Assessment of Additionality suggests three analysis methods which are simple cost analysis (Option I), investment comparison analysis (Option II) and benchmark analysis (Option III). The Project will earn revenues not only from the CERs but also from electricity sales, so the simple cost analysis method is not appropriate. The Project will use benchmark analysis (Option III) based on the consideration that the benchmark IRR of the power sector is available.

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

According to *Interim Rules on Economic Assessment of Electric Power Engineering Retrofit Projects,* the benchmark project IRR adopted by the Project is 8% (post-tax). On the basis of this benchmark, calculation and comparison of IRR are carried out in sub-step 2c.

Sub-step 2c. Calculation and comparison of IRR

(1) Basic parameters and assumptions

Calculation and comparison of IRR is implemented according to *Tool for the Demonstration and Assessment of Additionality*. The FSR of the Project was finalized by Hebei Electric Power Design & Research Institute and approved by Hebei Development and Reform Commission. Hebei Electric Power Design & Research Institute is a qualified organization which has qualification Level I in design and research of electric power engineering. Therefore the FSR is a reliable data source for investment analysis. According to the FSR, the basic parameters and assumptions for calculation of the project IRR of the Project are summarized below.

7 *Circular on Strictly Prohibiting the Violative Installation of Thermal Power Generation Units with the Capacity of 135 MW or Below* issued by the General Office of the State Council, decree no. 2002-6.

Installed capacity	49.5	MW
Supplied electricity	117,216	MWh
Construction period	15	months
Operation period	20	year
Total project cost	64,029	10000RMB
Working capital	149	10000RMB
Tariff (including VAT)	0.54	RMB/kWh
Interest during construction	1,363	10000RMB
Long-term loan	41,348	10000RMB
Interest rate of long-term loan	7.83	%
Repayment period (excluding 2 years of construction)	15	year
Working capital loan	104	10000RMB
Interest rate of working capital loan	7.47	%
Annual average O&M expenses	799	10000RMB
Salary and welfare of employees	49	10000RMB
Annual Maintenance	523	10000RMB
Materials	25	10000RMB
Miscellaneous	49	10000RMB
Insurance	152	10000RMB
VAT	8.5	%
Income tax	25	%
Urban maintenance and construction tax	5	%
Surtax for education	4	%
Depreciation period	15	year
Residue value rate	5	%
Expected CER price	11	EURO/tCO_2e
Crediting period	7yrs×3	

(2) Comparison of the project IRR of the benchmark and the Project

In accordance with the benchmark analysis (Option III), if the project IRR of a project is lower than that of the benchmark, the Project is not considered as financially attractive. Based on the above data, without CERs revenues, the project IRR is 5.31%, which is lower than that of the benchmark (8%) of power sector. Therefore, the Project is not financially attractive.

Sub-step 2d. Sensitivity analysis

In the Project, the following financial parameters were taken as uncertain factors for sensitivity analysis of financial attractiveness:

- Total project cost
- O&M expenses
- Supplied electricity
- Tariff

The results of sensitivity analysis of the four parameters of the Project are shown in Table 4 and Figure 5.

Table 4. Results of sensitivity analysis (%)
(without CERs revenues)

Range / Parameter	-10%	-5%	0	+5%	+10%
Total project cost	6.61	5.94	5.31	4.74	4.20
O&M expenses	5.47	5.40	5.31	5.23	5.15
Supplied electricity	3.90	4.62	5.31	5.98	6.63
Tariff	3.90	4.62	5.31	5.98	6.63

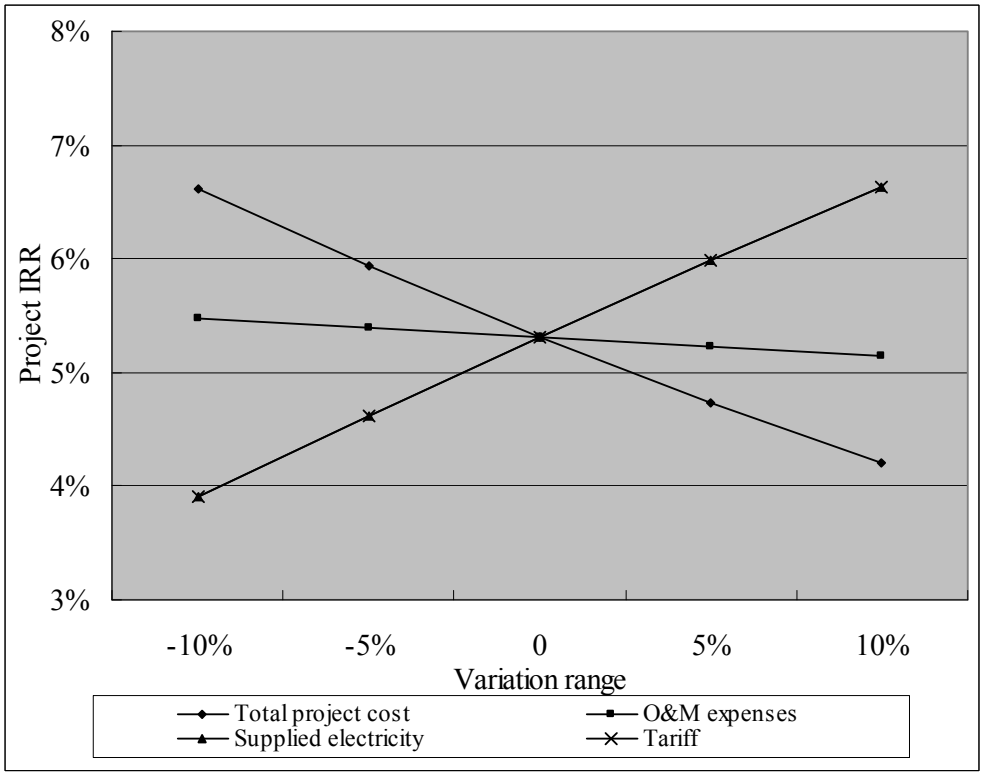

Figure 5. Results of sensitivity analysis
(without CERs revenues)

Based on the sensitivity analysis, the project IRR of the Project could reach the benchmark if one of the following conditions can be achieved:

- The total project cost were decreased by at least 19.42%;
- The O&M expenses were decreased by at least 192.39%;
- The tariff were increased by at least 21.32%;
- The supplied electricity were increased by at least 21.32%.

However, none of these conditions can be achieved due to the following reasons:

• **Regarding the total project cost**

The FSR of the Project has been finalized by Hebei Electric Power Design & Research Institute (HBED). HBED is a qualified organization which has qualification Level I in design and research of electric power engineering. So the FSR compiled by HBED provides reliable assessment on the total project cost of the Project. The FSR of the Project was finished in September 2008. The reason for the estimation in the FSR is the increasing equipment cost (mainly turbines and towers) from 2007 to 2008. In November 2007,

National Development and Reform Commission Coordinating Office for Major Technical Equipments pointed out that the increasing price of key equipments of turbines from abroad will result in the increase of turbine cost[8]. Then, the cost of energy and material kept increasing and further increased the cost of turbines and towers[9]. The estimation has been proven by *Equipment Purchase Agreement* and *Civil Engineering Contract* of the Project. Since the total value of already signed contracts of main equipments and engineering accounts more than 90% of the total project cost estimated in the FSR, it is impossible to decrease the total project cost by 19.42%.

• **Regarding the O&M expenses**

It is impossible to decrease the O&M expenses by 192.39%.

• **Regarding the tariff**

The tariff (including VAT) of wind power projects in Hebei Province kept stable as 0.54 RMB/kWh for years following government guidance on tariff (Document No. Fa Gai Jia Ge [2007]1260, Document No. Fa Gai Jia Ge [2007]3303, Document No. Fa Gai Jia Ge [2008]1876 and Document No. Fa Gai Jia Ge [2009]1906 and Document No. Ji Jia Guan [2009]69). The tariff of the Project is 0.54 RMB/kWh (including VAT) as pointed out in Document No.Ji Jia Guan[2009]69[10] issued by Hebei Development and Reform Commission. The tariff used in the investment analysis from the FSR is 0.54 RMB/kWh (including VAT), which is in line with the government guidance on tariff. Therefore, it is impossible to increase the tariff of the Project by 21.32%.

• **Regarding the supplied electricity**

Wind data of more than 30 years duration shows that wind resources at the local area keep decreasing[11]. The supplied electricity in the FSR is estimated based on the long term wind resources analysis. When preparing the FSR, the operation hours of each alternative of turbines and the expected power generation are calculated and the selected wind turbine is the one that could fit the local wind resource the best[12]. Therefore, it is impossible to increase the supplied electricity by 21.32% throughout the lifetime of the Project.

To summarize, the IRR of the Project could not reach the benchmark according to the sensitivity analysis and the additionality of the Project would not be influenced.

If the Project can be successfully registered as a CDM project, the CERs revenues will significantly improve the project IRR. Considering the CERs revenues (calculated with 11 EURO/tCO2e, 7 yrs×3 crediting period), the project IRR will be significantly improved to reach the benchmark, as shown in Table 5.

8 National Major Technical Equipments Website (http://chinaneast.xinhuanet.com/jszb/2007-11/22/content_11737734.htm).

9 China Wind Power Website (http://www.fenglifadian.com/news/533I7GG0.html) and China Securities Journal, August 17, 2008 (http://www.cs.com.cn/jrbznew/html/2008-07/17/content_16499157.htm).

10 Http://www.hebwj.gov.cn/upfiles/xy_col32super_20090901160416124272.htm.

11 Page 27 of the FSR of the Project.

12 Page 81 of the FSR of the Project.

Table 5. Comparison of the project IRR with and without CERs revenues

	the Project	the benchmark
Without CERs revenues (%)	5.31	8
With CERs revenues (%)	8.63	8

It is shown in Table 5 that the CERs revenues can alleviate the identified barriers.

Step 3 Barrier analysis

Barrier analysis is not employed for the Project, which can satisfy the requirement of *Tool for the Demonstration and Assessment of Additionality*.

Step 4 Common practice analysis

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

In accordance with *Tool for the Demonstration and Assessment of Additionality*, "Similar activities are defined as activities (i.e. technologies or practices) that are of similar scale, take place in a comparable environment, inter alia, with respect to the regulatory framework and are undertaken in the relevant geographical area". The Project is a newly built wind farm with an installed capacity of 49.5 MW located in Hebei Province. The Project is approved by the provincial government and the tariff of power plants is controlled by the government and different by province[13], so wind power plants located in Hebei Province are identified as similar project activities with respect to similar technology and similar regulatory framework.Wind farms located in Hebei Province with a starting date of operation later than January 1, 2002[14] are listed in Table 6 below.

According to *Tool for the Demonstration and Assessment of Additionality*, registered project activities and project activities which have been published on the UNFCCC website for global stakeholder consultation as part of the validation process are not listed in Table 6.

Table 6. Activities similar to the Project[15]

No.	Project	Installed capacity (MW)
1	Weichang Hongsongwa	51.3
2	Fengning Yuershan	1.2
3	Shangyi Manjing Wind Farm	34.5

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

Project No.1 was facing serious investment barriers and had applied for carbon funding by selling VER

13 Renewable Energy Law of People's Republic of China (http://www.ah.gov.cn/zfgb/gbcontent.asp?id=3560), NDRC Price [2006]1228 (http://www.sdpc.gov.cn/zfdj/jggg/dian/t20060630_128827.htm).

14 On February 10, 2002, the State Council issued Electric Power System Reform Plan, which suggested a series of measures to break the state monopoly of the electric power industry and establish a government supervised power market system characterized by separation of the government and enterprises, separation of the power plants and power grids and on-grid price bidding. Investment and operation environment for power generation projects in China have fundamentally changed then (http://news.sohu.com/64/31/news205353164.shtml).

15 *Installed Capacity of Wind Farms in China in 2007*, by Mr. Shi Pengfei, Vice Chairman of Chinese Wind Association (http://www.cwea.org.cn/download/display_info.asp?id=25).

through VCS to alleviate these serious barriers[16].

Project No.2 only has two units for testing which is not a commercially operated wind power project[17] and is essentially different with the Project.

Project No.3 was also facing serious investment barriers and had applied for carbon funding by selling VER through VCS to alleviate these serious barriers[18].

Therefore, since the Project No.1 and Project No.3 in Table 6 alleviate their investment barriers through VCS and Project No.2 in Table 6 is essentially small thus different from the Project, the Project does not belong to common practice and fulfils the requirement of additionality.

To summarize, "the Project is undertaken without being registered as a CDM project activity" is not financially attractive to investors, thus is not feasible. Being registered as a CDM project, the CERs revenues can alleviate the identified barriers, therefore the Project is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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The methodology ACM0002 is applied in the context of the Project in the following four steps:

- First, calculate the project emissions;
- Second, calculate the baseline emissions;
- Third, calculate the leakage;
- Fourth, calculate the emission reductions.

I. Calculate the project emissions

The Project is a wind power project and no project emissions should be considered as per the methodology ACM0002, i.e., $PE_y = 0$ tCO_2e.

II. Calculate the baseline emissions

As per the methodology ACM0002, baseline emissions include only CO_2 emissions from electricity generation in North China Grid that the Project is connected to. The baseline emissions are to be calculated as follows:

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

Where:

BE_y is the baseline emissions in year y (tCO_2e);

$EG_{PJ,y}$ is the quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in year y (MWh);

$EF_{grid,CM,y}$ is the combined margin CO2 emission factor for grid connected power generation in year y calculated using the latest version of *Tool to Calculate the Emission Factor for an Electricity System*

16 Https://vcsregistry1.apx.com/mymodule/ProjectDoc/EditProjectDoc.asp?id1=61.
17 Http://www.hebei.gov.cn/article/20070416/280348.htm.
18 Http://www.carbonneutral.com/cnregistry/projectsearch.asp.

(tCO_2e/MWh).

(1) Calculate the net electricity generation ($EG_{PJ,y}$)

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

$$EG_{PJ,y} = EG_{facility,y} \quad (2)$$

$$EG_{PJ,y} = EG_{PJtoGRID,y} - EG_{GRIDtoPJ,y} \quad (3)$$

Where:

$EG_{PJ,y}$ is the quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in year y (MWh);

$EG_{facility,y}$ is the quantity of net electricity generation supplied by the Project to the grid in year y (MWh).

$EG_{PJtoGRID,y}$ is the electricity supplied by the Project to the grid in year y (MWh);

$EG_{GRIDtoPJ,y}$ is the electricity imported by the Project from the grid in year y (MWh).

(2) Calculate the emission factor for project electricity system ($EF_{grid,CM,y}$)

Calculation of the emission factor of North China Grid, the relevant electricity system identified for the Project, is divided into seven steps as described below.

Step 1. Identify the relevant electricity systems

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

Electricity generated by the Project will be delivered to North China Grid. According to *China's Regional Grid Baseline Emission Factors* issued by China's DNA which provides the delineation of the relevant electricity systems, North China Grid is the relevant electricity system of the Project. North China Grid is composed of Beijing Power Grid, Tianjin Power Grid, Hebei Power Grid, Shanxi Power Grid, Shandong Power Grid and Inner Mongolia Power Grid.

Since there exists net electricity import from Northeast China Grid and Central China Grid to North China Grid. Northeast China Grid is composed of Liaoning Power Grid, Jilin Power Grid and Heilongjiang Power Grid. Central China Grid is composed of Henan Power Grid, Hubei Power Grid, Hunan Power Grid, Jiangxi Power Grid, Sichuan Power Grid and Chongqing Power Grid. The weighed average of the operating margin emission factor sourced from electricity supplied by Northeast China Grid and the weighted average of the operating margin emission factor sourced from the electricity supplied by Central China Grid will be used as the emission factor of the net electricity import.

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

Option I (only grid power plants are included in the calculation) provided in *Tool to Calculate the Emission Factor for an Electricity System* is chosen to calculate the operating margin and build margin emission factor.

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

Four methods are provided in *Tool to Calculate the Emission Factor for an Electricity System* for the calculation of the operating margin emission factor ($EF_{grid,OM,y}$), they are

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

As per *Tool to Calculate the Emission Factor for an Electricity System*, referring to *China's Regional Grid Baseline Emission Factors* (renewed on December 30, 2008), the method (a) simple OM is employed for calculation of the operating margin emission factor(s) ($EF_{grid,OM,y}$) of the Project.

As per *Tool to Calculate the Emission Factor for an Electricity System*, the method (a) simple OM only can be used when 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 hydropower production. Among the total electricity generation of North China Grid which the Project is connected to, the amount of low-cost/must-run resources account for about 0.89% in 2002, 0.86% in 2003, 0.76% in 2004, 0.75% in 2005 and 0.79% in 2006, all less than 50%. Thus, the method (a) simple OM can be used to calculate the baseline emission factor of operating margin ($EF_{grid,OM,y}$) for the Project.

For the simple OM, the emission factor can be calculated using either of the two following data vintages:
• *Ex ante* option: If the *ex ante* option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation weighted average, based on the most recent data available at the time of submission of the PDD to the DOE for validation. For off-grid power plants, use a single calendar year within the 5 most recent calendar years prior to the time of submission of the PDD for validation.
• *Ex post* option: If the ex post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emission factor to be updated annually during monitoring. If the data required to calculate the emission factor for year y is usually only available later than six months after the end of year y, 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 Project, only grid power plants are included in the calculation. And the *Ex ante* option is adopted by the Project to determine the emission factor. Therefore, the emission factor is determined once at the validation stage and no monitoring and recalculation of the emission factor during the crediting period is required.

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

Two options are provided in *Tool to Calculate the Emission Factor for an Electricity System* for the determination of the simple operating margin emission factor ($EF_{grid,OMsimple,y}$).

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

Since the data on the net electricity generation and CO_2 emission factor of each power unit in North China Grid are not available, Option A is not applicable to the Project. As summarized in Annex 3, only 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. Moreover, off-grid power plants are not included in the calculation (Option I has been chosen in Step 2). Therefore, Option B (based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the electricity system) is adopted to calculate the simple operating margin emission factor ($EF_{grid,OMsimple,y}$). The formula of $EF_{grid,OMsimple,y}$ calculation is

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_y} \quad (4)$$

$$EG_y = \sum_j GEN_{j,y} \times (1 - r_{j,y}) \quad (4\text{-a})$$

Where:

$EF_{grid,OMsimple,y}$ is the simple operating margin emission factor in year y (tCO_2e/MWh);

$FC_{i,y}$ is the amount of fuel i consumed in North China Grid in year y (mass or volume unit);

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

$EF_{CO2,i,y}$ is the CO_2 emission factor of fuel i in year y (tCO_2e/GJ);

EG_y is the 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 are all fuel types combusted in power sources in North China Grid in year y;
y is the relevant year as per the data vintage chosen in Step 3;
$GEN_{j,y}$ is total power generation of province j of North China Grid in year y;

$r_{j,y}$ is auxiliary electricity consumption rate of province j of North China Grid in year y.

There exists net electricity import from Northeast China Grid and Central China Grid to North China Grid, weighed average of the operating margin emission factor sourced from the electricity supplied by Northeast China Grid and Central China Grid will be used to as the emission factor of the net electricity import. Referring to *China's Regional Grid Baseline Emission Factors* (renewed on December 30, 2008), the simple operating margin emission factor ($EF_{grid,OM,y}$) of North China Grid is 1.1169 tCO_2e/MWh (see Annex 3 for details).

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

According to *Tool to Calculate the Emission Factor for an Electricity System*, the sample group of power units m used to calculate the build margin consists of either:
(a) The set of five power units that have been built most recently, or
(b) The set of power capacity additions in the electricity system that comprise 20% of the system generation (MWh) and that have been built most recently.

It is suggested that the set of power units that comprise the larger annual generation should be used.

Considering data availability, CDM EB accepts the following deviation in application of methodology[19]:
1) Use of capacity additions during the last 1~3 years for estimating the build margin emission factor for grid-connected electricity.
2) Use of weights estimated using installed capacity in place of annual electricity generation.

And it is suggested to use the efficiency level of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy.

Therefore for the Project: First, calculate the share of different power generation technology in recent capacity additions. Second, calculate the weight for capacity additions of each power generation technology. And finally calculate the emission factor using the efficiency level of the best technology commercially available in China.

According to *Tool to Calculate the Emission Factor for an Electricity System*, one of the following two options to calculate the build margin emission factor ($EF_{grid,BM,y}$) shall 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 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 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.

Option 1 is adopted by the Project.

Step 6. Calculate the build margin emission factor

According to the methodology ACM0002, calculate the build margin emission factor ($EF_{grid,BM,y}$) according to *Tool to Calculate the Emission Factor for an Electricity System* using equation (5):

$$EF_{grid,BM,y} = \frac{\sum_{m} EG_{m,y} \times EF_{EL,m,y}}{\sum_{m} EG_{m,y}} \quad (5)$$

Where:

$EF_{grid,BM,y}$ is the build margin emission factor in year y (tCO_2/MWh);

$EF_{EL,m,y}$ is the CO_2 emission factor of power unit m in year y (tCO_2e/MWh);

$EG_{m,y}$ is the net quantity of electricity generated and delivered to the grid by power unit m in year y

19 Http://cdm.unfccc.int/Projects/Deviations.

(MWh);
m is the power units included in the build margin;
y is the most recent historical year for which power generation data are available.

$EF_{EL,m,y}$ is calculated according to Option A2 of Step 4(a) (Simple OM) in *Tool to Calculate the Emission Factor for an Electricity System*.

As the data of installed capacity can not be separated into coal fired, oil fired and gas fired currently, the build margin emission factor is calculated by the following steps and formulae:

Step a. Calculate the power generation emissions of solid fuel, liquid fuel and gas fuel and each share in the total emissions based on *Energy Balance Table* of the most recent year.

$$\lambda_{Coal,y} = \frac{\sum_{i \in COAL, j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j,y}} \quad (6)$$

$$\lambda_{Oil,y} = \frac{\sum_{i \in OIL, j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j,y}} \quad (7)$$

$$\lambda_{Gas,y} = \frac{\sum_{i \in GAS, j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j,y}} \quad (8)$$

Where:
$F_{i,j,y}$ is the amount of fuel i (in a mass or volume unit) consumed by province j in year(s) y;
$NCV_{i,y}$ is the net calorific value (energy content) of fuel i in year y (GJ/mass or volume unit);
$EF_{CO2,i,y}$ is the CO_2 emission factor of fuel i in year y (tCO_2e/GJ).
COAL, OIL and GAS are footnote group for solid fuels, liquid fuels and gas fuels.

Step b. Calculate the emission factor for thermal power of the grid based on the result of Step a and the efficiency level of the best technology commercially available in China.

$$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y} \quad (9)$$

$$EF_{Coal,Adv,y} = FC_{adv,coal} \times NCV_{coal,y} \times EF_{CO2,coal,y} \quad (9\text{-a})$$

$$EF_{oil,Adv,y} = FC_{adv,oil} \times NCV_{oil,y} \times EF_{CO2,oil,y} \quad (9\text{-b})$$

$$EF_{gas,Adv,y} = FC_{adv,gas} \times NCV_{gas,y} \times EF_{CO2,gas,y} \quad (9\text{-c})$$

Where $EF_{Coal,Adv,y}$, $EF_{Oil,Adv,y}$ and $EF_{Gas,Adv,y}$ are emission factor proxies of efficiency level of the best coal fired, oil fired and gas fired power generation technology commercially available in China.

Step c. Calculate the build margin emission factor of the grid based on the result of Step b and the share of thermal power of recent 20% capacity additions.

$$EF_{grid,BM,y} = \frac{CAP_{Thermal,y}}{CAP_{Total.y}} \times EF_{Thermal,y} \quad (10)$$

$$CAP_{total,y} = \sum_{j} CAP_{j,y} \quad (10\text{-a})$$

Where:

$CAP_{Total,y}$ is total capacity additions that are close to and exceed 20% of existing capacity;

$CAP_{Thermal,y}$ is capacity additions of thermal power;

$CAP_{j,y}$ is total installed capacity of province j of North China Grid in year y.

The data on different fuel consumptions for power generation and the net calorific values of the fuels are obtained from *China Energy Statistical Yearbook* from 2005 to 2007. The emission factors of the fuels employed are obtained from Table 1.3 and Table 1.4 on page 1.21-1.24 of volume 2 of 2006 *IPCC Guidelines for National Greenhouse Gas Inventories*.

Referring to *China's Regional Grid Baseline Emission Factors* (renewed on December 30, 2008), the build margin emission factor ($EF_{grid,BM,y}$) of North China Grid is 0.8687 tCO_2e/MWh.

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

Based on *Tool to Calculate the Emission Factor for an Electricity System*, the combined margin emission factor ($EF_{grid,CM,y}$) is calculated as the weighted average of the operating margin emission factor ($EF_{grid,OM,y}$) and the build margin emission factor ($EF_{grid,BM,y}$), as

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times \omega_{OM} + EF_{grid,BM,y} \times \omega_{BM} \quad (11)$$

According to *Tool to Calculate the Emission Factor for an Electricity System*, the weight w_{OM} is 0.75 and the weight w_{BM} is 0.25 for wind power projects. Therefore the combined margin emission factor, i.e. the baseline emission factor of the Project,

$EF_{grid,CM,y}$ = 0.75 × 1.1169 + 0.25 × 0.8687 = 1.05485 (tCO_2e/MWh).

III. Calculate the leakage

According to the methodology ACM0002, the leakage of the Project is not considered.

IV. Calculate the emission reductions

The Project Activity will generate emission reductions by avoiding CO_2 emissions from electricity generation by fossil fuel power plants. The emission reductions (ER_y) of the Project Activity during a given year y is the difference between the baseline emissions (BE_y) and the project emissions (PE_y). It is calculated as:

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

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

Data/Parameter:	$CAP_{j,y}$
Data unit:	MW
Description:	Total installed capacity of province j of North China Grid in year y
Source of data used:	*China Electric Power Yearbook* from 2005 to 2007
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from *China Electric Power Yearbook* issued by authorized entity in China are reliable.
Any comment:	-

Data/Parameter:	$GEN_{j,y}$
Data unit:	MWh
Description:	Total power generation of province j of North China Grid in year y
Source of data used:	*China Electric Power Yearbook* from 2005 to 2007
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from *China Electric Power Yearbook* issued by authorized entity in China are reliable.
Any comment:	-

Data/Parameter:	$r_{j,y}$
Data unit:	-
Description:	Auxiliary electricity consumption rate of province j of North China Grid in year y
Source of data used:	*China Electric Power Yearbook* from 2005 to 2007
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from *China Electric Power Yearbook* issued by authorized entity in China are reliable.
Any comment:	-

Data/Parameter:	$F_{i,j,y}$
Data unit:	t or m^3
Description:	Consumption of fuel i of province j of North China Grid in year y
Source of data used:	*China Energy Statistical Yearbook* from 2005 to 2007
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from *China Energy Statistical Yearbook* issued by authorized entity in China are reliable.
Any comment:	-

Data/Parameter:	$NCV_{i,y}$
Data unit:	TJ per mass or volume unit of fuel i in year y
Description:	Net calorific value of fuel i
Source of data used:	P287 of *China Energy Statistical Yearbook* 2007 edition
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from *China Energy Statistical Yearbook* issued by authorized entity in China are reliable.
Any comment:	-

Data/Parameter:	$EF_{CO2,i,y}$
Data unit:	tC/TJ
Description:	CO_2 emission factor per unit of energy of the fuel i in year y
Source of data used:	*2006 IPCC Guideline for National Greenhouse Gas Inventories*
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from 2006 *IPCC Guideline for National Greenhouse Gas Inventories* are reliable.
Any comment:	-

Data/Parameter:	$FC_{adv,coal}$
Data unit:	gCe/kWh
Description:	Weighted average of the fuel consumption for power generation of top 30 sets of 600 MW coal fired power generation units built in 2006 (taken as efficiency level of the best technology commercially available in China)
Source of data used:	*China's Regional Grid Baseline Emission Factors* (renewed on December 30, 2008)
Value applied:	329.94
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from *China's Regional Grid Baseline Emission Factors* made publicly available by China's DNA are reliable.
Any comment:	-

Data/Parameter:	$FC_{adv,oil/gas}$
Data unit:	gCe/kWh
Description:	Weighted average of the fuel consumption for power generation of 200 MW oil/gas fired combined cycle power generation units (taken as efficiency level of the best technology commercially available in China)
Source of data used:	*China's Regional Grid Baseline Emission Factors* (renewed on December 30, 2008)
Value applied:	252
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from *China's Regional Grid Baseline Emission Factors* are reliable.
Any comment:	-

B.6.3 Ex-ante calculation of emission reductions:

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I. Estimated project emissions:

The Project is a wind power project and no project emissions should be considered as per the methodology ACM0002, i.e., $PE_y = 0$ tCO_2e.

II. Estimated anthropogenic emissions by sources of greenhouse gases of the baseline:

According to the FSR, the electricity delivered by the Project to the grid is estimated as 117,216 MWh per year. According to *China's Regional Grid Baseline Emission Factors* (renewed on December 30, 2008), the baseline emission factor of the Project is 1.05485 tCO_2e/MWh. Therefore, the annual baseline emissions of the Project are estimated as 123,645 tCO_2e.

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} = \left(EG_{PJtoGRID,y} - EG_{GRIDtoPJ,y}\right) \times EF_{grid,CM,y}$$
$$= (117{,}216\text{-}0) \times 1.05485 = 123{,}645 \text{ } tCO_2e$$

III. Estimated leakage:

As per the methodology ACM0002, the leakage of the Project is not considered.

IV. Estimated emission reductions

As per formula (12), the annual emission reductions of the Project are 123,645 tCO_2e.

$$ER_y = BE_y - PE_y = 123{,}645 - 0 = 123{,}645 \text{ } tCO_2e$$

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

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Renewable crediting period (7yrs×3) is adopted by the Project. It is expected that the Project Activity will generate emission reductions of about 865,515 tCO_2e over the first 7-year crediting period from May 1, 2010 to April 30, 2017.

Year	Estimation of project emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
May to December, 2010	0	82,430	0	82,430
2011	0	123,645	0	123,645
2012	0	123,645	0	123,645
2013	0	123,645	0	123,645
2014	0	123,645	0	123,645
2015	0	123,645	0	123,645
2016	0	123,645	0	123,645
January to April, 2017	0	41,215	0	41,215
Total (tCO_2e)	**0**	**865,515**	**0**	**865,515**

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

B.7.1 Data and parameters monitored:

Data/Parameter:	$EG_{PJ,y}$
Data unit:	MWh
Description:	The quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the Project in year y
Source of data to be used:	The data used in the PDD are obtained from the FSR of the Project. Actual data will be determined through on-site measurement.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	117,216
Description of measurement methods and procedures to be applied:	Calculated monthly with on-site monitored data of $EG_{PJtoGRID,y}$ and $EG_{GRIDtoPJ,y}$ with formula $EG_{PJ,y} = EG_{PJtoGRID,y} - EG_{GRIDtoPJ,y}$.
QA/QC procedures to be applied:	Receipt(s) is used for cross-check.
Any comment:	-

Data/Parameter:	$EG_{PJtoGRID,y}$
Data unit:	MWh
Description:	The electricity delivered by the Project to the grid in year y
Source of data to be used:	The data used in the PDD are obtained from the FSR of the Project. Actual data will be obtained through on-site measurement.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	117,216
Description of measurement methods and procedures to be applied:	Continuously measured by bi-directional meter(s) installed on the main transmission line of the Project and monthly recorded.
QA/QC procedures to be applied:	Receipt(s) is used for cross-check.
Any comment:	-

Data/Parameter:	$EG_{GRIDtoPJ,y}$
Data unit:	MWh
Description:	The electricity imported by the Project from the grid in year y
Source of data to be used:	Assumed as zero in the PDD. Actual data will be obtained through on-site measurement.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0
Description of measurement methods and procedures to be applied:	Continuously measured by meter(s) installed on the main transmission line of the Project and monthly recorded.
QA/QC procedures to be applied:	Receipt(s) is used for cross-check.
Any comment:	-

B.7.2 Description of the monitoring plan:

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1. Monitored Data

The ex-ante determined baseline emission factor will be adopted. The electricity delivered by the Project to the grid ($EG_{PJtoGRID,y}$) and the electricity imported from the grid to the Project ($EG_{GRIDtoPJ,y}$) will be monitored.

2. Monitoring System Organization Chart

The monitoring system is shown in Figure 6 and implemented by the Project Owner.

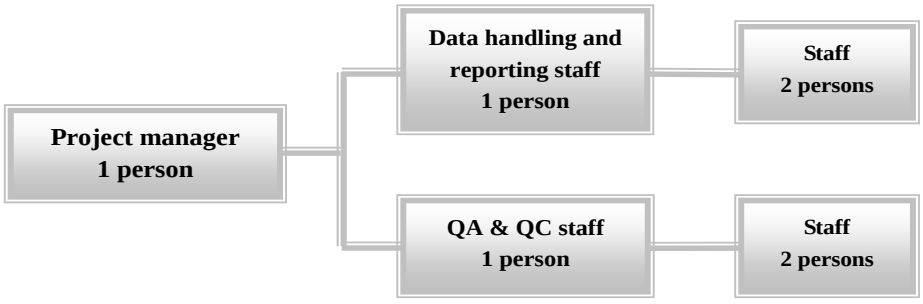

Figure 6. The monitoring system

The Project Manager is responsible for implementation and supervision of the monitoring activity and liaison of this CDM project. The data handling and reporting staff are responsible for managing, processing and submitting data. The QA & QC staff are responsible for calibration of meters and supervision of the whole process quality.

3. Installation of Meter(s)

The electricity delivered by the Project to the grid ($EG_{PJtoGRID,y}$) will be measured continuously by bi-directional meter(s) installed on the main transmission line of the Project and recorded monthly. The electricity imported from the grid to the Project ($EG_{GRIDtoPJ,y}$) will be measured continuously by meter(s) installed on the main transmission line of the Project and recorded monthly.

Receipt(s) is used for cross-check $EG_{PJtoGRID,y}$ and $EG_{GRIDtoPJ,y}$. If there exists difference between the monitored data and the data on receipt(s), the conservative values will be used to estimate emission reductions.

4. Precision of Meter(s)

The measurement precision of the meter(s) employed by the Project will be at least 0.5s.

5. Calibration of Meter(s)

The meter(s) of the Project will be calibrated and checked periodically for accuracy. The calibration frequency is once a year.

6. Data Management System

• Particular staff will be appointed by the Project Owner to take the overall responsibility for monitoring emission reductions and keeping all the data collected as part of monitoring archived electronically and kept at least for two years after the end of the last crediting period.
• Electronic data and documents, including readings from meter(s) connected into the computer central control system, will be regularly copied and archived via optical discs and storage tapes, and kept at least for two years after the end of the last crediting period or two years after the last issuance of CERs.
• Written data and documents, including receipts for cross-checking of data, will be copied and archived with an explanation of the department or company where the original copy is kept, and kept for at least two years after the end of the last crediting period or two years after the last issuance of CERs.

7. Quality Assurance and Quality Control Procedure

Particular QC staff will be appointed by the Project Owner to take the overall responsibility of calibrating monitoring equipments, managing and processing the monitored data according to QA/QC procedure provided in Section B.7.1. If something unusual, the Project Manager should be immediately reported.

8. Preparation for Verification

Besides the recorded data and the documents for cross-check required in Section B.7.1, other documents will be prepared by the Project Owner for verification by the DOE including, but not limited to:

• PDD (registration version), including the electronic spreadsheets and supporting documents (assumptions, estimations, measurement, etc);
• Documents relevant to quality control and quality assurance;
• Report on necessary maintenance and calibration of meter(s).

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

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The application of the baseline study and monitoring methodology of the Project was completed on 17/12/2009 by:

Entity	Project participate (Yes/No)
PAN Tao Additional Consulting and Engineering Mobile: +86-13911049424 Email: Tao.Pan@Additional.cn	No

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:

>>
18/03/2009 (*Equipment Purchase Agreement* has been signed.)

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

>>
20y-0m

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

C.2.1. Renewable crediting period

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

>>
01/05/2010[20]

C.2.1.2. Length of the first crediting period:

>>
7y-0m

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
Not applicable.

C.2.2.2. Length:

>>
Not applicable.

20 Starting date of the first crediting period will be the actual registration date of the Project or the date here, whichever is late.

SECTION D. Environmental impacts

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

>>

The Environmental Impact Statement Form was completed by Hebei Provincial Institute of Geographic Sciences and approved by Environmental Protection Bureau of Hebei Province on May 15, 2008 (Document No.JHB[2008]320). According to the Environmental Impact Statement Form, environmental impacts possibly caused by the Project and treatment measures adopted by the Project Owner are analyzed as follows:

Waste water

Waste water produced during construction period and operation period of the Project is mainly domestic waste water of workers. A little of the waste water produced during the construction period will be absorbed by the earth or evaporated, without contaminating the surface ground. The domestic waste water produced during operation period will be treated in waste water treatment facilities. Then, the overflow water in the upper layer of the facilities will be introduced into reservoir for the greening of the wind farm area, without being discharged outside. Thus the domestic waste water has little impact on the surroundings.

Dust and exhaust gas

There is no discharge of exhaust gas during the operation period of the Project. During the construction period of the Project, the generation of dust reentrainment is mainly due to excavation, piling, backfilling and transportation of earth, land flatting, road expansion and transportation, loading and unloading and piling of construction materials. Exhaust gas could also be generated from the operation of oil fuelled machines and vehicle running. However, by means of watering and covering the material piling areas and limiting the speed of vehicles, the air pollutant emission of the Project will meet the requirement of *Integrated Emission Standard of Air Pollutants* (GB16297-1996), so the Project will not have any impact on the surroundings.

Noise

Noises generated during the construction period of the Project stem from activities such as excavation and backfilling of earth for the foundation of wind turbines, piling, casting of the foundation platform, installation of the power generation equipments and construction of the multipurpose building and the substation. After attenuation, the noises meet the requirement of *Noise Limits for Construction Site* (GB12523-90). The noises under abnormal working conditions during the operation period will be reduced through regular maintenance and timely conservation on equipments such as turbines and transformers. As a result, the noises in the plant area and the noises at sensitive sites meet the requirement of Category I of *Standard of Noise at Boundary of Industrial Enterprises* (GB12348-90) and Category I of *Standard of Environmental Noise of Urban Area* (GB3096-93).

Solid waste

The solid waste produced during the construction period is mainly the discarded earth, the construction waste, the domestic waste and etc. The discarded earth will be immediately transported to dump sites. The construction waste and the domestic waste will be transported to the waste disposal site of Guyuan

County by the environmental sanitation administrative department for sanitary landfill. During the operation period of the Project, domestic waste (about 3.65 t/a) will be collected and periodically transported to the waste disposal site of Guyuan County by the environmental sanitation administrative department for sanitary landfill. By taking the measures above, the solid waste produced in the Project will not have negative impacts on the surroundings.

Ecological impact
Damage to the vegetation caused by permanent land occupation of the Project will be compensated accordingly, in other words, vegetation with equal area and quality to the damaged will be recovered in another place. By taking measures of vegetation recovery and compensation, the Project will have no impact on local ecological environment. The migration route of birds does not go through the region of the Project, so the wind power generation facilities will not impact the migrating birds.

In summary, by means of measures of pollution avoidance and control as well as ecological recovery, the Project will not impact the environment.

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

>>
Environmental impacts of the Project are considered not significant by the Project Participants. Environmental impacts of the Project comply with relevant laws and regulations of the host country. Therefore it is not necessary to provide additional information for the Project in this Section.

SECTION E. Stakeholders' comments

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

>>

Stakeholders of the Project are identified as local residents possibly affected by the Project. In December 2008, a survey was conducted on the stakeholders of the Project, through distributing and collecting responses to a questionnaire.

The questionnaire is distributed to the local residents near the Project Site. They are of different ages and occupations, coming from different towns and villages. For the total 60 questionnaires distributed to the stakeholders, 60 returned with a response rate of 100%. According to the 60 questionnaires returned, the basic structure of the respondents is illustrated in Table 7.

Table 7. Structure of the respondents

Structure of gender		
Gender	**No.**	**Percentage (%)**
Male	31	52
Female	29	48

Structure of educational level		
Educational level	**No.**	**Percentage (%)**
Primary school	8	13
Junior middle school	9	15
Senior middle school	14	23
Technical college or university	29	49

Structure of age		
Age	**No.**	**Percentage (%)**
Below 30	21	35
31~40	23	38
41~50	12	20
51 and above	4	7

The questionnaires mainly focus on the following issues:

• What's the extent of the stakeholders' knowledge about the Project?

• What's the attitude of the stakeholders on the construction of the Project?

• What positive impacts will be introduced by the implementation of the Project from the view of stakeholders?

• What negative impacts will be introduced by the implementation of the Project from the view of stakeholders?

E.2. Summary of the comments received:

>>

According to the 60 questionnaires received:

• 58 respondents (97%) have a certain or very good understanding of the Project and 2 respondents (3%) haven't heard of the Project.

• 58 respondents (97%) support the implementation of the Project and 2 respondents (3%) keep a neutral attitude.

• 40 respondents (67%) think that the implementation of the Project could possibly enhance the electricity consumption of local residents. 18 respondents (30%) think that the implementation of the Project could possibly improve the income of local residents. 33 respondents (55%) think that the implementation of the Project could possibly increase employment opportunities for local residents. None of the respondents put forward any other positive impact possibly caused by the implementation of the Project.

• 22 respondents (37%) think that the implementation of the Project could possibly result in noise. 16 respondents (27%) think that the implementation of the Project could possibly cause land occupation. None of the respondents put forward any other negative impact possibly caused by the implementation of the Project.

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

>>

We know from the results of questionnaire statistics that all the stakeholders understand and support the construction of the Project.

The issue of noise considered by the respondents and corresponding prevention and control measures have been analyzed in Section D.1 of the PDD. The Project Owner will take measures to ensure that there will be no noise pollution to the local environment. For the issue of land occupation considered by the respondents, the Project has no relation to the issue of land occupation since the land required by the Project is mainly grassland and the Project Owner has paid for compensation on land occupation, as described in the FSR.

Thus, there is no necessity to modify the Project in the aspect of design, construction and operation. The Project Owner will think much of the public comments and strictly implement the pollution prevention measures stated in the Environmental Impact Statement Form.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding from Annex I Parties for the Project.

Annex 3

BASELINE INFORMATION

To determine the simple operating margin emission factor ($EF_{OM,y}$) and the build margin emission factor ($EF_{BM,y}$) of the Project, data recommended in *China's Regional Grid Baseline Emission Factors* renewed on December 30, 2008 for North China Grid are adopted.

The following tables summarise the numerical results from the equations listed in *Tool to Calculate the Emission Factor for an Electricity System*. Information provided by the tables includes data, data sources and the underlying calculations.

Table A1. Thermal power generation of North China Grid in 2004

	Electricity generation (MWh)	Auxiliary electricity consumption (%)	Electricity delivered to the grid (MWh)
Beijing	18,579,000	7.94	17,103,827
Tianjin	33,952,000	6.35	31,796,048
Hebei	124,970,000	6.5	116,846,950
Shanxi	104,926,000	7.7	96,846,698
Inner Mongolia	80,427,000	7.17	74,660,384
Shandong	163,918,000	7.32	151,919,202
Total			489,173,110

Data source: China Electric Power Yearbook 2005.

Table A2. Thermal power generation of North China Grid in 2005

	Electricity generation (MWh)	Auxiliary electricity consumption (%)	Electricity delivered to the grid (MWh)
Beijing	20,880,000	7.73	19,265,976
Tianjin	36,993,000	6.63	34,540,364
Hebei	134,348,000	6.57	125,521,336
Shanxi	128,785,000	7.42	119,229,153
Inner Mongolia	92,345,000	7.01	85,871,616
Shandong	189,880,000	7.14	176,322,568
Total			560,751,013

Data source: China Electric Power Yearbook 2006.

Table A3. Thermal power generation of North China Grid in 2006

	Electricity generation (MWh)	Auxiliary electricity consumption (%)	Electricity delivered to the grid (MWh)
Beijing	20,705,000	7.51	19,150,055
Tianjin	35,924,000	6.86	33,459,614
Hebei	143,888,000	6.63	134,348,226
Shanxi	150,250,000	7.45	139,056,375
Inner Mongolia	139,593,000	7.58	129,011,851
Shandong	230,922,000	7.12	214,480,354
Total			669,506,473

Data source: China Electric Power Yearbook 2007.

Table A4. Calculation of the simple operating margin emission factor of North China Grid in 2004

Fuel	Unit	Beijing A	Tianjin B	Hebei C	Shanxi D	Inner Mongolia E	Shandong F	Total G=A+B+…+F	Emission factor (tC/TJ) H	NCV (MJ/t or 1000m^3) I	CO_2 emission[21] (tCO_2e) J
Raw coal	10^4t	823.09	1,410	6,299.8	5,213.2	4,932.2	8,550	27,228.29	25.8	20,908	538,547,477
Cleaned coal	10^4t	0.00	0.00	0.00	0.00	0.00	40	40	25.8	26,344	996,857
Other washed coal	10^4t	6.48	0.00	101.04	354.17	0.00	284.22	745.91	25.8	8,363	5,901,191
Coke	10^4t	0.00	0.00	0.00	0.00	0.22	0.00	0.22	29.2	28,435	6,698
Coke oven gas	10^8m^3	0.55	0.00	0.54	5.32	0.4	8.73	15.54	12.1	16,726	1,153,187
Other gas	10^8m^3	17.74	0.00	24.25	8.2	16.47	1.41	68.07	12.1	5,227	1,578,574
Diesel	10^4t	0.39	0.84	4.66	0.00	0.00	0.00	5.89	20.2	42,652	186,070
Fuel oil	10^4t	14.66	0.00	0.16	0.00	0.00	0.00	14.82	21.1	41,816	479,451
Refinery gas	10^4t	0.00	0.55	1.42	0.00	0.00	0.00	1.97	15.7	46,055	52,229
Natural gas	10^8m^3	0.00	0.37	0.00	0.19	0.00	0.00	0.56	15.3	38,931	122,306
Other energy	10^4tCe	9.41	0.00	34.64	109.73	4.48	0.00	158.26	0	0	0
Net electricity import from Northeast China Grid to North China Grid (MWh)						4,514,550					
Emission factor of the net electricity imported from Northeast China Grid (tCO_2e/MWh)						1.17384					
Total emission of North China Grid (tCO_2e)						554,323,400					

Data source: China Energy Statistical Yearbook 2005.

21 If the unit of the fuel is 10^4 t, then J=G×H×I×44/12/10^2; if the unit of the fuel is 10^8 m^3, then J=G×H×I×44/12/10. The same about the calculation of J in Table A5, Table A6 and Table A7.

Table A5. Calculation of the simple operating margin emission factor of North China Grid in 2005

Fuel	Unit	Beijing A	Tianjin B	Hebei C	Shanxi D	Inner Mongolia E	Shandong F	Total G=A+B+…+F	Emission factor (tC/TJ) H	NCV (MJ/t or $1000m^3$) I	CO_2 emission (tCO_2e) J
Raw coal	10^4t	897.75	1,675.2	6,726.5	6,176.5	6,277.23	10,405.4	32,158.53	25.8	20,908	636,062,536
Cleaned coal	10^4t	0.00	0.00	0.00	0.00	0.00	42.18	42.18	25.8	26,344	1,051,186
Other washed coal	10^4t	6.57	0.00	167.45	373.65	0.00	108.69	656.36	25.8	8,363	5,192,725
Coke	10^4t	0.00	0.00	0.00	0.00	0.21	0.11	0.32	29.2	28,435	9,742
Coke oven gas	10^8m^3	0.64	0.75	0.62	21.08	0.39	0.00	23.48	12.1	16,726	1,742,396
Other gas	10^8m^3	16.09	7.86	38.83	9.88	18.37	0.00	91.03	12.1	5,227	2,111,027
Crude oil	10^4t	0.00	0.00	0.00	0.00	0.73	0.00	0.73	20	41,816	22,385
Gasoline	10^4t	0.00	0.00	0.01	0.00	0.00	0.00	0.01	18.9	43,070	298
Diesel	10^4t	0.48	0.00	3.54	0.00	0.12	0.00	4.14	20.2	42,652	130,786
Fuel oil	10^4t	12.25	0.00	0.23	0.00	0.06	0.00	12.54	21.1	41,816	405,690
Refinery gas	10^4t	0.00	0.00	9.02	0.00	0.00	0.00	9.02	15.7	46,055	239,141
Natural gas	10^8m^3	0.28	0.08	0.00	2.76	0.00	0.00	3.12	15.3	38,931	681,417
Other energy	10^4tCe	8.58	0.00	32.35	69.31	7.27	118.9	236.41	0	0	0
Net electricity import from Northeast China Grid to North China Grid (MWh)						3,929,000					
Emission factor of the net electricity imported from Northeast China Grid (tCO_2e/MWh)						1,15764					
Total emission of North China Grid (tCO_2e)						652,197,698					

Data source: China Energy Statistical Yearbook 2006.

Table A6. Calculation of the simple operating margin emission factor of North China Grid in 2006

Fuel	Unit	Beijing A	Tianjin B	Hebei C	Shanxi D	Inner Mongolia E	Shandong F	Total G=A+B+…+F	Emission factor (tC/TJ) H	NCV (MJ/t or 1000m^3) I	CO_2 emission (tCO_2e) J
Raw coal	10^4t	796.63	1,639.20	6,867.99	6,968.88	8,404.05	10,930.66	35,607.41	25.8	20,908	704,277,823
Cleaned coal	10^4t	0.00	0.00	0.00	0.00	0.00	39.77	39.77	25.8	26,344	991,125
Other washed coal	10^4t	6.36	0.00	214.13	371.14	61.77	544.60	1,198	25.8	8,363	9,477,855
Briquette	10^4t	7.97	0.00	0.00	0.00	0.00	27.77	35.74	26.6	20,908	728,820
Coke	10^4t	0.00	0.00	0.00	0.00	0.00	3.23	3.23	29.2	28,435	98,335
Coke oven gas	10^8m^3	0.38	0.63	5.80	22.32	0.64	5.79	35.56	12.1	16,726	2,638,825
Other gas	10^8m^3	20.66	6.58	69.72	13.79	22.76	7.22	140.73	12.1	5,227	3,263,593
Crude oil	10^4t	0.00	0.00	0.00	0.00	0.74	0.00	0.74	20	41,816	22,692
Gasoline	10^4t	0.00	0.00	0.01	0.00	0.00	0.00	0.01	18.9	43,070	298
Diesel	10^4t	0.21	0.00	3.01	0.00	0.07	6.32	9.61	20.2	42,652	303,589
Fuel oil	10^4t	6.38	0.00	0.08	0.00	0.00	4.10	10.56	21.1	41,816	341,633
LPG	10^4t	0.00	0.00	0.00	0.00	0.00	0.01	0.01	17.2	50,179	316
Refinery gas	10^4t	0.00	0.00	2.43	0.00	0.00	2.32	4.75	15.7	46,055	125,934
Natural gas	10^8m^3	3.41	0.73	0.00	0.53	0.00	0.00	4.67	15.3	38,931	1,019,942
Other oil products	10^4t	0.00	0.00	0.00	0.00	0.00	0.28	0.28	20	38,369	7,878
Other energy	10^4tCe	6.83	0.00	47.11	230.76	12.51	132.29	429.50	0	0	0
Net electricity import from Northeast China Grid to North China Grid (MWh)						2,618,060					
Emission factor of the net electricity imported from Northeast China Grid (tCO_2e/MWh)						1.16688					
Net electricity import from Central China Grid to North China Grid (MWh)						497,060					
Emission factor of the net electricity imported from Central China Grid (tCO_2e/MWh)						0.87599					
Total emission of North China Grid (tCO_2e)						726,789,038					

Data source: China Energy Statistical Yearbook 2007.

Based on the data provided in Table A1~Table A6, the operating margin emission factor of North China Grid is calculated as 1.1169 tCO_2e/MWh.

Table A7. Data and results of Step a.

Fuel	Unit	Beijing A	Tianjin B	Hebei C	Shanxi D	Inner Mongolia E	Shandong F	Total G= A+B+…+F	Emission factor (tC/TJ) H	NCV (MJ/t or 1000m^3) I	CO_2 emission (tCO_2e) J
Raw coal	10^4t	796.63	1,639.20	6,867.99	6,968.88	8,404.05	10,930.66	35,607.41	25.8	20,908	704,277,823
Cleaned coal	10^4t	0.00	0.00	0.00	0.00	0.00	39.77	39.77	25.8	26,344	991,125
Other washed coal	10^4t	6.36	0.00	214.13	371.14	61.77	544.60	1198	25.8	8,363	9,477,855
Briquette	10^4t	7.97	0.00	0.00	0.00	0.00	27.77	35.74	26.6	20,908	728,820
Coke	10^4t	0.00	0.00	0.00	0.00	0.00	3.23	3.23	29.2	28,435	98,335
Sub-total of solid fuel											**715,573,958**
Crude oil	10^4t	0.00	0.00	0.00	0.00	0.74	0.00	0.74	20	41,816	22,692
Gasoline	10^4t	0.00	0.00	0.01	0.00	0.00	0.00	0.01	18.9	43,070	298
Diesel	10^4t	0.21	0.00	3.01	0.00	0.07	6.32	9.61	20.2	42,652	303,589
Fuel oil	10^4t	6.38	0.00	0.08	0.00	0.00	4.10	10.56	21.1	41,816	341,633
Other oil products	10^4t	0.00	0.00	0.00	0.00	0.00	0.28	0.28	20	38,369	7,878
Sub-total of liquid fuel											**676,091**
Coke oven gas	10^8m^3	0.38	0.63	5.80	22.32	0.64	5.79	35.56	12.1	16,726	2,638,825
Other gas	10^8m^3	20.66	6.58	69.72	13.79	22.76	7.22	140.73	12.1	5,227	3,263,593
LPG	10^4t	0.00	0.00	0.00	0.00	0.00	0.01	0.01	17.2	50,179	316
Refinery gas	10^4t	0.00	0.00	2.43	0.00	0.00	2.32	4.75	15.7	46,055	125,934
Natural gas	10^8m^3	3.41	0.73	0.00	0.53	0.00	0.00	4.67	15.3	38,931	1,019,942
Sub-total of gas fuel											**7,048,610**
Total											**723,298,659**

Data source: China Energy Statistical Yearbook 2007.

Calculated with the data provided in Table A7 and formula (6)~(8), the value of λ_{Coal} is 98.93%, the value of λ_{Oil} is 0.09% and the value of λ_{Gas} is 0.98%. Therefore, $EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y}$ = 0.9083 tCO_2e/MWh.

Table A8. Installed capacity of North China Grid in 2006

	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total
Thermal power (MW)	3,984	6,512	26,087	26,661	28,899	49,395	141,538
Hydro power (MW)	1,053	5	785	790	818	553	4,004
Wind power and Others (MW)	24	24	218	0	565	106	937
Total (MW)	5,061	6,541	27,090	27,451	30,282	50,054	146,479

Data source: China Electric Power Yearbook 2007.

Table A9. Installed capacity of North China Grid in 2005

	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total
Thermal power (MW)	3,833.5	6,149.9	22,333.2	22,246.8	19,173.3	37,332	111,068.7
Hydro power (MW)	1025	5	784.5	783	567.9	50.8	3,216.2
Wind power and Others (MW)	24	24	48	0	208.9	30.6	335.5
Total (MW)	4,882.5	6,178.9	23,165.7	23,029.8	19,950.2	37,413.4	114,620.5

Data source: China Electric Power Yearbook 2006.

Table A10. Installed capacity of North China Grid in 2004

	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total
Thermal power (MW)	3,458.5	6,008.5	19,932.7	17,693.3	13,641.5	32,860.4	93,594.9
Hydro power (MW)	1,055.9	5	783.8	787.3	567.9	50.8	3,250.7
Wind power and Others (MW)	0	0	13.5	0	111.7	12.3	137.5
Total (MW)	4,514.4	6,013.5	20,730	18,480.6	14,321.2	32,923.5	96,983.2

Data source: China Electric Power Yearbook 2005.

Table A11. Calculation of the build margin emission factor of North China Grid

	Installed capacity in 2004 (MW) A	Installed capacity in 2005 (MW) B	Installed capacity in 2006 (MW) C	Capacity additions from 2005 to 2006 (MW) D=C-B	Share in total capacity additions
Thermal power	93,594.9	111,068.7	141,538	30,469.3	95.64%
Hydro power	3,250.7	3,216.2	4,004	787.8	2.47%
Wind power and Others	137.5	335.5	937	601.5	1.89%
Total	96,983.1	114,620.4	146,479	31,858.6	100.00%
Share in the total installed capacity of 2006	66.21%	78.25%	100%		

Therefore, $EF_{grid,BM,y}$ = 0.9083 × 95.64% = 0.8687 tCO_2e/MWh.

Annex 4

MONITORING INFORMATION

The calibration of meters & metering, the QA/QC procedure and others of the monitoring plan should be carried out referring to the power purchase agreement of the Project, the parallel operation agreement of the Project and the checking and testing standard and the specification of the monitoring equipments. No other additional information.

Clarification of clauses 1.12, 1.13, 1.14, 8.1 and 8.2 of the VCS PD template

The Project was registered as a CDM project on 03/07/2010 (reference number: 3356). As per *Further Guidance for Projects that are Registered in Two GHG Programs* published on 19/03/2008:

"Projects registered under other VCS Program approved GHG Programs (such as the CDM) are eligible to create Voluntary Carbon Units (VCUs) for the emissions reductions or removals not registered under that GHG Program.

…

For example, when a project has been validated under the CDM, a further validation shall be completed of clauses 1.12, 1.13, 1.14, 8.1 and 8.2 of the VCS Project Description template (http://v-c-s.org/docs/VCS%20PD.doc). This validation can be completed when the Project Proponent undergoes a VCS Program verification of achieved emissions reductions or removals."

Therefore only clauses 1.12, 1.13, 1.14, 8.1 and 8.2 of the VCS Project Description template are filled as below.

1.12 Demonstration to confirm that the project was not implemented to create GHG emissions primarily for the purpose of its subsequent removal or destruction.

As described in the registered CDM-PDD (version 03), "the Project is a grid-connected renewable power generation project activity that installs a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity." As a wind power project, the Project generates emission reductions by avoiding CO_2 emissions from the same amount of electricity generation from North China Grid, which is mainly composed of traditional thermal power plants. Therefore, the Project was not implemented to create GHG emissions primarily for the purpose of its subsequent removal or destruction.

1.13 Demonstration that the project has not created another form of environmental credit (for example renewable energy certificates).

The Project was registered as a CDM project on 03/07/2010. As per CDM rules, emission reduction credits generated by the Project prior to 03/07/2010 can not be claimed as CERs. The Project Owner expects to claim these emission reduction credits as VCUs and will not apply for other environmental credits.

1.14 Project rejected under other GHG programs (if applicable):

Prior to the application for issuance of VCUs, only CDM development was implemented for the Project. The Project was registered as a CDM project on 03/07/2010. And the Project has not been rejected by other GHG programs.

8.1 Proof of Title:

Letter of Approval issued by China's DNA for the Project can be the proof of title of the Project Owner. As described in Letter of Approval, Construction Investment Yanshan (Guyuan) Wind Energy Co., Ltd. is authorized as China's participant to voluntarily participate in and carry out the Project. Letter of Approval issued by China's DNA for the Project can be found at:
http://cdm.unfccc.int/UserManagement/FileStorage/K6RYL2HPZ7913XJWMCFUA0VN8EGD5O.

The Project Owner has also obtained all relevant permits for to the Project including Business License, FSR Approval and Power Purchase Agreement. Moreover, the ownership of the Project Owner has been described in the registered CDM-PDD (version 03), which has been validated by Bureau Veritas Certification. The validation report issued by Bureau Veritas Certification can be found at:
http://cdm.unfccc.int/UserManagement/FileStorage/GJUD586H3OW29I1KSVL47YNMEPTACB.

8.2 Projects that reduce GHG emissions from activities that participate in an emissions trading program (if

applicable):

The Project does not reduce GHG emissions from activities that are included in an emissions trading program or take place in a jurisdiction or sector in which binding limits are established on GHG emissions. So this clause is not applicable.