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

CONTENTS

Annexes

SECTION A. General description of project activity

A.1. Title of the project activity:

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Inner Mongolia Wuliji Wind Farm Project
PDD version: 03
Date: 15/04/2013

A.2. Description of the project activity:

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Inner Mongolia Wuliji Wind Farm Project (hereinafter referred as to "the project") is located in the Wulate Hou Qi, Bayannao'er City, Inner Mongolia Autonomous Region, China. The objective of the project is to generate renewable electricity from wind and the generated power will be accessed to the North China Power Grid (NCPG).

Based on the real conditions of the project development, the developer is planning to install 40 wind turbines, each with a capacity of 1.25MW. The total installed capacity is 50MW. The expected net generation of the project activity is 117,630MWh per year based on an expected loadfactor of 26.86% with the annual usage hours of 2353h per year. The expected of emission reductions is 124,076 tCO_2e per year once fully operational.

The project will assist China in stimulating and accelerating the commercialisation of grid-connected wind power technologies and markets which are an important objective of the Chinese government. The project will therefore help reduce GHG emissions versus the high-growth, coal-dominated business-as-usual scenario. Furthermore, the project will improve air quality and local livelihoods, promote sustainable renewable energy industry development.

The baseline scenario, therefore, is the same as the scenario existing prior to the implementation of the project activity, i.e. generation of electricity by grid connected power plants.

The project activity will promote the local and national sustainable development powerfully in the following aspects:

- Reduce greenhouse gas emissions in China compared to a business-as-usual scenario;
- Help to stimulate the growth of the wind power industry in China;
- Create local employment opportunity during the assembly and installation of wind turbines, and for operation of the wind farm;
- Reduce other pollutants resulting from the power generation industry, compared to a business-as-usual approach, such as SO_2, NO_x and soot.

A.3. Project participants:

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Name of Party involved	Private and/or public entity(ies) project participants (as applicable)	Party involved wishes to be considered as project participant (Yes/No)
P.R. China (host)	CGN Wind Power Co., Ltd.	No

United Kingdom of Great Britain and Northern Ireland	Carbon Resource Management Ltd.	No

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

>>
People's Republic of China

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

>>
Inner Mongolia Autonomous Region

A.4.1.3. City/Town/Community etc:

>>
Bayannao'er City/Wulate Hou Qi

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

>>
The project activity lies in the Wulate Hou Qi, Bayannao'er City, Inner Mongolia Autonomous Region, China. The coordination of the wind farm center is as follow:
Latitude: 41°30′20″ (N)
Longitude 106°38′30″ (E)

Figure 1: The location of the wind farm

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

>>
Sectoral Scope: 1. Energy Industries (Renewable sources).

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

>>
The project developer adopts advanced commercial wind-power technology from Sewind Co., Ltd. A total of 40 turbines with a capacity 1.25MW will be installed with the total installed capacity of 50MW. Net generation is expected to be 117,630MWh per year, once the project is fully operational, which is exported to the NCPG. The project activity is expected to be operational for 20 years.

The turbine manufacturers will provide on-the-job-training for staff of the proposed wind farm before the start of operation.

The main technical specifications of the wind turbines are provided in Table 1.

Table 1 Main technical specifications of the installed wind turbines

Item	Value
Type	SEC-1250
Quantity	40
Rated capacity (kW)	1250
Hub height (m)	65
Rotor diameter (m)	64
Sweep-wind area (m2)	3217
Cut-in speed (m/s)	2.8
Rated wind speed (m/s)	12.3
Cut-out speed (m/s)	23
Rated voltage of generator (V)	690

The power generation is monitored by the electronic control and monitoring system in the onsite office, as well as through the electricity meter at the 220kV transformer station is planed at the project site, to connect the project with the 220kV grid.

Prior to the implementation of the project activity, the electricity was generated by grid-connected power plants. Without the implementation of the project, this scenario would have continued and is considered the baseline scenario.

The technology adopted in the project activity is widely used has been proved to have no negative influence on environment. The main equipment is manufactured in the host country. No international technology is transferred from other countries to the bundle project.

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

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The project will achieve an ex-ante estimated average emission reduction of 124,076 tCO2 per year over the chosen 7-year renewable crediting period, as presented in Table 2 below.

Table 2 Estimated emission reductions of the project in the first crediting period

Period	Annual estimation of emission reductions(tCO_2e)
2010	124,076
2011	124,076
2012	124,076
2013	124,076
2014	124,076
2015	124,076
2016	124,076
Total estimated reductions (tCO_2e)	868,532
Total number of crediting years	7
Annual average of estimated reductions over the crediting period (tCO_2e)	124,076

*Note: * Using 12-monthly periods, not calendar years, from the start of the crediting period.*

The baseline emissions factor has been fixed for the first crediting period. In each year the amount of CERs actually generated by the project will depend on the metered electricity supplied by the project to the grid.

A.4.5. Public funding of the project activity:

>>
No public funding from any of the UNFCCC Annex I country governments has been secured for the 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:

>>
Title of the approved methodology: *ACM0002 Consolidated methodology for grid-connected electricity generation from renewable sources*
Version 9 (valid from 27 Feb 09 onwards)

Tools referenced in this methodology:
AM_Tool_01 "Tool for the demonstration and assessment of additionality"
Version 05.2 (EB 39)

AM_Tool_07 "Tool to calculate the emission factor for an electricity system"
Version 01.1 (EB 35)

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

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The approved methodology ACM0002 is applicable to the project activities, because:

- The project involves electricity capacity additions to the grid from wind power resources; and

- The project does not involve switching from fossil fuels to renewable energy at the site of the project activity; and
- The geographic and system boundaries of the NCPG can be clearly identified and information on the characteristics of the grid is public available.[1]

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

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Emission sources:

For the baseline determination only CO_2 emissions from electricity generation by fossil fuel fired power plant that is displaced due to the project activity are taken into account.

Spatial boundary:

The spatial extend of the project boundary includes the project site and all power plants connected to NCPG. NCPG is an electricity system which is defined by the spatial extent of the power plants that can be dispatched without significant transmission constrains.

Using the boundary definitions of the Chinese DNA[2], NCPG consists of Shandong, Beijing, Tianjin, Hebei, Shanxi, and Inner Mongolia power grids. The electricity transmission between different provinces in NCPG is very large and it is reasonable for the project to regard NCPG as the project boundary.

NCPG connects with Northeast Power Grid (NEPG) and Central China Power Grid (CCPG); the electricity transfers are from NEPG and CCPG to NCPG. Electricity transfer from NEPG and CCPG, therefore, are taken into account.

Table 3 Sources and gases in the project boundary

	Source	Gas	Included?	Justification / Explanation
Baseline	Power supplied by NCPG	CO_2	Yes	Following ACM0002
		CH_4	No	Conservative / according to ACM0002
		N_2O	No	Conservative / according to ACM0002
Project Activity	Emissions from backup power generation	CO_2	No	The proposed project activity does not have backup power generation, therefore project emissions from the proposed project activity are not considered.
		CH_4	No	
		N_2O	No	

[1] The boundary of NCPG is defined by Chinese DNA on 18/07/2008 with the linkage of http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/2008/200887164119674.pdf

[2] Chinese DNA designates it on 18/07/2008 at http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/2008/200887164119674.pdf

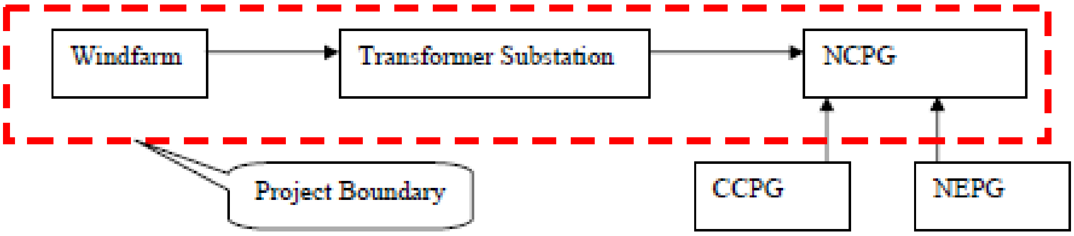

Figure 2 Flow diagram of the project boundary

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

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Because the project activity is the installation of a new grid-connected renewable power plant/unit, and is not a modification/retrofit of an existing plant/unit, the baseline scenario, according to methodology ACM0002, 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".

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):

>>
CDM consideration

The CDM was taken into account at the very beginning of the project. The FSR of the project was finished in November 2007. The IRRs of the two options in the FSR (using 1.5MW and 1.25MW turbines) were below benchmark of 8% without obtaining additional income from the sale of emission reductions. The CDM income, therefore, was taken into account in the FSR to improve the IRR to above the benchmark. Therefore, the developer held a meeting after the accomplishment of the FSR to undertake the project as a proposed CDM project activity. An Emission Reduction Purchase Agreement (ERPA) was signed in January 2008 and the main Equipment Purchase Agreement (EPA) was signed in July 2008.

The total installed capacity in the EPA signed in July 2008 was 49.5MW (33×1500kW); however, the turbines with an installed capacity of 1500kW could not be delivered on time. Therefore, the project developer decided to change the installation according to the alternative option discussed in the approved FSR, the installed capacity of which was 50MW (40×1250kW). A revised EPA was signed in November 2008.

A detailed project timeline is shown below.

Table 4 Project timeline

Time	Event
7 November 2007	EIA

November 2007	FSR
20 December 2007	Board Meeting to undertake the project as a proposed CDM project activity
25 January 2008	ERPA
5 May 2008	Approval of EIA
23 July 2008	Approval of FSR
28 July 2008	Equipment Purchase Agreement of 49.5MW
26 November 2008	Revised Equipment Purchase Agreement of 50MW

From the description above, it can be concluded that 28 July 2008, the date of the EPA, is to be considered the starting date of the project activity, and the project owner had decided to apply for CDM registration to overcome the financial barriers before the start date of the project.

Additionality

According to ACM0002, the additionality of the project activity is demonstrated and assessed using the latest version of *AM_Tool_01 "Tool for the demonstration and assessment of additionality"*. The tool uses the following steps:

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

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

Sub-step1a. Define alternatives to the project activity:

The demonstration about the alternative that provides outputs or services comparable with the proposed CDM project activity is as follows:

a) *The proposed project activity undertaken without being registered as a CDM project activity.*
The alternative (a) is fully in accordance with current Chinese law and regulations. The proposed project is financially less attractive than alternatives, as demonstrated below, and the proposed project activity undertaken without being registered as a CDM project activity is not a realistic alternative.

b) *Thermal power plant with comparable capacity or electricity generation.*
This is not realistic alternative in line with current laws and regulations as explained in sub-step 1b.

c) *Renewable energy plant with comparable capacity or electricity generation.*
Besides wind energy, solar PV, geothermal, biomass and hydro are the possible grid-connected renewable energy technologies that could be applied in China. Due to the technology development status and the high cost for power generation, solar PV, geothermal and biomass of the similar installed capacity as the proposed project are alternatives far from being attractive investment in the grid in China[3]. There is no exploitable hydro power resource to develop in the region of the proposed project activity. Therefore, the hydro and other kinds of renewable energy power plant are also not realistic alternative.

[3] http://finance.people.com.cn/GB/1038/59942/59949/6294546.html.

d) *Continuation of the current situation: 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. Comparable capacity or electricity generation addition provided by North China Power Grid.*
To meet the increasing electricity demand, the power grid company can increase the generation from operating units as well as from and rely on some new built (thermal) power plants connected to the grid. Indeed, this is the current route followed by the industry to meet demand, as reflected in the baseline calculations data presented: more than 99% of recently added capacity is thermal power. Therefore, continuation of the current situation, with the electricity generated by the operation of grid-connected power plants and by the addition of new generation sources. Therefore, comparable capacity or electricity generation addition provided by Northeast China Power Grid can be taken as a realistic alternative for the project activity and comply with the applicable laws and regulations.

From the above mentioned we know that the alternative (d) is the baseline scenario of the project, in line with the methodology.

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

According to Chinese regulations, coal-fired power plants of less than 135MW are prohibited to be built in the areas covered by the large grids such as provincial grids[4]. It is therefore not possible under Chinese regulations to install a fossil fuel-fired power plant either with the same capacity or with the same expected power generation[5]. Scenario (b) therefore is not a feasible alternative to the project.

According to the analysis in sub-step 1a and 1b, alternative (a) and alternative (d) are the realistic and feasible alternatives which comply with applicable laws and regulations.

Step 2. Investment analysis

The purpose of this step is to determine whether the proposed project activity is economically or financially less attractive than other alternatives, or economically or financially not feasible, identified in step 1, without the revenue from the sale of certified emission reductions (CERs). To conduct the investment analysis, the following sub-steps are used:

Sub-step 2a. Determine appropriate analysis method

Determine whether to apply the simple cost analysis, investment comparison analysis or benchmark analysis (sub-step 2b):

The proposed project activity generates financial benefits by the sales of electricity, so the simple cost analysis can not be applied. The alternative to the project activity is the supply of electricity from a grid, which is not considered an investment, and a benchmark approach is considered appropriate, according to

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

[5] Using the average load factor of thermal plant connected to NEPG, as reported in the *China Electric Power Yearbook* (2007 Edition), of 5633 hours per year, a fossil fuel-fired plant of 20.88MW would generate 117,630 MWh per year.

EB Guidance[6]. The investment comparison analysis (Option II), therefore, is not suitable, and the benchmark analysis (Option III) is adopted. The investment comparison analysis is suitable for a project which has a similar type alternative project. The alternative of the proposed project is comparable capacity or electricity generation addition provided by the NEPG, not a concrete project, so this is not a suitable analysis method either.

Therefore, in line with EB Guidance, the benchmark analysis is adopted.

Sub-step 2b – Option III. Apply benchmark analysis

According to the *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects* issued by former State Power Corporation of China in 2002, the benchmark of total investment financial internal rate of return (IRR) of electric power industry is 8%, and only if the total investment IRR of the project is higher than or equivalent to this benchmark, the proposed project is financially feasible. This benchmark is widely used in assessment and approval of Chinese electricity power industrial, especially new projects, and is applied by many Chinese projects under the CDM. Therefore, the project activity uses the benchmark of 8% in the financial analysis.

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

The investment estimation for 50MW in the Feasibility Study Report (FSR) is completed by Inner Mongolia Power Exploration & Design Institute (Grade A, No.050101-sj) based on national regulation, material and equipment price levels and was carried out by an independent design institute regulated by national regulation.

The FSR was completed in November 2007 and was approved by Development and Reform Committee of Inner Mongolia Autonomous Region in July 2008. The project start date is 28 July 2008, thus the time between the completion of the FSR and the investment decision is less than nine months, and all the input values are valid and applicable at the time of the investment decision.

Therefore, all the input values and calculations used in the PDD are derived from the FSR, and the relevant data is listed in Table 5.

Table 5 Relevant indicators for financial assessment

Item	**Value**
Net supplied power to the grid	117,630 MWh/y
Fixed asset investment	540.48 million RMB Yuan
Annual O&M costs	8.03 million RMB Yuan
On-grid tariff (including VAT)	0.51 RMB / kWh
Interest rate	7.83%
Value added tax rate	8.50%
Income tax rate	25%
Depreciation lifetime	15 years
Scrap value rate	5%
Lifetime of the project	20years

6 EB 41 Annex 45 (paragraph 15).

Source: Feasibility Study Report

Further detail on the input values

Since the power sector reform in 2002, a total 47 wind farm projects in west Inner Mongolia connected to the North China Power Grid (NCPG), including 6 concessional projects. The list of the main input value of each project is presented below.

Table 5a: Projects in West Inner Mongolia exporting electricity to NCPG

	Approved tariff	Approval	Date	Project Name	Installation	Carbon	investment	O & M costs	other fee	material fee
	(RMB/kWh)						(RMB/kw)	(RMB/MWh)	(RMB/kw)	(RMB/kw)
	Conventional projects									
1	0.55	[2004]1093	Jun-04	Huitengxile Windfarm Project	Jun-04	0064	N/A	N/A		
2	0.579	[2006]2908	Dec-06	Inner-Mongolia Ximeng Abag 49.5MW Wind Power Project	Oct-08	2135	11503.23	98.97	8.00	6.00
3	0.5497	[2006]2908	Dec-06	Inner Mongolia Wulatezhongqi Wind farm	Dec-07	Under validation	10488.89	69.80	-	-
4	0.548	[2006]2908	Dec-06	Inner Mongolia Bailingmiao Wind-farm	Dec-07	GS VER	11026.60	96.45	-	-
5	0.51	[2007]1260	Jun-07	Inner Mongolia Datang Zhuozi Wind Farm	Dec-06	1327	9604.00	99.69	-	-
6	0.51	[2007]3303	Dec-07	Inner Mongolia Bayannaoer Chuanjingsumu 49.3MW Wind Power Project	Dec-07	1621	9875.46	109.44	40.00	-
7	0.51	[2007]3303	Dec-07	Expansion Project of Huadian Inner Mongolia Huitengxile Wind Farm	Nov-07	1992	8407.53	71.36	40.00	5.00
8	0.51	[2007]3303	Dec-07	Guohua Inner Mongolia Huitengliang West Wind Farm Project	Sep-07	2047	9205.05	80.04	27.07	14.75
9	0.51	[2007]3303	Dec-07	Goldwind Damao Wind Farm Project	Dec-08	2051	8416.36	71.92	12.73	-
10	0.51	[2007]3303	Dec-07	Fuhui Inner Mongolia Tugurige Wind Farm Project	Dec-07	2038	7822.63	83.00	13.13	-
11	0.51	[2007]3303	Dec-07	Fuhui Inner Mongolia Narenbaolige Wind Farm Project	Dec-07	2072	8203.43	86.11	13.13	-
12	0.51	[2007]3303	Dec-07	Inner Mongolia Bayinhanggai 49.5MW Wind Farm Project	Dec-08	2027	10361.62	64.21	12.93	4.24
13	0.51	[2007]3303	Dec-07	Guohua Inner Mongolia Huitengliang Wind Farm Project	Oct-07	1261	10299.49	84.70	27.49	14.97
14	0.51	[2007]3303	Dec-07	Inner Mongolia Huitengliang 49.5MW Wind Power Project	Nov-07	0589	11058.79	-	-	-
15	0.51	[2007]3303	Dec-07	Inner Mongolia North Longyuan Huitengxile WindFarm Project	Jun-07	2078	10370.37	48.03	10.12	7.90
16	0.51	[2007]3303	Dec-07	Xilinguole Huitengliang Wind Power Project Guotai Phase I	N/A	2450	9811.31	104.09	-	-
17	0.51	[2007]3303	Dec-07	Inner Mongolia North Longyuan Zhurihe WindFarm Project	Dec-06	1990	9163.03	54.62	10.10	5.05
18	0.51	[2007]3303	Dec-07	Inner Mongolia Bayannaoer Chuanjingsumu Wind Power Project	Dec-07	2099	8198.17	226.23	40.00	-
19	0.51	[2007]3303	Dec-07	Inner Mongolia Siziwangqi Bayin'aobao Wind Power Project	Jan-08	2053	8857.17	89.03	30.00	5.00
20	0.51	[2007]3303	Dec-07	Sinohydro Inner Mongolia Ximeng Honggeer Wind Power Project	Jun-08	Under validation	9288.69	103.08	-	-
21	0.51	[2007]3303	Dec-07	Inner Mongolia Goldwind Damao Wind Farm Phase II Project	N/A	Under validation	8860.40	-	-	-
22	0.51	[2007]3303	Dec-07	Inner Mongolia Bayinxile Wind Power Project	N/A	Under validation	10182.83	96.59	-	-
23	0.51	[2007]3303	Dec-07	Inner Mongolia Ximeng Zheligentu Wind Farm Phase I Project	Dec-08	Under validation	9008.82	104.54	-	-
24	0.51	[2007]3303	Dec-07	Inner Mongolia Hangjin Yihewusu Wind Power Project	Dec-07	Under validation	7741.62	237.93	-	-
25	0.51	[2007]3303	Dec-07	Inner Mongolia Zhuozi Ⅱ Wind Power Project	Oct-08	Under validation	10069.48	78.78	-	-
26	0.51	[2007]3303	Dec-07	Inner Mongolia Bayin'aobao 49.5MW Wind Farm Project (Phase I)	Dec-08	1823	10393.54	89.02	18.64	13.98
27	0.51	[2007]3303	Dec-07	Inner Mongolia Saiwusu I Wind Power Project	N/A	Under validation	8594.55	104.67	-	-
28	0.51	[2007]3303	Dec-07	Beijing Energy Huitengxile 49.5MW Wind Power Project	Dec-08	Under validation	10143.43	85.74	-	-
29	0.51	[2007]3303	Dec-07	Baiyun Ebo Wind Farm Inner Mongolia	Aug-07	Under validation	9457.98	119.29	-	-
30	0.51	[2007]3303	Dec-07	Alashan Bayannuoergong Wind Farm Project	N/A	Under validation	N/A	N/A	N/A	N/A
31	0.51	[2007]3303	Dec-07	Bayannaoer Wulatehouqi Hailisu Wind Farm Project	N/A	Under validation	10971.72	95.35	-	-
32	0.51	[2007]3303	Dec-07	Xilinguole Huangqi Huawei Wind Farm Project	N/A	Under validation	N/A	N/A	N/A	N/A
33	0.51	[2007]3303	Dec-07	Chuanjing Wind Farm Inner Mongolia Luneng PhaseII	Dec-08	Under validation	10407.88	102.42	-	-
34	0.51	[2008]1876	Jul-08	Inner Mongolia Duolun Daxishan 30.6MW Wind Power Project	Dec-08	1833	9908.17	84.24	19.28	-
35	0.51	[2008]1876	Jul-08	Inner Mongolia Taipusi Gongbaolage Wind Farm Project	Mar-08	Under validation	8422.22	-	-	-
36	0.51	[2008]1876	Jul-08	Inner Mongolia Ximeng Huitengliang Area Phase I Wind Power Project	N/A	Under validation	9388.08	-	-	-
37	0.51	[2008]1876	Jul-08	Inner Mongolia Huitengliang Phase II Wind Power Project	Aug-08	1815	9187.68	122.63	26.67	14.55
38	0.51	[2008]1876	Jul-08	Inner Mongolia Bayannaoer Chuanjingsumu III Wind Power Project	Mar-08	Under validation	8089.90	237.45	-	-
39	0.51	[2008]1876	Jul-08	Inner Mongolia Erlianhaote Phase I Wind Farm Project	Dec-07	1662	10747.77	95.25	26.50	5.50
40	0.51	[2009]2013	Sep-09	Inner Mongolia Wuliji Wind Farm Project	N/A	2384	10809.60	68.26	18.82	14.12
41	0.51	[2009]2406	Nov-09	IMAR Debaotu Wind Farm Phase I 49.5MW Project	N/A	2732	10803.03	82.25	15.12	15.12
	0.515	*Average*								
	Concessional projects									
1	0.468		Nov-07	Inner Mongolia Wulanyiligeng Wind Farm	N/A	Under validation				
2	0.4056		Aug-06	North Longyuan Huitengliang Wind PowerFarm Project	N/A	Under validation				
3	0.42		Aug-06	CGN Inner Mongolia Huitengliang 300MW Wind Power Project	N/A	2113				
4	0.4656		Aug-06	Inner Mongolia Baotoubayin Wind-farm	N/A	2153				
5	0.382		Sep-04	Inner Mongolia Beijing International Power Huitengxile Wind Farm	2006	0870				
6	0.382		Sep-04	Huadian Inner Mongolia Huitengxile 100.25MW Wind Farm Project	2006	0823				
	0.421	*average*								

Source: Statistics of installed capacity of wind power in China in 2007, Professor Shi Pengfei (for projects installed by 31 December 2007), the tariff notifications (Fa Gai Jia Ge [2007]1260, Fa Gai Jia Ge [2007]3303, Fa Gai Jia Ge [2008]1876, Nei Fa Gai Jia Zi [2009] 2013 and Nei Fa Gai Jia Zi [2009] 2406), China Wind Power Report 2008, China Renewable Energy Institute Association (CREIA) and WWF, in October 2008 (http://www.wwfchina.org/english/downloads/Wind%20Report/china%20wind%20power%202008.pdf), and UNFCCC web site.
Note: All projects since 2002 have received or are applying for carbon finance (CDM).

Operating costs
The O&M costs were estimated by an experienced design institute which has been awarded the highest certificate (grade A) in accordance with the prescription of the "Codes on Compiling Feasibility Study Report of Wind Farms" and "Preparation rules and calculation standard for budgetary estimation of wind power projects feasibility study report" issued by NDRC, and the guidance of the "Economic Evaluation Method and Parameters for Project Construction"[7], as well as building on the experience of the developer. The FSR was approved by Development and Reform Committee of Inner Mongolia Autonomous Region in July 2008.

According to the "Codes on Compiling Feasibility Study Report of Wind Farms", the detailed estimation of the annual O & M costs in the FSR includes the equipment repair cost, salary, material fee, and other fee[8]. The 'other fee' comprises of business travel, office expenses, training fees, daily transport costs and union fees, etc. The 'materials fee' is the expense for the objects used and consumed in the daily operations of the project.

Referring to the real situation of operating wind farms in the surrounding area and considering the characteristics of the project location, the values of the other fee and materials fee determined by the design institute are 18.82 RMB/kW (or 8 RMB/MWh) and 14.116 RMB/kW (or 6 RMB/MWh), respectively. With the statistic of the registered projects in Western Inner Mongolia, the value range of other fee is 8~40 RMB/kW and the range of materials fee is 4.24~14.97 RMB/kW (see the Table 5a). Thus the values for the investment analysis of the proposed project are valid and reasonable. The detailed break down for the items in the other fee has been provided by the design institute of the FSR and shown in the Table 5b below.

Table 5b Detailed breakdown of the other fee

Item	Costs (thousands RMB/year)	Costs (RMB/kW)
Office expenses	187.5	3.75
Business travel	237.5	4.75
Training fees	237.5	4.75
Daily transport costs	187.5	3.75
Union fees	91	1.82
Total	941	18.82

The estimated O&M costs are also compared to other projects in the region. The range of 'other fees' is 8 to 40 RMB/kW; the estimated cost for the proposed project is 18.82 RMB/kW which is within the range. The range of 'material fees is 4.24 to 14.97 RMB/kW (see the Table 5a); the estimated cost for the

7 Economic Evaluation Method and Parameters for Project Construction, issued by NDRC in June 2006.
8 Codes on Compiling Feasibility Study Report of Wind Farms, NDRC, page 33 and 38.

proposed project is 14.116 RMB/kW which is within the range.

Investment costs
The total investment was estimated by an experienced design institute which has been awarded the highest certificate (grade A). In the FSR, the estimated static investment for the proposed project is 10,810 RMB/kW, which is comparable to the investment level of other wind projects. The specific investment costs of similar projects in West Inner Mongolia range from 7,823 to 11,503 RMB/kW (see the Table 5a). Therefore, it can be concluded that the estimated investment costs in the FSR are reasonable.

Generation
The expected power generation of the proposed project is calculated by an independent qualified design institute with the highest grade (Grade A) in the FSR, based on wind assessment records for 30 years and detailed information on the equipment. Therefore, the generation and plant load factor determination are in line with both options of the EB Guidelines for the reporting and validation of plant load factors (EB 48 Annex 11): (a) provided to the government while applying the project activity for implementation approval, and (b) determined by a third party contracted by the project participants.

Tariff
The expected on-grid tariff used for the financial analysis in the FSR refers to the most recent tariffs for wind farms in West Inner Mongolia and installed on the same grid at the time of writing the FSR (November 2007). The FSR referred to the tariff letter issued by NDRC in June 2007 (Fa Gai Jia Ge [2007]1260])[9], which indicated that the unified tariff was 0.51 RMB/kWh (incl. VAT). Therefore, given that 0.51 RMB/kWh was the most recent tariff approved at the time of writing the FSR it is appropriate and reasonable to use this value, and no other value could credibly be used.

According to the tariff notification by NDRC in June 2007, the tariff of the wind farm projects officially approved were two-phase tariffs. The tariff for the first phase (the first 30,000 full load hours) will be fixed (i.e. 0.51 Yuan/kWh), the tariff after 30,000 full load hours will be set at the average tariff of the local grid which was 0.26276 Yuan/kWh (incl. VAT) in 2007[10], i.e. significantly below the tariff level granted for the initial period. The simplified tariff adopted in the investment analysis, using just one single tariff of 0.51 RMB/kWh for the lifetime of the project, therefore, is conservative.

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

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

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

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

The tariff notifications issued for West Inner Mongolia since the entry into force of the Renewable Energy Law are presented in Table 5c below. In addition to the notifications listed, several concession projects had received tariff approvals at significantly lower levels.

Table 5c NDRC tariff notifications for West Inner Mongolia

Date	Document reference	Tariff (RMB/kWh, including VAT)
22 December 2006	Fa Gai Jia Ge [2006] No. 2908	0.548, 0.5497, and 0.579
9 June 2007	Fa Gai Jia Ge [2007] No. 1260	0.51
3 December 2007	Fa Gai Jia Ge [2007] No. 3303	0.51
23 July 2008	Fa Gai Jia Ge [2008] No. 1876	0.51
20 July 2009	Fa Gai Jia Ge [2009] No. 1906	0.51

The tariff of the proposed project has been approved as 0.51 RMB/kWh (incl. VAT) in the tariff notification Neifagaijiage [2009]2013 dated 4/09/2009[11] based on the "Circular on Improving Wind Power On-grid Tariff Policy" (Fagaijiage [2009]1906).

In addition, the table 5a above shows all wind power projects exporting electricity to the same grid in West Inner Mongolia as this project activity, NCPG, including both CDM and non CDM projects, and the installation dates[12] of these projects. The "Statistics of installed capacity of wind power in China in 2007" by Professor Shi Pengfei (CWEA) is used for projects installed by 31 December 2007. For projects commissioned after this date, the tariff notifications and China Wind Power Report 2008 (CREIA and WWF) are used; however the tariff notifications do not give commissioning dates.

The State Council issued the Notice of Electric Power Sector Reform Program to undertake the power sector reform in China. The reform was to divide the former National Power Company into regional companies and to separate power plant and the grid responsibilities and introduce marketing scheme. Under this new policy, the tariff mechanism was distinguished from the one before 2002. Two models for determining tariff of wind power projects exists in China after 2002, viz. the tariff of wind power projects can be determined through tendering process or approved by government.

For the proposed project is not a tendering wind farm project, its tariff should follow the guided tariff issued by the government. With the implementation of Law of the People's Republic of China on Renewable Energies and Interim Measures for Renewable Energy Power Tariff and Cost-sharing (Document Fa Gai Jia Ge [2006] No. 7) from 2006, the tariff of most wind power projects began to be guided by government. The guiding tariff of wind power projects currently in West China are publicly available and tend to be more unified. Since June 2007, the same tariff of 0.51RMB/kWh (Incl. VAT) was issued as a guiding tariff for all wind power projects in West Inner Mongolia. There are total 41 conventional wind power projects in West Inner Mongolia since 2002. All projects are CDM projects except one Gold Standard-Voluntary Emission Reduction project.

A few previous tariffs were higher than the tariff applicable to the Project at the time of the FSR being written. However, the earlier feed-in tariffs were individually decided, and no investment security was provided by these tariffs; while some projects were awarded high tariffs, at the same time other

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

[12] The commissioning dates are not publicly available, therefore the installation start date, as provided in the source document is used.

concessional projects received lower tariffs than the current rate. The rapid increase of numbers of wind power projects can prove that the reduction of tariff did not materially affected the net return to the investor, as further demonstrated below:

Four previous tariffs since 2002 were higher than the tariff applicable to the project activity at the time of writing the FSR, each of these four tariffs was limited to the first 30,000 hours only, after which the tariff would revert to the local grid price. As shown in the table above, all projects receive or considered Carbon finance.

For example, the tariff of the Huitengxile Windfarm project (UNFCCC Ref: 0064) was approved to be 0.55 RMB/kWh for the first 30,000h by the Inner Mongolia DRC in April 2004. At that time, the wind power industry developed slowly due to its high cost and uncertainty regarding support that could be obtained. In the context of the project situation at that time, the tariff of 0.55 RMB/kWh was approved. This project became the first CDM project in China. As demonstrated in the registered PDD, the project faced barriers and would have been economically unviable without CDM support.

On 01/01/2006 the “Renewable Energy Law” and the "Interim Regulation for Tariff of Renewable Energy Power Generation and Appointment of Expenses" ([2006] 7) came into force. With these measures, which include an obligation on grid companies to purchase renewable electricity, the Chinese government encourages both the development and employment of wind power and the increased competitiveness of wind power generation compared to thermal generation. Domestic manufacturing of major parts and accessories was also encouraged and the domestic wind power industry has been growing to maturity. Domestic manufacturers have played a key role in reducing wind power costs and boosting wind development, especially with their advantage of lower product prices.

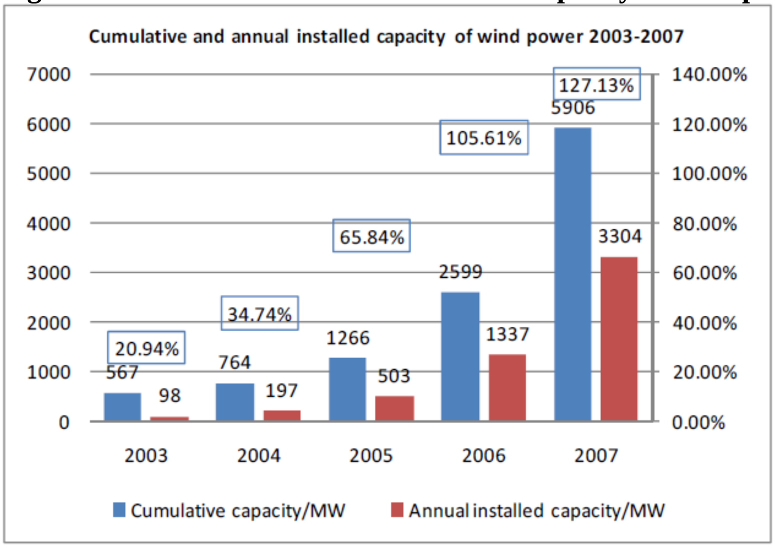
As shown in the Statistics of installed capacity of wind power in China in 2007, by Professor Shi Pengfei, the installed capacity from 2002 to 2005 was very small in West Inner Mongolia. The first notification on tariffs of wind power projects in West Inner Mongolia issued by NDRC was issued in December 2006 ([2006]2098): the tariffs of three projects were approved as 0.579, 0.5497 and 0.548 RMB/kWh for their first 30,000 operating hours in this notification that have been listed above. The tariffs were approved by government with considering the investment environment, developer’s operational experience, wind resource, etc. Therefore, the tariff was approved for each specific project and was different in each case and is not applicable to the Project. All the three projects have been supported by carbon finance and would have been financial unfeasible without carbon finance to secure the financial feasible (IRR without carbon finance lower than the benchmark 8%).

Based on the information presented, it can be concluded that the same tariff of 0.51RMB/kWh (Incl. VAT) has been approved to nearly all conventional wind power projects in West Inner Mongolia, and this tariff has been remained the same for several years. However, a few projects were installed in the early years which had higher levels of tariffs. To the extent that a reduction in tariffs has occurred for government approved, the possible reasons lies in a number of factors, in particular with encouraging policy for wind power development as discussed above, the maturing of the technology globally and increasing domestically manufactured technology penetration. The change in the tariff has not had an adverse effect on the economic viability of these projects; on the contrary, there have been a large volume of projects that have gone ahead in the most recent years, whereas very few projects were developed prior to 2007.

In recent years, with the development of wind power, the overseas manufacturer began to set up factory in China; furthermore encouraged by favourable policies, the Chinese domestic wind turbine manufacturers

contributes their efforts in the technology developing, the wind power technology and equipment maintenance becomes more and more mature, and domestic wind turbines have been introduced more and more to some extent, e.g. the market share addition for domestic manufacturers from 2004 to 2007 was 25%, 29.4%, 41.3%, and 55.9% respectively. Besides, the domestic service is more convenient than abroad manufacture.

Figure 3 Cumulative and annual installed capacity of wind power 2003-2007



Source: China wind power report 2007, by Professor Li Junfeng, Shi Pengfei, etc., China environmental press.

Project IRR is determined by many factors, including total investment, annual operation and maintenance cost, annual supplied electricity and tariff. From the table above, we can find that the tariff for wind power projects in Inner Mongolia covered by NCPG is to be unified after 2006, however, whether to invest on a wind power project or not, is based on the investment analysis for the Project specifically. As discussed above, the net return to the investor has not been reduced as a result of the reduction in tariffs because of the policy support from the government, the more and more expanded wind power market scale, the more and more mature domestic wind power technology development, etc.

Therefore, it can be concluded that the net return to the investors has not been materially affected. On the contrary, the incentives on investment of wind power projects have been increased and a large quantity of wind power projects there have gone ahead in the most recent years.

During the validation process, taking into account the tariff notifications ([2006]2908, [2007]1260, [2007]3303, [2008]1876, [2009]1906), the tariff of wind power projects located in west Inner Mongolia will be fixed at 0.51RMB/kWh and the tariff of the Project has been approved at 0.51RMB/kWh by local DRC on 04/09/2009 based on the guidance of [20091906] (Document No. Nei Fa Gai Jia Zi [2009]1906). Hence, the tariff used in the PDD is appropriate in comparison with the actual situation presented in the region.

In conclusion, the applied tariff in the investment analysis in the FSR and PDD is appropriate, taking into account EB guidance. Furthermore, applying the highest tariff of 0.579 RMB/kWh in the whole project life (while the tariff was only awarded for 30,000h), the project IRR would still only be 7%, lower than

the benchmark of 8%.

Comparison of financial indicators

Table 6 IRR with and without the CERs income

Parameter	Benchmark IRR	IRR without CERs	IRR with CERs
Value	8%	5.35%	9.42%

It can be seen in the IRR calculation spreadsheet that the IRR without CER revenue is below the benchmark 8%. The proposed project activity without registration as a CDM project, therefore, is not financially attractive to the project developer.

Sub-step 2d. Sensitivity analysis

According to the rules and regulations, the sensitivity analysis that was carried out in the FSR used total investment, tariff, O & M costs and net supplied power as the critical variables.

The result of the sensitivity analysis is shown in Figure 3 below. This sensitivity analysis shows that the conclusion of sub-step 2c that the project is not attractive without CDM registration is robust to reasonable variations in the critical assumptions.

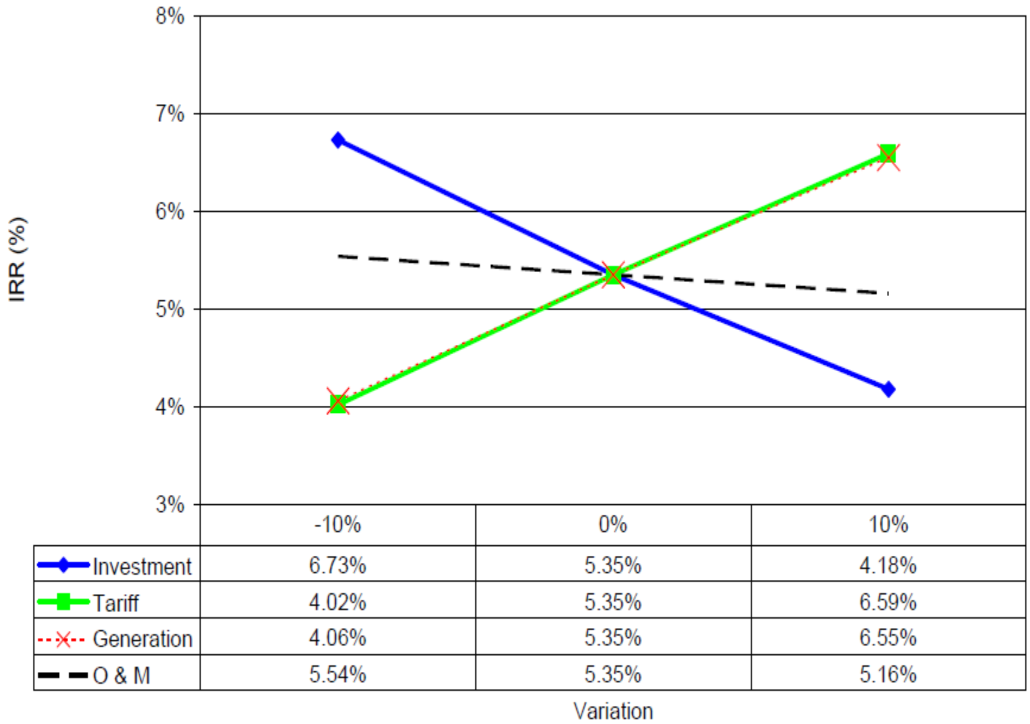


Figure 4 IRR sensitivity analysis for the proposed project

Variations of +10% to -10% from the original assumptions for each of the critical variables are used in line with the regulations, and therefore greater variations are not considered credible.

The financial analysis shows that the project is not financially attractive, and the sensitivity analysis shows that it is unlikely to be financially attractive under reasonable variations in the assumptions.

(1) Investment

For wind farm projects, the costs of turbines, engineering construction and related accessories comprise the main budget of total investment. As prices of turbines and other related equipment have been increasing in recent years, a decrease of the investment is unlikely and there's a much greater likelihood of the cost of investment to go up.[13] Therefore, it was not realistic for the developer to assume that investment costs could decrease sufficiently in order to reach the benchmark. Indeed, the starting date of the proposed project is the date of the equipment contract. The actual costs in the various supply contracts is slightly higher than the estimates from the FSR. Therefore, the investment is unlikely to decrease by 17.95% to reach the benchmark IRR.

(2) Tariff

The expected on-grid tariff used for the financial analysis in the FSR is 0.51 RMB/kWh. Indeed, according to the electricity tariff policy in western Inner Mongolia, approved by the NDRC, the electricity tariff has been fixed at 0.51RMB/kWh in the recent years. Therefore, it is not realistic to assume that the electricity tariff could increase by 22.56% to reach the benchmark IRR. The required increase would result in a tariff of 0.625 RMB/kWh for the full project life, i.e. not limited to 30,000 operating hours and reverting to the average grid tariff after 30,000h. This would be higher than the highest tariff awarded to a wind project since the Power Sector Reform in 2002. Applying the highest tariff awarded, 0.579 RMB/kWh, for the duration of the project life (while the tariff was only awarded for 30,000h), the project IRR would still only be 7%.

Therefore, it is not credible to assume the tariff could increase, so that the project would reach the benchmark IRR.

(3) Electricity generation

In the approved FSR, the expected net supplied power is calculated by an independent qualified design institute with the highest grade (Grade A), based on statistics of on-site wind measurements and 30 years (1977~2006) of historical wind data in the local area. Thus, this value represents the long-term average power supply during the lifetime of the project, taking into account yearly variations in power generation. Therefore, it is not credible to assume electricity generation would increase by 23.30% to reach the benchmark IRR.

(4) O&M costs

Even if O & M costs were to decrease to zero, the IRR does not hit the benchmark. Therefore, O & M costs are not a sensitive factor in the investment analysis

Conclusion

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[13] http://energy.people.com.cn/GB/5720709.html.

The financial analysis shows that the project is not the most financially attractive alternative, and the sensitivity analysis shows that it is unlikely to be financially attractive under reasonable variations in the assumptions.

Step 4. Common practice analysis

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

In line with the EB guidance on the additionality tool, the common practice analysis is carried out on similar projects in the same region and taking place in a comparable environment with regards to regulatory framework, investment climate, access to technology, financing, etc.

In China, the regulatory framework and investment climate for wind farm projects are only similar and comparable in the same Province/Autonomous Region. Wind farm project proposals are approved by the provincial DRC, and the projects' EIAs by the provincial Environmental Protection Bureau. Therefore, the common practice analysis for the proposed project activity is restricted to Inner Mongolia Autonomous Region. In addition, Inner Mongolia has the most abundant wind power resource in China[14], and a large installed capacity.

In April 2002, China implemented power sector reform to establish a more commercialized power market in China[15]. Since market condition for wind power project development has changed significantly since 2002, the common practice analysis starts from 2002.

The analysis is restricted to large scale project (using the CDM definition of large scale, i.e. 15MW or larger) installed by the proposed project activity.

Using the statistics of installed capacity of wind power in China in 2007, collated by Professor Shi Pengfei[16], the large scale wind farm projects commissioned and planned in the same region are listed in Table 7 below. Other CDM projects activities are excluded in line with the guidance of the additionality tool.

Table 7. Wind farm project above 15MW located in Inner Mongolia Province

Name	Commissioning date	Capacity (MW)	Note
Dali Wind Power Project Phase III wind farm fund	2004. 4	31.2	Supported by national debt
Da Mao Qi Bailingmiao wind farm	2007.12	35	VER project under Gold Standard programme

Source: http://www.cwea.org.cn/download/display_info.asp?cid=2&sid=&id=25; http://cdm.unfccc.int/Projects/registered.html; http://cdm.unfccc.int/Projects/Validation/index.html; http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1868.pdf.

14 http://hvdc.chinapower.com.cn/membercenter/newenergycenter/viewarticle.asp?user=newenergy&tempname=%BF%C9%D4%D9%C9%FA%C4%DC%D4%B4&articleid=10037064

15 Chinese National Development and Reform Commission, Separate Power Plants from Network and Compete in Price to Enter Network, April 11, 2002, http://www.ndrc.gov.cn/xwfb/t20050708_28096.htm.

16 *"Statistics of domestic wind farm installation capacity in 2007" , Shi Pengfei*, see http://www.cwea.org.cn/download/display_info.asp?id=25.

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

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

Dali Wind Power Project Phase III wind farm is a demonstration project enjoying favourable treatment belonging to "the fourth issue of national debt special fund project"[17], which is no longer available.

Da Mao Qi Bailingmiao wind farm uses foreign capital and thus is not eligible for CDM under the Chinese DNA rules. Therefore, the project had to be implemented as a Gold Standard VER project[18], meeting the same additionality criteria[19].

Several wind farm projects in Inner Mongolia have been registered as CDM projects in the last few years, and many others are applying for CDM registration, because they are financially unattractive without the additional income from CER sales, and face barriers.

As already described in the statement above, currently there are no wind farm projects with similar capacity in Inner Mongolia Autonomous Region. Therefore it can be concluded that the proposed project is not common practice in Inner Mongolia Autonomous Region.

→ If Sub-steps 4a and 4b are satisfied, i.e. similar activities cannot be observed or similar activities are observed, but essential distinctions between the project activity and similar activities can reasonably be explained, then the project activity is additional.

In conclusion, all the steps above are satisfied, the proposed CDM project is not the baseline scenario, and the project activity is additional.

B.6.	**Emission reductions:**

	B.6.1.	**Explanation of methodological choices:**

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Project emissions (PE_y)

The proposed project does not have backup power generation. Therefore, in accordance with ACM0002, the project emission of the project activity is zero.

Baseline emissions (BE_y)

Following the methodology, the baseline emissions (BEy) are the CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The emissions are calculated from the net electricity delivered to the grid by the project activity (EG) and the combined margin emissions factor (EF) as described in the "Tool to calculate the emission factor for an electricity

[17] http://www.chifeng.gov.cn/html/2008-11/3130.shtml
[18] http://china.camcoglobal.com/zh/chinacasestudyview.obyx?cs=honiton.html
[19] See the PDD on http://www.sgsqualitynetwork.com/tradeassurance/ccp/projects/423/GS-VER(Retroactive)Honiton(1)-080111_GSP.pdf

system":

$BE_y = (EG_y - EG_{baseline}) * EF_y$

Where:
BE_y is the baseline emissions in year y
EG_y is the net electricity supplied by the project activity to the grid in year y
$EG_{baseline}$ is the baseline electricity supplied to the grid. For new power plants this value is zero.
EF_y is the combined margin emission coefficient calculated using the 'Tool to calculate the emission factor for an electricity system'

As $EG_{baseline}$ is zero, this is simplified to:

$BE_y = EG_y * EF_y$

Using the 'Tool to calculate the emission factor for an electricity system' EF_y is calculated in the following 6 steps:

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

Details of the calculations and data follow the published data from the Chinese DNA and official national statistics (China Energy Statistical Yearbook and China Electric Power Yearbook), and are also given in Annex 3 of the PDD.

STEP 1. Identify the relevant electric power system.

As described in section B.3 the spatial extend of the project boundary includes the project site and all power plants connected to NCPG. NCPG is an electricity system which is defined by the spatial extent of the power plants that can be dispatched without significant transmission constrains.

Using the boundary definitions of the Chinese DNA[20], NCPG consists of Shandong, Beijing, Tianjin, Hebei, Shanxi, and Inner Mongolia power grids. The electricity transmission between different provinces in NCPG is very large and it is reasonable for the project to regard NCPG as the project boundary.

Imports

NCPG connects with Northeast Power Grid (NEPG) and Central China Power Grid (CCPG); the electricity transfers are from NEPG and CCPG to NCPG. Electricity transfers from NEPG and CCPG, therefore, are taken into account.

[20] Chinese DNA designates it on 18/07/2008 at
http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/2008/200887164119674.pdf

STEP 2. Select an operating margin (OM) method.

According to the tool, four various methods are provided for calculating the operating margin emission factor ($EF_{grid,OM,y}$), including:

a) Simple OM;
b) Simple Adjusted OM;
c) Dispatch data analysis OM;
d) Average OM

The Simple OM method can only be used where 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 normal data for hydroelectricity production. Low-cost/must-run resources do indeed constitute less than 50% of NCPG during 2002 to 2006 (see Annex 3), so, following the publication of the EF by the Chinese DNA, the project participants have chosen to use the Simple OM method (option a) for calculating the operating margin emission factor.

The Simple OM can be calculated using either of the two following data vintages for years(s) y:

- (ex-ante option) the full generation-weighted average for the most recent 3 years for which data are 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 if or,
- (ex-post option) the year in which project generation occurs, if EF_{OM}, y is updated based on ex-post monitoring.

The project participants choose the ex-ante option, fixing the emission factor in the PDD for the first crediting period. The three most recent years for which data is available are 2004-2006.

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

The Simple OM emission factor $EF_{grid,OM,y}$ is defined as the generation-weighted average emissions per unit net electricity generation (in tCO_2/MWh) of all generating sources serving the system, not including low-operating cost and must-run power plants. Three options can be selected to calculate the Simple OM:

A. Based on data on fuel consumption and net electricity generation of each power plant / unit; or
B. Based on data on net electricity generation, the average efficiency of each power unit and the fuel type(s) used in each power unit; or
C. 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 can be used if the necessary data for using options A and B is not available, and if only nuclear and renewable power generation are considered low-cost/must-run sources. Data for using options A and B is not available. Following the publication of the EF by the Chinese DNA, nuclear and renewables are considered the only low-cost/must-run power generation sources and the total electricity generation of which is available. Therefore, option C is chosen to calculate the OM emission factor.

For 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, and including electricity imports[21], as follows:

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

Where

$EF_{grid,OM,y}$	=	Simple operating margin CO_2 emission factor in year y (tCO_2/MWh)
$FC_{i,y}$	=	Amount of fossil fuel type i consumed in the project electricity system in year y (mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fossil fuel type i in year y (GJ/mass or volume unit)
$EF_{CO2,i,y}$	=	CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ)
EG_y	=	Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost / must-run power plants / units, in year y (MWh)
i	=	All fossil fuel types combusted in power sources in the project electricity system in year y
y	=	(Using the ex-ante option) The three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation

On the basis of the data available, the three-year generation-weighted average operating margin emission factor is calculated by the DNA (see Annex 3) as:

$EF_{grid,OMsimlpe,2004\text{-}2006}$ = 1.1169 tCO_2/MWh

STEP 4. Identify the cohort of power units to be included in the build margin (BM).

According to tool, the sample group of power units m used to calculate the build margin consists of the set of power units that comprise the larger annual generation of either:
(a) The set of five power units that have been built most recently, or
(b) The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.[22]

The set of power units as identified by option (b) would comprise the larger annual generation and is therefore chosen.

However, due to the limited publicly available data, it is not possible to identify the exact new-built plants which comprise the 20% of the system generation. Therefore, the project participants follow the method of calculations of the Chinese DNA, which uses the deviation accepted by EB to calculate $EF_{grid,BM,y}$[23] :
Using the latest statistical data available (from the China Power Yearbook), the most recent year from which the added generation capacity is equal to or just exceeds 20% of the latest year is determined. This added generation capacity is the sample group of power units m used to calculate the build margin.

In terms of vintage of data, the project participants can choose between ex-ante and ex-post data vintages. The project participants choose the ex-ante option, fixing the emission factor in the PDD for the first crediting period:

[21] As described above, import from a connected electricity system is considered as one power source.
[22] If 20% falls on part capacity of a unit, that unit is fully included in the calculation.
[23] http://cdm.unfccc.int/Projects/Deviations: Application of approved methodology AM0005 (DNV, 07 Oct 05).

- 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.

STEP 5. Calculate the build margin emission factor ($EF_{grid,BM,y}$)

The build margin emissions factor $EF_{BM,y}$ is the generation-weighted average emission factor (in tCO_2/MWh) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

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

Where

$EF_{grid,BM,y}$	=	Build margin CO_2 emission factor in year y (tCO_2/MWh)
$EG_{m,y}$	=	Net electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	=	CO_2 emission factor of power unit m in year y (tCO_2/MWh)
m	=	Power units included in the build margin
y	=	Most recent historical year for which data is available

The CO_2 emission factor of each power unit m ($EF_{EL,m,y}$) should be determined as per the guidance in step 3 (a) for the Simple OM, using options B1, B2 or B3, using for y the most recent historical year for which power generation data is available, and using for m the power units included in the build margin. However, data on fuel consumption, fuel types and electricity generation from each of the units m is not available. Therefore, following the calculations of the Chinese DNA, the deviation mentioned above is used, using the following sub-steps:

Sub-step 1: Calculate the CO_2 emission share of thermal generation by fuel type

- Using the latest statistical data available from the China Energy Statistical Yearbook calculate the CO_2 emission percentages (λ_i) of solid, liquid and gas fossil fuels in the total emissions from thermal power generation in the project electricity system.

Sub-step 2: Calculate the weighted emission factor of thermal power

- Based the fuel shares (λ_i) and the corresponding emission factor (EFi) according to the best technology commercially available in the China, calculate the weighted emission factor of thermal power ($EF_{thermal}$).

Sub-step 3: Calculate the build margin emission factor

- Using the identified cohort of power units (step 4) and the emission factor of thermal power, calculate the build margin emission factor.

On the basis of the data available, the build margin emission factor is calculated by the DNA (see Annex 3) as:

$EF_{grid,BM,y}$ = 0.8687 tCO_2/MWh

STEP 6. Calculate the combined margin emissions factor (EF)

The combined margin emission factor is calculated as follows:

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

Where

w_{OM}	=	Weighting of operating margin emissions factor (%)
$EF_{grid,OM,y}$	=	Operating margin CO_2 emission factor in year y (tCO_2/MWh)
w_{BM}	=	Weighting of build margin emissions factor (%)
$EF_{grid,BM,y}$	=	Build margin CO_2 emission factor in year y (tCO_2/MWh)

For wind power projects the default weights w_{OM} and w_{BM} are 75% and 25% respectively.

With both $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ fixed in this PDD for the first crediting period, EF is also fixed for the first crediting period. The emission factor will be revised at the renewal of the crediting period.

$EF_{grid,CM,y}$ = 1.0548 tCO_2/MWh

Having determined the combined margin emission fact, the baseline emissions (BE_y) can now be calculated as the emission factor multiplied by the annual net generation of the project as described above.

Leakage emissions (L_y)

The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction, fuel handling (extraction, processing, and transport), and land inundation (for hydroelectric projects – see applicability conditions above). In line with the methodology, the project participants do not need consider these emission sources as leakage in applying this methodology.

$L_y = 0$

Emission reductions (ER_y)

Emission reductions are calculated as the baseline emissions minus project and leakage emissions. With project and leakage emissions equal to zero, emission reductions therefore are equivalent to the baseline emissions, as follows:

$ER_y = BE_y – L_y – PE_y = BE_y – 0-0$

Therefore:

$ER_y = BE_y = EG_y * EF_{grid,CM,y}$

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

Data / Parameter:	NCV_i

Data unit:	kJ/kg or kJ/m^3
Description:	The net calorific value (energy content) per mass or volume unit of fuel i
Source of data used:	China Energy Statistical Yearbook 2007
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied:	Data used are from Chinese authorities
Any comment:	Used for calculation of power grid emission factor

Data / Parameter:	$F_{i,j,y}$
Data unit:	Tonnes or m^3
Description:	The quantity of fuel i (in a mass or volume unit) consumed by power plants in provinces j in year(s) y
Source of data used:	China Energy Statistical Yearbook 2005-2007
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied:	Data used are from Chinese authorities
Any comment:	Used for calculation of power grid emission factor

Data / Parameter:	$GEN_{j,y}$
Data unit:	MWh
Description:	The gross electricity generated in province j in year y
Source of data used:	China Electric Power Yearbook 2005-2007
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied:	Data used are from Chinese authorities
Any comment:	Used for calculation of power grid emission factor

Data / Parameter:	Internal power use rate of power plant
Data unit:	%
Description:	The internal power consumption rate of power plants in province j in year y
Source of data used:	China Electric Power Yearbook 2005-2007
Value applied:	See Annex 3 for details
Justification of the choice of data or	Data used are from Chinese authorities

description of measurement methods and procedures actually applied:	
Any comment:	Used for calculation of power grid emission factor

Data / Parameter:	$EF_{CO2,i}$
Data unit:	tCO_2/TJ
Description:	The CO2 emission factor per unit of fuel i
Source of data used:	Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied:	The IPCC default value is adopted by the DNA
Any comment:	Used for calculation of power grid emission factor

Data / Parameter:	$CAP_{i,j,y}$
Data unit:	MW
Description:	Installed capacities of power plant category i of province j in years y
Source of data used:	China Electric Power Yearbook 2005-2007
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied:	Data used are from Chinese authorities
Any comment:	Used for calculation of power grid emission factor

Data / Parameter:	Efficiency of the best technology commercially
Data unit:	
Description:	Best commercial available efficiency of coal, gas, oil fuel power plant
Source of data used:	http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=3239
Value applied:	Best efficiency for coal plant is 37.28%; Best efficiency for oil plant is 48.81% Best efficiency for gas plant is 48.81%
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	$Import_{NEPG,y}$
Data unit:	MWh
Description:	The electricity import from NEPG in year y
Source of data used:	China Electric Power Yearbook 2005-2007
Value applied:	2004: 4,514,550 2005: 3,929,000 2006: 2,618,060 (see Annex 3 for details)
Justification of the choice of data or description of measurement methods and procedures actually applied:	Data used are from Chinese authorities
Any comment:	Used for calculation of power grid emission factor due to imports to NEPG

Data / Parameter:	$Import_{CCPG,y}$
Data unit:	MWh
Description:	The electricity import from CCPG in year y
Source of data used:	China Electric Power Yearbook 2005-2007
Value applied:	2004: 0 2005: 0 2006: 497,060 (see Annex 3 for details)
Justification of the choice of data or description of measurement methods and procedures actually applied:	Data used are from Chinese authorities
Any comment:	Used for calculation of power grid emission factor due to imports to CCPG

Data / Parameter:	$EF_{average\_NEPG,y}$
Data unit:	tCO_2e/MWh
Description:	Average grid emission factor for NEPG in year y
Source of data used:	Chinese DNA’s Guideline of emission factors of Chinese grids
Value applied:	2004: 1.1738 2005: 1.1576 2006: 1.1669 (see Annex 3 for details)
Justification of the choice of data or description of measurement methods and procedures actually applied:	Data used are from Chinese authorities
Any comment:	Used for calculation of power grid emission factor due to imports to NEPG

Data / Parameter:	$EF_{average\_CCPG,y}$
Data unit:	tCO2e/MWh
Description:	Average grid emission factor for CCPG in year y
Source of data used:	Chinese DNA's Guideline of emission factors of Chinese grids
Value applied:	2004: not applicable 2005: not applicable 2006: 0.8760 (see Annex 3 for details)
Justification of the choice of data or description of measurement methods and procedures actually applied:	Data used are from Chinese authorities
Any comment:	Used for calculation of power grid emission factor due to imports to CCPG

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

>>

The Baseline Emissions (BE_y, in tCO_2), for each year y, are calculated by multiplying the baseline emissions factor (*EF*, in tCO_2/MWh) by the net supplied power of the project (EG_y, in MWh), as follows:

$$BE_y = EG_y * EF_{grid,CM,y}$$

The baseline emissions factor ($EF_{grid,CM,y}$) is calculated using operating and build margins as described in detail in section B.6.1 above.

According to the Feasibility Study Report the proposed project activity is estimated to supply 117,630 MWh per year, net of own consumption, once fully operational from the third year of operation. Thus, baseline emissions, once fully operational, are:

$$BE = EG*EF_{grid,CM,y} = 117{,}630 \times 1.0548 = 124{,}076 \ tCO_2/y$$

The values obtained are presented in the table in section B.6.4

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

>>

Table 8 The ex-ante estimation of emission reductions of the project activity

Period	Estimation of the project activity emissions (tCO_2e)	Estimation of the baseline emissions (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of overall emission reductions (tCO_2e)
2010	0	124,076	0	124,076
2011	0	124,076	0	124,076
2012	0	124,076	0	124,076
2013	0	124,076	0	124,076
2014	0	124,076	0	124,076
2015	0	124,076	0	124,076
2016	0	124,076	0	124,076
Total (tCO_2e)	0	868,532	0	868,532

*Note: * Using 12-monthly periods, not calendar years, from the start of the crediting period.*

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

All data collected as part of the monitoring are archived electronically and kept at least for 2 years after the end of the last crediting period. 100% of the data are monitored as indicated in the table below. All measurements are conducted with calibrated measurement equipment according to relevant industry standards.

B.7.1. Data and parameters monitored:

Data/Parameter:	EG_y
Data unit:	MWh
Description:	Net electricity supplied to the grid by the Project in period y
Source of data to be used:	Electricity meters (bi-directional, i.e. recording generation and consumption)
Value of data applied for the purpose of calculating expected emission reductions in Section B.6.3	117,630(once fully operational)
Description of measurement methods and procedures to be applied:	Electricity meters are installed at the onsite substation (the main meter) and the separate meters installed at the project site (M1, M2, M3, M4, M5, M6, M7, M8) to monitor the power output generated. The net power output supplied to the grid is measured continuously and recorded automatically. The accuracy of the meters will be at least 0.5S, meeting the national standard. A designated person from the grid company and the project company jointly record the readings of the meters at the onsite substation each month.
QA/QC procedures to be applied:	1. The net electricity supply to the grid is double checked by receipt of sales. 2. The meters are calibrated once per year by a qualified organization according to the related national standards and regulations (Chinese electricity industry

	regulation DL/T448). 3. A back-up meter is installed at the onsite substation to check the main meter. When the main meter fails to work normally, the readings of the back-up meter will be adopted. 4. Proportion of the monitored data is 100%. 5. The data will be kept during the crediting period and until two years after the end of the crediting period.
Any comment:	The uncertainty of the data is very low.

Data/Parameter:	**EG_{export_total}**
Data unit:	MWh
Description:	Quantity of annual electricity exported to the grid by the project and other wind farm project
Source of data to be used:	Electricity meter: Main meter.
Value of data applied for the purpose of calculating expected emission reductions in Section B.6.3	-
Description of measurement methods and procedures to be applied:	The quantity of annual electricity exported to the grid will be monitored continuously through the main meter installed at onsite substation. The accuracy of the meters will be at least 0.5S, meeting the national standard. A designated person from the grid company and the project company jointly record the readings of the meters at the onsite substation each month.
QA/QC procedures to be applied:	1. The electricity supply to the grid is cross-checked against receipt of sales. 2. The meters are calibrated once per year by a qualified organization according to the related national standards and regulations (Chinese electricity industry regulation DL/T448). 3. A back-up meter is installed at the onsite substation to check the main meter. When the main meter fails to work normally, the readings of the back-up meter will be adopted. 4. The data will be kept during the crediting period and until two years after the end of the crediting period.
Any comment:	The Project shares the same transformer, substation and transmission line with other wind farm, the share of this wind farm of the electricity supply to the grid is accounted for proportionally to generation of the project and other wind farm.

Data/Parameter:	**EG_{import_total}**
Data unit:	MWh
Description:	Quantity of annual electricity imported from the grid by the project and other wind farm project
Source of data to be used:	Electricity meter: Main meter.
Value of data applied for the purpose of	-

calculating expected emission reductions in Section B.6.3	
Description of measurement methods and procedures to be applied:	The quantity of annual electricity imported from the grid will be monitored continuously through the main meter installed at onsite substation. The accuracy of the meters will be at least 0.5S, meeting the national standard. A designated person from the grid company and the project company jointly record the readings of the meters at the onsite substation each month.
QA/QC procedures to be applied:	1. The electricity imported from the grid is cross-checked against records of purchase electricity. 2. The meters are calibrated once per year by a qualified organization according to the related national standards and regulations (Chinese electricity industry regulation DL/T448). 3. A back-up meter is installed at the onsite substation to check the main meter. When the main meter fails to work normally, the readings of the back-up meter will be adopted. 4. The data will be kept during the crediting period and until two years after the end of the crediting period.
Any comment:	The Project shares the same transformer, substation and transmission line with other wind farm, the share of this wind farm of the electricity supply to the grid is accounted for proportionally to generation of the project and other wind farm.

Data/Parameter:	$E_{project}$
Data unit:	MWh
Description:	Quantity of electricity generation from the project activity metered by the separate meters
Source of data to be used:	Separate meters (M1, M2, M3, M4) installed at project site
Value of data applied for the purpose of calculating expected emission reductions in Section B.6.3	-
Description of measurement methods and procedures to be applied:	The quantity of electricity generation from the project activity will be monitored continuously through the separate meters (M1, M2, M3, M4) installed at project site. The accuracy of the meters will be at least 0.5S, meeting the national standard.
QA/QC procedures to be applied:	1. The meters are calibrated once per year by a qualified organization according to the related national standards and regulations (Chinese electricity industry regulation DL/T448). 2. The data will be kept during the crediting period and until two years after the end of the crediting period.
Any comment:	-

Data/Parameter:	E_{others}
Data unit:	MWh

Description:	Quantity of electricity generation from other projects metered by the other separate meters
Source of data to be used:	Other separate meters (M5, M6, M7, M8) installed at project site
Value of data applied for the purpose of calculating expected emission reductions in Section B.6.3	-
Description of measurement methods and procedures to be applied:	The quantity of electricity generation from other projects will be monitored continuously through the other separate meters (M5, M6, M7, M8) installed at project site. The accuracy of the meters will be at least 0.5S, meeting the national standard.
QA/QC procedures to be applied:	1. The meters are calibrated once per year by a qualified organization according to the related national standards and regulations (Chinese electricity industry regulation DL/T448). 2. The data will be kept during the crediting period and until two years after the end of the crediting period.
Any comment:	-

B.7.2. Description of the monitoring plan:

>>

The aim of the monitoring plan is to make sure that the net electricity generation delivered to the grid is monitored completely, consistently, reliably and precisely. The details are summarized as follows:

1. Monitoring subject

The main data monitored are the net electricity generation delivered to the grid by the project.

2. Monitoring management structure

In order to obtain reliable monitoring data, the project developer will establish a monitoring management framework prior to the starting of the crediting period. Clear responsibilities will be assigned to all staff involved in the CDM project. A monitoring director will be appointed who has the overall responsibilities for the monitoring of the project, other staff will be responsible for the data recording, data collecting, data archiving and emission reductions calculation. The detailed structure is as follows:

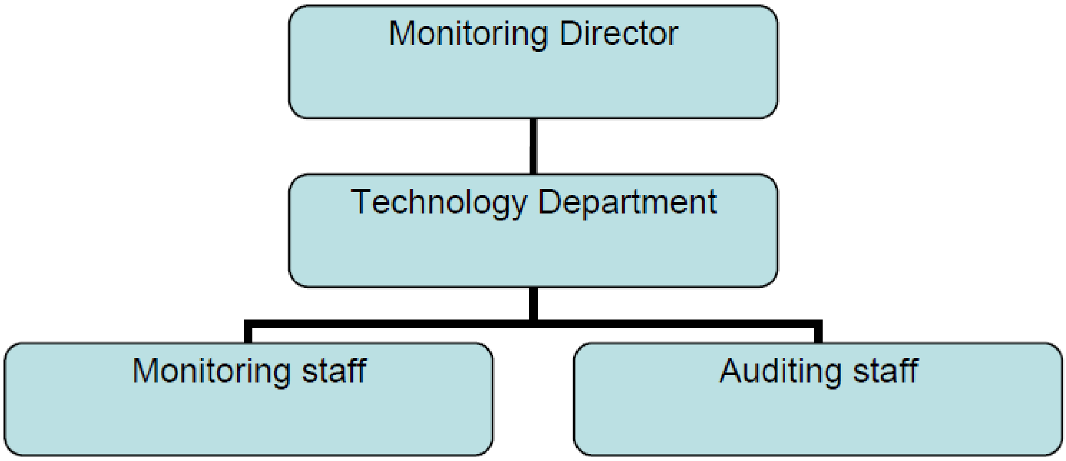


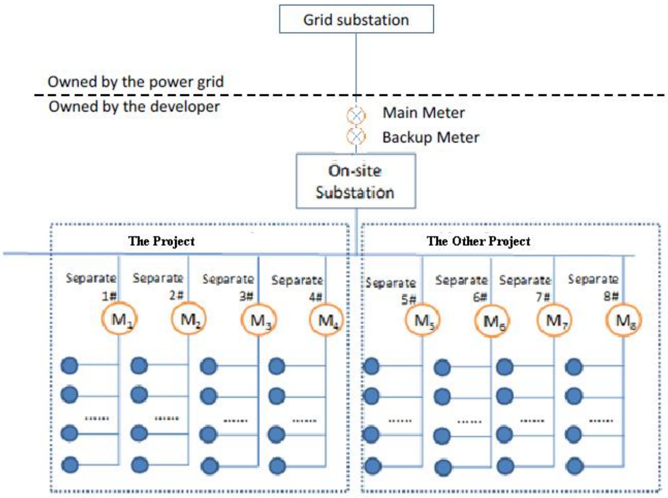
Figure 4 CDM management structure of the project

3. Monitoring apparatus and installation:

The proposed project shares the same transformer, substation or transmission line with some other wind farms, appropriate additional meters are installed at the project site so that the electricity generation can be monitored for each wind farm separately so as to calculate the share of this wind farm of the net supply to the grid.

The net electricity supplied by the project activity (EG_y) is calculated as follows:
$EG_y = EG_{total} * E_{project} / (E_{project} + E_{others})$
$EG_{total} = EG_{export\_total} – EG_{import\_total}$
Where:
EG_y is the quantity of net electricity supplied to the grid by the Project in period y;
EG_{total} is the total net electricity supplied to the grid based on the data metered by the main meter;
$E_{project}$ is the electricity generation from the project activity metered by the separate meters;
E_{others} is the electricity generation from other projects metered by the other separate meters;
EG_{export_total} is the quantity of annual electricity exported to the grid by the project and other wind farm project;
EG_{import_total} is quantity of annual electricity imported from the grid by the project and other wind farm project.

The separate meters M1~M8 are installed at the project site so that the electricity generation can be monitored for each wind farm separately so as to calculate the share of this wind farm of the total net electricity exported to the grid. M1~M4 are installed in Line1#~4# respectively to monitor the generation from the Project; M5~M8 are installed in Line5#~8# respectively to monitor the generation from other wind farm project. The location of the meters in relation to the grid, project, and other project transmission lines are displayed as following diagram:



The generation and consumption data as recorded by the grid company and the project company, and provided to the project developer, will be cross-checked against sales receipts.

4. Data monitoring

The readings of the main meter and separate meters are used for calculating the emission reductions when the main meter and separate meters are in normal operation state. The monitoring processes are as follows:

(1) The meter readings from the main meter and separate meters are recorded daily;
(2) The designated persons from the grid company and the project company jointly record the main meter readings of the power to/from the grid monthly;
(3) The project developer provides the power grid company with a settling accounts sheet about the net electricity supplied to the grid monthly;
(4) The project developer provides the power grid company with a sale receipt after the power grid company has confirmed the settling accounts sheet, and archives a copy of the sale receipt;
(5) The project developer provides the DOE with the readings of the main meter at onsite substation and separate meters at project site and the copy of sale receipt.

5. Quality control

1) Calibration of meters

The calibration of meters is conducted by a qualified organization in compliance with the national standard and sectional regulations to ensure the accuracy. The meters will be calibrated once per year. The meters must be sealed after calibration.
The calibration records must be archived together with other monitoring records. When the main meter or back-up meter have a breakdown, the party finding the breakdown should tell another party and inform the qualified calibration organization to check, calibrate, test and treat the meter so as to recover the normal monitoring state.

2) Emergency treatment

When the main meter, back-up meter or separate meters have a breakdown, the electricity generation difference will be treated as follows:
(1) When one of the main meter and back-up has a breakdown, the readings of the other meter will be adopted;
(2) If both the main meter and back-up meter have breakdowns, the project company and power company shall jointly prepare a reasonable and conservative estimate of the correct reading, and provide sufficient evidence that this estimation is reasonable and conservative.
(3) If separate meters have breakdowns, the project company and power company shall jointly prepare a reasonable and conservative estimate of the correct reading, and provide sufficient evidence that this estimation is reasonable and conservative.

6. Data management

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

All the electronic and paper documents will be archived during the crediting period plus two years.

7. Training program

The project developer will train all related staff before the start of the crediting period. The training contains CDM knowledge, operational regulations, quality control (QC), data monitoring requirements and data management regulations, etc.

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

>>
Date of completion of the baseline study and monitoring methodology: 26/03/2009.

Contact information of the entity and persons responsible:

- Carbon Resource Management (CRM) prepared the PDD. CRM is a project participant. Contact information is given in Annex 1.
- The persons preparing the documentation were:
  - Ms. Zhu Qiyan, Mr. Shi Xiangfeng, and Ms. Qian Yiwen, zqy@carbonresource.com, Tel: +86 10 8447 5246/8
  - Mr. Christiaan Vrolijk, cv@carbonresource.com, Tel: +44 20 7016 1420.

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:

>>
28/07/2008 (date of signing of the equipment purchase agreement)

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

>>
20y

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

C.2.1. Renewable crediting period

A renewable crediting period is chosen.

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

>>
15/03/2010 or the date of registration whichever is later

C.2.1.2. Length of the first crediting period:

>>
7y-0m

C.2.2. Fixed crediting period:

Not applicable

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 Environment Impact Assessment is prepared by Inner Mongolia Autonomous Region in November 2007 and approved by Environment Protection Bureau of Inner Mongolia Autonomous Region in May 2008.

According to the Environmental Impact Assessment (EIA), the environment impacts of the project are summarised below:

1. The analysis of the environment impact during the construction period

The environmental impacts during the construction period are as follows:

Noise: the project will meet the restrictive construction boundary noise values during the construction stage. Therefore, the noise is not considered to negatively impact local residential areas.

Dust: the dust will be produced during the construction period by the machines. The impact of dust can be erased by sprinkling and covering the materials in the windy days.

Solid waste: the main solid wastes produced during the construction period are construction waste and garbage from the construction workers. Garbage will be collected and will be sent to landfill. The construction wastes will be used for backfilling, foundations and road construction.

Waste water: waste water will be treated and reused.

2. The analysis of the environment impact during operation period

The environment impacts during the construction period are as follows:

Waste water: a small quantity of waste water will be produced by the project management staff during operation. The waste water will be treated and will be used for sprinkling the vegetation.

Noise: the noise from the wind turbines is expected to be 53~33DB (A) at a distance of 50~150 meters, meeting the “Industry Enterprise Factory Boundary Noise Standard”. Therefore, the noise of the wind farm is not considered to have a negative impact on local residents during the operational period.

Solid waste: the main solid waste during the operational period is generated by the project management staff. All the waste produced will be collected and sent to landfill.

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 are not considered significant.The Environmental Protection Bureau of Inner Mongolia Autonomous Region approved the EIA.[24]

SECTION E. Stakeholders' comments

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

>>

In February 2008, the project developer has sent out questionnaires to the stakeholders in the directly affected area, requesting comments on the proposed project construction. 40 copies of questionnaires were distributed, and 40 copies were returned. The age of the participating stakeholders was in the range of 26 to 70 years old.

The main content of the questionnaire is as follow:

Name		Sex	
Profession		Age	
Education(√)	Junior Middle School or Below ☐Junior Middle School ☐ Senior Middle School ☐ University or Above ☐		
Job(√)	Farmer ☐Worker ☐Officer ☐Student ☐Teacher ☐Other☐		
1、Do you think the project will influence the natural scenery?	Yes ☐	No ☐	Unconcerned ☐
2、Do you think the project will influence the ecosystem?	Yes ☐	No ☐	Unconcerned ☐
3、Do you think the project will influence the surrounding area?	Yes ☐	No ☐	Unconcerned ☐
4、Do you think the project will be helpful to the local economy?	Yes ☐	No ☐	Unconcerned ☐
5、 Do you agree the construction of the project?	Agree ☐	Disagree ☐	No opinion ☐
6、 What about your opinion about the proposed project?			

E.2. Summary of the comments received:

>>

All stakeholders gave a positive opinion to the project, and supported the construction of the project.

The results of the questionnaires are as follows:

- 100% agreed to the construction of the project;

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[24] Approval of the EIA of Inner Mongolia Wuliji Wind Farm Project (Neihuanshen[2008]No.95), Environment Protection Bureau of Inner Mongolia Autonomous Region, May 5, 2008.

- 100% thought the project would be helpful to the local economy;
- 95% thought the project would not influence the surrounding area, the other people were unconcerned about the problem;
- 97.5% thought the project would not influence the natural scenery; the others were unconcerned about the problem;
- 92.5% thought the project would not influence the ecosystem; the other people were unconcerned about the problem.

Conclusion from the survey:

The survey shows that the proposed project has strong local among the local people. They all believe the proposed project will promote the local economic development and will improve the life level of the local people. All the respondents agree the project construction.

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

>>

The villagers are all supportive of the proposed project and to date there has been no need to modify the project design according to the comments received.

The project owner has an overall environment-friendly plan to guarantee that the project has the minimum negative impact on the environment during the project construction and operation.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Personal e-mail:	nac@carbonresource.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding for the proposed project activity.

Annex 3

BASELINE INFORMATION

Step 1. Identify the relevant electric power system

Following the delineation published by Chinese DNA, the project electricity system is the North China Power Grid (NCPG), consisting of six provincial grids: Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia and Shandong.

The connected electricity systems are the Northeast Power Grid (NEPG), consisting of three provincial grids: Jilin, Liaoning and Heilongjiang, and Central China Power Grid (CCPG), consisting of six provincial grids: Jiangxi, Henan, Hubei, Hunan, Chongqing, Sichuan.

Step 2. Select an operating margin (OM) method

According to Tool to calculate the emission factor for an electricity system, the Simple OM method is applicable to the project if the low-cost resources constitute less than 50% of total grid generation on average in the five most recent years or based on long-term average hydroelectric production. The Simple OM method, therefore, is applicable to the proposed project as the share of low-cost/must-run generation does not exceed 1% in the most recent last 5 years, with the average being 0.8% as presented below.

The most recent year for which data is available in the yearbook is the year 2006. Table A1 presents the shares of generation from all sources including hydro power, other than thermal plants. The table shows that over the last five years generation from these sources has been consistently less than 1%.

Table A1 Power generation in the North China Power Grid from 2002 to 2006

year	Low-cost/must-run generation	Total Generation	shared	Source
	(10^8 kWh)	(10^8 kWh)		(edition/page)
2002	36.25	4,075.45	0.89%	2003/p585
2003	39.79	4,616.53	0.86%	2004/p709
2004	40.32	5,308.04	0.76%	2005/p474
2005	45.51	6,077.82	0.75%	2006/p568
2006	45.89	6,079.11	0.75%	2007/p638
Total	207.76	26,156.95		
Average	41.552	5231.39	0.80%	

Data source: China Electric Power Yearbook 2003～2007

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

$EF_{CO2,i,y}$, the CO_2 emission factor of fossil fuel type i in year y ,is calculated as follows:

$EF_{CO2,i,y} = EF_{CO2,i,y}*44/12$

Table A2 Emission Factors of Fuels **Low Calorific Value (kJ/kg,m3) Emission Factor (tC/TJ)**

Fuel	Low Calorific Value(kJ/kg,m3)	Emission Factor (tC/TJ)
Raw Coal	20,908	25.8
Cleaned Coal	26,344	25.8
Other Washed Coal	8,363	25.8
Mould Coal	20,908	26.6
Coke	28,435	29.2
Crude Oil	41,816	20.0
Gasoline	43,070	18.9
Diesel Oil	42,652	20.2
Fuel Oil	41,816	21.1
Natural Gas	38,931	15.3
Coke Oven Gas	16,726	12.1
Other Gas	5,227	12.1
LPG	50,179	17.2
Refinery Dry Gas	46,055	15.7
Other Oil Product	38,369	20.0
Other Oven Product	28,435	25.8
Other Energy	0	0

Source: 1) 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy; 2) China Power Year Book (2007).

Fossil fuel consumption

Fuel consumption is taken from the latest China Energy Statistical Yearbook editions. The yearbooks present a range of more than 10 fuels for each province. Data is presented in Table A3 below. The share of emissions from coal consumption is also given in the table.

Table A3 Simple OM Emission Factors Calculation of NCPG for Year 2004

Fuel	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total	EF (tc/TJ)	NCV (MJ/t,km^3)	CO2 emission (tCO_2e)
Raw Coal	10^4 t	823.09	1,410.00	6,299.80	5,213.20	4,932.20	8,550.00	27,228.29	25.8	20,908	538,547,477
Cleaned Coal	10^4 t						40.00	40.00	25.8	26,344	996,857
Other Washed Coal	10^4 t	6.48		101.04	354.17		284.22	745.91	25.8	8,363	5,901,191
Coke	10^4 t					0.22		0.22	29.2	28,435	6,698
Coke Oven Gas	10^8m^3	0.55		0.54	5.32	0.40	8.73	15.54	12.1	16,726	1,153,187
Other Gas	10^8m^3	17.74		24.25	8.20	16.47	1.41	68.07	12.1	5,227	1,578,574
Crude oil	10^4 t							-	20.0	41,816	-
Gas Oil	10^4 t							-	18.9	43,070	-
Diesel Oil	10^4 t	0.39	0.84	4.66				5.89	20.2	42,652	186,070
Fuel oil	10^4 t	14.66		0.16				14.82	21.1	41,816	479,451
LPG	10^4 t							-	17.2	50,179	-
Refinery Dry Gas	10^4 t		0.55	1.42				1.97	15.7	46,055	52,229
Natural Gas	10^8m^3		0.37		0.19			0.56	15.3	38,931	122,306
Other oil Product	10^4 t							-	20.0	38,369	-
Other Oven Product	10^4 t							-	25.8	28,435	-
Other Energy	10^4 t	9.41		34.64	109.73	4.48		158.26	-	-	-
										Total	**549,024,041**

Source: China Energy Statistical Year Book (2005).

Table A4 Fuel-fired Electricity Generation of NCPG for Year 2004

Province	Electricity Generation (10^8 kWh)	Auxiliary Power Ratio (%)	Supplied Electricity (MWh)
Beijing	185.79	7.94	17,103,827
Tianjin	339.52	6.35	31,796,048
Hebei	1,249.70	6.5	116,846,950
Shanxi	1,049.26	7.7	96,846,698
Inner Mongolia	804.27	7.17	74,660,384
Shandong	1,639.18	7.32	151,919,202
Total			489,173,110
Import electricity from NEPG in 2004		4,514,550	MWh
Average emission factor of NEPG in 2004		1.1738	tCO2/MWh
$EF_{OM,simple,2004}$	1.1228		

Source: China Energy Statistical Year Book (2005).

Table A5 Simple OM Emission Factors Calculation of NCPG for Year 2005

Fuel	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total	EF (tc/TJ)	NCV (MJ/t,km^3)	CO2 emission (tCO_2e)
Raw Coal	10^4 t	897.75	1,675.20	6,726.50	6,176.45	6,277.23	10,405.40	32,158.53	25.8	20,908	636,062,536
Cleaned Coal	10^4 t						42.18	42.18	25.8	26,344	1,051,186
Other Washed Coal	10^4 t	6.57		167.45	373.65		108.69	656.36	25.8	8,363	5,192,725
Coke	10^4 t					0.21	0.11	0.32	29.2	28,435	9,742
Coke Oven Gas	$10^8 m^3$	0.64	0.75	0.62	21.08	0.39		23.48	12.1	16,726	1,742,396
Other Gas	$10^8 m^3$	16.09	7.86	38.83	9.88	18.37		91.03	12.1	5,227	2,111,027
Crude oil	10^4 t					0.73		0.73	20	41,816	22,385
Gasoline	10^4 t			0.01				0.01	18.9	43,070	298
Diesel Oil	10^4 t	0.48		3.54		0.12		4.14	20.2	42,652	130,786
Fuel oil	10^4 t	12.25		0.23		0.06		12.54	21.1	41,816	405,690
LPG	10^4 t							-	17.2	50,179	-
Refinery Dry Gas	10^4 t			9.02				9.02	15.7	46,055	239,141
Natural Gas	$10^8 m^3$	0.28	0.08		2.76			3.12	15.3	38,931	681,417
Other oil Product	10^4 t							-	20	38,369	-
Other Oven Product	10^4 t							-	25.8	28,435	-
Other Energy	10^4 t	8.58		32.35	69.31	7.27		117.51	-	-	-
										Total	**647,649,331**

Source: China Energy Statistical Year Book (2006).

Table A6 Fuel-fired Electricity Generation of NCPG for Year 2005

Province	Electricity Generation (10^8 kWh)	Auxiliary Power Ratio (%)	Supplied Electricity (MWh)
Beijing	208.8	7.73	19,265,976
Tianjin	369.93	6.63	34,540,364
Hebei	1,343.48	6.57	125,521,336
Shanxi	1,287.85	7.42	119,229,153
Inner Mongolia	923.45	7.01	85,871,616
Shandong	1,898.80	7.14	176,322,568
Total			560,751,013
Import electricity from NEPG in 2005		3,929,000	MWh
Average emission factor of NEPG in 2005		1.1576	tCO2/MWh
$EF_{OM,simple,2005}$	1.1550		

Source: China Energy Statistical Year Book (2006).

Table A7 Simple OM Emission Factors Calculation of NCPG for Year 2006

Fuel	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total	EF (tc/TJ)	NCV (MJ/t,km^3)	CO2 emission (tCO_2e)
Raw Coal	10^4 t	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	10^4 t						39.77	39.77	25.8	26,344	991,125
Other Washed Coal	10^4 t	6.36		214.13	371.14	61.77	544.6	1,198.00	25.8	8,363	9,477,855
Moule Coal	10^4 t	7.97					27.77	35.74	26.6	20,908	728,820
Coke	10^4 t						3.23	3.23	29.2	28,435	98,335
Coke Oven Gas	10^8m^3	0.38	0.63	5.8	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	10^4 t					0.74		0.74	20	41,816	22,692
Gas Oil	10^4 t			0.01				0.01	18.9	43,070	298
Diesel Oil	10^4 t	0.21		3.01		0.07	6.32	9.61	20.2	42,652	303,589
Fuel oil	10^4 t	6.38		0.08			4.1	10.56	21.1	41,816	341,633
LPG	10^4 t						0.01	0.01	17.2	50,179	316
Refinery Dry Gas	10^4 t			2.43			2.32	4.75	15.7	46,055	125,934
Natural Gas	10^8m^3	3.41	0.73		0.53			4.67	15.3	38,931	1,019,942
Other oil Product	10^4 t						0.28	0.28	20	38,369	7,878
Other Oven Product	10^4 t							-	25.8	28,435	-
Other Energy	10^4 t	6.83		47.11	230.76	12.51	132.29	429.5	-	-	-
										Total	**723,298,659**

Source: China Energy Statistical Year Book (2007).

Table A8 Fuel-fired Electricity Generation of NCPG for Year 2006

Province	Electricity Generation (10^8 kWh)	Auxiliary Power Ratio (%)	Supplied Electricity (MWh)
Beijing	207.05	7.51	19,150,055
Tianjin	359.24	6.86	33,459,614
Hebei	1,438.88	6.63	134,348,226
Shanxi	1,502.50	7.45	139,056,375
Inner Mongolia	1,395.93	7.58	129,011,851
Shandong	2,309.22	7.12	214,480,354
Total			669,506,473
Import electricity generation from NEPG in 2006		2,618,060	MWh
Average emission factor of NEPG in 2005		1.1669	tCO2e/MWh
Import electricity generation from CCPG in 2006		497,060	MWh
Average emission factor of CCPG in 2006		0.8760	tCO2e/MWh
$EF_{OM,simple,2006}$	1.0805		

Source: China Energy Statistical Year Book (2007).

Table A9 Weighted average EF_{OM} calculation

	2004	2005	2006	Total
Emissions (million tCO2e)	554,323,387	652,197,697	726,789,037	1,933,310,122
Net supply (million MWh)	493,687,660	564,680,013	672,621,593	1,730,989,266
Emission factor tCO_2e/MWh)	**1.1228**	**1.1550**	**1.0805**	**1.1169**

On the basis of the data above, the three-year generation-weighted average operating margin emission factor:

EF_{OM} = 1.1169 tCO_2/MWh

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 the set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently. This option is chosen as it comprises larger annual generation than the five units built most recently. Following the deviation, the latest statistical data available (from the China Power Yearbook 2007) is used by the DNA to determine the most recent year from which the added generation capacity is equal to or just exceeds 20% of the latest statistic year 2006. The added generation capacity is the sample group of power units *m* used to calculate the build margin.

Step 5. Calculate the build margin emission factor

As described in step 4, because of the limited availability of publicly available data, this proposed project uses a substitute method accepted by EB to calculate $EF_{BM,y}$

Sub-step 1: calculate the thermal emission factor

Calculate the different CO_2 emission percentage of solid, liquid and gas fuel in the total emission of North China Power Grid in 2006 using new latest statistical data available from China Energy Statistical Year Book 2007.

Table A10 Calculation of CO2 Emission of North China Power Grid in 2006

	CO2 Emission (tCO_2e)	share, λ (%)
Raw Coal	704,277,823	
Cleaned Coal	991,125	
Other Washed Coal	9,477,855	
Mould Coal	728,820	
Coke	98,335	
Subtotal	**715,573,958**	**98.93%**
Crude Oil	22,692	
Gasoline	298	
Diesel Oil	303,589	
Fuel Oil	341,633	
Other Oil Product	7,878	
Subtotal	**676,091**	**0.09%**
Natural Gas	1,019,942	
Coke Oven Gas	2,638,825	
Other Gas	3,263,593	
LPG	316	
Refinery Dry Gas	125,934	
Subtotal	**7,048,610**	**0.97%**
Total	**723,298,659**	**100%**

Sub-step 2:

Based the emission percentage (λ_i) of different kind fossil fuels and the corresponding emission factor (EF_i) according to the best technology commercially available in the China, the weighted emission factor of thermal power ($EF_{thermal}$) is calculated.

Table A11 Calculation of CO_2 **Emission Factor of Coal, Oil and Gas Fuel Power Plant with the Best Commercial Efficiency in China**

	Parameter	Efficiency of Power Suppy	Emission Factor of Fuel (tc/TJ)	Oxidation Factor	Emission Factor (tCO2/MWh)	Share of CO2 emissions (λ)
		A	B	C	D=3.6/A/1000*B *C*44/12	
Coal-fired Power Plant	$EF_{Coal,bat}$	37.28%	25.8	100%	0.9135	98.93%
Gas-fired Power Plant	$EF_{Gas,bat}$	48.81%	15.3	100%	0.4138	0.97%
Oil-fired Power Plant	$EF_{Oil,bat}$	48.81%	21.1	100%	0.5706	0.09%
Thermal Power Plant	*EF thermal*				0.9083	

Source: http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=2876

So, emission factor of thermal plant is:

$$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv} = 0.9083 tCO_2/MWh$$

Sub-step3:

Using the latest statistical data available (from the China Electric Power Yearbook) determine the year from which the added generation capacity is equal to or just exceeds 20% of the latest statistic year 2006.

Table A12 Identify the year from which the added generation capacity is equal to or just exceeds 20% of the latest statistic year 2006

	2005	2006	Added from 2005 to 2006	Newly added share
	A	B	C=B-A	
Fossil fuel-fired(MW)	111,068.7	141,538.0	30,469.3	95.64%
Hydro (MW)	3,216.2	4,004.0	787.8	2.47%
Nuclear (MW)	-	-	-	0.00%
Wind & Others (MW)	335.5	937.0	601.5	1.89%
Total (MW)	114,620.4	146,479.0	31,858.6	100.00%
Newly installed capacity to 2006 (%)	21.75%			

Source: China Power Year Book (2005, 2006, 2007).

$EF_{BM} = (CAP_{Thermal} / CAP_{Total}) * EF_{Thermal}$

$CAP_{Thermal}$ is the thermal capacity among the new capacity from 2005 to 2006, and CAP_{Total} is the total capacity from 2005 to 2006.

$EF_{BM} = 0.9083 \times 95.64\% = 0.8687\ tCO_2/MWh$

Step 6. Calculation of the combined margin emission factor

The combined margin emission factor is calculated as follows:

$EF_{grid,CM,y} = w_{OM} * EF_{grid,OM,y} + w_{BM} * EF_{grid,BM,y} = 0.75 \times 1.1169 + 0.25 \times 0.8687 = 1.0548\ tCO_2/MWh$[25]

[25] The EF value in the GSP PDD is 1.0549tCO_2/MWh, while the value has been adjusted to 1.0548tCO_2/MWh in the final PDD for submission by remaining 4 digits without rounding off.

Annex 4

MONITORING PLAN

No additional information

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