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:

Inner Mongolia Mangniuhai II Wind Power Project

Version: 04

Date: 10/09/2010

A.2. Description of the project activity:

Inner Mongolia Mangniuhai II Wind Power Project (hereinafter refers to the proposed project) is developed by Longyuan (Xing'anmeng) Wind Power Co., Ltd. and located on Xiliu Town, Tuquan County, Xing'an League, Inner Mongolia Autonomous Region，P.R.China. The construction of project has been started from April 11th, 2009 and the preparation work of the project was conducted at present. It will be operation in December, 2009.

The purpose of the project activity:

- ✧ The scenario existing prior to the start of the implementation of the Project is to provide the same annual electricity output as the Project by Northeast China Power Grid (NECPG).
- ✧ The Project is a newly-build wind plant with total installed capacity of 49.5MW (33*1500kW). The project will generate electricity from wind resources using advanced wind power generation technology on a commercial basis and to deliver the electricity to the Northeast China Power Grid (NECPG). The implementation of the proposed project will achieve CO_2 emission reduction by replacing electricity generated by fossil fuel fired power plant.
- ✧ The baseline scenario of the Project is the same as the scenario existing prior to the start of implementation of the Project activity.

How the Project reduces GHG emissions:

The Project will utilize the wind resources of the local to generate electricity, which will be delivered to NECPG without CO_2 emissions. It is estimated that the feed-in electricity to the NECPG is approximately 114,200MWh per year with 2307h designed annual operation hours. The Project activity will achieve greenhouse gas (GHG) emission reductions by avoiding CO_2 emissions from the business-as-usual scenario electricity generated by those fossil fuel-fired power plants connected into NECPG. It is estimated that annual emission reductions are 117,400tCO_2e per year.

Contributions of the project to sustainable development:

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

- ➢ To contribute to local economy development by providing electricity to meet local increasing energy demands;
- ➢ To reduce GHG emissions and to mitigate the emissions of other pollutants caused from local coal-

fired power plants compared with a business-as-usual scenario by displacing part of electricity from fossil fuel-fired power plants;

- To be in accordance with the development priority of China energy industry, and to help diversify energy mix of NECPG by increasing the share of renewable energy;
- To create plenty of short-term employment opportunities and permanent jobs for the local people during the construction and operation period of the Project.

A.3. Project participants:

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
P.R.China (Host)	Longyuan (Xing'anmeng) Wind Power Co., Ltd. (the project owner)	No
Switzerland	Essent Trading International S.A. （the purchasing party）	No
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

Please see Annex 1 for detailed contact information

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:

Xiliu Town, Tuquan County, Xing'an League

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

The proposed project is located in Xiliu Town, Tuquan County, Xing'an League, Inner Mongolia Autonomous Region, and P.R.China. The geographical co-ordinates are around: East longitude 121°41′09″ and north latitude 45°15′20″, and altitude 240m~267.3m. Figure 1 shows the location of Inner Mongolia Autonomous Region and Tuquan County. Figure 2 shows the location of the Project.

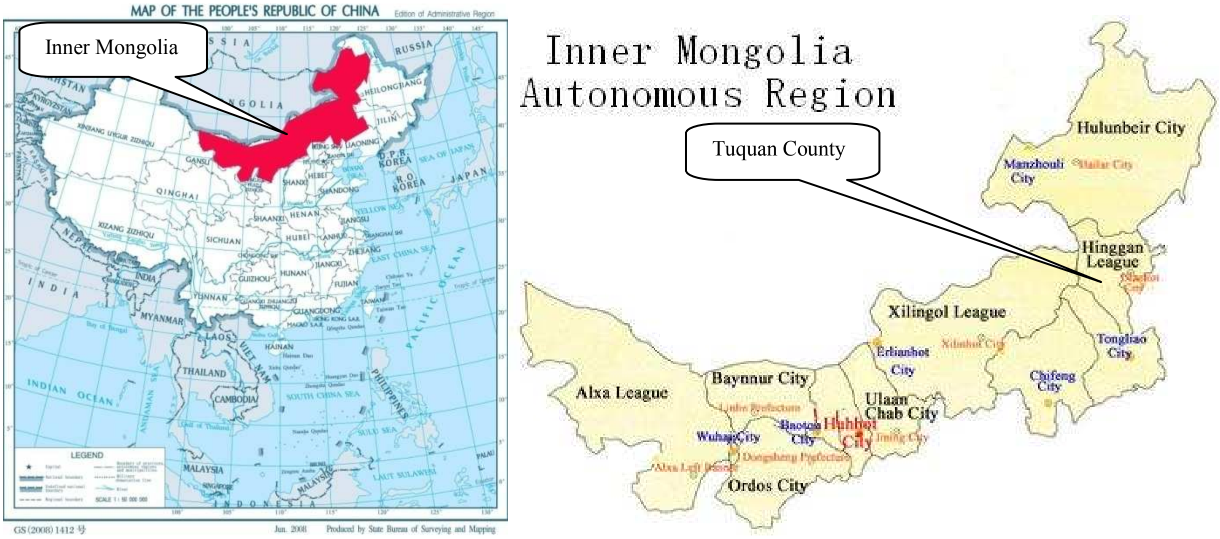

Figure 1 location of Inner Mongolia and Tuquan County

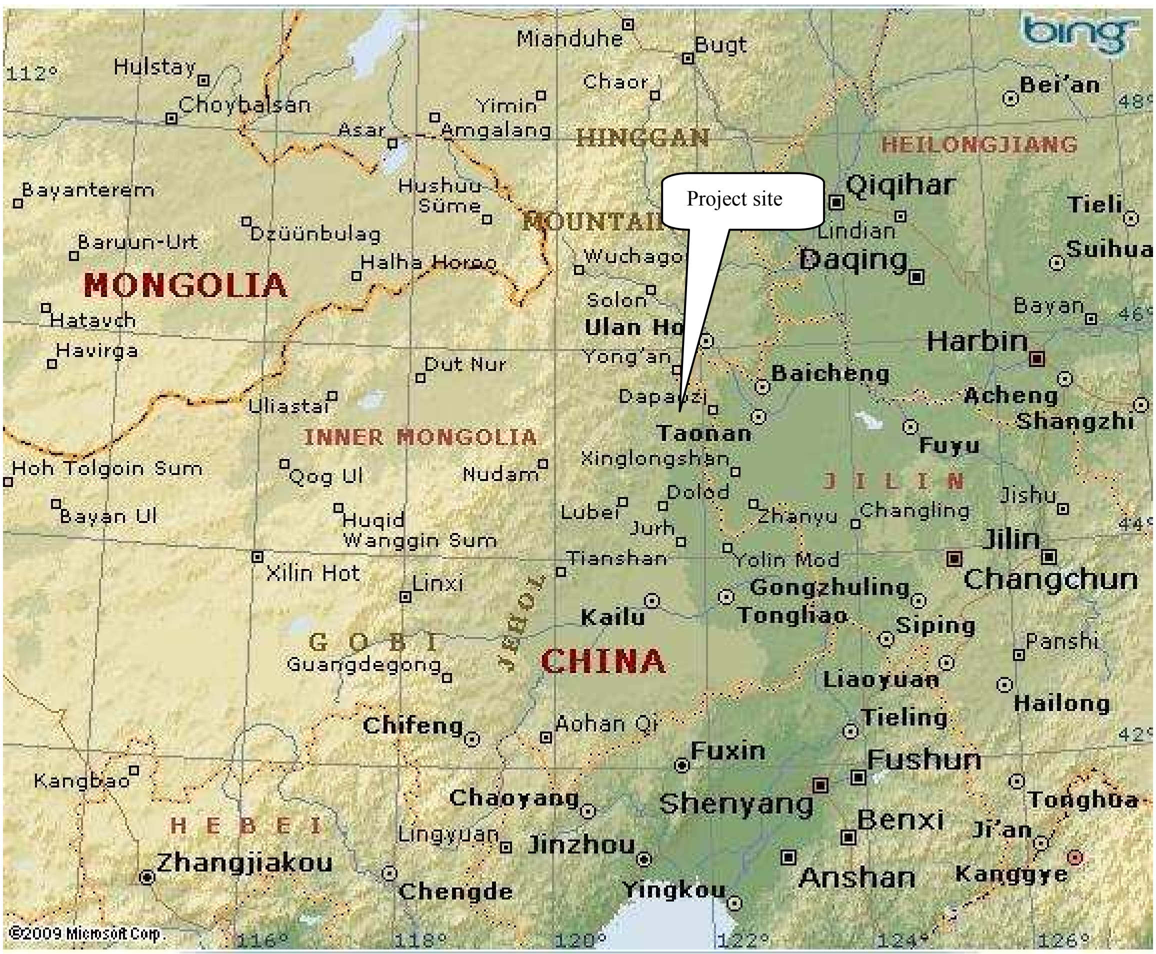

Figure 2 location of the Project

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

Category: Renewable Energy in grid connected applications

Sectoral Scope 1: Energy industries (renewable - / non-renewable sources)

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

(a) Technology to be employed before the Project:

The scenario existing prior to the start of the implementation of the Project is to provide the same annual electricity output as the Project by Northeast China Power Grid (NECPG); the key information about NECPG is listed as follows:

Emission Factor	$EF_{OM,y}$	$EF_{BM,y}$	$EF_{CM,y}$	Source
Value/Unit	1.1293tCO_2e/MWh	0.7242tCO_2e/MWh	1.028tCO_2e/MWh	Notification on Determining Baseline Emission Factor of China's Grid[1]
Electricity grid included in NECPG	Liaoning Power Grid, Jilin Power Grid, Heilongjiang Power Grid			

(b) Technology to be employed by the Project:

The project scenario is the implementation of the proposed project, the installation and operation of 33 sets of wind turbines with a total capacity of 49.5MW which will supply an average annual generation of 114,200MWh to NECPG and replace the same amount of electricity generated by fossil fuel fired power plants connected to NECPG. The operation hours are 2307h and the load factor is 0.263 for the proposed project, which are determined in FSR which made by China Fulin Wind Power Engineering Co., Ltd. as an independent third party contracted by the project participant and had been provided to Local government while applying the project activity for implementation approval. The type of wind turbine will be SL1500/82 which purchased from Sinovel Wind Co., Ltd. There are eight 10kV lines which gather the electricity generated from 33 sets of wind turbines to the cubicle switchboard located in the booster stations and the electricity would be sent to 220kV substation, Tuquan substation, by the a 66kV line.

The technologies employed in the proposed project activity are advanced domestic technologies, which is no technology transfer activity involved. The main advantage of this domestic manufactured turbine is its' adaptability to different types of wind resources and its improved generation efficiency, so it has been widely installed in China. Table 1 provides the main technical information of wind turbines used in the proposed project.

[1] Notification on Determining Baseline Emission Factor of China's Grid issued by China's DNA on July 2nd,2009 http://cdm.ccchina.gov.cn

Parameter	Value	Source
Installed Capacity（kW）	1500	Feasibility Study Report
Diameter of rotor（m）	82.9	
Rated wind speed（m/s）	10.5	
Cut-in wind speed（m/s）	3	
Cut-out wind speed（m/s）	20	
Survival wind speed（m/s）	59.5	
Swept area (m^2)	5398	
Generator	Doubly fed asynchronous generator	
Export voltage (V)	0.69	
Output control	Variable speed and full span pitched	

The facilities used in the Project are produced domestically without interalia technology transfer from other countries.

(c) The baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity.

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

The renewable crediting period is adopted by the Project. It is expected that the Project will generate emission reductions for about 117,400tCO_2e per year over the first 7-year crediting period from Oct 1st, 2010 to Sep 30th, 2017.

Years	Annual estimation of emission reductions in tonnes of CO_2e
2010(Oct.1st-Dec.31st)	29,350
2011	117,400
2012	117,400
2013	117,400
2014	117,400
2015	117,400
2016	117,400
2017(Jan 1st-Sep.30th)	88,050
Total estimated reductions (tonnes of CO_2e)	821,800
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	117,400

A.4.5. Public funding of the project activity:

No public funds from countries in Annex I are involved in the proposed project.

SECTION B. Application of a baseline and monitoring methodology:

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

The Project applies the approved baseline and monitoring methodology ACM0002-Consolidated methodology for grid-connected electricity generation from renewable sources (Version 10) and refers to *Tool for the demonstration and assessment of additionality* (Version 05.2) and *Tool to calculate the emission factor for an electricity system* (Version 02).

For more information please refer to following link:

http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

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

The Project meets the applicable criteria of the methodology ACM0002 (Version 10) due to following reasons:

- The Project is a newly-built grid-connected wind power plant with zero-emission;
- The geographic and system boundaries for NECPG that the Project is connected into can be clearly identified and information on the characteristics of the Grid is available;
- The Project dose not involves switching from fossil fuels to renewable energy sources at the site of the Project activity.

Therefore the methodology ACM0002 (Version 10) is applicable to the Project.

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

The electricity generated by the Project will be transmitted to Xing'an Power Grid which is an integral part of NECPG. According to *Notification on Determining Baseline Emission Factors of China Power Grid*[2] issued by the National Development and Reform Commission of the Government of China (China DNA), NECPG (Northeast China Power Grid) is composed by Heilongjiang Power Grid, Jilin Power Grid and Liaoning Power Grid. Therefore, NECPG is defined as the project boundary of the Project.

The spatial extent of the project boundary includes the project site and all power plants connected physically to NECPG.

The sources and gases included in the project boundary are listed as below:

2 Notification on Determining Baseline Emission Factor of China's Grid issued by China's DNA on July 2nd,2009 http://cdm.ccchina.gov.cn

	Source	Gas	Included?	Justification / Explanation
Baseline	CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.	CO_2	Yes	Major emission sources
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
Project Activity	Not applicable-the project is a zero-emissions renewable power source	CO_2	No	Minor emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source

The Project boundary can be explained by the following flow diagram, figure 3:

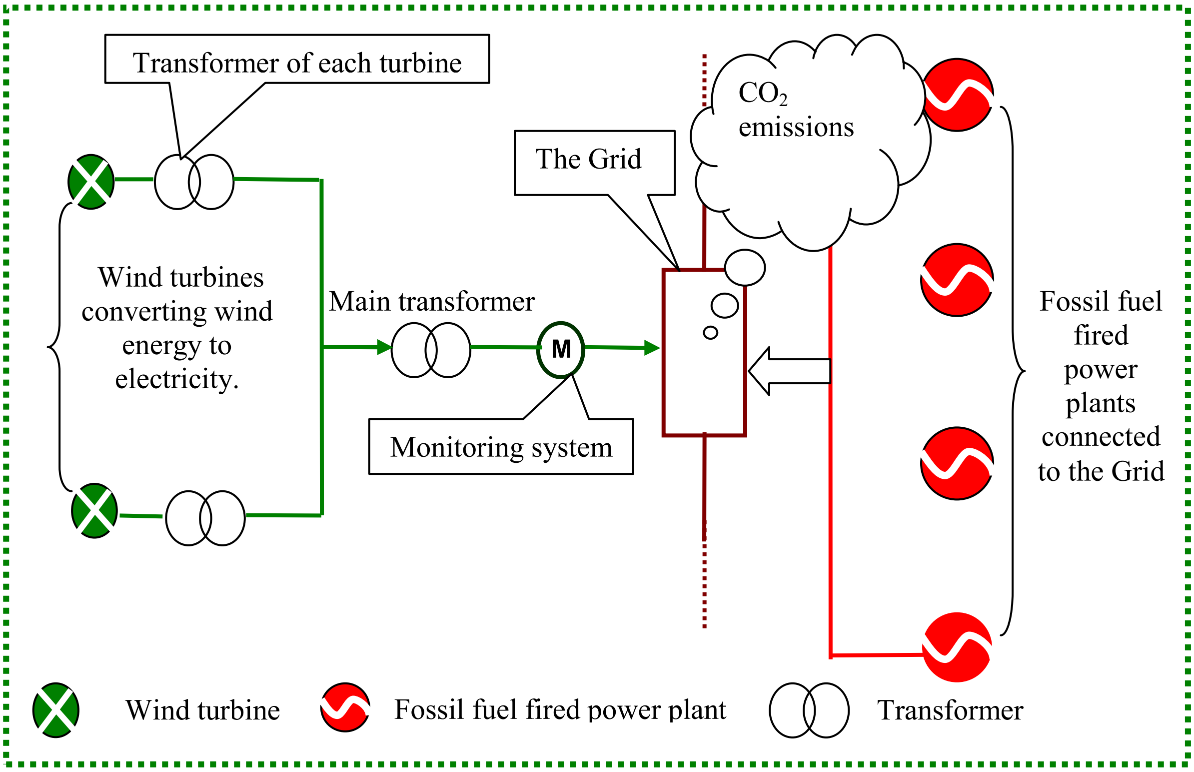

Figure 3 the flow diagram of the project

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

For the Project, the possible alternative scenarios that provide outputs or services comparable to the Project should be as follows:

Alternative I: To implement the proposed project activity, but not registered as a CDM project activity;

Alternative II: To construct a thermal power plant with the same electricity output as the Project;

Alternative III: To construct a power plant using other renewable resources with the same electricity output as the Project, and

Alternative IV: To provide for the same annual electricity output as the Project by NECPG.

These alternatives are discussed as below:

Alternative I: The alternative is in compliance with current laws and regulations of China. However, according to the investment analysis in section B.5, the proposed project activity without CDM revenues is economically unattractive because the total investment's internal rate of return (IRR) of the Project is lower than the financial benchmark IRR (8%). Therefore, Alternative I is not feasible and should not be the baseline scenario of the Project.

Alternative II: According to the current regulations in China, construction of coal-fired power plants with capacity of less than 135 MW are forbidden in the areas which can be covered by large grids[3], and the fossil fuel-fired power units with capacity of less than 100MW is strictly limited for installation[4]. Therefore, Alternative II is not compliant with current laws and regulations of China, and should not be the baseline scenario of the Project.

Alternative III: The alternative is in compliance with current laws and regulations of China. However,

Alternative III is not realistic. Xing'an League, where the Project is located, lacks of feasible water resources for constructing a hydropower plant with the same installed capacity as the Project[5]. Furthermore, there are no adequate biomass sources, solar sources, wave and tidal sources or geothermal sources for constructing a power plant with the same installed capacity as the Project, the reasons showed as following: The county located in the interior area which no any wave and tidal sources[6] and the PV solar power and geothermal power is in its beginning stage which has very little projects in China and most of the projects are demonstration projects which have not put into commercial operation[7]. Meanwhile, there is no geothermal source in the Tuquan County[8] and the evidence of the distribution of geothermal source has been submitted to DOE. The biomass power is also in its beginning stage in China[9]. There is a biomass residue power plant which has been under constructing in Tuquan county and no

[3] *Notice on Strictly Prohibiting the Installation of Fuel-fired Generators with the Capacity of 135 MW or below* issued by the General Office of the State Council, decree no. 2002-6.
[4] Interim Rules on the Installation and Management of Small-scale Fuel-fired Generators (issued in Aug., 1997).
[5] http://www.nmxadd.com/newsdisp.asp?id=3610
[6] http://www.china5e.com/show.php?contentid=45147
[7] http://www.gxi.gov.cn/bgcy/bgcy_jtny/bgcy_jtny_scfx/200908/t20090803_134201.htm
http://hi.baidu.com/%BA%CD%C4%D1%C8%CB/blog/item/e3504b82a9c37598f703a677.html
[8] http://www.newenergycn.com/drn_news.asp?id=125
[9] http://www.agri.gov.cn/jjps/t20090722_1316360.htm

adequate biomass source to construct a power plant using biomass resources with the same electricity output as the Project[10]. Meanwhile, according to relevant regulation in China, it is forbidden to build a redundant biomass project in the same region[11]. Therefore, Alternative III is not feasible and should not be the baseline scenario of the Project.

Alternative IV: The alternative is compliant with current laws and regulations of China and economically feasible.

In conclusion, Alternative IV is the most likely one to be implemented among all the alternatives. Therefore Alternative IV is identified as the baseline scenario of the Project. In absence of the Project, NECPG will provide for the same annual electricity output as the Project.

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

The Project is not financial attractiveness in feasibility period; the IRR of total investment is just 7.28% and would not reach benchmark and has barriers to be set up. CDM was introduced to the Project owner during in feasibility period, and the FSR had been approved by the Local DRC. In March 2009, the directorate of project owner thought that the potential CERs revenue can help the project to be financial attractive and decided to invest the construction of the project. The project owner has signed the equipment purchasing contract with some equipment trader in March 2009, and the construction period started from Apr. 11th, 2009.

Meanwhile, according to 48th meeting of EB, the project owner has been reported to China DNA and EB for confirming the starting date. So, in conclusion, it clearly that CDM had been seriously considered by the project owner prior to the construction of the Project.

Table 2 the timeline of the project

No.	Timeline	Milestone
1	August 2008	Feasibility study finished
2	14/10/2008	Approval of the FSR issued by DRC of Inner Mongolia Autonomous Region.
3	08/12/2008	EIA finished
4	05/02/2009	The directorate of project owner thought that the potential CERs revenue can help the project to be financial attractive and decided to invest the construction of the project.
5	Feb.2009	When the consult contract signed
4	27/02/2009	EIA approval
6	15/03/2009	Minutes of meeting for collecting comments of local stakeholders
7	21/03/2009	When the main transformer purchasing contract signed
8	24/03/2009	When the install contact signed

10 http://www.xam.gov.cn/web/xam/mxtzz/zsxm/998.htm
11 http://keji.eco.gov.cn/2/6/6/2/2009/0512/2509.html

9	24/03/2009	When the wind turbine purchasing contract signed
10	11/04/2009	The construction of the load of plant started
11	11/04/2009	The Form of Prior Consideration of the CDM has been submitted to China DNA and the reply from China DNA has been received on Jul.1st, 2009
12	03/05/2009	The construction period of the wind power plant started
13	20/07/2009	According to the 48th meeting of EB, the Form of Prior Consideration of the CDM has been submitted to EB and the reply from cdm registration of EB has been received on Jul.23rd, 2009

The additionality of the Project is demonstrated by using the *Tool for the Demonstration and Assessment of Additionality* (Version 05.2) approved by the CDM EB and requested by the methodology ACM0002 (Version10). The *Tool for the Demonstration and Assessment of Additionality* (Version05.2) provides for a step-wise approach to demonstrate and assess the additionality. These steps include:

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

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

For the Project, the possible alternative scenarios in absence of the CDM project activity should be as follows:

Alternative I: To implement the proposed project activity, but not as a CDM project activity;

Alternative II: To construct a thermal power plant with the same electricity output as the Project;

Alternative III: To construct a power plant using other renewable resources with the same electricity output as the Project;

Alternative IV: To provide for the same annual electricity output as the Project by NECPG.

Alternative III is not realistic because Xing'an League, where the Project is located, lacks of feasible water resources for constructing a hydropower plant with the same installed capacity as the Project[12]. Furthermore, there are no adequate biomass sources, solar sources, wave and tidal sources or geothermal sources for constructing a power plant with the same installed capacity as the Project.

To sum up, Alternative I, Alternative II and Alternative IV should be considered in the following analysis.

Sub-step1b. Enforcement of applicable laws and regulations:

Alternative I: To implement the proposed project activity, but not as a CDM project activity. The alternative is in compliance with current laws and regulations of China.

[12] http://www.nmxadd.com/newsdisp.asp?id=3610; http://cwera.cma.gov.cn/cn/

Alternative II: To construct a thermal power plant with the same installed capacity as the Project. Based on the requirements of applicable laws and regulations, the alternative is not realistic. According to the current regulations in China, construction of coal-fired power plants with capacity of less than 135 MW are forbidden in the areas which can be covered by large grids and the fossil fuel-fired power units with capacity of less than 100 MW is strictly limited for installation.

Alternative IV: To provide for the same annual electricity output as the Project by NECPG. The alternative is in compliance with current laws and regulations of China.

To sum up, Alterative I and Alterative IV should be considered in the following analysis.

Step 2. Investment analysis

Sub-step 2a. Determine appropriate analysis method

Tool for the Demonstration and Assessment of Additionality (Version05.2) provides three analysis methods to apply for the investment analysis: the simple cost analysis (option I), the investment comparison analysis (option II) and the benchmark analysis (option III).

For the proposed project, the simple cost analysis method is not applicable because the project activity will generate economic benefit (from electricity sale) other than CDM related income. The investment comparison analysis method is also not applicable because the Alterative IV is the Northeast China Power Grid rather than a new investment project.

To conclude, the proposed project will use the benchmark analysis method based on total investment IRR to identify whether or not that the financial indicators of the proposed project is lower than relevant benchmark value.

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

In according with *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects* issued by former State Power Corporation of China[13], the financial internal rate of return (IRR) for total investment as benchmark in China's power generation industry is 8%, considering economic assessments of hydropower projects, fossil fuel fired projects, transmission and substation projects. Nowadays China's existing wind power projects have also applied it as the benchmark IRR. Therefore, 8% is adopted as the financial benchmark IRR for the Project. If the total investment's IRR of the Project is less than 8%, the Project will be financially unfeasible and then be additional.

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

[13] http://www.law-lib.com/law/law_view1.asp?id=8867

Basic parameters of the Project

The basic parameters to calculate the financial indicators of the Project are listed in Table 3.

Table3. Basic parameters for IRR calculation[14]

Items	Unit	Data	Source
Installed Capacity	MW	49.5	Feasibility Study Report
Estimated annual electricity generated	MWh	114,200	Feasibility Study Report
Project lifetime	year	21	Feasibility Study Report
Total investment	Million RMB	414.29	Feasibility Study Report
Electricity tariff(incl. VAT) (<30000hours)	RMB/kWh	0.54	Feasibility Study Report
Electricity tariff(incl. VAT) (>30000hours)	RMB/kWh	0.40	Feasibility Study Report
VAT	%	8.5	Feasibility Study Report
Income tax	%	25	Feasibility Study Report
Tax of expense for city maintenance and construction	%	5	Feasibility Study Report
Tax of education fee addition	%	3	Feasibility Study Report
Period of depreciation	years	15	Feasibility Study Report
Rate of depreciation	%	6.33	Feasibility Study Report
Annual O&M cost	Million RMB	12.11	Feasibility Study Report

Comparison of financial indicator

Based on these data listed on Table one above, the IRR of the total investment of the Project is only 7.28%, which is lower than the benchmark IRR of 8%. Therefore, the Project is not financially attractive and fulfils the requirement of additionality.

Taking into account the income from CERs (10.5€/tCO_2e), the total investment's IRR of the Project will be 9.54%, which will higher than the benchmark IRR of 8%. Therefore, the Project is economically attractive, which means that the CDM revenues could help the Project overcome the investment barrier.

Sub-step 2d. Sensitivity analysis

[14] According to Interim Rules on Economic Assessment of Electrical Engineering Retrofit Project, the fixed value should be used in the investment analysis.

The purpose of the sensitivity analysis is to examine whether the conclusion regarding the financial viability of the proposed project is sound and tenable with those reasonable variations in the assumptions.

Four factors are considered in following sensitivity analysis:

1) Total static investment
2) Tariff
3) Estimated annual output
4) Annual operation and maintenance cost(**O&M cost**)

The four financial parameters were identified as the main variable factors for sensitive analysis of financial attractiveness.

In the case that total investment decreases by about 4.90%, the IRR of the proposed project begins to exceed the benchmark. Considering the majority of total investment is due to wind turbines whose price tends to increase for its demand booming[15], at the same time, recently the material price (especially the steel price) and tax rate are gradually increasing in China[16], as a result, it is very difficult to lower the total investment in the FSR of the proposed project. Hence within the reasonable range of total investment, the proposed project is always lack of financial attractiveness. According to table7, the total investment is the lowest one in the registered projects in East Inner Mongolia, and according the Clarification from Clarification issued from the third party, Beijing Hualian Electricity Management Company, which is a independent management company for the proposed project, the actual investment is 429.989Million RMB which is higher than estimated one.

In the case that the expected power tariff increases by about 4.75%, the IRR of the proposed project begins to exceed the benchmark. However there is extremely unlikely for the tariff of the proposed project to have an increase of 4.75%. According to China's Management Rules on Tariff issued by NDRC[17], the tariff of the un-tendering projects should be determined by the government with reference to the tariff of tendering wind projects. The tariff used in the calculation of FSR is the same with the latest guiding price[18] . As a result, the proposed project is always lack of financial attractiveness because the tariff would not increase by 4.75%.

The following description is to explain the reason why the policy decision to apply a higher tariff for the first 30,000 hours was implemented and cross-check of investment analysis:

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15 http://www.86wind.com/info/detail/4-5335.html

16 http://www.ic37.com/htm_news/2008-1/15834_66520.htm

17 http://www.gov.cn/ztzl/2006-01/20/content_165910.htm .Interim Regulation for Tariff of Renewable Energy Power Generation and Appointment of Expenses FAGAIJIAGE(2006) No.7

18 http://www.ndrc.gov.cn/zcfb/zcfbtz/2008tongzhi/t20080813_230718.htm

The policy of approving a fixed tariff for the first 30,000 hours and adopting the average tariff of local power grid after the 30,000 hours was initially implemented on 10 December 2002[19], which was issued as a result of the power sector reforms[20] in China. As the table 4 indicated, all the tariff approval[21] issued by the NDRC for the wind power projects in the whole country explicitly stated that different tariff was applied for different operation period: constant tariff for the first 30,000 operation hours period, and the average tariff of the local power grid applied for the after 30,000 hours period, named **Two-stage tariff.** In fact, all of the wind power projects approved by the NDRC in China apply to the Two-stage tariff. Hence, it is credible and appropriate for the project owner to use two-stage tariff in the IRR assessment on purpose of consistent with the tariff policy of China.

According to paragraph 6 of the "Tool for the demonstration and assessment of additionality" (Version 05.2), it is mentioned that input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant. According to the Tariff policy applied in China in table 4, the Two-stage tariff is the only official tariff which could be obtained when the time of investment decision taken by PP. So, it is very reasonable that the Two-stage tariff should be used in the FSR and PDD.

Moreover, it is emphasized that the China DNA has begun to issue the first CDM management regulation about CDM application on 30/06/2004[22], and the first CDM project in China was registered on 26/06/2005[23], the first CDM project in the worldwide was registered on 18/11/2004[24]. All the CDM actions are taken after the two-stage tariff policy issued. Therefore, the two-stage tariff policy is not issued on purpose of making wind power projects in China become CDM eligible and the policy of two stage tariff for the before and after 30,000 hours operation period has long been implemented in China.

Table 4 Tariff policy applied in China

No	Policy description	Issued institution	Two-stage tariff	Implementation date of the policy
1	Tariff approval for wind project (Ji Ji Chu [2002] No. 2692)	National Development and Plan Committee	Yes	10 December 2002
2	Tariff approval, Fa Gai Jia Ge[2006]2908	National Development and Reform Committee	Yes	22 Dec. 2006
3	Tariff approval for renewable power	National Development	Yes	09 June 2007

[19] Tariff approval for wind project (Ji Ji Chu [2002] No. 2692), by National Development and Plan Committee, 10th December 2002

[20] Power sector reforms in China lead to the separation of power generation from grid business and diversification in the ownership of generation capacity. As a result, all power generations, including new energy generation, were expected to compete under commercial conditions. (http://www.chinabaike.com/law/zy/xz/gwy/1333796.html)

[21] Fa Gai Jia Ge [2007]1260, http://www.hebwj.gov.cn/upfiles/xy_col32gjc___20070718 4220007126.htm, Fa Gai Jia Ge [2007]3303, http://jgs.ndrc.gov.cn/zcfg/t20080218_192021.htm, Fa Gai Jia Ge [2008]1876, http://jgs.ndrc.gov.cn/zcfg/t20080813_230722.htm

[22] http://www.creia.net/html/200810911241351.html

[23] http://cdm.unfccc.int/Projects/projsearch.html

[24] http://cdm.unfccc.int/Projects/projsearch.html

	projects, Fa Gai Jia Ge [2007]1260	and Reform Committee		
4	Tariff approval, Fa Gai Jia Ge [2007]3303	National Development and Reform Committee	Yes	03 Dec. 2007
5	Tariff approval, Fa Gai Jia Ge [2008]1876	National Development and Reform Committee	Yes	23 July 2008

According to the "Information note on the highest tariffs applied by the EB in its decisions on registration of projects in the People's Republic of China"[25], the highest tariff ever issued for wind projects in Inner Mongolia region is 0.54RMB/kWh including VAT. From table 4, we can notice that the highest tariff in Inner Mongolia, even in all over the country, is a two-stage tariff. That is, the actual highest tariff in Inner Mongolia is 0.54RMB/kWh in the first 30,000hours and the average tariff of the local power grid applied for the after 30,000hours.

Furthermore, using two phase tariff in the IRR calculation can provide us the solid assessment through the IRR calculation, and it's helpful for the project owner to objectively evaluate the investment return rate of the proposed project, because it is fully consistent with the factual tariff policy in China. Hence, applying the different tariffs for the before and after 30,000 hours in the financial analysis has been commonly implemented in China. As the table 5 indicated, there are 36 registered projects have applied the different tariff for the after 30,000hours period. For the other registered wind projects in China, the project participants applied a tariff the same with the one approved for the first 30,000 hours period during the after 30,000hours period.

Table 5 Registered wind power projects with Two-stage Tariff(a higher tariff for the first 30,000 operation hours)

No	Reference No.	Project Name	Registration Date	Source link
1	3153	Tongliao Naiman Banner Baxiantong Haritang Wind Power Project	27 Jun 10	http://cdm.unfccc.int/Projects/DB/DNV-CUK1258970138.88/view
2	2598	Huaneng Jilin Tongyu Phase II Wind Farm Project	21 Jun 10	http://cdm.unfccc.int/Projects/DB/BVQI1242974589.56/view
3	3258	Tongliao Kezuozhong Banner Dailiji Aorimu Wind Power Project	14 Jun 10	http://cdm.unfccc.int/Projects/DB/DNV-CUK1262929581.35/view
4	3241	Huadian Gansu Guazhou Ganhekou No. 7 Wind Farm Project	24 May 10	http://cdm.unfccc.int/Projects/DB/DNV-CUK1261995235.23/view
5	2615	Inner Mongolia Chifeng Saihanba Tashanzi Wind Power Project	3 May 10	http://cdm.unfccc.int/Projects/DB/DNV-CUK1243934217.91/view
6	3105	Datang Chifeng Bolike II Wind Power Project	02 Apr 10	http://cdm.unfccc.int/Projects/DB/DNV-CUK1256589807.79/view
7	2593	Inner Mongolia Keyouqianqi Wind Farm Project	15 Mar 10	http://cdm.unfccc.int/Projects/DB/DNV-CUK1242803353.52/view
8	2617	Inner Mongolia Chifeng Saihanba Qingmachang Wind Power Project	04 Mar 10	http://cdm.unfccc.int/Projects/DB/DNV-CUK1243935386.29/view

[25] Para 53, EB 53, http://cdm.unfccc.int/Reference/Notes/reg_note07.pdf

9	2766	Gansu Jingtai 45MW Wind Power Project	03 Mar 10	http://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1247703700.0/view
10	1924	Liaoning Faku Heping Wind Power Project	01 Mar 10	http://cdm.unfccc.int/Projects/DB/DNV-CUK1214931141.79/view
11	2864	Liaoning Kangping Furaoshan Wind Power Project	24 Feb 10	http://cdm.unfccc.int/Projects/DB/TUEV-SUED1249387437.04/view
12	2951	Inner Mongolia Bayannaoer Chuanjingsumu （IV） Wind Power Project	12 Feb 10	http://cdm.unfccc.int/Projects/DB/SGS-UKL1251976657.48/view
13	2777	Heilongjiang Shaobaishan Wind Power Project	28 Dec 09	http://cdm.unfccc.int/Projects/DB/BVQI1248251636.98/view
14	1577	CGN Inner Mongolia Zhurihe Phase I Wind Farm Project	23 Dec 09	http://cdm.unfccc.int/Projects/DB/DNV-CUK1200642678.34/view
15	2886	Inner Mongolia Tongliao Huolinhe Wind Power Project	18 Dec 09	http://cdm.unfccc.int/Projects/DB/DNV-CUK1249456347.48/view
16	2883	Gansu Baiyin Pingchuan Jiancaitang 45MW Wind Farm Concession Project	14 Dec 09	http://cdm.unfccc.int/Projects/DB/TUEV-SUED1249417862.09/view
17	1815	Inner Mongolia Huitengliang Phase II Wind Power Project	27 Oct 09	http://cdm.unfccc.int/Projects/DB/BVQI1207768950.28/view
18	2153	Inner Mongolia Baotou Bayin Wind Power Project	12 May 09	http://cdm.unfccc.int/Projects/DB/DNV-CUK1218624488.68/view
19	2109	CGN Gansu Anxi Daliang 49.5MW Wind Power Project	29 Apr 09	http://cdm.unfccc.int/Projects/DB/DNV-CUK1218548297.8/view
20	2007	Hebei Haixing 49.5MW Wind Farm Project	06 Mar 09	http://cdm.unfccc.int/Projects/DB/TUEV-SUED1218101320.07/view
21	2140	Hebei Chongli Qingsanying 49.3MW Wind Farm Project	23 Feb 09	http://cdm.unfccc.int/Projects/DB/TUEV-SUED1218616949.73/view
22	2088	Hebei Yuxian Kongzhongcaoyuan 49.5MW Wind Farm Project	23 Feb 09	http://cdm.unfccc.int/Projects/DB/TUEV-SUED1218534453.07/view
23	2021	Shandong Haiyang Qiuershan Wind Power Project	08 Feb 09	http://cdm.unfccc.int/Projects/DB/DNV-CUK1218168872.11/view
24	2113	CGN Inner Mongolia Huitengliang 300MW Wind Power Project	28 Jan 09	http://cdm.unfccc.int/Projects/DB/DNV-CUK1218552183.25/view
25	2068	Jilin Tongyu Tongfa Wind Power Project	26 Jan 09	http://cdm.unfccc.int/Projects/DB/DNV-CUK1218468288.41/view
26	2169	Jiangsu Rudong Lingyang Wind Power Project	12 Jan 09	http://cdm.unfccc.int/Projects/DB/TUEV-SUED1218638332.96/view
27	2193	Gansu Yumen Sanshilijingzi Wind Power Project	08 Jan 09	http://cdm.unfccc.int/Projects/DB/TUEV-SUED1218655051.51/view
28	2135	Inner-Mongolia Ximeng Abag 49.5MW Wind Power Project	16 Apr. 09	http://cdm.unfccc.int/Projects/DB/RWTUV1218614638.67/view
29	1992	Expansion Project of Huadian Inner Mongolia Huitengxile Wind Farm	26 Jan 09	http://cdm.unfccc.int/Projects/DB/TUEV-SUED1217944278.42/view
30	2170	CECIC HKC Danjinghe Wind Farm Project	29 Dec 08	http://cdm.unfccc.int/Projects/DB/DNV-CUK1218638823.56/view
31	1837	Zhejiang Cixi Wind Farm Project	09 Dec 08	http://cdm.unfccc.int/Projects/DB/TUEV-SUED1210258122.12/view
32	1789	Shandong Tuoji Island Windfarm Project	20 Nov 08	http://cdm.unfccc.int/Projects/DB/DNV-CUK1207658366.01/view
33	1627	Shibeishan Wind Power	17 Sep 08	http://cdm.unfccc.int/Projects/DB/DNV-

		Generation Project in Huilai County, Guangdong Province		CUK1203852135.01/view
34	0897	Jilin Tongyu Tuanjie wind project, 100.3 MW	07 Apr 07	http://cdm.unfccc.int/Projects/DB/DNV-CUK1169716720.28/view
35	0823	Huadian Inner Mongolia Huitengxile 100.25MW Wind Farm Project	29 Mar 07	http://cdm.unfccc.int/Projects/DB/TUEV-SUED1166704457.57/view
36	0256	Jilin Tongyu Huaneng 100.05MW Wind Power Project	12 Aug 06	http://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1149172847.67/view

Meanwhile, the average tariff of the local power grid should be applied. Since the Grid is dominated by the thermal power plants which supplies more than 98.4%[26] of the total power generation of that province, the average tariff in the grid is mainly determined by thermal power tariff. The thermal power tariff in Inner Mongolia power grid is 0.2599 RMB/kWh (incl.VAT)[27], so the average tariff in Inner Mongolia province is around 0.2599 RMB/kWh (incl.VAT).

According to the opinion of third party which designed the FSR, they chose the most conservative opinion that the thermal power generation and renewable energy sources generation take an in part each in the total power generation of the province, that is, the average tariff is the average of 0.54 and 0.2599((0.54+0.2599)/2=0.4 Yuan/kWh (including VAT)) as the tariff for after 30000 hours operation period which has been used in the PDD.

As the sensitivity analysis carried out in PDD regarding the tariff of after 30000-hours indicated, since the benchmark thermal power tariff in Inner Mongolia 0.2599 Yuan /kWh (including VAT)[28] in 2008 and the average inflation rates of China is 2.98% from 1995 to 2009[29], the benchmark tariff after 30000 hours operation period can be only increased to 0.392Yuan /kWh (including VAT) calculated at this rate, which is still lower than 0.4Yuan/kWh used in the PDD.

In conclusion, the project has simultaneously applying the highest tariff in Inner Mongolia region (0.54Yuan/kWh, including VAT) and the highest average tariff for Inner Mongolia power grid after 30000 hours operation period later (0.4 Yuan/kWh, including VAT) in the PDD. The IRR of the proposed project is 7.28%**,** which is lower than the benchmark, the proposed project is additional.

Furthermore, PP tries to prove that the project IRR could be lower than benchmark IRR when the highest tariff of 0.54RMB/kWh used in the whole operation period when cross-checked by the actual rate of loan and investment:

[26] China Electric Power Yearbook 2008
[27] http://www.sdpc.gov.cn/zcfb/zcfbtz/2008tongzhi/t20080702_222220.htm
[28] Notice on adjustment of the tariff in NCPG issued by NDRC in 2008
[29] http://canglang.blog.hexun.com/14687662_d.html
http://www.stats.gov.cn/tjgb/index.htm

A. Cross-check by the rate of loan:

1) According to the LOI of long-term loan from loan bank issued on Jan 13th 2009, the rate of long-term loan should be moved down by 10% based on the rate published by the People's Bank of China. Meanwhile, the rate of long-term loan published by the People's Bank of China has been changed to 5.94% on Dec 13th 2008 and remains unchanged from Dec 13th 2008 to the time of the investment decision taken by the project participant. The actual rate of long-term loan at the time of the investment decision taken by the project participant is 5.346% (5.94 %× (1-10%)), although PP adopted the conservative data of FSR in the submitted PDD for requesting registration. It could be cross-checked by the Loan Contract.

2) PP cross checks the IRR based on the actual rate of loan, the IRR of the project is 7.90% when the highest tariff of 0.54RMB/kWh used in the whole operation period. So, the project IRR is still lower than benchmark IRR.

B. Cross-check by the actual investment:

1) PP wants to notice that according to the table6, the estimated investment of the project is the lowest investment in the east Inner Mongolia. According to the IRR sheet which has been submitted to EB for registration, the IRR with the highest tariff of 0.54RMB/kWh used in the whole operation period is 8.03% which is very close to the Benchmark IRR of 8%, and PP thinks that it is still greater uncertainty to state that the project is not additional.

2) According the Clarification from Clarification issued from the third party, Beijing Hualian Electricity Management Company, which is a independent management company for the proposed project, the actual investment is 429.989Million RMB which is higher than estimated one.

3) In order to cross-check the IRR, PP used the actual investment to calculate the actual IRR. According to the sheet of "Actual IRR based on the actual investment", the IRR with highest tariff of 0.54RMB/kWh used in the whole operation period is just 7.49% which is far lower than the Benchmark IRR and the project is still additional.

In conclusion, the Two-stage tariff used in the PDD is applicable and the project IRR is still lower than benchmark IRR when the highest tariff issued for similar projects in the region.

In the case that the estimated annual output increases by about 4.55%, the IRR of the proposed project begins to exceed the benchmark. Therefore, the estimated annual output reflects the annual generation output of the proposed project, which depends on the average wind resources at the project site for a

specific wind turbine. The calculation of local wind resources is based on the 36 years monitoring data by local weather department[30]. Therefore, the probability that electricity outputs is 4.55% higher than the estimated value is unreasonable.

Plant load factor (PLF) is defined by the FSR which is designed by the authoritative third party named China Fulin Wind Power Development Corporation, which has signed the agreement with the PP and has the B level design licensing qualification for the wind power projects. Meanwhile, the FSR of the proposed project has been approved by the local government, Inner Mongolia Development and Reform Commission. This is in line with the latest guidelines on plant load factors "guidelines for the reporting and validation of plant load factors" in EB 48 Annexure 11.

According to the basic theory of wind power, the wind energy is proportional to the cube of wind speed. And wind speed is the major parameter to estimate the power generation[31]. So, PP made an explanation for wind speed in order to clarify the sensibility of PLF in the PDD.

Refer to the "Specification for Compiling Feasibility Study Report of Wind Power Project", two requirements need to be followed. First the third party should collect the data of the average yearly wind speed from local weather station of 30 years and the monthly records one year by the anemometer tower installed on the wind plant for estimating the power generation when designing the FSR. For the project, the third party collected the data of the wind speed from local weather station, Tuquan Weather Station, from 1972 to 2007 which covered more than 30 years period. And, the third party also collected the data of the wind speed from the specified anemometer tower from Aug 2006 to Jul 2007. The Clarification from the China Fulin Wind Power Development Corporation which has been submitted to DOE for validation are in line with the "Specification for Compiling Feasibility Study Report of Wind Power Project" and has been approved by the local government as well.

Those 30 years dataset is applied to amend the 1 year dataset by using the following steps:

Step 1: According to the 30 years historical data, whether the wind speed in that 1 year is higher or lower than the average value of the 30 years data.

Step 2: Calculate the linear relationship between that year and the average value of the 30 years data.

Step 3: Correct the one year measure data according to the linear relationship achieved in step 2.

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[30] FSR, Page 2-3

[31] $E = \frac{1}{2}\rho S v^3$, in which, E means wind energy, ρ means the wind energy density, S means area and v means wind speed.

Step 4: The relevant data from wind turbine manufacture and the data gathered in step 3 was insert in professional WASP software for the purpose of getting an authoritative result about power generation volume for each turbine.

According to the average wind speed table from FSR and Clarification, the FSR was completed in Aug 2008. And, the FSR collected the data of the wind speed from local weather station, Tuquan Weather Station, from 1972 to 2007. According to the FSR, the "year" of the data from Tuquan Weather Station means from this August to next July, that is, the year of 2007 means from Aug. 2007 to July 2008. Therefore, in Aug.2008 when the FSR was completed, the data from 2007 is the newest and data from 2008 to 2009 was not possible being obtained.

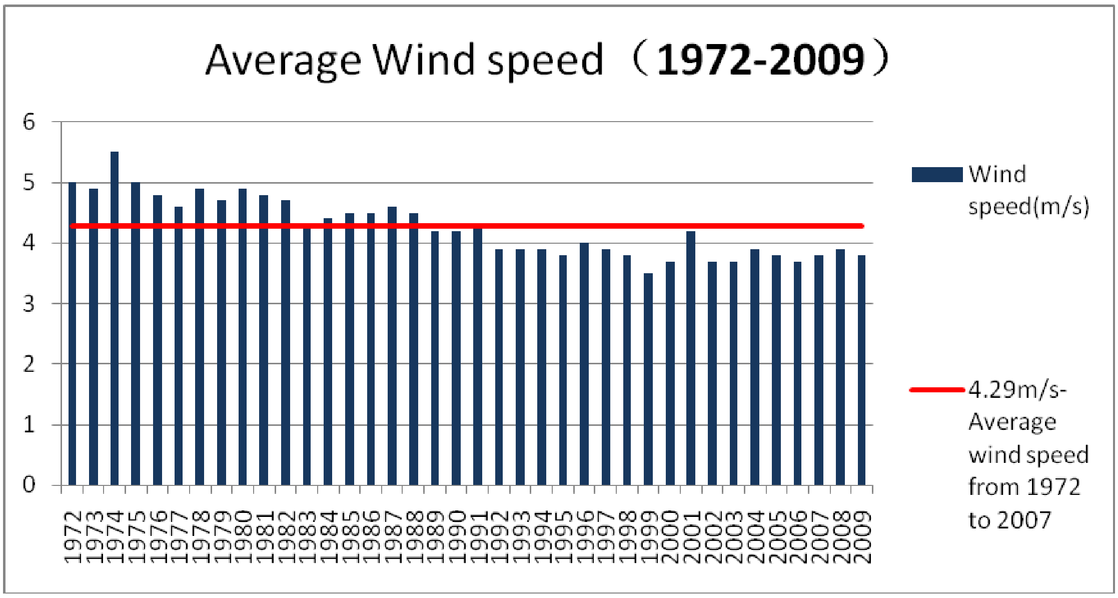
In order to cross-check the wind speed of 2008 and 2009, PP contacted with Fulin for the data of wind speed of 2008 and 2009 from local weather station. As shown in Figure 4, although the data fluctuated, the whole trend of weather data decreases obviously. After adding the wind speed data of 2008 and 2009, it does not change the whole trend. And in Figure 4, the straight line is the average wind speed from 1972 to 2007, which was used for estimating PLF in FSR. Also, the updated wind speed data of 2008 and 2009 is lower than the average, which only can make the total average smaller. Since the PLF is proportional to the cubic of the wind speed[32], the lower wind speed makes the lower PLF. Therefore, the wind speed used in designing FSR can be considered conservative.

Table 6 Average Wind Speed from 1972 to 2009

Year	Starting and ending time	Average Wind speed (m/s)	Year	Starting and ending time	Average Wind speed (m/s)	Year	Starting and ending time	Average Wind speed (m/s)
1972	1972.8-1973.7	5	1985	1985.8-1986.7	4.5	1998	1998.8-1999.7	3.8
1973	1973.8-1974.7	4.9	1986	1986.8-1987.7	4.5	1999	1999.8-2000.7	3.5
1974	1974.8-1975.7	5.5	1987	1987.8-1988.7	4.6	2000	2000.8-2001.7	3.7
1975	1975.8-1976.7	5	1988	1988.8-1989.7	4.5	2001	2001.8-2002.7	4.2
1976	1976.8-1977.7	4.8	1989	1989.8-1990.7	4.2	2002	2002.8-2003.7	3.7
1977	1977.8-1978.7	4.6	1990	1990.8-1991.7	4.2	2003	2003.8-2004.7	3.7
1978	1978.8-1979.7	4.9	1991	1991.8-1992.7	4.3	2004	2004.8-2005.7	3.9
1979	1979.8-1980.7	4.7	1992	1992.8-1993.7	3.9	2005	2005.8-2006.7	3.8
1980	1980.8-1981.7	4.9	1993	1993.8-1994.7	3.9	2006	2006.8-2007.7	3.7
1981	1981.8-1982.7	4.8	1994	1994.8-1995.7	3.9	2007	2007.8-2008.7	3.8
1982	1982.8-1983.7	4.7	1995	1995.8-1996.7	3.8	2008	2008.8-2009.7	3.9
1983	1983.8-1984.7	4.3	1996	1996.8-1997.7	4	2009	2009.8-2010.7	3.8
1984	1984.8-1985.7	4.4	1997	1997.8-1998.7	3.9			

[32] http://tieba.baidu.com/f?kz=488219004

Figure 4 Average Wind Speed from 1972 to 2009



As mentioned above, the FSR of the proposed project is authorized and qualified by competent third party and local government.

Based on the "Explanation regarding the issue for discount of theoretical annual generation of wind power in China" issued by NDRC dated 2 June 2009, the reasonable arrange of load factor is from 20% to 40% in the country.

In order to compare the PLF of the project in the particular region, the comparison showed that the annual load factor, 26.3%, of the project fell within the range from 23.90% - 28.39% of the similar projects in the same region East Inner Mongolia.

Table 7 Comparison among wind power projects in East Inner Mongolia

Ref No	Project Name	Investment cost per MW (Yuan/MW)	Plant load factor
0561	Saihanba East 45.05 MW Windfarm project	11908614	28.04%
0576	Saihanba North 45.05 MW Windfarm project	10149612	28.04%
0689	Inner Mongolia Chifeng Dongshan 49.3 MW wind farm project	10445233	28.39%
0981	Guohua Hulunbeier Xinbaerhu Youqi wind farm project	9868687	26.52%
0994	Inner Mongolia Chifeng Saihanba West 30.6 MW wind farm project	9491176	27.92%
1487	Inner Mongolia Wudaogou 50.25 MW wind project	9406169	28.32%
1488	Inner Mongolia Sunjiaying 50.25 MW wind farm project	10072836	27.47%
1628	Inner Monolia Dali Phase IV 49.5MW wind power project	11049495	28.46%

1629	Inner Mongolia Dali Phase V 49.5MW wind power project	11719192	25.42%
1825	Guohua Tongliao kezuo zhongqi Phase II 49.5MW wind farm project	9885491	24.37%
1830	Inner Mongolia Chifeng Bolike 50MW Wind power project	10372400	28.05%
1869	Inner Mongolia Chifeng Dongshan Phase II 50MW wind farm project	10180200	28.33%
2472	Guohua Chenbaerhu Qi Phase I 49.5MW Wind Farm Project	9758840	23.90%
2381	Inner Mongolia Meiyaoshan wind farm`	9240385	24.57%
2599	Huaneng Tongliao Baolongshan phase II 49.5MW Wind power project	10800000	27.79%
3084	Huaneng Tongliao Baolongshan phase III 49.5MW Wind power project	10736000	28%
2811	Inner Mongolia Chifeng Yihegong Windfarm Project	9762000	26%
3124	Huaneng Tongliao Zhurihe Phase I Wind Farm Project	10657000	26%
3258	Tongliao Kezuozhong Banner Dailiji Aorimu Wind Power Project	9799000	25%
3153	Tongliao Naiman Banner Baxiantong Haritang Wind Power Project	10138000	25%
3287	Inner Mongolia Tongliao Wind Farm Project Phase IV	9707000	25%
3264	Inner Mongolia Tongliao Wind Farm Project Phase III	10159000	26%
3080	Huaneng Inner Mongolia Keyouzhongqi Gaoliban Wind Farm Project	11106000	26%
2886	Inner Mongolia Tongliao Huolinhe Wind Farm Project	9188200	26.96%
	Range of above projects	9188200~11908614	23.90%~28.39%
	The proposed project	836950	26.3%

In order to cross-check the PLF of the project, the actual power generation has been submitted to DOE. According to the Clarification from local Power Grid Company, the actual electricity exported to the grid over 212 days from Jan 1st 2010 to July 31st 2010 (the project has been operated at full capacity in the end of 2009) is 47655.4MWh. So, the actual PLF is 18.92%[33], which is lower than the estimated PLF in the FSR.

Therefore, the PLF used in FSR is appropriate, and within the reasonable range in the ***particular region***. Furthermore, the PLF could be cross-checked by the actual power generation and it has been approved conservative.

The impact of the annual O&M cost is the slightest, as the IRR of the proposed project begins to exceed the benchmark when the annual O&M cost decreases by 21%. Since the wind turbines operate in high latitude and cold area, such reduction of O&M cost lacks possibility for the proposed project. Moreover,

[33] $PLF = \frac{\text{Operation hours}}{\text{Total hours}} \times 100\% = \frac{\frac{\text{Power Generation}}{\text{Install Capacity}}}{\text{Operation days} \times 24\text{hours}} \times 100\% = \frac{\frac{47655.4}{49.5}}{212 \times 24} \times 100\% = 18.92\%$

the price of material and salaries of the employees are gradually increasing in China, which leads annual O&M cost gradually increasing[34],Therefore, the proposed project always lacks financial attractiveness within the reasonable range of annual O&M cost.

Step3. Barrier analysis

No barrier analysis has been applied.

Step 4 Common practice analysis

Sub-step 4a. Analyze other activities similar to the proposed 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, and access to financing, etc. In China, the general environment of projects of this type of wind farm such as the wind resources[35], on grid tariff[36], investment climate[37] are only similar and comparable in the same province (Autonomous Region). On this basis, the common practice region and comparable framework is provincial and the project is compared to other projects in the Inner Mongolia Autonomous Region.

According to the ACM0013 (Version 02.1) Page 7, the similar projects should be defined as the range from 50% to 150% of the rated capacity of the project plant. So, the project chose the range from 25MW to 75MW as the similar projects of the project.

Projects applied in common practice analysis are defined as wind power projects with similar installed capacity (25MW to 75MW) and commissioning data (after 2002[38]) in Inner Mongolia Autonomous Region. Referring to "*China Wind Farms Capacity Statistic in 2007",* Detailed information list as follows:

Table 9 Grid-connected wind farms similar to the project in Inner Mongolia Power grid

Project Title	**Capacity**	**Remarks**
Inner Mongolia Keshiketeng Qi Dali III wind power project	31.2 **MW**	Demonstration Project Supported by national debt fund and loan from Denmark government

[34] http://www.ic37.com/htm_news/2008-1/15834_66520.htm
http://www.chinadaily.com.cn/hqcj/2007-09/03/content_6075777.htm
[35] http://cwera.cma.gov.cn/upload/b_2_left_02.jpg: Cumulative wind installation in China till 2006.
[36] The tariff issued by the NDRC is based on the same province, such as (Fa Gai Jia Ge [2007]1260 dated 9/06/2007, Fa Gai Jia Ge [2007]3303 dated 03/12/2007 and Fa Gai Jia Ge [2008]1876 dated 23/07/2008).
[37] http://www.sdpc.gov.cn/nyjt/nyzywx/t20050810_41378.htm
[38] In 2002, the State Council approved the Power Industry System Reform Plan which established the basic policy for the reform of Chinese Power industry. The reform that enforced the separation of power plant from grids and introduced a competition system, the tariffs are determined through competitive bidding. So there has much difference in regulation frame for the wind power plants that put in to operation before and after 2002.

Data source：

http://www.gd.xinhuanet.com/newscenter/ztbd/2007-10/18/content_11435955.htm

http://www.86wind.com/info/detail/37-6774.html

http://www.sdpc.gov.cn/zfdj/jggg/dian/t20080218_193009.htm

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

According to the tool for demonstration and assessment of additionality (Version 05.2), CDM project activities (registered activities and project activities which have been published on the UNFCCC website for global stakeholder consultation as part of validation process) are not included in this analysis.

Then, as the table above shown, the project is a demonstration project. Inner Mongolia Keshiketeng Qi Dali III wind power project was also a demonstration project supported by national debt fund and loan from Denmark government[39].

For the proposed project, it is impossible to be developed in such favorable financial conditions like the demonstration project enjoyed.

Therefore, the existence of these projects in Table 7 does not contradict the claim that the proposed project activity is financially unattractive.

In conclusion, the proposed project is additional. Without the CDM revenues, the project activity would not be implemented smoothly.

[39] http://www.gd.xinhuanet.com/newscenter/ztbd/2007-10/18/content_11435955.htm

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

Baseline emissions

The Project is a new power plant, therefore, according to ACM0002 (version 10), the baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity, calculated as follows:

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

Where:

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

$EG_{PJ,y}$ =Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the proposed project activity in year *y* (MWh/yr).

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

Calculation of $EG_{PJ,y}$

The calculation of $EG_{PJ,y}$ is different for (a) Greenfield plants, (b) retrofits and replacements, and (c) capacity additions.

Because the project activity is the installation of a new grid-connected renewable power plant at a site where no renewable power plant was operated prior to the implementation of the project activity, so method (a), Greenfield plants is adopted to calculate the $EG_{PJ,y}$ in this PDD.

$$EG_{PJ,y} = EG_{facility,y}$$

Where:

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the proposed project activity in year *y* (MWh/yr).

$EG_{facility,y}$ = Quantity of net electricity generation supplied by the proposed project to the grid in year *y* (MWh/yr)

Calculation of $EF_{grid,CM,y}$

The *Tool to calculate the emission factor for an electricity system* provides for a step-wise approach to calculate the $EF_{grid,CM,y}$. These steps include:

Step 1 Identify the relevant electric power system

As described in Section B.3, the spatial extent of the project boundary includes all power plants connected physically into NECPG. Therefore, the project electricity system is defined as NECPG.

For NECPG, there are electricity imports from Northwest China Power Grid (NWPG), therefore the connected electricity system is defined NWPG. However, when determining the operating margin (OM) emission factor of NECPG, the PDD uses the weighted average emission rate of NWPG as the emission factor of net electricity imports ($EF_{grid,import,y}$) from NWPG to NECPG(Detail information refer to Annex3).

Step 2 Select an operating margin (OM) method

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

Option A: (a) Simple OM, or

Option B: (b) Simple adjusted OM, or

Option C: (c) Dispatch data analysis OM, or

Option D: (d) Average OM.

Among the total electricity generation of NECPG, the amount of low-cost/must run resources accounts for about 4.72% in 2003, 6.46% in 2004, 8.28% in 2005 and 5.69% in 2006, 5.53% in 2007[40] respectively, all less than 50%. Therefore, method (a), simple OM is adopted to calculate the operating margin emission factor of NECPG in this PDD.

For the Project, the *ex-ante* option is adopted with using the data vintage as a 3-year generation-weighted average based on the most recent data for calculation of the simple OM emission factor ($EF_{grid,OMsimple,y}$) of NECPG.

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

[40] *China Electric Power Yearbook*, 2004~2008 Edition.

The simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants / units. It may be calculated:

(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.

As per Tool to calculate the emission factor for an electricity system, Option A should be preferred. However, the data on fuel consumption and net electricity generation of each power plant / unit is not publicly available. Thus, Option A cannot be adopted for the Project. Similarly, the data on net electricity generation, the average efficiency of each power unit and the fuel type(s) used in each power unit are not available too. Thus, Option B cannot be adopted for the Project.

According to the *Notification on Determining Baseline Emission Factors of China Power Grid*, only nuclear and renewable power generations are considered as low-cost / must-run power sources in China. Furthermore, the quantity of electricity supplied to the grid by low-cost / must-run power sources is known. Therefore, Option C is adopted to calculate the simple OM emission factor of NECPG.

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

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{co2,i,y}}{EG_y} \quad (2)$$

Where:

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

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

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

$EF_{co2,i,y}$ = 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 = the three most recent years.

The data on electricity generation are obtained from the *China Electric Power Yearbook* from 2006 to 2008 (published annually). The data on different fuel consumptions for power generation and the net caloric values of the fuels are obtained from the *China Energy Statistical Yearbook* from 2006 to 2008 (published annually). The emission factors of the fuels adopted are obtained from *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

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

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

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

Since the set of power units described as (b) in NECPG comprises the larger annual generation than that of (a), the sample group (b) should be used for calculating the build margin of NECPG. Power plant registered as CDM project activities should be excluded from the sample group *m*.

In terms of vintage of data, the PDD choose the option as below:

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

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

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \cdot EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad (3)$$

Where:

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

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

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

m = Power units included in the build margin.

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

Currently in China, the capacity margin data of sampling plants group *m* are publicly unavailable. Taking notice of this situation, CDM EB accepts the following deviation in application of methodology AMS-I.D in China[41]:

- Use of capacity additions exceeds 20% of total generation for estimating the build margin emission factor for grid electricity.
- Use of weights estimated using installed capacity in place of annual electricity generation.

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

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

Due to the installed capacities of coal based, oil based and gas based cannot be separated and determined directly at present, BM is calculated with following steps and formula:

SubStep 5.a Calculate the power generation emissions for solid, liquid and gas fuel and each share of total emissions based on the Energy Balance Table of the most recent year.

[41] http://cdm.unfccc.int/Projects/Deviations

$$\lambda_{Coal} = \frac{\sum_{i \in COAL, j} F_{i,j,y} \times NCV_{i,j} \times EF_{co2,i,j}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,j} \times EF_{co2,i,j}} \quad (4)$$

$$\lambda_{Oil} = \frac{\sum_{i \in OIL, j} F_{i,j,y} \times NCV_{i,j} \times EF_{co2,i,j}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,j} \times EF_{co2,i,j}} \quad (5)$$

$$\lambda_{Gas} = \frac{\sum_{i \in GAS, j} F_{i,j,y} \times NCV_{i,j} \times EF_{co2,i,j}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,j} \times EF_{co2,i,j}} \quad (6)$$

Where:

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

$NCV_{i,j} =$ Net calorific value (energy content) of fossil fuel type *i* consumed by province *j* (GJ / mass or volume unit).

$EF_{co2.i.j} =$ CO_2 emission factor of fossil fuel type *i* consumed by province *j* (tCO_2/GJ).

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

SubStep 5.b Calculate emission factor for thermal power of each grid based on the result of *SubStep 5.a* and the efficiency level of the best technology commercially available in China.

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

Where:

$EF_{Coal,Adv}$, $EF_{Oil,Adv}$ and $EF_{Gas,Adv}$ represent the efficiency level of the best coal-based, oil-based and gas-based power generation technology commercially available in China.

SubStep 5.c Calculate BM of the grid based on the result of *SubStep 5.b* and the share of thermal power of recent 20% capacity additions.

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

Where:

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

The data on different fuel consumptions for power generation and the net caloric values of the fuels are obtained from the *China Electric Power Yearbook* from 2006 to 2008 (published annually) and the *China Energy Statistical Yearbook* from 2006 to 2008 (published annually). The emission factors of the fuels adopted are obtained from *2006 IPCC Guidelines for National Greenhouse Gas Inventories.*

With reference to the *Notification on Determining Baseline Emission Factors of China Power Grid*, the weighted average fuel consumption for power generation of 600 MW sub-critical coal-fired power generators built in 2007 (322.5gCe/kWh) and the 200 MW oil/gas based combined cycle power generators (246gCe/kWh) are taken as the efficiency level of the best technology commercially available in China.

Step 6 Calculate the combined margin emissions factor

The combined margin emissions factor is calculated as follows:

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

Where:

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

$EF_{grid,OM,y} =$ Operating margin CO_2 emission factor in year y (tCO_2/MWh)

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

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

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

Project emissions

For wind power project activities, $PE_y = 0$

Leakage

Accord to the ACM0002 (Version 10), no leakage emissions are considered. 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 and upstream emissions from fossil fuel use (e.g. extraction, processing, and transport). These emissions sources are neglected.

Emission reductions

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y \qquad (10)$$

Where:

ER_y = Emission reductions in year y (t CO_2e/yr).

BE_y = Baseline emissions in year y (t CO_2e/yr).

PE_y = Project emissions in year y (t CO_2/yr).

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

Data / Parameter:	*Power generation*
Data unit:	*MWh*
Description:	*The total electricity generation and the electricity generated by those low-cost/musts run power plants of NECPG on 2003, 2004, 2005, 2006 and 2007.*
Source of data used:	*China Electric Power Yearbook 2004, 2005, 2006, 2007 and 2008 Edition.*
Value applied:	*Detailed in China Electric Power Yearbook 2004-2008 Edition.*
Justification of the choice of data or description of measurement methods and procedures actually applied :	*Official data.*
Any comment:	-

Data / Parameter:	EG_y
Data unit:	*MWh*
Description:	*The net electricity generated and delivered to NECPG on 2005, 2006 and 2007, not including those generated by low-cost/must run power plants/units.*
Source of data used:	*China Electric Power Yearbook 2006-2008 Edition.*
Value applied:	*Detailed in Annex 3.*
Justification of the choice of data or description of measurement methods and procedures actually applied :	*Official data.*
Any comment:	-

Data / Parameter:	*Installed Capacity*
Data unit:	*MW*
Description:	*The installed capacity by different sources of NECPG in year 2004, 2005 and 2007.*
Source of data used:	*China Electric Power Yearbook 2005, 2006 and 2008 Edition.*

Value applied:	*Detailed in Annex 3.*
Justification of the choice of data or description of measurement methods and procedures actually applied :	*Official data.*
Any comment:	

Data / Parameter:	$F_{i,j,y}$
Data unit:	$10^4 t$ or $10^8 m^3$
Description:	*Different fuel consumptions for power generation in NECPG in year 2005, 2006 and 2007.*
Source of data used:	*China Energy Statistical Yearbook 2006, 2007 and 2008 Edition.*
Value applied:	*Detailed in Annex 3.*
Justification of the choice of data or description of measurement methods and procedures actually applied :	*Official data.*
Any comment:	-

Data / Parameter:	NCV_i
Data unit:	GJ/t or $GJ/10^3 m^3$
Description:	*Average low calorific values of fuels for electricity generation.*
Source of data used:	*China Energy Statistical Yearbook 2008 Edition, P283.*
Value applied:	*Detailed in Annex 3.*
Justification of the choice of data or description of measurement methods and procedures actually applied :	*China-specific values are adopted.*
Any comment:	*Official data.*

Data / Parameter:	$EF_{CO2,i}$
Data unit:	*tC/TJ*
Description:	*Emission factors of fuels for electricity generation.*
Source of data used:	*Table 1.3 and 1.4, Page 1.21-1.24, "2006 IPCC Guidelines for National Greenhouse Gas Inventories" Volume 2 Energy.*
Value applied:	*Detailed in Annex 3.*
Justification of the choice of data or description of measurement methods and procedures actually applied :	*IPCC world-wide default values are adopted. Data issued by IPCC.*

Any comment:	
Data / Parameter:	$EF_{Coal,Adv}$, $EF_{Oil,Adv}$ *and* $EF_{Gas,Adv}$
Data unit:	*tCO_2e/MWh*
Description:	*The efficiency level of the best coal-based, oil-based and gas-based power generation technology commercially available in China.*
Source of data used:	*Notification on Determining Baseline Emission Factors of China Power Grid*
Value applied:	*Detailed in Annex 3.*
Justification of the choice of data or description of measurement methods and procedures actually applied :	*Official data.*
Any comment:	

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

According to the calculation results in B6.1, the emission reductions of the proposed project are calculated as follows:

Baseline emissions

With reference to the Notification on Determining Baseline Emission Factors of China Power Grid issued by Chinese DNA on July 2nd, 2009, the OM emission factor ($EF_{OM,y}$) of NECPG is 1.1293tCO_2e/MWh, and the build margin emission factor ($EF_{BM,y}$) of NECPG is 0.7242tCO_2e/MWh. The detailed calculations and data are listed in Annex 3.

The baseline emissions factor (EF_y) of NECPG is calculated with formula (9) in part B.6.1 as follow:

$$EF_y = w_{OM} \cdot EF_{OM,y} + w_{BM} \cdot EF_{BM,y} = 1.028tCO_2e/MWh$$

Annual electricity output to NECPG of the Project is 114,200MWh. Based on the emission factors in the previous step, the baseline emission of the Project can be calculated with formula (1) in part B.6.1 as follow:

BE_y =117,400tCO_2e

Project emissions

According to the baseline methodology ACM0002, the GHG emission of the proposed project within the project boundary is zero

$$PE_y = 0$$

Emission Reductions

The emission reduction (ER_y) by the project activity during a given year y is the difference between baseline emissions (BE_y), project emissions (PE_y), as follows:

$$ER_y = BE_y - PE_y = 117{,}400 - 0 = 117{,}400 tCO_2e$$

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

Year	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
2010(Oct.1st-Dec.31st)	0	28,350	0	28,350
2011	0	117,400	0	117,400
2012	0	117,400	0	117,400
2013	0	117,400	0	117,400
2014	0	117,400	0	117,400
2015	0	117,400	0	117,400
2016	0	117,400	0	117,400
2017(Jan 1st-Sep.30th)	0	88,050	0	88,050
Total (tonnes of CO_2e)	0	821,800	0	821,800

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

B.7.1. Data and parameters monitored:

Data / Parameter:	$EG_{facility,y}$
Data unit:	*MWh/y*
Description:	*Quantity of net electricity generation supplied by the project to the grid in year y*
Source of data to be used:	*Measured and Calculated by Monitoring Meter.*
Value of data applied for the purpose of calculating expected emission reductions in section B.5	*114,200*
Description of measurement methods and procedures to be applied:	*There will be installed a multifunctional and bidirectional meter (accuracy degree will be no less than 0.5) in the project site through which the exported and imported generation can be measured, and the net electricity generation can be calculated.* *The metering instruments will be calibrated annually according to the national standards and rules.*
QA/QC procedures to be applied:	*The record of the electricity transaction between the project and the grid will be obtained to ensure the consistency.*
Any comment:	*See also section B.7.2 for more details.*

B.7.2. Description of the monitoring plan:

For the purpose of the integrated, continuous, transparent and accurate monitoring of the Project and the precise calculation of emission reductions during the crediting period, based on the monitoring methodology and the actual conditions of the Project, the monitoring plan is designed as follow:

1. Data to be monitored

In this PDD, emission factor of the Project is determined ex-ante. Therefore the quantity of net electricity generation supplied by the project to the grid by the Project which is used to calculate emission reductions is defined as the key data to be monitored.

2. Implementation of the monitoring plan

The Project owner will take the responsibility for the monitoring plan implementation. A CDM working team is established and consists of project manager, CDM manager, technical staff, and statistic staff. Organizing structure of the CDM team is shown as figure 4.

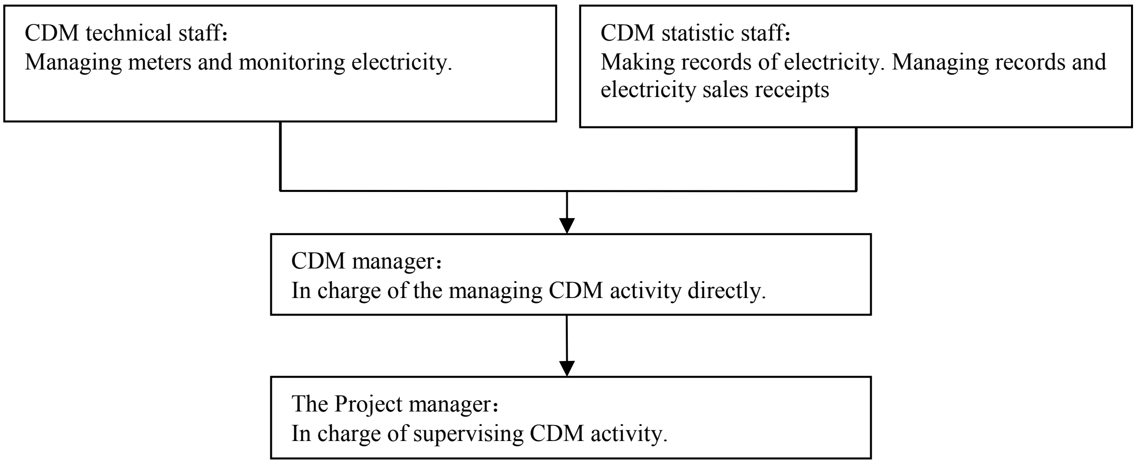


Figure 4 Structure of the CDM team

3. Training

The Management Group has all received sufficient training in terms of monitoring and verification. They have received general training on wind power project operation organized the project owner, including reading and calibration of meters, recording of the readings, adjustment of readings, and reporting of readings. On the other hand, they have received CDM training, including validation, registration and verification. When necessary, the CDM Manager is responsible for organizing or attending trainings on Monitoring and Verification. The procedure is as follows:

(1) Investigating whether there is need for trainings, and if so, the content of trainings.

(2) If so, obtaining the approval of General Manager.

(3) Checking if there are any trainings on Monitoring and Verification to be organized by other organizations. If so, attending them.

(4) If not, organizing trainings themselves.

4. Monitoring meter

The quantity of net electricity generation supplied by the project to the grid by the Project will be continuously monitored through the monitoring meter installed in the Project site. The accuracy degree will be no less than 0.5 according to relevant national standards.

The Schematic diagram of the meter position is as follows:

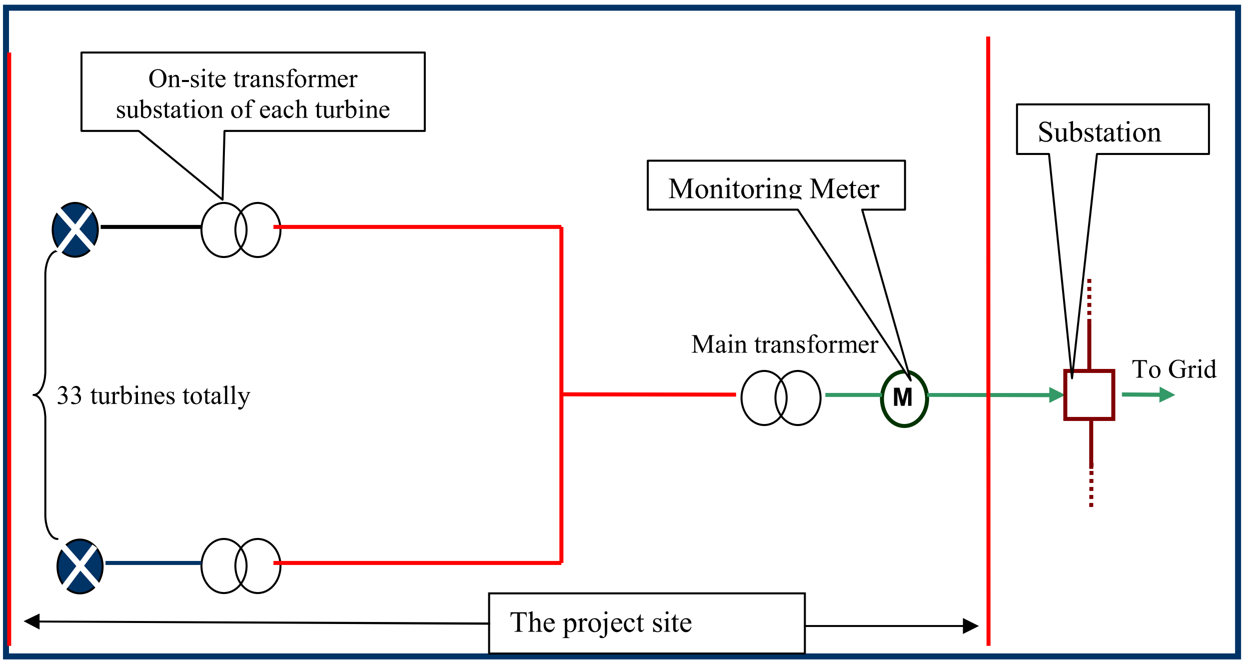


Figure 5 The Schematic diagram of the meter position

5. Procedures of monitoring

On-duty staff will watch the operation status of metering equipments everyday on site. Furthermore, designated staff will collect the measured electricity data and complete the corresponding records on a monthly basis. Before being archived, these records will be checked by other staffs to ensure the correctness. The data from these records will be digested and analyzed and the results will be reported to company administrator or supervisor.

All the relevant data records will be kept by the Project owner during the crediting period and two years after for verification.

6. Quality assurance and quality control

The quality assurance and quality control procedures involves of data monitoring, recording, maintaining and archiving, and monitoring equipment calibration.

The quantity of net electricity generation supplied by the project to the grid by the Project will be monitored through Monitoring Meter installed in the Project site. The data should be double checked against relevant electricity records from the grid for quality control. The Power Purchase Agreement between the Project owner and Grid Company can be used as guidance on data collection and documentation.

Calibration of Meters & Metering should be implemented according to national standards and rules (such as *DL/T448-2000 the Technical Management Rules for Electric Power Measuring Installations*), and the accuracy of the electricity meter is no less than 0.5.

7. Procedures of exception handling and reporting

The CDM technical staffs will take real-time monitoring on the operation status of metering meters to ensure that any abnormity could be detected and the corresponding measures of processing, reporting and recording will be taken in time. The abnormal meters will be repaired immediately and must be calibrated by a qualified third-party before being put into use again.

Problem occurred in monitoring and measurement process will be recorded and reported to company administrator or supervisor. Consequently, the corrective resolution will be adopted to deal with that problem and to avoid it occur again in future.

All the relevant records of exception handling will be kept by the Project owner during the crediting period and two years after for verification.

8. Verification

It is expected that the verification of emission reductions generated from the Project will be carried out annually.

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

Date of completion of baseline study: 24/07/2009

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

(Not the project participants listed in Annex 1)

Renlei

Longyuan (Beijing) Carbon Asset Management Technology Co., Ltd

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

Tel: +86-10-66091521

Fax: +86-10-66091396

Email: renlei@clypg.com

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:

21/03/2009（Real action- the earliest date for the purchase agreement with some technology suppliers.）

The main transformer purchasing contract was signed on Mar. 21th, 2009. The install contact of equipment and the wind turbine purchasing contract were signed on Mar. 24th, 2009. And the start work order was signed on Apr. 11th, 2009. So, the PP chooses the date of signature for purchasing main transformer as the starting date of CDM project activity conservatively.

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

21 years

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

C.2.1. Renewable crediting period

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

01/10/2010 or the day after registration, whichever is later

C.2.1.2. Length of the first crediting period:

7 years and 0 month.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

Not applicable.

C.2.2.2. Length:

Not applicable.

SECTION D. Environmental impacts

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

In accordance with relevant environmental law and regulations, the Environmental Assessment Report Table of the project has been approved by the Environmental Protection Administration of Inner Mongolia Autonomous Region, referred as "Neihuanshen (Table) [2009] No.54". A summary of the report is illustrated as follows:

- **Impacts on Water**

The wind-farm does not consume any water, nor does it generate any wastewater in the operation phase. The possible negative impacts are the household wastewater. Under normal conditions with highly automated monitoring and control system, the household wastewater will be first treated in a septic tank, and then be disinfected to discharge for circumjacent virescence.

- **Impacts Solid Waste**

Solid waste produced by builders and staff, and the waste earth from digging of the foundation in the construction phase. The amount of household solid waste will be very little, which will not have impact on the environment. Besides, the solid waste will be collected and moved to the landfill site of the nearest city. The waste earth from the digging should be firstly used for refilling. The rest of the waste earth should be placed in the low area of the site and replanted with grass.

- **Impacts on Noise Environment**

The noise of the project in construction phase is from vehicles and machines on-site. According to the monitoring data from the construction site, the noise is at a level between 91-102 dB. Moreover, the magnitude of the impacts during construction phase only exists for a temporary period and will expire with the end of the construction phase. Moreover, operational noise from the rotating blades is expected to be minimal due to the higher background noise caused by strong winds. The closest residential area to the site of the Project is over 1km away. Therefore, the noise of the project will not have impact on nearby residents.

Impacts on Air Environment

Wind Power plants are known to contribute to zero atmospheric pollution as no fuel combustion is involved during any stage of the operation. However, the sources of air pollution are mainly due to the construction activities including the transportation of construction material, road construction and Improvement and cadre construction etc. The impacts on air environment are temporarily that the impact

will be ended when the construction is completed. It is suggested that several measures shall be taken into account, such as the construction under strong wind weather is prohibited, reducing the area of construction as much as possible, spraying water when undertaking construction, and reducing the speed of vehicles in the field. Hence, air pollution caused by the project is not significant to the surrounding environment.

- **Impacts on Ecosystem Environment**

A serious potential concern for wind farms is their impact on vegetation, animals and migrating birds. The land on which the project activity takes place is barren and unfertile. Prior to the project activity the land had no beneficial use. The vegetation in the project area was substituted by grassland for livestock use and land for cultivation. So the minor quantity of solid / liquid discharge, likely to be generated during the construction phase has no noticeable impact on soil use and the project proponent has made arrangements to dispose them in an environmentally acceptable manner. Moreover, there are no migratory birds / endangered species in the region of project activity. Therefore, the activities to be carried out will not generate any negative impact on the ecological environment.

- **Ecological impacts**

The impacts on the vegetation and the use of land are mainly from activities of construction. The plants destroyed due to construction activities are mostly secondary shrubbery and weed, and there have no impacts on valuable and rare plants. With the implementation of water and solid conservation plan, the impacted vegetation can be recovered. Therefore, the Project has little impacts on the regional ecosystem and the vegetation.

In conclusion, environmental impacts arising from the Project are considered insignificant.

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

The Project will not have significant impacts on local environment in general, and the proposed project is definitely an environmentally more friendly way of providing power than others power plants. Meanwhile, the EIA of the Project has been approved by the local environmental protection administration. In conclusion, environmental impacts arising from the Project are considered insignificant.

SECTION E. Stakeholders' comments

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

In Mar 2009, staff from the project owner carried out a survey of local residents possibly be impacted in the area where the Project is sited to collect public comments and attitudes towards the Project before the construction starting.

The comments on the project activity by the local stakeholders have been invited and complied in two ways:

1) Symposium

On Mar 15th, 2009, under the support of local government, the project owner successfully held a stakeholder symposium in Tuquan County. Totally 10 stakeholder representatives participated the symposium, respectively from the Development and Reform Bureau of Tuquan County, several other department of local government and some villagers around plant. The project participants informed them about the project, asked for their comments on the project concerning socio-economic and environmental aspects, namely as follows,

1) Impact on the economic aspect, including the local economy, income and employment, etc;

2) Impact on the environmental aspect, including the ecological environment, air, noise and the impact of soil erosion, etc;

3) Impact on sustainable development;

4) Suggestions and recommendations on the proposed project;

5) Attitude to the implementation of the proposed project, whether or not to support.

2) Questionnaire

In order to finish this survey, project owner designed the style of Questionnaire and visited to Xiliu town to do door to door Interviews. The investigators went into the house of local residents to finish the work face to face. The local residents mainly included some villagers inhabiting in the town. The survey was conducted through distributing and collecting responses to a questionnaire.

The following is the main questions of the questionnaire.

- ✧ Do you know the proposed project?
- ✧ What benefits will be brought by the proposed project? Such as lessening of power shortage; increasing of income; improvement standard of living; improvement of local environment;

increasing of employment opportunities; or others.

- ✧ Will the proposed project bring negative impacts to economy development? Such as impacts of water quality; ecological environment; construction noise; quality of the air; or others.
- ✧ Do you comprehend the corresponding compensation measures for submerged land and settlement of migrants of the proposed project?
- ✧ Do you agree with the corresponding compensation measures?
- ✧ Do you support the construction of the proposed project?

Questionnaires were distributed according to the principle of both representation and randomness in order to reflect the public opinions and comments in a fair and real manner.

Totally 45 questionnaires returned out of 45 with 100% response rate.

The survey had taken full account into the public advice of different ages, genders, and occupations. Of all the respondents, 69% are under the age of 40, 31% are over 41; 92% are male and 8% are female; 58% are college or above, 58% are senior high school or below.

Table10 the stat of the respondents

<table>
<tr><td>Item</td><td colspan="8">The stat of the respondents</td></tr>
<tr><td rowspan="2">Sex</td><td colspan="2" rowspan="2">Male</td><td>No.</td><td>%</td><td rowspan="2">Female</td><td>No.</td><td colspan="2">%</td></tr>
<tr><td>41</td><td>82</td><td>4</td><td colspan="2">8</td></tr>
<tr><td rowspan="2">Age</td><td colspan="2">≤30</td><td colspan="2">31-40</td><td colspan="2">41-60</td><td colspan="2">>50</td></tr>
<tr><td colspan="2">13</td><td colspan="2">18</td><td colspan="2">10</td><td colspan="2">4</td></tr>
<tr><td rowspan="2">Education</td><td colspan="4">senior high school and below</td><td colspan="4">college and above</td></tr>
<tr><td colspan="4">19</td><td colspan="4">26</td></tr>
</table>

E.2. Summary of the comments received:

The following is a summary of the key findings based on 45 returned questionnaires.

- ✧ All respondents are supportive of the construction of the Project
- ✧ 42 respondents (93.3%) consider that the Project will be beneficial for the local social and economic development, and 3 respondents (6.7%) hold the neutral attitude;
- ✧ All respondents consider that the Project won’t have impact on ecological environment in the process of operation.
- ✧ 39 respondents (86.7%) consider the project won’t have negative impact on ecological environment in the process of construction, and 6 respondents (13.4%) hold the neutral attitude;

- 43 respondents (95.6%) consider the project will bring more job chances, and 2 respondents (4.4%) hold the neutral attitude;
- 1 respondent (2.2%) consider that the project will have negative impact that the vehicles for construction may crush down grass farms; others won't have any mind for the negative impact.

It shows that the local residents strongly support the Project, and they consider the Project will bring various positive impacts on their lives. The possible negative impacts focus on the grass farms which could be crushed down by the vehicles for construction.

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

The Project owner will pay much attention to the comments and suggestions of stakeholders and will put all of the measures listed in the EIA into effect during construction and operation period, so as to achieve environmental benefits, social benefits and economic benefits.

1 person said that the possible negative impacts focus on the grass farms which could be crushed down by the vehicles for construction. For this impact, the project owner will make sure the bound of construction, require the vehicles run in accordance with the road transport routes

In corresponding with EIA, the project owner has defined construction scale and worked out operation route. They request vehicles should be driven according to required transportation route. The behaviour of rolling grassland by construction vehicles will be prohibited in order to reduce the construction impact on surrounding vegetation.

Meanwhile, the work of vegetation restore should be done when construction is over. Eco impact brought by the project will be eliminated with the complete of the construction.

To sum up, the local residents are very supportive on the Project. The Project owner has taken full consideration of the comments and suggestions given by stakeholders during the project implementation. The Project owner will also keep regular communication with the public regarding the construction and operation of the Project.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

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

Annex 3

BASELINE INFORMATION

Data recommended in the *Notification on Determining Baseline Emission Factors of China power Grid* （issued by Chinese DNA） for NECPG are adopted for the Project.
Table A1~A3 show the thermal power generation supplied to NECPG in 2005, 2006 and 2007.

Table A1. Thermal power generation data within the NECPG in 2005

Province	Thermal power generation （MWh)	Auxiliary electricity consumption （%）	Thermal power supplied to the grid （MWh)
Liaoning	83697000	7.03	77,813,101
Jilin	35294000	6.59	32,968,125
Heilongjiang	58000000	7.96	53,383,200
Total			164,164,426

Data source: China Electric Power Yearbook 2006.

Table A2. Thermal power generation data within the NECPG in 2006

Province	Thermal power generation （MWh)	Auxiliary electricity consumption （%）	Thermal power supplied to the grid （MWh)
Liaoning	96282000	6.62	89,908,132
Jilin	38576000	6.78	35,960,547
Heilongjiang	62964000	7.85	58,021,326
Total			183,890,005

Data source: China Electric Power Yearbook 2007.
China Energy Statistical Yearbook 2007Edition.

Table A3. Thermal power generation data within the NECPG in 2007

Province	Thermal power generation （MWh)	Auxiliary electricity consumption （%）	Thermal power supplied to the grid （MWh)
Liaoning	106,500,000	7.00	99,045,000
Jilin	43,700,000	7.68	40,343,840
Heilongjiang	68,400,000	7.67	63,153,720
Total			202,542,560

Data source: China Electric Power Yearbook 2008.

With reference to the *Notification on Determining Baseline Emission Factors of China Power Grid*, Table A4 shows the low calorific values and emission factors for electricity generation that are to be used in the following OM emission factor calculation and BM emission factor calculation.

Table A4. Data of fuels consumed for electricity generation

Fuel type	Low calorific value	Emission factor	Oxidation rate
Raw coal	20908 kJ/kg	87,300	1
Cleaned coal	26344 kJ/kg	87,300	1
Other washed coal	8363 kJ/kg	87,300	1
Briquettes	20908 kJ/kg	87,300	1
Coke	28435 kJ/kg	95,700	1
Crude oil	41816 kJ/kg	71,100	1
Gasoline	43070 kJ/kg	67,500	1
Diesel	42652 kJ/kg	72,600	1
Fuel oil	41816 kJ/kg	75,500	1
Other petroleum products	41816 kJ/kg	75,500	1
Natural gas	38931 kJ/m3	54300	1
Coke oven gas	16726 kJ/m3	37300	1
Other gas	5227 kJ/m3	37300	1
LPG	50179 kJ/kg	61600	1
Refinery gas	46055 kJ/kg	48200	1

Data sources: China Energy Statistical Yearbook 2008 Edition, P283;

Table 1.3 and Table 1.4, Chapter 1, Volume 2 of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

Table A5~A7show the calculation of the simple OM emission factor of NECPG in 2005, 2006 and 2007

Table A5 Calculation of Simple OM Emission Factor of NECPG in 2005

Fuel type	**Unit**	**Liaoning** **A**	**Jinlin** **B**	**Heilongjiang** **C**	**Total Fuel** **D=A+B+C**	**Carbon Content tC/TJ** **E**	**Oxidation rate %** **F**	**Emission Factor kgCO2/TJ** **G**	**NCV MJ/t,km3** **H**	**Emission tCO2e I=D×G×H/100000（10000)**
Raw Coal	10^4t	4305.41	2446.13	3383.21	10134.75	25.8	100	87300	20908	184,986,389
Clean Coal	10^4t				0	25.8	100	87300	26344	0
Other washed coal	10^4t	524.74	19.26	24.16	568.16	25.8	100	87300	8363	4,148,079
Coke	10^4t				0	29.2	100	95700	28435	0
Coke oven gas	10^8m^3	1.03	3.57	0.68	5.28	12.1	100	37300	16726	329,409
Other coal gas	10^8m^3	12.62	8.37		20.99	12.1	100	37300	5227	409,236
Crude oil	10^4t	1.16			1.16	20	100	71100	41816	34,488
Gasoline	10^4t				0	18.9	100	67500	43070	0
Diesel	10^4t	1.18	1.48	0.57	3.23	20.2	100	72600	42652	100,018
Fuel oil	10^4t	9.32	2.46	1.55	13.33	21.1	100	75500	41816	420,842
LPG	10^4t	0.12			0.12	17.2	100	61600	50179	3,709
Refinery gas	10^4t	5.48		1.32	6.8	15.7	100	48200	46055	150,950
Nature gas	10^8m^3		0.84	2.24	3.08	15.3	100	54300	38931	651,098
Other petroleum products	10^4t				0	20	100	75500	41816	0
Other coking	10^4t				0	25.8	100	95700	28435	0
Other energy	10^4tce	16.18			16.18	0	100	0	0	0
Total emission of North East China Grid(tCO2e)					191,234,218					
Net electricity import from North East China Grid(MWh)					164,164,426					
Average emission factor of North East China(tCO2e/MWh)					1.16489					

Source: China Energy Statistical Yearbook 2006 Edition

Table A5 Calculation of Simple OM Emission Factor of NECPG in 2006

Fuel type	Unit	Liaoning A	Jinlin B	Heilongjiang C	Total Fuel D=A+B+C	Carbon Content tC/TJ E	Oxidation rate % F	Emission Factor kgCO2/TJ G	NCV MJ/t,km3 H	Emission tCO2e I=D×G×H/100000 (10000)
Raw Coal	10^4t	4681.99	2738.24	3698.29	11118.52	25.8	100	87300	20908	202,942,832
Clean Coal	10^4t	0.03			0.03	25.8	100	87300	26344	690
Other washed coal	10^4t	674.74	17.83	96	788.57	25.8	100	87300	8363	5,757,270
Coke	10^4t	3.32			3.32	29.2	100	95700	28435	90,345
Coke oven gas	10^8m^3	2.68	0.16	1.44	4.28	12.1	100	37300	16726	267,021
Other coal gas	10^8m^3	55.26	1.43		56.69	12.1	100	37300	5227	1,105,268
Crude oil	10^4t	0.49			0.49	20	100	71100	41816	14,568
Gasoline	10^4t				0	18.9	100	67500	43070	0
Diesel	10^4t	0.75	0.39	0.3	1.44	20.2	100	72600	42652	44,590
Fuel oil	10^4t	11.73	0.45	1.44	13.62	21.1	100	75500	41816	429,998
LPG	10^4t				0	17.2	100	61600	50179	0
Refinery gas	10^4t	8.55		4.27	12.82	15.7	100	48200	46055	284,585
Nature gas	10^8m^3		0.19	2.1	2.29	15.3	100	54300	38931	484,095
Other petroleum products	10^4t				0	20	100	75500	41816	0
Other coking	10^4t				0	25.8	100	95700	28435	0
Other energy	10^4tce	12.16	17.6	82.77	112.53	0	100	0	0	0
Total emission of North East China Grid(tCO2e)					211,421,263					
Net electricity import from North East China Grid(MWh)					183,890,005					
Average emission factor of North East China(tCO2e/MWh)					1.14972					

Source: China Energy Statistical Yearbook 2007 Edition

Table A5 Calculation of Simple OM Emission Factor of NECPG in 2007

Fuel type	Unit	Liaoning A	Jinlin B	Heilongjiang C	Total Fuel D=A+B+C	Carbon Content tC/TJ E	Oxidation rate % F	Emission Factor kgCO2/TJ G	NCV MJ/t,km3 H	Emission tCO2e I=D×G×H/100000 （10000)
Raw Coal	10^4t	4869.32	2873.45	3736.11	11478.88	25.8	100	87300	20908	209,520,369
Clean Coal	10^4t	0	0	0	0	25.8	100	87300	26344	0
Other washed coal	10^4t	747.85	16.52	106.81	871.18	25.8	100	87300	8363	6,360,397
Coke	10^4t	4.99	0	0	4.99	29.2	100	95700	28435	135,789
Coke oven gas	10^8m^3	5.53	1.44	1.89	8.86	12.1	100	37300	16726	552,758
Other coal gas	10^8m^3	68.38	9.06	0	77.44	12.1	100	37300	5227	1,509,825
Crude oil	10^4t	0.24	0	0	0.24	20	100	71100	41816	7,135
Gasoline	10^4t	0	0	0	0	18.9	100	67500	43070	0
Diesel	10^4t	0.96	0.39	0.47	1.82	20.2	100	72600	42652	56,357
Fuel oil	10^4t	8.43	0.45	1.48	10.36	21.1	100	75500	41816	327,076
LPG	10^4t	0	0	0	0	17.2	100	61600	50179	0
Refinery gas	10^4t	7.33	0	1.99	9.32	15.7	100	48200	46055	206,890
Nature gas	10^8m^3	0	0.02	2.03	2.05	15.3	100	54300	38931	433,360
Other petroleum products	10^4t	0.01	0	0	0.01	20	100	75500	41816	316
Other coking	10^4t	0.46	0	0	0.46	25.8	100	95700	28435	12,518
Other energy	10^4tce	12.41	2.43	51.35	66.19	0	100	0	0	0
Total emission of North East China Grid(tCO2e)					219,122,791					
Net electricity import from North East China Grid(MWh)					202,542,560					
Average emission factor of North East China(tCO2e/MWh)					1.08186					

Source: China Energy Statistical Yearbook 2008 Edition

The Simple OM emission factor is the weighted average value of the Simple OM emission factors in the year 2005, 2006 and 2007, i.e.

$EF_{OM,y}$ =1.1293tCO$_2$e/MWh

Build Margin emission factor is calculated according to the steps and formulae described in Section B.6.1.
Table A8 is the calculation of the emission factor reflecting the efficiency level of the best electricity generation technology commercially available in China with reference to the *Notification on Determining Baseline Emission Factors of China Power Grid* issued by Chinese DNA.

Table A8. The data of efficiency level of the best electricity generation technologies commercially available in China and the corresponding emission factors

	Parameter	**Best efficiency of supplying electricity** **%**	**Fuel emission factor** **tc/TJ**	**Oxidation rate**	**Emission factor** **tCO2e/MWh**
		A	B	C	C=3.6/A/10000*B*C
Coal-fired power plant	EF_{Coal}	38.10	87300.00	1	0.8249
Oil-fired power plant	EF_{Oil}	49.99	75500.00	1	0.5437
Gas-fired power plant	EF_{Gas}	49.99	54300.00	1	0.3910

Table A9. Calculation of simple OM emission factor of NCPG in 2007

Energy	Unit	Liaoning	Jinlin	Heilongjiang	Total Fuel	Carbon Content tC/TJ	Oxidation rate %	Emission Factor kgCO2/TJ	NCV MJ/t,km3	Emission (tCO_2e) tCO2e
		A	B	C	D=A+B+C	E	F	G	H	I=D×G×H/100000（10000)
Raw Coal	10^4t	4869.32	2873.45	3736.11	11478.88	25.8	100	87300	20908	209,520,369
Cleaned coal	10^4t	0	0	0	0	25.8	100	87300	26344	0
Other washed coal	10^4t	747.85	16.52	106.81	871.18	25.8	100	87300	8363	6,360,397
Coke	10^4t	4.99	0	0	4.99	29.2	100	95700	28435	135,789
Other coking	10^4t	0.46	0	0	0.46	25.8	100	95700	28435	12,518
Sub-total										**216,029,074**
Crude oil	10^4t	0.24	0	0	0.24	20	100	71100	41816	7,135
Gasoline	10^4t	0	0	0	0	18.9	100	67500	43070	0
Diesel	10^4t	0.96	0.39	0.47	1.82	20.2	100	72600	42652	56,357
Fuel oil	10^4t	8.43	0.45	1.48	10.36	21.1	100	75500	41816	327,076
Other petroleum products	10^4t	0.01	0	0	0.01	20	100	75500	41816	316
Sub-total										**390,885**
LPG	10^4t	0	0	0	0	17.2	100	61600	50179	0
Refinery gas	10^4t	7.33	0	1.99	9.32	15.7	100	48200	46055	206,890
Coke oven gas	10^8m^3	5.53	1.44	1.89	8.86	12.1	100	37300	16726	552,758
Other coal gas	10^8m^3	68.38	9.06	0	77.44	12.1	100	37300	5227	1,509,825
Nature gas	10^8m^3	0	0.02	2.03	2.05	15.3	100	54300	38931	433,360
Sub-total										**2,702,833**
Total										**219,122,791**

Source:China Energy Statistical Yearbook 2008 Edition

Calculate with data provided in Table A8, A9 and formula, the value for

$\lambda_{Coal,y}$ =98.59% $\lambda_{Oil,y}$ =0.18% $\lambda_{Gas,y}$ =1.23%

Based on Table A8 and formula in section B.6.1, the emission factor for thermal power is:

$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y}$ =0.8190tCO_2e/MWh

Table A10~A12 show the installed capacity of NECPG in 2004, 2005 and 2007 and Table A13 shows the calculation of BM emission factor of NECPG.

Table A10. Installed capacity of the NECPG in 2004

Installed Capacity	Liaoning	Jilin	Heilongjiang	Total
Thermal power (MW)	14960.3	5958.7	11259.1	32178.1
Hydro power (MW)	1404.1	3601.2	844.6	5849.9
Nuclear power (MW)	0	0	0	0
Wind power and Other (MW)	142	36.1	39.3	217.4
Total (MW)	16506.4	9596	12143	38245.4

Data sources: China Electric Power Yearbook 2005 Edition.

Table A12. Installed capacity of the NECPG in 2005

Installed Capacity	Liaoning	Jilin	Heilongjiang	Total
Thermal power (MW)	15999	6359.4	11575.6	33934
Hydro power (MW)	1403.9	3720.8	846.7	5971.4
Nuclear power (MW)	0	0	0	0
Wind power and Other (MW)	135.5	85.4	52.4	273.3
Total (MW)	17538.4	10165.6	12474.7	40178.7

Data sources: China Electric Power Yearbook 2006 Edition.

Table A12. Installed capacity of the NECPG in 2007

Installed Capacity	Liaoning	Jilin	Heilongjiang	Total
Thermal power(MW)	19720	7580	14080	41380
Hydro power(MW)	1410	3890	870	6170
Nuclear power(MW)	0	0	0	0
Wind power and Other(MW)	359	514	230	1103
Total(MW)	21489	11984	15180	48653

Data sources: China Electric Power Yearbook 2008Edition.

Table A13. Calculation of BM emission factor of NECPG

	Installed capacity in 2004 (MW) A	Installed capacity in 2005 (MW) B	Installed capacity in 2007 (MW) C	Capacity additions during 2004-2007 (MW) D=C-A	Share in total capacity Additions (MW)
Thermal power	**32178.1**	**33934**	**41380**	**9201.9**	**88.42%**
Hydro power	**5849.9**	**5971.4**	**6170**	**320.1**	**3.08%**
Nuclear power	**0**	**0**	**0**	**0**	**0.00%**
Wind power and Other	**217.4**	**273.3**	**1103**	**885.6**	**8.51%**
Total	**38245.4**	**40178.7**	**48653**	**10407.6**	**100.00%**
Proportion to the installed capacity in 2007	**78.61%**	**82.58%**	**100.00%**		

Based on Table A13 and formula in section B.6.1, calculate the BM emission factor of NECPG as

$$EF_{BM,y} = \frac{CAP_{Thermal,y}}{CAP_{Total,y}} \times EF_{Thermal,y} = 0.8190 \times 88.42\% = 0.7242 \text{tCO2/MW}$$

Annex 4

MONITORING PLAN

Please refer to section B.7. No need to complement more information here.

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