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

CONTENTS

SECTION A. General description of project activity

A.1 Title of the project activity:

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Heilongjiang Fujin Phase II 18MW Wind Power Project
Version number of the document: 3
Date: 11/08/2008

A.2. Description of the project activity:

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The Heilongjiang Fujin Phase II 18MW Wind Power Project (hereafter, the Project), is sited in the Bielayinshan, which is located in the 32 km southwest to Fujin City of Heilongjiang Province. The Project involves the installation of 12 turbines, each of which have a capacity of 1500kW, providing a total installed capacity of 18MW. The estimated electricity delivered to the Northeast China Grid by the Project is 40,716 MWh [1]per year.

As a grid-connected renewable power project, the Project activity will achieve the greenhouse gas (GHG) emission reductions by avoiding CO_2 emissions from the business-as-usual scenario, the electricity generation of those fossil fuel-fired power plants connected into the Northeast China Grid. The estimated annual emission reductions are 46,657 tCO_2e.

The Project clearly fits into the development priority of China, and will support China in stimulating and accelerating the commercialization of grid-connected renewable energy technologies and the development of the green-power market. The Project will also contribute to the sustainable development of the host country and the local community mainly by:

- ✧ Reducing GHG emissions in China compared to the business-as-usual scenario;
- ✧ Reducing other pollutants resulting from the power generation industry in China, compared to the business-as-usual scenario;
- ✧ Helping to stimulate the growth of wind power industry in China;
- ✧ Creating local employment opportunities during the project construction and operation (about 10 persons);
- ✧ Increasing the revenue for local government.

A.3. Project participants:

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The partied involved in the Project are listed as follows:

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)	Heilongjiang Huafu Wind Power Fujin Co., Ltd.	No
UK	Shell Trading International Ltd.(UK)	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		

[1] Data from Feasibility Study Report: 18MW×2262h = 40716MWh

requesting registration, the approval by the Party (ies) involved is required.

Annex 1 lists the complete contact information on participants in the project activity.

A.4. Technical description of the project activity:

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A.4.1. Location of the project activity:

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A.4.1.1. Host Party(ies):

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People's Republic of China

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

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Heilongjiang Province

A.4.1.3. City/Town/Community etc:

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Fujin City

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

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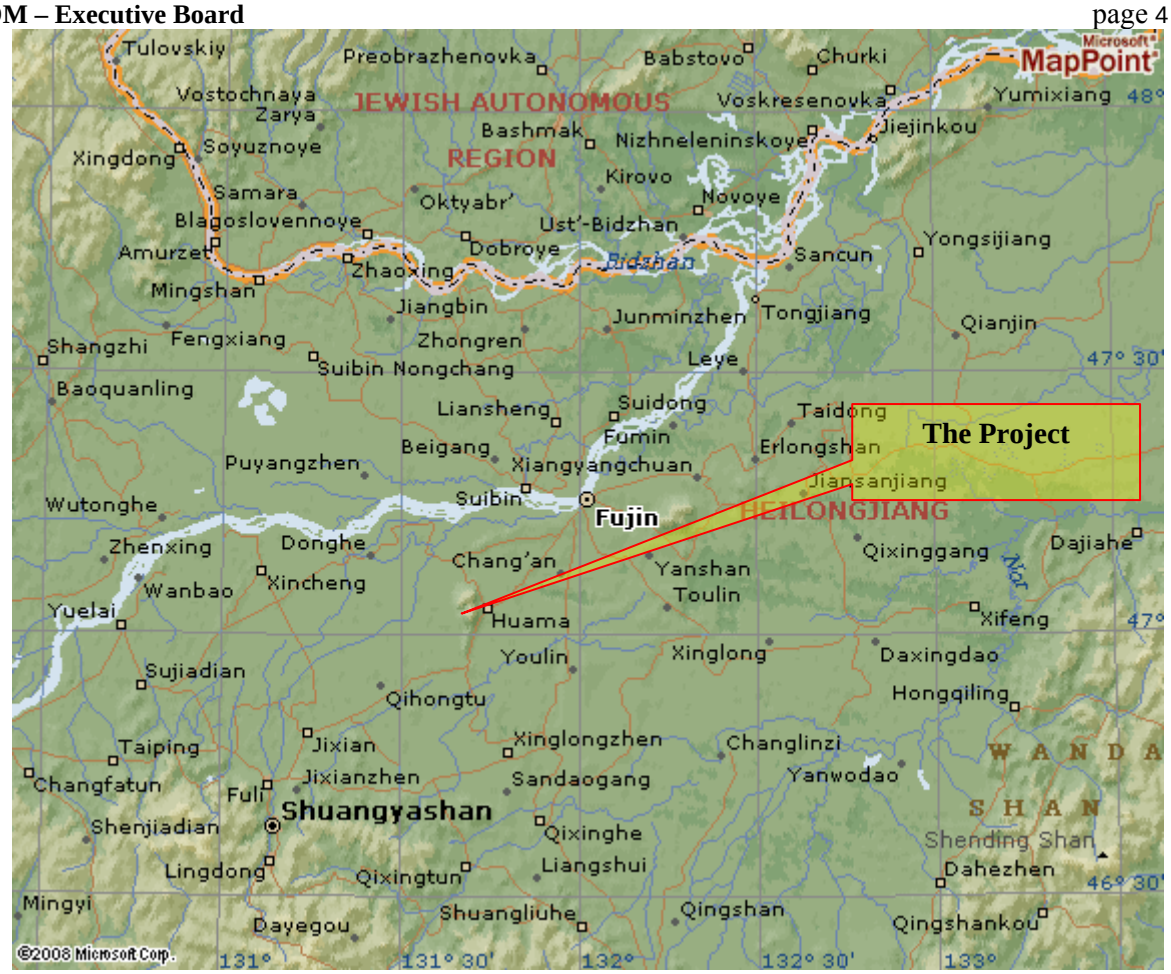
The Project is sited in the Bielayinshan, which is located in the 32 km southwest to Fujin City of Heilongjiang Province. The Project has geographical coordinates with east longitude of 131° 40′ and north latitude of 47° 04′. Figure A-1 and Figure A-2 show the location of the Project.

Figure A-1. Location of the Project

Figure A-2. Location of the Project



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

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Sectoral scope 1: energy industries (renewable sources).

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

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Totally 12 sets of FL1500 turbines with a unit capacity of 1500 kW were selected for the Project, providing a total installed capacity of 18MW. The FL1500 turbines are manufactured by local supplier Sinovel Wind Co. Ltd. According to the turbine layout, each turbine will be equipped with one transformer. The construction will also include the wind farm 66kV step-up substation. The electricity generated by the Project will be delivered to the grid through the Fujin Wind Farm 66kV substation.

Key technical parameters of FL1500 turbine are listed in the following Table A-1.

Table A-1. Technical parameters of FL1500 Turbine

Item	Unit	Index
Nominal capacity	kW	1500
Number of blades	piece	3
Rotor diameter	m	70.4
Swept area	m^2	3890.59
Cut-in speed	m/s	3

Rated wind speed	m/s	12
Cut-out speed	m/s	25
Rated voltage of generator	V	690
Frequency	Hz	50

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

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It is expected that the Project activity will generate emission reductions for about 46,657 tCO_2e annually over the first 7-year crediting period from 2008 to 2014.

Years*	Annual estimation of emission reductions in tones of CO_2e
2008	46,657
2009	46,657
2010	46,657
2011	46,657
2012	46,657
2013	46,657
2014	46,657
Total estimated reductions (tones of CO_2e)	326,599
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tones of CO_2e)	46,657

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

A.4.5. Public funding of the project activity:

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There is no public funding from Annex I Parties for this 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:

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ACM0002 (ver 06) – "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" and "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources".

The Tool for the Demonstration and Assessment of Additionality (ver 04).

Reference: UNFCCC website: http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

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

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Wind power generation technology is a renewable electricity generation technology which displaces fossil fuel-fired power generation technology to supply electricity to the grid. Therefore the methodology used to determine the Project baseline is the approved consolidated baseline methodology ACM0002. The methodology can be used to calculate GHG emission reductions achieved by wind power generation.

The Project meets all applicability conditions of baseline methodology ACM0002 as follows:

1) The Project involves an electricity capacity addition from wind power;
2) The Project does not involve switching from fossil fuel-fired to renewable energy at the site of the project activity.
3) The geographic and system boundaries for the Northeast China Grid can be clearly identified and information on the characteristics of the grid is available.

Therefore, the approved consolidated baseline methodology ACM0002 "Consolidated baseline and monitoring methodology for grid-connected electricity generation from renewable sources." is applicable to the Project.

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

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The spatial extent of the Project boundary includes the Project site and all power plants connected physically to the Northeast China Grid which is the electricity system that the Project is connected to. The Northeast China Grid includes Liaoning Province Grid, Jilin Province Grid and Heilongjiang Province Grid.

	Source	Gas	Included?	Justification / Explanation
Baseline	Electricity generation of those fossil fuel-fired power plants connected into the Northeast China Grid	CO_2	Yes	Main emission sources.
		CH_4	No	Excluded for simplification. This is conservative.
		N_2O	No	Excluded for simplification. This is conservative.
Project Activity	Project emission	CO_2	No	The Project is a wind power project, so the project emissions should not be considered as per ACM0002.
		CH_4	No	
		N_2O	No	

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

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Realistic and credible alternatives that provide outputs or services comparable to the Project activity include:

***Alternative 1*:** Construction of a fossil fuel-fired power plant with equivalent amount of annual electricity generation;
Alternative 2: The Project activity not undertaken as a CDM project activity;
Alternative 3: Construction of a power plant using other sources of renewable energy with equivalent amount of annual electricity generation;
Alternative 4: Equivalent electricity service provided by the Northeast China Grid.

For ***Alternative 1***, in generally speaking, the annual operating hours of a fossil fuel-fired power plant are about at least 2 times more than that of a wind power project. The annual operating hours of the Project are 2262 hours, and the annual operating hours of a fossil fuel-fired power plant in China are over 5876 hours in most cases[2]. So a fossil fuel-fired power plant which provides equivalent annual electricity generation would require an installed capacity lower than 10MW. However, according to Chinese regulations, construction of fossil fuel-fired power plants with the installed capacity of 135MW or below is prohibited in the areas covered by large grids such as provincial grids[3]. For the above reason, the possible alternative baseline scenario of building a 10MW fossil fuel-fired power plant conflicts with Chinese current regulations. So, ***Alternative 1*** is not feasible as an alternative scenario.

For ***Alternative 2***, is consistent with current laws and regulations. Therefore, ***Alternative 2*** is feasible.

For ***Alternative 3***, the local area is lack of biomass materials. So, other renewable energy basically refers to hydro energy. In China, water resources are so unevenly distributed that 90% of exploitable installed capacity of hydropower project is concentrated in the western China. In the northeast China, hydro resources are relatively limited. In 2006, hydropower project accounted for only 0.06%[4] of the total installed capacity of the Heilongjiang province and 0.02%[5] of the total installed capacity of the Northeast China Grid. It clearly shows that water resources are limited in local area. For these reasons, ***Alternative 3*** is not feasible as an alternative scenario.

For ***Alternative 4***, is consistent with current laws and regulations also. Therefore, ***Alternative 4*** is feasible.

In conclusion, ***Alternative 2*** and ***Alternative 4*** are analyzed as potential baseline alternatives.

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

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The Feasibility Study Report (hereafter, FSR) of the Project was completed by Heilongjiang Electric

[2] http://www.gov.cn/banshi/2006-03/20/content_231470.htm

[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] *China Electric Power Yearbook 2007*

[5] *China Electric Power Yearbook 2007*

Power Design Institute in Nov 2006 and was approved by Heilongjiang Development and Reform Commission. In the FSR, the total investment IRR could reach the financial benchmark, so the CDM revenues were not considered in the FSR. Soon after, on the same month, the Project owner received two documents which are *The Adjustment of the tariff in Northeast China Grid from Nation Development and Reform Commission* (hereafter, NDRC)[6] and *The some regulation about Renewable Energy*[7] were issued by NDRC. According these documents, the tariff of renewable energy such as wind farm project in Heilongjiang is 0.6067 RMB/kWh[8], much lower than what used in the FSR. According to the analysis based on the FSR and the guidance tariff from the NDRC, the financial indicator such as total investment IRR of the Project is lower than the financial benchmark. The Project is not financially attractive. At that time, CDM under Kyoto Protocol had already been well known by the energy industry in China and even some CDM projects had been registered in EB (such as Fujian Zhangpu Liuao 30.6 MW Wind Power Project[9] , Ningxia Tianjing Shenzhou 30.6MW Wind-farm Project[10] and so on). The Project owner got to know the CDM information from internet and the Project was suggested to be developed as a CDM project by CDM consulting company. In order to alleviate the financial disadvantages of the Project, the Project owner accepted the suggestion from the CDM consulting company and then the Project owner held the Board Meeting for CDM development on 15 Dec 2006. The CDM service agreement was signed between the Project owner and CDM consulting company on the same month. In the Board Meeting, the Project directorate made the decision to seek the help from CDM revenue to alleviate the financial disadvantages. The board decision showed that, only with the compensation from CDM project, the IRR can be increased to normal level to promote the continuous development of the Project. Therefore, the Project owner expected to look for CERs buyers through invitation for bid. With the preparation for the invitation for bid about 2 months, Shell was issued as CER Buyer in Feb 2007. With the compensation from CDM revenues, the financial disadvantages could be alleviated. Before long, the Equipment Purchase Agreement was signed on 18 Apr 2007 and then the construction of the Project was formally launched on 13 June 2007.

The date (18/04/2007) of signing the Equipment Purchase Agreement was selected as the Starting Date of the Project since it was the earliest date at which the implementation of the Project begins, according to definition in paragraph 76 of thirty-third Meeting Report of the EB [11].

The additionality of the Project is demonstrated and assessed by using the *Tool for the Demonstration and Assessment of Additionality* approved by EB (ver 04). It includes the following steps:

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

[6] http://www.ndrc.gov.cn/zcfb/zcfbtz/tz2006/t20060630_75078.htm

[7] http://www.gov.cn/ztzl/2006-01/20/content_165910.htm

[8] According to *The Adjustment of the tariff in Northeast China Grid from NDRC*, the demarcated tariff, in Heilongjiang is fixed as 0.3567 RMB/kWh, and referring to *The some regulation about Renewable Energy from NDRC*, the renewable energy project in Heilongjiang will get subsidy as 0.25 RMB/kWh, so the total tariff is 0.6067 RMB/kWh.

[9] http://cdm.unfccc.int/Projects/DB/DNV-CUK1145978917.74/view

[10] http://cdm.unfccc.int/Projects/DB/DNV-CUK1146207502.96/view

[11] The Board agreed to clarify that the primary purpose of defining the start date of a project activity is to ensure that project activities submitted for registration comply with the requirements of paragraph 13 of Decision 17/CP.7. In this context, it has always been the Board's view that the start date of a CDM project activity is the earliest of the dates at which the implementation or construction or real action of the project activity begins.

The objective of the Step 1 is to define realistic and credible alternatives to the project activity that can be (part of) the baseline scenario through the following sub-steps:

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

Realistic and credible alternatives that provide outputs or services comparable to the Project activity include:

***Alternative 1*:** Construction of a fossil fuel-fired power plant with equivalent amount of annual electricity generation;
Alternative 2: The Project activity not undertaken as a CDM project activity;
Alternative 3: Construction of a power plant using other sources of renewable energy with equivalent amount of annual electricity generation;
Alternative 4: Equivalent electricity service provided by the Northeast China Grid.

The local area is lack of biomass materials. So, other renewable energy basically refers to hydro energy. In China, water resources are so unevenly distributed that 90% of exploitable installed capacity of hydropower project are concentrated in the western China. In the northeast China, hydro resources are relatively limited. In 2006, hydropower project accounted for only 0.06%[12] of the total installed capacity of the Heilongjiang province and 0.02%[13] of the total installed capacity of the Northeast China Grid. It clearly shows that water resources are limited in local area. For these reasons, ***Alternative 3*** is not feasible as an alternative scenario.

Outcome of Sub-step 1a:
Four realistic and credible alternatives to the Project activity are selected and ***Alternative 3*** is excluded.

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

For ***Alternative 1***, in generally speaking, the annual operating hours of a fossil fuel-fired power plant are about at least 2 times more than that of a wind power project. The annual operating hours of the Project are 2262 hours, and the annual operating hours of a fossil fuel-fired power plant in China are over 5876 hours in most cases[14]. So a fuel-fired power plant which provides equivalent annual electricity generation would require an installed capacity lower than 10MW. However, according to Chinese regulations, construction of fuel-fired power plants with the installed capacity of 135MW or below is prohibited to be built in the areas covered by large grids such as provincial grids[15]. For the above reasons, the possible alternative baseline scenario of building a 10MW fuel-fired power plant conflicts with China's current regulations. So, ***Alternative 1*** is not feasible as an alternative scenario.

For ***Alternative 2***, is consistent with current laws and regulations. Therefore, ***Alternative 2*** is feasible.

For ***Alternative 4***, is consistent with current laws and regulations also. Therefore, ***Alternative 4*** is feasible.

Outcome of Sub-step 1b:
Therefore ***Alternative 2*** and ***Alternative 4*** are analyzed in **Step 2 Investment Analysis** as potential

[12] *China Electric Power Yearbook 2007*

[13] *China Electric Power Yearbook 2007*

[14] http://www.gov.cn/banshi/2006-03/20/content_231470.htm

[15] *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.

baseline alternatives.

Step 2. Investment Analysis

Sub-step 2a. Determine appropriate analysis method

The *Tools for the demonstration and assessment of additionality* recommends three analysis methods which are simple cost analysis (option I), investment comparison analysis (option II) and benchmark analysis (option III).

If the Project will earn the revenues from only the CDM activity but not including the electricity output, then the simple cost analysis (option I) is appropriate. Otherwise, the investment comparative analysis (option II) and the benchmark analysis (Option III) could be used to the Project. The benchmark analysis (Option III) shall be chosen to assess the financial viability of the Project activity. The Investment Analysis in accordance with the *Guidance on the Assessment of Investment Analysis* (version02, EB 41 Meeting Report Annex45).

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

According to the *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects*[16], a project will be financially acceptable when the total investment Internal Return Rate (IRR) is higher than 8% for investments in power industry. On the basis of the benchmark 8%, calculation and comparison of financial indicators are carried out in ***sub-step 2c***.

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

(1) Basic parameters for calculation of financial indicators

The basic parameters for calculation of financial indicators are shown in Table B-1 as follows:

Table B-1 Basic parameters for calculation of financial indicators

Item	**Value**	**Data Source**
Installed capacity	18MW	FSR
Annual electricity output	40,716 MWh	FSR
Project lifetime	20 years	FSR
Total investment	RMB 195.6911 million	FSR
Feed-in-Tariff (including VAT)	0.6067 RMB/KWh	Guidance tariff from the NDRC[17]

[16] *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects* was issued by Operation Department of Power Generation and Transmission, State Power Corporation on 10 Sep 2002.

[17] *The Adjustment of the tariff in Northeast China Grid from NDRC* and *The some regulation about Renewable Energy*

Tax	8.5% (VAT), 33% (income tax)	FSR
Annual O&M costs	RMB 4.21 million	FSR
CERs Price	9 Euro/tCO2e	

(2) Comparison of total investment IRR for the Project and the financial benchmark

In accordance with benchmark analysis (Option III), if the financial indicators (such as total investment IRR) of a project are lower than the benchmark, it is not considered to be financially attractive.

Table B-2 shows the total investment IRR of the Project with and without the CDM revenues. Without the CDM revenues, the IRR of total investment is 6.70%, which is lower than the financial benchmark 8%. Thus the Project is not financially attractive. While taking into account the CDM revenues (calculated with 9 Euro/t CO2e, 7×3 years crediting period), the total investment IRR of the Project will be 9.81%, which is higher than the financial benchmark 8%.

Table B-2 Total Investment IRR of the Project

	Total Investment IRR
Without CDM revenues	6.70%
With CDM revenues	9.81%
Financial benchmark	8%

Sub-step 2d. Sensitivity analysis

The sensitivity analysis shall show whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions.

According to *Economical Assessment and Parameters for Construction Project*[18], the fluctuation of sensitivity analysis in construction projects could be in ±10% which is same as FSR. Besides the Project, similar wind power projects in China always adopt ±10% as the fluctuation of sensitivity analysis, which is the common sense in China. So, the sensitivity analysis conducted by altering from -10% to +10% respectively is commonly acknowledged and used in China.

For the Project, four parameters were selected as sensitive factors to assess the financial attractiveness:

1) Total investment
2) Annual O&M cost
3) Annual electricity output
4) Feed-in-Tariff

The results of sensitive analysis (without CDM revenues) are shown in Table B-3 and Figure B-1 below.

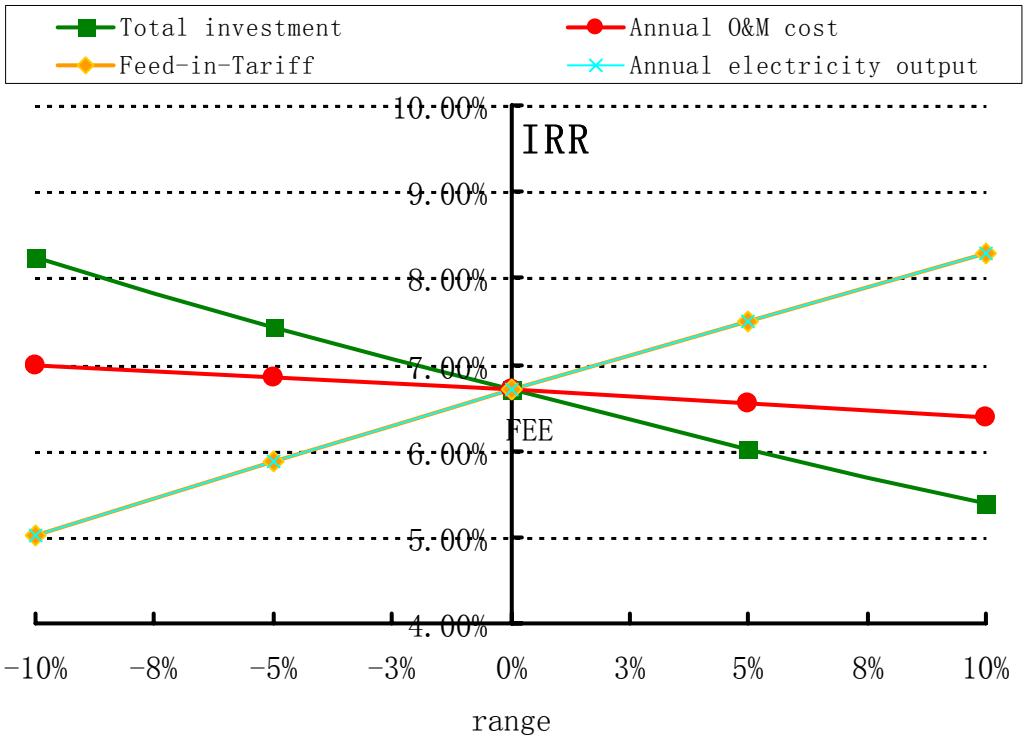
Table B-3. Sensitivity of total investment IRR to different financial parameters

	-10%	-5%	0%	+5%	+10%
Total investment	8.23%	7.43%	6.70%	6.02%	5.39%
Annual O&M cost	6.99%	6.85%	6.70%	6.55%	6.39%

[18] *Economical Assessment and Parameters for Construction Project* issued by National Planning Committee and Ministry of Construction and Published by China Planning Press.

Annual electricity output	5.03%	5.87%	6.70%	7.50%	8.28%
Feed-in-Tariff	5.03%	5.87%	6.70%	7.50%	8.28%

Figure B-1. Sensitivity of total investment IRR to different financial parameters



It could be found that the total investment IRR of the Project will reach the benchmark IRR when the total investment decreases 9.14 percent. In China the prices of construction materials such as steel and cement are continuously increasing[19] in these years. So it is unlikely that the total investment of the Project decreases over 9.14 percent.

When the annual O&M cost varies from negative 10 percent to positive 10 percent, the total investment IRR of the Project is lower than the benchmark IRR. Since the wind turbines operate in the hill of the Bielayinshan, and the operating maintenance is very difficult, such reduction of O&M cost is lack of possibility for the Project. Therefore, it is unlikely that the O&M cost of the Project decreases over 10 percent.

It could be found that the total investment IRR of the Project will reach the benchmark IRR when the annual electricity output increase 8.2 percent. The annual electricity output was calculated based on the historical data which is same as FSR. The historical data of the wind speed was noted by the Fujin weather station of latest 34 years, so it is very unlikely that the annual electricity output of the Project increases over 8.2 percent.

It could be found that the total investment IRR of the Project will reach the benchmark IRR when the feed-in-tariff increases 8.2 percent. There is no mature electric power market in China, and the tariffs of power plants are decided by the government. Furthermore, once the tariff is decided, it won't be changed in a fairly long time. Once the tariff is issued, it will be strictly regulated by the government; neither the

[19] http://www.projectbidding.cn/gcxx/show_gcxx.jsp?leixing=scfx&id=5124

Project owner nor the grid company can change it. Hence, it is very unlikely that the tariff of the Project increases over 8.2 percent for a long time.

To sum up, it can be concluded that without CDM revenues, the Project is not financially attractive.

Outcome of Step2:
In conclusion, the realistic and credible alternatives to the Project activity are selected and ***Alternative 2*** is excluded. The realistic and credible baseline scenario is ***Alternative 4*** Equivalent electricity service provided by the Northeast China Grid.

Step 4. Common practice analysis

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

According to the *Chinese Wind Energy Association* statistics[20], there are nine wind power projects with similar installed capacity (12MW-50MW) as the Project in Heilongjiang province. But among them, seven projects have been developed as CDM projects or are being developed as CDM projects[21]. According to *Tool for the demonstration and assessment of additionality*, the seven projects shall not be included in common practice analysis. Table B-4 shows the other two similar project activities comparing with the Project activity:

Table B-4 Activities similar to the Project in Heilongjiang province

Name	Installed Capacity (MW)	Year	Tariff (RMB/kWh)	Unit Investment (RMB/kW)
Fujin Phase I [22]	21	2004	0.79	9827
Mulan Menggushan[23]	12	2004	0.85	9688
The Project	18	2007	0.6067	10871

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

From Table B-4, we can see that Fujin Phase I Wind Farm enjoys higher tariff than the Project. Moreover the unit investment (RMB/KW) of the Fujin Phase I Wind Farm is lower than that of the Project. Therefore, the Fujin Phase I Wind Farm is much more economically attractive than the Project.

From Table B-4, we can see that the tariff of the Mulan Menggushan Wind Farm is much higher than that of the Project. Moreover the unit investment (RMB/KW) of the Mulan Menggushan Wind Farm is lower than that of the Project. Therefore, the Mulan Menggushan Wind Farm is much more economically attractive than the Project.

[20] *Chinese Wind Energy Association* statistics 2004-2007

[21] http://cdm.unfccc.int/index.html

[22] http://fujin.mofcom.gov.cn/aarticle/dongtai/200508/20050800238518.html

[23] http://www.chinapower.com.cn/newsarticle/1005/new1005504.asp
http://www.newenergy.org.cn/html/00412/20041605.html

Moreover, both of Fujin Phase I Wind Farm and Mulan Menggushan Wind Farm are funded by international low interest loan or national soft loan.

The other seven wind power projects in Heilongjiang province have been developed as CDM projects or are being developed as CDM projects to alleviate the financial disadvantages.

According to the common practice analysis, we conclude that there are essential distinctions between the Project and existing similar projects.

Outcome of Step 4:

To summarize, it can be proved that the Project activity is additional and not (part of) baseline scenario. The above additionality analysis provides sufficient evidence that the CDM revenues can alleviate the financial disadvantages of the Project.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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The calculation of the GHG emission reductions by the Project is followed the baseline methodology ACM0002 (ver 06). All the calculation in compliance with requirement of the baseline methodology (ACM0002), the details is listed in the following steps.

1. Calculate the baseline GHG emissions

Baseline emission factors of Operating Margin ($EF_{OM,y}$) and Build Margin ($EF_{BM,y}$) were determined ex ante. The baseline emission factor (EF_y) is calculated as a combined margin (CM) of $EF_{OM,y}$ and $EF_{BM,y}$, according to the following three steps:

STEP 1. Calculate the Operating Margin Emission Factor(s) ($EF_{OM,y}$)

ACM0002 provide four calculation methods for Operating Margin emission ($EF_{OM,y}$) as follows:

(a). Simple operation margin(OM),or
(b). Simple adjusted OM, or
(c). Dispatch data analysis OM, or
(d). Average OM.
Each method is analyzed as below.

Method (a) Simple OM

The simple OM method only can be use when low operation cost/must run resources constitute less than 50% of total grid generation 1) in the five most recent years, or 2) by taking into account long-term normal for hydropower. Typical low operating cost/must run resources usually includes hydropower, geothermal power, wind power, and those low operating cost biomass power generations as well as the nuclear and solar energy. Among the total electricity generation in 2001~2005 of the Northeast China Grid where the proposed Project connected into, hydropower and others (including wind power, waste heating et al) are far less than 50% (Year 2001 is 7.07%, Year 2002 is 5.44%, Year 2003 is 4.72%, Year

2004 is 6.88%, Year 2005 is 8.28%)[24]. Thus, the method (a) Simple OM can be used to calculate the baseline emission factor of Operating Margin ($EF_{OM,y}$) for the proposed Project.

Method (b) Simple adjusted OM

The simple adjusted OM needs the annual load duration curve of the grid. The power sector in China a transitional period of "separating the plant operation from the grid operation", resulting in that the detailed information data on dispatch and fuel consumption are often taken as confidential business matter by the grid company and/or the power plants, therefore those data are unlikely to be public available. In most cases, it is difficult for the CDM projects in China to adopt Method (b) for the calculation of the baseline emission factor of operating margin ($EF_{OM,y}$). Similarly, the proposed Project can not adopt Method (b) for the calculation of the baseline emission factor of operating margin ($EF_{OM,y}$) due to unavailability of the load data of the Northeast China Grid.

Method (c) Dispatch data analysis OM

Dispatch data analysis OM should be the first methodological choice if the dispatch data are available, because the method can truly reflect the substitutable relationship between the amount of electricity output from power plants of the baseline grid and from the proposed Project activity and the emission reductions generated. However, Method (c) cannot be adopted for the proposed Project because of unavailability of the dispatch data of the Northeast China Grid, similar reason as method (b).

Method (d) Average OM

Method (d) can only be used when 1) low-cost/must run resources constitute more than 50% of total amount of grid output and 2) detailed data on applying method (b) is not available and detailed data on applying method (c) is unavailable. But among the total amount of electricity output in 2001~2005 of the Northeast China Grid where the proposed Project connected into, the amount of low-cost/must run resources accounts for about is 7.07%(Year 2001), is 5.44%(Year 2002), is 4.72%(Year 2003), is 6.88%(Year 2004), is 8.28%(Year 2005), all less than 50%, therefore method (d) cannot be applied to the Project.

In conclusion, Method (a) Simple OM is the only reasonable and feasible method among the four methods for the calculation of the Operating Margin Emission Factor(s) ($EF_{OM,y}$) of the proposed Project.

In according to ACM0002, The Simple OM emission factor ($EF_{OM,simple,y}$)is calculated as the generation-weighted average emissions per electricity unit (tCO2/MWh) of all generating sources serving the system, excluding those low-operating cost and must-run power plants. The formula of $EF_{OM,simple,y}$ calculation is

$$EF_{OM,simple,y} = \frac{\sum_{i,j} F_{i,j,y} \cdot COEF_{i,j,y}}{\sum_{j} GEN_{j,y}} \quad (1)$$

Where:

[24] Data source: *China Electric Power Yearbook 2002~2006*

$F_{i,j,y}$ is the total amount of fuel *i* (in a mass or volume unit) consumed by all the relevant power sources *j* in year(s) *y*, and

$COEF_{i,j,y}$ is the total amount the CO_2 emission coefficient of fuel *i* (tCO_2/mass or volume unit of the fuel), taking into account the carbon content of the fuels used by relevant power sources *j* and the percent oxidation of the fuel in year(s) y, and

$GEN_{j,y}$ is the electricity output (MWh) delivered to the grid by the sources j.

The CO_2 emission coefficient $COEF_{i,j,y}$ is obtained from formula (2) as

$$COEF_i = NCV_i \cdot EF_{co_2,i} \cdot OXID_i \quad (2)$$

Where

NCV_i is the net calorific value (energy content) per mass or volume unit of fuel *i*;

$OXID_i$ is the oxidation factor of fuel I, and

$EF_{CO2,i}$ is the CO_2 emission factor per unit of energy of the fuel *i*.

The Northeast Grid is connecting with the North China Grid. Since there's no Net Electricity Import from a connected electricity system to the project electricity system, no electricity imports has been considered in the Project.

With reference to the *Notification on Determining Baseline Emission Factor of China's Grid*[25], the Simple OM emission factor ($EF_{OM,y}$) of the Northeast China Grid is calculated as 1.2402 tCO_2e/MWh.

STEP 2. Calculate the Build Margin Emission Factor(s) ($EF_{BM,y}$)

Calculate the Build Margin emission factor ($EF_{BM,y}$) as the generation-weighed average emission factor (tCO_2/MWh) of a sample power plants m, using formula (3):

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \cdot COEF_{i,m,y}}{\sum_{m} GEN_{m,y}} \quad (3)$$

where

$F_{i,m,y}$ is the amount of fuel *i* (in a mass or volume unit) consumed by power plant sample *m* in *year(s) y*, *m* refers to the power plant sample delivering electricity to the grid, not including low operating cost/must run power plants, including imports to the grid;

$COEF_{i,m,y}$ is the CO_2 emission coefficient of fuel *i* (tCO_2 per mass or volume unit of the fuel), taking into account the carbon content of the fuels used by relevant power plant sample *m* and the percent oxidation of the fuel in year(s) y, and

[25] http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=2193

$GEN_{m,y}$ is the electricity output (MWh) delivered to the grid by the sources *m*.

Option 1, calculate the Build Margin emission factor ($EF_{BM,y}$) ex-ante based on the most recent information available on plants already built for sample group *m* at the time of PDD submission was selected for the project.

In China, it is very difficult to obtain the data of the five existing power plants built most recently or the power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that were built most recently because these data are considered as confidential business information by the plants owners. Taking notice of this situation, EB accepts the following deviation in methodology application:

1) Use of capacity additions during the last 1~3 years for estimating the build margin emission factor for grid electricity;

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

And the EB suggested that the Project participants use the following alternative solutions in absence of data:

1) For small scale project activities, use the average emission factor of the grid described in the AMS-I.D;

2) Use the efficiency level of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy, for each fuel type in estimating the fuel consumption to estimate the build margin. For the estimation of the operating margin the average emission factor for the grid for each type can be used.

The following steps were adopted to calculate the Build Margin emission factor:

Step a. The breakdown data by power plants are not available while the aggregate data by different types of fuels are available. Considering this situation, the m sample group will consist of capacity addition by power sources with same fuel instead of by power plants. For the proposed project the m sample group will consist of fossil fired capacity addition, hydropower capacity addition and other capacity addition;

Step b. Assuming that all the power plants with same fuel type have equal annual operation hours, the starting year t_0 could be identified which fulfils the following constraint:

$$\sum_i CAP_{i,t-t_0} \geq 20\% \times \sum_i CAP_{i,t} \quad (4)$$

Where,

t is the recent year of which the latest data is available;

$CAP_{i,t-t_0}$ is the capacity addition of type i from year t_0 to year *t*;

$CAP_{i,t}$ is the installed capacity of type *i* in year *t*;

The capacity addition belonging to *m* sample group thus could be identified. For the proposed project, the

most recent year of which data is available is 2005, while t_0=1998, the total capacity addition during 1998 to 2005 consisting of 7829.1 MW of fossil fired capacity, 489.1 MW of hydropower capacity and 256.3 MW of wind power capacity, which accounts for 21.34% of total installed capacity in 2005.

Step c. To be conservative, the best commercially available technology for coal fired power generation is identified as domestically produced 600MW sub-critical power unit. The coal consumption per kWh electricity supplied to grid by domestically produced 600MW sub-critical power unit is estimated as 343.33 gce/kWh, equivalent to 35.82% as power supply efficiency[26].

Step d. In addition, there are two assumptions in this substitute calculation method: Zero emission factors were selected for hydropower capacity and other capacity; the average annual operational hours of non fuel-fired power plants are less than those of fuel-fired power plants. Then this proposed project uses a conservative alternative method (as the formula 5 described) to calculate $EF_{BM,y}$, using the share of different type capacity in capacity addition as weight, the weight average of emission factors of different type capacity is calculated as the Build Margin emission factor , $EF_{BM,y}$ of the Northeast China Grid.

$$EF_{BM,y} = \frac{CAP_{Thermal,addition}}{CAP_{Total,addition}} \times EF_{Thermal,adv} \quad (5)$$

Where:

$CAP_{Total,addition}$ is the capacity addition of fuel-fired power plant from 1998 to 2005;

$CAP_{Thermal,addition}$ is the total capacity addition from 1998 to 2005;

$EF_{Thermal,adv}$ is the emission factor of coal-fired power with Best Practiced Commercialized Technology;

Following the four steps above, the Build Margin emission factor ($EF_{BM,y}$) of the Northeast China Grid is calculated ex ante as 0.8631 tCO_2e/MWh. The details calculation and data were listed in the annex 3.

STEP3. Calculate the baseline emission factor (EF_y)

Based on ACM0002, the baseline emission factor EF_y is calculated as the weighted average of the Operating Margin emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{OM,y}$), as

$$EF_y = w_{OM} \cdot EF_{OM,y} + w_{BM} \cdot EF_{BM,y} \quad (6)$$

According to the consolidated baseline methodology ACM0002, the weight w_{OM} is 0.75 and the weight w_{BM} is 0.25 for wind power projects. Therefore the combined baseline emission factor

$$EF_y = 0.75 \times 1.2402 + 0.25 \times 0.8631 = 1.1459 (tCO_2e/MWh).$$

Baseline emissions

[26] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1374.pdf

Baseline emissions are calculated with combined baseline emission factor and electricity delivered to the grid by the Project as follows:

$$BE_y = EG_y \times EF_y \quad (7)$$

2.Calculate the project GHG emission

The Project is a wind power project that the project emissions should not be considered as per ACM0002, i.e. PE_y = 0 tCO_2e.

3. Calculate the project leakage GHG emission

According to the consolidated baseline methodology ACM0002, the main indirect emissions potentially giving rise to leakage in the context of electric sector projects result from activities such as power plant construction, fuel handling(mining, processing, and transportation), and land inundation (for hydroelectric projects). The project developer does not need to consider such indirect emissions when applying the methodology. So the Project can take no account of such leakages, L_y=0 tCO_2e.

4. Calculate the Emission reductions

The Project activity will generate GHG emission reductions by avoiding CO_2 emissions from electricity generation by fossil fuel-fired power plants. The emission reduction (ER_y) during a given year y is calculated as follows:

$$ER_y = BE_y - PE_y - L_y \quad (8)$$

Since the project emission for wind power (PE_y) and the leakage (L_y) is considered as zero, the emission reduction is equal to baseline emission (BE_y), i.e.:

$$ER_y = BE_y = EG_y \cdot EF_y \quad (9)$$

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

>>

Data / Parameter:	NCV_i
Data unit:	MJ/t, or MJ/Km^3
Description:	The net calorific value per mass or volume unit of a fuel *i*
Source of data used:	*China Energy Statistical Yearbook 2006*
Value applied:	*Notification on Determining Baseline Emission Factor of China's Grid* http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=2193
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the latest version of ACM0002, the proposed Project uses the national values
Any comment:	-

Data / Parameter:	$OXID_i$
Data unit:	-
Description:	The oxidation factor of the fuel *i*
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories: Volume 2 Energy – Chapter 1
Value applied:	*Notification on Determining Baseline Emission Factor of China's Grid* http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=2193
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data obtained from IPCC Guideline for National Greenhouse Gas Inventories is reliable.
Any comment:	-

Data / Parameter:	$EF_{CO2,i}$
Data unit:	tC/TJ
Description:	The CO_2 emission factor per unit of energy of the fuel *i*
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories: Volume 2 Energy – Chapter 1
Value applied:	*Notification on Determining Baseline Emission Factor of China's Grid* http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=2193
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the latest version of ACM0002, the proposed Project uses the IPCC default values.
Any comment:	-

Data / Parameter:	$F_{i,j,y}$
Data unit:	mass or volume unit of the fuel i
Description:	The total amount of fuel *i* (in a mass or volume unit) consumed by all the relevant power sources *j* in year(s) *y*
Source of data used:	*China Energy Statistical Yearbook*
Value applied:	As for the amount of fuel i consumed by Liaoning Province, Jilin Province, and Heilongjiang Province of the Northeast China Grid in year 2003, 2004 and 2005, please sees *Notification on Determining Baseline Emission Factor of China's Grid* http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=2193
Justification of the choice of data or description of measurement methods and procedures actually applied :	This kind of data accords with the latest version of ACM0002
Any comment:	-

Data / Parameter:	$GEN_{j, y}$
Data unit:	MWh
Description:	the electricity(MWh) delivered to the grid by source *j*
Source of data used:	*China Electric Power Yearbook*
Value applied:	The grid-connected electricity generation by Liaoning Province, Jilin Province, and Heilongjiang Province of the Northeast China Grid in year 2003, 2004 and 2005, please sees *Notification on Determining Baseline Emission Factor of China's Grid* http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=2193
Justification of the choice of data or description of measurement methods and procedures actually applied :	This kind of data accords with the latest version of ACM0002
Any comment:	-

Data / Parameter:	The installed capacity of every kind of electricity generation of the Northeast China Grid in the recent years.
Data unit:	MW
Description:	The installed capacity of every kind of electricity generation of the Northeast China Grid in the recent years
Source of data used:	*China Electric Power Yearbook*
Value applied:	*Notification on Determining Baseline Emission Factor of China's Grid* http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=2193
Justification of the choice of data or description of measurement methods and procedures actually applied :	China Electric Power Yearbook is a reliable data source.
Any comment:	-

The data parameters used in the calculations of the baseline emissions and project emissions are listed above. Details are provided in the Annex 3.

B.6.3 Ex-ante calculation of emission reductions:

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1. Estimated anthropogenic emissions by source of greenhouse gas of the baseline:

According to the Feasibility Study Report of the Project, the annual power generation is estimated to be 40,716 MWh. According to the *Notification on Determining Baseline Emission Factor of China's Grid*[27], the baseline emission factor of the Project is 1.1459tCO2e/MWh and the annual baseline emission of the Project is 46,657 tCO_2e.

[27] http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=2193

2. Estimated project activity emissions:

The Project is a wind power project that the project emissions should not be considered as per ACM0002, i.e. $PE_y = 0$ tCO_2e.

3. Estimated project leakage emissions:

As above ACM0002, the leakage of the Project is not considered, i.e. $L_y = 0$ tCO_2e.

4. Estimated emission reductions

As the formula (6) and (7), the annual emission reductions of the Project are 46,657 tCO_2e.

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

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It is expected that the Project activity will generate emission reductions for about 46,657 tCO_2e annually over the first 7-year period from 2008 to 2014.

Year*	Estimation of baseline emission reductions (tCO_2e)	Estimation of emission reductions generated by the Project Activity(tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of emission reduction (tCO_2e)
2008	0	46,657	0	46,657
2009	0	46,657	0	46,657
2010	0	46,657	0	46,657
2011	0	46,657	0	46,657
2012	0	46,657	0	46,657
2013	0	46,657	0	46,657
2014	0	46,657	0	46,657
Total ($t\text{-}CO_2e$)	0	326,599	0	326,599

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

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

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B.7.1 Data and parameters monitored:

>>

Data / Parameter:	EG_y
Data unit:	MWh
Description:	The electricity exported to the grid and imported from the gird by the Project in year y
Source of data to be used:	Electricity meter: Main Meter, Meter A1, Meter A2, Meter A3, Meter B1, Meter B2 and Meter C
Value of data applied for the purpose of calculating expected emission reductions in section B.5	40,716 MWh
Description of	The net electricity supplied and delivered to the grid by the Project is hourly

measurement methods and procedures to be applied:	measured by national standard electricity metering instruments and recorded by the project owner. The metering instruments will be calibrated annually in accordance with the *"Technical administrative code of electric energy metering (DL/T448 － 2000)"* The regulations of the grid company require annual calibrations of the metering instruments.
QA/QC procedures to be applied:	Sale receipts/ records to the grid are used to ensure the consistency.
Any comment:	-

B.7.2 Description of the monitoring plan:

>>

1. Introduction

The Heilongjiang Fujin Phase II 18MW Wind Power Project adopts the approved consolidated monitoring methodology ACM0002 (ver 06) "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources" to determine and monitor the emission reductions from the net electricity generation from the Project.

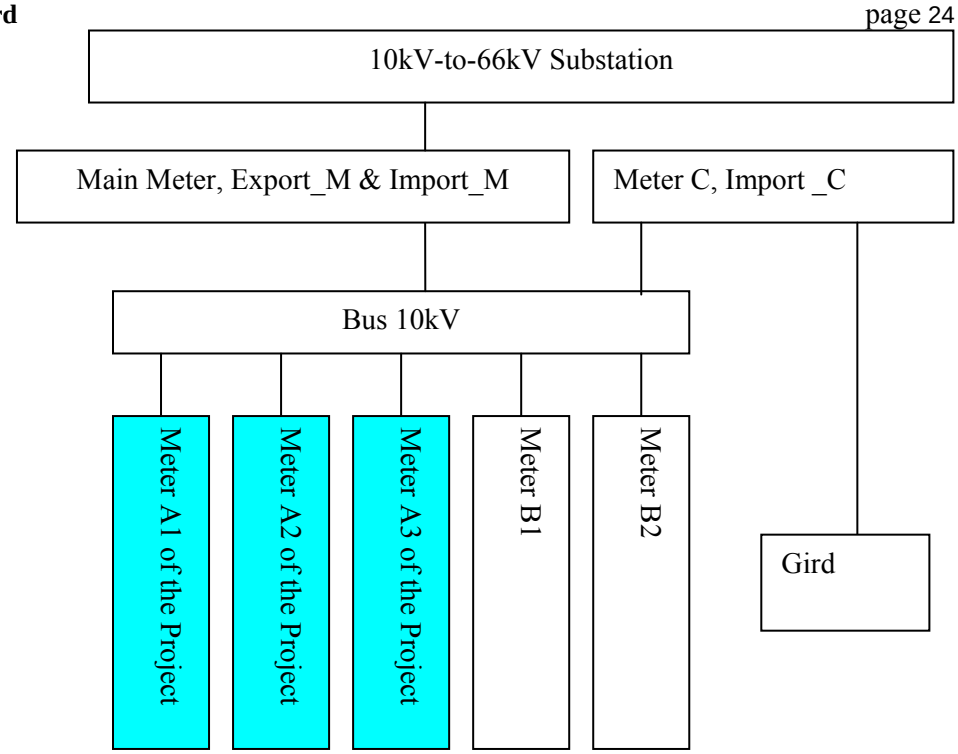
2. Meters and Calibration[28]

The meters will be installed in accordance with *Technical administrative code of electric energy metering (DL/T448 －2000)*, also the accuracy of the meters must accord with the national standard. The electricity generated by the Project will be delivered to the grid through the Fujin Wind Farm 66kV substation. The net electricity delivered to the Northeast China Grid by the Project will be monitored through the metering equipments.

There are totally 7 meters involved, which are Main Meter, Meter A1, Meter A2, Meter A3, Meter B1, Meter B2 and Meter C. According to the PPA, Main Meter, which is sited at 10kV low voltage side of the 10kV-to-66kV substation, is a bidirectional meter monitoring the electricity both exported to the grid (Export_M) and imported from the grid (Import_M). Meter C is sited at the incoming line of external power supply, monitoring the electricity imported from grid through the backup line (Import_C). At the site of the Project, totally twelve turbines with a unit capacity of 1500 kW are installed, providing a total installed capacity of 18MW. There are three separate meters (MeterA1, MeterA2, and MeterA3) and each meter monitors and measures four turbines of the Project. MeterA1, MeterA2, and MeterA3 are bidirectional meter, monitoring the electricity both exported from the Project and imported to the Project. Meter B1 and B2 are also bidirectional meter, each of them monitoring and measuring four turbines' the electricity supplied from the other project. MeterA1, MeterA2, MeterA3, MeterB1 and MeterB2 are all sited at 10kV low voltage side of the substation. The net electricity exported to the grid by the Project should be cross-checked by the Receipts of Electricity Sales. The metering diagram is presented as follows, giving an overview of these meters.

Metering diagram

[28] Refer to the Power Project Agreement (PPA)



The net electricity is calculated as export electricity minus import electricity. The Merer A1,A2,A3,B1 and B2 are used to calculate the share of the net electricity supplied to the grid by the Project. The net electricity from the Project (EG.project) can be calculated as following:

*EG.project = (M.Export_M - M.Import_M - M.Import_C) * (M.A1 + M.A2 + M.A3) / (M.A1 + M.A2 + M.A3 + M.B1 + M.B2)*[29]

Where:
EG.project is the calculated net electricity from the wind farm (the Project);
M.Export_M is the electricity exported to the grid measured by the Main Meter;
M.Import_M is the electricity imported from the grid measured by the Main Meter;
M.Import_C is the electricity imported from the grid measured by the Meter C;
M.A1, M.A2 and M.A3 is the net electricity supplied to the grid measured by the MeterA1, MeterA2, and MeterA3;
M.B1 and M.B2 is the net electricity supplied to the grid measured by the MeterB1 and MeterB2;

The calibration of meters must comply with national standards and regulations to ensure the accuracy.

- The metering equipments will be properly calibrated and checked annually for accuracy.
- The accuracy degree of the metering equipments is 0.5S.
- All the installed meters must be pasted with seal after installation or calibration. The seal is forbidden to rip by either party independently;
- When the following situations occurred, all the meters should be tested in 10 days:

[29] Refer to the Saihanba project: http://cdm.unfccc.int/Projects/DB/DNV-CUK1173680185.45

(a) The detection of a difference larger than the allowable error in the reading of both meters;
(b) The meters have any malfunctions and are repaired or replaced;
(c) If any errors are detected, the party who owns the meter shall be responsible for the repair, recalibration or replacement of the meter and shall give the other party (Project owner or power company) sufficient notice to allow a representative to attend any corrective activity.

- If the previous reading of the meters are beyond the allowable error or the meters operate improperly, the electricity generated by the Project shall be determined by:

(a) the Project owner and the local grid company shall jointly prepare an estimate of the correct reading;
(b) If the Project owner and the local grid company fail to agree the estimate of the correct reading, then the matter will be referred for arbitration according to the agreed procedures.

Calibration is carried out by the local grid company with the records being provided to the Project owner, and these records will be maintained by the Project owner.

All the records should be documented and maintained by the Project owner for DOE's verification.

3. Quality control

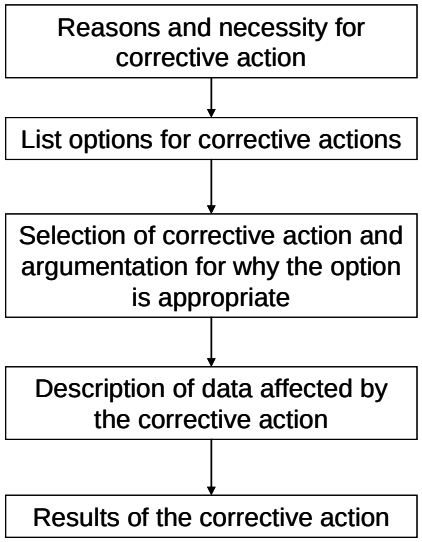
Monthly net generation data should be approved and signed off by the Project Manager before it is accepted and stored.
The internal audit will be carried out to check if this monitoring plan has been executed. The audit will also identify potential improvements on procedures to improve monitoring and reporting in future years. If such improvements are proposed, these improvements should be reported to the DOE and could be operated after approval from the DOE.

4. Data Management System

Specific staff will be appointed by the Project owner to take the overall responsibility for monitoring of greenhouse gas emission reductions and keeping all the data and information for emission reductions verification. The first crediting period starts from 0:00 AM of the registration date. The net electricity supplied and delivered to the grid by the Project will be hourly measured and recorded by the project owner. And the project owner will prepare the monitoring reports of the Project activity, which records the daily operation of the Project, including operating periods, power generation, power delivered to the grid, equipment defects, etc. Finally, the monitoring reports will be reviewed by the General Manager. And all the data including calibration records should be kept for 2 years after the whole crediting period of the Project.

5. Corrective actions

Specific staff will log all corrective actions and will report the monitoring report. In case corrective actions are considered necessary, these actions will be implemented according to the procedures outlined below.



6. Training

The Project owner and Beijing RuiChi Electric Power Information Technology Co., Ltd. together will train all the relative staffs before the operation of the generators. The training will include the following:

- CDM knowledge
- Contents of PDD and monitoring plan (including monitoring procedures)
- Practical requirements for monitoring (including metering, calibration)
- Audit procedures / project performance review / corrective actions
- Worksheet (excel) containing monitoring data and calculations
- Monitoring report template
- Practical training exercise

7. Verification

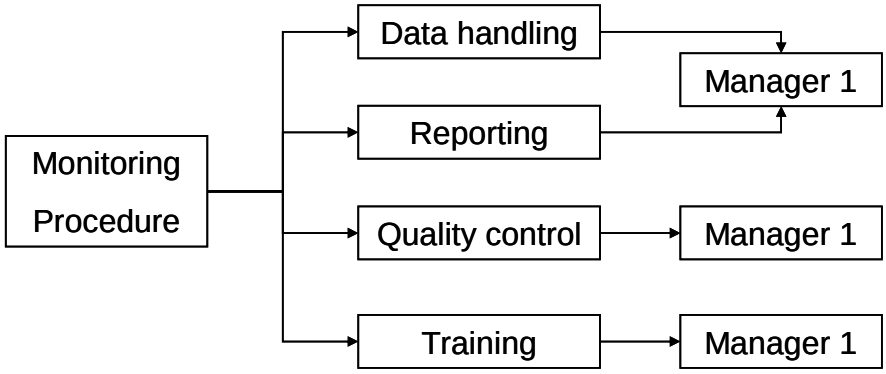
The Table B-5 below outlines the key documents relevant to monitoring and verification of the emission reductions from the Project. With all these documents compiled, the Project owner will sign a verification service agreement with specific DOE.

Table B-5. Key Documents Relevant to Monitoring and Verification

I.D. No.	Document	Main Content	Source
F-1	PDD, including the electronic spreadsheets and supporting documentations (assumptions, estimations, measurement, etc)	Calculation procedure of emission reduction and monitoring items	the Project owner, or directly download from UNFCCC website

I.D. No.	Document	Main Content	Source
F-2	Monitoring Quality Control and Quality Assurance Report	Equipments and national and industry standards	the Project owner
F-3	The report on qualifications of the persons responsible for the monitoring and data management	Major, the title of a technical post, working experience and etc.	the Project owner
F-4	The report on monitoring and checking of the electricity supplied to the grid	Record based on monthly meters reading and electricity sale receipts	the Project owner
F-5	Record on maintenance and calibration of metering equipment	Reasons for maintenance and calibration and the precision after maintenance and calibration	the Project owner
F-6	Monitoring report	CO_2 emission reduction calculation	the Project owner
F-7	Letter of confirmation on F-2 to F-6	Confirmation of monitoring and data management and procedure from F-2 to F-6	the Project owner
F-8	Daily reading records (DRR)	True reflection of the operation of the Project	the Project owner

8. Monitoring System



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

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The baseline and monitoring study of the proposed Project was completed on 11/08/2008 by Beijing Ruichi Electric Power Information Technology Co. Ltd. The key persons are following. The persons and Beijing Ruichi Electric Power Information Technology Co. Ltd are not the project participants listed in Annex 1.

1. *Mr. Gu Naiyan, naiyan.gu@richserc.com.cn* , Beijing Ruichi Electric Power Information Technology Co. Ltd., Floor7, Ruichi Grand Hotel, No.1 Xinhua South Street, Beijing, China, tel: (8610) 5876 8246
2. *Mr. Chen Yifei ,yifei.chen@richserc.com.cn* , Beijing Ruichi Electric Power Information Technology Co. Ltd., Floor7, Ruichi Grand Hotel, No.1 Xinhua South Street, Beijing, China, tel: (8610) 5876 8246

3. *Ms. Yang Lusi , lucy.yang@richserc.com.cn* , Beijing Ruichi Electric Power Information Technology Co. Ltd., Floor7, Ruichi Grand Hotel, No.1 Xinhua South Street, Beijing, China, tel: (8610) 5876 8246

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>
18/04/2007

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

>>
20 y -0m

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

C.2.1. Renewable crediting period

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

>>
01/11/2008 or the registration date, whichever is the latest

C.2.1.2. Length of the first crediting period:

>>
7 y-0m

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:

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The Environmental Impact Assessment Report of the Project was approved by the Environment Protection Administration of Heilongjiang Province in September 2005.

The environmental impacts arising from the Project are analyzed in the following two phases:

Construction Phase

Land use

Construction occupied land is just minor part for the whole wind farm. The Project is located in the Bielayinshan of Fujin City, so the most part of the construction occupied land is forest land. The permanently occupied land of the Project is about 13 hectares, where forest land is 12 hectares. The Project owner will compensate for the occupied land in advance according to relevant regulations approved by the relevant land use management organization from the government. After the completion of the Project, the land in the project management site and temporary construction site will be restored and rehabilitated with the trees and vegetation.

Noise

The noise pollution is mainly caused from the machines and vehicles in construction phase. According to the Noise Limits on the Border of the Construction Site (GB12523-90), if the site is about 40 meters from the construction site in daytime or about 200 meters in night, the disturbance of the noise from construction machinery will be very little. However, there is no resident in the range of 2 km to the Project site, and there is no school, hospital or factory in the range of 3 km to the Project.

To diminish to impact of noise of vehicles, the Project owner will strictly control the construction time and prohibit construction in the night time.

Dust and exhaust gas

Due to the earthwork excavation and the running of construction vehicles dust, reentrainment of dust and tail gas are generated around. The Project owner will take measure, by means of dust wetting, adoption of advanced environment friendly equipments strengthening the workers' protection devices and so on, to control and minimize the air pollution of dust and exhaust gas.

Waste water

Because the wastewater produced by the construction machines is very little, it is no need to treat this little wastewater. The construction workers weren't live in the Project site. Therefore, the impact of wastewater of the Project will be insignificant.

Solid waste

The most excavated earthwork during the construction period will be directly used, whose impact on the environment is insignificant. As to the municipal waste the Project owner will arrange garbage cans classified by areas and types of garbage and transport to dispose uniformly.

Operation Phase

Noise

The operating noise of wind power turbine generator system comes from the friction between wind and blades and the running mechanical parts inside it. The wind farm is located in the Bielayinshan, which is 2km away from the nearest local residents. The noise level at 2km from the tower foundation of the generator system is estimated to be 37dB, which is much lower than the relative standard. As a result, the operating noise from the wind power turbines will have little impact on the surrounding residents.

Sanitary wastewater

The sanitary wastewater from the staff of the wind farm will be discharged into waste water treatment facilities, which are located in the substation of the Project. Because the Project is a highly automatic wind farm plant, there are only 10 operation and management staff. Therefore, the sanitary wastewater will be very little, and it can be used to irrigate plants in the wind farm.

Impacts on wild animals

The operating noise of wind power turbine generator system will change the living range of wild animals. However, the Project only occupies very little part of land at Bielayinshan and the impact on wild animals is insignificant.

According to the comments by the experts of birds in Heilongjiang province, the migration route of the birds lived in forest are not fixed and also the Project only occupies very little part of land at Bielayinshan. Therefore, construction of the Project will have little impact on the migration route of birds lived in the Bielayinshan.

The environment management during the construction period and operation period is co-undertaken by the project owner and supervision institute. From above all, the impact of the Project on surrounding natural environment and social environment is 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:

>>

Impacts are not considered significant.

SECTION E. Stakeholders' comments

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

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On Dec 16 2006, the project owner conducted a survey among the local residents possibly affected by the Project. The survey was conducted through distributing questionnaires and collecting responses. During the process, the announcement on introducing the project and survey was broadcasted in the nearest village. Meanwhile, the announcement was published on the village billboard by the village commission. Totally 30 questionnaires were distributed to the villagers and returned.

E.2. Summary of the comments received:

>>

The survey was conducted through distributing questionnaires and collecting responses to the questionnaire. Totally 30 questionnaires returned with 100% response rate. The following is a summary of the key comments based on 30 returned questionnaires.

–Education level of the respondents: primary level (40%), middle level (20%), higher level (40%).

– Most respondents (100%) are satisfied with their living conditions and surrounding environment.

– 14 (47%) persons of the respondents know well about wind power, and 16 (53%) persons know a little.
– 29(97%) persons of the respondents support the local constructed wind farm and 1 person has an indifferent attitude. No one is opposed to the construction of the project.
– The respondents consider construction and operation of the Project may improve living level (57%), increase employment opportunities (27%) and income (10%), mitigate air pollution (30%), and decrease local electricity price (6%).
– Among the negative impacts mentioned, the main issues concerned are garbage (60%), land use (6%) and noise during construction (13%).

– All of the 30 respondents support the construction of the Project.
The survey shows that the proposed project receives very strong support from local people who believe the Project will have positive impacts in many aspects.

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

>>

The residents and local government are all very supportive to the Project. Therefore there has been no need to modify the project due to the comments received.

Meanwhile the Project owner will actively take measures to control and avoid negative impacts. (See Section D for details.)

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding from Annex I Parties for this project.

Annex 3

BASELINE INFORMATION

The following tables summarize the numerical results from the equations listed in the ACM0002 Baseline methodology for grid-connected electricity generation from renewable sources. The information provided by the tables includes data, data resources and the underlying computation.

1. Calculation of EF_{OM}

Calculating the Operating Margin Emission Factor of Northwest China Grid in 2003									
Fuel	Unit	Liaoning A	Jilin B	Heilongjiang C	Total D=A+B+C	Emission Factor of the Fuel（tc/TJ） E	Oxidation Factor（%） F	Calorific Value（MJ/t,km3） G	Emission of CO_2（tCO_2e） H=D*E*F*G*44/12/10000(Mass) H=D*E*F*G*44/12/1000(Volume)
Raw coal	10^4t	3556.51	2006.66	2763.62	8326.79	25.8	100	20908	164695312.95
Cleaned coal	10^4t	70.83		3	73.83	25.8	100	26344	1839948.73
Other washed coal	10^4t	617.04	15.9	53.41	686.35	25.8	100	8363	5429988.02
Coke	10^4t				0	29.2	100	28435	0.00
Coke oven gas	10^8m^3	1.66			1.66	12.1	100	16726	123184.76
Other Coal Gas	10^8m^3	5.31			5.31	12.1	100	5227	123141.32
Crude Oil	10^4t	3.39			3.39	20	100	41816	103954.58
Gasline	10^4t				0	18.9	100	43070	0.00
Diesel	10^4t	0.32	0.34		0.66	20.2	100	42652	20850.00
Fuel oil	10^4t	14.87	0.7	4.32	19.89	21.1	100	41816	643474.23
Liquefied Petroleum	10^4t	1.55			1.55	17.2	100	50179	49051.65
Refinery gas	10^4t	4.03		0.46	4.49	15.7	100	46055	119040.35
Natural gas	10^8m^3		0.04	4.47	4.51	15.3	100	38931	984997.12
Other Petroleum Products	10^4t				0	20	100	38369	0.00
Other Coking Pruducts	10^4t				0	25.8	100	28435	0.00
Other Energy	10^4 tce	29.38			29.38	0	100	0	0.00
								Total	174132943.72

Data source: *China Energy statistical Yearbook 2004*

Fossil Fuel-fired Power Generation of Northeast China Grid in 2003				
Regions	Rate of Electricity Consumption	Rate of Electricity Consumption	Electricity Supply of Grid	Electricity Supply of Grid
	10^8MWh	（MWh)	（%）	（MWh)
Liaoning	797.51	79751000	7.17	74,032,853
Jilin	297.39	29739000	7.32	27,562,105
Heilongjiang	484.93	48493000	8.48	44,380,794
Total				145,975,752

Data source: *China Electric Power Yearbook 2004*

Calculating the Operating Margin Emission Factor of Northwest China Grid in 2004									
Fuel	Unit	Liaoning A	Jilin B	Heilongjiang C	Total D=A+B+C	Emission Factor of the Fuel （tc/TJ） E	Oxidation Factor （%） F	Calorific Value （MJ/t,km3） G	Emission of CO_2（tCO_2e） H=D*E*F*G*44/12/10000(Mass) H=D*E*F*G*44/12/1000(Volume)
Raw coal	10^4t	4144.2	2310.9	3084.8	9539.9	25.8	100	20908	188689376.82
Cleaned coal	10^4t	84.75	1.09	4.88	90.72	25.8	100	26344	2260871.59
Other washed coal	10^4t	577.67	14.26	61	652.93	25.8	100	8363	5165589.10
Coke	10^4t				0	29.2	100	28435	0.00
Coke oven gas	10^8m^3	4.83	2.91		7.74	12.1	100	16726	574367.49
Other Coal Gas	10^8m^3	57.33	4.19		61.52	12.1	100	5227	1426676.89
Crude Oil	10^4t				0	20	100	41816	0.00
Gasline	10^4t				0	18.9	100	43070	0.00
Diesel	10^4t	2.04	1.16	0.24	3.44	20.2	100	42652	108672.75

Fuel oil	10^4t	12.81	1.78	2.86	17.45	21.1	100	41816	564536.21
Liquefied Petroleum	10^4t	2.19			2.19	17.2	100	50179	69305.23
Refinery gas	10^4t	9.79		1.14	10.93	15.7	100	46055	289779.75
Natural gas	10^8m^3		0.03	2.53	2.56	15.3	100	38931	559111.45
Other Petroleum Products	10^4t				0	20	100	38369	0.00
Other Coking Pruducts	10^4t				0	25.8	100	28435	0.00
Other Energy	10^4 tce	26.97	5.07		32.04	0	100	0	0.00
								Total	199708287.28

Data source: *China Energy statistical Yearbook 2005*

Fossil Fuel-fired Power Generation of Northeast China Grid in 2004				
Regions	Rate of Electricity Consumption	Rate of Electricity Consumption	Electricity Supply of Grid	Electricity Supply of Grid
	10^8MWh	（MWh)	（%）	（MWh)
Liaoning	845.43	84543000	7.21	78,447,450
Jilin	332.42	33242000	7.68	30,689,014
Heilongjiang	534.82	53482000	7.84	49,289,011
Total				158,425,475

Data source: *China Electric Power Yearbook 2005*

Calculating the Operating Margin Emission Factor of Northwest China Grid in 2005									
Fuel	Unit	Liaoning A	Jilin B	Heilongjiang C	Total D=A+B+C	Emission Factor of the Fuel （tc/TJ） E	Oxidation Factor （%） F	Calorific Value （MJ/t,km3） G	Emission of CO_2（tCO_2e） H=D*E*F*G*44/12/10000(Mass) H=D*E*F*G*44/12/1000(Volume)
Raw coal	10^4t	4305.41	2446.13	3383.21	10134.75	25.8	100	20908	200454895.94

Cleaned coal	10^4t				0	25.8	100	26344	0.00
Other washed coal	10^4t	524.74	19.26	24.16	568.16	25.8	100	8363	4494939.89
Coke	10^4t				0	29.2	100	28435	0.00
Coke oven gas	10^8m^3	1.03	3.57	0.68	5.28	12.1	100	16726	391816.59
Other Coal Gas	10^8m^3	12.62	8.37		20.99	12.1	100	5227	486767.69
Crude Oil	10^4t	1.16			1.16	20	100	41816	35571.48
Gasline	10^4t				0	18.9	100	43070	0.00
Diesel	10^4t	1.18	1.48	0.57	3.23	20.2	100	42652	102038.65
Fuel oil	10^4t	9.32	2.46	1.55	13.33	21.1	100	41816	431247.43
Liquefied Petroleum	10^4t	0.12			0.12	17.2	100	50179	3797.55
Refinery gas	10^4t	5.48		1.32	6.8	15.7	100	46055	180283.83
Natural gas	10^8m^3		0.84	2.24	3.08	15.3	100	38931	672680.96
Other Petroleum Products	10^4t				0	20	100	38369	0.00
Other Coking Pruducts	10^4t				0	25.8	100	28435	0.00
Other Energy	10^4 tce	16.18			16.18	0	100	0	0.00
								Total	207254040.00

Data source: *China Energy statistical Yearbook 2006*

Fossil Fuel-fired Power Generation of Northeast China Grid in 2005				
Regions	Rate of Electricity Consumption	Rate of Electricity Consumption	Electricity Supply of Grid	Electricity Supply of Grid
	10^8MWh	（MWh)	（%）	（MWh)
Liaoning	836.97	83697000	7.03	77,813,101
Jilin	352.94	35294000	6.59	32,968,125

Heilongjiang	580	58000000	7.96	53,383,200
Total				164,164,426

Data source: *China Electric Power Yearbook 2006*

Table A7 The Operating Margin Emission Factor of Northeast China Grid in 2002-2004

Year	2003	2004	2005	EF_{OM}
CO2 emission (tCO2e)	174,132,944	199,708,287	207,254,040	1.2402
Fuel-fired power generation of Northeast China Grid (MWh)	145,975,752	158,425,475	164,164,426	

Data source: *Table A1~A6*

2. Calculation of EF_{BM}

Table A8 The Oxidation Factor, Emission Factors and Average Low Calorific Value of the Fuel i

Fuel	Unit	Liaoning A	Jilin B	Heilongjiang C	Total D=A+B+C	Calorific Value E	Emission Factor of the Fuel F	Oxidation Factor G	Emission of CO_2 H=D*E*F*G*44/12/100
Raw coal	10^4t	4305.41	2446.13	3383.21	10134.75	20908	25.8	1	200,454,896
Cleaned coal	10^4t	0	0	0	0	26344	25.8	1	0
Other washed coal	10^4t	524.74	19.26	24.16	568.16	8363	25.8	1	4,494,940
Coke	10^4t	0	0	0	0	28435	29.2	1	0
									204,949,836
Crude oil	10^4t	1.16	0	0	1.16	41816	20	1	35,571
Gasoline	10^4t	0	0	0	0	43070	18.9	1	0
Kerosene	10^4t	0	0	0	0	43070	19.6	1	0
Diesel	10^4t	1.18	1.48	0.57	3.23	42652	20.2	1	102,039
Fuel oil	10^4t	9.32	2.46	1.55	13.33	41816	21.1	1	431,247
Other Petroleum	10^4t	0	0	0	0	38369	20	1	0

Products									
									568,858
Natural gas	10^7m^3	0	8.4	22.4	30.8	38931	15.3	1	672,681
Coke oven gas	10^7m^3	10.3	35.7	6.8	52.8	16726	12.1	1	391,817
Other coal gas	10^7m^3	126.2	83.7	0	209.9	5227	12.1	1	486,768
Liquefied Petroleum	10^4t	0.12	0	0	0.12	50179	17.2	1	3,798
Refinery gas	10^4t	5.48	0	1.32	6.8	46055	15.7	1	180,284
									1,735,347
								Total	207,254,040

Data source: *China Energy statistical Yearbook 2006*

Table A9 CO_2 emission from the coal ,oil and gas in Northeast China Grid

λ_{Coal}	λ_{Oil}	λ_{Gas}
98.88%	0.27%	0.85%

Table A10 The Emission Factor of the unit applying best commercially available technology

	Variable	Efficiency of Power Supply	Emission Factor of the Fuel (tc/TJ)	Oxidation Factor	Emission Factor (tCO_2/MWh)
		A	B	C	D=3.6/A/1000*B*C*44/12
Coal-fired power plant	$EF_{Coal,adv}$	35.82%	25.8	1	0.9508
Gas-fired power plant	$EF_{Gas,adv}$	47.67%	15.3	1	0.4237
Oil-fired power plant	$EF_{Oil,adv}$	47.67%	21.1	1	0.5843

Table A11 Change in Installed Capacity of Northeast China Grid in 1998-2005

	1998	1999	2005	Change in Installed Capacity from 1998 to 2005	The Proportion of the Total Change Capacity
	A	B	C	D＝C-A	
Fuel-fired Power	26104.9	27136.9	33934	7829.1	91.31%

Hydropower	5482.3	5522.7	5971.4	489.1	5.70%
Nucleus power	0	0	0	0	0.00%
Wind power	17	22.9	273.3	256.3	2.99%
Total	31604.2	32682.5	40178.7	8574.5	100.00%
Percentage of the Installed Capacity of 2005	78.66%	81.34%	100.00%		

Data source: *China Electric Power Yearbook 1999-2006*

According to the data, the EF_{BM} of the Northeast China Grid is equal to $\frac{CAP_{Thermal,addition}}{CAP_{Total,addition}} \times EF_{Thermal,adv}$ = 0.9453×91.31% =0.8631 tCO_2/MWh.

Table A12 Calculation the baseline emission factor EF_y of Northeast China Gird

OM(tCO_2e/MWh) A	BM(tCO_2e/MWh) B	CM(tCO_2e/MWh) C=0.75×A+0.25*B
1.2402	0.8631	1.1459

Annex 4
MONITORING PLAN

The calibration of meters & metering, the QA/QC procedure and others of the monitoring plan should be carried out with reference to the Power Purchase Agreement of the Project, the Agreement of the Project Accessing to the Grid and the checking and testing standard and the specification of the monitoring equipments. No other information.