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:

Yichun xiaochengshan wind power Project
Version: 6.1
Date: 18/11/2008

A.2. Description of the project activity:

Yichun Xiaochengshan Wind Power Project (hereafter referred as the proposed project) is a grid connected renewable energy project. The objective of the proposed project is to generate electricity from wind resources using advanced wind power generation technology and deliver to the Northeast China Power Grid (NECPG). So the implementation of the proposed project will achieve CO_2 emission reduction by replacing electricity generated by fossil fuel fired power plants connected to the Grid, and will increase the economic viability and technical feasibility of advanced renewable energy power sources against the fact that up to now the economics of exploiting renewable energy resources still been seen as marginal.

The purpose of the proposed project is to generate zero-emission wind power and deliver it to Northeast China Power Grid. For the proposed project,

(a) The scenario existing prior to the start of the implementation of the project activity is NECPG providing the same electricity service as the proposed project;
(b) The project scenario is the implementation of the proposed project, the installation and operation of 58 sets of wind turbines with a total capacity of 49.3MW which will supply an average annual generation of 100470MW.h to NECPG and replace the same amount of electricity generated by fossil fuel fired power plants connected to NECPG;
(c) The baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity.

The proposed project is located in Xiaochengshan, Dailing District, Yichun City, Heilongjiang Province, Northeast China. The proposed project proposes to install 58 sets of 850 KW wind turbines, for a total installed capacity of 49.3 MW. Xiaochengshan area where the proposed project is located has relative rich wind resources. It is estimated that the annual generation of the proposed project will be 100470MGWh. As a result, 114,606 tonnes of CO2 emission reduction will be generated.

Being as an environmentally sound energy supply technology, the contributions of the proposed project are summarized as follows:

- Being located in a power grid dominated by coal-fired power plants, development of the proposed project will not only reduce GHG emissions but also mitigate local environmental pollution caused by air emissions from coal-fired power plants.
- The proposed project could be helpful to diversify power structure of China Northeast Power Grid and reduce the dependence on exhaustible fossil fuels for power generation.
- Heilongjiang province where the proposed project is located is facing rapid increase in electricity demand. Development of the proposed project could contribute to meeting local electricity demand, and therefore boosts the economy in the local region.

- For the local population, they can benefit from the compensation for the deserted land occupation, and the job opportunities due to the construction and operation of the proposed 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)
China (host)	Yichun Longyuan Wind Power Co., Ltd.	No
Austria	Kommunalkredit Public Consulting GmbH	No

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

China

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

Heilongjiang Province

A.4.1.3. City/Town/Community etc:

Dailing District, Yichun

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 Xiaochengshan District, Yichun, Heilongjiang Province of China, its geographical coordinates are north latitude 46º49′ and east longitude 128º35′, and its altitude is from 850m to 1223m. The detailed location of the proposed project is shown in figure 1.

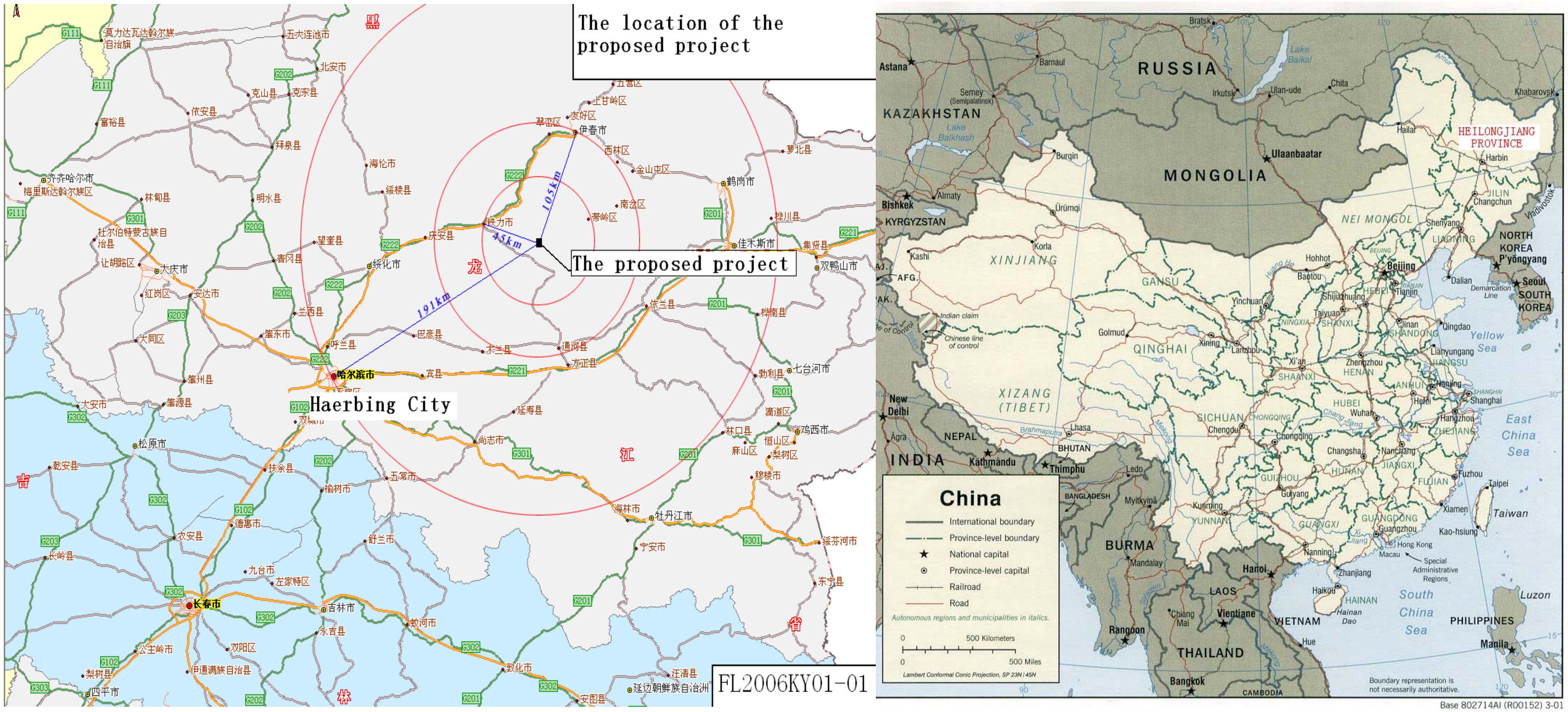


Figure 1. Location of the proposed project

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

This category would fall within sectoral scope 1: energy industries-Renewable sources.

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

The purpose of the proposed project is to generate zero-emission wind power and deliver it to Northeast China Power Grid. For the proposed project,
(a) The scenario existing prior to the start of the implementation of the project activity is NECPG providing the same electricity service as the proposed project;
(b) The project scenario is the implementation of the proposed project, the installation and operation of 58 sets of wind turbines with a total capacity of 49.3MW which will supply an average annual generation of 100470MW.h to NECPG and replace the same amount of electricity generated by fossil fuel fired power plants connected to NECPG;
(c) The baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity.

Given that the wind speed is around 7.5 m/s which is suitable for wind turbines of IECII class and above, the 850 kW Gamesa52 wind turbine domestically manufactured in Tianjing City in China applying the technology of Gamesa Corporation was finally adopted. According to the manufacturer's specifications, the lifetime of the wind turbine is 20 years. The G52 wind turbine has been installed in many wind farms around the world, the performance proved its high quality, technical advantage, and it is more advanced than the current Chinese wind turbine technology available domestically. The development of the proposed project will contribute to promoting application of such type of wind turbine, accelerating the accumulation of experiences, absorption of this kind of technology and advancement of domestic wind power technology.

The Gamesa Eolica's G52-850kW is a three bladed, upwind, pitch regulating and active yaw wind turbine. It has a rotor of 52m and uses the Ingecon-W control system concept that enables the wind turbine to operate in a broad range of variation of rotor speed and maximizes the power output by choosing the combination of rotor speed and pitch angle.

Additional technical details[1] are:

- Rotor diameter 52m,
- Capacity 0.85 MW,
- Cut-in wind speed 4m/s,
- Rated wind speed 13m/s,
- Cut out wind speed 25m/s and
- Survival speed 70m/s.

Each turbine will have a 690V-to-10.5kV transformer, from which a 10.5kV line will link into the on-site 66kV switchgear at the substations which will be constructed for the proposed project. The wind turbines and transmission facility could be monitored and controlled by onsite central control room.

1 http://www.gamesa.es/files/File/G52-ingles.pdf

The project owner has conducted a series of training process in 2007 to guarantee the successful implementation of the wind farm. Furthermore the Gamesa Wind Co. planed a training process about the wind farm operation and maintenance to guarantee the safe operation during the life time of the project. Detailed training schedule shown in the table below:

Table 1 Training schedule for the staff of the proposed project

Time	Training items	Place
20 July to 15 November	Special fundamental knowledge about wind power generation	Management department of the project
15-18 Aug	Management regulation application	Operation department of the project
8 April	On site operation of the wind turbine	Site of Shimaodingzi wind farm
20 June	Technical training about the maintenance of the G52	The Gamesa factory in Tianjing city
14 Aug to 19 Aug	Safety in site	Site of Shimaodingzi wind farm
30 November	Assembly training, on site adjustment	Site of Shimaodingzi wind farm

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

The renewable crediting period is adopted for the Project. An estimation of emission reductions over the first 7-year crediting period is 802,242tCO_2e.

Table 2 Emission reduction estimation during first credit period

Years	**Annual estimation of emission reductions in tCO_2 e**
01/03/2009-28/02/2010	114,606
01/03/2010-28/02/2011	114,606
01/03/2011-29/02/2012	114,606
01/03/2012-28/02/2013	114,606
01/03/2013-28/02/2014	114,606
01/03/2014-28/02/2015	114,606
01/03/2015-29/02/2016	114,606
Total estimated reductions (tCO_2e)	802,242
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tCO_2e)	114,606

A.4.5. Public funding of the project activity:

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

SECTION B. Application of a baseline and monitoring methodology

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

Approved consolidated baseline and monitoring methodology ACM0002 version 07 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources".

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

- ◆Tool to calculate the emission factor for an electricity system (version 1.1);
- ◆Tool for the demonstration and assessment of additionality (version 5.1);
- ◆Tool to calculate project or leakage CO2 emissions from fossil fuel combustion (version 02).

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

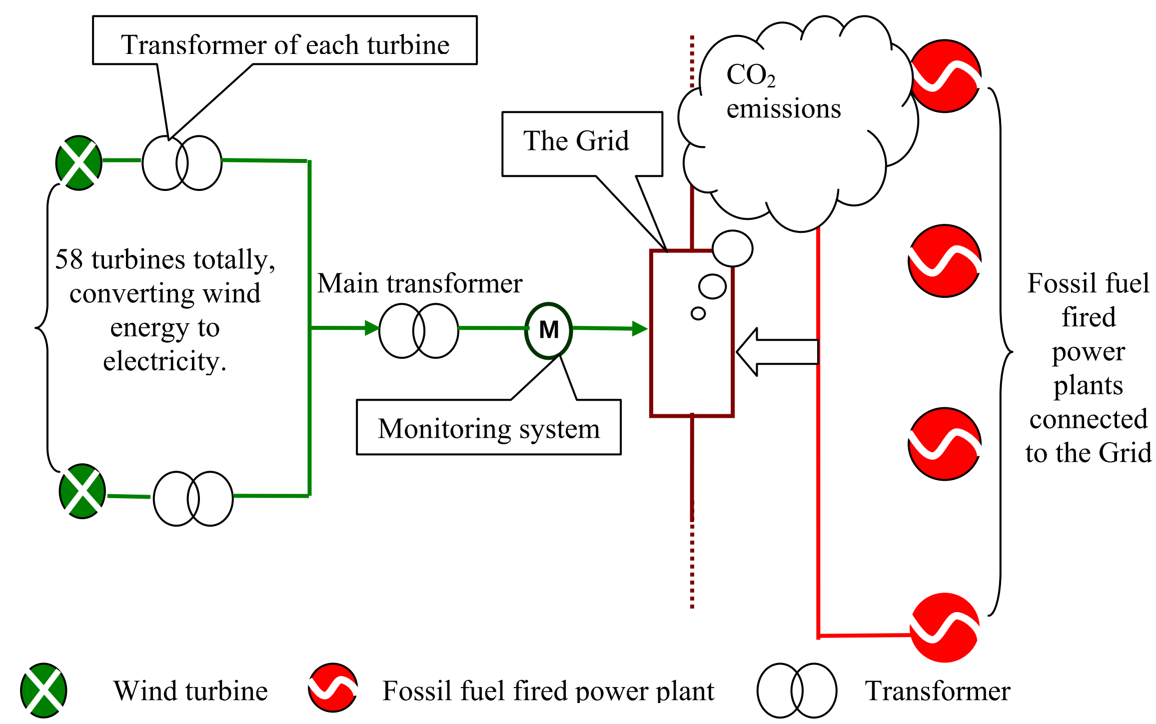
B.2. Justification of the choice of the methodology and why it is applicable to the project activity:

The proposed project can meet the applicability criteria of the baseline methodology (ACM0002 version 07), therefore, the methodology is applicable to the proposed project.

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

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

According to the methodology (ACM0002 version 07), the spatial extend of the project boundary includes the proposed project and all power plants connected to the Electricity System that the CDM project power plant is connected to. The Northeast China Power Grid is the project Electricity System, which is defined by the spatial extent of the power plants that are connected through transmission and distribution lines to the project activity and that can be dispatched without significant transmission constrains. Using the boundary definitions of the Chinese DNA, the Northeast China Power Grid consists of independent province-level electricity systems including Liaoning, Heilongjiang and Jilin power grids.



The flow diagram of the project boundary

	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	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

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

The proposed project is the installation of a new grid-connected renewable power plant that does not modify or retrofit an existing electricity generation facility. The proposed project connected to Heilongjiang Grid, which is an integrated part of Northeast China Power Grid. Therefore the baseline scenario of the proposed project can be identified as the following:

The baseline scenario of the proposed project is provision of equivalent amount of annual power output by the NECPG where the proposed project is connected into, which is the continued operation of the existing power plants and the addition of new generation sources in the NECPG to meet the electricity demand.

According to ACM0002, baseline emissions are equal to power generated by the project that delivered to the NECPG, multiplied by the baseline emission factor. The baseline emission factor (EFy) is calculated as a Combined Margin (CM).

The analysis and description in B.5 and B.6 will support the baseline scenario selected above.

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 following steps are used to demonstrate the additionality of the proposed project according to "Tools for the demonstration and assessment of additionality" agreed by Executive Board and requested by the baseline methodology (ACM0002 version 07).

No.	Timeline	Milestone
1	22nd May, 2006	(EIA) of the proposed project was approved by the Environmental Protection Administration of Heilongjiang Province.
2	April 2006	Feasibility study of the proposed project finished. The plan of the CDM application was listed in the FSR.
3	1st September 2006	The FSR was approved by DRC of Heilongjiang province
4	20th December 2006	The Official Letter about the tariff of the proposed project was issued by the Planning and Statistic Bureau of Dailing District, Yichun City of Heilongjiang province.
5	30th December 2006	Based on the tariff provided in the letter above, the project is financially unattractive. In order to increase the FIRR of the proposed project, the project owner signed a consultancy contract to start CDM development.
6	10st February, 2007	When the construction contract sighed.
7	1st March, 2007	Date of the project construction started.
8	20th March 2007	When the wind turbine purchasing contract signed.
9	23th August 2007	When Loan contract signed.

As the table above shown, the CDM application plan listed in FSR indicated the project owner's awareness of the CDM prior to the project activity start date. Because the tariff in the Official Letter issued by the Planning and Statistic Bureau of Dailing District, Yichun City of Heilongjiang province was lower than the tariff estimated in FSR, the IRR of the proposed project decreased below benchmark without the benefits of the CDM. In order to increase the FIRR of the proposed project, the project owner signed a consultancy contract to start CDM development. Then the construction contract of the project was signed at 10st February, 2007 when the real action of the proposed project started.

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

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

To provide the same output or services comparable with the proposed CDM project activity, these alternatives are to include:

a) The coal-fired plant with the same annual electricity output as the proposed project.
b) To implement the proposed project not undertaken as a CDM project activity but as a commercial project.
c) The other renewable energy resources with the same annual electricity output as the proposed project, such as the small hydro power plant.
d) The Northeast China Power Grid as the provider for the same electricity output as the proposed project.

At present, compared with other renewable energy technology in China, only small hydro power might have better benefits than wind power[2]. Meanwhile the project feasibility study shown Dailing county, the proposed project site, is the tree-covered mountains with no rivers, so this place is lack of the exploitable hydro resource. Otherwise the owner of the proposed project is dedicated to wind power development in China. In conclusion, alternative c) is unrealistic and should be eliminated.

Step1b.Consistency with mandatory laws and regulation.

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

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

According to the applicable laws and regulations, the alternative a) should be eliminated from the following consideration because it does not comply with the national regulation for controlling small scale fossil-fired power plant. To provide the same annual output as the proposed project, the alternative fossil-fired power plant will has the capacity lower than 49.3MW. Current Chinese regulations prohibit the construction of coal-fuel power plants with capacity lower than 135MW in areas served by provincial and/or regional grid systems (*On Prohibition of 135MW and Smaller-scale Coal-fired Power Plants*, General Office of State Council); The oil-fired or gas-fired unit capacity under 100MW does not comply with the regulation (*Temporary Management Regulation on Small Scale Fossil-fired plant Construction, 1997.8*) too.

Alternative b): 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.

Alternative d): To provide the same annual electricity output as the proposed project by North East China Power Grid. The alternative is in compliance with current laws and regulations of China.

In conclusion, the alternative b) and d) are the realistic, credible alternatives in compliance with current laws and regulations of China, which should be considered in the following analysis steps.

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[2] http://www.chinaenergy.gov.cn/news.php?id=15688,
http://www.cas.ac.cn/html/Dir/2003/03/05/8139.htm

Step2. Investment analysis.

Sub-step 2a. Determine appropriate analysis method.

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

The simple cost analysis is not applicable for the proposed project because the project activity will produce economic benefit (from electricity sale) other than CDM related income. The investment comparison analysis is also not applicable for the proposed project because the baseline scenario, providing the same capacity or electricity output by the Northeast China Power Grid, is not an investment project.

To conclude, the benchmark analysis will be used to identify whether the financial indicators (such as IRR) of the proposed project is better than relevant benchmark value.

Sub-step 2b Apply benchmark analysis.

According to the "Economical assessment and parameters for construction project, 2nd edition", a project will be financially acceptable when the Financial Internal Return Rate (FIRR) is better than the sectoral benchmark FIRR.

In according with *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects* issued by former State Power Corporation of China, the benchmark for financial internal rate of return (IRR) in China's power generation industry is 8% considering economic assessments of hydropower projects, fossil fuel fired projects, transmission and substation projects, especially the interest rate of commercial loans over five years. Nowadays many of China's existing wind power projects have applied it as the benchmark IRR.

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

Table 3 Main parameters for calculation of financial indicators

Items	Unit	Amount	Data source
Capacity	MW	49.3	Feasibility Study Report
Static Investment	Million RMB	412.75	Feasibility Study Report
Annually output	GWh/year	100.47	Feasibility Study Report
Electricity Tariff (Excluding VAT)	RMB/kWh	0.5622	Tariff Approval
Value Added Tax (VAT)	%	8.5	Feasibility Study Report
Income tax	%	15	Feasibility Study Report
Average Annual O&M Cost	Million RMB	16.30	Feasibility Study Report
Project operational life time	Year	20	Feasibility Study Report
Expected CERs Price	EUR/tCO_2	10.2	LOI

CERs crediting time	Year	7×3	

The financial indicators (FIRR) with and without income from selling CERs are listed in the following table. Without income from selling CERs, the FIRR of the proposed project is lower than the benchmark FIRR and the proposed project is financially unacceptable because of its low profitability. While considering such income, the financial acceptance will be changed, the FIRR of the proposed project is better than the benchmark then the proposed project is financially acceptable.

Table 4 Comparison of financial indicators with and without income from CERs

Items	Unit	Without income from CERs	Benchmark	With income from CERs
FIRR	%	6.95	8	9.77

Sub-step 2d. Sensitivity analysis.

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

Four factors are considered in following sensitivity analysis:

1) Plant load factor (PLF).
2) Tariff.
3) Total investment.
4) Annual operation and maintenance cost.

When the above four factors vary, the FIRR of the proposed project (without income from selling CERs) varies to different extent as analysed below.

The PLF is a very important factor affecting the financial attractiveness of the proposed project. In the case that the PLF increases about 6.8%, the FIRR of the proposed project begins to exceed the benchmark. According to the FSR, the annual output is estimated basing on the twenty-years weather statistic data from 1986 to 2005 provided by local meteorological station, first using professional software WAsP to select the rich wind source area, then using software WindFarmer to optimize the location of each turbine for maximize power generation. Moreover, the PLF value is positive correlation with the wind speed, the average wind speed of the project site tends to decrease over the past 20 years (from 1986 to 2005)[3] as shown in figure 3.

[3] feasibility study report of the proposed project p2-2

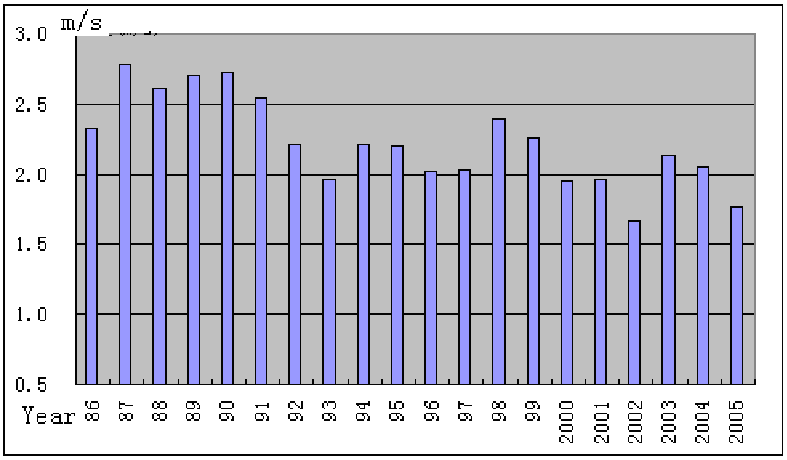

Figure 3 The annual average wind speed in the local meteorological station

Therefore the probability that PLF is 6.8% higher than the estimated value throughout the whole project operation period is unreasonable. The proposed project is always lack of financial attractiveness.

The impact on the IRR of the proposed project about the expected power tariff is equivalent to the impact of PLF. In the case that the expected power tariff increases by 6.8%, the FIRR of the proposed project begins to exceed the benchmark, the conclusion of financial additionality begins to be in question. However there is extremely unlikely for the tariff of the proposed project to have an increase of 6.8%. Firstly, according to China's Management Rules on Tariff issued by NDRC[4], the tariff of the un-tendering projects should be determined by the government with reference to the tariff of tendering wind projects. By this pricing principle, China government is gradually lowering down the wind power in-grid tariff[5]. Secondly, the Official Letter about the tariff of the proposed project issued by the Planning and Statistic Bureau of Dailing District Yichun City in Heilongjiang Province in December 2006 regulated the tariff of the proposed project as no more than 0.61Yuan/kWh, which declined almost 9% compared with the tariff in FS. Therefore it is impossible that the expected tariff of the proposed project could increase 6.8%, so the proposed project is always lack of financial attractiveness.

Another important factor for financial attractiveness is the change of total investment. In the case that the total investment decreases about 6.9%, the FIRR of the proposed project begins to exceed the benchmark. Considering the majority of total investment is due to wind turbines equipment purchase and installation[6] which is consisted 88. 35% of total statistic investment and whose price has increased nearly 25% in recent years[7]. So it is very difficult to lower the total investment of the proposed project. Hence within the reasonable range of total investment, the proposed project is always lack of financial attractiveness.

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[4] 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

[5] http://www.eri.org.cn/manage/upload/uploadimages/eri200672795944.pdf

[6] The Feasibility Study Report of the proposed project, page 13-9.

[7] China Government Establish Policy to Promote Windturbine Manufactory, reported by China New Energy Website, http://www.gzkj.gov.cn/kjxx/newsDetail.jsp?infoId=79934

The impact of the average annual O&M cost is the slightest, the FIRR of the proposed project will exceed the benchmark when the annual O&M cost declined 25.3%. Whereas, according to the FS, the detailed operation costs is composed of four kinds of costs - maintenance costs, annual salaries for the employees, insurance premium of fixed assets and other costs. Moreover, the price of material and salaries of the employees are gradually increasing in China, which leads annual O&M cost gradually increasing[8]. Further more, The FSR was finished by a qualified consultant company focused in wind power engineering and has be approved by NDRC, so the O&M cost wouldn't declined 25.3% compared with the one listed in FSR. Therefore, the proposed project is always lack of financial attractiveness within the reasonable range of annual O&M cost.

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

Step 3. Barrier analysis.

No barrier analysis has been applied.

Step 4. Common practice analysis

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

According to the definitions of other activities similar to the proposed project activity in "Tool for the Demonstration and Assessment of Additionality (version 4)", the activities similar to the proposed project activity were selected according to the follow three rules:
1. The activities should locate in the same province, because the wind power project was implemented under the administration of provincial level government. The activities in the same province have the similar wind resource, grid structure, geological and transportation conditions, economic developing status[9], the former two factors affected the estimated average annual output and the later three ones affected the total investment respectively.
2. The development of the wind projects with capacity over 50MW should be approved by the NDRC instead of the DRC of province, so the capacity of similar activities was defined as below 50 MW[10].
3. The activities should be implemented after 2003. The wider power sector reforms happened in China after 2003 leaded to diversification in the ownership of generation capacity. As a result, new generation, including wind power, was expected to compete under more commercial conditions. More over, the Chinese Government launched the Wind Concession Program In 2003, which was designed to bring wind power development in China onto a new commercial footing.[10]

The existing wind farms located in Heilongjiang province with the capacity below 50MW were listed in the following table:

Table 6 Existing wind farms in Heilongjiang Province

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[8] The price for construction material and manpower inflation, reported by Economic Observation Press, June 18th, 2006, http://www.china.com.cn/chinese/EC-c/1246238.htm

[9] China Wind Power Industry Development Report (2006), Shi Peng Fei, China Electric Year Book 2007.

[10] Notice about the requests for wind power project construction management (No.[2005]1204), issued by NDRC.

Wind farm	Installed Capacity(MW)	Date when wind turbines totally installed	Note
Huafu Mulan	12 (Re. source No.1)	2004.07	Tariff (exclude VAT) is 0.78RMB Yuan/kWh. (Re. source No.2)
Huafu Fujin	24.3	2004.09	Financed from Asia Development Bank (Re. source No.3)

Sources:
1. Shi Pengfei (Deputy Director, Chinese Wind Energy Association), Statistics on China Wind Farm Installed Capacity in 2007.
2. Tariff approval of Mulan wind power project, issued by Heilongjiang Price bureau, document No: 2003 [241]
3. http://www.china5e.com/news/power/200208/200208220027.html

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

The Huafu Mulan wind farm in table 6 enjoyed higher tariff than the proposed project, the other project financed from Asia Development Bank. So the wind farm projects listed in table 6 do not call into question the claim that the proposed project is financially unattractive as discussed in Step 2 because there are essential distinctions between them.

As the four steps described above, the proposed project activity passed all criteria of "Tool for the demonstration and assessment of additionality (version 03)". In conclusion, the proposed project is additional and not the baseline scenario.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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

Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

Project emissions

For wind power project activities, $PE_y = 0$

Baseline emissions

Baseline emissions include only CO2 emissions from electricity generation in fossil fuel fired

power plants that are displaced due to the project activity, calculated as follows:

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

Where:

BE_y = Baseline emissions in year *y* (tCO2/yr).

EG_y = Electricity supplied by the project activity to the grid (MWh).

$EG_{baseline}$ = Baseline electricity supplied to the grid in the case of modified or retrofit facilities (MWh). For new power plants this value is taken as zero.

$EF_{grid,CM,y}$ = Combined margin CO2 emission factor for grid connected power generation in year *y* calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (version 01).

Parameter

The methodological tool "Tool to calculate the emission factor for an electricity system" (version 01) provides procedures to determine the following parameters:

Parameter	SI Unit	Description
$EF_{grid,CM,y}$	tCO2/MWh	Combined margin CO_2 emission factor for grid connected power generation in year y
$EF_{grid,BM,y}$	tCO2/MWh	Build margin CO_2 emission factor for grid connected power generation in year y
$EF_{grid,OM,y}$	tCO2/MWh	Operating margin CO_2 emission factor for grid connected power generation in year y

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

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

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

Step1: Identify the relevant electric power system.

Using the boundary definitions of the Chinese DNA[11], Northeast China Power Grid is defined as the **project electricity system** , which consists of independent province-level electricity systems

[11] http://cdm.ccchina.gov.cn/web/index.asp.

including, Heilongjiang, Jilin, Liaoning, East Inner Mongolia province that can be dispatched without significant transmission constraints.

The **connected electricity system** is North China Power Grid, which is connected by transmission lines to the project electricity system. Power plants within the connected electricity system can be dispatched without significant transmission constraints but transmission to the project electricity system has significant transmission constraint.

Electricity transfers from connected electricity systems to the project electricity system are defined as **electricity imports** and electricity transfers to connected electricity systems are defined as **electricity exports**. The Northeast China Power Grid has net electricity exports to the North Power Grid.

For the purpose of determining the build margin emission factor, the spatial extent is limited to the project electricity system (Northeast China Power Grid), since there are no net electricity imports from North China Power Grid and recent or likely future additions to transmission capacity will not enable significant increases in imported electricity.

Step2: Select an operating margin (OM) method

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

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

The simple OM method (option a) can only be used if low-cost/must-run resources [12] constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.

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

- Ex ante option: A 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period, or
- Ex post option: The year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. If the data required calculating the emission factor for year *y* is usually only available later than six months after the end of year *y*, alternatively the emission factor of the previous year (y-1) may be used. If the data is usually only available 18 months after the end of year *y*, the emission factor of the year proceeding the previous year (y-2) may be used. The same data vintage (y, y-1 or y-2) should be used throughout all crediting periods.

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

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

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

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

For The Project, the simple Operating Margin emission factor was chosen based on the following two reasons:

1. In China, the State Grid Corporation runs the interregional dispatch system and each regional grid corporation run the intraregional dispatch system. The dispatch information is regarded as business secrets and not available to the public.
2. For the most recent 5 years (2002-2006), the low-cost/must run resources of total electricity generation in Northeast China Power Grid constitute 5.44%, 4.72%, 6.45% 7.98% and 5.25% of total generation of Northeast China Power Grid, respectively (China Electric Power Yearbooks 2003-2007), which is much less than 50% (detailed data s are shown in Annex 3).

As a result, the simple OM method can be used.

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

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

The simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO2/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants / units. It may be calculated:

- ◆ Based on data on fuel consumption and net electricity generation of each power plant / unit (Option A), or

- ◆ Based on data on net electricity generation, the average efficiency of each power unit and the fuel type(s) used in each power unit (Option B), or

- ◆ Based on data on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system (option C)

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

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

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

$$EF_{grid,OMsimple,y} = \frac{\sum FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_y} \qquad (2)$$

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 for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex ante option)

For this approach (simple OM) to calculate the operating margin, the simple OM emission factor is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including low-cost / must-run power plants / units.

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

As chosen in step 2, the simple OM emission factor is calculated by using Ex-ante option of data vintages, i.e. a 3-year generation-weighted average, based on the most recent data available at the

time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period.

The data of installed capacity, electricity generation and fuel consumptions are all from China Energy Statistical Yearbooks 2005-2007 and China Electric Power Yearbooks 2005-2007.

Given the above, the simple operating margin CO2 emission factor ($EF_{grid,OMsimple,y}$) of Northeast China Power Grid is **1.25609tCO2/MWh.** The detailed calculations and data are listed in the annex 3 (The baseline emission factor OM is same as that provided by Chinese DNA, the website is http://cdm.ccchina.gov.cn/web/index.asp).

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

The sample group of power unit *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[13].

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

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

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

(i) Exclude power unit(s) that is (are) built more than 10 years ago from the group; and

(ii) Include grid connected power projects registered as CDM project activities, which are dispatched by dispatching authority to the electricity system.

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

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

Option 1: For the first crediting period, calculate the build margin emission factor ex-ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second

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

crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

Option 2: For the first crediting period, the build margin emission factor shall be updated annually, ex-post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex-ante, as described in option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

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

Step 5: Calculate the build margin emission factor

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

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

Where:

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

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

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

m = Power units included in the build margin

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

No matter which options for calculating BM factor mentioned in step 4 was adopted for the proposed project; the same issue on data availability must be addressed. Currently, it is very difficulty to get the capacity margin data of power plants in China, since these data as well as net quantity of electricity generated and delivered to the grid and fuel consumption data in power unit *m* are regarded as commercial secrets or only for internal usage. Then the following deviation was adopted to calculate the Build Margin emission factor. According to the guidance from the CDM Executive Board for a deviation of the baseline methodology of AM0005, which had combined

into the baseline methodology of ACM0002, the following deviation was adopted to calculate the Build Margin emission factor. (http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_QEJWJEF3CFBP1OZAK6V5YXPQKK7WYJ)

1） Use of capacity additions for estimating the build margin emission factor for grid electricity.
2） Use of weights estimated using installed capacity in place of annual electricity generation.

Since the power plant capacity additions in the electricity system from 2000 to 2006 comprise 20% of the system generation (in MWh), so the sample group *m* consists of the power plants that have been built from 2000 to 2006.

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

According to the guidance from EB, the following deviation was adopted to calculate the Build Margin emission factor. Firstly calculate the proportion of incremental installed capacity and electricity generation technology, secondly calculate the weights of new installed capacity of all electricity generation technology, and finally calculate emission factors based on maximum energy efficiency level of new technology commercially.

Currently, it is difficult to separate different kinds of electricity generation technology of coal, oil and gas on the base of statistic data available. This project adopts following method: First, based on the energy balance which has been published recently, calculate the emission weights of total CO2 emissions which corresponds to solid, liquid and gas fuels for electricity generation, Secondly, based on the emission factors of maximum energy efficiency level of new technology commercially available, calculate thermal power emission factors making use of emission weights, finally, BM can be calculated by thermal power emission factors timing weights of thermal power of 20% installed capacity addition.

The detailed calculation as following:

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

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

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

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

Where:

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

$COEF_{i,j}$ =The CO2 emission coefficient of fuel i (tCO2/ mass or volume unit of the fuel), taking into account the carbon content of the fuels consumed by province,

$$COEF_i = NCV_i \times EF_{CO_2,i} \quad (7)$$

Where:

NCV_i =Net calorific value (energy content) of fossil fuel type i (GJ/ mass or volume unit）;

$EF_{CO_2,i}$ = CO2 emission factor of fossil fuel type i in year y (tCO2/GJ)

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

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

$$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv} \quad (8)$$

Where:

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

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

$$EF_{grid,BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal} \quad (9)$$

Where:

CAP_{Total} = The total capacity addition

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

Following the four steps above, the build margin emission factor $EF_{grid,BM,y}$ of the Northeast China Power Grid is calculated to be **0.7946tCO2/MWh.** The detailed calculations and data are

listed in the annex 3 (The build margin emission factor BM is same as that provided by Chinese DNA, the website is http://cdm.ccchina.gov.cn/web/index.asp.)

Step 6: Calculate the combined margin emissions factor

The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \quad (10)$$

Where:

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

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

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

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

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

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

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} = \mathbf{1.1407tCO2/MWh}$$

Leakage

For wind power project activities, $LE_y = 0$

Emission reductions

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \qquad (11)$$

Where:

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

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

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

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

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

Data / Parameter:	$F_{i,j,y}$
Data unit:	10^6tones, 10^{10}m^3, 10^6tce, depending on the specific fuel. Refer to Annex for details.
Description:	Amount of fuel i consumed in year(s) y for generation
Source of data used:	China Energy Statistical Yearbook (2004, 2005, 2006)
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Since the detailed fuel consumption data by power plants are not publicly available, therefore the aggregated data by fuel types are used instead, which have been published by the Chinese authorities.
Any comment:	

Data / Parameter:	$GEN_{i,y}$
Data unit:	MWh
Description:	Electricity (MWh) delivered to the grid excluding low operating cost/must run power plants in year y
Source of data used:	China Power Yearbook (2004, 2005, 2006)
Value applied:	See Annex 3
Justification of the choice	Since the detailed generation data by power plants are not publicly available,

of data or description of measurement methods and procedures actually applied :	therefore the aggregated data by fuel types are used instead.
Any comment:	

Data / Parameter:	NCV_i
Data unit:	TJ/t(m3)
Description:	Net calorific value (energy content) per mass or volume unit of fuel i
Source of data used:	China Energy Statistical Yearbook (2004, 2005, 2006)
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	These data are the best data available, and have been published by the Chinese authorities.
Any comment:	

Data / Parameter:	$OXID_y$
Data unit:	%
Description:	Oxidation factor of the fuel i
Source of data used:	IPCC 2006 default value
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	The country specific values of oxidation factors in China are not available. Thus IPCC default values are used instead.
Any comment:	

Data / Parameter:	$EF_{CO2,i}$
Data unit:	tCO2/TJ
Description:	CO2emission factor per unit of energy of the fuel i
Source of data used:	IPCC 2006 default value
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	The country specific values of fuel CO2 emission factor in China are not available. Thus IPCC default values are used instead, which have been published by the Chinese authorities.
Any comment:	

Data / Parameter:	FC_{bat}
Data unit:	%
Description:	Efficiency of advanced thermal power plant additions
Source of data used:	http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1051.pdf
Value applied:	Coal: 37.28%， oil: 48.81%, gas: 48.81%
Justification of the choice of data or description of	These data are the best data available, and have been published by the Chinese authorities.

measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	CAP_y
Data unit:	MW
Description:	The installed capacity in Northeast China Power Grid in year Y.
Source of data used:	China Power Yearbook
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to the EB guidance.
Any comment:	

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

According to the descriptions and formulas in section B.6.1, the combined baseline emission factor of the Northeast China Power Grid is: EF_y **= 1.1407 tCO_2/MWh.**

According to the Feasibility Study Report of the proposed project, the estimated annual electricity generation delivered to the power grid will be: EG_y =100470 **MWh.**

According to the baseline methodology ACM0002 (Ver 06), the GHG emission of the proposed project within the project boundary is zero, i.e. $PE_y = 0$.

According to the baseline methodology ACM0002 (VER 06), the leakage of the proposed project is not considered, i.e. $L_y = 0$.

Therefore, the proposed project activity emissions are zero, i.e. $E.1 + E.2 = PE_y + L_y = 0$.

Hence, the emission reductions due to the project are equal to the baseline emissions. The emission reduction will be calculated ex post on the basis of actual power supply to the grid, using the baseline emission factor presented above in Section B.6.1.

The annual emission reductions of the proposed project during the first crediting period are estimated to be: $ER_y = BE_y - PE_y - L_y = BE_y =$ **114,606 tCO_2.**

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

Year	**Estimation of project activity emission (tCO2e)**	**Estimation of baseline emission (tCO2e)**	**Estimation of leakage (tCO2e)**	**Estimation of emission reductions (tCO2e)**
01/03/2009-28/02/2010	0	114,606	0	114,606
01/03/2010-28/02/2011	0	114,606	0	114,606
01/03/2011-29/02/2012	0	114,606	0	114,606

01/03/2012-28/02/2013	0	114,606	0	114,606
01/03/2013-28/02/2014	0	114,606	0	114,606
01/03/2014-28/02/2015	0	114,606	0	114,606
01/03/2015-29/02/2016	0	114,606	0	114,606
Total(tCO_2e)	**0**	802,242	**0**	802,242

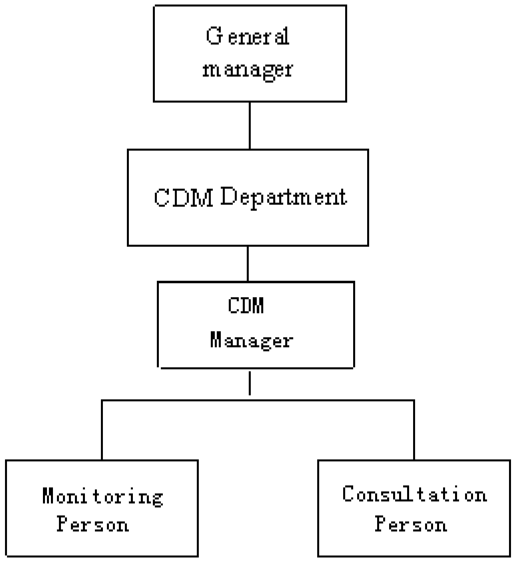
B.7. Application of the monitoring methodology and description of the monitoring plan:

B.7.1. Data and parameters monitored:

Data / Parameter:	EG_y
Data unit:	MWh
Description:	Net electricity delivered to the grid by the proposed project
Source of data to be used:	Electricity meter reading at project boundary
Value of data applied for the purpose of calculating expected emission reductions in section B.5	100,470MWh.
Description of measurement methods and procedures to be applied:	The supply of power to the grid by the proposed project is measured through electricity metering instruments meet the requirement of national standard DL/T448 —2000. The metering instruments will be calibrated by the qualified institution annually. The designated person of the project owner will read and aggregate the readings of the meters. Data will be archived for 2 years following the end of the crediting period by means of electronic and paper backup.
QA/QC procedures to be applied:	Those data will be directly used for calculation of emission reductions. The record of the electricity transaction between the project and the grid will be obtained to ensure the consistency.
Any comment:	See also section Annex 4 for more details.

B.7.2. Description of the monitoring plan:

This monitoring plan will be implemented by professional staff authorized by the owner of the proposed project, i.e. Yichun Longyuan Wind Power Co., Ltd. The management structure is illustrated as follows (See also section Annex 4 for more details):



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)

The Operating Margin Emission Factor and the Build Margin Emission Factor published by the Chinese Designated Authorities at 18/07/2008 were adopted in this PDD.

The persons involved in the application of the monitoring methodology are listed as follows:

Huidong GUO, Project Manager, China Fulin Wind Power Development Corporation.
Address: Room 809, Part C, International Investment Building, the 6th-9, North Avenue Fuchengmen Xicheng District, 100034, Beijing, P, R, of China
Telephone: +8610-66091321
Email: cflghd@gmail.com

Bingzhi SUN, China Fulin Wind Power Development Corporation.
Address: Room 816, Part C, International Investment Building, the 6th-9, North Avenue Fuchengmen Xicheng District, 100034, Beijing, P, R, of China
Telephone: +8610-66091379
Email: sunsunng1019@sina.com

(Not the project participants listed in Annex 1)

SECTION C. Duration of the project activity / Crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity construction:

10/02/2007 (Date when construction contract sighed is the earliest date on which the implementation of the proposed project has begun.).

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

20 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:

01/03/2009 or the date of registration whichever is later.

C.2.1.2. Length of the first crediting period:

7 years.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

Not applicable.

C.2.2.2. Length:

Not applicable.

SECTION D. Environmental impacts

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

In accordance with relevant environmental laws and regulations, an environmental impact assessment (EIA) of the proposed project was completed in 2006, and has been approved by the Environmental Protection Administration of Heilongjiang Province at May 22th, 2006.

The proposed project is likely to cause the following environmental impacts:

- Main Potential Environmental Impacts Associated with the project
  - Impacts from the construction of the wind farm include construction noise, dust as well as water and soil loss etc;
  - Impacts from noise and the electromagnetism pollutions of the wind turbines during the operation period;
  - Impacts on native vegetation and environment as a result of construction activities for windmill towers, transformers and access roads;
  - Impacts on socio-economy from the construction and operation of the project.

- **Impacts on Air Environment**

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 temporary that will be ended when the construction is completed. It is suggested that several measures shall be taken into account, such as prohibiting the construction under strong wind weather, reducing as much as possible the area of construction, spraying water during construction, and reducing the speed of vehicles in the field. Hence, the air quality of the proposed project site is relatively well, which meets the Class II of China Ambient Air Quality Standard (GB 3095-1996)

- **Impacts on Noise Environment**

The noise of the project in construction phase is from vehicles and machines on-site. During the construction period of the proposed project, the noise level will be lower than 55dB at the distance to noise source of 250m, which will meet the class I of China Environmental Noise Standard in Urban Area (GB3096-93). The proposed project is located in mountain area. Therefore, there will be no noise disturbance issue. Based on the formula of declining of sound emitted from a non-directional source, it is estimated that the maximum noise effective distance of the project is 50m in daytime and 300m at night. Moreover, the magnitude of the impacts during the construction period will only exist temporarily, and disappear with the completing of the construction period. Moreover, operational noise from the rotating blades is expected to be minimal due to the attenuation of noise beyond a distance of 300-500m from the wind turbines. The noise meets Class II of China Environmental Noise Standard in Urban Area (GB3096-1993). At the same time, the closest residential area to the site of the project is over 5km away. Therefore, the noise of the project will not have impact on nearby residents.

- **Impacts on Water and Solid Waste**

The wind-farm does not consume any water, nor does it generate any wastewater in the operation phase. The possible negative impacts are the household wastewater and solid waste produced by builders and staff, and the waste earth from digging of the foundation in the construction phase. Under normal conditions with highly automated monitoring and control system, the household wastewater will be first treated in a septic tank, and then be disinfected to discharge for circumjacent virescence. Moreover, the

amount of household solid waste will be very little, which will not have impact on the environment. Besides, the solid waste will be collected and moved to the 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 which should be replanted with grass. The quality of surface water meets the Class II of China Quality Standard for Sea Water (GB/T 14848-93). Following the suggestion, the water and solid waste should have no significant impact on the environment.

- **Impacts on telecommunications and television transmissions**

Since set of 110kV substation will be constructed in the project, the electromagnetism impact of the project should be evaluated. Based on the analogies of the built wind-farms, the result concludes that the operation of wind farm will not have electromagnetism impact on the nearby enterprises and residential areas that are 5 km away from the wind farms, and the electromagnetism impact is below the standard limit value specified in the Hygienic Standard on Power-frequency Electric Field Working Places (GB16203-1996). Therefore, the electromagnetism of this project in the operation phase doesn't impact the production and daily life of nearby enterprises and residents.

- **Impacts on Ecosystem Environment**

A serious potential concern for wind farms is their impact on vegetation, animals and migrating birds. The minor quantity of soil erosion 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 the project activity. After the completion of the construction, the surrounding area of permanent occupation of ground will be planted with vegetation; the temporary equipments will be taken away. The ground occupation will not have obvious impact on the local ecology impact. Therefore, the activities to be carried out will not generate any negative impact on the ecological environment.

- **Socio-Economic Impacts**

The preliminary appraisal assumed a larger installed capacity and higher coal displacement in the project. The project is estimated to product GHG emission reduction through delivering electricity to the grid. So the project generates eco-friendly, GHG free power that contributes to sustainable development of the region. Moreover, the locals have benefited economically through land sales and revenues. The project activity not only helps the uplift of skilled and unskilled manpower in the region, but also improves employment rate and livelihood of local populace in the vicinity of the project.

- **Conclusion**

The project activity does not have any major adverse impacts on environment during its construction and operational phase. The project is definitely a more environmentally friendly way of providing power than the other power plants.

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:

Not applicable, since the construction and operation of the proposed project have no significant environmental impacts.

SECTION E. Stakeholders' comments

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

On October, 1th, 2006, under the support of local government, the project owner successfully held a stakeholder meeting in Dailing County. It should be noted that the residents in the neighbourhood in which the project is located are very familiar with wind farms, due to a number of wind farms have been constructed close to the project location, either under CDM application or registered successfully. The Yichun Longyuan Wind Power Co, Ltd. invited totally 8 stakeholder representatives to participate in the meeting, respectively from the Development and Reform Bureau of Dailing County, the Environmental Protection Bureau of Dailing County, the Electricity supply bureau of Dailing district, and the Daxing Village of Dailing district. (The registration form of the meeting is available to be verified.)

Meeting:

Time of the meeting: 14:00-15:30 pm, October 1, 2006
Place of the meeting: Meeting room on the second floor of Dailing Electricity supply bureau, Yichun city, Heilongjiang province.

Process of the meeting:
First, the project owner gave a short introductory statements about the project construction, and the consultant to the project made a brief explanation of the Clean Development Mechanism, emphasized the importance of the CDM against the global warming disaster. After these introductory statements, the project owner and the consultant invited the participants in the meeting to express their comments and concerns about the project. At this stage, no critical comments were made; the overall finding was that the local residents and local government officials expected that the local people would benefit from the project. To further determine there are no negative impacts by the project, the consultant distributed 20 copies of questionnaire among the local residents after the meeting.

E.2. Summary of the comments received:

Comments on the meeting:

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

Comments from the local government: The proposed project has been approved by the Development and Reform Commission of Heilongjiang Province and Environmental Protection Administration of Heilongjiang Province, which shows that the construction and operation of the proposed project will have little impacts on the local environment. The proposed project is one of the largest investment projects in local area. The local municipal government highly supports the proposed project, and expects the increase of local financial incoming and new employment opportunity through the implementation of the proposed project.

Comments from villager and forestry worker representatives: The proposed project site is located on the top of Xiaochengshan Mountain. There are no residents and croplands in the area 10 km around the proposed project. Therefore, there is no issue on noise disturbance and residents movement. Moreover, the project owner has made compensation for the land occupied by the proposed project. The local residents also benefit from the employment opportunities for construction and operation of the proposed project.

Questionnaire:

To collect more stakeholders' comments, a one page questionnaire was designed to be easily filled in with the following questions:

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

4) Space for the respondents' signature and date

The survey had a 100% response rate (20 questionnaires returned out of 20) and the following is a summary of the key findings:

Education level of the respondents: primary level (25%), middle level (45%), high level (30%).
90% of the respondents are satisfied with their life conditions and surrounding environment.
100% of the respondents have some knowledge and understandings about wind farm projects.
100% of the respondents do not disagree with the development of the Project. About 85% of them believe that the Project will have overall positive impacts, such as "increase of job opportunities", "improvement of living standard", on their livelihoods, while the others believe there will be little impact on their livelihoods or do not know the impacts.

Among the negative impacts mentioned, the main concerns are trash amount increase during construction period (30%), noise (15%), infield occupation and plants damage (55%).
The main additional comments or suggestions on the Project construction is "decreasing the electricity tariff", which would make the IRR of the project even lower.

Conclusion

The survey shows that the proposed project receives strong support from local people, which is closely linked to the fact that the majority of local villagers have some understandings with wind power projects. Most of the respondents believe that the project will have overall positive impacts on their livelihoods with better standard of living and reduced tariff which is quite high now. Among the negative impacts, the two main issues concerned are land use and environmental pollution. However, as the environmental impact assessment demonstrates, both impacts only occur during construction period, and accompanied by mitigating measures such as enclosed operation, waste landfill, and restored vegetation, the impacts will be minimized after the construction.

The survey forms are available from the company.

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

Since there is no negative comment received, it's no need to make adjustment on design, construction and operation of the proposed project.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Represented by:	Alexandra Amerstorfer
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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

1. OM emission factor calculation of NEPG (Northeast Power Grid)

Table A-1, A-2, and A-3 provide annual thermal power electricity generation in NEPG from 2004 to 2006. The main data sources come from China Electric Power Yearbook 2005, 2006 and 2007.

Table A- 1 Annual thermal power electricity generation in NEPG in 2004

Province	Electricity generation	Self usage rate	Electricity delivered to the grid
	（MWh)	（%）	（MWh)
Liaoning	84543000	7.21	78447450
Jilin	33242000	7.68	30689014
Heilongjiang	53482000	7.84	49289011
Total			**158425475**

Data source：China Electric Power Yearbook 2005.

Table A- 2 Annual thermal power electricity generation in NEPG in 2005

Province	Electricity generation	Self usage rate	Electricity delivered to the grid
	（MWh)	（%）	（MWh)
Liaoning	83697000	7.03	77813101
Jilin	35294000	6.59	32968125
Heilongjiang	58000000	7.96	53383200
Total			**164164426**

Data source：China Electric Power Yearbook 2006.

Table A- 3 Annual thermal power electricity generation in NEPG in 2006

Province	Electricity generation	Self usage rate	Electricity delivered to the grid
	（MWh)	（%）	（MWh)
Liaoning	96282000	6.62	89908132
Jilin	38576000	6.78	35960547
Heilongjiang	62964000	7.85	58021326
Total			**183890005**

Data source：China Electric Power Yearbook 2007.

The key parameters in OM and BM calculation include the net caloric values (NCV_s) and CO2 emission factor per unit of energy (EF_{CO2s}) of various types of fuels, which are shown in the table below:

Table A-4: NCV_s and EF_{CO2s} of various types of fuels

Fuel	NCV_s	EF_{CO2s} (tc/TJ)
Coal	20908 kJ/kg	25.80
Washed coal	26344 kJ/kg	25.80
Other Washed Coal[14]	8363 kJ/kg	25.80
Coke	28435 kJ/kg	29.20
Crude oil	41816 kJ/kg	20.00
Gasoline	43070 kJ/kg	18.90
Kerosene	43070 kJ/kg	19.60
Diesel	42652 kJ/kg	20.20
Fuel oil	41816 kJ/kg	21.10
Other petroleum products[15]	38369 kJ/kg	20.00
Other coked products	28435 kJ/kg	25.80
Natural gas	38931 kJ/m3	15.30
Coke oven gas[16]	16726 kJ/m3	12.10
Other gas[17]	5227 kJ/m3	12.10
LPG	50179 kJ/kg	17.20
Refinery gas	46055 kJ/kg	15.70

Data sources:

NCV_s are from China Energy Statistical Yearbook 2007, p287

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

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

[16] The NCV value here adopts the lower limit of the NCV value range, i.e., 16726-17981 kJ/m^3, for coke oven gas provided in China Energy Statistical Yearbook 2007, P 287.

[17] The NCV value here adopts the lowest NCV value among those for gas by furnace, gas by heavy oil catalytic cracking, gas by heavy oil catalytic thermal cracking, gas by pressure gasification, and water coal gas, which are provided in China Energy Statistical Yearbook 2007, P 287.

EF_{CO2s} are from 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, Chapter 1, table 1-3.

Table A-5: The fuel consumption and total emissions of Northeast Power Grid in 2004

Fuel types	unit	Liaoning	Jilin	Heilongjiang	Sub-Total	EF_{co2}	Net caloric value	CO_2 emission（tCO_2e）
						（tc/TJ）	（MJ/t,km3）	G=D*E*F*44/12/100(quantity)
		A	B	C	D=A+B+C	E	F	G=D*E*F*44/12/10(volume)
Coal	10^4t	4144.2	2310.9	3084.8	9539.9	25.8	20908	188689377
Washed coal	10^4t	84.75	1.09	4.88	90.72	25.8	26344	2260872
Other Washed Coal	10^4t	577.67	14.26	61	652.93	25.8	8363	5165589
Coke	10^4t				0	29.2	28435	0
Coke oven gas	10^8M^3	4.83	2.91		7.74	12.1	16726	574367
Other gas	10^8M^3	57.33	4.19		61.52	12.1	5227	1426677
Crude oil	10^4t				0	20	41816	0
Gasoline	10^4t				0	18.9	43070	0
Diesel	10^4t	2.04	1.16	0.24	3.44	20.2	42652	108673
Fuel oil	10^4t	12.81	1.78	2.86	17.45	21.1	41816	564536
LPG	10^4t	2.19			2.19	17.2	50179	69305
Refinery gas	10^4t	9.79		1.14	10.93	15.7	46055	289780
Natural gas	10^8M^3		0.03	2.53	2.56	15.3	38931	559111
Other oil product	10^4t				0	20	38369	0
Other coked product	10^4t				0	25.8	28435	0
Other energy	10^4t	26.97	5.07		32.04	0	0	0
Total								199708287

China Energy Statistical Yearbook 2005

Table A-6: The fuel consumption and total emissions of Northeast Power Grid in 2005

Fuel types	unit	Liaoning	Jilin	Heilongjiang	Sub-Total	EF_{co2}	Net caloric value	CO_2 emission（tCO_2e）
						（tc/TJ）	（MJ/t,km3）	G=D*E*F*44/12/100(quantity)
		A	B	C	D=A+B+C	E	F	G=D*E*F*44/12/10(volume)
Coal	10^4t	4305.41	2446.13	3383.21	10134.75	25.8	20908	200454896
Washed coal	10^4t				0	25.8	26344	0
Other Washed Coal	10^4t	524.74	19.26	24.16	568.16	25.8	8363	4494940
Coke	10^4t				0	29.2	28435	0
Coke oven gas	10^8M^3	1.03	3.57	0.68	5.28	12.1	16726	391817
Other gas	10^8M^3	12.62	8.37		20.99	12.1	5227	486768
Crude oil	10^4t	1.16			1.16	20	41816	35571
Gasoline	10^4t				0	18.9	43070	0
Diesel	10^4t	1.18	1.48	0.57	3.23	20.2	42652	102039
Fuel oil	10^4t	9.32	2.46	1.55	13.33	21.1	41816	431247
LPG	10^4t	0.12			0.12	17.2	50179	3798
Refinery gas	10^4t	5.48		1.32	6.8	15.7	46055	180284
Natural gas	10^8M^3		0.84	2.24	3.08	15.3	38931	672681
Other oil product	10^4t				0	20	38369	0
Other coked product	10^4t				0	25.8	28435	0
Other energy	10^4t	16.18			16.18	0	0	0
Total								207254040

China Energy Statistical Yearbook 2006

Table A-7: The fuel consumption and total emissions of Northeast Power Grid in 2006

Fuel types	unit	Liaoning	Jilin	Heilongjiang	Sub-Total	EF_{co2}	Net caloric value	CO_2 emission（tCO_2e）
						（tc/TJ）	（MJ/t,km3）	G=D*E*F*44/12/100(quantity)
		A	B	C	D=A+B+C	E	F	G=D*E*F*44/12/10(volume)
Coal	10^4t	4681.99	2738.24	3698.29	11118.52	25.8	20908	219912851
Washed coal	10^4t	0.03			0.3	25.8	26344	748
Other Washed Coal	10^4t	674.74	17.83	96	788.57	25.8	8363	6238691
Coke	10^4t	3.32			3.32	29.2	28435	101075
Coke oven gas	10^8M^3	2.68	0.16	1.44	4.28	12.1	16726	317609
Other gas	10^8M^3	55.26	1.43		56.69	12.1	5227	1314667
Crude oil	10^4t	0.49			0.49	20	41816	15026
Gasoline	10^4t				0	18.9	43070	0
Diesel	10^4t	0.75	0.39	0.3	1.44	20.2	42652	45491
Fuel oil	10^4t	11.73	0.45	1.44	13.62	21.1	41816	440629
LPG	10^4t				0	17.2	50179	0
Refinery gas	10^4t	8.55		4.27	12.82	15.7	46055	339888
Natural gas	10^8M^3		0.19	2.1	2.29	15.3	38931	500143
Other oil product	10^4t				0	20	38369	0
Other coked product	10^4t				0	25.8	28435	0
Other energy	10^4t	12.16	17.6	82.77	112.53	0	0	0
Total								229226818

China Energy Statistical Yearbook 2007

Table A-8: OM factor of Northeast Power Grid

Years	Thermal generation delivered to NEPG (MWh)	The emissions from NEPG (tCO_2)	OM (tCO_2/MWh)
	A	B	C=B/A
2004	158425475	199708287	1.260582
2005	164164426	207254040	1.262478
2006	183890005	229226818	1.246543
Average OM	506479906	636189145	**1.256099**

2. BM emission factor calculation of NEPG.

Table A-9 Emission factor of the unit applying best commercially available technology

Technology	Electricity supply efficiency	EF_{co2} (tc/TJ)	Emission factor (tCO_2/MWh)
	A	B	C=3.6/A/1000*B*44/12
Coal fired plant	37.28%	25.8	$EF_{Coal,Adv}$ =**0.9135**
Gas fired plant	48.81%	15.3	$EF_{Gas,Adv}$ =**0.4138**
Oil fired plant	48.81%	21.1	$EF_{Oil,Adv}$ =**0.5706**

Table A-10 Calculation of the respective percentages of CO2 emissions from coal fired power generation, oil fired power generation, and gas fired power generation against total CO2 emissions from fossil fuel fired power generation

Fuel types	unit	Liaoning	Jilin	Heilongjiang	Sub-Total	EF_{co2}	Net caloric value	CO_2 emission（tCO_2e）
						（tc/TJ）	（MJ/t,km3）	G=D*E*F*44/12/100(quantity)
		A	B	C	D=A+B+C	E	F	G=D*E*F*44/12/10(volume)
Coal	10^4t	4681.99	2738.24	3698.29	11118.52	25.8	20908	219912851
Washed coal	10^4t	0.03			0.03	25.8	26344	748
Other Washed Coal	10^4t	674.74	17.83	96	788.57	25.8	8363	6238691
Coke	10^4t	3.32			3.32	29.2	28435	101075
Sub-total								**226253365**
Crude oil	10^4t	0.49			0.49	20	41816	15026
Diesel	10^4t	0.75	0.39	0.3	1.44	20.2	42652	45491
Fuel oil	10^4t	11.73	0.45	1.44	13.62	21.1	41816	440629
Other oil product	10^4t					20	38369	0
Sub-total								**501146**
Natural gas	10^7M^3		1.9	21	22.9	15.3	38931	500143
Coke oven gas	10^7M^3	26.8	1.6	14.4	42.8	12.1	16726	317609
Other gas	10^7M^3	552.6	14.3		566.9	12.1	5227	1314667
LPG	10^4t					17.2	50179	0
Refinery gas	10^4t	8.55		4.27	12.82	15.7	46055	339888
Sub-total								**2472307**
Total								**229226818**

China Energy Statistical Yearbook 2007

With the above table and formula (5), (6), and (7), the following results are achieved:

λ_{coal} =98.70% λ_{oil} =0.22% λ_{gas} =1.08%

$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv}$ =**0.9074 tCO2/MWh**

Table A-11: Capacity addition in the Northeast Power Grid

	Installed capacity in 1999（MW）	Installed capacity in 2000（MW）	Installed capacity in 2006（MW）	Addition capacity（MW）	Addition share（%）
	A	**B**	**C**	**C-B**	
Thermal	27136.9	28932.5	36216	7283.5	87.57%
Hydro	5522.7	5600	6126	526	6.32%
Other	22.9	43.9	552	508.1	6.11%
Total	32682.5	34576.4	42894	8317.6	100%
Share of 2006 installed capacity	76.19%	80.61%	100%		

Data sources: China Electric Power Yearbook 2000-2007

$EF_{grid,BM,y} = EF_{Thermal,Adv} \times CAP_{Thermal,addition} / CAP_{Total,,addition}$ = 0.9074×87.57%=**0.7946** **tCO2/MWh**

3. The combined emission factor calculation of the Northeast Power Grid

Table A-12: Combined emission factor of Northeast Power Grid

OM factor (tCO2/MWh)	1.256099
BM factor (tCO2/MWh)	0.7946
CM factor (tCO2/MWh) **CM**=0.75***OM**+0.25***BM**	**1.1407**

4．Installed capacity and annual electricity generation of each power source in the NECPG

Table A-11 Installed capacity in the Northeast China Power Grid in 1999

	Installed capacity (MW)			
	Total	**Hydro power**	**Thermal Power**	**Other**
Liaoning	**13688.6**	1240.0	12425.7	22.9
Jilin	**8091.3**	3508.2	4583.1	0
Heilongjiang	**10902.6**	774.5	10128.1	0
Total	**32682.5**	5522.7	27136.9	22.9

Data source：China Electric Power Yearbook 2000.

Table A-12 Installed capacity in the Northeast China Power Grid in 2000

	Installed capacity (MW)			
	Total	**Hydro power**	**Thermal Power**	**Other**
Liaoning	**15230.3**	1248.5	13937.9	43.9
Jilin	**8461.4**	3536.7	4924.7	0
Heilongjiang	**10884.7**	814.8	10069.9	0
Total	**34576.4**	5600	28932.5	43.9

Data source：China Electric Power Yearbook 2001.

Table A-13 Installed capacity in the Northeast China Power Grid in 2006

	Installed capacity (MW)			
	Total	**Hydro power**	**Thermal Power**	**Other**
Liaoning	**18338**	1401	16721	216
Jilin	**11132**	3872	7039	221
Heilongjiang	**13424**	853	12456	115
Total	**42894**	6126	36216	552

Data source：China Electric Power Yearbook 2007.

Annex 4

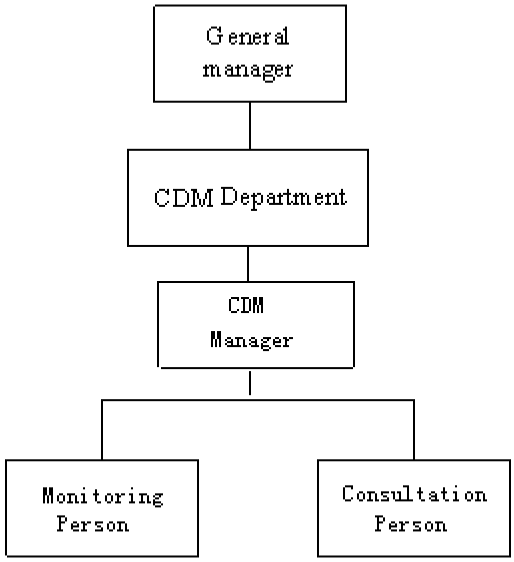
MONITORING PLAN

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

1. Management structure and staff for implementation of monitoring plan

The Management Group of the proposed project must maintain credible, transparent, and adequate data estimation, measurement, collection, and tracking systems to maintain the information required for an audit of an emission reduction project.

The Management Group consists of professional staff authorized by the owner of the proposed project, Yichun Longyuan Wind Power Co. Ltd. The management structure is illustrated as follows:



The Management Group is responsible for the CDM management of the proposed project, which specifically includes selecting a CDM consultant company, providing support to the selected consultant company, assisting the selected consultant company in selecting CER buyer and determine CER price, assisting the selected consultant company in applying for China DNA approval, providing support in the due diligence of the selected buyer, providing support in the CDM validation and registration by a selected DOE, and providing support in the verification by a selected DOE.

The General Manager is in general control and makes key decisions. The CDM Department is responsible for specific tasks in monitoring and execution of decisions. Specifically, the CDM Manager is responsible for the daily operation of the CDM Department, and contact with DOE to support their work in validation, registration, verification, and certification. The procedure is illustrated in Section 5 of this monitoring plan. This person is also responsible for Monitoring Data adjustment and settlement of Data uncertainties, together with local electric power company, and/or DOE. The procedure is illustrated in Section 3 of this monitoring plan.

The Monitoring Person is responsible for reading and calibration of the meter, recording of the readings, and reporting of readings to local electric power company and/or DOE. The procedures for reading, reporting, and calibration are illustrated in Section 2 and Section 4 of this monitoring plan, respectively.

The Consultation Person is responsible for selecting a CDM consultant company and providing support to its work in developing PDD, selecting CER buyer, and applying for DNA approval.

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 by the project owner, including reading and calibration of the meter, recording of the readings, and reporting of readings. On the other hand, they have received CDM training organized by China Fulin Windpower Development Corporation,

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.

The training records will be maintained by the CDM department of the project.

2. Data and Approach for Monitoring
The Data to be monitored include:

ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data kept?	Comment
1.EG_y	Electricity supplied to the grid by the project	Meters installed on the site of the proposed project	MWh	*m*	hourly measurement and monthly recording	100%	electronic	During the crediting period and two years after	Electricity supplied by the project activity to the grid. Double checked by receipt of sales.

Electricity supplied to the grid by the project will be monitored through the metering equipment. The data can also be monitored and recorded at the on-site control centre using a computer system. The metering equipment will be owned, operated and maintained by the project owner. The meter will have the capability to be read remotely through a communication line.
The specific steps to monitor are listed below:
- The project owner reads the meter and records data on the same day of every month.
- The project owner provides electricity sales invoice to Heilongjiang Electric Power Company.
- The project owner provides the meter's data readings to DOE for verification.

The meter reading will be readily accessible for DOE. Calibration test records will be maintained for verification.

3. Calibration of Meters & Metering
An agreement should be signed between the project owner and Heilingjiang Electric Power Company that defines the metering arrangements and the required quality control procedures to ensure accuracy.
- The metering equipment will be properly configured and calibrated annually according to the requirement from Technical administrative code of electric energy metering. The metering

equipment will be checked by the project owner and Heilongjiang Electric Power Company before operation.

- The electronic bidirectional multifunctional meters (accuracy degree is 0.2S) installed at the transformer station measure the total electricity supplied to the grid and the electricity purchased from the grid.
- The verification of electric energy meter should be periodically carried out according to national electric industry standards (DL/T448 －2000). After verification, the meter should be sealed. The meter shall be jointly inspected and sealed on behalf of the parties concerned and shall not be accessible by either party except in the presence of the other party or its accredited representatives.
- The meter installed shall be tested by the qualified metrical organization co-authorized by the Northeast China Power Grid and the project owner within 10 days after:
  1) The detection of a difference larger than the allowable error in the reading of the main meter and backup meter, when considering the reactive loss of electrical wire,
  2) The repair of all or part of the meter caused by the failure of one or more parts to operate in accordance with the specifications,

If any errors are detected, the party owning the meter shall repair, recalibrate or replace the meter and give the other party sufficient notice to allow a representative to attend during any corrective activity.

If reading of the meter be inaccurate by more than the allowable error, or otherwise functioned improperly, the electricity supplied to the grid by the proposed project shall be determined according to the relative clauses defined in PPA.

Calibration is carried out by the Heilongjiang Electric Power Company with the records being provided to the project owner, and these records will be maintained by the project owner.

4. Data Management System

This provides information on record keeping of the data collected during monitoring. Record keeping is the most important exercise in relation to the monitoring process. Below follows an outline of how project related records will be managed.

Overall responsibility for monitoring greenhouse gas emissions reductions will rest with the CDM Department. The CDM manual sets out the procedures for tracking information from the primary source to data calculations, in paper format. Physical documentation such as paper-based maps, diagrams and will be collated in a central place, together with this monitoring plan. In order to facilitate auditor’s reference, monitoring results will be indexed. All paper-based information and at least one copy will be stored by the project owner.

The following table below outlines the key documents relevant to monitoring and verification.

Table List of the key documents relevant to monitoring and verification

I.D.No.	Document Title	Main Content	Source
F-1	PDD, including the electronic spreadsheets and supporting documentation(assumptions, estimations, measurement, etc)	Calculation procedure of emission reduction and monitoring items	The project owner
F-2	The report on monitoring and checking of electricity supplied to the grid	Record based on monthly meter reading and electricity sale receipts	The project owner
F-3	Report on maintenance and calibration of metering equipment	Reasons for maintenance and calibration and the precision after maintenance and calibration	The project owner

5. Verification and Monitoring Results

The verification of the monitoring results of the project is a mandatory process required for all CDM projects. The main objective of the verification is to independently verify that the project has achieved the emission reductions as reported and projected in the PDD.

The responsibilities for verification of the projects are as follows:

◆ Sign a verification service agreement with specific DOE and agree to a time framework set by the EB for carrying out verification activities while taking into account the buyer's schedule. The project owner will make the arrangements for the verification and will prepare for the audit and verification process to the best of its abilities.

◆ The project owner will fully cooperate with the DOE and instruct its staff and management to be available for interviews and respond honestly to all questions from the DOE.

◆ DOE must be an Accredited Entity with a proven track record in environmental auditing and verification, experience with CDM projects and work in developing countries. The DOE should be accredited by the CDM EB. If the project owner deems that requirements of DOE go beyond the scope of verification, they should determine whether the requirements of DOE are reasonable. If considered unreasonable, a rejection letter in a written format should be provided to the DOE with justifiable reasons. If the project owner and the DOE cannot reach an agreement, the matter will be submitted to EB or UNFCCC for arbitration.