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:

Heilongjiang Yilan Hezuolinchang Wind Power Project
Version: 4.0
Date: 16/07/2008

A.2. Description of the project activity:

Heilongjiang Yilan Hezuolinchang 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 Northeast China Power Grid. The implementation of the proposed project will achieve CO_2 emission reduction by replacing electricity generated by fossil fuel fired power plant connected into Northeast China Power Grid.

The proposed project is located on the west side of Jinbu East Hill in Yilan County, Harbin City, Heilongjiang Province, Northeast China. The proposed project proposes to install 29 sets of Vestas V52-850KW wind turbines, for a total installed capacity of 24.65 MW. Jinbu East Hill where the proposed project is located has relative rich wind resources, it is estimated that the annual generation of the proposed project will be 56.04 GWh. As a result, 64222 tonnes of CO2 emission reduction will be generated.

Being as an environmentally sound energy supply technology, wind power generation is a priority development area in China. The contributions of the proposed project are summarized as follows:

- Being located in a power grid dominated by thermal power plants, development of the proposed project will not only reduce GHG emissions but also mitigate local environmental pollution caused by air emissions from thermal power plants.
- The proposed project could be helpful to diversify power mix of Northeast China Power Grid.
- The electricity of Yilan mostly is imported from outside, which becomes a barrier on local economic development. Development of the proposed project could contribute to meeting local electricity demand, therefore boost the economy in the local region.
- Wind power development is at developing stage both in local area and China. The successful implementation of the proposed project will be serving as a demonstration for wider deployment of wind power technology in local and national level.

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)	Yilan Longyuan Wind Power Co., Ltd.	No

United Kingdom of Great Britain and Northern Ireland	EDF Trading Limited	No
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

Yilan County, Harbin City, Heilongjiang Province, China

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:

Yilan County

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 Yilan County, Harbin City, Heilongjiang Province of China, its geographical coordinates are north latitude 46°05′ and east longitude 129°55′, and its altitude is 200-300 m, and its area is about 5 km^2. 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.
(http://unfccc.int/resource/docs/convkp/kpeng.html)

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

The proposed project is located in hilly area of Northeast China. Totally 29 wind turbines with a nominal capacity of 850 kW (Vestas V52-850KW) will be installed, providing a total capacity of 24.65MW. Vestas V52 which is variable speed and pitch wind turbine with a nominal capacity of 850kW, is finally adopted for the proposed project. All wind turbines are produced in Tianjin factories which are invested by Vestas corporation from Denmark.

The main technical specifications of wind turbine are as follows:

Vestas V52-850KW Wind Turbine

Vestas52-850kW wind turbine is all-round, with compact dimensions that make it easy to transport overland. The Vestas 52 uses OptiTip and OptiSpeed regulation technology to optimise the output under medium to high wind conditions, and is available in a wide range of tower heights from 40-86 m.

Rotor diameter: 52 m
Swept area: 2,124 m^2
Nominal revolutions: 26 rpm
Operational interval: 14.0-31.4 rpm
Number of blades: 3
Power regulation: Pitch/OptiSpeed®
Air brake: Full blade pitch
Generator type: Asynchronous with OptiSpeed®
Nominal output: 850 kW
Cut-in wind speed: 4 m/s
Nominal wind speed: 16 m/s
Cut-out wind speed: 25 m/s

Due to its advantage on fully utilizing wind resources and improving efficiency, Vestas52 - 850kW has been adopted worldwide and widely introduced into China. The development of the proposed project will contribute to promoting application of such type of wind turbine, accelerating the accumulation of experiences and absorption of the kind of technology and advancement of domestic wind power technology.
（reference could be made to
http://www.vestas.com/vestas/global/en/Products/Wind_turbines/V52_850.htm）

Each turbine will have a 690V-to-35kV transformer, from which a 35kV line will link into the on-site 220kV switchgear at the substation which will be constructed for the proposed project. By the 220 kV line, the electricity generated by the proposed project are delivered to the power grid. The wind turbines

and transmission facility could be monitored and controlled either by onsite central control room or by control room of Local Dispatch Center remotely.

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

It is estimated that 449554 tCO_2e emission reductions will be generated during the first crediting period (from January 1st, 2009 to December 31st, 2015) of the proposed project, as shown in the following table. The detailed information on estimation of emission reduction will be presented in section B.6.

Years	Annual estimation of emission reductions in tonnes of CO_2 e
2009	64222
2010	64222
2011	64222
2012	64222
2013	64222
2014	64222
2015	64222
Total estimated reductions (tonnes of CO_2e)	**449554**
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	64222

Note: The one year in the chosen crediting period is from January 1st of the current year to December 31st of the next year.

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:

Baseline methodology:

ACM0002(Version 06): Consolidated baseline methodology for grid-connected electricity generation from renewable sources.

"Tool for the Demonstration and Assessment of Additionality (version 04)".

Monitoring methodology:

Approved consolidated monitoring methodology ACM0002 (Version 06): "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources".

More information about the methodology can be found on the website:
http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

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

The proposed project can meet the applicability criteria of the baseline and monitoring methodology (ACM0002 Version 06), therefore, the methodology is applicable to the proposed project.

- The proposed project is a grid-connected zero-emission renewable power generation activity from wind source;
- The proposed project is not an activity that involves switching from fossil fuels to renewable energy at the proposed project site.
- The geographic and system boundaries for the power grid (the Northeast China Power Grid) which the proposed project is to be connected to is clearly identified and information on the characteristics of this grid is publicly available. (http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1364.pdf)
- The baseline methodology will be used in conjunction with the approved consolidated monitoring methodology ACM0002 (Version 06) ("Consolidated monitoring methodology for grid-connected electricity generation from renewable sources").

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

According to the methodology ACM0002(Version 06), since the proposed project is a grid connected wind power project, only CO2 emission from fossil fuels fired power plants in baseline scenario need to be considered.

	Source	Gas	Included?	Justification / Explanation
Baseline	Fossil fuel-fired	CO2	Yes	Major emission sources

	connected into the Northeast China Power Grid	CH4	No	Excluded for simplification. This is conservative.
		N2O	No	Excluded for simplification. This is conservative.
Project Activity	On-site fuel combustion to the project activity	CO2	No	According to ACM0002（Version 06）, the project emission of renewable energy project activity is not considered.
		CH4	No	According to ACM0002（Version 06）, the project emission of renewable energy project activity is not considered.
		N2O	No	According to ACM0002（Version 06）, the project emission of renewable energy project activity is not considered.

According to the methodology (ACM0002 Version 06), a project electricity system is defined by the spatial extent of the power plants that can be dispatched without significant transmission constraints. The boundary definitions were used with DNA guidance[1]. For the proposed project, the Northeast China Power Grid was as the project electricity system boundary, whose geographical range includes Heilongjiang Province, Jilin Province and Liaoning Province.

The Northeast China Power Grid is net electricity export grid.

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

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

a) The thermal power plant with the same annual electricity output as the proposed project.
b) The proposed project not undertaken as a CDM project activity but as a commercial project.
c) The other renewable energy power plant with the same annual electricity output as the proposed project.
d) The Northeast China Power Grid as the provider for the same electricity output as the proposed project.

The alternative a) is unrealistic and should be eliminated from the following consideration because the analysis in Step 1b of section B.5. will show that the thermal power plant with the same annual electricity output as the proposed project does not comply with Chinese legal and regulatory requirement.

The alternative b) is unrealistic and should be eliminated from the following consideration because the investment analysis in Step 2 of section B.5. will show the proposed project not undertaken as a CDM project and without CERs income is lack of the attraction for the potential investors.

[1] The *Notification on Determining Baseline Emission Factor of China's Grid* made publicly available on the website of China's DNA (http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=1889) on August 9th, 2007.

The alternative c) is also unrealistic and should be eliminated from the following consideration because the analysis in Step 1a of section B.5. will show that the proposed project owner is only dedicated to wind power development in Heilongjiang province according to the business scope, and has no experience and ability to develop other renewable energy power plants[2].

The alternative d) is realistic and creditable alternative. The installed capacity of Northeast China Power Grid keeps increasing for many years. The Northeast China Power Grid is dominated by thermal power plants, which will not likely to change in a short time. From 2001 to 2005, thermal power constituted 92.93%, 94.56%, 95.28%, 93.55% and 91.72% of total generation of Northeast China Power Grid, respectively (China Electric Power Yearbooks 2002-2006).

To summarize, the only realistic and creditable alternative is d) No construction of the proposed project, and the local power grid as the provider for the same electricity output as the proposed project.

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

The feasibility study report of the proposed project was completed in March 2007 and then submitted to Heilongjiang Development and Reform Commission for approval, in which the IRR of the project was 8.76% at an expected tariff of 0.6028 RMB/kWh (excl. VAT). During the period of waiting for the approval of the project, the project owner realized that the project would only obtain a tariff no more than 0.5622 RMB/kWh (excl. VAT) according to the propositional letter on the expected tariff from local Development and Reform Bureau on 15th April 2007[3], with which the IRR of the project was only 6.71%(the benchmark of 8%). Based on the lowered IRR of the proposed project, the project owner thought it was difficult to continue the project after they received the approval of the project. Because of that, the project owner made great efforts to seek solutions to carry out the project. During this term, the project owner invited a CDM consulting company to identify whether the proposed project met CDM requirements. According to the decrease of the IRR and low financial attractiveness of the project, the CDM consulting company advised the project owner to apply for the CDM support. On 8th May 2007, the project owner signed a CDM consultation contract with China Fulin Windpower Development Corp., employing the latter for developing the proposed project into a CDM project[4]. Financial analysis taking revenues from CDM shows that the CDM support could increase the IRR of the project to 9.16% and make it financially acceptable and project owner informed this situation to Heilongjiang Development and Reform Commission. In view of the CDM support, the feasibility study report of the proposed project was approved by Heilongjiang Development and Reform Commission on 22nd May 2007 and the project owner was permitted to perform the construction on 10th June 2007.

[2] The business licence of the proposed project owner has been submitted to DOE.

[3] The propositional letter on the expected tariff of the proposed project from local Development and Reform Bureau.

[4] The CDM consultation Letter of Intent has been submitted to DOE.

The following steps are used to demonstrate the additionality of the proposed project according to "Tools for the demonstration and assessment of additionality (version 04)" agreed by Executive Board and requested by the baseline methodology ACM0002 (Version 06).

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

The objective of this step is to identify realistic and credible alternatives to the proposed project that can be the baseline scenario through the following sub-steps:

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 thermal power plant with the same annual electricity output as the proposed project.
b) The proposed project not undertaken as a CDM project activity but as a commercial project.
c) The other renewable energy power plant with the same annual electricity output as the proposed project.
d) The Northeast China Power Grid as the provider for the same electricity output as the proposed project.

The alternative c) is unrealistic and should be eliminated from the following consideration. Besides wind energy, solar PV, geothermal, biomass and hydro are the possible grid-connected renewable energy technologies that could be applied in the Northeast China Power Grid. However, according to the business licence, the business scope of the project owner is wind farm development and operation. The project corporation comes into existence on 29th December, 2006 and the project owner has less experience in wind power development and has no experience in handling any other renewable source based power generation unit. Therefore, the proposed project owner is only dedicated to wind power development in Heilongjiang province according to the business scope, and has no experience and ability to develop other renewable energy power plants[5].

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

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 thermal power plant. To provide the same output as the proposed project, the alternative thermal power plant will has the capacity less than 50 MW then will be categorized as the small scale thermal

[5] The business licence of the proposed project owner has been submitted to DOE.

power plant and should be shut down according to the regulations from NDRC (*Opinions on Accelerating Closure of Small Thermal Power Units*, National Development and Reform Commission, National Energy Office)[6]. According to the regulation from General Office of the State Council of China, the thermal power plant under 50 MW should be shut down and the construction of thermal power plant under 135 MW will be forbidden within the grid connected area (*On Prohibition of 135MW and Smaller-scale Thermal Power Plants*, General Office of State Council)[7].

Outcome of Step 1: as illustrated above, the realistic and creditable alternatives that can provide the same output or services as the proposed project are b) and d).

Step2. Investment analysis.

This step will determine whether the proposed project is the economically or financially less attractive than other alternatives without the revenue from the sale of CERs.

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 a project.

To conclude, the benchmark analysis will be used to identify whether the financial indicators (such as IRR or NPV) 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, 3rd edition", a project will be financially acceptable when the Financial Internal Return Rate (FIRR) is better than the sectoral benchmark FIRR.

The sectoral benchmark FIRR on total investment for electrical power industry is 8% (*Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects* issued by State Power Corporation of China[8]). Nowadays many of China's existing wind power projects have applied it as the benchmark IRR.

The FIRR of the proposed project is calculated and compared as follows.

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

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[6] http://www.gov.cn/zwgk/2007-01/26/content_509911.htm

[7] http://www.gov.cn/gongbao/content/2002/content_61480.htm

[8] State Power Corporation of China. Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects. Beijing: China Electric Power Press, 2003

All financial parameters for calculation of Project FIRR except electricity tariff are obtained from the Feasibility Study Report of the proposed project. The financial parameters and detailed calculation of financial indicators are listed in Annex 5.

Table 1 Main parameters for calculation of financial indicators

Items	Unit	Amount	Note
Capacity	MW	24.65	The feasibility study report (FSR), P82
Static total investment	Million Yuan	222.43	FSR, P82
Annually output	GWh/year	56.04	FSR, P82
Electricity Tariff (Excluding VAT)	Yuan/kWh	0.5622	Regulated by the regulating entities[9]
Annual O&M cost[10]	Million Yuan	7.26	FSR, P83-P84
Value Added Tax (VAT)	%	8.5	FSR, P84
Income tax	%	33	FSR, P84
Expected CERs Price	EUR /tCO_2	10	
Project life time	Year	21	FSR, P82
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 2 Comparison of financial indicators with and without income from CERs

Items	Unit	Without income from CERs	Benchmark	With income from CERs
FIRR	%	6.71	8	9.16

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) Total investment.
2) Tariff.
3) PLF.
4) Annual operation and maintenance cost.

With the above four factors varying, the FIRR of the proposed project (without income from selling CERs) varies to different extent, as shown in Table 3- Table 6.

[9] The propositional letter on the expected tariff of the proposed project from local Development and Reform Bureau.
[10] This is the average data of 20 operational years. The concrete data for each year see IRR flowchart in Annex 5.

Table 3 Sensitivity analysis of Total investment

Rate of Change	-12.50%	-9.80%	-7.50%	-5.00%	-2.50%	0.00%	2.50%	5.00%	7.50%
Total investment	8.40%	8.00%	7.68%	7.34%	7.02%	6.71%	6.41%	6.12%	5.85%

Table 4 Sensitivity analysis of Tariff

Rate of Change	-7.50%	-5.00%	-2.50%	0.00%	2.50%	5.00%	7.50%	10.14%	12.50%
Tariff	5.72%	6.05%	6.38%	6.71%	7.03%	7.36%	7.67%	8.00%	8.30%

Table 5 Sensitivity analysis of PLF

Rate of Change	-7.50%	-5.00%	-2.50%	0.00%	2.50%	5.00%	7.50%	10.14%	12.50%
Tariff	5.72%	6.05%	6.38%	6.71%	7.03%	7.36%	7.67%	8.00%	8.30%

Table 6 Sensitivity analysis of Annual operation and maintenance cost

Rate of Change	-45.78%	-40.00%	-30.00%	-20.00%	-10.00%	0.00%	10.00%	20.00%	30.00%
Annual operation and maintenance cost	8.00%	7.85%	7.57%	7.28%	7.00%	6.71%	6.42%	6.12%	5.82%

The total investment is an important factor affecting the financial attractiveness of the proposed project. In the case that the total investment decreases by 9.80%, the FIRR of the proposed project begins to exceed the benchmark. 78.5% of the total investment of the proposed project is used to the purchase and installation of wind turbine system[11]. Moreover, the wind turbines demand exceeds supply in the whole world that leads the price of wind turbines gradually increasing[12]. Hence, it is impossible to lower the expected total investment of the project by 9.80%.

Another important factor for financial attractiveness is the tariff. In the case that the tariff increases by 10.14%, the FIRR of the proposed project begins to exceed the benchmark. According to the market rules of Northeast China power market, the proposed project is a un-tendering project while the tariff is regulated by the regulating entities. According to China's Management Rules on Tariff issued by NDRC[13], 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[14]. Moreover, the Official Letter about the tariff of the proposed project issued by the Development and Reform Bureau of Yilan County in Heilongjiang Province in April 2007

[11] The feasibility study report of Yilan Maanshan Wind Power Project (Appendix B)

[12] http://info.electric.hc360.com/2007/06/28101158551-6.shtml

[13] Trial Measures for the Administration of the Pricing of, and the Sharing of Costs in Connection with, the Generation of Electricity Using Renewable Energy Resources, FAGAIJIAGE(2006) No.7

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

regulated the tariff of the proposed project as no more than 0.5622 Yuan/kWh (excluding VAT), which is 7.2% lower than the tariff in the feasibility study report of the proposed project. Therefore it is impossible that the expected tariff of the proposed project could increase 10.14%, so the proposed project is always lack of financial attractiveness.

The sensitivity analysis of PLF is equivalent to the sensitivity analysis of tariff (both impact the turnover the same way). In the case that the PLF increases by 10.14%, the FIRR of the proposed project begins to exceed the benchmark. According to the Chinese Renewable Energy Law enacted on January 1st 2006, wind power generation should be purchased fully by the grid[15]. Therefore, the PLF reflects the annual generation output of the proposed project, which depends on the average wind speed at the project site for a specific wind turbine. According to the feasibility study report of the proposed project, the annual output is estimated basing on the long term weather statistic data provided by local meteorological station and wind resources measurement, which 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 annual average wind speed of the project site tends to decrease over the past 15 years for which data are available recently[16] as shown in figure 2. Therefore, the probability that PLF is 10.14% higher than the estimated value is very small.

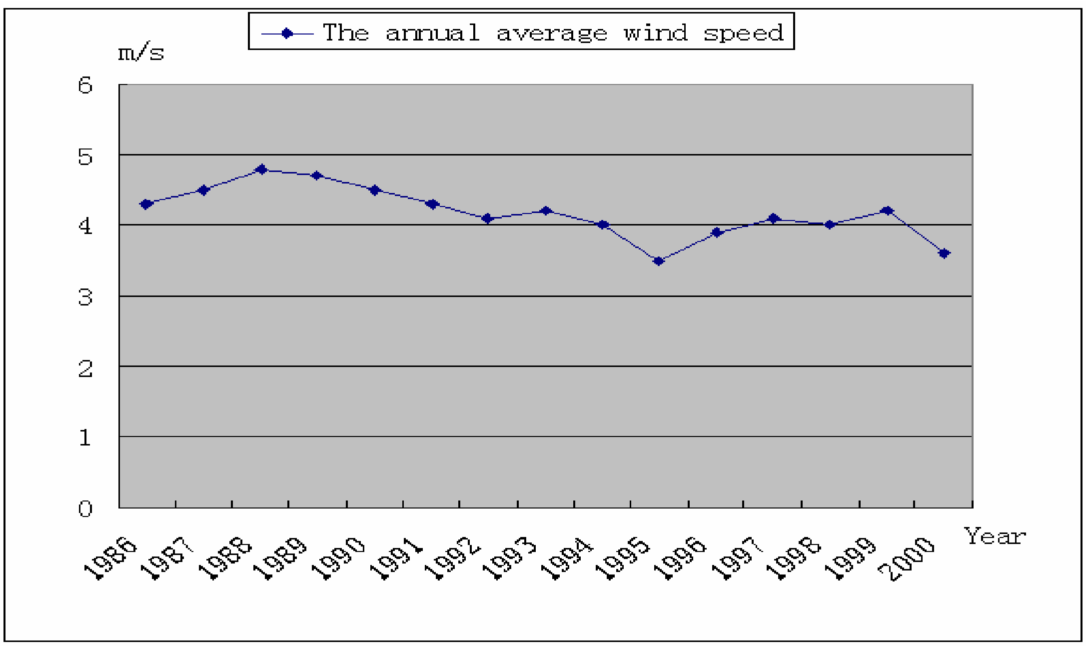

Figure 2 The annual average wind speed provided by local meteorological station

The impact of the annual O&M cost is the slightest. The FIRR of the proposed project could reach the benchmark when the annual O&M cost decreases by 45.78%. However, according to the Feasibility Study Report of the proposed project, 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. The Average Annual O&M Cost listed in Table 1 is the sum of the four kinds of costs and is the same as

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[15] http://www.gov.cn/ziliao/flfg/2005-06/21/content_8275.htm

[16] The feasibility study report of the proposed project.

that in the cash flow table in of the electronic spreadsheet which has been provided to DOE for validation. Moreover, the price of material and salaries of the employees are gradually increasing in China, which leads annual O&M cost gradually increasing[17]. Therefore, it is impossible that the annual O&M cost could decrease 45.78%, so the proposed project is always lack of financial attractiveness within the reasonable range of annual O&M cost.

Outcome of Step 2: The alternative b) is unrealistic because the proposed project not undertaken as a CDM project and without CERs income is lack of the attraction for the potential investors. The financial internal rate of return (IRR) of total investment of this project activity is 6.71%, lower than the benchmark IRR (8%)[18] without the income from CERs and thus the project not undertaken as CDM project is not financially feasible. Furthermore under the reasonable variations in the critical assumptions, the conclusion regarding the financial additionality is robust and supported by sensitivity analysis.

To conclude, under the reasonable variations in the critical assumptions, the conclusion regarding the financial additionality is robust and supported by sensitivity analysis. So, the only realistic and creditable alternative is d) The Northeast China Power Grid as the provider for the same electricity output as the proposed project.

Step 3. Barrier analysis

Investment analysis has argued that the project is the economically less attractive than other alternatives without the revenue from the sale of CERs. According to “Tool for the Demonstration and Assessment of Additionality (version 04)”, this PDD skips the barrier analysis and argues the additionality.

Step 4. Common practice analysis

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

The existing wind farms above 10MW located in the Heilongjiang Province are listed in the following table:

Table 7 Grid-connected wind farms similar to the project in Heilongjiang province

Project Title	**Commissioning Date**	**Capacity (MW)**	**On-grid Tariff (RMB Yuan/kWh, excl.VAT)**	**Note**
Huafu Mulan Wind Farm	2003.12	12(Source No.1)	0.78 (Source No.2)	Favourable loan policy (Source No.3)
Haufu Fujin Wind Farm	2004.09	24.3 (Source No.1)	0.79 (inquired from the owner of the Haufu Fujin project)	Favourable loan policy (Source No.4)

Data Sources:
1. Shi Pengfei (Deputy Director, Chinese Wind Energy Association), Statistics on China Wind Farm Installed Capacity in 2005. http://www.cwea.org.cn/upload/200612391640820.doc

[17] http://www.china.com.cn/chinese/EC-c/1246238.htm

http://www.chinadaily.com.cn/hqcj/2007-09/03/content_6075777.htm

[18] State Power Corporation of China. Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects. Beijing: China Electric Power Press, 2003

2. http://www.newenergy.org.cn/Html/00412/20041605.html
3. http://www.chinapower.com.cn/newsarticle/1005/new1005504.asp
4. http://www.china5e.com/news/power/200208/200208220027.html

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

The existing wind farm projects do not call into question the claim that the proposed project is financially unattractive as discussed in Step 2. The two wind farms in Table 7 enjoyed higher tariff than the proposed project. Moreover, the first two wind farms are funded by international low interest loan or national soft loan[19][20], while the proposed project does not enjoy these favourable policies and the loan is difficult to be obtained and the interest rate is higher because of the commercially unattractive condition.

Secondly, since there is serious investment barrier for the proposed project, the CDM has been considered in the early evaluation period. Moreover, other wind farms in Heilongjiang Province are also applying for CDM projects and several wind farms have been registered as CDM projects[21].

To conclude, there are essential distinctions between the proposed project and existing similar projects in Table 7. The existence of these projects in Table 7 does not contradict the claim that the proposed project activity is financially unattractive.

As described above, the proposed project activity passed all criteria of "Tool for the demonstration and assessment of additionality (version 04)". In conclusion, the proposed project is additional and not the baseline scenario.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

By replacing electricity generated by fossil fuel fired power plant connected into the Northeast China Power Grid, the proposed project will achieve CO_2 emission reduction consequently. In baseline scenario, the electricity would be otherwise generated by the operation of grid-connected power plants or by the addition of new generation sources.

The calculation of the GHG emission reductions by the proposed project followed the baseline methodology ACM0002 (Version 06). The spatial extent of the project boundary includes the project site and all power plants connected physically to the electricity system that the CDM project power plant is connected to. The project electricity system of the proposed project is defined as the Northeast China Power Grid, whose geographical range includes Heilongjiang Province, Jilin Province and Liaoning Province.
(http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1364.pdf)

The Northeast China Power Grid is dominated by thermal power plants, which will not likely to change in a short time. From 2001 to 2005, thermal power constituted 92.93%, 94.56%, 95.28%, 93.55% and

[19] http://www.chinapower.com.cn/newsarticle/1005/new1005504.asp

[20] http://www.china5e.com/news/power/200208/200208220027.html

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

91.72% of total generation of Northeast China Power Grid, respectively (China Electric Power Yearbooks 2002-2006).

To determine baseline scenario emissions, firstly ex-ante emission factors of Operating Margin ($EF_{OM,y}$) and Build Margin ($EF_{BM,y}$) were calculated based on the history data of the Northeast China Power Grid, which include the installed capacity, electricity generation and different types of fuel consumptions of all the power plants connected into the Northeast China Power Grid. Secondly, the baseline emission factor (EF_y) was calculated as a combined margin(CM) of the Operating Margin (OM) and Build Margin (BM) emission factors as described in following three steps. All the calculation was in compliance with requirement of the baseline methodology (ACM0002), as described in detail by the following steps.

Step 1: Calculation the Operating Margin emission factor ($EF_{OM,y}$)

Calculation of OM emission factor should be based on one of the following four methods:

(a) Simple OM, or
(b) Simple adjusted OM, or
(c) Dispatch Data Analysis OM, or
(d) Average OM.

The justifications of the choice of method to calculate OM emission factor are as follows.

Method (c): If the dispatch data is available, method (c) should be the first methodological choice. This method requires the dispatch order of each power plant and the dispatched electricity generation of all the power plants in the power grid during every operation hour period. Since the dispatch data and power plants operation data are considered as confidential information and only for internal usage not available publicly in China. Thus, method (c) is not applicable for the proposed project in China.

Method (b): Method (b) requires the annual load duration curve of the power grid and the load data of every hour data during the whole year on the basis of the time order. As mentioned above, the dispatch data and detailed load curve data were not available publicly in China. Therefore, method (b) is not applicable for the proposed project in China as well.

Method (d): Method (d) will only be used when (1) low-cost/must run resources constitute more than 50% of total grid generation and detailed data to apply method (b) is not available, and (2) where detailed data to apply option (c) above is unavailable. From 2001 to 2005, the low-cost/ must run resources constitute 7.07%, 5.44%, 4.72%, 6.45% and 8.28% of total generation of Northeast China Power Grid, respectively (China Electric Power Yearbooks 2002-2006). Hence method (d) is not applicable for the proposed project.

Method (a): Method (a) can only be used where low-cost/must run resources constitute less than 50% of total grid generation in: (1) average of the five most recent years, or (2) based on long-term normals for hydroelectricity production. Low operating cost and must run resources 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. From 2001 to 2005, the low-cost/ must run resources constitute 7.07%, 5.44%, 4.72%, 6.45% and 8.28% of total generation of Northeast China Power Grid, respectively (China Electric Power Yearbooks 2002-2006) , which is much less than 50%. Therefore, method (a) is applicable for the proposed project.

In conclusion, method (a) is the only reasonable and feasible method among the four methods for calculating the Operating Margin emission factor ($EF_{OM,y}$) of the Northeast China Power Grid.

According to the ACM0002, the Simple OM emission factor ($EF_{OM,simple,y}$) is calculated as the generation-weighted average emissions per electricity unit (tCO_2/MWh) of all generating sources serving the system, not including low-operating cost and must-run power plants. The detailed formulas are as following:

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

where:

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

j refers to the power sources delivering electricity to the grid, not including low-operating cost and must-run power plants, and including imports to the grid[22],

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

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

The CO_2 emission coefficient $COEF_i$ is obtained as

$$COEF_i = NCV_i \times EF_{CO_2,i} \times OXID_i \qquad (2)$$

where:

NCV_i is the net calorific value (energy content) per mass or volume unit of a fuel i , (TJ/ mass or volume unit), for which country-specific values were adopted,

$OXID_i$ is the oxidation factor of the fuel i , for which IPCC default values were adopted,

$EF_{CO_2,i}$ is the CO_2 emission factor per unit of energy of the fuel i (tCO2e/TJ), for which IPCC default values were adopted.

The simple OM emission factor can be calculated using either of the two following data vintages for years(s) y : (1) A 3-year generation weighted average based on the most recent statistics available at the time of PDD submission, or (2) The year in which project generation occurs, if $EF_{OM,y}$ is updated based on ex post monitoring.

The option (1), a 3-year generation weighted average based on the most recent statistics available at the time of PDD submission, is adopted for calculating the operation margin emission factor ($EF_{OM,y}$). The data of installed capacity, electricity generation and fuel consumptions are all from China Energy Statistical Yearbooks and China Power Electric Power Yearbooks.

[22] As described above, an import from a connected electricity system should be considered as one power source j .

Based on the calculation results, the Operation Margin emission factor ($EF_{OM,y}$) of Northeast China Power Grid is **1.2404 tCO2/MWh[23].** The detailed data and calculation are listed in the tables of annex 3.

Step2: Calculation the Build Margin emission factor ($EF_{BM,y}$)

According to the ACM0002, the baseline Build Margin emission factor was calculated as the generation-weighted average emission factor (tCO_2/MWh) of a sample of power plants *m*, as follows:

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

where:
$F_{i,m,y}$ is the amount of fuel *i* (in a mass or volume unit) consumed by *m* power plants in year(s) *y*,
m refers to the power plants included in the sample group determined by the following steps,
$COEF_{i,m,y}$ is the CO_2 emission coefficient of fuel *i* (tCO_2/ mass or volume unit of the fuel), taking into account the carbon content of the fuels used by *m* power plants and the percent oxidation of the fuel in year(s) *y*,
$GEN_{m,y}$ is the electricity (MWh) delivered to the grid by *m* power plants.

According to the baselinle methodology (ACM0002), one of the following two options shall be selected to identify sample group for calculating Build Margin emission factor.

Option 1. Calculate the Build Margin emission factor $EF_{BM,y}$ *ex ante* based on the most recent information available on plants already built for sample *m* at the time of PDD submission. The sample group *m* consists of either

- The five power plants that have been built most recently, or
- The power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

Project participants should use from these two options the sample group that comprises the larger annual generation.

Option 2. For the first crediting period, the Build Margin emission factor $EF_{BM,y}$ must be updated annually *ex post* for the year in which actual project generation and associated emission reductions occur. For subsequent crediting periods, $EF_{BM,y}$ should be calculated *ex-ante*, as described in option 1 above. The sample group *m* consisted of either

- The five power plants that have been built most recently, or
- The power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

Project participants should use from these two options that sample group that comprises the larger annual generation.

Power plant capacity additions registered as CDM project activities should be excluded from the sample group *m*.

[23] The calculation method of Operation Margin emission factor is cited from the Announcement of Determining China Regional Power Grid Baseline Emission Factors, published by China National Development and Reform Commission.

For the proposed project, Option 1 was adopted for calculating the Build Margin emission factor.

However, no matter which options mentioned above 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 electricity generation and fuel consumption data of each power plant are regarded as commercial secrets and only for internal usage. 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)

- ♦ Use of capacity additions for estimating the build margin emission factor for grid electricity.
- ♦ Use of weights estimated using installed capacity in place of annual electricity generation.
- ♦ 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 (BM).

Following the EB’s guidance the build margin is calculated as follows:

Firstly, calculating the proportion of incremental installed capacity and electricity generation technology; secondly, calculating the weights of new installed capacity of all electricity generation technology; finally, calculating emission factors based on maximum energy efficiency level of new technology commercially available.

Moreover, specific data on coal fired capacity, oil fired capacity, and gas fired capacity could not be separated from current statistical data on fossil fuel fired capacity, and so this project adopts the following method: first, based on the energy balance sheet which has been published recently, calculate the emission weights of total CO_2 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 time weights of thermal power of 20% installed capacity increment.

The detailed calculation as following:

Step 1, calculating the emission weights of total CO_2 emissions which correspond to solid, liquid and gas fuels for electricity generation

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

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

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

where:
$F_{i,j,y}$ is the amount of fuel *i* (in a mass or volume unit) consumed by province *j* in year(s) *y*,
$COEF_{i,j,y}$ is the CO_2 emission coefficient of fuel *i* (tCO_2/ mass or volume unit of the fuel), taking into account the carbon content of the fuels consumed by province *j* and the percent oxidation of the fuel in year(s) *y*,
COAL,*OIL*, *and GAS* are the aggregation of various kinds of coal, oil, and gas as fossil fuels.

Step 2: calculating thermal power emission factor

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

where:
$EF_{Coal,Adv}$, $EF_{Oil,Adv}$ and $EF_{Gas,Adv}$ 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 (See Annex 3 for detailed calculation).

Step 3: calculating the Build Margin emission factor $EF_{BM,y}$ of Northeast China Power Grid. The Build Margin emission factor $EF_{BM,y}$ of Northeast China Power Grid is calculated 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, as follows (See Annex 3 for detailed calculation):

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

where:
CAP_{Total} is the total capacity addition,
$CAP_{Thermal}$ is the thermal power capacity addition,
$EF_{Thermal}$ is the thermal power emission factor.

For the proposed project, the most recent year of which data is available is 2005, and the sample group *m* consists of installed capacity addition during 1998 to 2005. The total capacity addition during 1998 to 2005 accounts for 21.34% of total installed capacity in 2005, while that during 1999 to 2004 accounts for 18.66% of total installed capacity in 2005. The weight of installed capacity additions for thermal power plant accounts for 91.31% of total installed capacity additions. (See Annex 3 for detailed calculation)

The Build Margin emission factor ($EF_{BM,y}$) of the Northeast China Power Grid is calculated to be: **0.8632 tCO2/MWh[24].** The detailed data and calculation were listed in the annex 3**.**

Data sources for $EF_{OM,y}$ and $EF_{BM,y}$ calculation: Data on installed capacity, power generation, and self-usage rate of power plants are from China Electric Power Yearbooks 1999-2006. The consumption data

[24] The calculation method of Build Margin emission factor is cited from the Announcement of Determining China Regional Power Grid Baseline Emission Factors, published by China National Development and Reform Commission.

of various types of fuels and their net caloric values are from China Energy Statistical Yearbooks 2004-2006. The CO_2 emission factors per unit of energy and the oxidation factors are from 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Volume 2 Energy (Table 1.3 and Table 1.4 in Page 1.21-1.24, Chapter 1).

Step3: Calculation the baseline emission factor (EF_y)

According to the baseline methodology (ACM0002), the baseline emission factor EF_y is calculated as the weighted average of the Operating Margin emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{BM,y}$):

$$EF_y = \omega_{OM} \times EF_{OM,y} + \omega_{BM} \times EF_{BM,y} \qquad (9)$$

where the weights ω_{OM} and ω_{BM} are 75% and 25% respectively by the default.

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

$EF_y=0.75*EF_{OM,y}+0.25*EF_{BM,y}=$**1.1460** tCO2/MWh

B.6.2. Data and parameters that are available at validation: *(Copy this table for each data and parameter)*

Data / Parameter:	$F_{i,j,y}$
Data unit:	t/m^3
Description:	Amount of fuel *i* (in a mass or volume unit) consumed by relevant power sources *j* in year(s) *y*
Source of data used:	China Energy Statistical Yearbook 2004-2006
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.
Any comment:	

Data / Parameter:	$GEN_{j,y}$
Data unit:	MWh
Description:	Electricity delivered to the grid by relevant power sources *j* excluding low operating cost/must run power plants in year *y*
Source of data used:	China Electric Power Yearbook 2004-2006
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Since the detailed generation data by power plants are not publicly available, therefore the aggregated data by fuel types are used instead.

Any comment:	

Data / Parameter:	NCV_i
Data unit:	TJ/t(m^3)
Description:	Net calorific value (energy content) per mass or volume unit of fuel *i*
Source of data used:	China Energy Statistical Yearbook 2004-2006
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to ACM0002, the national specific value shall be used preferentially.
Any comment:	

Data / Parameter:	$OXID_i$
Data unit:	%
Description:	Oxidation factor of the fuel *i*
Source of data used:	IPCC2006 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. As such IPCC default values are used instead.
Any comment:	

Data / Parameter:	$EF_{CO2,i}$
Data unit:	tCO_2/TJ
Description:	CO_2 emission factor per unit of energy of the fuel *i*
Source of data used:	IPCC2006 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 CO_2 emission factor in China are not available. As such IPCC default values are used instead.
Any comment:	

Data / Parameter:	$CAP_{j,y}$
Data unit:	MW
Description:	Installed capacity of relevant power source *j* connected to the grid in year *y*
Source of data used:	China Electric Power Yearbook 1999-2006
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually	Following the EB guidance regarding application of AM0005 in China, the capacity weighted is used instead of generation weighted in calculation of BM emission factor.

applied :	
Any comment:	

Data / Parameter:	$PE_{Coal,Adv}$
Data unit:	%
Description:	Power supply efficiency of best coal fired power unit commercially available in China
Source of data used:	The statistics by State Electricity Regulatory Commission (SERC) on newly built thermal plants in 10th "Five-Year Plan" period 2000-2005. http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1374.pdf
Value applied:	**35.82**
Justification of the choice of data or description of measurement methods and procedures actually applied :	It follows the EB guidance and is conservative.
Any comment:	

Data / Parameter:	$PE_{Gas,Adv}$
Data unit:	%
Description:	Power supply efficiency of best gas fired power unit commercially available in China
Source of data used:	The statistics by State Electricity Regulatory Commission (SERC) on newly built thermal plants in 10th "Five-Year Plan" period 2000-2005. http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1374.pdf
Value applied:	**47.67**
Justification of the choice of data or description of measurement methods and procedures actually applied :	It follows the EB guidance and is conservative.
Any comment:	

Data / Parameter:	$PE_{Oil,Adv}$
Data unit:	%
Description:	Power supply efficiency of best oil fired power unit commercially available in China
Source of data used:	The statistics by State Electricity Regulatory Commission (SERC) on newly built thermal plants in 10th "Five-Year Plan" period 2000-2005. http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1374.pdf
Value applied:	**47.67**
Justification of the choice of data or description of measurement methods and procedures actually applied :	It follows the EB guidance and is conservative.
Any comment:	

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

According to the baseline methodology ACM0002, the GHG emission of the proposed project within the project boundary is zero, i.e. *PEy*=0.

According to the baseline methodology ACM0002, the leakage of the proposed project is not considered, i.e. *Ly*=0.

Therefore, the proposed project activity emissions are zero, i.e. *PEy*+*Ly*=0.

According to the descriptions and formulas in section B.6.1, the combined baseline emission factor of the Northeast China Power Grid is: ***EFy* =1.1460 tCO2MWh.**

According to the Feasibility Study Report of the proposed project, the estimated annual electricity generation delivered to the power grid will be:

***EGy*=56.04 GWh.**

The annual emissions of baseline scenario is: $\boldsymbol{BE_y = EG_y \times EF_y}$ **=64222 tCO2**

The annual emission reductions of the proposed project during the first crediting period are estimated to be:

$\boldsymbol{ER_y=BE_y-PE_y-L_y=BE_y=EG_y \times EF_y}$**=64222 tCO2**

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

Year	Estimation of Project activity Emission (tonnes of CO2e)	Estimation of baseline emission (tonnes of CO2e)	Estimation of leakage (tonnes of CO2e)	Estimation of Emission reductions (tonnes of CO2e)
2009	0	64222	0	64222
2010	0	64222	0	64222
2011	0	64222	0	64222
2012	0	64222	0	64222
2013	0	64222	0	64222
2014	0	64222	0	64222
2015	0	64222	0	64222
总计 (t CO2e)	**0**	**449554**	**0**	**449554**

Note: The one year in the crediting period is from January 1st of the current year to December 31st of the next year. The starting date of the first crediting period is on January 1st, 2009, the finishing date is on December 31st, 2015.

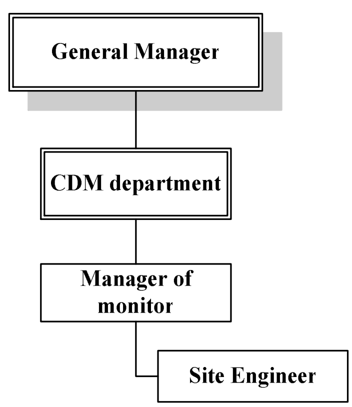
B.7. Application of the monitoring methodology and description of the monitoring plan:

B.7.1. Data and parameters monitored:

Data / Parameter:	**EG_y**
Data unit:	GWh
Description:	Electricity supplied to the grid by the 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.6	**56.04**
Description of measurement methods and procedures to be applied:	The electricity supplied to the grid will be monitored through the meters installed at the substation of the windfarm and the substation of the Grid. These meters have two-way metering and can record exports to the grid. The position and accuracy degree of the meters installed are shown in Annex 4. The readings of electricity meter will be hourly measured and monthly recorded. Data will be archived for 2 years following the end of the crediting period by means of electronic and paper backup. The metering equipment will be properly calibrated annually according to the requirement from Technical administrative code of electric energy metering (DL/T448 - 2000). The monitoring personnel of the project owner are responsible for reading and calibration of the meter, recording of the readings, and reporting of readings.
QA/QC procedures to be applied:	The electricity output from each turbine will be monitored and recorded at the on-site control centre using a computer system. The project operator is responsible for recording this set of data. Electricity sales invoices will also be obtained for double check.
Any comment:	Electricity supplied by the project activity to the grid. Double check by receipt of sales.

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. The management structure is illustrated as follows:



The responsibility of the person/entity is shown in the Annex 4.
The detailed monitoring plan is shown in the Annex 4**.**

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 baseline study and monitoring methodology of the proposed project was completed on 16/07/2008.

The persons involved in baseline study are listed as follows:

Fang HU, China Fulin Windpower Development Corporation.
Address: Floor 8, Tower C, International Investment Building, No.6-9 Fuchengmen North Street, Xicheng District, Beijing 100034, China
Telephone: +8610-66091380
Email: hufang@clypg.com.cn

Nianwu ZHANG, China Fulin Windpower Development Corporation.
Address: Floor 8, Tower C, International Investment Building, No.6-9 Fuchengmen North Street, Xicheng District, Beijing 100034, China
Telephone: +8610-66091317
Email: zhangnianwu@clypg.com.cn

Bingzhi SUN, China Fulin Windpower Development Corporation.
Address: Floor 8, Tower C, International Investment Building, No.6-9 Fuchengmen North Street, Xicheng District, Beijing 100034, China
Telephone: +8610-66091379
Email: Sunbingzhi@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:

10/06/2007. (Construction permission date)

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

21 years.

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

C.2.1. Renewable crediting period

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

01/01/2009.(The final starting date is the registered date.)

C.2.1.2. Length of the first crediting period:

7 years.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

N/A

C.2.2.2. Length:

N/A.

SECTION D. Environmental impacts

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

The Environmental Assessment Report of the proposed project has been approved by the Environmental Protection Administration of Heilongjiang Province, referred as "Heilongjiang Environment Construction (Table) [2006] No.54".

The EIA shows that: being located in the hilly area, the air quality of the proposed project site is very well, which meets the Class II of China Ambient Air Quality Standard (GB3095-1996); the environmental noise meets Class II of China Environmental Noise Standard in Urban Area (GB3096-93); and the quality of water meets the Class III of China Quality Standard for Surface Water (GB3838-2002), which can be used as drinking water resource.

The proposed project is likely to cause the following main potential environmental impacts during the construction period and operation period:

– 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 proposed 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 temporal 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 as undertake construction, and reducing the speed of vehicles in the field. Hence, air pollution caused by the proposed project is not significant to the surrounding environment.

- **Impacts on Noise Environment**

The noise of the proposed project in construction phase is from vehicles and machines on-site. Based on the formula of declining of sound emitted from a non-directional source, it is estimated that the noise meets Class I of China Environmental Noise Standard in Urban Area (GB3096-93) at 100m away from the sound source on daytime and at 200m away from the sound source on nighttime. Moreover, the impacts during the construction period will only exist temporarily, and disappear with the completing of the construction period. However, operational noise from the rotating blades is expected to be minimal due to the higher background noise caused by strong winds. The noise from the running of the wind power unit will have impacts on the area 200m around the wind farm, and have no impacts on the area 500m away. The proposed project site is located on the top of a hill, and the closest residential area to the site of the proposed project is over 3 km away. Therefore, the noise of the proposed 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 and tree. 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 220kV substation will be constructed in the proposed project, the electromagnetism impact of the proposed 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 over 3 km away from the wind farm. Therefore, the electromagnetism of the proposed 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 occupation of ground will destroy some surface vegetation during the proposed project construction period, but the vegetation destroyed by temporary ground occupation will be recovered through replanting tree and grass after the completion of the construction. So the minor quantity of soil erosion generated during the construction phase has no noticeable impact on soil use and the proposed 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 proposed project activity. Therefore, the activities to be carried out will not generate any negative impact on the ecological environment.

- **Socio-Economic Impacts**

The electricity generated by the proposed project will replace electricity generated by fossil fuels, so the proposed project could reduce the fossil fuel consumptions in connected power grid and as a result reduce GHG and contamination emissions. The proposed project is estimated to supply annually 56.04 GWh of power to the Heilongjiang Power Grid and to save 19600 tce. Therefore, the proposed 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 proposed project activity not only helps the uplift of skilled and unskilled manpower in the region, but also improves employment rate and livelihood of local population in the vicinity of the proposed project.

- **Conclusion**

Being as a typical type of clean renewable energy, the proposed project has no significant impacts on local environment during its construction and operational phase, and will greatly contribute to achievement of sustainable development objective and promote local environmental protection.

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 August 15th, 2006, under the support of local government, the project owner successfully held a stakeholder meeting in Yilan County. Totally 12 stakeholder representatives participated the meeting, respectively from the Development and Reform Bureau of Yilan County, the Environmental Protection Bureau of Yilan County, the Yilan Power Supply Corporation, and the Villagers from Wujiazi village where the proposed project is located. (The registration form of the meeting is in the attachment.)

In the meeting, the project owner introduced the Hezuolinchang wind farm and the CDM to stakeholder representatives, and obtained their comments. The presentations were followed by a question and answer section and further discussion. The 12 representatives respectively expressed their opinions on the construction and operation of the Hezuolinchang wind farm.

At the same time, the project owner carried out a questionnaire survey on the local villagers and residents in August, 2006.

E.2. Summary of the comments received:

Stakeholder 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 project 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 representatives: The proposed project site is located on the top of a hill. There are no residents in the area 3 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

A one page questionnaire was designed to be easily filled in with the following sections:

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 in Wujiazi village had a 100% response rate (30 questionnaires returned out of 30) and the following is a summary of the key findings:

Education level of the respondents: primary level (27%), middle level (53%), high level (20%).
97% of the respondents are satisfied with their life conditions and surrounding environment.
50% of the respondents have some knowledge and understandings about wind farm projects.
100% of the respondents agree with the development of the project, and 100% of them believe that the project will have overall positive impacts, such as "increase of job opportunities", "improvement of living standard", on their livelihoods.

The major concerns about the project are impacts during construction period, such as trash, wastewater noise and ecosystem environment damage.

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. To the major concerns about the project, the main issues concerned are environmental pollution. However, as the environmental impact assessment demonstrates, the 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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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

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

Annex 3

BASELINE INFORMATION

The Annex 3 provides the basic data and calculation for determining baseline.

The key parameters in OM and BM calculation include the net caloric values (NCVs), oxidation factors (OXIDs), and CO_2 emission factor per unit of energy (EF_{co2}s) of various types of fuels.

NCVs, OXIDs, and EF_{co2}s of various types of fuels

Fuel	NCV	EF_{co2} (tc/TJ)	OXID
Coal	20908 kJ/kg	25.80	1
Washed coal	26344 kJ/kg	25.80	1
Other Washed Coal[25]	8363 kJ/kg	25.80	1
Coke	28435 kJ/kg	25.80	1
Crude oil	41816 kJ/kg	20.00	1
Gasoline	43070 kJ/kg	18.90	1
Kerosene	43070 kJ/kg	19.60	1
Diesel oil	42652 kJ/kg	20.20	1
Fuel oil	41816 kJ/kg	21.10	1
Other petroleum products[26]	38369 kJ/kg	20.00	1
Natural gas	38931 kJ/m^3	15.30	1
Coke oven gas[27]	16726 kJ/m^3	12.10	1
Other gas[28]	5227 kJ/m^3	12.10	1
LPG	50179 kJ/kg	17.20	1
Refinery gas	46055 kJ/kg	18.20	1

Data sources:

[25] 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.

[26] 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.

[27] 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 2006, P287.

NCVs are from China Energy Statistical Yearbook 2006, P287.

EF_{co2} are from 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Volume 2 Energy, Chapter 1, P1.21-1.24, Table 1-3, and Table 1-4.
OXID are from 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Volume 2 Energy, Chapter 1, P1.23-1.24, Table 1-4.

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[28] 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 2006, P287.

1．OM calculation of Northeast China Power Grid

Table 1-1 Northeast China Power Grid CO2 emissions in 2003

Fuel	Unit	Liaoning	Jilin	Heilongjiang	Total	Emission Factor	Carbon oxidation rate	NCV	CO2 emissions（tCO_2e）
						（tc/TJ）	（%）	（MJ/t,km3）	H=G*D*E*F*44/12/10000（mass unit）
		A	B	C	D=A+B+C	E	F	G	H=G*D*E*F*44/12/1000 (volume unit)
Raw coal	10^4t	3556.51	2006.66	2763.62	**8326.79**	25.8	100	20908	164695313
Clean coal	10^4t	70.83		3	**73.83**	25.8	100	26344	1839948.734
Other washed coal	10^4t	617.04	15.9	53.41	**686.35**	25.8	100	8363	5429988.017
coke	10^4t				**0**	25.8	100	28435	0
Coke oven gas	10^8m3	1.66			**1.66**	12.1	100	16726	123184.7599
Other gas	10^8m3	5.31			**5.31**	12.1	100	5227	123141.3249
Crude oil	10^4t	3.39			**3.39**	20	100	41816	103954.576
Diesel oil	10^4t	0.32	0.34		**0.66**	20.2	100	42652	20850.00368
Fuel oil	10^4t	14.87	0.7	4.32	**19.89**	21.1	100	41816	643474.2257
LPG	10^4t	1.55			**1.55**	17.2	100	50179	49051.64513
Refinery gas	10^4t	4.03		0.46	**4.49**	18.2	100	46055	137995.8246
Natural gas	10^8m3		0.04	4.47	**4.51**	15.3	100	38931	984997.1241
Other petroleum products	10^4t				**0**	20	100	38369	0
Other coking products	10^4t				**0**	25.8	100	28435	0
Other energy	10^4tce	29.38			**29.38**	0	100	0	0
								Total	174151899.2

Data sources: China Energy Statistical Yearbook 2004, P166 - P177, P301.

Table 1-2 Electricity generation of thermal power in the Northeast China Power Grid in 2003

	Electricity generation (10^8kWh)	Electricity generation (MWh)	Self-use rates of fossil-fired power plants (%)	Electricity delivered to the grid (MWh)
Liaoning	797.51	79751000	7.17	74,032,853
Jilin	297.39	29739000	7.32	27,562,105
Heilongjiang	484.93	48493000	8.48	44,380,794
Total				145,975,752

Data sources: China Electric Power Yearbook 2004, P670, P709.

Table 1-3 Northeast China Power Grid simple OM in 2003

Total CO2 emissions (tCO2)	174,151,899
Total electricity delivered to the grid (MWh)	145,975,752
OM in 2003	1.193019

Table 1-4 Northeast China Power Grid CO2 emissions in 2004

Fuel	Unit	Liaoning	Jilin	Heilongjiang	Total	Emission Factor (tc/TJ)	Carbon oxidation rate (%)	NCV (MJ/t,km3)	CO2 emissions (tCO_2e) H=G*D*E*F*44/12/10000 (mass unit)
		A	B	C	D=A+B+C	E	F	G	H=G*D*E*F*44/12/1000 (volume unit)
Raw coal	10^4t	4144.2	2310.9	3084.8	**9539.9**	25.8	100	20908	188689376.8
Clean coal	10^4t	84.75	1.09	4.88	**90.72**	25.8	100	26344	2260871.585
Other washed coal	10^4t	577.67	14.26	61	**652.93**	25.8	100	8363	5165589.096
Coke	10^4t				**0**	25.8	100	28435	0
Coke oven gas	10^8m3	4.83	2.91		**7.74**	12.1	100	16726	574367.4948
Other gas	10^8m3	57.33	4.19		**61.52**	12.1	100	5227	1426676.894
Crude oil	10^4t				**0**	20	100	41816	0
Diesel oil	10^4t	2.04	1.16	0.24	**3.44**	20.2	100	42652	108672.7465
Fuel oil	10^4t	12.81	1.78	2.86	**17.45**	21.1	100	41816	564536.2111
LPG	10^4t	2.19			**2.19**	17.2	100	50179	69305.22764
Refinery gas	10^4t	9.79		1.14	**10.93**	18.2	100	46055	335923.0208
Natural gas	10^8m3		0.03	2.53	**2.56**	15.3	100	38931	559111.4496
Other petroleum products	10^4t				**0**	20	100	38369	0
Other coking products	10^4t				**0**	25.8	100	28435	0
Other energy	10^4tce	26.97	5.07		**32.04**	0	100	0	0
								Total	199754430.5

Data sources: China Energy Statistical Yearbook 2005, P222 - P233, P365.

Table 1-5 Electricity generation of thermal power in the Northeast China Power Grid in 2004

	Electricity generation (10^8kWh)	Electricity generation (MWh)	Self-use rates of fossil-fired power plants (%)	Electricity delivered to the grid (MWh)
Liaoning	845.43	84543000	7.21	78,447,450
Jilin	332.42	33242000	7.68	30,689,014
Heilongjiang	534.82	53482000	7.84	49,289,011
Total				158,425,475

Data sources: China Electric Power Yearbook 2005, P472, P474.

Table 1-6 Northeast China Power Grid simple OM in 2004

Total CO2 emissions (tCO2)	199,754,431
Total electricity delivered to the grid (MWh)	158,425,475
OM in 2004	1.260873

Table 1-7 Northeast China Power Grid CO2 emissions in 2005

Fuel	Unit	Liaoning	Jilin	Heilongjiang	Total	Emission Factor (tc/TJ)	Carbon oxidation rate (%)	NCV (MJ/t,km3)	CO2 emissions (tCO_2e) H=G*D*E*F*44/12/10000 (mass unit)
		A	B	C	D=A+B+C	E	F	G	H=G*D*E*F*44/12/1000 (volume unit)
Raw coal	10^4t	4305.41	2446.13	3383.21	**10134.75**	25.8	100	20908	200454895.9
Clean coal	10^4t				**0**	25.8	100	26344	0
Other washed coal	10^4t	524.74	19.26	24.16	**568.16**	25.8	100	8363	4494939.888
Coke	10^4t				**0**	25.8	100	28435	0
Coke oven gas	10^8m3	1.03	3.57	0.68	**5.28**	12.1	100	16726	391816.5856
Other gas	10^8m3	12.62	8.37		**20.99**	12.1	100	5227	486767.6854
Crude oil	10^4t	1.16			**1.16**	20	100	41816	35571.47733
Diesel oil	10^4t	1.18	1.48	0.57	**3.23**	20.2	100	42652	102038.6544
Fuel oil	10^4t	9.32	2.46	1.55	**13.33**	21.1	100	41816	431247.4323
LPG	10^4t	0.12			**0.12**	17.2	100	50179	3797.54672
Refinery gas	10^4t	5.48		1.32	**6.8**	18.2	100	46055	208991.4493
Natural gas	10^8m3		0.84	2.24	**3.08**	15.3	100	38931	672680.9628
Other petroleum products	10^4t				**0**	20	100	38369	0
Other coking products	10^4t				**0**	25.8	100	28435	0
Other energy	10^4tce	16.18			**16.18**	0	100	0	0
								Total	207282747.6

Data sources: China Energy Statistical Yearbook 2006, P146 - P157, P287.

Table 1-8 Electricity generation of thermal power in the Northeast China Power Grid in 2005

	Electricity generation (10^8kWh)	Electricity generation (MWh)	Self-use rates of fossil-fired power plants (%)	Electricity delivered to the grid (MWh)
Liaoning	836.97	83697000	7.03	77,813,101
Jilin	352.94	35294000	6.59	32,968,125
Heilongjiang	580	58000000	7.96	53,383,200
Total				164,164,426

Data sources: China Electric Power Yearbook 2006, P559, P568.

Table 1-9 Northeast China Power Grid simple OM in 2005

Total CO2 emissions (tCO2)	207,282,748
Total electricity delivered to the grid (MWh)	164,164,426
OM in 2005	1.262653

Table 1-10 The OM emission factor of the Northeast China Power Grid

OM CO2 emission factor（tCO2e/MWh）			Average OM CO2 emission factor（tCO2e/MWh）
2003	2004	2005	
1.193019	1.260873	1.262653	**1.2404**

Note：Average OM CO2 emission factor =the sum of each year CO2 emissions /the total supplied fossil fuel fired electricity of three years

2．BM calculation of Northeast China Power Grid

Power supply efficiency of the best commercially available technologies for various power generation

	Variable	Power supply efficiency	EF_{co2} (tc/TJ)	OXID	EF_{Adv} (tCO2/MWh)
		A	B	C	D=3.6/A/1000*B*C*44/12
Coal fired plants	$EF_{Coal,Adv}$	35.82%	25.8	1	0.9508
Gas fired plants	$EF_{Gas,Adv}$	47.67%	15.3	1	0.4237
Oil fired plants	$EF_{Oil,Adv}$	47.67%	21.1	1	0.5843

Data sources: The statistics by State Electricity Regulatory Commission (SERC) on newly built thermal plants in 10th "Five-Year Plan" period 2000-2005.

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

Step 1: 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

		Liaoning	**Jilin**	**Heilongjiang**	**Total**	**Emission Factor**	**Carbon oxidation rate**	**NCV**	**CO2 emissions**
Fuel	**Unit**	A	B	C	D=A+B+C	E	F	G	H=D*E*F*G*44/12/100
Raw coal	10^4t	4305.41	2446.13	3383.21	**10134.75**	25.8	1	20908	200454896
Clean coal	10^4t				**0**	25.8	1	26344	0
Other washed coal	10^4t	524.74	19.26	24.16	**568.16**	25.8	1	8363	4494940
Coke	10^4t				**0**	25.8	1	28435	0
Total									**204,949,836**
Crude oil	10^4t	1.16			**1.16**	20	1	41816	35571
Gasoline	10^4t	0	0	0	0	18.90	1	43070	0
Kerosene	10^4t	0	0	0	0	19.60	1	43070	0
Diesel oil	10^4t	1.18	1.48	0.57	**3.23**	20.2	1	42652	102039
Fuel oil	10^4t	9.32	2.46	1.55	**13.33**	21.1	1	41816	431247
Other petroleum products	10^4t				**0**	20	1	38369	0
Total									**568,858**
Natural gas	10^7m^3		8.4	22.4	**30.8**	15.3	1	38931	672681
Coke oven gas	10^7m^3	10.3	35.7	6.8	**52.8**	12.1	1	16726	391817
Other gas	10^7m^3	126.2	83.7		**209.9**	12.1	1	5227	486768
LPG	10^4t	0.12			**0.12**	17.2	1	50179	3798
Refinery gas	10^4t	5.48		1.32	**6.8**	18.2	1	46055	208991
Total									**1764054**
Sum total									**207282748**

Data sources: China Energy Statistical Yearbook 2006

With the above table and formula (4), (5), and (6) in B.6.1, the following results are achieved: λ_{Coal} =98.88%, λ_{Oil} =0.27%, λ_{Gas} =0.85%.

Step 2: calculating the corresponding emission factor for fossil fuel fired power generation

$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv}$ =0.9453

Step 3: calculating the $EF_{BM,y}$ of local grid

Installed capacity in the Northeast China Power Grid in 2005

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

Date source: China Electric Power Yearbook 2006

Installed capacity in the Northeast China Power Grid in 1999

Installed capacity	Unit	Liaoning	Jilin	Heilongjiang	Total
Thermal Power	MW	12425.7	4583.1	10128.1	27136.9
Hydro power	MW	1240.0	3508.2	774.5	5522.7
Nuclear power	MW	0	0	0	0
Wind power and Other	MW	22.9	0	0	22.9
Total	MW	13688.6	8091.3	10902.6	32682.5

Date source: China Electric Power Yearbook 2000

Installed capacity in the Northeast China Power Grid in 1998

Installed capacity	Unit	Liaoning	Jilin	Heilongjiang	Total
Thermal Power	MW	12560.3	4428.6	9116	26104.9
Hydro power	MW	1223.1	3474.7	784.5	5482.3
Nuclear power	MW	0	0	0	0
Wind power and Other	MW	17	0	0	17
Total	MW	13800.4	7903.3	9900.5	31604.2

Date source: China Electric Power Yearbook 1999

The BM emission factor of the Northeast China Power Grid

	Installed capacity in 2005	**Installed capacity in 1999**	**Addition capacity (1999-2005)**	**Installed capacity in 1998**	**Addition capacity (1998-2005)**	**Addition share (1998-2005)**
	A	B	C=A-B	D	E=A-D	F
Thermal Power（MW）	33934	27136.9	6797.1	26104.9	7829.1	91.31%
Hydro power（MW）	5971.4	5522.7	448.7	5482.3	489.1	5.70%
Nuclear power（MW）	0	0	0	0	0	0.00%
Wind power and Other（MW）	273.3	22.9	250.4	17	256.3	2.99%
Total（MW）	**40178.7**	**32682.5**	**7496.2**	**31604.2**	**8574.5**	**100.00%**
Share of 2005	100%		18.66%		21.34%	

$EF_{BM,y}$=0.9453×91.31%=0.8632 tCO_2/MWh

3．Combined EF calculation of Northeast China Power Grid

$$EF_y = 0.75\times EF_{OM,y} + 0.25\times EF_{BM,y} = 1.1460\ tCO_2/MWh$$

Annex 4

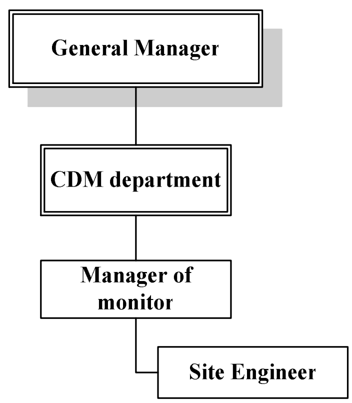
MONITORING PLAN

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, i.e. Yilan 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 and EB to support their work in validation, registration, verification, and certification. The procedure is illustrated in Section 6 of this monitoring plan. He 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.

Manager of monitor is responsible for supervising, checking data and whole data record process, calibrating meters, 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, Section 3 and Section 4 of this monitoring plan, respectively.

Site engineer is responsible for collecting data (such as reading electric meter data, keeping receipt of sales), calculating emission reduction and preparing the monitor report.

The Management Group has all received sufficient training in terms of monitoring and verification. They have received general training on wind power project operation organized the project owner, including reading and calibration of meters, recording of the readings, adjustment of readings, and reporting of readings. On the other hand, they have received CDM training 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.

2. Installation of meters and Approach for Monitoring

For the proposed project, 29 wind turbines are divided into two groups by two loops and connected with the 35kV wire, respectively, and then the 35kV wire is connected with the 220kV transformer that deliver the electricity to the grid through the substation by Dama line. The electrical diagram of the proposed project is shown in the end of Annex 4.

The two meters (accuracy degree is 0.5S, bidirectional) are installed on the two loops (Loop1# and Loop2#) without the back-up meters, respectively to measure the electricity including EG_y and $EG_{self\text{-}use}$ of the proposed project on hourly basis and recorded monthly on project site, which are measured by the project owner. For the meter readings, the negative readings are the electricity supplied to the grid (EG_y) by the proposed project and the positive readings is the Electricity utilized by the wind turbines ($EG_{self\text{-}use}$).

An electronic multifunctional electricity meter on the entrance side of substation of the Northeast Power Grid and a back-up meter on the exit side of the 35/220 kV substation of the wind farm (accuracy degree is 0.2S, bidirectional) are installed to measure and account the electricity including EGy and $EG_{self\text{-}use}$ by the proposed project, Heilongjiang Yilan Maanshan wind farm (Under construction) and Heilongjiang Yilan Hezuolinchang Phase II Wind farm (Under construction), which are measured by the local Electric Power Company and the project owner, respectively. The loss of power transmission is calculated conservatively based on the two meters mentioned above, which is the EGy difference of the two meters.

For the proposed project, four meters mentioned above need to be monitored and are used to calculate the net electricity supply to the grid. So the net electricity supply to the grid is calculated by the formula below：

$$EG_{\text{net electricity supply to the grid}} = \sum EGy - \sum EG_{self\text{-}use} - \sum EG_{\text{loss of Power transmission}}$$

If in the future, some other wind farms share the same transformer, substation or transmission line with this windfarm, the appropriate separate meters will also be installed in the project site so that the

electricity generation can be monitored respectively to calculate the share of this windfarm of the net supply to the grid.

The specific steps to monitoring are listed below:

- The project owner reads the meters and records data on the same day of every month (which day to be determined).
- The project owner supplies readings to Heilongjiang Electric Power Company.
- The project owner provides electricity sales invoice to Heilongjiang Electric Power Company.
- The project owner carries out an internal audit on and reports the readings to the 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 Heilongjiang 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 checked annually according to the requirement from Technical administrative code of electric energy metering (DL/T448 - 2000).The metering equipment will be checked by the project owner and Heilongjiang Electric Power Company Co.,Ltd before operation.
- The calibration of the electric energy meter should be periodically carried out according to relevant national electric industry standards or regulations. After calibration, 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 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 is 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.

The electricity recorded by the meter will suffice for the purpose of billing and emission reduction verification as long as the error in the meter is within the permissible limits.

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

4. Monitored data

During the first seven operating years, the on-site net electricity supplied (*EG*) will be monitored and recorded following the procedures above. Data variables to be monitored are presented in Section B.7 of the PDD.

As the proposed project is likely to share the substation with other projects in the future, the output data from turbines and other relevant data will need to be monitored. The net electricity supplied by the project activity will be monitored according to the Power Purchase Agreement or the conservative method.

5. 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. If data and information are from internet, the website must be provided. Moreover, the credibility and reliability of those data and information from internet must be confirmed.

Physical documentation will be collated in a central place. In order to facilitate auditor's reference, monitoring results will be indexed. All paper-based information 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

6. 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. It is expected that the verification will be done annually.

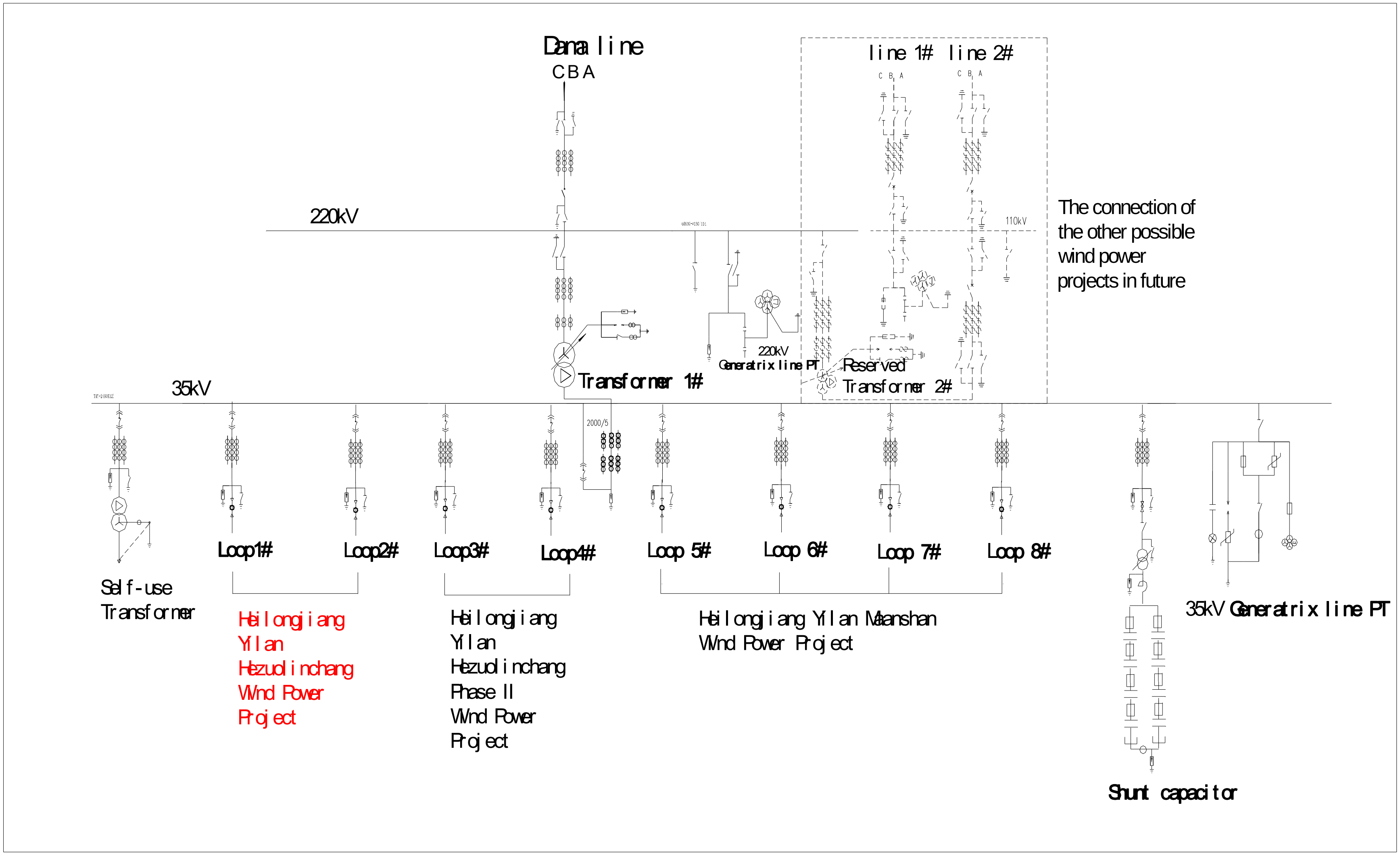
The responsibilities for verification of the projects are as follows:

- 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 facilitate the verification through providing the DOE with all required necessary information, before, during and, in the event of queries, after the verification.

 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.

The electrical diagram of the proposed project



Annex 5

IRR CALCULATION INFORMATION

The followings are the parameters needed for calculation of IRR and the calculation process of IRR for the proposed project. The primary data are from the feasibility study report of the proposed project and relevant laws and regulations. The calculation process of IRR for the proposed project is according to the "Economical assessment method and parameters for construction project, 3rd edition" issued by NDRC and Ministry of Construction.

Basic data table

No.	Item	Unit	Figure	Note
1	Type of wind turbines		850	The feasibility study report (FSR), P82
2	Number of wind turbines		29	FSR, P82
3	Installed capacity	MW	24.65	FSR, P82
4	Annual operation hours	Hour	2273	FSR, P34
5	Annual Electricity Supplied	10000 kWh	5604	FSR, P82
6	Electricity tariff (excluding VAT)	Yuan/kWh	0.5622	Regulated by the regulating entities
7	Static total investment	10000 Yuan	22243	FSR, P82
7.1	Original value of fixed assets	10000 Yuan	22243	FSR, P82
7.2	Other amortization assets	10000 Yuan	0	FSR, P82
8	Liquid capital	10000 Yuan	150	FSR, P83
9	Construction period	Year	1	FSR, P82
10	Operation period	Year	20	FSR, P82
11	Depreciable life of fixed assets	Year	15	FSR, P83
12	Rate of residual value of fixed assets	%	10	FSR, P83
13	Amortization period of other assets	Year	0	FSR, P83
14	Rate of fixed assets maintenance	%	1.6 in the first ten years, and 2.4 in the last ten years.	FSR, P83
15	Rate of insurance premium of fixed assets	%	0.405	FSR, P84
16	Employee population		16	FSR, P84

17	Annual salary per capita	10000 Yuan	4.1	FSR, P84
18	Rate of welfarism	%	41	FSR, P84
19	Material cost	Yuan/kW	0	FSR, P84
20	Other costs	Yuan/kW	40	FSR, P84
21	Rate of VAT	%	8.5	FSR, P84
22	Rate of city construction tax	%	5	FSR, P84
23	Rate of additional education fee	%	3	FSR, P84
24	Rate of income tax	%	33	FSR, P84
25	CERs	Ton	64222	
26	CERs Unit price	ERU/Ton	10	
27	Exchange rate	ERU:RMB	10.4026	
28	CERs income (incl. VAT)	10000 Yuan	668	
29	CERs income (excl. VAT)	10000 Yuan	616	

Formula for IRR calculation:

a) Cash inflow = sales revenue+ fixed assets residue+ recovered liquid capital
b) Sales revenue = annual output× tariff (excl. VAT)
c) Fixed assets residual value = original value of fixed assets × rate of assets residual value
d) Recovered liquid capital = liquid capital invested at beginning of project operation
e) Cash outflow = Construction investment + liquid capital + operating cost + sales tax and extra charges + income tax

Where:

- Construction investment = construction investment input of current year
- Liquid capital = liquid capital input of current year
- Operating cost = annual salary per capita ×employee population × (1+ rate of welfarism) + original value of fixed assets× (rate of maintenance + rate of insurance premium) + (fixed amount of material cost+ fixed amount of other costs) × installed capacity
- Sales tax and extra charges = sales revenue × rate of VAT × (rate of city construction tax + rate of additional education fee)
- Income tax = 〔sales revenue- sales tax and extra charges - operating cost - original value of fixed assets × (1- expected rate of residual value) ÷ expected depreciable life〕 × rate of income tax

f) Net cash flow = cash inflow - cash outflow

g) Accumulative total of net cash flow = $\sum_{1}^{n} annual\ net\ cash\ flow_n$

Where:
$annual\ net\ cash\ flow_n$ is the net cash flow in No. n year;
n is the project life time.

h) Formula for calculation of FIRR without CERs income:

$$\sum_{1}^{n} \frac{annual\ net\ cash\ flow_n}{(1+\ FIRR)^n} = 0$$

where:
n is the project life time;
$annual\ net\ cash\ flow_n$ is the net cash flow without CERs income in No. n year;
FIRR is the Financial Internal Return Rate of the proposed project without CERs income.

i) Net cash flow with CERs income = net cash flow without CERs income +〔CERs income excl. VAT - CERs income excl. VAT × VAT rate ×(rate of city construction tax + rate of additional education fee))× (1 - rate of income tax)

j) Formula for calculation of FIRR with CERs income:

$$\sum_{1}^{n} \frac{annual\ net\ cash\ flow'_n}{(1+\ FIRR')^n} = 0$$

where:

n is the project life time;
$annual\ net\ cash\ flow'_n$ is the net cash flow with CERs income in No. n year;
$FIRR'$ is the Financial Internal Return Rate of the proposed project with CERs income.

Cash Flow Table (total investment)

Unit：10000 Yuan RMB

No.	Item	Total	Construction Period	Operation Period								
			1	2	3	4	5	6	7	8	9	10
	（10000kWh） Annual Electricity Supplied	112080	0	5604	5604	5604	5604	5604	5604	5604	5604	5604
	Tariff (Yuan/kWh, excl. VAT)		0	0.5622	0.5622	0.5622	0.5622	0.5622	0.5622	0.5622	0.5622	0.5622
	Rate of fixed assets maintenance (%)		0	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
	Rate of income tax (%)		0	33	33	33	33	33	33	33	33	33
1	Cash inflow	65386	0	3151	3151	3151	3151	3151	3151	3151	3151	3151
1.1	Sales revenue	63011	0	3151	3151	3151	3151	3151	3151	3151	3151	3151
1.2	Fixed assets residual value	2224	0	0	0	0	0	0	0	0	0	0
1.3	Recovered liquid capital	150	0	0	0	0	0	0	0	0	0	0
2	Cash outflow	46597	22243	1190	1040	1040	1040	1040	1040	1040	1040	1040
2.1	Construction investment	22243	22243									
2.2	Liquid capital	150		150								
2.3	O&M cost	14521		637	637	637	637	637	637	637	637	637
2.4	Sales tax & extra charges	428	0	21	21	21	21	21	21	21	21	21
2.5	Income tax	9254		382	382	382	382	382	382	382	382	382
3	Net cash flow (1-2)	18789	-22243	1960	2110	2110	2110	2110	2110	2110	2110	2110
4	Accumulative total of net cash flow		-22243	-20283	-18173	-16063	-13953	-11842	-9732	-7622	-5512	-3402
5	Net cash flow with CERs income	26984	-22243	2370	2520	2520	2520	2520	2520	2520	2520	2520

Cash Flow Table (total investment)

Unit：10000 Yuan RMB

No.	Item	Operation Period										
		11	12	13	14	15	16	17	18	19	20	21
	（10000kW.h）Annual output	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604
	Tariff (Yuan/kWh, excl. VAT)	0.5622	0.5622	0.5622	0.5622	0.5622	0.5622	0.5622	0.5622	0.5622	0.5622	0.5622
	Rate of fixed assets maintenance (%)	1.6	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	Rate of income tax (%)	33	33	33	33	33	33	33	33	33	33	33
1	Cash inflow	3151	3151	3151	3151	3151	3151	3151	3151	3151	3151	5525
1.1	Sales revenue	3151	3151	3151	3151	3151	3151	3151	3151	3151	3151	3151
1.2	Fixed assets residual value	0	0	0	0	0	0	0	0	0	0	2224
1.3	Recovered liquid capital	0	0	0	0	0	0	0	0	0	0	150
2	Cash outflow	1040	1160	1160	1160	1160	1160	1600	1600	1600	1600	1600
2.1	Construction investment											
2.2	Liquid capital											
2.3	O&M cost	637	815	815	815	815	815	815	815	815	815	815
2.4	Sales tax & extra charges	21	21	21	21	21	21	21	21	21	21	21
2.5	Income tax	382	323	323	323	323	323	764	764	764	764	764
3	Net cash flow (1-2)	2110	1991	1991	1991	1991	1991	1550	1550	1550	1550	3925
4	Accumulative total of net cash flow	-1292	699	2690	4681	6672	8662	10213	11763	13314	14864	18789
5	Net cash flow with CERs income	2520	2401	2401	2401	2401	2401	1960	1960	1960	1960	4335

FIRR without CERs income	**6.71%**
FIRR with CERs income	**9.16%**