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

CONTENTS

SECTION A. General description of project activity

A.1. Title of the project activity:

Project Title: Jilin Zhenlai Mali Wind Power Project
Version No: 03
Completion Date: 11/12/2009

A.2. Description of the project activity:

The Jilin Zhenlai Mali Wind Power Project (hereafter refers to the Project) is located in Zhenlai County, Baicheng City, Jilin Province, P.R.China. It involves the installation of 33 turbines, each of which has a rated output of 1500kW, providing a total capacity of 49.5MW. The Project will supply 101,696MWh electricity annually to be connected into Northeast China Power Grid (NECPG).

The purpose of the Project is to supply clean energy by using renewable wind resources. It will help reduce GHG emissions generated from the high-growth, coal-dominated power generation from NECPG which is dominant of fossil fuel fired power plants. According to the Tool for the demonstration and assessment of additionality, the baseline scenario is identified to be the equivalent annual electricity supplied by the NECPG, which is the same as the situation prior to the implementation of the Project activity. The Project is estimated to deliver 116,317 tCO_2e emission reductions annually in the first crediting period, which will contribute to the alleviation of climate change.

Being as an environmentally sound energy supply technology, wind power is a priority development project in China. The contributions of the Project to sustainable development goal are summarized as follows:

- ♦ Being located in a power grid dominated by thermal power plants, development of the Project will not only reduce GHG emissions but also mitigate local environmental pollution caused by air emissions from thermal power plants.
- ♦ The Project could be helpful to diversify power mix of NECPG.
- ♦ Chinese government has established policies to encourage investment in Northeast China in order to accelerate local economic development. The Project could contribute to meet local electricity demand, therefore undoubtedly boosts the economy in the local region.
- ♦ Reducing the dependence on exhaustible fossil fuels for power generation.
- ♦ Creation of employment in local area.

A.3. Project participants:

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
P.R.China (host)	Jilin Huaneng Renewable Energy Co., Ltd.	No
Sweden	Carbon Asset Management Sweden AB	No

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

People's Republic of China

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

Jilin Province

A.4.1.3. City/Town/Community etc:

Zhenlai County, Baicheng City

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

The project site is located in Zhenlai County, Baicheng City, Jilin Province. The central geographical coordinates of project is longitude 123°08′ 09 " E and latitude 45°49′ 38 " N，where is 8 km from the Zhenlai County. Figure A-1 shows the location of the Project.

Figure 1 Map of Jilin Province in China

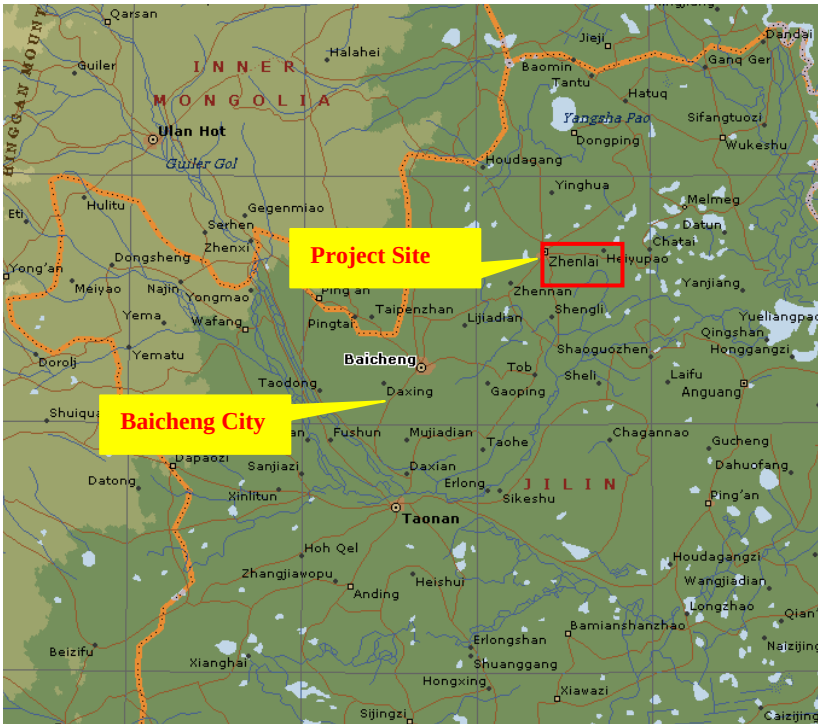

Figure 2: Location of the Project site

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

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Category: Renewable electricity in grid connected applications
Sectoral Scope: 1 Energy industries

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

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The Project activity aims at generating clean electricity through renewable wind resources in Zhenlai County, Baicheng City, Jilin Provicne, P.R.China. Prior to the start of the implementation of the project activity, the equivalent annual electricity was supplied by the NECPG dominated by thermal power, which is the same as the baseline scenario identified in the Section B.

The Project activity involves installation of 33 wind turbines with each capacity of 1,500 kW, totals up an installation capacity of 49.5 MW. The lifetime of wind turbines is 20 years[1]. The Project adopts a unit connection mode of one-turbine-one-transformer. Each turbine is equipped with a 35kV transformer. The full-load operation time of the Project amounts to 2,056 hours per year (PLF 23.47%)[2], and thus contributes to net electricity output of 101,696MWh annually connected to NECPG.

The net electricity output can be monitored by a monitoring system installed at the Project site,

[1] Approved FSR, and Contracts of Wind Turbines singed on 04/12/2008, which have been provided during on-site audit.

[2] Approved FSR. According to the FSR, the data is estimated based on the wind speed data of the local wind resources for the most recent 20 years from 1988~2007 provided by Zhenlai County meteorological station by using professional WASP software in accordance with "Wind Resources Measurement Method of Wind Farms" (GB/T 18709-2002) and "Wind Resources Evaluation Method of Wind farms" (GB/T 18710-2002), with considering the turbine characteristics and turbines distribution optimized by software WindFarmer for maximizing power generation.

which has been agreed by both project owner and grid company. Detailed monitoring information is given Section B.7 below.

Main technical parameters of the turbines are listed as Table 1 below.

Table 1. Main parameters of wind turbine employed by the Project

No	Item	Unit	Value
1	Rated capacity	kW	1,500
2	Number of blades		3
3	Nominal wind speed	m/s	11
4	Cut in speed	m/s	3
5	Cut out speed	m/s	20
6	Hub height	m	70
7	Rated voltage of generator	v	690

Type of turbines is 77/1500 manufactured by Xinjiang Goldwind Science &Technology Co., Ltd., and Sinovel Wind Co., Ltd.

The electricity will be finally upgraded to 220kV, then connected to NECPG. The Project is to use the domestic equipment, and therefore won't involve in technology transfer.

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

A crediting period of 7 (seven) years (renewable twice) is selected for the project activity. The total emission reductions during the first crediting period are 814,219 tCO_2e. The estimated amount of emission reductions over the chosen crediting period is summarized as follows:

Years	Annual estimation of emission reductions in tonnes of CO_2e
01/05/2010~31/12/2010	77,545
2011	116,317
2012	116,317
2013	116,317
2014	116,317
2015	116,317
2016	116,317
01/01/2017~30/04/2017	38,772
Total estimated reductions (tonnes of CO_2e)	814,219
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	116,317

A.4.5. Public funding of the project activity:

There is no public funding from Annex I parties for the proposed project.

SECTION B. Application of a baseline and monitoring methodology:

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

The following approved baseline and monitoring methodology is applied to the proposed project:

The approved consolidated baseline and monitoring methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 09, EB45)
Tool for the demonstration and assessment of additionality (Version 05.2, EB39)
Guidelines on the assessment of investment analysis (Version 03, EB51)
Tool to calculate the emission factor for an electricity system (Version 02, EB50)

For more information on these methodologies, please refer to:
http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

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

The project is a grid-connected renewable power generation project activity which meets all the applicability criteria stated in methodology ACM0002 (Version 09):

1) The proposed project is a newly built 49.5 MW wind energy plant by using renewable wind resources to generate electricity, which will be connected to NECPG.
2) The proposed project does not involve switching from fossil fuels to renewable energy at the site of the project activity.
3) The geographic and system boundaries for NECPG can be clearly identified and information on the characteristics of the grid is available.

Therefore approved consolidated baseline and monitoring methodology ACM0002 (Version 09) is applicable to the proposed project.

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

As per ACM0002 (version 09), the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to. Therefore, the spatial extent of the project boundary of the Project covers the project site and all other plants connecter to NECPG. According to the guidance of China DNA[3], NECPG is composed of Jilin Power Grid, Liaoning Power Grid, and Heilongjiang Power Grid. The main emission sources and type of GHGs in the project boundary are listed in Table 2 below:

[3] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/2008/20081230102527637.pdf

Table2. Sources and gases in the project boundary

	Source	Gas	Included?	Justification / Explanation
Baseline	CO_2 emissions from electricity generation in fossil fuel-fired power plants connected to NECPG	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
Project Activity	Project Emission.	CO_2	No	The Project is a wind power project that the project emissions should not be considered as per ACM0002 (Version 09).
		CH_4	No	
		N_2O	No	
	For all renewable energy plants, CO_2 emisisons from backup power generation.	CO_2	No	No backup power generation equipment involved in the Project activity.
		CH_4	No	
		N_2O	No	

A flow diagram of the project boundary is shown as in Figure 1 below:

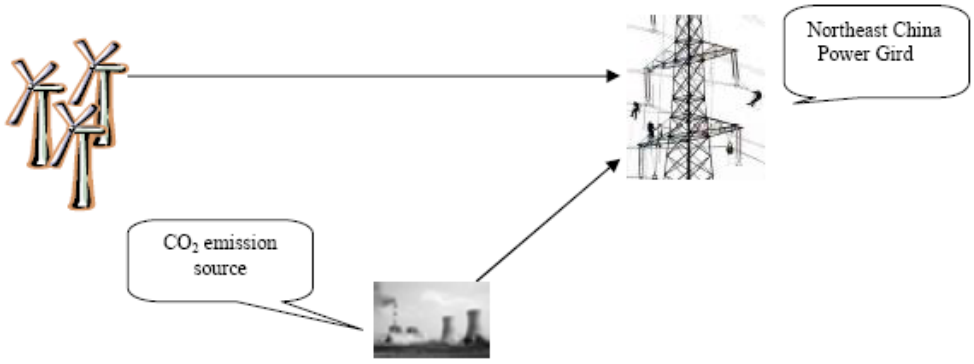

Figure 1 diagram of the Project Boundary

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

As the Project activity is the installation of a new grid-connected renewable power plant, and the electricity supplied by the Project will be connected into NECPG. Thus, NECPG is considered as the "connected electricity system", which is defined as the "project boundary" of the Project. Therefore, according to ACM0002 (version 09), the baseline scenario of the Project is identified as the following:

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

According to ACM0002 (version 09), baseline emissions are equal to the power generated by the project that is delivered to the NECPG, multiplied by the baseline emission factor. The baseline emission factor (EF_y) is calculated as a Combined Margin (CM), which consists of the weighted average of Operating Margin (OM) emission factor and Build Margin (BM) emission factor. The key parameters used for emission reductions calculation are as follow:

Parameter	Unit	Value
EF_{OM}	tCO_2e/MWh	1.2561
EF_{BM}	tCO_2e/MWh	0.8068
EF_y	tCO_2e/MWh	1.1438

The emission reductions calculations are specified in Section B.6.and Annex 3.

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):

Prior consideration of CDM and timeline

The project owner seriously considered CDM in the decision to proceed with the investment in the Project prior to the start of the Project activity. Since the starting date of the Project is before the date of validation, therefore according to "*Guidance on the demonstration and assessment of prior consideration of the CDM*" (ver 03), the prior consideration of CDM is demonstrated in the following. Table 3 below shows the key events of the Project activity.

Time	Events	Comment
09/05/2008	Approval of Environmental Impact Assessment	
07/2008	Completion of the Feasibility Study Report (FSR)	As indicated in the FSR, the project is financial unattractiveness, and CDM is considered as a main factor to make it financial feasible.
01/08/2008	Board meeting that made final CDM decision to invest the Project as CDM project	The board meeting finally decided to invest on the Project activity with CDM consideration, which showed that benefits of the CDM was a decisive factor in the decision to precede with the Project.
17/11/2008	Approval of FSR	
20/11/2008	ERPA signed	
04/12/2008	**Wind Turbine Purchasing Contract signed**	**The starting date of the project activity**
05/12/2008	Turbine Tower Purchasing Contract signed	
09/12/2008	Construction Contract signed	
05/01/2009	The construction launched[4]	
05/01/2009	Contract of main generator transformer signed	
17/03/2009	Attending the assessment meeting hold by China's DNA for approval[5]	
09/04/2009	Letter of Approval issued by China's DNA	
20/05/2009	**Notification regarding to prior consideration of the CDM submitted to and confirmed by China's DNA**	According to "*Guidance on the demonstration and assessment of prior consideration of the CDM (version 1, EB46)"*, the Notification was sent to China's DNA within six months of the project activity start date.
11/09/2009	**Notification regarding to prior consideration of the CDM listed in UNFCCC website**	As "*Guidance on the demonstration and assessment of prior consideration of the CDM (version 2, EB48)" issued on 17/07/2009* requires all notifications in a standardized form

[4] Start Construction Order dated 05/01/2009

[5] Notification for attending CDM assessment meeting issued by China's DNA by 04/03/2009

Time	Events	Comment
		to be sent to the UNFCCC secretariat, the Project also sent a Notification by using the standardized form to UNFCCC secretariat.

As shown in the Table 3 above, the earliest date of the real action of the project activity is 04/12/2008 which is the date that the Wind Turbine Purchasing Contract signed. According to the "*CDM Glossary Term"*, this date is defined as the starting date of the Project activity. As the starting date of the project activity is later than 02/08/2008, according to the "*Guidance on the demonstration and assessment of prior consideration of the CDM*",, Notifications regarding to prior consideration of the CDM have been submitted to China's DNA and UNFCCC secretariat on 20/05/2009 and 11/09/2009 respectively, and also confirmed by both.

Also, it can be seen that the incentive from CDM had been taken into account in the very beginning when starting Feasibility Study Report (FSR), which is prior to the starting date of the Project activity. The FSR was finalized by Jilin Province Power Exploration and Design Institute in July 2008. As analyzed in the FSR, the project IRR is below the benchmark and financially unattractive, thus CDM revenues is really needed as additional incomes to make it financially attractive. Therefore, the FSR recommends the Project to conduct CDM to overcome its financial risk. Based on the FSR and confidence of CDM revenue, the project owner finally decided to invest and develop the Project as CDM project on 01/08/2008, which is before the starting date.

According to "Tool for the demonstration and assessment of additionality" (Version 5.2) and "Guidelines on the assessment of investment analysis" (Version 03) , the additionality of the project is demonstrated and assessed through the following steps:

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

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

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

In absence of the proposed project, plausible and credible alternatives available to the proposed project that provide outputs or services comparable to the proposed CDM project activity include:

Alternative 1: The Project activity not undertaken as a CDM project activity;
Alternative 2: Construction of a thermal power plant with equivalent amount of annual power supply;
Alternative 3: Construction of other renewable energy power plant with equivalent amount of annual power supply;
Alternative 4: Equivalent annual electricity supplied by NECPG.

Besides wind energy, solar PV, geothermal, biomass and hydro are the possible grid-connected renewable energy technologies that could be applied in China. However, biomass power generation technology is still in the demonstration phase and can bring only poor economic benefits, which can not be operated without support from the national policies[6] .Due to the technology development status and the high cost for power generation, solar PV[7] and geothermal[8] with the similar installed

[6] http://www.nongji.com.cn/news/viewNews.action?newsId=27133

[7] http://finance.qq.com/a/20070920/002031.htm

capacity as the Project are far from being economically attractive. The area that the Project is located is belong to semiarid region, where the rainfall is very limited but evaporation is four times as higher as the rainfall, as a result drought occurrence becomes more frequent[9]. Therefore, it isn't suit for development of hydro power projects in Zhenlai County. As a result, the alternative 3 is not a plausible and credible one to the proposed project.

Sub-step 1b. Enforcement of applicable laws and regulations:

Alternative 1: The Project activity not undertaken as CDM project activity

The Chinese government encourages and promotes wind power development through a series of laws, regulations and preferential policies. Alternative 1) is in compliance with legal and regulatory requirements.

Alternative 2: Construct a thermal power plant with equivalent amount of annual power supply

For the average annual utilization hours of the fossil fuel plants are larger than that of the Project, the installed capacity of the fossil fuel-fired plants with equivalent annual power supply as the Project will be lower than 49.5MW. However according to *Notice on Strictly Prohibiting the Installation of Fuel-fired Generation with the Capacity of 135MW or below issued by the General Office of the State Council (decree no. 2002-6*,) coal-fired plants with a capacity of 135MW or less are prohibited from development in large grid such as provincial girds[10], and the fossil fuel-fired power units with less than 100MW capacity is strictly regulated for installations according to current regulations in China[11]. Consequently, alternative 2 is not a feasible alternative scenario to the proposed project.

Alternative 3: Construct other renewable energy power plant with equivalent amount of annual power supply.

The alternative is in compliance with legal and regulatory requirements; however, it is excluded from baseline scenario in sub-step 1a with reasonable explanation.

Alternative 4: Equivalent annual electricity supplied by NECPG

Alternative 4 is in compliance with legal and regulatory requirements. To meet the increase of the electricity demand, the power grid company can either increase the output generation from operating units or build some new power plants. As reflected in the baseline calculation, most of recently added capacity is thermal power. Therefore, continuation of the current situation, the electricity generated by the operation of grid-connected power plants and by the addition of new generation plants on Northeast China Power Grid can be taken as a realistic alternative for the proposed project activity. So the scenario 4 is realistic and credible choice.

Outcome of Step 1b:

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[8] Source: Page 5 of Overview of Chinese Renewable Energy Development 2006, by Energy Bureau of NDRC, CRED(Center for Renewable Energy Development) of NDRC and CREIA(Chinese Renewable Energy Industries Association)

[9] http://www.jl.gov.cn/zwxx/zfwj/szfbgtfw/t20050720_16669.htm
http://www.jlzhenlai.gov.cn/index.php?option=com_content&module=22&sortid=31&artid=163

[10] http://www.zjjmw.gov.cn/zcfg/gjfg/2002/10/10/9318.shtml

[11] Interim Rules on the Installation and Management of Small-scale Fuel-fired Generators issued in August 1997, as for more detailed information please refer to http://www.sdpc.gov.cn/zcfb/zcfbqt/2007qita/t20070131_115037.htm

Mandatory legislation and regulations to each alternative are taken into account in sub-step 1b.Based on the above analysis, the Project activity is not the only alternative amongst the project participants that is in compliance with mandatory regulations with which there is general compliance. Therefore, the Project activity may be additional.

Step 2. Investment analysis

The purpose of this step is to determine whether the Project activity is economically or financially less attractive than other alternatives without revenue from the sale of certified emission reductions (CERs). The investment analysis was conducted in the following steps:

Sub-step 2a. Determine appropriate analysis method

The three analysis methods suggested by tools for the demonstration and assessment of additionality （Ver.05.2） are simple cost analysis (option I), investment comparison analysis (option II) and benchmark analysis (option III). Since the proposed project will earn revenues from not only the CDM but also from electricity output, the simple cost analysis method (option I) is not appropriate. The investment comparison analysis method (Option II) is also not applicable because the alternative of the Project is "Equivalent annual electricity supplied by NECPG" rather than a new investment project. The Project will use benchmark analysis method (option III) based on total investment IRR to identify whether the financial indicators of the Project is better than the benchmark value.

Sub-step 2b. Apply benchmark analysis (Option III)

With reference to *Interim Rules on Economic Assessment of Electric Engineering Retrofit Projects*[12], the benchmark project IRR (after tax) of 8% is applied in Chinese power industry, which has been used widely for Feasibility Studies of the power projects investment, including the wind power project in China.

As the post-tax benchmark of project IRR is applied, according to "Guidelines on the assessment of investment analysis"(Version 03), the actual loan interest is taken into account to reflect the actual income tax when calculating the Project IRR in this PDD, which is a more conservative treatment to demonstrate the additionality of the Project.

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

Based on the above-mentioned benchmark and "Guidelines on the assessment of investment analysis"(Version 03), the calculation and comparative analysis of financial indicators for the proposed project are carried out in sub-step 2c.

(1) Basic parameters for calculation of financial indicators

Based on the approved Feasibility Study Report (FSR) of the Project, basic parameters for calculation of financial indicators are summarized as follows:

Table 3. The financial indicators for the proposed project

Indicator	Unit	Value	Data Source
Installed Capacity	MW	49.5	Approved FSR

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

Annual Electricity Output	MWh	101,696	Approved FSR
Static Investment	Million Yuan	493.35	Approved FSR
Average Annual O&M Cost	Million Yuan	8.95	Approved FSR
Feed-in Tariff (including tax)	RMB/kWh	0.61	Approved FSR
Value Added Tax Rate	%	8.5	Approved FSR
Income Tax	%	25	Approved FSR
Education Tax	%	5	Approved FSR
City Build Tax	%	3	Approved FSR
Project Lifetime	year	21 (including 1-year period of construction)	Approved FSR
Expected CERs Price	EURO/ t CO_2e	11	Prediction

The input parameters applied in the PDD are taken from and consistent with the FSR. The FSR was completed by Jilin Electric Power Survey & Design Institute with Class A accredited by National Development and Reform Commission (NDRC)[13] in July 2008, and then approved by Development & Reform Commission of Jilin Province on 17/11/2008. Since the FSR was developed by a qualified and independent third party according to the relevant national standards made by NDRC[14], and approved by the authority, the input parameters used in the investment analysis can be considered as reliable source.

Also, the FSR has been the basis of the decision to proceed with the investment in the project activity. The FSR was finalized in July 2008, and the investment decision of the project owner was soon made on 01/08/2008. As the very period of time between finalization of the FSR and decision to proceed with the project, it is unlikely in the context of the underlying project activity that the input values would have materially changed.

To be concluded, the input parameters used in the investment analysis of the PDD are relied on and consistent the values of the approved FSR, which is credible and reasonably represent the economic situation of the Project at the time of decision making taken by the project owner. Therefore, the input parameters used in the investment analysis of the PDD are in line with the guidance of EB 38 paragraph 54.

According to the above, it also can be proved that the annual electricity output of the 101,696MWh, corresponding to annul operation hours of 2,056h with Plant Load Factor (PLF) of 23.47%[15] ex-ante in the PDD was the same one in the FSR determined by a third party contracted with the project owner, and provided to government while applying the implementation approval, thus complies with

[13] http://www.jlepsdi.com/jieshao.asp

[14] Methodology of Feasibility Study Report on Wind Farm Project DL/T5067-1996(2005)

[15] Page 80 of the approved FSR

the *Guidelines for the Reporting and Validation of Plant Load Factors* (version 1) (EB48, Annex 11) and is considered reasonable.

The feed-in tariff of 0.61RMB/KWh (included VAT) applied in the PDD for investment analysis is derived from the approved FSR, in which, the tariff was estimated referring to the most recent tariff approved to wind farms in Jilin Province by the government at the time when making the FSR.

According to the relevant regulations on renewable energy power sector and electricity tariff management[16], the feed-in tariff for wind power projects shall be decided by the government; and it is the responsibility of the government for the adjustment of electricity tariff. It means the tariff of wind farms was strictly controlled by the government and will not be significantly changed without government's regulation. So, it is impossible for project owner to forecast possible changes of tariff when making the FSR and investment decision. And thus, when doing the investment analysis in the FSR, the design institute and the project owner expected the tariff of 0.61RMB/KWh (included VAT) referring to the tariff notifications released by NDRC on 06/09/2007 and 23/07/2008[17], which set the tariff at 0.61 yuan/kWh (incl. VAT) for all wind projects in Jilin Province and was the most recent and available information of approved tariff of wind farms in Jilin when finalizing the FSR (July 2008) and at the time of the project investment decision (01/08/2008).

Furthermore, according to the latest policy regarding tariff of wind power issued by NDRC on 20/07/2009 [18], wind power projects in Jilin Province should be applied the unified tariff of 0.61RMB/kWh (included VAT) which is same as and consistent with the previous official notifications regarding the tariff of wind farms in Jilin [refer to footnote 17].

In addition, recently the Power Purchase Agreement (PPA) of the Project has been countersigned on 20/11/2009 by project owner and Grid Company[19], which states the feed-in tariff of the Project is signed at 0.61RMB/KWh (included VAT), and is double confirmed as same as the tariff expected in the approved FSR and consistent with the tariff policy in Jilin Province.

Thus, it is credible and reasonable to apply tariff of 0.61RMB/KWh (included VAT) for the investment analysis in the approved FSR and investment decision-making.

(2) Comparison of the IRR for the proposed project and the financial indicators benchmark

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[16] Proposed Regulation on Electricity Tariff for Renewable Energy Power Projects and Share of Proceeds issued by NDRC on 04/01/2006. Document No. Fa Gai Jia Ge[2006]7

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

Notification of Electricity Tariff Reform issued by General Office of Stage Council on 28/03/2005. Document No. Fa Gai Jia Ge [2005]514

http://www.sdpc.gov.cn/jggl/zcfg/t20050527_4698.htm

[17] Tariff approval document for wind power projects issued by NDRC on 09/06/2007. Document No. Fa Gai Jia Ge [2007]1260

Tariff approval document for wind power projects issued by NDRC on 23/07/2008. Document No. Fa Gai Jia Ge [2008]1876

[18] Notification on Improvements to the Wind Power Feed-In Pricing Policy issued by NDRC on 20/07/2009. Document No.Fa Gai Jia Ge [2009] 1906

http://www.ndrc.gov.cn/jggl/jggs/t20090727_292846.htm

[19] PPA of the Project signed by the project owner and Grid Company on 20/11/2009

In accordance with the benchmark analysis (Option III), the Project will be financially unattractive if the financial indicators of the Project (i.e. project IRR) are lower than the benchmark rate.

Table 4 below shows the fluctuating situation of project IRR, with and without CDM revenues. As shown from Table 3, the IRR is 6.95% in absence of CDM revenues, which is lower than the benchmark rate of 8%. And therefore the project is unattractive to the investor, as well as not applicable commercially. However, with the CDM revenue, project IRR is significantly improved and exceeds the benchmark rate.

Table 4. Financial indicators of the Project

	IRR **Benchmark rate =8%**
Without CDM revenue	6.95%[20]
With CDM revenue	10.48%

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 financial parameters are identified as the main variable factors for sensitive analysis, including:

(1) total static investment;
(2) annual O&M cost;
(3) feed-in tariff; and
(4) annual electricity output

Assuming the fluctuation range varies from -10%~ +10%, which is consistent with the approved FSR and is a reasonable range commonly used in FSR for sensitivity analysis of construction project in China, the project IRR varies (without CERs revenue) to different extents. Detailed results of sensitive analysis of the four indicators are shown in Table 5 and Figure 2 below.

[20] The original project IRR in the PDD submitted for GSP is at 6.20% (after tax), which is calculated based on the method of adjust income tax (calculated as the EBIT (earnings before interest and tax) times the income tax rate). It is fully complied with the "*Economic Assessment and Parameters for Construction Project*" (3rd edition) and also consistent with the "*Guidance on the Assessment of Investment Analysis*" (Version 2). However, as per the latest Guidelines, the calculation of income tax is revised accordingly which considers the actual local interest to reflect the actual income tax and is more conservative in the project IRR (after tax) calculation. Therefore, the project IRR (after tax) is revised to 6.95%. Please refer to detail interpretation in validation findings.

Table 5 Sensibility analysis of financial indicator for the Project
(IRR without the CDM revenue)

	-10%	-5%	0%	5%	10%
Total static investment	8.42%	7.67%	6.95%	6.27%	5.63%
Annual O&M costs	7.15%	7.05%	6.95%	6.84%	6.74%
Feed-in tariff	5.46%	6.22%	6.95%	7.65%	8.31%
Annual electricity output	5.46%	6.22%	6.95%	7.65%	8.31%

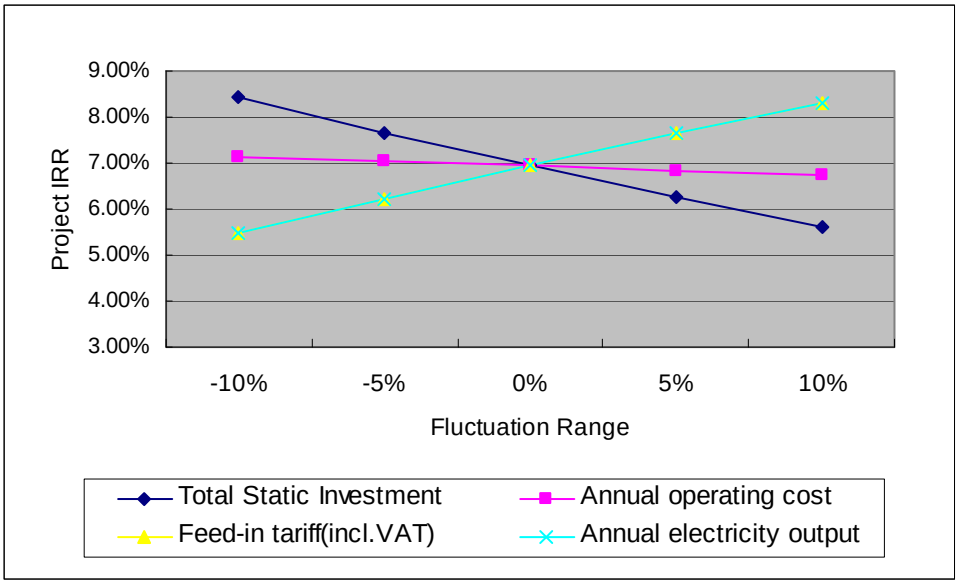

Figure 2. Sensibility analysis of financial indicator

It can be seen that the impact of total static investment on IRR is most significant, following by feed-in tariff or annual electricity output. Table B6 below summarizes the variation of each financial parameter that can make the project IRR reach 8%.

Table 6 Variation of financial parameters to reach the benchmark of project IRR
(IRR without the CDM revenue)

	Variation
Total static investment	-7.25%
Annual O&M costs	-53.50%
Feed-in tariff	7.63%
Annual electricity output	7.63%

However, these variations do not reflect a realistic range of assumptions for the input parameters of the financial analysis.

1) Total static investment

The project IRR can reach the benchmark when the total static investment decreases by 7.25%. However, such condition cannot be occurred for the Project. For a wind farm project, the costs of the equipments and engineering construction comprise the majority of total static investment. As prices of turbines and other related equipments, and raw materials have been increasing in recent years[21], a

[21] http://energy.people.com.cn/GB/5720709.html In the last 2 years, the demands for the turbines and its accessories exceeded the supply. Moreover the price of the raw material such as steel and cooper is increasing, which results in the price of wind turbines and equipments increasing, as demonstrated in *The Development of Wind Power*, published by

decrease of the static investment is unlikely occurred. As per the approved FSR, the entire sub-budget of equipment and engineering construction is estimated as 459.59million RMB, accounting for 93.2% of the total static investment. Compared with that, according to the main equipments purchase contracts (i.e. turbines, towers, transformer, and related accessories) and contracts on major construction works[22], the real investment of main equipments and construction works is 489.78 million RMB, which has already exceeded the sub-budget by 6.57%, and has already been very closed to and accounted for 99.3% of the total static investment estimation. Therefore, the total static investment of the Project cannot decrease by 7.25%, which is unrealistic.

2) Annual O&M cost

As shown in Table 5 above, the annual O&M cost has no significant impact on the IRR, and when the annual O&M cost varies from -10% to 10% the project IRR is still lower than the benchmark IRR. Only if it were drastically reduced by 53.5% would the project IRR reach benchmark. Whereas, the O&M cost mainly contains employ salary and welfare, material expense, maintenance fees and insurance fees, due to the fact that the purchasing price of the raw materials and products[23], labour cost[24] are keeping raising, therefore the annual O&M cost reduced is unlikely occurred.

3) Annual electricity output/PLF

The project IRR can reach the benchmark when the annual electricity output increases by 7.63%. As mentioned above, the annual electricity output of 101,696MWh, namely annul operation hours of 2,056h with PLF of 23.47%, applied in the PDD is taken from the approved FSR which was finalized in 2008 by Jilin Electric Power Survey & Design Institute granted as a top class design institute in the power industry by the government. The annual electricity output/annual operation hours was calculated based on the wind speed data of the local wind resources for the most recent 20 years from 1988~2007 provided by Zhenlai County meteorological station by using professional WASP software[25] in accordance with "Wind Resources Measurement Method of Wind Farms" (GB/T 18709-2002) and "Wind Resources Evaluation Method of Wind farms" (GB/T 18710-2002), with considering the turbine characteristics and turbines distribution optimized by software WindFarmer for maximizing power generation. The annual electricity output in the FSR represents a long-term average power supply throughout the lifetime of the Project estimated according to historical data, where the yearly-variations have already been taken into account. And, according to the FSR, the annual average wind speed of the project sites tends to stable over the past 20 years, and have a slightly declined since 2004[26]. Therefore, the electricity output of the Project would not change so much to make the project IRR reach 8%.

4) Feed-in tariff

The IRR of the Project can reach the benchmark when feed-in tariff increased by 7.63%. However, considering the tariff of wind power projects in Jilin Province analyzed as below, the feed-in tariff of the Project would not be significantly changed, i.e. increasing by 7.63%.

As mentioned in section (1) of the Sub-step 2c above, the feed-in tariff of 0.61RMB/KWh (included VAT) applied in the PDD for investment analysis is derived from the approved FSR that was

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[22] Main equipments purchase contracts and contracts on major construction works have been provided to DOE during on-site audit.

[23] http://tjj.jl.gov.cn/sjfb/200807/t20080731_425981.html

http://www.stats.gov.cn/tjsj/ndsj/2007/html/I0913C.HTM

[24] http://www.stats.gov.cn/tjsj/ndsj/2008/indexch.htm

[25] www.wasp.dk

[26] Page 20 of the approved FSR

completed by a qualified third part with a top class and approved by the government. As the tariff of wind power projects in China are regulated by the government, the project owner can not be able to make assumption of possible changes of tariff for investment decision making. Thus, the tariff determined in the FSR for wind power projects in China is generally governed by the availability of public information of wind power tariff in the region, and is a common practice in local areas. Regarding to the Project, the tariff estimated in the FSR referenced from the tariffs of 0.61RMB/KWh (included VAT) approved for wind farms in Jilin Provinces by NDRC on 06/09/2007 and 23/07/2008 refer to the reference 17, which is the most recent information available before finalizing the FSR (July 2008) and at the time of the project investment decision (01/08/2008). Based on the historical tariff approvals issued by NDRC on 06/09/2007 and 23/07/2008 refer to the reference 17, and the latest official notification issued by NDRC on 20/07/2009, and the countersigned PPA refer to reference 19, the tariff for the proposed project is double confirmed as 0.61RMB/kWh (included VAT).Therefore, the tariff of 0.61RMB/KWh (included VAT) applied is credible and reasonable for the Project when making the FSR and investment decision.

The Project will supply electricity to Jilin Province and then to Northeast China Power Grid (NECPG). In China, the tariff, investment circumstance and wind energy resources of each province are significant different, therefore, the tariff analysis in the PDD focuses on provincial basis, i.e. the tariff of wind farms in Jilin Province covered by NECPG. And, there was a significant reform of the electricity power sector in China took place in the end of 2002, which has brought some fundamental changes to the industry: led to the separation of electricity generation from the grid operation; break the state-monopoly of the electric supply system[27]. The investment climate was different compared to the situation before the reform. So for the tariff analysis in the PDD, according to the official tariffs documents, the statistic of installed capacity of wind power in China[28], and UNFCCC website, all information of feed-in tariffs and wind farm projects commissioned in Jilin Province after 2002 are taken into consideration and listed in Table 4 below:

Table 4 Tariff and Wind Power Project in Jilin Provicne

NO.	Tariff approval time	UNFCCC Ref.	Project name	Installed Capacity (MW)	Tariff (RMB/kWh, incl. VAT)	Tariff Document No. / website
1	Mar 2005	0256	Jilin Tongyu Huaneng 100.05MW Wind Power Project	100.5	0.552	http://www.ndrc.gov.cn/zdxm/t20060324_64262.htm
2	Mar 2005	0897	Jilin Tongyu Tuanjie wind project	100.3	0.552	http://www.ndrc.gov.cn/zdxm/t20060324_64258.htm
3	Dec 2006	0771	Changling wind power project	9.35	0.63	No. Fa Gai Jia Ge [2006]2908
4	Mar 2007	2068	Jilin Tongyu Tongfa Wind Power Project	100.3	0.552	http://www.chinapower.com.cn/article/1073/art1073001.asp
5	Jun 2007	0483	Jilin Changling Wind Farm Phase I Project	49.5	0.61	Fa Gai Jia Ge [2007]1260
6	Jun 2007	0544	Jilin Taobei Fuyu wind power project	49.5	0.61	Fa Gai Jia Ge [2007]1260
7	Jun 2007	0599	Jilin Taonan wind power project	49.3	0.61	Fa Gai Jia Ge [2007]1260
8	Jun 2007	0238	Jilin Taobei Huaneng wind power project	49.3	0.61	Fa Gai Jia Ge [2007]1260

[27] http://www.cec.org.cn/news/showc.asp?ID=16731

[28] *China Wind Farm Capacity Statistic in 2007,* by Shi pengfei, China Wind Energy Association

9	Jun 2007	0869	Datang Jilin Shuangliao Wind farm project	49.3	0.61	Fa Gai Jia Ge [2007]1260
10	Jun 2007	1129	Jilin Baicheng ChaganHot Wind power project	30	0.61	Fa Gai Jia Ge [2007]1260
11	Jul 2008	2083	CGN Jilin Daan 49.5MW Wind Power Project	49.5	0.61	Fa Gai Jia Ge [2008]1876
12	Jul 2008	Under validation	Datang Jilin Datong wind farm project	49.5	0.61	Fa Gai Jia Ge [2008]1876
13	2009	2586	Jilin Da'an Dagangzi Wind Power Project Phase II	49.5	0.61	Fa Gai Jia Ge [2009]1906
14	2009	Under validation	Jilin Da'an Dagangzi Wind Power Project Phase III	49.5	0.61	Fa Gai Jia Ge [2009]1906
15	2009	2685	Jilin Shuangliao 2nd Phase Wind Power Project	49.5	0.61	Fa Gai Jia Ge [2009]1906

* All wind power projects commissioned in Jilin Province after 2002 are registered as CDM projects or under validation. Related evidences are available to DOE.

As shown in the above, the tariffs of wind power projects in Jilin after 2002 include 0.552RMB/KWh (including VAT), 0.63RMB/KWh (including VAT) and 0.61 RMB/KWh (including VAT). 0.552RMB/KWh (including VAT) was the tariff approved for three wind power projects above 100MW by NDRC respectively in Mar. 2005 and Mar. 2007. There was only one slightly higher tariff of 0.63RMB/KWh (including VAT) approved by NDRC in Dec. 2006 just for one small-scaled wind power project with capacity of 9.35MW. Since then, tariffs endorsed to all other new wind power project in Jilin Province have been remained stable and constant at 0.61RMB/KWh (including VAT) as evidenced by official notifications issued by NDRC in Jun 2007, Jul.2008 and Jun. 2009 refer to footnote 17 and 18. Furthermore, according to the latest tariff policy issued by NDRC on 20/07/2009 refer to footnote 18, the tariff that will endorsed to new wind projects in Jilin Province should be applied the unified tariff of 0.61RMB/kWh (included VAT).

Therefore, the tariff of wind farms in Jilin province remains stable at 0.61RMB/KWh (including VAT) over the years, and in light of the latest tariff policy, it will be still steady at the same level in the future. Moreover, since the tariff has been signed by project owner and Grid Company at 0.61 RMB/KWh (including VAT), it cannot be changed once contracted. Therefore, a 7.63% increase is highly unrealistic.

Nevertheless, even if the investment analysis in the PDD applies the slightly higher tariff of 0.63 RMB/kWh (including VAT), as mentioned above which was only endorsed to a small-scaled project, the project IRR is calculated at 7.41%, which is still lower than the benchmark, and does not affect the CDM additionality of the project.

After above sensitive analysis, when financial indicators change within reasonable range, the proposed project is not financially feasible without CDM support. Therefore, alternative 1 is not a feasible alternative baseline scenario.

Step 3: Barrier analysis

The proposed project does not adopt barrier analysis.

Step 4: Common practice analysis

According to the Tool for the Demonstration and Assessment of Additionality, projects are a in case they are located in the "same county/region", are of "similar scale", and "take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc". Below is further explanation of how similar projects were identified:

Sub-step 4a: Analyse other activities similar to the proposed project activity
Limiting to wind power projects in Jilin Province
China covers an extremely large area, the investment circumstance, policies and regulations and natural sources of each province are different. The general environment of wind projects in China such as investment climate, tariff policy and wind resource differs for each province. For example, the electricity tariff for different province is much different under the control of National Development and Reform Commission[29] and price index of industrial products differs for each province[30]. Also the difference of wind resources in different area is relatively large[31]. Therefore, common practice analysis is limited to the provincial level. As the Project is located in Jilin Province, the selected geographical area for the project is Jilin province.

Limiting to projects put into operation after 2002
In the end of 2002, a reform on the electric power sector was approved by the State Council[32]. After 2002 the electricity generation and power grid operation are separated into two sectors, and private capital providers were allowed to invest in power plants. The investment climate was quite different compared to the situation before the reform. So wind power projects commissioned after 2002 are chosen to do common practice analysis.

As conclude above, all wind power projects in Jilin Province which are put into operation after 2002 are considered similar projects. And the registered CDM projects and projects under GSP are not included according to EB's guidance.

According to the statistic of installed capacity of wind power in China[33], and UNFCCC website, except the projects under the CDM development, there are no similar projects as the Project in Jilin Province which started operation after 2002[34], which have been analysis and listed in Table 4 above.

Sub-step 4b: Discuss any similar options that are occurring
As already described in the statement above, there are no similar projects in Jilin Province, which are not CDM project activities. Since wind power development in Jilin Province face the same financial barriers as the Project, all the other wind power projects have already successfully been registered or are applying as CDM projects. So it can be seen that the Project is not common practice in Jilin Province.

To summarize, it can be proved that the proposed project activity is additional and not (part of) baseline scenario. Without the CDM revenues, the project activity would not be implemented smoothly. As a result, the reduction of GHG emissions would not be realized. The above additionality analysis provides sufficient evidence that the registration of the CDM revenues can enable the project to overcome the barriers it faces.

B.6. Emission reductions:

[29] http://www.sdpc.gov.cn/zfdj/jggg/dian/t20080813_230724.htm

[30] Data is from *National Bureau of Statistics of China*.

[31] http://www.showchina.org/zgdl/sylm/200701/t104908.htm

[32] http://www.chinapower.com.cn/article/1000/art1000014.asp

[33] *China Wind Farm Capacity Statistic in 2007,* by Shi pengfei, China Wind Energy Association

[34] Relevant evidences are available and have been provided to DOE.

B.6.1. Explanation of methodological choices:

I. Baseline emissions

According to baseline methodology ACM0002 (Version 09), the baseline emissions are the CO_2 emissions from the equivalent electricity suuply in NECPG that are displaced by the Project activity. So the baseline emissions by the Project activity during a given year *y* is obtained from the formula below. According to ACM0002, the baseline emission should be calculated as:

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

Where,

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

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

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

$EF_{grid.CM.y}$ Combined margin CO_2 emission factor for the electricity system in year *y*, calculated using the latest version of the "Tool to calculate the emission factor for an electricity system, Version 02".

Since the Project activity is a newly built wind power plant, the $EG_{baseline}$ is zero, thus the formula transfers to:

$$BE_y = EG_y \times EF_{grid.CM.y} \quad (2)$$

According to *Tool to calculate the emission factor for an electricity system.(Version 02)*, the baseline emission factor(EF_y)is calculated as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) factors according to the following seven steps. OM and BM are calculated by the method of ex-ante, which will be fixed during the first crediting period. Data for calculation are based on official national statistics books: China Energy Statistical Yearbook and China Electric Power Yearbook.

STEP1. Identify the relevant electric system

In accordance with the *Tool to Calculate the Emission Factor for an Electricity System, Version 02*, the project relevant electric system of the proposed project is identified by the delineation of the project electricity system and connected electricity systems published by China's DNA.

Electricity generated by the proposed project will be delivered to the NECPG. According to the *Bulletin on China's Regional Grid Baseline Emission Factors* issued by China's DNA on 30/12/2008[35] , the project electricity system is NECPG, consisting of Heilongjiang Power Grid, Jilin Power Grid, and Liaoning Power Grid. NECPG has no electricity imports from other Grids.

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)

Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.

[35] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/2008/20081230102527637.pdf

Option II: Both grid power plants and off-grid power plants are included in the calculation.

Option I is chosen by project participants for the project, i.e. only grid power plants are included in the calculation.

STEP3. Select a method to determine the operating margin (OM)

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

a Simple OM, or

b Simple adjusted OM, or

c Dispatch data analysis OM, or

d Average OM.

The application of method (c) requires availability of dispatch data. However, the detailed data of dispatch are taken as confidential business information by the grid company and not publicly available. Thus, method (c) cannot be adopted for the Project. Similarly, the data of annual load duration curve required by method (b) also can not be obtained publicly. Therefore, method (b) is also not applicable here.

From 2002 to 2006, the low cost/ must run generation in NECPG account for 5.44%, 4.72%, 6.53% and 8.28%, and 5.25%[10], respectively. Therefore the generation from low cost/must run resources constitute is less than 50% of the total generation, which accords with the defined condition of Option a, but not Option d. Therefore, method (a), simple OM is adopted to calculate the operating margin emission factor of NECPG in this PDD.

This PDD applies *ex ante* option to calculate the simple OM: the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation.

STEP4. Calculate the operating margin emission factor according to the selected method

According to "Tool to calculate the emission factor for an electricity system, version (Version.02)", the simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants / units. It may be calculated:

Option A: Based on the net electricity generation and a CO_2 emission factor of each power unit; or

Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Since the data of each power plant /unit is unavailable, Option A is not applicable to the proposed project. Thus, Option B is used for calculating simple OM emission factor under following conditions for the Project:

[10] *China Electric Power Yearbook 2003 ~ 2007*

(1) Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
(2) Off-grid power plants are not include in the calculation (i.e., Option I has been chosen in Step 2).

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

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{EG_y} \quad (3)$$

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

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

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

$EF_{CO_2,i,y}$: CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ)

EG_y: Net electricity generated and delivered to the grid by all power sources serving the System, not including low-cost / must-run power plants / units, in year y (MWh)

i: All fossil fuel types combusted in power sources in the project electricity system in year y

y: The relevant year as per the data vintage chosen in Step 3

The fuel consumption and the total electricity generation of thermal plants connected to NECPG can be obtained from China Energy Statistical Yearbook and China Electric Power Yearbook of recent 3 years (2005-2007). The $NCV_{i,y}$ can be obtained from China Energy Statistical Yearbook (2007). $EF_{CO_2,i,y}$ and $OXID_i$ of the fuels adopted are obtained from Page1.21 and 1.23 of the default values in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: workbook.

Based on these data, the operating margin emission factor ($EF_{grid,OMsimple,y}$) of NECPG is 1.2561 tCO_2/MWh (refer to Annex 3 for details).

STEP5. Identify the cohort of power units to be included in the build margin

According to "Tool to calculate the emission factor for an electricity system, Version 02", the sample group of power units m used to calculate the build margin consists of either:

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

The option with more annual generation power should be used. In term of NECPG, option two is chosen since it would represent a larger, more representative of annul generation.

In terms of vintage of data, the project participant chose option a for calculation. For the first crediting period, calculate the build margin emission factor *ex-ante* based on the most recent information available on units already built for sample group *m* at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of

submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

STEP6. Calculate the build margin emission factor ($EF_{grid,BM,y}$)

In accordance with "Tool to calculate the emission factor for an electricity system, Version 02",the build margin emissions factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units *m* during the most recent year *y* for which power generation data is available, calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad (4)$$

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

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

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

m : Power units included in the build margin

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

According to the EB' guidance on DNV deviation request "Request for clarification on use of approved methodology AM0005 for several projects in China", the EB accepted the following deviation[36]:

1) Use of capacity additions exceeds 20% of total generation for estimating the build margin emission factor for grid electricity.

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

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

The build margin calculations featured below is derived from the *Bulletin on China's Regional Grid Baseline Emission Factors* issued by China DNA on 30/12/ 2008[37].

Since there is no way to separate the different generation technology capacities as coal, oil, and gas etc from thermal power based on the present statistical data, the following calculating measures will be taken: First, according to the energy statistical data of 2006, determine the weight of CO_2 emissions from solid, liquid, and gas fuel consumption for power generation; then multiply this weight by the respective emission factors based of commercially best technology to calculate the thermal emission factor . Finally, emission factor of thermal power is multiplied by the ratio of thermal power identified within the approximation for the latest 20% installed capacity addition to

[36] http://cdm.unfccc.int/Project/Deviation

[37] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/2008/20081231101111351.pdf

the grid. The result is the BM emission factor of the grid.

Step a. Calculation of weights of CO_2 emissions of solid, liquid and gas fuel in total emissions for power generation

$$\lambda_{Coal} = \frac{\sum_{i \in COAL, j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j}} \quad (5)$$

$$\lambda_{Oil} = \frac{\sum_{i \in OIL, j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j}} \quad (6)$$

$$\lambda_{Gas} = \frac{\sum_{i \in GAS, j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO2,i,j}} \quad (7)$$

where:

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

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

$EF_{CO2,i,j}$ is the CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ), taking into account the carbon content of the fuels (coal, oil and gas) used by province j and the percent oxidation of the fuel in year(s) y;

COAL, OIL and GAS is solid, liquid and gas fuels respectively.

Step b. Calculate emission factor for thermal power of NECPG

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

Where , $EF_{Coal,Adv}$, $EF_{Oil,Adv}$ and $EF_{Gas,Adv}$ respectively refers to the emission factor representing best technology commercially available for fuel of coal, oil or gas fired power plants.

Step c. Calculate BM of the NECPG

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

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

In accordance with the *Bulletin on China's Regional Grid Baseline Emission Factors* issued by China DNA on 30/12/2008[38], a coal-fired power plant with a total installed capacity of 600MW is assumed to be the commercially available best practice technology in terms of efficiency. The estimated coal consumption of such a National Sub-critical Power Station with a capacity of 600MW is 329.94gce/kWh, which corresponds to an efficiency of 37.28% for electricity generation. For gas and oil power plants a 200MW power plant with a specific fuel consumption of 252gce/kWh, which corresponds to an efficiency of 48.81% for electricity generation, is selected as commercially available best practice technology in terms of efficiency. Based on above the data, the build margin emission factor ($EF_{grid,BM,y}$) of the NECPG is 0.8068 tCO_2e/MWh.

As mentioned above, the build margin emission factor of the baseline is calculated ex-ante and will

[38] http:// cdm.ccchina.gov.cn/WebSite/CDM/UpFile/2008/20081231101111351.pdf

not be renewed in the first crediting period.

STEP7: Calculate the combined margin emissions factor ($EF_{grid,CM,y}$)

Combined Margin emission factor ($EF_{grid,CM,y}$) is calculated as the weighted average of the operating margin emission factor ($EF_{grid,OM,y}$) and the build margin emission factor ($EF_{grid,BM,y}$), where the weights ω_{OM} and ω_{BM} ,by default, are 0.75 and 0.25 in the first crediting period, and $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ are calculated as described above and are expressed in tCO_2/MWh.

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

$EF_{grid,CM,y}$ =0.75*1.2561+0.25*0.8068=1.143775 (tCO_2e/MWh)

II. Project emissions (PE_y)

The proposed project is a wind power plant and no backup power generation involved in the Project activity. In case there is a emergency situation which electricity will be imported from the NECPG. Thus, according to ACM0002, PE_y =0tCO_2e.

III. Project leakage (LE_y)

No leakage is identified as the project is a wind project, and any electricity usage is taken into account in the net electricity generation from the proposed project, i.e. LE_y =0 tCO_2e.

IV. Emission reductions (ER_y)

The project activity will generate GHG emission reductions by avoiding CO_2 emissions from electricity generation by fossil fuel power plants of NECPG. The emission reduction (ER_y) is calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

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

Data / Parameter:	NCV_i
Data unit:	TJ per mass or volume unit of fuel i
Description:	The net calorific value (energy content) per mass or volume unit of a fuel i
Source of data used:	China Energy Statistical Yearbook 2007
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official data
Any comment:	

Data / Parameter:	$FC_{i,y}$
Data unit:	t or m^3
Description:	Amount of fossil fuel type i consumed in the project electricity system in

	year y
Source of data used:	China Energy Statistical Yearbook 2005-2007
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official data
Any comment:	--

Data / Parameter:	$EF_{CO_2,i,y}$
Data unit:	t CO_2/GJ
Description:	CO_2 emission factor of fossil fuel i in year y
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC world-wide default values are adopted.
Any comment:	

Data / Parameter:	Electricity Generation
Data unit:	MWh/year
Description:	The total power generation and power generated by low-cost/must run power plants within NECPG in year 2002, 2003, 2004,2005 and 2006,
Source of data used:	China Electric Power Yearbook,2003-2007
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official data
Any comment:	--

Data / Parameter:	Electricity self-consumption ratio
Data unit:	%
Description:	The auxiliary electricity consumption rate of the power plants in NECPG
Source of data used:	China Electric Power Yearbook,2005-2007
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official data
Any comment:	--

Data / Parameter:	$\eta_{best,i}$
Data unit:	%
Description:	The efficiency of best technology commercially available for coal-, gas- and oil-fired power in China.
Source of data used:	The bulletin of China Regional Grid Emission Factor issued by China DNA on 30/12/2008.
Value applied:	The efficiency of best technology commercially available for coal is 37.28%, for gas is 48.81%; and for oil is 48.81%
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official data

Data / Parameter:	Installed capacity
Data unit:	MW
Description:	Installed capacity of power plant category i in NECPG from 2000 to 2006
Source of data used:	China Electricity Yearbook 2001~2007
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official data

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

I. Estimated baseline emissions

According to the Feasibility Study Report, the annual electricity output is estimated to be 101,696 MWh.The baseline emission factor is 1.143775 tCO_2e/ MWh and the annual baseline emission of the project is 116,317 tCO_2e as calculated below.

$$BE_y = EG_y * EF_y = 101,696*1.143775 = 116,317\ tCO_2e$$

II. Estimated project emissions

The proposed project is a wind power plant that the project emissions should not be taken into account according to ACM0002, i.e.

PE_y =0tCO_2e

III. Calculate the project leakage

According to ACM0002, the Project needn't consider leakages, i.e. L_y =0 tCO_2e.

IV. Calculate the emission reductions

The project activity will generate GHG emission reductions by avoiding CO_2 emissions from electricity generation by fossil fuel power plants. The emission reduction (ER_y) is calculated as follows:

$ER_y = BE_y - PE_y - L_y$ =116,317-0-0=116,317 tCO_2e

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

Year	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
01/05/2010~31/12/2010	0	77,545	0	77,545
2011	0	116,317	0	116,317
2012	0	116,317	0	116,317
2013	0	116,317	0	116,317
2014	0	116,317	0	116,317
2015	0	116,317	0	116,317
2016	0	116,317	0	116,317
01/01/2017~30/04/2017	0	38,772	0	38,772
Total (tonnes of CO_2e)	0	814,219	0	814,219

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

B.7.1. Data and parameters monitored:

Data / Parameter:	$EG_{out, y}$
Data unit:	MWh
Description:	Annual electricity export to NECPG by the Project in year y.
Source of data to be used:	Monitored by the energy meter
Value of data applied for the purpose of calculating expected emission reductions in section B.5	101,696
Description of measurement methods and procedures to be applied:	The data will be continuously measured by bidirectional energy meter and recorded monthly. The data will be kept during the crediting period and two years after.
QA/QC procedures to be applied:	The accuracy of the energy meter is 0.5s or above. Sales receipts will be used for double check to ensure the consistency. The energy meter will be calibrated according to the industry standard by a qualified organization to ensure accuracy.
Any comment:	

Data / Parameter:	$EG_{in, y}$
Data unit:	MWh
Description:	Annual electricity imports from NECPG by the Project for operation.
Source of data to be used:	Monitored by the energy meter
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0
Description of measurement methods and procedures to be applied:	The data will be continuously measured by bidirectional energy meter and recorded monthly.The data will be kept during the crediting period and two years after.
QA/QC procedures to be applied:	The accuracy of the energy meter is 0.5s or above. Sales receipts will be used for double check to ensure the consistency. The energy meter will be calibrated according to the industry standard by a qualified organization to ensure accuracy.
Any comment:	

Data / Parameter:	$EG_{aux, y}$
Data unit:	MWh
Description:	Auxiliary electricity imported from NECPG through backup line in emergency situation during operation period in year y.
Source of data to be used:	Monitored by the energy meter
Value of data applied	0

for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	In case of emergency, the back up line will start up to let the auxiliary electricity imported from the grid. The data will be continuously measured by energy meter and record monthly. The data will be kept during the crediting period and two years after.
QA/QC procedures to be applied:	The accuracy of the energy meter is 0.5s or above. The energy meter will be calibrated according to the industry standard by a qualified organization to ensure accuracy.
Any comment:	

B.7.2. Description of the monitoring plan:

The project owner is the user of this monitoring plan and will be responsible for it. For the purpose of the integrated, continuous, transparent and accurate monitoring of the Project and the precise calculation of emission reductions during the crediting period, based on the monitoring methodology and the actual conditions of the Project, the monitoring plan is designed as follow:

1. Data to be monitored

As emission factor of the Project is determined ex-ante, the main data to be monitored includes electricity exports to the grid (NECPG) by the Project ($EG_{out,y}$) and the electricity imports from the grid via main line by the Project ($EG_{in,y}$) for operation, and auxiliary electricity imported from the grid through back up line in case of emergency ($EG_{aux,y}$).

Therefore, the net electricity output of the Project is calculated as the difference among $EG_{out,y}$, $EG_{in,y}$ and $EG_{aux,y}$ ($EG_{out,y} - EG_{in,y} - EG_{aux,y}$).

2. Operational and management structure for monitoring

The monitoring of the emission reductions will be carried out according to Figure 4 below.

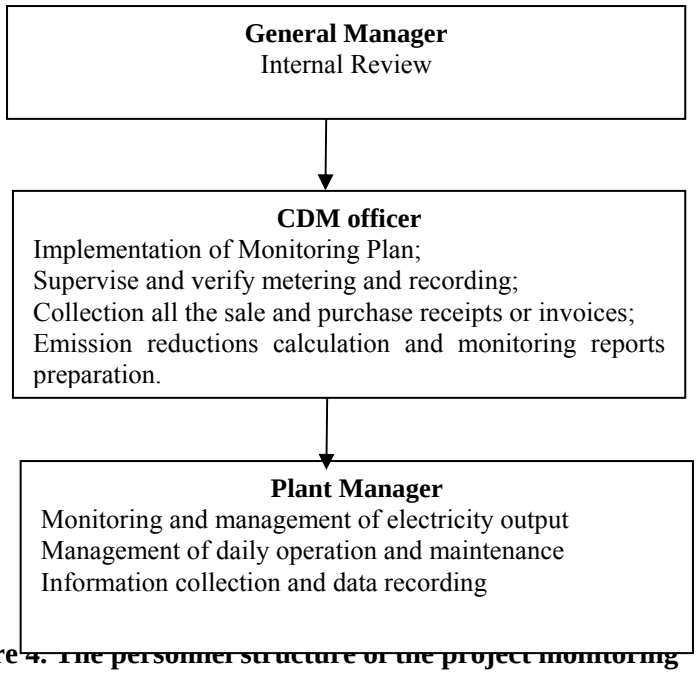

Figure 4. The personnel structure of the project monitoring

Plant manager of wind farm is responsible to record and collect the information and data required by the Monitoring Plan. The required information and data will be documented and sent to the CDM officer monthly. The CDM officer works out the monitoring plan, charges of its implementation and reports to the General Manager of the company. The General Manager of the company will make the confirmations on monitoring calculation data and reports.

The project owner will entrust the professional engineers and experts to train all the relative staffs before operation of generators. The training contains CDM knowledge, operational regulations, quality control (QC) standard flow, data monitoring requirements and data management regulations etc.

3. Monitoring energy meters and installation:

The electricity exports ($EG_{out,y}$) to and imports ($EG_{in,y}$) from the grid via main line by the Project will be continuously monitored through the main energy meter installed at the project site. Also, a backup energy meter will be installed beside the main energy meter for double checking in case of the erroneous of main energy meter occurred. Both main energy meter and backup energy meter have bidirectional function that can read the electricity exports ($EG_{out,y}$) to and imports ($EG_{in,y}$) from the grid, and precision of 0.5s or above.

In case of emergency, the back up line will start up to let the auxiliary electricity imported from the grid ($EG_{aux,y}$). The data will be monitored by the auxiliary energy meter with precision of 0.5s or above installed at the backup line in the project site.

All the above energy meters are managed and operated by the grid company, and will be installed in accordance with Technology & Management Regulations for Power Metering Devices, the accuracy of the energy meters must meet the national standard. Electricity data can be cross-checked against relevant electricity sale receipts and/or records from the grid. The location of energy meters is shown in Figure 5 below.

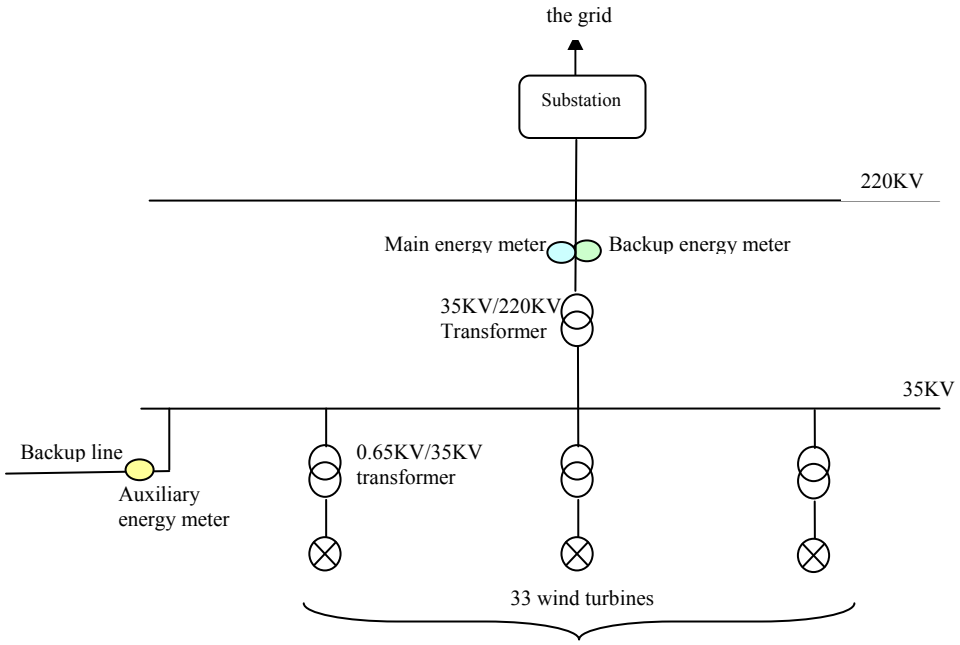

Figure 5 Sketch for the location of the energy meters

4. Data monitoring

The electricity exported to and imported from the grid via main line ($EG_{out,y}$ and $EG_{in,y}$) will be recorded by the main energy meter owned by the grid company, the monitoring steps are as follows:

(1) The Grid Company will measure the electricity data of main energy meter continuously and record monthly, together with the project owner.
(2) The Grid Company provides the project owner with the monthly electricity export data and electricity import record;
(3) The project owner provides the Grid Company with sales receipts and preserves the copies of the sales receipts.
(4) The project owner provides DOE with readings record of the energy meter and copies of sales receipts.

In case of the back up line startup under emergency, the auxiliary energy meter installed in the project site for backup line will be used to continuously measure the electricity imported from the backup line ($EG_{aux,y}$). The project owner and/or the grid company will read and record the data monthly, and then the project owner will provide the grid company with receipts and preserve the copies.

The electricity exported to and imported from the grid via main line ($EG_{out,y}$ and $EG_{in,y}$), and auxiliary electricity imported from the backup line ($EG_{aux,y}$) (if any) will be used in the emission reduction calculation.

5. Quality Assurance and Quality Control

The calibration of meters conducted by qualified organization must comply with national standard and sectoral regulations to ensure the accuracy. The calibration records must be archived together with other monitoring records.

If any previous months reading of the main meter are inaccurate by more than the allowable error, or otherwise functioned improperly, the net energy output shall be determined by:

(a) first, by reading backup energy meter installed beside the main energy meter, unless a test by either party reveals it is inaccurate;
(b) if the backup energy meter is not within acceptable limits of accuracy or is otherwise performing improperly the project owner and grid company shall jointly prepare an estimate of the correct reading;
(c) if the Grid Company and the project owner fail to agree then the matter will be referred for arbitration according to agreed procedures.

If any previous reading of the auxiliary energy meter are inaccurate by more than the allowable error, or otherwise functioned improperly, the project owner and grid company shall jointly prepare an estimate of the correct reading of the auxiliary electricity imported form the grid. If the grid company and the project owner fail to agree then the matter will be referred for arbitration according to agreed procedures.

If any emergency occurred, after handling of the emergency the project owner must prepare a report regarding the emergency to explain to DOE that the handling method is reasonable.

6. Data Management System

All monitoring data and records will be archived in electronic document and paper document. The project owners will also keep copies of sales receipts and prepare a monitoring report at the time of verification, which includes the net electricity generation, the calibration records, the emission reductions calculation and energy meters' corrective action records.

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

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 completion of the baseline methodology is 11/12/2009
The persons and entity completing the application of the baseline and monitoring methodology are:

Ms. Shunrong LIN, Carbon Asset Management Sweden AB
Email: linnet2001@hotmail.com
Tel: +86-10-65305930

Carbon Asset Management Sweden AB is the project participant.

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:

04/12/2008

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

20 years.

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

C.2.1. Renewable crediting period

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

01/05/2010 or the registration date, whichever is later.

C.2.1.2. Length of the first crediting period:

7 years 0 months

C.2.2. Fixed crediting period:

n/a

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:

According to China Environmental Protection Law, the Environmental Impact Assessment (EIA) must be completed before the development and construction of the proposed project. Thus, the project owner authorized a third party to carry out the EIA report. The EIA report was approved by the Environmental Protection Bureau of Jilin Province in 09/05/2008, indicating that the project meets all the national environmental protection regulations. The analysis and measures to be taken to mitigate the impacts are demonstrated in the following:

Dust and Air Quality
The air impact during the construction period mainly comes from flying dust produced by excavating land and transportation vehicles, and some exhaust discharge from using and moving construction machinery. The project owner will take the effective prevention measures, such as timely sprinkler suppression dust, stamping sacking on the construction site, and other construction work surfaces. All these measures can be effective in reducing the impact on the environment. The construction of projects is small-scale, relatively simple and has a short construction period, the excavation, transport dust will also spend a shorter time, the short-term construction period, and a temporary, partial impact on the region's air quality does not have a greater influence.

Waste water and sewage
The waste water and sewage from daily office work of employees is negligible, all the wastewater and sewage will be firstly processed by using sedimentation pond and septic tank, then applied to the farmland. No waste water or sewage will be discarded.

Noise
The noise pollution mainly comes from transportation and the construction equipment during construction period and aerodynamic interaction between the wind and turbine blades during operation period. Since the Project site is far away from residential area, the noise control can meet the national standard. Thus impacts on surrounding environment are not significant.

Solid Waste
The amount of soil backfilled is equal to the soil excavated, thus soil erosion will not occur. Therefore, during construction period, solid waste is mainly from the life sludge of workers in construction. Garbage will be transported to the nearby garbage dump properly. The solid waste of wind farm operation period is mainly the living garbage of operation and maintenance personnel and management staff. The waste will be transported to the garbage dump for treatment after being collected.

Radiation of electromagnetism
Impact of radiation of electromagnetism arising from substation equipment can meet the limitation of the national standard, and is considered insignificant. Also, it is unlikely bring negative impacts on residents' health because of the distant between wind farm and residential area.

Conclusion
Wind Farm building can alleviate the pollution of the surrounding environment from the construction of coal-fired power plant, have the role of use of renewable energy, conservation of fossil energy, reducing pollution, protecting the ecological environment. Therefore, from the view of environmental protection, the project is practicable.

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:

According to the results of EIA and the approval issued by the Environmental Protection Bureau of Jilin Province, the impacts on the environment are not significant.

SECTION E. Stakeholders' comments

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

1. Local Stakeholder Consultation (LSC) Meeting

As the Project applies for both CDM and Gold Standard, the project owner organized an initial LSC meeting which aimed to invite stakeholders' comments and investigate the impacts of the Project on local ecological environment according the GS rules. An advertisement was published in local newspaper "Baicheng Daily" on 26/12/2008, and invitation poster was posted in local public area on 25/12/2008 in Zhenlai County to call for local stakeholders' attendance. Meanwhile, the project owner also invited local authorities and NGOs to participate in the meeting by email and call. The meeting was held on 05/01/2009 by the project owner in the project office building, Zhenlai County, Baicheng City, Jilin Province. Total 21 stakeholder representatives attended the meeting as follows:

Attendees Type	Numbers
Local villagers	15
Officer from Environmental Protection Bureau of Zhenlai County	1
Officer from Development and Reform Bureau of Zhenlai County	1
Representatives of the project owner	4
Total	21

In the meeting, the representatives of the project owner gave a brief introduction regarding the meeting purpose and project information. Then, the officers from the Development and Reform Bureau and Environmental Protection Bureau of Zhenlai County of Zhenlai County evaluated the important roles of the Project activity on local wind resources utilization and clean energy development, and impacts on local environment, economy and sustainable development. After that, all villagers attending the meeting freely discussed the project's impacts on their daily life and environment.

Then, a questionnaire was hand out to each attendee to let them consider the project's impacts on the sustainable development regarding three categories: environment, social development and technological & economic development, and give the score: positive impact, no impact, or negative impact. The questionnaires had 100% return rate (21 questionnaires returned out of 21).

In the end, all attendees were asked to fill in evaluation forms which aim to summarize their general attitudes' toward the meeting and the Project. There questions are contained in the form contain in the purpose of evaluation including:

- What do think of the stakeholder meeting?
- What possible positive impacts will the project activity bring to the local inhabitants on following aspects?
    - Sustainable development
    - Eco-evironment development
    - Economic development and job opportunity
- What are the possible negative impacts?

The evaluation forms had 100% return rate (21 questionnaires returned out of 21).

Outcomes of the LSC meeting are summarized in Section E.2 beblow.

2. Questionnaire Investigation
To further invite the comments of local stakeholders on the project activity as CDM project, a questionnaire investigation was conducted in March, 2009 by the project owner. The surveyed stakeholders are from local villages around the Project site, with different age, gender, education level and occupation (see Table 6 below). 40 questionnaires were distributed, and all of them were recovered with 100% recovery rate.

Table 6 Statistic information of the stakeholders participating in the survey

Item	Sub-item	Number	Percentage
Gender	Male	31	77.5%
	Female	9	22.5%
Age	18-30	14	35.0%
	31-50	24	60.0%
	>51	2	5.0%
Education level	Elementary school	4	10.0%
	Junior high school	13	32.5%
	Senior high school	17	42.5%
	University or above	6	15.0%
Occupation	Farmers	34	85.0%
	Officials	2	5.0%
	Worker	1	2.5%
	Student	3	7.5%
	Others	0	0.0%

Main questions in the questionnaire are shown in below:
1. Do you know this Project?
2. How do you think the impact on local economic development brought by the Project implementation?
3. How do you think the impact on local ecological environment brought by the Project implementation?
4. Do you think the Project construction will bring noise pollution to your life?
5. Do you think the Project location is reasonable?
6. How do you think the impact on livelihood of local residents brought by the Project implementation?
7. Will the Project increase the working opportunities for local residents?
8. Will the Project increase the income of local residents?
9. Will the Project bring improvement to local infrastructure construction?
10. What is your opinion toward to the Project?
11. What other comments and suggestions regarding the Project?

E.2. Summary of the comments received:

1. The main topic and result of the meeting are summarized as follows.

(1) The official delegates of Development and Reform Bureau and Environmental Protection Bureau of Zhenlai County confirmed the social and environmental benefits of the project. The project can make good use of local wind resource that is a kind of clean energy to generate electricity, and thus does not result in pollutants emission and has no negative impact on local environment and ecology. Furthermore, the project is benefit to local economic development,

and provides job opportunities to local people, increases their revenues, and improves living standard of local people. Therefore, the government supports the project implementation.

(2) During the free discussion session, all villagers attending the meeting expressed their attitude towards to the Project. They believed the Project helped to increase household revenues and improve their living standard since it provided them job opportunities a road was built due to the project activity which improved local transportation facility. Besides, since no farmlands occupied by the project activity, they believed the Project did not negatively impact their daily life. Also, all of them thought as a clean energy project, the Project has no negative impact on local environment and ecology.

(3) The outcome of the questionnaire survey regarding the project's impacts on the sustainable development as following table in details:

	Positive Impact	No impact	Negative Impact
Air quality	100%	0%	0%
Water quality and quantity	90%	10%	0%
Soil condition	90%	10%	0%
Other pollutants	0%	0%	0%
Biodiversity	81%	19%	0%
Quality of employment	100%	0%	0%
Livelihood of the poor	81%	19%	0%
Access to affordable and clean energy services	100%	0%	0%
Human and institutional capacity	90%	10%	0%
Quantitative employment and income generation	95%	5%	0%
Balance of payments and investment	95%	5%	0%
Technology transfer and technological self-reliance	76%	24%	0%

Sine proper mitigation measures adopted by the project and supervised by local authorities, all the stakeholders attending the meeting believed that the implementation of the project will not result in any negative impact.

(4) The outcome of the stakeholders' evaluation on the meeting and the Project in general
As evaluated by the stakeholders attending the meeting, the meeting was successfully and well organized. They believed the Project contributed to environmental protection, sustainable development, work opportunities provision to local people, and local economy development. No negative effects due to the project were highlighted by all attendees.

2. The results of the questionnaire survey taken in March 2009 are summarized as follows.

- 85% of the respondents know the Project well; the rest just know about the Project generally.
- 100% of the respondents agree that the Project will promote the local economic development.
- 60% think that the Project has good impact on local ecological environment; the rest believe that it has no impacts on environment.
- 82.5% think that the Project will not bring noise pollution to their life, the rest have no idea.

- 95% think that the Project is located reasonably; the rest have no idea.
- 77.5% agree that the Project will affect their life positively, the rest believe that the Project has no effects on their life.
- 100% believe the Project increase the working opportunities for local residents.
- 90% think the Project will increase income of local residents, the rest think there is no impact.
- 80% think the Project will improve the local infrastructure construction, the rest think there is no impact.
- 100% support the Project implementation.

The background information of interviewee is summarized in the following table:

Conclusion

The survey shows that the Project receives strong support from local people. The consensus is that the Project can bring many positive impacts to the local economy and livelihoods of local people with increased job opportunities, increased income and stimulated economy. No other comments and suggestions were received.

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

Both the local resident and government gave strong support to the construction of the Project. According to comments from the stakeholders, it is not necessary to adjust the design, construction or operation of the proposed project.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Jilin Huaneng Renewable Energy Co., Ltd
Street/P.O.Box:	NO.1100, Tonghua Road, Nanguan District
Building:	
City:	Changchun
State/Region:	Jilin Province
Postfix/ZIP:	130000
Country:	People's Republic of China
Telephone:	+86 0431-85792773
FAX:	+86 0431-88955600
E-Mail:	jaden.lu@hotmail.com
Represented by:	
Title:	
Salutation:	Mr.
Last Name:	Wang
Middle Name:	
First Name:	Lu
Department:	
Mobile:	
Direct FAX:	+86 0431-88955600
Direct tel:	+86 0431-85792773
Personal E-Mail:	jaden.lu@hotmail.com

Organization:	Carbon Asset Management Sweden AB
Street/P.O.Box:	C/o Tricorona AB, Box 704 26
Building:	-
City:	Stockholm
State/Region:	-
Postfix/ZIP:	SE-107 25
Country:	Sweden
Telephone:	+46 8 506 885 51
FAX:	+46 8 34 60 80
E-Mail:	nvz@tricorona.se
URL:	www.tricorona.se
Represented by:	Niels von Zweigbergk
Title:	President & CEO
Salutation:	Mr.
Last Name:	von Zweigbergk
Middle Name:	-
First Name:	Niels
Department:	-
Mobile:	+46 708 59 35 00
Direct FAX:	+46 8 34 60 80
Direct tel:	+46 8 506 885 51
Personal E-Mail:	nvz@tricorona.se

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding from Annex I parties for the proposed project.

Annex 3

BASELINE INFORMATION

Table 1 Low calorific values, CO_2 emission factors and oxidation factors of fuels

Fuel	Low Calorific Value (kJ/kg or kJ/m^3)	Emission Factor (tC/TJ)	Oxidation Factor
Raw coal	20908	25.80	1
Clean coal	26344	25.80	1
Other washed coal	8363	25.80	1
Moulded coke	20908	26.60	1
Coke	28435	29.20	1
Crude oil	41816	20.00	1
gasoline	43070	18.90	1
kerosene	43070	19.60	1
Diesel oil	42652	20.20	1
Fuel oil	41816	21.10	1
Others oil products	38369	20.00	1
Other coke products	28435	25.80	1
Natural gas	38931	15.30	1
Coke oven gas	16726	12.10	1
Other coal gas	5227	12.10	1
LPG	50179	17.20	1
Refinery dry gas	46055	15.70	1

Data Source:
The net calorific values are quoted from <China Energy Statistical Yearbook 2007>.

Table 2 Fuel consumption and emission of Northeast China Grid in 2004

Fuel type	unit	Liaoning	Jilin	Heilong jiang	Fuel Consumption	Emission factor	average low Caloric value	CO_2 emission (tCO_2e)
						(tc/TJ)	(MJ/t,km3)	H=G*D*E*F*44/12/10000 (Quality unit)
		A	B	C	D=A+B+C	E	G	H=G*D*E*F*44/12/1000 (Volume Unit)
Raw coal	10^4tonne	4144.2	2310.9	3084.8	9539.9	25.8	20908	188,689,377
Clean coal	10^4tonne	84.75	1.09	4.88	90.72	25.8	26344	2,260,872
Other washed coal	10^4tonne	577.67	14.26	61	652.93	25.8	8363	5,165,589
Coke	10^4tonne				0	29.2	28435	0
Coke oven gas	10^8m^3	4.83	2.91		7.74	12.1	16726	574,367
Other coal gas	10^8m^3	57.33	4.19		61.52	12.1	5227	1,426,677
Crude oil	10^4tonne				0	20	41816	0
Gasoline	10^4tonne					18.9	43070	0
Diesel oil	10^4tonne	2.04	1.16	0.24	3.44	20.2	42652	108,673
Fuel oil	10^4tonne	12.81	1.78	2.86	17.45	21.1	41816	564,536
LPG	10^4tonne	2.19			2.19	17.2	50179	69,305
Refinery gas	10^8m^3	9.79		1.14	10.93	15.7	46055	289,780
Natural gas	10^4tonne		0.03	2.53	2.56	15.3	38931	559,111
Other petroleum product	10^4tonne				0	20	38369	0
Other coke product	10^4tonne				0	25.8	28435	0
Other energy	10^4tonne tce	26.97	5.07		32.04	0	0	0
Total							Subtotal	199,708,287

Data source: China Energy Statistic Yearbook 2005

Table3 The fossil-fired electricity generation of Northeast China Grid in 2004

Province	Electricity Generation (10^8KWh)	Auxiliary Power Ratio (%)	Supplied Electricity (MWh)
Liaoning	845.43	7.21	78,447,450
Jilin	332.42	7.68	30,689,014
Heilongjiang	534.82	7.84	49,289,011
Total			158,425,475

Data source: China Electric Power Yearbook 2005

Total emission (tCO_2e): 199,708,287
Total electricity supply (MWh): 158,425,475
$EF_{(2004)}$: 1.260582 tCO_2e/ MWh

Table4 Fuel consumption and emission of Northeast China Grid in 2005

Fuel type	unit	Liaoning	Jilin	Heilong jiang	Fuel Consumption	Emission factor	average low Caloric value	CO_2 emission (tCO_2e)
						(tc/TJ)	(MJ/t,km3)	H=G*D*E*F*44/12/10000 (Quality unit)
		A	B	C	D=A+B+C	E	G	H=G*D*E*F*44/12/1000 (Volume Unit)
Raw coal	10^4tonne	4305.41	2446.13	3383.21	10134.75	25.8	20908	200,454,896
Clean coal	10^4tonne				0	25.8	26344	0
Other washed coal	10^4tonne	524.74	19.26	24.16	568.16	25.8	8363	4,494,940
Coke	10^4tonne				0	29.2	28435	0
Coke oven gas	10^8m^3	1.03	3.57	0.68	5.28	12.1	16726	391,817
Other coal gas	10^8m^3	12.62	8.37		20.99	12.1	5227	486,768
Crude oil	10^4tonne	1.16			1.16	20	41816	35,571
gasoline	10^4tonne				0	18.9	43070	0
Diesel oil	10^4tonne	1.18	1.48	0.57	3.23	20.2	42652	102,039
Fuel oil	10^4tonne	9.32	2.46	1.55	13.33	21.1	41816	431,247
LPG	10^4tonne	0.12			0.12	17.2	50179	3,798
Refinery gas	10^8m^3	5.48		1.32	6.8	15.7	46055	180,284
Natural gas	10^4tonne		0.84	2.24	3.08	15.3	38931	672,681
Other petroleum product	10^4tonne				0	20	38369	0
Other coke product	10^4tonne				0	25.8	28435	0
Other energy	10^4tonne tce	16.18			16.18	0	0	0
Total							Subtotal	207,254,040

Data source: China Energy Statistic Yearbook 2006

Table5 The fossil-fired electricity generation of Northeast China Grid in 2005

Province	Electricity Generation (10^8KWh)	Auxiliary Power Ratio (%)	Supplied Electricity (MWh)
Liaoning	836.97	7.03	77,813,101
Jilin	352.94	6.59	32,968,125
Heilongjiang	580	7.96	53,383,200
Total			164,164,426

Data source: China Electric Power Yearbook 2006

Total emission (tCO_2e): 207,254,040
Total electricity supply (MWh): 164,164,426
$EF_{(2005)}$: 1.262478 tCO_2e/ MWh

Table6 Fuel consumption and emission of Northeast China Grid in 2006

Fuel type	unit	Liaoning	Jilin	Heilongjiang	Fuel Consumption	Emission factor	average low Caloric value	CO_2 emission (tCO_2e)
						(tc/TJ)	(MJ/t,km3)	H=G*D*E*F*44/12/10000 (Quality unit)
		A	B	C	D=A+B+C	E	G	H=G*D*E*F*44/12/1000 (Volume Unit)
Raw coal	10^4tonne	4681.99	2738.24	3698.29	11118.52	25.8	20908	219,912,851
Clean coal	10^4tonne	0.03			0.03	25.8	26344	748
Other washed coal	10^4tonne	674.74	17.83	96	788.57	25.8	8363	6,238,691
Coke	10^4tonne	3.32			3.32	29.2	28435	101,075
Coke oven gas	10^8m^3	2.68	0.16	1.44	4.28	12.1	16726	317,609
Other coal gas	10^8m^3	55.26	1.43		56.69	12.1	5227	1,314,667
Crude oil	10^4tonne	0.49			0.49	20	41816	15,026
gasoline	10^4tonne				0	18.9	43070	0
Diesel oil	10^4tonne	0.75	0.39	0.3	1.44	20.2	42652	45,491
Fuel oil	10^4tonne	11.73	0.45	1.44	13.62	21.1	41816	440,629
LPG	10^4tonne				0	17.2	50179	0
Refinery gas	10^8m^3	8.55		4.27	12.82	15.7	46055	339,888
Natural gas	10^4tonne		0.19	2.1	2.29	15.3	38931	500,143
Other petroleum product	10^4tonne				0	20	38369	0
Other coke product	10^4tonne				0	25.8	28435	0
Other energy	10^4tonne tce	12.16	17.6	82.77	112.53	0	0	0
Total							Subtotal	229,226,818

China Energy Statistic Yearbook 2007

Table7 The fossil-fired electricity generation of Northeast China Grid in 2006

Province	Electricity Generation (10^8KWh)	Auxiliary Power Ratio (%)	Supplied Electricity (MWh)
Liaoning	962.82	6.62	89,908,132
Jilin	385.76	6.78	35,960,547
Heilongjiang	629.64	7.85	58,021,326
Total			183,890,005

Data source: China Electric Power Yearbook 2007

Total emission (tCO_2e): 229,226,818
Total electricity supply (MWh): 183,890,005
EF (2006): 1.246543 tCO2e/ MWh

The Simple OM emission factor ($EF_{grid,OM,y}$): 1.2561 tCO2e/ MWh

Table 8 Percentages of CO_2 emissions from the coal-fired, gas-fired and oil-fired power plants in total fuel-fired CO_2 emissions

Fuel type	unit	Liaoning	Jilin	Heilongjiang	Total	average low Caloric value (MJ/t,km^3,tce)	Carbon Possession (tc/TJ)	CO_2 emission (tCO_2e)
		A	B	C	D=A+B+C	E	F	H=G*D*E*F*44/12/100
Raw coal	10^4tonne	4681.99	2738.24	3698.29	11118.52	20908	25.8	219,912,851
Clean coal	10^4tonne	0.03			0.03	26344	25.8	748
Other washed coal	10^4tonne	674.74	17.83	96.00	788.57	8363	25.8	6,238,691
Moulded coke	10^4tonne				0.00	20908	26.6	0
Coke	10^4tonne	3.32			3.32	28435	29.2	101,075
								226,253,365
Crude oil	10^4tonne	0.49			0.49	41816	20.0	15,026
gasoline	10^4tonne				0.00	43070	18.9	0
kerosene	10^4tonne				0.00	43070	19.6	0
Diesel oil	10^4tonne	0.75	0.39	0.30	1.44	42652	20.2	45,491
Fuel oil	10^4tonne	11.73	0.45	1.44	13.62	41816	21.1	440,629
Other petrol product	10^4tonne				0.00	38369	20.0	0
Other coke product	10^4tonne				0.00	28435	25.8	0
								501,146
Natural gas	10^8m^3		1.90	21.00	22.90	38931	15.3	500,143
Coke oven gas	10^8m^3	26.80	1.60	14.40	42.80	16726	12.1	317,609
Other coal gas	10^8m^3	552.60	14.30		566.90	5227	12.1	1,314,667
LPG	10^4tonne				0.00	50179	17.2	0
Refinery dry gas	10^4tonne	8.55		4.27	12.82	46055	15.7	339,888
								2,472,307
Total								229,226,818

Data source: China Energy Statistic Yearbook 2007

According to the data in the table above, $\lambda_{coal,y}$=98.70%,$\lambda_{Oil,y}$ =0.22%,$\lambda_{Gas,y}$= 1.08%(λ is the ratio of CO_2 emission by burning coal, oil, gas to the total emission).

Table 9 Emission Factor of best advanced commercial power technologies

	variable	Power generation efficiency	Emission factor	oxidation	Emission factor
		A	B	C	D=3.6/A/1000*B*C*44/12
Coal-fire power plant	$EF_{coal,adv,y}$	37.28%	25.8	1	0.9135
Gas-fired power plant	$EF_{gas,adv,y}$	48.81%	15.3	1	0.4138
Oil-fired power plant	$EF_{oil,adv,y}$	48.81%	21.1	1	0.5706

According to Table 8, $EF_{Thermal} = \lambda_{coal} \times EF_{coal,adv} + \lambda_{oil} \times EF_{oil,adv} + \lambda_{gas} \times EF_{gas,adv}$ **= 0.9074 tCO_2e/MWh**

Table 10: The installed capacity of Northeast China Power Gird in 2006

Installed capacity	Unit	Liaoning	Jilin	Heilongjiang	Total
Thermal	MW	16721	7039	12456	36216
Hydro	MW	1401	3872	853	6126
Nuclear	MW	0	0	0	0
Wind and other	MW	216	221	115	552
Total	MW	18338	11132	13424	42894

Data source: China Electric Power Yearbook<2007>

Table 11: The installed capacity of Northeast China Power Gird in 2000

Installed capacity	Unit	Liaoning	Jilin	Heilongjiang	Total
Thermal	MW	13937.9	4924.7	10069.9	28932.5
Hydro	MW	1248.5	3536.7	814.8	5600
Nuclear	MW	0	0	0	0
Wind and other	MW	43.9	0	0	43.9
Total	MW	15230.3	8461.4	10884.7	34576.4

Data source: China Electric Power Yearbook<2001>

Table 12: The installed capacity of Northeast China Power Gird in 1999

Installed capacity	Unit	Liaoning	Jilin	Heilongjiang	Total
Thermal	MW	12425.7	4583.1	10128.1	27136.9
Hydro	MW	1240	3508.2	774.5	5522.7
Nuclear	MW	0	0	0	0
Wind and other	MW	22.9	0	0	22.9
Total	MW	13688.6	8091.3	10902.6	32682.5

Data source: China Electric Power Yearbook<2000>

Table 13: BM emission factor of Northeast China Power Grid

	Installed capacity in 1999	Installed capacity in 2000	Installed capacity in 2006	Newly installed capacity addition	Percentage to newly-added capacity
	A	B	C	D=C-B	E
Thermal（MW）	27136.9	28932.5	36216	9079.1	88.91%
Hydro（MW）	5522.7	5600	6126	603.3	5.91%
Nuclear（MW）	0	0	0	0	0.00%
Wind（MW）	22.9	43.9	552	529.1	5.18%
Total（MW）	32682.5	34576.4	42894	10211.5	100.00%
Percentage of newly installed capacity to 2006	76.19%	80.61%	100.00%		

$EF_{grid,BM,y}$= 0.9074×88.91% = 0.8068 tCO_2/MWh

Annex 4

Monitoring Information

No further information on the monitoring information.