



Voluntary Carbon Standard
Project Description Template

19 November 2007

***[Date of the VCS PD]
28 September 2010***



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

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**SECTION A. General description of project activity****A.1 Title of the project activity:**

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Jilin Da'an Dagangzi Wind Power Project Phase II

Version 5.0

18/02/2010

Revision history

Version Number	Date	Description and reason of revision
01	24/04/08	Initial Adoption
02	25/09/08	PDD updated based on validation findings
03	13/11/08	PDD updated based on findings from DOE certification body
04	17/03/09	PDD updated based on DOE new findings
04.1	30/09/09	PDD revised in response to Request for Review
05	18/02/2010	PDD updated to include additional information requested by EB after corrections at EB52

A.2. Description of the project activity:

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The Jilin Da'an Dagangzi Wind Power Project Phase II (hereafter referred to as the "Project") developed by Jilin CGN Wind Power Co., Ltd (hereafter referred to as the "Project Developer") is a grid connected renewable energy project in Da'an city, Jilin Province, in the People's Republic of China (hereafter referred to as the "Host Country"). It involves the installation of 33 wind turbines, each of which has a rated output of 1,500 kW, providing a total installed capacity of 49.5 MW, with a predicted power supplied to the grid of 103,130 MWh per annum. The provider of the wind turbines is Dongfang Steam Turbine Works.

The purpose of project is to utilise a wind power facility to generate zero greenhouse gas (GHG) emissions electricity for the Northeast China Power Grid (hereafter referred to as "NECPG" or the "Grid"). The Project Developer has obtained permission to sell generated electricity to the Jilin Power Grid which is an integral part of the NECPG. The NECPG is a coal-dominated power grid. The electricity currently generated by the grid is relatively carbon intensive, with an operating margin emission factor of 1.2404tCO₂/MWh and a build margin emission factor of 0.8631CO₂/MWh (see section B for further details). The project is therefore expected to reduce emissions of GHG by an estimated 118,197 tCO₂e per year during the first crediting period by displacing electricity from the Grid. The baseline scenario is the same as the scenario existing prior to the start of the implementation of the project activity: electricity delivered to the Grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources.

The project is contributing to sustainable development of the Host Country. Specifically, the project:

- Achieves GHG emission reductions by avoiding CO₂ emission from the business-as-usual scenario electricity generation of those fossil fuel-fired power plants connected to the Grid, which is dominated by fossil fuel fired electricity.
- Increases employment opportunities in the area where the project is located (approximately 16¹ people will be permanently employed for the project operation, and the construction of the project secures jobs in the construction sector) and thereby contributes to poverty alleviation.
- Enhances the local investment environment and therefore improves the local economy.

¹ Feasibility Study, p125



- Diversifies the sources of electricity generation, important for meeting growing energy demands and the transition away from diesel and coal-supplied electricity generation.
- Makes greater use of renewable wind resources.

A.3. Project participants:

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Table 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)
People's Republic of China (host)	Jilin CGN Wind Power Co., Ltd	No
United Kingdom of Great Britain and Northern Ireland	Credit Suisse International	No
United Kingdom of Great Britain and Northern Ireland	EcoSecurities Group plc	No
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

Further contact information of project participants is provided in Annex 1.

A.4. Technical description of the project activity:**A.4.1. Location of the project activity:**

The project is located near the village of Shuanggang, Dagangzi County, Da'an City, Jilin Province, People's Republic of China (P. R. China)

A.4.1.1. Host Party(ies):

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P. R. China

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

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Jilin Province

A.4.1.3. City/Town/Community etc:

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Shuanggang Village, Dagangzi County

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

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The exact location of the project is defined using geographic coordinates obtained with a Global Positioning System (GPS) receiver: E 123°35'26"~123°38'58" Longitude, N 44°18'23"~45°18'46" Latitude. These geographic coordinates are for the centre of the wind farm.

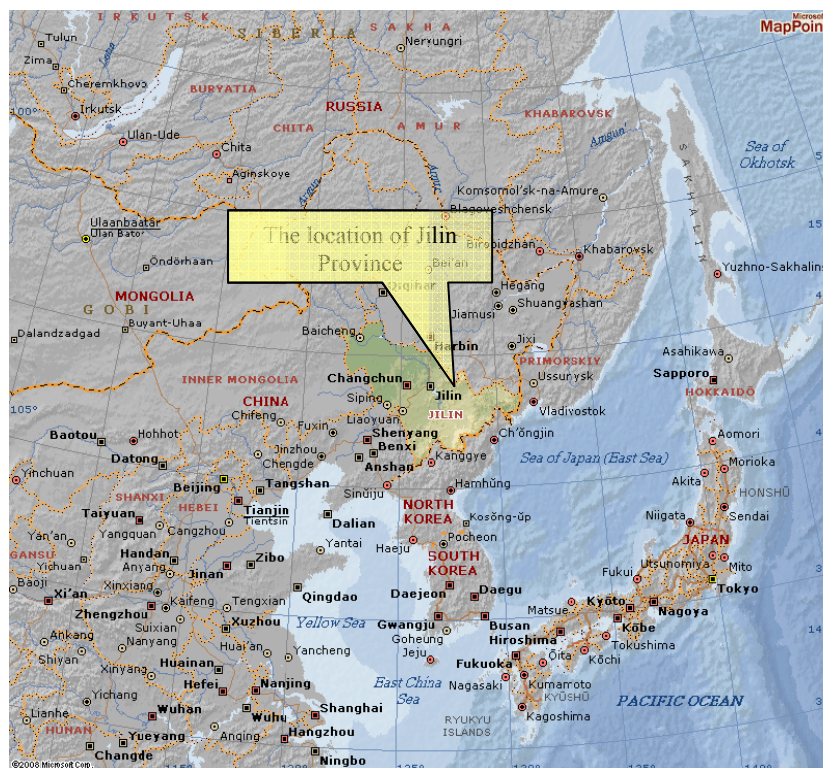


Figure A.4.1 The location of Jilin Province in China



Figure A.4.2 The location of Project

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



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According to Annex A of the Kyoto Protocol, this project fits in Sectoral Category 1, Energy Industries (renewable/non renewable).

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

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The purpose of the Project is to use well established wind power generation technology for electricity generation and transmission to generate low emissions electricity for the Grid thereby displacing CO₂ emissions from electricity generation from the Grid. The baseline scenario is the same as the scenario existing prior to the start of the implementation of the project activity: electricity delivered to the Grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources. The Grid includes the Jilin, Liaoning and Heilongjiang Provincial Power Grids.

The proposed project involves the installation of 33 wind turbines each of which with a rated capacity of 1,500 kW, providing a total capacity of 49.5MW. The expected annual electricity supply to the grid is 103,310MWh. The height of the rotor hub of all turbines is 61.5m. As the wind resource in the area is plentiful, and the average wind speed is relatively high with 5.91m/s at a height of 30m and 6.61m/s at a height of 50m, the wind resource can be used as much as possible.

According to the turbine layout, each turbine will be equipped with one transformer. The construction will also include the wind farm 220kV step-up substation. The wind power to be generated will be delivered to the step-up substation by 35kV transmission lines. The power in the 220kV step-up substation will be transmitted to the Baicheng 220kV Da'an substation. Then the electricity generated will first be transmitted to the Jilin Power Grid and then to the North East China Power Grid.

Details on the monitoring equipments and their location are given in section B.7.2. of the PDD.

The main technical parameters of the proposed project are shown in Table A.4.3.1

Table A.4.3.2 Main technical parameters of the proposed project

	Value	Source
Forecast installed capacity (MW)	49.5	Feasibility Study p9
Forecast operating time yearly (hour)	2,083	Feasibility Study p10
Forecast annual electricity supplied to the grid (MWh)	103,130	Feasibility Study p10
Forecast load factor (%)	30	Calculated based on the Feasibility Study parameters

* The Feasibility Study was approved by Jilin Development and Reform Commission in 2007

The milestones of the Project are summarised in Table A.4.3.2.

Table A.4.3.2 Milestones of the Project

Project activity	Time
EIA (Environmental Impact Assessment) approval	17/09/2007
FS (Feasibility Study) approval	23/10/2007
Project started construction	10/03/2008



Expected operation starting date ²	04/2009
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Table A.4.3.3 Main Technical Parameters of the wind turbines³

Generator ⁴	
Parameter	Value
Type	FD77B
No. of vane	3
Rated Power (kW)	1,500
Diameter of wheel(m)	77
Cut-in speed(m/s)	4
Cut-out speed(m/s)	25
Rated speed(m/s)	16
Height of Wheel(m)	61.5
Manufacturer	Dongfang Steam Turbine Works

The generator is produced by Dongfang Steam Turbine Works Company. All other items of equipment used in the Project are produced domestically and the project developer is experienced in handling and operating this kind of equipment.

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

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

Years	Annual estimation of emission reductions in tonnes of CO _{2e}
2009(Aug to Dec)	49,249
2010	118,197
2011	118,197
2012	118,197
2013	118,197
2014	118,197
2015	118,197
2016 (Jan to July)	68,948
Total estimated reductions (tonnes of CO _{2e})	827,379
Total number of crediting years	7

² p.112 of Feasibility Study³ These technical specifications may be subject to change since the PDD is written at an early stage of project development⁴ All these technical specifications are subject to change since the project is under construction



Annual average over the crediting period of estimated reductions (tonnes of CO _{2e})	118,197
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Refer to section B.6.3 for further details on the quantification of GHG emission reductions associated with the project.

A.4.5. Public funding of the <u>project activity</u>:
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The project will not receive any public funding from Parties included in Annex I of the UNFCCC.

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

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1. The approved consolidated baseline and monitoring methodology ACM0002: “Consolidated methodology for grid-connected electricity generation from renewable sources” Version 7, in effect as of 14 December 2007; and
2. The approved “Tool for demonstration and assessment of additionality”, Version 05.2, in effect as of EB 39
3. The approved Tool to calculate the emission factor for an electricity system, Version 01.1, in effect as of EB 35 is applied to the Project activity⁵.

More information about the methodology can be obtained at:

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

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

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The Methodology ACM0002 (Version 7) is chosen and applicable to the proposed project due to the following reasons:

- The project activity is a new grid-connected renewable power generation project activity: the project is a new grid-connected wind power plant.
- The project activity is connected to the NECPG. The geographic and system boundaries for this grid can be clearly identified and information on the characteristics of this grid is available.
- The project activity does not involve switching from fossil fuels to renewable energy at the site of the project activity.
- The project activity is not a biomass fired plant
- The project activity meets the applicability conditions of the Tool to calculate the emission factor for an electricity system and the Tool for the demonstration and assessment of additionality.

The applicability criteria stated in methodology ACM0002 (Version 7) are met on the basis of the reasons above.

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

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	Source	Gas	Included?	Justification / Explanation
Baseline	CO ₂ emissions from electricity generation in fossil fuel-fired power plants connected into the Northeast China Power Grid (NECPG) displaced due to the project activity	CO ₂	Yes	Main emission source.
		CH ₄	No	Minor emission source.
		N ₂ O	No	Minor emission source.
Project Activity	Project Emission	CO ₂	No	

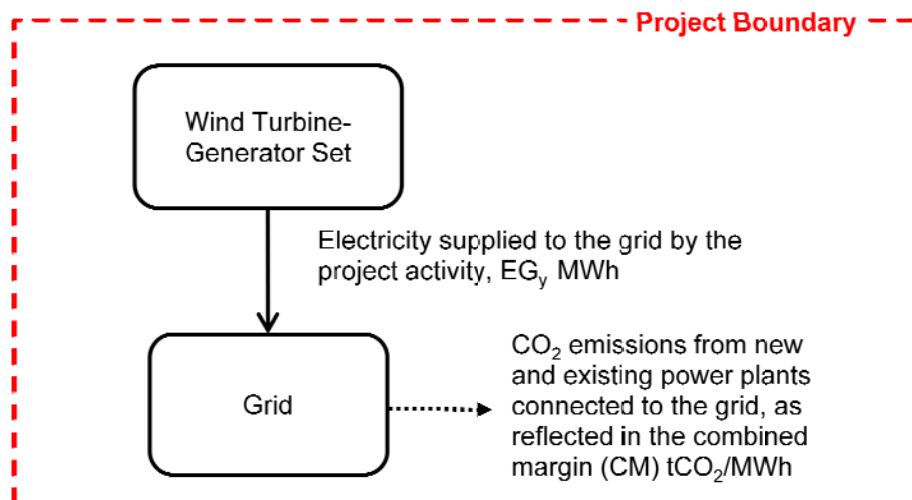
⁵ The “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion” Version 1, in effect as of EB 32, is not applied to this Project, since ACM0002 refers to this Tool for geothermal projects and the proposed Project is a wind power project.



		CH ₄	No	The project is a wind power project. Project emissions should not be considered according to ACM0002.
		N ₂ O	No	

The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the NECPG to which the Project is connected. NECPG includes Liaoning, Jilin and Heilongjiang Province Power Grids⁶.

Flow diagram of the project boundary



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

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According to the description in the approved baseline methodology ACM0002, as the proposed project does not modify or retrofit existing electricity generation facilities, the baseline scenario is the following:

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

The Project is the installation of a new grid-connected renewable power plant that connects with and delivers electricity to the Jilin Power Grid, which is part of the NECPG. According to the “Tool to calculate the emission factor for an electricity system”, the delineation of grid boundaries of the Project is the NECPG. According to the consolidated baseline methodology ACM0002, the baseline scenario of the Project is “the provision of an equivalent amount of annual power output by the NECPG to which the Project is connected to”.

Realistic and credible alternatives to the project activity will be identified and assessed in section B.5. The analysis and description in B.5 and B.6 will support the baseline scenario identified above.

⁶ <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/2008/20081230102527637.pdf>



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

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The following steps are used to demonstrate the additionality of the project according to the latest version of the “*Tool for the demonstration and assessment of additionality* (version 05.2)” approved by the Executive Board.

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

Sub-step 1a. Identification of alternatives to the project activity consistent with current laws and regulations

Four realistic and credible alternatives to the project scenario are considered:

Alternative 1: The proposed Project activity undertaken without being registered as a CDM project activity, i.e. the construction of a new wind power generation plant with an installed capacity of 49.5MW connected to the local grid, implemented without considering CDM revenues.

Alternative 2: Continuation of the current situation, i.e. electricity will continue to be generated by the existing generation mix operating in the grid.

Alternative 3: Construction of a thermal power plant with the same installed capacity or the same annual power output.

Alternative 4: Construction of a power plant using another renewable energy resource with the same installed capacity or the same annual power output.

Jilin Province lacks other renewable sources, apart from wind and hydropower resources. According to the China Electric Power Yearbooks (2003-2007), the installed capacity of other renewable energy technologies is 0 MW. As per the Feasibility Study Report, the project is located in a flat plain, there is no potential for a hydroelectric facility of the same installed capacity or the same electricity generation as the proposed project⁷. Therefore, *Alternative 4* is not realistic and credible and is not considered further in the assessment of the alternatives.

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

The Chinese power sector has undergone a transformation to a market-oriented system. Therefore, investment in a power generation project is an individual power project developer's decision based on the project return and risk profile⁸. There are no laws compelling the project developer to develop wind power plants, thus alternatives 1 and 2 identified are in line with all applicable laws and regulations.

The main sectoral policy relevant to this Project activity is the Renewable Energy Law of the People's Republic of China, which came into effect 1 January 2006 and aims to promote renewable energy in P.R. China. This Law demonstrates the Chinese Government's commitment to the development of renewable

⁷ See: Feasibility Study Report p.7

⁸ Source: State Council's Decision on Reforming Investment Approval Process, 16/07/2004.



energy as part of the overall energy development strategy, and encourages grid-connected power generation from renewable sources. Nevertheless, there are no direct incentives such as financial grants, higher tariffs or subsidised loans available for these types of project.

In addition to the above, although energy efficiency and renewable energy were included in the agenda for the P.R. China's 11th Five-Year Plan (2006-2010), there is no legislative requirement to meet the projections under this Plan⁹.

Second, according to the regulations related to power production in P. R. China, it is forbidden to build a thermal power station with an installed capacity lower than 135 MW¹⁰. Therefore, *Alternative 3* above is not in line with applicable laws and regulations, and will not be considered in the assessment of the alternatives.

Alternative 4 is in compliance with legal and regulatory requirements, however, it was excluded from the assessment of the alternatives in sub-step 1a.

Mandatory legislation and regulations relevant to each alternative are taken into account in sub-step 1b. Based on the above analysis, the proposed project activity is not the only alternative that is in compliance with mandatory regulations with which there is general compliance. Therefore, according to the Additionality tool, this means that the proposed CDM project activity may be additional and the additionality can be further assessed in the next steps of the Additionality Tool.

Step 2. Investment Analysis

Sub-step 2a. Determine appropriate analysis method

According to the "Tool for the demonstration and assessment of additionality (version 05.2)", three options can be applied to conduct the investment analysis. These are the simple cost analysis (Option I), the investment comparison analysis (Option II) and the benchmark analysis (Option III).

Since the proposed Project will generate financial/economic benefits other than CDM related income, through the sale of generated electricity, Option I (Simple Cost Analysis) is not applicable.

According to the Additionality Tool, if the alternative to the CDM project activity does not include investments of comparable scale to the project, then Option III must be used.

Given that the project developer does not have alternative and comparable investment choices, benchmark analysis (Option III) is more appropriate than investment comparison analysis (Option II) for assessing the financial attractiveness of the project activity.

Sub-step 2b. Option III – Application of benchmark analysis

The likelihood of the development of this Project, as opposed to continued generation of electricity from the current electricity generation mix (i.e. its baseline), will be determined by comparing the Project IRR (without carbon) with benchmark rates available to a typical local investor. Benchmarks include both financial indicators determined by local banks, or by investment bonds in the Host Country.

⁹ See: Point Carbon. CDM & JI Monitor: *Chinese official defends additionality of renewables in CDM*. 21/03/2007

¹⁰ See the announcement which strictly forbids the construction of thermal power stations with an installed capacity lower than 135 MW published by the State Council office, Guo Ban Fa Ming Dian[2002] No.6



With reference to *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects*, the financial benchmark rate of return (Project IRR after tax) of the Chinese power industry is 8%, which is therefore the benchmark applicable for the IRR of this Project. It was used to assess the Project in the Feasibility Study of the Project. This benchmark is widely applied for power project investments in P. R. China and serves as the sectoral benchmark rate on total investment for wind projects.

Table 5.1 below shows the financial analysis for the project activity, at the time that the decision to go ahead was made, with and without CDM financing. As shown, the Project IRR after tax was lower than the benchmark rate of return applicable. This therefore indicates that in comparison to other alternative investments, the project was not financially attractive.

Table B.5.1. Summary of project's financial analysis without and with CDM financing

IRR without CDM	7.06%
IRR with CDM	9.66 %

Details for calculating the IRR are provided in table B.5.3

A sensitivity analysis was conducted by altering the following parameters:

- Electricity Tariff
- Investment Costs
- Operating Costs
- Annual Operating hours

Table B.5.2 summarizes the results of the sensitivity analysis, showing the variation of each parameter needed to reach the 8% benchmark.

Table B.5.2. Results of the sensitivity analysis

	Variation of the parameter needed to reach the 8% benchmark
Operating Costs	-86.0%
Investment Costs	-8.9%
Electricity Tariff	+8.2%
Annual Operating hours	+8.9%

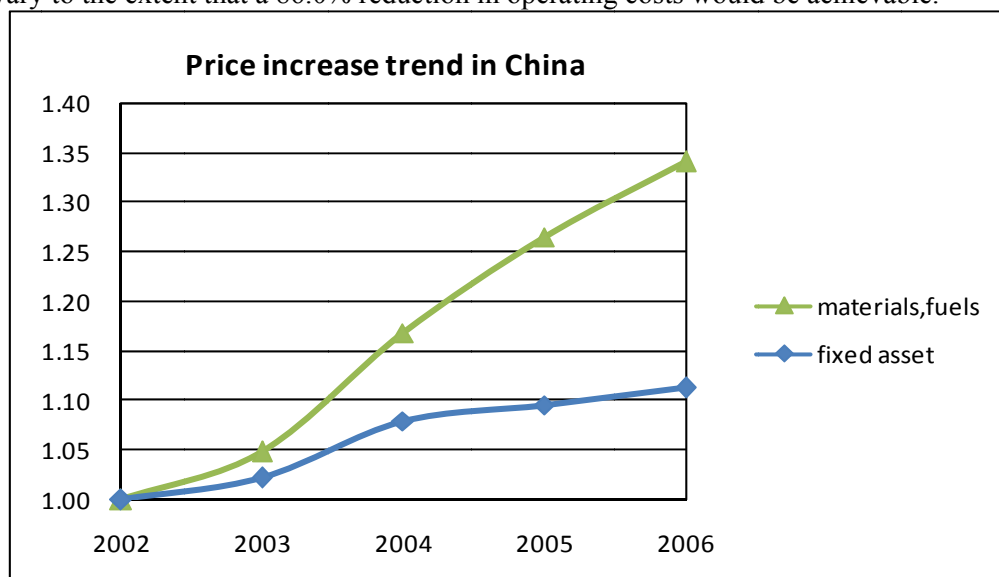
These variations do not reflect a realistic range of assumptions for the input parameters of the financial analysis.

- **Investment costs:** The costs of turbines, engineering construction and related accessories make up the main investment for a wind farm project. It is much more likely that wind power projects will experience cost *increases* rather than cost decreases during construction. This can be explained by the increase in the price of turbines¹¹ and of staff salaries (Table B.5.3) that has been happening for the last years. Compared to total static investment in the Feasibility Study (461,240,000RMB), the real investment has reached 492,986,400 RMB by November 2008¹², due to increased price of turbines, other related equipment and connection system. Since the real investment is already 7% higher than that in the Feasibility Study, an 8.9% decrease is highly unrealistic.

¹¹ <http://energy.people.com.cn/GB/5720709.html>

¹² See the financial statement of the Jilin Province Jineng Electric Power Construction Supervision Co., Ltd.

- **Operating Costs:** The operating costs are calculated in the approved, 3rd party Feasibility Study for the proposed project, in accordance with *Economic Assessment Method and Parameters for Construction Project Materials*, and comprise of materials, staff salaries and welfare, repair costs, insurance, and other costs. In the Feasibility Study, materials costs, staff salaries and other costs are fixed throughout the whole project lifetime, which is a conservative assumption, since material costs as well as staff salaries have been increasing in recent years in China. In the Feasibility Study, repair costs increase after year 10 to reflect the fact that once the equipment reaches this age, it will require more regular and extensive maintenance. Due to sustained increases in labour and raw material costs in China (See Figure B.5.1 and Table B.5.3 below), it is unlikely that the repair costs will reduce during the project lifetime, and furthermore the total repair costs are equivalent to less than 1% of the value of the total fixed assets and are thus unlikely to have a significant effect upon the financial feasibility of the project. Insurance costs in the Feasibility Study are calculated as 0.1% of the residual value of the fixed assets, the value of which decrease over the course of the project lifetime due to depreciation, so that insurance costs decrease accordingly. The insurance costs are unlikely to vary considerably, and would not in any case vary to the extent that a 86.0% reduction in operating costs would be achievable.



- **Figure B.5.1** Price index for fixed asset and materials (2002-2006)

- Source: Table 9-2, Chapter 9, China Statistical Yearbook 2007, issued by National Bureau of Statistics of China

- **Table B.5.3** Annual average salary in China (2000-2006)

	2000	2001	2002	2003	2004	2005	2006
Salary (RMB)	9,371	10,870	12,422	14,040	16,024	18,364	21,001

Source: Table 5-22, Chapter 5, China Statistical Yearbook 2007, issued by National Bureau of Statistics of China

- **Electricity tariff:** Electricity tariffs for wind projects in China are regulated at national level by the National Development & Reform Commission (NDRC), which sets a maximum tariff for each province. The guidance stipulates that the maximum tariff applies for the first 30,000 hours of operation of the project, after which the project must receive a tariff equivalent to the average tariff paid to all power plants in the province¹³. Since most power plants in the province receive a

¹³ See NDRC http://www.ndrc.gov.cn/zcfb/zcfbtz/2008tongzhi/t20080813_230718.htm



lower tariff than wind projects (around 341 RMB/MWh¹⁴), the average tariff is considerably lower than the tariff for wind projects. Therefore each wind farm project will negotiate a tariff for the first 30,000 hours of operation with the local grid company through a tender process but cannot receive a tariff higher than the value defined in the NDRC guidance. The maximum tariff set by NDRC for the first 30,000 hours of operation for wind projects in Jilin province is 610 RMB/MWh (including VAT). After that, the lower average tariff will be paid.

For the proposed project, the tariff for the first 30,000 hours of operation (i.e. around 14 years) was set at 610 RMB/MWh (including VAT). This was the latest data available at the time of the investment decision¹⁵ and was later confirmed by the results of the bidding process, the approval of the tariff by the NDRC for projects in Jilin Province in 2008 as well as the approval of the tariff by the Jilin Provincial Pricing Bureau for the proposed project^{16,17,18}. Since the tariff is fixed for the first 30,000 hours, and will subsequently reduce significantly to the average provincial tariff which is currently approximately 55% of the tariff offered to wind projects, a 8.2% increase is highly unrealistic. Therefore, the IRR is not likely to reach the benchmark due to an increase in electricity tariff.

Furthermore, in the IRR calculations presented in this PDD the higher tariff (610 RMB/MWh) was used for the entire lifetime of the financial analysis, and not only for the first 30,000 hours of operation, in order to be conservative. If the average provincial tariff is used in the investment analysis after the first 30,000 hours of operation, as it will happen in reality, the IRR is 5.88% and a 16% increase in electricity tariff is needed to reach the benchmark, which is highly unlikely given the pricing structure for wind projects.

In China, the wind power projects are categorized as follows:

- a. Wind power projects with Government approved tariffs: projects where the tariff is determined by Government regulation.
- b. Wind power projects with a concession: projects where the developer has successfully bid to win the concession to produce electricity on the project site, and the tariff is determined in the bid process.
- c. Demonstration Wind power projects: early stage (i.e. pre Power sector Reform in 2001) “pilot” projects, where the tariff is determined by particular characteristics of the project.

The proposed project is connected to, and obtained permission to sell the generated electricity to the Jilin Power Grid¹⁹. Since electricity tariffs exporting to grids differ province by province, only wind power projects connected in Jilin Province are considered in the case of this proposed

¹⁴ See NDRC http://www.ndrc.gov.cn/zcfb/zcfbtz/2007tongzhi/t20071207_177491.htm

¹⁵ See Notice on Feed in Tariff of Renewable Energy Project– issued by NDRC on 9 June 2007 http://www.hebwj.gov.cn/upfiles/xy_col32gjc_20070718164220007126.htm (Fa Gai Jia Ge[2007]1260)

¹⁶ See Tariff Bidding Announcement issued by Jilin Province Machine & Equipment Tendering Company

¹⁷ See Notice on Feed in Tariff of Renewable Energy Project– issued by NDRC on 23 July 2008 http://www.ndrc.gov.cn/zcfb/zcfbtz/2008tongzhi/t20080813_230718.htm (Fa Gai Jia Ge[2008]1876)

¹⁸ See Ji Sheng Jia Shen Pi [2009]28, 24 November 2009, Jilin Provincial Pricing Bureau, based on the NDRC’s “Circular on Improving Wind Power On-grid Tariff Policy” ([2009]1906). The notice stipulates that the tariff for wind power projects should be fixed according to the region where the project located, considering wind resources, and four wind resource regions were identified in China based on the analysis on the Wind Energy Resources and Standard for Engineering Construction.

¹⁹ The Jilin Provincial Power Grid is the part of regional Northeast China Power Grid (NCPG). The NCPG includes the Jilin, Liaoning and Heilongjiang Power Grids



dated 20 July 2009 http://www.ndrc.gov.cn/jggj/jggs/t20090727_292846.htm Ji Sheng Jia Shen Pi[2009]28 – Approval of the Electricity Price for 13 Wind Farms issued by Jilin Provincial Pricing Bureau dated 24 November 2009							
Sources for other information: UNFCCC website - http://cdm.unfccc.int/Projects							
II. Wind power concession projects ⁺							
13	2598	Huaneng Jilin Tongyu Phase II Wind Farm Project (100.5 MW)	0.552 RMB/kWh	2004 (year when the concession project begins)	Fa Gai Neng Yuan [2008] 1471 Refer the source below	N/A	CDM
14	0256	Jilin Tongyu Huaneng 100.05MW Wind Power Project (100.05 MW)	0.552 RMB/kWh	2004 (year when the concession project begins)	China Wind Power website, 2006 Refer the source below	2007	CDM
15	2068	Jilin Tongyu Tongfa Wind Power Project (100.3 MW)	0.552 RMB/kWh	2004 (year when the concession project begins)	Fa Gai Jia Ge [2007] 529 Refer the source below	2008	CDM
16	0897	Jilin Tongyu Tuanjie wind project (100.3 MW)	0.552 RMB/kWh	2004 (year when the concession project begins)	China Wind Power website, 2006 Refer the source below	2007	CDM
Sources for the concession projects:							
- Phase I-Phase IV Bidding results, an on-line news report issued on website of China Wind Power - http://www.windpower.org.cn/rule/fd4.jsp - Projects2068, Fa Gai Neng Yuan[2007]529: http://www.chinapower.com.cn/article/1073/art1073001.asp - Project 0897, The introduction of Jilin Tongyu 100MW Wind Farm Concession Project, a news report on NDRC website http://www.ndrc.gov.cn/zdxm/t20060324_64258.htm - Project 2598, Fa Gai Neng Yuan [2008] 1471 http://cdm.unfccc.int/Projects/DB/BVQI1242974589.56/view - Project 0256: The introduction of Jilin Tongyu Huneng Wind Farm Concession Project, a news report on NDRC website http://www.ndrc.gov.cn/zdxm/t20060324_64262.htm							
III. Demonstration Project							
17	N/A	Jilin Tongyu Wind Farm Project Phase I	0.9159 RMB/kWh	1999	Refer to the sources below	N/A	Not CDM
Sources for the demonstration project: China Wind Power Report 2007 (Greenpeace, GWEC et al.) Jilin Economic News, 2006 http://218.62.26.202:9993/ReaMarkArticle.aspx?PSubjectId=523&Id=2391 ; http://www.jl.gov.cn/lhzt/rd/dbjy/t20050114_0328.htm							

Other Sources:

- Statistics on China Wind Farm Installed Capacity in 2007 (Shi Pengfei, Chinese Wind Energy Association)
- China Wind Report 2007 (Greenpeace and GWEC, China Environmental Science Press) - <http://www.gwec.net/uploads/media/wind-power-report.pdf>
- Website of China Wind Energy Association - <http://www.cwea.org.cn/main.asp>

Unlike the demonstration project, the tariffs of other wind projects in Jilin province were determined based on the government guidance according to “Interim Regulation for Tariff of Renewable Energy Power Generation and Apportionment of Expenses” ([2006] no.7)²⁰, and each one of them are based on the relevant approval listed in the Table B.5.4.

Figure B.5.2 below shows the actual electricity tariff of each wind power projects exporting electricity in Jilin Province, previous to this project activity (please also refer to Table B.5.4 above). Therefore, there has been no reduction in tariffs over time in Jilin Province. There are two wind power projects connected to the Jilin Grid where the tariff was higher than the tariff

²⁰ Interim Regulation for Tariff of Renewable Energy Power Generation and Appointment of Expenses issued by NDRC on 04 January 2006 http://jgs.ndrc.gov.cn/zcfg/t20060120_57585.htm



applicable to this project activity –Jilin Tongyu Wind Farm Project and the Changling Wind Power Project.

Jilin Tongyu Wind Farm Project

It was the first and only demonstration project in Jilin Province, with an electricity tariff higher than the other wind projects (see Table B.5.4). Unlike the proposed Project (and other projects in Table 1), it was built in 1999, a few years before the reform of the power sector in China in 2002. Before the power sector reform, all power plants in China were state-owned with government funding and the provincial governments provided guaranteed electricity tariffs on a project-by-project basis under the monopoly market condition.

In addition, the above demonstration project was developed at an early stage of wind power development in Jilin Province, when the domestic equipment manufacturing sector in China was still immature. China's wind power industry was undergoing an "industrialization period" between 1994 and 2003, and was only starting to explore its domestic equipment manufacturing²¹.

Besides, unlike other similar projects in Jilin Province, the above demonstration project applies imported technologies, using turbines from Spain and Germany, which resulted in increased investment costs for that project. The tariff was set at a reasonably high level of just above 0.9 RMB/kWh in order to guarantee a marginal return to the project²².

As a result, the first and only demonstration project in Jilin Province is considered to be different to the proposed Project. Therefore, the electricity tariff is not applicable for comparison with the proposed Project.

Also, in the period prior to the power sector reform, before 2002, the power sector was a monopolistic sector with a vertically integrated electricity company carrying out generation, transmission and supply of electricity. Therefore, projects were implemented by subsidiary companies of, or closely linked to the central power company. Tariffs as high as over 1 RMB/kWh were recorded for this period (the Kuocangshan wind farm in Zhengjiang received 1.2 Yuan/kWh)²³. As a result the 0.92 RMB/kWh figure for the Jilin Tongyu Wind Farm Project should be viewed in a historical context and not one that is relevant to the analysis of post 2001 tariffs based on public policies.

Changling Wind Power Project

The installed capacity of the Changling Wind Power Project is 9.35 MW, which is significantly lower than all other government approved projects, whose installed capacity is between 30 and 50 MW, is 0.61 RMB/kWh (see Table B.5.4). In addition, the tariff of the Changling Wind Power Project is only 3% higher than the tariff given to the other wind projects with an installed capacity of around 50 MW.

In the case of this project activity, even if the higher tariff of 0.63 RMB/kWh (inclusive of VAT) was used, the Project IRR without CDM would be 7.48%²⁴. Only if the proposed Project received

²¹ Study Report on Development of Policy of Chinese Wind Power Tariff (CREIA, WED) paper submitted to the CDM Executive Board dated 24 November 2009. <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2364.doc>

²² Jilin Provincial government, 2004: http://www.jl.gov.cn/lhzt/rd/dbjy/t20050114_0328.htm

²³ Study Report on Development of Policy of Chinese Wind Power Tariff (CREIA, WED) paper submitted to the CDM Executive Board dated 24 November 2009. <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2364.doc>

²⁴ The IRR of 7.48% was calculated by using the highest tariff of Jilin province without considering the 30000 hours factor, because according to the approval of the tariff, the proposed project will have a much lower tariff after 30000 operation hours in the future. Therefore, the result is more conservative.



a tariff of 0.655RMB/kWh throughout its lifetime, would the IRR reach the benchmark. This scenario is highly unlikely since, as mentioned above, the tariff of the proposed Project has been officially approved by the Jilin Provincial Pricing Bureau on 24 November 2009 (Ji Sheng Jia Shen Pi[2009]28) at 0.61 RMB/kWh including VAT, based on the NDRC's "Circular on Improving Wind Power On-grid Tariff Policy" ([2009]1906).

Therefore, as mentioned above, the IRR is not likely to reach the benchmark due to an increase in electricity tariff.

- **Annual operating hours:** The expected annual operating hours (2,083) and hence the plant load factor (23.7%)²⁵, of the proposed Project is determined by an independent third party, with the highest Grade A. The calculation are carried out using professional WASP software²⁶, which is a scientific method applied internationally and has been widely used by wind developers and turbine manufactures. The operating hours are mainly determined by the availability of grid capacity, turbines availability and wind speed. For the proposed project, the availabilities of grid capacity and turbines are assumed to be 100%, which is conservative as neither grid nor turbine will reach this theoretical 100% level. The wind speeds indicated in chapter 2 of the Feasibility Study were calculated based on historical wind data over the past 30 years (since 1977), and one year (2006 – 2007) of on-site wind measurement was also factored into the calculation, in accordance with the 'Methodology of wind energy resource for wind farm' (GB/T 18710-2002), published by General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China in 2002. Additionally, the past trend reveals a trend that the average wind speed is decreasing: the overall average wind speed from 1977 to 2006 is 3.3m/s; the overall average wind speed from 1997 to 2006 is 3.2m/s. It can be concluded that the wind speed applied in the PDD is more conservative.

As the three of the main parameters influencing the annual operating hours were optimistic estimates, assuming a sustained 8.9%²⁷ increase in annual operating hours is not reasonable since this would represent a shift in climatic conditions, which are outside the control or ability of the project developer to predict, and therefore the IRR is not likely to reach the benchmark from an increase in annual operating hours.

The expected operating hours, and hence load factor, can be cross-checked against similar projects in the same region as the project activity. Table 2 shows the wind projects in Baicheng Region in the Jilin Province (the region where the project activity is located) that have been registered as CDM projects. From this table it can be seen that the operating hours of the projects in the same region as the project activity are slightly lower than the operating hours of the project activity. This cross-check demonstrates that the operating hours (and hence the load factor) were valid and applicable at the time of the investment decision.

Table B.5.5. Operating hours of wind projects in Baicheng Region of Jilin Province

Project Name	Operating hours	Load factor	UNFCCC Ref. number
Jilin Taobei Huaneng 49.3MW Wind Power Project	1876	21%	0238
Jilin Taobei Fuyu 49.5MW Wind Power Project	1603	18%	0544
Jilin Taonan Wind Power Project	2093	24%	0599
Jilin Baicheng ChaganHot Wind Power Project	1687	19%	1129
CGN Jilin Daan 49.5MW Wind	2046	23%	2083

²⁵ The load factor is calculated as the annual operating hours divided by the number of hours in a year (8,760).

²⁶ www.wasp.dk

²⁷ 16% increase needed if the actual pricing system for wind projects is applied in the investment analysis.



Power Project			
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Sources:

<http://cdm.unfccc.int/UserManagement/FileStorage/E3BULO69CV0ADCGLQ2C516UP52GRZ> (0238)

<http://cdm.unfccc.int/UserManagement/FileStorage/HRWSXEVL3XMKVZOVVINEWB6NVI8623>

(0544)

<http://cdm.unfccc.int/UserManagement/FileStorage/W7XJNKVEK0BN1R6OMUXEI9EQFHQ2GA> (0599)

<http://cdm.unfccc.int/UserManagement/FileStorage/VI0HTA4LGNSO3RZDI17SYJ8C69AMA0> (1129)

<http://cdm.unfccc.int/UserManagement/FileStorage/7V3KSGEP4MDTZWXF52RIL90U6OACJH>

(2083)

These results show that only with highly unrealistic and favourable circumstances would it be possible to reach the Project IRR benchmark. In reality, circumstances typically occur more unfavourably than projected and the IRR would thus be even further away from the benchmark. We can conclude that the IRR is lower than the benchmark for a realistic range of assumptions for the input parameters of the sensitivity analysis, and therefore, that the Project is not financially attractive. This demonstrates that the project activity would not be implemented without the CDM.

Table B.5.6. Main parameters used in the investment analysis

Name	Value	Source
Installed capacity (MW)	49.5	Feasibility Study* p10
Total investment (RMB)	461,240,000	Feasibility Study p125
Expected power supplied to the grid (MWh)	103,130	Feasibility Study p12
Tariff, including VAT (RMB/MWh)	610	NDRC & Project Approved Tariff ²⁸
VAT (%)	8.5	Feasibility Study p128
Income tax (%)	25	Feasibility Study p128
City Maintenance and Construction Tax (%)	5	Feasibility Study p128
Educational Surcharge Tax (%)	3	Feasibility Study p128
Lifetime of project	20	Feasibility Study p126
Total operating costs (RMB)	132, 140,000	Feasibility Study

* The Feasibility Study was carried out by an independent third party, the Jilin Provincial Investigation, Design and Research Institute of Water Conservancy and Electric Power in July 2007 and audited and approved by the local government (Jilin Development and Reform Commission) in October 2007.

Step 3. Barrier Analysis

The “Tool for the demonstration and assessment of additionality” (Version 05.2) states that project participants may choose to apply Step 2 (Investment analysis) OR Step 3 (Barrier Analysis) to demonstrate the Project additionality.

Given the low IRR of the Project, Step 3 is not used to demonstrate the additionality of the proposed Project.

²⁸ NDRC – maximum tariff for wind projects in Jilin Province in 2007: Notice on Feed in Tariff of Renewable Energy Project FAGAIJAGE[2007]1260 – issued by NDRC on 9 June 2007. This document gives the maximum tariff approved by NDRC for Wind Projects in Jilin Province in 2007, which is 610RMB/MWh;

Project Approved Tariff: Tariff Bidding Announcement for Daan project issued on 30/11/2007, and Tariff Approval for the proposed project: http://www.ndrc.gov.cn/zcfb/zcfbtz/2008tongzhi/t20080813_230718.htm issued by NDRC on 23/07/2008 and <http://www.ndrc.gov.cn/zcfb/zcfbtz/2008tongzhi/W020080813574224669079.pdf>, issued by NDRC on 23/07/2008.

**Step 4. Common Practice Analysis*****Sub-step 4a. Analyze other activities similar to the proposed project activity:***

In line with the EB guidance on the additionality tool, other wind power projects that are currently operational in Jilin Province that are similar to the proposed Project activity are listed in Table B.5.4 below.

Firstly, the common practice analysis is limited to the provincial level, as the investment environment for each province differs (e.g. with regards to taxes²⁹, loan policy, and electricity tariffs³⁰). In Jilin Province, the Provincial Government is responsible for taxes, loan policies etc., which are specifically applicable to the Province.

Furthermore, only the projects which were developed after 2003 are considered in the common practice analysis below. Before 2003³¹, wind power projects in China were undertaken under non-commercial conditions with supporting policies, such as favorable higher tariffs³² for wind projects, known as ‘cost-plus power pricing’, domestic loan subsidies, bilateral soft loan financing and multilateral finance, so that most wind projects were built as monopolistic power company “pilot-projects”. This resulted in a series of wind farms each with capacity less than 30MW, however, on which the sector still could not be commercialized. After 2003, only limited wind farm development occurred (except under CDM) due to a change in regulations issued by the National Development and Reform Commission, which required the wind projects to be developed on a commercial basis, through a bidding process. Recently wind farm development has increased, due to the availability of CDM financing. Several similar projects have been or are being developed, and these have all had recourse to CDM incentives.

So other wind farms in Jilin Province with an installed capacity above 30MW are shown in Table B.5.4 below.

Table B.5.4 Wind Farm Development in Jilin Province

Project name	Start of Operation	Total capacity	CDM activities	UNFCCC ID No.
Jilin Tongyu	2000	30.06MW	No (project received a favorable tariff. Developed before 2002.)	N/A
Jilin Taonan	2005	49.3MW	Registered	0599
Jilin Changling Phase I	2005	49.5MW	Registered	0483
Jilin Taobei Huaneng	2005	49.3MW	Registered	0256
Jilin Taobei Fuyu	2005	49.5MW	Registered	0544
Jilin Taobei Huaneng	2006	49.3MW	Registered	0238
Jilin Baicheng	2007	30MW	Registered	1129
Jilin Shuangliao	2007	49.3MW	Registered	0869
Jilin Tongyu Tuanjie	2007	100.3MW	Registered	0897
Jilin Tongyu Huaneng	2007	100.05MW	Registered	0256

²⁹ <http://www.jl-n-tax.gov.cn/>

³⁰ http://www.ndrc.gov.cn/zcfb/zcfbtz/2008tongzhi/t20080813_230718.htm

³¹ <http://www.nwtc.cn/Article/ShowArticle.asp?ArticleID=422>

<http://www.nwtc.cn/Article/ShowArticle.asp?ArticleID=183>

³² <http://www.newenergy.org.cn/html/00412/20041605.html>



Twelve other wind projects in Jilin Province	Various	Various	Applying for CDM	Under validation ³³
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Data sources:

http://www.cwea.org.cn/download/display_info.asp?cid=2&sid=&id=25&

<http://www.cwea.org.cn/upload/20080324.pdf> (Wind Farms in China 2007 written by Shi Pengfei)

[http://www.nwtc.cn/Article/ShowArticle.asp?ArticleID=217\(Jilin](http://www.nwtc.cn/Article/ShowArticle.asp?ArticleID=217(Jilin) Tongyu)

<http://www.newenergy.org.cn/html/00412/20041605.html> (Jilin Tongyu)

<http://cdm.unfccc.int>

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

As discussed in *Sub-step 4a*, earlier wind energy developments in China prior to 2003 were somewhat small in scale. Tongyu wind farm is the only large (i.e. installed capacity equal or greater than 30 MW) wind farm that was developed in the region before the year 2000. It started operation in 2000 with the support of a higher than normal tariff³⁴.

From 2000 to 2004, not a single wind power project was built by private developers in the province. Since 2005, more new wind farms started construction by different developers; however these are all being developed under the CDM and face similar barriers to the proposed project activity. Without CDM, new wind farms in Jilin province including the proposed project are not likely to be developed. These wind projects face financing difficulties because of the bidding pricing system and low tariff.

It can therefore be concluded that all similar projects identified in the region had recourse to CDM financing, and therefore the project can not be considered common practice.

In conclusion the proposed project shall be deemed to be additional according to ACM0002.

CDM consideration

The benefits of the CDM were a decisive factor in the decision to proceed with the project. The Feasibility Study Report, carried out by an independent third party, the Jilin Provincial Investigation, Design and Research Institute of Water Conservancy and Electric Power, emphasised that the project can be eligible as a CDM project to improve the financial attractiveness. On 22th June 2007, the project developer got a notice that the tariff for the first 30,000 hours of operation would be a maximum of 610 RMB/MWh (including VAT), and the lower average tariff for power generation in the Province would be paid after 30,000 hours. As the maximum tariff approved by NDRC was much lower than expected in the Feasibility Study Report and the project was not financially attractive, the project developer made the decision to proceed with the project as a CDM project and published a Bidding Notice for the CDM development of the project in August 2007. The bid was won by EcoSecurities and Credit Suisse International³⁵ and an Emission Reduction Purchase Agreement (ERPA) was negotiated and signed on January 29 2008. The CDM revenue was also regarded as an important factor in securing a loan for the project: the Project Developer applied for a loan from the China Construction Bank, Da'an Branch, which was granted in January 2008 because the expected CER revenues that would be generated by the CDM Project will increase the capability of repayment. Considering the additional revenues that are likely to accrue from registration as a CDM project, the Project Developer started to make preparation for the commencement and the Project could finally start construction on 10/03/2008.

Table B 5.5 Timeline for the development of the proposed Project and CDM consideration

³³ <http://cdm.unfccc.int/Projects/Validation/index.html>

³⁴ <http://www.newenergy.org.cn/html/00412/20041605.html>

³⁵ See the Notice of bid results – Jilin CGN Wind Power Co., Ltd - 10/01/2008



Project activity	Time	CDM consideration
Completion of FSR ³⁶	07/2007	emphasised that the project can be eligible as a CDM project
Project Developer got a much lower tariff than expected in FSR ³⁷	22/06/2007	
Project Developer made the decision to proceed with the project as a CDM project	06/08/2007	Publication of the Bidding Notice for the CDM development of the project ³⁸
Project Developer signed the equipment purchase contract ³⁹	07/09/2007	Starting Date of the Project
The bank agreed to grant a loan to the Project Developer ⁴⁰	15/01/2008	Bank letter with consideration of CDM revenue
Project Developer made preparations for the construction	29/01/2008	ERPA signature between the Project Developer and EcoSecurities and Credit Suisse International ⁴¹
Project started construction ⁴²	10/03/2008	
Project is under construction	22/04/2008	Getting the Letter of Approval from China DNA
Project is under construction	05/2008	Submission for validation

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

According to the latest version of ACM0002 (version 07) and the tool to calculate the emission factor for electricity system, since the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

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

The Project therefore applies the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.

³⁶ See: Feasibility Study – Chapter 15

³⁷ See the notice sent by CGN Wind Power Co. Ltd

³⁸ See the Bidding Notice for the CDM development - Jilin CGN Wind Power Co., Ltd

³⁹ See: Equipment purchase contract between Jilin CGN Wind Power Co., Ltd and Dongfang Steam Turbine Works Company

⁴⁰ See: letter granting a loan to Da'an Wind Project from China Construction Bank, Da'an Branch

⁴¹ See: ERPA between Jilin CGN Wind Power Co., Ltd and EcoSecurities Group PLC

⁴² See the Approval of the construction by the Jilin Province Jineng Electric Power Construction Supervision Co. Ltd



This PDD uses the calculations published by the DNA of P. R. China⁴³ to determine the Operating Margin (OM) emission factor⁴⁴ and the Build Margin (BM) emission factor⁴⁵ using the most recent data available.

The description below follows the steps of the latest version of the “Tool to calculate the emission factor for an electricity system” and focuses on the key process of the calculation of the emission factors. Please see Annex 3 for the baseline data underlying the calculations.

The “Tool to calculate the emission factor for an electricity system (Version 01.1)” is applied in the context of the Project in the following six steps:

- Step 1. Identify the relevant electric power system
- Step 2. Select an operating margin (OM) method
- Step 3. Calculate OM emission factor according to the selected method
- Step 4. Identify the cohort of power plants to be included in the build margin
- Step 5. Calculate the build margin emission factor
- Step 6. Calculate the combined margin emission factor

Step 1. Identify the relevant electric power system

P. R. China is divided into regional electricity systems which are defined by the DNA of P. R. China⁴⁶. The Project is located in Jilin Province which belongs to the NECPG. Therefore, the relevant electric power system is identified as the NECPG.

Step 2. Select an operating margin (OM) method

The “Tool to calculate the emission factor for an electricity system” offers four methods to calculate the OM emission factor ($EF_{grid,OM,y}$):

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

Of these procedures, Option (a) (Simple OM) is applied. This is because low-cost / must run resources constitute less than 50% of total grid generation in average of the five most recent years. From 2001 to 2005 respectively, 7.02%, 5.43%, 4.72%, 6.53% and 8.28% of the electricity generated in the NECPG came from low-cost / must run resources⁴⁷.

Power plants registered as CDM project activities are included in the sample group that is used to calculate the OM as long as the criteria for including the power sources in the sample group apply.

⁴³ National Coordination Committee on Climate Change – National Development and Reform Commission (NDRC)

⁴⁴ See <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1358.xls> for the EF_{OM}

⁴⁵ See <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1374.pdf> for the EF_{BM}

⁴⁶ See <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1364.pdf>

⁴⁷ China Electric Power Yearbooks 2002-2006

The “Tool to calculate the emission factor for an electricity system” offers the choice between two data vintages calculate the Simple OM emission factor ($EF_{grid,OMsimple,y}$):

- *Ex-ante* option: A 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period.
- *Ex-post* option: The year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring.

$EF_{grid,OMsimple,y}$ is calculated *ex-ante* using the data from 2003 to 2005, available in the China Energy Statistics Yearbooks 2004-2006 and the China Electric Power Yearbooks 2004-2006. This data vintage remains fixed during the crediting period.

Step 3. Calculate OM emission factor according to the selected method

The “Tool to calculate the emission factor for an electricity system” offers three options to calculate $EF_{grid,OMsimple,y}$:

- *Option A*: Based on data on fuel consumption and net electricity generation of each power plant / unit
- *Option B*: Based on data on net electricity generation, the average efficiency of each power unit and the fuel type(s) used in each power unit
- *Option C*: Based on data on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Detailed data on the individual power plants connected to the NECPG necessary for applying option A and option B is not available; therefore, options A and B cannot be used. Since only nuclear and renewable power generation are considered as low-cost / must-run power sources and since the quantity of electricity supplied to the grid by these sources is known, option C is applicable and used to calculate the Simple OM emission factor.

$EF_{grid,OMsimple,y}$ using option C is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including low-cost / must-run power plants / units, and based on the fuel type(s) and total fuel consumption of the project electricity system, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_{y,grid}} \quad (1)$$

Where:

- $EF_{grid,OMsimple,y}$ = Simple operating margin CO₂ emission factor in year y (tCO₂/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) (country-specific values are used)
- $EF_{CO2,i,y}$ = CO₂ emission factor of fossil fuel type i in year y (tCO₂/GJ)
- $EG_{y,grid}$ ⁴⁸ = 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

⁴⁸ $EG_{y,grid}$ = GEN x (1-rate of internal use by the power station). See Annex 3 and section B.6.2. for details.



y = The three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation

$$EF_{grid,OMsimple,y} = 1.2404 \text{ tCO}_2/\text{MWh}$$

For detailed information, please see Annex 3.

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

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

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

However, due to the fact that data on electricity generation of each power plant / unit in the grid is currently not available in P. R. China (see Step 3), EB guidance on the estimation of the build margin in P.R. China can be applied for the purpose of defining the sample group⁴⁹. In accordance with the guidance, the build margin consists of the set of power capacity additions in the electricity system that comprises 20% of the system generation capacity (in MW) and that have been built most recently. The set of power capacity additions included in the build margin is determined as follows:

$$\frac{\sum_j CAP_{j,y-n}}{\sum_j CAP_{j,y}} > 20\% \quad (2)$$

- $\sum_j CAP_{j,y-n}$ = The aggregate incrementally installed power capacity of all kinds of power generation sources j (MW) in year $y-n$
- $\sum_j CAP_{j,y}$ = The aggregate incrementally installed power capacity of all kinds of power generation sources j (MW) in year y
- n = The number of years ($y-1, y-2, \dots, y-n$) which have to be considered to comprise 20% of the system generation capacity (in MW) and that have been built most recently

In the period from 1998 to 2005 (2005 being the most recent year for which data is available), the amount of power capacity additions made up 20% of the total NECPG generation capacity in 2006. Therefore $n = 7$.

Since data on the electricity generation of each individual power plant / unit in the grid is not available in P. R. China, power plants registered as CDM project activities cannot be isolated and are taken into account in the build margin.

The “Tool to calculate the emission factor for an electricity system” offers the choice between two data vintages to calculate the BM:

- *Option 1.* For the first crediting period, the build margin emission factor is calculated *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.

⁴⁹ See: EB guidance on estimating the build margin for AM0005, consolidated in ACM0002 which refers to the Tool to calculate the emission factor for an electricity system

<http://cdm.unfccc.int/UserManagement/FileStorage/6POIAMGYOEDOTKW25TA20EHEKPR4DM> and http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_QEJWJEF3CFBP1OZAK6V5YXPQKK7WYJ

- *Option 2.* For the first crediting period, the build margin emission factor shall be updated annually, *ex-post*, including those units built up to the year of registration of the project activity

The BM emission factor ($EF_{grid, BM, y}$) is calculated *ex-ante* using the data from 2004 to 2006, available in the China Energy Statistics Yearbook 2006 and the China Electric Power Yearbooks 2004-2006. This data vintage remains fixed during the first crediting period and will be updated for the second crediting period.

Step 5. Calculate the build margin emission factor

According to the “Tool to calculate the emission factor for an electricity system”, $EF_{grid, BM, y}$ is the generation-weighted average emission factor of all power units m during the most recent year y for which power generation data is available. However, due to the fact that data on both electricity generation and emission factor of each power plant / unit in the grid is currently not available in P. R. China (see Step 3), EB guidance on the estimation of the build margin in P.R. China can also be applied for the purpose of estimating the BM emission factor⁵⁰ and $EF_{grid, BM, y}$ is calculated as follows:

$$EF_{grid, BM, y} = \frac{CAP_{thermal, y-n, y}}{\sum_j CAP_{j, y-n, y}} \times EF_{thermal, adv} \quad (3)$$

- $EF_{grid, BM, y}$ = Build margin CO₂ emission factor in year y (tCO₂/MWh)
- $CAP_{thermal, y-n, y}$ = The incrementally installed power capacity of thermal power generation sources (MW) in the NECPG in year y compared to that of year $y-n$
- $\sum_j CAP_{j, y-n, y}$ = the aggregate incrementally installed power capacity of all kinds of power generation sources j (MW) in the NECPG in year $y-n$ compared to that of year $y-n$
- $EF_{thermal, adv}$ = The emission factor of thermal power generation sources of the NECPG with the efficiency level of the best commercially available technology in P. R. China, for y the most recent historical year for which power generation data is available

$EF_{Thermal, Adv}$ is calculated as follows:

$$EF_{Thermal, Adv} = \lambda_{Coal} \times EF_{Coal, Adv} + \lambda_{Oil} \times EF_{Oil, Adv} + \lambda_{Gas} \times EF_{Gas, Adv} \quad (4)$$

Where:

- $EF_{i, Adv}$ = The CO₂ emission factor of fuel i (tCO₂/MWh) using the best commercially available technology in P. R. China and taking into account the carbon content and the oxidation factor of fuel i ⁵¹
- $Coal, Oil$ = Solid fuel, liquid fuel and gaseous fuel respectively
- and Gas
- λ_i = The weight of CO₂ emissions from fuel i fired power plants in the total CO₂ emissions from thermal power, using the most recent available data

And

⁵⁰ See: <http://cdm.unfccc.int/UserManagement/FileStorage/6POIAMGYOEDOTKW25TA20EHEKPR4DM> and http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_QEJWJEF3CFBP1OZAK6V5YXPQKK7WYJ

⁵¹ See <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1374.pdf>



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

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

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

Where $FC_{i,y}$ and $EF_{CO2,i,y}$ are defined as in equation 1.

$$EF_{grid,BM,y} = 0.8631 \text{ tCO}_2/\text{MWh}$$

For detailed information, please see Annex 3.

Step 6. Calculate the combined margin emission factor

The combined margin (CM) emissions factor ($EF_{grid,CM,y}$) is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \quad (8)$$

Where:

- $EF_{grid,CM,y}$ = Combined margin CO₂ emissions factor in year y (tCO₂/MWh)
- $EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (tCO₂/MWh)
- $EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (tCO₂/MWh)
- w_{OM} = Weighting of operating margin emissions factor, which is 0.75 by default
- w_{BM} = Weighting of build margin emissions factor, which is 0.25 by default

$$EF_{grid,CM,y} = 0.75 \times 1.2404 + 0.25 \times 0.8631 = 1.1461 \text{ tCO}_2/\text{MWh}$$

For detailed information, please see Annex 3.

Then baseline emissions (BE_y) are obtained as:

$$BE_y = EG_y \times EF_{grid,CM,y} \quad (9)$$

Where:

- BE_y = Baseline emissions in year y (tCO₂)
- EG_y = Electricity supplied by the project p to the grid in year y (MWh)
- $EF_{grid,CM,y}$ = Combined margin CO₂ emissions factor in year y (tCO₂/MWh)

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



Data / Parameter:	<i>Installed Capacity of the project activity</i>
Data unit:	MW
Description:	The installed capacity of the project activity
Source of data used:	Feasibility Study Report
Value applied:	49.5MW
Justification of the choice of data or description of measurement methods and procedures actually applied :	This data is from the Feasibility Study Report
Any comment:	

Data / Parameter:	EF_{OM}
Data unit:	tCO ₂ / MWh
Description:	Operating Margin Emission Factor
Source of data used:	Baseline Emission Factors for Power Grids in China, sourced from http://cdm.ccchina.gov.cn/
Value applied:	1.2404
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated according to the updated Baseline Emission Factors for Power Grids in China based on ACM0002 and EB guidance
Any comment:	

Data / Parameter:	EF_{BM}
Data unit:	tCO ₂ / MWh
Description:	Build Margin Emission Factor
Source of data used:	Baseline Emission Factors for Power Grids in China, sourced from http://cdm.ccchina.gov.cn/
Value applied:	0.8631
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated according to the updated Baseline Emission Factors for Power Grids in China based on ACM0002 and EB guidance.
Any comment:	

Data / Parameter:	EF_{grid,CM,y}
Data unit:	tCO ₂ / MWh
Description:	Combined margin CO ₂ emission factor for the NECPG
Source of data used:	Baseline Emission Factors for Power Grids in China, sourced from http://cdm.ccchina.gov.cn/
Value applied:	1.1461
Justification of the choice of data or description of measurement methods and procedures actually applied:	Calculated according to the updated Baseline Emission Factors for Power Grids in China based on ACM0002 and EB guidance
Any comment:	



Data / Parameter:	$FC_{i,y}$
Data unit:	t, m^3
Description:	Amount of fossil fuel type i consumed in the project electricity system in year y (mass or volume unit)
Source of data used:	China Energy Statistics Yearbooks (2004-2006)
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official released statistics; publicly accessible and reliable data source
Any comment:	

Data / Parameter:	$NCV_{i,y}$
Data unit:	$MJ/t, kJ/m^3$
Description:	Net calorific value (energy content) of fossil fuel type i in year y
Source of data used:	China Energy Statistics Yearbook (2004-2006)
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official released statistics; publicly accessible and reliable data source
Any comment:	

Data / Parameter:	$EF_{CO_2,i,y}$
Data unit:	Tco_2/TJ
Description:	CO ₂ emission factor of fossil fuel type i in year y
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC default value
Any comment:	

Data / Parameter:	$GEN_{j,y}$
Data unit:	MWh
Description:	The electricity generation by source j in year y of each province connected to the NECPG
Source of data used:	China Electric Power Yearbooks (2002-2006)
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official released statistics; publicly accessible and reliable data source
Any comment:	



Data / Parameter:	<i>Rate of internal use by the power station</i>
Data unit:	%
Description:	The rate of internal use of power source <i>j</i> in each province connected to the NECPG.
Source of data used:	China Electric Power Yearbooks (2004-2006)
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official released statistics; publicly accessible and reliable data source
Any comment:	

Data / Parameter:	$CAP_{j,y}$
Data unit:	MW
Description:	The aggregate incrementally installed power capacity of all kinds of power generation sources <i>j</i> (MW) in the NECPG in year <i>y</i>
Source of data used:	China Electric Power Yearbooks (2004-2006)
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official released statistics; publicly accessible and reliable data source
Any comment:	

Data / Parameter:	$CAP_{thermal,y-n,y}$
Data unit:	MW
Description:	The aggregate incrementally installed power capacity of thermal power generation sources (MW) in the NECPG in year <i>y</i> compared to that of year <i>y-n</i>
Source of data used:	China Electric Power Yearbooks (2004-2006)
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official released statistics; publicly accessible and reliable data source
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

The *ex-ante* emission reductions (ER_y) are calculated as follows:

$$ER_y = BE_y - PE_y - L_y$$

Where:

ER_y = Emission reductions in year *y* (tCO₂)

BE_y = Baseline emissions in year *y* (tCO₂)

PE_y = Project Emissions in year *y* (tCO₂)

L_y = Leakage emissions in year *y* (tCO₂)

Project emissions



According to ACM0002, there are no expected project emissions related to the generation of electricity, as generation is based on a renewable resource.

Therefore $PE_y = 0$

Leakage

According to ACM0002, no leakage needs to be considered. Therefore,

$L_y = 0$

Table B.6.1 Key Information and Data Used to calculate the Baseline Emissions

	Per year (average)	7 years
Operating Margin Emissions Factor ($EF_{OM,y}$ in tCO ₂ /MWh)	1.2404	1.2404
Build Margin Emissions Factor ($EF_{BM,y}$ in tCO ₂ /MWh)	0.8631	0.8631
Baseline Emissions Factor (EF_y in tCO ₂ /MWh)	1.1461	1.1461
Electricity supplied to the grid by the Project (EG_y MWh)	103,130	721,910
Baseline Emissions (BE tCO ₂)	118,197	827,379

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

Year	Estimation of project activity emissions (tonnes of CO ₂ e)	Estimation of baseline emissions (tonnes of CO ₂ e)	Estimation of leakage (tonnes of CO ₂ e)	Estimation of overall emission reductions (tonnes of CO ₂ e)
2009 (Aug to Dec)	0	49,249	0	49,249
2010	0	118,197	0	118,197
2011	0	118,197	0	118,197
2012	0	118,197	0	118,197
2013	0	118,197	0	118,197
2014	0	118,197	0	118,197
2015	0	118,197	0	118,197
2016 (Jan to July)	0	68,948	0	68,948
Total (tonnes of CO ₂ e)	0	827,379	0	827,379

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

**B.7.1 Data and parameters monitored:**

Data / Parameter:	<i>EG_y</i>
Data unit:	MWh/year
Description:	Electricity supplied to the grid by the project
Source of data to be used:	Measured
Value of data applied for the purpose of calculating expected emission reductions in section B.6.3	103,130
Description of measurement methods and procedures to be applied:	Cumulative measurement and monthly recording of net electricity supplied to the grid.
QA/QC procedures to be applied:	Meters will be calibrated according to the relevant national standard. Data measured by the main meter will be cross checked using electricity sales receipts.
Any comment:	Data will be archived at least for two years after the end of the crediting period, or the last issuance of CERs, whichever is later

Please refer to Annex 4 for further background documentation

B.7.2 Description of the monitoring plan:

This section details the steps taken to monitor the GHG emissions reductions on a regular basis from the Jilin Da'an Dagangzi Wind Power Project Phase II in People's Republic of China.

The Monitoring set up for this project has been developed to ensure that from the start, the project is well organised in terms of the collection and archiving of complete and reliable data.

1. Monitoring Organisation

Roles and responsibilities will be defined for the relevant staff involved in CDM monitoring, and the prospect of nominating a responsible person will be considered. If appointed, the responsible person will have the overall responsibility for the monitoring system on this project.

A responsible person, or an appropriate senior manager, will manage the process of training new staff, ensuring trained staff perform the monitoring duties and that where trained monitoring staff are absent, the integrity of the monitoring system is maintained by other trained staff.

Records of trained CDM staff will be retained by the Project Developer.

A formal set of monitoring procedures such as training, data quality assurance and control, and relevant back-up procedures will be identified prior to the start of the project. A description of these procedures is provided in Annex 4. It is important to note that these procedures may be based on existing on site practices.

2. Monitoring equipment and installation

Given that the emission factor is calculated *ex-ante*, and referring to the Monitoring Methodology ACM0002, the only data to be monitored is electricity supplied to the grid by the Project (detailed in B.7.1).

The only data to be monitored is the net electricity supplied to the grid by the Project, which is equal to the electricity exported to the grid minus the electricity imported from the grid. (A bidirectional meter will be used to obtain the total net electricity supplied to the grid (the difference between the electricity exported to the grid and imported from the grid) . In the event of erroneous meter readings (where there are either data gaps, or data outliers present), data can be cross-checked against other invoices, bills, power generation statements, or other meters.

Back-up strategy: In the event of erroneous meter(s) readings (where there are either data gaps, or data outliers present), data can be cross-checked against invoices, bills, power generation statements, or other meters (back-up meter, etc). Details of the back-up strategy will be consolidated into the monitoring manual for CDM monitoring.

Electricity meters should meet the relevant standards at the time of installation. Records of the meters (type, make, model and calibration documentation) will be retained in the quality control system.

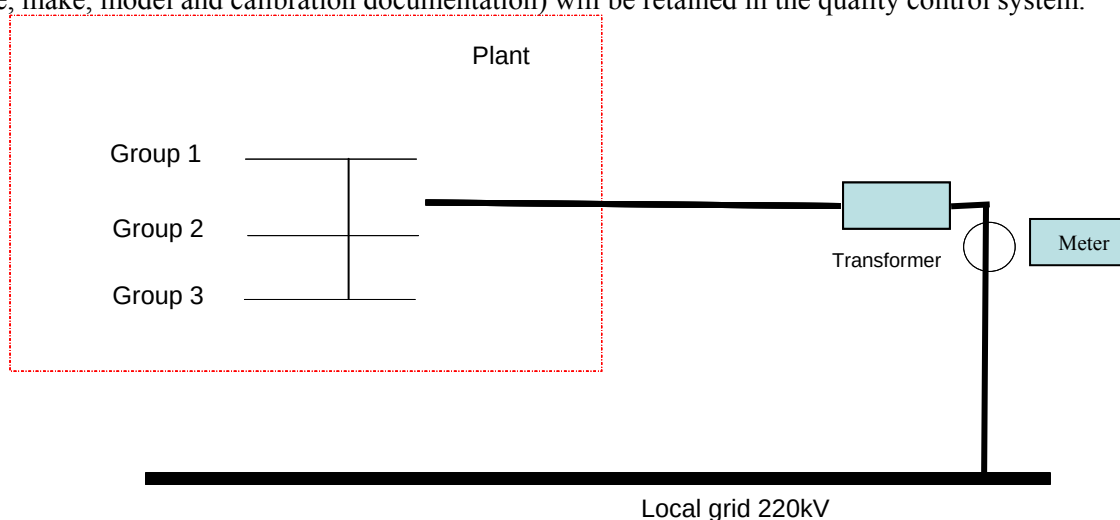


Figure B.7.1 Electric wiring diagram (design – exact configuration may change)

3. Data recording procedure, management and archiving

The monitoring steps are as follows:

- (1) Net electricity supplied to the grid will be monitored continuously and recorded monthly.
- (2) The Project Developer and the Grid Company will confirm the electricity transactions.
- (3) The records of meter(s) readings and copies of sales receipts will be obtained to reflect the actual data of supplied electricity.
- (4) The project developer will archive the data electronically until two years after the end of the crediting period or the last issuance of CERs, whichever occurs later.

All relevant documentation such as technical drawings and reports (the Environmental Impact Assessment and the Feasibility study etc.) should be stored and available for reference. All the data shall be kept until two years after the end of crediting period, or the last issuance of CERs, whichever occurs later.

For details of the operational and management structure, please see Annex 4.



4. Quality Assurance and Quality Control

The quality of data will be maintained through the development of an overarching monitoring system. Relevant operating procedures will be provided to relevant monitoring staff, and the monitoring staff will be supervised. Some other complementary procedures are further outlined in Annex 4. All monitoring data will be reviewed internally by EcoSecurities before it is sent to the verifier.

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 application of the baseline study and monitoring methodology was completed on 14/12/2007. The entity determining the baseline study and the monitoring methodology and participating in the Project as the Carbon Advisor is EcoSecurities Group PLC, listed in Annex 1 of this document as a project participant.

Contact: Contact: Hao Guo, EcoSecurities Group PLC

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Detailed baseline information is attached in Annex 3.

**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:**

>>

12/09/2007 (Date of Purchase Agreement of key equipment)

This is the date of the equipment purchase agreement, which is the date on which the project developer committed to expenditures related to the construction of the project. This is the earliest date at which the implementation or real action of the project began.

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

>>

20 years⁵²**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:**

>>

The crediting period will start on 01/08/2009, or on the date of registration of the CDM project activity, whichever is later.

C.2.1.2. Length of the first crediting period:

>>

7 years

C.2.2. Fixed crediting period:**C.2.2.1. Starting date:**

>>

Not applicable

C.2.2.2. Length:

>>

Not applicable

⁵² p.125 of Feasibility Study

**SECTION D. Environmental impacts**

>>

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

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According to clauses 13 and 19 of the Environmental Evaluation Law of the P. R. China, the project entity must analyse the environmental impacts of project activities in P. R. China before utilising natural resources and beginning project construction. The Project Developer therefore commissioned a third party, the Northeast Coal Industry and Environment Institute, to conduct the required environmental impact assessment (EIA) in 2007, and the EIA report was approved by the Jilin Provincial Environmental Protection Bureau in September 2007 (approval number: Jihuanjian (biao) zi [2007] No. 239).

There are no transboundary impacts related to the Project, and there is no resettlement or relocation of population, buildings or public services required. Therefore social and environmental influences are considered partial, short-term and reversible.

Where impacts of the project were identified, mitigation measures were suggested and defined. The EIA highlights the following with regards to the Project, as shown in the following discussion.

Impact on air

The air pollution from dust and other airborne emissions were expected to exist mainly during the period of construction. Protective measures adopted include stopping work on windy days and reducing the speed of vehicles. As the period of construction is short, the impacts on air are deemed to be insignificant after conducting these mitigation measures. During operation, there will be no bad gas emissions generated by the Project.

Impact from noise

The operation of the wind turbines will generate continuous low-level noise. It is said in the EIA that 600m away from the turbine is a reasonable distance for residents to not experience any significant adverse noise impacts. The nearest resident area, however, is 2.3km away from the project location. Therefore, the noise of the turbines will not affect the local residents.

Electromagnetic impact

The operation of the wind farm will generate electromagnetic energy, however, it has little effect on residents. According to the survey of the local residents near the Project, no impact to local residents and electronic equipments was detected. Furthermore, the site of the Project is far from the residential area. Therefore, there is no significant electromagnetic impact expected to be generated.

Impacts from solid waste

Most of the waste earth produced in the construction shall be refilled back to the foundations of the turbines. The staff waste during the construction period will be collected and transported to Baicheng municipal landfill.

Impacts on vegetation

The land area permanently taken by the project will be 68,847m², most of which is grassland. There is little biomass resource and rare plant species in the area. As the lands will be replanted after completion of the project construction, the impacts on grassland are considered insignificant.

**Biological impact**

There are very few animals at the site and no protected animal has been detected where the project is constructed. Therefore, there is no significant impact by the Project to the local ecosystem.

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:

>>

With mitigation controls planned as part of the project construction and EIA process, and the contribution made by the project to sustainable development for the local and national area, the project is expected to have an overall positive impact on the local and global environment. All negative environmental impacts are subject to mitigation measures as described above.

**SECTION E. Stakeholders' comments**

>>

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

>>

The stakeholder consultation for the Project activity took place in February 2008. During the consultation, local stakeholders were invited to submit comments on the Project activity by filling a questionnaire sent out by the Project Developer. The Project Developer put the notice at the project management office as well as the government building around the project site and also randomly sent the questionnaire out around the project site.

The questionnaires included a technical description of the Project as well as a brief explanation of how the project activity mitigates climate change through the Clean Development Mechanism of the Kyoto Protocol and brings sustainable development benefits. The questions asked were as follows:

- What impacts do you think the CDM Project activity will have on the local environment?
- What impacts do you think the CDM Project activity will have on employment and social welfare in the local area?
- Are there any negative impacts on your livelihood during the construction of the CDM Project?
- What would be the overall positive effects of the construction and operation of the CDM Project?
- What would be the overall negative effects of the construction and operation of the CDM Project?
- What is your attitude towards the construction of the CDM Project?
- Do you support the construction of the CDM Project?

30 questionnaires were sent to the stakeholders by the Project Developer. The full list of stakeholders consulted is available.

E.2. Summary of the comments received:

>>

The survey received 100% participation (30 questionnaires returned out of 30). The survey shows the stakeholders believe that the proposed CDM project activity will have positive impacts on the local ecological, environmental, employment and social life. All stakeholders expressed their support to the proposed project.

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

>>

No negative comments have been received on the project.

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

This project will not receive any public funding.



Annex 3
BASELINE INFORMATION

Calculation of the Operating Margin Emission Factor of Northeast China Power Grid

Table A1 CO₂ emissions from thermal power plants of the Northeast China Power Grid (2003)

Fuel	Unit	Liaoning	Jilin	Heilongjian g	Northeast china grid	Carbon coefficien t	Oxidation factor	NCV	CO2 emissions (tCO ₂ e)
						(tc/TJ)	(%)	(MJ/t,km ³)	$H=G*D*E*F*44/12/1000$ 0
		A	B	C	D=A+B+C	E	F	G	$H=G*D*E*F*44/12/1000$ (unit of volume)
Raw coal	10 ⁴ Tons	3556.51	2006.66	2763.62	8326.79	25.8	100	20,908	164695313
Clean coal	10 ⁴ Tons	70.83		3	73.83	25.8	100	26,344	1839948.734
Other washed coal	10 ⁴ Tons	617.04	15.9	53.41	686.35	25.8	100	8,363	5429988.017
Coke	10 ⁴ Tons				0	29.2	100	28,435	0
Coke oven gas	10 ⁸ m ³	1.66			1.66	12.1	100	16,726	123184.7599
Other gas	10 ⁸ m ³	5.31			5.31	12.1	100	5,227	123141.3249
Crude oil	10 ⁴ Tons	3.39			3.39	20	100	41,816	103954.576
Gasoline	10 ⁴ Tons					18.9	100	43,070	0
Diesel	10 ⁴ Tons	0.32	0.34		0.66	20.2	100	42,652	20850.00368
Fuel oil	10 ⁴ Tons	14.87	0.7	4.32	19.89	21.1	100	41,816	643474.2257
LPG	10 ⁴ Tons	1.55			1.55	17.2	100	50,179	49051.64513
Refinery gas	10 ⁴ Tons	4.03		0.46	4.49	15.7	100	46,055	119040.3542
Natural gas	10 ⁸ m ³		0.04	4.47	4.51	15.3	100	38,931	984997.1241
Other petroleum products	10 ⁴ Tons				0	20	100	38,369	0
Other coking products	10 ⁴ Tons				0	25.8	100	28,435	0
Other E (standard coal)	10 ⁴ Tce	29.38			29.38	0	100	0	0
								Total	174132943.7



Data source: China Energy Statistics Yearbook 2004

Table A2 Electricity Generation of Northeast China Power Grid (2003)

Province	Thermal Power generation (100 million kWh)	Thermal Power generation (MWh)	Losses (%)	Thermal power supply (MWh)
Liaoning	797.51	79,751,000	7.17	74,032,853
Jilin	297.39	29,739,000	7.32	27,562,105
Heilongjiang	484.93	48,493,000	8.48	44,380,794
Total				145,975,752

Data source: China Energy Statistics Yearbook 2004

Table A3 CO₂ emissions from thermal power plants of the Northeast China Power Grid (2004)

Fuel	Unit	Liaoning	Jilin	Heilongjiang	Northeast china grid	Carbon coefficient (tc/TJ)	Oxidation factor (%)	NCV (MJ/t,km3)	CO2 emissions (tCO ₂ e) $H=G*D*E*F*44/12/10000$ $H=G*D*E*F*44/12/1000$ (unit of volume)
		A	B	C	D=A+B+C	E	F	G	
Raw coal	10 ⁴ Tons	4144.2	2310.9	3084.8	9539.9	25.8	100	20,908	188689376.8
Clean coal	10 ⁴ Tons	84.75	1.09	4.88	90.72	25.8	100	26,344	2260871.585
Other washed coal	10 ⁴ Tons	577.67	14.26	61	652.93	25.8	100	8,363	5165589.096
Coke	10 ⁴ Tons				0	29.2	100	28,435	0
Coke oven gas	10 ⁸ m ³	4.83	2.91		7.74	12.1	100	16,726	574367.4948
Other gas	10 ⁸ m ³	57.33	4.19		61.52	12.1	100	5,227	1426676.894
Crude oil	10 ⁴ Tons				0	20	100	41,816	0
Gasoline	10 ⁴ Tons					18.9	100	43,070	0



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Diesel	10 ⁴ Tons	2.04	1.16	0.24	3.44	20.2	100	42,652	108672.7465
Fuel oil	10 ⁴ Tons	12.81	1.78	2.86	17.45	21.1	100	41,816	564536.2111
LPG	10 ⁴ Tons	2.19			2.19	17.2	100	50,179	69305.22764
Refinery gas	10 ⁴ Tons	9.79		1.14	10.93	15.7	100	46,055	289779.7487
Natural gas	10 ⁸ m ³		0.03	2.53	2.56	15.3	100	38,931	559111.4496
Other petroleum products	10 ⁴ Tons				0	20	100	38,369	0
Other coking products	10 ⁴ Tons				0	25.8	100	28,435	0
Other E (standard coal)	10 ⁴ Tce	26.97	5.07		32.04	0	100	0	0
								Total	199708287.3

Data source: China Energy Statistics Yearbook 2005

Table A4 Electricity Generation of Northeast China Power Grid (2004)

Province	Thermal Power generation (100 million kWh)	Thermal Power generation (MWh)	Losses (%)	Thermal power supply (MWh)
Liaoning	845.43	84,543,000	7.21	78,447,450
Jilin	332.42	33,242,000	7.68	30,689,014
Heilongjiang	534.82	53,482,000	7.84	49,289,011
Total				158,425,475

Data source: China Energy Statistics Yearbook 2005

Table A5 CO₂ emissions from thermal power plants of the Northeast China Power Grid (2005)

Fuel	Unit	Liaoning	Jilin	Heilongjiang	Northeast china grid	Carbon coefficient (tc/TJ)	Oxidation factor (%)	NCV (MJ/t,km3)	CO2 emissions (tCO ₂ e) $H=G*D*E*F*44/12/10000$ $H=G*D*E*F*44/12/1000$ (unit of volume)
		A	B	C	D=A+B+C	E	F	G	
Raw coal	10 ⁴ Tons	4305.41	2446.13	3383.21	10134.75	25.8	100	20,908	200454895.9
Clean coal	10 ⁴ Tons				0	25.8	100	26,344	0
Other washed coal	10 ⁴ Tons	524.74	19.26	24.16	568.16	25.8	100	8,363	4494939.888
Coke	10 ⁴ Tons				0	29.2	100	28,435	0
Coke oven gas	10 ⁸ m ³	1.03	3.57	0.68	5.28	12.1	100	16,726	391816.5856
Other gas	10 ⁸ m ³	12.62	8.37		20.99	12.1	100	5,227	486767.6854
Crude oil	10 ⁴ Tons	1.16			1.16	20	100	41,816	35571.47733
Gasoline	10 ⁴ Tons				0	18.9	100	43,070	0
Diesel	10 ⁴ Tons	1.18	1.48	0.57	3.23	20.2	100	42,652	102038.6544
Fuel oil	10 ⁴ Tons	9.32	2.46	1.55	13.33	21.1	100	41,816	431247.4323
LPG	10 ⁴ Tons	0.12			0.12	17.2	100	50,179	3797.54672
Refinery gas	10 ⁴ Tons	5.48		1.32	6.8	15.7	100	46,055	180283.8327
Natural gas	10 ⁸ m ³		0.84	2.24	3.08	15.3	100	38,931	672680.9628
Other petroleum products	10 ⁴ Tons				0	20	100	38,369	0
Other coking products	10 ⁴ Tons				0	25.8	100	28,435	0
Other E (standard coal)	10 ⁴ Tce	16.18			16.18	0	100	0	0
								Total	207254040

Data source: China Energy Statistics Yearbook 2006



Table A6 Electricity Generation of Northeast China Power Grid (2005)

Province	Thermal Power generation (100 million kWh)	Thermal Power generation (MWh)	Losses (%)	Thermal power supply (MWh)
Liaoning	836.97	83,697,000	7.03	77,813,101
Jilin	352.94	35,294,000	6.59	32,968,125
Heilongjiang	580	58,000,000	7.96	53,383,200
Total				164,164,426

Data source: China Energy Statistics Yearbook 2006

Table A7 Operating Margin Emission Factor of the Northeast China Power Grid

	Emission Factor	Electricity generated(MWh)	Emission
OM2003	1.193019	145,975,752	174151899.2
OM2004	1.260873	158,425,475	199754430.5
OM2005	1.262653	164,164,426	207282747.6
Average EF_{OM} (tCO₂/MWh)	1.2404		

Calculation of the Build Margin Emission Factor of Northeast China Power GridTable A8 Calculation of CO₂ Emission of Solid, Liquid and Gas Fuel for Power Grid

Fuel	Unit	Liaoning	Jilin	Heilongjiang	Northeast China Grid	NCV (KJ/kg)	Carbon coefficient (tc/TJ)	Oxidation factor (%)	CO2 emissions (tCO ₂ e) $H=D*E*F*G*44/12/10000$
		A	B	C	D=A+B+C	E	F	G	$H=D*E*F*G*44/12/1000$
Raw coal	10 ⁴ Tons	4305.41	2446.13	3383.21	10134.75	20,908	25.8	100	200,454,896
Clean coal	10 ⁴ Tons				0	26,344	25.8	100	0
Other washed coal	10 ⁴ Tons	524.74	19.26	24.16	568.16	8,363	25.8	100	4,494,940
Coke	10 ⁴ Tons				0	28,435	29.2	100	0
Coal total	10 ⁴ Tons								204,949,836
Crude oil	10 ⁴ Tons	1.16			1.16	41,816	20	100	35,571



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Gasoline	10 ⁴ Tons				0	43,070	18.9	100	0
Coke oil	10 ⁴ Tons				0	43,070	19.6	100	0
Diesel	10 ⁴ Tons	1.18	1.48	0.57	3.23	42,652	20.2	100	102,039
Fuel oil	10 ⁴ Tons	9.32	2.46	1.55	13.33	41,816	21.1	100	431,247
Other petroleum products	10 ⁴ Tons				0	38,369	20	100	0
Oil total	10 ⁴ Tons								568,858
Natural gas	10 ⁸ m ³		8.4	22.4	30.8	38,931	15.3	100	672,681
Coke oven gas	10 ⁸ m ³	10.3	35.7	6.8	52.8	16,726	12.1	100	391,817
Other gas	10 ⁸ m ³	126.2	83.7		209.9	5,227	12.1	100	486,768
LPG	10 ⁴ Tons	0.12			0.12	50,179	17.2	100	3,798
Refinery gas	10 ⁴ Tons	5.48		1.32	6.8	46,055	15.7	100	180,284
Gas Total									1,735,347
Total									207,254,040

Data source: China electricity statistical yearbook 2006

Table A9 Installed capacities of Northeast China Power Grid (1998)

Power type	unit	Liaoning	Jilin	Heilongjiang	Total
Thermal power	MW	12560.3	4428.6	9,116	26104.9
Wind power	MW	1223.1	3474.7	784.5	5482.3
Nuclear	MW				0
Others	MW	17			17
Total	MW	13800.4	7903.3	9900.5	31604.2

Data source: China electricity statistical yearbook 1999

Table A10 Installed capacities of Northeast China Power Grid (1999)

Power type	unit	Liaoning	Jilin	Heilongjiang	Total
Thermal power	MW	12425.7	4583.1	10128.1	27136.9
Wind power	MW	1240	3508.2	774.5	5522.7



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Nuclear	MW				0
Others	MW	22.9			22.9
Total	MW	13688.6	8091.3	10902.6	32682.5

Data source: China electricity statistical yearbook 2000

Table A11 Installed capacities of Northeast China Power Grid (2005)

Power type	unit	Liaoning	Jilin	Heilongjiang	Total
Thermal power	MW	15,999	6359.4	11575.6	33,934
Wind power	MW	1403.9	3720.8	846.7	5971.4
Nuclear	MW				0
Others	MW	135.5	85.4	52.4	273.3
Total	MW	17538.4	10165.6	12474.7	40178.7

Data source: China electricity statistical yearbook 2006

Table A12 Emission factor of coal-fired plants, gas-fired plants and oil-fired plants in the Northeast China Power Grid

	variable	efficiency of power supply	Carbon coefficient(tc/TJ)	Oxidation factor	EF(tcCO ₂ /MWh)
		A	B	C	$D=3.6/A/1000*B*C*44/12$
Coal plant	EF _{coal,adv}	35.82%	25.8	1	0.9508
Gas plant	EF _{gas,adv}	47.67%	15.3	1	0.4237
Oil plant	EF _{oil,adv}	47.67%	21.1	1	0.5843

Table A.13. Share of different fossil fuels in the total CO₂ emissions from thermal power plants of the Northeast China Power Grid

Item	Value
λ _{coal}	98.89%



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λ_{oil}	0.27%
λ_{gas}	0.84%

According to the table A9 and formula: $\lambda_{coal}=98.89\%$; $\lambda_{oil}=0.27\%$; $\lambda_{gas}=0.84\%$.

Therefore $EF_{thermal} = \lambda_{coal} * 0.9508 + \lambda_{oil} * 0.5843 + \lambda_{gas} * 0.4237 = 0.9453 \text{ tCO}_2\text{e/MWh}$

Table A14 Incremental installed capacity from 1998-2005

	A	B	C	D	E
	Installed Capacity 1998	Installed Capacity 1999	Installed Capacity 2005	Installed Capacity 2005-1998	Ratio of Thermal Capacity Additions to Total Capacity Additions
	MW	MW	MW	MW	%
Thermal (MW)	26104.9	27136.9	33,934	7829.1	91.31%
Wind power (MW)	5482.3	5522.7	5971.4	489.1	5.70%
Nuclear (MW)	0	0	0	0.0	0.00%
Other (MW)	17	22.9	273.3	256.3	2.99%
Total (MW)	31604.2	32682.5	40178.7	8574.5	100.00%
Percentage of 2005 capacity	78.66%	81.34%	100.00%		

$EF_{grid,BM,y} = 0.9453 * 91.31\% = 0.8631 \text{ tCO}_2\text{/MWh}$

Table A15 Baseline Emission Factor of the Northeast China Power Grid (tCO₂/MWh)

A	Operating Margin Emission Factor	1.2404
B	Build Margin Emission Factor	0.8361
C	Combined Emission Factor ($C=0.75*A+0.25*B$)	1.1461

**Annex 4****FURTHER DETAILS OF THE MONITORING PLAN****Table 4.1.** CDM Monitoring System Procedures

Procedure name	Description
CDM Staff training	This procedure outlines the steps to ensure that staff receive adequate training to collect and archive complete and accurate data necessary for CDM monitoring.
CDM data and record keeping arrangements	This procedure provides details of the sites data and record keeping arrangements. The arrangements ensure that complete and accurate records are retained by the appropriate senior Manager within the quality control system.
Data collection	This procedure will outline the steps to collect the data from the meter(s).
CDM data quality control and quality assurance	Data and records will be checked prior to being stored and archived. Data from the project will be checked to identify possible errors or omissions. The data checks will include cross checks of the electricity meter(s), and checks of the electricity figures on the receipts. All records will be checked for completeness.
Electricity meter check	This procedure outlines the steps to provide regular and preventative check to the electricity meter(s)
Equipment failure	This procedure details the process of data collection in the case that a problem with any meter occurs.
Equipment calibration	This procedure details the process of organising and managing the calibration process. The procedure includes details of how a suitable company or organisation is commissioned to undertake the calibration to the relevant standards.

The above procedures will be available during the verification and will be documented as part of the monitoring support material. The procedures may be contained in a single document (e.g. a monitoring manual) for CDM monitoring rather than separate procedures. Some of these procedures may exist in the form of existing on-site practises.

**Table 4.2.** Operational procedures and responsibilities for monitoring and quality assurance of emissions reductions from the project activity

Task	On-site technician	Operations manager	Project developer's head office	Head of Maintenance / External company	EcoSecurities
Collect Data	E	R	N/A	N/A	N/A
Enter data into Spreadsheet	N/A	E	R	N/A	N/A
Make monitoring reports	N/A	E	R	N/A	I
Archive data & reports	N/A	E	R	N/A	N/A
Calibration/ Maintenance	I	I	I	E	I

Legend: *E* = responsible for executing data collection, *R* = responsible for overseeing and assuring quality, *I* = to be informed

Annex 5 VCS requirement

According to Policy Announcement from the VCS Association, a further validation shall be completed of clauses 1.5, 1.12, 1.13, 1.14, 8.1 and 8.2 of the VCS Project Description template. Therefore, the description of clauses 1.12, 1.13, 1.14, 8.1 and 8.2 is shown as follows:

1.5 Project location including geographic and physical information allowing the unique identification and delineation of the specific extent of the project:

The project is located near the village of Shanggang, Dagangzi County, Da'an City, Jilin Province, People's Republic of China (P.R.China).

The exact location of the project is defined using geographic coordinates obtained with a Global Positioning System (GPS) receiver: E. 123 35'26"~ 123 38'58" Longitude, N 44 18'23"~ 45 18'46" Latitude. These geographic coordinates are for the centre of the wind farm.



Figure A.4.1 The Location of Jilin Province in China

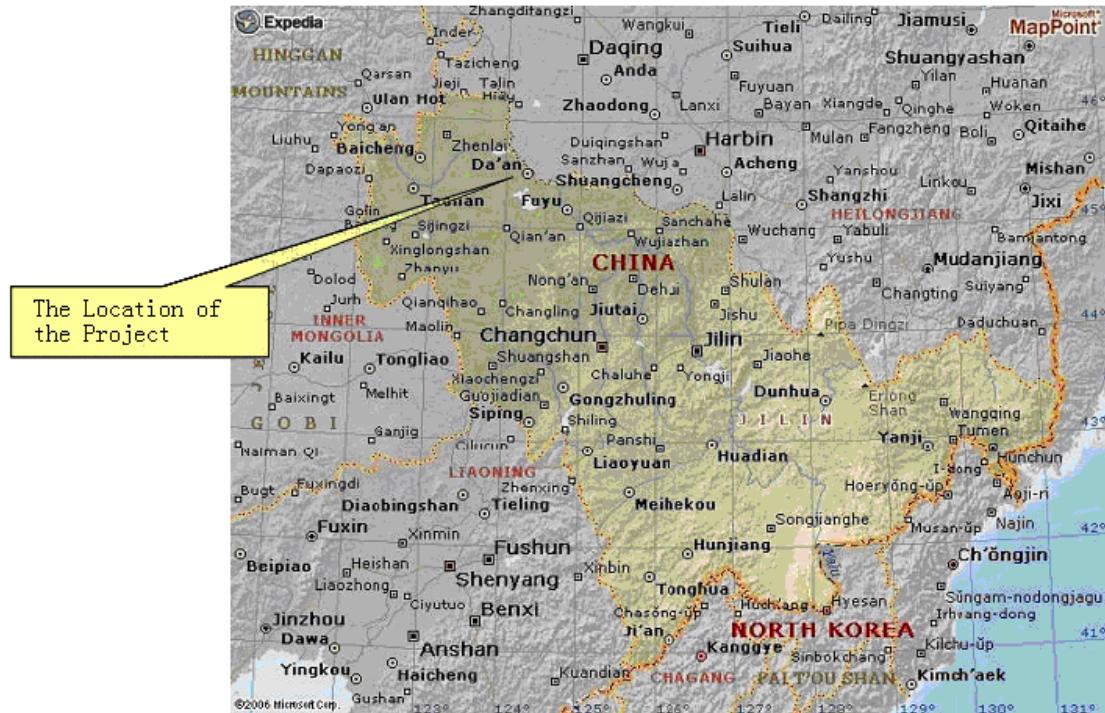


Figure A.4.2 The Location of the Project

1.12 Demonstration to confirm that the project was not implemented to create GHG emissions primarily for the purpose of its subsequent removal or destruction.

The Project is a new-built wind power project with the project emission is zero. Furthermore, the purpose of the Project is to utilize the local wind resources to generate electricity, which will be delivered to Northeast China Power Grid (hereafter referred to as “NECPG” or the “Grid”) without CO₂ emissions. The Project will achieve GHG emission reductions by displacing equivalent electricity supplied by NECPG, which is predominated by fossil fuel-fired power plants, that would otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources. So, the project was not implemented to create GHG emissions primarily for the purpose of its subsequent removal or destruction.

1.13 Demonstration that the project has not created another form of environmental credit (for example renewable energy certificates)

The Project has been registered as a CDM project in UNFCCC on Mar. 09th, 2010. So the Credit which be issued after Mar. 09th, 2010 would be used as a CDM credit. But the project proponent chose a clear VCS crediting period from Jan 1st, 2009 to Mar. 08th, 2010 which has not created another form of environmental credit.

1.14 Project rejected under other GHG programs (if applicable):

Not applicable.

8.1 Proof of Title:

The approval of EIA and FSR are evidences for legislative right. Besides, the purchasing contract of wind turbine and the purchasing power agreement are the evidences for the ownership of the plant, equipment and process generating.

8.2 Projects that reduce GHG emissions from activities that participate in an emissions trading program (if applicable):

The Project has been registered as a CDM project in UNFCCC on Mar. 09th, 2010. So the Credit which be issued after Mar. 09th, 2010 would be used as a CDM credit. But the project proponent chose a clear VCS crediting period from Jan 1st, 2009 to Mar. 08th, 2010 which has not created another form of environmental credit.