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

CONTENTS

Annexes

SECTION A. General description of project activity

A.1 Title of the project activity:

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Heilongjiang Daqing Ruihao Wind Farm Project
Version number of the document: 2
Date: 12/02/2009

Version	Date	Comments
Version 1	30/06/2008	GSP version
Version 2	12/02/2009	First respond based on validation protocol

A.2.Description of the project activity:

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The Heilongjiang Daqing Ruihao Wind Farm Project (hereafter refers to the proposed project) is to utilize wind resources for electricity generation through the construction of a wind farm with a total capacity of 49MW in Bayan Chagan of Durbat Mongolian Autonomous County, Daqing City, Heilongjiang Province, P.R.China. The electricity generated from the project will be sold to Heilongjiang Provincial Power Grid, an integral part of the North East China Power Grid. By replacing the electricity generated from fossil fuel-fired power plants dominated Northeast China Power Grid, the proposed project activity will achieve obvious greenhouse gas (GHG) emission reductions by avoiding CO_2 emissions.

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

(a) Prior to the start of implementation of the project activity, there is no power generation unit at the site of the proposed project, and the electricity was supplied by the Northeast China Power Grid which was dominated by fossil fuel-fired power plants.

(b) The project scenario is the implementation of the proposed project, the installation and operation of 36 sets wind turbines with total installed capacity of 49MW which will supply an average annual generation of 108,783MWh to Northeast China Power Grid and replace the same amount of electricity generated by fossil fuel-fired power plants connected to Northeast China Power Grid. According to ACM0002 applied, the proposed project is a zero-emission electricity generating activity.

(c) The baseline scenario of the proposed project is the electricity supply of equal amount as the proposed project from the Northeast China Power Grid. The baseline scenario of the proposed project is the same against the scenario prior to the start of the implementation of the project activity.

The proposed project is located in Bayan Chagan of Durbat Mongolian Autonomous County, Daqing City, Heilongjiang Province, P.R.China. The proposed project involves the installation of 36 sets wind turbines with capacities of 10 sets of DW1.0/56 Wuhan Guoce, 10 sets of HFD1500(77) Hadian and 16 sets of HV-1500 Shenyang Gongda, which total installed capacity of 49MW. The proposed project is constructed and operated by Daqing LongJiang Wind Power Co., Ltd. The estimated annual net electricity output and average annual emission reductions of the proposed project are 108,783 MWh and 124,089 tCO_2e, respectively.

The proposed project makes contribution to the local sustainable development as follows:

1. GHG emission reduction

The proposed project activity will achieve obvious greenhouse gas (GHG) emission reductions by avoiding CO_2 emissions, as grid-connected fossil fuel-fired power dominates in the Northeast China Power Grid.

2. Pollutants emission reduction through replacing fossil fuel combustion
The proposed project is to replace grid-connected fossil fuel-fired power plants in the Northeast China Power Grid, and thus reduce fossil fuel consumption and avoid pollutants emission, such as sulfur dioxide and dust, brought by fossil fuel combustion. Therefore, the proposed project has obvious environmental benefit.

3. Employment opportunities
The conducting of the proposed project will create local employment opportunities during the assembly and installation of wind turbines, road construction and for operation of the wind farm.

4. Economic Improvement
The construction of the wind farm will achieve the economic growth in the local area through employment creation. Furthermore, the project contributes to local government with more tax revenues by selling power generation.

A.3. Project participants:

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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)
The Peoples' Republic of China (host)	Daqing LongJiang Wind Power Co., Ltd	No
The United Kingdom of Great Britain and Northern Ireland	Goldman Sachs International	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:

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A.4.1.1. Host Party(ies):

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The People's Republic of China

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

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Heilongjiang Province

A.4.1.3. City/Town/Community etc:

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Bayan Chagan of Durbat Mongolian Autonomous County, Daqing City

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

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The proposed project locates in Bayan Chagan of Durbat Mongolian Autonomous County, Daqing City, Heilongjiang Province, and P. R. China. The project has geographical coordinates with east longitude of 124°02'44"and north latitude of 46°22'04". The figures A1 and A2 show the geographical location of the proposed project.

Figure A1. The proposed project in the map of P. R. China

Figure A2. The proposed project in the map of Heilongjiang Province, P. R. China

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

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

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

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The proposed project is to utilize wind sources for electricity generation in Bayan Chagan of Durbat Mongolian Autonomous County, Daqing City, Heilongjiang Province, the P. R. of China. The proposed project is a grid-connected renewable energy project.

Prior to the start of implementation of the project activity, there is no power generation unit at the site of the proposed project, and the electricity was supplied by the Northeast China Power Grid. The baseline scenario of the proposed project is the electricity supply of equal amount as the proposed project from the Northeast China Power Grid. The baseline scenario of the proposed project is the same against the scenario prior to the start of the implementation of the project activity.

The proposed project involves the installation of 36 sets of wind turbines with 10 sets unit capacity of 1000 kW of DW1.0/56 Wuhan Guoce, 10 sets unit capacity of 1500 kW of HFD1500(77) Hadian and 16 sets unit capacity of 1500 kW of HV-1500 Shenyang Gongda, which total installed capacity of 49MW. And the annual operating hours is 2220 hours, and the expected electricity supply is 108,783MWh. The main technical specifications of the wind turbine are provided in the following table.

Item	Unit	Hadian	Shenyang Gongda	Guo Ce
Rated capacity	kW	1500	1500	1000
Rated voltage	V	690	690	690
Number of blades		3	3	2
Turbines type		HFD1500(77)	HV-1500	DW1.0/56
Rotor diameter	m	77	70	56
Start-up speed	m/s	3	4	5
Rated wind speed	m/s	12.5	12 ~ 15	15
Shutoff speed	m/s	25	25	25
Safe wind speed	m/s	59.5	50 ~ 70	60
Height of hub	m	70	70	70
Average lifetime	year	20	20	20
Load factor		0.26	0.26	0.26
Manufacturing plant		Hanwei Wind Power Equipage (Daqing) Co. Ltd.	Daqing Deta Electic Co. Ltd.	Wuhan Guoce Nordic New Energy Co.,Ltd

A110kV Ruihao substation will be set up at the site which connects the proposed project to the 110kV Aolin Substation and then pass through 110kV Feng - Ao line to 220kV Xianfeng substation which can be transmitted to the Heilongjiang Provincial Power Grid. The power generated will be supplied to the Heilongjiang Provincial Power Grid, which is an integral part of the Northeast China Power Grid. Grid-connected electricity generated by the proposed project will be monitored through one pair of bidirectional meters (0.2s, M1 is main meter and another M1' is for back-up) at the 110 kV Ruihao substation. The data can also be monitored and recorded at the on-site (110 kV Ruihao substation) control centre using a computer system. Another pair of bidirectional meters (0.2s, M2 is main meter and another M2' is for back-up) will be installed at the 110kV Aolin substation which belongs to the Local Grid Company. Before the project is in operation, both the project owner and the grid company will check the meters to ensure their work properly.

The project will apply domestic-made state-of-art wind turbines, thus it doesn't involve any international technology transfer.

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

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A crediting period of 7 (2009.9 – 2016.8) years (renewable twice) is selected for the project activity. An estimation of emissions reductions expected over the crediting period is provided in the table below.

Years	**Annual estimation of emission reductions in tonnes of CO_2e**
2009 (Sep.-Dec.)	41,363
2010	124,089
2011	124,089
2012	124,089
2013	124,089
2014	124,089
2015	124,089
2016 (Jan.- Aug.)	82,726
Total estimated reductions of the first crediting period (tonnes of CO_2e)	**868,621**

Total number of the first crediting years	**7**
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	**124,089**

A.4.5. Public funding of the project activity:

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

SECTION B. Application of a baseline and monitoring methodology

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

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The approved methodology applied in the proposed project activity is ACM0002 (version 07) – "Consolidated methodology for grid-connected electricity generation from renewable sources".

"Tool for the Demonstration and Assessment of Additionality (version 5.2)" and "Tool to calculate the emission factor for an electricity system (version 1.1)" is also applied in the proposed project.

For more information regarding the methodologies please refer to
http://cdm.unfccc.int/metholdogies/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 proposed project meets all applicability conditions of methodology ACM0002 which are listed as follows:

1) The proposed project is a new wind power project;
2) The proposed project does not involve switching from fossil fuels to renewable energy at the site;
3) The geographic and system boundaries of North East China Power Grid to which the proposed project will be connected can be clearly identified and information on the characteristics of the gird is available.

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

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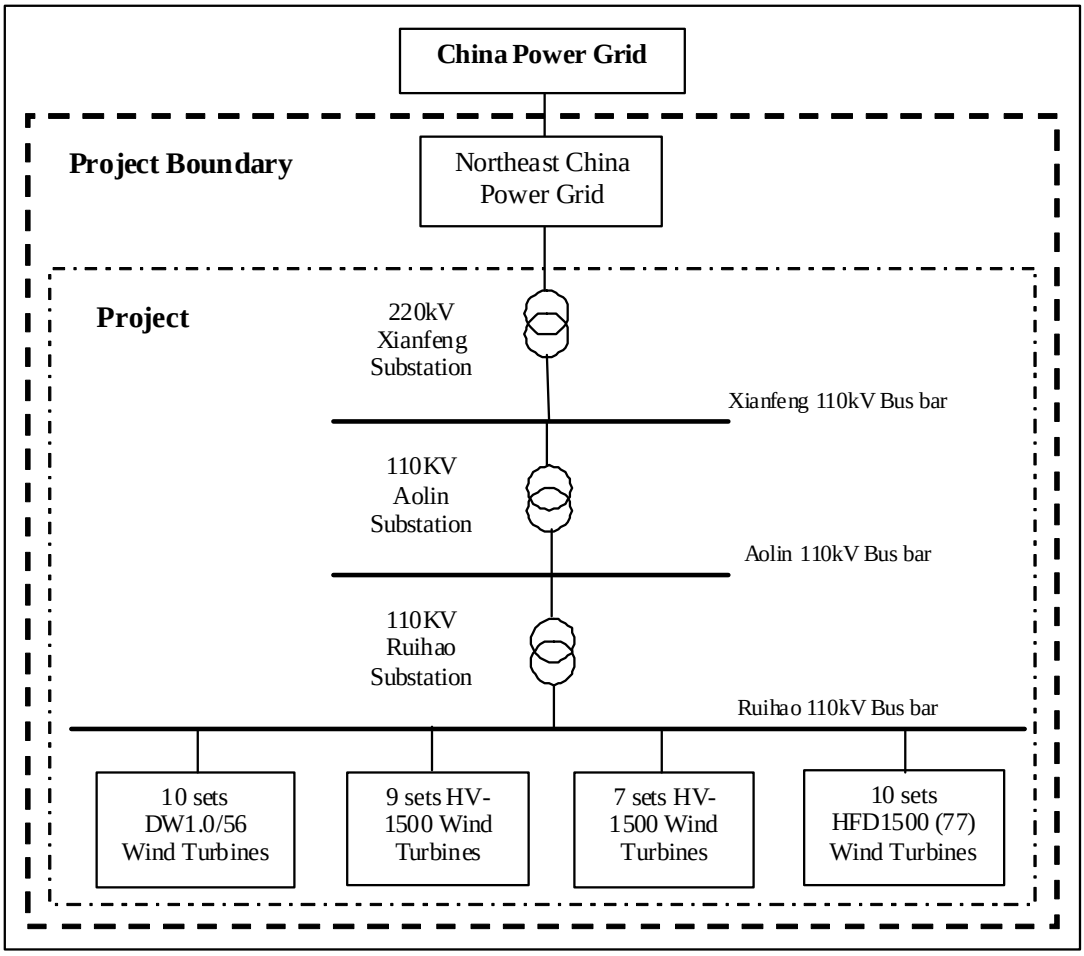
	Source	Gas	Included?	Justification / Explanation
Baseline	Fossil fuel-fired power plants in the North East China Power Grid	CO_2	Yes	Major emission sources.
		CH_4	No	Minor emission source. Excluded for simplification. This is conservative.
		N_2O	No	
Project Activity	Emissions from the Project power plant	CO_2	No	As per the methodology ACM0002, the project emission for wind energy project is considered to be zero.
		CH_4	No	
		N_2O	No	

The boundary of the proposed project includes the physical and geographical boundaries of the proposed project and all the grid-connected power plants in the North East China Power Grid. Therefore, the project boundary is the North East China Power Grid, which includes Liaoning, Jilin and Heilongjiang Power Grids[1], which is shown in the below flow diagram.

[1] *Bulletin on determining the 2008 baseline emission factors for regional power grids in China*, Office of National Coordination Committee on Climate Change, NDRC, http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=3239



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

According to the consolidated baseline methodology ACM0002 (version07), 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 resources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

The Project activity is the installation of a new grid-connected renewable power plant that connects with and delivers electricity to Heilongjiang Power Grid. According to the "*Tool to calculate the emission factor for an electricity system*", the delineation of grid boundaries of the Project is the Northeast China Power Grid. 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 Northeast China Power Grid which the Project is connected to". Detailed analysis please refers to Section B.5.

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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Consideration of CDM before Construction

The staring date of the proposed project is on 23rd Jan. 2007 before the date when the project was submitted for validation. The incentive from CDM was seriously considered in the decision to proceed with the Project activity. The decision to proceed with the project was made at the board meeting of the major investor separately in May 2006 and December 2006. From Dec. 2006 to Dec. 2007, project owner communicated with several buyers and consultant companies for cooperation, relevant evidence had been provided to DOE. The meeting minutes showed that the CDM incentive was seriously considered when the decision was made to proceed with the project. Key milestones during the development of the Project are summarized below:

Time	Milestone
16/05/2006	According to the experience from other wind projects in Heilongjiang province, Board of project owner considered the CDM for the proposed Project.
08/2006	Feasibility Study Report (FSR) completed
12/2006	According to the initial evaluation by a designing institute, based on the information of the Project and the tariff, the Board of project owner realized that the Project had investment risk, but the additional CDM revenue generated by the Project could greatly reduce the risk and thus decided to apply for the Project.
23/01/2007	Shen Gongda equipment purchase agreement signed (with Daqing Deta)
01/02/2007	Wuce equipment purchase agreement signed (with Wuhan Guoce)
16/04/2007	Hadian equipment purchase agreement signed (with Hanwei)
13/08/2007	Construction contract signed
18/08/2007	Construction work started
03/12/2007	ERPA signed with Goldman Sachs International
24/07/2008	Started communication with BUREAU VERITAS CERTIFICATION HOLDING S.A.S.
22/09/2008	LOA of P.R.China
03/2009	Commissioning

The additionality of the proposed project is demonstrated and assessed as follows by using the "Tool for the Demonstration and Assessment of Additionality" (Version 5.2) approved by CDM EB.

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

Define realistic and credible alternatives to the project activity(s) that can be (part of) the baseline scenario through the following sub-steps:

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

In absence of the proposed project, reasonable and credible alternatives that are in accordance with current laws and regulations include:

1) The proposed project not undertaken as CDM project;
2) Construction of a fossil fuel power plant with equivalent amount of annual electricity output;
3) Construction of a power plant using other source of renewable energy with equivalent amount of annual electricity output; and
4) Supply of equivalent annual power output by the Grid to which the proposed project is connected.

Specific analysis on the four alternative scenarios in absence of the proposed project is as follows:

1) According to the investment analysis in Section B5, the Project IRR of the proposed project is only 6.92%. The development of the proposed project under fully commercialized conditions without CDM could not be financially attractive. Therefore, the Scenario 1 is not a feasible alternative.
2) The alternative fossil fuel power plant with the equivalent power output as the proposed project will be less than 135MW, while fossil fuel-fired plants with a capacity of 135MW or less are prohibited from development in large grid such as provincial girds[2], according to current regulations in China. Consequently, Scenario 2 is ruled out from being a feasible alternative.
3) Besides wind power, Solar PV, geothermal, biomass and hydro are the possible grid-connected renewable energy options that could be applied in the North East China Power Grid besides wind energy. Limited by the status of technological advancement and high investment costs, solar PV, geothermal and biomass options are far from being economically attractive. Biomass for power generation is no economic attractive.[3] Hydropower is comparable to wind power in China, however, the project locates at the Bayan Chagan of Durbat Mongolian Autonomous County of Heilongjiang province with flat landform, where lacks of usable hydro resource for developing hydropower[4]. Hence, Scenario 3 is not a feasible alternative.
4) The installed capacity of Northeast China Power Grid has been continuously increasing over the past. Moreover, this alternative complies with all applicable laws and is economically viable. Therefore, Scenario 4 is a feasible alternative baseline scenario.

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

Scenario 1 complies with current laws and regulations, but is not mandatory.
Scenario 2 does not comply with current mandatory laws and regulations – the alternative thermal unit to the proposed project would be less than 135MW, which is strictly prohibited in China unless consented by Central Government based on special considerations.
Scenario 4 complies with current laws and regulations, but is not mandatory.

Step 2. Investment analysis

The purpose of this step is to determine whether the proposed project activity is economically or financially less attractive than other alternatives without an additional funding that may be derived from the CDM project activities. The investment analysis was conducted in the following steps:

Sub-step 2a. Determine appropriate analysis method

The three analysis methods suggested by *Tools for the demonstration and assessment of additionality* are simple cost analysis (Option I), investment comparison analysis (Option II) and benchmark analysis (Option III). Since the proposed project will earn revenues from not only the CDM but also the electricity output, the simple cost analysis method is not appropriate. Investment comparative analysis method is only applicable to the case that alternative baseline scenario is similar to the proposed projects, so that comparative analysis can be conducted. The alternative baseline scenario of the proposed project is to supply equivalent electricity from the North East China Power Grid rather than a new investment project. Therefore, Option II is not an appropriate method either. The proposed project will use benchmark analysis method based on Project IRR.

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

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[2] Notice on Strictly Prohibiting the Installation of Fuel-fired Generation with the Capacity of 135MW or below , General Office of the State Council, http://www.gov.cn/gongbao/content/2002/content_61480.htm

[3] http://jjckb.xinhuanet.com/cjxw/2007-11/27/content_75467.htm

[4] Source: Page 11-26, the Supplementary Feasibility Study Report of the proposed project

With reference to the *Interim Rules on Economic Assessment of Electric Engineering Retrofit Projects*[5], the financial benchmark IRR of Chinese electricity industry is 8% on total investment, which has been used widely in feasibility studies of new power plants, including wind power projects in China.

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

Based on the above-mentioned benchmark, the calculation and comparative analysis of financial indicators for the proposed project are carried out in sub-step 2c.

(1) Basic parameters for calculation of financial indicators

The Feasibility Study Report of the Project, which was compiled and finalized by Heilongjiang Electric Power Design & Survey Institute in Aug, 2006, and has been approved by provincial Development Reform Commission. Heilongjiang Electric power Survey & Design Institute is a qualified and independent entity with qualification Class A in engineer consulting, and qualification Class A in engineer designing.

When Daqing Long Jiang Wind Power Co., Ltd was purchasing wind turbines according to approved Feasibility Study Report in August 2006, it sent procurement letter of inviting bidding to several wind turbines suppliers at the international market, but it was informed that the wind turbines with the installed capacity between 80~1500kW and with the models of G58, Wwd1050/70 and FL1500/77 were facing a tight supply situation and at least 18 months was needed before the delivery. Considering the production cycle of wind turbine and wind turbine demand at home and abroad, the Board of Directors finally decided to change the type of wind turbines so as to guarantee that the construction of Ruihao Wind Farm can be fulfilled on time. With the particular research on home and abroad markets and discussion with many equipment suppliers again and again, combined with the characteristic of wind resource at Ruihao Wind Farm, the project owner decided to purchase 10 sets unit capacity of 1000 kW of DW1.0/56 Wuhan Guoce, 10 sets unit capacity of 1500 kW of HFD1500 (77) Hadian and 16 sets unit capacity of 1500 kW of HV-1500 Shenyang Gongda, which actual total installed capacity of 49MW. The supplementary Feasibility Study Report was carried out by the same design institute (Heilongjiang Electric Power Design & Survey Institute) to reflect the actual situation of the Project and the supplementary FSR has been provided to DOE. And the key parameters used to conduct financial analysis were compared as follows:

	FSR	Supplementary FSR
Installed Capacity	49.5MW (33*1.5MW)	49MW (10*1MW+10*1.5MW+16*1.5MW)
Total investment	511.05 Million RMB	511.05 Million RMB
Annual Output	104,050MWh	108,780MWh

From above table, we can find that:

- The total investment is same between the FSR and the supplementary FSR, which was estimated reasonable by the design institute after calculated the detailed components of the total investment, and relevant evidences have been provided to DOE.

- The annual output of 49MW is a little higher than that of 49.5MW. As indicated the supplementary FSR, the annual output was calculated based on the characteristic of actual signed

[5] In accordance with the *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects* issued by former State Power Corporation of China, ,it rules the benchmark of both electrical engineering retrofit projects and new projects.

wind turbines and local wind resources, which is much reasonable than the FSR. The relevant evidences have been provided to DOE.

From above analysis, the alternative with 36 units wind turbines and 49MW installed capacity of the actual situation was adopted to do investment analysis, which is reasonable and conservative. So the project IRR is calculated based on the data from the supplementary FSR.

Basic parameters	Value	Data source
Installed capacity (MW)	49	the supplementary Feasibility Study Report
Annual output (MWh)	108,780	the supplementary Feasibility Study Report
Total investment (Million Yuan)	511.05	the supplementary Feasibility Study Report
O&M cost (Million Yuan/Year)	12.188	the supplementary Feasibility Study Report
Tariff (including VAT) (Yuan/KWh)	0.61	Fagaijiage [2006] 1231
Depreciation period (Years)	12.5	the supplementary Feasibility Study Report
Depreciation rate (%)	8	the supplementary Feasibility Study Report
Tax (VAT) (%)	8.5	the supplementary Feasibility Study Report
Income tax (%)	25	Enterprise Income Tax Law of People's Republic of China[6]
Salvage value (%)	5	the supplementary Feasibility Study Report
City tax (%)	5	the supplementary Feasibility Study Report
Education (%)	3	the supplementary Feasibility Study Report
Project lifetime (Years)	20	the supplementary Feasibility Study Report
Crediting period (Years)	7×3	
Expected CER price (Euro/tCO_2e)	11.5	ERPA

The power tariff used for the calculation was reasonably assumed by the project owner on the basis of the applicable legal framework when the decision was made. According to the "Trial Management Rules on the Power Tariff of Renewable Energy Power Generation and the Sharing of Costs thereof"[7] issued by the National Development and Reform Commission (NDRC) of China on 4 January 2006, the on-grid power tariff for wind energy power generation projects shall use the price recommended by the government, which is supposed to be determined by the pricing authority on the basis of the price generated through tendering. The final power tariffs agreed for the three wind energy power generation tendering projects in 2006 were between 0.4056 RMB/kWh and 0.5006 RMB/kWh[8], which was believed too low by some industry insiders[9]. The government also did not publish any recommended price for

6 The Enterprise Income Tax is 33% in the supplementary Feasibility Study Report, and 25% is adopted due to conservative consideration. http://news.xinhuanet.com/legal/2007-03/19/content_5866953.htm
7 http://www.gov.cn/ztzl/2006-01/20/content_165910.htm
8 http://www.windpower.org.cn:80/rule/fd4.jsp
9 http://www.86ne.com/Wind/200802/Wind_112338.html

wind energy power generation project in 2006. Then rumors spread in the industry that the pricing policy for biomass energy power plants as stipulated in the "Trial Management Rules on the Power Tariff of Renewable Energy Power Generation and the Sharing of Costs thereof" would be also used for wind energy projects. According to the "Trial Management Rules on the Power Tariff of Renewable Energy Power Generation and the Sharing of Costs thereof", the power tariff for biomass energy projects shall be the local reference tariff for coal-fired generation units equipped with de-sulphurization system plus a subsidy of 0.25 RMB/kWh for the first 15 years of operation time. The reference tariff for coal-fired generation units equipped with de-sulphurization system was 0.3567 RMB/kWh[10] in Heilongjiang province in 2006, which would mean a power tariff of 0.6067 RMB/kWh for biomass energy projects. Based on the overall situation in the industry and the information available, an expected power tariff of 0.61 RMB/kWh (Conservative consideration) was assumed by the project owner for the proposed Project at the time of decision making, which was perfectly justified by the later approvals on wind project tariffs issued by NDRC[11,12].

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

In accordance with the benchmark analysis (Option III), the proposed project will not be considered as financially attractive if its financial indicators (such as IRR) are lower than the benchmark.

Table 1 shows the project IRR of the proposed project, with and without CDM-related income. Without CDM-related income, the project IRR is lower than the benchmark and the proposed project is not financially acceptable. With it, the project IRR is better than the benchmark and therefore, the proposed project is financially acceptable.

Table 1. Financial indicators of the Proposed Project

	IRR (Project IRR, benchmark=8%)
Without CDM-related income	6.92%
With CDM-related income	10.42%

Sub-step 2d. Sensitivity analysis (only applicable to options II and III):

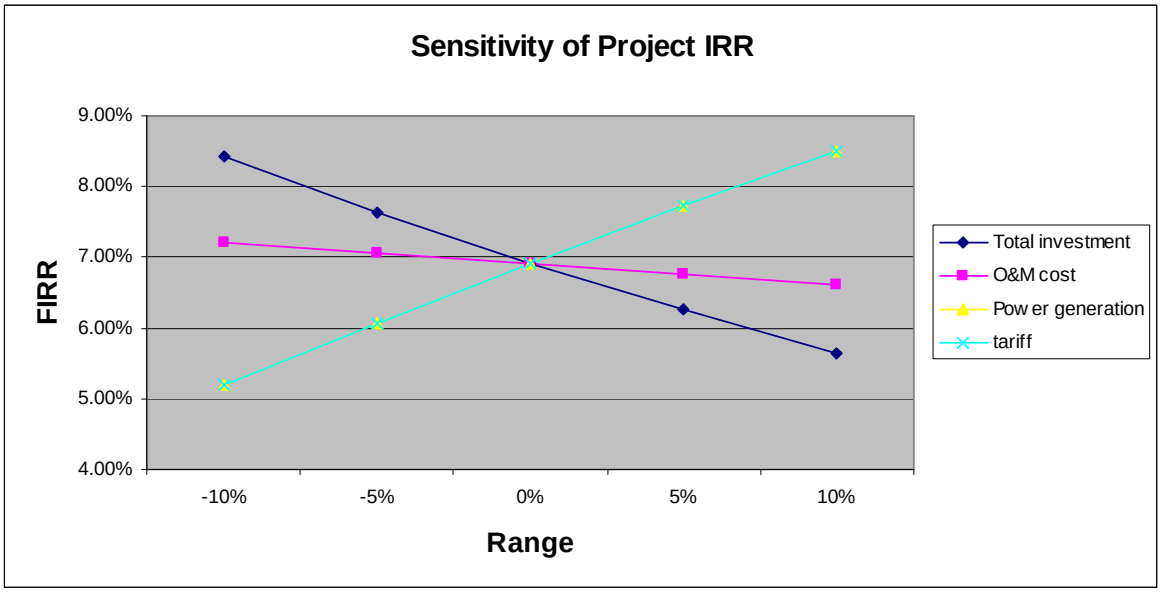
To show that the conclusion regarding the financial attractiveness of the proposed project is robust to reasonable variations of the critical assumptions, four financial parameters, i.e. total investment, annual output, tariff and annual O&M cost, are chosen for sensitive analysis. The chosen financial parameters are assumed to vary within a reasonable range from -10% to +10%, and accordingly, the Project IRR (without CDM-related income) varies to different extents, as shown in Table 2 and Figure 2

Table 2. Sensitivity of Project IRR to different financial parameters

Parameter	Range				
	-10%	-5%	0%	5%	10%
Total investment	8.42%	7.64%	6.92%	6.26%	5.64%
O&M cost	7.22%	7.07%	6.92%	6.77%	6.61%
Annual output	5.20%	6.07%	6.92%	7.74%	8.51%
Tariff	5.20%	6.07%	6.92%	7.74%	8.51%

10 http://jgs.ndrc.gov.cn/zcfg/t20060630_75068.htm
11 http://jgs.ndrc.gov.cn/zcfg/t20080218_193011.htm
12 http://jgs.ndrc.gov.cn/zcfg/t20080813_230722.htm

Figure 2. Sensitivity of Project IRR to different financial parameters



As shown in Table 2 and Figure 2, the Project IRR of the proposed project varies to different extents, when the above four financial indicators fluctuated within the reasonable range from -10% to +10%. In comparison, the impact of the annual output and tariff on IRR is most significant.

When the total investment decreases by 7.35% and the annual O&M cost decreases by 37.2%, Project IRR can meet the benchmark of 8%. Based on the equipment contract statistic, the contract amount is closed to the total investment, and the price of raw materials has been continuously increasing in China in these years after the Feasibility Report was developed, the total investment and O&M cost will be increased, but not decreased. Therefore, the total investment is not possible to decreases 7.35%, and the annual O&M cost of the proposed project is not possible to decrease 37.2%[13].

When the annual output increases by 6.63%, Project IRR can meet the benchmark of 8%. The annual output in the supplementary Feasibility Study Report is calculated based on the monitored data of the local wind resources. And there is the specific description of the wind resources in recent decades at project site in the supplementary Feasibility Study Report, mentioned the wind resource can not be increased 6.63%[14]. Therefore, the annual output of the proposed project is not possible to increase 6.63%.

When the tariff of the proposed project increases by 6.63%, Project IRR can meet the benchmark of 8%. However, the tariff of the proposed project is confirmed through bidding process organized by NDRC. The fixed tariff (0.61 RMB/kWh – including VAT) of the proposed project before 30,000 of full load operational hours is approved by NDRC in the Project Approval. Hence, it is not possible for the proposed project to increase tariff during this period. For the tariff of the proposed project after 30,000 of full load operational hours, it will be determined based on local average on-grid electricity tariff according to the Project Approval. According to the supplementary Feasibility Study Report of the proposed project, in which the level of local economic development, energy and resource status and local residents' affordability of electricity tariff have been taken into consideration. Considering the tariff of the proposed project after 30,000 of full load operational hours will be decreased to the local average tariff.

[13] http://news.xinhuanet.com/video/2008-01/25/content_7494104.htm

[14] The Wind Resource, Page 2 of the supplementary Feasibility Study Report of the proposed project

The fixed tariff (0.61 RMB/kWh – including VAT) of the proposed Project uses for IRR calculation rather than lower tariff, it is conservative.

The above sensitivity analysis demonstrates that when financial indicators change within reasonable range, the proposed project is not financially feasible without CDM support. Hence, the Scenario 1) is not feasible as an alternative scenario.

Step 3: Barrier analysis

Since it is concluded in Step 2 that the proposed CDM project activity is unlikely to be financially / economically attractive, this step is optional. The demonstration proceeds to Step 4.

Step 4. Common practice analysis

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

The proposed Project is a wind farm project in Heilongjiang Province. Other similar projects identified in Heilongjiang Province is listed below. Wind farm projects that are applying for CDM registration or already registered as CDM projects are not included in the above analysis.

Table 3 Projects similar to the proposed Project in Heilongjiang Province[15]

No.	Project name	Turbine Model	Unit capacity (kW)	No. of turbines	Installed capacity (MW)
1	Mulan Menggushan	Xi'an Nordex	600	20	12
2	Fujin Bielayinshan	NEG Micon	900	27	24.3
3	Muling Daimagou	Vestas	850	58	49.3
		HE	1200	1	1.2

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

There are essential distinctions between the projects identified above and the proposed Project. The Mulan Menggushan project enjoys a high power tariff of 0.78 RMB/kWh (incl. VAT), which is nearly 30% higher than the expected power tariff of the proposed Project, while the Fujin Bielayinshan project is supported by the ADB loan[16] and also gets 200 million US dollars from GEF grant (no interest). The Muling Daimagou project was invested by the enterprises with foreign capital[17], which enjoy the corporate income tax privilege[18]. Since the proposed Project does not have such financial or tariff advantages, the existence of the above projects does not contradict the claim that the proposed Project is financially unattractive.

To summarize, if the Project fails to be registered as a CDM project, without CERs sales revenues, the high cost of the Project can not be compensated and the loan payback can not be guaranteed. Under such

[15] Source: *Statistic of installed capacity of China's Wind Farms in 2007* issued by Chinese Wind Energy Association, Shi Pengfei http://www.cwea.org.cn/upload/20080324.pdf

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

[17] http://www.mdjprojects.gov.cn/ArticleContent.asp?ID=1143,

http://www.china5e.com/news/newpower/200504/200504080214.html

[18] http://www.hlj.gov.cn/tzpd/tzhz/yhzc/200707/t20070706_22263.htm

circumstances, it is difficult to implement and operate the Project. Being registered as a CDM project, CERs sales revenues can alleviate the identified barriers, therefore the proposed project is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

The GHG emission calculation of the proposed project was based on the instruction of "Tool to calculate the emission factor for an electricity system (version 01)". All the data employed in the calculation is based on the available data from North East China Power Grid. The baseline emission factor (EFy) is calculated as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) factors according to the following three steps(OM and BM of the proposed project has been pre-determined):

STEP 1. Identify the relevant electric power system

According to the 2008 Baseline Emission Factors for Regional Power Grids in China (published on 18th July 2008[19]) issued by China's DNA, which provides the delineation of the project electricity system and connected electricity systems, this delineation is used. The project electricity system is the Northeast China Power Grid, which consists of Liaoning, Jilin and Heilongjiang Power Grids. There is no electricity import of Northeast Power Grid.

STEP 2. Select an operating margin (OM) method

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

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

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

The low-cost/must-run resources constitute, on average, only 5.97% (5.44% in 2002, 4.72% in 2003, 6.45% in 2004, 7.98% in 2005 and 5.25% in 2006, China Electric Power Yearbooks 2003-2007) of the total grid generation of the project electricity system, i.e. NEPG, which is much less than 50%, based on the most recent 5-year data available at the time of PDD completion.

Therefore, the simple OM method (option a) is selected for the calculation of $EF_{grid,OM,y}$.

The data vintage used for the calculation of the OM emission factor is as following:

- 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.

[19] *Bulletin on determining the 2008 baseline emission factors for regional power grids in China*, Office of National Coordination Committee on Climate Change, NDRC, published on 18th July 2008.
http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=3239

STEP 3. Calculate the operating margin emission factor according to the selected method

The Simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants / units. It may be calculated:

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

For the proposed project activity, the required data for the exercise of Option A and B are not available and those of Option C can be obtained from official sources. For the purpose of calculating the simple OM, the necessary data for option A and option B is not available and only nuclear and renewable power generation are considered as low-cost / must-run power sources and if the quantity of electricity supplied to the grid by these sources is known, so the Option C is chosen to calculate the operating margin emission factor:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_y}$$

Where:

$EF_{grid,OMsimple,y}$ = Simple operating margin CO_2 emission factor in year *y* (tCO_2 /MWh)
$FC_{i,y}$ = Amount of fossil fuel type *i* consumed in the project electricity system in year *y* (mass or volume unit)
$NCV_{i,y}$ = Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ / mass or volume unit)
$EF_{CO2,i,y}$ = CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2 /GJ)
EG_y = Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost / must-run power plants / units, in year *y* (MWh)
i = All fossil fuel types combusted in power sources in the project electricity system in year *y*
y = The three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation

STEP 4. Identify the cohort of power units to be included in the build margin

The sample group of power units *m* used to calculate the build margin consists of either:

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

Project participants should use the set of power units that comprises the larger annual generation.

However, it is very difficult to obtain the data of the five power plants built most recently because these data are considered as confidential information by the company itself and the Grid in China. Therefore, a deviation approved by the EB is applied:

1) Use of capacity additions during the last 1~3 years for estimating the build margin emission factor for grid electricity,
2) Use of weights estimated using installed capacity in place of annual electricity generation.

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

Therefore for the Project: First, calculate the share of different power generation technology in recent capacity additions. Second, calculate the weight for capacity additions of each power generation technology. And finally calculate the emission factor using the efficiency level of the best technology commercially available in China.

Ex-ante calculation is chosen by this project, without requirement to monitor and recalculate the emissions factor during the first crediting period.

STEP 5. Calculate the build margin emission factor

The build margin emission factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units *m* during the most recent year *y* for which power generation data is available, calculated as follows:

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

Where:

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

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

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

m = Power units included in the build margin

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

As discussed in STEP 4, a deviation of this method is used to calculate build margin emission factors in China:

Deviated Calculation of Build Margin (BM)

Sub-step 1. Calculation of weights of CO_2 emissions of solid, liquid and gaseous fossil fuels in total emissions for power generation

$$\lambda_{Coal,y} = \frac{\sum_{i \in COAL, j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}$$

$$\lambda_{Oil,y} = \frac{\sum_{i \in OIL, j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}$$

$$\lambda_{Gas,y} = \frac{\sum_{i \in GAS, j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}$$

Where:

$FC_{i,j,y}$ = Amount of fossil fuel type *i* consumed in province *j* in year *y* (mass or volume unit)

$EF_{CO2,i,y}$ = CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2 /GJ)

COAL, OIL and GAS refer to the group of solid, liquid, and gaseous fossil fuels, respectively.

Sub-step 2: Calculation of Emission Factor of Relevant Thermal Power

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

Where:
$EF_{Coal,Adv}$, $EF_{Oil,Adv}$ and $EF_{Gas,Adv}$ refer to the emission factors representing best technologies commercially available for coal, oil and gas fired power plants, respectively.

Sub-step 3: Calculation of BM of the Grid

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

Where:
CAP_{Total} = The total newly added electricity generation capacity (MW)
$CAP_{Thermal}$ = The newly added electricity generation capacity of thermal power (MW)

STEP 6. Calculate the combined margin emission factor

The combined margin emission factor is calculated as follows:

$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$

Where:
$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year *y* (tCO2/MWh)
$EF_{grid,OM,y}$ = Operating margin CO_2 emission factor in year *y* (tCO2/MWh)
w_{OM} = Weighting of operating margin emissions factor (%)
w_{BM} = Weighting of build margin emissions factor (%)

The default values of w_{OM} and w_{BM} are:
w_{OM} = 0.75 and w_{BM} = 0.25

Baseline Emissions are calculated by multiplying the ex-ante Baseline Emission factor by annual power generation.

$BE_y = EG_y \times EF_{grid,CM,y}$

Where:
BE_y = Baseline emissions in year *y* of North East Power Grid (tCO_2 /yr)
EG_y = Electricity supplied by the project activity to the grid (MWh)
$EF_{grid,CM,y}$= Combined margin emission factor for grid connected power generation in year *y* calculated using the latest version of the "Tool to calculate the emission factor for an electricity system".

Project Emissions

According to the baseline methodology ACM0002, the GHG emission of the Heilongjiang Daqing Ruihao Wind Farm Project within the project boundary is zero, therefore no emissions from the project activity were identified.

Leakage

The project does not consider leakage according to the requirements of methodology applied.

Emission Reductions

The annual emission reductions ER_y for the project activity are calculated as the baseline emissions minus the project emissions. Being the project of a zero-emission activity the final GHG emission reductions are calculated as follows:

$ER_y = BE_y - PE_y - LE_y$
Where:
ER_y = Emission reductions in year *y* (tCO_2e/year)
BE_y = Baseline emissions in year *y* (tCO_2e /year)
PE_y = Project emissions in year *y* (tCO_2e year)
LE_y = Leakage emissions in year *y* (tCO_2e /year)

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

Data / Parameter:	$\mathbf{FC_{i,m,y}}$
Data unit:	tonnes or m^3
Description:	Amount of fossil fuel type *i* consumed by power plant / unit *m* in year *y*
Source of data used:	China Energy Statistical Yearbook（2005~2007）
Value applied:	See Annex 3 for details
Justification of the choice of data or	Official statistical data

description of measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	**$NCV_{i,y}$**
Data unit:	kJ/kg or kJ/m^3
Description:	Net calorific value (energy content) of fossil fuel type *i* in year *y* of North East Power Grid
Source of data used:	China Energy Statistical Yearbook（2007）
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistical data
Any comment:	

Data / Parameter:	**$EF_{CO2,i,y}$**
Data unit:	tc/TJ
Description:	CO_2 emission factor of fossil fuel type *i* in year *y* of North East Power Grid
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC default value
Any comment:	

Data / Parameter:	**Installed Capacity**
Data unit:	MW
Description:	The Installed Capacity of the power plants in the grid in the year y of North East Power Grid
Source of data used:	China Electric Power Yearbook (2005~2007)
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistical data
Any comment:	

Data / Parameter:	**Electricity Generation**
Data unit:	MWh

Description:	The electricity generation of the power plants in the grid in the year y of North East Power Grid
Source of data used:	China Electric Power Yearbook (2003~2007)
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistical data
Any comment:	

Data / Parameter:	**Electricity self-consumption ratio**
Data unit:	
Description:	The ratio of electricity self-consumption to the total electricity generation of the power plants
Source of data used:	China Electric Power Yearbook
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistical data
Any comment:	

Data / Parameter:	**$GENE_{best, coal}$**
Data unit:	
Description:	The optimum commercial, coal-fired power supply efficiency
Source of data used:	*China DNA: Bulletin on Baseline Emission Factor of China Region Grid-the calculation of baseline Build Margin emission factor for China Grid on July 18th 2008*
Value applied:	37.28%
Justification of the choice of data or description of measurement methods and procedures actually applied :	Value issued by NDRC
Any comment:	To calculate BM

Data / Parameter:	**$GENE_{best, gas/oil}$**
Data unit:	
Description:	The optimum commercial, coal-fired power supply efficiency
Source of data used:	*China DNA: Bulletin on Baseline Emission Factor of China Region Grid-the calculation of baseline Build Margin emission factor for China Grid on July 18th 2008*
Value applied:	48.81%
Justification of the choice of data or	Value issued by NDRC

description of measurement methods and procedures actually applied :	
Any comment:	To calculate BM

B.6.3 Ex-ante calculation of emission reductions:

>>

As described in B.6, the emission reductions of the proposed project are calculated as follows:

Baseline emissions

According to the supplementary FSR, the net electricity supplied to the grid is estimated as 108,783 MWh.

$EF_{grid,OM,y}$ = 1.2561 tCO_2/ MWh
$EF_{grid,BM,y}$ = 0.7946 tCO_2/ MWh

$EF_{grid,CM,y}$ = 1.2561 × 0.75 + 0.7946 × 0.25 = 1.1407 tCO_2/MWh

BEy = 108,783 × 1.1407= 124,089 tCO_2e

The ex-ante baseline emission factor: **1.1407 tCO_2/ MWh**
Annual baseline emissions: **124,089 tCO_2e** (details in Annex 3)

Project emissions

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

$$PEy=0$$

Leakage

According to the baseline methodology ACM0002, the leakage of the proposed project is not considered,

$$LE_y = 0$$

Project Emission Reductions

$ER_y = BE_y - PE_y - LE_y$

The total annual baseline emissions are 124,089 tCO_2.
The total annual project emissions are 0 tCO_2.
The total annual leakage emissions are 0 tCO_2.

$ER_y = BE_y - PE_y - LE_y$ = 124,089 – 0 – 0 = 124,089 tCO_2

The annual emission reductions are estimated to be: 124,089 tCO_2. The proposed project activity is expected to achieve 868,621 tCO_2e of net emission reductions during the first 7-year crediting period.

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

>>

Year	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
2009 (Sep.-Dec.)	0	41,363	0	41,363
2010	0	124,089	0	124,089
2011	0	124,089	0	124,089
2012	0	124,089	0	124,089
2013	0	124,089	0	124,089
2014	0	124,089	0	124,089
2015	0	124,089	0	124,089
2016 (Jan.- Aug.)	0	82,726	0	82,726
Total (tonnes of CO_2e)	**0**	868,621	0	868,621

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

B.7.1 Data and parameters monitored:

Data / Parameter:	EG_y
Data unit:	MWh
Description:	Electricity supplied by the project activities to the grid during year *y*
Source of data to be used:	Electricity meter reading at the substation between the proposed project and the Grid
Value of data applied for the purpose of calculating expected emission reductions in section B.6	108,783
Description of measurement methods and procedures to be applied:	The readings of the electricity meter will be hourly measured and monthly recorded. Data will be archived for 2 years following the end of the last crediting period by means of electronic and paper backup. The accuracy of electricity meter is 0.2s. The calibration frequency is one time/year.
QA/QC procedures to be applied:	The electricity generation from the plant will be monitored by the ammeter and be recorded at the on-site control centre using a computer system in the wind farm. The project operator is responsible for recording such data. Receipts for electricity sales will be kept for further verification, when necessary.
Any comment:	

Data / Parameter:	$EG_{import,y}$
Data unit:	MWh
Description:	Electricity purchased from the grid by the project activities during year *y*
Source of data to be used:	On-site measurements
Value of data applied for the purpose of calculating expected emission reductions in section B.6	0

Description of measurement methods and procedures to be applied:	The readings of the electricity meter will be hourly measured and monthly recorded. Data will be archived for 2 years following the end of the crediting period by means of electronic and paper backup. The calibration frequency is one time/year.
QA/QC procedures to be applied:	The electricity purchased from the grid will be monitored by the ammeter and be recorded at the on-site control centre using a computer system in the wind farm. The project operator is responsible for recording such data. Receipts for electricity sales will be kept for further verification, when necessary.
Any comment:	

B.7.2 Description of the monitoring plan:

>>

This Monitoring plan will set out a number of monitoring tasks in order to ensure the complete, consistent, clear and accurate monitoring and the accurate calculation of the emission reduction in the crediting period. This plan is mainly implemented by the project owner with the cooperation of the grid company.

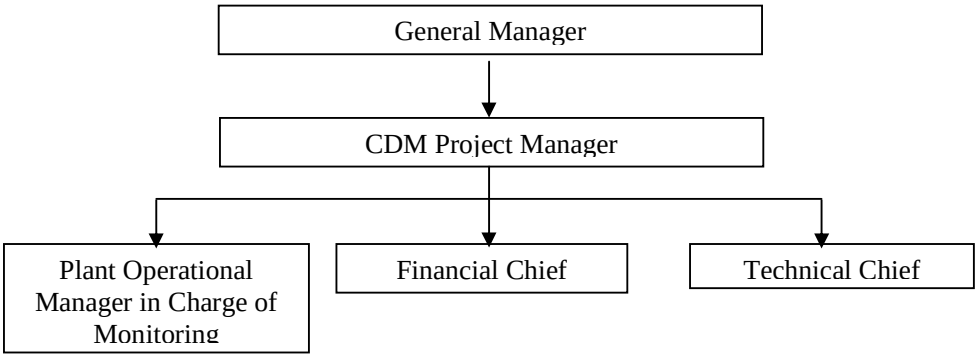
1. Monitoring Object

The main objective data is the net electricity supplied to the grid, which is to calculate the emission reduction of the project. The net electricity supplied to the grid equals to the electricity supplied by the project activities to the grid minus the electricity purchased from the grid by the project activities.

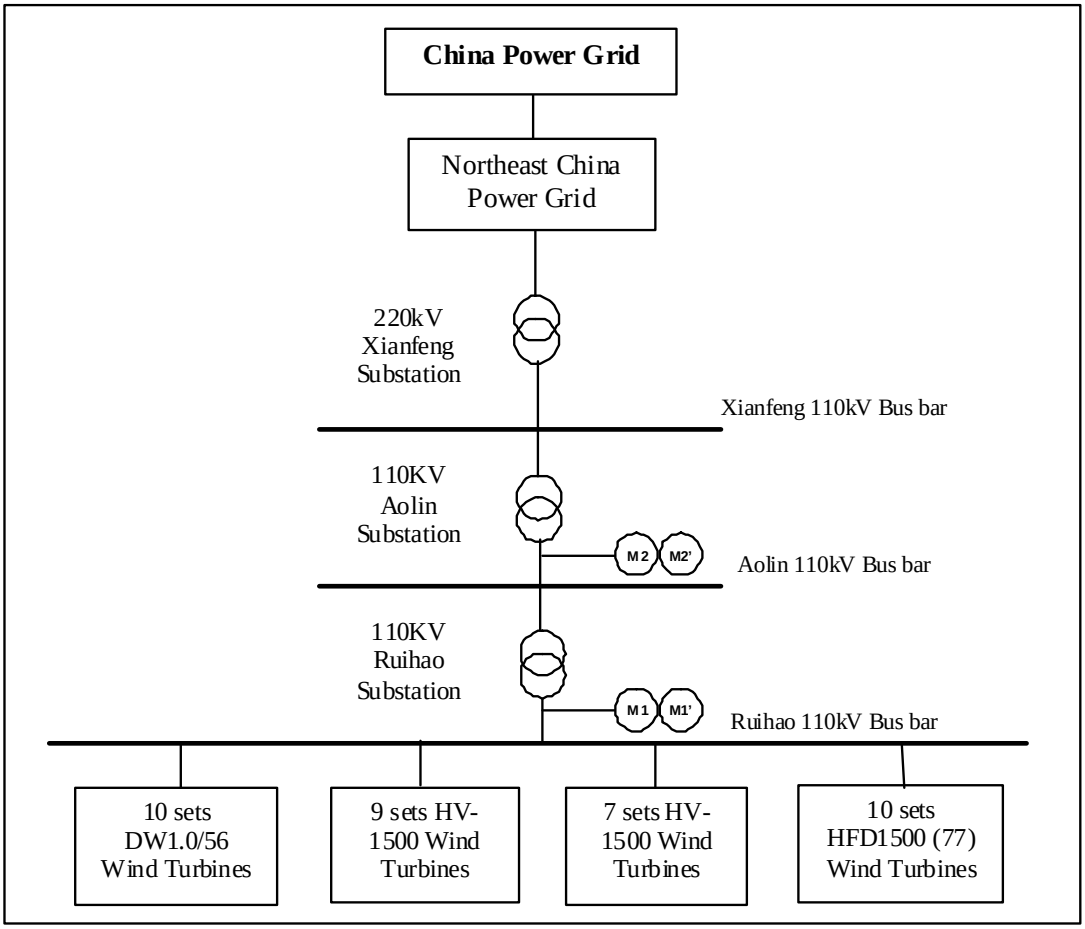
2. Monitoring Implementers

The General Manager of the project entity will appoint a CDM project manager or a chief officer. The operational and monitoring manager of the plant, the Financial Chief, and the Technical Chief are responsible for the collection of the data and information required in the monitoring plan. The collected information will be documented and sent to the CDM manager or responsible staffs of the project entity monthly. The CDM manager will in charge of the implementation of the Monitoring Plan and report to the General Manager of the company. The General Manager of the company will make the confirmations on monitoring, calculation data and reports.

The organization of the monitoring implementers is illustrated in the table below:



3. Monitoring Program and Equipments



A110kV Ruihao substation will be set up at the site which connects the proposed project to the 110kV Aolin Substation and then pass through 110kV Feng - Ao line to 220kV Xianfeng substation which can be transmitted to the Heilongjiang Provincial Power Grid. The power generated will be supplied to the Heilongjiang Provincial Power Grid, which is an integral part of the Northeast China Power Grid. Grid-connected electricity generated by the proposed project will be monitored through one pair of bidirectional meters (0.2s, M1 is main meter and another M1' is for back-up) at the 110 kV Ruihao substation. The data can also be monitored and recorded at the on-site (110 kV Ruihao substation) control centre using a computer system. Another pair of bidirectional meters (0.2s, M2 is main meter and another M2' is for back-up) will be installed at the 110kV Aolin substation which belongs to the Local Grid Company. Before the project is in operation, both the project owner and the grid company will check the meters to ensure their work properly.

4. Data Collection

The verification will use the main meter's data as long as the inaccuracy of the meter is within the permissible tolerance. The main procedures are as follows:

1) According to the requirements of power purchase/sales agreement, the project owner and the grid company should collect the two meters' data periodically (installed at the Ruihao substation and Aolin substation), and check them at the same time.

2) The project owner supplies the electricity to the grid company, and provides an electricity sales invoice to the Grid Company. A copy of the invoice is stored by the project owner, together with a record of the payment by the grid company.
3) When the electricity generated by this project cannot meet the electricity requirement of the power plant, the grid company supplies the electricity to the project owner. The Grid Company provides an electricity sales invoice to the project owner and the invoice is stored by the project owner.
4) The project owner records the power supplied to and purchased from the grid, and hence calculate the net electricity supplied to the grid;
5) The project owner keeps and safe keeps the records of the main meter's data readings for verification by the DOE.

If the fault of the main meters exceeds the allowable tolerance or its malfunction occurs, the grid-connected electricity generated by the proposed project will be resolved by following measures:
1) Adopting the backup meters' data, unless a test by either party reveals it is inaccuracy;
2) If the inaccuracy of the backup meters are not within the acceptable limits or they cannot work properly, the project owner and the grid company shall jointly prepare a new agreement of correct reading;
3) If the project owner and the grid company fail to reach an agreement concerning the correct reading, this matter will be submitted for arbitration according to agreed procedures.

5. Calibration of Meters & Metering

The metering equipment will be properly calibrated and checked annually for accuracy. The project owner will prepare backup procedures to deal with any errors occurred to the meters. The calibration records carried out by the grid company should be provided to the proposed project owner, and these records will be maintained by the proposed project owner and the third party designated.

Meters should be tested by a qualified metric organization co-authorized by the project owner and the grid company within 10 days after:
1) The detection of the reading difference between the main meter and the backup meter that exceeds the allowable tolerance.
2) The equipments malfunction caused by improper operation.

All the calibration test records should be maintained safely for the verification.

6. Data Management System

To keep safely the record of the data collected during monitoring, this project will set up a complete data management system. It is the responsibility of the proposed project owner to provide additional necessary data and information for validation and verification requirements of respective DOE. Physical documentation such as paper-based maps, diagrams and environmental assessment will be collated in a central place, together with this monitoring plan. All paper-based information will be stored by the proposed project owner and kept at least one copy.

At the end of each month, the monitoring data will be filed in a spreadsheet and stored on a hard disk, and the paper-based printout should be also archived. Furthermore, the project owner collects the sales receipts for the electricity supplied to the grid as a cross-check, and compiled the monitoring report including the monitoring data and relevant evidence at the end of each crediting year.

All the data will be kept for two years following the end of the last crediting period.

7. Monitoring Report

After the CDM project manager collects and sorts the monitored data, the monitoring report is prepared by the project developer alone or with designated third party. The project developer and/or the designated third party have to make sure that the format and content of the monitoring report are consistent with the monitoring methodology in the registered PDD.

8. Training plan

Prior to request for registration, the task of training staff that are in charge of executing the monitoring plan will be completed, with the training contents including basic concepts and operation modality of CDM, methods of data monitoring and archiving for CDM projects, quality control and quality assurance of monitoring, and preparation and improvement of key documents of monitoring.

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)

>>

Date of completion of Baseline Study is 12/02/2009

Name of person/entity determining the baseline:
Liu Tianyang / Sun lina
Secretary of the Board
Daqing LongJiang Wind Power Co., Ltd
Add: Ruihao Campus, No.3 Industry Park New and Hi-Tech Industry Zone
Daqing City, Heilongjiang Province, China 163316
Tel: +86 459 430 3177×1 Fax: +86 459 430 3188
Mobile: +86 137 184 99999
Email: windenergy.cn@gmail.com

Above persons are Project Participants.

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:

>>
23/01/2007(starting date of equipment purchase agreement signing)

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

>>
20 years 0 month

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

C.2.1. Renewable crediting period

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

>>
01/09/2009

C.2.1.2. Length of the first crediting period:

>>
7 years 0 month

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
Not applicable

C.2.2.2. Length:

>>
Not applicable

SECTION D. Environmental impacts

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

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The environmental impact assessment for this project was carried out by Heilongjiang Provincial Environment Engineering Technical Consulting Service Station on June 29th 2006 and approved by Heilongjiang Provincial Environment Protection Bureau on August 2nd 2006.A summary of the report is illustrated as below:

Ambient air

The impact on ambient air quality of the proposed project is mainly from dust during the construction phase. The excavation work is the primary emission source, however, it is a ground source and the particle size is quite large so that dust will deposit quickly on the ground. Immediately replant the areas where construction has completed, and sprinkling water on the road frequently should be conducted. Therefore, the proposed project will not pose any threat on the quality of ambient air.

Noise

There is some noise during the operation of wind turbines. The equipments and techniques with lower noise will be chosen to apply. Improvement on construction process and strengthening of equipment maintenance is emphasized. In the construction period, the proposed project can comply with the requirement of "Threshold Noise Level of Construction Sites (GB12523-90)" and "Enterprise Plant Boundary Noise Level Standard (GB12348-90)". Meanwhile, the project site is very far from the village or resident. Consequently, the noise of operation has little impact to the surrounding environment.

Electromagnetic impact

The operation of the wind farm will generate electromagnetic pollution, whereas the pollution is slight. In addition, the project is very far from local residents and village. Therefore, the electronic magnetic pollution to the surrounding environment is insignificant.

Solid waste

Solid wastes generated from the proposed project activity are excavated earth material and municipal solid waste. Part of the excavated earth material will be backfilled, and the rest will be used for land levelling and road construction near the project site. The municipal solid waste will be collected and treated together with the waste from local residents. As the report indicates, solid waste is handled properly.

Wastewater

Wastewater is mainly domestic wastewater. Wastewater quantity is fairly small and treatment methods will be applied for on-site primary treatment, and then the wastewater will be removed periodically. Small-scale septic tanks should be built on the site, through which the wastewater can meet the first degree standard of discharge after treatment. Therefore, the impact of wastewater is limited and mitigated.

Ecosystem

The proposed project will both permanently and temporarily occupy some land (mostly farmland), the temporarily occupied land will be ecologically restored for original use. Such restoration measures will include land re-surfacing, re-vegetation, and etc. As for the permanently occupied land, ecological compensation measures will be applied to the adjacent area to offset the impact on ecosystem. The project site is located along the migration zone of migratory birds.

No migrating birds have been found in the project field till now. Therefore, the project is not located on the passage of migrating birds, and the project construction will not influence the migration of birds.

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:

>>

The environmental impacts of the Heilongjiang Daqing Ruihao Wind Farm Project are not considered significant.

SECTION E. Stakeholders' comments

>>

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

>>

On May 19th 2008, under the support of the local government, the project developer successfully held a stakeholder meeting in the conference room of Bayan Chagan of Durbat Mongolian Autonomous County. Totally 66 stakeholder representatives participated the symposium. Respectively from the Local Development and Reform Commission, local Merchants Steam Navigation Company and several villages influenced by and around the proposed project. The 50 copies of questionnaire were distributed, and 49 pieces of reply were received. The recovery ratio is 98%. Among the interviewees, 11 of them have educational level of middle school or below middle school, 38of high school. The questions regarding the proposed project were mainly as follows:

1. Is the current living and/or working environment quiet?
2. Do you currently experience electromagnetic interference when watching TV at home?
3. Are there any negative impacts of the proposed project on the everyday life of local residents?
4. Is the proposed project going to help improve the living and/or working environment?
5. Which is the environmental topic that concerns you the most during the construction and operation of the proposed project?
6. Do you support the proposed project?

E.2. Summary of the comments received:

>>

The summary of survey is listed as the following:

- 100% of them consider their current living and/or working environment is quiet;
- 94% of them currently do not experience electromagnetic interference when watching TV at home and 6% of them is unsure;
- 92% of them think there will not be any negative impacts on their everyday life, and the remainder is unsure;
- 88% of them think the proposed project will help improve their living and/or working environment, while 12% of them is unsure;
- Regarding the construction and operation of the propose project, 90% of them are most concerned with electromagnetic interference, 6% of them are most concerned with the noise level, and 4% of them are most concerned with wastewater from the project;
- 100% of them support the implementation of the proposed project.

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

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The local community possesses basically strong positive comments on the effects of the proposed project. During the survey some people express their concerns about the environmental impacts of the project, local residents were most concerned with electromagnetic interference, some of them were concerned with, noise level and some showed concern about wastewater. As discussed in the EIA report, these issues are well illuminated and specific instructions were given to mitigate the potential impacts of these issues. With good implementation of the above-mentioned measures, the proposed project will not have significant negative impact on the local environment. Therefore, the proposed project can be carried out as planned.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding from Annex I Parties for this Project.
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Annex 3

BASELINE INFORMATION

All the tables related to the calculation of baseline emission reduction are presented below:
Calculation of Operating Margin (OM):

Table A1. Simple OM Emission Factor of Northeast China Power Grid in 2004

Fuel types	Unit	Liaoning	Jilin	Heilongjiang	Subtotal	Emission Factor (tc/TJ)	Average low Caloric value (KJ/kg, m^3)	CO_2 emission (tCO_2e) H=G*D*E*F*44/12/100 (unit of mass)
		A	B	C	D=A+B+C	E	G	H=G*D*E*F*44/12/10 (unit of volume)
Raw coal	10000 ton	4144.2	2310.9	3084.8	**9539.9**	25.8	20908	188,689,377
Cleaned coal	10000 ton	84.75	1.09	4.88	**90.72**	25.8	26344	2,260,872
Other washed coal	10000 ton	577.67	14.26	61	**652.93**	25.8	8363	5,165,589
Coke	10000 ton				**0**	29.2	28435	0
Coke oven gas	$10^8 m^3$	4.83	2.91		**7.74**	12.1	16726	574,367
Other coal gas	$10^8 m^3$	57.33	4.19		**61.52**	12.1	5227	1,426,677
Crude oil	10000 ton				**0**	20	41816	0
Gasoline	10000 ton					18.9	43070	0
Diesel	10000 ton	2.04	1.16	0.24	**3.44**	20.2	42652	108,673
Fuel oil	10000 ton	12.81	1.78	2.86	**17.45**	21.1	41816	564,536
LPG	10000 ton	2.19			**2.19**	17.2	50179	69,305
Refinery gas	10000 ton	9.79		1.14	**10.93**	15.7	46055	289,780
Natural gas	$10^8 m^3$		0.03	2.53	**2.56**	15.3	38931	559,111
Other oil product	10000 ton				**0**	20	38369	0
Other coking	10000 ton				**0**	25.8	28435	0

product								
Other fuel	10000 tce	26.97	5.07		**32.04**	0	0	0
							Subtotal	199,708,287

China Energy Statistical Yearbook 2005

Table A2. Thermal Power Generation of Northeast China Power Grid in 2004

Province	**Power Generation (MWh)**	**Ratio of Self Power Consumption of Plant (%)**	**Power Supply (MWh)**
Liaoning	84543000	7.21	78,447,450
Jilin	33242000	7.68	30,689,014
Heilongjiang	53482000	7.84	49,289,011
Total			158,425,475

China Power Yearbook 2005

Table A3. Emission Factor of Northeast China Power Grid in 2004

	Parameter	**Unit**	**Value**	**Source**
A	Total Power Supply of Northeast China Power Grid	MWh	158,425,475	A=Total Annual output of Northeast China Power Grid
B	Total Emissions of Northeast China Power Grid	tCO_2e	199,708,287	
C	Emission Factor of Northeast China Power Grid	tCO_2e/MWh	1.260582	C=B/A

Table A4. Simple OM Emission Factor of Northeast China Power Grid in 2005

Fuel types	Unit	Liaoning	Jilin	Heilongjiang	Subtotal	Emission Factor (tc/TJ)	Average low Caloric value (KJ/kg m^3)	CO_2 emission (tCO_2e) H=G*D*E*F*44/12/100 (unit of mass)
		A	B	C	D=A+B+C	E	G	H=G*D*E*F*44/12/10 (unit of volume)
Raw coal	10000 ton	4305.41	2446.13	3383.21	**10134.75**	25.8	20908	200,454,896
Cleaned coal	10000 ton				**0**	25.8	26344	0
Other washed coal	10000 ton	524.74	19.26	24.16	**568.16**	25.8	8363	4,494,940
Coke	10000 ton				**0**	29.2	28435	0
Coke oven gas	$10^8 m^3$	1.03	3.57	0.68	**5.28**	12.1	16726	391,817
Other coal gas	$10^8 m^3$	12.62	8.37		**20.99**	12.1	5227	486,768
Crude oil	10000 ton	1.16			**1.16**	20	41816	35,571
Gasoline	10000 ton				**0**	18.9	43070	0
Diesel	10000 ton	1.18	1.48	0.57	**3.23**	20.2	42652	102,039
Fuel oil	10000 ton	9.32	2.46	1.55	**13.33**	21.1	41816	431,247
LPG	10000 ton	0.12			**0.12**	17.2	50179	3,798
Refinery gas	10000 ton	5.48		1.32	**6.8**	15.7	46055	180,284
Natural gas	$10^8 m^3$		0.84	2.24	**3.08**	15.3	38931	672,681
Other oil product	10000 ton				**0**	20	38369	0
Other coking product	10000 ton				**0**	25.8	28435	0
Other fuel	10000 ton	16.18			**16.18**	0	0	0
							Subtotal	207,254,040

China Energy Statistical Yearbook 2006

Table A5. Thermal Power Generation of Northeast China Power Grid in 2005

Province	Power Generation (MWh)	Ratio of Self Power Consumption of Plant (%)	Power Supply (MWh)
Liaoning	83697000	7.03	77,813,101
Jilin	35294000	6.59	32,968,125
Heilongjiang	58000000	7.96	53,383,200
Total			164,164,426

China Power Yearbook 2006

Table A6. Emission Factor of Northeast China Power Grid in 2005

	Parameter	Unit	Value	Source
A	Total Power Supply of Northeast China Power Grid	MWh	164,164,426	A=Total Annual output of Northeast China Power Grid
B	Total Emissions of Northeast China Power Grid	tCO_2e	207,254,040	
C	Emission Factor of Northeast China Power Grid	tCO_2e/MWh	1.262478	C=B/A

Table A7. Simple OM Emission Factor of Northeast China Power Grid in 2006

Fuel types	Unit	Liaoning	Jilin	Heilongjiang	Subtotal	Emission Factor (tc/TJ)	Average low Caloric value (KJ/kg,m^3)	CO_2 emission (tCO_2e) H=G*D*E*F*44/12/100 (unit of mass)
		A	B	C	D=A+B+C	E	G	H=G*D*E*F*44/12/10 (unit of volume)
Raw coal	10000 ton	4681.99	2738.24	3698.29	**11118.52**	25.8	20908	219,912,851
Cleaned coal	10000 ton	0.03			**0.03**	25.8	26344	748
Other washed coal	10000 ton	674.74	17.83	96	**788.57**	25.8	8363	6,238,691
Coke	10000 ton	3.32			**3.32**	29.2	28435	101,075
Coke oven gas	$10^8 m^3$	2.68	0.16	1.44	**4.28**	12.1	16726	317,609
Other coal gas	$10^8 m^3$	55.26	1.43		**56.69**	12.1	5227	1,314,667
Crude oil	10000 ton	0.49			**0.49**	20	41816	15,026
Gasoline	10000 ton				**0**	18.9	43070	0
Diesel	10000 ton	0.75	0.39	0.3	**1.44**	20.2	42652	45,491
Fuel oil	10000 ton	11.73	0.45	1.44	**13.62**	21.1	41816	440,629
LPG	10000 ton				**0**	17.2	50179	0
Refinery gas	10000 ton	8.55		4.27	**12.82**	15.7	46055	339,888
Natural gas	$10^8 m^3$		0.19	2.1	**2.29**	15.3	38931	500,143
Other oil product	10000 ton				**0**	20	38369	0
Other coking product	10000 ton				**0**	25.8	28435	0
Other fuel	10000 tce	12.16	17.6	82.77	**112.53**	0	0	0
							Subtotal	229,226,818

China Energy Statistical Yearbook 2007

Table A8. Thermal Power Generation of Northeast China Power Grid in 2006

Province	Power Generation (MWh)	Ratio of Self Power Consumption of Plant (%)	Power Supply (MWh)
Liaoning	96282000	6.62	89,908,132
Jilin	38576000	6.78	35,960,547
Heilongjiang	62964000	7.85	58,021,326
Total			183,890,005

China Power Yearbook 2007

Table A9. Emission Factor of Northeast China Power Grid in 2006

	Parameter	Unit	Value	Source
A	Total Power Supply of Northeast China Power Grid	MWh	183,890,005	A=Total Annual output of Northeast China Power Grid
B	Total Emissions of Northeast China Power Grid	tCO_2e	229,226,818	
C	Emission Factor of Northeast China Power Grid	tCO_2e/MWh	1.246543	C=B/A

Table A10. Operating Margin Emission Factor of Northeast China Power Grid

		Year 2004	Year 2005	Year 2006	Total
A	Emissions (tCO_2/year)	199,708,287	207,254,040	229,226,818	636,189,145
B	Power Supply (MWh)	158,425,475	164,164,426	183,890,005	506,479,906
C	CO_2 Emission Factor (tCO_2/MWh)	C = A/B			**1.256099**

Calculation of Build Margin (BM):

Step 1. Calculation of weights of CO_2 emissions of solid, liquid and gas fuel in total emissions for power generation

$$\lambda_{Coal,y} = \frac{\sum_{i \in COAL, j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}$$

$$\lambda_{Oil,y} = \frac{\sum_{i \in OIL, j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}$$

$$\lambda_{Gas,y} = \frac{\sum_{i \in GAS, j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}$$

Where:

$F_{i,j,y}$: the consumption of fuel i for province j in year y (tce);

$COEF_{i,j,y}$: is the emission factor (tCO_2/tce) of fuel i, taking into account the carbon content of fuel i and the percentage of oxidation of the fuel in year y

COAL,OIL and GAS respectively refers to the group of solid, liquid, and gas fuels.

Based on China Energy Statistical Yearbook 2007, the calculation of the weights of solid, liquid, and gas fuels in Northeast China Power Grid are:

$$\lambda_{Coal} = 98.70\% \ , \ \lambda_{Oil} = 0.22\% \ , \ \lambda_{Gas} = 1.08\%$$

Step 2: Calculation of Emission Factor of Relevant Thermal Power

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

Where: $EF_{Coal,Adv}$, $EF_{Oil,Adv}$ and $EF_{Gas,Adv}$ respectively refers to the emission factor representing best technology commercially available for fuel of coal,

oil or gas fired power plants. For specific workings, see the following:

Table A11. Emission factor representing best technology commercially available for fuel of coal, oil or gas fired power plants

	Variable	Efficiency of Power Supply	Emission Coefficient of Fuel (tc/TJ)	Emissions (tCO_2/MWh)
		A	**B**	**C=3.6/A/1000*B *44/12**
Coal-fired Power Plant	$EF_{Coal,Adv}$	37.28%	25.8	0.9135
Gas-fired Power Plant	$EF_{Gas,Adv}$	48.81%	15.3	0.4138
Oil-fired Power Plant	$EF_{Oil,Adv}$	48.81%	21.1	0.5706

$$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv} = 0.9074 \ (tCO_2/MWh)$$

Step 3: Calculation of BM of the Grid

$$EF_{BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal} \ ,$$

Where: CAP_{Total} is the total of new capacity additions, and $CAP_{Thermal}$ is the new capacity addition of thermal power.

Table A12.Installed Capacity of Northeast China Power Grid in 2006

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

Source: China Power Yearbook 2007

Table A13.Installed Capacity of Northeast China Power Grid in 2000

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

Source: China Power Yearbook 2001

Table A14.Installed Capacity of Northeast China Power Grid in 1999

Installed Capacity	Unit	Liaoning	Jilin	Heilongjiang	Total
Thermal Power	MW	12425.7	4583.1	10128.1	27136.5
Hydro Power	MW	1240	3508.2	774.5	5522.7
Nuclear Power	MW	0	0	0	0
Wind Power and Others	MW	22.9	0	0	22.9
Total	MW	113688.6	8091.3	10902.6	32682.5

Source: China Power Yearbook 2000

Table A15.Calculation of BM of Northeast China Power Grid

	Installation in year 1999	**Installation in year 2000**	**Installation in year 2006**	**New Additions from 2000 to 2006**	**Ratio in New Additions**
	A	B	C	D=C-B	
Thermal Power（MW）	27136.9	28932.5	36216	7283.5	87.57%
Hydro Power（MW）	5522.7	5600	6126	526	6.32%
Nuclear Power（MW）	0	0	0	0	0.00%
Wind Power（MW）	22.9	43.9	552	508.1	6.11%
Total（MW）	**32682.5**	**34576.4**	**42894**	**10211.5**	**100.00%**
Percentage compared with installation of 2006	76.19%	80.61%	100%		

Build Margin Emission Factor of Northeast China Power Grid: $EF_{BM,y}$=0.9074×87.57%=0.7946 tCO_2/MWh.

Table A16. Baseline Emission Factor of Northeast China Power Grid

	Parameter	Unit	Amount
A	Operating Margin Emission Factor	tCO_2/MWh	1.2561
B	Build Margin Emission Factor	tCO_2/MWh	0.7946
C	Combined Emission Factor (C=0.75*A+0.25*B)	tCO_2/MWh	**1.1407**

Table A17. Electricity Generation Baseline Emissions

	Parameter	Unit	Amount	Source or Equation
A	Project installed capacity	MW	49	Feasibility Study
B	Annual electricity supplied	MWh	108,783	Feasibility Study

C	Baseline Emissions Factor	tCO_2/MWh	1.1407	Table 16
D	Electricity generation baseline emissions	tCO_2/year	**124,089**	D= B * C

Annex 4

MONITORING PLAN

Please refer to B 7.2 in the PDD.
