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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Guohua Dongying Lijin Phase I 49.5 MW Wind Farm Project
Version number of the document: 01
Date: 20/12/2007

A.2. Description of the project activity:

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Guohua Dongying Lijin Phase I 49.5 MW Wind Farm Project (hereafter referred to as the project) is sited on the Lijin District which is in the Dongying City of Shandong province, P.R.China. The objective of the Project is to utilize the wind power for generating electricity which will be sold into the North China power grid. The total installed capacity of the Project is49.5MW with 33sets of turbines with a unit capacity of 1500kW. The estimated electricity output to the North China power grid is 103140 MWh per year.

The Project clearly fits into the development priority of China. The Project will not only supply renewable electricity to grid, but also contribute to sustainable development of the local community, the host country and the world by means of:

- reducing greenhouse gas emissions compared to a business-as-usual scenario; helping to stimulate the growth of the wind power industry in China;
- reducing the emission of other pollutants by SO_2 577.6t/y,dust 329t/y,NO_x324t/y,CO8.35t/y, compared to a business-as-usual scenario;
- creating 23 local employment opportunities during the proposed project construction and operation period; promoting the development of local truism industry.

A.3. Project participants:

Please list project participants and Party(ies) involved and provide contact information in Annex 1. Information shall be in indicated using the following tabular format.

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
P.R.China (host)	Guohua Ruifeng (Lijin) Wind Power Co., Ltd	No
United Kingdom of Great Britain and Northern Ireland	Merrill Lynch Commodities Europe Limited	No

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):

the People's Republic of China

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

Shangdong Province

A.4.1.3. City/Town/Community etc:

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Dongying City, Lijin County，Diaokou Coutry

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 is located in Diaokou Country , Lijin County, Dongying City, which is located in north of Shandong Province, east to Kenli Distrist and Dongying City, west to Binzhou City and Zhanhua District, Nouth to Lijin District, Dongying City. The geographical coordinates of the proposed project is east longitude 118°07′-118°54′ and north latitude 37°22′-38°12′.

Figure 1 The location of Shandong province in China

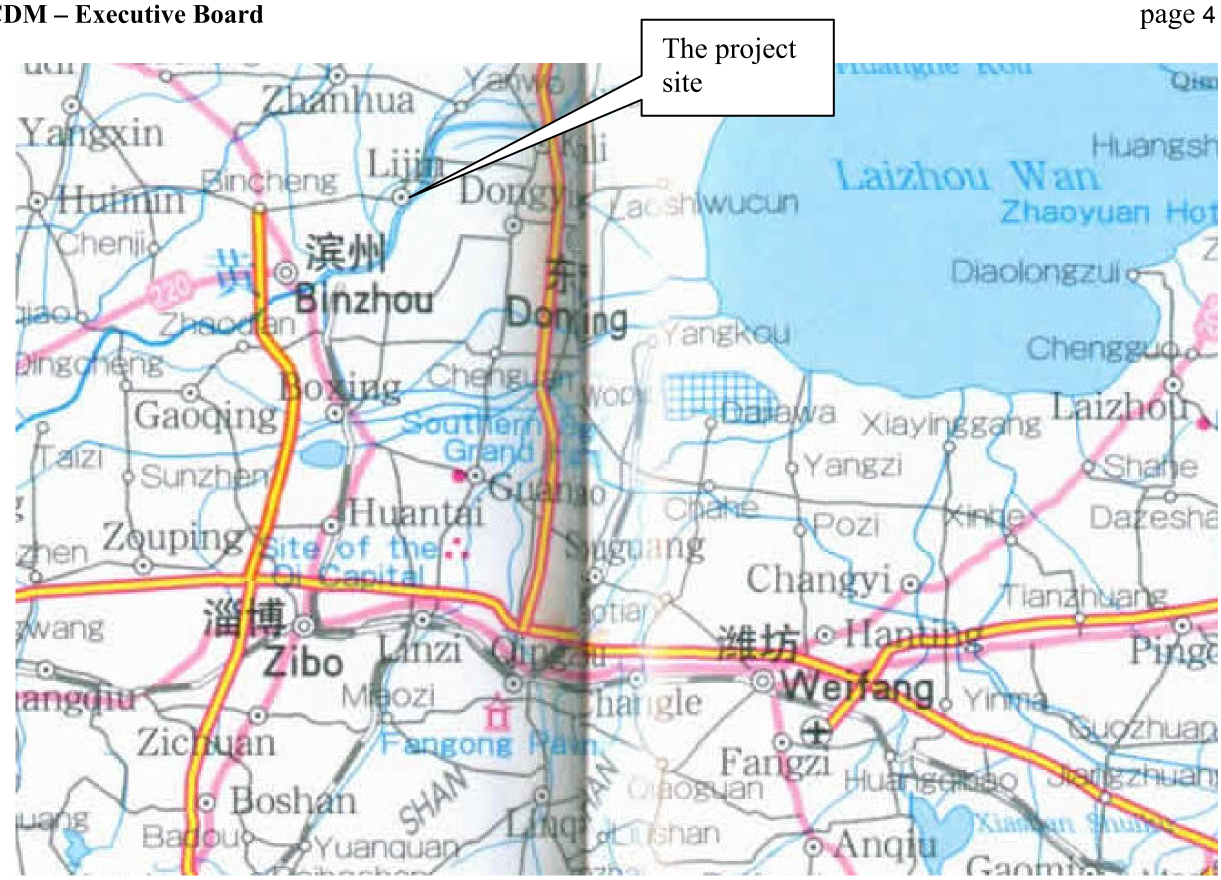

Figure 2 The location of the project in Shandong Province

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

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Sectoral scope: scope 1, energy industries.

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

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Lijin District where the proposed project is located is rich in wind resources. The annual average wind speed and annual average wind power density are is 7.0m/s , 370.3W/m^2, respectively. The probability that the wind speed is between 3m/s and 20m/s is 93.5% and the dominant wind direction is NE~SSW、with popular wind energy direction NE and ENE. The parameter of wind turbines are as follows:

Table1 .Parameters of wind turbines

No	Item	Value
1	Type	Nominal power1500kW，three leafs
2	Diameter	77m
3	Covering Area	4657m2
4	Rotation speed of wind wheel	10.0~20.0r/min
5	Tangent in wind speed	4.0m/s
6	Nominal wind speed	12m/s
7	Tangent out wind speed	25m/s
8	Pole height	80m
9	Nominal voltage	690v
10	IEC Grade	IECIII

The electricity generated is connected into Dongying Power Grid first, then Shandong Power Grid, which is part of North China Power Grid.

The proposed project involves no technology transfer from abroad.

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

The first crediting period of this project is 7 years, the amount of annual and total emission reductions are estimated in the following table:

Years	Annual estimation of emission reductions in tonnes of CO_2e
1st March,2009-1st December,2009	92439
2010	110927
2011	110927
2012	110927
2013	110927
2014	110927
2015	110927
1st January 2016-1st February ,2016	18488
Total estimated reductions (tonnes of CO_2e)	776489
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	110927

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 baseline methodology applied to the proposed includes:

The approved consolidated baseline methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, Version 07

Tool for the demonstration and assessment of additionality, Version 04

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

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

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

- The project is a new 49.5 MW wind energy plant by using renewable wind resources to generate electricity that supply power to NCPG.

- The project does not involve switching from fossil fuels to renewable energy at the site of the project activity.
- The geographic and system boundaries for NCPG can be clearly identified and information on the characteristics of the grid is available.

So the baseline and monitoring methodology ACM0002 are applicable to the project.

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

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The project boundary covers the wind power plant itself and NCPG. According to the delineation of grid boundaries as provided by the DNA China, NCPG is composed of Shandong Power Grid, Beijing Power Grid, Hebei Power Grid, Tianjin Power Grid, Shanxi Power Grid and Inner Mongolia Power Grid.

	Source	Gas	Included?	Justification / Explanation
Baseline	Grid electricity generation	CO_2	Included	Main emission source
		CH_4	Excluded	Excluded for simplification. This is conservative.
		N_2O	Excluded	Excluded for simplification. This is conservative.
Project Activity	Project Emission.	CO_2	Excluded	Excluded by the methodology.
		CH_4	Excluded	Excluded by the methodology.
		N_2O	Excluded	Excluded by the methodology.

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

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The project activity does not modify or retrofit an existing generating facility. The baseline scenario in accordance with ACM0002 for grid-connected electricity generation from renewable energy sources is the following:

"Electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plant and by the addition of new generation sources, as reflected in the combined margin (CM) calculation described below."

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 baseline scenario of the proposed project has been identified in section B.4. And next the additionality will be demonstrated by the latest "Tool for the demonstration and assessment of additionality" Version 04

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

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

Plausible and credible alternatives available to the proposed project that provide outputs or services comparable to the proposed CDM project activity include:

1. The proposed project activity not undertaken as a CDM project activity.
2. Construction of a fuel-fired power plant which can supply the same electricity generation annually as the proposed project.
3. Construction of other renewable energy power plant which can supply the same electricity generation annually as the proposed project.
4. Equivalent annual generated electricity supplied by NCPG.

The other renewable energy here refer to hydropower and biomass. However, the place where the propose project is located is shortage of water resource and it is impossible to build a hydropower station similar to the proposed project. Also the biomass is scarce so that biomass power plant can not be set up there. To sum up, Alternative 1 is not a realistic and credible choice.

Sub-step 1b. Enforcement of applicable laws and regulations:
For alternative 2, it has been excluded since it conflicts with China's current regulations. Considering the same annual electricity generation, the alternative baseline scenario for the proposed project should be a coal-fired/oil-fired/gas-fired power plant with installed capacity lower than 49.5 MW. Besides, as the proposed project is a grid-connected wind power plant, the alternative baseline scenario must be a grid-connected fuel-fired power generation project. However, according to China's regulations, construction of fuel-fired power plants with the installed unit capacity equal to or lower than 135MW is prohibited in the areas which can be covered by large grids such as provincial grids. Therefore, Alternative 1 is not a realistic and credible choice.

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 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 from electricity output, the simple cost analysis method is not appropriate. The investment comparative analysis method is only applicable to a case where the alternative baseline scenario is similar to the proposed project, so that comparative analysis can be conducted. The alternative baseline scenario of the proposed project is the North China Power Grid rather than a new investment project. Therefore option II is not an appropriate method either. The proposed project will use the benchmark analysis method based on the consideration that benchmark IRR and total investment IRR of the power sector are both available.

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

With reference to Interim Rules on Economic Assessment of Electric Engineering Retrofit Projects, the financial benchmark rate of return of Chinese power industry is 8% of the total investment, which has been used widely for Feasibility Studies of the power project investments.

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.

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

(1) Basic parameters for calculation of financial indicators

The basic parameters for calculation of the financial indicators in the Feasibility Study Report of the proposal project are listed below.

Table2. The financial indicators for the proposed project

Indicator	Unit	Value
Installed capacity	MW	49.5
Annual output	MWh/a	103140
Tariff for power	RMB/MWh	640.39
Lending rate	%	5.52
Project lifetime	year	21
Value added tax rate	%	8.5
Income tax rate	%	33
City Built Tax	%	5
Education Additions	%	4
Total investment	Million RMB	48479
Crediting Period	year	7*3=21 (Renewable)
Expected CERs price	EURO/ t CO_2e	8

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

Based on the benchmark analysis (Option III), the proposed project will be financially unattractive if the financial indicators of the proposed project (e.g. IRR) are lower than the benchmark rate.

Table 3 shows the different calculation results of the same financial indicators with the CDM revenues and without CDM revenues respectively. As shown from Table 3, the IRR of the total investment is 5.65% in absence of CDM revenues, which is lower than the benchmark rate of 8%. And therefore the project is unattractive to the investor, as well as not applicable commercially.

Table3. Financial indicators Shandong Dongying Hekou Wind Power Project Project

	IRR (Total investment) Benchmark rate =8%
Without CDM revenue	5.65%
With CDM revenue	8.65%

Sub-step 2d. Sensitivity analysis

The purpose of the sensibility analysis is to examine whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumption. The investment analysis provides a valid argument in favour of additionality only if it consistently supports (for a realistic range of assumptions) the conclusion that the project activity is unlikely to be the most financially attractive or is unlikely to be least financially attractive.

As for the proposed project, the following indicators will be identified as the variable factors to conduct the sensibility analysis of financial attraction:

1) Static total investment
2) Annual O & M costs
3) Tariff (excluding VAT)

We give the priority to the impact of the static total investment, annual O&M costs and tariff on IRR. Provided that these three indicators fluctuate between -10% and 10%, the influence of the total investment on IRR is summarized in Table 4.

Table 4. Sensibility analysis of financial indicator in the proposed project (IRR of total investment, without the CDM revenue)

	-10.0%	-5.0%	0.0%	5.0%	10.0%
Static total investment	7.37%	6.47%	5.65%	4.91%	4.22%
Annual O&M costs	3.07%	4.40%	5.65%	6.83%	7.95%
Tariff (excluding VAT)	6.08%	5.87%	5.65%	5.43%	5.21%

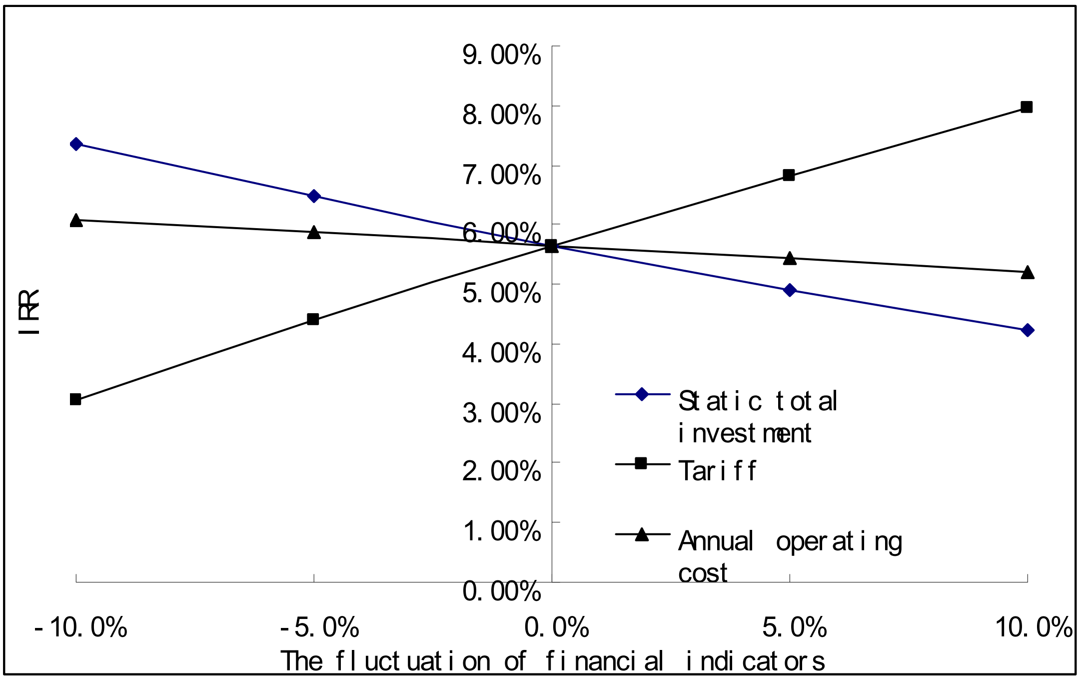

Figure3.Sensibility of total investment IRR

As shown in Table4, the total investment IRR of the proposed project in absence of CDM varies to different extent when the above three financial indicators fluctuated within the range from -10% to +10%. Among them, the tariff fluctuation has the most significant impact on the IRR, followed by the total investment and annual O&M costs. As shown in the sensitivity analysis, even the variation range of the uncertain reaches 10%, the IRR of total investment of the Project can not reach the benchmark and the additionality of the Project can not be influenced.

Based on the Investment Analysis above, the Project is not financially attractive without consideration of CDM sales revenues. So alternative 2 is not feasible.

On the condition that the CER price is 8 Euro per tCO_2e, the IRR reaches 8.33%, which demonstrates that the CDM revenues improve the project ability to overcome the financial risk.

In conclusion, the practical and feasible baseline is alternative 3, the provision of equivalent mount of annual electricity supply by the NCPG into which the Project is connected.

Step 3: Barrier analysis

The proposed project does not adopt barrier analysis.

Step 4: Common practice analysis

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

Wind farm projects which were put into operation before 31st Dec. 2005 in Shandong Province are listed inTable5.

Table 5 Wind farm projects similar to the proposed project in Shandong Province[1]..

Name	Installed Capacity (MW)	Unit Installed Capacity	Turbine Type
Laizhou Diaolongzui Wind farm Project	48.75	1250	Dongqi

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

The project mentioned in Sub-step 4a is applying for the CDM because it is facing the same investment barrier as the proposed project. So it can be seen that the proposed project is not common practice in Shandong Province. And these proposed projects have no impact of the additionality of the proposed project.

Conclusion: The proposed project is financially attractive and additional.

B.6. Emission reductions:

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B.6.1. Explanation of methodological choices:

The consolidated methodology ACM0002 is applied in the context of the proposed project in the following four steps:

- First, calculate the baseline GHG emissions;
- Second, calculate the proposed project GHG emissions;
- Third, calculate the proposed project leakage;
- Last, calculate the emission reductions.

I. Baseline emissions

[1] Source from<Stat. of domestic wind farm installation capacity in 2005>, Shipengfei. http://www.cses.org.cn/nywzbody.asp?id=9

The proposed project does not modify or retrofit an existing electricity generation facitlity. ACM0002 defines that for such project activities 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 plant and by the addition of new generation sources, as reflected in the combined margin (CM) calculation described below.
The baseline emission factor(EF_y)is calculated as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) factors according to the following three steps defined in ACM0002. The baseline emission factor calculated by the method of ex-ante, which will be fixed during the first crediting period. Data for the calculation are based on official national statistics books: China Energy Statistical Yearbook and China Electric Power Yearbook.

CEF_{grid} is calculated according to "Tool for calculation of emission factor for electricity systems" (ver 01) step by step as below:

STEP1. Identify the relevant electric power system

According to instructions of Chinese DNA, the relevant electric power system is the North China Power Grid which consists of Shandong, Shanxi, Beijing, Tianjin, Hebei, Inner Mongolia provincial grids.

STEP2. Select an operating margin (OM) method

The Operating Margin emission factor($EF_{OM,y}$) is calculated based on one of the four following methods:

1. Simple OM;
2. Simple adjusted OM;
3. Dispatch data analysis OM;
4. Average OM.

'Simple OM' (1) method is applicable to this project activity because that in the last five years the lowcost/must run resources constituted less than 50% of generation in the project electricity system, the North China Power Grid,. The data in the table below illustrates this point.

Table4 Power generation mix of North China Power Grid for most recent five years

Energy Source	2001	2002	2003	2004	2005
Total Power Generation (GWh)	361119	407544	461653	530804	607789
Total Low-cost/must run resources (Hydro) (GWh)	2927	3455	3798	3758	4093
Total Low-cost/must run resources (Nuclear) (GWh)	126	170	181	274	458
Percentage of Lowcost/ must run resources % of the total grid generation(GWh)	0.85	0.89	0.86	0.76	0.75

Data Sources: China Electric Power Yearbook (2002-2006)

According to the result, the Simple OM method can be applied to this project activity. The simple OM can be calculated using either of the two following data vintages:

● Ex ante option: A 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period, or

● Ex post option: The year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. If the data required to calculate the emission factor for year y is usually only available later than six months after the end of year y,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).

Based on the most recent statistics available of the project activity at the time of PDD submission, the first data vintages (ex-ante) for the calculation of the OM emission factor was chosen for this project.

STEP3. Calculate the operating margin emission factor according to the selected method

As the power plant level generation and dispatch information is not public available in China, option C has to be applied in this PDD.

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

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{EG_y} \quad (9)$$

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

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

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

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

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

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

y : Either the three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex ante option) or the applicable year during monitoring (ex post option), following the guidance on data vintage in step 2

The North China Power Grid(NCPG) will import Northeast Power Grid every year, however the electricity imported is less thant 20% of electricity generated in NCPG. And therefore emission factor of imported electricity is average emission factor of Northeast Power Grid.

STEP4. 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.

Due to data availability, the latest clarification from CDM EB is applied. And option(b) is used to calculate build margin.

In terms of vintage of data, there are also two options:

Option 1. For the first crediting period, calculate the build margin emission factor *ex-ante* based on the most recent information available on units already built for sample group *m* at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

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

And option 1 is used for the proposed project. With reference to the *Notification on Determining Baseline Emission Factor of China's Grid*, the Build Margin emission factor ($EF_{OM,y}$) of the NCPG is 1.1208 tCO_2e/MWh.

STEP5. Calculate the build margin emission factor

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \qquad (10)$$

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

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

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

m : Power units included in the build margin

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

According to the EB' guidance on DNV deviation request "Request for clarification on use of approved methodology AM005 for several projects in China", the EB accepted the following deviation:[2]

1) Use of capacity additions during the last 1-3years for estimating the build margin emission factor for gird electricity,

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

2) Use of weights estimated using installed capacity in place of annual electricity generation.
Use the efficiency level of the best technology commercially available in the provincial/ regional or national grid of China, as a conservative proxy, for each fuel type in estimating the fuel consumption to estimate the build margin.

The build margin calculations featured below is derived from the "Bulletin on the baseline emission factor of the Chinese Electricity Grid", which has been renewed by the Chinese DNA (Office of National Coordination Committee on Climate Change) on Aug. 9, 2007.

Since there is no way to separate the different generation technology capacities as fuel coal, fuel oil, fuel gas etc from thermal power based on the present statistical data, the following calculating measures will be taken: First, according to the energy statistical data of most recent one year, determine the ratio of CO_2 emissions produced by solid, liquid, and gas fuel consumption for power generation; then multiply this ratio by the respective emission factors based on commercially available best practice technology in terms of efficiency. Finally, this emission factor for thermal power is multiplied with the ratio of thermal power identified within the approximation for the latest 20% installed capacity addition to the grid. The result is the BM emission factor of the grid.

Step a. Calculate the power generation emissions for solid, liquid and gas fuel and each share of total emissions based on the *Energy Balance Table* of the most recent year.

$$\lambda_{Coal} = \frac{\sum_{i \in COAL,j} F_{i,j,y} \times COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \times COEF_{i,j}} \quad (11)$$

$$\lambda_{Oil} = \frac{\sum_{i \in OIL,j} F_{i,j,y} \times COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \times COEF_{i,j}} \quad (12)$$

$$\lambda_{Gas} = \frac{\sum_{i \in GAS,j} F_{i,j,y} \times COEF_{i,j}}{\sum_{i,j} F_{i,j,y} \times COEF_{i,j}} \quad (13)$$

where:
$F_{i,j,y}$ is the amount of fuel i (in a mass or volume unit) consumed by province j in year(s) y,
$COEF_{i,j}$ is the CO_2 emission coefficient of fuel i (tCO2/GJ), taking into account the carbon content of the fuels (coal, oil and gas) used by province j and the percent oxidation of the fuel in year(s) y, and COAL, OIL and GAS are footnote group for solid fuels, liquid fuels and gas fuels.

Step b. Calculate emission factor for thermal power of each grid based on the result of Step a and the efficiency level of the best technology commercially available in China.

$$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Coal,Adv} + \lambda_{Gas} \times EF_{Gas,Adv} \quad (14)$$

Where $EF_{Coal,Adv}$, $EF_{Coal,Adv}$ and $EF_{Gas,Adv}$ represents the efficiency level of the best coal-fired, oil-based and gas-based power generation technology commercially available in China.

Step c. Calculate BM of the grid based on the result of Step b and the share of thermal power of recent 20% capacity additions.

$$EF_{BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal} \quad (15)$$

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

A coal-fired power plant with a total installed capacity of 600MW is assumed to be the commercially available best practice technology in terms of efficiency. The estimated coal consumption of such a National Sub-critical Power Station with a capacity of 600MW is 343.33gce/kWh, which corresponds to an efficiency of 35.82% for electricity generation.

For gas and oil power plants a 200MW power plant with a specific fuel consumption of 258gce/kWh, which corresponds to an efficiency of 47.67% for electricity generation, is selected as commercially available best practice technology in terms of efficiency.

With reference to the *Notification on Determining Baseline Emission Factor of China's Grid*, the Build Margin emission factor ($EF_{BM,y}$) of the NCPG is 0.9397 tCO_2e/MWh.

As mentioned above, the build margin emission factor of the baseline is calculated ex-ante and will not be renewed in the first crediting period. The calculation above is based on the data of DNA of China:http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1374.pdf.

STEP6: Calculate the combined margin emissions factor (EF_y)

As per Step 3 the baseline emission factor EF_y is calculated as the weighted average of the Operating Margin emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{BM,y}$),by default where the weights $\omega_{OM,y}$ is 75% and $\omega_{BM,y}$ is 25% (i.e., $\omega_{OM,y}$ =0.75, $\omega_{BM,y}$ = 0.25) in the first crediting period, and $EF_{OM,y}$ and $EF_{BM,y}$ are calculated as described above and are expressed in tCO_2/MWh.

$$EF_y = \omega_{OM} \times EF_{grid,OM,y} + \omega_{BM} \times EF_{grid,BM,y} \quad (16)$$

EF_y =1.1208*0.75+0. 9397*0.25=1.0755(tCO_2e/MWh)

Step 7: Calculate the baseline emissions

Baseline emissions are calculated based on combined baseline emission factor multiplying by electricity delivered to the grid by the project as follows:

$$BE_y = EG_y \times EF_y$$

II. Calculate the project GHG emissions

The proposed project is a wind power plant and the project emissions should not be taken into account according to ACM0002, i.e. PE_y =0tCO_2e.

III. Calculate the project leakage

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

IV. Calculate the emission reductions

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

$$ER_y = BE_y - PE_y - L_y$$

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

Data / Parameter:	NCV_i
Data unit:	TJ per mass or volume unit of fuel i
Description:	The net calorific value (energy content) per mass or volume unit of a fuel i
Source of data used:	*China Energy Statistical Yearbook 2006*
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data is obtained from the *China Energy Statistical Yearbook 2006* and is reliable.
Any comment:	

Data / Parameter:	$OXID_i$
Data unit:	%
Description:	Oxidation rate of the fuel *i*
Source of data used:	2006 IPCC guidelines
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data are collected from the IPCC.
Any comment:	

Data / Parameter:	$EF_{CO_2,i}$
Data unit:	tC/TJ
Description:	CO_2 emission factor per unit of energy of the fuel i
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 :	The data is obtained from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* and is reliable.
Any comment:	

Data / Parameter:	$F_{i,j,y}$
Data unit:	t or m^3
Description:	The fuel consumed in NCPG.
Source of data used:	China Energy Statistical Yearbook 2006
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data is obtained from the China Energy Statistical Yearbook and is reliable.
Any comment:	

Data / Parameter:	$GEN_{i,y}$
Data unit:	MWh/y
Description:	The electricity generated in NCPG.
Source of data used:	China Electricity Yearbook,2004-2006
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data is obtained from the China Electricity Yearbook and is reliable.
Any comment:	

Data / Parameter:	η_i
Data unit:	%
Description:	The portion of electricity used in NCPG.
Source of data used:	China Electricity Yearbook,2004-2006
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data is obtained from the China Electricity Yearbook and is reliable.
Any comment:	

Data / Parameter:	η_b
Data unit:	%
Description:	The efficiency of best technology in NCPG.
Source of data used:	China Electricity Yearbook,2004-2006
Value applied:	See Annex 3 for details.
Justification of the choice of data or description of measurement methods and procedures actually	The data is obtained from the China Electricity Yearbook and is reliable.

applied :	
Any comment:	

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

I. Estimated baseline emissions

According to the Feasibility Study Report, the annual power generation is estimated to be 102396 MWh. According to the *Notification on Determining Baseline Emission Factor of China's Grid,* the baseline emission factor for the project is 1.0755 tCO_2e/MWh and the annual baseline emission of the project is 110927 tCO_2e as calculated below.

$BE_y = EG_y \times EF_y$ =102396*1.0755=110927 tCO_2e

II. Estimated project emissions

The proposed project is a wind power plant that the project emissions should not be taken into account according to ACM0002, i.e. PE_y =0tCO_2e.

III. Calculate the project leakage

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

IV. Calculate the emission reductions

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

$ER_y = BE_y - PE_y - L_y$ =110927-0-0=110927 tCO_2e

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

Year	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
1st March,2009-1st December,2009	0	92439	0	92439
2010	0	110927	0	110927
2011	0	110927	0	110927
2012	0	110927	0	110927
2013	0	110927	0	110927
2014	0	110927	0	110927
2015	0	110927	0	110927
1st January 2016-1st February ,2016	0	18488	0	18488
Total (tonnes of CO_2e)	0	776489	0	776489

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

B.7.1. Data and parameters monitored:

Data to be monitored in tables below shall be archived for 2 years following the end of the crediting period.

Data / Parameter:	EG_y
Data unit:	MWh
Description:	The quantity of power electricity connected to the grid in year y
Source of data to be used:	Data used in the PDD is obtained from the Feasibility Study Report of the project. Actual data will be read from ammeters.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	103140
Description of measurement methods and procedures to be applied:	The quantity of the electricity will be measured by the meter. There are two meters to be installed in the project plant by the grid company and project developer. The meter installed by the project developer is just complementary to the meter installed by the grid company is the. The data from these two meters will be recorded in detail.
QA/QC procedures to be applied:	The electricity output will be monitored and recorded by using the computer system. Annual electricity output will be clear by calculating on-line monitored data. Additionally, these data will be cross-checked according to invoice provided by the grid company.
Any comment:	Uncertainty level of data is low.

Data / Parameter:	EG_{aux}
Data unit:	MWh
Description:	Electricity imported by the Project from the grid in year y.
Source of data to be used:	Data used in the PDD is assumed as zero. Actual data will be read from ammeters.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0
Description of measurement methods and procedures to be applied:	Continuously measured by ammeters installed at the 10.5kV Distribution Box. Recorded per month by appointed staff as backup.
QA/QC procedures to be applied:	Double-checked with readings of the backup ammeter.
Any comment:	---

B.7.2. Description of the monitoring plan:

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

1. The requirement of monitoring plan.

Managers of the proposed project must maintain credible, transparent, and adequate data estimation, measurement, collection, and tracking systems to maintain the information required for an audit of an emission reduction project. These records and monitoring systems are needed to allow the selected DOE to verify project performance as part of the verification and certification process. This process also reinforces that CO_2 reductions are real and credible to the buyers of the Certified
Emissions Reductions (CERs). Emission reductions will be achieved through avoided power generation of fossil-fuel-fired electricity due to the power generated by the proposed project. The amount of the electricity generated from the proposed project and the baseline emission factor are therefore defined as the key
activities to monitor.

- ✧ The monitoring plan provides the requirements and instructions for: Establishing and maintaining the appropriate monitoring systems for electricity generated by the proposed project
- ✧ Quality control of the measurements
- ✧ Procedures for the periodic calculation of GHG emission reductions
- ✧ Assigning monitoring responsibilities to personnel
- ✧ Data storage and filing system
- ✧ Preparing for the requirements of an independent, third party auditor/verifier

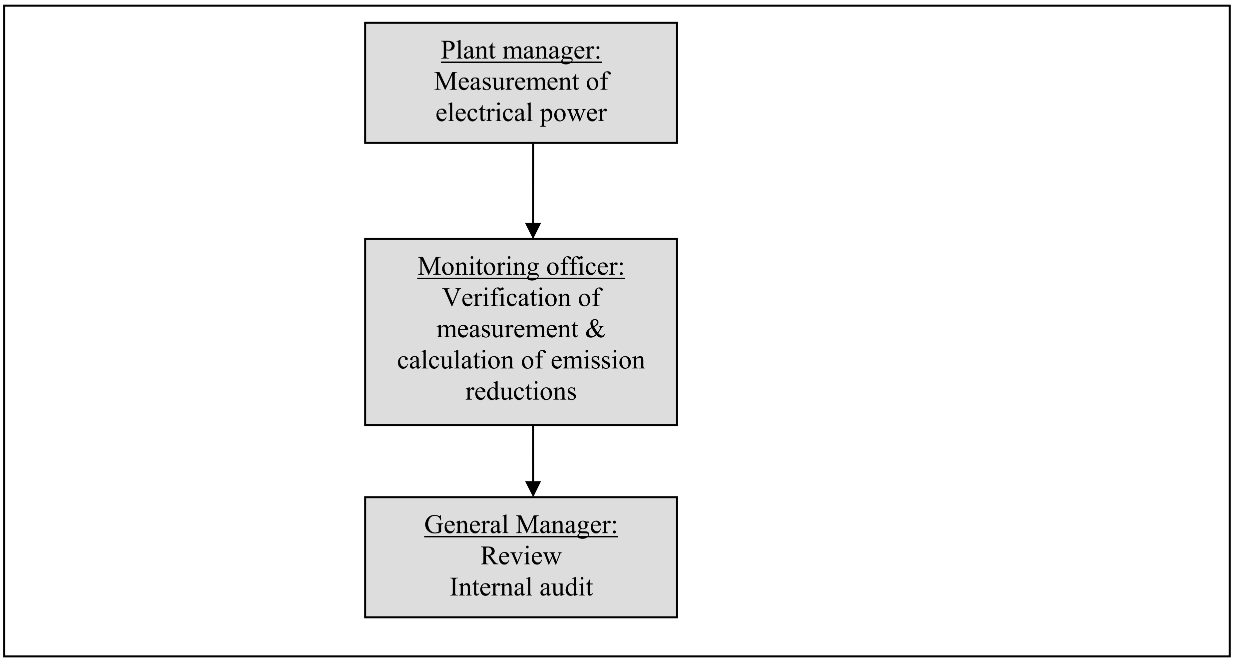
2. The users who use the monitoring plan

The Guohua Ruifeng(Lijin) Wind Power Co., Ltd, the proposed project owner, will use this document as guideline in monitoring of the project emission reduction performance and will adhere to the guidelines set out in this monitoring plan. This plan should be modified according to actual conditions and requirements of DOE in order to ensure that the monitoring is credible, transparent and conservative.

3. Operational and management structure for monitoring

The monitoring of the emission reductions will be carried out according to the scheme shown in Figure below. The General Manager will hold the overall responsibility for the monitoring process, but as indicated below parts of the process are delegated. The first step is the measurement of the electrical energy supplied to the grid and reporting of daily operations, which will be carried out by the plant manager.

The project owner will appoint a monitoring officer who will be responsible for verification of the measurement, collection of sales receipts, collection of billing receipts of the power supplied by the grid to the wind farm and the calculation of the emissions reductions. The monitoring officer will prepare operational reports of the project activity, recording the daily operation of the wind farm, including operating periods, power generation; power delivered to the grid, equipment defects, etc. Finally, the monitoring reports will be reviewed by the General Manager.



4. Key definitions

The monitoring plan will use the following definitions of monitoring and verification.

- Monitoring: the systematic surveillance of the project's performance by measuring and recording performance-related indicators relevant in the context of GHG emission reductions.
- Verification: the periodic ex-post auditing of monitoring results, the assessment of achieved emission reductions and of the project's continued conformance with all relevant project criteria by a selected Designated Operational Entity.

5. Calibration of Meters & Metering

An agreement should be signed between the proposed project owner and the local grid company that defines the metering arrangements and the required quality control procedures to ensure accuracy. The metering equipment will be properly calibrated and checked annually for accuracy.

- The metering equipment shall have sufficient accuracy so that error resulting from such equipment shall not exceed +0.5% of full-scale rating.
- Both Meters shall be jointly inspected and sealed on behalf of the parties concerned and shall not be interfered with by either party except in the presence of the other party or its accredited representatives.
- All the meters installed shall be tested by the local grid company within 10 days after:

(a) The detection of a difference larger than the allowable error in the reading of both meters

(b) The repair of all or part of the meter caused by the failure of one or more parts to operate in accordance with the specifications

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

- Should any previous months reading of the Main Meter be inaccurate by more than the allowable error, or otherwise functioned improperly, the grid-connected electricity generated by the proposed project shall be determined by:

(a) First, by Reading Backup Meter, unless a test by either party reveals it is inaccurate

(b) If the backup system is not within acceptable limits of accuracy or is performing improperly, the proposed project owner and the local grid company shall jointly
prepare an estimate of the correct reading, and

(c) If the proposed project owner and the local grid company fail to agree the estimate of the correct reading, then the matter will be referred for arbitration according to agreed procedures.

- The electricity recorded by the Main Meters alone will suffice for the purpose of billing and emission

reduction verification as long as the error in the Main Meter is within the permissible limits.
Calibration is carried out by the local grid company with the records being provided to the proposed project owner, and these records will be maintained by the proposed project owner and the third party designated.

6. Monitoring
Data that will be monitored include:
6.1 Monitoring of grid-connected electricity generated by the proposed project
Grid-connected electricity generated by the proposed project will be monitored through metering equipment at the substation (interconnection facility connecting the facility to the grid). The data can also be monitored and recorded at the on-site control centre using a computer system. The Main Metering System equipment will be owned, operated and maintained by the local grid company, and the Backup Metering System equipment will be owned, operated and maintained by the proposed
project owner. Both meters will have the capability to be read remotely through a communication line. Detailed monitoring procedure of grid-connected electricity generated by the proposed project will be established in accordance with the Grid Connection Agreement. The meter reading will be readily accessible for DOE. Calibration tests records will be maintain for verification.
6.2 Monitoring of electricity imported from the grid
The Main metering will record the electricity imported from the grid. The staff from the project company will write down the data every day and draft annual production table accordingly. DOE can double-check by invoice between the grid company and the project owner.

7. Quality Assurance and Quality Control
The quality assurance and quality control procedures for recording, maintaining and archiving data shall be improved as part of this CDM proposed project activity. This is an on-going process which will be ensured through the CDM mechanism in terms of the need for verification of the emissions on an annual basis according to this PDD and the CDM manual.

8. Data Management System
The general manager has the overall responsibility of checking data for its completeness and correctness. The data collected from daily logs will be forwarded to the central registry after verification from respective departments. CDM audits shall be carried out to check the correctness of procedures and data monitored by the internal auditing team entrusted for the work. Report on internal audits done, faults found and corrective action taken shall be maintained and kept for external auditing.

The proposed project activity does not result in any unidentified activity that can result in substantial emissions from the proposed project activity. No need for emergency preparedness in data monitoring is visualized. After verification of the data and due diligence on correctness an annual report on monitoring and estimations shall be maintained by the CDM team and record to this effect shall be maintained for verification. Below follows an outline of how proposed project related records will be managed. Overall responsibility for monitoring of GHG emissions reduction will rest with the CDM responsible person of the proposed project. The CDM manual sets out the procedures for tracking information from the primary source to the end-data calculations, in paper document format. If data and information are from internet, the website must be provided. Moreover, the credibility and reliability of those data and information from internet must be confirmed by the CDM developer, CREIA, or other qualified entities. 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 impact assessment will be collated in a central place, together with this monitoring plan. In order to facilitate auditor's reference, monitoring results will be indexed. All paper-based information will be stored by the proposed project owner and kept at least one copy. The responsible person for the information management system for emissions reduction monitoring must be qualified as a statistician. Table below outlines the main documents relevant to monitoring and verification of the proposed project.

I.D. No.	Document Title	Main Content	Source
F-1	PDD, including the electronic spreadsheets and supporting documentation (assumptions, estimations, measurement, etc)	Calculation procedure of emission reduction and monitoring items	PDD in English and Chinese must be documented by the proposed project owner，or directly download from UNFCCC website
F-2	Monitoring Quality Control and Quality Assurance Report	Equipments and national and industry standards	Proposed project owner
F-3	The report on qualifications of the persons responsible for the monitoring and calculation	i.e. the title of a technical post, working experience etc.	Proposed project owner
F-4	The report on monitoring and checking of electricity supplied to the grid	Record based on monthly meter reading and electricity sale receipts	Proposed project owner
F-5	Record on maintenance and calibration of metering equipment	Reasons for maintenance and calibration and the precision after maintenance and calibration	Proposed project owner
F-6	The report on baseline emission factor calculation	Data sources and calculation procedure	Proposed project owner
F-7	Record on CO_2 emission reduction	Monthly calculation (F4×F6)	Proposed project owner
F-8	Letter of confirmation on F-2 to F-7	Make confirm of monitoring and calculation data and procedure from F-2 to F-7	Proposed project owner
F-9	Proposed project Management Record (including data collection and management system)	Comprehensively and truly reflect the management and the operation of the proposed proposed project	Proposed project owner

9. Monitoring Report

The CDM manager will write the monitoring report including electricity produced and emission reduction every month and then submit it to the general manager, who will audit it internally. And all these documents can be vivificated by DOE.

B.8. Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)

The completion of the baseline methodology is 18 December, 2007

The technicians determining the baseline methodology include:

1. Mr.Wang Weiquan
   Chinese Renewable Energy Industries Association, Beijing 100044, P.R.China
   A2106 WuHua Plaza, Che Gongzhuang St., Xicheng District
   Tel :(8610) 68002617/18 ext 503 E-mail: wangweiquanth@gmail.com
2. Mr. Li Junfeng
   Chinese Renewable Energy Industries Association, Beijing 100044, P.R.China
   A2106 WuHua Plaza, Che Gongzhuang St., Xicheng District
   Tel: (8610) 68002615 E-mail: lijunfeng@amr.gov.cn
3. Mr. Wang Zhongying
   Chinese Renewable Energy Industries Association, Beijing 100044, P.R.China
   A2106 WuHua Plaza, Che Gongzhuang St., Xicheng District
   Tel: (8610) 68002619 E-mail: WangZhongying@amr.gov.cn
4. Ms. Liu Ying
   Chinese Renewable Energy Industries Association, Beijing 100044, P.R.China
   A2106 WuHua Plaza, Che Gongzhuang St., Xicheng District
   Tel: (8610) 68003689 E-mail: Nancy_fly@163.com
5. Ms. Ma Lingjuan
   Chinese Renewable Energy Industries Association, Beijing 100044, P.R.China
   A2106 WuHua Plaza, Che Gongzhuang St., Xicheng District
   Tel: (8610) 68002615 E-mail: horse_liyi@263.net

None of them is the 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:

01/01/2008

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

21years.

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

C.2.1. Renewable crediting period

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

>>
01/03/2009

C.2.1.2. Length of the first crediting period:

>>
7 years 0 months

C.2.2. Fixed crediting period:

>>
n/a

C.2.2.1. Starting date:

>>
n/a

C.2.2.2. Length:

>>
n/a

SECTION D. Environmental impacts

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

>>
An Environmental Impact Assessment (EIA) for the proposed project was completed in May 2006 by Shandong Normal University and subsequently approved by the Shandong Environmental Protection Administration according to the current legislation. The EIA was approved by the Shandong Environmental Protection Administration in June 2006.
A summary of the impacts is presented below.

Analysis of environmental impacts during construction duration
Atmospheres
The largest impact scope of dust emission is 420 meters. The closest distance between construction site and local village is 500 meters. Therefore, there is not so much environmental impact on local air quality.
Noise
Noise during construction is mainly caused by equipment installation and operation. Since the closest distance between construction site and local village is 500 meters, the noise is acceptable during the construction.
Solid waste
Few people lives nearby the wind farm site, where is a natural ecology with nice natural environment. Solid waste will be reasonably treated, which include clean up the extra earth in time, clam the landscape, recover the previous plants, protect the natural environment with less destruction, so the destruction level of local natural environment by this project implementation is controlled relatively low, therefore the project implementation doesn't have obvious impacts on local natural environment.
Hydro
Waste water is mainly produced by daily water discharged by workers. Minimum amount of waste water will be discharged directly on the earth. There is no surface water at the project site. So the discharged waste water will be absorbed by earth or vaporized. Therefore surface water will not be polluted.
Ecological impact
There is no endangered species live in this area. The project owner will strictly control the on-site construction scope, take vegetation protection into account; meanwhile, restore vegetation generation based on restoration framework, so it will not influence the ecological environment very much.

Analysis of environmental impacts after put into production
Hydro
The treated waste water of the project site fulfil standard of<water quality standard of agricultural irrigation>(GB5084-1992). The project owner will prepare one pump to treat waste water. After pumped,

the waste water will be composted after decomposed by anaerobic bacteria in septic tank, which will cause little impact on surface water quality.

Noise
The Project will produce noise to surrounding areas between 37.1-41.0dB (A) after the project put into production. This is acceptable noise level. Consider that there is no other noise source in the villages nearby, the background noise level is relative low. So the operation noise of the Project can be within level I of <Urban area environmental noise standard>. It will not cause negative impact to local inhabitants.

Electromagnetism impact
Wind farm operation will create electromagnetism. However, its density is very low and the electromagnetism is far from local residents area, so it will not cause health damage to local people.

Solid waste
The main solid waste after the site put into production is household garbage. The household garbage is stored centrally and transport to special area for storage and burying. So solid waste discharged by this project will not influence the local ecological environment.

The environmental impacts are not deemed to be significant.

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:

>>
An Environmental Impact Assessment (EIA) for the proposed project was completed in May 2006 by Shandong Normal University and subsequently approved by the Shandong Environmental Protection Administration according to the current legislation. The EIA was approved by the Shandong Environmental Protection Administration in June 2006. The environmental impacts are not deemed to be significant.

SECTION E. Stakeholders' comments

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

Project owners held a stakeholder forum for Dongying Lijin on April 13, 2007. There is four parts in meeting process, the project basic information introduced by project owner, Chinese renewable energy industries association Ms. Liu Ying introduce the basic concept of CDM, the free discussion in meeting and the participants filled out questionnaires.

There are specific people responsible for records filed for the representative speech and recovery the questionnaire and do some statistics work.Speeches and questionnaire statistics fruit see E.2. Part.

E.2. Summary of the comments received:

The forum issued a total of 31 copies of the questionnaire, 31 recoveries, 100% recovery rate, the investigators state in table 8.There were 6 items to be interviewed in this public investigation and interview comments are summarized as follows.

- 97% of the respondents know the proposed project and 3% know a little about it;
- 100% of the respondents argue that the proposed project will promote the local economic;
- 94% agree that the proposed project will affect their life positively and 6% has no idea about it;
- 100% think that the proposed project is located reasonably;
- 97% think that the proposed project has no bad impact on the environment,3% don't care;

- 100% of the respondents support the proposed project.

Conclusion

From the comments above, it can be concluded most representatives think the proposed project will do good to local environment and economy and all support it.

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

According to comments from the stakeholders, it is not necessary to adjust the design, construction or operation of the proposed project.

Annex 1
CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Guohua Ruifeng (Lijin) Wind Power Co., Ltd
Street/P.O.Box:	
Building:	
City:	Dongying City
State/Region:	Shandong Province
Postfix/ZIP:	
Country:	The People's Republic of China
Telephone:	+ 86.010.58157576
FAX:	+ 86.010.58157568
E-Mail:	wangwei@guohua.com.cn
URL:	www.guohua.com.cn
Represented by:	WANG Wei
Title:	
Salutation:	
Last Name:	WANG
Middle Name:	
First Name:	Wei
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	wangwei@guohua.com.cn

Organization:	Merrill Lynch Commodities Europe Limited
Street/P.O.Box:	2 King Edwards Street, London, EC1A 1HQ,
Building:	
City:	London
State/Region:	
Postfix/ZIP:	
Country:	UK
Telephone:	(852) 2536 3399
FAX:	(852) 2536 3475
E-Mail:	jennifer_jiang@ml.com
URL:	
Represented by:	JIANG Hongbo
Title:	
Salutation:	
Last Name:	JIANG
Middle Name:	
First Name:	Hongbo
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	jennifer_jiang@ml.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

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

Annex 3

BASELINE INFORMATION

Table A1- A10 below shows the data and calculation process of the simple operating margin emission factor of the North China Power Network. Table A11 to A13 show data used to calculate $EF_{BM,y}$.

Table A 1．Thermal Power to North China Power Grid in 2003

Province	Electricity Generation（MWh)	Used by the Power Plant（%）	Electricity to the Grid（MWh)
Beijing	18608000	7.52	17208678
Tianjin	32191000	6.79	30005231
Hebei	108261000	6.5	101224035
Shanxi	93962000	7.69	86736322
Inner Mongolia	65106000	7.66	60118880
Shandong	139547000	6.79	130071759
Total			**425364906**

《China Electric Power Yearbook2004》

Thermal power imported from the North East Power Grid is **4,244,380** MWh, and therefore the total thermal power to the grid is **429,609,286** MWh

Table A 2．Thermal Power to North China Power Grid in 2004

Province	Electricity Generation（MWh)	Used by the Power Plant（%）	Electricity to the Grid（MWh)
Beijing	18579000	7.94	17103827
Tianjin	33952000	6.35	31796048
Hebei	124970000	6.5	116846950
Shanxi	104926000	7.7	96846698
Inner Mongolia	80427000	7.17	74660384
Shandong	163918000	7.32	151919202
Total			**489173110**

《China Electric Power Yearbook2005》

Thermal power imported from the North East Power Grid is **4,514,550** MWh, and therefore the total thermal power to the grid is **493,687,660** MWh

Table A 3． Thermal Power to North China Power Grid in 2005

Province	Electricity Generation （MWh)	Used by the Power Plant （%）	Electricity to the Grid （MWh)
Beijing	20880000	7.73	19,265,976
Tianjin	36993000	6.63	34,540,364
Hebei	134348000	6.57	125,521,336
Shanxi	128785000	7.42	119,229,153
Inner Mongolia	92345000	7.01	85,871,616
Shandong	189880000	7.14	176,322,568
Total			**560,751,013**

《China Electric Power Yearbook2006》

Thermal power imported from the North East Power Grid is **23,423,000**MWh, and therefore the total thermal power to the grid is **584,174,013** MWh.

Table A 4 . Emissions of North China Power Grid in 2003

Fuel Type	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total	Emission Factor	Oxidate	low caloric value(MJ/t, m3,tce)	CO2 emission (tCO2)
									(tc/TJ)	(%)	(MJ/t,km3)	K=G*H*I*J*44/ 12/10000(m)
		A	B	C	D	E	F	G=A+B+ C+D+E+F	H	I	J	K=G*H*I*J*44/ 12/1000 (v)
Raw Coal	10^4t	714.73	1052.74	5482.64	4528.5	3949.32	6808	**22535.94**	25.8	100	20908	445737636.11
Cleaned Coal	10^4t						9.41	**9.41**	25.8	100	26344	234510.60
Other Washed Coal	10^4t	6.31		67.28	208.21		450.9	**732.7**	25.8	100	8363	5796681.31
Coke	10^4t					2.8		**2.8**	25.8	100	28435	75318.63
Coke Oven Gas	10^8m^3	0.24	1.71		0.9	0.21	0.02	**3.08**	12.1	100	16726	228559.67
Other Gas	10^8m^3	16.92		10.63		10.32	1.56	**39.43**	12.1	100	5227	914399.71
Crude Oil	10^4t						29.68	**29.68**	20	100	41816	910139.18
Gasoline	10^4t						0.01	**0.01**	18.9	100	43070	298.48
Diesel	10^4t	0.29	1.35	4		2.91	5.4	**13.95**	20.2	100	42652	440693.26
Fuel Oil	10^4t	13.95	0.02	1.11		0.65	10.07	**25.8**	21.1	100	41816	834672.45
PLG	10^4t							**0**	17.2	100	50179	0.00
Refinery Gas	10^4t			0.27			0.83	**1.1**	18.2	100	46055	33807.44
Natural Gas	10^8m^3		0.5				1.08	**1.58**	15.3	100	38931	345076.60
Other Petroleum Products.	10^4t							**0**	20	100	38369	0.00
Other Coking Products.	10^4t							**0**	25.8	100	28435	0.00

Other Energy	10^4tce	9.83					39.21	**49.04**	0	100	0	0.00
												455551793.43

《China Energy Statistical Yearbook 2004》

Table A5. Emission due to import from Northeast Power Grid in 2003

Thermal Power Generation from Northeast Power Grid (MWh)	Emission Factor of Northeast Power Grid	Emissions due to Electricity Imported (tCO_2)
4,244,380	1.1366	4,823,987

North China Power Grid imported 4,244,380 MWh from North East Power Grid in 2003 and the emission factor of North East Power Grid is 1.1366tCO_2e /MWh according to the data issued by the DNA of China[3], which is calculated with the same way as this PDD.

The total emissions in 2003 is 460,375,781 tCO_2

Table A 6． Emissions of North China Power Grid in 2004

Fuel Type	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total	Emission Factor	Oxidate	low caloric value(MJ/t, m3,tce)	CO2 emission (tCO2)
									(tc/TJ)	(%)	(MJ/t,km3)	K=G*H*I*J*44/ 12/10000(m)
		A	B	C	D	E	F	G=A+B+ C+D+E+F	H	I	J	K=G*H*I*J*44/ 12/1000 (v)

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

Raw Coal	10^4t	823.09	1410	6299.8	5213.2	4932.2	8550	**27228.29**	25.8	100	20908	538547476.6
Cleaned Coal	10^4t						40	**40**	25.8	100	26344	996856.96
Other Washed Coal	10^4t	6.48		101.04	354.17		284.22	**745.91**	25.8	100	8363	5901190.882
Coke	10^4t					0.22		**0.22**	25.8	100	28435	5917.8922
Coke Oven Gas	10^8m^3	0.55		0.54	5.32	0.4	8.73	**15.54**	12.1	100	16726	1153187.451
Other Gas	10^8m^3	17.74		24.25	8.2	16.47	1.41	**68.07**	12.1	100	5227	1578574.385
Crude Oil	10^4t							**0**	20	100	41816	0
Gasoline	10^4t								18.9	100	43070	0
Diesel	10^4t	0.39	0.84	4.66				**5.89**	20.2	100	42652	186070.4874
Fuel Oil	10^4t	14.66		0.16				**14.82**	21.1	100	41816	479451.3838
PLG	10^4t							**0**	17.2	100	50179	0
Refinery Gas	10^4t		0.55	1.42				**1.97**	18.2	100	46055	60546.05223
Natural Gas	10^8m^3		0.37		0.19			**0.56**	15.3	100	38931	122305.6296
Other Petroleum Products.	10^4t							**0**	20	100	38369	0
Other Coking Products.	10^4t							**0**	25.8	100	28435	0
Other Energy	10^4tce	9.41		34.64	109.73	4.48		**158.26**	0	100	0	0
												549031577.7

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Table A7. Emission due to import from Northeast Power Grid in 2004

Thermal Power Generation from Northeast Power Grid (MWh)	Emission Factor of Northeast Power Grid	Emissions due to Electricity Imported (tCO_2)
4,514,500	1.17411	**5,300,571**

North China Power Grid imported 4514550 MWh from North East Power Grid in 2004 and the emission factor of North East Power Grid is 1.17411tCO_2e /MWh according to the data issued by the DNA of China[4], which is calculated with the same way as this PDD.

The total emissions in 2004 are 554,332,148tCO_2.

Table A 8． Emissions of North China Power Grid in 2005

Fuel Type	**Unit**	**Beijing**	**Tianjin**	**Hebei**	**Shanxi**	**Inner Mongolia**	**Shandong**	**Total**	**Emission Factor**	**Oxidate**	**low caloric value(MJ/t, m3,tce)**	**CO2 emission (tCO2)**
									(tc/TJ)	**(%)**	**(MJ/t,km3)**	**K=G*H*I*J*44/ 12/10000(m)**
		A	**B**	**C**	**D**	**E**	**F**	**G=A+B+ C+D+E+F**	**H**	**I**	**J**	**K=G*H*I*J*44/ 12/1000 (v)**
Raw Coal	10^4t	897.75	1675.2	6726.5	6176.5	6277.23	10405.4	**32158.53**	25.8	100	20908	636062535.8
Cleaned Coal	10^4t						42.18	**42.18**	25.8	100	26344	1051185.664
Other	10^4t	6.57		167.45	373.65		108.69	**656.36**	25.8	100	8363	5192725.191

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

Washed Coal												
Coke	10^4t					0.21	0.11	**0.32**	25.8	100	28435	8607.8432
Coke Oven Gas	10^8m^3	0.64	0.75	0.62	21.08	0.39		**23.48**	12.1	100	16726	1742396.483
Other Gas	10^8m^3	16.09	7.86	38.83	9.88	18.37		**91.03**	12.1	100	5227	2111027.27
Crude Oil	10^4t					0.73		**0.73**	20	100	41816	22385.49867
Gasoline	10^4t			0.01				**0.01**	18.9	100	43070	298.4751
Diesel	10^4t	0.48		3.54		0.12		**4.14**	20.2	100	42652	130786.3867
Fuel Oil	10^4t	12.25		0.23		0.06		**12.54**	21.1	100	41816	405689.6325
PLG	10^4t							**0**	17.2	100	50179	0
Refinery Gas	10^4t			9.02				**9.02**	18.2	100	46055	277221.0107
Natural Gas	10^8m^3	0.28	0.08		2.76			**3.12**	15.3	100	38931	681417.0792
Other Petroleum Products.	10^4t							**0**	20	100	38369	0
Other Coking Products.	10^4t							**0**	25.8	100	28435	0
Other Energy	10^4tce	8.58		32.35	69.31	7.27	118.9	**236.41**	0	100	0	0
												647686276.3

Table A9. Emission due to import from Northeast Power Grid in 2005

Thermal Power Generation from Northeast Power Grid (MWh)	Emission Factor of Northeast Power Grid	Emissions due to Electricity Imported (tCO_2)
23,423,000	1.1578	**27,119,149**

North China Power Grid imported 23,423,000 MWh from North East Power Grid in 2005 and the emission factor of North East Power Grid is 1.1578 tCO_2e /MWh according to the data issued by the DNA of China[5], which is calculated with the same way as this PDD.

The total emissions in 2005 are 674,805,425 tCO_2.

Table A10. OM Emission Factor

	Total emissions	**Total thermal power to the grid**	**Average Emission Factor**
2003	460,375,781	429,609,286	
2004	554,332,148	493,687,660	
2005	674,805,425	584,174,013	
Average Emission Factor	1,689,513,354	1,507,470,959	**1.12078**

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

TableA11. Calculating the proportion of solid fuel, liquid fuel and gas fuel in the total emission.

		Beijing	Tianjin	Hebei	Shanxi	Shangdong	Inner Mongolia	Total	Calorific value	Emission Factors	Oxidation rate	Emission
Fuel Type	**Units**	**A**	**B**	**C**	**D**	**E**	**F**	**G=A+B +C+D+ E+F**	**H**	**I**	**J**	**H=G*H*I*J*44/ 12/100**
Raw Coal	10^4t	897.75	1675.2	6726.5	6176.45	10405.4	6277.23	32158. 53	20908	25.8	1	636,062,536
Cleaned Coal	10^4t	0	0	0	0	42.18	0	42.18	26344	25.8	1	1,051,186
Other Washed Coal	10^4t	6.57	0	167.45	373.65	108.69	0	656.36	8363	25.8	1	5,192,725
Coke	10^4t	0	0	0	0	0.11	0.21	0.32	28435	25.8	1	8,608
Sub-total												**642,315,054**
Crude Oil	10^4t	0	0	0	0	0	0.73	0.73	41816	20	1	22,385
Gasoline	10^4t	0	0	0.01	0	0	0	0.01	43070	18.9	1	298
Kerosene	10^4t	0	0	0	0	0	0	0	43070	19.6	1	0
Diesel	10^4t	0.48	0	3.54	0	0	0.12	4.14	42652	20.2	1	130,786
Fuel	10^4t	12.25	0	0.23	0	0	0.06	12.54	41816	21.1	1	405,690
Other oil products	10^4t	0	0	0	0	0	0	0	38369	20	1	0
Sub-total												**559,160**
Natural Gas	10^8m^3	2.8	0.8	0	27.6	0	0	31.2	38931	15.3	1	681,417
Coke Oven Gas	10^8m^3	6.4	7.5	6.2	210.8	0	3.9	234.8	16726	12.1	1	1,742,396
Other Gas	10^8m^3	160.9	78.6	388.3	98.8	0	183.7	910.3	5227	12.1	1	2,111,027
LPG	10^4t	0	0	0	0	0	0	0	50179	17.2	1	0

Refinery gas	10^4t	0	0	9.02	0	0	0	9.02	46055	18.2	1	277,221
Sub-total												**4,812,062**
Total												**647,686,276**

According to the data and equation (2),(3),(4) , λ_{Coal} =99.17% , λ_{Oil} =0.08% , λ_{Gas} =0.74%。

Table A12. Emission factor of the best technologies commercialization

	Variables	The efficiency of power supply	Fuel emissions factor(tc/TJ)	Oxidation rate	Emission Factors(tCO_2/MWh)
		A	**B**	**C**	**D=3.6/A/1000*B*C*44/12**
Coal-fired Power Plant	$EF_{Coal,Adv}$	35.82%	25.8	1	0.9508
Gas-fired Power Plant	$EF_{Gas,Adv}$	47.67%	15.3	1	0.4237
Oil-fired Power Plant	$EF_{Oil,Adv}$	47.67%	21.1	1	0.5843

Emission factor of thermal power is calculated based on the following equation.

$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Coal,Adv} + \lambda_{Gas} \times EF_{Gas,Adv}$ =0.9508*99.17%+0.4237*0.08%+0.5843*0.74=0.9465 tCO2/MWh

Table A13. Installed capacity of the North China Grid in 2003

	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total
Thermal power (MW)	MW	3347.5	6008.5	17698.7	15035.8	11421.7	30494.4
Hydro power (MW)	MW	1058.1	5	764.3	795.7	592.1	50.8

Wind power and Other (MW)	MW	0	0	0	0	0	0
Total (MW)	MW	0	0	13.5	0	76.6	0

《China Electric Power Yearbook 2004》

Table A14. Installed capacity of the North China Power Grid in 2004

	Beijing	**Tianjin**	**Hebei**	**Shanxi**	**Inner Mongolia**	**Shandong**	**Total**
Thermal power (MW)	MW	3458.5	6008.5	19932.7	17693.3	13641.5	32860.4
Hydro power (MW)	MW	1055.9	5	783.8	787.3	567.9	50.8
Wind power and Other (MW)	MW	0	0	0	0	0	0
Total (MW)	MW	0	0	13.5	0	111.7	12.3

《China Electric Power Yearbook 2005》.

Table A15. Installed capacity of the North China Power Grid in 2005

	Beijing	**Tianjin**	**Hebei**	**Shanxi**	**Inner Mongolia**	**Shandong**	**Total**
Thermal power (MW)	MW	3833.5	6149.9	22333.2	22246.8	19173.3	37332
Hydro power (MW)	MW	1025	5	784.5	783	567.9	50.8
Wind power and Other (MW)	MW	0	0	0	0	0	0
Total (MW)	MW	24	24	48	0	208.9	30.6

《China Electric Power Yearbook 2006》.

Table A16. Calculation of BM emission factor of the North China Power Grid

	Installed capacity in 2003 (MW) A	Installed capacity in 2004 (MW) B	Installed capacity in 2005 (MW) C	Capacity additions from 2003 to 2005 (MW) D=C-A	Share in total capacity additions
Thermal power (MW)	84006.6	93594.9	111068.7	27062.1	99.28%
Hydro power (MW)	3266.0	3250.7	3216.2	-49.8	-0.18%
Nuclear power	0	0	0	0	0.00%
Wind power and Other (MW)	90.1	137.5	335.5	245.4	0.90%
Share in total installed capacity of 2005	74.31%	81.41%	100%		

$EF_{BM,y}$ =0.9465×99.28%=**0.9397 tCO2/MWh.**

Annex 4

MONITORING INFORMATION

>>There is no further information about monitoring.

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