



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

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**SECTION A. General description of project activity****A.1. Title of the project activity:****Proposed project Title:** Guohua Binzhou Zhanhua 49.5MW Windfarm Project (Phrase I)**Version No:** 02**Completion Date:** 18 December 2007**A.2. Description of the project activity:**

Guohua Binzhou Zhanhua 49.5MW Windfarm Project (Phrase I) (hereafter referred to as “the proposed project”) is located in Zhanhua County, Binzhou City, Shandong Province, P.R.China. The objective of the proposed project is to generate renewable electricity using the wind power resource and sell the generated outputs to the North China Power Grid (NCPG). Annual power generation will be 119341MWh and the estimated electricity output to the NCPG is 99324MWh per year.

The proposed project involved in installation and operation of 33 wind turbines with the unit capacity of 1500kW and total capacity of 49.5MW. The proposed project activity will generate greenhouse gas (GHG) emission reductions by avoiding CO₂ emissions from electricity generation by fossil fuel power plants and will contribute to sustainable development of the local community and the host country by reducing green housed gases (GHG) emissions of 106823 tCO₂e per year.

The proposed project will not only supply renewable electricity to grid, but also contribute to sustainable development of the local community and the host country by means of:

- Creating 20 new employment opportunities and helping to improve the livelihood of local residents;
- Mitigating the pressure of local power supply;
- Promoting local economic development during the project construction and operation period.
- Reducing the emission of other pollutants like SO₂ and dust resulting from the power generation industry in China compared to a business-as-usual scenario.

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) proposed project participants (* (as applicable)	Kindly indicate if the Party involved wishes to be considered as proposed project participant (Yes/No)
P.R.China (host)	Guohua Resourceful (Zhanghua) Wind power Company	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:**



A.4.1.1. Host Party(ies):

People’s Republic of China

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

Shandong Province

A.4.1.3. City/Town/Community etc:

Zhanhua County, Binzhou City

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

The proposed project is located in Zhanhua County, Binzhou City, Shandong Province. The geographical coordinates of the proposed project is east longitude 118°03’ ~ 118°13’and north latitude 38°03’ ~ 38°08’.



Figure 1 Location of Shandong Province in China



Figure 2 Location of the proposed project in Shandong Province

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

Sectoral scope 1: energy industries/ Renewable Energy

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

There are abundant wind resources in the proposed project site. The annual average wind speed and average wind power density in the representative year at the height of 10 m is 5.37m/s and 180.73 W/m² respectively. The annual average wind speed and average wind power density in the representative year at the height of 30 m is 6.06m/s and 248.37 W/m² respectively. The annual average wind speed and average wind power density in the representative year at the height of 50 m is 6.46m/s and 301.21 W/m² respectively. The annual average wind speed and average wind power density in the representative year at the height of 70 m is 6.75m/s and 350.66 W/m² respectively. The proposed project will use such wind turbine and its parameters was summarize in the below table.

The proposed project will set up 110 KV substation and 110kv transmission line. The power generation from the proposed project will be transmitted to 110KV substation by 35KV transmission line. After the voltage ascending, the power generation will be delivered to 220KV substation by 110KV line and finally submit to NCPG.

Table1 Wind Turbines Parameters

Item	Unit	Value
Diameter	m	70
Covering Area	m ²	3848
Rotation speed of wind wheel	r/min	10.0~20.0
Cut in wind speed	m/s	3.5



Nominal wind speed	m/s	11
Cut out wind speed	m/s	25
Hub height	m	70
Nominal voltage	v	690

The proposed project involves no technology transfer from abroad.

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

The proposed project will achieve the GHG emission reduction by replacing fossil-fuel power generation from NCPG. The first crediting period of this proposed project is 7 years from 2008 to 2014, annual and total emission reductions are estimated in the following table:

Years	Annual estimation of emission reductions in tonnes of CO ₂ e
2009/04/01-2010/03/31	106823
2010/04/01-2011/03/31	106823
2011/04/01-2012/03/31	106823
2012/04/01-2013/03/31	106823
2013/04/01-2014/03/31	106823
2014/04/01-2015/03/31	106823
2015/04/01-2016/03/31	106823
Total estimated reductions (tonnes of CO ₂ e)	747761
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO ₂ e)	106823

A.4.5. Public funding of the proposed project activity:

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

SECTION B. Application of a baseline and monitoring methodology:

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

Baseline Methodology

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

Monitoring Methodology

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



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 proposed project activity:

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

- ◆ The proposed project is a new 49.5 MW wind power plant by using renewable wind resources to generate electricity supplied to NCPG.
- ◆ The proposed project does not involve switching from fossil fuels to renewable energy at the site of the proposed project activity.
- ◆ The geographic and system boundaries for NCPG can be clearly identified and information on the characteristics of the grid is available.

Therefore, the baseline and monitoring methodology ACM0002 are applicable to the proposed project.

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

The project boundary covers the proposed project site and all power plants connected to NCPG. According to the delineation of grid boundary 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	As required by ACM0002. This is conservative.
		N ₂ O	Excluded	As required by ACM0002. This is conservative.
Proposed project Activity	Proposed project Emission.	CO ₂	Excluded	Due to renewable energy project, no emission
		CH ₄	Excluded	Due to renewable energy project, no emission
		N ₂ O	Excluded	Due to renewable energy project, no emission

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

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.”



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

Alternative 1: Construction of a fuel-fired power plant with the same annual electricity generation.

Alternative 2: The proposed project activity not undertaken as a CDM project activity.

Alternative 3: Construction of other renewable energy project with the same annual electricity generation.

Alternative 4: Equivalent annual generated electricity supplied by NCPG.

The feasibility of the alternatives above is described as follows.

Alternative 1: Construction of a fuel-fired power plant with the same annual electricity generation.

It has been excluded since it conflicts with China's current regulations. Considering the same annual electricity generation, the alternative baseline scenario for the project should be a coal-fired/oil-fired/gas-fired power plant with installed capacity lower than 49.5 MW. Besides, as the 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.

Alternative 2: The proposed project activity not undertaken as a CDM project activity.

This alternative is not feasible since it is a financially unattractive project. According to the financial analysis in section B.5, it is obvious that project IRR is only 5.67% without the CDM revenues, much lower than the benchmark of 8%. Therefore, Alternative 2 is not a realistic and credible choice.

Alternative 3: Construction of other renewable energy project with the same annual electricity generation.

The resource where the project is located is not good enough to develop other renewable energy project. For example, there is little water resource here. As for electricity from solar energy, technology is too immature to develop for the purpose of commercialization. Therefore, alternative 3 is not realistic and credible either.

Alternative 4: Equivalent annual generated electricity supplied by NCPG.

According to the current policies and regulations in China, NCPG can increase its installed capacity through the possible expansion of existing power plants as well as the new power plants. The installed capacity of the NCPG has been increased for many years, and NCPG is a fuel-fired dominant power grid. Therefore, this alternative is most realistic and credible baseline scenario.

All in all, the alternative 4 is the only realistic and credible choice for the baseline scenario.

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 proposed project activity (assessment and demonstration of additionality):

The Approved methodology ACM002 requires the use of the latest version of the "Tool for the demonstration and assessment of additionality" agreed by the Executive Board to demonstrate and assess the additionality of the proposed project.

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

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

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

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

Alternative 1: Construction of a thermal power plant with the same annual electricity generation. If taking the capacity with the same annual generation, according to the current laws and regulations, it is not realistic alternative (please refer to the analysis in sub-step 1b).

Alternative 2: The proposed project activity not undertaken as a CDM project activity. According to the financial analysis in section B.5, it is obvious that project IRR is only 5.67% without the CDM revenues, much lower than the benchmark of 8%; therefore, the proposed project activity undertaken without being registered as a CDM project activity is not a realistic alternative.

Alternative 3: Construction of other renewable energy project with the same capacity or annual electricity generation. Besides wind energy, solar PV, geothermal, biomass and hydro are the possible grid-connected renewable energy technologies that could be applied in China. Due to the technology development status and the high cost for power generation, solar PV, geothermal and biomass of the similar installed capacity as the proposed project are alternatives far from being attractive investment in the grid in China. Only hydropower projects have the investment return rate that can compete over that of wind power projects in China. However, there is no hydro power resource to develop in the region of Binzhou city. Therefore the hydro and other kinds of renewable energy power plant are also not realistic alternative.

Alternative 4: Comparable capacity or electricity generation additions supplied by NCPG. To satisfy the increase of the electricity demand, the power grid company can either increase the output generation from operating units or build some new power plants, therefore comparable capacity or electricity generation addition provided by NCPG can be taken as a realistic alternative for the project activity.

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

For the alternative 1 described in sub-step 1a, if taking the capacity that can generate the same annual electricity generation and estimating annual utilization hours as 5,991 which is the average utilization hours of the thermal units in China in 2004¹, the alternative baseline scenario for the proposed project should be a grid-connected fossil fuel fired power plant with installed capacity of no more than 50 MW. However, according to Chinese regulations, thermal power plants of less than 135MW are prohibited for construction in the areas covered by the large grids such as provincial grids². Meanwhile, National Development and Reform Commission (NDRC) requested to execute strictly the policy to close fossil fuel fired power plants less than 50MW³. Therefore, alternative 1 can not be a realistic alternative.

Alternative 2 comply with China current law and regulations, but it doesn't belong to mandatory scope. Alternative 4 is in compliance with China current mandatory law and regulations.

¹ Page 472, *China Electric Power Yearbook* (2005 Edition), China Electric Power Press

² Notice on Strictly Prohibiting the Installation of Fuel-fired Generators with the Capacity of 135MW or below issued by the General Office of the State Council, Decree No. 2002-6.

³ http://www.sdpc.gov.cn/zcfb/zcfbqt/2007qita/t20070131_115037.htm

**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 CDM revenue. 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. 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 Financial Assessment Method and Parameters of Construction Projects (Version 2) issued by National Development and Reform Commission (NDRC) and Ministry of Construction (MOC), the financial benchmark rate of return (after tax) 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 proposed project are listed below.

Table2. The financial indicators for the proposed project

Indicator	Unit	Value
Installed capacity	MW	49.5
Annual output	MWh/a	99324
Total investment	Million RMB	47897
Expected On-grid Tariff	RMB/KWh	0.63
Income tax rate	%	33
VAT	%	8.5
Project Lifetime	Year	22



City Built Tax	%	5
Education Additions	%	3
Expected CERs price	EURO/ t CO ₂ e	7

(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 5.67% in absence of CDM revenues, which is lower than the benchmark rate of 8%. And therefore the proposed project is unattractive to the investor, as well as not applicable commercially.

Table3. Financial indicators of the proposed project

	IRR (Total investment)
	Benchmark rate =8%
Without CDM revenue	5.67%
With CDM revenue	8.45%

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

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 proposed 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.

**Table4 . Sensibility analysis of financial indicator of the proposed project
(IRR of total investment, without the CDM revenue)**

	-10.0%	-5.0%	0.0%	5.0%	10.0%
Static total investment	7.14%	6.38%	5.67%	5.01%	4.40%
Annual O&M costs	6.11%	5.89%	5.67%	5.45%	5.22%
Tariff (excluding VAT)	3.32%	4.52%	5.67%	6.76%	7.81%

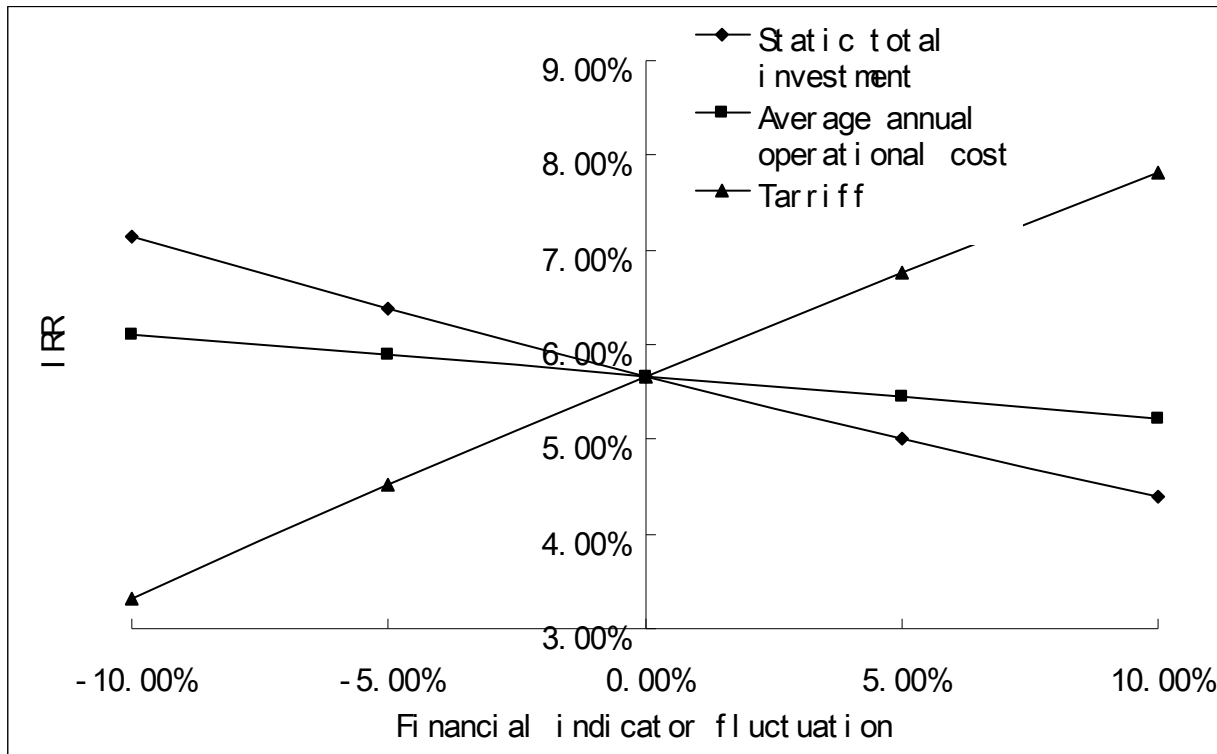


Figure 3. Sensibility of total investment IRR

As shown in Table 4, 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 proposed project can not reach the benchmark and the additionality of the proposed project can not be influenced.

Therefore, IRR of the proposed project is only 5.67% without CDM revenue, which justify the proposed project, is faced with the investment barriers.

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

For the purpose of analyzing common practice, wind farm projects in Shandong, with installed capacity between 30MW and 60MW, and operated after the year 2000 are listed in Table below.

Project Name	Total 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:**B.6.1. Explanation of methodological choices:****I. Baseline emissions**

The proposed project does not modify or retrofit an existing electricity generation facility. 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 CO₂ emission factor in year y (tCO₂/MWh)

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

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

$EF_{CO_2,i,y}$: CO₂ emission factor of fossil fuel type i in year y (tCO₂/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 than 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 tCO₂e/MWh.

STEP5. Calculate the build margin emission factor



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

$EF_{grid,BM,y}$: Build margin CO₂ emission factor in year y (tCO₂/MWh)

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

$EF_{EL,m,y}$: CO₂ emission factor of power unit m in year y (tCO₂/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:⁴

- 1) Use of capacity additions during the last 1-3years for estimating the build margin emission factor for grid electricity,
- 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 CO₂ 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.

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

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

⁴ <http://cdm.unfccc.int/Project/Deviation>



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

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 CO₂ 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 tCO₂e/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 tCO₂/MWh.

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

$$EF_y = 1.1208 \times 0.75 + 0.9397 \times 0.25 = 1.0755 \text{ (tCO}_2\text{e/MWh)}$$

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. $PE_y = 0 \text{ tCO}_2\text{e}$.

III. Calculate the project leakage

According to ACM0002, the proposed project needn't consider leakages, i.e. $L_y = 0 \text{ tCO}_2\text{e}$.

IV. Calculate the emission reductions

The project activity will generate GHG emission reductions by avoiding CO₂ 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:	<i>China Energy Statistical Yearbook 2006</i>
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 <i>China Energy Statistical Yearbook 2006</i> and is reliable.
Any comment:	

Data / Parameter:	$OXID_i$
Data unit:	%



Description:	Oxidation rate of the fuel <i>i</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>i</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 applied :	The data is obtained from the China Electricity Yearbook and is reliable.
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 99324MWh. According to the *Notification on Determining Baseline Emission Factor of China's Grid*, the baseline emission factor for the proposed project is 1.0755 tCO₂e/MWh and the annual baseline emission of the proposed project is 101360 tCO₂e as calculated below.

$$BE_y = EG_y \times EF_y = 99324 * 1.0755 = 106823 \text{ tCO}_2\text{e}$$

II. Estimated proposed project emissions

The proposed project is a wind power plant and the proposed project emissions should not be taken into account according to ACM0002, i.e. $PE_y = 0 \text{ tCO}_2\text{e}$.

III. Calculate the proposed project leakage

According to ACM0002, the proposed project needn't consider leakages, i.e. $L_y = 0 \text{ tCO}_2\text{e}$.

IV. Calculate the emission reductions

The project activity will generate GHG emission reductions by avoiding CO₂ emissions from electricity generation by fossil fuel power plants. The emission reduction (ER_y) is calculated as follows:



$$ER_y = BE_y - PE_y - L_y = 106823 - 0 - 0 = 101360 \text{ tCO}_2\text{e}$$

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

Year	Estimation of proposed project activity emissions (tonnes of CO ₂ e)	Estimation of baseline emissions (tonnes of CO ₂ e)	Estimation of leakage (tonnes of CO ₂ e)	Estimation of overall emission reductions (tonnes of CO ₂ e)
2009/04/01-2010/03/31	0	106823	0	106823
2010/04/01-2011/03/31	0	106823	0	106823
2011/04/01-2012/03/31	0	106823	0	106823
2012/04/01-2013/03/31	0	106823	0	106823
2013/04/01-2014/03/31	0	106823	0	106823
2014/04/01-2015/03/31	0	106823	0	106823
2015/04/01-2016/03/31	0	106823	0	106823
Total (tonnes of CO₂e)	0	747761	0	747761

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 proposed project. Actual data will be read from ammeters.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	99324
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 proposed project plant by the grid company and proposed project developer. The meter installed by the proposed 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 Proposed 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 proposed project. These records and monitoring systems are needed to allow the selected DOE to verify proposed project performance as part of the verification and certification process. This process also reinforces that CO₂ 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

Guohua Resourceful (Zhanhua) Wind power Company, the proposed project owner, will use this

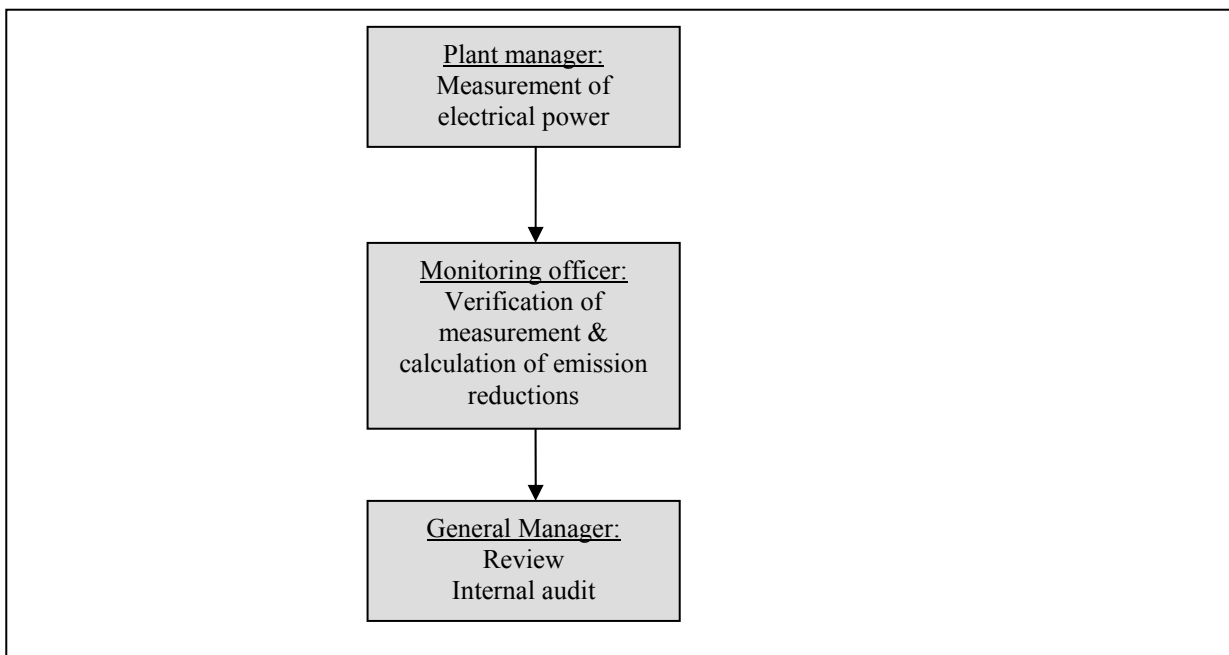


document as guideline in monitoring of the proposed project emission reduction performance and will adhere to the guidelines set out in this monitoring plan. This plan should be modified according to actual conditions and requirements of DOE in order to ensure that the monitoring is credible, transparent 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 proposed 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 proposed 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 proposed 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 proposed project’s continued conformance with all relevant proposed 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 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 A8 below outlines the main documents relevant to monitoring and verification of the proposed 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 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 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 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 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 proposed project owner



F-6	The report on baseline emission factor calculation	Data sources and calculation procedure	Proposed proposed project owner
F-7	Record on CO2 emission reduction	Monthly calculation (F4×F6)	Proposed 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 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 project	Proposed 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. Ms. Liu Ying

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2. Mr.Wang Weiquan

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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:**

01/12/2007

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

22years.

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:**

01/04/2009

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 June 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. There are no negative impacts of the proposed project on environment.

A summary of the impacts is presented below. The environmental impacts are not deemed to be significant.

Summary of Environmental Impact Assessment

The analysis of the environmental impacts during the construction period

The main environmental impacts during the construction period are from dust, noise and solid water.

Ecological impact

There is no endangered species live in this area. The proposed 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.

Impact on the air

The main air pollution sources during the construction period are from excavation, blasting and transportation. The main air pollutant is dust. Some measure will be taken to reduce the impact of dust, such as watering, covering and so on. In addition, the construction area is open and wide and the construction will cause little negative impact on local air environment.

Waste water

The waste water during the construction period is mainly from the worker living and construction. As for waste water from construction, it will use deposition pool to dispose. The water disposed will be reused to water the machine. Living waste water dealt with by anaerobic lagoon will be used for watering.

Noise

Noise during the construction period is mainly caused by transportation and equipment operation. The construction site is far away from the household and there are no any objectives sensitive to noise. In addition, some measures will be taken to reduce environmental impacts of noise to the fullest extent.

Solid waste

Make effort to backfill the excavated soil as much as possible, reducing waste slag. The wastes must be piled up in designed residues site. The domestic waste produced by the workers will be collected into local garbage disposal facilities.

Analysis of environmental impacts after put into production

Ecological impact

The site of the proposed project is not in the route of bird's flight. There is little marsh where birds live. Little birds come up near the wind park.

Impact on the air

The proposed project is clean energy and will not emission any GHG. The proposed project has no impact on the air when its operation.

Waste water

The waste water during the operation period is daily generation of domestic wastewater. The waster water



will be treated by anaerobic lagoon for greening and water on the construction ground. Therefore, the waste water will not affect on water environment around

Noise

The proposed project will produce noise to surrounding areas between 37.1-41.0dB (A) after the proposed 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 proposed project can be within level I of <Urban area environmental noise standard>. It will not cause negative impact to local inhabitants.

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 proposed project will not influence the local ecological environment.

Conclusion

There is abundant wind resource in the project construction site. The proposed project is clean energy. The development and utilization of the clean energy will reduce the fossil fuel utilization and pollutant emission. The proposed project will has no impact on environment.

D.2. If environmental impacts are considered significant by the proposed 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 June 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. There are no negative impacts of the proposed project on environment.

SECTION E. Stakeholders' comments

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

In order to invite the comments from the stakeholder on the proposed project, Stakeholder Comments on the proposed project was held in Binhai Country, Zhanhua County, Binzhou City, Shandong Province on 11 April 2007. There are 30 representatives from Tourism Bureau, Environmental protection, Construction Bureau, Financial Bureau, Development and Reform Bureau and Weather Bureau participants in the stakeholder comments meeting. Xu Zonghai, director of Zhanhua County Development and Reform Bureau, host this meeting.

There are four session at the meeting. Mr. Xu Zonghai introduced the representatives, meeting agenda and meeting objectives. Mr. Feng Xuepei, Deputy Director of Guohua Energy Investment Co., Ltd, introduce the Guohua Company and the proposed project. Ms. Liu Ying from Chinese Renewable Energy Industry Association introduced the CDM. The representatives were invited to give comments on the proposed project.

After that, the participants filled in the Questionnaires for Guohua Bizhou Zhanghua 49.5MW Wind Farm Project. Mr. Wangwei from Guohua Company collected the Questionnaires and finalized the results from participant, which will be summarized in section E.2.

**E.2. Summary of the comments received:**

There are 32 questionnaires to be delivered and among them 32 questionnaires were collected. The return rate reaches 100%. Here we summarized the results.

- ◆ 97% of interviewees knows well the proposed project and 3 % know something about it;
- ◆ All believe that the proposed project will improve the local economy;
- ◆ 75% of interviewees believe that the proposed project will impact their livelihood positively and 25% of interviewees believe that the project construction has no effect on their livelihood.
- ◆ All agree that the location of the proposed project is reasonable;
- ◆ 88% of interviewees think that the proposed project has no adverse impact on the environment , 9% of interviewees think that the project implementation has an effect on the environment to some extend and 3% of interviewees has no idea.
- ◆ All support the construction of the Project.

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

The local residents and the government support the proposed project. According to the comments from stakeholders, there are no requirements for adjustment of design, construction and operation of the proposed project.

**Annex 1****CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY**

Organization:	GuohuaResourceful (Zhanhua) Wind farm Co., Ltd
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Salutation:	
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public fund from Annex I parties.

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

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Thermal power imported from the North East Power Grid is **23,423,000MWh**, 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 ⁴ t	714.73	1052.74	5482.64	4528.5	3949.32	6808	22535.94	25.8	100	20908	445737636.11
Cleaned Coal	10 ⁴ t						9.41	9.41	25.8	100	26344	234510.60
Other Washed Coal	10 ⁴ t	6.31		67.28	208.21		450.9	732.7	25.8	100	8363	5796681.31
Coke	10 ⁴ t					2.8		2.8	25.8	100	28435	75318.63
Coke Oven Gas	10 ⁸ m ³	0.24	1.71		0.9	0.21	0.02	3.08	12.1	100	16726	228559.67
Other Gas	10 ⁸ m ³	16.92		10.63		10.32	1.56	39.43	12.1	100	5227	914399.71
Crude Oil	10 ⁴ t						29.68	29.68	20	100	41816	910139.18
Gasoline	10 ⁴ t						0.01	0.01	18.9	100	43070	298.48
Diesel	10 ⁴ t	0.29	1.35	4		2.91	5.4	13.95	20.2	100	42652	440693.26
Fuel Oil	10 ⁴ t	13.95	0.02	1.11		0.65	10.07	25.8	21.1	100	41816	834672.45
PLG	10 ⁴ t							0	17.2	100	50179	0.00
Refinery Gas	10 ⁴ t			0.27			0.83	1.1	18.2	100	46055	33807.44
Natural Gas	10 ⁸ m ³		0.5				1.08	1.58	15.3	100	38931	345076.60
Other Petroleum Products.	10 ⁴ t							0	20	100	38369	0.00
Other Coking Products.	10 ⁴ t							0	25.8	100	28435	0.00

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Other Energy	10 ⁴ tce	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 1.1366tCO₂e/MWh according to the data issued by the DNA of China⁵, which is calculated with the same way as this PDD.

The total emissions in 2003 is 460,375,781 tCO₂

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

Fuel Type	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total	Emission Factor	Oxid ate	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	$K=G*H*I*J*44/12/1000(v)$

⁵ <http://cdm.ccchina.gov.cn/web/index.asp>

Raw Coal	10 ⁴ t	823.09	1410	6299.8	5213.2	4932.2	8550	27228.29	25.8	100	20908	538547476.6
Cleaned Coal	10 ⁴ t						40	40	25.8	100	26344	996856.96
Other Washed Coal	10 ⁴ t	6.48		101.04	354.17		284.22	745.91	25.8	100	8363	5901190.882
Coke	10 ⁴ t					0.22		0.22	25.8	100	28435	5917.8922
Coke Oven Gas	10 ⁸ m ³	0.55		0.54	5.32	0.4	8.73	15.54	12.1	100	16726	1153187.451
Other Gas	10 ⁸ m ³	17.74		24.25	8.2	16.47	1.41	68.07	12.1	100	5227	1578574.385
Crude Oil	10 ⁴ t							0	20	100	41816	0
Gasoline	10 ⁴ t								18.9	100	43070	0
Diesel	10 ⁴ t	0.39	0.84	4.66				5.89	20.2	100	42652	186070.4874
Fuel Oil	10 ⁴ t	14.66		0.16				14.82	21.1	100	41816	479451.3838
PLG	10 ⁴ t							0	17.2	100	50179	0
Refinery Gas	10 ⁴ t		0.55	1.42				1.97	18.2	100	46055	60546.05223
Natural Gas	10 ⁸ m ³		0.37		0.19			0.56	15.3	100	38931	122305.6296
Other Petroleum Products.	10 ⁴ t							0	20	100	38369	0
Other Coking Products.	10 ⁴ t							0	25.8	100	28435	0
Other Energy	10 ⁴ tce	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 1.17411tCO₂e /MWh according to the data issued by the DNA of China⁶, which is calculated with the same way as this PDD.

The total emissions in 2004 are 554,332,148tCO₂.

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

Fuel Type	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total	Emission Factor	Oxid ate	low caloric value(MJ/t, m3,tce)	CO2 emission (tCO ₂)
									(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 ⁴ t	897.75	1675.2	6726.5	6176.5	6277.23	10405.4	32158.53	25.8	100	20908	636062535.8
Cleaned Coal	10 ⁴ t						42.18	42.18	25.8	100	26344	1051185.664
Other	10 ⁴ t	6.57		167.45	373.65		108.69	656.36	25.8	100	8363	5192725.191

⁶ <http://cdm.ccchina.gov.cn/web/index.asp>

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

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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 tCO₂e /MWh according to the data issued by the DNA of China⁷, which is calculated with the same way as this PDD.

The total emissions in 2005 are 674,805,425 tCO₂.

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

⁷ <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 ⁴ t	897.75	1675.2	6726.5	6176.45	10405.4	6277.23	32158.53	20908	25.8	1	636,062,536
Cleaned Coal	10 ⁴ t	0	0	0	0	42.18	0	42.18	26344	25.8	1	1,051,186
Other Washed Coal	10 ⁴ t	6.57	0	167.45	373.65	108.69	0	656.36	8363	25.8	1	5,192,725
Coke	10 ⁴ t	0	0	0	0	0.11	0.21	0.32	28435	25.8	1	8,608
Sub-total												642,315,054
Crude Oil	10 ⁴ t	0	0	0	0	0	0.73	0.73	41816	20	1	22,385
Gasoline	10 ⁴ t	0	0	0.01	0	0	0	0.01	43070	18.9	1	298
Kerosene	10 ⁴ t	0	0	0	0	0	0	0	43070	19.6	1	0
Diesel	10 ⁴ t	0.48	0	3.54	0	0	0.12	4.14	42652	20.2	1	130,786
Fuel	10 ⁴ t	12.25	0	0.23	0	0	0.06	12.54	41816	21.1	1	405,690
Other oil products	10 ⁴ t	0	0	0	0	0	0	0	38369	20	1	0
Sub-total												559,160
Natural Gas	10 ⁸ m ³	2.8	0.8	0	27.6	0	0	31.2	38931	15.3	1	681,417
Coke Oven Gas	10 ⁸ m ³	6.4	7.5	6.2	210.8	0	3.9	234.8	16726	12.1	1	1,742,396
Other Gas	10 ⁸ m ³	160.9	78.6	388.3	98.8	0	183.7	910.3	5227	12.1	1	2,111,027
LPG	10 ⁴ t	0	0	0	0	0	0	0	50179	17.2	1	0



Refinery gas	10 ⁴ t	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) , $\lambda_{Coal} = 99.17\%$, $\lambda_{Oil} = 0.08\%$, $\lambda_{Gas} = 0.74\%$.

Table A112. 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.

$$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Coal,Adv} + \lambda_{Gas} \times EF_{Gas,Adv} = 0.9508 \times 99.17\% + 0.4237 \times 0.08\% + 0.5843 \times 0.74\% = 0.9465 \text{ tCO}_2/\text{MWh}$$

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

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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%		

$$EF_{BM,y} = 0.9465 \times 99.28\% = 0.9397 \text{ tCO}_2/\text{MWh}.$$



Annex 4

MONITORING INFORMATION

>>There is no further information about monitoring.