CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 02 - in effect as of: 1 July 2004)

CONTENTS

Annexes

SECTION A. General description of project activity

A.1. Title of the project activity:

>>
Ningxia Tianjing 50.25MW Wind-farm Project
PDD Version TJWi-06
23 January 2007

A.2. Description of the project activity:

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The objective of Ningxia Tianjing 50.25MW Wind-farm Project (hereafter referred to as the project) is to generate renewable electricity using wind power resources and to sell the generated output to the Ningxia Power Grid on the basis of a power purchase agreement (PPA) signed by the project owner and Ningxia Electric Power Company.

The project is located at the eastern Changcheng of southern Helanshan, northwest Ningxia. It is about 25km away from northwest Qingtongxia. The project is near the Inner Mongolia border. The project will have a total installed capacity of 50.25MW. A total of 67 wind turbines will be installed with a unit capacity of 750kW. The construction schedule of the project is:

·Feb. 2006, 10.5MW has been connected into the grid (Hongchazi / Qingtongxia / Ningxia);

·Nov. 2006, 20.25MW will be connected into the grid (Shidunzi / Shengjiadunliang / Qingtongxia / Ningxia);

·Mar. 2007, 10.5MW will be connected into the grid (Shidunzi / Shengjiadunliang / Qingtongxia / Ningxia);

·Jun. 2007, 9.0MW will be connected into the grid (Hongchazi / Qingtongxia / Ningxia).

After the project is put into operation, it is expected to sell about 97,325MWh power to the grid yearly and the estimation of annual average emission reductions of the project are 92,355 tCO_2e.

The project will contribute to sustainable development mainly by:

·Reducing greenhouse gas emissions, compared to a business-as-usual scenario;

·Helping to stimulate the growth of the wind power industry in Ningxia and China;

·Reducing other pollutants resulting from the power generation industry in China, compared to a business-as-usual approach;

·Creating local employment opportunities during the project construction and operation period;

·Reducing poverty, which is very important in Ningxia.

The Ningxia Government is supportive of the project because the development of wind power is in accordance with the national criteria for sustainable development and national policies relating to energy resources and the environment, which will push forward the use of renewable and clean energy across China.

A.3. Project participants:

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The project participants are shown in Table A3-1:

Table A3-1 Project participants

Name of Party involved	Private (*) and /or public (**) entity	Party's willing or not to be regarded as participants
China (host)	Ningxia Tianjing Wind Power Generation Electricity Joint Stock Co., Ltd.**	No
Japan	Chubu Electric Power Co., Inc.**	No

Project Owner

Ningxia Tianjing Wind Power Generation Electricity Joint Stock Co., Ltd. (TJWP)

TJWP was built in Oct. 2004, which has registered capital of 45 million RMB. TJWP mainly deals in the construction and development of wind power industry. The holding company is Tianjing Electric Energy Development Group Ltd..

Tianjing Electric Energy Development Group Ltd. is one of the five groups in Ningxia electricity industry and one of the large enterprises in Ningxia. It was built in May 2003, which has registered capital of 230 million RMB. The total assets are 1.1 billion RMB and the annual sale revenue is 1.3 billion RMB.

CER Buyer

Chubu Electric Power Co., Inc.

Chubu Electric Power Co., Inc. is Japan's third-largest electric power company in terms of power generation capacity, total assets, electric energy sold, and operating revenues. The company has total generating capacity of 32,585 MW and total assets of 53,110 million U.S. Dollars as of March 31, 2005, and it sold total electric energy of 126,663,000 MWh and earned operating revenues of 19,864 million U.S. Dollars for the year ended March 31 2005. Chubu Electric Power Company was established on May 1, 1951, and it serves a total area of approximately 39,000 square kilometers across five prefectures in central Japan, an area with a population of around 16 million people. This area is known as one of Japan's leading manufacturing regions, in which many leading Japanese industries, such as automobiles, machine tools, electric components, and new materials, are centred.

For more detailed contact information on participants in the project activities, please refer to Annex 1.

CDM Project Developer

Ningxia CDM Service Centre

Ningxia CDM Service Centre is a service institution focusing on CDM-related consulting and facilitation.

A.4. Technical description of the project activity:

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A.4.1. Location of the project activity:

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A.4.1.1. Host Party(ies):

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The People's Republic of China

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

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Ningxia Hui Autonomous Region

A.4.1.3. City/Town/Community etc:

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Shidunzi / Shengjiadunliang / Qingtongxia City; Hongchazi / Qingtongxia

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 project is located at Eastern Changcheng of southern Helanshan, northwest Ningxia. It is about 25km away from northwest Qingtongxia and it is near the Inner Mongolia border. The project area covers an area of 15 square kilometres. The coordinates of the project location are 105°50.5′ east longitude, 37°57.5′ north latitude. The site is 1,300-1,350 m above sea level. Figure A4.1 is location of the project.

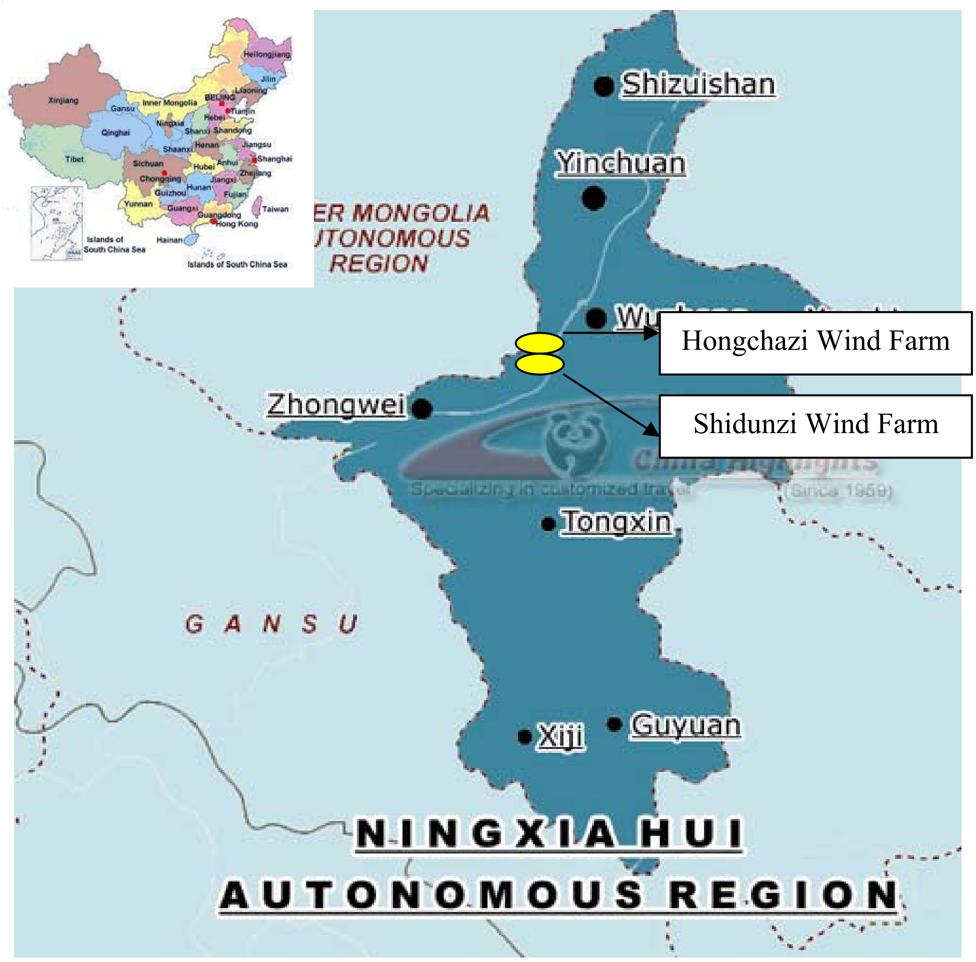

Figure A4.1 Location of the project

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

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The project activity category belongs to:
Sectoral Scope 1: Energy industries
- Electricity generation from wind power

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

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A series of factors are considered including manufacture level, technical skill, actual operation, price and hoisting and installation of construction machinery for wind turbines at home and abroad currently. The variable pitch wind turbines (S50/750kW model) manufactured by Goldwind Science and Technology Co., Ltd. is used by tender. The installed capacity of the project is 50.25MW.

A.4.4. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed CDM project activity, including why the emission reductions would not occur in the absence of the proposed project activity, taking into account national and/or sectoral policies and circumstances:

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The electricity generated by the project activity is inputted into Ningxia Power Grid and connected to Northwest China Power Grid via Ningxia Power Grid.

The North-western China has rich and concentrated coal resources. As a result, the overall costs for constructing coal-fired power plants are comparatively low. Up to Dec. 2004, the total power generation of Northwest China Power Grid was 140,846GWh[1] and the power generation of fire power was 109,187GWh, which accounts for 77.52% of total power generation. So the Northwest China Power Grid is dominated by coal-fired power.

Therefore, without the project, the unmet power demand will be satisfied by newly built coal fired power plants and intensified operation of existing plants. The project is a renewable energy project, the generated power will displace part of the electricity generated by coal-fired power plants, and it will thus mitigate GHG emissions from coal fired power plants.

The Chinese government makes series of policies to encourage and promote the development of wind power industry, but there are no compulsory rules to require wind power.

A.4.4.1. Estimated amount of emission reductions over the chosen crediting period:

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The estimation of the emission reductions in crediting period is presented in Table A4-1.

Table A4-1 The estimation of the emission reductions in crediting period

Year	The estimation of annual emission reductions (tCO_2e)
2007[2]	66,675
2008	92,770
2009	92,770
2010	92,770
2011	92,770
2012	92,770
2013	92,770
2014	23,194

1 The State Electric Industry Yearbook 2005 p. 474

2 30.75MW will be put into operation in Dec. 2006; 10.5MW will be put into operation in Mar. 2007; 9.0MW will be put into operation in Jun. 2007 and the total 50.25MW will be put into operation.

The estimation of total emission reductions in the first crediting period	646,485
Total number of crediting years	7
The estimation of annual average emission reductions in the first crediting period	92,355

A.4.5. Public funding of the project activity:

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No public funding from the Annex 1 countries is provided to the project.

B Application of a baseline methodology

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

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Revision to the approved consolidated baseline methodology ACM0002 (Version 06): Consolidated baseline methodology for grid-connected electricity generation from renewable sources. This methodology is available on the following website: http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html.

B.1.1. Justification of the choice of the methodology and why it is applicable to the project activity:

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The baseline methodology ACM0002 (Version 06) is applicable to the project, because the project meets all the applicability criteria stated in the methodology:

·The project is a capacity addition from a renewable energy source, i.e. wind resources.

·The project does not involve an on-site switch from fossil fuels to a renewable source.

·The geographic and system boundaries for the relevant electricity grid, the Northwest China Power Grid, can be clearly identified and information on the characteristics of the grid is available.

·Be used in conjunction with the approved consolidated monitoring methodology ACM0002 (Version 06) (Consolidated monitoring methodology for grid-connected electricity generation from renewable sources).

Therefore, the project activity is in accordance with the applicability of ACM0002 (Version 06).

B.2. Description of how the methodology is applied in the context of the project activity:

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According to the latest rules to project boundary of version 06 of ACM0002,
1. Use the delineation of grid boundaries as provided by the DNA of the host country if available; or
2. Use, where DNA guidance is not available, the following definition of boundary:

·In large countries with layered dispatch system (e.g. state/provincial/regional/national) the regional grid definition should be used.

The power generation of the project is connected to Northwest China Power Grid via Ningxia Power Grid. According to above requirements, the Northwest China Power Grid is selected as the project boundary. The Northwest China Power Grid includes Shaanxi Power Grid, Gansu Power Grid, Qinghai Power Grid, Ningxia Power Grid and Xinjiang Power Grid[3].

[3] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1053.pdf (Baseline Emission Factor of Chinese Power Grid)

The baseline emission factor (EF_y) is calculated as the simple average of the operating margin (*OM*) emission factor ($EF_{OM,y}$) and the build margin (*BM*) emission factor ($EF_{BM,y}$). In accordance with version 06 of ACM0002, the baseline emission factor (EF_y) can be calculated with the 3 steps described below:

STEP 1. Calculate the Operating Margin Emission Factor(s) ($EF_{OM,y}$)

Based on one of the four following methods:

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

Analysis on each method is described as below.

Method (a) Simple *OM*

The simple *OM* method only can be used when low-cost/must run resources constitute less than 50% of total amount grid generating output. Among the total electricity generations in 2000-2004 of the Northwest China Power Grid where the project connected into, the low-cost/must run resources constitute less than 50% of total amount grid generating output. The detailed information could be seen in Table B2-1.

Table B2-1 Annual electricity generation of Northwest China Power Grid 2000-2004

No.	Year	Electricity generation （10^8kWh）					Proportion of power of low operating cost[4]
		Total generation	Fuel-fired power	Hydro power	Nuclear Power	Other	
1	2000[5]	1,015.32	715.68	299.64	/		29.51%
2	2001[6]	1,086.10	811.49	274.47	/	0.14	25.28%
3	2002[7]	1,209.81	933.56	274.27	/	1.98	22.83%
4	2003[8]	1,412.34	1,130.93	278.99	/	2.42	19.93%
5	2004[9]	1,674.57	1,319.39	348.13	/	7.05	21.21%

Method (b) Simple adjusted *OM*

The simple adjusted *OM* needs the annual load duration curve of the grid. As the detailed data of dispatch of Northwest China Power Grid and power plants are often taken as confidential business information, those data are not publicly available. It is difficult to adopt Method (b) for the calculation of the baseline emission factor of operating margin ($EF_{OM,y}$).

Method (c) Dispatch data analysis *OM*

Dispatch data analysis *OM* should be the first methodological choice if the dispatch data are available, because the method can truly reflect the substitutable relationship between the amount of electricity

[4] According to ACM0002 (Version 06), low operating cost and must run resources typically include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation.
[5] The State Electric Industry Yearbook 2001 p. 667
[6] The State Electric Industry Yearbook 2002 p. 617
[7] The State Electric Industry Yearbook 2003 p. 585
[8] The State Electric Industry Yearbook 2004 p. 709
[9] The State Electric Industry Yearbook 2005 p. 474

output from power plants of the baseline grid and from the project activity and the emission reductions generated. However, Method (c) cannot be adopted for the project because of unavailability of the dispatch data of the Northwest China Power Grid.

Method (d) Average *OM*

Method (d) can only be used when low-cost/must run resources constitute more than 50% of total amount of grid output. According to the calculation of Table B2-1, the project doesn't apply to the method, so it is not suitable for the project.

Thus, the method (a) Simple *OM* can be used to calculate the baseline emission factor of operating margin ($EF_{OM,y}$) for the project.

In accordance with ACM0002 (Version 06), the *OM* emission factor in the first crediting period is calculated ex-ante by the project and it needn't to be updated ex-post in the first crediting period, i.e. (ex-ante) the full generation-weighted average for the most recent 3 years for which data are available at the time of PDD submission.
The *OM* emission factor will still be calculated ex-ante before the subsequent crediting periods begin.

In accordance with ACM0002, the Simple *OM* emission factor ($EF_{OM,,y}$) is calculated as the generation-weighted average emissions per electricity unit (tCO_2/MWh) of all generating sources serving the system, excluding those low-operating cost and must-run power plants. The formula of $EF_{OM,simple,y}$ calculation is

$$EF_{OM,simple,y} = \frac{\sum_{i,j} F_{i,j,y} \cdot COEF_{i,j}}{\sum_{j} GEN_{j,y}} \quad (B.1)$$

Where:
$F_{i,j,y}$ is the amount of fuel *i* consumed (ton of coal equivalent: tce) by relevant power sources *j* in years *y*,
j refers to the power sources delivering electricity to the grid, not including low-operating cost and must run power plants, and including imports to the grid.
$COEF_{i,j,y}$ is the CO_2 emission coefficient of fuel *i* (tCO_2/tce), taking into account the carbon content of the fuels used by relevant power sources *j* and the percent oxidation of the fuel in years *y*,
$GEN_{j,y}$ is the electricity (MWh) delivered to the grid by source *j*.

According to ACM0002, when *OM* emission factor ($EF_{OM,y}$) is calculated by using simple *OM* or average *OM*, if the plants and data are not available, i.e. lacking of amounts of generation/power supply, amount of fuel consumption, fuel type and emission factor etc., the aggregated generation and fuel consumption data could be used[10]. The aggregated generation and fuel consumption data of 5 provincial-level grids (Shaanxi, Guansu, Qinghai, Ningxia and Xinjiang) which constitute the Northwest China Power Grid are used for the project.

The CO_2 emission coefficient $COEF_{i,j,y}$ is then obtained from the following equation as:

$$COEF_i = NCV_i \cdot EF_{CO2,i} \cdot OXID_i \quad (B.2)$$

Where:
NCV_i is the net calorific value per ton of coal equivalent (GJ/tce);
$OXID_i$ is the oxidation factor of coal;

[10] http://www.unfccc.com

$EF_{CO2,i}$ is the CO_2 emission factor per GJ of coal (tCO_2/GJ).

Up to Dec. 31, 2004, the Northwest China Power Grid has no electricity trade with other grids[11], so the emission factor of imported grid does not need to be considered when calculating emission factor. The State Electric Industry Yearbook 2003-2005 show that all of the thermal power plants of Northwest China Power Grid are coal-fired power plants. Besides, the aggregated generation and fuel consumption data of 5 provincial-level grids (Shaanxi, Guansu, Qinghai, Ningxia and Xinjiang) which constitute the Northwest China Power Grid could be obtained.

According to the published baseline *OM* calculation in the calculation result of baseline emission factor of Chinese Power Grid[12], the *OM* emission factor ($EF_{OM,y}$) calculated as a 3-year average (2002-2004), based on the most recent statistics available could be seen in Table B2-2. The details could be seen in Annex 3.

Table B2-2: *OM* emission factor

Year	Emission factor (tCO_2/MWh)
2002	0.9278
2003	1.0606
2004	1.1313
Weighted Average of 3 years	**1.0518**

STEP 2. Calculation of the Build Margin Emission Factor ($EF_{BM,y}$)

The Build Margin Emission Factor ($EF_{BM,y}$) is calculated according to ACM0002 (Version 06):

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \times COEF_{i,m}}{\sum_{m} GEN_{m,y}} \tag{B.3}$$

Where

$F_{i,m,y}$ is the amount of fuel *i* (tce) consumed by plant *m* in year *y*;

$COEF_{i,m,y}$ is the CO_2 emission coefficient (tCO_2/tce) of fuel *i*, taking into account the carbon content of the fuels used by plant *m* and the percent oxidation of the fuel in year *y*;

$GEN_{m,y}$ is the electricity (MWh) delivered to the grid by plant *m*.

In accordance with ACM0002 (Version 06), the *BM* emission factor in the first crediting period is calculated ex-ante by the project and it needn't to be updated ex-post in the first crediting period.

The *BM* emission factor will still be calculated ex-ante before the subsequent crediting periods begin.

Calculate the Build Margin emission factor $EF_{BM,y}$ ex ante based on the most recent information available on plants already built for sample group m at the time of PDD submission. The sample group m consists of either:

• The five power plants that have been built most recently, or

• The power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

According to the published baseline *BM* calculation in the calculation result of baseline emission factor of

[11] The State Electric Industry Yearbook 2005 p. 491

[12] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1052.xls

Chinese Power Grid[13], *BM* emission factor ($EF_{BM,y}$) of Northwest China Power Grid where the project located in is as follows:

BM=0.6641 tCO_2/MWh

However, as far as Northwest China Power Grid is concerned, there is some oil (or gas) consumption for fuel-fired power plant, e.g., CO_2 emission from the oil (or gas) in Northwest China Power Grid account for 1.54%[14] in total emission of the grid in 2004. This oil (or gas) is not combusted directly for power generation; instead it is mostly for start-ups of boilers. So the sample selection of best technology commercially available for oil-fired (or gas-fired) power plant is infeasible. As a simple and conservative method, the $EF_{BM,y}$ calculated above should be discounted by multiplying a coefficient (100% subtract the proportion of CO_2 emission from the oil (or gas)). The $EF_{BM,y}$ is revised as: 0.6641*(100%-1.54%)=0.6575 tCO_2e/MWh.

The details could be seen in Annex 3.

The *BM* emission factor ($EF_{BM,y}$) is calculated ex ante and needn't to be updated ex post.

STEP 3. Calculation of the Baseline Emission Factor (EF_y)

Based on ACM0002 (Version 06), the baseline emission factor EF_y was calculated as the weighted average of the Operating Margin emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{BM,y}$).

$$EF_y = w_{OM} \cdot EF_{OM,y} + w_{BM} \cdot EF_{BM,y} \tag{B.7}$$

Where the weights by default are 0.75:0.25, i.e. the weights of *OM* and *BM* are:

$w_{OM} : w_{BM} = 0.75 : 0.25$

Hence EF_y =0.75*$EF_{OM,y}$ +0.25*$EF_{BM,y}$

EF_y = 0.75*1.0518+ 0.25*0.6575

= 0.9532 (tCO_2/MWh)

The above calculation is shown as follows:

Table B2-3: Calculation of the baseline emission factor

Emission factor	Value (tCO_2/MWh)	Weight	Weighted Value (tCO_2/MWh)
OM Emission Factor	1.0518	0.75	0.7889
BM Emission Factor	0.6575	0.25	0.1644
Baseline Emission Factor (EF_y)			**0.9532**

STEP 4. Calculate the Baseline Emissions (BE_y) and Emission Reductions (ER_y)

According to ACM0002 (Version 06), the baseline emissions (BE_y) are calculated as:

$$BE_y = EG_y \cdot EF_y \tag{B.8}$$

Where:

[13] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1051.pdf
[14] China Energy Statistical Yearbook 2005 p.302-321

BE_y the baseline emission of Northwest China Power Grid in year y, EG_y the amount of power generated by the project and supplied to the grid, and EF_y the emission factor in year y.

According to the project feasibility study report, the amount of electricity to be delivered to the grid from the project is EG_y=97,325MWh

So the annual baseline emissions (BE_y) are: $BE_y = EG_y*EF_y$ = 92,770 tCO_2.

There is no project emission, then $PE_y = 0$.

There is no leakage due to the project activity, then $L_y = 0$.

The emission reductions ER_y by the project activity during a given year y is as follows:

$ER_y = BE_y – PE_y - L_y = EG_y * EF_y$ = 92,770 tCO_2.

B.3. 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:

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According to the requirements of baseline methodologies of ACM0002 (Version 06), the following steps are used to demonstrate the additionality of the project according to latest version of the "Tool for the demonstration and assessment of additionality" agreed by the Executive Board.

Step 0. Preliminary screening based on the starting date of the project activity

This step is not applicable because the crediting period of the project will start after the date of registration.

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

The objective of the Step 1 is to define realistic and credible alternatives to the project activity that can be part of the baseline scenario through the following sub-steps:

Sub-step 1a. Alternatives

In the absence of the project, the feasible, actual and measurable alternative baseline scenarios would be:

Scenario 1: Construction of a fuel-fired power plant with equivalent amount of installed capacity or annual electricity output;
Scenario 2: Construction of a commercialised wind power project with equivalent amount of installed capacity, but not as a CDM project activity;
Scenario 3: Provision of equivalent amount of annual power output by the grid where the project is connected into;
Scenario 4: Construction of a power plant using other sources of renewable energy with equivalent amount of installed capacity or annual electricity output.

Sub-step 1b. Applicable laws and regulations

At present, national planning frameworks, policies and regulations promoting wind power development have been made. For example, *Wind Power Medium- and Long-term National Planning Framework, Program of Action for sustainable Development in China in the Early 21st Century, Renewable Energy*

Promotion Law. Policies and regulations promoting the industrialization of renewable energy technology options and localization of equipments, such as *New and Renewable Energy Industrial Development Planning Outline for 2000-2015,Guide to Key Areas for High-tech Development (2004) Circular on Organizing*. These regulations are benefit for implementation of the project.

The scenario most likely to occur among the three alternative scenarios is analysed as follow:

·In generally speaking, the annual operational hours for a fossil fuel-fired power plant are about at least 2 times more than that of a wind power project. Therefore the power generation capacity for a fuel-fired power plant is about at least 2 times more than that of a wind power project with equivalent amount of installed capacity. If taking the same annual power generation capacity, the alternative baseline scenario for the project should be a fuel-fired power plant with installed capacity of 15MW (The equipment utilization hours of fire power of the North-west Power Grid in 2004 were 6,387 h[15]). Further, as the project is a grid-connected wind power generation project, the alternative baseline scenario must be a grid-connected fuel-fired power generation project. However, according to Chinese regulations, coal-fired power plants of less than 135MW are prohibited for construction in the areas covered by the large grids such as provincial grids[16], and the fossil fuel-fired power units with less than 100MW is strictly regulated for installation[17]. For these reasons, the possible alternative baseline scenario of building a 15MW fuel-fired power plant conflicts with Chinese regulations. So, scenario 1 is not feasible as an alternative scenario.

·Though construction of wind power project conforms to the policies of China, the investment of the project is high and the power price is low. Therefore, it is difficult to construct the project if not being developed as a CDM project. So, the scenario 2 is not feasible as an alternative scenario.

·According to the regulation and policies that currently governing the Chinese power market, the Northwest China Power Grid will have the installation capacity not only for the existing power plants including those incremental plants built during the past three years, but also for the new power plant to be developed in a foreseeable future. Therefore, alternative 3 is the only feasible alternative scenario.

·Among all the possible technology options of grid-connected renewable energy power projects, only the hydropower project has the investment rate of return that can compete over that of wind power in China. But the project location has no exploitable hydropower resources. Hence the scenario 4 is not feasible as an alternative scenario.

Step 2. Investment Analysis

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

Sub-step 2a. Determine appropriate analysis method

Tools for the demonstration and assessment of additionality suggest three analysis methods are simple cost analysis (option I), investment comparison analysis (option II) and benchmark analysis (option III).

Since the project will earn the revenues not only the CDM but also electricity sales, the simple cost analysis method (option I) is not appropriate.

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[15] The State Electric Industry Yearbook 2005 p. 487

[16] 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.

[17] Interim Rules on the Installation and Management of Small-scale Fuel-fired Generators (issued in Aug. 1997)

Investment comparison analysis method (option II) is applicable to projects whose alternatives are similar investment projects. Only on such basis, comparison analysis can be conducted. The alternative baseline scenario of the project is the Northwest China Power Grid rather than new investment projects. Therefore investment comparison analysis method (option II) is not an appropriate method.
The project will use benchmark analysis method (option III) based on the consideration that benchmark IRR and equity IRR of the power sector are both available.

Sub-step 2b. Benchmark Analysis Method (Option III)

According to the "Economical Assessment and Parameters for Construction Project, 2nd edition"[18], which was issued by Ministry of Construction and former State Development and Planning Commission (current NDRC) and is the most important reference for project assessment in China, a project will be financially acceptable when the FIRR is better than the sectoral benchmark FIRR.

The sectoral benchmark FIRR on total investment for power industry is 8%.

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

(1) Basic parameters for calculation of financial indicators

Based on the feasibility study report of the project, basic parameters for calculation of financial indicators are shown in the following Table:

Table B3-1: Basic parameters of the feasibility study report

No.	Name of the project	Indicators parameters
1	Installed capacity	50.25MW
2	Estimated annual output	97,325MWh
3	Project lifetime	20
4	Total investment	346.2046 million RMB
5	Prospective bus-bar tariff	0.5096 RMB/kWh
6	Tax	
	VAT	8.5%
	income tax	33%

·Crediting period: 7 yrs (Renewable)

·CERs price assumption: US$7.5/t$CO_2$e

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

In accordance with benchmark analysis (Option III), if the financial indicators (such as IRR and NPV) of the project are lower than the benchmark, the project is not considered as financially attractive.

Table B3-2: Financial indicators of the project

	NPV(total investment) (10^4 RMB)	IRR(total investment) Benchmark=8%
Without CDM	-2,138.39	6.99%
With CDM	2,787.54	9.26%

18 China Planning Press, 1993

From Table B3-2, it could be seen that without CDM, the IRR of total investment is lower than the benchmark 8%. Thus, the project is not financially attractive. Considering that the perturbation for price of equipment and other factors may further increase the risk of the project, the project is not financially attractive to investors and is not commercially feasible.

With CDM (CERs price is US$7.5/t$CO_2$e and crediting period is 7 yrs), CERs revenue will significantly improve IRR and the IRR of total investment exceeds 2.77% of that of the benchmarks. Therefore, the project, with CDM revenue, can be considered as financially attractive to investors.
Besides, the project feasibility study report shows that the feasibility of CDM development is taken into consideration by the project owner during the project feasibility study.

Sub-step 2d. Sensitivity analysis

The objective of sensitivity analysis is to show whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions.

For the project, the following financial parameters were taken as uncertain factors for sensitive analysis of financial attractiveness:

·Construction investment

·Power generation

The impact of change for on-grid price is not considered as the on-grid price is approved by related price department.

When the above two financial indicators fluctuate within the range of –10% to +10%, the IRR of total investment of the project varies to different extent. The impacts to IRR of total investment by above parameters fluctuation (not considering CERs income) are show as Table B3-3 and Figure B3.1:

Table B3-3 Sensitivity analysis of the project IRR (total investment)

Fluctuation range of indicator	-10%	-5%	0	5%	10%
Construction investment	8.52%	7.72%	6.99%	6.31%	5.68%
Power generation	4.74%	5.85%	6.99%	8.03%	9.04%

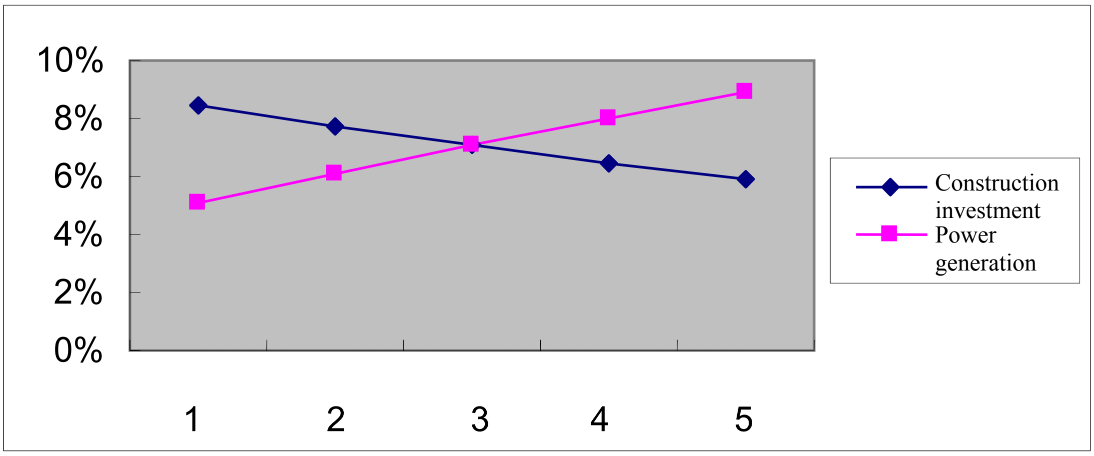


Figure B3.1 The impacts to *IRR* (total investment) by uncertain factors fluctuation

The above results show that the *IRR* of total investment of the project varies to different extent. The fluctuation of power generation has a great impact on *IRR* and the power generation is considered to be the most sensitive factor to impact the project. If the annual power generation of the project increases 5%, the *IRR* of the project exceeds 8%. Considering that the annual power generation in the project feasibility study report is estimated from the long time series of wind resources data, the probability that the variation range of the annual power generation exceeds 5% is very small. Besides, if construction investment could save 10%, the project *IRR* could exceeds the benchmark *IRR*, but the possibility is also very little. The equipment investment accounts for 90% of the total investment. In order to save the investment, the domestic turbines are adopted by the project owner, and 5 options for equipments investment have been compared at length and the project option is finally determined. So there is no possibility for saving 10% of construction investment.

Based on above analyses, without support of CER income, the project is not economically attractive, so the project is additional.

Step 3. Barrier analysis

Sub-step 3a. Identify barriers that would prevent the implementation of type of the proposed project activity:

The barriers may include:

·Investment barrier

The per kW total investment cost of 750kW wind turbine adopted by the proposed project is 6889.64 RMB/kW[19]. But the supervising and managing information of electric power project in the Tenth Five-Year periods just issued by State Electricity Supervising Committee shows that the unit budgetary estimate of fuel-fired power project in the Tenth Five-Year periods is about 4,000RMB/kW[20].

Moreover, investment barrier is from external investors of the project. Financial institutions perceive some risks associated with the operation and maintenance of the equipment, making it difficult for the project to gain loans.

·Technical barrier

The project uses domestic equipment and technology, which is the first of its kind in Ningxia. The shortage of local technicians for operation and maintenance of the equipments may bring the bigger barrier for implementing the project. If the project is developed as a CDM project, the additional CER revenue could make the project entity hire the related out-of-town technicians and the barrier could be resolved.

Two wind farms in Ningxia have used the imported equipments and the technical barrier of the project is relatively low if it also uses the imported equipments. However, in order to save the investment, the domestic equipment is used, which will bring the above barriers.

Sub-step 3b. Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the project activity)

As mentioned above, the Northwest China Power Grid that the project sites in provides equivalent capacity and equivalent annual electricity generation. The existing and new incremental power capacity in

19 The Proposed Project Feasibility Study Report p.9
20 http://www.sdpc.gov.cn/cyfz/hxfx/t20060725_77544.htm

the Northwest China Power Grid is in compliance with Chinese laws and regulations without any investment and technological barriers etc..

Step 4. Common practice analysis

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

At present, Ningxia Electric Power Group Co., Ltd build Ningxia Helanshan Wind-farm Project with 111.9MW installed capacity and the import equipment from overseas is used. The project is developed as CDM project. Besides, Ningxia Tianjing Shenzhou Wind Power Ltd. build wind-farm project with 30.6MW installed capacity and the import equipment from overseas is also used. The project is also developed as CDM project. The above two projects has been registered by CDM-EB. At present, there are the only two wind farms in Ningxia.

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

There is a big difference between above built project and the project:
Ningxia Electric Power Group Co., Ltd, the owner of Ningxia Helanshan Wind-farm Project, is mainly engaged in the construction of power sources in Ningxia and has rich experience of electricity generation and management. And Ningxia Electric Power Group Co., Ltd invests 50% shares in Ningxia Tianjing Wind Power Ltd.. However, the project owner, Ningxia Tianjing Wind Power Ltd. was built in Oct. 2004, which has limited financing and loan channels. So there is a big difference between the project and above built projects.

Step 5. Impact of CDM registration

It is obvious that CDM income is one of the important income sources for the project activity. If the CER price is set as 7.5US$/t$CO_2$, the CER revenue is about 5.385 million RMB, which accounts for about 10% of the project total income. The potential benefit will increase investment return and reduce investment risk directly. It is benefit for project owner to push ahead the project activity.

In conclusion, the project is additional.

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the project activity:

>>
According to ACM0002 (Version 06), the spatial extent of the project boundary includes the project site and all power plants connected physically to the electricity system that the CDM project power plant is connected to. The project boundary is the project activity and other power plants connected to the Northwest China Power Grid (including Shaanxi Province, Gansu Province, Qinghai Province, Ningxia Autonomous Region and Xinjiang Autonomous Region).

B.5. Details of baseline information, including the date of completion of the baseline study and the name of person (s)/entity (ies) determining the baseline:

>>
Date of completion: 25/12/2006
Name of person determining the baseline: Zhang Jisheng
Tel：86-951-6193183
Fax：86-951-6193563
Email: nxzjsh@vip.sina.com

Affiliated institution: Ningxia CDM Service Centre (CDM project developer, not a project participant)

Contributors:
Zhao Ying Ningxia CDM Service Centre
Wang Kui Ningxia Tianjing Wind Power Ltd.
Wang Jun Ningxia Tianjing Wind Power Ltd.

Ningxia Tianjing Wind Power Ltd. is a project participant.

SECTION C. Duration of the project activity / Crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>
01/05/2005

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

>>
The lifetime of the project is 20y-0m.

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

C.2.1. Renewable crediting period

>>
A renewable crediting period will be used

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

>>
01/04/2007

C.2.1.2. Length of the first crediting period:

>>
7y-0m

C.2.2. Fixed crediting period:

>>
Not applicable – left open on purpose

C.2.2.1. Starting date:

>>
Not applicable – left open on purpose

C.2.2.2. Length:

>>
Not applicable – left open on purpose

SECTION D. Application of a monitoring methodology and plan

D.1. Name and reference of approved monitoring methodology applied to the project activity:

>>

Revision to the approved consolidated monitoring methodology ACM0002 (Version 06): "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources". This methodology is available on the following website: http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html.

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

>>

The monitoring methodology ACM0002 (Version 06) is applicable to the project, because the project meets all the applicability criteria stated in the methodology:

·The project is an electricity capacity addition from a renewable energy source, i.e. wind resources.

·The project does not involve an on-site switch from fossil fuels to a renewable source.

·The geographic and system boundaries for the Northwest China Power Grid can be clearly identified and information on the characteristics of the grid is available.

·Be used in conjunction with the approved consolidated baseline methodology ACM0002 (Version 06) (Consolidated baseline methodology for grid-connected electricity generation from renewable sources).

D.2. 1. Option 1: Monitoring of the emissions in the project scenario and the baseline scenario

D.2.1.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:

ID number (Please use numbers to ease cross-referencing to D.3)	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data kept?	Comment
NA									

>>
This table is left open on purpose. According to ACM0002 (Version 06), the project activity does not have GHG emissions. Hence the monitoring is unnecessary.

D.2.1.2. Description of formulae used to estimate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

>>
According to ACM0002 (Version 06), the project activity does not have any GHG emissions. $PE_y = 0$

D.2.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project boundary and how such data will be collected and archived:

ID number(Please use numbers to ease cross-referencing to D.3)	Data variable	Data source	Data unit	Measured (m), calculated (c), estimated (e)	For which baseline method (s) must this element be included	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic / paper)	For how long is archived data kept?	Comment
1. EG_y	Electricity supplied to the grid by the project	Measured	MWh	Directly measured	Simple *OM*	hourly measurement and	100%	Electronic/ paper	During the crediting period and two years after	Electricity supplied by the project activity to the grid. Double check by receipt of sales

						monthly recording				
2. $EF_{OM,y}$	Emission factor	http://cdm.ccchina.gov.cn/web/main.asp?ColumnId=25	tCO_2 / MWh	c	Simple *OM*	yearly	100%	Electronic/ paper	During the crediting period and two years after	The official data is used
3. $EF_{BM,y}$	Emission factor	http://cdm.ccchina.gov.cn/web/main.asp?ColumnId=25	tCO_2 / MWh	c	*BM*	yearly	100%	Electronic/ paper	During the crediting period and two years after	The official data is used

As the baseline emission factor published by Chinese DNA is used by the project, only the electricity supplied to the grid by the project need to be monitored.

D.2.1.4. Description of formulae used to estimate baseline emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

>>

The important steps of ACM0002 (Version 06) are:

1. Calculation of Operating Margin (*OM*) emission factor
2. Calculation of Build Margin (*BM*) emission factor
3. Calculation of Combined Margin (*CM*) emission factor

Calculation of *OM* emission factor ($EF_{OM,y}$):

According to Simple *OM*, the *OM* emission factor ($EF_{OM,y}$) is calculated as:

$$EF_{OM,simple,y} = \frac{\sum_{i,j} F_{i,j,y} \cdot COEF_{i,j}}{\sum_{j} GEN_{j,y}} \quad (D.1)$$

With:

·$F_{i,j,y}$ the amount of fuel i consumed by relevant power sources j in year(s) y;

·j runs over all power sources including imports, but excludes low operating costs and must-run power plants;

·$COEF_{i,j,}$ the CO_2 emission coefficient of fuel i (tCO_2/tce), taking into account the carbon content of fuels used by relevant power sources j and the percentage oxidation of the fuel in year(s) y;

·$GEN_{j,y}$ the electricity delivered to the grid by source j in year(s) y (MWh).

The CO_2 emission coefficient $COEF_i$ is obtained as

$$COEF_i = NCV_i \cdot EF_{CO2,i} \cdot OXID_i \tag{D.2}$$

Where:
NCV_i is the net calorific value per ton of coal equivalent (GJ/tce);
$OXID_i$ is the oxidation factor of coal;
$EF_{CO2,i}$ is the CO_2 emission factor per GJ of coal (tCO_2/GJ).

EB suggests to the project participants using the following alternatives when lacking data: (ii) 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 (*BM*). For the estimation of the operating margin (*OM*) the average emission factor for the grid for each fuel type can be used.

Then if without plant data, the aggregated generation/power supply for each fuel type, the aggregated consumption of each fuel type for generation/power supply, and emission coefficient of each fuel type can be used for estimation of *OM* emission coefficient.

Therefore, in formula D.1:
$F_{i,j,y}$ is the amount of coal consumption (tce) in years y of Shaanxi Power Grid, Gansu Power Grid, Qinghai Power Grid, Ningxia Power Grid, Xinjiang Power Grid;
j is the Shaanxi Power Grid, Gansu Power Grid, Qinghai Power Grid, Ningxia Power Grid, Xinjiang Power Grid connected into the Northwest China Power Grid, not including low-operating cost and must run power plants, and including imports to the grid;
COEF is the CO_2 emission coefficient of fuel i (tCO_2/tce);
$GEN_{j,y}$ is the power generation (MWh) provided to the Northwest China Power Grid in years y by Shaanxi Power Grid, Gansu Power Grid, Qinghai Power Grid, Ningxia Power Grid, Xinjiang Power Grid.

The *OM* emission factor ($EF_{OM,y}$) is calculated as a 3-year average (2002-2004), based on the most recent statistics (See Annex 3) of Northwest China Power Grid available.

Calculation of *BM* emission factor ($EF_{BM,y}$):

According to ACM0002, the *BM* emission factor ($EF_{BM,y}$) is calculated as:

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \times COEF_{i,m}}{\sum_{m} GEN_{m,y}} \qquad (D.3)$$

Where
$F_{i,m,y}$ is the amount of fuel *i* (tce) consumed by plant *m* in year(s) *y*.
$COEF_{i,m,y}$ is the CO_2 emission coefficient (tCO_2/tce) of fuel *i*, taking into account the carbon content of the fuels used by plant *m* and the percent oxidation of the fuel in year(s) *y*.
$GEN_{m,y}$ is the electricity (MWh) delivered to the grid by plant *m* in year(s) *y*.

CM emission factor (EF_y):

The Baseline Emission Factor (EF_y) is calculated as a Combined Margin, using a weighted average of the Operating Margin and Build Margin.

$$EF_y = w_{OM} \cdot EF_{OM,y} + w_{BM} \cdot EF_{BM,y} \qquad (D.4)$$

The default weights are used: $w_{OM} : w_{BM} = 0.75:0.25$

The Baseline Emission Factor (EF_y) could be calculated according to default weights ($w_{OM} : w_{BM} = 0.75:0.25$) and $EF_{OM,y}$ and $EF_{BM,y}$.

Calculate the baseline emissions (BE_y):

According to ACM0002, the baseline emissions (BE_y) is calculated as

$$BE_y = EG_y \cdot EF_y \qquad (D.5)$$

The baseline emission could be calculated according to the amount of power generated by the project and supplied to the grid (EG_y) and EF_y.

D.2.2. Option 2: Direct monitoring of emission reductions from the project activity (values should be consistent with those in section E).

>>

Leave intentionally blank. This option is not applied to the project.

D.2.2.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:

ID number (Please use numbers to ease cross-referencing to table D.3)	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data kept?	Comment
NA									

>>

Leave intentionally blank. This option is not applied to the project.

D.2.2.2. Description of formulae used to calculate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

>>

Leave intentionally blank. This option is not applied to the project.

D.2.3. Treatment of leakage in the monitoring plan

D.2.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project activity

ID number (Please use numbers to ease cross-referencing to table D.3)	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data kept?	Comment

>>

Leave intentionally blank. In accordance with ACM0002, there is no leakage.

D.2.3.2. Description of formulae used to estimate leakage (for each gas, source, formulae/algorithm, emissions units of CO2 equ.)

>>
Leave intentionally blank. In accordance with ACM0002 (Version 06), there is no leakage. Hence $L_y = 0$.

D.2.4. Description of formulae used to estimate emission reductions for the project activity (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

>>
The emission reduction ER_y by the project activity during a given year y is the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (L_y), as follows:

$$ER_y = BE_y - PE_y - L_y \quad \text{(D.6)}$$

There is no project emission, then PE_y=0.

There is no leakage due to the project activity, then L_y=0.

So the emission reductions by the project activity are as follows:
$ER_y=EG_y*EF_y$

So the Emission Reductions due to the project (ER_y) are equal to the baseline emissions (BE_y).

D.3. Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored		
Data (Indicate table and ID number e.g. D.3-1; D.3-2)	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
1. EG_y in Table D.2.1.3	Low	The data will be directly used to calculate emission reductions and measured by Ningxia Electricity Company. The measurement result will be checked with receipt of sales.

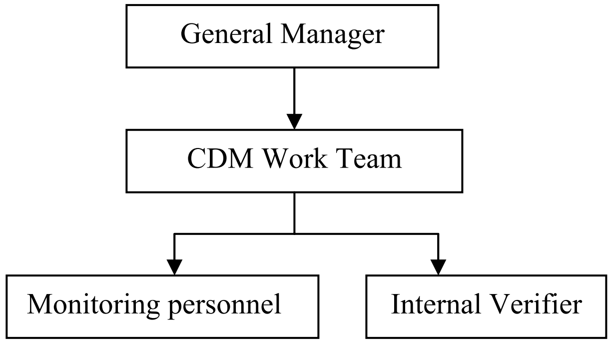
>>

D.4 Please describe the operational and management structure that the project operator will implement in order to monitor emission reductions and any leakage effects, generated by the project activity

>>

Supported by the project owner, the CDM developer has completed a CDM manual serve as a guideline for the project owner to manage and monitor the project during the project implementation. The table of contents of the manual is as follows:

The project owner will establish a specialized organization for project monitoring, which is shown as follows:



The monitoring personnel of the specialized organization will record monitoring data and archive them in line with actual needs; the verifier will be in charge of the related work such as verification of data.

The specialized organization will also carry out regular calibrations on the related equipment to insure the accuracy of the monitoring data. The operation reports will reflect the calibration results as well.

Mr. Wang Kui, the general manager of the project owner, will take charge of the monitoring management of the project.

For more details refer to Annex 4.

D.5 Name of person/entity determining the monitoring methodology:

>>

Person determining the monitoring methodology: Zhang Jisheng
Tel: 86-951-6193 183
Fax: 86-951-6193 563
Email: nxzjsh@vip.sina.com

Entity:
Ningxia CDM Service Centre (CDM project developer, not a project participant)

Contributors:

Wang Kui	Ningxia Tianjing Wind Power Ltd.
Wang Jun	Ningxia Tianjing Wind Power Ltd.
Zhao Ying	Ningxia CDM Service Centre

Ningxia Tianjing Wind Power Ltd. is a project participant.

SECTION E. Estimation of GHG emissions by sources

>>

E.1. Estimate of GHG emissions by sources:

>>

The Project emissions are zero according to ACM0002 (Version 06), as argued above. Hence PE_y=0.

E.2. Estimated leakage:

>>

As explained in Section D.2.3.2, the project produces no GHG emissions through leakage, i.e., L_y=0.

E.3. The sum of E.1 and E.2 representing the project activity emissions:

>>

$PE_y + L_y = 0$

This means the project activity emissions are zero.

E.4. Estimated anthropogenic emissions by sources of greenhouse gases of the baseline:

>>

According to Section B.2, the CM emission factor of the project is EF_y= 0.9532 tCO_2/MWh.

According to the project feasibility study report, the annual amount of electricity to be delivered to the grid from the project is EG_y=97,325 MWh.

The baseline emissions (BE_y) are $BE_y = EG_y * EF_y$ = 92,770 tCO_2.

E.5. Difference between E.4 and E.3 representing the emission reductions of the project activity:

>>

In a given year, the emission reductions realised by the project activity (ER_y) is equal to baseline GHG emissions (BE_y) minus project direct emissions and leakages during the same year:

$$\begin{aligned} ER_y &= BE_y - PE_y - L_y \\ &= BE_y - 0 - 0 \\ &= BE_y \end{aligned}$$

Hence the emission reductions due to the project are equal to the baseline emissions, i.e. ER_y = 92,770 tCO_2.

E.6. Table providing values obtained when applying formulae above:

>>

Table E6-1 Estimation of emission reductions due to the project

No.	Year	Estimation of project emission (tCO_2e)	Estimation of baseline emission (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of emission reductions (tCO_2e)
1	2007	0	66,675	0	66,675
2	2008	0	92,770	0	92,770
3	2009	0	92,770	0	92,770
4	2010	0	92,770	0	92,770
5	2011	0	92,770	0	92,770
6	2012	0	92,770	0	92,770

7	2013	0	92,770	0	92,770
8	2014	0	15,462	0	23,192
Total		**0**	***638,755***	**0**	646,485

SECTION F. Environmental impacts

>>

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

>>

In accordance with relevant environmental law and regulations, a Preliminary Appraisal Table of Environmental Impacts of a Construction Project was completed.

The project is likely to cause the following environmental impacts:

1. Impacts on air pollution

The preliminary appraisal assumed a larger installed capacity and higher coal displacement than the PDD; the figures below have been revised to bring them in agreement with the eventual capacity of the wind-farm and the assumptions in the remainder of the PDD. The project will have a total installed capacity of 50.25MW, installing altogether 67 wind turbines. The wind-farm is estimated to supply 95,294MWh of power to the Ningxia grid per year. It is estimated that 33,352.9 tce of fuel will be saved per year. This implies air pollution emission reductions equal to (annually) 488.25 tonne SO_2, 497.0 tonne NO_x and 582.5 tonne particulate matter.

2. Noise pollution

When the wind-farm is put into operation, the noise caused by the wind turbine operation will be less than 100dB, and can be reduced to under 65dB at the distance of 200m – 500m from the wind turbines. This complies with the National Urban Environmental Noise Standard (GB3096-93). The project is located in the desert with little vegetation. There are no residents within 5.0 km distance from the project site. Therefore, noise will not cause any impact to nearby residents.

The construction noise mainly comes from manual drills and cement mixers. It is recommended that all construction be conducted during the day and it will have little impact on neighbouring residents. According to the monitoring data from the construction site, a small-sized concrete mixer produces noise at a level between 91-102 dB, and a manual drill between 90-100 dB. According to the formula of declining of sound emitted from a non-directional source, it is estimated that, as close as 50 meters from the construction site, the noise produced by construction machinery will be under the 70 dB limit. Therefore, the construction noise imposes no harm to the surrounding area.

3. Impacts on telecommunications and television transmissions

The project site is at least 10 km away from the nearby enterprises and residential areas. It is concluded that the operation of the wind-farm will not cause any problem with telecommunications and television signals, which is very important to the production and daily life of nearby enterprises and residents.

4. Impacts on soil conservation

The project is located in the Gobi desert with little ground vegetation. Because the topsoil is quite loose and soft, the smaller particulates have been blown away by strong winds and only larger particulates are left near the project site. After the mechanical extraction during the project construction, small particulates will be stirred up on the ground surface again and cause local dust problem again. For this reason, the construction roads shall be watered and rolled regularly. As soon as the base pits are extracted, concrete should be cast and the holes shall be refilled and the surface shall be rolled in time, so as to reduce the occurrence of local dust pollution.

5. Impacts on domestic sewage

The operation of the wind-farm is based on a highly automated monitoring and control system. Under normal conditions, no staff or very few staff is needed to work on site. Therefore, little sewage will be generated. The sewage will be first treated in a septic tank, then discharged to a settlement tank, and finally evaporated, thus causing little environmental impact.

6. Impacts on the landscape and birds

The project is entirely built in the Gobi area. When migratory birds fly across the region in autumns and springs, there is no water body that birds can stay near the project site. As a result, birds are seldom seen throughout the year. Therefore the project is unlikely to affect birds' flight and migration.

7. Other impacts

The wind-farm does not consume any water, nor does it generate any wastewater. It will improve the local environment and is beneficial to natural resource conservation. The possible negative impacts during the project construction include dust, solid waste, decreased biomass, etc. However, the pollution will not be severe, and can and will be mitigated to a marginal level through effective management measures.

Summary

The Preliminary Appraisal Table of Environmental Impacts of a Construction Project concerning the project concludes: The operation of the project will not discharge wastewater, nor emit air pollutants to the local environment. Noise from the wind turbines will have little impact on the neighbourhood, given that the terrain that the wind-farm is located is uncultivated and unpopulated. The construction site of the project is confined to a small area. The soil extracted will be refilled, which will not damage the vegetation, nor will it cause water and soil degradation.

During the construction period, the project will still have modest impact on the environment, such as on soil and the natural environment. Generally speaking, the project is compatible with the environment, and only during the construction of the project shall be subject to strict environmental protection measures.
We therefore conclude that the environmental impacts of the project are minor, and the project is definitely an environmentally more friendly way of providing power than the main alternatives in Ningxia, coal-fired power and to a lesser extent hydropower.

F.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:

>>

Impacts are considered not significant and Ningxia Environmental Protection Bureau has approved the project[21].

[21] Ningxia Environmental Protection Bureau: No. [2005]16, No. [2006]01.

SECTION G. Stakeholders' comments

>>

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

>>

1. Open public conference was held in Jan., 2005 in Yinchuan city to better understand stakeholders' comments. Supported by Ningxia Development and Reform Commission, the project owner visits many organizations, such as Ningxia Commission of Economy and Trade, Environmental Protection Bureau of Ningxia, Ningxia Price Bureau, Ningxia Meteorological Bureau, Ningxia Electric Power Co., Ningxia branch of China Industrial and Commercial Banks, Northwest Investigation Design & Research Institute (NIDRI), Ningxia Electric Power Design Institute etc.. The information of project owner was introduced mainly on wind resources, wind-farm area, transportation, techniques applied, economic benefit and environmental protection etc., and then following further discussion.
2. On-site survey of local community's comments was done by project owner at the project site and its surrounding areas.

G.2. Summary of the comments received:

>>

There are no adverse comments on the project activity and most of the stakeholders are supportive of it. However the following concerns still need to be considered:

1. It is advised the project owner try to lower its cost, as it is much higher than that of coal-fired. Special efforts should be made to get CDM revenues to complete its financing.
2. The project activity should pay more attention to technology exchange and training, as it is not universal in Ningxia and with a relatively high risk in technology.
3. It is also suggested the project owner pay special attention to and make efforts to vegetation recovery, soil and water conservation and related facility construction.

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

>>

The following measures have been or will be taken by the project owner to answer the comments of the stakeholders:

1. Project owner will try to get CDM approval and use the revenues from its CERs product to improve profit of the project.
2. It is the first time to use the domestic technology in Ningxia. The project owner will take the following measures to reduce technical risk:

   ——send the managers and technicians to the equipment supply enterprise to training for 3 months and learn related knowledge.

   ——in the stage of the equipment installation and operation, the supplier could send the technical expert to the project locale to do the technical guidance.

   ——send the managers and technicians to other wind power enterprises to training.
3. Efforts will be made to recover vegetation and reduce soil and water loss.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

The Project Owner:

Organization:	Ningxia Tianjing Wind Power Generation Electricity Joint Stock Co., Ltd.
Street/P.O.Box:	Development Zone for High and New Technological Industry in Jinfeng District
Building:	Hexin Building
City:	Yinchuan
State/Region:	Ningxia
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Country:	People's Republic of China
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding from UNFCCC Annex 1 countries for the project.

Annex 3

BASELINE INFORMATION

1. Calculation of Operating Margin (*OM*) Emission Factor

Table 3-1 Operating Margin (*OM*) Emission Factor of Northwest China Power Grid 2002

Fuel types	Unit	Shaanxi A	Gansu B	Qinghai C	Ningxia D	Xinjiang E	Subtotal F=A+B+C+D+E	Emission factor tc/TJ G	Oxidation factor % H	NCV $MJ/t,m^3$ I	CO_2 emission (tCO_2e) *J=G*H*I*F*44/12/10000 (Mass unit)* *J=G*H*I*F*44/12/1000 (Volume unit)*
Raw coal	10^4t	1,607.5	1,156.02	278.66		981.75	4023.93	25.8	100	20,908	79,589,182.7
Cleaned coal	10^4t		0.91				0.91	25.8	100	26,344	22,678.49584
Other washed coal	10^4t						0	25.8	100	8,363	0
Coke	10^4t						0	29.2	100	28,438	0
Coke oven gas	10^8m^3		0.04				0.04	12.1	100	16,726	296.8307467
Other coal gas	10^8m^3		0.08				0.08	12.1	100	5,227	185.5236533
Crude oil	10^4t						0	20	100	41,816	0
Diesel	10^4t	1.96				1.12	3.08	20.2	100	42,652	973,00.01717
Fuel oil	10^4t		1.7			1.27	2.97	21.1	100	41,816	96,084.38664
LPG	10^4t						0	17.2	100	50,179	0
Refinery gas	10^4t						0	15.7	100	46,055	0
Natural gas	10^8m^3		0.53			2.33	2.86	15.3	100	38,931	62,463.23226
Other oil products	10^4t						0	20	100	38,369	0
Other coal chemicals	10^4t						0	25.8	100	28,435	0
Other energy	10^4t ce		5.07			1.74	6.81	0	0	0	0
										Total	**79,868,191.19**

Data sources: China Energy Statistical Yearbook 2000-2002

Table 3-2 Fire power generation of Northwest China Power Grid 2002

Name of the province	Generation	Generation	Rate of electricity used by factory	Power Supply		
	10^8kWh	MWh	%	MWh		
Shaanxi	319.41	31,941,000	7.87	29,427,243		
Gansu	235.04	23,504,000	6.83	21,898,677	Total emission amount	79,868,191.19 tCO_2
Qinghai	49.8	4,980,000	8.40	4,561,680	Total power supply	86,084,777.9MWh
Ningxia	155.05	15,505,000	6.54	14,490,973		
Xinjiang	174.98	17,498,000	10.24	15,706,205	Emission factor in 2002	0.9277853CO_2/MWh
Total				86,084,778		

Data sources: The State Electric Industry Yearbook 2003

Table 3-3 Operating Margin (*OM*) Emission Factor of Northwest China Power Grid 2003

Fuel types	Unit	Shaanxi A	Gansu B	Qinghai C	Ningxia D	Xinjiang E	Subtotal F=A+B+C+D+E	Emission factor tc/TJ G	Oxidation factor % H	NCV MJ/t,m^3 I	CO_2 emission (tCO_2e) *J=G*H*I*F*44/12 /10000 (Mass unit)* *J=G*H*I*F*44/12/ 1000 (Volume unit)*
Raw coal	10^4t	2,002.3	1,479.62	330.67	682	1,065.75	5,560.3	25.8	100	20,908	109,976,995.8
Cleaned coal	10^4t		0.91				0	25.8	100	26,344	0
Other washed coal	10^4t				27	3.64	30.64	25.8	100	8,363	242,405.2347
Coke	10^4t						0	29.2	100	28,438	0
Coke oven gas	10^8m^3		1.54				1.54	12.1	100	16,726	114,279.8375
Other coal gas	10^8m^3		0.12				0.12	12.1	100	5,227	2,782.8548
Crude oil	10^4t						0	20	100	41,816	0
Diesel	10^4t	3.12			0.04	0.4	3.56	20.2	100	42,652	11,2463.6562
Fuel oil	10^4t		1.19			1.02	2.21	21.1	100	41,816	7,149.13619
LPG	10^4t						0	17.2	100	50,179	0
Refinery gas	10^4t					3.48	3.48	15.7	100	46,055	92,262.9026
Natural gas	10^8m^3	0.1	0.54			5.95	6.59	15.3	100	38,931	1,439,275.177
Other oil products	10^4t						0	20	100	38,369	0
Other coal chemicals	10^4t						0	25.8	100	28,435	0
Other energy	10^4tce		5.86			2.3	8.16	0	0	0	0
										Total	**112,051,962.6**

Data sources: China Energy Statistical Yearbook 2004

Table 3-4 Fire power generation of Northwest China Power Grid 2003

Name of the province	Generation	Generation	Rate of electricity used by factory	Power supply		
	10^8kWh	MWh	%	MWh		
Shaanxi	381.44	38,144,000	6.94	35,496,808		
Gansu	294.94	29,494,000	6.35	27,621,131	Total emission amount	112,051,962.6 tCO_2
Qinghai	64.46	6,446,000	4.50	6,155,930	Total power supply	105,651,775.3MWh
Ningxia	191.75	19,175,000	5.25	18,168,313		
Xinjiang	198.34	19,834,000	8.19	18,209,595	Emission factor in 2003	1.06057813tCO_2/MWh
Total				105,651,775		

Data sources: The State Electric Industry Yearbook 2004

Table 3-5 Operating Margin (*OM*) Emission Factor of Northwest China Power Grid 2004

Fuel types	Unit	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Subtotal	Emission factor tc/TJ	Oxidation factor %	NCV MJ/t,m^3	CO_2 emission (tCO_2e) *J=G*H*I*F*44/12 /10000 (Mass unit)* *J=G*H**F*44/12/ 1000 (Volume unit)*
		A	B	C	D	E	F=A+B+C+D+E	G	H	I	
Raw coal	10^4t	2,428.7	1,595.9	322.8	1,270	1,240.9	6,858.4	25.8	100	20,908	135,652,074.1
Cleaned coal	10^4t		0.91				0	25.8	100	26,344	0
Other washed coal	10^4t				102	10.5	113.14	25.8	100	8,363	895,095.5697
Coke	10^4t	0.78					0.78	29.2	100	28,438	23,746.6372
Coke oven gas	10^8m^3		0.3				0.3	12.1	100	16,726	22,262.306
Other coal gas	10^8m^3	0.74	1.26				2	12.1	100	5,227	46,380.91333
Crude oil	10^4t	0.01				0.06	0.07	20	100	41,816	2,146.554667
Gasoline	10^4t	0.02					0.02	18.9	100	43,070	596.9502
Diesel	10^4t	2.16	0.36		0.05	0.41	2.98	20.2	100	42,652	934,140.92571
Fuel oil	10^4t	0.01	0.69			0.3	1	21.1	100	41,816	32,351.64533
LPG	10^4t						0	17.2	100	50,179	0
Refinery gas	10^4t					3.26	3.26	15.7	100	46,055	86,430.19037
Natural gas	10^8m^3	1.61	0.59			6.27	8.47	15.3	100	38,931	1,849,872.648
Other oil products	10^4t						0	20	100	38,369	0
Other coal chemicals	10^4t						0	25.8	100	28,435	0
Other energy	10^4tce		6.17			3.46	9.63	0	0	0	0
										Total	**138,705,098.5**

Data sources: China Energy Statistical Yearbook 2005

Table 3-6 Fire power generation of Northwest China Power Grid 2004

Name of the province	Generation	Generation	Rate of electricity used by factory	Power supply		
	10^8kWh	MWh	%	MWh		
Shaanxi	444.39	44,439,000	7.50	41,106,075		
Gansu	332.42	33,242,000	6.21	31,177,672	Total emission amount	138,705,098.5 tCO_2
Qinghai	62.08	6,208,000	7.96	5,713,843.2	Total power supply	122,605,243MWh
Ningxia	252.98	25,298,000	5.45	23,919,259		
Xinjiang	227.52	22,752,000	9.07	20,688,394	Emission factor in 2004	1.13131458tCO_2/MWh
Total				122,605,243		

Data sources: The State Electric Industry Yearbook 2005

Weighted Average Emission Factor of 3 years: 1.05180175 tCO_2/MWh

2. Calculation of Build Margin (*BM*) Emission Factor

Table 3-7 NCV, Oxidation factor and potential emission factor of each fuel

Fuel types	NCV	Emission factor	Oxidation factor
Raw coal	20908 kJ/kg	25.8tc/TJ	1
Cleaned coal	26344 kJ/kg	25.8tc/TJ	1
Other washed coal [22]	8363 kJ/kg	25.8tc/TJ	1
Coke	28435 kJ/kg	29.2tc/TJ	1
Crude oil	41816 kJ/kg	20.0tc/TJ	1
Gasoline	43070 kJ/kg	18.9tc/TJ	1
Coal oil	43070 kJ/kg	19.6tc/TJ	1
Diesel	42652 kJ/kg	20.2tc/TJ	1
Fuel oil	41816 kJ/kg	21.1tc/TJ	1
Other oil products [23]	38369 kJ/kg	20.0tc/TJ	1
Natural gas	38931 kJ/m	15.3tc/TJ	1
Coke oven gas [24]	16726 kJ/m3	12.1tc/TJ	1
Other coal gas [25]	5227 kJ/m3	12.1tc/TJ	1
LPG	50179 kJ/kg	17.2tc/TJ	1
Refinery gas	46055 kJ/kg	15.7tc/TJ	1

Data sources: the heat value of each fuel is from China Energy Statistical Yearbook 2005 p. 365. The potential emission factor of each fuel is from *Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Workbook*, Chapter 1, p. 1.23, Table 1.4. The Oxidation factor data of each fuel is from *Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Workbook*, Chapter 1, p. 1.23, Table 1.4.

The efficiency level of the best technology commercially available of coal-fired power in the calculation result is set as 600MW domestic subcritical generator sets. The weighted average value of coal consumption of power supply of 11 set of 600MW generator sets newly built in 2004 is taken as the estimation of the efficiency level of the best technology commercially available in the calculation result. The coal consumption of power supply of 600MW domestic subcritical power plant is estimated to be 336.66gce/kWh, which is equivalent to 36.53% of power supply efficiency.

There is no oil-fired power and gas-fired power in the fuel-fired power plant of Northwest China Power Grid.

Table 3-8 Efficiency of power supply of Coal-fired power plant

	Variable	Efficiency of	NCV	Oxidation	Emission factor (tCO_2/MWh)

[22] Calculated as per NCV of washed coal provided by China Energy Statistical Yearbook 2005 p. 365, and as the average NCV of coal slime is larger than that of washed coal, it is conservative to conduct by this way.

[23] China Energy Statistical Yearbook of each year doesn't indicate the NCV of other oil products. The NVC in the annex is 38369kJ/kg, which is equivalent to 1.3108 tce/t.

[24] Calculated as per the lower value of NCV range 16726-17981 kJ/m^3 of Coke oven gas provided by China Energy Statistical Yearbook 2005 p. 365.

[25] Calculated as per the lowest value of NCV of coal gas provided by China Energy Statistical Yearbook 2005 p. 365.

		power supply	(tc/TJ)	factor	
		A	B	C	D=3.6/A/1000*B*C*44/12
Coal-fired power plant	$EF_{Coal,Adv}$	36.53%	25.8	1	0.9323

Table 3-9 Installed capacity of the Northwest China Power Grid 2004

Installed capacity	Unit	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Total
Fire power	MW	7,640.4	4,975.6	889.8	3,782	4,959.7	22,247.5
Hydro power	MW	1,876.5	3,566.1	4,053.4	366.2	973	10,835.2
Nuclear power	MW	0	0	0	0	0	0
Wind power and other	MW	0	138.2	0	42.5	95.3	276
Total	MW	9,516.9	8,679.9	4,943.2	4,190.7	6,028	33,358.7

Data sources: The State Electric Industry Yearbook 2005

Table 3-10 Installed capacity of the Northwest China Power Grid 2002

Installed capacity	Unit	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Total
Fire power	MW	6,735.4	3,881.8	803.8	2,386	3,949.9	17,756.9
Hydro power	MW	1,462.3	3,238.6	3,206.3	307.9	984.8	9,199.9
Nuclear power	MW	0	0	0	0	0	0
Wind power and other	MW	0	8.4	0	0	96.7	105.1
Total	MW	8,197.7	7,128.8	4,010.1	2,693.9	5,031.4	27,061.9

Data sources: The State Electric Industry Yearbook 2003

Table 3-11 Installed capacity of the Northwest China Power Grid 2001

Installed capacity	Unit	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Total
Fire power	MW	6,302.4	3,874.8	766.8	2,046	3,804.9	16,794.9
Hydro power	MW	1,450.7	3,118.3	3,127.4	307.9	868.1	8,872.4
Nuclear power	MW	0	0	0	0	0	0
Wind power and other	MW	0	8.4	0	0	70.6	79
Total	MW	7,753.1	7,001.5	3,894.1	2,353.9	4,743.6	25,746.2

Data sources: The State Electric Industry Yearbook 2002

Table 3-12 *BM* calculation of the Northwest China Power Grid

	Installed capacity 2001	Installed capacity 2002	Installed capacity 2004	New added installed capacity 2001-2004	The fraction of newly added installed capacity
	A	B	C	D=C-A	
Fire power	16,794.9	17,756.9	22,247.5	5,452.6	71.63%
Hydro power	8,872.4	9,199.9	10,835.2	1,962.8	25.78%
Nuclear power	0	0	0	0	0
Wind power	79	105.1	276	197	2.59%
Total	25,746.3	27,061.9	33,358.7	7,612.4	100.00%
The fraction of installed capacity 2004	77.18%	81.12%	100%		

$EF_{Thermal}$=0.9323*71.63%=0.6678 tCO_2/MWh

Table 3-13 The proportion of CO_2 emission of solid, liquid and gas in total emission

Fuel types	Unit	Shaanxi A	Gansu B	Qinghai C	Ningxia D	Xinjiang E	Subtotal F=A+…+E	NCV G	Emission factor (tc/TJ) H	Oxidation factor I	CO_2 emission (tCO_2e) *J=F*G*H*I*44/12/100*
Raw coal	10^4t	2,428.70	1,595.90	322.80	1,270.10	1,240.90	6,858.4	20,908kJ/kg	25.8	1	135,652,074.13
Cleaned coal	10^4t	0	0	0	0	0	0	26,344kJ/kg	25.8	1	0
Other washed coal	10^4t	0	0	0	102.64	10.50	113.14	8,363kJ/kg	25.8	1	895,095.5697
Coke	10^4t	0.78	0	0	0	0	0.78	28,435kJ/kg	29.2	1	23,746.6372
Total										1	***136,570,916.34***
Crude oil	10^4t	0.01	0	0	0	0.06	0.07	41,816kJ/kg	20.0	1	2,146.554667
Gasoline	10^4t	0.02	0	0	0	0	0.02	43,070kJ/kg	18.9	1	596.9502
Coal oil	10^4t	0	0	0	0	0	0	43,070kJ/kg	19.6	1	0
Diesel	10^4t	2.16	0.36	0	0.05	0.41	2.98	42,652kJ/kg	20.2	1	94,140.92571
Fuel oil	10^4t	0.01	0.69	0	0	0.30	1	41,816kJ/kg	21.1	1	32,351.64533
Other oil products	10^4t	0	0	0	0	0	0	38,369kJ/kg	20.0	1	0
Total										1	***129,236.0759***
Natural gas	10^7m^3	16.1	5.9	0	0	6.27	84.7	38,391kJ/m^3	15.3	1	1,849,872.648
Coke oven gas	10^7m^3	0	3.0	0	0	0	3	16,726kJ/m^3	12.1	1	22,262.306
Other coal gas	10^7m^3	7.4	12.6	0	0	0	20	5,227kJ/m^3	12.1	1	46,380.91333
LPG	10^4t	0	0	0	0	0	0	50,179kJ/kg	17.2	1	0
Refinery gas	10^4t	0	0	0	0	3.26	3.26	46,055kJ/kg	15.7	1	86,430.19037
Total	*10^4t*										***2,004,946.057***
Total											***138,705,098.47***

Data sources: China Energy Statistical Yearbook 2005

According to above calculation, λ_{Coal} =98.46%, λ_{Oil} =0.09%, λ_{Gas} =1.45%.

I.e. $\lambda_{Oil} + \lambda_{Gas}$ =1.54%

According to the conservative method, the emission factor of fire power is calculated as:

$EF_{BM,y}$ = 0.6678* (100%- 1.54%) =0.6575 tCO_2/MWh

Annex 4

MONITORING PLAN

The project use the approved methodology ACM0002 (Version 06): Consolidated baseline methodology for grid-connected electricity generation from renewable sources to determine the baseline of Northwest China Power Grid. Accordingly, The MP is based on the approved methodology ACM0002 (Version 06), "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources".

1. The Monitoring Requirements

The project owner and the CDM developer should know and master the new requirements of EB and the methodologies.

The project owner 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 electricity due to the power generated by the proposed project. As the baseline emission factor is calculated ex ante when the proposed project PDD is designed, the grid-connected output is therefore defined as the key activities to monitoring.

2. The User of the Monitoring Plan

Ningxia Tianjing Wind Power Generation Electricity Joint Stock Co., Ltd., the 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.

3. Key Definitions

The monitoring and verification of the monitoring plan are defined as follows:

·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 by the project owner.

·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 project criteria by a selected Designated Operational Entity.

4. The Monitoring Plan

4.1 Responsibility

This MP is used by the project owner during all stages of the project design and implementation, e.g. planning, construction and operation. The project owner implements all of the monitoring responsibility under this MP.

Mr. Wang Kui, the general manager of the project owner, will take charge of the monitoring management of the project.

4.2 Calibration of Meters & Metering

Ningxia Electricity Company (as the sub-grid of the Northwest China Power Grid) will ensure the accuracy of the metering in terms of relevant rules of national electric power.

·The Meter shall be accurate enough so that error resulting from such equipment shall not exceed +0.5% of full-scale rating.

·The main Meter shall be inspected and sealed by Ningxia Electricity Company.

·The Meter installed should be tested by Ningxia Electricity Company when the following cases occur within 10 days:

a. The error of reading for main Meter exceeds the permissible error limits.
b. The Meter is repaired because of the Meter parts trouble.
c. If the Meter needs to be repaired, calibrated again or replaced, the project owner should be informed in advance and asked to send person to supervise the relevant repair, recalibration or replacement activity.

·If the inaccuracy degree of the month reading of the main Meter exceeds the permissible error limits or the Meter function is improper, the net output power should be confirmed by the following methods:

a. Determine the affected data and remedy the deviation;
b. The equipment of the main Meter and the relevant lines are inspected by Ningxia Electricity Company;
c. Ningxia Electricity Company tells the inspection result to the project owner and negotiates with the project owner to confirm the net output power.

Regarding the above method for confirmation of the net output power, the project owner should design a reasonable, appropriate and conservative counting estimation method and provide sufficient evidence when DOE conducts the verification.

· The electricity recorded by the Meter alone will suffice for the purpose of billing and emission reduction verification as long as the error in the Meter is within the permissible limits.

The calibration is carried out by Ningxia Electricity Company and the records will be provided to the project owner, and these records will be held by the project owner and the third party designated.

4.3 Monitoring

4.3.1 Monitoring of electricity output data

In order to ensure the accuracy of measurement of power generation, the monitoring is finished by the project owner and CDM developer. The electricity generated by the proposed project will be monitored through Meter 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 Meter will be controlled, operated and maintained by Ningxia Electricity Company.

The meter reading and the record of calibration should be readily accessible for DOE.

4.3.2 Quality assurance (QA) and quality control (QC)

The quality assurance and quality control procedures of data record, maintenance and archive should be conducted according to the requirements of the QA/QC procedures. The project owner will also carry out regular calibrations on the related equipment to insure the accuracy of the monitoring data.
4.3.3 The annual relevant data of the project boundary grid should be collected in time so as to calculate emission factor before the next crediting period is updated.

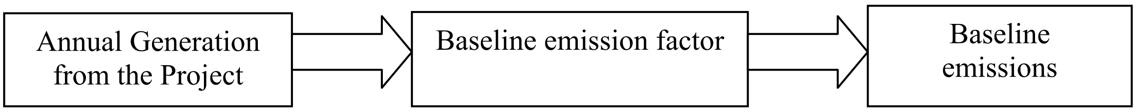
4.4 Data Management System

The project owner or authorized CDM principals are responsible for monitoring of greenhouse gas emissions reduction. The procedures for tracking information from the primary source to the end-data calculations are 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 or other qualified entities. It is the responsibility of the project owner to provide additional necessary data and information for validation and verification requirements of respective DOE.

Physical documentation such as paper-based maps, diagrams and environmental assessment will be collated in a central place, together with this monitoring plan. In order to facilitate auditor's reference, monitoring results will be indexed. All paper-based information will be stored by the project owner and kept at least one copy.

5. Calculating Emission Reductions

The emission reduction from the project result from the electricity is from the Ningxia Tianjing Wind Power Generation Electricity Joint Stock Co., Ltd. displacing power generated by other sources of power, including most importantly coal. The outline of the method to calculate the emission reduction is presented on the following page.



6. Description of the Spreadsheet

The project only need to monitor the power generation delivered to the grid generated by the project activity. The emission reduction generated by the project activity could be obtained by multiplying the power generation delivered to the grid by the baseline emission factor calculated ex ante. The full monitoring plan contains sections that are not including here for reasons of space.