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

CONTENTS

Annexes

SECTION A. General description of project activity

A.1. Title of the project activity:

>>
CECIC Urumqi Tuoli Phase I Wind Farm Project
Current version of the PDD: 1.2
Date of completion: 20/12/2010

PDD revision history

PDD version	Time	Note
Version 1.0	02/08/2010	Complete first version and submission to China DNA
Version 1.1	26/10/2010	Submission to DOE for GSP after internal QA
Version 1.2	20/12/2010	Revised based on the draft validation report

A.2. Description of the project activity:

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CECIC Urumqi Tuoli Phase I Wind Farm Project (the Proposed Project Activity) is located in Tuoli Town, Urumqi County, Xinjiang Uygur Autonomous Region. The Proposed Project Activity is developed by CECIC Wind Power (Xinjiang) Co., Ltd.. The Proposed Project Activity is to install and operate 33 wind turbines with a capacity of 1,500 kW each; the total installed capacity will be 49.5 MW. Once fully operational, the Proposed Project Activity is expected to deliver on average approximately 125,532 MWh (net) of electricity per year to the Northwest Power Grid (NWPG). The purpose of the Proposed Project Activity is the generation of electricity from wind and the supply of this electricity to the NWPG.

The project scenario is the installation of 49.5 MW of renewable energy power generation capacity, and the supply to the NWPG of 125,532 MWh (net) of electricity generated from renewable energy.

The baseline scenario, which is the same as the scenario existing prior to the implementation of the Proposed Project Activity, is the generation of electricity by grid-connected power plants.

As the NWPG is dominated by thermal power generation, the establishment of the Proposed Project Activity will lead to greenhouse gas (GHG) emission reductions. Following the baseline methodology, the emission reductions are estimated to be approximately 116,644 tonnes of CO_2 equivalent (tCO_2e) per year once the Proposed Project Activity is fully operational.

Sustainable development

The Proposed Project Activity will help the local government to promote economic development and to improve the air quality. The project will assist China in stimulating and accelerating the commercialisation of grid-connected wind power technologies and markets which are an important objective of the Chinese government. The project will therefore help reduce GHG emissions versus the high-growth, coal-dominated business-as-usual scenario. The project will improve air quality and local livelihoods, promote sustainable renewable energy industry development.

The Proposed Project Activity will contribute to sustainable development in the following ways:

- It will promote local economic development by creating local employment opportunities during both the construction and operational phase of the Proposed Project Activity.
- It will generate electricity from renewable sources.
- It will promote technology development, through the use of advanced technology.
- It will reduce GHG emissions in China compared to the baseline/business-as-usual scenario.
- It will reduce the emissions of other pollutants associated with the operation of fossil fuel-fired thermal power plant, including SO_2 and soot, as well as reducing thermal pollution from cooling water in the baseline/business-as-usual scenario.

A.3. Project participants:

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Name of Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Party involved wishes to be considered as project participant (Yes/No)
P.R. China (host)	CECIC Wind Power (Xinjiang) Co., Ltd.	No
United Kingdom of Great Britain and Northern Ireland	Carbon Resource Management S.A.	No

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

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People's Republic of China

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

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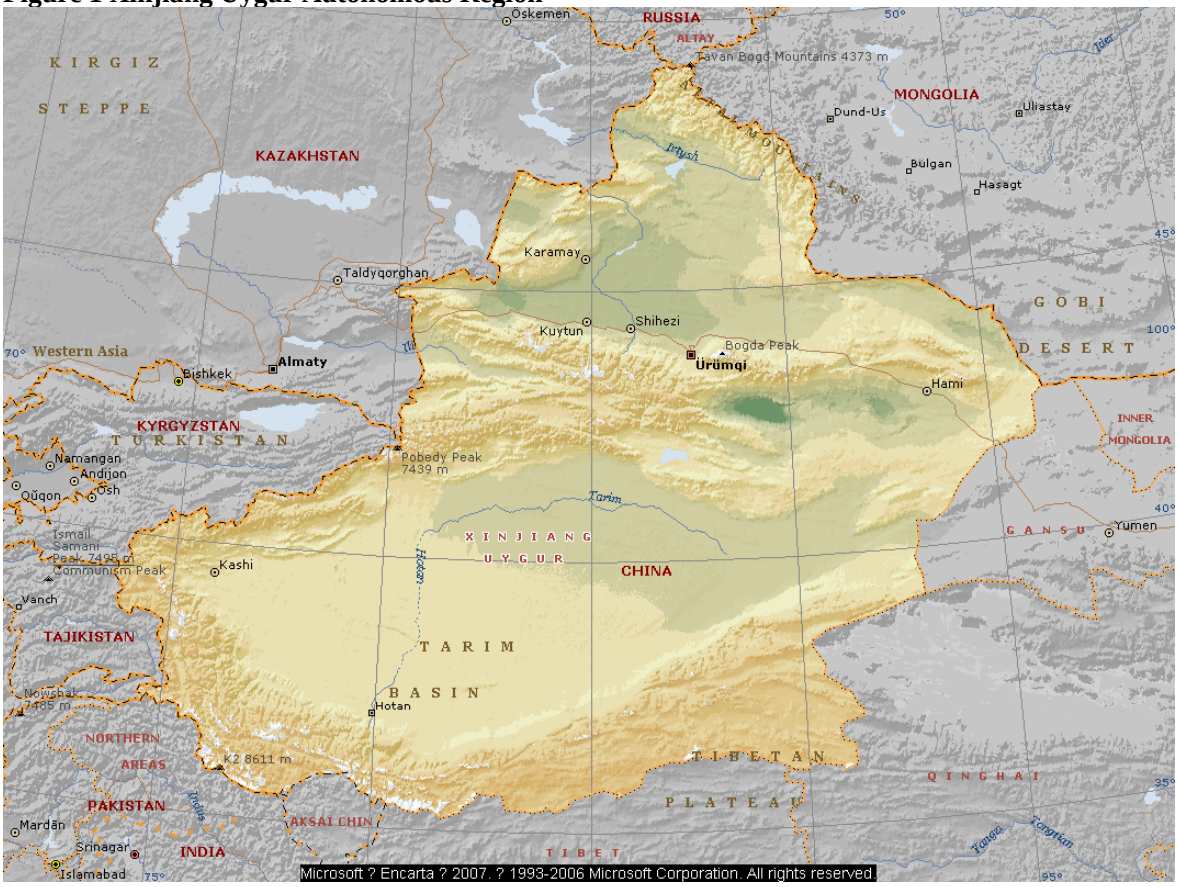
Xinjiang Uygur Autonomous Region

Figure 1 Xinjiang Uygur Autonomous Region



A.4.1.3. City/Town/Community etc.:

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Tuoli Town, Urumqi County

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

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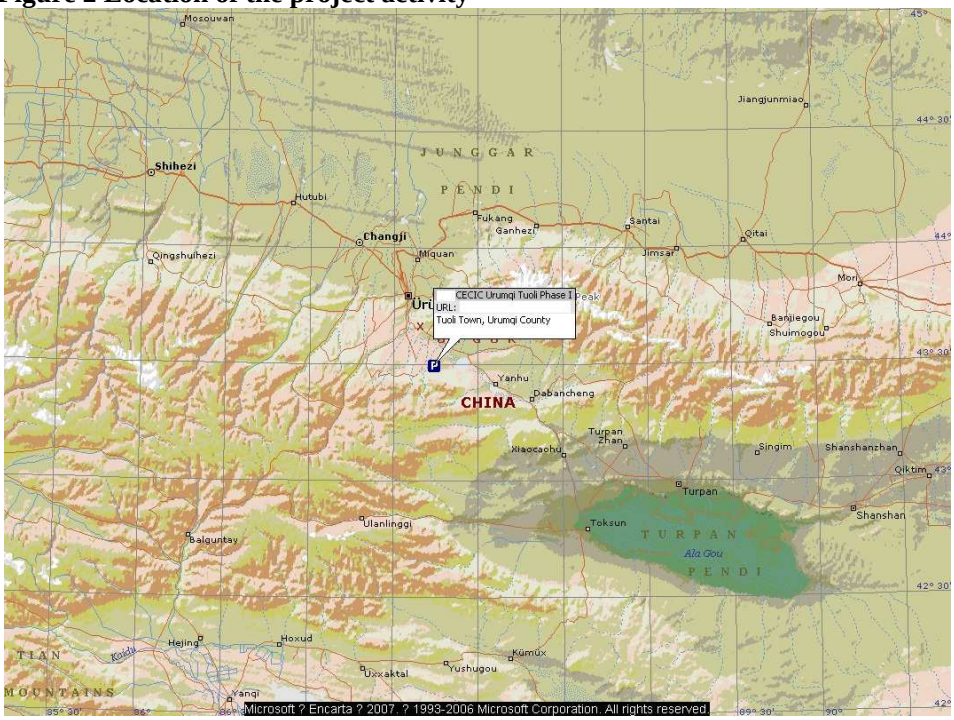
Longitude (centre)	87.7333 East
Latitude (centre)	43.4833 North
Altitude	1150～1345 m

Figure 2 shows the location of the project site.

Figure 2 Location of the project activity



The coordinates of the project boundary corners are summarized below.

Corner No.	Longitude	Latitude
1	87.7264	43.5042
2	87.7369	43.5028
3	87.7350	43.4997
4	87.7561	43.4967
5	87.7511	43.4875
6	87.7406	43.4892
7	87.7353	43.4803
8	87.7247	43.4819
9	87.7197	43.4731
10	87.7092	43.4744

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

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Sectoral scope: 01 Energy industries

Category: Grid-connected electricity generation from renewable sources

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

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The purpose of the Proposed Project Activity is the generation of electricity from wind and the supply of

this electricity to the Grid. The project scenario is the installation of 33 wind turbines with a capacity of 1,500kW each. The equipment is manufactured in China by Xinjiang Goldwind Science & Technology Co., Ltd.. The technology is considered good practice in China. The technology specifications applied is shown in Table 1.

Table 1 Technology specifications

Item	Specification
Manufacturer	Xinjiang Goldwind Science & Technology Co., Ltd.
Type	GW77/1500kW
Power Rating	1500 kW
Rotor Diameter	77 m
Hub height (Centre)	65 m
Cut-in Wind Speed	3 m/s
Rating Wind Speed	12 m/s
Cut-out Wind Speed	22 m/s
Designed Life	20 years

Each turbine will have a transformer from 690 V to 35 kV, and are connected with the newly-constructed 110 kV substation on the wind farm. The onsite substation is connected to the grid substation via 110 kV transmission line. All the electricity generated by the wind farm will be transferred to the NWPG via the grid substation.

The project scenario is the installation of 33 wind turbines with a total capacity of 49.5 MW. The wind turbines are estimated to generate on average 125,532 MWh (net) of electricity annually once fully operational, with an average load factor of 28.9%. The expected load factor is determined by an independent qualified design institute in the Feasibility Study Report (FSR) using detailed onsite information and long-term local wind data, in accordance with EB guidance on plant load factors (EB48 Annex 11).

The generation and consumption of the Proposed Project Activity is monitored continuously through an electronic control and monitoring system in the onsite office, using meters in the grid substation. For the purpose of invoicing for generation and consumption, electricity meters in the grid substation are used. The grid substation is operated by the Grid Company, and data is monitored by the Grid Company and reported to the Developer. The data from the grid substation is used for the calculation of emission reductions, and records for sold electricity are used for cross-referencing.

Prior to the implementation of the project activity, the electricity was generated by grid-connected power plants. Without the implementation of the project, this scenario would have continued and is considered the baseline scenario. As the grid is dominated by thermal power generation, the establishment of the Proposed Project Activity will lead to greenhouse gas (GHG) emission reductions, estimated following the baseline methodology below.

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

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Applying the baseline methodology and estimated annual net electricity supply, the ex-ante estimated

emission reductions over the chosen 7-year crediting period are presented below.

Table 2 Estimated amount of emission reductions over the chosen crediting period

Period*	Annual estimation of emission reductions in tonnes of CO_2e
2011	116,644
2012	116,644
2013	116,644
2014	116,644
2015	116,644
2016	116,644
2017	116,644
Total estimated reductions (tonnes CO_2e)	816,508
Total number of crediting years	7 years
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	116,644

*Note: * Using 12-monthly periods form the start of the crediting period, not calendar years.*

A.4.5. Public funding of the project activity:

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There is no public funding from Parties included in Annex I involved in this project.

SECTION B. Application of a baseline and monitoring methodology

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

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Methodology

- ACM0002 version 12.1.0 "*Consolidated baseline methodology for grid-connected electricity generation from renewable sources*" (EB58 Annex 7, 26 November 2010, version 12 valid from 17 Sep 2010 onwards)

The methodology refers to the following tools

- AM_Tool_01 version 05.2 "*Tool for the demonstration and assessment of additionality*"
- AM_Tool_02 version 02.2 "*Combined tool to identify the baseline scenario and demonstrate additionality*" (this tool is not applicable to the project)
- AM_Tool_03 version 02 "*Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion*" (this tool is not applicable to the project)
- AM_Tool_07 version 02 "*Tool to calculate the emission factor for an electricity system*"

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

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This methodology is applicable to grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).

Therefore, the methodology is applicable as the Proposed Project Activity is the installation of a Greenfield, grid-connected wind power plant (a).

The methodology is applicable under the following conditions:

Criteria	Applicability	Conclusion
The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit	The Proposed Project Activity is the installation of a wind power plant.	OK
In the case of capacity additions, retrofits or replacements: the	The Proposed Project Activity is a Greenfield plant and does not	OK

existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity	represent a capacity addition to an existing plant.	
In case of hydro power plants, one of the following conditions must apply: • The project activity is implemented in an existing reservoir, with no change in the volume of reservoir; or • The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m2; or • The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m2.	Not applicable. The Proposed Project Activity is a wind power plant.	OK

The methodology is not applicable to the following:

Criteria	**Applicability**	**Conclusion**
Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site;	The Proposed Project Activity does not involve switching from fossil fuels to renewable energy at the site of the project activity	OK
Biomass fired power plants	Not applicable. The Proposed	OK

	Project Activity is a wind power plant	
Hydro power plants that result in new reservoirs or in the increase in existing reservoirs where the power density of the power plant is less than 4 W/m^2	Not applicable. The Proposed Project Activity is a wind power plant	OK

In addition, the applicability conditions included in the tools applied and referred to above apply as follows:

Tool / Criteria	**Applicability**	**Conclusion**
AM Tool 1 / Once the additionally tool is included in an approved methodology, its application by project participants using this methodology is mandatory.	The chosen methodology prescribes the use of this tool. There are no further applicability criteria for using the tool.	OK
AM Tool 7 / This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity, i.e. where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).	The Proposed Project Activity is the installation of a wind power plant supplying electricity to the Grid.	OK

Any conditions for the application of the tools are addressed in the sections below where the tools are used, sections B.5 and B.6, showing that the tools are applicable to the Proposed Project Activity. In addition, it is noted that:

- the project is a Greenfield project, therefore the AM_Tool_02 "*Combined tool to identify the baseline scenario and demonstrate additionality*" is not required to identify the baseline scenario of the proposed project; and
- the project is a wind power project, there are no fossil fuels used for electricity generation, so there are no CO_2 emissions and leakage from combustion of fossil fuels, and thus the AM_Tool_03 "*Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion*" is not applicable to the proposed project.

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

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Spatial boundary

The spatial extent of the proposed project boundary includes the Proposed Project Activity and all power plants connected physically to the project electricity system. The project electricity system is defined in AM_Tool_07 as the spatial extent of the power plants that are physically connected through transmission and distribution lines to the Proposed Project Activity and that can be dispatched without significant transmission constraints.

A connected electricity system is defined as an electricity system that is connected by transmission lines to the project electricity system. Power plants within the connected electricity system can be dispatched without significant transmission constraints but transmission to the project electricity system has significant transmission constraint.

As the DNA of China has published a delineation of the project electricity system and connected electricity systems[1], these delineations are used. According to the delineation of grid boundaries as provided by the DNA of China, the NWPG includes Shaanxi, Gansu, Qinghai, Ningxia, and Xinjiang. The NWPG is the project electricity system, as the power plants that are connected to NWPG can be dispatched without significant transmission constrains.

Emission sources and gases

Following the methodology, only CO2 emissions from electricity generation by fossil fuel fired power plant that is displaced due to the project activity are taken into account for determining the baseline emissions. According to the methodology, project emissions from geothermal, solar thermal and hydro power plants need to be taken into account; there are no project emissions for a wind power plant, thus PE_y = 0.

Table 3 Emission sources and GHG included in the project boundary

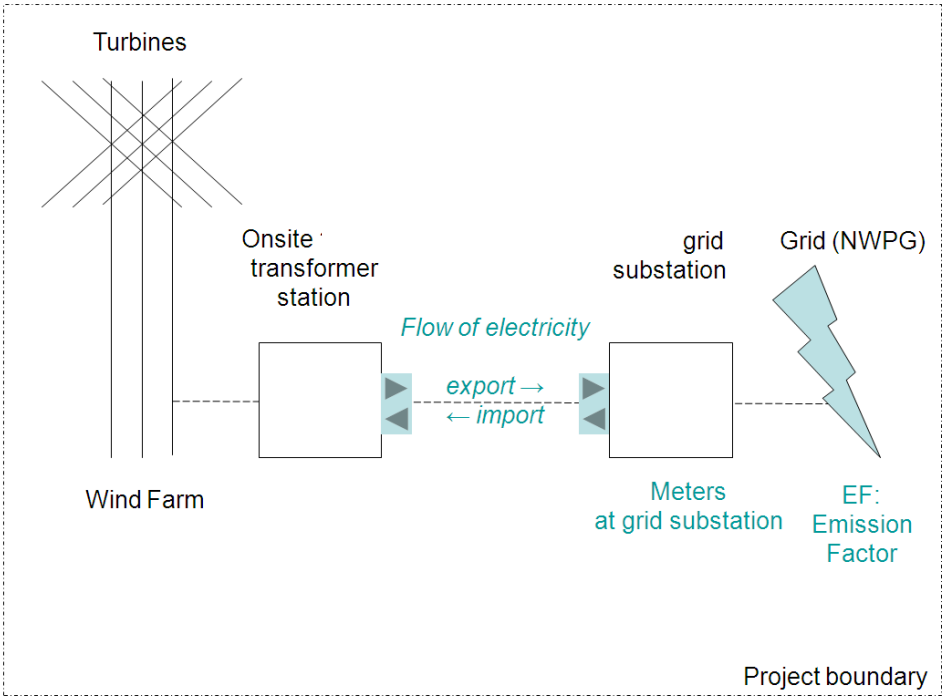
	Source	***Gas***	***Included?***	***Justification / Explanation***
Baseline	CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.	CO_2	Yes	Main emission source.
		CH_4	No	Minor emission source.
		N_2O	No	Minor emission source.
Project Activity	For geothermal power plants, fugitive emissions of CH_4 and CO_2 from non-condensable gases contained in geothermal steam.	CO_2	No	Not applicable to wind.
		CH_4		
		N_2O		
	CO_2 emissions from combustion of fossil fuels for electricity generation in solar	CO_2	No	Not applicable to wind.
		CH_4		
		N_2O		

[1] Chinese DNA designates it at http://qhs.ndrc.gov.cn/qjfzjz/t20090703_289357.htm

	thermal power plants and geothermal power plants.			
	For hydro power plants, emissions of CH_4 from the reservoir.	CO_2	No	Not applicable to wind.
		CH_4		
		N_2O		

In line with *Guidelines for Completing the PDD and the Proposed New Baseline and Monitoring Methodologies (version 07)*, a flow diagram of the project boundary is presented in Figure 3 below. The flow diagram physically delineates the project boundary, includes the flow of electricity and represents the emissions included (EF: emission factor) and the monitoring variable (EG: net electricity generation is export minus import).

Figure 3 Flow diagram of the project boundary



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

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Because the project activity is the installation of a new grid-connected renewable power plant, and is not a capacity addition, retrofit or replacement of existing grid-connected renewable power plant/unit, the baseline scenario, according to the methodology, is the following:

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

electricity system".

The baseline is determined and the combined margin calculated in Section B.6 below.

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

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CDM consideration

Following EB guidelines (EB 49 Annex 22) the project participant informed the Host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of the intention to seek CDM status, as the starting date of the project activity is after 02/08/2008. This notification was made within six months of the project activity start date as shown in the timeline below.

In addition to this confirmation of serious prior consideration of the CDM by the project participants, the timeline below indicates continuing and real actions to secure CDM status for the project in parallel with its implementation.

Table 4 Timeline of the implementation of the project

Time	Milestone
04/05/2008	Environmental Impact Assessment (EIA) completed
02/06/2008	EIA approved by Xinjiang Uygur Autonomous Region Environmental Protection Bureau
Mar. 2010	FSR completed
31/05/2010	FSR approved by Xinjiang Uygur Autonomous Region Development & Reform Commission
02/06/2010	Board decision on CDM development of the project
22/06/2010	ERPA signed with CRM S.A.
22/07/2010	Notification of the intention to develop this project as CDM confirmed by EB
09/08/2010	Notification of the intention to develop this project as CDM confirmed by DNA
01/09/2010	Turbine Purchasing Contract signed (Starting date)

In the FSR the revenues from CER sales was analysed and taken into account. Following previous experience of the Project Developer and the vast experience with CDM in the wind power sector in China in general, it was decided to develop the Proposed Project Activity as a CDM project. The project owner confirmed CRM as their CDM partner. A notification of this intention was sent to the UNFCCC secretariat and the DNA. Therefore, the CDM was seriously considered in the decision to proceed with the project activity.

Additionality

The methodology requires the use of the latest version of *Tool for the demonstration and assessment of additionality*. The Tool consists of the steps below.

Step 1. 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:

The demonstration about the alternative that provides outputs or services comparable with the proposed CDM project activity is as follows:

a) The proposed project activity undertaken without being registered as a CDM project activity.

- Alternative a) is in compliance with all applicable legal and regulatory requirements. But according to the detailed analysis in step 2, this scenario is less attractive with low IRR and is not realistic without CDM financing.

b) A fossil fuel-fired power plant with the comparable capacity or electricity generation.

- Taking into account the required capacity for the same annual generation, according to the current laws and regulations, it is not a realistic alternative (please refer to the analysis in sub-step 1b).

c) A power plant using other source of renewable energy with the comparable capacity or electricity generation, such as PV, biomass and hydro, etc.

- Besides wind energy, other kinds of renewable energy technologies, such as solar PV, geothermal, biomass and hydro are possible grid-connected sources that could be used in China. However, due to the technology development status and the high cost for power generation by solar PV, geothermal and biomass of similar installed capacity as the proposed project are not realistic alternatives in China. Solar PV is blocked by high cost and technology, and faces some technology and financial barriers in China.[2] Geothermal power generation is at undeveloped stage in China and can be ruled out due to high investment and lack of policy support in China.[3] Biomass power generation also faces barriers and is difficult to be operated without policies& financial support[4]. However, due to dry climate and the lack of water resource in the project area, there is no commercially exploitable hydro power resource which can provide same electricity generation output of the proposed project activity[5]. Therefore, this alternative is not realistic.

d) Comparable capacity or electricity generation addition provided by the NWPG.

- Scenario d) is a realistic and feasible alternative which can provide outputs or services comparable with the proposed project and comply with applicable laws and regulations. Added capacity is dominated by thermal (coal-fired) power plants as determined in B.6.

Based on the analysis above, alternative (c) is not realistic. And alternative (a) is not realistic according

[2] http://www.ce.cn/xwzx/gnsz/gdxw/200910/12/t20091012_20177105.shtml
[3] http://www.newenergy.org.cn/Html/0098/870929050.Html
[4] http://www.newenergy.org.cn/html/00912/1270930650.html
[5] http://www.watereyes.com/info.asp?id=2125 , in which, the distribution map of water resource in China shows that the project site is in a water-resource-shorted

to step 2 and alternative (b) is not realistic according to the analysis in sub-step 1b.Therefore, continuation of the current situation, with the electricity generated by the operation of grid-connected power plants and by the addition of new generation sources on NWPG can be taken as a realistic alternative for the project activity and comply with the applicable laws and regulations.

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

For the alternative (b) described in sub-step 1a, if taking the capacity that can generate the same annual electricity generation and estimating annual utilization hours as 4885[6]which is the average utilization hours of the thermal units in China in 2008, the alternative baseline scenario for the proposed project should be a fossil fuel-fired power plant with installed capacity of 25.7 MW or lower. However, according to Chinese regulations, fossil fuel-fired power plants of less than 135MW are prohibited to be built in the areas covered by the large grids[7]. For these reasons, the possible alternative baseline scenario of building an 25.7 MW fossil fuel-fired power plant conflicts with Chinese regulations. But the other scenarios are all compliant with the mandatory laws and regulations. So, scenario b) is not feasible as an alternative scenario, either.

According to the analysis in sub-step 1a and 1b, alternative (a) and alternative (d) are the realistic and feasible alternatives which comply with applicable laws and regulations.

Step 2. Investment analysis

The purpose of this step is to determine whether the Proposed Project Activity is not:
(a) The most economically or financially attractive; or
(b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).

To conduct the investment analysis, the following sub-steps are used and the guidance provided by the Board on investment analysis[8] is taken into account:

Sub-step 2a. Determine appropriate analysis method

The purpose of this sub-step is to determine whether to apply the simple cost analysis, investment comparison analysis or benchmark analysis (sub-step 2b):

The Proposed Project Activity generates financial benefits by the sales of electricity, so the simple cost analysis (Option I) should not be applied. Following *EB guidance on the assessment of investment analysis*[9], if the alternative to the project activity is the supply of electricity from the grid, this is not considered an investment and a benchmark approach is considered appropriate. As the baseline alternative involves the continuation of current practices, supply of electricity from the grid, a benchmark

[6] *China Electric Power Yearbook* (2009 Edition), China Electric Power Press
[7] 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, http://www.gov.cn/gongbao/content/2002/content_61480.htm
[8] 'Guidance on the Assessment of Investment Analysis' (version 03.1), EB 51 Annex 58.
[9] Paragraph 16

analysis is used to identify whether the project is economically attractive (Option III). The use of a benchmark analysis is also in line with Chinese practice and is followed in the FSR.

Therefore, the benchmark analysis (Option III) is adopted.

Sub-step 2b – Option III. Apply benchmark analysis

According to *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects* issued by former State Power Corporation of China in 2002, the benchmark of project internal rate of return (IRR) of electric power industry is 8% (after tax), and only if the project IRR of the project is higher than or equivalent to this benchmark, the proposed project is financially feasible. This benchmark is commonly used in the electricity sector.

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

The investment estimation in the FSR was carried out by an independent design institute. The analysis is based on the national regulation and the material and equipment price level. Therefore, each of the input parameters is valid and applicable at the time of writing the FSR (Mar. 2010), and the FSR has been approved by Xinjiang Uygur Autonomous Region Development & Reform Commission (31/05/2010). The period of time between the finalisation of the FSR and the project start date is less than one year, and therefore it is not likely that the input values would have materially changed and the decision to proceed with the investment was based on the FSR.

As indicated as a preference in the EB guidance, the period of assessment reflects the full period of expected operation of the underlying project activity (technical lifetime, i.e. 20 years from commissioning). However, while the assessment period covers the full lifetime of the equipment, the value of the Proposed Project Activity assets at the end of the assessment period has been included as a cash inflow in the final year and, as stated in the FSR, was calculated in accordance with local accounting regulations.

The cost of financing expenditures is not included in the calculation of project IRR; however such costs must be calculated to help estimate the level of taxes due.

Input values

The key data for the calculation of the financial indicator, all derived from the FSR, are listed below, with full detail in the IRR calculation spreadsheet.

Table 5 Key data for the financial indicator calculation

Item	Value
Static total investment	485.37 million RMB
Annual power generation (once fully operational)	125,532 MWh
Annual O&M costs	0.14 RMB/kWh
Feed-in tariff (incl. VAT)	0.51 RMB/kWh
Operating life	20 years
Rate of residual value	3%

Rate of value added tax	17%
Rate of VAT recovery	50%
Rate of income tax	25%
Rate of education tax	3%
Rate of city build tax	5%

Source: Feasibility Study Report, Xinjiang Uygur Autonomous Region Hydropower Design & Research Institute, Mar. 2010.
Note: FSR approved by Xinjiang Uygur Autonomous Region Development & Reform Commission on 31/05/2010.

Investment costs
The total investment was estimated by an experienced design institute which has been awarded the highest certificate (grade A), taking into account the experience of the developer, who have been involved in several earlier projects. The estimated total investment for the Proposed Project Activity is 9,805 RMB/kW, which is comparable to the investment level of previous wind projects by the Developer and in China in general[10] and in the range of the other similar projects in Xinjiang Uygur Autonomous Region, which is 7,682~10,305 RMB/kW.

Therefore, it can be concluded that the estimated investment costs in the FSR are reasonable.

Generation / load factor
The expected power generation of the proposed project is calculated by an independent qualified design institute with the highest grade (Grade A) in the FSR, based on detailed information of onsite measurement, wind assessment records for recent 27 years and equipment characteristics. Therefore, the generation and plant load factor determination are in line with both options of the EB Guidelines for the reporting and validation of plant load factors (EB 48 Annex 11): (a) provided to the government while applying the project activity for implementation approval, and (b) determined by a third party contracted by the project participants.

O&M costs
The O&M costs were estimated by an experienced design institute which has been awarded the highest certificate (grade A). The estimated average annual O&M costs are 0.14 RMB/kWh, which is comparable to the costs of previous wind projects in Xinjiang Uygur Autonomous Region, which ranges from 0.02 to 0.33 RMB/kWh.

The other costs for the proposed project consist of the other manufacture expenses, general administrative expenses and operating expenses.[11] The other costs of proposed project is 50 RMB/kW,which is comparable to the range (25 RMB/kW – 50 RMB/kW) of other similar projects in Xinjiang Uygur Autonomous Region.

Therefore, it can be concluded that the estimated average annual O&M costs in the FSR are reasonable.

[10] The average investment level of the wind farm is 8,000 to 12,000 RMB/kWh, see http://www.in-en.com/newenergy/html/newenergy-20072007042885858.html.
[11] Economic Evaluation Code and Parameters for Construction Project (version 3), P7.

Tariff
The expected on-grid tariff used for the financial analysis in the FSR refers to the most recent tariff notifications and tariffs for wind farms in Xinjiang Uygur Autonomous Region at the time of writing the FSR (Mar 2010). The FSR specifically refers to the tariff notification issued by NDRC in July 2009 (*Fa Gai Jia Ge [2009] No. 1906*), which indicated that the unified tariff in the project region was 0.51 RMB/kWh (incl. VAT). Indeed, this latest notification clarified that the proposed project is in Wind Resource Area I and all future projects in this area approved after 01/08/2009 would automatically be awarded this tariff upon their FSR approval. The FSR of the project was approved on 31/05/2010 and the tariff was therefore automatically fixed at 0.51 RMB/kWh (incl. VAT) in line with the NDRC notification. Therefore, the tariff in the FSR is appropriate and reasonable.

For completeness, all tariff notifications issued for Xinjiang since the entry into force of the Renewable Energy Law are presented in Table 6 below, ranging from 0.47 to 0.51 RMB/kWh (incl. VAT).

Table 6 Public tariff notifications for Xinjiang Uygur Autonomous Region

Date	Document reference	Tariff (RMB/kWh, including VAT)
28/07/2006	*Fa Gai Jia Ge [2006] No.1232*	0.47
09/06/2007	*Fa Gai Jia Ge [2007] No. 1260*	0.51
03/12/2007	*Fa Gai Jia Ge [2007] No. 3303*	0.51
20/07/2009	*Fa Gai Jia Ge [2009] No. 1906*[12] (Wind Resource Area I*)	0.51

*Note: * Wind Resource Area I in Xinjiang Uygur Autonomous Region includes Urumqi City, Ili Kazakh Autonomous Prefecture, Hui Autonomous Prefecture of Changji, Karamay City, and Shihezi City.*

According to the "Information note on the highest tariffs applied by the Executive Board in its decisions on registration of projects in the People's Republic of China (version 01)", published on 24 June 2010, the highest historical tariff in Province is 0.533 RMB/kWh (incl VAT). Therefore, the sensitivity analysis below includes the calculation of the project IRR of the Proposed Project Activity on the basis of this highest tariff to show that the tariff is appropriate and that the Proposed Project Activity is additional, even when taking the highest tariff into account.

The applied tariff in the investment analysis in the FSR and PDD is appropriate, taking into account EB guidance, and has proven to be correct. Applying the highest tariff, for the whole project life, the project IRR is lower than the benchmark of 8% (see IRR calculation spreadsheet).

Residual value
As indicated as a preference in the EB Guidance, the period of assessment reflects the full period of expected operation of the project activity. The fair value of the Proposed Project Activity assets at the end of the assessment period has been included as a cash inflow in the final year and, as stated in the FSR, was calculated in accordance with local accounting regulations, by an experienced design institute. The estimated rate of residual value is 3%, which is in compliance with relevant national and industrial regulation[13].

[12] http://www.ndrc.gov.cn/jggl/jggs/t20090727_292846.htm
[13] http://www.gov.cn/zwgk/2007-12/11/content_830645.htm

Taxes

Each of the tax rates used in the FSR is in accordance with Chinese law as indicated below.

a) Value Added Tax: The rate of VAT is 17%, and the rate of VAT drawback is 50%, applicable to the wind power industry in accordance with *National VAT Law (State Council [2008]538)*[14] issued by State Administration of Taxation and *VAT policy on Comprehensive Utilization of Resource and Other Products (Cai Shui[2008]156)*[15] released by Ministry of Finance and State Administration of Taxation. Also applicable is the "Notice about implementation of VAT reform in the whole country" (Cai Shui[2008]170), which allows for the VAT from the investment in wind projects to be recouped. The reduction in VAT on the electricity generated was first introduced after 11 November 2001[16], and the possibility to recoup the VAT on the investment for wind farms was also introduced after 11 November 2001. However, both VAT reduction policies are taken into account in the assessment. This is conservative.
b) Income Tax: According to *People's Republic of China Enterprise Income Tax Provisional Regulations* issued in March 2007, State Council No. 63, the income tax was approved as 25%[17].
c) Education Tax: According to *Interim Provision on Education Tax Law*, the education rate is 3% of VAT[18].
d) City Building Tax: According to *National City Tax Law*, the city building tax rate is 5% of VAT[19].

Comparison of the financial indicators

Table 7 shows the project IRR without and with CER revenue. It can be seen that IRR without CER revenue is below the benchmark 8% and with revenue from CDM at the assumed price level, the proposed project would be more financially attractive.

Table 7 Comparison of indicators

without CDM	Benchmark	with CDM
5.65%	8%	9.09%

The revenue from the sale of CERs is expected to have a significant impact on the IRR. Although some uncertainties still exist, investors would gain reasonable financial return to reduce the risk. And the internal return rates, 9.09% for total investment, would appear more financially attractive for prospective investors.

Sub-step 2d. Sensitivity analysis

A sensitivity analysis is used to show whether the conclusion regarding the economic or financial attractiveness is robust to reasonable variations in the critical assumptions. The investment analysis

[14] http://www.js-n-tax.gov.cn/Page1/StatuteDetail.aspx?StatuteID=8862 , State Administration of Taxation, National VAT Law.
[15] http://www.js-n-tax.gov.cn/Page1/StatuteDetail.aspx?StatuteID=8931 , State Administration of Taxation, 50%-off discount on VAT for wind power projects.
[16] Halved VAT for wind power: *Notice of VAT Policy on Comprehensive Utilization of Some Recourses and Other Products* issued by Ministry of Finance and State Administration of Taxation on 01/12/2001.
[17] http://xxgk.jxfc.gov.cn/xxgk/dsj/xxgk/fgwj/fgwj/2008-06/200806021616104377.html
[18] http://www.law-lib.com/law/law_view1.asp?id=99771.
[19] http://202.108.90.130/chinatax/jibenfa/jibenfa0401.htm.

above provides a valid argument in favour of additionality as the sensitivity analysis consistently supports (for a realistic range of assumptions) the conclusion that the project activity is unlikely to be economically or financially attractive.

According to EB guidance, only variables that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variations. For the Proposed Project Activity, the key variable analysed are:

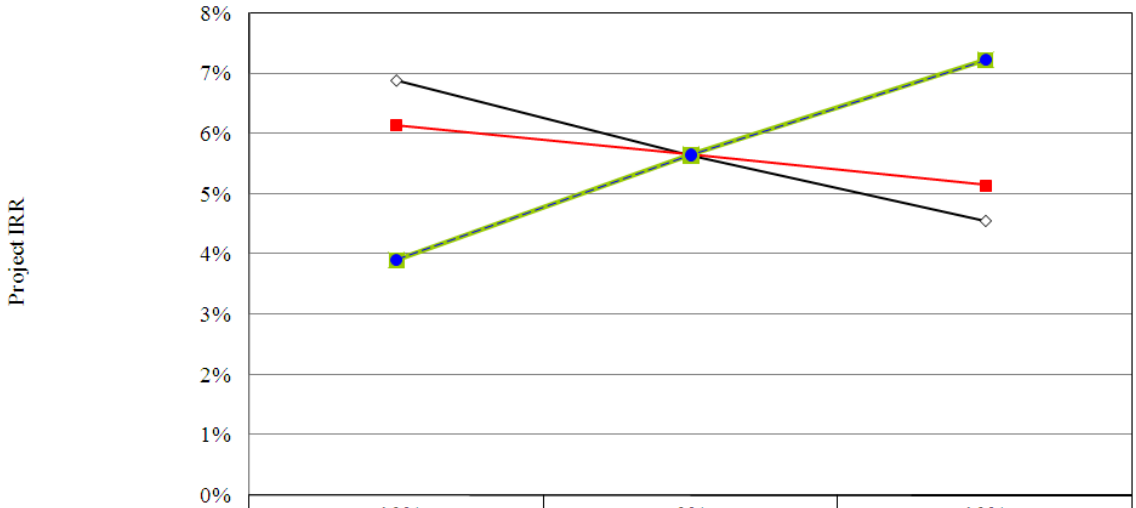
1) Investment;
2) Generation / PLF;
3) Tariff;
4) O&M Costs.

In line with EB guidance, the range of variations in the sensitivity analysis covers a range of between –10% and +10%, which is also in line with the regulations in China[20]. Greater variations are unlikely, as discussed below, and in line with the regulations are not considered. The result of the sensitivity analysis is presented below, showing that the benchmark is not reached.

The IRR calculation spreadsheet shows the variations at which the benchmark would be reached: if the investment would need to decrease by about 17.9%; the tariff or annual power generation would need to increase by 15.2%; the annual O&M costs would need to decrease by 51%. None of these scenarios are likely to happen.

[20] *Codes on Compiling Feasibility Study Report of Wind Farms*, issued by NDRC on 25/05/2005, prescribes the –10% to +10% variation range (http://www.windpower.org.cn/news/links/js_2005_0508.htm).

Figure 4 Sensitivity analysis



	-10%	0%	10%
Investment	6.89%	5.65%	4.56%
O&M cost	6.14%	5.65%	5.15%
Tariff	3.91%	5.65%	7.23%
Generation/PLF	3.91%	5.65%	7.23%

Investment

For wind farm projects, the costs of turbines, engineering construction and related accessories comprise the main budget of static investment. As prices of turbines and other related equipment have been increasing in recent years, a decrease of the static investment is unlikely[21]. Indeed, the final price of the contracted equipments (including turbines ,towers and transformers is 347.58 million RMB[22]) was higher than that estimated in FSR (320.71 million RMB). Also the final contracted value of the main construction was 35.72[23] million RMB, higher than that estimated in FSR (32.02 million RMB). The actual value of these main contracts and other contracts of the proposed project already accounts for 78.97% (383.3 million RMB) of the estimated static investment in the FSR (485.37 million RMB).

Therefore, it was not realistic for the developer to assume that investment costs could decrease by 17.9% in order to reach the benchmark.

O&M

The O&M costs in the approved feasibility study were derived from the extensive experience of the design institute. Past trends show that costs have been rising: as prices, including those of the

[21] http://energy.people.com.cn/GB/5720709.html. In the last 2 years, the demands for the turbines and its accessories exceeded the supply. Moreover the price of the raw material such as steel and cooper is increasing, which results in the price of wind turbines and equipments increasing, as demonstrated in *The Development of Wind Power*, published by People's Daily.

[22] The contracts of wind turbine, tower, and transformers have been submitted to validation team.

[23] The contracts of road construction, foundation construction have been submitted to validation team.

requirement equipment and commodities, have been increasing in recent years, a significant reduction in the level of costs is particularly unlikely.[24] As O&M costs would need to drop by more than half in order to reach the benchmark rate of 8%, this possibility can be ruled out.

Tariff

The expected on-grid tariff used for the financial analysis in the FSR refers to the most recent tariff notifications and tariffs for wind farms in the same region, as available at the time of writing the FSR (Mar. 2010). As shown in Table 6 above, the NDRC issued a tariff notification, in Jul. 2009, which was therefore the latest tariff information available at the time of completing the FSR. The tariffs for wind projects in the region have been the same at 0.51 RMB/kWh (incl. VAT) in the latest three notifications since the Renewable Energy Law, see Table 6 above, and therefore it was reasonable to assume in the FSR that the tariff would eventually be fixed at this level.

Indeed, this latest notification[25] clarified that future projects in these regions would automatically be awarded this tariff upon approval of their FSR. As the starting date of the project is after the approval of the FSR, the tariff was fixed at the time of making the decision to go ahead with the project. Therefore, the tariff for the project activity is agreed and fixed at 0.51 RMB/kWh (incl. VAT), the same as estimated in the FSR. Any variation from this original assumption, therefore, can not be considered credible, as the tariff has been fixed prior to the project start date.

The tariff would need to be 15.2% higher than the assumed level in the FSR, at 0.588 RMB/kWh (incl. VAT), for the project IRR to reach the benchmark. The highest historical tariff in Xinjiang Uygur Autonomous Region was 0.533 RMB/kWh (incl. VAT), according to *Information note on the highest tariffs applied by the Executive Board in its decisions on registration of projects in the People's Republic of China (version 01)* published on 24/06/2010. The tariff at 0.588 RMB/kWh (incl. VAT) is much higher than the highest historical tariff, and it is not credible to assume this could happen.

Generation

The expected power generation of the proposed project is calculated by an independent qualified design institute with the highest grade (Grade A) in the FSR. Therefore, the generation and plant load factor determination are in line with both options of the EB Guidelines for the reporting and validation of plant load factors (EB 48 Annex 11): (a) provided to the government while applying the project activity for implementation approval, and (b) determined by a third party contracted by the project participants.

The annual electricity in the FSR is calculated based on detailed information of onsite measurement, meteorological data of the wind resource in the local area for 27 years (1982-2008) and equipment characteristics, using a scientific approach applied internationally. The volume of annual generation therefore is expected to accurately represent the long-term average power supply during the lifetime of the wind farm, taking into account yearly variations in power generation, and it is not credible to assume that generation would be significantly higher over the lifetime of the Proposed Project Activity than that which can be expected from the long-term averages.

As per the FSR, the estimated net supplied power is calculated from the turbine availability, grid availability and the wind speed. The professional software *WASP version 9.0* was used to select the rich

[24] *The Development of Wind Power*, People's Daily, http://energy.people.com.cn/GB/5720709.html, as above.
[25] *Fa Gai Jia Ge [2009] No. 1906*, 20/07/2009.

wind source area, and then using software *Windfarmer 3.6.1* to optimize the distribution of each turbine for maximize power generation. The yearly data was then processed in professional software to calculate the annual theoretical power generation, from which the annual effective power generation was obtained through discount by considering factors such as air density, trailing stream, wind turbine efficiency etc. The method of anticipating power generation is also approved by the government and is widely used in China for wind energy.

Therefore, it is not credible to assume that generation from the proposed project would increase by more than 15.2% each year on average over the lifetime of the project in order the reach the benchmark 8%.

Conclusion

The financial analysis shows that the project is not financially attractive, and the sensitivity analysis shows that without CER revenue IRR of the project will not reach the benchmark 8% for any reasonable variation in the main parameters.

In conclusion, the proposed project is not financially feasible without the revenue of CERs. Therefore, the analysis proceeds to step 4.

Step 3. Barrier analysis

Not applied.

Step 4. Common practice analysis

The Proposed Project Activity is not a first-of-its kind project; therefore the test above is complemented with an analysis of the extent to which the proposed project type has already diffused in the relevant sector and region, acting as a credibility check to the analysis above. The existing common practice is identified and discussed through the following sub-steps:

Sub-step 4a. Analyze other activities similar to the Proposed Project Activity:

In line with the EB guidance on the additionality tool, the common practice analysis is carried out on any other activities that are operational and that are similar to the Proposed Project Activity. Projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of similar scale, and take place in a comparable environment with regards to regulatory framework, investment climate etc.

In China, the regulatory framework and investment climate for wind farm projects are only similar and comparable for projects connected to the same grid and located in the same Autonomous Region or Province. Wind farm project proposals are approved by the Regional DRC, and the projects' EIAs by the Regional Environmental Protection Bureau. The common practice analysis of the Proposed Project Activity, therefore, covers projects in the Xinjiang Uygur Autonomous Region and connected to the NWPG.

In April 2002, China implemented power sector reform to establish a more commercialized power market

in China[26], which completely changed the regulatory environment for the whole power sector, both for conventional and renewable energy projects. After the power sector reform, the Renewable Energy Law entered into force on 01/01/2006, which changed the market conditions for wind power project development significantly. Prior to the Renewable Energy Law, very few wind projects were implemented, and most were supported as demonstration projects or through ODA contributions from Annex I Parties. However, to be more conservative in the analysis, the common practice analysis includes all projects since the Power Sector Reform.

The analysis is restricted to large scale project (using the CDM definition of large scale: >15MW) as small scale projects are not comparable in size to the 49.5MW installed by the Proposed Project Activity.

The appropriate criteria to determine whether other activities are similar to the Proposed Project Activity are:

Scope	**Criterion**
Geography	Xinjiang Uygur Autonomous Region
Technology	Wind
Scale	Large-scale project (using the CDM definition of large scale, >15MW)
Regulatory framework	Xinjiang Uygur Autonomous Region, and connected to the NWPG
Investment climate	Since the Power Sector Reform (11/04/2002)
Other	None

Other CDM projects activities (registered project activities and project activities which have been published on the UNFCCC website for global stakeholder consultation as part of the validation process) are not to be included in this analysis, according to the EB guidance on the additionality tool.

Based upon an analysis of the information available[27], there are no wind farm projects similar to the Proposed Project Activity, other than CDM projects,

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

All the other wind farms in Xinjiang Uygur Autonomous Region have already successfully been registered or are applying as CDM projects. Currently there are no similar projects as the Proposed Project Activity's capacity in Xinjiang Uygur Autonomous Region after the China Power Reform. Presently, further development of large scale wind farms in Xinjiang Uygur Autonomous Region faces financial barriers and is not feasible. Therefore, the wind power projects similar with the Proposed Project Activity are not common practice in Xinjiang Uygur Autonomous Region.

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[26] Chinese National Development and Reform Commission, Separate Power Plants from Network and Compete in Price to Enter Network, 11/04/2002, http://www.ndrc.gov.cn/xwfb/t20050708_28096.htm.

[27] *Statistics of Domestic Wind Farm Installation Capacity in 2007*, Shi Pengfei, downloadable from http://www.cwea.org.cn/download/display_info.asp?id=25;
Statistics of Domestic Wind Farm Installation Capacity in 2008, Shi Pengfei, downloadable from http://www.cwea.org.cn/download/display_info.asp?cid=2&sid=&id=31;
and http://cdm.unfccc.int/Projects/registered.html;
http://cdm.unfccc.int/Projects/Validation/index.html;
http://cdm.ccchina.gov.cn/web/ItemList.asp

In conclusion, all the steps above are satisfied, the proposed CDM project is not the baseline scenario, and the Proposed Project Activity is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

Project emissions

According to the methodology**,** for most renewable energy project activities, $PE_y = 0$. However, the methodology prescribes project emission calculations for geothermal, solar thermal and hydro power plant. As a wind power plant, therefore, there are no project emissions according to the methodology:

$$PE_y = 0 \quad (1)$$

Baseline emissions

According to the methodology**,** the baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are calculated as follows:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} \quad (2)$$

Where:
BE_y is the baseline emissions in year y (tCO_2/yr).
$EG_{PJ,y}$ is the quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr).
$EF_{grid,CM,y}$ is the combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version[28] of *Tool to calculate the emission factor for an electricity system* (tCO_2/MWh).

Calculation of $EG_{PJ,y}$

As the Proposed Project Activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, the following applies:

$$EG_{PJ,y} = EG_{facility,y} \quad (3)$$

Where:
$EG_{PJ,y}$ is the quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr).
$EG_{facility,y}$ is the quantity of net electricity generation supplied by the project plant/unit to the grid in year

[28] See section B.1. for the version.

y (MWh/yr).

Baseline emission factor

In line with the methodology, the baseline emission factor is calculated as a combined margin ($EF_{grid,CM,y}$), consisting of the combination of operating margin ($EF_{grid,OM,y}$) and build margin ($EF_{grid,BM,y}$) factors according to the steps defined in *Tool to calculate the emission factor for an electricity system.*

Details of the calculations and data follow the published data from the Chinese DNA and official national statistics (*China Energy Statistical Yearbook* and *China Electric Power Yearbook*), and are presented in Annex 3 of the PDD and the EF calculation spreadsheet.

Step 1. Identify the relevant electricity systems

The power generated from the Proposed Project Activity will be supplied to the grid. As the DNA has published a delineation of the project electricity system and connected electricity systems, these delineations are used.

Following the DNA delineation, the project electricity system is Northwest Power Grid (NWPG), consisting of five provincial grids: Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang.

The connected electricity system is the Central China Power Grid (NWPG), consisting of six provincial grids: Jiangxi, Henan, Hubei, Hunan, Chongqing, Sichuan. However, as power is exported to the connected electricity system, CCPG is not included in the project boundary: electricity exports are not subtracted from electricity generation data used for calculating and monitoring the baseline emission rate.

For the purpose of determining the operating margin emission factor, one of the following options to determine the CO_2 emission factor(s) for net electricity imports from a connected electricity system within the same host country (ies) is used:

(a) 0 tCO_2/MWh, or
(b) The weighted average operating margin (OM) emission rate of the exporting grid, determined as described in Step 4 (d) below; or
(c) The simple operating margin emission rate of the exporting grid, determined as described in Step 4 (a), if the conditions for this method, as described in Step 3 below, apply to the exporting grid; or
(d) The simple adjusted operating margin emission rate of the exporting grid, determined as described in Step 4 (b) below.

For imports from connected electricity systems located in another host country (ies), the emission factor is 0 tonnes CO_2 per MWh. However, there are no electricity imports from another country.

Electricity exports should not be subtracted from electricity generation data used for calculating and monitoring the electricity emission factors.

Following the calculations of the DNA, the simple operating margin (option (c)) is used to calculate the CO_2 emission factors for net electricity imports ($EF_{grid,import,y}$). For the NWPG, there are no electricity imports from other power grids.

Step 2. Choose whether to include off-grid power plants in the project electricity system (optional)

Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.
Option II: Both grid power plants and off-grid power plants are included in the calculation.

Following the calculations of the DNA, and the statistical data available, Option I is chosen.

Step 3. Select a method to determine the operating margin (OM)

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

(a) Simple OM; or
(b) Simple Adjusted OM; or
(c) Dispatch data analysis OM; or
(d) Average OM

Each method is described under Step 4.

According to the Tool, the simple OM method (option a) can only be used if low-cost / must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production. This criterion is met (see Annex 3) and therefore the project participants chose to use the simple OM method (option a).

Since generation from all sources (including hydro power) other than thermal plants were less than 30% of total generation in the NWPG in 2007[29] and this percentage has not changed significantly in recent years, the Simple OM method is applicable to the proposed project.

The Simple OM emissions factor can be calculated using either ex-ante or ex-post data vintages. The project participants have chosen to use the ex-ante option, and $EF_{grid,OM,y}$ is fixed for the duration of the first crediting period.

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.

Step 4. Calculate the operating margin emission factor according to the selected method

(a) Simple OM

[29] Page 748, *Electric Power in China 2008* by China Electricity Council

The Simple OM emission factor $EF_{grid,OM,y}$is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating sources serving the system, not including low-cost / must-run power plants.

The simple OM may be calculated:

Option A: Based on the net electricity generation and a CO_2 emission factor of each power unit; or
Option B: Based 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 B can only be used if:
(a) The necessary data for Option A is not available; and
(b) Only nuclear and renewable power generation are considered as low-cost / must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
(c) Off-grid power plants are not included in the calculation (i.e. if Option I has been chosen in Step 2).

The criteria for Option B are met, as (a) the necessary data for Option A is not available as indicated in the calculations of the DNA, (b) only nuclear and renewable power generation are considered as low-cost / must-run power sources and the quantity of electricity supplied to the grid by these sources is known, and (c) Option I is chosen in Step 2.

Option B – Calculation based on total fuel consumption and electricity generation of the system

According to the Tool, where Option B 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, and total fuel consumption of the project electricity system, as follows:

$$EF_{grid,OMsimple,y} = \sum_i (FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}) / EG_y \quad (4)$$

Where:
$EF_{grid,OMsimple,y}$ is the simple operating margin CO_2 emission factor in year y (tCO_2/MWh)
$FC_{i,y}$ is the amount of fossil fuel type i consumed in the project electricity system in year y (mass or volume unit)
$NCV_{i,y}$ is the net calorific value (energy content) of fossil fuel type i in year y (GJ/mass or volume unit)
$EF_{CO2,i,y}$ is the CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ)
EG_y is the net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost / must-run power plants / units, in year y (MWh)
i is all fossil fuel types combusted in power sources in the project electricity system in year y
y is the relevant year as per the data vintage chosen in Step 3 (i.e. 2005-2007, as the ex-ante option is chosen)

On the basis of the data available, the three-year average operating margin emission factor is calculated by the DNA as a full-generation-weighted average of the emission factors[30]:

[30] http://qhs.ndrc.gov.cn/qjfzjz/t20090703_289357.htm

$EF_{grid,OMsimlpe,y}$ = 1.0246 tCO_2/MWh

Step 5. Identify the group 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 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[31]. This option is chosen as it comprises larger annual generation than the five units built most recently.

Following the deviation[32], the latest statistical data available (from *China Power Yearbook*) is used by the DNA to determine the most recent year from which the added generation capacity is equal to or just exceeds 20% of the latest statistic year 2007. The added generation capacity is the sample group of power units *m* used to calculate the build margin.

In terms of vintage of data, the project participants chose the ex-ante option (as for the OM calculation), and $EF_{grid,BM,y}$ is fixed for the duration of the first crediting period:

Option 1: ex-ante. 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.

Step 6. Calculate the build margin emission factor

The build margin emissions factor is the generation-weighted average emission factor (tCO2/MWh) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

$$EF_{grid,BM,y} = \sum_m (EG_{m,y} \times EF_{EL,m,y}) / \sum_m EG_{m,y} \quad (5)$$

Where:
$EF_{grid,BM,y}$ is the build margin CO_2 emission factor in year y (tCO_2/MWh)
$EG_{m,y}$ is the net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$ is the CO_2 emission factor of power unit m in year y (tCO_2/MWh)
m is the power units included in the build margin
y is the most recent historical year for which power generation data is available

The CO_2 emission factor of each power unit m ($EF_{EL,m,y}$) should be determined as per the guidance in Step 4 (a) for the simple OM, using options A1, A2 or A3, using for y the most recent historical year for which power generation data is available, and using for *m* the power units included in the build margin.

[31] If 20% falls on part capacity of a unit, that unit is fully included in the calculation.
[32] Deviation for projects in China (DNV, 07/10/2005), see http://cdm.unfccc.int/Projects/Deviations.

Due to the limited availability of data on individual power units, the DNA uses the deviation above[33] to calculate the CO_2 emission factor of thermal power units and the build margin emission factor as follows (with more detail presented in Annex 3):

- The CO2 emission factor used is the weighted average emission factor for thermal power plant calculated from the average net energy conversion efficiency of the best technologies commercially available in China for solid, liquid and gas fuels, using option A2, weighted on the basis of the emissions from each of these fuel types in the latest year for which data is available.
- The added generation capacity is taken instead of generation, as with the determination of the cohort of plant included in the build margin.

The build margin emission factor is calculated by the DNA using this methodology:

$EF_{grid,BM,y}$ = 0.6433 tCO_2/MWh[34] (see Annex 3 for more details).

Step 7. Calculation of the combined margin emission factor

The combined margin emission factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \quad (6)$$

Where
$EF_{grid,OM,y}$ is the operating margin CO2 emission factor in year y (tCO2/MWh)
w_{OM} is the weighting of operating margin emissions factor (%)
$EF_{grid,BM,y}$ is the build margin CO2 emission factor in year y (tCO2/MWh)
w_{BM} is the weighting of build margin emissions factor (%).

According to the Tool, the default values for w_{OM} and w_{BM} for the wind projects in the first crediting period and the subsequent crediting period are: w_{OM} = 0.75 and w_{BM} = 0.25 (owing to their intermittent and non-dispatchable nature).

On the basis of these weights for the first crediting period, the combined margin emission factor is calculated, and are fixed ex-ante for the duration of the first crediting period (rounded down to the fourth digit) as follows and as shown in Table 9 below:

$EF_{grid,CM,y}$ =0.9292 tCO_2/MWh

Table 9 Emission factor calculation

Item	CO_2 emission factor (tCO_2/MWh)	Weighting (%)
Operating margin (see Step 4)	1.0246	75%
Build margin (see Step 6)	0.6433	25%
Combined margin	0.9292	

[33] Deviation for projects in China (DNV, 07/10/2005), see http://cdm.unfccc.int/Projects/Deviations.
[34] http://qhs.ndrc.gov.cn/qjfzjz/t20090703_289357.htm

These parameters will be recalculated at any renewal of the crediting period.

Baseline emissions (BE_y) now can be calculated as the annual net generation of the Proposed Project (EG_y) multiplied by the combined margin CO_2 emission factor ($EF_{grid,CM,y}$).

Leakage

According to the methodology, no leakage is considered for the Proposed Project Activity.

Emission reductions

Emission reductions are calculated as follows:

$$ER_y = BE_y – PE_y \quad (7)$$

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

This section includes a compilation of information on the data and parameters that are not monitored throughout the crediting period but that are determined only once and thus remain fixed throughout the crediting period and that are available when validation is undertaken. Following EB guidance, data that is calculated with equations provided in the methodology or default values specified in the methodology are not included in the compilation.

Data / Parameter:	$FC_{i,y}$
Data unit:	Mass or volume
Description:	The amount of the fossil fuel i consumed in the project electricity system in year *y*
Source of data used:	*China Energy Statistical Yearbook*
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Based on official national statistics accepted and used by the DNA for the official emission factor calculations
Any comment:	-

Data / Parameter:	$EG_{grid,y}$ *and* $EG_{m,y}$
Data unit:	MWh
Description:	Electricity supplied to power grid by included sources in year *y*
Source of data used:	*China Electric Power Yearbook*
Value applied:	See Annex 3
Justification of the choice of data or description of	Based on official national statistics accepted and used by the DNA for the official emission factor calculations

measurement methods and procedures actually applied :	
Any comment:	-

Data / Parameter:	NCV_i
Data unit:	GJ/mass or volume unit
Description:	Net caloric value of fossil fuel type i consumed in the project electricity system in year *y*
Source of data used:	*China Energy Statistic Yearbook*
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Based on official national statistics, accepted and used by the DNA for the official emission factor calculations
Any comment:	-

Data / Parameter:	$EF_{CO2,i,y}$ *and* $EF_{CO2,m,y}$
Data unit:	tCO_2/GJ
Description:	CO_2 emission factor of fossil fuel type i in year *y*
Source of data used:	Taken from DNA of China, see http://qhs.ndrc.gov.cn/qjfzjz/t20090703_289357.htm which uses the IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	The IPCC default values at the lower level of 95% confidence interval are accepted and used by the DNA for the official emission factor calculations, and are the default value in the tool.
Any comment:	-

Data / Parameter:	Efficiency of the best technology commercially
Data unit:	%
Description:	Best commercial available efficiency of coal, gas, oil fuel power plant
Source of data used:	http://qhs.ndrc.gov.cn/qjfzjz/t20090703_289357.htm
Value applied:	Best efficiency for coal plant is 38.10%; Best efficiency for oil plant is 49.99% Best efficiency for gas plant is 49.99%
Justification of the choice of data or description of	Based on official national statistics, accepted and used by the DNA for the official emission factor calculations

measurement methods and procedures actually applied :	
Any comment:	-

Data / Parameter:	Installed Capacity
Data unit:	MW
Description:	Installed capacity of the NWPG in year *y*
Source of data used:	China Electric Power Yearbook(2006,2007,2008)
Value applied:	See Annex 3
Justification of the choice of data or description of measurement methods and procedures actually applied :	Based on official national statistics
Any comment:	-

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

>>

The annual emission reduction is (rounded down to whole tonnes):

$BE_y = EG_y \times EF_{grid,CM,y}$ = 125,532 MWh/yr ×0.9292 tCO_2/MWh = 116,644 tCO_2/yr

$ER_y = BE_y - PE_y$ = 116,644 – 0 = 116,644 tCO_2/yr

The ex-ante calculations are included in the ER calculation spreadsheet.

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

>>

Table 10 Summary of the ex-ante estimation of emission reductions

Period*	Estimation of the project activity emissions (tCO_2e)	Estimation of the baseline emissions (tCO_2e)	Estimation of leakage (tCO_2e)	Estimation of overall emission reductions (tCO_2e)
2011	0	116,644	0	116,644
2012	0	116,644	0	116,644
2013	0	116,644	0	116,644
2014	0	116,644	0	116,644
2015	0	116,644	0	116,644
2016	0	116,644	0	116,644
2017	0	116,644	0	116,644
Total (tCO_2e)	0	816,508	0	816,508

*Note: * Using 12-monthly periods from the start of the crediting period*

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

>>
The following baseline and monitoring methodology is used:

- ACM0002 version 12.1.0 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"

B.7.1 Data and parameters monitored:

All data collected as part of the monitoring are archived electronically and kept at least for 2 years after the end of the last crediting period. 100% of the data are monitored if not indicated otherwise in the tables below. All measurements are conducted with calibrated measurement equipment according to relevant industry standards.

Data / Parameter:	$EG_{facility,y}$
Data unit:	MWh/yr
Description:	Quantity of net electricity supplied by the project to the grid in year y
Source of data to be used:	Electricity meter, monitoring supply to the grid ($EG_{facility,\ export,\ y}$) and imports from the grid ($EG_{facility,\ import,\ y}$) (bi-directional, i.e. recording import and export). The net electricity supplied by the Proposed Project Activity to the grid ($EG_{facility,,y}$) is the difference of exports to the grid and imports from the grid ($EG_{facility,\ export,\ y} - EG_{facility,\ import,\ y}$).
Value of data applied for the purpose of calculating expected emission reductions in section B.5	125,532 MWh/yr once fully operational
Description of measurement methods and procedures to be applied:	Net electricity supplied by the proposed project is monitored through main meter at the grid substation. The data is measured continuously and recorded monthly. A backup meter is installed at the grid substation. When the main meter fails to work normally, the readings of the backup meter will be adopted.
QA/QC procedures to be applied:	The metering equipments will be calibrated annually and checked yearly by qualified third party for accuracy according to the appropriate industry standards (*Chinese electric industry regulation DL/T448*). The measurement results are cross-checked with records for sold electricity. The accuracy of the meters meets the national standard, and the metering equipments shall have sufficient accuracy so that any error resulting from such equipment shall not exceed 0.5%. Monthly supplied generation data will be approved and signed off by CDM manager before it is accepted and stored. This audit will check compliance with operational procedures in this monitoring plan (for details, see Section B.7.2). This internal audit will also identify potential improvements to procedures to improve monitoring and reporting in future years. If such improvements are proposed these will be reported to the DOE and only operated after approval

	from the DOE.
Any comment:	-

If and when additional capacity, which could be either an additional wind farm or expansion of the existing wind farm, is added to the grid at the same point as the Proposed Project Activity, and if such additional capacity shares transmission facilities, the following parameters are monitored in order to calculate the net electricity supplied by the project activity (E_facility,y) as per section B.7.2:

Data / Parameter:	**EG_total,y**
Data unit:	MWh
Description:	Quantity of total net electricity supplied to the grid by the project activity and additional capacity installed based on the data metered by the main meter and calculated as export minus import
Source of data to be used:	Grid substation
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Only applicable when additional capacity is installed
Description of measurement methods and procedures to be applied:	Electricity meter (bi-directional, recording supply and consumption) at the grid substation. Continuous measurement and at least monthly recording, calculated from supply to the grid and import from the grid.
QA/QC procedures to be applied:	The metering equipment are calibrated annually and checked for accuracy by a qualified third party in accordance with industry standards (*Chinese electric industry regulation DL/T448*). The accuracy of the metering equipment shall not exceed 0.5%. The main meter is installed at the grid substation. The backup meter is installed at the grid substation.
Any comment:	Only applicable when additional capacity is installed

Data / Parameter:	**E_facility,y**
Data unit:	MWh
Description:	Quantity of electricity generation by the Proposed Project Activity based on the data metered by the separate meters
Source of data to be used:	Project activity site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Only applicable when additional capacity is installed
Description of measurement methods	Electricity meters at the onsite substation.

and procedures to be applied:	Continuous measurement and at least monthly recording, calculated from supply to the grid and import from the grid.
QA/QC procedures to be applied:	The metering equipments are calibrated annually and checked for accuracy by a qualified third party in accordance with industry standards (*Chinese electric industry regulation DL/T448*). The accuracy of the metering equipment shall not exceed 0.5%. The monthly electricity generation supplied is approved and signed off by the CDM Manager and is cross-checked by records for sold electricity before being accepted and stored.
Any comment:	Only applicable when additional capacity is installed

Data / Parameter:	**E_additional_capacity,y**
Data unit:	MWh
Description:	Quantity of electricity generated by the additional installed capacity based on the data metered by the separate meters for the additional capacity.
Source of data to be used:	Site of the additional capacity
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Only applicable when additional capacity is installed
Description of measurement methods and procedures to be applied:	Electricity meters at the onsite substation. Continuous measurement and at least monthly recording, calculated from supply to the grid and import from the grid.
QA/QC procedures to be applied:	The metering equipments are calibrated annually and checked for accuracy by a qualified third party in accordance with industry standards (*Chinese electric industry regulation DL/T448*). The accuracy of the metering equipment shall not exceed 0.5%.
Any comment:	Only applicable when additional capacity is installed

B.7.2. Description of the monitoring plan:

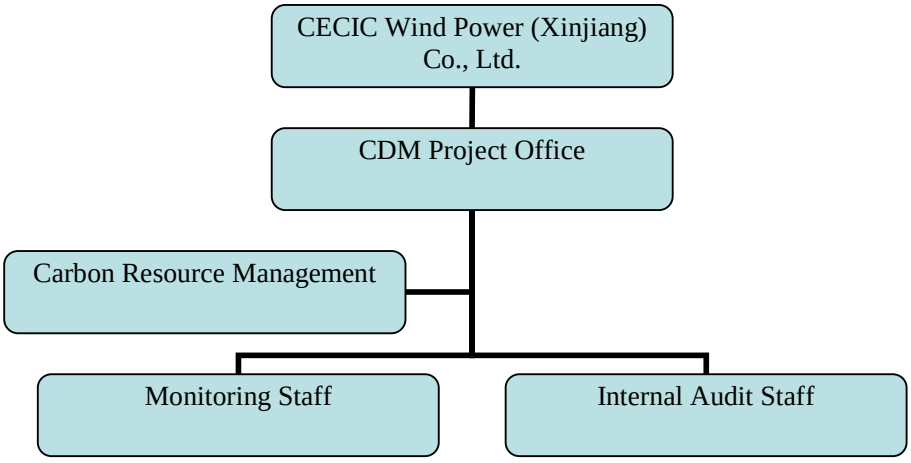
>>

The proposed project adopts ACM0002 Version 12.1.0 to determine the emission reductions from the net electricity generation from the wind farm. This plan describes in more detail the process.

I. Responsibility

The responsibility for monitoring lies with CECIC Wind Power (Xinjiang) Co., Ltd. who operates the Proposed Project Activity. The company will establish a CDM project management office and assign dedicated people responsible for the monitoring and reporting of the generation and emission reductions of the project activity.

The operating and management structure is illustrated as followed:



II. Training

Personnel from the CDM Project Management Office will complete training before power generation of the Proposed Project Activity. New personnel of the CDM PMO will complete training before their start of the monitoring work.

A CDM Manual will be compiled before power generation of the Proposed Project Activity.

III. Data and parameters to be monitored

The data and parameters to be monitored for the CDM project activity are listed in Section B.7.1. of this PDD:

- EG: Net electricity supplied by the project activity to the grid, calculated from supply to the grid and imports from the grid using the main meter at the grid substation.

The emission factor is determined ex-ante and fixed for the duration of the crediting period in this PDD.

Some parameters are monitored for purposes other than the CDM, in particular for ongoing for operational and maintenance requirements of the project.

IV. Installation of electricity meters

Both the main meter and backup meter are installed in accordance with industry standards (Chinese electric industry regulation DL/T448). Any error resulting from the meter shall not exceed 0.5%, which is in line with the industry standards.

- Main meter, is installed at the grid substation.
- Backup meter, is installed at the grid substation.

The exact metering arrangements will be defined in an agreement between the Developer and the local grid company once the project is connected to the grid.

V. Compilation of the monitored data and dealing with errors

Should any previous months reading of the main meter be inaccurate by more than the allowable error, or otherwise functioned improperly, the net generation output 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 with acceptable limits of accuracy or operation is performed improperly the Developer and grid company shall jointly prepare an reasonable and conservative estimate of the correct reading, and provide sufficient evidence that this estimation is reasonable and conservative for verification by the DOE; and (c) if the grid company and the Developer fail to agree then the matter will be referred for arbitration according to agreed procedures.

VI. Calibration

The metering equipment is calibrated annually and checked for accuracy by a qualified entity in accordance with industry standards (*Chinese electric industry regulation DL/T448*). Calibration records will be kept by the Developer for verification. The meters will be jointly inspected and sealed on behalf of the parties concerned and not be interfered with by either party except in the presence of the other party or its accredited representatives.

The exact metering arrangements, including maintenance and calibration frequencies of the meters, will be defined in an agreement between the Developer and the local grid company.

The meters installed shall be tested by qualified entity:

- before the end of the validity of the previous calibration certificate,
- after the detection of a difference larger than the allowable error in the readings of the meters, or
- after the repair of all or part of a meter caused by the failure of one or more parts to operate in accordance with the specifications.

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.

VII. Dealing with potential future additional installed capacity

If in the future, other wind farms share the same transformer, substation or transmission line with this wind farm, appropriate additional meters will be installed at the project site so that the electricity generation can be monitored for each wind farm (or each turbines) separately so as to calculate the share of this wind farm of the net supply to the grid.

If such additional capacity is installed, the data from the onsite or additional meters are used to calculate the share of the project in the overall net output, and the net electricity supplied by the project activity (EG_facility,y) will be calculated as follows:

$EG_{facility,y} = EG_{total,y} * Share_{project,y}$

Where:
$EG_{facility,y}$ is the net electricity supplied by the project activity to the grid;
$EG_{total,y}$ is the total net electricity supplied to the grid based on the data metered by the main meter

and calculated as export minus import;
Share_project,y is the share of generation of the Proposed Project Activity in the total generation connected at this point.

Share_project is calculated on the basis of the electricity generated by the Proposed Project Activity and the additional installed capacity as metered by the onsite meters as follows:

Share_project,y = E_facility,y / (E_facility,y + E_additional_capacity,y)

Where:
E_facility,y is the electricity generated by the Proposed Project Activity based on the data metered by the onsite separate meters;
E_additional_capacity,y is the electricity generated by the additional installed capacity based on the data metered by the onsite separate meter(s) for the additional capacity.

If such additional capacity is installed and does share the transmission facilities, then this is described in the Monitoring Report. The method of attribution will be described clearly in the Monitoring Report.

The measurement results are cross-checked with records for sold electricity and the data from the onsite meter, with the most conservative value chosen for the emission reduction calculation.

VIII. Quality control

The CDM manager also checks the validity of the calibration certificates of the electricity meters. If the data is correct and the meters calibrated, the data is approved, signed off and stored. If any errors are identified, such errors will be described and corrected, prior to approval, sign off and storage of the corrected data and error descriptions.

The internal audit will also identify potential improvements or required changes in the monitoring procedure and reporting for the future.

IX. Reporting

The Monitoring Report will describe the monitoring procedures and the approved and signed off metering data, corrected errors, and the emission reduction calculations.

With the Monitoring Report, the calibration records are presented for verification.

X. Record keeping

All data collected as part of the monitoring are archived electronically and kept at least for 2 years after the end of the last crediting period by the CDM Project Management Office.

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

>>
Date of completion of the baseline study and monitoring methodology: 20/12/2010.

Contact information of the entity and persons responsible:

- Carbon Resource Management Ltd. prepared the PDD. CRM Ltd. is not a project participant.
- The persons preparing the documentation were:
  - Ms. Gao Yan, Mr. Cai Luping, gy@carbonresource.com, Tel: +86 10 8447 5246/15
  - Mr. Shi Xiangfeng, sxf@carbonresource.com, Tel: +86 10 8447 5246/30
  - Mr. Christiaan Vrolijk, cv@carbonresource.com, Tel: +44 20 7016 1420.

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:

>>
01/09/2010

The starting date of a CDM project activity is the earliest of the date(s) on which the implementation or construction or real action of a project activity begins/has begun. The starting date of the Proposed Project Activity is the signing date of Turbine Purchasing Contract, as this is the earliest date as indicated in the timeline in Section B.5.

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

>>
20y-0m from commissioning

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

C.2.1. Renewable crediting period:

A renewable crediting period is chosen.

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

>>
01/05/2011 or the date of registration, whichever is later

C.2.1.2. Length of the first crediting period:

>>
7y-0m

C.2.2. Fixed crediting period:

Not chosen

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:

>>

Environmental Impact Assessment (EIA) for the proposed project has been completed by Xinjiang Environmental Protection Technology Consulting Centre and approved on 02/06/2008 by Xinjiang Uygur Autonomous Region Environmental Protection Bureau.

The analysis of the environment impact in the construction period

- The air pollution from the proposed project is mainly due to the dust emitted from the construction activity. The major measures for dust control include storing the construction materials intensively, concentrative construction, and cleaning construction site, etc.
- The waste water during construction period is mainly from equipment wash, and this small quantity of waste water with very few pollutants will cause no impact on the local underground water.
- Construction machinery will generate noise. Because the wind farm is in the desert with no residents nearby, the impact of construction noise to the local region is minimal.
- The solid waste in the construction period is mainly from construction waste. The solid waste will be collected and then disposed, thus it will not have the impact on the environment.
- The necessary measures will be undertaken in order to minimize the impact to the environment, by means of reducing the excavated volume of the construction foundation, storing the excavation reasonably, disposing the waste excavation properly, regulate the vehicles' routes, levelling the site and recovering the green after construction.

The analysis of the environment impact in operation period

- The waste water during operation period is mainly from operation staff, and this small quantity of waste water, which after treatment is used to water the plants, will cause no impact on the local water environment.
- The operation of wind farm will cause some noise. The low-noise equipment is chosen at the phase of the project design. The wind farm is located in the open desert with no residents nearby, therefore, the noise does not influence the local area.
- The operation of the project will not influence the birds, which has the instinct to avoid danger and will fly much higher in the sky.
- The high- voltage transmission line and transformation equipment will cause electromagnetic radiation. The wind farm is located in the open desert with no residents and no sensitive areas nearby, thus the electromagnetic radiation does not influence the local area.

Conclusion

Wind power is renewable energy and the impacts caused by wind farms on the surrounding ecosystem, water, noise, and atmosphere environment is insignificant.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental

impact assessment undertaken in accordance with the procedures as required by the host Party:

>>

Environmental impacts are not considered significant. Xinjiang Uygur Autonomous Region Environmental Protection Bureau has approved the EIA (02/06/2008).

SECTION E. Stakeholders' comments

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

>>

In May 2010, the staff from the Developer carried out a survey of the local villagers and residents near the area. Questionnaires were sent to 49 stakeholders and the survey had a 100% response rate. The result of the survey indicated the support to the project.

The questionnaire was designed to be understandable and easy to fill in for the local stakeholders. The questionnaire included a short summary of the Proposed Project Activity, questions about the responding stakeholder and a number of specific questions and the opportunity for further comments.

E.2. Summary of the comments received:

>>

Stakeholders surveyed

Item	Content	Vote	Proportion
Gender	Male	31	63.27%
	Female	18	36.73%
Education	Elementary school	19	38.78%
	Junior high school	23	46.94%
	Senior high school	7	14.29%
	University or above	0	0.00%

Responses

1. Will the project affect your environment of living, studying and working?	Yes	No	Not Sure
	2.04%	97.96%	0%
2. Will construction, operation or decommissioning of the project affect natural resources or ecosystems, such as water, habitats, etc?	Yes	No	Not Sure
	0	100%	0%
3. Will the project cause noise, vibration or release of electromagnetic radiation that could adversely affect your health?	Yes	No	Not Sure
	2.04%	97.96%	0%
4. Will the project help to reduce GHG emissions, comparing to conventional thermal power plant?	Yes	No	Not Sure
	100%	0%	0%
5. Do you think the proposed project will have a positive impact on local economic development?	Yes	No	Unclear
	100%	0%	0%
6. Do you agree with the development of the Project?	Yes	No	No Concern
	100%	0%	0%

No further comments were given.

Conclusions from the survey

The survey shows that the proposed project has strong support among the local stakeholders. They all believe the proposed project will promote the local economic development and agree the project construction.

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

>>

The local stakeholders are all supportive of the Proposed Project Activity, and up to date there has been no need to modify the project design according to the comments received.

The Project Developer has an overall environment-friendly plan to guarantee that the project has the minimum negative impact on the environment during the project construction and operation.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding from Annex I used for the financing of the Proposed Project Activity.

Annex 3

BASELINE INFORMATION

Step 1. Identify the relevant electric power system

Following the DNA delineation, the project electricity system is the Northwest Power Grid (NWPG), consisting of six provincial grids: Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang.

Step 2. Choose whether to include off-grid power plants in the project electricity system (optional)

See B.6. Option I is chosen: only grid power plants are included in the calculation.

Step 3. Select a method to determine the operating margin (OM)

Table A1 Power generation in the Northwest Power Grid from 2003 to 2007

Year	Low-cost/must-run generation (10^8 kWh)	Total Generation (10^8 kWh)	Share	Source* (edition/page)
2003	22,364	115,625	19.34%	2004/p709
2004	31,629	142,612	22.18%	2005/p474
2005	43,586	184,562	23.62%	2006/p568
2006	49,054	198,491	24.71%	2007/p638
2007	53,234	229,939	23.15%	2008/p748
Total	199,867	871,229		
Average	39,973	174,246	22.94%	

Step 4. Calculate the operating margin emission factor according to the selected method

Option B – Calculation based on total fuel consumption and electricity generation of the system

Table A2 Emission Factors of Fuels

Fuel types	Carbon Emission Factor ($kgCO_2/TJ$)	Net Caloric Value (MJ/t, km3)
Coal	87,300	20908
Cleaned Coal	87,300	26344
Other washed coal	87,300	8363
Coke	95,700	28435
Shaped Coal	87,300	20908
Crude Oil	71,100	41816
Gasoline	67,500	43070
Diesel	72,600	42652
Fuel Oil	75,500	41816
Other Petro Product	75,500	41816
Natural Gas	54,300	38931

Coke Oven Gas	37,300	16726
Other Coal Gas	37,300	5227
LPG	61,600	50179
Refinery Gas	48,200	46055
Other Coking Products	95,700	28435
Other Energy	0	0

Source: 1) 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy; 2) China Power Year Book (2008).

Fossil fuel consumption

Fuel consumption is taken from the latest China Energy Statistical Yearbook editions. The yearbooks present a range of more than 10 fuels for each province. Data is presented in Table A3 below. The share of emissions from coal consumption is also given in the table.

Table A3 Energy consumption and CO_2 emissions of NWPG in 2005-2007

2005

Fuel Type	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Total amount (10^4t, 10^8m$^{3)}$)	CO_2 emission(tCO_2)
Coal	2461.28	1597	345.1	1467.7	1358.09	**7229.17**	131,951,755
Cleaned coal	16.22					**16.22**	373,032
Other washed coal	35.56			101.95	10.2	**147.71**	1,078,415
Coke	3.23					**3.23**	87,895
Coke oven gas						**0**	0
Other coal gas						**0**	0
Crude oil					0.18	**0.18**	5,351
Gasoline	0.02				0.01	**0.03**	8,72
Diesel	2.24	0.46	0.06		0.5	**3.26**	100,947
Fuel oil	0.01	0.57			0.25	**0.83**	26,203
LPG						**0**	0
Refinery gas					7.71	**7.71**	171,150
Natural gas	1.46	0.52	1.33		7.81	**11.12**	2,350,716
Other petro products						**0**	0
Other coke products						**0**	0
Other energy	8.24	1.3				**9.54**	0
				CO_2 total emission			**136,146,341 tCO_2**

Source: China Energy Statistical Year Book (2006)

2006

Fuel Type	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Total amount (10^4t, 10^8m$^{3)}$)	CO_2 emission(tCO_2)
Coal	2834.44	1660.92	421.86	1833.7	1547.69	**8298.63**	151,472,271
Cleaned coal						**0**	0
Other washed coal				112.7	8.45	**121.15**	884,504
Coke				0.01		**0.01**	272
Coke oven gas	0.2				0.08	**0.28**	17,469
Other coal gas	0.1					**0.1**	1,950
Crude oil					0.02	**0.02**	595
Gasoline	0.01					**0.01**	291
Diesel	1.14	0.24	0.61		1.25	**3.24**	100,328
Fuel oil		0.6			0.11	**0.71**	22,415
LPG						**0**	0
Refinery gas						**0**	0
Natural gas	1.59	0.56	1.06		7.49	**10.7**	2,261,930
Other petro products						**0**	0
Other coke products	1.86					**1.86**	50,615
Other energy	33.57	8.81			2.2	**44.58**	0
					CO_2 total emission		154,812,639 **tCO_2**

Source: China Energy Statistical Year Book (2007)

2007

Fuel Type	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang	Total amount (10^4t, 10^8m$^{3)}$)	CO_2 emission(tCO_2)
Coal	3303.44	1969.03	470.85	2165.8	1762.11	**9671.23**	176,525,905
Cleaned coal						**0**	0
Other washed coal	3.73			124.31	7.73	**135.77**	991,243
Shaped coal	3.53					**3.53**	64,432
Coke						**0**	0
Coke oven gas	0.52	0.65			0.26	**1.43**	89,215
Other coal gas	14.14	0.71				**14.85**	289,526
Crude oil					0.09	**0.09**	2,676
Gasoline	0.02					**0.02**	581
Diesel	1.12	0.26	0.42		1.77	**3.57**	110,546
Fuel oil	0.01	1.05	0.04		0.05	**1.15**	36,307
LPG						**0**	0
Refinery gas					5.99	**5.99**	132,969
Natural gas	1.68	0.49	1.93		8.66	**12.76**	2,697,404

Other petro products			**0**	0
Other coke products			**0**	0
Other energy	94.36	9.73	**104.09**	0
		CO_2 total emission		180,940,805 **tCO_2**

Source: China Energy Statistical Year Book (2008)

Calculation of net generation from included sources

Gross generation for each province is presented in the yearbooks. The data is also broken down into three categories: thermal, hydro and other sources. For the OM calculations, only thermal generation is included. Gross generation and own consumption is used to calculate net generation from included sources. The calculations are presented in Table A4 below.

Table A4 Thermal generation, own consumption rate, and net supply in NWPG

Provincial Grid	Year 2005		
	Generation (MWh)	**Self use rate (%)**	**On-grid generation (MWh)**
Shaanxi	41,100,000	7.16	38,157,240
Gansu	33,106,000	4.23	31,705,616
Qinghai	5,500,000	2.69	5,352,050
Ningxia	27,643,000	5.73	26,059,056
Xinjiang	26,560,000	8.8	24,222,720
Total			125,496,682

Source: China Power Year Book (2006)

Provincial Grid	Year 2006		
	Generation (MWh)	**Self use rate (%)**	**On-grid generation (MWh)**
Shaanxi	54,482,000	6.97	50,684,605
Gansu	35,738,000	4.29	34,204,840
Qinghai	7,204,000	2.57	7,018,857
Ningxia	36,731,000		36,731,000
Xinjiang	29,901,000	8.02	27,502,940
Total			156,142,241

Source: China Power Year Book (2007)

Provincial Grid	Year 2007		
	Generation (MWh)	**Self use rate (%)**	**On-grid generation (MWh)**
Shaanxi	59,100,000	6.77	55,098,930
Gansu	42,400,000	5.89	39,902,640
Qinghai	9,700,000	7.19	9,002,570
Ningxia	43,500,000		43,500,000

Xinjiang	34,600,000	9.2	31,416,800
Total			178,920,940

Source: China Power Year Book (2008)

Operating Margin Emission Factor calculations

The Operating Margin Emissions Factor is now calculated from the data presented above using the formula below. The calculation is shown in Table A5.

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{co_2,i,y}}{EG_y}$$

Table A5 Operating margin emission factor calculation

NWPG	Unit	2005	2006	2007	3-year total/average
Emissions	tCO_2	136,146,341	154,812,639	180,940,805	471,899,785
Generation	MWh	125,496,682	156,142,241	178,920,940	460,559,863
Operating margin Emission Factor				**1.0246 tCO_2/MWh**	

Based on above data, the simple OM emission factor of NWPG is calculated ex-ante using a 3-year generation-weighed average is 1.0246 tCO_2e/MWh.

Step 5. Identify the group 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 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. This option is chosen as it comprises larger annual generation than the five units built most recently. Following the deviation, the latest statistical data available (from the China Power Yearbook 2008) is used by the DNA to determine the most recent year from which the added generation capacity is equal to or just exceeds 20% of the latest statistic year 2007. The added generation capacity is the sample group of power units *m* used to calculate the build margin.

Using the latest statistical data available (from the China Electric Power Yearbook) determine the year from which the added generation capacity is equal to or just exceeds 20% of the latest statistic year 2007.

Table A6 Identify the year from which the added generation capacity is equal to or just exceeds 20% of the latest statistic year 2007

Power plant type	**Capacity 2005** **A**	**Capacity 2006** **B**	**Capacity 2007** **C**	**Added Capacity 2005-2007** **D=C-A**	**Share**
Thermal (MW)	25362.6	29627	35620	10257.4	**78.74%**
Hydro (MW)	12219.8	14074	14590	2370.2	18.20%
Nuclear (MW)	0	0	0	0	0
Wind (MW)	399.5	399	798.5	399	3.06%
Total (MW)	37981.9	44100	51008.5	13026.6	100.00%

The ratio to C	74.46%	86.46%	100.00%

Source: China Power Year Book (2006, 2007, 2008).

Step 6. Calculate the build margin emission factor

As described above, because of the limited availability of publicly available data, this proposed project uses a substitute method accepted by EB to calculate $EF_{BM,y}$

Calculate the thermal emission factor

Calculate the different CO_2 emission percentage of solid, liquid and gas fuel in the total emission of Northwest Power Grid in 2007 using new latest statistical data available from China Energy Statistical Year Book 2008.

Table A7 Calculation of CO_2 Emission of Northwest Power Grid in 2007

Fuel type	CO_2 Emission (tCO_2)	Share
Coal	177,581,580	98.143%
Oil	150,110	0.083%
Gas	3,209,114	1.774%
Total	**180,940,805**	**100%**

Source: China Energy Statistical Year Book (2008).

λ_{Coal} = 98.143%; λ_{Oil} = 0.083%; λ_{Gas} = 1.774%.

Based the emission percentage (λ_i) of different kind fossil fuels and the corresponding emission factor (EF_i) according to the best technology commercially available in the China, the weighted emission factor of thermal power ($EF_{thermal}$) is calculated.

Table A8 Calculation of CO_2 Emission Factor of Coal, Oil and Gas Fuel Power Plant with the Best Commercial Efficiency in China

Power plant type	Parameter	Best efficiency	Carbon factor ($kgCO_2/TJ$)	CO_2 emission factor (tCO_2/MWh)
		A	B	C=3.6/A/1,000,000*B
Coal	$EF_{Coal,Adv}$	38.10%	87,300	0.8249
Gas	$EF_{Gas,Adv}$	49.99%	75,500	0.5437
Oil	$EF_{Oil,Adv}$	49.99%	54,300	0.3910

http://qhs.ndrc.gov.cn/qjfzjz/t20090703_289357.htm

So, emission factor of thermal plant is:

$$EF_{Thermal} = \lambda_{Coal} \times EF_{Coal,Adv} + \lambda_{Oil} \times EF_{Oil,Adv} + \lambda_{Gas} \times EF_{Gas,Adv} = 0.817 \text{ tCO}_2/\text{MWh}$$

Using the added capacities from Table A6, the EF_{BM} can now be calculated:

$EF_{BM} = (CAP_{Thermal} / CAP_{Total}) * EF_{Thermal}$

$CAP_{Thermal}$ is the thermal capacity among the new capacity from 2005 to 2007, and CAP_{Total} is the total capacity from 2005 to 2007.

EF_{BM}= 0.817×78.74% = 0.6433 tCO_2/MWh

Step 7. Calculation of the combined margin emission factor

$EF_{grid,CM,y} = w_{OM} \bullet EF_{grid,OM,y} + w_{BM} \bullet EF_{grid,BM,y}$ = 0.75× 1.0246 + 0.25×0.6433 = 0.9292 tCO_2/MWh

Annex 4

MONITORING INFORMATION

No further information.

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