Project design document form for CDM project activities

(Version 08.0)

Complete this form in accordance with the Attachment "Instructions for filling out the project design document form for CDM project activities" at the end of this form.

PROJECT DESIGN DOCUMENT (PDD)	
Title of the project activity	Inner Mongolia Electric Power Transmission and Transformation Chayouzhongqi Wind Farm 49.5MW Project
Version number of the PDD	3.0
Completion date of the PDD	7/2/2017
Project participant(s)	Inner-Mongolia Electric Power Transmission and Transformation Co.,Ltd.
Host Party	China
Applied methodology(ies) and, where applicable, applied standardized baseline(s)	Methodology: ACM0002:"Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 12.3.0, EB66)
Sectoral scope(s) linked to the applied methodology(ies)	Sectoral scope: 01 Energy industries(renewable resources) Wind Power Generation
Estimated amount of annual average GHG emission reductions	97,196

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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Inner Mongolia Electric Power Transmission and Transformation Chayouzhongqi Wind Farm 49.5MW Project (hereafter, the “Project”) is located at Ulanqab City in the Inner Mongolia Autonomous Region of the People’s Republic of China (hereafter, the “Host Country”). The Project is being constructed by Inner-Mongolia Electric Power Transmission and Transformation Co., Ltd. (hereafter, “EPTT”).

The Project’s baseline scenario, which is the same as the existing scenario prior to implementation of the Project, involves electricity being generated by fossil fuel power plants connected to the North China Power Grid (hereafter, “NCPG”).

The Project will install and operate 25 sets of wind turbines, 24 of which have a capacity of 2000kW and 1 of which has a capacity of 1500kW; therefore, the total installed capacity of the Project will be 49.5MW. The full load hours estimated is 2,192 hours per year and the expected net electricity generation supplied to NCPG is 108,502MWh per year. The Project will reduce greenhouse gas (hereafter, “GHG”) emissions by replacing electricity that would otherwise be generated from coal-fired power plants. The Project’s annual expected emissions reduction is 97,196tCO_2e.

The Project is consistent with and will contribute to the achievement of the Host Country’s sustainable development objectives. Specifically, the Project will have several positive social and environmental impacts:

- Make full use of Inner Mongolia’s wind energy resources;
- Satisfy increases in demand for electricity in Inner Mongolia;
- Reduce GHG emissions and other pollutants such as SO_2, NOX and flue gas dust by substituting Project-generated electricity for electricity produced by fossil fuel power plants presently supplying the NCPG;
- Create employment opportunities through the Project’s construction and operation; and
- Provide an attraction for tourism.

A.2. Location of project activity

A.2.1. Host Party

>>
China

A.2.2. Region/State/Province etc.

>>
Inner Mongolia Autonomous Region

A.2.3. City/Town/Community etc.

>>
Chayouzhongqi, Ulanqab City

A.2.4. Physical/Geographical location

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The Project is located at Ulanqab City in the Inner Mongolia Autonomous Region of the People’s Republic of China. The centre geographic coordinates of the wind farm is 112º29′30″E (112.49167°E) and 41º21′00″N(41.35000°N). Figure 1 and Figure 1 highlight

the location of Inner Mongolia Autonomous Region and Ulanqab City. Figure 2 then shows the Project's location.

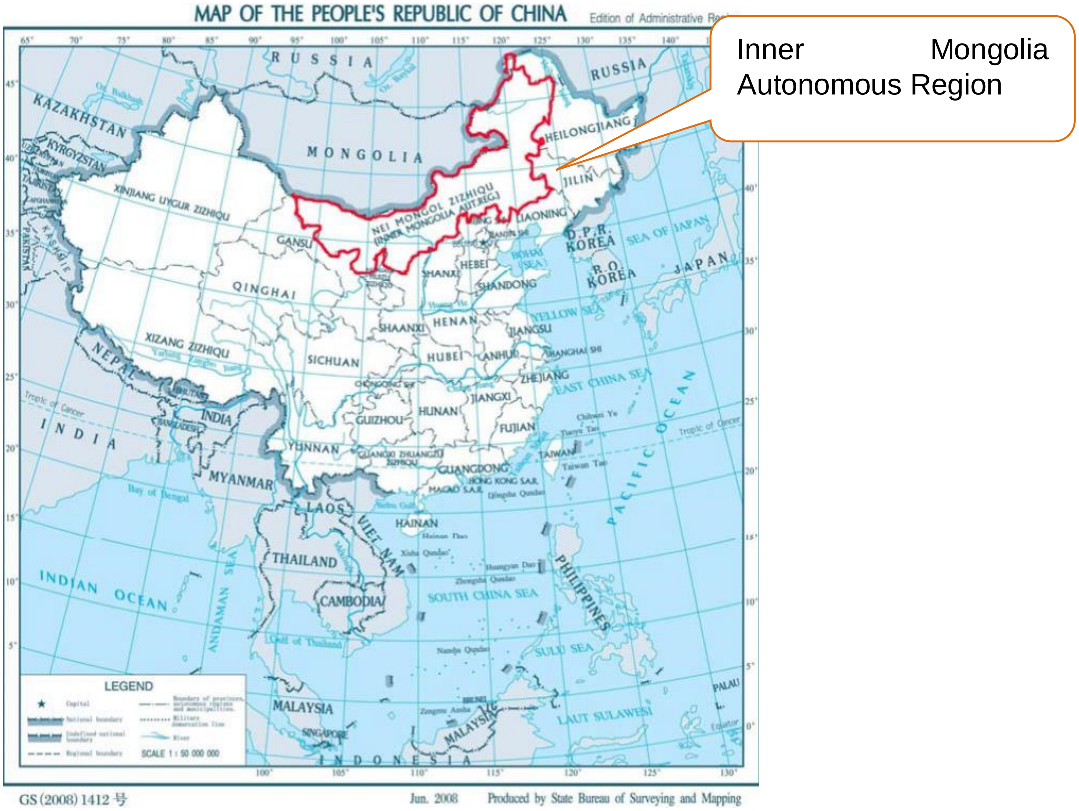

Figure 1 The Location of Inner Mongolia Autonomous Region

Figure 1 The Location of Xilingol League

Figure 2 The Project Site

A.3. Technologies and/or measures

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The most important purpose of the Project is to avoid environmental pollution and GHG emissions from fossil fuel power plants, and utilize the wind energy.

The scenario existing prior to the start of the implementation of the Project

The scenario existing prior to the start of the implementation of the Project involves the electricity being generated by fossil fuel power plants connected to the NCPG. This scenario is the same as the Project's baseline scenario. This scenario's main emission sources and GHG is CO2 emissions from fossil fuel based power plants connected to the NCPG.

The Project scenario

The Project involves the construction and operation of a new wind farm, with the purpose of utilizing wind energy to generate electricity. The Project will install 24 wind turbines, each of which have a capacity of 2,000kW, and 1 wind turbine which have a capacity of 1,500kW, providing a total capacity of 49.5MW. The expected net electricity generation supplied to NCPG is 108,502MWh per year.

The electricity generated from the Project will be transmitted to the existed 220kV booster station to be built on the site of the wind farm by Electric Power Transmission and Transformation Wind Farm Project. After being transmitted to the 220 kV booster station, the electricity will further be transmitted to Desheng substation of NCPG.

The key technical specifications of wind turbines used in the Project are listed in Table 1.

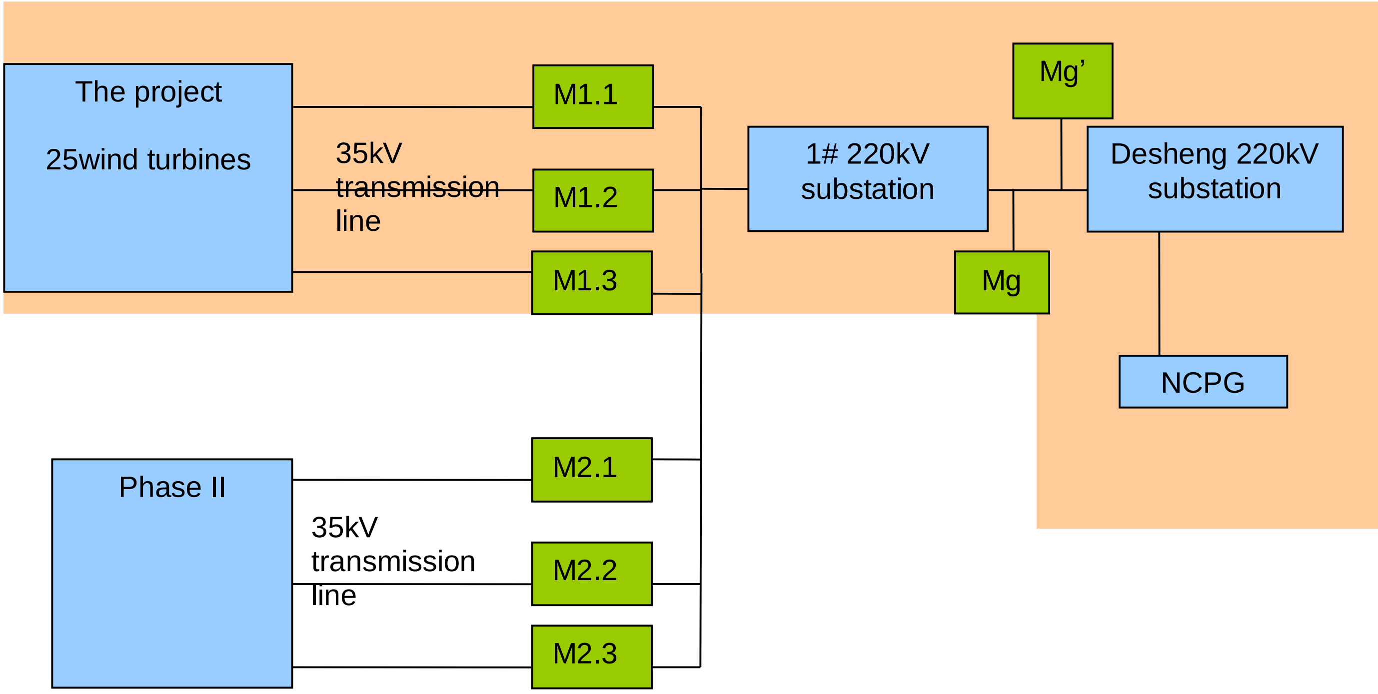
Table 1 Key Technical Specifications of Wind Turbines[1]

Parameters		Value	
Wind Turbine Type		XE82-2000	XE82-1500C
Manufacturer		Xiangdian Wind Power Co., Ltd	
Life Time		20	
Annual Operation Hours		2,192	
Load Factor		0.25	
Wind Wheel	Diameter (m)	82.74	82.74
	Rated Capacity (kW)	2000	1500
	Cut-in Wind Speed (m/s)	3	3
	Rated Wind Speed (m/s)	12.0	12.0
	Cut-out Wind Speed (m/s)	25.0	25.0
	Operation Temperature(℃)	-30℃~+40℃	-30℃~+40℃
Generator	Type	Direct-drive	Direct-drive
	Capacity (kW)	2150	2150
	Rated Voltage (V)	660	660
Tower	Hub Height (m)	80	80

Based on the description above, there is no greenhouse gases involved in the Project.

The energy flows of the equipment included in the Project is listed in Figure 3.

[1] Data Source of "Annual Operation Hours" and "Load Factor": Feasibility Study Report; Data Source of others: Technical Specifications from the manufacturer.



The total electricity exported and imported by the Project and Phase II would be monitored by Mg installed at the 1# 220kV booster station and Mg' installed at Desheng 220kV booster station. Besides, M1.1, M1.2, M1.3 installed at 35kV transmission line would monitor electricity imported and exported by the Project and M2.1, M2.2, M2.3 installed at 35kV transmission line would monitor electricity imported and exported by Phase II.

All equipment to be used in the Project has been manufactured domestically. The Project involves no international technology transfer.

A.4. Parties and project participants

Party involved (host) indicates host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
China (host)	Inner-Mongolia Electric Power Transmission and Transformation Co.,Ltd.	No
United Kingdom of Great Britain and Northern Ireland	Eco-Tec Asia (UK) Ltd	No

A.5. Public funding of project activity

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There is no public funding from Parties included in Annex I involved in the Project.

SECTION B. Application of selected approved baseline and monitoring methodology and standardized baseline

B.1. Reference of methodology and standardized baseline

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Approved consolidated baseline and monitoring methodology ACM0002: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 12.3.0, EB 66)

The methodology refers to the following tools:

"Tool for the demonstration and assessment of additionality" (Version 06.0.0 EB 65) "Tool to calculate the emission factor for an electricity system" (Version 02.2.1, EB 63)

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

B.2. Applicability of methodology and standardized baseline

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The ACM0002 (Version 12.3.0，EB 66) states the applicability conditions as follows:

> 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 Project involves installation of a new wind power plant at the place where no renewable energy project was operated prior to the implementation of the Project and thus the above condition is met.

> The project activities do not involve switching from fossil fuels to renewable energy sources at the site of the project activity.

The Project is a newly built wind power project and does not involve switching from fossil fuels to renewable energy.

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 geothermal power plant/unit, solar power	The Proposed Project Activity is the installation of a wind power plant.	OK
In case of hydro power plants,	Not applicable. The Proposed	OK

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.	Project Activity is a wind power plant.	
In case of hydro power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m2 all the following conditions must apply: The power density calculated for the entire project activity using equation 5 is greater than 4 W/m2; Multiple reservoirs and hydro power plants located at the same river and where are designed together to function as an integrated project[2] that collectively constitute the generation capacity of the combined power plant; Water flow between multiple reservoirs is not used by any other hydropower unit which is not a part of the project	Not applicable. The Proposed Project Activity is a wind power plant.	OK

[2] This requirement can be demonstrated, for example, (i) by the fact that water flow from upstream power units spilling directly to the downstream reservoir, or (ii) through the analysis of the water balance. Water balance is the mass balance of water fed to power units, with all possible combinations of multiple reservoirs and without the construction of reservoirs. The purpose of such water balance is to demonstrate the requirement of specific combination of multiple reservoirs constructed under CDM project activity for the optimization of power output.This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum three years prior to implementation of CDM project activity.

activity; Total installed capacity of the power units, which are driven using water from the reservoirs with power density lower than 4 W/m2,is lower than 15MW; Total installed capacity of the power units, which are driven using water from reservoirs with power density lower than 4 W/m2, is less than 10% of the total installed capacity of the project activity from multiple reservoirs.		

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;	Not applicable. The Proposed Project Activity is a Greenfield project, and 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 Project Activity is a wind power plant.	OK
Hydro power plant[3] that result in the creation of a new single reservoir or in the increase in an existing single reservoir where the power density of the power plant is less than 4W/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

[3] Project participants wishing to undertake a hydroelectric project activity that result in a new reservoir or an increase in the existing reservoir, in particular where reservoirs have no significant vegetative biomass in the catchments area, may request a revision to the approved consolidated methodology.

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 NCPG.	OK
AM Tool 7 / In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex-I country.	The project electricity system is OK located in a non-Annex I country.	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 Proposed Project Activity is a Greenfield project, therefore the "Combined tool to identify the baseline scenario and demonstrate additionality" is not required to identify the baseline scenario of the Proposed Project Activity; and
- the Proposed Project Activity is a wind power project, therefore there are no fossil fuels used for electricity generation, so there are no CO2 emissions and leakage from combustion of fossil fuels, and thus the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" is not applicable to the Proposed Project Activity.

In conclusion, the ACM0002 (Version 12.3.0，EB 66) is applicable to the Project.

B.3. Project boundary

ACM0002 (Version 12.3.0，EB 66) states:

"The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to."

The electricity generated by the Project will be supplied to the NCPG. Thus, according to the "Tool to calculate the emission factor for an electricity system" (Version 02.2.1, EB63), the electricity system of the Project is defined as the NCPG which can be dispatched without significant transmission constraints. The Project boundary therefore includes all power plants physically connected to the NCPG and the Project power plant itself.

As the Chinese Designated National Authority (thereafter the "DNA"), the National Development and Reform Commission (therefore the "NDRC") published "2011 Baseline Emission Factors for Regional Power Grids in China", which stipulates that the NCPG is a regional grid in China including Beijing City Power Grid, Tianjin City Power Grid, Hebei Province Power Grid, Shanxi Province Power Grid, Shandong Province Power Grid and Inner Mongolia Autonomous Region Power Grid."[4]

Figure 4 describes the project boundary of the Project:

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[4] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf, Department of Climate Change, NDRC,20-10-2011.

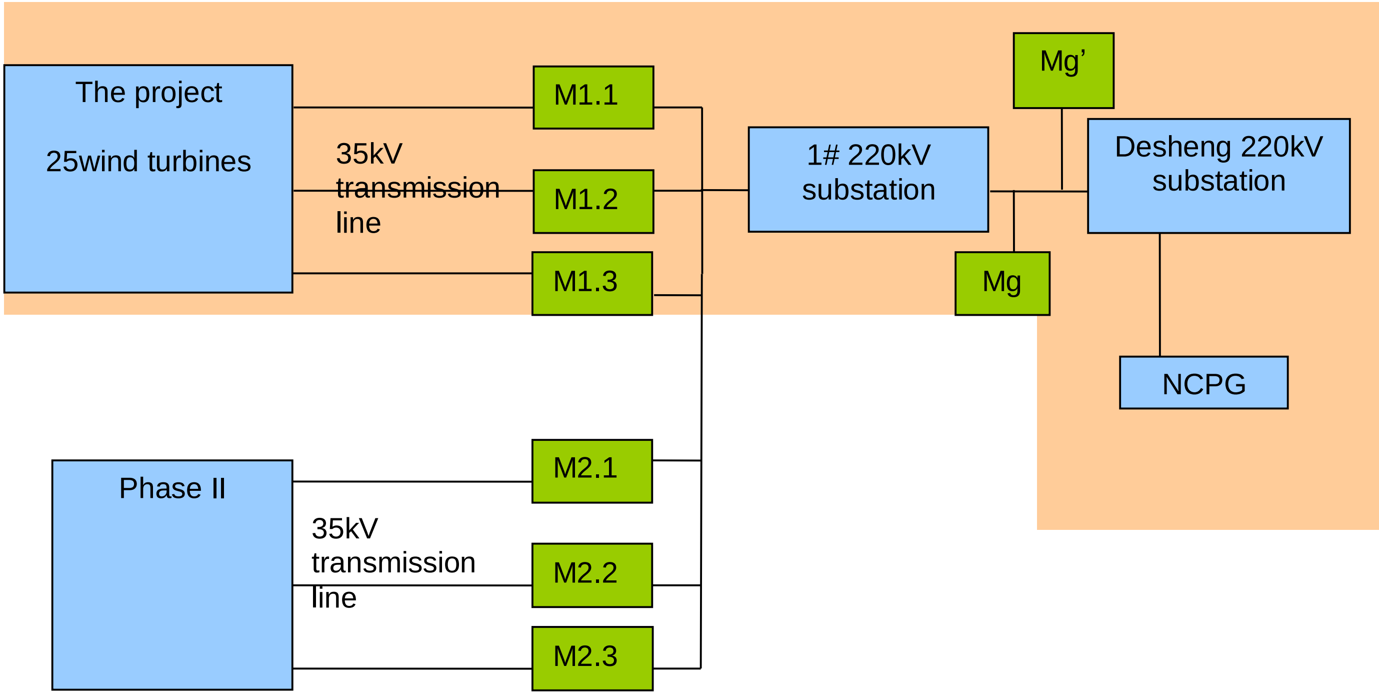

Figure 4 Project Boundary

Table 3 below provides an overview of the inclusion or exclusion of emission sources within the Project boundary.

Table 3 Overview of Project Boundary Inclusion or Exclusion of Emission Sources.

	Source	**GHGs**	**Included?**	**Justification / Explanation**
Baseline scenario	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 in the baseline
		CH_4	No	CH_4 are small compared to CO_2 emission from fossil fuel firing. Exclusion of this gas is conservative.
		N_2O	No	N_2O are small compared to CO_2 emission from fossil fuel firing. Exclusion of this gas is conservative.
Project scenario	The Project	CO_2	No	The Project use renewable energy for electricity, producing no CO_2 emission according to the methodology.
		CH_4	No	The Project use renewable energy for electricity, producing no CH_4 emission according to the methodology.
		N_2O	No	The Project use renewable energy for electricity, producing no N_2O emission according to the methodology.

B.4. Establishment and description of baseline scenario

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The project activity is the installation of a new grid-connected renewable power plant/unit, and is not a modification / retrofit of an existing plant / unit, thus, the baseline scenario, according to methodology ACM0002, is the following:

Electricity delivered to the NCPG by the Project would have otherwise been generated by the operation of grid-connected power plants in the NCPG and by the addition of new generation sources in the NCPG, as reflected in the combined margin (CM) calculation in Section B.6.

B.5. Demonstration of additionality

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Serious CDM consideration

The project owner considered CDM revenue from the very beginning of the project implementation. According to the "Guidelines on the Demonstration and Assessment of Prior Consideration on the CDM" (version 04, EB62), *project activity with a starting date on or after 02 August 2008, the project participant must inform a Host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention seek CDM status, and such notification must be made within six months of the project activity start date. Such notification is not necessary if a PDD has been published for global stakeholder consultation before the project activity start date*.

The Project's start date is 16^{th}, June 2011 which is the date of wind turbines' foundation construction contract been signed, and the Project have not been published for global stakeholder consultation yet, so the notification is necessary for the Project. These notifications were made within six months of the Project 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, as there is no gap greater than 2 years between these actions to secure CDM status.

Table 4. Implementation Timetable of the Project

Date	Key Event
2 August, 2010	EIA was complied.
15 September, 2010	The Project received approval of the EIA.
October, 2010	FSR was complied.
29 December, 2010	The Project received approval of the FSR.
17 January, 2011	Based on the conclusion of approved FSR, the PP decided to seek CDM
16 June, 2011	The Wind Turbines' Foundation Construction Contract was signed, which is defined as the project activity starting date as per the lasted
7 July, 2011	The construction start order of the Project was issued.
7 August, 2011	The Emission Reduction Purchase Agreement was signed.
10 September, 2011	Wind Towers Purchasing Contract was signed.
September, 2011	Wind Turbines and the Attaching Equipments Purchasing Contract was signed.
10 November, 2011	The notification of prior consideration of CDM was received by UNFCCC
19 November, 2011	PDD was published for global stakeholder consultation
2 December, 2011	The notification of prior consideration of CDM was received by China

The additionality of the project is further demonstrated using the steps described in the "Tool for the demonstration and assessment of additionality" (version 06.0.0, EB 65) as follows:

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:

<u>Sub-step 1a. Define alternatives to the project activity:</u>

There are two alternatives being considered here:

(a) The project not being implemented as a CDM project.

(b) The electricity being generated by fossil fuel power plants connected to the NCPG. This is the baseline scenario of the proposed project.

Step2: Investment analysis

The purpose of this investment analysis is to determine whether the Project 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**").

<u>Sub-step 2a: Determine appropriate analysis method</u>

There are three options listed in the "Tool for demonstration and assessment of additionality" (Version 06.0.0, EB65): simple cost analysis (Option1), investment comparison analysis (Option2) and benchmark analysis (Option3).

The electricity generated from the Project will be delivered to NCPG, it means that beside the additional CERs benefit, benefit from electricity sales can also be achieved; simple cost analysis can be excluded. Following EB guidance on the assessment of investment analysis[5], if the alternative to the Project is the supply of electricity from the grid, this is not considered an investment and a benchmark approach is considered appropriate. Therefore, a benchmark analysis is used to identify whether the project is economically attractive.

<u>Sub-step 2b: Option III. Apply benchmark analysis</u>

The likelihood of the development of this Project will be determined by comparing its IRR with the financial benchmark rate of return of 8% of the Project IRR (post tax) and widely used for electric power industry investment in China, according to the '*Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects*[6]'. The calculation and comparison of financial indicators are carried out in sub-step 2c.

<u>Sub-step 2c: Calculation and comparison of financial indicators</u>

(1) Basic parameters for calculation of financial indicators

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[5] Paragraph 15, 'Guidance on the assessment of Investment Analysis'(version 02.1), EB41 Annex 45.

[6] Operation Department of Power Generation and Transmission, State Power Corporation, <u>Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects</u> (China Electric Power Publishing House, 2003) 2.

Table 5 Parameters for financial analysis

serie	item	value	remark	data source
	general description			
1	installed capacity	49.5	MW	FSR, page 1-3
2	annual electricity output	108,50	MWh	FSR, page 1-6
3	construction period	1	year	FSR, page 14-5
4	operation period	20	year	FSR, page 14-5
5	bus-bar tariff (including VAT)	0.51[7]	RMB/kWh	FSR, page 1-16
6	bus-bar tariff (excluding VAT)	0.4359	RMB/kWh	FSR, page 1-16
	investment plan			
	total investment	42594.3	10000RMB	FSR, page 1-16
1	static investment	41444.5	10000RMB	FSR, page 1-16
2	interest incurred during construction	1001.2	10000RMB	FSR, page 1-16
3	circulating capital	148.5	10000RMB	FSR, page 14-5
	capital raising			
	total investment	42594.3	10000RMB	FSR, page 1-16
1	self-finance	8518.8	10000RMB	FSR, page 14-1
1.1	construction capital	8474.3	10000RMB	FSR, page 14-1
1.2	initial circulating capital	148.5	10000RMB	FSR, page 14-5
2	loans	34075.4	10000RMB	FSR, page 14-1
2.1	long-term loans	34075.4	10000RMB	FSR, page 14-1
2.2	thereinto: long-term loans capital	32970.2	10000RMB	FSR, page 14-1
2.3	interest incurred during construction	1001.28	10000RMB	FSR, page 1-13
2.4	loans for circulating capital	103.95	10000RMB	FSR, page 14-1
	interest rate			
1	interest rate of long-term loans	5.94%		FSR, page 1-13
2	period of repayment	15	year	FSR, page 1-13
3	interest rate of loans for circulating capital	5.94%		FSR, page 1-13
4	interest rate of short-term loans	5.31%		FSR, page 14-5
	tax			

[7] The data shown in the GSP version of PDD was incorrect due to the input typo. The 0.51RMB/kWh is sourced from the FSR. The Tariff Approval issued by the Inner Mongolia Development and Revolution Commission on March 21st, 2012(NFGJ〔2012〕No.539) has been provided to the DOE, which also stated that the tariff of the Project was 0.51RMB/kWh.

1	VAT	17.0%		FSR, page 14-6National VAT Law (Document no. 538)[8] and Notice of comprehensive utilization of resources and value- added tax policies for other products issued by Financial Department and State Taxation Administration (Document
2	Recovery of VAT	50%		FSR, page 14-6
3	income tax	25%		FSR, page 14-6
4	urban maintenance and construction	5%		FSR, page 14-6
5	surtax for education	3%		FSR, page 14-6
	O&M cost			
			10000RMB/	FSR, page 14-5
2	number of employees	4	person	FSR, page 14-6
			10000RMB/	FSR, page 14-6
4	welfare allowance rate	41%		FSR, page 14-6
5	repair fee rate	2.5%		FSR, page 14-5
6	insurance fee rate	0.25%		FSR, page 14-5
7	miscellaneous fee rate	4	10000RMB/ MW	FSR, page 14-5
	CERs revenue			
1	CER price	10.5	Euro/tCO2	ERPA
2	Exchange rate	9.4	RMB/Euro	
3	Credit years	10	year	ERPA
	other			
1	period of depreciation	15	year	FSR, page 14-5
2	Residual rate	5%		FSR, page 14-5

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

Table 6 Financial indicators of the project

Item	Without CER revenue	Benchmark	With CER revenue
IRR (total investment after income	6.18%	8%	8.45%

[8] http://www.gov.cn/flfg/2008-11/14/content_1149549.htm

[9] http://fina.shqp.gov.cn/gb/content/2010-09/17/content_341699.htm

As described in the above Table 6, if the Project is not undertaken as a CDM project, the Project IRR would be 6.18%, which would also be lower than the benchmark IRR. It means that the project is not financial attractive. However, if the project is undertaken as a CDM, with the CER revenue the project IRR can reach beyond the bench mark. Thus CDM revenue can help the project to conquer investment barriers and make it economically feasible.

Sub-step 2d: Sensitivity analysis

A sensitivity analysis was conducted by altering the following parameters:

Annual O&M cost;
Static investment;
Electricity (excl. VAT); and
Annual electricity output.

These parameters were selected as being the most likely to fluctuate over time and have the greatest impact on IRR. Financial analyses were performed altering each of these parameters by ±10%[10], and assessing what the impact on the project IRR would be. The analysis shows that the project IRR remains lower than its alternative even in the case where these parameters change in favour of the Project.

Table 7 Sensitivity analysis

	-46.00%	-11.70%	-10.0%	0.0%	10.0%	13.60%
Annual O&M cost	8.00%	-	6.59%	6.18%	5.77%	-
Static investment	-	8.00%	7.72%	6.18%	4.89%	-
Electricity tariff (excl. VAT)	-	-	4.79%	6.18%	7.53%	8.00%
Annual electricity output	-	-	4.79%	6.18%	7.53%	8.00%

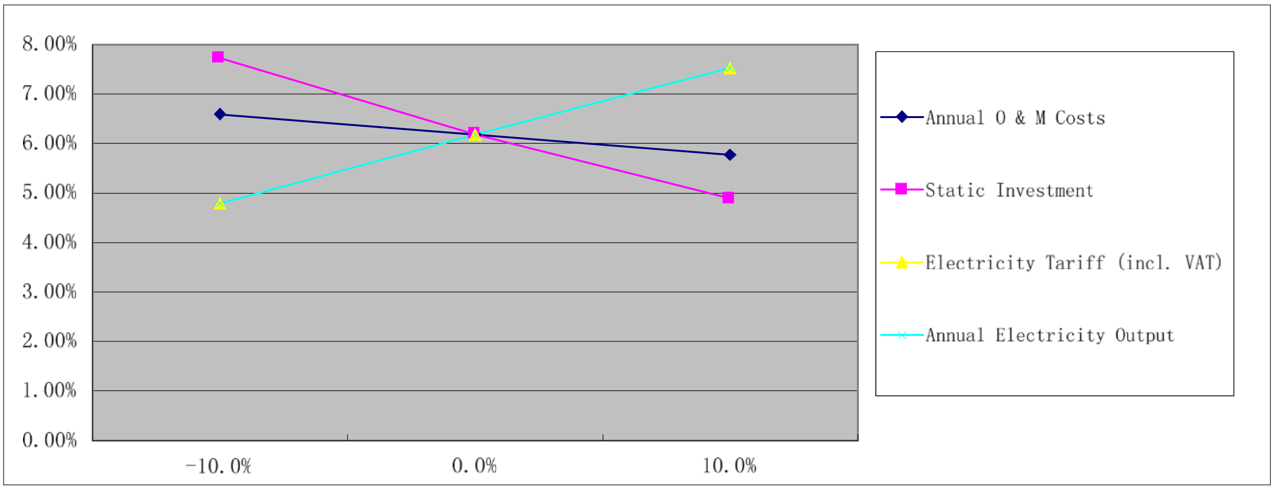

Figure 5 Sensitivity analysis of Project IRR

As shown in the sensitivity analysis, even if the variation range of the uncertain factors reaches +/-10%, the project IRR of the Project, could not reach the benchmark of 8% and the additionality of the Project would not be influenced.

As shown in the above table 7, the IRR of the Project could reach the benchmark if one of the following conditions can be achieved:

(1) The annual O&M cost would be decreased by at least 46.00%; (2) The static investment would be decreased by at least 11.70%; (3) The electricity tariff would be increased by at least 13.60%;

[10] In terms of the guidance on the assessment of investment analysis from EB41, Annex 45, paragraph 17, as a general point of departure variations in the sensitivity analysis should cover a range of +10% and -10%, Past trend may be a guide to determine the reasonable range.

(4) The annual electricity output would be increased by at least 13.60%.

Based on the explanation and justification below, none of these conditions can be achieved:

(1) The O&M cost include the repair charge, salary and welfare allowance, material cost, insurance premium and other expenses. These costs are calculated to be based on the extensive industry experience of the developer and the design institute. Due to the increasing of raw material price and staff wage and welfare cost as indicated by the increasing trend of Price index of PRC[11]and Inner Mongolia Autonomous Region[12] from 2003 ~ 2010, it is impossible to decrease the O&M cost as much as 46.00%. In addition, compared with the total static investment, electricity tariff and the annual net electricity generation supplied to NCPG, the O&M cost has the least effect on the impact of project IRR. The O&M cost decreasing by as much as 46.00% will give arise to outreach of IRR benchmark, while it is unlikely to have this great dropdown in reality, ie. it is impossible to decrease the O&M cost as much as 46.00%;

(2) As for the static investment, its main budget contains the cost of turbines, engineering construction and related accessories for wind farm projects. Most of the equipment purchase and engineering construction contracts of the Project have been signed in which the contracted capital, 432,568,727RMB, already exceeds the estimated static investment, 414,445,400yuan, in FSR. The actual investment is much more and thus the decrease of the static investment by 11.70% is impossible;

(3) As for the electricity tariff, which is regulated by the government authority in China, the wind power project tariff is not possible to raise or drop significantly. According to the Notice regarding Improving Wind Power Electricity Tariff Policy issued by the NDRC on July 20th, 2009, the electricity tariff of the wind power projects constructed in Ulanqab City which falls into Wind Resource Area I is streamlined as 0.51RMB/kWh (incl. VAT). However, if the electricity tariff increases by 13.60%, it will reach 0.579RMB/kWh (incl. VAT), which is even higher than the highest historical tariff of 0.54RMB/kWh (incl. VAT) in Inner Mongolia Autonomous Region[13]. Additionally, even if the electricity tariff becomes to 0.54RMB/kWh, the IRR would be 6.99%, which is still lower than the bench mark. Thus, it is not feasible for the Project to have the tariff increased by 13.60%;

(4) During the phase of the FSR, the design organization of the FSR collected one year data of the wind energy resources from on-site wind energy measurement point and analyzed more than thirty years of local meteorological data. The Project's electricity generation is estimated based on the 32-year's (from 1977~2008) wind speed data and the annually (year 2008) wind speed data, using a scientific approach and professional equipments applied internationally. The output is maximized through selection of the most suitable turbines, optimal turbine distribution in the wind farm, and considering the specific turbine characteristics, and the grid connection. 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 Project activity than that which can be expected from the long-term averages. Therefore, it is impossible to increase the annual electricity generation by 13.60% throughout the whole lifetime of the Project.

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[11] Data source of year 2003 ~ 2009: China Statistical Yearbook 2010. China Statistics Press, September 1st 2010

[12] Data source of year 2003 ~ 2010: Statistics Communique of the Inner Mongolia Autonomus Region on the 2003 ~ 2010 National Economic & Social Development, Inner Mongolia Autonomous Region Bureau of Statistics. http://www.nmgtj.gov.cn/Html/jjshfztjgb/index.shtml

[13] According to the Information Note on the Highest Tariffs Applied by The Executive Board in its Decisions on Registration of Projects in China issued by the CDM EB (version 02), the historical highest tariff of wind power projects in Inner Mongolia is 0.54 RMB/kWh (incl. VAT)

To summarize, the project IRR of the Project could not reach the benchmark according to the sensitivity analysis and the additionality of the Project would not be influenced. The alternative (a) of the Project undertaken without being registered as a CDM project activity is not feasible.

Step3: Barrier analysis
This step is not adopted in this PDD.

Step4: Common practice analysis
The proposed project activity is not a first-of-its kind project, therefore the above test 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.

In line with the tool, if the Proposed Project Activity is one of four types of measures listed in paragraph 6, the common practice analysis is carried out in four steps identified in paragraph 47 of the tool:

(a) Fuel and feedstock switch;
(b) Switch of technology with or without change of energy source (including energy efficiency improvement as well as use of renewable energies);
(c) Methane destruction;
(d) Methane formation avoidance.

As a newly-built wind farm project, the proposed project is not a first-of-its kind project and belongs to the type (b) of measures above.

Therefore, the existing common practice is identified and discussed through the following steps:

Sub-step 4-1: Calculate applicable output range as +/-50% of the designed output or capacity of the proposed project activity.

The designed capacity of the proposed project activity is 49.5MW, so the relevant +/-50% range would be 24.75MW to 74.25MW.

Sub-step 4-2: In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project. Note their number N_{all}. Registered CDM project activities and projects activities undergoing validation shall not be included in this step;

Grid connected power generation varies considerably from location to location. In China, the regulatory framework and investment climate for grid-connected power generation projects are only similar and comparable for projects located in the same Province/Autonomous Region. Wind farm project proposals are approved by the provincial DRC, and the projects' EIAs by the provincial Environmental Protection Bureau. Thus it is reasonable to limit the analysis to projects located in the same Province/Autonomous Region. The project is located in Inner Mongolia, the common practice analysis of the proposed project activity, therefore, covers projects located in Inner Mongolia.

The proposed project activity start date is June 16th, 2011, therefore only projects which started commercial operation prior to June 16th, 2011 are considered.

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.

Therefore, all plants which are not registered as CDM projects and are not undergoing validation, delivering the capacity within the applicable output range and starting commercial operation before the starting date of the Proposed Project Activity are identified in Inner Mongolia. The number of all the projects is noted as N_{all}.

$N_{all} = N_{all,wind} + N_{all,other}$

Where:
N_{all} is all plants within the applicable output range and applicable geographical area, which started the commercial operation before the starting date of the Proposed Project Activity;
$N_{all,wind}$: Number of all wind projects delivering the capacity within the applicable output range, starting commercial operation before the starting date of the Proposed Project Activity, i.e. 16/06/2011 are identified in Inner Mongolia;
$N_{all,other}$: Number of all other projects (except wind farm project, such as Hydropower plants, biomass plants, etc) delivering the capacity within the applicable output range of 24.75MW - 74.25MW, starting commercial operation before the starting date of the Proposed Project Activity are identified in Inner Mongolia.

In accordance with the approved clarification[14], it is conservative in Step 2 to use $N_{all,wind}$ for N_{all} and in Step 3 $N_{diff,wind}$ for N_{diff}.

Using the statistics of installed wind power in China collated by Professor Shi Pengfei and Chinese Wind Energy Association[15], five projects can be identified which have not published a PDD on the UNFCCC website for global stakeholder consultation. For completeness the projects are listed below.

Table 8 Wind project activities identified in Inner Mongolia

Name	Capacity (MW)	Operation Date	Note
Keshiketeng Qi Dali Phase III	31.2	2003.12 (10.2MW) 2004.4 (21MW)	Demonstration project supported by national debt fund[16]
Bailingmiao Phase I wind power project (Bailingmiao I)	50	2007.12 (35MW) 2008.2 (15MW)	Registered as Voluntary Emission Reduction under Golden Standard Voluntary Carbon Standard[17]
Bailingmiao Phase II wind power project (Bailingmiao II)	50	2009	Registered as Voluntary Emission Reduction under Golden Standard Voluntary Carbon Standard[18]

[14] CLA_Tool_0015, http://cdm.unfccc.int/methodologies/PAmethodologies/tools-clarifications/30494

[15] "Statistics of domestic wind farm installation capacity in 2007", Shi Pengfei, see http://www.cwea.org.cn/upload/20080324.pdf. "Statistics of domestic wind farm installation capacity in 2008",see http://www.cwea.org.cn/upload/20090305.pdf.Shi Pengfei. "Statistics of domestic wind farm installation capacity in 2009", CWEA see http://www.cwea.org.cn/upload/201006102.pdf. "Statistics of domestic wind farm installation capacity in 2010", CWEA, see http://www.cwea.org.cn/upload/2010%E5%B9%B4%E9%A3%8E%E7%94%B5%E8%A3%85%E6%9C%BA%E5%AE%B9%E9%87%8F%E7%BB%9F%E8%AE%A1.pdf. "Statistics of domestic wind farm installation capacity in 2011", CWEA, see http://www.cwea.org.cn/download/display_info.asp?cid=9&sid=&id=44

[16] "National Debt Fund 30MW Project in Keshiketeng Banner," December 22, 2008, July 14, 2009<http://www.chifeng.gov.cn/html/2008-11/3130.shtml>.

[17] https://gs1.apx.com/mymodule/ProjectDoc/EditProjectDoc.asp?id1=449

[18] https://gs1.apx.com/mymodule/ProjectDoc/EditProjectDoc.asp?id1=505

Honiton Xiwu Phase I wind farm project (Xiwu I)	50	2010	Registered as Voluntary Emission Reduction under Golden Standard Voluntary Carbon Standard[19]
Inner Mongolia Mangniuhai II Wind Power Project	49.5	2009	Project rejected by EB[20] and till now no re-applying the CDM is found.

Therefore $N_{all}= N_{all,wind} = 5$

Sub-step 4-3: Within plants identified in Step 2, identify those that apply technologies different than the technology applied in the proposed project activity. Note their number N_{diff}.

Different technologies in the context of common practice are technologies that deliver the same output and differ by at least one of the following (as appropriate in the context of the measure applied in the proposed CDM project and applicable geographical area):

(a) Energy source/fuel;
(b) Feed stock;
(c) Size of installation (power capacity):
    (i) Micro (as defined in paragraph 24 of Decision 2/CMP.5 and paragraph 39 of Decision 3/CMP.6);
    (ii) Small (as defined in paragraph 28 of Decision 1/CMP.2);
    (iii) Large
(d) Investment climate in the date of the investment decision, inter alia:
    (i) Access to technology;
    (ii) Subsidies or other financial flows;
    (iii) Promotional policies;
    (iv) Legal regulations;
(e) Other features, inter alia:
    (i) Unit cost of output (unit costs are considered different if they differ by at least 20 %);

The number of plants within the applicable output range and applicable geographical area, which started the commercial operation before the starting date of the Proposed Project Activity, that apply technologies different than the technology applied in the proposed project activity can be found as follows:

$N_{diff} = N_{diff,wind} + N_{diff,other}$

Where
N_{diff} is all plants within the applicable output range and applicable geographical area, which started the commercial operation before the starting date of the Proposed Project Activity, that apply technologies different than the technology applied in the proposed project activity;
$N_{diff,wind}$ is the number of wind farm projects within the applicable output range and applicable geographical area, which started the commercial operation before the starting date of the Proposed Project Activity, that apply technologies different than the technology applied in the proposed project activity;
$N_{diff,other}$ is the number of all non-wind plants within the applicable output range and applicable geographical area, which started the commercial operation before the starting date of the

[19] https://gs1.apx.com/mymodule/ProjectDoc/EditProjectDoc.asp?id1=620

[20] http://cdm.unfccc.int/Projects/DB/DNV-CUK1267706086.52/view

Proposed Project Activity, because all non-wind plant apply technologies different than the technology applied in the proposed project activity.

However, in accordance with the approved clarification[21], it is conservative in Step 2 to use $N_{all,wind}$ for
N_{all} and in Step 3 $N_{diff,wind}$ for N_{diff}.

According to the “Tool-Additionality” para 9, different technologies in the context of common practice are technologies that deliver the same output and differ by at least one of the following: (a) Energy source/fuel; (b) Feed stock; (c) Size of installation; (d) Investment climate in the date of investment decision; (e) Other features. As shown in Table 8 above, Dali III was supported by National Debt Special Fund and Bailingmiao I, Bailingmiao II and Xiwu I got registered as Gold Standard Voluntary Emission Reductions Projects and obtained the carbon revenue. Therefore, the investment climate in the date of the investment decision of those four projects is different from the Project, inter alia: subsidies or other financial flows as indicated in “Tool- Additionality” para 9 (item (ii) under (d) Investment climate in the date of investment decision).

Therefore $N_{diff} = N_{diff,wind} = 4$

Sub-step 4-4: Calculated factor F = 1- N_{diff} /N_{all}, Representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity.

Therefore, with the conservative assumption that the number of non-wind projects is 0: F = 1 –

4/5 = 0.2

The proposed project activity is common practice within a sector in the applicable geographical areas if both the following conditions are fulfilled:

I. The factor F is greater than 0.2, and
II. $N_{all} – N_{diff}$ is greater than 3.

Therefore, the Proposed Project Activity is not considered common practice within the sector in the applicable geographical area, because:

I. F is 0.2, which is not greater than 0.2, and
II. $N_{all} – N_{diff}$ is 1, which is not greater than 3.

In conclusion, all the steps above are satisfied, the proposed CDM project is not a common practice and the project activity is additional.

B.6. Emission reductions

B.6.1. Explanation of methodological choices

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The emission reductions of the Project are calculated according to the following methods:
Baseline emissions

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y} \quad (1)$$

Where：

BE_y	=	Baseline emissions in year y, tCO_2/yr

[21] CLA_Tool_0015, http://cdm.unfccc.int/methodologies/PAmethodologies/tools-clarifications/30494

$EG_{PJ,y}$	=	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
$EF_{grid,CM,y}$	=	Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system", tCO_2/MWh

Calculation of $EG_{PJ,y}$

$$EG_{PJ,y} = EG_{facility,y} \quad (2)$$

$EG_{PJ,y}$	=	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
$EG_{facility,y}$	=	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y, MWh/yr

Calculation of $EF_{grid,CM,y}$

The "Tool to calculate the emission factor for an electricity system" (Version 02.2.1, EB 63) determines the CO_2 emission factor for the displacement of electricity generated by power plants in an electricity system, by calculating the "combined margin" emission factor (CM) of the electricity system. The CM is the result of a weighted average of two emission factors pertaining to the electricity system: the "operating margin" (OM) and the "building margin" (BM). The operating margin is the emission factor that refers to the group of existing power plants whose current electricity generation would be affected by the proposed CDM project activity. The build margin is the emission factor that refers to the group of power plants whose construction and future operation would be affected by the proposed CDM project activity.

The "Tool to calculate the emission factor for an electricity system" (Version 02.2.1, EB 63) provides procedures to determine the following parameters:

Parameter	SI Unit	Description
$EF_{CM,grid,y}$	$tCO_2/MW.h$	Combined margin CO_2 emission factor for the project electricity system
$EF_{BM,grid,y}$	$tCO_2/MW.h$	Build margin CO_2 emission factor for the project electricity system in
$EF_{OM,grid,y}$	$tCO_2/MW.h$	Operating margin CO_2 emission factor for the project electricity system in year y

The following six steps are applied to calculate the emission factor for an electricity system:

STEP 1: Identify the relevant electricity systems.
STEP 2: Choose whether to include off-grid power plants in the project electricity system (optional).
STEP 3: Select a method to determine the operating margin (OM).
STEP 4: Calculate the operating margin emission factor according to the selected method.
STEP 5: Calculate the build margin emission factor.
STEP 6: Calculate the combined margin (CM) emissions factor.

Step 1. Identify the relevant electric power system

For determining the electricity emission factors, identify the relevant project electricity system. Similarly, identify any connected electricity system. If a connected electricity system is located

partially or totally in Annex-I countries, then the emission factor of that connected electricity system should be considered zero. If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used.

The DNA has published a delineation of the project electricity system and connected electricity systems, therefore these delineations are used in accordance with the Tool[22]:

- The project electricity system is the North China Power Grid (NCPG), consisting of six provincial grids: Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia and Shandong.
- The connected electricity systems are the Northeast Power Grid (NEPG), consisting of three provincial grids: Jilin, Liaoning and Heilongjiang, and the Central China Power Grid (CCPG), consisting of Jiangxi, Henan, Hubei, Hunan, Chongqing and Sichuan. The NEPG and the CCPG export a mount of generated electricity to the NCPG as being indicated in the Tool[23].

For the purpose of this tool, the reference system is the project electricity system. Hence electricity transfers from a connected electricity systems to the project electricity system are defined as electricity imports while electricity transfers from the project electricity system to connected electricity systems are defined as electricity exports.
For the purpose of determining the build margin emission factor, the spatial extent is limited to the project electricity system, except where recent or likely future additions to the transmission capacity enable significant increases in imported electricity. In such cases, the transmission capacity may be considered a build margin source.

- There are no recent or likely future additions to transmission capacity that would enable significant increases in imported electricity; the data in Appendix 4 shows that imports are relatively small and have not changed significantly in the period covered. Therefore, the transmission capacity is not considered a build margin source.

For the purpose of determining the operating margin emission factor, use one of the following options to determine the CO2 emission factor(s) for net electricity imports from a connected electricity system:
0 tCO_2/MWh; or
1. The weighted average operating margin (OM) emission rate of the exporting grid, determined as
described in Step 4 (d) below; or
2. 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
3. The simple adjusted operating margin emission rate of the exporting grid, determined as described in Step 4 (b) below.

- Following the calculations of the DNA, the simple operating margin (option (b) is used to calculate the CO2 emission factors for net electricity imports ($EF_{grid,import,y}$).

For imports from connected electricity systems located in Annex-I country(ies), the emission factor is 0 tonnes CO2 per MWh.

- There are no imports from Annex-I country(ies).

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

- Electricity exports from the project electricity system to the connected electricity system are not subtracted from electricity generation data used for calculating and monitoring the electricity emission factors.

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[22] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf, Department of Climate Change, NDRC, 20-10-2011.
[23] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf, Department of Climate Change, NDRC, 20-10-2011.

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.

For the Project, the Option I is selected to calculate emission factor of the NCPG.

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

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) can be 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.

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

The Project is connected to the NCPG which is dominated by coal-fired power generation. Low-cost/must run power resources such as hydro, geothermal, wind, solar, nuclear and low cost biomass power only account for 0.75%，0 .79%、0.88%, 1.21% and 3.00% of the total electricity generated by the NCPG in each respective year from 2005 to 2009[24]. Because the low-cost/must-run resources constitute less than 50% of total grid generation in the average of the five most recent years prior to the start of the Project, the Simple OM can be used.

For the simple OM, the emissions factor can be calculated using either of the two following data vintages:

(a) Ex ante option: If the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use 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.

(b) Ex post option: If the ex post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. If the data required for calculating the emission factor for year y is available later than six months after the end of year y, the emission factor of the previous year (y-1) may be used. If the data is available 18 months after the end of year y, the emission factor of the year proceeding the previous year (y-2) may be used. The same data vintage (y, y-1 or y-2) should be used throughout all crediting periods.

For the project, ex ante option (a) is chosen to calculate the emission factor.

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[24] China Electric Power Yearbook Editorial Board, China Electric Power Yearbook (2006～2010 Version) (China Electric Power Publishing House, 2006～2010).

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

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

Option A: Based on the net electricity generation and a CO_2 emission factor of each power

unit;

Option B: Based on the total net electricity generation of all power plants serving the system andthe fuel types and total fuel consumption of the Project electricity system. The 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).

As the above three requirements are met, the Option B is used to calculate the Project's simple OM.

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_y} \quad (3)$$

$EF_{grid,OMsimple,y}$	=	Simple operating margin CO_2 emission factor in year y, tCO_2/MWh
$FC_{i,y}$	=	Amount of fossil fuel type i consumed in the project electricity system in year y(mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fossil fuel types i in year y, GJ/mass or volume unit
$EF_{CO2,i,y}$	=	CO_2 emission factor of fossil fuel type i in year y, t CO_2/GJ
EG_y	=	Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost/ must-run power plants/ units, in year y, MWh
i	=	All fossil fuel types combusted in power sources in the project electricity system in year y
y	=	Either the most recently three years for which data is available at the time of submission of the CDM-PDD to the DOE for validation, following the guidance on data vintage in step 2

Based on the amount of different fuels consumed, the power generation, the net caloric value, the oxidation rate and the emission factor, we can calculate the $EF_{grid,OM,y}$ of the year 2007-2009. The average emission factor is the 3-year generation-weighted average. For the Project, we adopt the $EF_{grid,OM,y}$ published by the Chinese DNA, which has a value of 0.9803 tCO_2/MWh. The details are shown in Appendix 4.

Step 5. Calculate the build margin emission factor

In terms of vintage of data, project participants can choose between one of the following two

options:

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

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

The Project uses the Option 1 to 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.

As per the emission factor tool (Version 02.2.1, EB63), the sample group of power units *m* used to
calculate the build margin should be determined as per the following procedure, consistent with the data vintage Option 1 selected above:

Identify the set of five power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently ($SET_{5\text{-units}}$) and determine their annual electricity generation ($AEG_{SET\text{-}5\text{-units}}$, in MWh);

Determine the annual electricity generation of the the project electricity system, excluding power units registered as CDM project activities (AEG_{total}, in MWh). Identify the set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20% of AEG_{total} (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) ($SET_{\geq 20\%}$) and determine their annual electricity generation ($AEG_{SET\text{-}\geq 20\%}$, in MWh);

From $SET_{5\text{-units}}$ and $SET_{\geq 20\%}$ select the set of power units that comprises the larger annual electricity generation (SET_{sample});

Identify the date when the power units in SET_{sample} started to supply electricity to the grid. If none of the power units in SET_{sample} started to supply electricity to the grid more than 10 years ago,
then use SET_{sample} to calculate the build margin. Ignore steps (d), (e) and (f).

Otherwise:

Exclude from SET_{sample} the power units which started to supply electricity to the grid more than 10 years ago. Include in that set the power units registered as CDM project

activity, starting with power units that started to supply electricity to the grid most recently, until the electricity generation of the new set comprises 20% of the annual electricity generation of the project electricity system (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) to the extent is possible. Determine for the resulting set ($SET_{sample-CDM}$) the annual electricity generation ($AEG_{SET-sample-CDM}$, in MWh);

If the annual electricity generation of that set is comprises at least 20% of the annual electricity generation of the project electricity system (i.e. $AEG_{SET-sample-CDM} \geq 0.2 \times AEG_{total}$), then use the sample group $SET_{sample-CDM}$ to calculate the build margin. Ignore steps (e) and (f).

Otherwise:

Include in the sample group $SET_{sample-CDM}$ the power units that started to supply electricity to the grid more than 10 years ago until the electricity generation of the new set comprises 20% of the annual electricity generation of the project electricity system (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation);

The sample group of power units m used to calculate the build margin is the resulting set ($SET_{sample-CDM->10yrs}$).

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

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad (4)$$

$EF_{grid,BM,y}$	=	Build margin CO_2 emission factor in year y, tCO_2/MWh
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit *m* in year y, MWh
$EF_{EL,m,y}$	=	CO_2 emission factor of power unit m in year y, tCO_2/MWh
m	=	Power units included in the build margin
y	=	Most recent historical year for which power generation data is available

However, in China it is very difficult to obtain the data of the five existing power plants built most recently ($SET_{5-units}$; and $AEG_{SET-5-units}$, in MWh) or the power plants capacity additions in the electricity system that comprise 20% of the system generation ($SET_{\geq 20\%}$; and $AEG_{SET-\geq 20\%}$, in MWh) and that were built most recently.

As there is insufficient information to perform the above calculation the Project calculates $EF_{grid,BM,y}$ using the following conservative alternative method agreed by the CDM Executive Board[25]

[25] " Request for clarification on use of approved methodology AM0005 for several projects in China", 28 December 2009 http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_QEJWJEF3CFBP1OZAK6V5YXPQKK7WYJ

Sub-step 5a. The corresponding percentage of the CO_2 emissions from the power generation using coal, oil and gas

$$\lambda_{Coal,y} = \frac{\sum_{i \in COAL,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \qquad (5)$$

$$\lambda_{Oil,y} = \frac{\sum_{i \in OIL,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \qquad (6)$$

$$\lambda_{Gas,y} = \frac{\sum_{i \in GAS,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \qquad (7)$$

$F_{i,j,y}$	=	The amount of fuel i consumed by relevant power sources j province in year y, t or m^3
$NCV_{i,y}$	=	Net calorific value of fossil fuel type i in year y, GJ/t or m^3
$EF_{CO_2,i,j,y}$	=	CO_2 emission factor of fossil fuel type i in year y, tCO_2/GJ

COAL, OIL and GAS represent the groups of solid, liquid and gas fuels respectively.

Sub-step 5b. Calculation of $EF_{Thermal,y}$

$$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y} \qquad (8)$$

$EF_{Coal,Adv,y}$, $EF_{Oil,Adv,y}$ and $EF_{Gas,Adv,y}$ are the emission factors of COAL, OIL , GAS-fired power with the best practised commercialized technology.

Sub-step 5c: Calculation of BM

$$EF_{grid,BM,y} = \frac{CAP_{Thermal,y}}{CAP_{Total,y}} \times EF_{Thermal,y} \qquad (9)$$

$CAP_{Total,y}$	=	The total incremental installed capacity of various power sources in the grid
$CAP_{Thermal,y}$	=	The incremental installed capacity of fuel-fired power

According to NDRC's "2010 Announcement about Confirming Baseline Emission Factors for Factor of Regional Power Grids in China", the Project assumes the weighted average coal consumption of the 30 lowest consuming 2008 built coal-fired power plants with a total installed capacity of 600MW as the best practice coal power technology. The estimated coal consumption of such a power plant 600MW is 314.35gce/kWh, corresponding to 39.08% electricity generation efficiency.

According to the statistics of the China Electricity Council (CEC) about the 2008 built gas and oil power plant, the 200MW combined-cycle power plant are defined as the best practice gas and oil power technology, and select the gas and oil power plant with actual highest power

supply efficiency for the estimation of the best practice technology. The coal consumption of the gas and oil plant is 238.74gce/KWH. This corresponds to 51.46% electricity generation efficiency.

On the basis of the above-mentioned calculation process, the $EF_{grid,BM,y}$ 0.6426tCO_2/MWh. Further details are provided in Appendix 4.

Step 6: Calculate the combined margin emissions factor

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

I. Weighted average CM; or
II. Simplified CM.

The weighted average CM method (option A) is used for the Project as the preferred option.

(a) Weighted average CM

The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \quad (10)$$

$EF_{grid,OM,y}$	=	Operating margin CO_2 emission factor in year y, tCO_2/MWh
$EF_{grid,BM,y}$	=	Building margin CO_2 emission factor in year y, tCO_2/MWh
w_{OM}	=	Weighting of operating margin emissions factor, %
w_{BM}	=	Weighting of build margin emissions factor, %

AS for the Project, in the crediting period, we adopt w_{OM}=0.75 and w_{BM}=0.25. Applying the $EF_{grid,OM}$, and $EF_{grid,BM,y}$ calculated above, we get $EF_{grid,CM,y}$ =0.8958 tCO_2/MWh.

(b) Simplified CM

Not suitable for the Project.

Project Emissions

According to ACM0002 (Version 12.3.0，EB 66), the Project emissions is zero.

Leakage

No leakage effects need to be accounted under this methodology.

Emission Reduction

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y \quad (11)$$

Where:

ER_y	=	Emission reductions in year y, tCO_2e/yr
BE_y	=	Baseline emissions in year y, tCO_2e/yr
PE_y	=	Project emissions in year y, tCO_2e/yr

Since PE_y is zero, ER_y can be calculated as follows:

$$ER_y = BE_y = EG_{PJ,y} * EF_{grid,CM,y} = EG_{facility,y} * EF_{grid,CM,y} \quad (12)$$

B.6.2. Data and parameters fixed ex ante

Data / Parameter	**$NCV_{i,y}$**
Unit	MJ/t or km^3
Description	Net calorific value (energy content) of fossil fuel types i consumed in the coal fired power plant connected to NCPG in year y
Source of data	China Energy Statistics Yearbook 2008-2010
Value(s) applied	Details can be seen in Annex3
Choice of data or Measurement methods and procedures	Published by China's DNA
Purpose of data	Baseline emissions calculation
Additional comment	-

Data / Parameter	**$EF_{CO2,i,y}$**
Unit	tC/GJ
Description	CO_2 emission factor of fossil fuel type i consumed in the coal fired power plant connected to NCPG in year y
Source of data	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied	Details can be seen in Annex3
Choice of data or Measurement methods and procedures	IPCC default value.
Purpose of data	Baseline emissions calculation
Additional comment	-

Data / Parameter	**$FC_{i,y}$**
Unit	t or m^3
Description	Amount of fossil fuel type i consumed in the project electricity system in year y
Source of data	China Energy Statistics Yearbook 2008-2010
Value(s) applied	Details can be seen in Annex3
Choice of data or Measurement methods and procedures	Published by China's DNA
Purpose of data	Baseline emissions calculation
Additional comment	-

Data / Parameter	EGy
Unit	MWh

Description	Net electricity generated and delivered to the NCPG by all power sources serving the system, not including low-cost/ must-run power plants/ units, in year y
Source of data	China Electric Power Yearbook 2008-2010
Value(s) applied	Details can be seen in Annex3
Choice of data or Measurement methods and procedures	Published by China's DNA
Purpose of data	Baseline emissions calculation
Additional comment	-

Data / Parameter	$F_{i,j,y}$
Unit	t
Description	The amount of fuel i consumed by relevant power sources j province of the NCPG in year y
Source of data	China Energy Statistics Yearbook 2010
Value(s) applied	Details can be seen in Annex3
Choice of data or Measurement methods and procedures	Published by China's DNA
Purpose of data	Baseline emissions calculation
Additional comment	-

Data / Parameter	$CAP_{Thermal,y}$
Unit	MW
Description	The incremental installed capacity of fuel-fired power in the NCPG
Source of data	China Electric Power Yearbook 2008-2010
Value(s) applied	Details can be seen in Annex3
Choice of data or Measurement methods and procedures	Published by China's DNA
Purpose of data	Baseline emissions calculation
Additional comment	-

Data / Parameter	$CAP_{Total,y}$
Unit	MW
Description	The total incremental installed capacity of various power sources in the NCPG
Source of data	China Electric Power Yearbook 2008-2010
Value(s) applied	Details can be seen in Annex3

Choice of data or Measurement methods and procedures	Published by China's DNA
Purpose of data	Baseline emissions calculation
Additional comment	-

Data / Parameter	$EF_{Coal,Adv,y}$
Unit	%
Description	Commercially available coal-fired power plant corresponding to the best practice in terms of efficiency
Source of data	Chinese DNA "2011 Bulletin on Baseline Emission Factors of the China's Regional Grids-the calculations of baseline Build Margin emission factor for the China Regional Grids"
Value(s) applied	39.45%
Choice of data or Measurement methods and procedures	National specific value
Purpose of data	Baseline emissions calculation
Additional comment	-

Data / Parameter	$EF_{Oil,Adv,y}$/$EF_{Gas,Adv,y}$
Unit	%
Description	Commercially available oil and gas power plant corresponding to the best practice in terms of efficiency
Source of data	Chinese DNA "2011 Bulletin on Baseline Emission Factors of the China's Regional Grids-the calculations of baseline Build Margin emission factor for the China Regional Grids"
Value(s) applied	51.77%
Choice of data or Measurement methods and procedures	National specific value
Purpose of data	Baseline emissions calculation
Additional comment	-

B.6.3. Ex ante calculation of emission reductions

>>

1. Baseline Emissions

Calculation of the baseline emission factor:

Step 1. Calcualte the operating marging emission factor $EF_{grid,OM,y}$:

The value of $EF_{grid,OM,y}$ used in this PDD is 0.9803 tCO_2/MWh published by the Chinese DNA, which details are shown in Appendix 4;

Step 2. Calcualte the building marging emission factor $EF_{grid, BM, y}$:
The value of $EF_{grid, BM, y}$ used in this PDD is 0.6426tCO_2/MWh published by the Chinese DNA, which details are shown in Appendix 4;

Step 3. Calcualte the combined baseline emission factor $EF_{grid, CM, y}$:

$$EF_{grid,\ CM,\ y} = \omega_{OM,\ y} \times EF_{grid,\ OM,\ y} + \omega_{BM,\ y} \times EF_{grid,\ BM,\ y}$$
$$= 0.75 \times 0.9803 + 0.25 * 0.6426$$
$$= 0.8958 \quad tCO_2 / MWh$$

Calculation of the baseline emissions:

According to the FSR, the annual amount of electricity to be delivered to the grid from the proposed Project is $EG_{facility, y}$ = 102,540 MWh.

So the annual baseline emissions (BE_y) are:

$$BE_y = EG_{facility,\ y} \times EF_{grid,\ CM,\ y} = 108{,}502 \times 0.8958 = 97{,}196.1 \quad tCO_2$$

2. Project Emissions

PE_y = 0.

3. Emission Reductions

The average annual emissions reduction of the Project activity is:

$$ER_y = EG_{facility,y} \times EF_{grid,CM,y} = 108{,}502 MWh \times 0.8958 tCO_2 / MWh = 97{,}196.1 tCO_2$$

B.6.4. Summary of ex ante estimates of emission reductions

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
1st January 2013-31st December 2013	97,196	0	0	97,196
2014	97,196	0	0	97,196
2015	97,196	0	0	97,196
2016	97,196	0	0	97,196
2017	97,196	0	0	97,196
2018	97,196	0	0	97,196
2019	97,196	0	0	97,196
2020	97,196	0	0	97,196
2021	97,196	0	0	97,196
2022	97,196	0	0	97,196
Total	971,960	0	0	971,960
Total number of crediting years	10			
Annual average over the crediting period	97,196	0	0	97,196

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data / Parameter	$EG_{export,\ y}$
Unit	MWh
Description	Quantity of electricity exported to the grid by the project in year y
Source of data	Electricity meters
Value(s) applied	108,502
Measurement methods and procedures	Continuously monitored and monthly recorded by Mg installed at the 1# 220kV booster station. Besides, M1.1, M1.2, M1.3 installed at 35kV transmission line would monitor electricity imported and exported by the Project and M2.1, M2.2, M2.3 istalled at 35kV transmission line would monitor electricity imported and exported by Phase II.. The data will be archived and kept at least for two years after the end of the last crediting period. The accuracy of the main meter and the backup meter is no lower than 0.5s.
Monitoring frequency	Continuously monitored
QA/QC procedures	Meters will be calibrated and checked yearly by qualified third party for accuracy in accordance with national standards. Meter data measurements of the total electricity exported to the grid by the Project and Phase II will be cross-checked with electricity sales receipts (or Electricity Transaction Notes).
Purpose of data	Baseline emissions calculation
Additional comment	$EG_{export,y} = ES_{total,export,y} \times \frac{\sum_{i=1}^{3} ES_{I,\ i,\ export,\ y}}{\sum_{i=1}^{3} ES_{I,\ i,\ export,\ y} + \sum_{i=1}^{3} ES_{II,\ i,\ export,\ y}}$ For the details, please refer to Appendix 6.

Data / Parameter	$EG_{import,\ y}$
Unit	MWh
Description	Quantity of electricity imported from the grid to the project in year y
Source of data	Electricity meters
Value(s) applied	0
Measurement methods and procedures	Continuously monitored and monthly recorded by Mg installed at the 1# 220kV booster station. Besides, M1.1, M1.2, M1.3 installed at 35kV transmission line would monitor electricity imported and exported by the Project and M2.1, M2.2, M2.3 installed at 35kV transmission line would monitor electricity imported and exported by Phase II. The data will be archived and kept at least for two years after the end of the last crediting period. The accuracy of the main meter and the backup meter is no lower than 0.5s.
Monitoring frequency	Continuously monitored
QA/QC procedures	Meters will be calibrated and checked yearly by qualified third party for accuracy in accordance with national standards. Meter data measurements of the total electricity imported from the grid by the project and Phase II will be cross-checked with electricity sales receipts (or Electricity Transaction Notes).
Purpose of data	Baseline emissions calculation

Additional comment	**EG**$_{\textbf{import,y}}$ = $ES_{total,import,y} \times \frac{\sum_{i=1}^{3} ES_{I,\ i,\ import,\ y}}{\sum_{i=1}^{3} ES_{I,\ i,\ import,\ y} + \sum_{i=1}^{3} ES_{II,\ i,\ import,\ y}}$ For the details, please refer to Appendix 6.

Data / Parameter	**EG**$_{\textbf{facility,y}}$
Unit	MWh/yr
Description	Quantity of net electricity generation supplied by the Project to the grid in year y
Source of data	**EG**$_{\textbf{facility,y}}$ = $EG_{export,\ y} - EG_{imxport,\ y}$
Value(s) applied	108,502
Measurement methods and procedures	Quantity of electricity exported to the grid by the project and quantity of electricity imported from the grid to the project in year y Continuously monitored and monthly recorded by the main meter installed at the 220kV booster station and the backup meter installed at the Desheng 220kV substation. The data will be archived and kept at least for two years after the end of the last crediting period. The accuracy of the main meter and the backup meter is no lower than 0.5s.
Monitoring frequency	Continuously monitored
QA/QC procedures	Meters will be calibrated and checked yearly by qualified third party for accuracy in accordance with national standards.. The accuracy of the meters meets the national standards, and the metering equipments shall have sufficient accuracy.
Purpose of data	Baseline emissions calculation
Additional comment	

B.7.2. Sampling plan

>>
N/A

B.7.3. Other elements of monitoring plan

>>

The monitoring plan aims to ensure that the emission reduction is realized during the crediting period. ACM0002 requires all data collected as part of the monitoring plan to be archived and kept for at least two years after the end of the crediting period.

1. Monitoring Structure

The project owner will appoint a CDM manager with responsibility for monitoring the data related to the calculation of emission reductions. Technical and financial teams will also be organized to assist the CDM manager, as displayed in Figure 6 below.

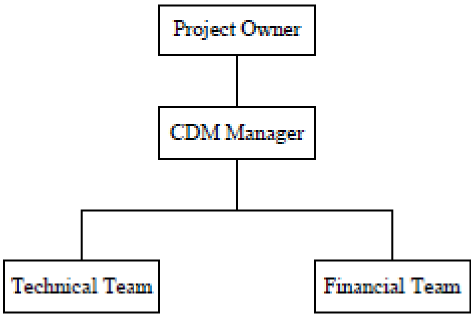

Figure 6 The monitoring structure

The CDM manager will have full responsibility for matters relating to the CDM, including:

Tracking the development of CDM;

Supervising and checking the process of measuring record, data collection, and calculation of emission reductions;

Ensuring monitoring data integrity and accuracy; and

Performing CER-issuance related tasks.

The **technical team** will be responsible for the calibration and maintenance of meters, data recording and verification, archive management and periodic data summaries as required by the CDM manager.

The **financial team** will be responsible for the preparation, custody and drafting of relevant financial documents.

2. Monitored Data

During the ten years crediting period, all the parameters listed in section B.7.1 will be monitored.

3. Installation of Monitoring Equipment

The total electricity exported and imported by the Project and Phase II is monitored by the main meter Mg （getaway meter）installed at the 1# 220kV booster station and the backup meter Mg'(evaluation meter) installed at the Desheng 220kV substation. Besides, M1.1, M1.2, M1.3 installed at 35kV transmission line monitor electricity imported and exported by the Project and M2.1, M2.2, M2.3 installed at 35kV transmission line monitor electricity imported and exported by Phase II. In case of the gateway meter falling out of order, the readings from the evaluation meter is used.

The metering equipments will be properly configured and checked periodically according to relevant national standards. The metering equipments will be checked by the project owner and the grid company before operation.

4. Procedures for Emergency

If the main gateway meter reading exceeds the allowable error or the meter functions improperly, the net electricity generated by the Project shall be determined by:

Reading the backup gateway meter, unless a test by either party reveals that it is inaccurate;

If the errors of both the gateway meters exceed the national or trade standard allowance levels, the quantity of electricity supplied to the NCPG will be calculated as follows:

The total amount of electricity exported to or imported from the grid will be calculated according to the evaluation electricity meter reading and the historical line loss rate, unless either party doubts the meter's accuracy;

If the evaluation electricity meter does not have an acceptable level of precision, EPTT and the grid company will design a reasonable and conservative evaluation method together. In this event, EPTT will provide sufficient evidence to demonstrate the method's rationality and conservatism during the validation and verification processes.

If EPTT and the grid company are unable to agree on the evaluation method, they will participate in an arbitration process to ensure the consistency of the evaluation method as provided for by their agreement

5. Calibration

An agreement about the quality control procedures of electricity meters' measurement and calibration to ensure accuracy will be signed between the project owner and the grid company. The electricity meters will be calibrated and checked annually according to national standard. Calibration will be carried out by the grid company. The grid company will supply calibration records to the project owner, which will be retained. The electricity meters will be jointly inspected and sealed by the parties concerned and not be interferrd by either party except in the presence of the other party.

All installed meters will be tested by a third party within ten days after:

The detection of a difference larger than the allowable error in the readings of both meters;

The repair of a meter caused by the failure of one or more parts to operate in accordance with the specifications.

6. Data Collection and Handling

EPTT and the grid company will read and record the data both from the electricity meters on the last day of every month. This data will then be checked by each respective party.

The grid company will provide NCPG electricity supply data to EPTT. EPTT will provide invoices to the grid company, storing copies of the invoices.

EPTT will finally provide the data record reading from the gateway electricity meter (Mg) and retain copies of the invoices to DOE.

If electricity meter errors exceed national or trade standard allowance levels, the quantity of electricity supplied to the NCPG will be calculated as follows:

The quantity of electricity supplied to the NCPG will be calculated according to the evaluation electricity meter reading and the historical line loss rate, unless either party doubts the meter's accuracy.

If the evaluation electricity meter does not have an acceptable level of precision, EPTT and the grid company will design a reasonable and conservative evaluation method together. In this event, EPTT will provide sufficient evidence to demonstrate the method's rationality and conservatism during the validation and verification processes.

If EPTT and the grid company are unable to agree on the evaluation method, they will participate in an arbitration process to ensure the consistency of the evaluation method as provided for by their agreement.

7. Data Management

The monitoring data will be archived in both electronic and paper format at the end of each month, and will be preserved for two years after the end of the crediting period. Electronic files will be backed up onto CDs or disks, and paper files will be printed out. The CDM manager will collect the data in both written and electronic format on a monthly basis, and store additional copies of the data in a secure location to ensure its availability upon request.

The CDM manager will also provide documents about the Project and the index of monitoring report to facilitate the DOE's acquisition of information related to the Project's emission reductions. Paper files, such as maps, drawings, and EIA report will be referred to in conjunction with the monitoring plan in order to validate the information supplied.

8. The Monitoring Report

The Project's monitoring report will be submitted to the DOE upon completion. This will include information relating to the monitoring of the export and import of electricity to and from the power grid, emissions reduction calculations and the calibration and maintenance of monitoring equipment.

B.8. Date of completion of application of methodology and standardized baseline and contact information of responsible persons/ entities

>>
Completion Date: 7th February, 2017.
Name of person completing the baseline study and monitoring methodology: Responsible Person: Yiping Qu
Responsible Entity: Eco-Tec Asia (Beijing) Co., Ltd.
Address: 18A Zhong Guan Chun South Street, B1505, New Logo International Building, Haidian District of Beijing City, 100081
Telephone: (86) 10 6215 6001 ext 812
Facsimile: (86) 10 6215 6006
E-mail: yiping.qu@ecotec-asia.com

The person / entity is not a project participant.

SECTION C. Duration and crediting period

C.1. Duration of project activity

C.1.1. Start date of project activity

>>
The Project's starting date is 16th, June 2011, the date of wind turbines' foundation construction contract being signed. This is the earliest date on which the project participant has committed to expenditures related to the implementation or related to the construction of the Project.

C.1.2. Expected operational lifetime of project activity

>>
20 years 0 month

C.2. Crediting period of project activity

C.2.1. Type of crediting period

>>
Fixed

C.2.2. Start date of crediting period

>>
1st January 2013[26]

C.2.3. Length of crediting period

Ten years 0 month

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

>>
The project's Environmental Impact Assessment ("**EIA**") was compiled by Inner Mongolia Environmental Protection Science Research Institute. The EIA was then approved by the Environmental Protection Bureau of Inner Mongolia Autonomous Region on 15th September 2010. A summary of the environmental impacts contained in the EIA is presented below.

Construction Phase

<u>Air</u>

The Project's impacts on the air will mainly occur during construction phase. The main sources of air pollution will be powdery material stack and transportation. Measures taken to mitigate this air pollution will include:

Forbidding to construct in strong windy days;

Reducing the disturbed area on the ground;

Slowing down the speed of the vehicles;

<u>Water</u>

Waste water generated in the construction phase will include construction waste water and domestic sewage. Construction waste water will be generated from washing and maintenance of the vehicles and machines, whose key pollution are SS and petroleum. Domestic sewage will be generated from the daily
life of the builders, whose key pollution are CODcr、BOD_5、SS, animal and vegetable oils. Measures
taken to mitigate this water pollution will include:

<u>Construction waster water</u>

Construction waste water will be treated by oil separating tank and sedimentation tank, from which the supernatant can be discharged directly and the mud will be transported to the landfill with other construction solid wastes.

Temporary settling basins will be built in backfill stacking site and construction mud sources. Muddy water will be discharged after be treated by settling basins.

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[26] If the registration date is later than 1st January 2013, the registration date will be adjusted to be the crediting period's start date.

Domestic sewage

Canteen sewage will be treated by oil separating tank.

Other domestic sewage will be treated by septic tank.

Noise

Construction machinery will generate noise. The main noise sources are pneumatic drill and concrete mixer. The noise of the Project will not have great negative effect on neighborhoods and wildlife according to the noise source intensity attenuation calculation.

Solid Waste

Solid waste generated by the builders' daily life, sludge generated by the waste water treatment facilities and spoil generated by the Project construction are included in the construction phase. Measures taken to mitigate this solid waste pollution will include:

Solid waste generated by the builders' daily life will be collected and delivered to the approved landfill.

Sludge also will be collected and delivered to the approved landfill after being dehydrated, concentrated and desiccated.

Spoil will be delivered to the approved spoil ground.

Ecology

The main ecological impacts of the Project include soil erosion and water loss since ground vegetation be destroyed. According to analysis in the EIA, the Project has limited impacts on local vegetation and soil after grass being planted.

Operation Phase

Air

The Project has no negative impacts on the air during operation phase.

Water

Waste water generated in the operation phase mainly refers to domestic sewage. The domestic sewage will be treated by integrated sewage treatment instrument, such as LDZ-48 and the effluent can meet the discharge standard.

Noise

The main noise is sourced from the rotation of wind turbines during the operation phase. The noise of the Project will not have great negative effect on neighborhoods and wildlife according to the noise source intensity attenuation calculation.

Solid waste

The solid waste is mainly generated by the daily life of the workers during the operation phase and will be collected and delivered to the approved landfill.

Electromagnetic radiation

According to the analogical monitoring data, the power frequency electric field and magnetic field intensities fluctuation range of the 220kV substation (booster stations) are 1.22~1.25V/m and
0.015~0.985μT during the operation phase respectively, both of which are far below the recommended
standard (power frequency electric field intensity: 4kV/m; power frequency magnetic field intensity:
0.1mT) of the *Technical Regulations On Environmental Impact Assessment of Electromagnetic Radiation*
Produced By 500kV Ultrahigh Voltage Transmission and transfer power Engineering (HJ/T24-1998)[27]

Ecology

Grassland biomass

The grassland biomass will reduce due to the construction of the Project. After the Project is completed, the area been temporary occupied will be re-planted and the vegetation coverage will be lager than before. Therefore, the Project will not have great negative impacts on local eco-environmental quality.

Wild life

The project's impacts on birds mainly exist in two aspects: one is the rotation of the blades, the other is the noise generated by wind turbines. Measures taken to mitigate the impacts on birds will include:

Enforcing the observation of birds' activity characteristics and adjusting the wind turbines operation plan.

Adding lamplight to the wind turbines.

Landscape

The wind turbines and the beautiful natural landscape will constitute a unique human landscape after the construction of the Project. The local landscape will be improved greatly and bring opportunities for the development of the tourism industry, and promote the local economic and environmental development.

Conclusion

The Project's impacts on the environment will be controlled and mitigated in every respect. Overall the
Project is not expected to have significant impact on the environment.

D.2. Environmental impact assessment

>>

The EIA approved by the Environmental Protection Bureau of Inner Mongolia Autonomous Region states that the project's environmental impact is not considered being significant.

[27] State Environmental Protection Administration, Technical Regulations On Environmental Impact Assessment of Electromagnetic Radiation Produced By 500kV Ultrahigh Voltage Transmission and transfer power Engineering (HJ/T24-1998) (November 19, 1998).

SECTION E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

>>

EPTT released an announcement in nearby villages on 1st April 2010 and invited local stakeholders to comment at a meeting about the Project on 11th April 2010. Thirty six stakeholders attended the meeting and asked to complete questionnaires. The composition of the stakeholders present at the meeting is displayed in Table 9 to Table 11 below.

Table 9 Stakeholder Composition by Occupation

Occupation	Number	Percentag
Government Official	5	13.89%
Labour	11	30.56%
Farmer	9	25.00%
Teacher	3	8.33%
Student	2	5.56%
Others	6	16.67%

Table 10 Stakeholder Composition by Age

18-25	3	8.33%
26-45	28	77.78%
46+	5	13.89%

Table 11 Stakeholder Composition by Education Level

Junior high school and below	14	38.89%
Senior high school	7	19.44%
Undergraduate and above	15	41.67%

The questionnaire asked the following six questions:

Do you have any knowledge or understanding about wind farm projects?
What is your attitude towards the local wind power projects?
What is your attitude towards the Project?
How will the Project affect your quality of living, studying and working?
Will the Project have a negative impact on the environment?
How will the project impact on the local economy?

E.2. Summary of comments received

>>

Thirty six questionnaires were distributed to local stakeholders and all of the questionnaires were returned. The respondents' comments can be summarized as follows:

1. 69.44% of the respondents understand the information about wind farm project and the other 30.56% of the respondents know a little about that;
2. 83.33% of the respondents held the positive attitude towards the local wind power projects;
3. 94.44% of the respondents supported the construction of the Project and the other 5.56% of the respondents do not care about whether the Project is constructed or not;
4. 80.56% of the respondents believed that the construction of the Project would improve the quality of living, studying and working for local residents and the other 19.44% of the respondents think the Project's impact on improving the quality of living, studying and working for local residents is very limited;
5. 100% of the respondents believed the Project's construction would have no negative impact on the local environment;
6. 91. 67% of the respondents believed that the construction of the Project would assist local economic development and the other 8.33% of the respondents think the project's impact on assisting local economic development is very limited.

E.3. Report on consideration of comments received

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No negative comments were received from the local stakeholders. Therefore, the Project's design has not been modified.

SECTION F. Approval and authorization

>>

On 15 September 2010, The project received approval of EIA. On 29 December 2010, The project received approval of the FSR.

Appendix 1. Contact information of project participants and responsible persons/ entities

Project participant and/or responsible person/ entity	☒ Project participant ☐ Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity
Organization name	Inner-Mongolia Electric Power Transmission and Transformation Co., Ltd.
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Project participant and/or responsible person/ entity	☒ Project participant ☒ Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity
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Appendix 2. Affirmation regarding public funding

There is no public funding from Annex I countries involved in the Project.

Appendix 3. Applicability of methodology and standardized baseline

N/A

Appendix 4. Further background information on ex ante calculation of emission reductions

Table A1-A6 below shows the data and calculation process of the OM emission factor of NCPG. Table
A7-A12 show data used to calculation BM emission factor of NCPG.

Table A1 Operation Margin Emission Factor of NCPG in 2007

Fuel Type	Unit	Beijing A	Tianjin B	Hebei C	Shanxi D	Inner Mongolia E	Shandong F	Sub-total G=A+B+C+D+E+F	Carbon conten (tC/TJ) H	OXID (%) I	Fuel emission ($kgCO_2/TJ$) J	NCV (MJ/t, km^3) K	CO_2emission(tCO_2e) L=G×J×K/100000 (mass unit) L=G×J×K/10000 (volume unit)
Coal	10^4t	816.17	1753.99	7716.13	7510.06	10434.25	11884.83	**40115.43**	25.8	100	87,300	20,908	732,214,267
Cleaned coal	10^4t						18.43	**18.43**	25.8	100	87,300	26,344	423,859
Other washed coal	10^4t	5.76		156.89	478.81	48.57	756.84	**1446.87**	25.8	100	87,300	8,363	10,563,452
Briquette	10^4t	7.93					42.86	**50.79**	26.6	100	87,300	20,908	927,054
Coke	10^8m^3			0.02			4.09	**4.11**	29.2	100	95,700	28,435	111,843
Coke oven gas	10^8m^3	0.07	0.72	3.13	25.46	2.58	13.61	**45.57**	12.1	100	37,300	16,726	2,843,020
Other gas	10^4t	11.8	7.6	88.38	72.8	28.17	29.64	**238.39**	12.1	100	37,300	5,227	4,647,821
Crude oil	10^4t							**0**	20	100	71,100	41,816	0
Gasoline	10^4t			0.01				**0.01**	18.9	100	67,500	43,070	291
Diesel	10^4t	0.33		2.35		0.62	5.08	**8.38**	20.2	100	72,600	42,652	259,490
Fuel oil	10^4t	4.74		0.18			2.35	**7.27**	21.1	100	75,500	41,816	229,522
LPG	10^4t							**0**	17.2	100	61,600	50,179	0
Refinery gas	10^8m^3	0.06		2.85			1.65	**4.56**	15.7	100	48,200	46,055	101,225
Natural gas	10^4t	5.03	0.73		0.54	4.22	0.01	**10.53**	15.3	100	54,300	38,931	2,225,993
Other oil product	10^4t	1.72						**1.72**	20	100	75,500	41,816	54,302
Other coking product	10^4t ce	4.74						**4.74**	25.8	100	95,700	28,435	128,986
Other energy		11.94		76.31	360.26	30.75	163.48	**643.68**	0	0	0	0	0
												Sub-total	754,731,124

<China Energy Statistics Yearbook 2008>

Table A2 Thermal Power Generation of NCPG in 2007

Item	Electricity generation （10^8kWh）	Electricity generation （MWh）	Auxiliary electricity consumption (%)	Electricity delivered to the grid (MWh)
Beijing	223	22,300,000	7.51	20,625,270
Tianjin	399	39,900,000	6.53	37,294,530
Hebei	1633	163,300,000	6.67	152,407,890
Shanxi	1734	173,400,000	7.99	159,545,340
Inner Mongolia	1801	180,100,000	7.77	166,106,230
Shandong	2591	259,100,000	7.23	240,367,070
Total		838,100,000		776,346,330

<China Electric Power Yearbook 2008>

In addition, in year 2007, Northeast China Power Grid supplied 1,789,750MWh electricity to NCPG and the emission factor of Northeast China Power Grid was 1.08186; Central China Power Grid supplied 803,000MWh electricity to NCPG and the emission factor of Central China Power Grid was 1.10197. Therefore, total CO_2 emission of NCPG in 2007 is 757,552,268 tCO_2, total electricity delivered to NCPG is 778,939,080MWh, and thus the emission factor in 2007 is 0.97254.

Table A3 Operation Margin emission factor of NCPG in 2008

Fuel Type	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Sub-total	Carbon conten (tC/TJ)	OXID (%)	Fuel emission ($kgCO_2/TJ$)	NCV ($MJ/t, km^3$)	CO_2emission(tCO_2e) L=G×J×K/100000 (mass unit)
		A	B	C	D	E	F	G=A+B+C+D+E+F	H	I	J	K	L=G×J×K/10000 (volume unit)
Coal	10^4t	755.75	1800.12	7353.33	7854.39	12607.82	12360.75	**42732.16**	25.8	100	87,300	20,908	779,976,613
Cleaned coal	10^4t						23.88	**23.88**	25.8	100	87,300	26,344	549,200
Other washed coal	10^4t	5.05		134.52	582.39	66.2	691.21	**1479.37**	25.8	100	87,300	8,363	10,800,731
Briquette	10^4t	5.66			32.49		45.38	**83.53**	26.6	100	87,300	20,908	1,524,647
Coke	10^8m^3			0.02			6.07	**6.09**	29.2	100	95,700	28,435	165,723
Coke oven gas	10^8m^3	0.11	0.86	8.37	24.55	3.55	16.2	**53.64**	12.1	100	37,300	16,726	3,346,491
Other gas	10^4t	10.4	9.08	187.54	36	34.32	29.76	**307.1**	12.1	100	37,300	5,227	5,987,440
Crude oil	10^4t					0.02		**0.02**	20	100	71,100	41,816	595
Gasoline	10^4t							**0**	18.9	100	67,500	43,070	0
Diesel	10^4t	0.15		3.08		0.35		**3.58**	20.2	100	72,600	42,652	110,856
Fuel oil	10^4t	2.56		0.25				**2.81**	21.1	100	75,500	41,816	88,715
LPG	10^4t							**0**	17.2	100	61,600	50,179	0
Refinery gas	10^8m^3	0.44		2.93				**3.37**	15.7	100	48,200	46,055	74,809
Natural gas	10^4t	11.09	0.7		0.97	2.12		**14.88**	15.3	100	54,300	38,931	3,145,563
Other oil product	10^4t	1.45						**1.45**	20	100	72,200	41,816	43,777
Other coking product	10^4t ce	7.97		7.61				**15.58**	25.8	100	95,700	28,435	423,968
Other energy		4.9	2.34	61.02	466	63.72	141.71	**739.69**	0	0	0	0	0
												Sub-Total	806,239,126

<China Energy Statistics Yearbook 2009>

Table A4 Thermal Power Generation of NCPG in 2008

Item	Electricity generation (10^8kWh)	Electricity generation (MWh)	Auxiliary electricity consumption (%)	Electricity delivered to the grid (MWh)
Beijing	243	24,300,000	7.14	22,564,980
Tianjin	397	39,700,000	7.05	36,901,150
Hebei	1580	158,000,000	6.9	147,098,000
Shanxi	1762	176,200,000	8.22	161,716,360
Inner Mongolia	2008	200,800,000	7.96	184,816,320
Shandong	2689	268,900,000	7.14	249,700,540
Total		867,900,000		802,797,350

<China Electric Power Yearbook 2009>

In addition, in year 2008, Northeast China Power Grid supplied 5,286,140MWh electricity to NCPG and the emission factor of Northeast China Power Grid was 1.10489. Therefore, total CO_2 emission of NCPG in 2008 is 812,079,707 tCO_2, total electricity delivered to NCPG is 808,83,490MWh, and thus the emission factor in 2008 is 1.00495.

Table A5 Operation Margin emission factor of NCPG in 2009

Fuel Type	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Sub-total	Carbon conten (tC/TJ)	OXID (%)	Fuel emission ($kgCO_2$/TJ)	NCV (MJ/t, km^3)	CO_2emission(tCO_2e) L=G×J×K/100000 (mass unit) L=G×J×K/10000 (volume unit)
		A	B	C	D	E	F	G=A+B+C+D+E+F	H	I	J	K	
Coal	104t	665.16	1870.36	7623.94	8024.02	12538.57	12654.05	43376.1	25.8	100	87,300	20,908	791,730,246
Cleaned coal	104t						11.7	11.7	25.8	100	87,300	26,344	269,080
Other washed coal	104t	6.15		247.51	586.04	104.69	862.02	1806.41	25.8	100	87,300	8,363	13,188,417
Briquette	104t	3.73					31.83	35.56	26.6	100	87,300	20,908	649,065
Coke	108m3						10.43	10.43	29.2	100	95,700	28,435	283,824
Coke oven gas	108m3	0.13	1.27	8.72	19.48	3.35	11.69	44.64	12.1	100	37,300	16,726	2,784,999
Other gas	104t	10.23	13.43	228.32	35.89	48.35	37.21	373.43	12.1	100	37,300	5,227	7,280,656
Crude oil	104t					0.13		0.13	20	100	71,100	41,816	3,865
Gasoline	104t						0.01	0.01	18.9	100	67,500	43,070	291
Diesel	104t	0.1		2.38		2.64	3.07	8.19	20.2	100	72,600	42,652	253,606
Fuel oil	104t	0.82		0.19		0.02	2.63	3.66	21.1	100	75,500	41,816	115,550
LPG	104t							0	17.2	100	61,600	50,179	0
Refinery gas	108m3	0.83		3.95			3.44	8.22	15.7	100	48,200	46,055	182,472
Natural gas	104t	13.55	0.63		4.39	2.03	0.03	20.63	15.3	100	54,300	38,931	4,361,086
Other oil product	104t	1.52					23.18	24.7	20	100	72,200	41,816	745,721
Other coking product	104t ce	6.62		7.79			5.52	19.93	25.8	100	95,700	28,435	542,341
Other energy			2.11	62.14	570.3	90.63	137.68	862.86	0	0	0	0	0
												小计	822,391,221

<China Energy Statistics Yearbook 2009>

Table A6 Thermal Power Generation of NCPG in 2008

Item	Electricity generation (10^8kWh)	Electricity generation (MWh)	Auxiliary electricity consumption (%)	Electricity delivered to the grid (MWh)
Beijing	241	24,100,000	6.55	22,521,450
Tianjin	413	41,300,000	6.8	38,491,600
Hebei	1733	173,300,000	6.92	161,307,640
Shanxi	1850	185,000,000	8.1	170,015,000
Inner Mongolia	2135	213,500,000	7.82	196,804,300
Shandong	2858	285,800,000	7.43	264,565,060
Total		923,000,000		853,705,050

<China Electric Power Yearbook 2009>

In addition, in year 2008, Northeast China Power Grid supplied 6,982,610MWh electricity to NCPG and the emission factor of Northeast China Power Grid was 1.06915. Therefore, total CO_2 emission of NCPG in 2008 is 829,856,644 tCO_2, total electricity delivered to NCPG is 860,687,660MWh, and thus the emission factor in 2009 is 0.96418.

According to the analysis above, the weighted average operation margin emission factor of NCPG is 0.98030.

Table A7 Share of Emission from Coal, Oil and Gas Fuel in Electricity Generation in NCPG

Fuel type	Unit	Beijing	Tianjin	Hebei	Shanxi	Shandong	Inner Mongolia	Total	NCV	Emission factor	OXID	Emission
		A	B	C	D	E	F	G=A+…+F	H	I	J	K=G＊H＊I＊J/100,000
Coal	10^4t	665.16	1,870.36	7,623.94	8,024.02	12,654.05	12,538.57	43,376.10	20,908	87,300	1	791,730,246
Cleaned coal	10^4t	0	0	0	0	11.7	0	11.70	26,344	87,300	1	269,080
Other washed coal	10^4t	6.15	0	247.51	586.04	862.02	104.69	1,806.41	8,363	87,300	1	13,188,417
Briquette	10^4t	3.73	0	0	0	31.83	0	35.56	20,908	87,300	1	649,065
Coke	10^4t	0	0	0	0	10.43	0	10.43	28,435	95,700	1	283,824
Other coking product	10^4t	6.62	0	7.79	0	5.52	0	19.93	28,435	95,700	1	542,341
Sub-total								0.00				806,662,974
Crude oil	10^4t	0	0	0	0	0	0.13	0.13	41,816	71,100	1	3,865
Gasoline	10^4t	0	0	0	0	0.01	0	0.01	43,070	67,500	1	291
Diesel	10^4t	0.1	0	2.38	0	3.07	2.64	8.19	42,652	72,600	1	253,606
Fuel oil	10^4t	0.82	0	0.19	0	2.63	0.02	3.66	41,816	75,500	1	115,550
Other oil product	10^4t	1.52	0	0	0	23.18	0	24.7	41,816	72,200	1	745,721
Sub-total								0				1,119,034
Natural gas	10^7m^3	135.5	6.3	0	43.9	0.3	20.3	206.3	38,931	54,300	1	4,361,086
COG	10^7m^3	1.3	12.7	87.2	194.8	116.9	33.5	446.4	16,726	37,300	1	2,784,999
Other gas	10^7m^3	102.3	134.3	2283.2	358.9	372.1	483.5	3734.3	5,227	37,300	1	7,280,656
LPG	10^4t	0	0	0	0	0	0	0	50,179	61,600	1	0
Refinery gas	10^4t	0.83	0	3.95	0	3.44	0	8.22	46,055	48,200	1	182,472
Sub-total												14,609,213
Total												822,391,221

<China Energy Statistics Yearbook 2009>

Based on table A7 and related formulas described in the PDD, $\lambda_{Coal,y}$ =98.08%， $\lambda_{Oil,y}$ =0.14%， $\lambda_{Gas,y}$ =1.78% are obtained.

Table A8 Emission Factor of Best Technology

	Variables	Electricity supply efficiency (%) A	Emission factor of fuels （$kgCO_2/TJ$） B	Emission factor (tCO_2/MWh) D=3.6/A/1,000,000×B
Coal-based power plants	$EF_{Coal,Adv}$	39.45	87,300	0.7967
Gas-based power plants	$EF_{Gas,Adv}$	51.77	75,500	0.5250
Oil-based power plants	$EF_{Oil,Adv}$	51.77	54,300	0.3776

Thus, the emission factor of thermal power is:

$$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y} = 0.7889\ tCO_2/MWh$$

Table A9 Installed Capacity of NCPG in 2009

Installed capacity	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total
Thermal power	MW	5,120	10,030	35,140	39,150	48,300	58,860	196,600
Hydro power	MW	1,050	10	1,790	1,610	830	1,060	6,350
Nuclear power	MW	0	0	0	0	0	0	0
Wind power and other	MW	50	0	1,360	120	6,420	860	8,810
Total	MW	6,220	10,040	38,290	40,880	55,550	60,780	211,760

<China Electric Power Yearbook 2010>

Table A10 Installed Capacity of NCPG in 2008

Installed capacity	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total
Thermal power	MW	4,760	7,490	29,870	35,250	45,740	55,930	179,040
Hydro power	MW	1,050	0	1,540	790	830	1,050	5,260
Nuclear power	MW	0	0	0	0	0	0	0
Wind power and other	MW	0	0	700	0	2,300	370	3,370
Total	MW	5,810	7,490	32,110	36,040	48,860	57,350	187,660

<China Electric Power Yearbook 2009>

Table A11 Installed Capacity of NCPG in 2007

Installed capacity	Unit	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Shandong	Total
Thermal power	MW	3,900	6,920	29,020	30,950	39,870	54,140	164,800

Hydro power	MW	1050	10	780	790	830	1,050	4,510
Nuclear power	MW	0	0	0	0	0	0	0
Wind power and other	MW	2.7	0	410	0	1,096.5	210	1,719.2
Total	MW	4,952.7	6,930	30,210	31,740	41,796.5	55,400	171,029.2

<China Electric Power Yearbook 2008>

Table A12 Calculation of BM Emission Factor of NCPG[28]

	Unit	Installed capacity in 2007 A	Installed capacity in 2008 B	Installed capacity in 2009 C	Capacity additions from 2007 to 2009	Capacity additions from 2008 to 2009	Share in total capacity additions
Thermal power	MW	164,800	164,800	329,600	39,270	21,422	81.46%
Hydro power	MW	4,510	4,510	9,020	1,849	1,090	3.84%
Nuclear power	MW	0	0	0	0	0	0.00%
Wind power and other	MW	1,719.2	1,719.2	3,438.4	7,091	5,440	14.71%
Total	MW	**171,029.2**	**171,029.2**	**342,058.4**	**48,210**	**27,952**	**100.00%**
Share in total installed capacity of 2008					22.77%	13.20%	

In conclusion, $EF_{grid,BM,y}$ =0.7889*81.46%=0.6426tCO_2/MWh

Thus, the baseline emission factor of NCPG is $EF_{grid,y}$ =0.75*0.9803+0.25*0.6426=0.8958 tCO_2/MWh

Appendix 5. Further background information on monitoring plan

N/A

Appendix 6. Summary of post registration changes

The meters monitoring the electricity exported and imported are changed because of the phase II project. Before, the electricity would be monitored by the main meter installed at the 220kV booster station and the backup meter installed at the Desheng 220kV substation. Now, the total electricity exported and imported by the Project and Phase II would be monitored by Mg installed at the 1# 220kV booster station. Besides, M1.1, M1.2, M1.3 installed at 35kV transmission line would monitor electricity imported and exported by the Project and M2.1, M2.2, M2.3 installed at 35kV transmission line would monitor electricity imported and exported by Phase II.
Meanwhile, the quantity of electricity exported to the grid by the project in year y($EG_{export,y}$) is calculated by the formula:

$$\mathbf{EG_{export,y}} = ES_{total,export,y} \times \frac{\sum_{i=1}^{3} ES_{I,\ i,\ export,\ y}}{\sum_{i=1}^{3} ES_{I,\ i,\ export,\ y} + \sum_{i=1}^{3} ES_{II,\ i,\ export,\ y}}$$

$ES_{total,export,y}$: the quantity of electricity exported to the grid monitored by Mg;
$ES_{I,\ i,\ export,\ y}$: the quantity of electricity exported to the grid monitored by M1.i (i=1,2,3);
$ES_{II,\ i,\ export,\ y}$: the quantity of electricity exported to the grid monitored by M2.i (i=1,2,3).

The quantity of electricity imported from the grid by the project in year y($EG_{import,y}$) is calculated by the formula:

$$\mathbf{EG_{import,y}} = ES_{total,import,y} \times \frac{\sum_{i=1}^{3} ES_{I,\ i,\ import,\ y}}{\sum_{i=1}^{3} ES_{I,\ i,\ import,\ y} + \sum_{i=1}^{3} ES_{II,\ i,\ import,\ y}}$$

$ES_{total,import,y}$: the quantity of electricity imported from the grid monitored by Mg;
$ES_{I,\ i,\ import,\ y}$: the quantity of electricity imported from the grid monitored by M1.i (i=1,2,3);
$ES_{II,\ i,\ import,\ y}$: the quantity of electricity imported from the grid monitored by M2.i (i=1,2,3).

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