Project design document form
(Version 10.1)

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION	
Title of the project activity	Hebei Shangyi CGN Dongshan Wind Power Project
Scale of the project activity	☒ Large-scale ☐ Small-scale
Version number of the PDD	2.0
Completion date of the PDD	27/09/2018
Project participants	CGN (Shangyi) Wind Power Co., Ltd.
Host Party	People's Republic of China
Applied methodologies and standardized baselines	ACM0002: Consolidated baseline methodology for grid-connected electricity generation from renewable sources (Version 13.0.0)
Sectoral scopes linked to the applied methodologies	**Sectoral scope:** Scope 1: Energy industries (renewable - / non-renewable sources)
Estimated amount of annual average GHG emission reductions	94,532

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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Hebei Shangyi CGN Dongshan Wind Power Project (hereafter referred to as the Proposed Project) is located in Shangyi County, Zhangjiakou City, Hebei Province, People's Republic of China. The Proposed Project will be constructed and operated by CGN (Shangyi) Wind Power Co., Ltd. (the Project Owner).

The purpose of the Proposed Project is to generate electricity through utilizing wind resource to meet the growing needs for local economic development. The total installed capacity of the Proposed Project is 49.5 MW. Based on the local wind resource, the project activity is expected to deliver on average 105,520MWh of electricity to North China Power Grid (NCPG) annually.

The Proposed Project activity will generate greenhouse gas (GHG) emission reductions by avoiding CO_2 emissions from electricity generation by fossil fuel power plants and will contribute to sustainable development of the local community and the host country by reducing greenhouse gases (GHG) emissions of 94,532tCO_2e per year. Furthermore, the project will improve air quality and local livelihoods, promote sustainable renewable energy industry development.

The baseline scenario is the same as the scenario existing prior to the implementation of the project activity, i.e. the equivalent electricity is provided by NCPG.

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

- Reduce exploitation of fossil fuel by supplying with renewable energy to improve existing energy consumption model relying on fossil fuel, also it will improve energy security;
- Stimulating the growth of the wind power industry in China;
- Promote local economic development by creating local employment opportunities. The project activity will provide with jobs opportunities during both the construction and operational phase of the proposed project activity;
- Reducing the emissions of pollutants associated with operation of fossil fuel-fired thermal power plant, including SO_2, NOx and dust in the baseline/business-as-usual scenario, thus improve the local environment;

A.2. Location of project activity

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The proposed project is in Shangyi County, Hebei Province, P. R. China. The project has geographical coordinates with east longitude from 114°15′02″ to 114°17′55″ and north latitude from 41°18′25″ to 41°21′06″. Figure A-1 shows the location of the project site.

FigureA-1 The location of the proposed project

A.3. Technologies/measures

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Project Scenario

The Proposed Project is to generate zero-emission wind power and supply it to NCPG. The project scenario is the implementation of the project (with CDM as an indispensable consideration), i.e., the installation and operation of total 49.5 MW wind turbine generators which will supply an average annual generation of 105,520MWh to NCPG and replace the same amount of electricity generated by fossil fuel fired power plants connected into NCPG. The main equipment installed in the Proposed Project is wind turbine generators.

The Proposed Project will totally install 33 wind turbines with capacity of 1500 kW each, which amount to 49.5MW of total installed capacity. Based on the local wind resource, the project activity

is expected to deliver on average 105,520MWh of electricity to the NCPG annually. The plant load factor is 24.33% .

The technical parameters of wind turbine are described as Table A-1.

Table A- 1 The main technical specifications of the wind turbines

Parameter	Data[1]
Model	GW82/1500 kW
Quantity	33
Height of hub	70 m
Diameter	82 m
Number of blades	3
Rated wind speed	11 m/s
Cut-in wind speed	3 m/s
Cut-off wind speed	22 m/s
Rated Power	1500 kW
Rated voltage	690V
Life time	20 years

The net electricity delivered to the power grid will be monitored continuously by meters that will be installed at the onsite substation. Records for electricity sold will be used for cross-check. The design of monitoring system is presented in B.7.3.

The applied technology and equipment are domestic-made. Therefore, the Proposed Project is not involved in technology transfer.

Existing scenario prior to the project activity & Baseline scenario

Electricity supply prior to the implementation of the project activity is provided by NCPG which is dominated by fossil fuel-fired thermal power plants.

In the absence of the Proposed Project, the electricity generated by the project would have been provided by NCPG. Thus, the baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity, i.e., the equivalent electricity is provided by NCPG.

A.4. Parties and project participants

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Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
People’s Republic of China (host)	CGN (Shangyi) Wind Power Co., Ltd.	No
Australia	Macquarie Bank Limited	No

A.5. Public funding of project activity

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

A.6. History of project activity

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The project activity owner has confirmed that:

[1] The values of the parameters are based on the technological specification of the wind turbines.

A. The proposed CDM project activity is neither registered as a CDM project activity nor included as a component project activity (CPA) in a registered CDM programme of activities (PoA) .
B. the proposed CDM project activity is not a project activity that has been deregistered.

A.7. Debundling

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N.A

SECTION B. Application of selected methodologies and standardized baselines

B.1. Reference to methodologies and standardized baselines

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ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 13.0.0, valid from 11/05/2012 onwards);
http://cdm.unfccc.int/UserManagement/FileStorage/4W1SCKX3EMPO6AYGRJUTD7BQ8IVN0H

"Tool for the demonstration and assessment of additionality" (Version 06.1.0, valid from 13/09/2012 onwards);
http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.1.0.pdf

"Tool to calculate the emission factor for an electricity system" (Version 02.2.1, valid from 29/09/2011 onwards);
http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.2.1.pdf

B.2. Applicability of methodologies and standardized baselines

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This methodology is applicable to grid-connected renewable power generation project activities that

(a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant);

(b) involve a capacity addition;

(c) involve a retrofit of (an) existing plant(s); or

(d) involve a replacement of (an) existing plant(s)

As a grid-connected wind farm project, the Proposed Project meets all the applicability criteria of the methodology as the following:

• The Proposed Project is a greenfield wind power project. The Proposed Project is the installation of a new wind power plant with a total capacity of 49.5 MW at the project site where no renewable power plant was operated prior to the implementation of the Proposed Project.

• The Proposed Project does not involve switching from fossil fuels to a renewable energy source at the site of the Proposed Project.

• The Proposed Project is neither a biomass fired power plant nor a hydro power plant.
Therefore, ACM0002 is applicable to the Proposed Project.

B.3. Project boundary, sources and greenhouse gases (GHGs)

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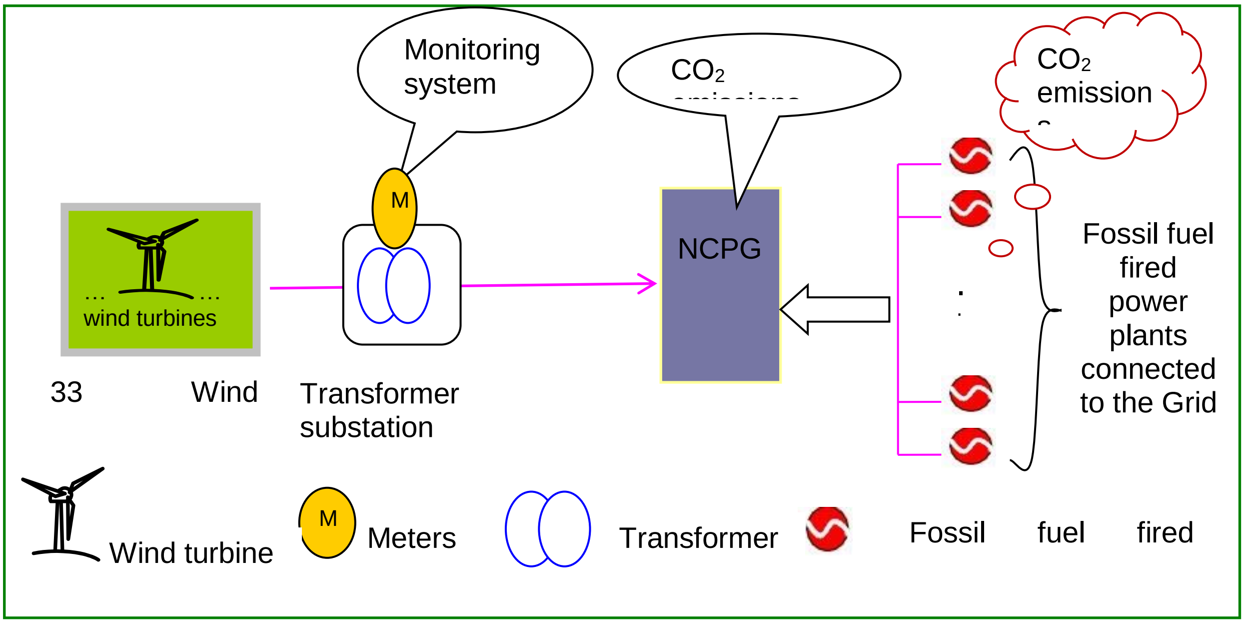
As per ACM0002 and "Tool to calculate the emission factor for an electricity system", the spatial extent of the project boundary includes the project site and all power plants connected physically to the electricity system. The project electricity system is defined by the spatial extent of the power plants that can be dispatched without significant transmission constraints. Based on the significant transmission between the provincial grids within NCPG and the difficulty in distinguishing between these individual provincial grids, NCPG has been selected as electricity system of the project.
Since there are electricity imports from the Northeast China Power Grid (NEPG) and the Central China Power Grid (CCPG) to NCPG, NEPG and CCPG are identified as the connected electricity system.

In accordance with the boundary definitions of the Chinese DNA (NDRC), NCPG consists of independent province-level electricity systems including Beijing, Tianjin, Hebei, Shanxi, Shandong, and Inner Mongolia Power Grid that can be dispatched without significant transmission constraints.

According to the approved methodology ACM0002, the emission sources and GHGs in the project boundary are as follows:

Source		GHGs	Included?	Justification/Explanation
Baseline scenario	CO_2 emissions from electricity generation in fossil fuel fired power plants connected to NCPG that are displaced due to the project activity	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
Project scenario	For geothermal power plants, fugitive emissions of CH4 and CO2 from non-condensable gases contained in geothermal steam	CO_2	No	Excluded by the methodology for wind farm projects.
		CH_4	No	Excluded by the methodology for wind farm projects.
		N_2O	No	Excluded by the methodology for wind farm projects.
	CO2 emissions from combustion of fossil fuels for electricity generation in solar thermal power plants and geothermal power plants	CO_2	No	Excluded by the methodology for wind farm projects.
		CH_4	No	Excluded by the methodology for wind farm projects.
		N_2O	No	Excluded by the methodology for wind farm projects.
	For hydro power plants, emissions of CH4 from the reservoir	CO_2	No	Excluded by the methodology for wind farm projects.
		CH_4	No	Excluded by the methodology for wind farm projects.
		N_2O	No	Excluded by the methodology for wind farm projects.

And the flow diagram of the project boundary is shown in Figure B-1.



FigureB-1 Flow diagram and the project boundary

B.4. Establishment and description of baseline scenario

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The Proposed Project is the installation of a new grid-connected renewable power plant, and is not a capacity addition, retrofit or replacement of existing grid-connected renewable power plant/unit. Therefore, the baseline scenario according to the methodology ACM0002 (version 13.0.0) is the following:

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

Therefore, the baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity, i.e., the equivalent electricity is provided by NCPG.

B.5. Demonstration of additionality

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CDM Consideration

The incentive from the CDM had been considered prior to the starting date of the project activity, aiming to obtain the additional funding to secure the project financially. In the feasibility study of the project, the revenue from CDM was analysed and it is concluded that if the project is registered as a CDM project, the revenue from CDM will make the project financially attractive. Then the project owner, CGN (Shangyi) Wind Power Co., Ltd. held the board meeting and decided to apply for CDM registration to overcome the financial barriers.
The key timelines are presented in the table below:

Table B-1 Timeline of the implementation of the project

Date	Project Implementation Activities
02/12/2010	Environmental Impact Assessment (EIA) completed
07/01/2011	EIA approved by Hebei Environmental Protection Bureau
12/2010	Feasibility Study Report (FSR) completed, taking CER revenue into account
06/08/2011	FSR approved by Hebei Development and Reform Commission
10/10/2011	Board Meeting Decision on Developing the Proposed Project as CDM
07/11/2011	CDM survey of the local Stakeholders’ comments
20/03/2012	The wind turbine purchase contract was signed (Project Starting Date)
27/03/2012	Wind turbine foundation and road construction contract was signed
15/08/2012	The prior consideration of the CDM form of the project submitted to EB
16/08/2012	The prior consideration of the CDM form of the project submitted to China DNA

Additionality
According to the selected methodology, the additionality of the Proposed Project Activity shall be demonstrated and assessed using the latest version of the “Tool for the Demonstration and Assessment of Additionality” agreed by the Board. The Tool consists of the steps below.

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

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

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

The purpose of this step is to identify realistic and credible alternative(s) available to the project participants or similar project developers that provide outputs or services comparable with the proposed CDM project activity.

According to the latest version of the “Tool for the demonstration and assessment of additionality”, project activities that apply this tool in context of approved consolidated methodology ACM0002, only need to identify that there is at least one credible and feasible alternative that would be more attractive than the proposed project activity.

Therefore, two alternatives are identified as follows:
Alternative 1: The proposed project activity undertaken without being registered as a CDM project activity;
Alternative 2: Provision of an equivalent amount of annual power output by NCPG which the project is connected to, i.e. continuation of the current situation.

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

The alternatives are realistic and feasible and comply with applicable laws and regulations.
Step 2: Investment analysis

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

To conduct the investment analysis, the following sub-steps are used and the latest version of the “Guidelines on the assessment of investment analysis” from the UNFCCC website is considered:

Sub-step 2a: Determine appropriate analysis method

The “Tool for the Demonstration and Assessment of Additionality” provides three analysis methods: simple cost analysis (Option I), investment comparison analysis (Option II) and benchmark analysis (Option III).

The proposed project activity generates financial benefits by the sales of electricity and CER revenue, so the simple cost analysis (Option I) should not be applied.

Following the EB guidance on the assessment of investment analysis[2], if the alternative to the project activity is the supply of electricity from the grid, this is not considered an investment (Option II) and a benchmark approach (Option III) is considered appropriate. As the baseline alternative involves the continuation of current practices, supply of electricity from the grid (the alternative baseline scenario of the proposed project is the North China Power Grid rather than a new investment project), a benchmark analysis is used to identify whether the project is economically attractive (Option III).

The use of a benchmark analysis (Option III) is also in line with Chinese practice and is followed in the FSR.

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

[2] http://cdm.unfccc.int/Reference/Guidclarif/reg/reg_guid03.pdf

According to “*Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projec[3]t*” issued by former State Power Corporation of China in 2002, a project IRR of 8% (after tax) has been applied as a benchmark to assess new investment in power sector. This benchmark has been commonly used in the power sector. Therefore, the IRR of 8% is applied as the benchmark in the investment analysis of the Proposed Project. Only if the project IRR of the Proposed Project is higher than or equivalent to this benchmark, the Proposed Project is financially feasible. This benchmark is commonly used in the electricity sector, and therefore appropriate in accordance with the EB guidelines[4].

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

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

Table B-2 Relevant indicators of the proposed project

Indicator	**Value**	**Source**
Annual Net Supplied Power	105,520MWh	FSR
Static total investment	453.83 million RMB	FSR
On-grid tariff	0.54RMB /kWh (including the VAT)	FSR
Long-term loan interest rate	6.14%	FSR
Construction interest	10.75 million RMB	FSR
Average Annual O&M cost	12.76 million RMB	FSR
Residual rate	5%	FSR
Depreciable life of fixed assets	15	FSR
Income tax	25%	FSR
VAT	17%	FSR
City maintenance & construction tax	5%	FSR
Education tax	4%	FSR
Assumed CER price	10.5 €/t CO_2	FSR
Project operational lifetime	20 years	FSR

Data source: Feasibility Study Report

Table B-3 shows the different calculation results of the same financial indicators with the CDM revenues and without CDM revenues respectively. As shown from Table B-3, the IRR of the total investment is 6.20% in absence of CDM revenues, which is lower than the benchmark rate of 8%. And therefore the project is unattractive to the investor, as well as not applicable commercially.

Table B-3 Project IRR with and without CDM

	Project IRR (Benchmark 8%)
Without CDM	6.20%
With CDM	9.15%

[3] State Power Corporation of China, Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects. China Electric Power Press, 2002

[4] “Guidelines on the Assessment of Investment Analysis” (version 05), EB 62 Annex 5, para 12 and 13.

Sub-step 2d. Sensitivity analysis

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

As per the guideline on the assessment of investment analysis, only the variables constituting more than 20% of either total project costs or total project revenues and having significant impact on the sensitivity analysis should be subjected to reasonable variation. Therefore, the four financial parameters below were identified as the main variable factors for sensitive analysis of financial attractiveness:

1) Static total investment;
2) Average Annual O&M cost;
3) On-grid tariff;
4) Annual net supplied power.

They are fluctuated within the range from -10% to +10% and the selection is also in accordance with “Guideline on the Assessment of Investment Analysis”. Their impacts on Project IRR of the proposed project were presented in Table B-4 and Figure 3 below.

Table B-4 Sensibility analysis of the proposed project

Range	-10.0%	-5.0%	0.0%	5.0%	10.0%
Static total Investment	7.64%	6.89%	6.20%	5.56%	4.97%
Average Annual O&M cost	6.56%	6.38%	6.20%	6.01%	5.83%
On-grid tariff	4.59%	5.41%	6.20%	6.96%	7.68%
Annual net supplied power	4.59%	5.41%	6.20%	6.96%	7.68%

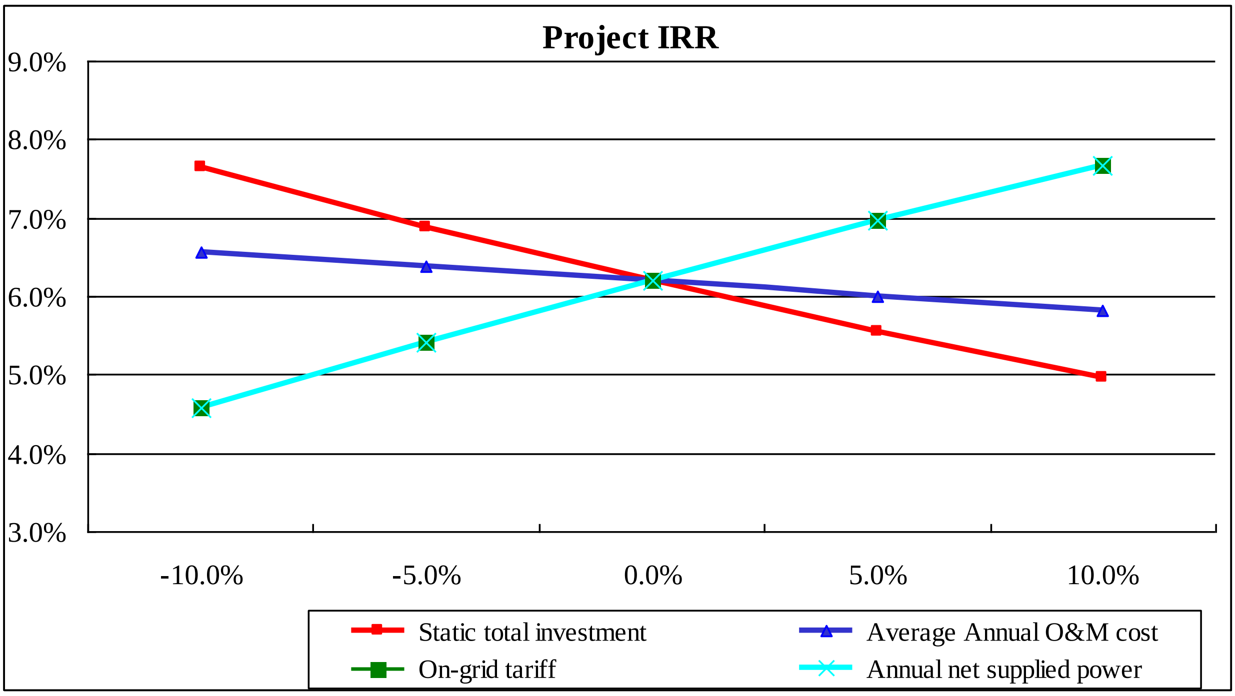

Figure 3-Sensibility analysis of the proposed project

From Table B-4 and Figure 3, as the chosen parameters vary within the reasonable range, Project IRR does not surpass the benchmark under any of the assumptions. The table B-5 show the Project IRR, without the CDM revenue, Variation of financial parameters when the project IRR

reaches the benchmark

Table B-5 Variation of financial parameters to make the project IRR reach 8%

Variation of the parameters to make IRR reach the benchmark 8%	Static total investment	Average Annual O&M cost	On-grid tariff	Annual net supplied power
	-12.26%	-52.60%	12.39%	12.39%

The sensitivity analysis shows that without CER revenue the IRR for the project will not reach the benchmark under reasonable variations and assumptions, and is financially unattractive.

As shown in Table B-5, the project IRR is significantly influenced by static total investment, tariff and Annual net supplied power, while the impact of annual O&M cost is slight. It is found by the sensitivity analysis that without CER revenue, the IRR of the project reaches the benchmark 8% if the static total investment decreases by 12.26%, or the on-grid tariff increases by 12.39%, or annual net supplied power increases by 12.39%, or the annual O&M cost decreases by 52.60%. However, none of them would happen, as demonstrated below:

a. ***Static total investment***

Static total investment is an important factor affecting the project IRR. When the static total investment decreases by 10%, the Project IRR is 7.64%, which is lower than the benchmark of 8%. If the static investment decreases by 12.26%, the IRR of the Proposed Project will reach the benchmark. The static investment in the approved Feasibility Study Report was evaluated based on equipment suppliers' quotes and relevant design and quotas standards. For wind power projects, as evaluated in the FSR, the static total investment of the Proposed Project is mainly composed by the equipment costs (wind turbine, tower of wind turbine, main transformer and relevant equipments), construction engineering, land for construction use costs, production preparation costs and several other costs. In recent years, the prices, including equipment and commodities, also the labour costs are all increased remarkably in China[5]. As several signed equipment purchase and construction engineering contracts below which have been provided to DOE show that the real prices is higher than that estimated in the FSR.

Values (Million RMB)	Contracts	FSR
Wind Turbine	244.50	230.51
Tower	54.34	53.84
Wind turbine foundation and road construction contract	28.80	26.40
The Box Transformer foundation, 35KV collector line and booster station electrical installation construction contract	30.73	21.78

Further, according to the China Statistical Yearbook[6], the Price Index for Investment in Fixed Assets from 2006 to 2010 (setting the preceding year price index as 100) is 101.5, 103.9, 108.9, 97.6 and 103.6 respectively, and the Purchasing Price Index for Raw Material, Fuel and Power from 2006 to 2010 (setting the preceding year price index as 100) is 106.0, 104.4, 110.5, 92.1, 109.6 respectively. Considering the increasing trend of price index, the possibility of reducing the static total investment is little. So, it is obvious that a drop of 12.26% of the static investment is unlikely. Hence, the Project IRR will not reach 8%.

b. Average Annual O&M cost

[5] http://www.stats.gov.cn/tjgb/ndtjgb/qgndtjgb/t20120222_402786440.htm
http://www.stats.gov.cn/tjgb/ndtjgb/qgndtjgb/t20110228_402705692.htm
http://www.stats.gov.cn/tjgb/ndtjgb/qgndtjgb/t20100225_402622945.htm

[6] http://www.stats.gov.cn/tjsj/ndsj/2011/indexch.htm

The sensitivity analysis shows that when the average annual O&M cost decreases by 10%, the Project IRR is 6.56%, lower than the benchmark. Without CER revenue the IRR for the project will reach the benchmark if the average annual O&M cost decreases 52.60%. According to the FSR of the project, annual O&M cost consists of raw materials cost, wage & welfare, repair cost and other costs as well. All these costs have been increased in recent years[8,7] and unlikely to be reduced by 52.60%.

c. On-grid Tariff

In the case that the expected power tariff increases by about 12.39%, the IRR of the Proposed Project begins to exceed the benchmark. However, there is extremely unlikely for the tariff of the Proposed Project to have an increase of 12.39%. On 20 July 2009, NDRC of China issued the benchmark guiding tariff for wind power projects[8]. According to the document of benchmark guiding tariff for wind power projects, the guiding tariff of wind power projects in the wind resource area which the Proposed Project belongs to is 0.54 (Including VAT). Considering the fact that the guiding tariff has been determined, it is almost unlikely for this tariff has an increase. Therefore, it is impossible that the expected tariff of the proposed project could increase 12.39%, so the Proposed Project is always lack of financial attractiveness within the reasonable range of tariff.

Applying the Reference Tariff to the proposed project

As per "*Information note on the highest tariffs applied by the executive board in its decisions on registration of projects in the people's republic of China (version 02)*" published on 03/06/2011, EB 61th meeting[9], the highest tariff in Hebei Province is 0.60RMB/kWh (incl. VAT). This highest tariff is employed by the Heibei Chengde Huifeng Windfarm Project ("Chengde Project").

The proposed project is facing different investment environment with the project receiving the tariff of 0.60RMB/kWh (incl. VAT). When applying the highest tariff the differences of investment costs and O&M costs are supposed to be taken into account, thus, the reference tariff was applied to demonstrate the additionality of the proposed project. Table B-6 illustrates the main investment and operation parameters of ***Chengde Project*** as below:

Table B-6 Projects receiving the tariff of 0.60 (RMB/kWh, incl. VAT) with VAT of 8.5%

Reference Project	Tariff (RMB/kWh, incl.VAT)	Tariff (RMB/kWh, excl.VAT)	Static Investment (million RMB)	Unit Static Investment (RMB/kW)	Average annual O&M Cost (million RMB)	Unit average annual O&M Cost(RMB/kW)
Hebei Chengde Huifeng Windfarm Project	0.60	0.553	534.525	10798	12.4	251

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[7] http://www.stats.gov.cn/tjsj/ndsj/2011/indexch.htm

http://www.stats.gov.cn/tjsj/ndsj/2010/indexch.htm

http://www.stats.gov.cn/tjsj/ndsj/2009/indexch.htm

http://www.stats.gov.cn/tjsj/ndsj/2008/indexch.htm

http://www.stats.gov.cn/tjsj/ndsj/2007/indexch.htm

[8] Notice on perfecting the tariff policy of wind power issued by NDRC of China on 20/07/2009

http://www.sdpc.gov.cn/zcfb/zcfbtz/2009tz/t20090727_292827.htm

[9] Highest applicable wind tariffs in China applied by the Executive Board, EB61

http://cdm.unfccc.int/Reference/Notes/reg/reg_note07.pdf

By using the tariff of 0.60 RMB/kWh (incl. VAT) for the proposed project, and considering the average financial parameters (investment cost and O&M costs) of the projects with the tariff of 0.60 RMB/kWh (incl. VAT), we arrive at a hypothetic IRR of 6.67%, and a reference tariff of 0.5560 RMB/kWh (incl. VAT) and 0.4752 RMB/kWh (excl. VAT) for the project could be obtained. Thus at this reference tariff, the project does not cross the benchmark of 8%.

d. <u>Annual net supplied power</u>

When the annual net supplied power increases by 10%, the Project IRR is 7.68%, lower than the benchmark. If the annual net supplied power increases by 12.39%, the project IRR can reach 8%.

The annual net supplied power is taken from the FSR, which is prepared by a 3rd independent qualified design institute with the highest grade: Grade A and approved by Hebei Development and Reform Commission on 6 August 2011. According to the FSR of the Proposed Project, the power generation is calculated based on the monitored data of the local wind resources over 30 years (1979~2008), the long-term wind resources in this region was stable and unlikely to significantly enhance in the future. The annual generation represents a long-term average power supply throughout the lifetime of wind farm, where the yearly-variations have already been considered. Therefore, the power generation of the proposed project is unlikely to increase by 12.39% to exceed benchmark of 8%.

In conclusion, the proposed project is not financially feasible without the revenue of CERs and thus is additional.

Step 3: Barrier analysis

The proposed project does not adopt barrier analysis.

Step 4: Common practice analysis

The Proposed Project will use wind power energy to generate electricity, therefore, the measure used by the Proposed Project belongs to the measure (b) *switch of technology with or without change of energy source (including energy efficiency improvement as well as use of renewable energies)*, hence the common practice analysis shall be carried out according to the following four steps:

Step 1): Calculate applicable output range as +/-50% of the design output or capacity of the proposed project activity.

The annual total installed capacity of the Proposed Project is 49.5MW, therefore, the applicable output range is 24.75~74.25MW.

Step 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.

Geographical area: According to the additionality tool, the common practice shall provide an analysis of any other activities that are similar to the project. Projects are considered similar if they are in the same country/region and /or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc. Based on this guidance, regarding the investment environment in each province is different. In china, the general environment of wind power projects such as wind resources, tariff and investment climate are only similar and comparable in the same province, so, it is reasonable the common practice analysis is conducted on the basis of province where the project is located. Therefore, Hebei Province is selected as the region for common practice.

Applicable output range: As identified in step 1, the applicable output range is 24.75~74.25MW;

Date: The start date of the Proposed Project was on 20 March 2012, therefore, the project activities which have started commercial operation before 20 March 2012 are included in this analysis.

Furthermore, registered CDM project activities and projects activities undergoing validation shall not be included in this step.

According to the recent clarification approved by EB on the common practice analysis[10]:

$N_{all} = N_{all, energy\_source} + N_{other\_energy}$
$N_{diff} = N_{diff, energy\_source} + N_{other\_energy}$

So, for this project:

$N_{all} = N_{all, wind} + N_{other\_energy}$
$N_{diff} = N_{diff, wind} + N_{other\_energy}$

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;
$N_{all,wind}$ is the number of all 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;
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 that 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 applied technologies different that the technology applied in the proposed project activity;
$N_{other,energy}$ 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 Proposed Project Activity.

According to the statistics of installed wind power in China[11], the public accessible information from the UNFCCC website[12] and the VCS Project Database[13,14], two projects can be identified within the applicable output range and applicable geographical area, which started the commercial operation

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[10] http://cdm.unfccc.int/methodologies/PAmethodologies/tools-clarifications/30494

[11] "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/download/display_info.asp?cid=2&sid=&id=31
"Statistics of domestic wind farm installation capacity in 2009", Chinese Wind Energy Assosiation (CWEA), downloadable from: http://www.cwea.org.cn/upload/201006102.pdf
"Statistics of domestic wind farm installation capacity in 2010", Chinese Wind Energy Assosiation (CWEA), downloadable from: http://www.cwea.org.cn/download/display_info.asp?cid=&sid=&id=39
"Statistics of domestic wind farm installation capacity in 2011", Chinese Wind Energy Assosiation (CWEA), downloadable from: http://www.cwea.org.cn/upload/2011年风电装机容量统计.pdf

[12] http://cdm.unfccc.int/Projects/projsearch.html

before the starting date of the Proposed Project Activity, which have not published a PDD on the UNFCCC website for global stakeholder consultation.
For completeness, these projects are listed below.

Table B-6 Wind project within the applicable output range and applicable geographical area, which started the commercial operation before the starting date of the Proposed Project Activity

Name	Commissioning Date	Capacity (MW)	Note
Shangyi Manjing Windfarm Project	Jul 2005	34.5	Facing financial barriers, applying for VER financing, validated by DNV, follow the criteria of VCS[13]
Chengde Hongsong Windfarm Project	Dec 2004	51.3	Facing financial barriers, applying for VER financing, validated by DNV, follow the criteria of VCS[14]

Thus, Nall,wind is 2, therefore, $N_{all} = 2 + N_{other\_energy}$.

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

Different technologies in the context of common practice are identified in paragraph 9 of the tool as 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 %);

As the formulas shown in Step2,
$N_{diff} = N_{diff,\ wind} + N_{other\_energy}$

Different wind farm projects may be considered to apply technologies different that the technology applied in the Proposed Project Activity on the basis of size of installation (para 9 (c)), investment climate (para 9 (d)), or other features (para 9 (e)). However, all projects within the applicable output range are large projects in accordance with para 9 (c) (iii), thus size is not used to differentiate projects. Also, other features including the unit cost of output are not used to differentiate projects.
The IRR of these two projects identified above were lower than the benchmark 8%, so these two projects were also facing serious financial barriers during operating period and could not be

13 https://vcsprojectdatabase2.apx.com/myModule/Interactive.asp?Tab=Projects&a=2&i=135&lat=41%2E183333&lon=114%2E25&bp=1https://vcsprojectdatabase1.apx.com/mymodule/ProjectDoc/EditProjectDoc.asp?id1=135.

14 https://vcsprojectdatabase2.apx.com/myModule/Interactive.asp?Tab=Projects&a=2&i=71&lat=42%2E583333&lon=117%2E666667&bp=1

implemented without carbon finance. Both projects agreed carbon funding to help overcome this serious barrier. Therefore, both projects are considered to apply different technology as per paragraph 9 (d) (ii) of the tool.

Thus, $N_{diff,wind}$ is 2.
Therefore:
$N_{diff} = N_{diff\ wind} + N_{other,\ energy} = 2 + N_{other,\ energy}$

Step 4): Calculate 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.

According to the analysis above:
$N_{all} = 2 + N_{other,\ energy}$
$N_{diff} =2 + N_{other,\ energy}$

So, it can be calculated that:
$N_{all} = N_{diff}$
$F=1-N_{diff}/N_{all} =0$
$N_{all} - N_{diff} =0$

As per "Tool for the demonstration and assessment of additionality" (Version 06.1.0), when the factor F is greater than 0.2 and $N_{all} - N_{diff}$ is greater than 3, the proposed project activity is considered to be a "common practice". However, F of the Proposed Project is 0 (<0.2) and $N_{all} - N_{diff}$ is 0 (<3), thus, it is obvious that the proposed project is not a common practice.

B.6. Estimation of emission reductions

B.6.1. Explanation of methodological choices

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1. Project emissions (PE_y)

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

2. Baseline emissions

Baseline emissions include only CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

$BE_y=EG_{PJ,y} \cdot EF_{grid,CM,y}$
Where:
BE_y = Baseline emissions in year *y* (tCO_2/yr)
$EG_{PJ,y}$ = 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 $EG_{PJ,y}$

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

$EG_{PJ, y} = EG_{facility, y}$

Where:

$EG_{PJ, y}$ = 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 baseline emission factor (EF_y) is calculated as a combined margin ($EF_{grid, CM, y}$), consisting of the combination of operating margin ($EF_{grid, OM, y}$) and build margin ($EF_{grid, BM, y}$) factors according to the following steps defined in the "Tool to calculate the emission factor for an electricity system". Data for the calculations are based on official national statistics books: *China Energy Statistical Yearbook* and *China Electric Power Yearbook*.

The methodological tool "Tool to calculate the emission factor for an electricity system" (version 02.2.1) provides procedures to determine the following parameters:

Parameter	SI Unit	Description
$EF_{grid,CM,y}$	tCO_2/MWh	Combined margin CO_2 emission factor for the project electricity system in year y
$EF_{grid,BM,y}$	tCO_2/MWh	Build margin CO_2 emission factor for the project electricity system in year y
$EF_{grid,OM,y}$	tCO_2/MWh	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 (BM) emission factor.
STEP 6: Calculate the combined margin (CM) emissions factor

Step1: Identify the relevant electricity systems

According to the *Tool to calculate the emission factor for an electricity system* (Version 02.2.1), 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. Since Chinese DNA has published a delineation of the project electricity system and connected electricity systems[15], these delineations should be applied for the Proposed Project. According to the delineations, the NCPG is identified as the relevant electric power system of the Proposed Project, which includes the grids of Beijing Grid, Tianjin Grid, Hebei Grid, Shanxi Grid, Shandong Grid, and Inner Mongolia Grid. The project belongs to the Hebei Power Grid, which is part of NCPG.

In view of the fact that there are electricity transfers from the Northeast China Power Grid (NEPG) and the Central China Power Grid (CCPG) to NCPG, the emission factor for net electricity imports

[15] http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf

from NEPG and CCPG, as the connected electricity systems, shall be determined. As specified by the *"Tool to calculate the emission factor for an electricity system"*, one of the following options shall be adopted to determine the CO_2 emission factor for the net electricity imports ($EF_{grid, import, y}$) for the purpose of determining the operating margin emission factor:

(a) 0 tCO_2/MWh, or
(b) The weighted average operating margin (OM) emission rate of the exporting grid, or
(c) The simple operating margin emission rate of the exporting grid, or
(d) The simple adjusted operating margin emission rate of the exporting grid.

This PDD opts for option (c) to calculate the $EF_{grid, import, y}$ for net electricity imports from NEPG and CCPG.

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 pants and off-grid power plants are included in the calculation.

The proposed project calculation only included grid power plants. Therefore, Option I is selected.

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

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

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

According to the Tool, the simple OM method (option a) can only be used if low-cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production. Low operating cost and must run resources typically include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation. If coal is obviously used as must-run, it should also be included in this list, i.e. excluded from the set of plants. Considering the low-cost/ must run resources only constitute no more than 10% of total generation of North China Power Grid from the year 2005 to 2009, respectively (0.8% in 2005, 0.8% in 2006, 0.9% in 2007, 1.2% in 2008 and 2% in 2009) (China Electric Power Yearbooks 2006-2010). Therefore, the project participants chose to use the simple OM method (option a).

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

◆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.

◆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 calculating the emission factor for year *y* is usually only available later than six months after the end of year *y*, alternatively the emission factor of the

previous year (y-1) may be used. If the data is usually only 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.

Power plants registered as CDM project activities should be included in the sample group that is used to calculate the operating margin if the criteria for including the power source in the sample group apply.
In conclusion, the Ex ante option of the data vintages is chosen to calculate the emission factor of the NCPG by using the simple OM method (option a) for the proposed project.

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.

The simple OM may be calculated:

Option A: Based on the net electricity generation and a CO_2 emission factor of each power unit[16]; or
Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Option B can only be used if:

(a) The necessary data for Option A is not available; and
(b) Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
(c) Off-grid power plants are not included in the calculation (i.e., if Option I has been chosen in Step 2).

For the Proposed Project, the data on fuel consumption, net electricity generation and the average efficiency of each power unit are unavailable, thus option A cannot be used. Nevertheless, the data on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system are available, 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, off-grid power plants are not included in the calculation which means

Option I has been chosen in Step 2, therefore, Option B can be used.

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

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

Where
$EF_{grid,OMsimple,y}$ Simple operating margin CO_2 emission factor in year y (tCO_2/MWh)
$FC_{i,y}$ Amount of fossil fuel type i consumed in the project electricity system in year y (mass or volume unit)
$NCV_{i,y}$ Net calorific value (energy content) of fossil fuel type i in year y (GJ/mass or volume

[16] Power units should be considered if some of the power units at the site of the power plant are low-cost/must-run units and some are not. Power plants can be considered if *all* power units at the site of the power plant belong to the group of low-cost/must-run units or if *all* power units at the site of the power plant do *not* belong to the group of low-cost/must-run units.

unit)

$EF_{CO2,i,y}$ CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ)

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

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

y (Using the ex-ante option) The three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation

For this approach (simple OM) to calculate the operating margin, the simple OM emission factor is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including low-cost / must-run power plants / units, and including electricity imports to the grid. Electricity imports should be treated as one power plant source.

On the basis of the data available, the three-year average operating margin emission factor is calculated as a full-generation-weighted average of the emission factors: the simple operating margin CO_2 emission factor ($EF_{grid,OMsimple,\ y}$) of NCPG is **0.9803tCO_2/MWh.** The detailed calculations and data are listed in the Appendix 4 (The baseline emission factor OM is same as that provided by Chinese DNA, the website is (http://cdm.ccchina.gov.cn/web/index.asp.).

Step 5: Calculate the build margin (BM) emission factor

In terms of vintage of data, one of the following two options can be chosen:

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.

For the Proposed Project, option 1 is chosen to calculate Build Margin emission factor.

Capacity additions from retrofits of power plants should not be included in the calculation of the build margin emission factor.

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 selected above:

(a) 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);

(b) Determine the annual electricity generation of 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≥20%) and determine their annual electricity generation ($AEG_{SET\text{-}\geq 20\%}$, in MWh);

(c) 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. In this case ignore steps (d), (e) and (f). Otherwise:

(d) 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 activities, 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 ($SET_{sample\text{-}CDM}$) the annual electricity generation ($AEG_{SET\text{-}sample\text{-}CDM}$, 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. $AEGS_{ET\text{-}sample\text{-}CDM} \geq 0.2 \times AEG_{total}$), then use the sample group $SET_{sample\text{-}CDM}$ to calculate the build margin. Ignore steps (e) and (f).

Otherwise:

(e) Include in the sample group $SET_{sample\text{-}CDM}$ 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);

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

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, calculated as follows:

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

Where

$EF_{gridBM,y}$	Build margin CO_2 emission factor in year y (tCO_2/MWh)
$EG_{m,y}$	Net 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 data is available

In China, because some of the data is not available, a flexible method agreed by the CDM EB[17] was adopted. First, calculate the newly added installed capacity and the various component technologies, then calculation of the weight of newly added installed capacity of each power generation technology. Finally the commercial and efficient level of each power generation technology is adopted to calculate BM emission factor.

Since there is no way to separate the different generation technology capacities as coal, oil or gas etc from thermal power based on the present statistical data, the following calculating measures will be taken:

• Firstly, according to the energy statistical data of most recent one year, determine the ratio of CO2 emissions produced by solid, liquid, and gas fuels consumption for power generation;
• Second, multiply this ratio by the respective emission factors based on commercially available

[17] This is in accordance with the "Request for guidance: Application of AM0005 and AMS-I.D in China", a letter from DNV to the Executive Board, dated 07/10/2005, available online at:
http://cdm.unfccc.int/UserManagement/FileStorage/6POIAMGYOEDOTKW25TA20EHEKPR4DM
The CDM-EB has accepted the alternative method to determine BM emission factor in a conservative manner for Chinese projects:
http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_QEJWJEF3CFBP1OZAK6V5YXPQKK7WYJ

best practice technology in terms of efficiency;
• Finally, this emission factor for thermal power is multiplied with the ratio of thermal power identified within the approximation for the latest 20% installed capacity addition to the grid. The result is the BM emission factor of the grid.

Sub- Step5.1

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

$$\lambda_{Coal,y} = \frac{\sum_{i \in COAL,j} F_{i,j,y} \times NCV_{i,j} \times EF_{co2,i,j}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,j} \times EF_{co2,i,j}}$$

$$\lambda_{Oil,y} = \frac{\sum_{i \in OIL,j} F_{i,j,y} \times NCV_{i,j} \times EF_{co2,i,j}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,j} \times EF_{co2,i,j}}$$

$$\lambda_{Gas,y} = \frac{\sum_{i \in GAS,j} F_{i,j,y} \times NCV_{i,j} \times EF_{co2,i,j}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,j} \times EF_{co2,i,j}}$$

Where:

$F_{i,j,y}$	The amount of fuel *i* (in a mass or volume unit) consumed by province *j* in year(s) y.
$NCV_{i,j}$	Net calorific value (energy content) of fossil fuel type *i* consumed by province *j* (GJ / mass or volume unit).
$EF_{CO2,i,j}$	CO_2 emission factor of fossil fuel type *i* consumed by province *j* (tCO_2/GJ).

COAL, *OIL* and *GAS* are footnote group for solid fuels, liquid fuels and gas fuels.

Sub-step 5.2: Calculation of emission factor of thermal power (EF thermal power) of NCPG

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

Where: $EF_{Coal, Adv, y}$, $EF_{Oil, Adv, y}$ and $EF_{Gas, Adv, y}$ represent the emission factor of the efficiency level of the best coal-based, oil-based and gas-based power generation technology commercially available in China.

Sub-step 5.3: Calculation of Build Margin (BM) emission factor of NCPG

$$EF_{grid,BM,y} = \frac{CAP_{Thermal}}{CAP_{Total}} \times EF_{Thermal,y}$$

Where

CAP_{Total} is total capacity additions while

$CAP_{Thermal}$ is capacity additions of thermal power.

Base on the formulas above, the result is:

$EF_{grid,BM,y}$=0.6426 tCO_2/MWh

For the detailed information, please see the Appendix 4.

Step 6: Calculate the combined margin emissions factor (EF_y)

The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \quad (27)$$

Where:

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

Wind project activities: $w_{OM} = 0.75$ and $w_{BM} = 0.25$ (owing to their intermittent and non dispatch able nature) for the first crediting period and for subsequent crediting periods.

The default weights are adopted for the proposed project, the baseline emission factor is:

$EF_{grid,CM,y}=EF_{grid,OM,y}\times w_{OM}+EF_{grid,BM,y}\times w_{BM}$ = **0.895875tCO_2/MWh**

3. Leakage

Accord to the ACM0002, no leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, and transport). These emissions sources are neglected.

4. Emission Reduction

To calculate the emission reductions the project participant shall apply the following equation:

$ER_y = BE_y – PE_y$

Where:

ER_y	is the emissions reductions in year y (tCO_2e)
BE_y	is the baseline emissions in year y (tCO_2)
PE_y	is the project emissions in year y (tCO_2e)

B.6.2. Data and parameters fixed ex ante

Data/Parameter	***$FC_{i,y}$***
Data unit	Mass or volume unit, such as 10^4t or 10^7m^3 or 10^8m^3
Description	the amount of the fossil fuel i consumed in the project electricity system in year y
Source of data	China Energy Statistical Yearbook (2008~2010)
Value(s) applied	See Annex 4
Choice of data or measurement methods and procedures	The data is obtained from the China Energy Statistical Yearbook and is reliable
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$NCV_{i,y}$
Unit	GJ/ mass or volume unit, such as MJ/t or MJ/km^3
Description	Net calorific value (energy content) of fossil fuel type *i* in year *y*
Source of data	China Energy Statistical Yearbook 2010
Value(s) applied	See Appendix 4
Choice of data or Measurement methods and procedures	Data collected from the official statistics of China
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$EF_{CO2,i,y}$
Unit	tCO_2/GJ
Description	CO_2 emission factor of fossil fuel type i in year y
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value(s) applied	See Appendix 4
Choice of data or Measurement methods and procedures	Data collected from IPCC
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	EG_y
Unit	MWh
Description	Net electricity generated and delivered in the project electricity system in year y
Source of data	China Electric Power Yearbook (2008~2010)
Value(s) applied	See Appendix 4
Choice of data or Measurement methods and procedures	Data collected from the official statistics of China
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	Electricity imported
Unit	MWh
Description	Net electricity imported from NEPG and CCPG to NCPG
Source of data	2011 Baseline emission factors for regional power grids in China issued by the China DNA Chinese DNA on http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf
Value(s) applied	See Appendix 4
Choice of data or Measurement methods and procedures	2011 Baseline emission factors for regional power grids in China issued by the China DNA Data collected from http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	Simple OM of the CCPG
Unit	tCO_2e /MWh
Description	Simple operating margin CO_2 emission factor of CCPG
Source of data	2011 Baseline emission factors for regional power grids in China issued by the China DNA Chinese DNA on http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf
Value(s) applied	See Appendix 4
Choice of data or Measurement methods and procedures	2011 Baseline emission factors for regional power grids in China issued by the China DNA Data collected from http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	Simple OM of the NEPG
Unit	tCO_2e /MWh
Description	Simple operating margin CO_2 emission factor of NEPG
Source of data	2011 Baseline emission factors for regional power grids in China issued by the China DNA Data collected from http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf
Value(s) applied	See Appendix 4
Choice of data or Measurement methods and procedures	2011 Baseline emission factors for regional power grids in China issued by the China DNA Data collected from http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	Efficiency of the best technology commercially
Unit	%
Description	The efficiency of the best commercially available coal, oil, or gas-fired power plant
Source of data	Chinese DNA on http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2720.pdf
Value(s) applied	Best efficiency for coal plant is 39.45%; Best efficiency for oil plant is 51.77% Best efficiency for gas plant is 51.77%
Choice of data or Measurement methods and procedures	Official statistics
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	Installed Capacity
Unit	MW
Description	Installed capacity of the NCPG
Source of data	China Electric Power Yearbook (2008-2010)
Value(s) applied	See Appendix 4
Choice of data or Measurement methods and procedures	Official statistics
Purpose of data	Calculation of baseline emissions
Additional comment	-

B.6.3. Ex ante calculation of emission reductions

>>

According to the baseline methodology ACM0002, the GHG emission of the proposed project within the project boundary is zero, i.e. PE y =0.

According to the descriptions and calculation in section B. 6.1, the combined baseline emission factor of the NCPG is:

$EF_{grid,CM,y}$ =0.895875tCO2/MWh.

According to the Feasibility Study Report of the Proposed Project, the estimated annual net electricity generation supplied by the proposed project to the grid will be:

$EG_{facility,y} = (EG_{export,y} - EG_{import,y})$ =105,520MWh-0MWh=105,520MWh

The annual emissions of the baseline scenario will be:

$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} = EG_{facility,y} \times EF_{grid,CM,y} = (EG_{export,y} - EG_{import,y}) \times EF_{grid,CM,y}$ = 94,532tCO_2

$ER_y = BE_y - PE_y$ =94,532 – 0 = 94,532 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)
01/01/2013~31/12/2013	94,532	0	0	94,532
01/01/2014~31/12/2014	94,532	0	0	94,532
01/01/2015~31/12/2015	94,532	0	0	94,532
01/01/2016~31/12/2016	94,532	0	0	94,532
01/01/2017~31/12/2017	94,532	0	0	94,532
01/01/2018~31/12/2018	94,532	0	0	94,532
01/01/2019~31/12/2019	94,532	0	0	94,532
Total	661,724	0	0	661,724
Total number of crediting years	7 years			
Annual average over the crediting period	94,532	0	0	94,532

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data and parameters to be monitored

Data / Parameter	$EG_{export,\ y}$
Unit	MWh/yr
Description	Electricity supplied by the proposed project and the Hebei Shangyi Dongshan Wind Farm Project to the grid in year y.
Source of data	Electricity meter (Main meter M1 and the backup meter M2) readings installed at the high volt side of 220kV project site substation
Value(s) applied	105,520
Measurement methods and procedures	the electricity supplied by the project to the grid will be monitored and measured by the meter(s) (Main meter M1 and the backup meter M2) installed at the high volt side of 220kV project site substation. The readings of electricity meter will be continuously measured and monthly recorded.
Monitoring frequency	Continuously measurement and monthly recording
QA/QC procedures	The metering equipment at the project site will be calibrated by a qualified Meter Calibration Organization once a year according to the management standard. Power supplied to the grid will be double checked according to electricity sales receipts. The accuracy of the metering equipment is 0.2S.
Purpose of data	Baseline emission calculation
Additional comment	-

Data / Parameter	$EG_{import,\ y}$
Unit	MWh
Description	Electricity imported from the grid by the proposed project and the Hebei Shangyi Dongshan Wind Farm Project during year y.
Source of data	Electricity meter (Main meter M1 and the backup meter M2) readings installed at the high volt side of 220kV project site substation.
Value(s) applied	0
Measurement methods and procedures	The electricity imported from the grid will be monitored and measured by the meter(s) (Main meter M1 and the backup meter M2) installed at the high volt side of 220kV project site substation. The readings of electricity meter will be continuously measured and monthly recorded.
Monitoring frequency	Continuously measurement and at least monthly recording
QA/QC procedures	The metering equipment at the project site will be calibrated by a qualified Meter Calibration Organization once a year according to the management standard. Power supplied to the grid will be double checked according to electricity sales receipts. The accuracy of the metering equipment is 0.2S.
Purpose of data	Baseline emission calculation
Additional comment	-

Data/Parameter	$EG_{project, y}$
Unit	MWh
Description	Electricity generated measured by meters installed at the 35kv transmission lines of the proposed project during year y.
Source of data	Sum of electricity meter readings of M7, M8 and M9 installed at the 35kv transmission lines.
Value(s) applied	N.a
Measurement methods and procedures	$EG_{project,y} = \sum_{i=1}^{3} EG_{project,y,i}$ After the operation of the proposed Project, the readings of the electricity meters will be continuously measured and monthly recorded. Data will be archived for 2 years following the end of the crediting period by means of electronic and paper backup.
Monitoring frequency	Continuously measurement and monthly recording
QA/QC procedures	The metering equipment at the project site will be calibrated by a qualified Meter Calibration Organization according to the management standard. Power imported from the grid will be double checked according to electricity sales receipts. The accuracy of the metering equipment is 0.2S.
Purpose of data/parameter	Baseline emission calculation
Additional comments	-

Data/Parameter	$EG_{Other, y}$
Unit	MWh
Description	Electricity generated measured by meters installed at the 35kv transmission lines of the Hebei Shangyi Dongshan Wind Farm Project during year y.
Source of data	Sum of electricity meter readings of M4, M5 and M6 at the 35kv transmission lines of the Hebei Shangyi Dongshan Wind Farm Project.
Value(s) applied	N.a
Measurement methods and procedures	$EG_{other,y} = \sum_{i=1}^{n} EG_{other,y,i}$ After the operation of the proposed project, the readings of the electricity meters will be continuously measured and monthly recorded. Data will be archived for 2 years following the end of the crediting period by means of electronic and paper backup.
Monitoring frequency	Continuously measurement and monthly recording
Measuring/reading/recording frequency	Continuously measurement and monthly recording
QA/QC procedures	The metering equipment at the project site will be calibrated by a qualified Meter Calibration Organization according to the management standard. Power imported from the grid will be double checked according to electricity sales receipts. The accuracy of the metering equipment is 0.2S.
Purpose of data/parameter	Baseline emission calculation
Additional comments	-

Data / Parameter	$EG_{facility,y}$
Unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y*
Source of data	Electricity meter (Main meter M1 and the backup meter M2) readings at the high volt side of 220kV project site substation, the M6, M7 and M8 at the 35kv transmission lines of the proposed project. M4, M5 and M6 at the 35kv transmission lines of the Hebei Shangyi Dongshan Wind Farm Project project
Value(s) applied	105,520 Which is from the FSR, in actual this value is calculated by the . $EG_{facility,y} = EG_{export,y} \times \frac{EG_{project,y}}{EG_{project,y}+EG_{other,y}} - EG_{import,y}$
Measurement methods and procedures	Electricity meter(s) recording supply and consumption were at the onsite sub-station.
Monitoring frequency	Continuously measurement and monthly recording
QA/QC procedures	The metering equipment at the project site will be calibrated by a qualified Meter Calibration Organization according to the management standard. Power imported from the grid will be double checked according to electricity sales receipts. The accuracy of the metering equipment is 0.2S.
Purpose of data	Calculation of baseline emissions
Additional comment	-

B.7.2. Sampling plan

>>

The Proposed Project is not involved in a sampling approach.

B.7.3. Other elements of monitoring plan

>>

The monitoring plan is to serve as a guideline for the Project Owner to monitor the emission reduction of the Proposed Project. A more detailed Monitoring and Management Manual of the Proposed Project will be completed before the project operation. The contents of the Monitoring and Management Manual are highlighted as follows:

1. Data and parameters to be monitored

Since the baseline emission factor is calculated ex-ante, the main data to be monitored is the net electricity generation supplied by the project to the grid ($EG_{facility,y}$).

$EG_{facility,y}$: Net electricity supplied by the project activity to the grid, calculated as

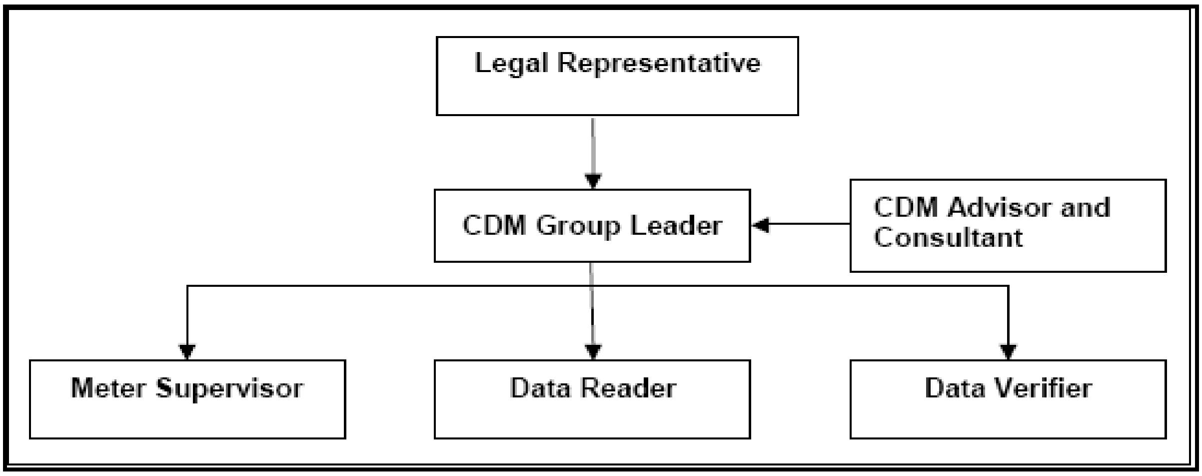
$$EG_{facility,y} = EG_{export,y} \times \frac{EG_{project,y}}{EG_{project,y} + EG_{other,y}} - EG_{import,y}$$

$EG_{facility,y}$: Net electricity supplied by the proposed project to the grid in year y.
$EG_{import,\ y}$: Electricity imported from the grid by the proposed project and the Hebei Shangyi Dongshan Wind Farm Project in year y.
$EG_{export,\ y}$: Electricity exported from the project and the Hebei Shangyi Dongshan Wind Farm Project to the grid in year y.
$EG_{project,,y}$: Electricity generated measured by meters installed at the 35kv transmission lines of the proposed project in year y
$EG_{other,y}$= Electricity generated measured by meters installed at the 35kv transmission lines of the Hebei Shangyi Dongshan Wind Farm Project to the grid in year y.

2. Description of the monitoring system

The Project owner was responsible for the monitoring related work, including the relevant data

collection, monitoring and verification. A CDM working panel was established internally and to be assisted by an external CDM consulting company. The operational and organizational structure for the monitoring process is showed as in the Figure below.



Furthermore, a CDM manual was designed as a guideline for the project owner for management of the Project and monitoring of the data during the operation period. Details on the authority and responsibility for monitoring, measurement and reporting, the procedures for the training of monitoring personnel, the procedures for day-to-day records handling, the procedures for internal audits, the procedures for corrective actions and so on are provided in the CDM manual for the Project owner.

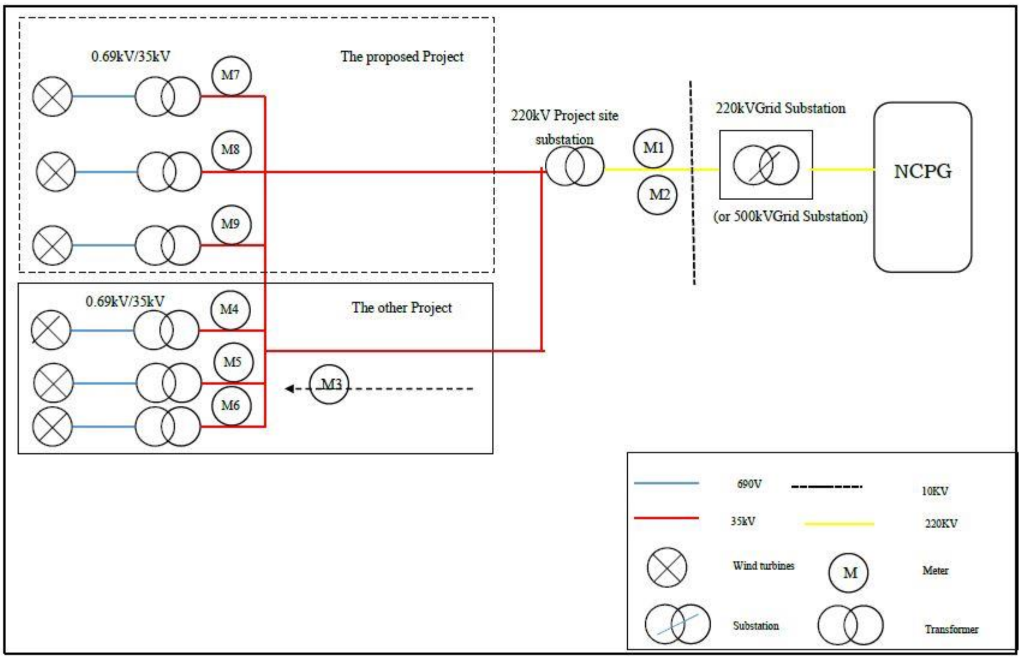
3. Monitoring meters

The proposed project had been put into operation on 02/06/2013. After the operation of the proposed project, the proposed project uses joint meters with the other project namely Hebei Shangyi Dongshan Wind Farm Project, main meter M1 and the back-up meter M2 were used to monitor total electricity supplied to the grid and imported from the grid by the proposed project and Hebei Shangyi Dongshan Wind Farm project. the accuracy of all the meters are 0.2S.

The 33 sets of wind turbines of the proposed project are divided into three groups, and each group connected with a 35kV transmission line and installed with one meter at the input side of 220kV project site substation. The meters of M7, M8and M9 use to monitor the electricity generated by the proposed project. The accuracy of all the meter the accuracy of all the meters is 0.2S.

After the operation of the proposed project, Similar situation occur in the. Hebei Shangyi Dongshan Wind Farm Project, the meters of M4, M5 and M6 use to monitor the electricity generated by The Hebei Shangyi Dongshan Wind Farm Project, the meter M3 and the spare 10kV agriculture line used for the Hebei Shangyi Dongshan Wind Farm project only, which is not used by the proposed project. The accuracy of all the meters is 0.2S.

A diagram of the temporary plan shows how parameters are monitored is presented as follows:



4. Calibration

The Project owner will sign agreement with a local third-party possessing state qualification to calibrate the meters at regular intervals. The electricity meters must be regularly verified according to the requirements as per China electric industry regulation. The electricity meters must be sealed after verification and must not be dismantled and changed by the Project owner unless in presence of quality monitoring institution.

5. Data management

All monitoring data and records will be archived in electronic documents as well as paper documents. The electronic documents will be backed up in Compact Discs or Hard Discs. All data including calibration records will be kept for two years after the end of the total crediting period of the CDM project.

6. Quality control

The supplied power to the grid for the purpose of emission reduction calculations will be cross-checked against sales receipts, approved and signed off by the CDM manager prior to being accepted and stored. In addition, internal auditing will be performed to assess the monitoring process and results.

Emergency Procedure:

In case metering equipment is damaged and no reliable readings can be recorded the project owner will estimate net supply by the proposed project activity according to the following procedure:
In case metering equipment is damaged: The project owner and the grid company will jointly prepare a reasonable and conservative estimate of the correct reading, and provide sufficient evidence that this estimation is reasonable and conservative. And a statement will be prepared indicating.

►the background to the damage to metering equipment

►the assumptions used to estimate net supply to the grid for the days for which no record could be recorded

►the estimation of power supplied to the grid. The statement will be signed by both a representative of the project owner as well as a representative of the grid company.

SECTION C. Start date, crediting period type and duration

C.1. Start date of project activity

>>
20/03/2012
The starting date of a CDM project activity is the earliest of the date(s) on which the implementation or construction or real action of a project activity begins/has begun. The wind turbine purchase contract was signed on 20/03/2012. Therefore, the earliest date as mentioned above is determined as the start date of the Proposed Project.

C.2. Expected operational lifetime of project activity

>>
20 years 0 month

C.3. Crediting period of project activity

C.3.1. Type of crediting period

>>
A renewable crediting period is chosen (first).

C.3.2. Start date of crediting period

>>
01/01/2013. (or the date of registration, whichever is later.)

C.3.3. Duration of crediting period

>>
Crediting period Dates: 01/01/2013– 31/12/2019 (first and last days included)

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

>>

The EIA of the Proposed Project was completed by China exploration metallurgy Survey and Design Institute Co. Ltd. on 02/02/2010 and approved by Hebei Environmental Protection Bureau on 07/01/2011. The summary of this evaluation is as following:

1. Noise

The noises will be produced by the constructing equipment and transporting vehicle during construction period. The major measures for noise control include applying low-noise machinery and technology, pre-planning the construction, maintaining the construction machinery regularly, slowing speed and forbidding tooting while vehicles pass the residential area. The operation of wind turbines is the major source of noise during the operational period. As the proposed site is located far from the resident area, the noise impact of the Proposed Project on the surrounding area is negligible. The noisy during the operation period also meets the national standard.

2. Air Pollution

The dust produced in the constructing process is the main factor for the air pollution during construction period. Sprinkling, covering the raw material and so on will be carried out to reduce the impact to lowest.

3. Wastewater

The wastewater during construction period involves wastewater and domestic sewage. The waste water is few and will be used to sprinkling the construction area. The sewage will be treated in the septic tank and then will be used to sprinkling too. In the operation period, the domestic sewage will be drained into the water storage pit after treatment. Then it will be used for factory virescence. Therefore, there is no impact on the water environment.

4. Solid waste

The solid wastes include living garbage and construction garbage during construction period and operation period. The solid waste will be transported to the nearest landfill, so it will not impact on the environment.

5. Ecological environment

The ecological impact of wind farms is on vegetation, animals and migrating birds. The occupation of ground will destroy some surface vegetation during the proposed project construction period, but the vegetation destroyed by temporary ground occupation will be recovered through replanting tree and grass after the completion of the construction. So the minor quantity of soil erosion generated during the construction phase has no noticeable impact on soil use and the proposed project proponent has made arrangements to dispose them in an environmentally acceptable manner. Moreover, there are no wild animals or migrating birds in the region of the proposed project activity. Therefore, the activities to be carried out will not generate any negative impact on the ecological environment.

Conclusion

After the above measurements performed, the negative impacts on environment will be minimized below the requirements of laws and regulations during the construction and operation periods. Furthermore, as renewable power project, the proposed project can reduce the consumption of fossil fuel sources and GHG emission.

D.2. Environmental impact assessment

>>

The Proposed Project will not have significant impacts on local environment in general, and the Proposed Project is definitely an environmentally more friendly way of providing power than others power plants.

Meanwhile, the EIA of the Proposed Project has been approved by the local environmental protection administration. In conclusion, environmental impacts arising from the Proposed Project are considered insignificant.

SECTION E. Local stakeholder consultation

E.1. Modalities for local stakeholder consultation

>>

In 11/2011, staff from the developer carried out a survey of the residents near the project site. Questionnaires were sent to 30 stakeholders and the survey had a 100% response rate. The basic structure of the respondents is illustrated in Table C-1.

Table C-1. Structure of the respondents

Structure of gender		
Gender	**No.**	**Percentage (%)**
Male	16	53
Female	14	47

Structure of educational level		
Educational level	**No.**	**Percentage (%)**
Primary school	9	30
Junior middle school	3	10
Senior middle school	14	47
Technical college or university	4	13

Structure of age		
Age	**No.**	**Percentage (%)**
Below 30	3	10
30~39	12	40
40~49	13	43
50 and above	2	7

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

The questionnaire includes below contents:

1. Do you know this project?
2. Do you think the proposed project will be helpful to improve the living and/or working environment?
3. Do you think the location of the proposed project is reasonable or unreasonable?
4. Will the proposed project improve the environment and local economic?
5. Do you think this project will cause noise, vibration or electromagnetic radiation to cause harm to your health?
6. Do you support the construction of the project?

E.2. Summary of comments received

>>

Conclusion from course of the consultant meeting and questionnaires

The investigation results are as the following:

100% of the respondents know the proposed project;

93.3% agree that the proposed project will affect their life positively, 6.7% think it is not sure;

93.3% think that the proposed project is located reasonably, 6.7% think it is not sure.

100% of the respondents argue that the project will promote the environment and local economic;

87% think it will not cause noise, vibration or electromagnetic to cause harm to health, 13% think it is not sure.

100% of the respondents support the proposed project.

The survey shows that, all the participants had a better understanding of the project and associated impacts on the surrounding environment and community and local economy, and showed fully support to the project.

E.3. Consideration of comments received

>>

Based on the concern of local stakeholders, the project owner will take appropriate environmental protection measures according to EIA report, and the local Environmental Protection Bureau will check regularly.

The local stakeholders are supportive of the Proposed Project, and there have been no negative evaluation to be taken in account that could affect the project design.

SECTION F. Approval and authorization

>>

The letter of approval (LoA) from DNA of Australia (No. AUSCDM120823MBL_HSC) issued on 26/09/2012 and from Chinese DNA (No.4625) issued on 19/10/2012.

Appendix 1. Contact information of project participants

Organization name	CGN (Shangyi) Wind Power Co., Ltd.
Country	Republic of China
Address	Area 12 of Advanced Business Park, No.188 West of South 4th Ring Road, No.2 Building, Beijing City, P.R.China.
Telephone	+86 (0)10 6370 5765
Fax	+86 (0)10 6370 5875
E-mail	cgnwind@163.com
Website	
Contact person	Shi Lei

Organization name	Macquarie Bank Limited
Country	United Kingdom
Address	28 Ropemaker Street, Level 6, Ropemaker Place, London city, United Kingdom
Telephone	+44 203 037 2000
Fax	+44 203 037 4301
E-mail	carbontrading@macquarie.com
Website	www.macquarie.com
Contact person	John Marlow

Appendix 2. Affirmation regarding public funding

There is no public funding for Hebei Shangyi DongShan Wind Farm Project.

Appendix 3. Applicability of methodologies and standardized baselines

Please refer to section B in the PDD.

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

Based on the approved methodology ACM0002, the "Tool to calculate the emission factor for an electricity system", and the "2011 Baseline Emission Factors for Regional Power Grids in China", the emission factor of NCPG calculation was shown below:

1. OM emission factor calculation of NCPG

Table A-1, A-2, and A-3 provide annual thermal power electricity generation in NCPG from 2007 to
2009. The main data sources come from China Electric Power Yearbook 2008, 2009 and 2010.

Table A-1. Thermal power generation data within the NCPG in 2007

	Thermal power generation	Auxiliary electricity consumption	Thermal power supplied to the grid
	(MWh)	(%)	(MWh)
Beijing	22,300,000	7.51	20,625,270
Tianjin	39,900,000	6.53	37,294,530
Hebei	163,300,000	6.67	152,407,890
Shanxi	173,400,000	7.99	159,545,340
Inner Mongolia	180,100,000	7.77	166,106,230
Shandong	259,100,000	7.23	240,367,070
Total	838,100,000		776,346,330

Data source: China Electric Power Yearbook 2008.

2007
Net Electricity Imports from Northeast china Power Grid (MWh) 1,789,750
Net Electricity Imports from Central china Power Grid (MWh) 803,000
Northeast simple OM 1.08186
Central china simple OM 1.10197
Total power output (MWh) 778,939,080
Total emission (tCO_2) 757,549,895
EF 2007 0.97254

Table A-2. Thermal power generation data within the NCPG in 2008

	Thermal power generation	Auxiliary electricity consumption	Thermal power supplied to the grid
	(MWh)	(%)	(MWh)
Beijing	24,300,000	7.14	22,564,980
Tianjin	39,700,000	7.05	36,901,150
Hebei	158,000,000	6.9	147,098,000
Shanxi	176,200,000	8.22	161,716,360
Inner Mongolia	200,800,000	7.96	184,816,320

Shandong	268,900,000	7.14	249,700,540
Total	867,900,000		802,797,350

Data source: China Electric Power Yearbook 2009.

2008
Net Electricity Imports from Northeast china Power Grid (MWh) 5,286,140
Northeast simple OM 1.10489
Total power output (MWh) 808,083,490
Total emission(tCO2) 812,079,707
EF 2008 1.00495

Table A-3. Thermal power generation data within the NCPG in 2009

	Thermal power generation	Auxiliary electricity consumption	Thermal power supplied to the grid
	(MWh)	(%)	(MWh)
Beijing	24,100,000	6.55	22,521,450
Tianjin	41,300,000	6.8	38,491,600
Hebei	173,300,000	6.92	161,307,640
Shanxi	185,000,000	8.1	170,015,000
Inner Mongolia	213,500,000	7.82	196,804,300
Shandong	285,800,000	7.43	264,565,060
Total	923,000,000		853,705,050

Data source: China Electric Power Yearbook 2010.

2009
Net Electricity Imports from Northeast china Power Grid (MWh) 6,982,610
Northeast simple OM 1.06915
Total power output (MWh) 860,687,660
Total emission (tCO2) 829,856,644
EF 2009 0.96418

Table A-4 shows the low calorific values and emission factors of fuels consumed for electricity generation that are to be used in the following OM emission factor calculation and BM emission factor calculation.

Table A-4. Data of fuels consumed for electricity generation

Fuel type	Average Low Calorific Value	Emission factor	Carbon oxidation rate
	(MJ/t,km^3)	**(kgCO_2/TJ)**	**(%)**
Raw coal	20,908	87,300	100
Cleaned coal	26,344	87,300	100
Briquette	20,908	87,300	100
Other washed coal	8,363	87,300	100
Coke	28,435	95,700	100
Crude oil	41,816	71,100	100
Gasoline	43,070	67,500	100
Diesel	42,652	72,600	100
Fuel oil	41,816	75,500	100
Other Coking products	41,816	72,200	100
Natural gas	38,931	54,300	100
Coke Oven Gas	16,726	37,300	100
Other coal gas	5,227	37,300	100
LPG	50,179	61,600	100
Refinery dry gas	46,055	48,200	100

Data sources: China Energy Statistical Yearbook 2010Edition,
"2006 IPCC Guidelines for National Greenhouse Gas Inventories", Volume2, Chap 1, Table 1.2, Table 1.4

Table A-5~A-7 show the calculation of the simple OM emission factor of NCPG in 2007, 2008 and 2009.

Table A-5. Calculation of simple OM emission factor of NCPG in 2007

Fuel type	Unit	Beijing A	Tianjin B	Hebei C	Shanxi D	Inner Mongolia E	Shandong F	Total G=A+B+C+D+E+F	Carbon (tC/TJ) H	Carbon oxidation rate (%) I	Fuel emission factor (tC/TJ) J	NCV (MJ/t,km^3) K	CO_2 emissions （tCO_2e） L=G*J*K/100000(mass unit) L= G*J *K /10000(volume unit)
Raw 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
Clean washed 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	10^4t			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	10^8m^3	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
Refined gas	10^4t	0.06		2.85			1.65	**4.56**	15.7	100	48,200	46,055	101,225
Natural gas	10^8m^3	5.03	0.73		0.54	4.22	0.01	**10.53**	15.3	100	54,300	38,931	2,225,993
Other petroleum	10^4t	1.72						**1.72**	20	100	72,200	41,816	51,929
Other coking	10^4t	4.74						**4.74**	25.8	100	95,700	28,435	128,986
products	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

Total emissions of NCPG (tCO_2)	754,728,750

Data sources: China Energy Statistical Yearbook 2008 Edition

Table A-6. Calculation of simple OM emission factor of NCPG in 2008

Fuel type	**Unit**	**Beijing A**	**Tianjin B**	**Hebei C**	**Shanxi D**	**Inner Mongolia E**	**Shandong F**	**Total G=A+B+C+D+E+F**	**Carbon (tC/TJ) H**	**Carbon oxidation rate (%) I**	**Fuel emission factor (tC/TJ) J**	**NCV (MJ/t,km³) K**	**CO_2 emissions (tCO_2e) L=G*J*K/100000(mass unit) L= G*J *K /10000(volume unit)**
Raw 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
Clean washed 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	10^4t			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	10^8m^3	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
Refined gas	10^4t	0.44		2.93				**3.37**	15.7	100	48,200	46,055	74,809
Natural gas	10^8m^3	11.09	0.7		0.97	2.12		**14.88**	15.3	100	54,300	38,931	3,145,563
Other petroleum	10^4t	1.45						**1.45**	20	100	72,200	41,816	43,777

Other coking	10^4t	7.97		7.61				**15.58**	25.8	100	95,700	28,435	423,968
products	10^4t	4.9	2.34	61.02	466	63.72	141.71	**739.69**	0	0	0	0	0
Total emissions of NCPG (tCO_2)													806,239,126

Data sources: China Energy Statistical Yearbook 2009 Edition

Table A-7. Calculation of simple OM emission factor of NCPG in 2009

Fuel type	**Unit**	**Beijing** A	**Tianjin** B	**Hebei** C	**Shanxi** D	**Inner Mongolia** E	**Shandong** F	**Total** G=A+B+C+D+E+F	**Carbon (tC/TJ)** H	**Carbon oxidation rate (%)** I	**Fuel emission factor (tC/TJ)** J	**NCV (MJ/t,km^3)** K	**CO_2 emissions (tCO_2e) L=G*J*K/100000(mass unit) L= G*J *K /10000(volume unit)**
Raw coal	10^4t	665.16	1870.36	7623.94	8024.02	12538.57	12654.05	**43376.1**	25.8	100	87,300	20,908	791,730,246
Clean washed coal	10^4t						11.7	**11.7**	25.8	100	87,300	26,344	269,080
Other washed coal	10^4t	6.15		247.51	586.04	104.69	862.02	**1806.41**	25.8	100	87,300	8,363	13,188,417
Briquette	10^4t	3.73					31.83	**35.56**	26.6	100	87,300	20,908	649,065
Coke	10^4t						10.43	**10.43**	29.2	100	95,700	28,435	283,824
Coke oven gas	10^8m^3	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	10^8m^3	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	10^4t					0.13		**0.13**	20	100	71,100	41,816	3,865
Gasoline	10^4t						0.01	**0.01**	18.9	100	67,500	43,070	291
Diesel	10^4t	0.1		2.38		2.64	3.07	**8.19**	20.2	100	72,600	42,652	253,606
Fuel oil	10^4t	0.82		0.19		0.02	2.63	**3.66**	21.1	100	75,500	41,816	115,550
LPG	10^4t							**0**	17.2	100	61,600	50,179	0
Refined gas	10^4t	0.83		3.95			3.44	**8.22**	15.7	100	48,200	46,055	182,472

Natural gas	10^8m^3	13.55	0.63		4.39	2.03	0.03	**20.63**	15.3	100	54,300	38,931	4,361,086
Other petroleum	10^4t	1.52					23.18	**24.7**	20	100	72,200	41,816	745,721
Other coking	10^4t	6.62		7.79			5.52	**19.93**	25.8	100	95,700	28,435	542,341
products	10^4t		2.11	62.14	570.3	90.63	137.68	**862.86**	0	0	0	0	0
Total emissions of NCPG (tCO_2)													822,391,221

Data sources: China Energy Statistical Yearbook 2010 Edition

The Simple OM emission factor is the weighted average value of the Simple OM emission factors in the year 2007, 2008and 2009, i.e.

0.9803 tCO_2e

2. BM emission factor calculation of NCPG.

Table A-8. Emission factor of the best power technology commercially available

	Parameter	**Efficiency of supplying electricity (%)**	**Fuel emission factor ($kgCO_2/TJ$)**	**Oxidation rate**	**Emission factor (tCO_2e/MWh)**
		A	B	C	D=3.6/A/10,000*B*C
Coal-fired power plant	$EF_{Coal,Adv,y}$	39.45	87,300	1	0.7967
Gas-fired power plant	$EF_{Gas,Adv,y}$	51.77	54,300	1	0.3776
Oil-fired power plant	$EF_{Oil,Adv,y}$	51.77	75,500	1	0.5250

Appendix 5. Further background information on monitoring plan

Please refer to B.7.2 in the PDD

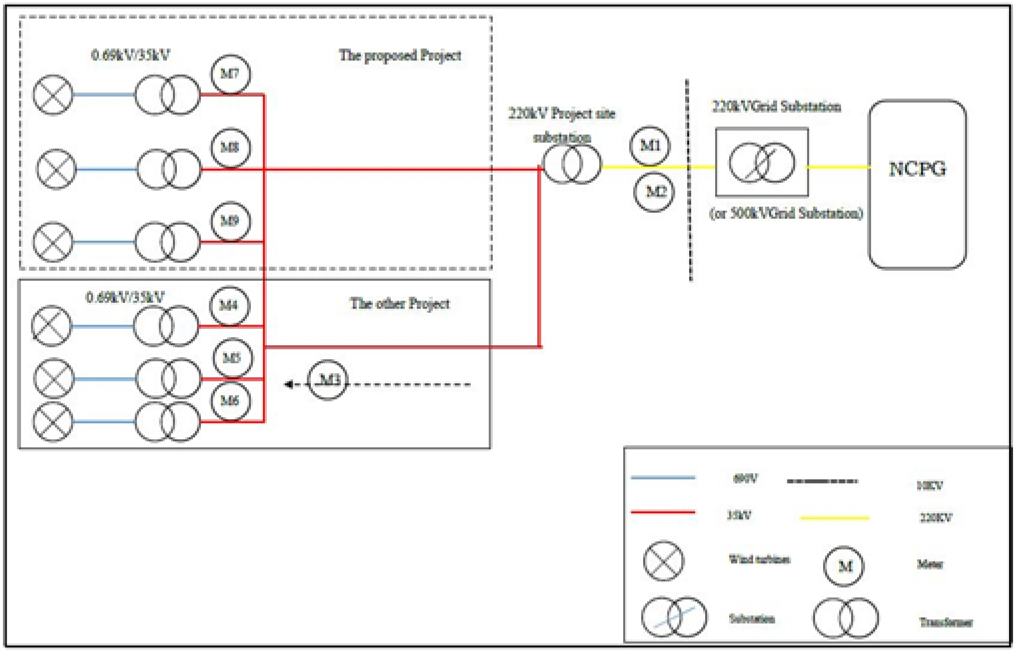
Appendix 6. Summary report of comments received from local stakeholders

Please refer to E.2 in the PDD

Appendix 7. Summary of post-registration changes

There are permanent changes to the registered monitoring plan, Changes that are being submitted with this monitoring report as part of the request for issuance (post-registration change - issuance track) as applicable from this monitoring period.In the registered PDD(Version 1.3,08/11/2011), the project installed one bi-directional meter at the high volt side of 220kV project site Substation. Both electricity supplied to the grid by the proposed project and the electricity imported from the grid to the project site is monitored by the meters. However, in actual, there is a other project, namely, Hebei Shangyi Dongshan Wind Farm Project. which uses joint meter with the proposed project.

Hence, in the revised PDD (version 2.0, 27/09/2018), the sketch for the location of the meters in Section B.7.1 and some relevant description in the registered CDM-PDD (version 1.3, 08/11/2011) should be permanently changed. The actual sketch for the location of the meters is shown in the following figure. The meters installed at the 35kv lines (M4 M5 M6 M7 M8 M9) had been added in the revised PDD(version 2.0,27/09/2018).



For the monitoring parameters $EG_{project,y}$, $EG_{other,y}$ had been added to B.7.1 of the revised PDD(version 2.0,27/09/2018).For the parameters $EG_{import,y}$, $EG_{export,y}$ *and* $EG_{facility,y}$, the description, monitoring method, calculation method had been changed which showed in the B7.1 of the revised PDD(version 2.0,27/09/2018).

Document information

Version	Date	Description
06.0	7 June 2017	Revision to: • Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Make editorial improvements.
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.

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