



**Verified Carbon
Standard**

INNER MONGOLIA XIMENG ZHELIGENTU WIND FARM PHASE I PROJECT



Document Prepared by Climate Bridge (Shanghai) Ltd.

Tel: +86 21 6246 2036; Fax: +86 21 2301 9950

Project Title	Inner Mongolia Ximeng Zheligentu Wind Farm Phase I Project
Version	02
Date of Issue	17-August-2020
Prepared By	Fan Zhang
Contact	Block B, Level 24, Jiangong Mansion, 33 Fushan Road, Pudong New Area, Shanghai, P.R. of China Telephone: 2162462036; Email: zhang.fan@climatebridge.com http://www.climatebridge.com

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1 PROJECT DETAILS

1.1 Summary Description of the Project

Inner Mongolia Ximeng Zheligentu Wind Farm Phase I Project (hereinafter referred to as the project) is to utilize wind resources for electricity generation through the construction of a wind farm with a total capacity of 48.75MW and a 220kV substation in Zhengxiangbai Qi, south Xilinguole League, Inner Mongolia Autonomous Region, P.R.China. The project is constructed and operated by Beijing International New Energy Co., Ltd. The electricity generated from the project is sold to West Inner Mongolia Power Grid, an integral part of the North China Power Grid. The estimated annual net electricity output and average annual emission reductions of the project is 99.48GWh and 83,612 tCO₂e during the second crediting period from 01/05/2019 to 30/04/2029. The project is a grid-connected renewable energy project.

The project started construction on 06/06/2008. The first wind turbine of the Project has been put into operation on 30/04/2009. And all the 39 wind turbines have been put into operation on 02/07/2009.

The scenario existing prior to the start of the implementation of the project activity is NCPG providing the same electricity service as the Project;

The baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity.

1.2 Sectoral Scope and Project Type

Sectoral scope: 1. Energy industries (renewable/non-renewable sources);

Project type: Energy industries (renewable/non-renewable sources)

The project is not a grouped project.

1.3 Project Eligibility

The project is not a grouped project.

1.4 Project Design

NA

1.5 Project Proponent

Organization name	Beijing International New Energy Co., Ltd.
Contact person	Jiaman Xu
Title	Manager
Address	No.1, Nanbinhe Road, Guanganmenwai, Xuanwu District, 1003 Room, Gaoxin Building, Beijing City, China.
Telephone	021-23019950
Email	1169735462@qq.com

1.6 Other Entities Involved in the Project

Organization name	Climate Bridge (Shanghai)Ltd.
Role in the project	VCU buyer
Contact person	Zhiwen Gao
Title	General Manager
Address	Block B, Level 24, Jiangong Mansion, 33 Fushan Road, Pudong New Area, Shanghai, China 200120
Telephone	+86-2162462036
Email	gao.zhiwen@climatebridge.com

1.7 Ownership

The project proponent is Beijing International New Energy Co., Ltd., who has the full ownership of the project. The approval of Environmental Impact Assessment (EIA), Preliminary Design Report (PDR), and Letter of Approval for the Project as a CDM Project issued by China National Development and Reform Commission, and the business license of the project owner are evidences for legislative right. Besides, the equipment purchasing contract and the purchasing power agreement are the evidences for the ownership of the plant, equipment and power generating.

1.8 Project Start Date

The project started on 01/05/2009 (the start date of electricity generation).

1.9 Project Crediting Period

The project crediting period is ten years, twice renewable for a total of 30 years. However, as the project is also registered as a CDM project with a seven year twice renewable project crediting period, it is not eligible for VCU issuance beyond the end of those 21 years. The project first crediting period is from 01/05/2009 to 30/04/2019. This is the second crediting period from 01/05/2019 to 30/04/2029.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	✓
Large project	

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
01/05/2019~30/04/2020	83,612
01/05/2020~30/04/2021	83,612
01/05/2021~30/04/2022	83,612
01/05/2022~30/04/2023	83,612
01/05/2023~30/04/2024	83,612
01/05/2024~30/04/2025	83,612
01/05/2025~30/04/2026	83,612
01/05/2026~30/04/2027	83,612
01/05/2027~30/04/2028	83,612
01/05/2028~30/04/2029	83,612
Total estimated ERs	836,120
Total number of crediting years	10
Average annual ERs	83,612

1.11 Description of the Project Activity

Inner Mongolia Ximeng Zheligentu Wind Farm Phase I Project (hereinafter referred to as the project) is to utilize wind resources for electricity generation through the construction of a wind farm with a total capacity of 48.75MW and a 220kV substation in Zhengxiangbai Qi, south Xilinguole League, Inner Mongolia Autonomous Region, P.R.China. The project is constructed and

operated by Beijing International New Energy Co., Ltd. The electricity generated from the project is sold to West Inner Mongolia Power Grid, an integral part of the North China Power Grid. The estimated annual net electricity output and average annual emission reductions of the project is 99.48GWh and 83,612 tCO_{2e} during the second crediting period from 01/05/2019 to 30/04/2029. The project is a grid-connected renewable energy project.

For the Project

The scenario existing prior to the start of the implementation of the project activity is NCPG providing the same electricity service as the Project;

The project scenario is the implementation of the Project, the installation and operation of turbines with a total capacity of 48.75MW which supply an average annual generation of 99.48GWh to NCPG and replace the same amount of electricity generated by fossil fuel fired power plants connected to NCPG;

The baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity.

Technology to be employed by the project activity

The project involves the installation of 39 wind turbines with each capacity of 1250kW each, which amount to a total installed capacity of 48.75MW. The annual net electricity output is 99.48GWh. The wind turbines are supplied by a domestic manufacturer–Shanghai Electric Wind Power Equipment Co., Ltd. and the selected model is SEC-1250. The main technical specifications of the wind turbine are provided in the following Table.1.

Table 1 Key Technical specifications of wind turbines

Item	Unit	Index
Rated capacity	kW	1250
Number of blades	-	3
Rotor diameter	m	64
Swept area	m ²	3217
Cut-in speed	m/s	2.8
Rated wind speed	m/s	12.3
Safe wind speed	m/s	50.3
Cut-out speed	m/s	23
Height of hub	m	68
Rated voltage of generator	V	690
Rated capacity of generator	kW	1250
Lifetime	years	24

A 220kV substation has been set up at the site, which connects the project to the 220kV Zhengxiangbai Qi Substation. Then the power produced in the wind farm can be transmitted to the West Inner Mongolia Power Grid which is part of North China Power Grid. The wind turbines employed in the project is made in domestic, therefore it doesn't involve international technology transfer.

1.12 Project Location

The project is located at Zhengxiangbai Qi, Xilinguole League, middle grassland of Inner Mongolia Autonomous Region, P. R. China. The project has geographical coordinates with east longitude of 115° 29'34" and north latitude of 42° 28'15". Figures A1 and A2 show the geographical location of the project.



Figure 1. Location of Inner Mongolia Autonomous Region in China



Figure 2. Location of the project

1.13 Conditions Prior to Project Initiation

The scenario existing prior to the start of the implementation of the project activity is NCPG providing the same electricity service as the Project;

The project scenario is the implementation of the Project, the installation and operation of turbines with a total capacity of 48.75MW which supply an average annual generation of 99.48GWh to NCPG and replace the same amount of electricity generated by fossil fuel fired power plants connected to NCPG;

The baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

The project is wind power generation project and meets the relevant provisions of the Law of the People's Republic of China on the Prevention and Control of Environmental Pollution. The generation of power supplied to NCPG will meet the requirement of national laws and regulations, also financially viable.

1.15 Participation under Other GHG Programs

1.15.1 Projects Registered (or seeking registration) under Other GHG Program(s)

The project has been registered as a Clean Development Mechanism (CDM) project in UNFCCC on 06/05/2010(UNFCCC Ref. 2566), with the 7 years crediting period started from 06/05/2010. Total GHG emission reductions of 212,018 tCO₂ generated from 06/05/2010 to 20/08/2012 (both days included) by the project has been issued as CER under CDM program Please refer to the following link for details.

<https://cdm.unfccc.int/Projects/DB/BVQI1241775223.11/view?cp=1>

1.15.2 Projects Rejected by Other GHG Programs

NA

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

The project does not reduce GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading

1.16.2 Other Forms of Environmental Credit

The project has not sought or received another form of GHG-related environmental credit, including renewable energy certificates, during this monitoring period .

1.17 Additional Information Relevant to the Project

Leakage Management

NA

Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description.

Sustainable Development

The project makes contribution to the local sustainable development as follows:

1. GHG emission reduction

The project activity achieves obvious greenhouse gas (GHG) emission reductions by avoiding CO₂ emissions, as grid-connected fossil fuel-fired power dominates in the North China Power Grid.

2. Pollutants emission reduction through replacing fossil fuel combustion

The project is to replace grid-connected fossil fuel-fired power plants in the North China Power Grid, and thus reduce fossil fuel consumption and avoid pollutants emission, such as sulfur dioxide and dust, brought by fossil fuel combustion. Therefore, the project has obvious environmental benefit.

3. Employment opportunities

The conducting of the project offered 16 job opportunities for local people.

4. Economy development

The region can achieve economic growth and booming of local tourism through the construction and operation of the project. Furthermore, the project contributes to local government with more tax revenues and poverty eradication.

Further Information

NA

2 SAFEGUARDS

2.1 No Net Harm

There are no negative environmental and/or socio-economic impacts due to the project.

2.2 Local Stakeholder Consultation

The project developer has sent out questionnaires to the stakeholders in the local County for the comments of the project construction in 06/03/2008. 50 copies of questionnaire were distributed, and 43 pieces of reply were received. The recovery ratio is 86%. Among the interviewees, there were 1 farmer, 6 workers, 17 government officials and 19 others. 8 of them have educational level of middle school or below middle school, 13 of high school, 21 of college and 1 other.

The summary of survey is listed as the following:

- 72% of them consider their current living and/or working environment is quiet, another 28% is unsure and only one person thinks different;
- 72% of them currently do not experience electromagnetic interference when watching TV at home, while other 21% have the experience, and 7% don't know;
- 84% of them think there will not be any negative impacts on their everyday life, and the remainder is unsure;
- 88% of them think the proposed project will help improve local economics, while the other of them is unsure;
- 70% of them think the construction of the proposed project will have no noise impact on the environment while other 28% is not sure, and only one person thinks the construction of the proposed project will have noise impact on the environment;
- Regarding the construction and operation of the propose project, 21% of them are most concerned with the noise level, 30% of them are most concerned with electromagnetic interference, and 49% of them are most concerned with wastewater from the project;
- 93% of them support the implementation of the proposed project and the others are not sure.

2.3 Environmental Impact

The environmental impact assessment for this project was carried out by Inner Mongolia Electricity Survey and Design Institute on 06/01/2006 and approved by Inner Mongolia Environmental Protection Bureau on 16/01/ 2006. A summary of the report is illustrated as below:

Ambient air

The impact on ambient air quality of the project is mainly from dust during the construction phase. The excavation work is the primary emission source; however, it is a ground source and the particle size are quite large so that dust deposit quickly on the ground. Immediately replant the areas where construction has completed, and sprinkling water on the road frequently should be conducted. Therefore, the project doesn't pose any threat on the quality of ambient air.

Impact from noise

There is some noise during the operation of wind turbines. The equipments and techniques with lower noise was chosen to apply. Improvement on construction process and strengthening of equipment maintenance is emphasized. Meanwhile, the project site is very far from the village or resident.

Consequently, the noise of operation has little impact to the surrounding environment. As a result, the noise doesn't impact the work and daily life of local residents.

Electromagnetic impact

The operation of the wind farm generates electromagnetic pollution, whereas the pollution is slight. In addition, the project is very far from local residents and village. Therefore, the electronic magnetic pollution to the surrounding environment is insignificant

Impact from Solid waste

Solid wastes generated from the project activity are excavated earth material and municipal solid waste. Part of the excavated earth material was backfilled, and the rest was used for land levelling and road construction near the project site. The municipal solid waste was collected and treated together with the waste from local residents. As the report indicates, solid waste is handled properly.

Impact from Wastewater

Wastewater is mainly domestic wastewater. Wastewater quantity is fairly small and treatment methods was applied for on-site primary treatment, and then the wastewater was treated together with the local wastewater. Small-scale septic tanks should be built on the site, through which the wastewater can meet the second-degree standard of discharge after treatment. Therefore, the impact of wastewater is limited and mitigate

Impact on natural environment

In order to protect the landscape, vehicles are prohibited from driving on the landscape randomly and timely afforestation is required; hunting wild animals is strictly forbidden at the same time. The lands permanently taken by wind farms are normally mountain ridges, where most of the vegetation is grass and shrub, without rare plants. Hence, the project construction has little impact on the mountain's eco-environment.

No migrating birds have been found in the project field till now. Therefore, the project is not located on the passage of migrating birds, and the project construction doesn't influence the migration of birds.

2.4 Public Comments

The project has been open for public comment from 23/09/2008 to 22/09/2008 on CDM website during CDM validation, no comments were received.

2.5 AFOLU-Specific Safeguards

NA.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Following approved baseline & monitoring methodology is applied:

Methodology:

ACM0002 "Grid-connected electricity generation from renewable sources" (Version 20.0)

Reference: <https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG>

The applied tools:

Tools: "Tool for assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" (Version 3.0.1).

Reference:

<https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-11-v3.0.1.pdf>

Tools: "Tool to calculate the emission factor for an electricity system" (Version 07.0)

Reference:

<https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v7.0.pdf>

Tools: "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" (Version 03.0).

Reference:

<http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-05-v3.0.pdf>

3.2 Applicability of Methodology

The approved methodology ACM0002 (version 20.0) is applicable to the project activity and the project meets the applicability of the applied methodology as follows:

Clauses	Requirements of the ACM0002	Scenario of the project	Conclusion
1	This methodology is applicable to grid-connected renewable energy power generation project activities that: <ul style="list-style-type: none"> a) Install a Greenfield power plant; b) Involve a capacity addition to (an) existing plant(s); c) Involve a retrofit of (an) existing operating plants/units; d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or e) Involve a replacement of (an) existing plant(s)/unit(s). 	The project is a greenfield NCPG-connected renewable power generation project.	Applicable
2	The methodology is applicable under the following conditions: <ul style="list-style-type: none"> (a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; (b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity. 	The project is a newly built wind power project and the project activity involves the installation of the wind power plant.	Applicable
3	In case of hydro power plants, one of the following conditions must apply:	Not applicable, the project is not a hydro power plant, so this applicability condition	NA

Clauses	Requirements of the ACM0002	Scenario of the project	Conclusion
	<p>(a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or</p> <p>(b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density calculated using equation (7), is greater than 4 W/m²; or</p> <p>(c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m²; or</p> <p>(d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m², all of the following conditions shall apply:</p> <p>(i) The power density calculated using the total installed capacity of the integrated project, as per equation (8), is greater than 4 W/m²;</p> <p>(ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity;</p> <p>(iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m² shall be:</p> <p>a. Lower than or equal to 15 MW; and</p> <p>b. Less than 10 per cent of the total installed capacity of integrated hydro power project.</p>	<p>does not need to be considered.</p>	

Clauses	Requirements of the ACM0002	Scenario of the project	Conclusion
4	<p>In the case of integrated hydro power projects, project proponent shall:</p> <p>Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or</p> <p>Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore, this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.</p>	<p>Not applicable, the project is not a hydro power plant, so this applicability condition does not need to be considered.</p>	<p>NA</p>
5	<p>The methodology is not applicable to:</p> <p>a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site;</p> <p>b) Biomass fired power plants/units.</p>	<p>The project does not involve switching from fossil-fuels to renewable energy sources at the site of the project activity and the project is not a biomass-fired power project.</p>	<p>Applicable</p>
6	<p>In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is “the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance”.</p>	<p>Not applicable, the project is a newly built wind power project.</p>	<p>NA</p>

In addition, the project meets the applicability conditions of the applied tools applied in the PD as follows:

Tool	Criteria	Applicability	Conclusion
Tool to calculate the emission factor for an electricity system	This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).	The project is the installation of a wind power plant supplying electricity to the grid.	Applicable
Tool to calculate the emission factor for an electricity system	In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	The project electricity system is located in a non-Annex I country.	Applicable
Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation.	If emissions are calculated for electricity consumption, the tool is only applicable if one out of the following three scenarios applies to the sources of electricity consumption: (a) Scenario A: Electricity consumption from the grid. (b) Scenario B: Electricity consumption from (an) off-grid fossil fuel fired captive power plant(s). or (c) Scenario C: Electricity consumption from the grid and (a) fossil fuel fired captive power plant(s).	The electricity consumption of the project is purchased from the grid.	Applicable
Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation.	This tool can be referred to in methodologies to provide procedures to monitor amount of electricity generated in the project scenario, only if one out of the following three project scenarios applies to the recipient of the electricity generated: (a) Scenario I: Electricity is supplied to the grid; (b) Scenario II: Electricity is supplied to consumers/electricity consuming facilities; or (c) Scenario III: Electricity is supplied to the grid and	The electricity generated by the project is supplied to the grid.	Applicable

Tool	Criteria	Applicability	Conclusion
	consumers/electricity consuming facilities.		
Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation.	This tool is not applicable in cases where captive renewable power generation technologies are installed to provide electricity in the project activity, in the baseline scenario or to sources of leakage. The tool only accounts for CO ₂ emissions.	There are no captive renewable power generation technologies installed to provide electricity in the project activity, in the baseline scenario or to sources of leakage.	Applicable
Tool for assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period”	<p>This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period, as required by paragraph 49 (a) of the modalities and procedures of the clean development mechanism.</p> <p>The tool consists of two steps:</p> <p>The first step provides an approach to evaluate whether the current baseline is still valid for the next crediting period. The second step provides an approach to update the baseline in case that the current baseline is not valid anymore for the next crediting period.</p>	<p>The validity of the baseline of the project is assessed by the following two steps:</p> <p>Evaluate whether the current baseline is still valid for the next crediting period;</p> <p>Update the baseline in case that the current baseline is not valid anymore for the next crediting period.</p>	Applicable

3.3 Project Boundary

According to ACM0002 (version 20.0), the spatial extent of the project boundary includes the project power plant and all the power plants connected physically and geographically to electricity system that the project power plant is connected to. According to the “Tool to calculate the emission factor for an electricity system (version 07.0)”, the electricity system is defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity (e.g. the renewable power plant location or the consumers where electricity is being saved) and that are covered by either single or layered dispatch area.

Electricity generated by the Project was delivered to North China Power Grid (NCPG). According to 2017 Baseline Emission Factors for Regional Power Grids in China issued by China's DNA¹, The NCPG is composed of Beijing, Tianjin, Hebei, Shandong, Shanxi and Inner Mongolia power grids, therefore, NCPG was defined as the electricity system the project is connected to, and the spatial extent of the project boundary includes the project power plant and all the power plants connected physically and geographically to NCPG.

The greenhouse gases and emission sources included in or excluded from the above-identified project boundary are shown as below:

Source	Gas	Included?	Justification/Explanation	
Baseline	CO ₂ emissions from electricity generation in fossil fuel-fired power plants that is displaced due to the project activity.	CO ₂	Yes	Main emission source
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source
Project	The wind power plant	CO ₂	No	According to ACM0002, the project emission of renewable energy project activity should not be considered.
		CH ₄	No	
		N ₂ O	No	

Figure 3 presents a flow diagram within the project boundary including all the equipment, systems.

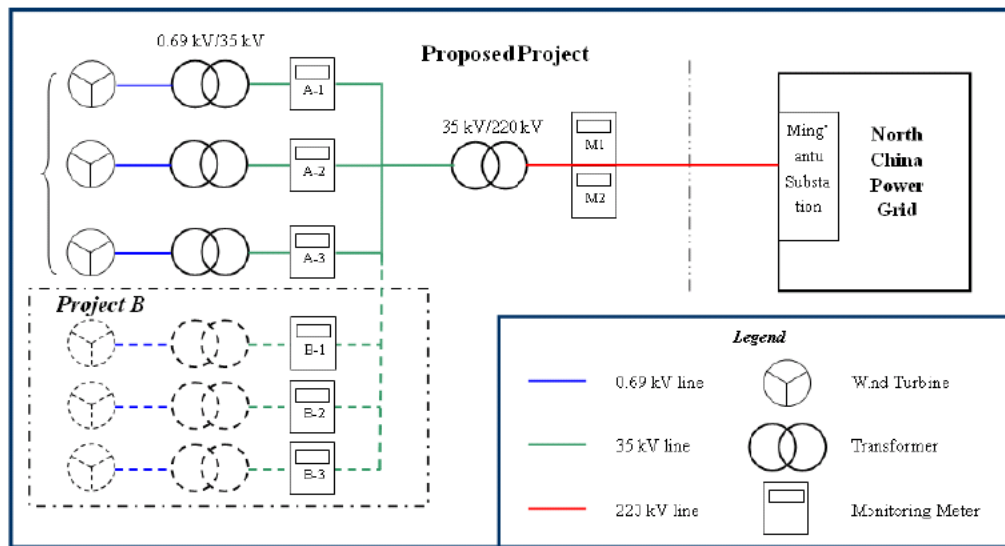


Figure 3 Flow diagram of the project boundary

¹ http://www.mee.gov.cn/ywgz/ydqhbh/wsgtkz/index_1.shtml

3.4 Baseline Scenario

In accordance with “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period” (version 03.0.1), the validity of the current baseline is assessed using the following sub-steps:

Step 1: Assess the validity of the current baseline for the next crediting period

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

There are no new national and/or sectoral policies that could affect the baseline scenario during the renewal of the crediting period. For total electricity generation produced by fossil fuel power plants, the average share of the five most recent years is more than 50% of total electricity generation in NCPG. Hence in the absence of the project activity, electricity would still have been generated in the existing grid-connected power plants or by the addition of new generation sources from NCPG. The current baseline still complies with all relevant mandatory national and sectoral policies which have come into effect after the submission of the project activity for validation and are applicable at the time of requesting renewal of the crediting period. Go to step 1.2.

Step 1.2: Assess the impact of circumstances

The baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment. The investment environment or market characteristics especially the feed-in tariff, the policy in terms of market access permit, these circumstances continue during the second crediting period and therefore, do not have an impact on the current baseline emissions. Hence the current baseline does not need to be updated. Go to step 1.3.

Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.

The project is a greenfield project with a lifetime of 24 operation years, with no baseline equipment(s) or an investment for the crediting period for which renewal is requested, this step is not applicable. Go to step 1.4.

Step 1.4: Assessment of the validity of the data and parameters

Data and parameters that need to be updated are as follows:

$EF_{grid,CM,y}$: the baseline emission factor that determined once for the first crediting period at the time of validation, hence it has been updated using the latest version of “Tool to calculate the emission factor for an electricity system”. Please refer to section B.6 for details.

Application of Steps 1.1, 1.2, 1.3 and 1.4 confirmed that the current baseline is valid for the second crediting period but data and parameters need to be updated. Therefore step 2 is used.

Step 2: Update the current baseline and the data and parameters

Step 2.1: Update the current baseline

The baseline emissions for the second crediting period has been updated, without reassessing the baseline scenario, based on the latest approved version of the methodology ACM0002 (Version 20.0). This update was applied in the context of the sectoral policies and circumstances that is applicable at the time of requesting for renewal of the crediting period. More details for the updated baseline emissions for the second crediting period can be seen in section 4.

Step 2.2: Update the data and parameters

The updated baseline emission factor for the project ($EF_{grid,CM,y}$) is 0.8405 tCO₂e/MWh.

3.5 Additionality

The project has demonstrated its additionality in the first crediting period and no changes affect the additionality of the project since its registration.

3.6 Methodology Deviations

There is no deviation applied to this second crediting period

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

According to the ACM0002 (Version 20.0), baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity, calculated as follows:

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

Where:

BE_y = Baseline emission in year y (tCO₂/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 CO₂ 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”

The project activity is a Greenfield wind power plant, then:

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

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)

4.1.1 To calculate the emission factor for an electricity system

$EF_{grid,CM,y}$ is calculated as per the latest version of “Tool to calculate the emission factor for an electricity system” (version 07.0). The baseline emission factor $EF_{grid,CM,y}$ is calculated ex ante and fixed for the second crediting period. Detailed as follows:

Step 1. Identify the relevant electricity system

According to the “Tool to calculate the emission factor for an electricity system (Version 07.0)”, project participants may delineate the project electricity system using any of the following options:

Option 1. A delineation of the project electricity system and connected electricity systems published by the DNA or the group of the DNAs of the host country(ies), In case a delineation is provided by a group of DNAs, the same delineation should be used by all the project participants applying the tool in these countries;

Option 2. A delineation of the project electricity system defined by the dispatch area of the dispatch centre responsible for scheduling and dispatching electricity generated by the project activity.

Where the dispatch area is controlled by more than one dispatch centre, i.e. layered dispatch area, the higher level area shall be used as a delineation of the project electricity system (e.g. where regional dispatch centres are required to comply with dispatch orders of the national dispatch centre then area controlled by the national dispatch centre shall be used);

Option 3. A delineation of the project electricity system defined by more than one independent dispatch areas, e.g. multi-national power pools.

Since Chinese DNA has published a delineation of the project electricity system and connected electricity systems, Option 1 is applied for the project. According to the delineations, the North China Power Grid (NCPG) is identified as the relevant electric power system of the project, which includes Beijing, Tianjin, Hebei, Shandong, Shanxi and Inner Mongolia Provincial Power Grids. The project is located in Zhengxiangbai Qi, Xilinguole League, middle grassland of Inner Mongolia Autonomous Region, P. R. China and covered by the North China Power Grid (NCPG). According to the “2017 Baseline Emission Factors for Regional Power Grids in China”, There is no net

electricity imports to NCPG. Therefore, North China Power Grid (NCPG) is chosen as the relevant electric power system.

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

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

Option I: Only grid power plants are included in the calculation.

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

Based on China's real situation, only grid power plants are included in the calculation.

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 the following methods:

- (a) Simple OM, or
- (b) Simple adjusted OM, or
- (c) Dispatch Data Analysis OM, or
- (d) Average OM.

In China, specific data from the grid or each power plant is treated as business confidential and thus not public available. Therefore, method (b) and method (c) is not suitable for the project.

According to ACM0002, the Simple OM method (a) can only be applied when low-cost/must run resources² constitute less than 50% of total grid generation in average of the five most recent years or based on long-term normal for hydroelectric production.

According to the data from China Electric Power Yearbook 2013-2017, from year 2012 to year 2016, for the NCPG the project activity connected to, the low-cost/must-run electric power resources generation accounts for the total grid total are 26.26%, 23.47%, 23.54%, 24.13% and 24.29%, respectively, all lower than 50%, which satisfied the applicability of the method (a), therefore, the simple OM method is chosen for the calculation of the OM emission factor $EF_{grid,OM,y}$.

As per the latest version of "Tool to calculate the emission factor for an electricity system", one of the following methods should be chosen to calculate the simple OM emission factor:

- **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

² Low-cost/must-run resources are defined as power plants with low marginal generation costs or power plants that are dispatched independently of the daily or seasonal load of the grid. They 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.

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. For off-grid power plants, use a single calendar year within the five most recent calendar years prior to the time of submission of the CDM-PDD 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 emission factor to be updated annually during monitoring. If the data required to calculate the emission factor for year y is usually only available later than six months after the end of year y , 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 the 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.

Here ex-ante vintage is chosen, and the $EF_{\text{grid,OM}}$ is fixed during the second crediting period

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

Based on the analysis of the step 3, the simple OM emission factor is calculated as the generation-weighted average CO₂ emissions per unit net electricity generation (tCO₂/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/ units. The simple OM may be calculated by one of the following two options:

Option A: Based on the net electricity generation and a CO₂ emission factor of each power unit;
or

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

For the project activity, the required data for the exercise of Option A is not available and those of Option B can be obtained from official sources, and off-grid power plants are not included in the calculation, therefore, Option B is chosen to calculate the operating margin emission factor:

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.

As the data required by option A is not available in China, and the 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 in china, and off-grid power plants are not included in the calculation. Therefore, Option B is used for calculating project OM as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_y} \dots\dots\dots (2)$$

Where:

- EF_{grid,OMsimple,y} = Simple operating margin CO₂ emission factor in year y (tCO₂ /MWh)
- FC_{i,y} = Amount of fossil fuel type i consumed in the project electricity system in year y (mass or volume unit)
- NCV_{i,y} = Net calorific value (energy content) of fossil fuel type i in year y (GJ / mass or volume unit)
- EF_{CO2,i,y} = CO₂ emission factor of fossil fuel type i in year y (tCO₂ /GJ)
- EG_y = Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost / must-run power plants / units, in year y (MWh)
- i = All fossil fuel types combusted in power sources in the project electricity system in year y
- y = The relevant year as per the data vintage chosen in Step 3

If available, NCV_{i,y} and EF_{CO2,i,y} from the fuel supplier of the power plants in invoices may be used; or, regional or national average default values may be used. In this PDD, NCV_{i,y} of different fuels are obtained from China Energy Statistical Yearbook 2016. With regard to the fuel types where NCV_{i,y} fluctuate in a certain range, the floor values of the fluctuation range are used for conservatism. EF_{CO2,i,y} of fossil fuel comes from IPCC default values.

The Simple OM Emission Factor (EF_{grid,OMsimple,y}) of the project is calculated on the basis of the fuel consumption data for electricity generation of the NCPG, not including those of low-operating cost and must-run power plants, such as wind power, hydropower and nuclear etc. These data are obtained from the China Electric Power Yearbook (2014~2016, published annually) and China Energy Statistical Yearbook (2014~2016). Based on these data, the Simple OM Emission Factor (EF_{grid,OMsimple,y}) of the NCPG is calculated as 0.9680 tCO_{2e}/MWh (see appendix 4 for details).

Step 5. Calculate the build margin emission factor

In terms of vintages of data, project participants can choose between one of the following two options:

Option 1 For the first crediting period, calculate the build margin emission factor, ex ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the second crediting period

should be used. 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 year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex ante, as described in option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

The PDD chooses **Option 1**, which requires the project participant to calculate the Build Margin Emission Factor $EF_{grid, BM, y}$, ex-ante based on the most recent information available on units already built for sample group m at the time of PDD submission.

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 ($SET_{5-units}$) and determine their annual electricity generation ($AEG_{SET-5-units}$, 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 per cent of AEG_{total} (if 20 per cent falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) ($SET_{\geq 20}$ per cent) and determine their annual electricity generation ($AEG_{SET-\geq 20 \text{ per cent}}$, in MWh);

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

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

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

(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 per cent of the annual electricity generation of the project electricity system (if 20 per cent 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 ($SET_{sample\text{-}CDM \rightarrow 10\text{yrs}}$).

However, in China, it is very difficult to obtain the data of the five existing power plants built most recently or the power plants capacity additions in the electricity system that comprise 20 per cent of the system generation (in MWh) and that were built most recently, since no data of plant specific generation and fossil fuel consumption is currently available in China. As none of the above options can be selected, the following deviations are adopted to calculate the BM³:

First, to calculate the newly added installed capacity and the contribution component of other various power generation technologies, then calculate of the weight of newly added installed capacity of each power generation technology, and finally, to calculate BM emission factor using the commercially optimal efficiency level of each power generation technology.

According to the “Tool to calculate the emission factor for an electricity system”, the build margin emissions factor ($EF_{grid, BM, y}$) is calculated as the generation-weighted average emission factor (tCO₂e/MWh) of all power units m during the most recent year y for which power generation data is available. The calculation equation is as follows:

$$EF_{grid, BM, y} = \frac{\sum_m EG_{m, y} \times EF_{EL, m, y}}{\sum_m EG_{m, y}} \dots\dots (3)$$

Where:

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

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

$EF_{EL, m, y}$ = CO₂ emission factor of power unit m in year y (tCO₂ /MWh)

m = Power units included in the build margin

y = Most recent historical year for which power generation data is available

³<http://cdm.unfccc.int/UserManagement/FileStorage/6POIAMGYOEDOTKW25TA20EHEKPR4DM>

Since the generating capacity of coal-fired, oil-fired and gas-fired technologies can't be separated from the existing statistical data, the following measures are taken for the calculation:

First, based on the available data of the latest year, determine the ratio of CO₂ emissions from coal, oil, and gas consumption for power generation to the total CO₂ emission; Second, to calculate the emission factor of the thermal power based on the weight of CO₂ emission from coal, oil, and gas, and the emissions factors using commercial technologies with optimal efficiency. And finally, to multiply the thermal emission factor with the portion of the thermal power comprising 20 per cent of the newly added capacity.

Sub-step 5.1. Calculate the weights of CO₂ emission of solid, liquid and gaseous fossil fuels in total emissions for power generation

$$\lambda_{Coal} = \frac{\sum_{i \in COAL, j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \dots\dots\dots (4)$$

$$\lambda_{Oil} = \frac{\sum_{i \in OIL, j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \dots\dots\dots (5)$$

$$\lambda_{Gas} = \frac{\sum_{i \in GAS, j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,j,y}} \dots\dots\dots (6)$$

Where:

- FC_{i,j,y} = Amount of fossil fuel type i consumed in province j in year y (mass or volume unit)
- NCV_{i,y} = Net calorific value (energy content) of fossil fuel type i in year y (GJ/t or GJ/m³)
- EF_{CO₂,i,j,y} = CO₂ emission factor of fossil fuel type i in year y (tCO₂e/GJ)

Sub-step 5.2. Calculation of Emission Factor of Relevant Thermal Power

$$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y} \dots\dots\dots (7)$$

Where:

EF_{Coal,Adv,y}, EF_{Oil,Adv,y} and EF_{Gas,Adv,y} refers to the emission factors representing best technologies commercially available for coal, oil and gas fired power plants, respectively.

Sub-step 5.3. Calculate of BM of the grid

$$EF_{grid,BM,y} = \frac{CAP_{Thermal,y}}{CAP_{Total,y}} \times EF_{Thermal,y} \dots\dots\dots (8)$$

Where:

$CAP_{Total,y}$ = The total newly added electricity generation capacity (MW) in year y ;

$CAP_{Thermal,y}$ = The newly added electricity generation capacity of thermal power (MW) in year y

Key parameters used to calculate BM emission factor include the low calorific value of each fossil fuel, the oxidation rate, the potential emission factors, and the efficiency of various power generation technologies. The data of low calorific value of each fossil fuel and their oxidation rate comes from China Energy Statistical Yearbook 2016. The potential emission factors are sourced from “2006 IPCC Guidelines for National Greenhouse Gas Inventories” Table 1.3 and Table 1.4 of Page 1.21-1.24 in Chapter one, Volume 2 Energy.

According to the latest and available data at the time of this PD submission, $EF_{grid,BM,y}$ is calculated to be 0.4578 tCO₂e/MWh.

Step6. Calculate the combined margin emission factor

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

(a) Weighted average CM; or

(b) Simplified CM.

The weighted average CM method (option A) should be used as the preferred option.

The simplified CM method (option b) can only be used if:

(a) The project activity is located in: (i) a Least Developed Country (LDC); or in (ii) a country with less than 10 registered CDM projects at the starting date of validation; or (iii) a Small Island Developing States (SIDS); and

(b) The data requirements for the application of step 5 above cannot be met.

The PDD choose option A.

The combined margin emission factor is calculated as follows:

$$EF_{grid,CM,y} = \omega_{OM} \times EF_{grid,OM,y} + \omega_{BM} \times EF_{grid,BM,y} \dots\dots (9)$$

Where:

$EF_{grid,BM,y}$ = Build margin CO₂ emission factor for the project electricity system in year y
(tCO₂/MWh)

$EF_{grid,OM,y}$ = Operating margin CO₂ emission factor for the project electricity system in year y (tCO₂/MWh)

ω_{OM} = Weighting of operating margin emissions factor (%)

ω_{BM} = Weighting of build margin emissions factor (%)

The combined margin emissions factor $EF_{grid,CM,y}$ should be calculated as the weighted average of the Operating Margin emission factor ($EF_{grid,OM,y}$) and the Build Margin emission factor ($EF_{grid,BM,y}$), where $\omega_{OM} = 0.75$ and $\omega_{BM} = 0.25$ for wind project (owing to their intermittent and non-dispatchable nature) for the second crediting period and for subsequent crediting periods. The ($EF_{grid,OM,y}$) and ($EF_{grid,BM,y}$) are calculated as described in Step 4 and 5.

$$EF_{grid,CM,y} = 0.9680 \text{ tCO}_2\text{e/MWh} * 0.75 + 0.4578 \text{ tCO}_2\text{e/MWh} * 0.25 = 0.8405 \text{ (tCO}_2\text{e/MWh)}$$

4.2 Project Emissions

According to ACM0002 (version 20.0), the project is a GHG zero-emission electricity generating activity; therefore, no project emissions from the project activity were identified $PE_y = 0$.

4.3 Leakage

According to ACM0002 (version 20.0), no leakage is considered.

4.4 Net GHG Emission Reductions and Removals

The annual emission reductions ER_y for the project activity are calculated as the baseline emissions minus the project emissions. Being the project of a greenhouse gas GHG zero-emission activity the final GHG emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y \dots \dots \dots (10)$$

Where:

ER_y Emission reductions in year y (tCO₂)

BE_y Baseline Emissions in year y (tCO₂)

PE_y Project emissions in year y (tCO₂)

The summary of ex ante estimates of emission reductions is shown as follows:

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
01/05/2019~30/04/2020	83,612	0	0	83,612
01/05/2020~30/04/2021	83,612	0	0	83,612
01/05/2021~30/04/2022	83,612	0	0	83,612

01/05/2022~30/04/2023	83,612	0	0	83,612
01/05/2023~30/04/2024	83,612	0	0	83,612
01/05/2024~30/04/2025	83,612	0	0	83,612
01/05/2025~30/04/2026	83,612	0	0	83,612
01/05/2026~30/04/2027	83,612	0	0	83,612
01/05/2027~30/04/2028	83,612	0	0	83,612
01/05/2028~30/04/2029	83,612	0	0	83,612
Total	836,120	0	0	836,120

5 MONITORING

5.1 Data and Parameters Available at Validation

The baseline grid emission factor is obtained directly from the official source Notification on Determining Baseline Emission Factor of China's Grid by China's DNA. Thus, the relevant basis parameters for calculation of are not described in detail here. With consideration of the fact of the Project, data and parameters that are available at validation are summarized in below tables.

Data / Parameter	EF _{grid,CM,y}
Data unit	tCO _{2e} /MWh
Description	The baseline grid emission factor
Source of data	“2017 Baseline Emission Factors for Regional Power Grids in China” published by China DNA
Value applied	0.8405
Justification of choice of data or description of measurement methods and procedures applied	As per the requirements in “Tool to calculate the emission factor for an electricity system version 07.0”
Purpose of Data	Calculation of baseline emissions
Comments	Calculated ex ante and fixed for the second crediting period.

5.2 Data and Parameters Monitored

Data / Parameter	$EG_{\text{facility } y}$
Data unit	MWh/yr
Description	Quantity of net electricity generation supplied by the project plant/unit in year y .
Source of data	Calculated according to the equation (11) in section 5.3
Description of measurement methods and procedures to be applied	The net electricity supplied to the Grid by the project will be calculated through $EG_{\text{export},y}$, $EG_{\text{import},y}$, $EG_{A,y}$ and $EG_{B,y}$ according to the equation (11) in section 5.3
Frequency of monitoring/recording	-
Value applied	Estimation of annual net electricity generation delivered to grid: 99,480 MWh
Monitoring equipment	Electricity meter
QA/QC procedures to be applied	Power supplied to the grid will be checked by internal verification procedure and electricity sales receipts
Purpose of data	Calculation of baseline emissions
Calculation method	Not applicable
Comments	-

Data / Parameter	$EG_{\text{export}, y}$
Data unit	MWh
Description	Total electricity supplied to the grid by the project and Project B (Inner Mongolia Jingneng Zheligentu Wind Farm Phase II Project) during year y
Source of data	Bidirectional electricity meter reading of M1 installed at the project site.
Description of measurement methods and procedures to be applied	The readings of the electricity meter will be hourly 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.

	The accuracy of electricity meter is 0.2s. The calibration frequency is one time/year according to the national calibration standard (DL/T448-2016).
Frequency of monitoring/recording	Continuously measured and monthly recorded
Value applied	-
Monitoring equipment	Electricity meter
QA/QC procedures to be applied	The electricity supplied by the project activity to the grid will be monitored and recorded at the central control room. The project operator is responsible for recording such data Double check by receipt of sales.
Purpose of data	Calculation of baseline emissions
Calculation method	Not applicable
Comments	The reading from the main meter is first choice. When the main meter is out of order, the reading from the backup meter will be used.

Data / Parameter	$EG_{import, y}$
Data unit	MWh
Description	Total electricity purchased from the grid by the Project and project B (Inner Mongolia Jingneng Zheligentu Wind Farm Phase II Project) during year y
Source of data	Bidirectional electricity meter reading of M1 installed at the project site.
Description of measurement methods and procedures to be applied	<p>The readings of the electricity meter will be hourly 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.</p> <p>The accuracy of electricity meter is 0.2s. The calibration frequency is one time/year according to the national calibration standard (DL/T448-2016).</p>
Frequency of monitoring/recording	Continuously measured and monthly recorded
Value applied	-
Monitoring equipment	Electricity meter

QA/QC procedures to be applied	The electricity supplied by the project activity to the grid will be monitored and recorded at the central control room. The project operator is responsible for recording such data Double check by receipt of sales.
Purpose of data	Calculation of baseline emissions
Calculation method	-
Comments	The reading from the main meter is first choice. When the main meter is out of order, the reading from the backup meter will be used.

Data / Parameter	$EG_{A-i, y}$
Data unit	MWh/yr
Description	Quantity of electricity supplied to the grid by Group A-i (i=1,2,3) of the Project in year y.
Source of data	Readings of electricity meters (A-1, A-2, and A-3 described in section 5.3) installed at the 35kV transmission line of the project site.
Description of measurement methods and procedures to be applied	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 last crediting period by means of electronic and paper backup. The accuracy of electricity meters is not lower than 0.5s. The calibration frequency is once a year.
Frequency of monitoring/recording	Continuously measured and monthly recorded
Value applied	-
Monitoring equipment	Electricity meter
QA/QC procedures to be applied	The metering equipments at the substation will be calibrated once a year according to the management standard DL/T448-2016.
Purpose of data	Calculation of baseline emissions
Calculation method	Not applicable
Comments	-

Data / Parameter	$EG_{B-i, y}$
------------------	---------------

Data unit	MWh/yr
Description	Quantity of electricity supplied to the grid by Group B-i (i=1,2,3) of the project B in year y
Source of data	Readings of electricity meters (B-1, B-2, and B-3 described in section 5.3) installed at the 35kV transmission line of the project B site.
Description of measurement methods and procedures to be applied	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 last crediting period by means of electronic and paper backup. The accuracy of electricity meters is not lower than 0.5s. The calibration frequency is once a year.
Frequency of monitoring/recording	Continuously measured and monthly recorded
Value applied	-
Monitoring equipment	Electricity meter
QA/QC procedures to be applied	The metering equipments at the substation will be calibrated once a year according to the management standard DL/T448-2016.
Purpose of data	Calculation of baseline emissions
Calculation method	Not applicable
Comments	-

5.3 Monitoring Plan

This Monitoring plan sets out a number of monitoring tasks in order to ensure the complete, consistent, clear and accurate monitoring and the accurate calculation of the emission reduction in the crediting period. This plan is mainly implemented by the project owner with the cooperation of the grid company.

1. Monitoring Object

The main objective data is the power supplied to and purchased from the grid which is calculated according to the generated electricity and the purchased electricity and supplied to the grid, thus to calculate the emission reduction of the project.

2. Monitoring Implementers

The General Manager of the project entity appoint a VCS project manager or a chief officer. The operational and monitoring manager of the plant, the Financial Chief, and the Technical Chief

are responsible for the collection of the data and information required in the monitoring plan. The collected information is documented and sent to the VCS manager or responsible staffs of the project entity monthly. The VCS manager in charge of the implementation of the Monitoring Plan and report to the General Manager of the company. The General Manager of the company make the confirmations on monitoring, calculation data and reports.

The organization of the monitoring implementers is illustrated in the table below:

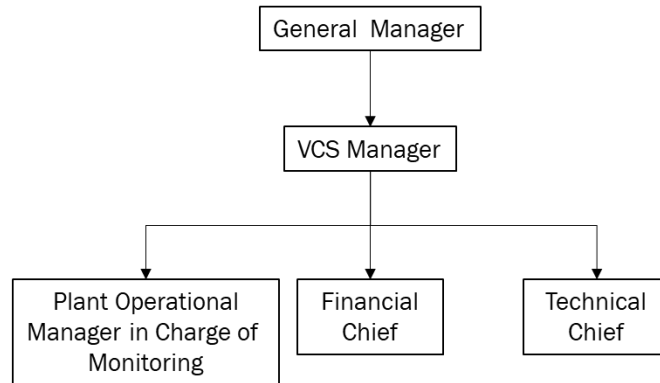


Figure 4 Operations and Monitoring Procedure of the Project

3. Monitoring Program and Equipments

The power connection and monitoring system is shown as below.

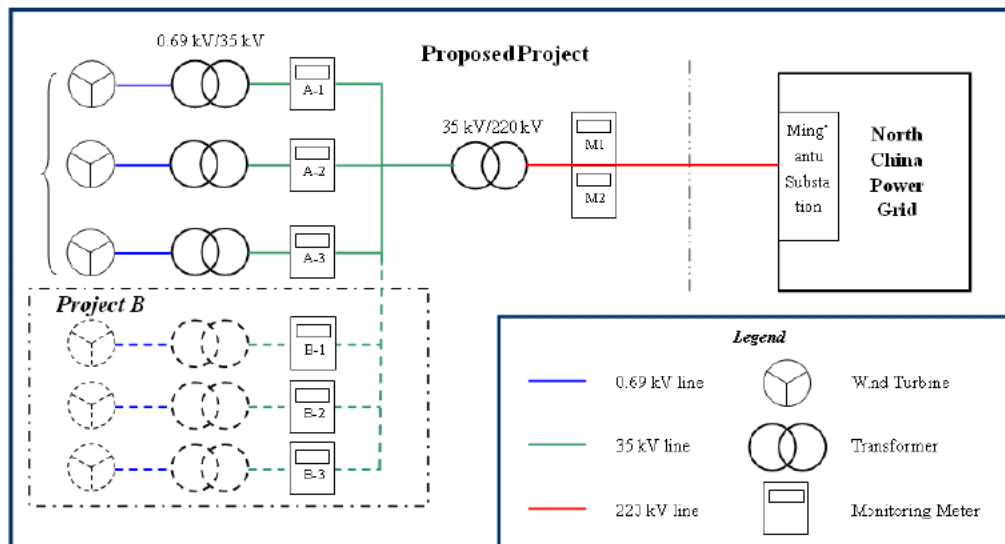


Figure 5 The location of meters

The project shares the transformer and gateway meters (the main meter M1 and backup meter M2) with another wind farm project (hereafter refer to Project B). Monitoring equipments include two bidirectional meters and six auxiliary meters. Both M1 (main meter) and M2 (backup meter)

are equipped at the project site. The project owner and the Grid Company are responsible for conducting the monitoring.

M1 was used to monitor the electricity exports to and imports from the grid by the project and project B as well as M2. The metering is hourly measured and daily recorded. The metering of M2 is used in case that M1 fails to work. Both meters have an accuracy of 0.2s. They are calibrated annually to ensure normal performance.

The 39 sets of wind turbines were divided into 3 groups, and each group is connected with a 35kV transmission line and installed with a meter at the low voltage side of 35kV/220kV transformer. These meters (A-1, A-2, A-3) are installed as auxiliary meters to calculate the electricity supplied to the grid by Group A-i (i=1,2,3) of the project activity. Similarly, three meters (B-1, B-2, B-3) are installed as auxiliary meters to calculate the electricity supplied to the grid by Group B-i (i=1,2,3) of the Project B. The precision of these six auxiliary meters is not lower than 0.5s.

In order to deal with the jointly-reading problem, the project owner and the grid company set up the procedure and calculation method to determine the net electricity supplied to the grid by the project, which is calculated as follows:

$$EG_{facility,y} = \frac{\sum_{i=1,2,3} EG_{A-i,y}}{\sum_{i=1,2,3} EG_{A-i,y} + \sum_{i=1,2,3} EG_{B-i,y}} \times EG_{export} - EG_{import} \dots \dots \dots (11)$$

Where:

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

$EG_{export,y}$ =Total electricity supplied to the grid by the Project and Project B (Inner Mongolia Jingneng Zheligentu Wind Farm Phase II Project) during year y.

$EG_{import,y}$ =Total electricity purchased from the grid by the Project and Project B (Inner Mongolia Jingneng Zheligentu Wind Farm Phase II Project) during year y.

$EG_{A-i,y}$ =Electricity supplied to the grid by Group A-i (i=1,2,3) of the Project in year y.

$EG_{B-i,y}$ =Electricity supplied to the grid by Group B-i (i=1,2,3) of the Project B in year y.

4. Data Collection

The verification use the main meter and six auxiliary meters' data as long as the inaccuracy of these meters is within the permissible tolerance. The main procedures are as follows:

I. According to the requirements of power purchase/sales agreement, the project owner and the grid company should collect the data of both the main meter (M1) and the backup meter (M2) periodically, and check them at the same time.

II. For the electricity supplied to the grid by the project activity, the project owner collects and records the data of auxiliary meters and calculates the electricity supplied to the grid by the project as per the procedure and calculation method jointly set up. The project owner provides sales receipts to the Grid Company. A copy of the sales receipts is stored for cross-check.

III. When the electricity generated by this project cannot meet the electricity requirement of the power plant, the grid company supplies the electricity to the project owner. The Grid Company provides an electricity sales receipt to the project owner and the receipt is stored by the project owner.

IV. The project owner records the power supplied to and purchased from the grid, and hence calculate the net electricity supplied to the grid;

V. The project owner keeps and safe keeps the records of the main meter and the six auxiliary meters' data readings for verification by the DOE.

In any case that any of the six auxiliary meters exceeds the allowable tolerance or its malfunction occurs, the project owner will give up the emission reductions during the period when any of the six auxiliary meters are inaccurate. Otherwise, if the fault of the main meter M1 exceeds the allowable tolerance or its malfunction occurs, but the six auxiliary meters are within the allowable tolerance, the grid-connected electricity generated by the project will be resolved by following measures:

I. Adopting the backup meter M2 and the six auxiliary meters' data, unless a test by either party reveals it is inaccuracy;

II. If the inaccuracy of the backup meter M2 is not within the acceptable limits or it cannot work properly, the project owner will give up the emission reductions during the period when both the main meter and the backup meter are inaccurate;

5. Calibration of Meters & Metering

The metering equipment is properly calibrated and checked annually for accuracy. The project owner prepares backup procedures to deal with any errors occurred to the meters. The calibration records carried out by the grid company should be provided to the project owner, and these records are maintained by the project owner and the third party designated.

Meters should be tested by a qualified metric organization co-authorized by the project owner and the grid company within 10 days after:

I. The detection of the reading difference between the main meter and the backup meter that exceeds the allowable tolerance.

II. The equipments malfunction caused by improper operation All the calibration test records should be maintained safely for the verification.

6. Data Management System

To keep safely the record of the data collected during monitoring, this project sets up a complete data management system. The project perfects the whole monitoring procedure by developing the VCS manual, tracking information from the primary source to the end-data calculations in paper document format. It is the responsibility of the project owner to provide additional necessary data and information for validation and verification requirements of respective DOE. Physical documentation such as paper-based maps, diagrams and environmental assessment are collated in a central place, together with this monitoring plan. All paper-based information is stored by the project owner and kept at least one copy.

At the end of each month, the monitoring data is filed in a spreadsheet and stored on a hard disk and CD-ROM, and the paper-based printout should be also archived. Furthermore, the project owner collects the sales receipts for the electricity supplied to the grid as a cross-check, and compiled the monitoring report including the monitoring data and relevant evidence at the end of each crediting year.

All the data will be kept for two years following the end of the last crediting period

7. Monitoring Report

After the VCS project manager collects and sorts the monitored data, the monitoring report is prepared by the project developer. The project developer has to make sure that the format and content of the monitoring report are consistent with the monitoring methodology in the registered PD.