BEIJING GUANTING WIND POWER PROJECT PHASE II AND PHASE II ADDITION

Document Prepared By Climate Bridge (Shanghai) Ltd.

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1 PROJECT DETAILS

1.1 Summary Description of the Project

Beijing Guanting Wind Power Project Phase II and Phase II addition (hereafter referred to as the Project) is sited on northwest side of Beijing, the north bank of Guanting Reservoir which situated in south-east side of Langshan wind valley in Huailai County, Hebei Province, invested and operated by Beijing Jingneng Clean Energy Co., Ltd.

The Project consists of two projects as follows:

1) Beijing Guanting Wind Power Project Phase II (hereafter referred to as the Guanting Phase II). The Guanting Phase II has installed 33 sets of 1.5MW wind turbine-generator with a total installed capacity 49.5MW. The type of wind turbine and generator is Goldwind 82/1500. It is estimated that the feed-in electricity is approximately 92,784MWh per year.

2) Beijing Guanting Wind Power Project Phase II addition (hereafter referred to as the Phase II addition). The Phase II addition has installed 24 sets of 1.5MW wind turbine-generator with a total installed capacity of 36MW. The type of wind turbine and generator is Goldwind 82/1500. It is estimated that the feed-in electricity is approximately 68,335MWh per year.

The Project installed 57 sets of wind turbine-generators with unit capacity of 1.5MW. The total installed capacity is 85.5MW. The project is connected to North China Power Grid (NCPG) via existing 110kV circuit after boosted by the No.2 main transformer of the 110kV substation of Beijing Guanting Wind Farm. The Project is a renewable energy project, and it achieves greenhouse gas (GHG) emission reductions by displacing power generation of those fossil fuel-fired power plants delivered to the NCPG under the baseline scenario.

The project started construction on 20-June-2009 and started commissioning on 23-Dec-2009. The first crediting period of the project was from 23-Dec-2009 to 22-Dec-2019. This is the 2nd crediting period of the project, covering the period from 23-Dec-2019 to 22-Dec-2029. The expected annual emission reductions during the 2nd crediting period are 133,229 tCO_2e, and the total estimated emission reductions of the 2nd crediting period are 1,332,290 tCO_2e.

The scenario existing prior to the implementation of the project activity is electricity delivered to the grid by the project activity would have been generated by the operation of grid-connected power plants and by the addition of new generation sources of NCPG. The baseline scenario is the same as the scenario existing prior to the implementation of the project activity.

1.2 Sectoral Scope and Project Type

Sectoral scope: 01 Energy industries (renewable/non-renewable sources).

Project type: Grid connected wind power project.

The project is not a grouped project.

1.3 Project Eligibility

The scope of the VCS Program includes:

1) The six Kyoto Protocol greenhouse gases: The project reduces CO_2 emissions from the production of the equivalent amount of electricity replaced by the Project that would otherwise have been supplied by North China Power Grid (NCPG). CO_2 is one of the six Kyoto Protocol greenhouse gases.

2) Ozone-depleting substances: N.A.

3) Project activities supported by a methodology approved under the VCS Program through the methodology approval process: N.A.

4) Project activities supported by a methodology approved under a VCS approved GHG program, unless explicitly excluded under the terms of Verra approval: The applied methodology ACM0002 (Version 20.0) is a methodology approved under CDM Program, which is a VCS approved GHG program.

5) Jurisdictional REDD+ programs and nested REDD+ projects as set out in the VCS Program document Jurisdictional and Nested REDD+ (JNR) Requirements: N.A.

The project utilizes renewable wind power for electricity generation, apparently the project does not belong to projects that can reasonably be assumed to have generated GHG emissions primarily for the purpose of their subsequent reduction, removal or destruction.

Although Table 1 of VCS Standard 4.1 has excluded the Grid-connected electricity generation using wind, geothermal, or solar power plants/units, the eligibility of the project under the scope of the VCS Program is not impacted. The project remains eligible under the VCS Program for the entirety of its crediting periods since the project was registered under VCS Standard 3 and completed validation on or before 09-Mar-2020.

In conclusion, the project is eligible under the scope of VCS program.

1.4 Project Design

The project has been designed to include a single installation of an activity, not multiple project activity instances, nor as a grouped project.

1.5 Project Proponent

Organization name	Beijing Jingneng Clean Energy Co., Ltd

Contact person	GENG Yan
Title	Senior Director
Address	Xibahe Lane 6, Chaoyang District, Beijing, China
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1.6 Other Entities Involved in the Project

Organization name	Climate Bridge (Shanghai) Ltd.
Role in the project	Consultant
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1.7 Ownership

The project proponent is Beijing Jingneng Clean Energy Co., Ltd, who has the full ownership of the project. The business license, Project approval, Environmental Impact Assessment (EIA) approval are evidence for legislative right. Besides, the equipment purchase contract and power purchase agreement are the evidence for the ownership of the plant, equipment and power generating.

1.8 Project Start Date

23-Dec-2009 (operation start date).

1.9 Project Crediting Period

There is a deviation for the crediting period. The project is registered under VCS 3 and completed validation before 19-Mar-2020, thus it remains eligible to apply the crediting period requirements under VCS Version 3 which shall be a maximum of ten years and may be renewed at most twice, so the 1st crediting period of the project was from 23-Dec-2009 to 22-Dec-2019. And the 2nd crediting period is from 23-Dec-2019 to 22-Dec-2029.

Furthermore, the project was also registered as a CDM project with a seven year twice renewable project crediting period starting from 28-Feb-2011, it is not eligible for VCU issuance beyond the end of those 21 years. The end date of the 2nd VCS crediting period is within the end of 21 years CDM crediting period

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	√
Large project	

Year	Estimated GHG emission reductions or removals (tCO_2e)
23/12/2019-22/12/2020	133,229
23/12/2020-22/12/2021	133,229
23/12/2021-22/12/2022	133,229
23/12/2022-22/12/2023	133,229
23/12/2023-22/12/2024	133,229
23/12/2024-22/12/2025	133,229
23/12/2025-22/12/2026	133,229
23/12/2026-22/12/2027	133,229
23/12/2027-22/12/2028	133,229
23/12/2028-22/12/2029	133,229
Total estimated ERs	1,332,290
Total number of crediting years	10
Average annual ERs	133,229

1.11 Description of the Project Activity

The Project has installed 57 sets of wind turbines, with unit capacity of 1,500kW. The designation of the Project is as follows:

1) 33 sets of wind turbines employed by the Guanting Phase II are placed in strip along the bank of Guanting Reservoir. Wind turbine is vertical to NW-SE direction, which are deployed in the area with Dagu elevation of 476m-479m of north bank of Guanting Reservoir. The hub height is 65m, the estimated annual feed-in electricity of 33 sets of wind turbines is 92,784MWh, the annual operation hour and the load factor of the Guanting Phase II is 1,874h and 0.2140 respectively.

2) 24 sets of wind turbines employed by the Phase II addition are placed in rows vertical to NW-SE direction, i.e., along NE-SW direction. The hub height is 65m, the estimated annual feed-in electricity of 24 sets of wind turbines is 68,335MWh, the annual operation hour and the load factor of the Phase II addition is 1,898h and 0.2167 respectively.

The electricity generated by the Project is sold into NCPG via an existed 110kV circuit after boosted by the 110kV substation of Beijing Guanting wind farm. It is estimated that the Project will achieve GHG emission reductions of 133,229 tCO_2e annually by displacing equivalent power generation of those fossil fuel-fired power plants delivered into the NCPG under the baseline scenario.

No. 2 main transformer, a 100MWA transformer, was installed for the electricity delivery of the Project and Beijing Yanqing Low Wind-speed Pilot Wind Power Project (hereafter referred to Yanqing Project). Because the Project shares gateway meters with Yanqing Project and Beijing 48 MW Guanting Wind Power Project (hereafter referred to as Guanting Project), the project owner installed two electricity meters (one main and one backup) for each line in order to separate the feed-in electricity and the electricity supplied by the NCPG to each project.

Wind turbines and generators employed by the Project were manufactured by Xinjiang Goldwind Science and Technology Co., Ltd, so no technology transfer is involved. And major technical parameters of the key equipment employed by the Project are illustrated in Table 1.

Table 1. Major technical parameters of the Project

Item		Unit	Data
Wind turbine	Type	-	Goldwind 82/1500
	Rated power	kW	1,500
	Blade number	-	3
	Rotor diameter	m	82
	Rotor swept area	m^2	5,282
	Cut in wind speed	m/s	3
	Rated wind speed	m/s	10.3
	Cut out wind speed	m/s	22
	Survival wind speed	m/s	37.5
	Hub height	m	65
	Quantity	-	57

Generator	Type	-	Permanent-magnet synchronous generator
	Rated power	kW	1,500
	Power factor	-	~0.95
	Rated voltage	V	690
	Quantity	-	57

1.12 Project Location

The Project is sited on Northwest side of Beijing, the north bank of Guanting Reservoir which situated in south-east side of Langshan wind valley in Huailai County, Hebei Province, with geographical coordinates of north latitude of 40.3192°~40.3507° and east longitude of 115.6112°~115.6999° for Guanting Phase II and with north latitude of 40.3263°~40.3499° and east longitude of 115.5734~115.6144° for Phase II addition. The central geographical coordinates for Guanting Phase II are north latitude 40.3375° and east longitude 115.6750°, while the central geographical coordinates for Phase II addition are north latitude 40.3381° and east longitude 115.6029°.

Figure 1 shows the location of Beijing and Hebei Province, and Figure 2 shows the location of the Project.

Figure 1. Map showing the location of Beijing City and Hebei Province

Figure 2. Map showing the location of the Project

1.13 Conditions Prior to Project Initiation

The scenario existed 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

The project scenario is the implementation of the project, which involves the installation of 57 sets of wind turbines with a total installed capacity of 85.5MW. The project will provide 161,119 MWh of electricity per year for NCPG, and replace equivalent electricity generated by fossil fuel fired power plants connected to NCPG.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

The project is a wind power project and meets the relevant provisions of the Law of the People's Republic of China.

The main sectoral policy relevant to the project is the 'Renewable Energy Law of the People's Republic of China', which came into effect on 01-Jan-2006 and aims to promote renewable energy in the Host Country. This Law demonstrates the Chinese Government's commitment to the development of renewable energy as part of the overall energy development strategy and encourages grid-connected power generation from renewable sources.

In addition, there are no laws and regulations that require mandatory implementation of renewable wind power project.

1.15 Participation under Other GHG Programs

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

The project was registered as Clean Development Mechanism (CDM) project on 28-Feb-2011 (UNFCCC Ref. 4413), with 7-year crediting period started from 28-February-2011. The GHG emission reductions of 85,534 tCO_2e generated from 28-Feb-2011 to 28-Sep-2011 and 146,654 tCO_2e generated from 29-Sep-2011 to 27-July-2012 by the project has been issued as CERs under CDM program. Please refer to the following link for details:

https://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1296190714.03/view?cp=1

1.15.2 Projects Rejected by Other GHG Programs

N.A.

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 hasn't sought or received another form of environmental credits.

1.17 Additional Information Relevant to the Project

Leakage Management

N.A.

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:

- Compared to conventional power generation, reducing the emission of other pollutants resulting from the power generation industry in China, the preliminary estimate of which can reach pollutant reduction of 1,932.9t of SO_2, 768.33t of NO_X;

- Helping to stimulate the growth of the wind power industry in China, encouraging and promoting the technological progress and commercial popularization of renewable energy generating technologies in China;
- Creating local employment opportunities during assembling and installing the generating equipment and during the project construction and operation period as well as simulating the development of local tourism industry;
- Providing 20 long-term positions during the operation of the Project.

Further Information

N.A.

2 SAFEGUARDS

2.1 No Net Harm

The Environmental Impact Assessment (EIA) of the project has been conducted and approved by local government officials. The EIA report has assessed every possible aspect of environmental impact of the project and recommended corresponding measures, where applicable, thus there are no negative environmental impacts due to the project. In addition, the project makes positive contribute to the sustainable development as described in section 1.17 of this report.

Therefore, the project has no negative impacts on local environment and socio-economy. No net harm on local environment and social community has been detected for the project.

2.2 Local Stakeholder Consultation

LSC prior to the project implementation

Local stakeholder consultation has been conducted in August 2009. All comments received have been well addressed. Please refer to section E of the CDM-PDD (version 5.4 dated 13/01/2011) of the project for detailed information.

LSC during the operation period

Communications with Local stakeholders have been carried out at periodic intervals. Key implementation schedules and changes of the project have been communicated to the local authority, the neighbourhood committee, and local residents. The comments and suggestions from residents were collected by the local authority, if any.

The project owner carried out questionnaire survey for the local stakeholders to collect the relevant comments and suggestions every two or three years. The local authority also conducts

spot checks on the implementation of the project at periodic intervals as per relevant regulations. There have been no negative comments received for the project so far.

In line with VCS requirements all the processes have been implemented to receive comments from local stakeholders as well as communicate with them at periodic intervals.

2.3 Environmental Impact

Environmental impact assessment of the project has been conducted and approved by local government officials. EIA report of Guanting Phase II was approved by Beijing Environmental Protection Bureau on 17-Otc-2008 (Approval No. JHS[2008]1081), EIA report of Guanting Phase II addition was approved by Beijing Environmental Protection Bureau on 25-May-2009 (Approval No. JHS[2009]616).

The EIA report has assessed every possible aspect of environmental impact of the project and recommended corresponding measures, where applicable. The environmental impacts, treatment and effect arising from the Project have been fully described in the registered CDM-PDD (version 5.4 dated 13/01/2011). Please refer to the registered CDM-PDD for details.

The environmental impact of the project during construction was temporary and no significant, and the environmental impact during the project operation is minor. The project activity can reduce CO_2 emissions and environmental pollution caused by coal-fired power plant of NCPG. The project will have positive impact on local environment.

2.4 Public Comments

The project developer published the project documents on the UNFCCC website for global stakeholders' comments during 13-Aug-2009 to 12-Sep-2009. No comments were received during this period.

2.5 AFOLU-Specific Safeguards

N.A.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Applied CDM methodology: ACM0002 (version 20.0) "Grid-connected electricity generation from renewable sources".

https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG

Applied CDM tools:

Tool to calculate the emission factor for an electricity system (version 07.0)

http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf

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).

http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf

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

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

3.2 Applicability of Methodology

The applicability of ACM0002 (version 20.0) has been justified as follows.

No.	Applicability criteria	Scenario of the project	Conclusion
1	This methodology is applicable to grid-connected renewable energy power generation project activities that: (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: (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.	(a) The project activity involves the installation of the wind power plant. (b) Irrelevant, the project does not involve capacity additions, retrofits, rehabilitations or replacements.	Applicable

3	In case of hydro power plants, one of the following conditions must apply: (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or (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/m^2; or (c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (7), is greater than 4 W/m^2; or (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 (7), is lower than or equal to 4 W/m^2, all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (8), is greater than 4 W/m^2; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m^2 shall be: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project.	Irrelevant. The Project is not a hydro power plant, so this applicability condition does not need to be considered.	N.A.

4	In the case of integrated hydro power projects, project proponent shall: 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 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 of five years prior to the implementation of the CDM project activity.	Irrelevant. The Project is not a hydro power plant, so this applicability condition does not need to be considered.	N.A.
5	The methodology is not applicable to: (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; (b) Biomass fired power plants/units.	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	Applicable
6	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”.	Irrelevant, the project does not involve capacity additions, retrofits, rehabilitations or replacements.	N.A.

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
	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 in non-Annex I country.	Applicable
Tool for Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period	This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the Vaseline at the renewal of a crediting period, as required by paragraph 49 (a) of the modalities and procedures of the clean development mechanism. The tool consists of two steps. 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.	The validity of the current baseline is assessed by the project using the following sub-steps: Step 1: Assess the validity of the current baseline for the next crediting period; Step 2: Update the current baseline and the data and parameters.	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
	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 consumers/electricity consuming facilities.	The electricity generated by the project is supplied to the grid.	Applicable
	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

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 to electricity system that the project power plant is connected to. Therefore, the spatial extent of the project boundary includes the project activity itself (both the Guanting Phase II and the Phase II addition) and all the power plants connected physically to NCPG.

As per 2019 Baseline Emission Factors for Regional Power Grids in China issued by China DNA[1] on 29-Dec-2020, NCPG consists of Beijing Power Grid, Tianjin Power Grid, Hebei Power Grid, Shanxi Power Grid, Shandong Power Grid and Inner Mongolia Power Grid.

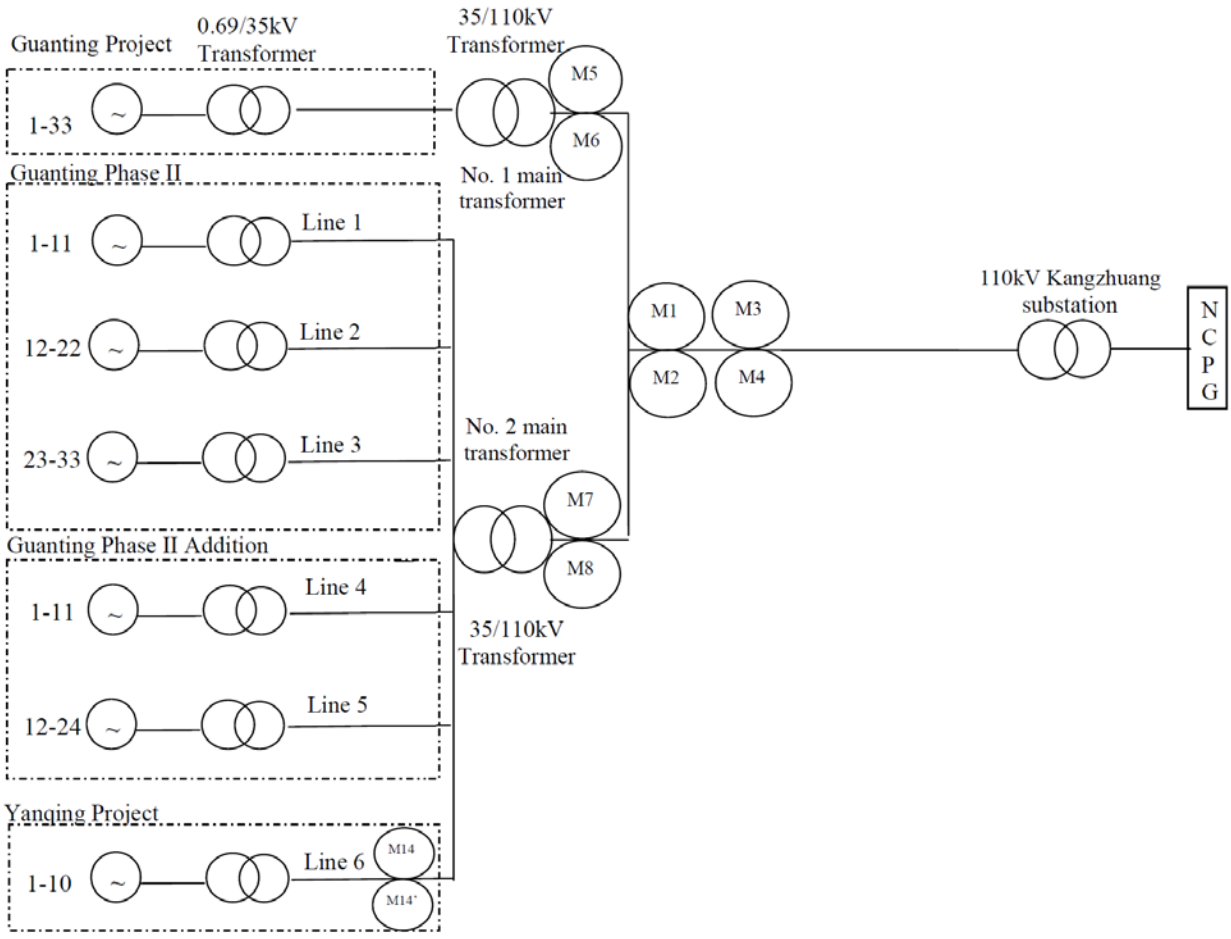

Figure 3. The boundary of the project

As per ACM0002 (version 20.0), the emission sources and GHGs in the project boundary are as follows:

[1] http://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/202012/t20201229_815386.shtml

Source		Gas	Included?	Justification/Explanation
Baseline	CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO_2	Yes	Main emission source.
		CH_4	No	Minor emission source.
		N_2O	No	Minor emission source.
Project	The wind power project	CO_2	No	No project emission is considered.
		CH_4	No	No project emission is considered.
		N_2O	No	No project emission is considered.

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. The baseline scenario of the project activity is still the electricity delivered to the NCPG by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation source. 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 scenario. 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 baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment, there's no current baseline equipment or an investment, hence the current baseline does not need to be updated. 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 shall be updated using the latest version of "Tool to calculate the emission factor for an electricity system". Please refer to section B.6 for details.

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

Step 2.1: Update the current baseline

As per the analysis in step 1 above, the current baseline does not need to be updated.

Step 2.2: Update the data and parameters

The updated baseline emission factor for the project ($EF_{grid,CM,y}$) is 0.8269 tCO_2e/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 a deviation on calculation of Build Margin when adopting the methodological tool – "Tool to calculate the emission factor for an electricity system" by the Chinese DNA in the "2019 Baseline Emission Factors for Regional Power Grids in China". The deviation has been approved by the EB Board in a response letter entitled "Request for clarification on use of approved methodology AM0005 for several projects in China", thus the same deviation method has been adopted in the first and second crediting periods of the project by the Chinese DNA.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The GHG emission reduction calculation of the project was based on the applied methodology ACM0002 (version 20.0).

Baseline Emission calculation:

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

Where:

BE_y	Baseline emissions in year y (tCO_2e)
$EG_{PJ,y}$	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in year y
$EF_{grid,CM,y}$	Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "TOOL07: Tool to calculate the emission factor for an electricity system" (tCO_2e/MWh)

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

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

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

And the baseline emission factor $EF_{grid,CM,y}$ is calculated as per the latest version of "TOOL07: Tool to calculate the emission factor for an electricity system" (version 07.0). The $EF_{grid,CM,y}$ is calculated ex ante and fixed for the second crediting period. Detailed as follows:

Step 1. Identify the relevant electricity system

The electricity generated by the Project is supplied to the NCPG, and in the absence of the project activity, the installed capacity of the NCPG for both the existing power plants and the power plants to be built in a foreseeable future would supply electricity comparable to that supplied by the Project, as per 2019 Baseline Emission Factors for Regional Power Grids in China published by China DNA, the NCPG includes provincial grid spatial extent of Beijing Power Grid, Tianjin Power Grid, Hebei Power Grid, Shanxi Power Grid, Shandong Power Grid, and Inner Mongolia Power Grid. Therefore, 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 actual situation, only grid power plants are included in the calculation. Thus, Option I is chosen.

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) are not suitable for the project.

The Simple OM method (a) can only be applied when low-cost/must run resources constitute less than 50% of total grid generation in average of the five most recent years. According to the data from China Electric Power Yearbook 2014-2018, from year 2013 to year 2017, for the NCPG the project activity connected to, the low-cost/must-run electric power resources generation accounts for the total grid total are 5.92%, 6.39%, 7.21%, 8.94% and 10.10%, 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 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, or

- 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.

Here the ex-ante option is selected, and the $EF_{grid,OM}$ 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 method is used to calculate the NCPG OM emission factor in this step. 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 by one of the following two options:

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

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

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:

For 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:

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

Where:

$EF_{grid,OMsimple,y}$	Simple operating margin CO_2 emission factor in year y (tCO_2/MWh)
$FC_{i,y}$	Amount of 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 fuel type i in year (GJ / mass or volume unit)
$EF_{CO2,i,y}$	CO_2 emission factor of 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 fuel types combusted in power sources in the project electricity system in year y
y	The three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation

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 2018 and Energy Consumption Statistics System for Public Institutions. Emission factors ($EF_{CO2,i,y}$) of each type of fossil fuel come from IPCC 2006 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 Northwest China Power Grid, 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 (2016~2018, published annually) and China Energy Statistical Yearbook (2016~2018). Based on these data, the Simple OM Emission Factor ($EF_{grid,OMsimple,y}$) of the North China Power Grid is calculated as 0.9419 tCO_2/MWh. Details of the calculations and the published data from the Chinese DNA[2], which uses official national statistics.

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

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

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

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

The PD 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 ($SET_{5\text{-}units}$) and determine their annual electricity generation ($AEG_{SET\text{-}5\text{-}units}$, in MWh);

[2] http://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/202012/t20201229_815386.shtml

(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 ($AEG_{SET-\geq 20\ per\ cent}$, in MWh);

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

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

Under the current circumstances in China, the power plants consider the Build Margin data as important business data and will not have them published. Therefore, it is difficult to obtain the data of five power plants that have been put into operation most recently or the newly installed power plant capacity additions in the electricity system that comprise 20% of the system generation.

According to the instructions of China DNA, for the determination of the set of samples, a sample merging processing in some degree has been adopted due to that the power generation data, energy consumption data or thermal efficiency data of each plant cannot be consulted in the public statistical data. In this calculation, the newly-installed power units in the past years are classified by year, province and power generation technology, and the same type of newly-installed power units in the same province and in the same year are bundled as a "newly-installed power units".

The power generation of each “newly-installed power units” in the most recent year y is estimated based on its installed capacity and the number of power generation utilization hours in year y. The formula is as follows:

$$EG_{m,y} = CAP_m \times H_{m,y} \qquad (4)$$

Where:

$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
CAP_m	Installed capacity of electricity generated and delivered to the grid by power unit m in year y (MW)
$H_{m,y}$	The number of power utilization hours (h) of electricity generated and delivered to the grid by power unit m in year y. And it selects the average utilization hours of similar units in the province in which it is located in year y;
y	Most recent year for which data is available.

m	The sample group of power units.

The power unit m is selected from the "newly-installed power plants" in the most recent year y (For the calculation of the grid BM in 2019, the y is equal to 2017) to the "newly-installed power plants" in the earlier year, until the cumulative power generation reaches 20% of the total power generation in the year y (y=2017).

Since the newly installed power units of the same type (k) in the same province (A) and the same year (t) are bundled into the “newly-installed power units”, the CAP_m is equal to the statistical data of recent installed capacity of a given unit type(k) in a given year (t) in a given province (A).

$$CAP_m = CAP_m|_{m=(A,t,k)} = CAP_{A,t,k} \quad (5)$$

Where:

CAP_m	Installed capacity of electricity generated and delivered to the grid by power unit m in year y (MW), and m is equivalent to an established combination of (A, t, k);
$CAP_{A,t,k}$	Capacity of newly-installed power units of a given province (A), given year (t), and given unit type (k) (MW)
A	It is the various provincial regions covered by the regional power grid
t	It is the sampling year of the "newly-installed power units". For the calculation of the grid BM in 2019, t is equal to 2017, 2016, until the units that comprise at least 20 percent of the system generation in 2017.
k	It is the power generation technology classification of "newly-installed power units", which is divided into: hydro-power, coal-thermal power, gas-thermal power, oil-thermal power, Waste-thermal power plant, other thermal power, nuclear power, wind power, solar power, and others.

As per tool, the CO_2 emission factor of each power unit m ($EF_{EL,m,y}$) should be determined as per the tool in Step 4 section 6.4.1 for the simple OM, using Options A1, A2 or A3, using for y the most recent historical year for which electricity generation data is available, and using for m the power units included in the build margin.

Because current statistics data cannot separate each power plant, for a power unit m, only data on electricity generation and the fuel types used is available. So, the option A2 is selected, the emission factor should be determined based on the CO2 emission factor of the fuel type used and the efficiency of the power unit, as follows:

$$EF_{EL.m.y} = \frac{EF_{CO2,m,i,y} \times 3.6}{\eta_{m,y}} \quad (6)$$

Where:

$EF_{EL.m.y}$	CO_2 emission factor of power unit m in year y (tCO_2/MWh)

$EF_{CO2,m,i,y}$	Average CO_2 emission factor of fuel type i used in power unit m in year y (tCO_2/GJ)
$\eta_{m,y}$	Average net energy conversion efficiency of power unit m in year y (ratio)
3.6	Conversion coefficient of thermal work equivalent of electricity (GJ/MWh)

According to formula (6), the unit electricity emission factor of the hydro-power, nuclear power, wind power, solar power, other thermal power, and others power generation technology in the "newly-installed power units" samples are is zero. The emission factor per unit of electricity for power generation from coal, gas, oil and electricity waste power is calculated based on formula (6). Since the average net energy conversion efficiency of each sample ($\eta_{m,y}$) cannot be obtained, the power supply thermal efficiency of the best commercialized technology of coal, gas, oil and waste power ($\eta_{Best,m,y}$) is better than $\eta_{m,y}$. It is conservative to use $\eta_{Best,m,y}$ for the calculation of $EF_{EL,m,y}$.

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:

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:

$$EF_{grid,BM,y} = \frac{\sum_{m} EG_{m,y} \times EF_{EL,m,y}}{\sum_{m} EG_{m,y}} \quad (7)$$

Where:

$EF_{grid,BM,y}$	Build Margin CO_2 emission factor in year y (tCO_2/MWh)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit m in year y
$EF_{EL,m,y}$	CO_2 emission factor of power unit m in year y (tCO_2/MWh)
m	Power units included in the Build Margin
y	The most recent year for which data is available

Outcome of STEP5:

Based on "2019 Baseline Emission Factors for Regional Power Grids in China" published by Chinese DNA, the Build Margin Emission Factor ($EF_{grid,BM,y}$) of the NCPG could be obtained to be 0.4819 tCO_2/MWh.

Step 6. Calculate the combined margin (CM) emission factor

As per the "tool to calculate the emission factor for an electricity system", 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 PD choose option (a).

The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = \omega_{OM} \times EF_{grid,OM,y} + \omega_{BM} \times EF_{grid,BM,y} \quad (8)$$

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)
ω_{OM}	Weighting of operating margin emissions factor (per cent)
ω_{BM}	Weighting of build margin emissions factor (per cent)

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 w_{OM} = 0.75 and w_{BM} = 0.25 for wind power project (owing to their intermittent and non-dispatchable nature) for the 1st crediting period and for subsequent crediting periods. Therefore $EF_{grid,CM,y}$ is calculated as follows:

$EF_{grid,CM,y}$=0.9419*0.75+0.4819*0.25 = 0.8269 (tCO_2/MWh)

4.2 Project Emissions

As per ACM0002 (Ver.20.0), the project emission is zero (PE_y=0) for wind power project.

4.3 Leakage

As per ACM0002 (Ver.20.0), no leakage emissions are considered.

4.4 Net GHG Emission Reductions and Removals

Emission reductions are calculated as follows:

$ER_y = BE_y - PE_y = BE_y$ (9)

Where:

ER_y	Emission reductions in year y (t CO_2e/yr).
BE_y	Baseline emissions in year y (t CO_2e/yr)
PE_y	Project emissions in year y (t CO_2e/yr)

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

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
23/12/2019-22/12/2020	133,229	0	0	133,229
23/12/2020-22/12/2021	133,229	0	0	133,229
23/12/2021-22/12/2022	133,229	0	0	133,229
23/12/2022-22/12/2023	133,229	0	0	133,229
23/12/2023-22/12/2024	133,229	0	0	133,229
23/12/2024-22/12/2025	133,229	0	0	133,229
23/12/2025-22/12/2026	133,229	0	0	133,229
23/12/2026-22/12/2027	133,229	0	0	133,229
23/12/2027-22/12/2028	133,229	0	0	133,229
23/12/2028-22/12/2029	133,229	0	0	133,229
Total	1,332,290	0	0	1,332,290

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,OM,y}$

Data unit	tCO_2/MWh
Description	Operating margin emission factor for North China Power Grid
Source of data	"2019 Baseline Emission Factors for Regional Power Grids in China" published by China DNA
Value applied	0.9419
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per the latest version of "Tool to calculate the emission factor for an electricity system" (version 07.0) by China DNA
Purpose of Data	Calculation of $EF_{grid,CM,y}$
Comments	Calculated ex ante and fixed for the second crediting period

Data / Parameter	$EF_{grid,BM,y}$
Data unit	tCO_2/MWh
Description	Build margin emission factor for North China Power Grid
Source of data	"2019 Baseline Emission Factors for Regional Power Grids in China" published by China DNA
Value applied	0.4819
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per the latest version of "Tool to calculate the emission factor for an electricity system" (version 07.0) by China DNA
Purpose of Data	Calculation of $EF_{grid,CM,y}$
Comments	Calculated ex ante and fixed for the second crediting period

Data / Parameter	ω_{OM}
Data unit	-
Description	Weighting of operating margin emissions factor
Source of data	"Tool to calculate the emission factor for an electricity system" (version 07.0)
Value applied	0.75

Justification of choice of data or description of measurement methods and procedures applied	-
Purpose of Data	Calculation of $EF_{grid,CM,y}$
Comments	Calculated ex ante and fixed for the second crediting period

Data / Parameter	ω_{BM}
Data unit	-
Description	Weighting of build margin emissions factor
Source of data	"Tool to calculate the emission factor for an electricity system" (version 07.0)
Value applied	0.25
Justification of choice of data or description of measurement methods and procedures applied	-
Purpose of Data	Calculation of $EF_{grid,CM,y}$
Comments	Calculated ex ante and fixed for the second crediting period

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2/MWh
Description	Baseline emission factor for Northeast China Power Grid
Source of data	"2019 Baseline Emission Factors for Regional Power Grids in China" published by Chinese DNA
Value applied	0.8269
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per the latest version of "Tool to calculate the emission factor for an electricity system" (version 07.0) by China DNA
Purpose of Data	Baseline emission calculation
Comments	Calculated ex ante and fixed for the second crediting period

5.2 Data and Parameters Monitored

Data / Parameter	$EG_{facility,y}$
Data unit	MWh
Description	Quantity of net electricity generation supplied to the grid by the project in year y.
Source of data	Calculated based on measurements from more than one electricity meters
Description of measurement methods and procedures to be applied	-
Frequency of monitoring/recording	Continuously measured and monthly recorded
Value applied	161,119
Monitoring equipment	-
QA/QC procedures to be applied	-
Purpose of data	Baseline emission calculation
Calculation method	Calculated as per equation below: $EG_{facility,y} = EG_{totaltogrid,y} \times \frac{EG_{PJtotrans,y}}{EG_{PJ+Yqtotrans,y} + EG_{Guantingtotrans,y}} - EG_{gridtototal,y}$ $EG_{totaltogrid,y}$: Electricity supplied to the grid by the Project and other projects in year y. $EG_{PJtotrans,y}$: Electricity supplied to No. 2 main transformer by the Project in year y. $EG_{PJ+Yqtotrans,y}$: Electricity supplied by the Project and the Yanqing Project in year y. $EG_{Guantingtotrans,y}$: Electricity supplied by Guanting project in year y $EG_{gridtototal,y}$ is the quantity of electricity consumed by the Project and other projects from the grid in year y, this is conservative
Comments	-

Data / Parameter	$EG_{Yanqingtotrans,y}$

Data unit	MWh
Description	Electricity supplied to No. 2 main transformer by Yanqing project in year y
Source of data	Electricity meters M14/M14'
Description of measurement methods and procedures to be applied	Directly measured by electricity meters with precision no lower than 0.5s installed at the line 6. The proportion of data to be monitored is 100% and the data will be archived electronically and kept during the crediting period and 2 years after.
Frequency of monitoring/recording	Continuously measured and monthly recorded
Value applied	Ex-post monitoring only
Monitoring equipment	Electricity meters M14/M14'
QA/QC procedures to be applied	Cross check by readings from meter M14 and meter M14'. Electricity meters are to be calibrated at periodic intervals.
Purpose of data	Calculation of baseline emissions
Calculation method	-
Comments	-

Data / Parameter	$EG_{Guantingtotrans,y}$
Data unit	MWh
Description	Electricity supplied by Guanting project in year y
Source of data	Electricity meters M5/M6
Description of measurement methods and procedures to be applied	Directly measured by electricity meters with precision 0.2s installed at No. 1 main transformer. The proportion of data to be monitored is 100% and the data will be archived electronically and kept during the crediting period and 2 years after.
Frequency of monitoring/recording	Continuously measured and monthly recorded
Value applied	Ex-post monitoring only
Monitoring equipment	Electricity meters M5/M6
QA/QC procedures to be applied	Cross check by readings from meter M5 and meter M6. Electricity meters are to be calibrated at periodic intervals.
Purpose of data	Calculation of baseline emissions
Calculation method	-
Comments	-

Data / Parameter	$EG_{PJ+Yqtotrans,y}$
Data unit	MWh
Description	Electricity supplied by the Project and the Yanqing Project in year y
Source of data	Electricity meters M7/M8
Description of measurement methods and procedures to be applied	Directly measured by electricity meters with precision 0.2s installed at No. 2 main transformer. The proportion of data to be monitored is 100% and the data will be archived electronically and kept during the crediting period and 2 years after.
Frequency of monitoring/recording	Continuously measured and monthly recorded
Value applied	Ex-post monitoring only
Monitoring equipment	Electricity meters M7/M8
QA/QC procedures to be applied	Cross check by readings from meter M7 and meter M8. Electricity meters are to be calibrated at periodic intervals.
Purpose of data	Calculation of baseline emissions
Calculation method	-
Comments	-

Data / Parameter	$EG_{PJtotrans,y}$
Data unit	MWh
Description	Electricity supplied to No. 2 main transformer by the Project in year y
Source of data	Calculated from $EG_{Yanqingtotrans,y}$ and $EG_{PJ+Yqtotrans,y}$
Description of measurement methods and procedures to be applied	-
Frequency of monitoring/recording	Monthly recorded and aggregated.
Value applied	Ex-post monitoring only
Monitoring equipment	-
QA/QC procedures to be applied	-
Purpose of data	Calculation of baseline emissions

Calculation method	$EG_{PJtotrans,y}=EG_{PJ+Yqtotrans,y} - EG_{Yanqingtotrans,y}$
Comments	-

Data / Parameter	$EG_{totaltoGrid,y}$
Data unit	MWh
Description	Electricity supplied to the grid by the Project and other projects in year y
Source of data	Electricity meters M1/M3
Description of measurement methods and procedures to be applied	Directly measured by gateway meters with precision 0.2s. The proportion of data to be monitored is 100% and the data will be archived electronically and kept during the crediting period and 2 years after.
Frequency of monitoring/recording	Continuously measured and monthly recorded
Value applied	Ex-post monitoring only
Monitoring equipment	Electricity meters M1/M3
QA/QC procedures to be applied	Cross check by sales receipts. Electricity meters are to be calibrated at periodic intervals.
Purpose of data	Calculation of baseline emissions
Calculation method	-
Comments	-

Data / Parameter	$EG_{Gridtototal,y}$
Data unit	MWh
Description	Electricity consumed by the Project and other projects from the grid in year y
Source of data	Electricity meters M2/M4
Description of measurement methods and procedures to be applied	Directly measured by gateway meters with precision 0.2s. The proportion of data to be monitored is 100% and the data will be archived electronically and kept during the crediting period and 2 years after.
Frequency of monitoring/recording	Continuously measured and monthly recorded
Value applied	Ex-post monitoring only
Monitoring equipment	Electricity meters M2/M4

QA/QC procedures to be applied	Cross check by sales receipts. Electricity meters are to be calibrated at periodic intervals.
Purpose of data	Calculation of baseline emissions
Calculation method	-
Comments	-

5.3 Monitoring Plan

Management Structure

The monitoring of the emission reductions is carried out according to the scheme shown in Figure 4. The project owner holds the overall responsibility for the monitoring process. The plant operation staff record the electricity exported to and imported from the grid and also keep record of daily operations of the Project.

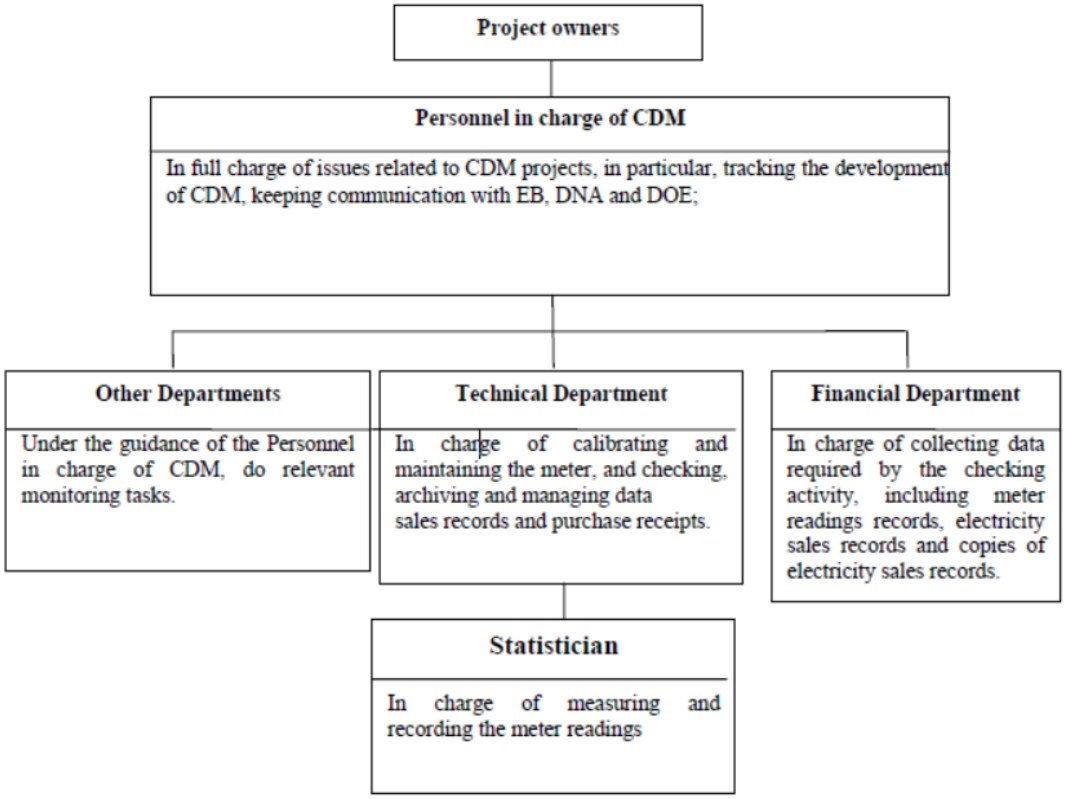

Figure 4. Management Structure of Monitoring Plan

Monitoring system

The Project shares gateway meters with Yanqing Project and Guanting Project. The total electricity supplied to the grid by the Project, Yanqing Project and Guanting Project ($EG_{totaltogrid,y}$) is measured by gateway meters M1/M3 and electricity bought from the grid by the Project, Yanqing Project and Guanting Project ($EG_{gridtototal,y}$) is measured by gateway meters M2/M4. Meter M1/M3 and M2/M4 were installed at the 110kV substation of Beijing Guanting wind farm.

The electricity meters M5/M6 were installed at the outlet of No. 1 main transformer to measure the electricity supply of the Guanting Project ($EG_{Guantingtotrans,y}$).

Electricity generated by the project and Yanqing project is supplied to the grid through No. 2 main transformer. The electricity meters M7/M8 were installed at the No. 2 main transformer to measure the electricity supply of the Project and the Yanqing Project through No. 2 main transformer ($EG_{PJ+Yqtotrans,y}$). Meters M14/M14' were installed at the transmission line (line 6) of the Yanqing project to measure the electricity supplied to No. 2 main transformer by Yanqing project ($EG_{Yanqingtotrans,y}$), hence the electricity supplied to No. 2 main transformer by the project ($EG_{PJtotrans,y}$) is calculated as the difference of $EG_{PJ+Yqtotrans,y}$ and $EG_{Yanqingtotrans,y}$, shown as below.

$$EG_{PJtotrans,y} = EG_{PJ+Yqtotrans,y} - EG_{Yanqingtotrans,y} \quad (10)$$

The net electricity supplied to the grid by the project ($EG_{facility,y}$) is calculated as follows:

$$EG_{facility,y} = EG_{totaltogrid,y} \times \frac{EG_{PJtotrans,y}}{EG_{PJ+Yqtotrans,y}+EG_{Guantingtotrans,y}} - EG_{gridtototal,y} \quad (11)$$

The monitoring system of the project is shown in Figure 5 below.

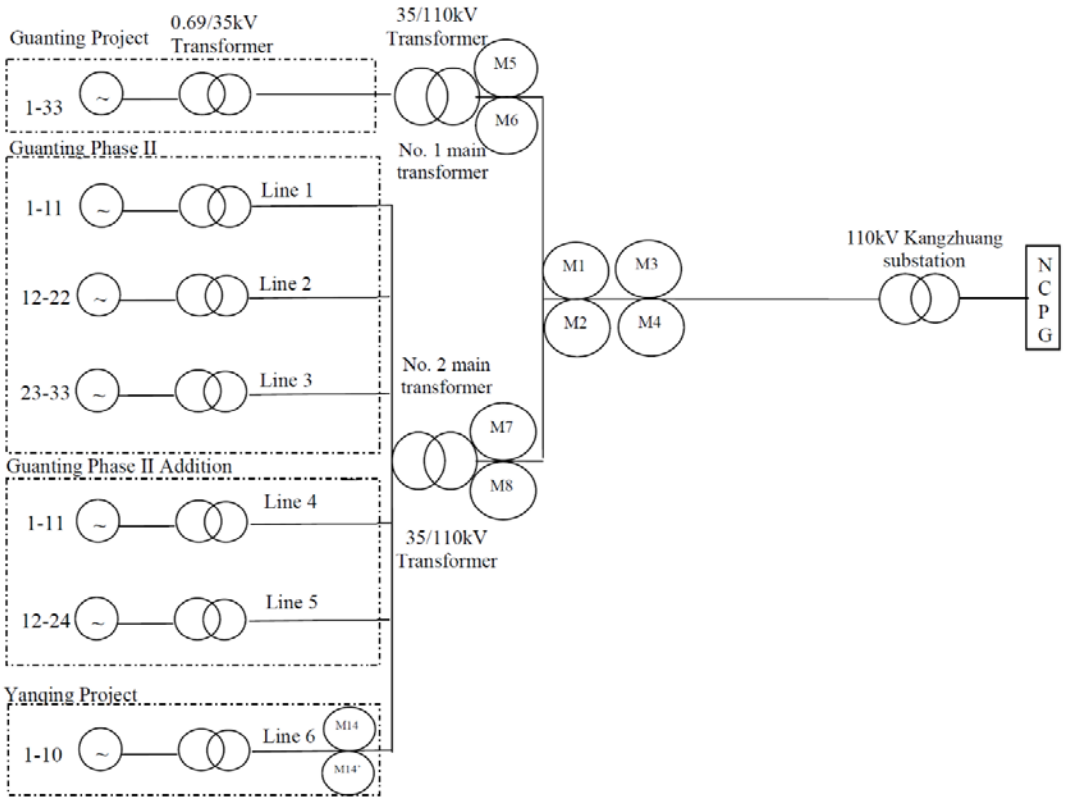

Figure 5 Monitoring system of the project

Installation and calibration of meters

All meters were installed as per the requirements of the Technical administrative code of electric energy metering (DL/T448). Calibration of meters has been carried out by qualified third party at periodic intervals to ensure the accuracy.

Data collection and QA/QC

The plant operation staff recorded meter readings from all meters involved monthly. Internal audit is to be carried out by designated staff to ensure the accurate data collection. The electricity transaction between the project proponent and the grid company are to be conducted monthly according to the meter readings of gateway meters. Sales receipts are to be issued accordingly.

All main meters have been equipped with backup meters. In case of main meter malfunctioning, meter readings from backup meters will be applied. In case of malfunctioning of both main meter and backup meter, the electricity will be determined as per the Power Purchase Agreement signed between the project owner and the local grid company.

Data Management System

Specific staff will be appointed by the project owner to take the overall responsibility for monitoring GHG emission reductions and keeping all the data collected as part of monitoring archived electronically and kept at least for two years after the end of the crediting period.