



GANSU GUAZHOU BEIDAQIAO WIND POWER PROJECT

Document Prepared by Longyuan Power Group Energy Sale Co., LTD

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1 PROJECT DETAILS

1.1 Summary Description of the Project

Gansu Guazhou Beidaqiao Wind Power Project (hereafter referred as “the project”) is located in Guazhou County, Jiuquan City, Gansu Province, the People’s Republic of China. The purpose of the Project is to generate electricity using wind power resources in the project region and to deliver to the Northwest China Power Grid (NWPG) which is predominated by connected fossil fuel fired power plants, especially coal fired plants. So, the project can reduce GHG emissions by replacing the electricity generated by fossil fuel fired power plants in NWPG.

Currently, most of the electricity in the region is generated through conventional fossil fuel based thermal power plants, according to *the China Electricity Power Yearbook*. Through combustion of fossil fuels, they emit a large volume of greenhouse gasses (GHG) into the atmosphere, which has a negative effect on global society.

The Project involves the installation of 134 wind turbines with 1,500kW capacity per unit, with a total installed capacity of 201 MW and the expected lifetime of the project is 20 years. Totally 480,708 MWh of clean electricity generated by the Project are expected to be delivered to the NWPG annually.

The baseline scenario of the project is the electricity supply of equal amount as the project from the NWPG. The baseline scenario of the project is the same against the scenario prior to the start of the implementation of the project activity.

The project began to construct on 28-November-2009, all the 134 sets of wind turbines started to trial-operate on 16-December-2010 and started exporting electricity to the grid on 22-January-2011 when the first group of wind turbines underwent 240 hours consecutive trial operation. All wind turbines had been put into full delivery since 01-February-2011.

The project is developed by Longyuan (Jiuquan) Wind Power Co., Ltd. (hereinafter referred as “the project proponent” or “PP”). The second VCS crediting period is 22-January-2021 to 21-January-2031. The estimated average annual emission reductions of the project are 374,627 tCO₂e and total GHG emission reductions and removals in the second crediting period is estimated to be 3,746,270 tCO₂e.

1.2 Sectoral Scope and Project Type

Sectoral scope: 1 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 project generates renewable and clean electricity by using wind power that would otherwise have been provided by the Northwest China Power Grid (NWPG), which reduces the emissions of CO₂ from fossil fuel-fired generation in the grid, and falls into the category of the six Kyoto Protocol greenhouse gases.

CDM methodology ACM0002 Version 20.0 “Grid-connected electricity generation from renewable sources” is adopted, which is the methodology approved under a VCS approved GHG program and is eligible for VCS by Verra.

The project is to utilize wind power for electricity generation. Prior to the implementation of the project, the equivalent electricity supplied by the project was sourced from NWPG. Apparently, the project does not generate GHG emissions primarily for the purpose of their subsequent reduction, removal, or destruction.

Thus, the project is eligible under the scope of the VCS Program.

1.4 Project Design

The project includes a single location or installation only and is not a grouped project.

1.5 Project Proponent

Organization name	Longyuan (Jiuquan) Wind Power Co., Ltd.
Contact person	Kong Shujian
Title	Manager
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1.6 Other Entities Involved in the Project

Organization name	Longyuan Power Group Energy Sale Co., LTD
Role in the project	Project developer
Contact person	Shi Di
Title	Project Manager

Address	No.6-9 Fuchengmen North Street, Xicheng District, Beijing, China
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1.7 Ownership

The project proponent is Longyuan (Jiuquan) Wind Power Co., LTD. who has the full ownership of the project. The approval of Environmental Impact Assessment (EIA) 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 evidence for legislative right. Besides, the equipment purchasing contract and the purchasing power agreement are the evidence for the ownership of the plant, equipment and power generating.

1.8 Project Start Date

All the 134 sets of wind turbines of the project started to trial-operate on 16-December-2010 and started exporting electricity to the grid on 22-January-2011 when the first group of wind turbines underwent 240 hours consecutive trail operation. All wind turbines had been put into full delivery since 01-February-2011.

The GHG emission reductions of 110,255 tCO₂e generated 22-January-2011 to 04-July-2011 by the project has been issued as VCUs under VCS program. According to the website of Verra Registry¹, the project start date of project crediting period was on 22-January-2011 when the first group of wind turbines underwent 240 hours consecutive trail operation.

1.9 Project Crediting Period

In the registered VCS PD, the crediting period is described as from 22-January-2011 to 04-July-2011. The project is registered under VCS Standard Version 3 and completed validation before 19-March-2020. Thus, it remains eligible to apply the crediting period requirements under VCS Standard Version 3, which shall be a maximum of ten years and may be renewed at most twice. Hence, the first renewable crediting period of the project has been updated from 22-January-2011~04-July-2011 to 22-January-2011~21-January-2021.

The project is also a registered CDM project (Ref.4832) with a 7*3 renewable project crediting period, the VCS issuance is not eligible for beyond the end of those 21 years. Furthermore, given that the VCS crediting period started on 22-January-2011 and the lifetime of the project is about 20 years. The total VCS crediting period was determined from 22-January-2011 to 21-January-2031, of which the first VCS crediting period is from 22-January-2011 to 21-January-2021 and the second VCS crediting period is from 22-January-2021 to 21-January-2031 (10 years).

¹ <https://registry.verra.org/app/projectDetail/VCS/873>

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)
22-January-2021~31-December-2021	353,073 ²
01-January-2022~31-December-2022	374,627
01-January-2023-31-December-2023	374,627
01-January-2024-31-December-2024	374,627
01-January-2025-31-December-2025	374,627
01-January-2026-31-December-2026	374,627
01-January-2027-31-December-2027	374,627
01-January-2028-31-December-2028	374,627
01-January-2029-31-December-2029	374,627
01-January-2030-31-December-2030	374,627
01-January-2031-21-January-2031	21,554 ³
Total estimated ERs	3,746,270
Total number of crediting years	10
Average annual ERs	374,627

1.11 Description of the Project Activity

The project began to construct on 28-November-2009, the all the 134 sets of wind turbines started to trial-operate on 16-December-2010. And all wind turbines have been put into full

² The estimated emission reductions of the project are 374,627 tCO₂e per year (365 days). There are 344 days from 22-January-2021 to 31-December-2021. Thus, the estimated emission reductions is calculated as $374,627/365 \times 344 = 353,073$ tCO₂e.

³ There are 21 days from 01-January-2031 to 21-January-2031. The ERs is calculated as $374,627/365 \times 21 = 21,554$ tCO₂e.

delivery on 01-February-2011. The project is to generate electricity using zero-emission wind resources and supply it to Northwest China Power Grid.

During the previous crediting period, the Project was operated and implemented smoothly. There were no emergencies happened to the monitoring system in the previous monitoring periods, or events or situations occurred during the previous monitoring periods, which may impact the applicability of the methodology.

Totally 134 wind turbines produced by Sinovel Wind Group Co., Ltd. with a nominal capacity of 1500 kW (type: SL1500/82) was installed, providing a total capacity of 201MW. The main technical specifications are as follows:

Table 1: Technical Characteristics of Wind Turbines for the Project

Preliminary Design Data	
Number	134
Manufacturer	Sinovel Wind Group Co., Ltd.
Nominal Capacity	1500 kW
Rotor	
Number of Blades	3
Cut-in Wind Speed	3 m/s
Rated Wind Speed	10.5 m/s
Cut-out Wind Speed	20 m/s
Extreme Wind Speed	59.5 m/s
Generator	
Rated Power	1500 kW
Rated Voltage	690 V
Lifetime	20 y
PLF	27.31%

Each turbine has a 690V-to-35kV transformer, from which a 35kV line links into the 330kV step-up substation, which has been constructed by other previous project. By the 330 kV overhead transmission line, the electricity generated by the project is delivered to the power grid.

The inspect system of wind turbines consists of on-site controlling system, central computer system and communication network. The step-up substation has been constructed by other previous project so that the inspect system of transmission facility has not been considered in this project. The electricity supplied to the power grid is measured by the electronic meters installed at the substation.

1.12 Project Location

The project is located in Guazhou County, Jiuquan City, Gansu province of China. Four inflexions of geographical scopes are A (E96.257°, N40.674°), B (E96.304°, N40.674°), C (E96.304°, N40.744°) and D (E96.257°, N40.744°). The detailed location of the project is shown in Figure 1.



Figure 1. 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 NWPG 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.

1.14 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.

The Environmental Impact Assessment (EIA) report was approved by Environmental Protection Administration of Gansu Province on 06-August-2008, and the Feasibility Study Report of the project was approved by National Development and Reform Commission on 13-May-2009. These approvals demonstrate that the project meets the requirement of national laws and regulations, including Renewable Energy Law of the People's Republic of China, Environmental Protection Law of People's Republic of China and Law of the People's Republic of China on the Prevention and Control of Solid Waste Pollution etc.

1.15 Participation under Other GHG Programs

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

The project is a registered CDM project with reference No. 4832 with 3*7 renewable crediting period. Total GHG emission reductions of 413,259 tCO₂ generated from 05-July-2011 to 31-December-2012 by the project has been issued as CERs under CDM program⁴.

Except for CDM and VCS, the project did not register under any other GHG program.

1.15.2 Projects Rejected by Other GHG Programs

The project has not been rejected by any other GHG programs.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

There is a Emission Trading Scheme (ETS) in China⁵. However, the project proponent: Longyuan (Jiuquan) Wind Power Co., Ltd. as an enterprise for renewable energy investment, is not included the mandatory emission control scheme since the scheme only cover the high-emission companies listed in the website of government⁶. Also, the project has not been registered as a CCER (Chinese Certified Emission Reductions) project in China. Thus, the emission reductions generated by project activity is not eligible to be used under the national emission trading programme as per the requirement of the China ETS. Therefore, the GHG emission reductions and removals generated by the project will not be enforced to be used for compliance in China.

⁴ <https://cdm.unfccc.int/Projects/DB/DNV-CUK1305872143.32/view>

⁵ http://www.gov.cn/zhengce/zhengceku/2021-01/06/content_5577360.htm

⁶ <http://sthj.gansu.gov.cn/sthj/c112985/202112/1921970.shtml>

In addition, the project proponent has signed the Statement of No Double Counting to ensure that the project will not apply for emission reduction credits or labels under any other schemes or mechanism.

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.

1.17 Sustainable Development Contributions

The Project is expected to produce various benefits to society as well as the environment. Therefore, the Project will significantly contribute to national as well as local sustainable development, including:

- **Job creation:** Implementation of the Project will generate employment opportunities for local contractors and suppliers, while operation and maintenance of the plant will create additional long-term employment opportunities for skilled professionals. For the project operation PP is planning to employ a number of skilled workers, while more additional jobs were created by sub-contractors for construction of the Project. The project activity generates long-term working opportunities for 30 people during the operation period. Thus, the project achieved SDG 8 Decent Work and Economic Growth⁷.
- **Reduction in GHG emissions:** Currently, most of the electricity in the region is generated through conventional fossil fuel based thermal power plants, according to the *China Electricity Power Yearbook*. Through combustion of fossil fuels, they emit a large volume of Greenhouse gasses (GHG) into the atmosphere, which has a negative effect on global society. Generation of GHG emission free electricity, such as wind, will displace electricity generated by these fossil fuel based thermal plants, therefore reducing GHG emissions. The estimated average annual emission reductions of the project are 374,627 tCO_{2e}. Thus, the project achieved SDG 13 Climate Action⁸.
- **Increase the share of renewable energy:** The project activity will reduce reliance on imported fossil fuels, which will contribute to increasing China's energy security, and will also improve local air quality as it reduces the emissions of SO₂, and NO_x associated with fossil fuel use. Totally 480,708 MWh of clean electricity generated by the Project are expected to be delivered to the NWPG annually. Thus, the project achieved SDG 7 Affordable and Clean Energy⁹.

⁷ <https://sdgs.un.org/goals/goal8>

⁸ <https://sdgs.un.org/goals/goal13>

⁹ <https://sdgs.un.org/goals/goal7>

1.18 Additional Information Relevant to the Project

Leakage Management

According to the applied methodology ACM0002 (Version 20.0), there is no leakage emission considered. No leakage management as the project is not an AFOLU project.

Commercially Sensitive Information

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

Further Information

No further information is required.

2 SAFEGUARDS

2.1 No Net Harm

The potential negative environmental impacts have been analysed during EIA; please refer to Section 2.3 for details. With necessary mitigation measures taken, there are no negative environmental impacts due to the Project.

In fact, the project as a clean renewable energy project can reduce greenhouse gas emissions and the environmental pollution caused by fossil fuels consumption. Meanwhile, the implementation of the project improves local socio-economic development through creating career opportunities, paying taxes and increasing clean and renewable energy to local area.

In conclusion, the construction and operation of the Project does not result in any significant environmental impacts or any negative socio-economic impact.

2.2 Local Stakeholder Consultation

2.2.1 Stakeholder consultation during registration stage under CDM scheme

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

According to the requirement by the Measures for Operation and Management of Clean Development Mechanism Projects in China and CDM PDD, the staff of Longyuan (Jiuquan) Wind Power Co. Limited held an open public survey during Sep. 2009 and a stakeholders' conference on the local villagers and residents on 20-September-2009. In order to invite comments from local stakeholders, a bulletin was published by the project owner on the bulletin boards in several towns around the project, providing a detailed introduction of the project, CDM, and the

stakeholder meeting. As supplement, the project owner also made telephone calls to the relevant organizations to ensure that they know about the project and the stakeholder meeting.

1) Symposium

On 20-September-2009, under the support of local government, the project owner successfully held a stakeholder s' meeting in Guazhou County. 12 stakeholder representatives participated the meeting, respectively from the Development and Reform Bureau of Guazhou County, the Environmental Protection Bureau, the local Power Grid Corporation and local residents. The project participants informed them about the project, asked for their comments on the project concerning socio-economic and environmental aspects, namely as follows:

- Impact on the economic aspect, including the local economy, income and employment, etc;
- Impact on the environmental aspect, including the ecological environment, air, noise and the impact of soil erosion, etc;
- Impact on sustainable development;
- Suggestions and recommendations on the project;
- Attitude to the implementation of the project, whether or not to support.

2) Questionnaire

The project participants have also carried out a public survey on the project in the format of questionnaires. Aimed to the dispersive characteristic of stakeholders in the project, the visiting and the investigational way had been used to invite the stakeholders. Moreover, to make sure the results more representative, all these informants came from nearby areas and covered different ages and occupations.

2. Summary of the comments received:

1) Summary of the comments received in the symposium:

- The project has been approved by the National Energy Bureau, Development and Environmental Protection Bureau of Gansu Province, which shows that the construction and operation of the project has little impacts on the local environment.
- All the stakeholder representatives believe that the project can achieve CO₂ emission reduction by replacing electricity generated by fossil fuel fired power plants connected into Northwest Power Grid, and the project has contributed to the mitigation of the GHG emissions.
- All the stakeholder representatives believe that the project have positive impacts on economy, environment and social in local region.
- The local government highly supports the project, and expects the increase of local financial incoming, which can provide more public health services and rebuild schools, etc.
- All stakeholders think that the project improves the life quality of local residents, such as, providing more employment opportunities for local residents, increasing incomes of the local

residents, increasing revenues from tourism with the wind farm as a beautiful landscape, accelerate the development of local service industry, and tourism.

- All stakeholders think that the project activity has no significant negative influence on local environment.
- All the stakeholder representatives support and welcome the project.

2) Public survey results:

Totally 30 questionnaires returned out of 30 with a 100% response rate. Of the 30 respondents, 17 persons are male, and 13 persons are female.

Summary views on the questionnaires:

- 90% of the informants have known about the project.
- 100% of the informants live or work 1000m away from the project.
- 100% of the informants are satisfied with the local environment.
- 100% of the informants believe that the project has positive impacts on economy, environment or social in local region.
- 100% of the informants believe that the implementation of the project improves the life quality of local residents, by providing more employment opportunities for local residents, or increasing incomes of the local residents, etc.
- 100% of the informants think that the project participants should pay attention to solid waste, noise in the implementation of the project. In this regard, the project participants was in strict accordance with the environmental impact assessment and take environmental protection measures to ease the impact of the environment.
- 100% of the informants support and welcome the project, no negative comments were received.

In conclusion, being as a typical type of clean renewable energy, the project has no significant impacts on local environment and greatly contribute to achievement of sustainable development objective, thus all the stakeholder representatives give no negative comments and support and welcome the project.

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

Since there is no negative comment received, it's no need to make adjustment on design, construction and operation of the project. However, to reduce the impacts on the local environment produced by the construction of the project, the project owner should guarantee and suitably add the investment of environmental protection. At the same time, the construction processes should be strictly implemented according to the national environment criterions.

2.2.2 Stakeholder consultation during the implementation stage

Communications with local stakeholders are being carried out at periodic intervals.

The project proponent carries out questionnaire survey for the local stakeholder to collect the relevant comments and suggestions every two years

In addition, stakeholders can communicate and give feedback directly to the project proponent at any time through the published phone number of contact person.

Furthermore, the local authority also conducts spot checks on the implementation of the project at periodic intervals as per relevant regulations.

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

In accordance with relevant environmental law and regulations, the Environmental Impact Assessment Report of the project has been approved by the Environmental Protection Administration of Gansu Province on 06-August-2008. The project is likely to cause the following environmental impacts:

Impacts on Air Environment

Wind Power plants are known to contribute to zero atmospheric pollution as no fuel combustion is involved during any stage of the operation. The sources of air pollution are mainly due to the construction activities including the transportation of construction material, road construction and improvement and cadre construction etc. The impacts on air environment can be ended when the construction is completed. Several measures shall be taken into account, such as prohibiting the construction under strong wind weather, reducing as much as possible the area of construction, spraying water when undertaking construction, and reducing the speed of vehicles in the field. Hence, air pollution caused by the project is not significant to the surrounding environment.

Impacts on Noise Environment

The noise of the project in construction phase is from vehicles and machines on-site. According to the monitoring data from the construction site, the noise is at a level below 55 dB from the distance of 300m away from the construction site. The closest residential area to the site of the project is at least 5km away. Therefore, the noise of the project doesn't have impact on nearby residents.

Impacts on Water and Solid Waste

The wind-farm does not consume any water, nor does it generate any wastewater in the operation phase. The possible negative impacts are the household wastewater and solid waste produced by builders and staff, and the waste earth from digging of the foundation in the construction phase. Under normal conditions with highly automated monitoring and control system, the household wastewater is sprinkled to the construction road surface. Moreover, the amount of household solid waste is very little, which does not have impact on the environment. Besides, the solid waste is collected and moved to the landfill site of the nearest city. The waste earth from the digging should be firstly used for refilling. The rest of the waste earth should be placed in the

low area of the site and replanted with grass. Following the suggestion, the water and solid waste should have no significant impact on the environment.

Impacts on telecommunications and television transmissions

The transformers of the project were closed down in the metal box which cause little impact on the surrounding environment. The closest residential area to the site of the project is at least 5km away. Therefore, the electromagnetism of this project in the operation phase doesn't impact the production and daily life of nearby enterprises and residents.

Impacts on Ecosystem Environment

The wind power project is located in a barren and desolate area with sparse vegetation, exposed dust and high soil erosion. Moreover, the installed height of turbines is lower than the winged height of the birds. So, there are no significant impacts on migratory birds / endangered species in the region of the project activity. Therefore, the activities to be carried out doesn't generate any negative impact on the ecological environment.

Socio-Economic Impacts

The project is estimated to supply annually 480,708MWh of power to the Gansu Power Grid and to save fossil fuel. So, the project generates eco-friendly, GHG free power that contributes to sustainable development of the region. Moreover, the project activity not only helps the uplift of skilled and unskilled manpower in the region, but also improves employment rate and livelihood of local populace in the vicinity of the project.

2.4 Public Comments

The project has been open for public comment on CDM website during CDM validation while during the operation period, communications with local stakeholders are being carried out at periodic intervals. The project proponent carried out questionnaire survey in August 2014, August 2016, August 2018 and March 2020 during the last crediting period: 22-January-2011~21-January-2021 under VCS scheme and no negative comments or complaints were received.

2.5 AFOLU-Specific Safeguards

Not applicable.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

The approved methodology applied in the project activity is ACM0002 (version 20.0) – “Grid-connected electricity generation from renewable sources”¹⁰.

¹⁰ <https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG>

The methodology also refers to the approved versions of the following tools:

Tool to calculate the emission factor for an electricity system (version 07.0)¹¹.

Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (version 03.0)¹². (Monitoring provisions in this tool referred by ACM0002 (version 20.0) for determination of $EG_{\text{facility},y}$ as the monitoring parameter)

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)¹³.

3.2 Applicability of Methodology

Since it is a wind power generation project which exports electricity to the NWPG, ACM0002 has been selected as the methodology for this project.

The Project conforms to the applicability condition of ACM0002 (version 20.0) – “Grid-Connected Electricity Generation from Renewable Sources” as demonstrated in the table below:

Clauses	Requirements of the ACM0002 (version 20.0)	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 NWPG-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.	The Project involves installation of a new wind power plant, and does not involve capacity addition, retrofits, or replacements.	Applicable

¹¹ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf>

¹² <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v3.0.pdf>

¹³ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf>

Clauses	Requirements of the ACM0002 (version 20.0)	Scenario of the project	Conclusion
	(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.		
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/m²; 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/m²; 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/m², 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/m². (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/m² shall be: a. Lower than or equal to 15 MW; and	Not applicable, the Project does not involve installation, modification or retrofit of hydro power plants. Therefore, does not need to be considered.	N/A

Clauses	Requirements of the ACM0002 (version 20.0)	Scenario of the project	Conclusion
	b. Less than 10 per cent of the total installed capacity of integrated hydro power project.		
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 five years prior to implementation of CDM project activity.	Not applicable, 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 is a new wind project to export electricity to the Grid system. Therefore, 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".	Not applicable, the project is a newly built wind power project.	N/A

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

Tool	Criteria Applicability	Criteria Applicability	Conclusion
Tool to calculate the emission factor for an electricity system (Version 07.0)	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 located in a non-Annex I country.	Applicable
Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (Version 03.0)	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 project is satisfied the Scenario I: electricity generated by the project is supplied to the grid. $EG_{\text{facility},y}$ is determined according to this tool as per applied methodology ACM0002 Version 20.0.	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	There are no captive renewable power generation technologies installed to provide electricity in the	Applicable

Tool	Criteria Applicability	Criteria Applicability	Conclusion
	accounts for CO ₂ emissions.	project activity, in the baseline scenario or to sources of leakage. Only CO ₂ emissions are considered in the baseline scenario.	
Tool for 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)	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. 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 project is applying for renewal of crediting period. The validity of the baseline of the project is assessed by the following two steps: Evaluate whether the current baseline is still valid for the next crediting period; Update the baseline in case that the current baseline is not valid anymore for the next crediting period.	Applicable

3.3 Project Boundary

In accordance with the methodology ACM0002 (version 20.0), the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the NWPG. According to China DNA's guidance, NWPG is composed of Shanxi Grid, Gansu Grid, Qinghai Grid, Ningxia Grid, and Xinjiang Grid. The schematic diagram of the Project is as shown on the below figure.

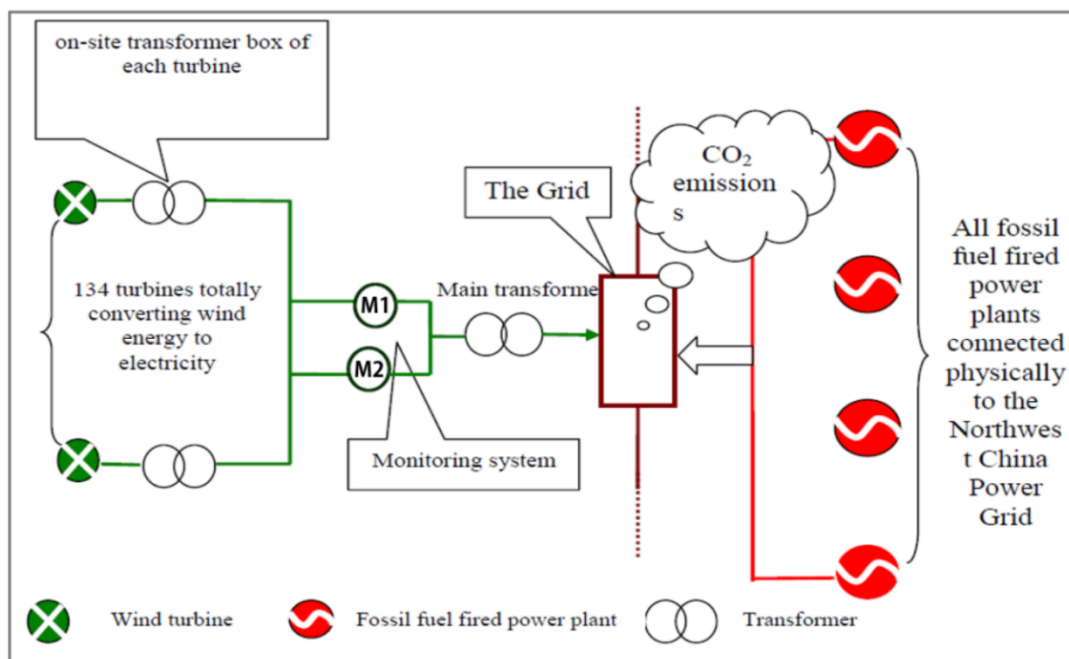


Figure 2. The boundary of the project

According to the approved methodology ACM0002 (version 20.0), the emission sources and GHGs in the project boundary are as follows:

	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 sources
		CH ₄	No	Minor emission sources
		N ₂ O	No	Minor emission sources
Project	The wind power plant	CO ₂	No	According to ACM0002, the project generates electricity by wind, which is a kind of renewable energy, thus project emissions should not be considered.
		CH ₄	No	
		N ₂ O	No	

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. As per the latest China Electric Power Yearbook 2021, from year 2016 to year 2020, the total accounts of electricity generation produced by fossil fuel power plants are 76%, 73%, 70%, 59.2% and 56.6%, all of which are more than 50% of total electricity generation in NWPG. 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 NWPG. 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 20 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:

$EF_{grid,CM,y}$: Combined margin CO₂ emission factor for the project electricity system in year y;

$EF_{grid,OM,y}$: Operating margin CO₂ emission factor in year y;

$EF_{grid,BM,y}$: Building margin CO₂ emission factor in year y.

$EF_{grid,CM,y}$, $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ have been updated using the latest version of Tool 07: “Tool to calculate the emission factor for an electricity system (version 07.0), details please refer to Section 4.1 below.

Data and parameters that are still valid thus need not to be updated are as follows:

ω_{OM} : weighting of operating margin emissions factor;

ω_{BM} : weighting of build margin emissions factor.

For wind power generation project activities: $\omega_{OM} = 0.75$ and $\omega_{BM} = 0.25$ (owing to its intermittent and non-dispatchable nature) for the first crediting period and for subsequent crediting periods.

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 have 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 0.779325 tCO₂e/MWh.

3.5 Additionality

According to VCS standard 4.3, a full reassessment of additionality is not required.

The validity of the original baseline scenario is demonstrated in Section 3.4, and it was concluded that the current baseline is still valid for the next crediting period.

Project has no change compared with the original status. Therefore, the project description is the same as in the first crediting period.

The demonstration of regulatory surplus is provided below.

The project activity is in compliance with current laws and regulations in China, such as Renewable Energy Law of the People's Republic of China and Environmental Protection Regulation for Wind Power Project, etc. The law and regulations are described in section 1.14. There is no other regulatory requirement for the implementation of a wind power technology that could affect the baseline scenario during the renewal of the crediting period. Thus, there is no regulatory surplus required comparing with the first validation at time of renewal of crediting period. .

3.6 Methodology Deviations

There are no methodology deviations for this project.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

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

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

Where:

BE_y	the baseline emissions in year y (tCO ₂ e);
$EG_{PJ,y}$	the quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the VCS project activity in year y (MWh/yr);
$EF_{grid,CM,y}$	the combined margin CO ₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” (tCO ₂ e/MWh);

The Project is the installation of a new grid-connected renewable power plant at a site where no renewable power plant was operated prior to the implementation of the Project. So:

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

Where:

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

And the baseline emission factor $EF_{grid,CM,y}$ is calculated as per the latest version of “Tool to calculate the emission factor for an electricity system” (version 07.0). The $EF_{grid,CM,y}$ 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, project 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. The Chinese DNA has published a delineation of the project electricity system and connected electricity system. According to the delineation, the project electricity system of the local grid to which the Project activity is connected is NWPG.

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

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

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

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

For the operating margin, “Option I: only grid power plants are included in the calculation” was selected.

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

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

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

Detailed information to carry out a dispatch data analysis is not publicly available; therefore, method (b) and method (c) is not suitable for the project.

According to tool, the Simple OM method is applicable to the project if the low-cost resources constitute less than 50% of total grid generation on average in the five most recent years or based on long-term normal for hydroelectric production.

According to the data from China Electric Power Yearbook 2015-2019, from year 2014 to year 2018, for the NWPG the project activity connected to, the low-cost/must-run electric power resources generation accounts for the total grid total are 24%, 24%, 24%, 27% and 30%, 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 $EF_{grid,OM,y}$.

The Simple OM can be calculated using either of the two following data vintages for years(s) y:

- (a) (Ex-ante option): If the ex-ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation.
- (b) (Ex-post option): If the ex-post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emission factor to be updated annually during monitoring.

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

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

The Simple OM emission factor is calculated as the generation-weighted average 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:

- 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:

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:

$$EF_{grid,OMsimple,y} = \frac{\sum_{i,m} FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{\sum_m EG_y} \quad (\text{Equation 3})$$

Where:

$EF_{grid,OMsimple,y}$	simply operating margin CO ₂ emission factor in year y (tCO ₂ /MWh) (MWh/yr);
$FC_{i,y}$	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 y (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 relevant year as per the data vintage chosen in Step 3 .

Regarding parameter selection, local values of $NCV_{i,y}$ and $EF_{CO2,i,y}$ should be used where available. If no such values are available, IPCC world-wide default values are preferable. In this PD, the Net Calorific Value ($NCV_{i,y}$) of each type of fossil fuel used in the calculation comes from China Energy Statistic Yearbook 2016-2018. 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 based on the fuel consumption data for electricity generation of the NWPG, 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 latest data published by China DNA , the Simple OM Emission Factor ($EF_{grid,OMsimple,y}$) of the NWPG is calculated as 0.8922 tCO₂e/MWh.

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 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 PD submission.

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:

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

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 (MWh);
$EF_{EL,m,y}$	CO ₂ emission factor of power unit m in year y (tCO ₂ /MWh);
m	Power units included in the build margin;
y	Most recent historical year for which electricity generation data is available.

As it is difficult to obtain the detailed data on the power generation, fuel consumption and thermal efficiency of each newly built power unit from public documents. The BM emission factor is calculated as follows:

- 1) Using the efficiency level of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy, for each fuel type in estimating the fuel consumption to estimate the build margin.
- 2) Use of capacity additions during last 1 ~ 3 years for estimating the build margin emission factor for grid electricity.
- 3) Use of weights estimated using installed capacity in place of annual electricity generation.

The newly built power plants in the past few years are bundled into “grouped new power plant” according to their construction year, their province and their fuel type. The annual net electricity generation in the year y of each “grouped new power plant” is estimated according to their total capacity and the average utilization hours, as the following equation:

$$EG_{m,y} = CAP_m \times H_{m,y} \quad (\text{Equation 5})$$

where:

$EG_{m,y}$	Annual net electricity generation the unit m in year y (MWh);
CAP_m	Installed capacity of the unit m (MW);
$H_{m,y}$	Utilization hour of the unit m in the year y (h), determined according to the average utilization hour of the same type of unit in the same province;
y	The most recent year for which the generation data is available. For the calculation of BM in 2019, $y = 2017$;
m	grouped new power plant;

Since the newly built power plants in the same province (A), in the same year (t) and using the same fuel type (k) are grouped into “a grouped new power plant”, CAP_m represents the total installed capacity of fuel type k power plants located in the province A and in the year t :

$$CAP_m = CAP_{A,t,k} \quad (\text{Equation 6})$$

where:

CAP_m	Installed capacity of the unit m (MW), with m representing the specified combination of A , t , and k ;
$CAP_{A,t,k}$	Provinces covered by the NWPG, namely, Shaanxi Province, Gansu Province, Qinghai Province, Ningxia Autonomous Region, Xinjiang Autonomous Region;
t	Years related to the grouped new power plants, for the 2019 calculation, t represents 2017, 2016, 2015.... Until the aggregated electricity generation of the grouped new power plants reaches 20% of the total electricity generation of the NWPG;
k	Fuel type of the grouped new power plants, including hydro, thermal (coal, gas, oil, waste incineration, other thermal), nuclear, wind, solar and others;

Figure 3 shows the procedure to determine the sample group of power units m .

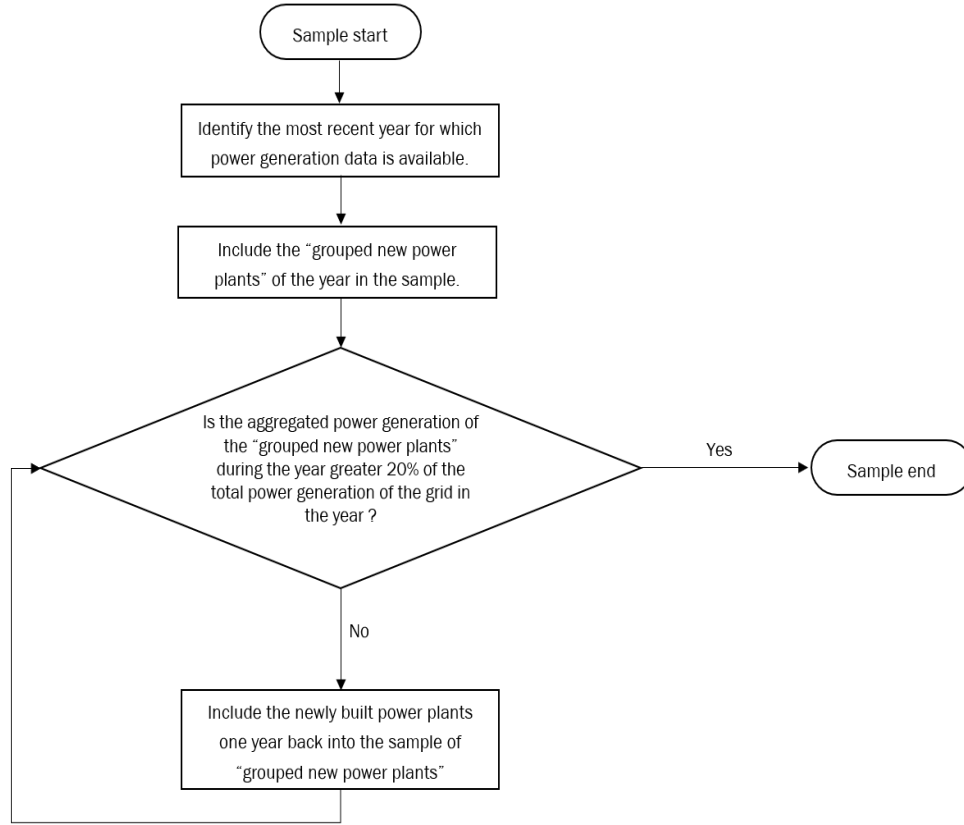


Figure 3 Procedure to determine the sample group of power units m used for the BM emission factor calculation

The emission factors of each fuel type $EF_{EL,m,y}$ are determined according to the Option A2 in the TOOL 07, as the following equation:

$$EF_{EL,m,y} = \frac{EF_{CO2,m,i,y} \times 3.6}{\eta_{m,y}} \quad (\text{Equation 7})$$

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 (t CO ₂ /GJ);
$\eta_{m,y}$	Average net energy conversion efficiency of power unit m in year y (ratio);
m	All power units serving the grid in year y except low-cost/must-run power units;
3.6	Conversion factor (GJ/MWh);

Among the fuel types, the emission factors of hydro, nuclear, wind, solar, other thermal and others are 0. Concerning the emission factors of coal, gas, oil and waste incineration, Equation (B-14) takes the following form due to conservativeness:

$$EF_{best,m,y} = \frac{EF_{CO2,m,i,y} \times 3.6}{\eta_{best,y}} \quad (\text{Equation 8})$$

where:

$EF_{best,m,y}$	Emission factor of power unit m with the best technology commercially available in year y (tCO ₂ /MWh);
$\eta_{best,y}$	Power generation efficiency of the best technology commercially available in year y ;
m	Power units serving the grid with coal, gas, oil or waste incineration in year y ;

BM is calculated based on the composition of each power generation technology and the emission factors with the best technology commercially available.

According to the latest and available data published by China DNA at the time of this PD submission, $EF_{grid,BM,y}$ is calculated to be 0.4407 tCO_{2e}/MWh.

Step 6. 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. And the PD choose option A.

The combined margin emissions factor ($EF_{grid,CM,y}$) is calculated as follows:

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

Where:

$EF_{grid,BM,y}$	Build margin CO ₂ emission for the project electricity system factor in year y (tCO _{2e} /MWh);
$EF_{grid,OM,y}$	Operating margin CO ₂ emission factor for the project electricity system in year y (tCO _{2e} /MWh);
ω_{BM}	Weighting of build margin emissions factor ;
ω_{OM}	Weighting of operating 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 all other project excluded wind and solar project for the second and third crediting period. The $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ are calculated as described in Step 4 and 5.

Therefore,

$$EF_{grid,CM,y} = 0.8922 \text{ tCO}_2\text{e/MWh} * 0.75 + 0.4407 \text{ tCO}_2\text{e/MWh} * 0.25 = 0.779325 \text{ tCO}_2\text{e/MWh}$$

$$BE_y = 480,708 \text{ MWh} * 0.779325 \text{ tCO}_2\text{e/MWh} = 374,627 \text{ tCO}_2\text{e}$$

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

As per the applied methodology ACM0002 (version 20.0), no leakage is considered.

4.4 Net GHG Emission Reductions and Removals

In line with the methodology, emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y \quad (\text{Equation 10})$$

Where:

ER_y	Emission reductions in year y (tCO ₂ e);
BE_y	Baseline Emissions in year y (tCO ₂ e);
PE_y	Project emissions in year y (tCO ₂ e).

As mentioned in Section 4.2 and 4.3 above, the project emission and leakage of the project is not considered.

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)
22-January-2021~31-December-2021	353,073	0	0	353,073
01-January-2022~31-December-2022	374,627	0	0	374,627
01-January-2023-31-December-2023	374,627	0	0	374,627
01-January-2024-31-December-2024	374,627	0	0	374,627
01-January-2025-31-December-2025	374,627	0	0	374,627
01-January-2026-31-December-2026	374,627	0	0	374,627
01-January-2027-31-December-2027	374,627	0	0	374,627
01-January-2028-31-December-2028	374,627	0	0	374,627
01-January-2029-31-December-2029	374,627	0	0	374,627
01-January-2030-31-December-2030	374,627	0	0	374,627
01-January-2031-21-January-2031	21,554	0	0	21,554
Total	3,746,270	0	0	3,746,270

5 MONITORING

5.1 Data and Parameters Available at Validation

The baseline grid emission factor $EF_{grid,CM,y}$ is obtained directly from the official source Notification on Determining Baseline Emission Factor of China's Grid by China's DNA¹⁴. Thus, the relevant basis parameters for calculation of $EF_{grid,CM,y}$ 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	$EF_{grid,OM,y}$
Data unit	tCO ₂ e/MWh

¹⁴ https://www.mee.gov.cn/ywgz/xdqhbh/wsqtz/202012/t20201229_815386.shtml

Description	Simple operating margin emission factor for Northwest China Power Grid
Source of data	“2019 Baseline Emission Factors for Regional Power Grids in China” published by China DNA
Value applied	0.8922
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)
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 e/MWh
Description	Build margin emission factor for Northwest China Power Grid
Source of data	“2019 Baseline Emission Factors for Regional Power Grids in China” published by China DNA
Value applied	0.4407
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)
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	$w_{OM}=0.75$ and $w_{BM}=0.25$ for wind and solar power generation project activities as per Tool to calculate the emission factor for an electricity system (version 07.0)
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	$w_{OM}=0.75$ and $w_{BM}=0.25$ for wind and solar power generation project activities as per Tool to calculate the emission factor for an electricity system (version 07.0)
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 e/MWh
Description	Baseline emission factor for Northwest China Power Grid
Source of data	Calculated through $EF_{grid,OM,y}$, $EF_{grid,BM,y}$, w_{OM} , w_{BM} according to the equation (9) in section 4.1
Value applied	0.779325
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)
Purpose of Data	Calculation of baseline emissions

Comments	Calculated ex ante and fixed for the second crediting period
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5.2 Data and Parameters Monitored

Data / Parameter	$EG_{facility,y}$												
Data unit	MWh/yr												
Description	Quantity of net electricity generation supplied by the project plants/units to the grid in year y												
Source of data	Measured by electricity meters M1 and M2												
Description of measurement methods and procedures to be applied	$EG_{facility,y}$ should be calculated based on the direct measurement result of the electricity exported to the grid ($EG_{export,y}$) and the electricity imported from the grid ($EG_{import,y}$) The calculation of this parameter is shown as below: $EG_{facility,y}=EG_{export,y}-EG_{import,y}$												
Frequency of monitoring/recording	Continuously measuring and monthly recording												
Value applied	Estimated to be 480,708 MWh/yr												
Monitoring equipment	<table><tr><th>Item</th><th>Type</th><th>SN</th><th>Accuracy class</th></tr><tr><td>Meter M1</td><td>SL7000</td><td>57034799</td><td>0.2S</td></tr><tr><td>Meter M2</td><td>SL7000</td><td>57034801</td><td>0.2S</td></tr></table> Refer to Section 5.3 for details of the meters' location, the meters' type and serial number in the former table can be changed according to the actual status in the crediting period, but the accuracy level will be no less than 0.5S as per the requirement from Technical administrative code of electric energy metering (DL/T448).	Item	Type	SN	Accuracy class	Meter M1	SL7000	57034799	0.2S	Meter M2	SL7000	57034801	0.2S
Item	Type	SN	Accuracy class										
Meter M1	SL7000	57034799	0.2S										
Meter M2	SL7000	57034801	0.2S										
QA/QC procedures to be applied	The metering equipments will be calibrated annually and checked periodically by qualified institute for accuracy according to Chinese electric industry regulation. The meters' readings will be cross-checked with ETNs issued by grid company. Data will be archived for 2 years following the end of the last crediting period.												
Purpose of data	Calculation of baseline emissions												
Calculation method	Calculated via equation: $EG_{facility,y}=EG_{export,y}-EG_{import,y}$ Where: $EG_{export,y}$ is the quantity of electricity generation supplied by the project plant to the grid												

	$EG_{import,y}$ is the quantity of electricity imported from the grid by the project
Comments	$EG_{facility,y}$ is determined as per “TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation”

Data / Parameter	$EG_{export,y}$			
Data unit	MWh/yr			
Description	Quantity of electricity generation supplied by the project plant to the grid in year y			
Source of data	Measured by electricity meters M1 and M2			
Description of measurement methods and procedures to be applied	EG _{export,y} is measured by bi-directional meters M1 and M2 installed at the two loops of the project. The readings of the electricity meters are continuously measured and at least monthly recorded.			
Frequency of monitoring/recording	Continuously measuring and monthly recording			
Value applied	Estimated to be 480,708 MWh/yr			
Monitoring equipment	Item	Type	SN	Accuracy class
	Meter M1	SL7000	57034799	0.2S
	Meter M2	SL7000	57034801	0.2S
	Refer to Section 5.3 for details of the meters' location, the meters' type and serial number in the former table can be changed according to the actual status in the crediting period, but the accuracy level will be no less than 0.5S as per the requirement from Technical administrative code of electric energy metering (DL/T448).			
QA/QC procedures to be applied	The metering equipments will be calibrated annually and checked periodically by qualified institute for accuracy according to Chinese electric industry regulation. The meters' readings will be cross-checked with ETNs issued by grid company. Data will be archived for 2 years following the end of the last crediting period.			
Purpose of data	Calculation of baseline emissions			
Calculation method	N/A			
Comments	-			

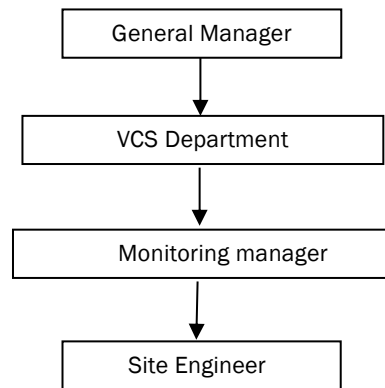
Data / Parameter	$EG_{import,y}$												
Data unit	MWh/yr												
Description	Quantity of electricity imported from the grid by the project in year y												
Source of data	Measured by electricity meters M1 and M2												
Description of measurement methods and procedures to be applied	$EG_{import,y}$ is measured by bi-directional meters M1 and M2 installed at the two loops of the project. The readings of the electricity meters are continuously measured and at least monthly recorded.												
Frequency of monitoring/recording	Continuously measuring and monthly recording												
Value applied	0												
Monitoring equipment	<table><tr><th>Item</th><th>Type</th><th>SN</th><th>Accuracy class</th></tr><tr><td>Meter M2</td><td>SL7000</td><td>57034801</td><td>0.2S</td></tr><tr><td>Meter M2</td><td>SL7000</td><td>57034801</td><td>0.2S</td></tr></table> Refer to Section 5.3 for details of the meters' location, the meters' type and serial number in the former table can be changed according to the actual status in the crediting period, but the accuracy level will be no less than 0.5S as per the requirement from Technical administrative code of electric energy metering (DL/T448).	Item	Type	SN	Accuracy class	Meter M2	SL7000	57034801	0.2S	Meter M2	SL7000	57034801	0.2S
Item	Type	SN	Accuracy class										
Meter M2	SL7000	57034801	0.2S										
Meter M2	SL7000	57034801	0.2S										
QA/QC procedures to be applied	The metering equipments will be calibrated annually and checked periodically by qualified institute for accuracy according to Chinese electric industry regulation. The meters' readings will be cross-checked with ETNs issued by grid company. Data will be archived for 2 years following the end of the last crediting period.												
Purpose of data	Calculation of baseline emissions												
Calculation method	N/A												
Comments	-												

5.3 Monitoring Plan

Monitoring plan is a division and schedule of a series of monitoring tasks. Monitoring tasks must be implemented according to the monitoring plan in order to ensure that the real, measurable and long-term greenhouse gas (GHG) emission reduction for the project is monitored and reported.

1. Management Structure

The management structure is as follows:



The general manager is in charge of decision-making on major VCS issues, the VCS department is responsible for the concrete implementation of the Monitoring Plan. The monitor manager is responsible for supervising and checking the whole data record process and the calibration of meters. Another main task of the monitor manager is facilitating the verification through providing the VVB with all required necessary information. The site engineers collect monitoring data (e.g. electric meter data) and keep invoices of sales, etc.

2. Training

Longyuan (Jiuquan) Wind Power Co. Limited will assign and train the dedicated people carrying out the monitoring work. The monitoring personnel training by the contacted VCS consult company will be completed before the registration, further training work will be completed with the preliminary verification.

3. Calibration and Arrangement of Meters

An agreement should be signed between the project owner and Power Grid Company that defines the metering arrangements and the required quality control procedures to ensure accuracy.

- For the project, all the wind turbines will be divided into two loops to parallel-connect with a junction line to new adding transformer shared with other planning wind projects.
- Two meters M1 and M2 are installed at two loops to monitor the electricity generation (, the accuracy degree of the meters is no less than 0.5S., bidirectional).
- The metering equipment for electricity will be properly configured and calibrated. The metering equipment will be checked by the project owner and Power Grid Company before operation.
- The verification of electric energy meter should be periodically carried out according to relevant national electric industry standards or regulations. After verification, meters should be sealed. Meters should be jointly inspected and sealed on behalf of the parties concerned

and shall not be accessible by either party except in the presence of the other party or its accredited representatives.

- All the metering equipment for electricity installed shall be tested by the qualified metrical agency co-authorized by the project owner and Power Grid Company, after:
 - 1) The detection of a difference larger than the allowable error in the reading of meters, when considering the reactive loss of electrical wire;
 - 2) The need for repair or replacement due to the damage of the meters in whole or in parts in accordance with the specifications.
- The project owner and Power Grid Company should have a remedial measure for the estimation of the correct reading according to agreed procedures under the signed agreement.

4. Monitoring parameters

All relevant parameters listed in Section 5.2 will be monitored according to the methodology requirements and description of measurement methods and procedures to be applied. The net electricity supplied the grid should be measured continuously and recorded monthly as required by the methodology applied. The data and meter reading will be well-documented and be readily accessible for VVB.

5. Data recording

The project owner and Power Grid Company are responsible for the operation of meters, to ensure that all meters are in good conditions. Under such circumstances, the specific steps for data collection and reporting are listed below:

- 1) Electricity exported to the grid by the project (EG_{export}) is continuously measured. The readings of the meter M1 and M2 installed at two loops in the onsite Substation are recorded by the project owner at 24:00 every day and then reports to the grid company monthly for confirmation purpose. The local grid company issues the ETNs monthly which is used to crosscheck the monthly recording data.
- 2) Electricity imported from the grid by the project (EG_{import}) will be continuously measured. The readings of the meter M1 and M2 installed at two loops in the onsite Substation are recorded by the project owner 24:00 every day and then reports to the grid company monthly for confirmation purpose. The local grid company issues the ETNs monthly which is used to crosscheck the monthly recording data.

The detail information about metering system was shown in diagram of monitoring system below:

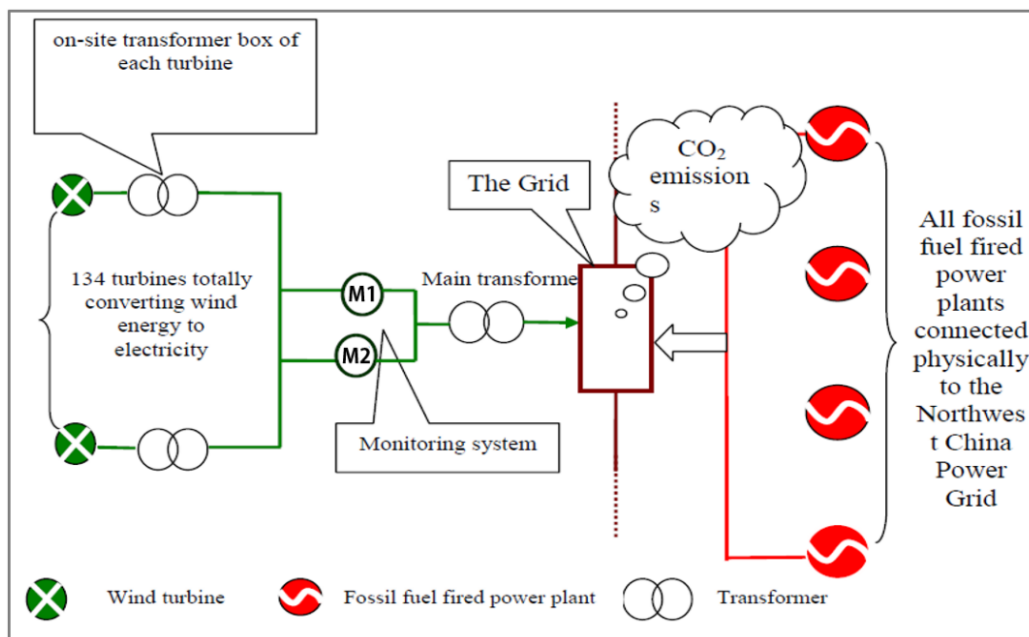


Figure 4. The monitoring system of the project

The metering equipments M1, M2 for the monitoring of $EG_{export,y}$ and $EG_{import,y}$ will be calibrated annually for accuracy by a qualified third party in accordance with industry standards.

6. Quality Assurance and Quality Control

The project activity uses high-precision monitoring equipment to monitor the electricity data. All meters will be calibrated and sealed as per the industry practices at regular intervals. Hence, high quality is ensured. ETNs will be used to test the consistency of the recorded data.

Project owner provides the meter's readings and ETNs to VVB for verification.

Should any previous months reading of the meter be inaccurate by more than the allowable error, or otherwise functioned improperly, the electricity generation supplied to the grid by the project shall be determined by:

- 1) The project owner and Power Grid Company shall jointly prepare an estimate of the correct reading and provide ample evidence to VVB that the method is reasonable;
- 2) The meter reading shall be for backup usage;
- 3) If the project owner and Power Grid Company fail to agree the estimate of the correct reading, then the matter will be referred for arbitration according to agreed procedures.

7. Data Management System

All parameters monitored under the monitoring plan will be archived electronically and be kept at least for 2 years after the end of last crediting period. The monitored data will be presented to the verification agency or VVB to whom verification of emission reductions is assigned.

The documents in paper format, such as maps, tables, and the EIA report, will be used in conjunction with the monitoring plan to check the authenticity of the information, and be kept at least one copy by the project owner.