



**Verified Carbon
Standard**

HEBEI CHENGDE WEICHANG YUDAOKOU PASTURE 150MW WIND FARM PROJECT

Document Prepared by Demeter Venture UK Limited

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1 PROJECT DETAILS

1.1 Summary Description of the project

Hebei Chengde Weichang Yudaokou Pasture 150MW Wind Farm Project (hereinafter referred to as “the Project”) is located in Weichang Manchu & Mongolia Autonomous County, Chengde City, Hebei province, P.R. China. The total installed capacity of the Project is 150MW with 100 sets of turbines and a unit capacity of 1,500kW. The annual output of the project is estimated to be 312,700 MWh and the electricity will be exported to the North China Power Grid (NCPG).

The scenario existing prior to the start of the implementation of the project is: the same electricity output by the project activity would have otherwise been generated by the operation of NCPG connected power plants and by the addition of new generation sources. That is the same as the baseline scenario.

When the project is operated, the electricity generated will displace part of the electricity from fossil fuel-fired plants connected to the NCPG, and thus greenhouse gas (GHG) generated by coal-fired power plants could be reduced. The estimated annual GHG emission reductions in the first crediting period are 329,852 tCO₂e/yr and are 258,571 tCO₂e/yr during the second crediting period.

The project began to construct on 11/05/2009 and was put into commercial operation on 27/11/2010 (i.e. the project starts date). The first crediting period is from 27/11/2010 to 26/11/2020 (10 years, renewable). The project operated normally in the first crediting period. The project is applying for the crediting period renewal and the second crediting period is expected from 27/11/2020 to 26/11/2030 (10 years).

1.2 Sectoral Scope and Project Type

The project falls in the sectoral scope 1: energy industries (renewable-/non-renewable sources).

Project type: Renewable (wind) power project

The project is not a grouped project.

1.3 Project Eligibility

The project is a wind power project, which reduces CO₂ by replacing electricity from fossil fuel power plants. This complies with the scope of VCS program.

1.4 Project Design

This project is a single project. It is not designed to include multiple project activity instances, or as a grouped project.

The project involves the installation of 100 turbines, each of which have a capacity of 1.5 MW, with a total capacity of 150 MW.

Eligibility Criteria

N/A as this is not a grouped project.

1.5 Project Proponent

Organization name	Hebei Construction Investment New Energy Co., Ltd.
Contact person	Zhang Bo
Title	Manager
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Telephone	+86-311-85278911
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1.6 Other Entities Involved in the project

Organization name	Demeter Venture UK Limited
Role in the project	Project participant (buyer)
Contact person	Susan Lu
Title	Manager
Address	Haidian District, Beijing, P.R.China
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1.7 Ownership

The approval of Environmental Impact Assessment (EIA), Feasibility Study Report (FSR), and Letter of Approval for the project as a CDM Project issued by China National Development and Reform Commission, established the project ownership of Hebei Construction Investment New Energy Co., Ltd. The purchasing contract of turbines, and the purchasing

power agreement are the evidences for the property and contractual right in the plant, equipment and electricity.

1.8 Project Start Date

27/11/2010. (It is the date when the first turbine was commissioned, which is also the first date that generates GHG emission reductions.)

1.9 Project Crediting Period

The first crediting period under VCS is from 27/11/2010 to 26/11/2020 (10 years, renewable). Therefore, the total crediting period under VCS would have been from 27/11/2010 to 26/11/2040 (30 years). However, the project was registered under CDM on 17/01/2011. And the total crediting period under CDM is from 17/01/2011 to 16/01/2032 (21 years). According to VCS standard and considering the 20-year lifetime of the project activity and 7*3 CDM renewable crediting period, the total VCS crediting period is 27/11/2010 to 16/01/2032.

The project is applying for the second crediting period, which is from 27/11/2020 to 26/11/2030.

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)
27/11/2020-31/12/2020(35days)	24,794
01/01/2021-31/12/2021	258,571
01/01/2022-31/12/2022	258,571
01/01/2023-31/12/2023	258,571
01/01/2024-31/12/2024	258,571
01/01/2025-31/12/2025	258,571

01/01/2026-31/12/2026	258,571
01/01/2027-31/12/2027	258,571
01/01/2028-31/12/2028	258,571
01/01/2029-31/12/2029	258,571
01/01/2030-26/11/2030 (330days)	233,777
Total estimated ERs	2,585,710
Total number of crediting years	10
Average annual ERs	258,571

1.11 Description of the project Activity

The project installed 100 sets of wind turbine, each of which has a rated installed capacity of 1,500kW, providing a total installed capacity of 150MW. The estimated electricity delivered to NCPG by the project is 312,700 MWh per year and the power load factor is 23.8%.

The wind turbines were supplied by a domestic manufacturer, Huarui Windpower Technology Co., Ltd and the selected model of the wind turbine is SL1500/77. Key Technical Specifications of the Wind Turbines are shown in the following table 1.

Table 1. Key Technical Specifications of the Wind Turbines

Technical parameters		Value
Wind turbine	Type	SL1500/77
	Manufacturer	Huarui Windpower Technology Co., Ltd
	Rotate Speed of Wheel Hub	9.7 -19r/min
	Number of Blades	3
	Fan diameter	77.4m
	Swept area	4,657m ²
	Cut in Wind Speed	3m/s
	Rated Wind Speed	12 m/s
	Cut out Wind Speed	20 m/s
Generator	Type	Asynchronous bidirectional
	Rated Capacity	1.50MW
	Rated Voltage	690V
	Rated Frequency	50Hz
Main	Type	SFZ10-100000/220

Transformer	Rated Frequency	50Hz
	Rated Voltage	High side: 242kV Low side: 38.5kV

As all equipments used in the project are domestically-made, there is no international technology transfer.

The power generated by the project will be transmitted via the Yudaokou 220kV Switching Station, and finally to the NCPG. Two bidirectional meters with accuracy of 0.2s installed in the project site to measure the electricity supply to the grid by the Project. The technical process of the project can be showed in following diagram:

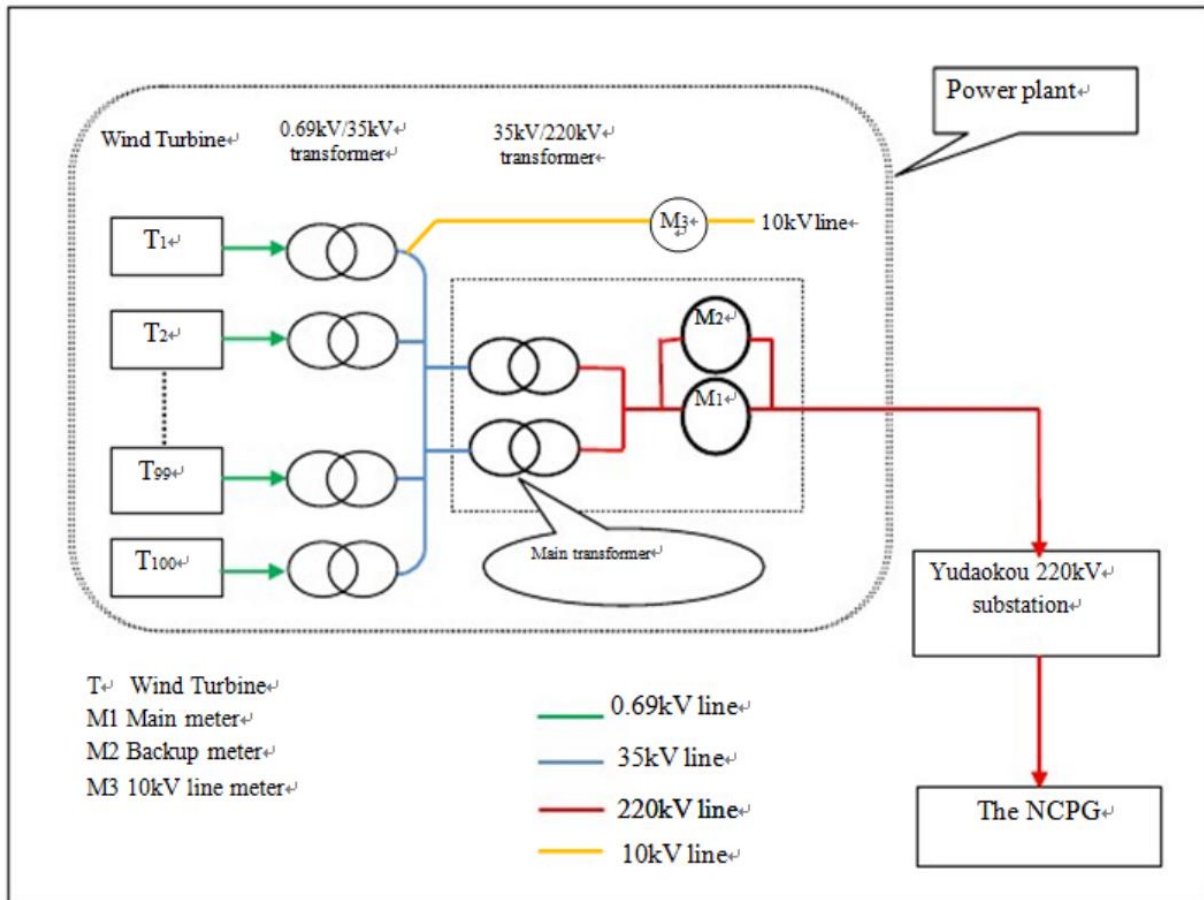


Figure 1. The technology flow diagram of the Project

1.12 Project Location

The project is located in Weichang Manchu & Mongolia Autonomous County, Chengde City, Hebei province, P.R. China. The central geographical coordinates of the project are longitude 116°57' 05" E and latitude 42°11' 21" N. The figure 2 is the geographic location of the Project.

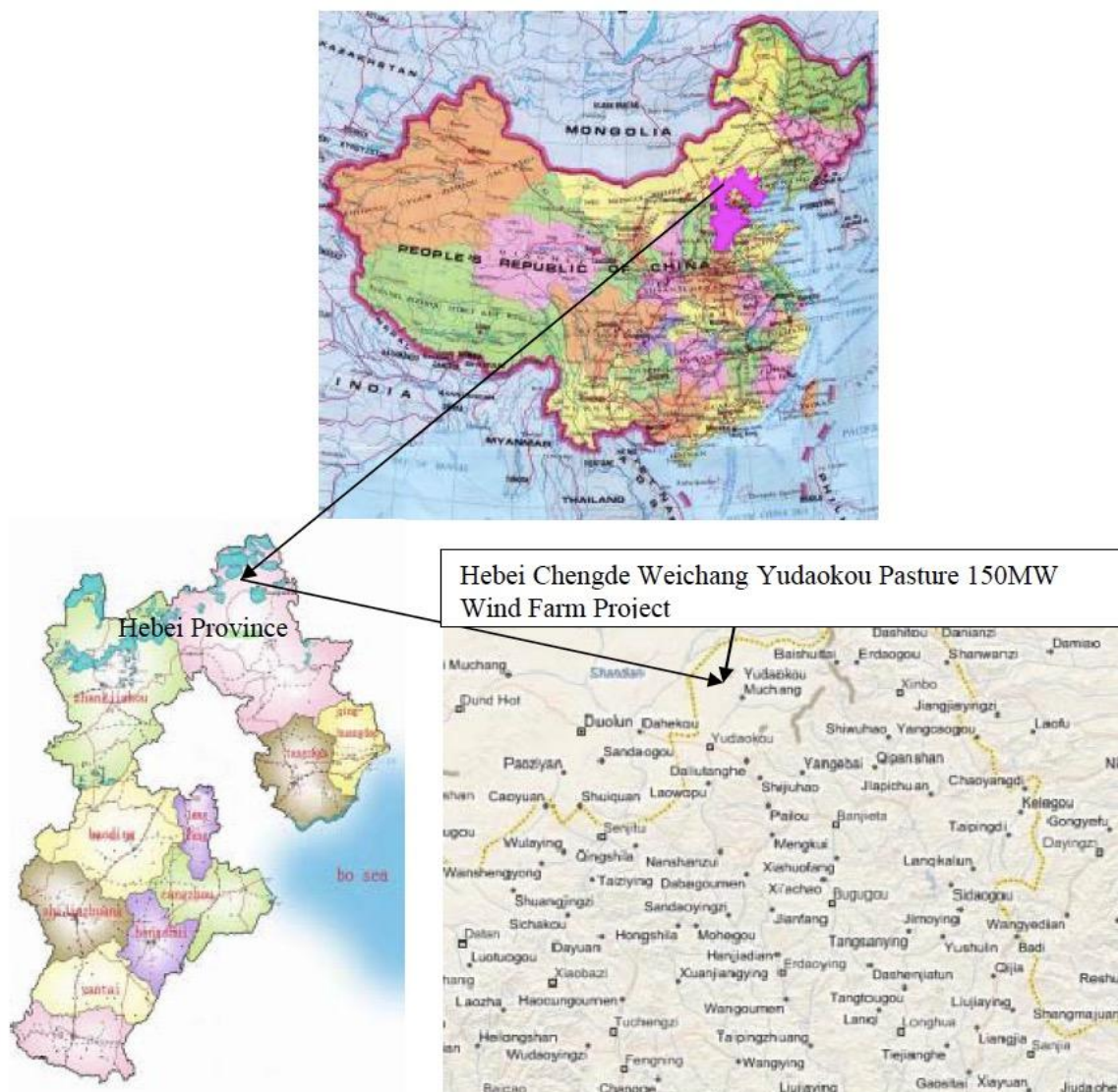


Figure2. The geographic location of the Project

1.13 Conditions Prior to Project Initiation

Electricity delivered to the grid (NCPG) by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources. It is the same as the baseline scenario.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

The project is in the field of renewable energy. The Environmental Impact Assessment (EIA) report was approved by Hebei Environmental Bureau, and the Feasibility Study Report of the project was approved by Hebei Development and Reform Commission. The project has got LoA from China DNA in 07/2009. 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 and Environmental Protection Regulation for Wind Power Project, etc.

This project is also in line with current laws and regulations, such as Safe Production Law of the People's Republic of China, Regulation on the Quality Management of Construction Projects, etc.

1.15 Participation under Other GHG Programs

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

The project has been registered as a CDM project in UNFCCC on 17/01/2011 (UNFCCC Ref. 3476) with renewable crediting period. The first 7-year renewable crediting period under CDM is from 17/01/2011 to 16/01/2018. Among them, 171,318 CERs from 17/01/2011 to 31/08/2011 and 906,415 CERs from 01/01/2013 to 30/09/2015 have been issued under CDM mechanism, 549,452 CERs from 01/09/2011 to 12/31/2012 are still awaiting issuance request.

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

The project has been registered as a CDM project in UNFCCC on 17/01/2011 (UNFCCC Ref. 3476) with renewable crediting period. The first 7-year renewable crediting period under CDM is from 17/01/2011 to 16/01/2018. And the crediting period renewal under CDM scheme is no longer possible.

Among them, 171, 318 CERs from 17/01/2011 to 31/08/2011 and 906,415 CERs from 01/01/2013 to 30/09/2015 have been issued under CDM mechanism, 549, 452 CERs from 01/09/2011 to 12/31/2012 are still awaiting issuance request.

The project has not been counted or used under GS project or under any other voluntary carbon crediting scheme. In the future, the emission reductions that apply for issuance under VCS will not be issued under CDM or GS project or under any other voluntary carbon crediting scheme. The project does not involved in ETS or other binding limits.

1.16.2 Other Forms of Environmental Credit

The project has been registered as a CDM project in UNFCCC on 17/01/2011 (UNFCCC Ref. 3476) with renewable crediting period. The first 7-year renewable crediting period under CDM is from 17/01/2011 to 16/01/2018.

Among them, 171, 318 CERs from 17/01/2011 to 31/08/2011 and 906,415 CERs from 01/01/2013 to 30/09/2015 have been issued under CDM mechanism, 549, 452 CERs from 01/09/2011 to 12/31/2012 are still awaiting issuance request.

The project does not apply for other forms of environmental credit.

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

This wind power generation project is a mean to generate renewable energy with no fossil fuels consumptions and strengthen the generation capability in the NCPG. The development of the project will contribute to the sustainable development in the energy sector, especially for the electricity industry. The main contribution includes:

- Reducing reliance on exhaustible fossil fuel;
- Reducing global emissions of greenhouses gases resulting of burning fossil fuel;
- Reducing local air pollution caused by burning fossil fuel;
- Providing sufficient electricity power for life and manufacture of local residents;
- Increasing employment opportunities and incomes for local residents, improving the life quality of local residents.

Further Information

There's not any further information.

2 SAFEGUARDS

2.1 No Net Harm

The project does not bring negative environmental and socio-economic impacts.

2.2 Local Stakeholder Consultation

Before the start of the construction of the proposed project, the project owner has given out questionnaires to local residents to ask their opinions. The aim of these questionnaires is to collect opinions concerning the influence the project would have on the local society, environment, economy, daily life etc.

A special stakeholder consultation meeting of the project was hold from 10:00 to 11:00 AM on 02/11/2008 at the meeting room of the project site, Chengde City. In order to make the potential stakeholders receive notification and information of the meeting, the project owner published a bulletin for the stakeholders meeting on the nearby residents' areas, from October 28, 2008. In the bulletin, the companies notified all the potential stakeholders that they could have detailed information on the proposed project.

During the meeting, the project owner invited the participants to express their comments and concerns about the project and CDM.

Main questions of the meeting and questionnaires are as follows:

- What is the main fuel that local residents used for heating and cooking?
- Will the project have a negative impact on the local residents?
- Will the construction of the project cause any pollution? Do the residents think that the noise unendurable? Does the noise have any impact on the lives of the local residents?
- Will the project have any negative impact on the habitat of birds? Is the project site the main flight way of migratory birds?
- Will the project have any negative impact on local ecological environment?
- Will the construction improve the communicating condition?
- Will the project bring any benefit for the local residents?
- Do the local residents support CDM project?
- Do local residents agree with the construction of the project?

40 questionnaires were distributed, and all were recollected, of which, 30% is from women, 40% is from people graduated from senior high school or lower school, 100% is from people elder than twenty years old, and the investigation results show the following:

- 60% of the investigated residents use firewood for heating and cooking, and the rest 40% use gas or coal for heating and cooking.
- 85% of investigated residents think the wind farm will bring benefit to their lives; other investigated residents think the wind farm will not influent their lives.
- 100% of the investigated residents think the construction of wind farm will not cause negative impact on their lives.

- 100% of investigated residents think the wind farm will not cause negative impact on the environment.
- 100% of investigated residents think the wind farm will not cause noise pollution.
- 100% of the investigated residents think the project site is not the main flight way of migratory birds.
- 100% of the investigated residents agree the proposed project to apply as CDM project.
- 100% of investigated residents agree with the construction of the project.

20 representatives (which is different from the people who give the questionnaires) of local residents, the representatives of local government and consultants attended this meeting, and the project owner has done the record of the meeting.

Through the investigation and stake-holder meeting, it was learned that all stakeholders, having considered that wind power is a renewable energy and will not cause negative impacts on the environment, agree to the construction of the wind farm. There are no residents living around the project. So the wind farm will not cause negative impacts on local residents. The wind farm site is located off the main flight path of migratory birds and only a few migratory birds stay around the wind farm, there will be no negative influence on birds. The project will provide sufficient electric power for social life and manufacture, increase the employment ratio and incomes of the local residents, improve life quality of local residents, and accelerate the development of social economy. Overall, the project will cause little negative impact on local residents and environment. All stakeholders support the construction of the project and the application as CDM project.

In addition, for continuous communication with local stakeholders, the project owner public its office telephone to local people and put a grievance book in the office of the company. Anyone who have comments on the project could write on the book or leave message by phone. And after these years' operation, no negative comments were received from local people.

2.3 Environmental Impact

According to the relevant environmental law and regulations, an environmental impact assessment has been carried out, and the assessment report has been approved by the Hebei Environmental Bureau. The main assessment conclusions are as follows:

Noise Impact on the Environment

Noise will be generated by machine equipment and vehicle during the construction period. Measures will be taken to reduce the environmental impacts of noise: choosing low-noise machines and technologies, strengthening the management and maintenance on equipment, allocate reasonable selection and layout on the plant construction site, and enhancing construction management etc. Low-noise turbine units will be employed and installed far

away from the surrounding villages. Noise level will be controlled within the Class 1 requirement of Standard of Environmental Noise of Urban Area (GB 3096-93). In addition, during the operation period the nearest residential area is far away from the construction site, and there is no enterprises, schools or hospitals nearby. So, the neighbor hood residents will not be influenced by the noise.

-Impact of solid waste on environment

During the construction period, the discharged waste slag will be reduced by refilling the excavated earth as much as possible, and the wastes will be piled up in designated waste disposal sites.

During the operation period, the domestic waste produced by operational workers will be collected and discharged by existing garbage disposal facilities.

Impact on the water environment

The main water pollution includes industrial wastewater and domestic wastewater. During the construction period, the domestic wastewater will be discharged through local sewage treatment facilities. For the applied mechanical equipment is relative less, so the industrial wastewater will be also less, in addition, the industrial wastewater can be used to irrigate plant.

During the operation period, domestic wastewater will be treated by a septic tank, so the wastewater after treatment could well satisfy the requirement of Chinese Environmental Standard, which will be collected into a water collection basin for greening and so on. After those appropriate treatment measures has been taken, such wastewater will not cause negative impacts on the environment.

- Impact on the Air quality

The main air pollution sources during the construction period include excavation, blasting and transportation, and the main air pollutant is dust. Some measures will be taken to reduce impact of dust, such as watering, covering and the construction material will be pile up centralized. Therefore, the construction has little negative impact on the local air environment.

-Impact on ecological environment

The construction will cause some negative impacts on the ecological environment, such as vegetation trampled by workers and machine and covered by the dust, excavating. In order to reduce the negative impacts, the following measures will be taken: controlling construction activity within occupied land to reduce negative impacts, and, carrying away all waste slag and cleaning up the construction site to recover the original vegetation when the construction is over.

There is no rare plant and wild animal living around the project site, nor the inhabitant of birds. Therefore, the project activity has little negative influence on birds and ecological environment.

Therefore, the project does not bring negative environmental and socio-economic impacts.

2.4 Public Comments

No public comments were received during the public comment period.

2.5 AFOLU-Specific Safeguards

This is not an AFOLU project. Therefore, this section is not applicable.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

The approved methodology applied in the project activity is ACM0002 – “Grid-connected electricity generation from renewable sources (version 20.0)”¹.

Related tools are:

- Tool to calculate the emission factor for an electricity system (version 07.0)
- Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (version 03.0)
- 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)

3.2 Applicability of Methodology

The criteria and assessment of ACM0002 (version 20.0) are in the following table.

Criteria	Assessment
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);	the project is the installation of a wind power project. Therefore, a) is applicable.

¹ <https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG>

(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 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.	the project activity includes a wind power plant. Therefore, a) is applicable.
In case of hydro power plants, one of the following conditions shall 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 b. Less than 10 per cent of the total installed capacity of integrated hydro power project.	Not applicable. the project is a wind power project, not hydro power plant.
In the case of integrated hydro power projects, project proponent shall: (a) 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 (b) Provide an analysis of the water balance covering the water fed to	Not applicable. the project is a wind power project, not an integrated hydro power project.

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.	
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 activity does not involve switching from fossil fuel to renewable energy sources at the site of the project activity. The project is not a biomass fired power plant/unit.
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 not retrofit, rehabilitation, replacement, or capacity addition project.

The criteria and assessment of “Tool to calculate the emission factor for an electricity system (version 07.0)” are in the following table.

Criteria	Assessment
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).	Applicable. the project generates electricity to national grid. This tool is used to calculate the OM, BM and CM.
Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub-options under the step 2 of the tool are available to the project participants, i.e. option IIa and option IIb. If option IIa is chosen, the conditions specified in “Appendix 1: Procedures related to off-grid power generation” should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity.	Since the project activity is grid connected, this condition is applicable and the emission factor has been calculated accordingly.

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.	Not applicable. the project is not located in annex I country.
Under this tool, the value applied to the CO ₂ emission factor of biofuels is zero.	Not applicable. the project is a wind power project and does not involve emissions from biofuels.

Applicability conditions of “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (version 03.0)” are in the following table.

Criteria	Assessment
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. The electricity is purchased from the grid only, and either no captive power plant(s) is/are installed at the site of electricity consumption or, if any captive power plant exists on site, it is either not operating or it is not physically able to provide electricity to the electricity consumer; (b) Scenario B: Electricity consumption from (an) off-grid fossil fuel fired captive power plant(s). One or more fossil fuel fired captive power plants are installed at the site of the electricity consumer and supply the consumer with electricity. The captive power plant(s) is/are not connected to the electricity grid; or (c) Scenario C: Electricity consumption from the grid and (a) fossil fuel fired captive power plant(s). One or more fossil fuel fired captive power plants operate at the site of the electricity consumer. The captive power plant(s) can provide electricity to the electricity consumer. The captive power plant(s) is/are also connected to the electricity grid. Hence, the electricity consumer can be provided with electricity from the captive power plant(s) and the grid.	Applicable. The electricity consumption lies to Scenario A: Electricity consumption from the grid. The electricity is purchased from the grid only, and no captive power plant is installed at the site of electricity consumption..
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	Applicable. The project scenario lies to Scenario I: Electricity is supplied to the grid.

(c) Scenario III: Electricity is supplied to the grid and consumers/electricity consuming facilities.	
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 CO2 emissions.	There is no captive renewable power generation technologies installed to provide electricity in the project activity, in the baseline scenario or to sources of leakage.

Applicability conditions of “Assessment of the validity of the original/current baseline and update the baseline at the renewal of the crediting period” (version 03.0.1) are in the following table.

Criteria	Assessment
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	Applicable. The baseline in this PD is at the renewal of the crediting period. The baseline is assessed by the procedure of this tool.

The applicability criteria stated in methodology ACM0002 (Version 20.0) and the tools are met on the basis of the reasons above.

For standardized baseline, it's not applicable.

3.3 Project Boundary

According to the methodology ACM0002, the spatial extent of the project boundary includes the project power plant/unit and all power plants/units connected physically to the electricity system that the CDM project power plant is connected to.

According to 2019 Baseline Emission Factors for Regional Power Grids in China issued by the Ministry of Ecology and Environment of China (China DNA) on 29/12/2020, NCPG consists of Beijing Power Grid, Tianjin Power Grid, Hebei Power Grid, Shanxi Power Grid, Shandong Power Grid and Inner Mongolia Power Grid.

The GHG emission sources included in or excluded from the project boundary are as follows:

Table 3. GHG emission sources of the project

Source	Gas	Included?	Justification/Explanation
--------	-----	-----------	---------------------------

Source		Gas	Included?	Justification/Explanation
Baseline	Emissions from fossil fuels fired power plants supplying to the North China Power Grid	CO ₂	Included	Main emission source.
		CH ₄	Excluded	Minor emission source.
		N ₂ O	Excluded	Minor emission source.
Project	Emissions caused by the project activity	CO ₂	Excluded	According to ACM0002 (Version 20.0), project emission is excluded as a wind power project.
		CH ₄	Excluded	
		N ₂ O	Excluded	

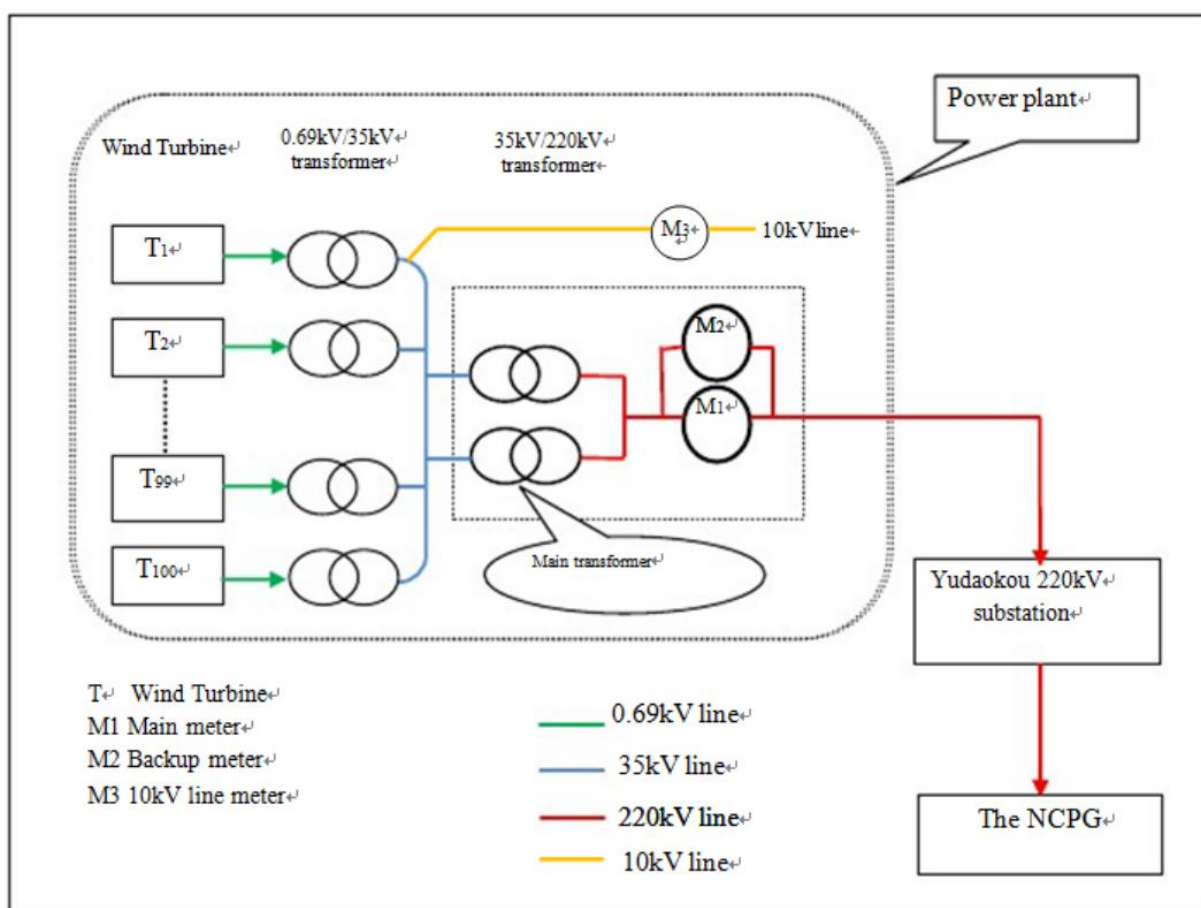


Figure 3. Flow diagram of the project boundary

3.4 Baseline Scenario

The baseline scenario of the project is electricity delivered to NCPG by the project that would otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid. According to the methodology ACM0002

(version 20.0), the baseline emissions are the electricity produced by the project multiplied by the emission factor of NCPG.

For the second crediting period, the continued validity of the original baseline should be assessed.

According to the Methodological Tool “Assessment of the validity of the original/current baseline and update the baseline at the renewal of the crediting period” (version 03.0.1), the stepwise procedure as follows should be adopted to assess the continued validity of the baseline and to update the baseline:

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. Although national policies favour the development of renewable energy sources, total renewable resources based power generation accounts for less than 50% of total generation of the NCPG in the latest 5 years respectively. Hence in the absence of the project activity electricity would still have been generated in the existing fossil fuel power plants or by the addition of new fossil fuel power plants connected to the NCPG.

Step 1.2: Assess the impact of circumstances

Firstly, the baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment;

Secondly, the mainly investment environment or market characteristics especially the feed-in tariff, the policy in terms of market access permit have no significant change which would impacts the current baseline. The current practice for the baseline emissions is still the GHG emitted by NCPG: the equivalent electricity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources within the NCPG;

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

The current baseline scenario is the continuation of the current practice. In the absence of the project, the electricity would have been supplied by NCPG, and it will not request an investment by the project proponent or third party. So, this step is not applicable.

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

Since there are some parameters, which were determined at the start of the first crediting period and not monitored during the first crediting period, are not valid anymore, therefore, the current baseline emissions needs to be updated for the second crediting period according to this tool.

Before the time of requesting renewal of the crediting period, the china DNA has issued the latest Notice “2019 Baseline Emission Factors for Regional Power Grids in China” on 29/12/2020², so the emission factor of NCPG is updated for the second crediting period according to this Notice.

In summary, the emission factor of NCPG and all values have been updated to the latest data for the second crediting period according to this Notice.

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. 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

As mentioned in step 1.4 above, all parameters regarding the grid emission factor calculation have been updated for this second crediting period. More details can be seen in section 4.

3.5 Additionality

According to VCS standard 4.1, 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. Only EF related parameters should be updated for the second 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.

² http://www.mee.gov.cn/ywgz/xdqhbh/wsqtgz/202012/t20201229_815386.shtml

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.

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

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

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

where

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

Calculation of $EG_{PJ,y}$

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

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

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

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

The baseline emission factor (EF_y) is calculated as a combined margin ($EF_{grid,CM,y}$), consisting of the combination of operating margin ($EF_{grid,OM,y}$) and build margin ($EF_{grid,BM,y}$) factors according to the following seven steps defined in the “Tool to calculate the emission factor for an electricity system”.

Data for the calculations are based on official public data on 2019 China Regional Power Grid Baseline Emission Factors³.

Step 1. Identify the relevant electricity systems

For determining the electricity emission factors, identify the relevant project electricity system.

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

- the project electricity system is the North China Power Grid (NCPG), consisting of six provincial grids: Beijing, Tianjin, Hebei, Shanxi, Shandong and Inner Mongolia.

For the purpose of this tool, the reference system is the project electricity system. Hence electricity transfers from a connected electricity system to the project electricity system are defined as electricity imports, and electricity transfers from the project electricity system to connected electricity systems are defined as electricity exports.

For the purpose of determining the build margin emission factor, the spatial extent is limited to the project electricity system, except where recent or likely future additions to the transmission capacity enable significant increases in imported electricity. In such cases, the transmission capacity may be considered a build margin source.

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

³ http://www.mee.gov.cn/ywgz/ycqhbh/wsqtz/202012/t20201229_815386.shtml

For the purpose of determining the operating margin emission factor, use one of the following options to determine the CO₂ emission factor(s) for net electricity imports from a connected electricity system:

- (a) 0 tCO₂/MWh; or
- (b) The weighted average operating margin (OM) emission rate of the exporting grid, determined as described in Step 4 (d) below; or
- (c) The simple operating margin emission rate of the exporting grid, determined as described in Step 4 (a), if the conditions for this method, as described in Step 3 below, apply to the exporting grid; or
- (d) The simple adjusted operating margin emission rate of the exporting grid, determined as described in Step 4 (b) below.

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

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

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

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

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

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.

Following the calculations of the DNA and the availability of statistical data availability, Option I is chosen.

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

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

- (a) Simple OM; or

- (b) Simple Adjusted OM; or
- (c) Dispatch data analysis OM; or
- (d) Average OM

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

This criterion is met and therefore the project participants chose to use the simple OM method (option a).

The Simple OM emissions factor can be calculated using either ex-ante or ex-post data vintages. the project participants have chosen to use the ex-ante option, and $EF_{grid,OM,y}$ is fixed for the duration of the second crediting period.

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.

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

- (a) Simple OM

The Simple Operating Margin emission factor $EF_{grid,OM,y}$ is defined as the generation-weighted average emissions per unit net electricity generation (tCO_2/MWh) of all generating sources serving the system, not including low-operating cost and must-run power plants. Two options can be selected to calculate the simple OM:

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.

Option B can only be used if:

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

The criteria for Option B are met, as (a) the necessary data for Option A is not available as indicated in the calculations of the DNA, (b) only nuclear and renewable power generation are considered as low-cost / must-run power sources and the quantity of electricity supplied to the grid by these sources is known, and (c) Option I is chosen in Step 2.

Option B – Calculation based on total fuel consumption and electricity generation of the system

According to the Tool, where Option B is used, 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 total fuel consumption of the project electricity system, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{EG_y} \quad (3)$$

Where:

$EF_{grid,OMsimple,y}$	Simple operating margin CO ₂ emission factor in year y (tCO ₂ /MWh)
$FC_{i,y}$	The amount of fossil fuel type i consumed in the project electricity system in year y (mass or volume unit)
$NCV_{i,y}$	Net calorific value (energy content) of fossil fuel type i in year y (GJ/mass or volume unit)
$EF_{CO_2,i,y}$	CO ₂ emission factor of fossil fuel type i in year y (tCO ₂ /GJ)
EG_y	Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost / must-run power plants / units, in year y (MWh)
i	All fossil fuel types combusted in power sources in the project electricity system in year y
y	The relevant year as per the data vintage chosen in Step 3

On the basis of the data available, the three-year average operating margin emission factor is calculated by the DNA as a full-generation-weighted average of the emission factors.

$$EF_{grid,OMsimple,y} = 0.9419 \text{ tCO}_2/\text{MWh}$$

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

In terms of vintage of data, the project participants chose Option 1, the ex-ante option (as for the OM calculation), and $EF_{grid,BM,y}$ is fixed for the duration of the second crediting period:

Option 1: ex-ante. 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.

The latest statistical data available (from the China Power Yearbook) is used by the DNA to determine the most recent year from which the added generation capacity is equal to or just exceeds 20% of the latest statistic. The added generation capacity is the sample group of power units m used to calculate the build margin.

The sample group of power units m used to calculate the build margin consists of the set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently. This option is chosen as it comprises larger annual generation than the five units built most recently.

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:

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

Where:

$EF_{grid,BM,y}$	Build margin CO_2 emission factor in year y ($\text{t CO}_2/\text{MWh}$)
$EG_{m,y}$	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	The most recent historical year for which power generation data is available

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

Due to the limited availability of data on individual power units, the build margin emission factor and the CO_2 emission factor of thermal power units as follows.

The added generation capacity is taken instead of generation in formula (4) above, as with the determination of the group of plant included in the build margin. Therefore, the calculation of $EG_{grid,BM,y}$ is as follows:

$$EF_{grid,BM,y} = \frac{\sum_m (CAP_{m,y} \times EF_{EL,m,y})}{\sum_m CAP_{m,y}} = \sum_m Share_{CAP,m,y} \times EF_{EL,m,y} \quad (5)$$

Where:

$EF_{grid,BM,y}$	Build margin CO ₂ emission factor in year y (t CO ₂ /MWh)
$CAP_{m,y}$	Added generation capacity by plant type m in year y (MW)
$EF_{EL,m,y}$	CO ₂ emission factor of plant type m in year y (tCO ₂ /MWh)
$Share_{CAP,m,y}$	Share of added generation capacity by plant type m in year y (%)
m	Plant type included in the build margin (thermal, hydro, nuclear, other)
y	The most recent historical year for which electricity generation data is available

The CO₂ emission factor of plant types other than thermal power plants is taken as zero.

The CO₂ emission factor of thermal power plants is the weighted average emission factor of the best thermal power plant technologies commercially available in China. The CO₂ emission factor of advanced (best commercially available) power plants using fuel type i can be calculated as follows:

$$EF_{m,Adv,y} = \frac{EF_{CO_2,m,y} \times 3.6}{\eta_{m,y}} \quad (6)$$

Where:

$EF_{m,Adv,y}$	CO ₂ emission factor of advanced power plants using fuel m in year y (tCO ₂ /MWh)
$EF_{CO_2,m,y}$	Average CO ₂ emission factor of fuel type m in year y (tCO ₂ /GJ)
$\eta_{m,y}$	Average net energy conversion efficiency of advanced power plants using fuel type m in year y (%)
m	Fuel type of thermal plant (coal/solid, oil/liquid, gas)
y	The relevant year as per the data vintage chosen

The weighted average CO₂ emission factor of thermal power plants is weighted on the basis of the emissions from each of these fuel types in the latest year for which data is available, and using the average net energy conversion efficiency for each fuel type of the best technologies commercially available in China.

$$EF_{thermal,y} = \sum_m (EF_{m,Adv,y} \times \lambda_{m,y}) \quad (7)$$

Where:

$EF_{thermal,y}$	Weighted average CO ₂ emission factor of thermal power plants in year y (tCO ₂ /MWh)
$EF_{m,Adv,y}$	CO ₂ emission factor of advanced power plants using fuel type m in year y (tCO ₂ /MWh)
$\lambda_{m,y}$	Share of emissions of fuel type m in year y (%)
m	Fuel type of thermal plant (coal/solid, oil/liquid, gas)
y	The relevant year as per the data vintage chosen

The build margin emission factor is calculated by the DNA using this methodology:

$$EF_{grid,BM,y} = 0.4819 \text{ tCO}_2/\text{MWh}.$$

Step 6. Calculation of the combined margin emission factor

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

- (a) Weighted average CM; or
- (b) Simplified CM.

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

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

- the project activity is located in a Least Developed Country (LDC) or in a country with less than 10 registered projects at the starting date of validation; and
- The data requirements for the application of step 5 above cannot be met.

Option a is the preferred option. Option b cannot be used as the project activity does not take place in an LDC or in a country with less than 10 registered CDM projects. Therefore, option a is chosen.

Weighted average CM

The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = w_{OM} \times EF_{grid,OMsimple,y} + w_{BM} \times EF_{grid,BM,y}$$

$$EF_{grid,CM,y} = \omega_{OM} \times EF_{grid,OMsimple,y} + \omega_{BM} \times EF_{grid,BM,y}$$

(8)

Where:

$EF_{grid,BM,y}$	Build margin CO ₂ emission factor in year y (tCO ₂ /MWh)
$EF_{grid,OMsimple,y}$	Simple operating margin CO ₂ emission factor in year y (tCO ₂ /MWh)
w_{OM}	Weighting of operating margin emissions factor (%)
w_{BM}	Weighting of build margin emissions factor (%).

The default weights are used, i.e. for the wind farm projects in the first crediting period and the subsequent crediting periods, $w_{OM} = 0.75$ and $w_{BM} = 0.25$.

On the basis of these weights for the second crediting period, the combined margin emission factor is calculated, and are fixed ex-ante for the duration of the second crediting period as follows:

	CO ₂ emission factor (tCO ₂ /MWh)	Weighting

Simple operating Margin Emissions Factor ($EF_{grid,OM\ simple,y}$)	0.9419	0.75
Build Margin Emissions Factor ($EF_{grid, BM,y}$)	0.4819	0.25
Baseline Emissions Factor ($EF_{grid,CM,y}$)	0.8269	

Thus,

$$BE_y = EG_{facility,y} \times EF_{grid,CM,y} = 312,700 \text{ MWh} \times 0.8269 \text{ tCO}_2/\text{MWh} = 258,571 \text{ tCO}_2$$

4.2 Project Emissions

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

$$PE_y = 0$$

4.3 Leakage

According to the methodology, no leakage is considered for the project activity.

4.4 Net GHG Emission Reductions and Removals

Emission reductions are calculated as follows:

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

Where:

ER_y Emission reductions in year y (t CO₂e/yr)

BE_y Baseline emissions in year y (t CO₂/yr)

PE_y Project emissions in year y (t CO₂e/yr)

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)
27/11/2020-31/12/2020(35days)	24,794	0	0	24,794
01/01/2021-31/12/2021	258,571	0	0	258,571

01/01/2022-31/12/2022	258,571	0	0	258,571
01/01/2023-31/12/2023	258,571	0	0	258,571
01/01/2024-31/12/2024	258,571	0	0	258,571
01/01/2025-31/12/2025	258,571	0	0	258,571
01/01/2026-31/12/2026	258,571	0	0	258,571
01/01/2027-31/12/2027	258,571	0	0	258,571
01/01/2028-31/12/2028	258,571	0	0	258,571
01/01/2029-31/12/2029	258,571	0	0	258,571
01/01/2030-26/11/2030 (330days)	233,777	0	0	233,777
Total	2,585,710	0	0	2,585,710

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter	EF _{grid,OM,y}
Data unit	tCO ₂ /MWh
Description	Operating margin CO ₂ emission factor in year y
Source of data	“2019 Baseline Emission Factors for Regional Power Grids in China” issued by China DNA ⁴
Value applied	0.9419
Justification of choice of data or description of measurement methods and procedures applied	Official public data from Chia DNA
Purpose of Data	Calculation of baseline emissions
Comments	/

⁴ <http://www.mee.gov.cn/ywgz/ymqhbh/wsqtz/202012/W020201229610353816665.pdf>

Data / Parameter	EF _{grid,BM,y}
Data unit	tCO ₂ /MWh
Description	Build margin CO ₂ emission factor in year y
Source of data	“2019 Baseline Emission Factors for Regional Power Grids in China” issued by China DNA ⁵
Value applied	0.4819
Justification of choice of data or description of measurement methods and procedures applied	Official public data from MEE
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	WOM
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	75
Justification of choice of data or description of measurement methods and procedures applied	Based on the requirements of “Tool to calculate the emission factor for an electricity system” (Version 07.0)
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	WBM
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)

⁵ <http://www.mee.gov.cn/ywgz/ymqhbh/wsqtz/202012/W020201229610354442145.pdf>

Value applied	25
Justification of choice of data or description of measurement methods and procedures applied	Based on the requirements of “Tool to calculate the emission factor for an electricity system” (Version 07.0)
Purpose of Data	Calculation of baseline emissions
Comments	/

5.2 Data and Parameters Monitored

Data / Parameter	$EG_{\text{facility},y}$
Data unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y.
Source of data	This parameter is calculated monthly with on-site monitored data of electricity delivered to grid ($EG_{s,y}$), imported electricity from the grid ($PR_{g,y}$) and electricity from the grid via 10kv line ($PR_{10kv,y}$)
Description of measurement methods and procedures to be applied	$EG_{\text{facility},y} = EG_{s,y} - PR_{g,y} - PR_{10kv,y}$ $EG_{s,y}$: The electricity delivered by the Project to the grid in year y $PR_{g,y}$: The electricity imported by the Project from the grid in year y $PR_{10kv,y}$: The electricity imported by the Project from the grid via 10kV line in year y
Frequency of monitoring/recording	Measured continuously and recorded monthly.
Value applied	312,700 MWh per year at full capacity. $EG_{\text{facility},y}$ is electricity net of exports and imports, and is estimated as 312,700 MWh.
Monitoring equipment	This parameter is calculated based on the measurement of monitoring meters at the project site.
QA/QC procedures to be applied	The electricity meters are calibrated by qualified entity according to national standards. The electricity records are crosschecked with electricity transaction note (ETN).
Purpose of data	Calculation of baseline emissions
Calculation method	$EG_{\text{facility},y} = EG_{s,y} - PR_{g,y} - PR_{10kv,y}$ $EG_{s,y}$: The electricity delivered by the Project to the grid in year y $PR_{g,y}$: The electricity imported by the Project from the grid in year y $PR_{10kv,y}$: The electricity imported by the Project from the grid via 10kV line in year y

Comments	/
Data / Parameter	EG _{s,y}
Data unit	MWh
Description	The electricity delivered by the Project to the grid in year y
Source of data	Measured by main meter M1 located at the output of the on-site transformer substation.
Description of measurement methods and procedures to be applied	The electricity delivered to NCPG by the project in year y will be monitored and measured continuously together with electricity meters M1 and M2, and it will be recorded monthly. Plant manager of wind farm will collect the information and data required by the Monitoring Plan. The collected information will be documented and sent to the CDM & VCS officer monthly. Data will be archived for 2 years following the end of the crediting period by means of electronic and paper backup.
Frequency of monitoring/recording	Measured continuously and recorded monthly.
Value applied	312,700 MWh/y
Monitoring equipment	The electricity is monitored by electricity meters M1 and M2 with national standards.
QA/QC procedures to be applied	The meters will be calibrated by qualified third party according to the relevant regulations. The accuracy of electricity meters is no less than 0.2s. The data will be double checked by receipt of sales or relevant commercial data. Meters will be examined, tested and calibrated regularly according to the manufacturer's standards.
Purpose of data	Calculation of baseline emissions
Calculation method	/
Comments	Uncertainty level of data is low.
Data / Parameter	PR _{g,y}
Data unit	MWh
Description	The electricity imported by the Project from the grid in year y.
Source of data	Measured by main meter M1 located at the output of the on-site transformer substation.
Description of measurement methods and procedures to be applied	The Electricity consumed by the project which is imported from the NCPG in year y will be monitored and measured continuously together with electricity meters M1 and M2 and it will be recorded monthly.

applied	Plant manager of wind farm will collect the information and data required by the Monitoring Plan. The collected information will be documented and sent to the CDM & VCS officer monthly. Data will be archived for 2 years following the end of the crediting period by means of electronic and paper backup.
Frequency of monitoring/recording	Measured continuously and recorded monthly.
Value applied	0 MWh/y
Monitoring equipment	The electricity is monitored by electricity meters M1 and M2 with national standards.
QA/QC procedures to be applied	The meters will be calibrated by qualified third party according to the relevant regulations. The accuracy of electricity meters is no less than 0.2s. The data will be double checked by receipt of sales or relevant commercial data. Meters will be examined, tested and calibrated regularly according to the manufacturer's standards.
Purpose of data	Calculation of baseline emissions
Calculation method	/
Comments	Uncertainty level of data is low.

Data / Parameter	PR _{10kV,y}
Data unit	MWh
Description	The electricity imported by the Project from the grid via 10kV line in year y.
Source of data	Measured by M3 located at the 10kV line of the project.
Description of measurement methods and procedures to be applied	The Electricity consumed by the project which is imported from the NCPG in year y will be monitored and measured continuously by electricity meter M3 and it will be recorded monthly. Plant manager of wind farm will collect the information and data required by the Monitoring Plan. The collected information will be documented and sent to the CDM & VCS officer monthly. Data will be archived for 2 years following the end of the crediting period by means of electronic and paper backup.
Frequency of monitoring/recording	Measured continuously and recorded monthly.
Value applied	0 MWh/y
Monitoring equipment	The electricity is monitored by electricity meter M3 with national standards.
QA/QC procedures to be applied	The meters will be calibrated by qualified third party according to the relevant regulations. The data will be double checked by receipt of sales or relevant commercial data. Meters will be examined, tested and calibrated regularly according

	to the manufacturer's standards.
Purpose of data	Calculation of baseline emissions
Calculation method	/
Comments	Uncertainty level of data is low.

5.3 Monitoring Plan

The project adopts the approved consolidated monitoring methodology ACM0002 “Consolidated monitoring methodology for grid-connected electricity generation from renewable sources” (version 20.0) to determine the emission reductions from the net electricity generation from the wind farm. This plan describes in more detail the process.

1. Operational and management structure for monitoring

The monitoring of the emission reductions will be carried out according to Figure 4 below.

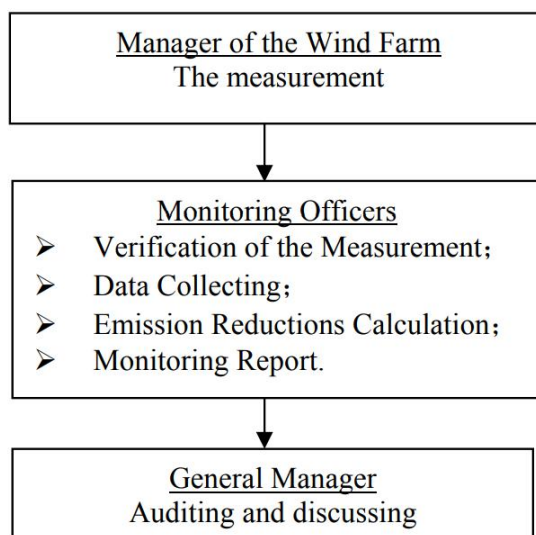


Figure 4. The personnel structure of the project monitoring

A chief monitoring officer will be appointed by the project owner, who will supervise and verify metering and recording, collect data (meter's data reading, sales/purchasing invoices), calculate emission reductions and prepare monitoring reports.

2. Monitoring apparatus and installation

Two bidirectional meters will be installed in the low pressure side of the booster station in accordance with Technology and Management Regulations for Power Metering Devices. The meters will be installed in parallel connection in the project site together to measure the

electricity supply to the grid by the Project. The accuracy of the meters(M1 and M2) are no less than 0.2s and uncertainty level of the meters will not exceed 0.5%.

3. Calibration of Meters & Metering

An agreement should be signed between the project owner and the local grid company that defines the metering arrangements and the required quality control procedures to ensure accuracy.

Calibration is carried out by the local grid company according to relevant regulations of electric industry at least once every year. Calibration report will be provided to the project owner.

4. Data monitoring

The exported and imported electricity are continuously monitored and monthly recorded by the working staff and reviewed by auditor. The project owner summarized and recorded readings of the electricity meter at 24:00 of the last day of each month in Monthly Production Report of the Project. After the data was confirmed by the grid company, the monthly Electricity Transaction Note (hereinafter referred to as ETN) was issued by the grid company to the Project Owner. ETNs issued by the grid company were used as sales receipts for crosscheck.

All paper documents are copied. All electrical files are backup by hard disk and kept after 2 years after the end of crediting period.

5. Quality Assurance and Quality Control

All the electricity meters are calibrated annually by qualified third party according to national industry standard. And all the metering data is cross checked with the ETN and the conservative value will be used for emission reductions.

The accuracy of the M1 and M2 is 0.2S. The accuracy of the M3 is 1.0.

6. Emergency Procedure

During this monitoring period, the Project was operated smoothly and no emergency happened.

- If abnormal operation happens, on-site operators should immediately report to team manager. The team manager takes the responsibility to handle the erroneous measurement as follows:

- If the reason for erroneous measurement is the malfunction of the meter(s), use the data automatically obtained and saved by the computer system as backup.

- If the erroneous measurement is caused by employees in charge of recording, use the data automatically obtained and saved by the computer system as backup. At the same time, training courses shall be rearranged for relevant employees to ensure the correct implementation of the monitoring plan, so as to prevent error.

6. Data Management System

All monitoring data and records will be archived in electronic documents as well as in paper. The electronic documents will be backed up in compact disc or hard disc form. The project owner will also keep the copies of sale and purchasing receipts and prepare a monitoring report at the end of each year, which includes the net electricity generation, the monitoring data summary, the calibration records, and the emission reduction calculation.

7. Training program

All the related staffs were trained. The training contained basic knowledge on CDM & VCS, project monitoring, the operation rules and quality controlling and management standard, data recording and archiving, etc.

8. Monitoring Report

The CDM & VCS manager will write the monitoring report including electricity produced and emission reduction every month and then submit it to the general manager, who will audit it internally. And all these documents can be verified by VVB.