GUOHUA RONGCHENG PHASE III WIND FARM PROJECT

Document Prepared by Guohua Energy Investment Co., Ltd.

Contact Information

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CONTENTS

1 PROJECT DETAILS

1.1 Summary Description of the Project

Guohua Rongcheng Phase III Wind Farm Project (hereinafter referred to as the project) is located in Chengshan Town, Rongcheng City, Shangdong Province, the People's Republic of China. The total installed capacity of the project is 49.5 MW, consisting of 33 wind turbines with unit capacity of 1500kW. The expected annual power delivered to the grid is 100,263MWh. The power output will be delivered to the North China Power Grid (NCPG) via Shandong Power Grid. The construction start date for the project is 01/12/2009. The first power unit started operation on 17/10/2010, and all the wind turbine generators were put into operation on 19/12/2010.

The scenario existing prior to the start of the implementation of the project is the same as the baseline scenario, i.e. electricity would have otherwise been generated by the operation of existing power plants connected to NCPG and by the addition of new generation sources of NCPG. After the project is put into operation, the power generated will replace a part of power supply in NCPG which is dominated by fuel-fired power plants and thus reduce greenhouse gas (GHG) emission through avoiding CO_2 emissions produced by NCPG.

The first VCS crediting period is from 17/10/2010 to 16/10/2020 (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 17/10/2020 to 16/10/2030 (10 years). The estimated annual average emission reductions are 82,907 tCO_2e and total emission reductions during the 10 years crediting period are 829,070.

1.2 Sectoral Scope and Project Type

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

Project type: grid connected renewable (wind) power project

The project is not a grouped project.

1.3 Project Eligibility

The project is a wind power project, which reduces CO_2 by replacing electricity from fossil fuel power plants. This complies with the scope of VCS program.

1.4 Project Design

The project has been designed to include a single location and has not been developed as a grouped project.

Eligibility Criteria

N/A as the project is not a grouped project.

1.5 Project Proponent

Organization name	Guohua Resourceful (Rongcheng) Wind Power Generation Co., Ltd.
Contact person	Mr. Hu Weiping
Title	Project manager
Address	No. 3 of Dongzhimen South Street, Dongcheng District, Beijing
Telephone	010-58151719
Email	huweiping@guohua.com.cn

1.6 Other Entities Involved in the Project

Organization name	N/A
Role in the project	N/A
Contact person	N/A
Title	N/A
Address	N/A
Telephone	N/A
Email	N/A

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 Guohua Resourceful (Rongcheng) Wind Power Generation 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

The first power unit started operation on 17/10/2010, the date on which the project started to generate GHG emission reductions and therefore is the project start date.

1.9 Project Crediting Period

The project is registered under VCS 3.4 and completed validation in 2014, and the VCUs have been claimed since 17/10/2010. It remains eligible to apply the crediting period requirements under VCS Version 3 which shall be a maximum of ten years and may be renewed at most twice, so the first renewable crediting period of the project shall be updated to be 17/10/2010 - 16/10/2020. Besides, the project has been registered under CDM, and is not eligible for VCU issuance beyond the end of the total project crediting period (7 years and renewed twice) under CDM (31/07/2033). Therefore the project crediting life would be 17/10/2010 – 31/07/2033 and the project is requesting renewal of the 2nd crediting period from 17/10/2020 to 16/10/2030.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	Yes
Large project	/

Year	Estimated GHG emission reductions or removals (tCO_2e)
2020 (17/10/2020 to 31/12/2020, 76 days)	17,263
2021	82,907
2022	82,907
2023	82,907
2024	82,907
2025	82,907
2026	82,907
2027	82,907
2028	82,907
2029	82,907
2030 (01/01/2030 to 16/10/2030, 289 days)	65,644

Total estimated ERs	829,070
Total number of crediting years	10
Average annual ERs	82,907

1.11 Description of the Project Activity

The purpose of the proposed project is to generate zero-emission wind power and deliver it to North China Power Grid. The project generates electricity by utilizing the renewable wind resources, a kind of clean and zero-emission energy, so there will be no GHG emission involved in the project activity.

The scenario existing prior to the start of the implementation of the project activity is NCPG providing the same electricity service as the proposed project, i.e. electricity would have otherwise been generated by the operation of power plants connected to the NCPG. This is the same as the baseline scenario.

The project scenario is the implementation of the proposed project which will have a total installed capacity of 49.5MW, consisting of 33 domestic wind turbines with a unit capacity of 1,500kW. The project generates electricity which will replace a part of power supply of NCPG which is dominated by fossil fuel fired power plants and thus reduce greenhouse gas (GHG) emission through avoiding CO_2 emissions produced by power plants connected to the NCPG. The power output will supply an average annual generation of 100,263MWh to NCPG and replace the same amount of electricity generated by fossil fuel fired power plants connected to NCPG. The plant load factor of the proposed project is 0.231 (PLF=Operation hour/8760h*100%=2026h/8760h*100%=23.1%), which was determined by a third party (FSR designer) based on analysis of local wind resource and technical status of generating equipments. This is consistent with the *Guidelines for the Reporting and Validation of Plant Load Factors* (Version 01) issued by EB. The key technical parameters of the wind turbines are as follows:

Table 1.11-1 Key technical parameters of the wind turbines

Parameter	Value
Model of wind turbine	GW82/1500
Manufacture	Xinjiang Goldwind Science & Technology Co., Ltd.
Rotor Diameter	82m
Amount of vane	3
Height of hub	70m
Cut-in wind speed	3m/s
Cut-out wind speed	22 m/s
PLF	0.231
Life time	20years

The electricity generated by the wind turbines firstly will be boosted up to 35KV before connected to the 110KV transformer at the project site, and then delivered to the NCPG via Shandong Power Grid.

1.12 Project Location

The project is located in Chengshan Town, Rongcheng City, Shandong Province, the People's Republic of China. The coordinates of the project location area are 121°11′-122°42′ east longitude and 36°41′-37°35′ north latitude. Figure 1.12-1 and 1.12-2 are the location of the project.

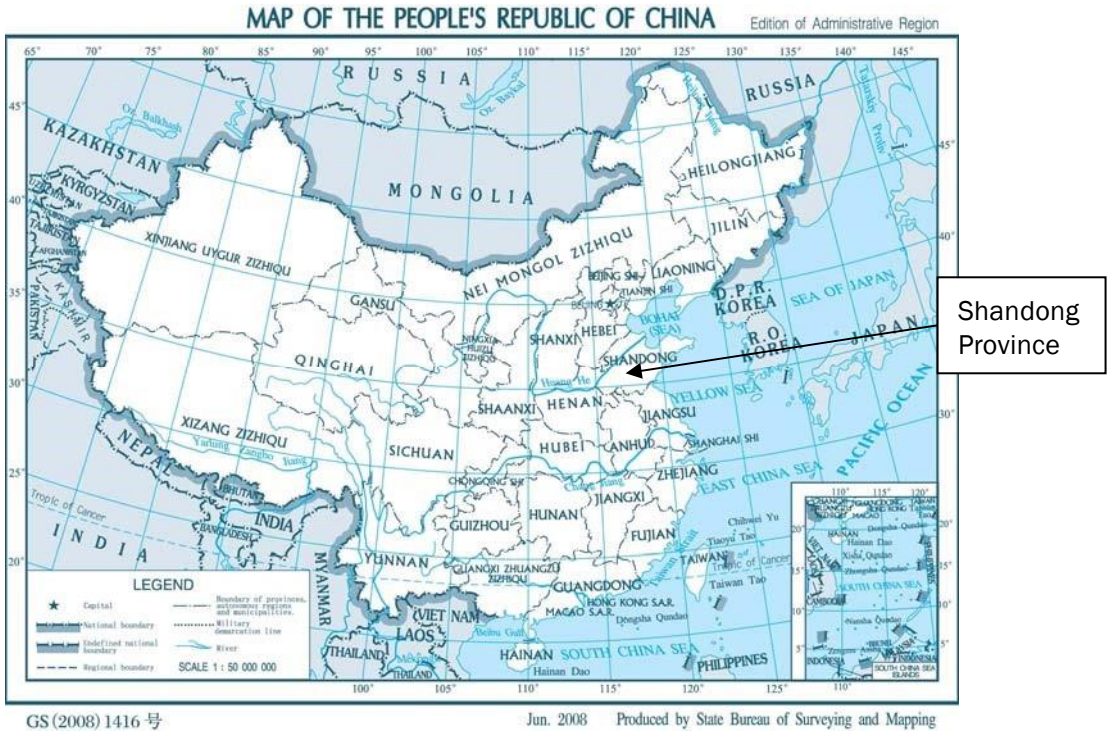


Figure 1.12-1 Geographic Location of Shandong Province

Figure 1.12-2 Geographic Location of the project

1.13 Conditions Prior to Project Initiation

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 a project utilizing renewable energy. The Environmental Impact Assessment (EIA) report was approved by Environmental Protection Bureau of Shandong Province on 28/11/2008, and the Feasibility Study Report of the project was approved by Shandong Development and Reform Commission on 19/12/2008. The project got CDM LoA from China DNA on 30/01/2010. 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.

1.15 Participation under Other GHG Programs

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

The project was registered as CDM project on 19/07/2012, and the registration number is 6580, for which a renewable crediting period of 3×7 years will be used under the CDM GHG Program. The project has not claimed any other forms of environment credit. The first 7-year renewable crediting period under CDM is from 01/08/2012 to 31/07/2019. In total 133851 CERs from 01/08/2012 to 31/01/2014, among which 38199 CERs from 01/08/2012 to 31/12/2012 and 95652 CERs from 01/01/2013 to 31/01/2014, have been issued under CDM mechanism.

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 VCS project with Ref. VCS 1304. All credits of the project will be only claimed under VCS program as VCUs for the project to avoid double counting, which will not be used for compliance with emission trading programs or to meet binding limits on GHG emissions.

China has initiated ETS in July 2021. As per the Notice (Huan ban qi hou [2021]No.9) issued by Ministry of Ecology and Environment of P.R.China (MEE), the fossil fuel power and/or heat generation plants are covered by China ETS, and also other seven industries will be included in the future. However, as per the notice, the project is not covered by the mandatory emission control scheme and there is no emission cap enforced for the project owner. Besides, the allowance (CEA) for power generation industries will be allocated on the basis of carbon emission intensity, i.e. the CEA allocation is not related with the components of local grid. Net GHG emission reductions generated by the project will not be used for compliance under other programs or mechanisms.

1.16.2 Other Forms of Environmental Credit

The project has not sought and will not seek another form of GHG-related environmental credit, including renewable energy certificates (REC).

1.17 Sustainable Development Contributions

The Project will contribute to the sustainable development of the host country and the local community mainly by:

SDG Target	SDG Indicator	Net Impact on SDG Indicator	Contributions Over Project Lifetime
7.1	7.1.1 Proportion of population with access to electricity	The project generates electricity from renewable resources, and supply affordable, reliable, and sustainable electricity for local residents.	The tariff keep fixed during the project lifetime, which is affordable to the local residents for a long period. Annual net electricity supplied to the grid is expected to be 100,263 MWh and total net electricity supplied to the grid is expected to be 2,005,260 MWh during the 20 years of project lifetime.
8.5	8.5.1 Average hourly earnings of employees	The project generates job opportunities and income	The project creates 15 long-term job opportunities and generates income for employees.
13.3	13.3 Tonnes of greenhouse gas emissions avoided or removed	The project will utilize renewable resources for power generation and supply power for the Grid, and will replace the electricity generated by the fossil fuel fired power plant which dominates the Grid	Prevented the release of 82,907 annually and in total 1,658,140 tonnes of carbon into the atmosphere during the whole lifetime of the project.

1.18 Additional Information Relevant to the Project

Leakage Management

According to the methodology ACM0002 Version 20.0, the leakage of the project is not considered. No leakage management involved 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

There's not any further information.

2 SAFEGUARDS

2.1 No Net Harm

There is no net harm resulted from the project as a wind power project. Environment impact of the project is analysed in Section 2.3.

2.2 Local Stakeholder Consultation

In order to invite local residents' comments, the project owner conducted a survey by means of sending questionnaires to villagers around the project site. 30 questionnaires were sent out and all of them were collected back. The collection rate is 100% and all of them are valid.

Table 2.2-1 Summary of questionnaire results

NO.	Questions	Option	Ratio (%)
1	How much do you know about wind power projects and the proposed project?	A lot	33.3
		A little	66.7
		Nothing	0
2	What is the positive effect of the project construction on local economic growth?	A lot	96.7
		A little	3.3
		Nothing	0
3	What is the impact that the proposed project will have on your livelihood?	Beneficial	20
		Disadvantageous	0
		No impact	80
4	How do you think of the project site?	Resonable	90
		Unreasonable	0

		No matter	10
5	What is the effect of the project construction on local environment?	Beneficial	43.3
		Disadvantageous	0
		No impact	56.7
6	Do you support the project construction?	Yes	96.7
		No	0
		No matter	3.3

Most of the local residents knew about wind power projects and all of them held positive and supportive attitude towards the construction of the proposed project. They hope that the project can be put into operation as soon as possible.

An invitation notice for stakeholder comments was issued by the project developer, and several representatives of local stakeholders, including governmental officials of local county and local residents, etc attended the meeting on 13/12/2008 to discuss the questionnaires collected and further introduce the project. No negative opinion on construction of the project is heard and environmental considerations expressed by stakeholders are discussed on the meeting.

The project owner has set out the mechanism for on-going communication with local stakeholders and the communications with local stakeholders are being carried out in any time. The project owner published the contact information of the contact person who is responsible for stakeholders comments. Stakeholders were informed of the contact information, and their comments can be directly collected by the contact person. The comments would be fed back to the stakeholders by the contact person for a timely response. Once the contact person received negative comments from the stakeholders, the contact person would record the negative comments and the feedback.

2.3 Environmental Impact

In accordance with relevant laws and regulations on environmental protection, an Environmental Impact Assessment (EIA) of the proposed project has been implemented. The results of the EIA have been approved by the Environmental Protection Bureau of Shandong Province.

The main environmental impacts of the proposed project are summarised as follows:

1. Impact of noise

The noise comes mainly from the construction of the proposed project. To solve this problem the project owner will mainly do the following work. Firstly, they will reduce the noise by choose machines with low noise. Secondly, in the areas near villages and schools, the machines with

high noise will be used only during the construction phase and the operating time of those machines will be controlled. This kind of high noise machines will also be arranged far from people's living areas to reduce the noise affection

When the wind-farm is put into operation, the noise is mainly from the turbines. The noise is around 57dB in the wind turbine tower foundation, which is far lower than the standard value in specifications for the design of noise control system in industrial enterprises. Furthermore, the nearest village is 250m far away. Therefore, noise will not cause big impact to nearby residents.

2. Impact of waste residue

Waste residue during construction period is mainly the construction material. It should be removed once generated and disposed promptly to avoid the impact on the environment.

During operation period, waste residual is mainly the domestic garbage and overhaul garbage, whose impact on the environment could be reduced by dumping at designated site and disposing centrally.

3. Impact of sewage

The sewage is mainly the domestic sewage. Since the quantity is small, it could volatilize after treatment, so the impact is neglected.

4. Impact of Dust

During construction period, dust may be generated during the earth excavation and the traffic moving, which could give rise to air pollution. So, it will be strictly controlled through regular watering and other measures. And this impact could disappear once the construction is finished.

5. Main Ecological Impacts

The vegetation in the area where the proposed project located is very sparse and there is no rare endangered species, so the project construction has little impact on the diversity of local fauna and flora. There may be some negative impact on the soil conservation. On the basis of the geomorphology, natural environment and construction method, and with the aim of reducing the negative impact, the project owner has framed a series of measures to optimize the construction and take measures to recover the vegetation.

2.4 Public Comments

No public comments were received during the public comment period.

2.5 AFOLU-Specific Safeguards

This section is not required, as the project is a non-AFOLU project.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Applied CDM methodology:

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

Applied CDM tools:

Tool 07 - Tool to calculate the emission factor for an electricity system (version 07.0)

Tool 11 - 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)

Reference:

https://cdm.unfccc.int/methodologies/index.html

3.2 Applicability of Methodology

ACM0002 Applicability Criteria	Justification
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 the installation of a wind power project. Therefore, a) is applicable.
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	The project activity includes a wind power plant. Therefore, a) is applicable.

been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	
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/m^2; or (c) the project activity results in new single or multiple reservoirs and the power density, calculated using equation (7), is greater than 4 W/m^2; or (d) the project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (7), is lower than or equal to 4 W/m^2, all of the following conditions shall apply: a) The power density calculated using the total installed capacity of the integrated project, as per equation (8), is greater than 4 W/m^2; b) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; c) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m^2 shall be: i. Lower than or equal to 15 MW; and ii. Less than 10 per cent of the total installed capacity of integrated (e) 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 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	Not applicable. the project is a wind power project, not an integrated hydro power project.

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, orcapacity addition project.
Tool 07 Applicability Criteria	Justification
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.	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.	The project is a wind power project and does not involve emissions from biofuels.
Tool 11 Applicability Criteria	Justification
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.

3.3 Project Boundary

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	Included	Main emission source.
		CH_4	Excluded	Minor emission source.
		N_2O	Excluded	Minor emission source.
		Other	Excluded	Minor emission source.
Project	Emissions caused by the project activity	CO_2	No	Minor emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
		Other	No	Minor emission source

The power generated by the project will be supplied to the Shandong Grid, finally to the NCPG. According to "2019 Baseline Emission Factors for Regional Power Grids in China" which is the latest version renewed by the Office of the National Coordination Committee on Climate Change of Ministry of Ecology and Environment of the People's Republic of China in December 29, 2020, the NCPG is a regional grid, which consists of five sub-grids: the Beijing Grid, Tianjin Grid, Hebei Grid, Shanxi Grid, Shandong Grid and Inner Mongolia Grid.

Diagram of the project boundary:

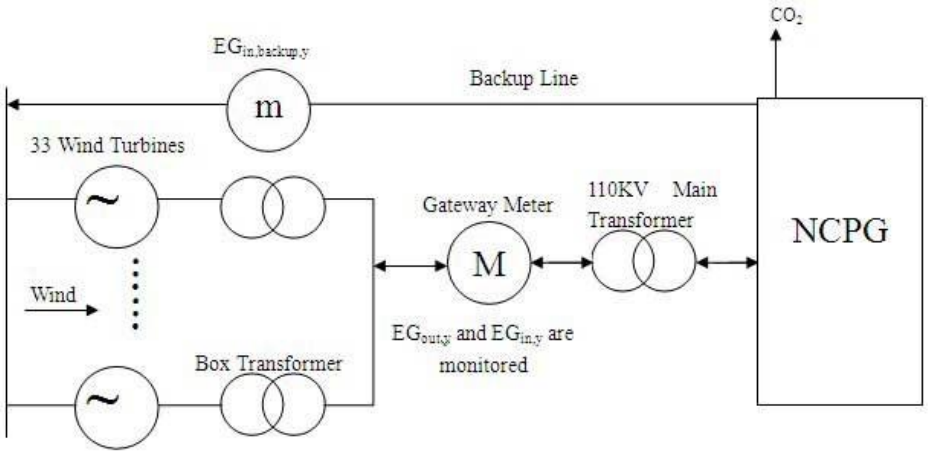


Figure 3.3-1 Flow Diagram of the Project Boundary

3.4 Baseline Scenario

As per the methodology ACM0002 (version 20.0), 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, 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" (version03.0.1), the stepwise procedure as follows should be adopted to assess the continued validity of the baseline and to update the baseline:

Step1: Assess the validity of the current baseline for the next crediting period

As demonstrated in the registered CDM-PDD, the baseline scenario for the project activity is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid. As per the methodology ACM0002 version 20.0, the baseline for the project activity remains the same as that in the registered CDM-PDD.

The validity of the current baseline is assessed using the following sub-steps:

Step1.1: 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 encourage 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.

Step1.2: 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.

Step1.3: 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.

Step1.4: 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 need 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 29/12/2020[1], of which the emission factor of NCPG is updated 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.

Step2: Update the current baseline and the data and parameters

Step2.1: 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

[1] http://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/202012/t20201229_81586.shtml

details for the updated baseline emissions for the second crediting period can be seen in section 4.

Step2.2: 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 4.3, 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. Only grid emission factors 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 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 are no methodology deviations for this project.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

According to the methodology, the baseline emissions include only CO_2 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:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$$

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:

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

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 six 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 Factors[2].

Step 1. Identify the relevant electricity systems

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

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

Option 2. A delineation of the project electricity system defined by the dispatch area of the dispatch center responsible for scheduling and dispatching electricity generated by the project activity. Where the dispatch area is controlled by more than one dispatch center, i.e. layered dispatch area, the higher level area shall be used as a delineation of the project electricity system

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

(e.g. where regional dispatch centers are required to comply with dispatch orders of the national dispatch center then area controlled by the national dispatch center shall be used);

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

The China DNA has published a delineation of the project electricity system and connected electricity systems[3], Option 1 is applied for the project. According to the delineations, the North China Power Grid (NCPG) is identified as the relevant electric power system of the project, which consists of six sub-grids: the Beijing Grid, Tianjin Grid, Hebei Grid, Shanxi Grid, Shandong Grid and Inner Mongolia Grid.

The power generated by the project will be supplied to the Shandong Grid, finally to the NCPG. According to "2019 Baseline Emission Factors for Regional Power Grids in China" which is renewed by the Office of the National Coordination Committee on Climate Change of Ministry of Ecology and Environment of the People's Republic of China in December 29, 2020, the NCPG is a regional grid, which consists of five sub-grids: the Beijing Grid, Tianjin Grid, Hebei Grid, Shanxi Grid, Shandong Grid and Inner Mongolia Grid.

There is net electricity import from Northeast Power Grid and Northwest Power Grid to North China Power Grid. In this case, the operating margin of NCPG is the weighted average operating margin (OM) of the local plants emission rate and the net electricity import emission rate. The simple operating margin emission rate should be used for the net electricity import.

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

Only grid power plants are included in the calculation.

Step 3. Select a method to determine the Operating Margin (OM)

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

(a) Simple OM, or

(b) Simple Adjusted OM, or

[3] 2019 Baseline Emission Factors for Regional Power Grids in China, Office of the National Coordination Committee on Climate Change of Ministry of Ecology and Environment of the People's Republic of China in December 29, 2020

(c) Dispatch Data Analysis OM, or

(d) Average OM.

Because the detailed dispatch data of NCPG is unavailable, method (c) and method (b) are not applicable.

As shown in table B.6 below, NCPG is a coal-fired dominated power grid, where the installed capacity of low cost / must run plants account for 5.95%, 6.20%, 6.89%, 8.57% and 10.10% in 2013, 2014, 2015 ,2016 and 2017 respectively, much lower than 50%. As per Tool to calculate the emission factor for an electricity system Figure 2. Flow chart, method (a): Simple OM was qualified to be chosen to calculate operating margin (OM).

Table 4.1-1 Electricity Generation of North China Power Grid (2013-2017)[4]

Year	electricity generation (10^8kWh)						Total	percentage of low cost/must run projects
	hydro	thermal	Nuclear	Wind	PV	Others		
2013	97.70	12,438.00	0.00	679.50	8.82	0.00	13,221.00	5.95%
2014	84.70	13,492.00	0.00	736.00	36.11	0.00	13,810.00	6.20%
2015	92.40	13,337.00	0.00	806.00	88.80	0.10	14,322.00	6.89%
2016	115.90	13,561.00	0.00	971.00	185.10	0.00	14,836.00	8.57%
2017	103.80	14,111.00	0.00	1,154.00	327.00	0.00	15,695.80	10.10%

Table 4.1-2 Installed Capacity of North China Power Grid (2013-2017)[5]

Year	Installed capacity (MW)						Total
	hydro	thermal	Nuclear	Wind	PV	Others	
2013	7,418	246,640	0	35,330	1,788	16	291,190

[4] China Electric Power Yearbook 2014~2018

[5] China Electric Power Yearbook 2014~2018

2014	8,128	269,230	0	41,840	4,790	100	324,090
2015	8,707	285,550	0	48,810	9,563	35	352,670
2016	8,738	303,370	0	53,530	19,080	20	384,720
2017	8,748	319,240	0	58,320	33,460	20	419,800

According to the total electricity generated in 2015-2017 by NCPG, the low-cost / must-run resources constitute less than 50% of total amount of grid generating output (see *Explanation of 2019 OM Calculation*[6] for details). Therefore, the Average OM method is not applicable.

The Simple OM method can be used to calculate the OM emission factor.

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

- Ex ante option: A 3-year generation-weighted average, based on the most recent data available at the time of submission of the PSF to the GCC verifier for validation, without requirement to monitor and recalculate the emissions factor during the crediting period, or
- Ex post option: The year in which the project activity displaces grid electricity, requiring the emission factor to be updated annually during monitoring.

The project participants chose to use the ex-ante vintages and fix the emission factor for the duration of the crediting period.

Step 4. Calculate the Operating Margin emission factor according to the selected method

According to the Tool, the simple OM emission factor in *y* year ($EF_{grid,OMsimple,y}$) is calculated as generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2e/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants. It may be calculated:

- Option A: Based on data on fuel consumption and net electricity generation of each power plant / unit, or
- Option B: Based on data on net electricity generation, the average efficiency of each power unit and the fuel type(s) used in each power unit, or
- Option C: Based on data on the total net electricity generation of all power plants serving the system and the fuel types and the total fuel consumption of the project electricity system.

[6] https://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/202012/t20201229_815386.shtml

Option A should be preferred and must be used if fuel consumption data is available for each power plant / unit. In other cases, option B or option C can be used. For the purpose of calculating the simple OM, option C should only be used if the necessary data for option A and option B is not available and can only be used if only nuclear and renewable power generation are considered as low-cost / must-run power sources and if the quantity of electricity supplied to the grid by these sources is known.

In China, there is no available data for the detailed fuel consumption, net electricity generation and average efficiency of each power plant / unit, so option C is selected for calculating the OM emission factor. The formula of $EF_{grid,OM,simple,y}$ is:

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

Where:

$EF_{grid,OM,simple,y}$ = Simple operating margin CO_2 emission factor in year *y* (tCO_2e/MWh)

$FC_{j,y}$ = Amount of fuel type *i* consumed in NCPG 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_2e/GJ)

EG_y= Net electricity generated and delivered to NCPG 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 NCPG in year y

y = The three most recent years for which data is available at the time of submission of the PSF to the GCC verifier for validation (ex ante option)

Step 5. Calculate the Build Margin (BM) emission factor

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

Option 1: for the first crediting period, calculate the build margin emission factor ex ante based on the most recent information available on units already built for sample group m at the time of PSF to the GCC verifier 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 verifier. For the third crediting period, the build margin emission factor calculated for the second crediting period

should be used. This option does not require monitoring the emission factor during the crediting period;

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

The proposed project applies option 1 to calculate the build margin emission factor ex-ante, which is based on the most recent information available on units already built for sample group m at the time of PSF submission.

The sample group of power units m used to calculate the build margin should be determined as per the following procedure, consistent with the data vintage selected above:

(a) Identify the set of five power units, excluding power units registered as GCC project activities, that started to supply electricity to the grid most recently ($SET_{5\ units}$) and determine their annual electricity generation ($AEG_{SET\text{-}5\text{-}units}$, in MWh);

(b) Determine the annual electricity generation of the project electricity system, excluding power units registered as GCC project activities (AEG_{total}, in MWh). Identify the set of power units, excluding power units registered as GCC project activities, that started to supply electricity to the grid most recently and that comprise 20 per cent of AEG_{total} (if 20 per cent falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) ($SET_{\geq 20\ per\ cent}$) and determine their annual electricity generation ($AEG_{SET\text{-}\geq 20\ per\ cent}$, in MWh);

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

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

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

According to the instructions of *Office of the National Coordination Committee on Climate Change of Ministry of Ecology and Environment of the People's Republic of China*, for the determination of the set of samples, a sample merging processing in some degree has been adopted due to that the power generation data, energy consumption data or thermal efficiency data of each plant

cannot be consulted in the public statistical data. In this calculation, the newly-installed power units in the past years are classified by year, province and power generation technology, and the same type of newly-installed power units in the same province and in the same year are bundled as a "newly-installed power units".

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

$$EG_{m,y}=CAP_m \times H_{m,y}$$

Where:

$EG_{m,y}$ = Net Quantity of electricity generated and delivered to NCPG by power unit *m* in year *y* (MWh)

CAP_m = Installed capacity of electricity generated and delivered to the grid by power unit *m* in year *y* (MW)

$H_{m,y}$ = The number of power utilization hours (h) of electricity generated and delivered to the grid by power unit *m* in year *y*. And it selects the average utilization hours of similar units in the province in which it is located in year *y*

y = Most recent year for which data is available

m = The sample group of power units.

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

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

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

Where :

CAP_m = Installed capacity of electricity generated and delivered to the grid by power unit *m* in year *y* (MW), and *m* is equivalent to an established combination of (A, t, k)

$CAP_{A,t,k}$ = Capacity of newly-installed power units of a given province (A), given year (t), and give unit type (k) (MW)

A = It is the various provincial regions covered by the regional power grid in the sampling year of the "newly-installed power units"

t = For the calculation of the grid BM in 2019, it is equal to 2017, 2016 until the units that comprise at least 20 percent of the system generation in 2017

k = It is the power generation technology classification of "newly-installed power units", which is divided into: hydro-power, coal-thermal power, gas-thermal power, oil-thermal power, Waste-thermal power plant, other thermal power[7], nuclear power, wind power, solar power, and others[8].

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

Because current statistics data cannot separate each power plant, for a power unit m, only data on electricity generation and the fuel types used is available. So, the option A2 is selected, the emission factor should be determined based on the CO_2 emission factor of the fuel type used and the efficiency of the power unit, as follows:

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

Where:

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

$EF_{CO2,m,i,y}$ = Average CO_2 emission factor of fuel type *i* used in power unit *m* in year *y* (tCO_2/GJ)

$\eta_{m,y}$ = Average net energy conversion efficiency of power unit *m* in year *y* (ratio)

3.6 = Conversion coefficient of thermal work equivalent of electricity (GJ/MWh)

The unit electricity emission factor of the hydropower, nuclear power, wind power, solar power, other thermal power[9], and others power generation technology[10] in the "newly- installed power units" samples is zero. The emission factor per unit of electricity for power generation from coal, gas, oil and electricity waste power is calculated. Since the average net energy conversion

[7] refers to waste heat and pressure, straw, bagasse, forest wood power generation.

[8] refers to power generation such as geothermal energy and ocean energy.

[9] Other thermal power mainly refers to waste heat and pressure, straw, bagasse and forest power generation.

[10] Others power generation technology mainly refers to geothermal energy, ocean energy and other power generation.

efficiency of each sample ($\eta_{m,y}$) cannot be obtained, the power supply thermal efficiency of the best commercialized technology of coal, gas, oil and waste power ($\eta_{Best,m,y}$) is better than $\eta_{m,y}$. It is conservative to use $\eta_{Best,m,y}$ for the calculation of $EF_{EL,m,y}$.

According to the Tool, the Build Margin emission factor ($EF_{grid,BM,y}$) is calculated as the generation-weighted average emission factor of a sample of power plants *m*, the formula is as follows:

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

Where:

$EF_{grid,BM,y}$ = Build Margin CO_2 emission factor in year *y* (tCO_2e/MWh)

$EG_{m,y}$ = Net Quantity of electricity generated and delivered to NCPG by power unit *m* in year *y* (MWh)

$EF_{EL,m,y}$ = CO_2 emission factor of power unit *m* in year *y* (tCO_2e/MWh)

m= Power units included in the build margin

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

As mentioned above, the build margin emission factor of the baseline is calculated *ex-ante* and will not be renewed in the first crediting period.

Step 6. Calculate the Combined Margin emission factor

The combined margin emissions factor is calculated as follows:

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

Where:

$EF_{,grid,BM,,y}$ = Build Margin CO_2 emission factor in year *y* (tCO_2e/MWh)

$EF_{grid,OM,,y}$ = Operating margin CO_2 emission factor in year *y* (tCO_2e/MWh)

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

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

According to Tool, the default weights of wind power projects are as follows:

ω_{OM} =0.75, ω_{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)	Weight
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	

Therefore, baseline emission can be calculated as below:

$BE_y=EF_{grid,CM,y}*E_{GPJ,y}$

4.2 Project Emissions

According to the methodology, PE_y = 0 as the project is a wind power project.

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:

$ER_y = BE_y - PE_y$

Where:

ER_y	Emission reductions in year y (t CO_2e/yr)
BE_y	Baseline emissions in year y (t CO_2/yr)
PE_y	Project emissions in year y (t CO_2e/yr)

The baseline emission BEy is calculated as formula (11):

BEy = 0.8269×100,263=82,907tC02e/year

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

Year	Estimated baseline	Estimated project emissions or removals (tCO_2e)	Estimated leakage	Estimated net GHG emission

	emissions or removals (tCO_2e)		emissions (tCO_2e)	reductions or removals (tCO_2e)
2020 (17/10/2020 to 31/12/2020, 76 days)	17,263	0	0	17,263
2021	82,907	0	0	82,907
2022	82,907	0	0	82,907
2023	82,907	0	0	82,907
2024	82,907	0	0	82,907
2025	82,907	0	0	82,907
2026	82,907	0	0	82,907
2027	82,907	0	0	82,907
2028	82,907	0	0	82,907
2029	82,907	0	0	82,907
2030 (01/01/2030 to 16/10/2030, 289 days)	65,644	0	0	65,644
Total	829,070	0	0	829,070

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2/MWh
Description	Baseline combined margin emission factor of NCPG
Source of data	"2019 Baseline Emission Factors for Regional Power Grids in China" issued by China DNA
Value applied	0.8269

Justification of choice of data or description of measurement methods and procedures applied	Sourced from official public data "2019 Baseline Emission Factors for Regional Power Gridsin China" issued by China DNA
Purpose of Data	Calculation of baseline emissions
Comments	/

5.2 Data and Parameters Monitored

Data / Parameter	$EG_{facility,y}$
Data unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y.
Source of data	Calculated based on the data of $EG_{out,y}$, $EG_{in,y}$ and $EG_{backup,y}$, which are measured by electricity meters
Description of measurement methods and procedures to be applied	$EG_{facility,y} = EG_{out,y} - EG_{in,y} - EG_{backup,y}$ $EG_{out,y}$: Electricity delivered to the NCPG by the proposed project $EG_{in,y}$: Electricity consumed by the proposed project which is imported from the NCPG through the main line $EG_{backup,y}$: electricity consumed by the proposed project which is imported from the NCPG through the backup line The data will be measured continuously, recorded monthly, and archived in electronic version for crediting period+2yrs.
Frequency of monitoring/recording	measured continuously, recorded monthly
Value applied	100,263
Monitoring equipment	Bi-directional meter M for monitoring $EG_{out,y}$ and $EG_{in,y}$: Type: electricity meter Accuracy class: 0.5 Serial number: 10030265270082 Meter m for monitoring $EG_{backup,y}$: Type: electricity meter Accuracy class: 0.5 Serial number: 10030265270067

QA/QC procedures to be applied	The metering equipments are calibrated and checked for accuracy periodically (once a year). Data measured by meters will be cross checked by receipts of sales and purchasing.
Purpose of data	Calculation of baseline emissions
Calculation method	$EG_{facility,y} = EG_{out,y} - EG_{in,y} - EG_{backup,y}$
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 GHG emission reduction for the proposed project is monitored and reported.

1. Monitoring objects

As the baseline emission factor has been ex-ante calculated, the main monitoring objects are the electricity delivered to the grid, electricity consumed by the proposed project which is imported from the NCPG and the net electricity delivered by the proposed project to the NCPG in year y. Meanwhile, the installation capacity, meter's calibration and QA/QC procedure would also be in the scope of the monitoring.

2. Monitoring organization

The monitoring of the emission reductions will be carried out according to Figure 5.3-1 below.

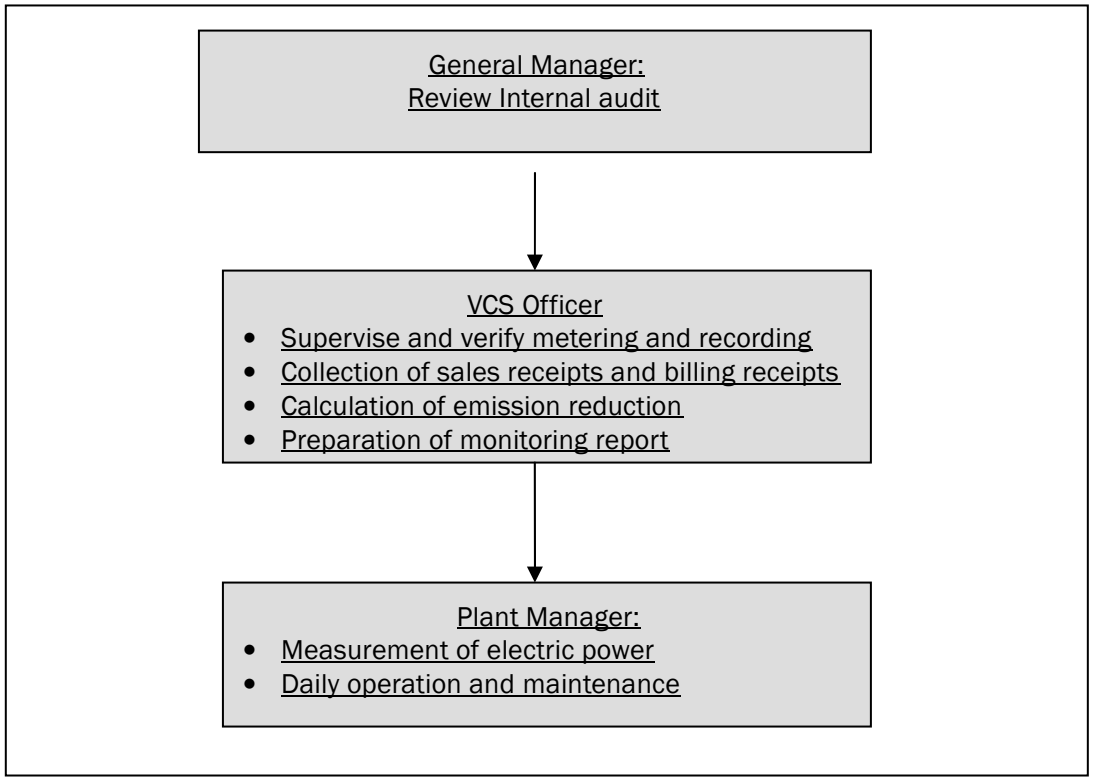
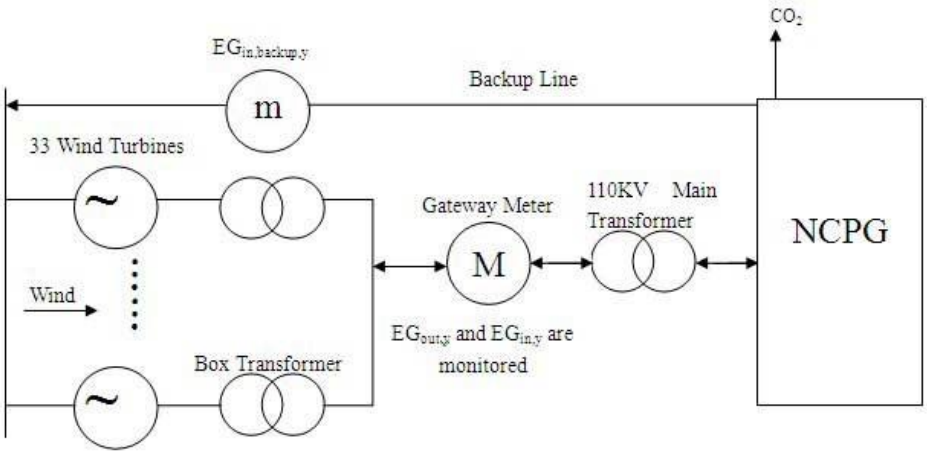


Figure 5.3-1: The personnel structure of the project monitoring

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 officer monthly. The CDM officer will be in charge of the implementation of the Monitoring Plan and report to the General Manager of the company. The General Manager of the company will make the confirmations on monitoring calculation data and reports.

3. Monitoring equipment and installation

A bi-directional gateway meter will be installed on project site for monitoring the electricity delivered to the grid and the electricity consumed through the main line. The accuracy of the gateway meter is 0.5. Meanwhile, for the safe operation of the project, a backup line will be connected for the emergency. A backup-line meter with the accuracy of 1.0 will be installed to measure the electricity imported through the backup line. Electricity meters will be installed in accordance with *Technical Administrative Code of Electric Energy Metering* (DL/T448-2016). And annual calibration will be carried out by the qualified metrological verification organization according to the *Verification Regulation of Electrical Energy Meters with Electronics* (JJG 596-2012).



The net electricity delivered by the proposed project to the NCPG is determined as follows:

$EG_{facility,y} = EG_{out,y} - EG_{in,y} - EG_{backup,y}$

4. Calibration of Meters & Metering and the emergency procedure

In order to guarantee the precision of the meters, periodical calibration and maintenance should be performed complying with the related standards and regulations of the national power sector.

After the occurrence of the conditions below, the meters shall be tested by the designated institute commissioned by the project owner and the power grid company together:

a. the error of the meter is out of the permissible limits

b. maintenance of the meters due to the faults of the meters' components

Once the above conditions occur, the line loss and the net electricity sent to the grid will be estimated by the project owner and the power grid company; otherwise, a conservative and reasonable methods agreed by both parties will be adopted.

5. Quality Assurances and Quality Control

The quality assurance and quality control procedures for recording, maintaining and archiving data shall be improved as part of this CDM project activity. This is an on-going process which will be ensured through the CDM mechanism in terms of the need for verification of the emissions on an annual basis according to this PDD and the CDM manual.

6. Data Management System

All monitoring data and records will be archived in electronic documents as well as in paper. The project owner will also keep the copies of sale receipts. The monitored data will be kept during the whole crediting period and 2 years after.

7. Training Program

Before the operation of proposed project, the project owner has provided the staffs a training which included project monitoring, the operation rules, quality controlling and management standard, data recording and archiving, etc.