Verified Carbon Standard

GUOHUA RONGCHENG PHASE II WIND FARM PROJECT

Document Prepared by Demeter Venture UK Limited

Project Title	Guohua Rongcheng Phase II Wind Farm Project
Version	3.1
Date of Issue	05/11/2021
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1 PROJECT DETAILS

1.1 Summary Description of the project

Guohua Rongcheng Phase II Wind Farm Project (hereinafter referred to as "the Project") is located in Chengshan Town, Rongcheng City, Shandong Province, People's Republic of China. The project is invested and implemented by Guohua Resourceful (Rongcheng) Wind Power Generation Co., Ltd.

The Project has a total installed capacity of 49.5 MW, consisting of 33 wind turbines with unit capacity of 1500kW. The expected annual power delivered to the grid is 102,337MWh. The poweroutput is delivered to the North China Power Grid (NCPG) which is dominated by fossil fuel fired power via Shandong Power Grid and thus reduce greenhouse gas (GHG) emission through avoiding CO_2 emissions produced by NCPG. The estimated annual GHG emission reductions in the first crediting period are 97,240 tCO_2e/yr, and are 84,622 tCO_2e/yr during the second crediting period.

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.

The Project started construction on 18/12/2009. The first power unit started operation on 30/06/2010, and the last power unit started operation on 29/09/2010. The first crediting period is from 30/06/2010 to 29/06/2020 (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 30/06/2020 to 29/06/2030 (10years).

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 CO_2 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 33 turbines, each of which have a capacity of 1.5 MW, with a total capacity of 49.5 MW.

Eligibility Criteria

N/A as this is not a grouped project.

1.5 Project Proponent

Organization name	Guohua Resourceful (Rongcheng) Wind Power Generation Co., Ltd
Contact person	Xuepei Feng
Title	Manager
Address	No.3 South Road of Dongzhimen, Dongcheng District, Beijing, People's Republic of China
Telephone	+86 010-58157576
Email	fengxuepei@guohua.com.cn

1.6 Other Entities Involved in the project

Organization name	Demeter Venture UK Limited
Role in the project	Consultancy
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 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

30/06/2010 (The Project started commissioning on 30/06/2010).

1.9 Project Crediting Period

The first CDM crediting period of the project is from 25/06/2011 to 24/06/2018, which could be renewed twice. the total crediting periods under CDM is from 25/06/2011 to 24/06/2032.

The first monitoring period under VCS is from 30/06/2010 to 21/06/2011. Therefore, the first crediting period of the Project is from 30/06/2010 to 29/06/2020 (10 years). The project is applying for the second crediting period, which is from 30/06/2020 to 29/06/2030.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	√
Large project	

Year	Estimated GHG emission reductions or removals (tCO_2e)
30/06/2020-31/12/2020 (185 days)	42,890
01/01/2021-31/12/2021	84,622
01/01/2022-31/12/2022	84,622
01/01/2023-31/12/2023	84,622
01/01/2024-31/12/2024	84,622

01/01/2025-31/12/2025	84,622
01/01/2026-31/12/2026	84,622
01/01/2027-31/12/2027	84,622
01/01/2028-31/12/2028	84,622
01/01/2029-31/12/2029	84,622
01/01/2030-29/06/2030 (180 days)	41,732
Total estimated ERs	846,220
Total number of crediting years	10
Average annual ERs	84,622

1.11 Description of the project Activity

The total capacity of the project is 49.5MW, consisting of 33 domestic wind power generating units with unit capacity of 1500kW. It is expected that the annual electricity delivered to the gird will be 102,337 MWh. The electricity generated by the Project is exported to NCPG via Shandong Power Grid. The plant load factor of the Project is 0.236, which was determined by a third party (FSR designer) based on analysis of local wind resource and technical status of generating equipments. The annual average emission reductions in the second crediting period is estimated as 84,622 tCO_2e.

The key technical parameters of the wind turbines are as following table 1.

Table 1. Key Technical Parameters of Wind Turbines

Manufacturer	Goldwind Science and Technology Co., Ltd.
Model	82/1500
1. Rotor	
Diameter	82 m
Amount of vane	3
Height of hub	70 m
Cut-in wind speed	3.0 m/s
Cut-out wind speed	22.0 m/s
2. Generator	
Rated Power	1,580 kW

Rated voltage	690 V
3.weight	
Weight of nacelle	11.8t (excluding rotor and generator)
Weight of generator	43.6 t
Weight of vane	6.085 t
Weight of rotor	32.105t (including vane and hub)

The Project diagram is shown in figure 1.

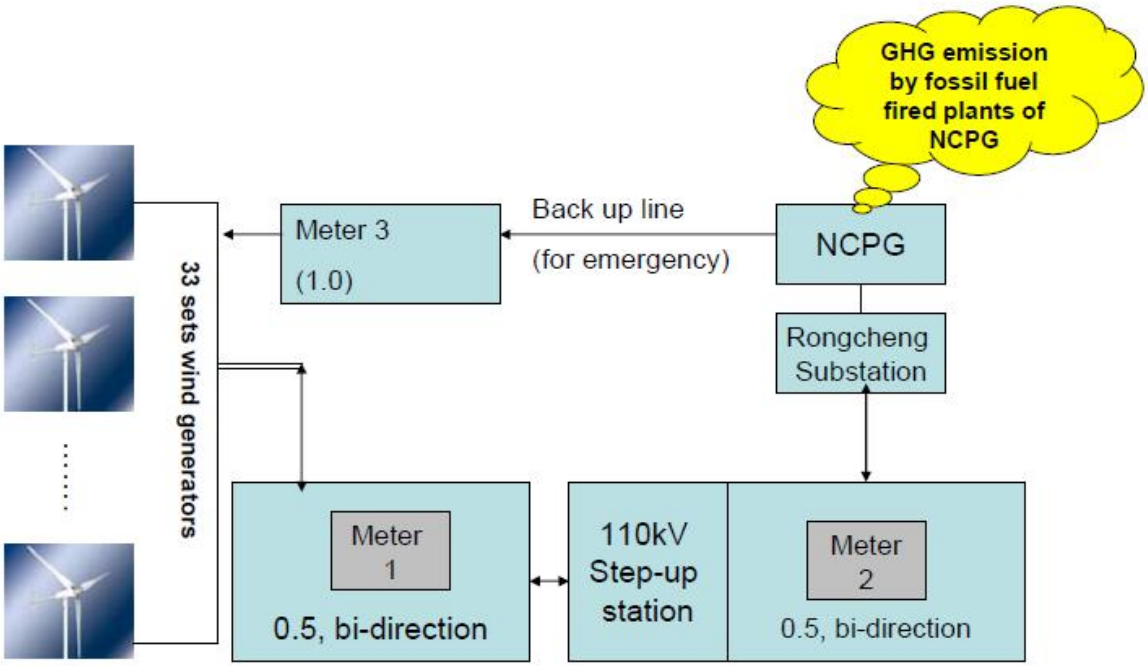

Figure 1. Project diagram

1.12 Project Location

The Project is located in Chengshan Town, Rongcheng City, Shandong Province, People's Republic of China. The coordinates of the proposed project location area are 122°26′-122°31′east longitude and 37°20′-37°23′ north latitude, and the coordinates of the substation centre is 122°30′54.48″ east longitude and 37°21′31.78″ north latitude. The Project location is shown in the Figure 2.

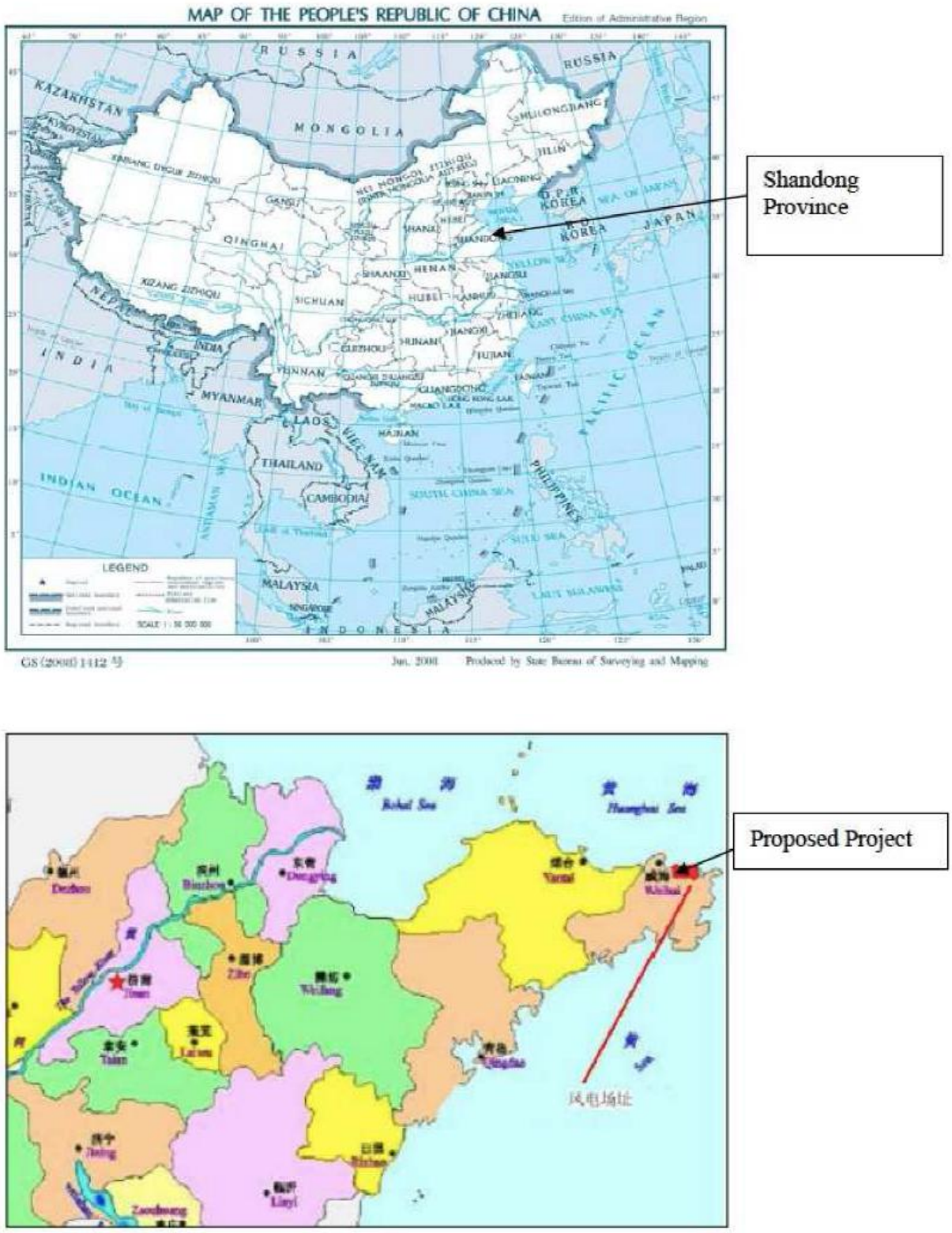

Figure2. The Project location

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 Environmental Protection Bureau of Shandong Province on 30/06/2008, and the Feasibility Study Report of the project was approved by Shandong Province Development and Reform Commission on 03/12/2008. The project has got LOA from China DNA in January 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.

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)

This project has been registered as a CDM project on 22/06/2011, and the registration number is 4882, 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 25/06/2011 to 24/06/2018. 91,822 CERs from 25/06/2011 to 31/05/2012 and 156,778 CERs from 01/06/2012 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

This project has been registered as a CDM project on 22/06/2011, and the registration number is 4882, for which a renewable crediting period of 3×7 years will be used under the CDM GHG Program. The first 7-year renewable crediting period under CDM is from 25/06/2011 to 24/06/2018. And the crediting period renewal is no longer possible.

91,822 CERs from 25/06/2011 to 31/05/2012 and 156,778 CERs from 01/06/2012 to 31/01/2014 have been issued under CDM mechanism.

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

This project has been registered as a CDM project on 22/06/2011, and the registration number is 4882, for which a renewable crediting period of 3×7 years will be used under the CDM GHG Program. The first 7-year renewable crediting period under CDM is from 25/06/2011 to 24/06/2018. And the crediting period renewal is no longer possible.

91,822 CERs from 25/06/2011 to 31/05/2012 and 156,778 CERs from 01/06/2012 to 31/01/2014 have been issued under CDM mechanism.

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

The Project will generate power with wind energy and contribute to sustainable development mainly by:

As the wind power plants of the project will generate clean and renewable electricity without GHG emission, the project can help local areas in reducing GHG emissions and replacing some part of the electricity from coal-fired power plants. The project also helps decrease the local environmental pollution caused by coal burning, which has remarkable environmental benefits. The estimated annual GHG emission reductions of the project activity are 84,622 tCO_2e/yr in the second VCS crediting period. Thus, the project achieved SDG 13 Climate Action[1].

[1] https://sdgs.un.org/goals/goal13

During the 2nd VCS crediting period, 102,337 MWh of electricity from renewable sources will be supplied to the power grid annually. The project makes good use of the local wind resource to solve the difficulties of lack of power and unstable voltage, which help improve local life quality. Thus, the project achieved SDG 7 Affordable and Clean Energy[2].

During the construction, operation, and maintenance of this project, the project, directly and indirectly, generates more job opportunities, which helps improve local employment and reduce local poverty. Thus, the project achieved SDG 8 Decent Work and Economic Growth[3].

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

Brief description

In order to invite local residents' comments, the project owner conducted a survey by ways of sending questionnaires to villagers living around the project site. In February of 2009, 50 questionnaires were sent out and all of them were collected back, the collection rate is 100% and all of them are valid. So, the valid questionnaires are 50.

The main content of the questionnaire is:

A. Basic information of the respondents

B. The brief introduction of the proposed project

C. Survey

1) How much do you know about wind power projects and the proposed project (A lot, Nothing, A little);

[2] https://sdgs.un.org/goals/goal7

[3] https://sdgs.un.org/goals/goal8

2) What are the positive impacts the proposed project will have on your livelihood (more stable power supply, more employment opportunities, improvement of living standard);

3) The negative impacts of the project construction on the current environment are (Significant, Minor, No impact);

4) What are the negative impacts the proposed project will have on your livelihood (Noises (Significant/ Minor/ No impact)/ Air pollution (Significant/ Minor/ No impact) / Affect the TV signal (Significant/ Minor/ No impact));

5) The impacts of the project construction on the local economic development (Significant, Minor, No impact);

6) The construction of the proposed project on the local sustainable development (Significant/ Minor/ No impact);

7) Do you support the project construction (Yes, No, Do not care);

8) Your advice on the project construction;

D. Signature and date

Summary of the comments received

According with the result of the questionnaires, all the residents agree and support the implementation of the proposed project; meanwhile, no negative views are found.

The survey results are as follows:

- The age distribution of the respondents: ≤30 (30%), 30-50 (50%), >50(20%);

- Education level of the respondents: Junior high school and below (26%), senior high school or technical secondary school (34%), above senior high school (40%);

- 80% of the respondents know about wind power projects and the proposed project, 4% don't know wind farm project and proposed project, 16% know little;

- 50% of the respondents believe that the proposed project can bring more stable power supply, 40% more employment opportunities, and 10% improvement of living standard;

- None of the respondents think the construction will bring large noise impacts; 10% of the respondents think the noise impact is little; and 90% of the respondents think there will be no noise impact.

- None of the respondents think the construction will bring large impacts on the cultivated land; 8%% of the respondents think the impact is little; and 92% of the respondents think there will be no impact;

- None of the respondents think the construction will bring materially impacts on the water resource;

- 12%% of the respondents think the impact is little; and 88% of the respondents think there will be no impact;

- None of the respondents think the construction will bring large negative impacts on the environment; 6% of the respondents think the impact is little; and 94% of the respondents think there will be no impact;

- 100% of the respondents believe that the proposed project will contribute greatly to the local economic development;

- 100% of the respondents believe that the proposed project will has great contribution to local the sustainable development;

- 100% of the respondents support the construction of the proposed project;

- The local officials involved in the survey addressed that the construction of the proposed project is supportive to the local economic development, and they will try their best to support the construction of the proposed project.

To sum up, most of the local residents knew about wind power projects and held positive and supportive attitude towards the construction of the proposed project. They hope that the proposed project can be put into operation as soon as possible.

Consideration of comments received

Both local residents and government are supportive to the proposed project. According to the comments received from the stakeholders, it is not necessary now to adjust the construction and operation of the proposed project.

In order for on-going communicate with local stakeholders, the project owner put a grievance notebook on the bulletin board outside the company office. Anyone can put their comments on the book. Since this project has been operated for several years, all local stakeholders know the telephone of the office. When people has comments on the project, he or she can call the project owner directly and leave message.

2.3 Environmental Impact

The project uses wind to generate electricity. It is environmentally friendly and there is no harm to the environment Environmental Impact Assessment (EIA) has been approved by Environmental Protection Bureau of Shandong Province on 30/06/2008.

According to the EIA report, the main environmental impacts of the 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 of turbines employed by the proposed project is 100dB (A), considering the diffusion and attenuation, the noise is predicted to reduce to 65dB(A) when measured 120m away from the wind turbine, and reduce to 43dB(A) when measured 200m away. According to the GB3096-93 Standard of Environmental Noise of Urban Area, the noise in country area is no more than 55dB(A) during daytime and no more than 45dB(A) during night. The nearest village is 250m far away, therefore, noise will not cause big impact to nearby residents.

2. Impact of waste residue

Waste residue comes mainly from consumer wastes produced by workers while its impact can be avoided through project owner's adopting collection and uniform disposal of the wastes.

3. Impact of sewage

The sewage is mainly daily used water from the construction workers and wind farm operators, the sewage will be collectively treated and used for watering plants or lands after disposal.

4. Impact of Dust solid waste

The dust produced will be strictly controlled through regular watering and measures of reducing smoke and dust. The solid waste is main for daily life of the workers, it will be collected and transported to the waste treatment plant.

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 maybe 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.

Through the assessment of the EIA, this project has no harm to environment.

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)[4].

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); (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	the project activity includes a wind power plant. Therefore, a) is applicable.

[4] https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG

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.	
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: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (8), is greater than 4 W/m^2; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m^2 shall be: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project.	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 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.	Not applicable. the project is a wind power project, not an integrated hydro power project.
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	The project activity does not involve switching from fossil fuel to renewable

baseline may be the continued use of fossil fuels at the site; b) Biomass fired power plants/units	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 (c) Scenario III: Electricity is supplied to the grid and consumers/electricity consuming facilities.	Applicable. The project scenario lies to Scenario I: Electricity is supplied to the grid.
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 2. GHG emission sources of the project

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_2O	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_2O	Excluded	

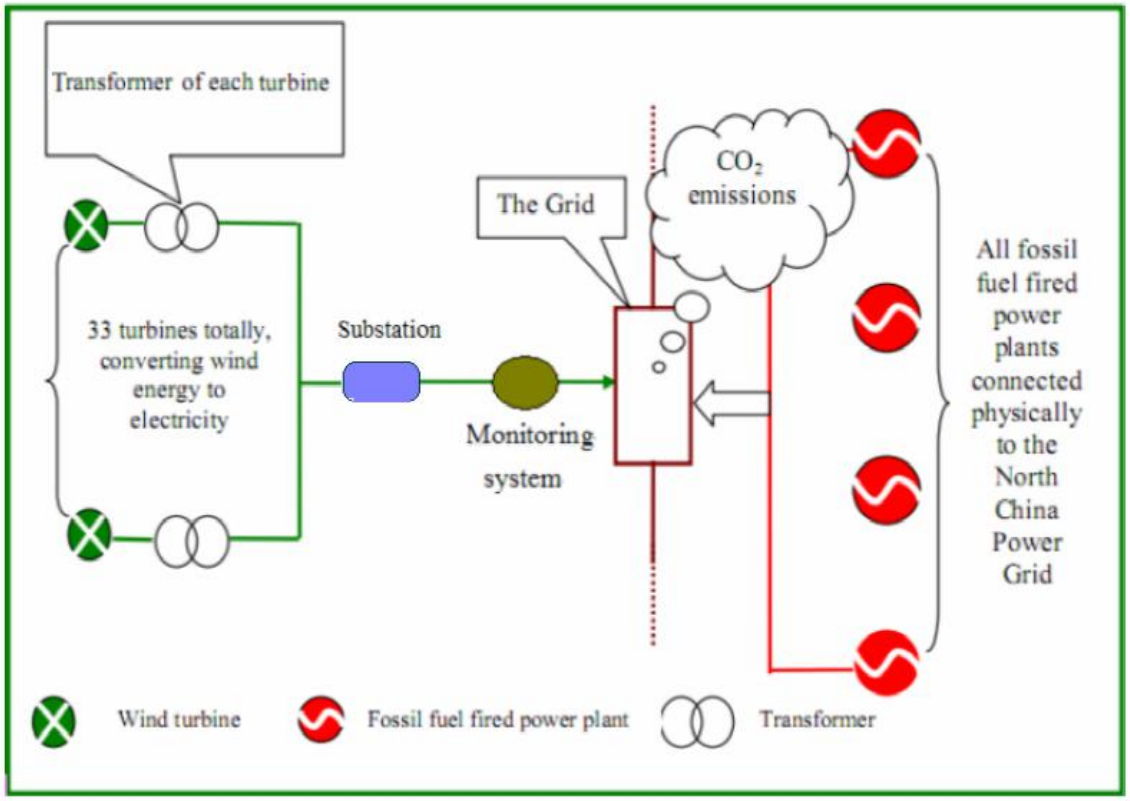

Figure 3. Flow diagram of the project boundary

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" (version03.0.1), 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 29/12/2020[5], 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.

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

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 4.0, 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.

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:

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

where

BEy	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 Factors[6].

Step 1. Identify the relevant electricity systems

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

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, Heibei, 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.

For the purpose of determining the operating margin emission factor, use one of the following options to determine the CO_2 emission factor(s) for net electricity imports from a connected electricity system:

(a) 0 tCO_2/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 CO_2 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 CO_2 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:

$EF_{grid,OM\ simple,y}$	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)
$EF_{CO2,i,y}$	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.

$EF_{grid,OM\ simlpe,y}$ =0.9419 tCO_2/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(t CO_2/MWh)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	CO_2 emission factor of power unit m in year y (tCO_2/MWh)
m	Power units included in the build margin
y	The most recent historical year for which power generation data is available

As it is difficult to obtain the detailed data on the power generation, fuel consumption and thermal efficiency of each newly built power unit from public documents, a deviation of TOOL07 (07.0) is adopted following the clarifications[7] given by the CDM EB concerning the BM emission factor calculation:

(1) The CDM EB suggested using the efficiency level of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy, for each fuel type in estimating the fuel consumption to estimate the build margin.

(2) The EB agreed the use of capacity additions during last 1 ~ 3 years for estimating the build margin emission factor for grid electricity.

(3) The EB also agreed to use of weights estimated using installed capacity in place of annual electricity generation.

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

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

Where:

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

[7] "Request for clarification on use of approved methodology AM0005 for several projects in China", the EB's guidance on DNV deviation request.

http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_QEJWJEF3CFBP1OZAK6V5YXPQKK7WYJ

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

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

CAP_m	Installed capacity of the unit m (MW), with m representing the specified combination of A, t, and k
$CAP_{A,t,k}$	Total installed capacity of fuel type k power plants located in the province A and in the year t
A	Provinces covered by the NCPG, namely, Beijing Ciry, Tianjin City, Hebei Province, Shanxi Province, Shandong Province and Inner Mongolia Autonomous Region.
t	Years related to the grouped new power plants, for the 2019 calculation, t represents 2017, 2016, 2015…. Until the aggregated electricity generation of the grouped new power plants reaches 20% of the total electricity generation of the NCPG
k	Fuel type of the grouped new power plants, including hydro, thermal (coal, gas, oil, waste incineration, other thermal), nuclear, wind, solar and others.

Figure 4 shows the procedure to determine the sample group of power units m.

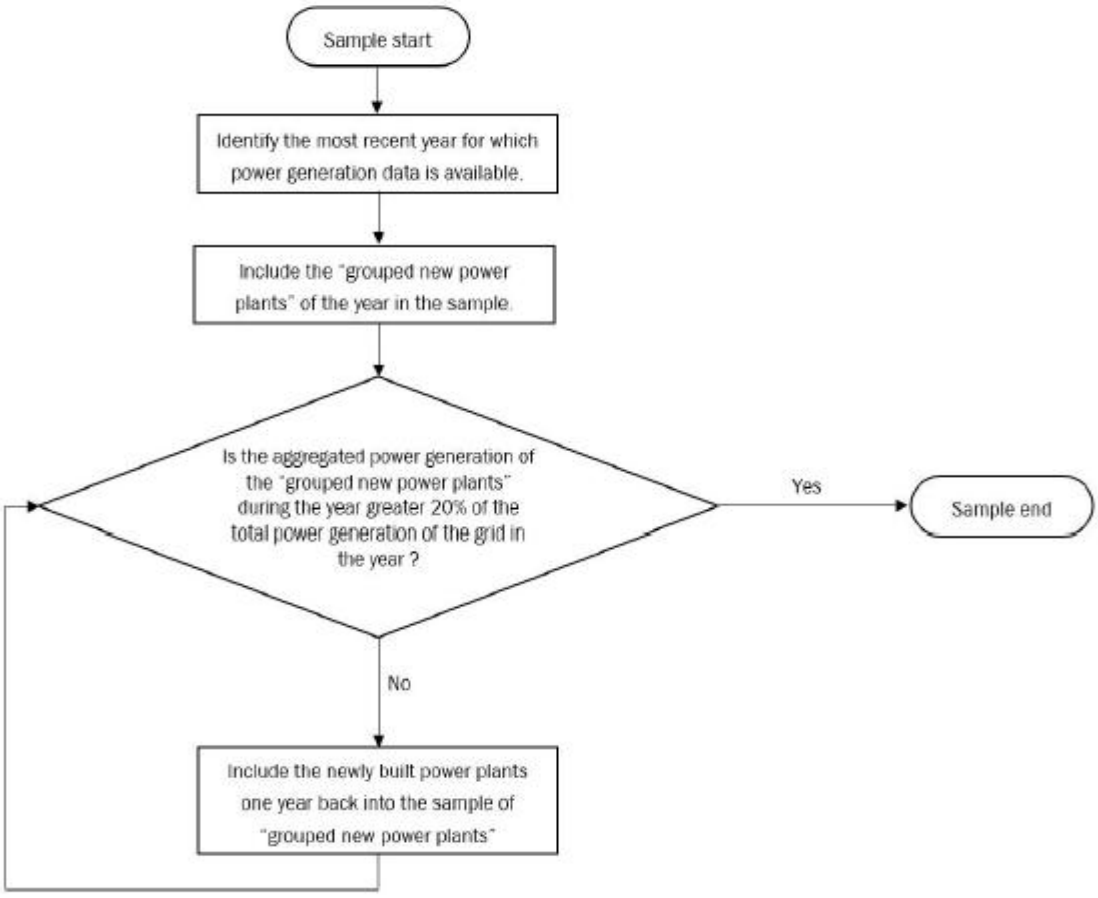

Figure 4 Procedure to determine the sample group of power units m used for the BM emission factor calculation

The emission factors of each fuel type are determined according to the Option A2 in the TOOL07, as the following equation:

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

$EF_{EL,m,y}$	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)
m	All power units serving the grid in year y except low-cost / must-run power units
3.6	Conversion factor (GJ/MWh)

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

$$EF_{best,m,y} = \frac{EF_{CO_2,m,i,y} \times 3.6}{\eta_{best,y}} \quad (8)$$

Where:

$EF_{best,m,y}$	Emission factor of power unit m with the best technology commercially available in year y (tCO_2/MWh)
$\eta_{best,y}$	Power generation efficiency of the best technology commercially available in year y
m	Power units serving the grid with coal, gas, oil or waste incineration in year y

According to the latest and available data at the time of this PDD submission, $EF_{grid,BM,y}$ is calculated to be 0.4819 tCO_2e/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:

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

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

Where:

$EF_{grid,BM,y}$	Build margin CO_2 emission factor in year y (tCO_2/MWh)
$EF_{grid,OM\ simple,y}$	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,

$BE_y = EG_{facility,y} \times EF_{grid,CM,y}$ = 102,337 MWh × 0.8269 tCO_2/MWh = 84,622 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 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 summary of ex ante estimates of emission reductions is shown as follows:

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
30/06/2020-31/12/2020 (185 days)	42,890	0	0	42,890
01/01/2021-31/12/2021	84,622	0	0	84,622
01/01/2022-31/12/2022	84,622	0	0	84,622
01/01/2023-31/12/2023	84,622	0	0	84,622
01/01/2024-31/12/2024	84,622	0	0	84,622
01/01/2025-31/12/2025	84,622	0	0	84,622
01/01/2026-31/12/2026	84,622	0	0	84,622
01/01/2027-31/12/2027	84,622	0	0	84,622
01/01/2028-31/12/2028	84,622	0	0	84,622
01/01/2029-31/12/2029	84,622	0	0	84,622
01/01/2030-29/06/2030 (180 days)	41,732	0	0	41,732
Total	2,804,880	0	0	846,220

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,OM\ simple,y}$
Data unit	tCO_2/MWh
Description	Simple 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 [8]
Value applied	0.9419
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	$EF_{grid,BM,y}$
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 [9]
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	w_{OM}
Data unit	%

[8] http://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/202012/W020201229610353816665.pdf

[9] http://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/202012/W020201229610354442145.pdf

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	w_{BM}
Data unit	%
Description	Weighting of build margin emissions factor
Source of data	"Tool to calculate the emission factor for an electricity system" (Version 07.0)
Value applied	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	$EG_{facility,y}$
Data unit	MWh/yr
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 $EG_{export,y}$, $EG_{import,y}$ and $EG_{importbackup,y}$
Description of measurement methods and procedures to be applied	Measurement will be performed continuously with electricity meters M1 (Accuracy: 0.5), M2 (Accuracy: 0.5) and M3 (Accuracy: 1.0). Meter M1 is installed at the project site to measure the electricity delivered to the grid and electricity consumed by the Project which

	is imported from the grid through the main line by the Project. Meter M2 is installed at outlet of 110kV step-up station to to measure the electricity delivered to the grid and electricity consumed by the Project which is imported from the grid through the main line by the Project. Meter M3 is installed at the project site to measure the electricity consumed by the Project which is imported from the grid through the backup line by the Project. Monitoring staff, on-site engineers and internal audit staff are responsible for the collection of the data and information required in the monitoring plan. The collected data and information is documented and sent to the carbon project manager monthly. The carbon project manager is in charge of the implementation of the monitoring plan and report to the general manager of the project owner. The general manager makes the confirmations on monitoring, calculation data and reports.
Frequency of monitoring/recording	Measured continuously and recorded monthly.
Value applied	102,337 MWh/y
Monitoring equipment	Electricity meters (M1, M1, M3)
QA/QC procedures to be applied	The meters are calibrated and checked for accuracy periodically (once a year) according to the industry standards so that the metering equipment shall have sufficient accuracy. Data measured by meters will be cross checked by receipts of sales and purchasing.
Purpose of data	Calculation of baseline emissions
Calculation method	$EG_{facility,y} = EG_{export,y} - EG_{import,y} - EG_{importbackup,y}$
Comments	/

Data / Parameter	$EG_{export,y}$
Data unit	MWh/yr
Description	Electricity delivered to NCPG by the proposed project in the year y.
Source of data	Electricity meters (M1, M2)
Description of measurement methods and procedures to be applied	The electricity exported is monitored by the electricity meter and recorded by working staff. Measurement will be performed continuously with electricity meters M1 (Accuracy: 0.5), M2 (Accuracy: 0.5). Meter M1 is installed at the project site to measure the electricity delivered to the grid and electricity consumed by the Project which is imported from the grid through the main line by the Project. Meter M2 is installed at outlet of 110kV step-up station to to measure the electricity delivered to the grid and electricity consumed by the Project which is imported from the grid through

	the main line by the Project. Monitoring staff, on-site engineers and internal audit staff are responsible for the collection of the data and information required in the monitoring plan. The collected data and information is documented and sent to the carbon project manager monthly. The carbon project manager is in charge of the implementation of the monitoring plan and report to the general manager of the project owner. The general manager makes the confirmations on monitoring, calculation data and reports.
Frequency of monitoring/recording	Measured continuously and recorded monthly.
Value applied	102,337 MWh/y
Monitoring equipment	Electricity meters (M1, M2)
QA/QC procedures to be applied	The meters will be calibrated by qualified third party according to the relevant regulations. The accuracy of electricity meter is 0.5. Data measured by meters will be cross checked by receipts of sales.
Purpose of data	Calculation of baseline emissions
Calculation method	/
Comments	Uncertainty level of data is low.

Data / Parameter	$EG_{import,y}$
Data unit	MWh/yr
Description	Electricity consumed by the Project which is imported from the NCPG at the main line in the year y.
Source of data	Electricity meters (M1, M2)
Description of measurement methods and procedures to be applied	The electricity consumed by the Project which is imported from the NCPG at the main line in the year y will be monitored and measured by meter installed in the project site. The readings of electricity meter will be continuously measured and monthly recorded. Measurement will be performed continuously with electricity meters M1 (Accuracy: 0.5), M2 (Accuracy: 0.5). Meter M1 is installed at the project site to measure the electricity delivered to the grid and electricity consumed by the Project which is imported from the grid through the main line by the Project. Meter M2 is installed at outlet of 110kV step-up station to to measure the electricity delivered to the grid and electricity consumed by the Project which is imported from the grid through the main line by the Project. Monitoring staff, on-site engineers and internal audit staff are responsible for the collection of the data and information required in the monitoring plan. The collected data and information is

	documented and sent to the carbon project manager monthly. The carbon project manager is in charge of the implementation of the monitoring plan and report to the general manager of the project owner. The general manager makes the confirmations on monitoring, calculation data and reports.
Frequency of monitoring/recording	Measured continuously and recorded monthly.
Value applied	0 MWh/y
Monitoring equipment	Electricity meters (M1, M2)
QA/QC procedures to be applied	The meters will be calibrated by qualified third party according to the relevant regulations. The accuracy of electricity meter is 0.5. Data measured by meters will be cross checked by receipts of purchasing.
Purpose of data	Calculation of baseline emissions
Calculation method	/
Comments	/

Data / Parameter	$EG_{importbackup,y}$
Data unit	MWh/yr
Description	Electricity consumed by the proposed project which is imported from the NCPG at the backup line in the year y.
Source of data	Electricity meter (M3)
Description of measurement methods and procedures to be applied	The electricity consumed by the Project which is imported from the NCPG at the backup line in the year y will be monitored and measured by meter installed in the project site. The readings of electricity meter will be continuously measured and monthly recorded. Measurement will be performed continuously with electricity meter M3 (Accuracy: 1.0). Meter M3 is installed at the project site to measure the electricity consumed by the Project which is imported from the grid through the backup line by the Project. Monitoring staff, on-site engineers and internal audit staff are responsible for the collection of the data and information required in the monitoring plan. The collected data and information is documented and sent to the carbon project manager monthly. The carbon project manager is in charge of the implementation of the monitoring plan and report to the general manager of the project owner. The general manager makes the confirmations on monitoring, calculation data and reports.
Frequency of monitoring/recording	Measured continuously and recorded monthly.

Value applied	0 MWh/y
Monitoring equipment	Electricity meter (M3)
QA/QC procedures to be applied	The meters will be calibrated by qualified third party according to the relevant regulations. The accuracy of electricity meter is 1.0. Data measured by meters will be cross checked by receipts of purchasing.
Purpose of data	Calculation of baseline emissions
Calculation method	/
Comments	Uncertainty level of data is low.

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 Project is monitored and reported.

1. Operational and management structure for monitoring

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

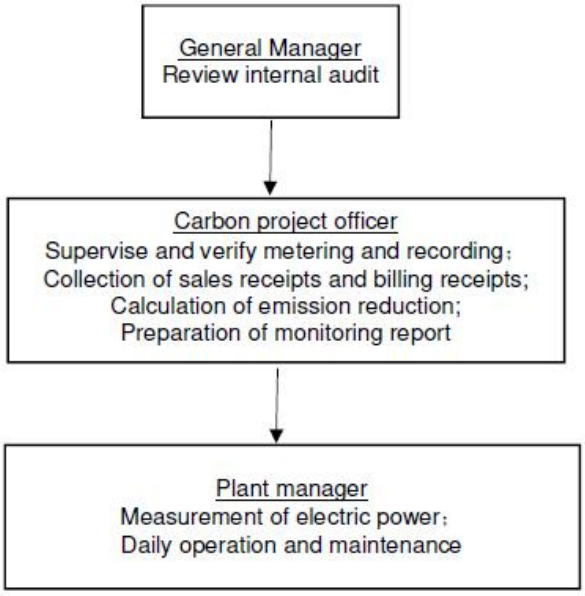

Figure 4. The personnel structure of the project monitoring

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 VCS officer monthly. The VCS officer will 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.

2. Monitoring apparatus and installation

The meters will be installed in accordance with "Technology and Management Regulations for Power Metering Devices. Two bidirectional meters will be installed at the main line to measure the electricity supply to and the electricity imported from NCPG by the project. The accuracy of the meters is 0.5 and uncertainty level of the meters will not exceed 0.5%. At the same time, for the safe operation of the project, a 10 kv back-up line will be connected for the emergency, one meter with the accuracy of 1.0 will be installed to measure the electricity imported by the back-up line. The installation of meters is as Figure 5.

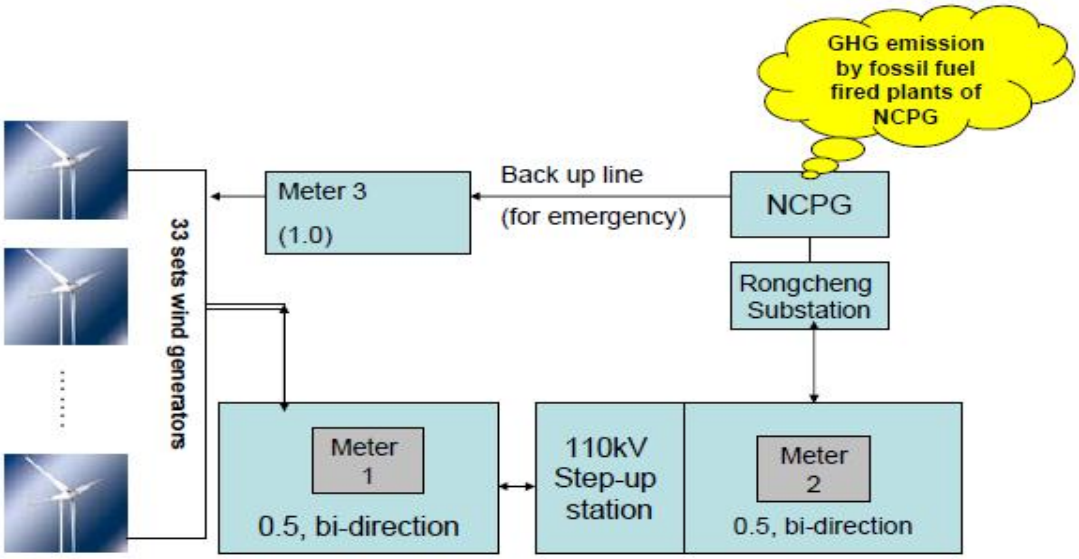

Figure 5. The schematic diagram of the position of meters

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 three years. Calibration report will be provided to the project owner.

4. Data monitoring

The readings of meters installed in the project activity site will be used for calculating the emission reductions. The monitoring process is as follows:

- The data is measured hourly and recorded monthly;

- The project owner provides the grid company with sales receipt and keeps the copies of these sales receipts. The power grid company provides the project owner with the data of power imported from the power grid;

- The project owner will provide DOE with record of net power generation data and copies of sales receipts;

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 project activity. This is an on-going process which will be ensured through the VCS mechanism in terms of the need for verification of the emissions on an annual basis according to this PD and the VCS manual.

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 VCS, project monitoring, the operation rules and quality controlling and management standard, data recording and archiving, etc.

8. Monitoring Report

The 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 DOE.