XINJIANG JIMUNAI CGN PHASE I WIND FARM PROJECT

Document Prepared By CGN Carbon Asset Management (Beijing) Co., Ltd.

Project Title	Xinjiang Jimunai CGN Phase I Wind Farm Project
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Prepared By	CGN Carbon Asset Management (Beijing) Co., Ltd.
Contact	Area 12 of Advanced Business Park, No. 188 west of South 4th Ring Road, No.2 Building, Beijing, The People's Republic of China Telephone: +86 10 63705765 Email:cgnwind@163.com

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1 PROJECT DETAILS

1.1 Summary Description of the Project

The Xinjiang Jimunai CGN Phase I Wind Farm Project (hereafter refers to the project) is to utilize wind resources for electricity generation through the construction of a wind farm with the installation of 33 wind turbines with capacities of 1500 kW each, which amount to a total installed capacity of 49.5 MW. The project is located at the southwest of Jimunai County, Xinjiang Uygur Autonomous Region, P. R. China. The geographical coordinates of the project is 86.0054° - 86.8443° east longitude and 47.5454°- 47.5796° north latitude. The electricity generated from the project is sold to Xinjiang Uygur Power Grid, an integral part of the Northwest China Power Grid (NWPG). By replacing the electricity generated from fossil fuel-fired power plants dominated NWPG; the project will achieve greenhouse gas (GHG) emission reductions by avoiding CO_2 emissions. The estimated annual net electricity output of the project is 117,315 MWh. The annual average and total emission reductions of the project during the second crediting period are estimated to be 91,423 tCO_2e and 914,230 tCO_2e respectively. The project is a grid-connected renewable energy project.

The scenario existing prior to the start of the implementation of the project activity is NWPG providing the same electricity service as the Project;

The baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity.

1.2 Sectoral Scope and Project Type

Category: Renewable electricity in grid connected application

Sectoral Scope 1: Energy industries (renewable -/non-renewable sources)

The project is not a grouped project.

1.3 Project Eligibility

The project generates renewable and clean electricity by using wind power that would otherwise have been provided by the NWPG, which reduces the emissions of CO_2 from fossil fuel-fired generation in the grid, and falls into the category of the six Kyoto Protocol greenhouse gases.

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

The project is to utilize wind power for electricity generation. Prior to the implementation of the project, the equivalent electricity supplied by the project was sourced from NWPG. Thus, the project

does not generate GHG emissions primarily for the purpose of their subsequent reduction, removal or destruction.

1.4 Project Design

The project is not a grouped project and is eligible under the scope of the VCS Program.

Eligibility Criteria

Not applicable as not a grouped project.

1.5 Project Proponent

Organization name	**Xinjiang Jimunai CGN Wind Power Co., Ltd.**
Contact person	Shi Lei
Title	CDM office director
Address	Area 12 of Advanced Business Park, No. 188 west of South 4th Ring Road, No.2 Building, Beijing, The People's Republic of China
Telephone	+86 10 63705765
Email	cgnwind@163.com

1.6 Other Entities Involved in the Project

Organization name	**CGN Carbon Asset Management (Beijing) Co., Ltd.**
Role in the Project	Consultancy
Contact person	Xing Hao
Title	VCS project manager
Address	Area 12 of Advanced Business Park, No. 188 west of South 4th Ring Road, No.2 Building, Beijing, The People's Republic of China
Telephone	+86 15989548122
Email	brys_xing@outlook.com

1.7 Ownership

The project proponent is Xinjiang Jimunai CGN Wind Power Co., Ltd., who has the full ownership of the project. 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's DNA, and the business

license of the project owner are evidences for legislative right. Besides, the equipment purchasing contract and the purchasing power agreement are the evidences for the ownership of the plant, equipment and power generating.

1.8 Project Start Date

19/03/2011(commissioning start date)

1.9 Project Crediting Period

In the registered VCS PD, the crediting period is described as from 19/03/2011 to 27/10/2011. A deviation is requested for the crediting period in the registered VCS PD. The project is registered under VCS Standard Version 3.4 and completed validation before 19/03/2020. Thus, according to VCS Standard Version 4.2, it remains eligible to apply the crediting period requirements under VCS Standard Version 3 which shall be a maximum of ten years and may be renewed at most twice, so the first renewable crediting period of the project should be updated from 19/03/2011 - 27/10/2011 to 19/03/2011 - 18/03/2021.

VCUs have been issued from 19/03/2011 to 27/10/2011 and 01/01/2017 to 31/12/2020. The GHG emission reductions from 28/10/2011 to 27/05/2012 and from 01/01/2013 to 31/12/2016 generated by the project has been issued as CERs under CDM program. The GHG emission reductions from 28/05/2012 to 31/12/2012 generated by the project is waiting for issuance request. The verification under VCS for the period from 01/01/2021 to 18/03/2021 is in process. Therefore, the monitoring period during the first VCS crediting period (19/03/2011 - 18/03/2021) is contiguous.

As the project is also registered as a CDM project with a seven year twice renewable project crediting period, and considering the lifetime of 20 years, it is not eligible for VCU issuance beyond 18/03/2031.The project first crediting period under VCS is from 19/03/2011 to 18/03/2021. This is the second crediting period from 19/03/2021 to 18/03/2031.

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)
19/03/2021~18/03/2022	91,423

19/03/2022~18/03/2023	91,423
19/03/2023~18/03/2024	91,423
19/03/2024~18/03/2025	91,423
19/03/2025~18/03/2026	91,423
19/03/2026~18/03/2027	91,423
19/03/2027~18/03/2028	91,423
19/03/2028~18/03/2029	91,423
19/03/2029~18/03/2030	91,423
19/03/2030~18/03/2031	91,423
Total estimated ERs	914,230
Total number of crediting years	10
Average annual ERs	91,423

1.11 Description of the Project Activity

The Xinjiang Jimunai CGN Phase I Wind Farm Project (hereafter refers to the project) is to utilize wind resources for electricity generation through the construction of a wind farm with the installation of 33 wind turbines with capacities of 1500 kW each, which amount to a total installed capacity of 49.5 MW in Jimunai County, Xinjiang Uygur Autonomous Region, P. R. China. The plant load factor provided to the government while applying the project activity for implementation approval will be adopted, which is defined ex-ante to be 27.05%, and expected net supplied power to the grid is 117,315 MWh per year. The estimated annual average annual emission reductions of the project are 91,423 tCO_2e during the second crediting period from 19/03/2021 to 18/03/2031. The project is a grid-connected renewable energy project. The electricity generated from the project is sold to Xinjiang Uygur Power Grid, an integral part of the Northwest China Power Grid (NWPG).

The scenario existing prior to the start of the implementation of the project activity is NWPG providing the same electricity which generated by fossil fuel fired power plants, to service as the Project.

The baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity.

For technology employed, the 33 sets of 1,500 kW turbines were chosen, manufactured by Goldwind Co., Ltd. The project will use domestic wind turbines. Hence, it does not involve technology transferred to the host parties. The technical design of the wind turbines is advanced and is deemed to reflect current good practice, and Key Technology Parameters are listed in Table 1.

Table 1 Key Technical specifications of wind turbines

Key Technology Parameter	Value
Model	77/1500
Rotor diameter (m)	77
Swept area (m^2)	4656
Cut-in wind speed (m/s)	3.0
Rated wind speed (m/s)	11.5
Cut-off wind speed (m/s)	22.0
Hub height of the wind turbines (m)	65
Capacity (kW)	1,500
Rated voltage (V)	620
Lifetime (years)	20

A 35kV/110kV on-site substation is set up at the project site. The electricity supplied by the project is delivered to the 35kV/110kV on-site substation via a 35kV transmission line, and then the electricity supplied by the project will delivered to Longwan Substation through 110kV transmission line. The electricity is transmitted to the NWPG finally. The electricity supplied to the grid by the project is monitored through metering equipment (meter monitoring both electricity input and electricity output) at the on-site substation. The data is also monitored and recorded at the on-site control center using a computer system. A backup power line will be used for supplied electricity in emergent case that the main power line fails to supply power. A meter is installed to measure the electricity imported via this line.

1.12 Project Location

The project is located at the southwest of Jimunai County, Xinjiang Uygur Autonomous Region, P. R. China. The geographical coordinates of the project is 86.0054° - 86.8443° east longitude and 47.5454°- 47.5796° north latitude. Figures A1 and A2 below show the geographical location of the project.

Figure A1. The location of the project in the map of P. R. China

Figure A2. The location of the project in the map of Xinjiang Uygur Autonomous Region, P. R. China

1.13 Conditions Prior to Project Initiation

The project activity is the installation of a new grid-connected wind power project and the generated power shall be exported to the NWPG. Prior to the implementation of the project activity, the equivalent 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 within NWPG.

The baseline scenario is the same as the scenario existing prior to the start of implementation of the project activity.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

The project complies with all Chinese relevant laws and regulations. It also obtained the approval letters from governmental authorities: Development and Reform Commission (DRC), as well as Environment Protection Bureau (EPB) of Xinjiang Uygur Autonomous Region. The two approvals well demonstrate that local government permits the construction of the project. Consequently, the project is compliance with laws, status and other regulatory frameworks.

1.15 Participation under Other GHG Programs

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

The project has been registered as a Clean Development Mechanism (CDM) project in UNFCCC (UNFCCC Ref. 5289), with the first 7 years crediting period from 28/10/2011 to 27/10/2018 and second 7 years crediting period from 28/10/2018 to 27/10/2025. The project has not been registered under GHG programs other than CDM and VCS.

As shown in the following table, total GHG emission reductions of 431,578 tCO_2 from 28/10/2011 to 27/05/2012 (both days included) and from 01/01/2013 to 31/12/2016 (both days included) generated by the project has been issued as CER under CDM program.

Period	GHG Program	Issued GHG emission reductions (tCO_2e)
28/10/2011~27/05/2012	CDM	74,517
28/05/2012~31/12/2012	CDM	Awaiting insurance request
01/01/2013~31/12/2016	CDM	357,061
Total	-	431,578

Please refer to the following link for details.

https://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1317203879.14/view.

1.15.2 Projects Rejected by Other GHG Programs

The project has not been rejected by other GHG Programs.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

The project proponent Xinjiang Jimunai CGN Wind Power Co., Ltd. as an enterprise for renewable energy investment, is not included in the compliance entity list by China national Emission Trading Scheme (ETS). Also, the project has not been registered as a CCER (Chinese Certified Emission Reductions) project in China. Thus, the emission reductions generated by project activity is not eligible to be used under the national emission trading program as per the requirement of the China ETS.

The project is not involved in an emission trading program or any other mechanism that includes GHG allowance trading. The GHG emission reductions and removals generated by the project will not be enforced to be used for compliance in China. The project proponent has signed statement on not being used for the compliance and no double counting claiming of the credits.

1.16.2 Other Forms of Environmental Credit

The project has not sought or received another form of GHG-related environmental credit, including renewable energy certificates during this crediting period.

1.17 Sustainable Development Contributions

The proposed project makes contribution to the local sustainable development as follows:

1. GHG emission reduction

The project activity will achieve obvious greenhouse gas (GHG) emission reductions by avoiding CO_2 emissions, as grid-connected fossil fuel-fired power dominates in the NWPG, the annual average emission reductions of the project during this crediting period is estimated to be 91,423 tCO_2e, which contributes to the China's commitment to peak carbon dioxide emissions before 2030. Thus, the project achieved SDG13 "Take urgent action to combat climate change and its impacts".

2. Increase the share of renewable energy

The project is to replace fossil fuel consumption by fired power plants in the NWPG which can increase the share of renewable energy and improve China's energy security and efficiency. Thus, the project achieved SDG7 "Ensure access to affordable, reliable, sustainable and modern energy for all".

3. Employment opportunities

The conducting of the project will offer job opportunities for local people during both the construction and operational period. Thus, the project achieved SDG8 "Promote sustained inclusive and sustainable economic growth, full and productive employment and decent work for all".

1.18 Additional Information Relevant to the Project

Leakage Management

According to the consolidated 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

No further information is required.

2 SAFEGUARDS

2.1 No Net Harm

According to the EIA (Environmental Impact Assessment) conducted by a third party, the environmental impact of the project was reduced to the minimum level. Thus, there are no negative environmental and/or socio-economic impacts due to the project. In fact, the project reduce greenhouse gas emissions and the environmental pollution caused by fossil fuels consumption. Meanwhile, the implementation of the project improves local socio-economic development through creating career opportunities and paying taxes.

2.2 Local Stakeholder Consultation

The project developer has sent out questionnaires to the stakeholders in the local County Jimunai Community for the comments of the project construction on 30/06/2010. 40 copies of questionnaire were distributed, and 38 pieces of reply were received. The recovery ratio is 95%. Among the interviewees, there were 35 farmers, 2 government officials and 1 student. 15 of them have educational level of middle school or below middle school, 22 of high school and 1 of college.

An invitation notice for stakeholder comments was later issued by the project owner, representatives of local stakeholders, including governmental officials of the local county and local residents, etc. attended the meeting in Jimunai County government meeting room on 02/07/2010 to discuss the questionnaires collected, introduce the project and further expressed their concerns or opinions. No negative opinion on construction of the project is heard and environmental considerations expressed by stakeholders are discussed on the meeting.

The questions regarding the project were mainly as follows:

a) Is the current living and/or working environment quiet?

b) Do you currently experience electromagnetic interference when watching TV at home?

c) Are there any negative impacts of the proposed project on the everyday life of local residents?

d) Is the proposed project going to help improve the living and/or working environment?

e) Which is the environmental topic that concerns you the most during the construction and operation of the proposed project?

f) Do you support the proposed project?

The summary of survey is listed as the following:

- 37 of them consider their current living and/or working environment quiet, only one person is unsure;

- 37 of them currently do not experience electromagnetic interference when watching TV at home and only one person is unsure;

- 38 of them think the proposed project will not make any negative impacts on their daily life;

- 38 of them think the proposed project will help improve their living and/or working environment;

- Regarding the construction and operation of the proposed project, 32 of them are most concerned with the noise level, and 6 of them are most concerned with wastewater from the project;

- 38 of them support the implementation of the proposed project.

Conclusion:

The local community possesses basically positive comments on the effects of the project. The interviewees considered that local social, economic and environmental development would be beneficial from the project. The response was overall supportive to the project implementation.

The project owner also has set out the mechanism for regular communication with local stakeholder.

First, stakeholders are informed of the status and progress of the project through the bulletin board on the village committee, and their comments can be recorded in the village committee's complaint book. This information is fed back to the project proponent by the contact person for a periodical response.

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

Finally, the contract person of project owner also meets local villagers to collect their comments and suggestions annually.

During the first crediting period, the project owner carried out the communication with local stakeholders in line with the mentioned mechanism of communication with local stakeholders and did not receive any negative comment for the project .

2.3 Environmental Impact

The environmental impact assessment for this project was carried out by Xinjiang Uygur Environmental Protection Technique Consulting Centre in August 2009 and approved by Xinjiang Uygur Environmental Protection Bureau on October 27th 2009 (xinhuanjianjianhan 212) and then renamed the EIA approval at May 18th 2010 (xinhuanpingjiahan 249). A summary of the report is illustrated as below:

Ambient air:

The impact on ambient air quality of the proposed project is mainly from dust during the construction phase. The excavation work is the primary emission source, however, it is a ground source and the particle size is quite large so that dust will deposit quickly on the ground. Immediately replant the areas where construction has completed, and sprinkling water on the road frequently should be conducted. Therefore, the proposed project will not cause any threat on the quality of ambient air.

Impact from noise:

There is some noise during the operation of wind turbines. The equipments and techniques with lower noise will be chosen to apply. Improvement on construction process and strengthening of equipment maintenance is emphasized. However, no village or resident exists near the project location within 200 meters. Consequently, the noise arising from operation and construction period has little impact to the surrounding environment.

Electromagnetic impact:

The operation of the wind farm will generate electromagnetic pollution, whereas the pollution is slight. In addition, the project is very far from local residents and village. Therefore, the electromagnetic pollution to the surrounding environment is insignificant.

Impact from solid waste:

Solid wastes generated from the proposed project activity are excavated earth material and domestic solid waste. Part of the excavated earth material will be backfilled, and the rest will be used for land levelling and road construction near the project site. The domestic solid waste will be legally collected and treated together with the waste from local residents.

Impact from wastewater:

Wastewater is mainly domestic wastewater. Wastewater quantity is fairly small and treatment methods will be applied for on-site primary treatment, and then the wastewater will be treated together with the local wastewater. Small-scale septic tanks should be built on the site, through which the wastewater can meet the national second degree standard of water discharge after treatment. Therefore, the impact of wastewater is limited and mitigated.

Impact on natural environment:

The lands permanently taken by wind farms are normally mountain ridges, where most of the vegetation is grass and shrub, without rare plants. No re-settlement is involved for construction of the project. The land taken by the proposed project is approximate of 20 mu (about 3.29 acres) permanently and 85 mu (about 14 acres) temporarily. In order to protect the landscape, vehicles are prohibited from driving on the landscape randomly and afforestation is required; hunting wild animals is strictly forbidden at the same time. Hence, the project construction has little impact on the mountain's eco-environment.

Impact on birds:

The fly height of birds is usually higher than 150 m, which is about 50 m higher than the height of wind turbines and birds usually can avoid obstacles as far as 100 to 200 meters away. In addition, the project site locates on mountainous area, with no lakes and marshes around, thus it is not a habitat for birds. Hence, the project construction and operation will have insignificant influence to the birds.

Conclusion:

The environmental impacts of the Xinjiang Jimunai CGN Phase I Wind Farm Project are not considered significant.

2.4 Public Comments

The project has been open for public comment on CDM website during CDM validation, no comments were received.

The project owner has set out the mechanism for regular communication with local stakeholder to receive public comments.

First, stakeholders were informed of the status and progress of the project through the bulletin board on the village committee, and their comments can be recorded in the village committee's complaint book. This information is fed back to the project proponent by the contact person for a periodical response.

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

Finally, the contract person of project owner also meets local villagers to collect their comments and suggestions annually.

No negative comments have been received on the project during the first crediting period.

2.5 AFOLU-Specific Safeguards

Not applicable as non-AFOLU project.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Following approved baseline & monitoring methodology is applied:

Methodology:

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

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

The applied tools:

Tools: "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/PAmethodologies/tools/am-tool-11-v3.0.1.pdf

Tools: "Tool to calculate the emission factor for an electricity system" (Version 07.0)

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

3.2 Applicability of Methodology

The approved methodology ACM0002 (version 20.0) is applicable to the project activity and the project meets the applicability of the applied methodology as follows:

Clauses	Requirements of the ACM0002	Scenario of the project	Conclusion
1	This methodology is applicable to grid-connected renewable energy power generation project activities that: a) Install a Greenfield power plant; b) Involve a capacity addition to (an) existing plant(s); c) Involve a retrofit of (an) existing operating plants/units; d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or e) Involve a replacement of (an) existing plant(s)/unit(s).	The project is a greenfield NWPG-connected renewable power generation project.	Applicable
2	The methodology is applicable under the following conditions: (a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; (b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	The project is a newly built wind power project and the project activity involves the installation of the wind power plant.	Applicable
3	In case of hydro power plants, one of the following conditions must apply: (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or (b) The project activity is implemented in existing single or multiple reservoirs,	Not applicable, the project is not a hydro power plant, so this applicability condition does not need to be considered.	NA

Clauses	Requirements of the ACM0002	Scenario of the project	Conclusion
	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.		
4	In the case of integrated hydro power projects, project proponent shall: Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity	Not applicable, the project is not a hydro power plant, so this applicability condition does not need to be considered.	NA

Clauses	Requirements of the ACM0002	Scenario of the project	Conclusion
	for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore, this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.		
5	The methodology is not applicable to: a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; b) Biomass fired power plants/units.	The project does not involve switching from fossil-fuels to renewable energy sources at the site of the project activity and the project is not a biomass-fired power project.	NA
6	In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".	Not applicable, the project is a newly built wind power project.	NA

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

Tool	Criteria	Applicability	Conclusion
Tool to calculate the emission factor for an electricity system	This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).	The project is the installation of a wind power plant supplying electricity to the grid.	Applicable

Tool	Criteria	Applicability	Conclusion
Tool to calculate the emission factor for an electricity system	In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	The project electricity system is located in a non-Annex I country.	NA
Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period	This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period, as required by paragraph 49 (a) of the modalities and procedures of the clean development mechanism. The tool consists of two steps: The first step provides an approach to evaluate whether the current baseline is still valid for the next crediting period. The second step provides an approach to update the baseline in case that the current baseline is not valid anymore for the next crediting period.	The validity of the baseline of the project is assessed by the following two steps: Evaluate whether the current baseline is still valid for the next crediting period; Update the baseline in case that the current baseline is not valid anymore for the next crediting period.	Applicable

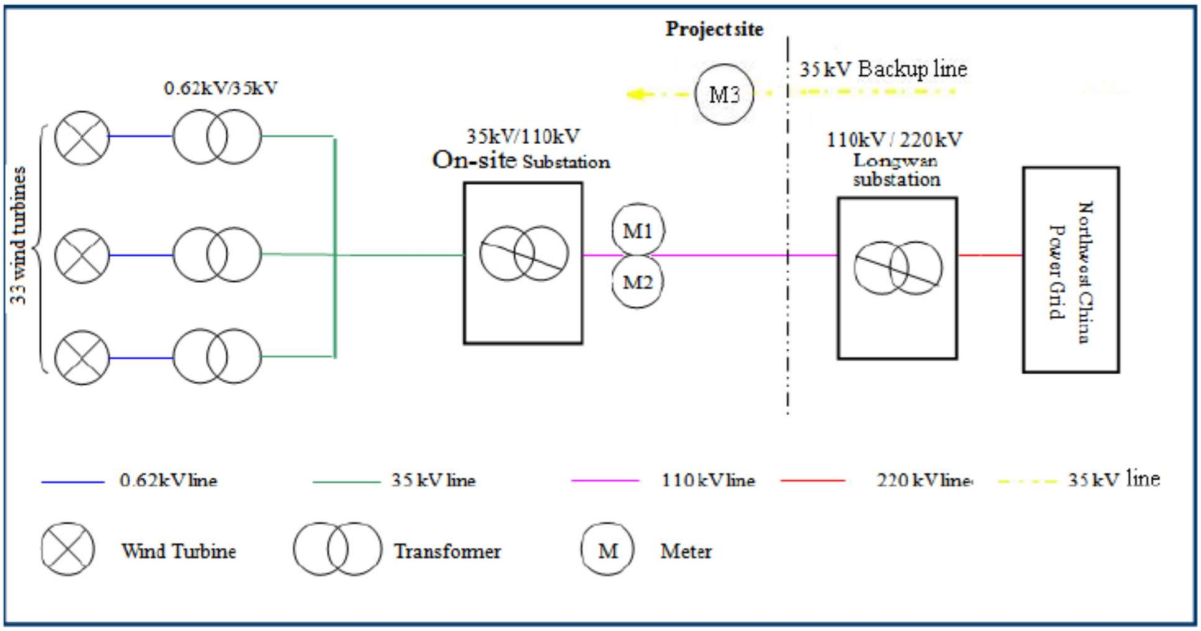
3.3 Project Boundary

The spatial extent of the project boundary includes the project site and all power plants physically connected to NWPG. NWPG is an electricity system which is defined by the spatial extent of the power plants that can be dispatched without significant transmission constraints.

Using the boundary definitions of the 2019 Baseline Emission Factors for Regional Power Grids in China, NWPG consists of Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang power grids. The electricity transmission between different provinces in NWPG is very large and it is reasonable for the project to regard the project site and all power plants physically connected to NWPG as the project boundary.

Figure 2 presents a flow diagram within the project boundary including all the equipment, systems.

Figure 2 Flow diagram of the project boundary



The sources and types of GHG included in the project boundary are listed below.

Source		Gas	Included?	Justification/Explanation
Baseline	CO_2 emissions from electricity generation in fossil fuel-fired power plants that is displaced due to the project activity.	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
		Other	No	Minor emission source
Project	The wind power plant	CO_2	No	No CO_2 emissions are emitted from the project
		CH_4	No	Project activity does not emit CH_4
		N_2O	No	Project activity does not emit N_2O
		Other	No	Project activity does not emit other gas

3.4 Baseline Scenario

The Project Activity is the installation of a new Greenfield power plant, and is not a capacity addition, retrofit, rehabilitation or replacement of existing grid-connected renewable power plant/unit. Therefore, the baseline scenario is prescribed in the methodology:

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, as reflected

in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

The selected methodology prescribes the baseline scenario; thus no further analysis is required.

The methodological tool "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" (version 3.0.1) is adopted to assess the continued validity of the baseline and to update the baseline. 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.

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

If the current baseline complies with all relevant mandatory national and/or sectoral policies which have come into effect after the submission of the project activity for validation or the submission of the previous request for renewal of the crediting period and are applicable at the time of requesting renewal of the crediting period, go to Step 1.2.

- There are no new national and/or sectoral policies that could affect the baseline scenario at the time of requesting renewal of the crediting period. The current baseline complies with all relevant mandatory national and/or sectoral policies. Hence in the absence of the project activity the electricity would still have been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

Step 1.2: Assess the impact of circumstances.

In the situation where the baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment, an assessment of the changes in market characteristics is required for the renewal of the crediting period.

- The baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment. Baseline emissions are primarily derived from the fossil fuel power plants in the NWPG. For total electricity generation produced by fossil fuel power plants, the average share of the five most recent years is more than 50% of total electricity generation in NWPG, the proportions are 76%, 76%, 76%, 73% and 70% from the year 2015 to 2019, respectively. The percentage has not been changed significantly in recent 5 years. Therefore, market characteristics do not have impact on the baseline emissions.

Evaluate whether the conditions used to determine the baseline emissions in the previous crediting period are still valid. Assess the availability of new fuels or raw materials and the impact of electricity or fuel prices in the identification of the current practice for the baseline emissions.

- The conditions used to determine the baseline emissions in the previous crediting period are still valid. The availability of new fuels or raw materials or the level of fuel prices has no impact

on the identification of the current practice for the baseline emissions. Presently the NWPG is dominated by the fossil fuel power plants. The availability of new fuels or raw materials or the level of fuel prices has no impact on the baseline emissions.

If the new circumstances make a continued validity of the current baseline not plausible, then the current baseline needs to be updated for the subsequent crediting period.

As there are no new circumstances that make a continued validity of the current baseline not plausible, the current baseline does not need to be updated for the second crediting period.

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

This sub-step should only be applied if the baseline scenario identified at the validation of the project activity was the continuation of use of the current equipment(s) without any investment and, the projects proponents or third party (or parties) would undertake an investment later due, for example, to the end of the technical lifetime of the equipment(s) before the end of the crediting period or the availability of a new technology.

Assess whether the remaining technical lifetime of the equipment that would have continued to be used in the absence of the project activity, as determined in the CDM-PDD or CDM-PDD-REN, exceeds the crediting period for which renewal is requested.

Take into consideration the market penetration of different technologies. Evaluate the penetration rate of different technologies that are available in the market and evaluate how they could affect the baseline.

- As determined in the CDM-PDD and CDM-PDD-REN, the baseline scenario 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 in NWPG, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system". The projects proponents or third party (or parties) would not undertake an investment later due. The combined margin calculation automatically takes account of any issues regarding remaining technical lifetime or market penetration.

If the baseline scenario of the project activity is the continuation of use of the current equipment(s) without any investment and the projects proponents or third party(ies) will undertake an investment later, but before the end of a crediting period, then the current baseline needs to be updated for that crediting period or the crediting of emission reductions should be limited to the period before the baseline equipment would cease its operation.

Therefore, the current baseline does not need to be updated for the second crediting period.

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

Assess whether data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period are still valid or whether they should be updated. Updates should be undertaken in the following cases:

- Where IPCC default values are used, the values should be updated if any new default values have been adopted and published by the IPCC, for example, in guidelines for national GHG inventories, IPCC assessment report or special reports by the IPCC;
- Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore as a result of the CDM project activity

Data and parameters that need to be updated are as follows:

$EF_{grid,CM,y}$: the baseline emission factor that determined once for the first crediting period at the time of validation, hence it has been updated using the latest version of "Tool to calculate the emission factor for an electricity system". Please refer to section 4 for details.

$EF_{grid,OM,y}$: the baseline emission factor that determined once for the first crediting period at the time of validation, hence it has been updated using the latest version of "Tool to calculate the emission factor for an electricity system". Please refer to section 4 for details.

$EF_{grid,BM,y}$: the baseline emission factor that determined once for the first crediting period at the time of validation, hence it has been updated using the latest version of "Tool to calculate the emission factor for an electricity system". Please refer to section 4 for details.

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

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

If any of the data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period are not valid anymore, the current baseline needs to be updated for the subsequent crediting period.

In accordance with the methodology, the grid emission factor and all the values in its calculation are updated in section 4.

If the application of Steps 1.1, 1.2, 1.3 and 1.4 confirmed that the current baseline as well as data and parameters are still valid for the subsequent crediting period, then this baseline, data and parameters can be used for the renewed crediting period. Otherwise, proceed to Step 2.

The original baseline needs to be updated to incorporate the latest grid emission factor in accordance with the methodology.

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

This step is only applicable if any of the Steps 1.1, 1.2, 1.3 and/or 1.4 showed that the current baseline needs to be updated.

Step 2.1: Update the current baseline

Update the current baseline emissions for the subsequent crediting period, without reassessing the baseline scenario, based on the latest approved version of the methodology applicable to the project activity. The procedure should be applied in the context of the sectoral policies and circumstances that are applicable at the time of request for renewal of the crediting period.

As shown in step 1.1 above, in accordance with the procedures for renewal of the crediting period of a registered CDM project activity, the original baseline, as updated, remains valid taking new relevant national and/or sectoral policies and circumstances into account.

Step 2.2: Update the data and parameters

If the application of Step 1.4 showed that the data and/or parameter(s) that were only determined at the start of the crediting period and not monitored during the crediting period are not valid anymore, project participants should update all applicable data and parameters, following the guidance in Step 1.4.

Please refer to the step 1.4,

Conclusion regarding the assessment of the validity of the original baseline scenario

In accordance with the procedures for renewal of the crediting period of a registered CDM and VCS project activity, the original baseline, as updated in accordance with in section 4, remains valid taking new relevant national and/or sectoral policies and circumstances into account.

The updated baseline emission factor for the project ($EF_{grid,CM,y}$) is 0.7793 tCO_2e/MWh.

3.5 Additionality

The project has demonstrated its additionality in the first crediting period and no changes affect the additionality of the project since its registration. There are no new national and/or sectoral policies that could affect the baseline scenario during the renewal of the crediting period. Of course no regulatory surplus required comparing with the first validation at time of renewal of crediting period.

3.6 Methodology Deviations

There is no deviation applied to this second crediting period

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

According to the ACM0002 (Version 20.0), baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity, calculated as follows:

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

Where:

BE_y	= Baseline emission in year y (tCO_2/yr)
$EG_{PJ,y}$	= The quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the 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 the "Tool to calculate the emission factor for an electricity system"

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

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

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)

4.1.1 To calculate the emission factor for an electricity system

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

Step 1. Identify the relevant electricity system

According to the "Tool 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 centre responsible for scheduling and dispatching electricity generated by the project activity.

Where the dispatch area is controlled by more than one dispatch centre, i.e. layered dispatch area, the higher-level area shall be used as a delineation of the project electricity system (e.g. where regional dispatch centres are required to comply with dispatch orders of the national dispatch centre then area controlled by the national dispatch centre 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.

Since Chinese DNA has published a delineation of the project electricity system and connected electricity systems, Option 1 is applied for the project. According to the delineations, the Northwest China Power Grid (NWPG), is identified as the relevant electric power system of the project, which includes Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang provincial power grids. The project is located in Jimunai County, Xinjiang Uygur Autonomous Region, P. R. China. and covered by the Northwest China Power Grid (NWPG), According to the "2019 Baseline Emission Factors for Regional Power Grids in China", There is no net electricity imports to NWPG. Therefore, Northwest China Power Grid (NWPG), is chosen as the relevant electric power system.

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

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

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

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

Based on China's real situation, 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 the following methods:

(a) Simple OM, or

(b) Simple adjusted OM, or

(c) Dispatch Data Analysis OM, or

(d) Average OM.

In China, specific data from the grid or each power plant is treated as business confidential and thus not public available. Therefore, method (b) and method (c) is not suitable for the project and method(a) is selected.

According to ACM0002, the Simple OM method (a) can only be applied when low-cost/must run resources[1] constitute less than 50% of total grid generation in average of the five most recent years or based on long-term normal for hydroelectric production.

The share of low-cost/must-run generation in NWPG is 24%, 24%, 24%, 27%,and 30% of total generation of NWPG from the year 2014 to 2018, respectively (China Electric Power Yearbooks 2015-2019), all lower than 50%, which satisfied the applicability of the method (a), therefore, the simple OM method is chosen for the calculation of the OM emission factor $EF_{grid,OM,y}$.

The simple OM 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. As per the latest version of "Tool to calculate the emission factor for an electricity system", one of the following methods should be chosen to calculate the simple OM emission factor:

- **Ex ante option:** If the ex-ante option is chosen, the emission factor is determined once at the validation stage. Thus, no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation. For off-grid power plants, use a single calendar year within the five most recent calendar years prior to the time of submission of the CDM-PDD for validation;
- **Ex post option:** If the ex post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emission factor to be updated annually during monitoring. If the data required to calculate the emission factor for year y is usually only available later than six months after the end of year y, alternatively the emission factor of the previous year (y-1) may be used. If the data is usually only available 18 months after the end of the year y, the emission factor of the year proceeding the previous year (y-2) may be used. The same data vintage (y, y-1 or y-2) should be used throughout all crediting periods.

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

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

[1] Low-cost/must-run resources are defined as power plants with low marginal generation costs or power plants that are dispatched independently of the daily or seasonal load of the grid. They typically include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation. If coal is obviously used as must-run, it should also be included in this list, i.e. excluded from the set of plants.

Based on the analysis of the step 3, the simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units. The simple OM may be calculated by one of the following two options:

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

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

For the project activity, the required data for the exercise of Option A is not available and those of Option B can be obtained from official sources, and off-grid power plants are not included in the calculation, therefore, Option B is chosen to calculate the operating margin emission factor:

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.

As the data required by option A is not available in China, and the 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 in China, and off-grid power plants are not included in the calculation. Therefore, Option B is used for calculating project OM as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_y} \quad \text{..... (2)}$$

Where:

$EF_{grid,OMsimple,y}$	= Simple operating margin CO_2 emission factor in year y (tCO_2/MWh)
$FC_{i,y}$	= 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)
EGy	= 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

= The relevant year as per the data vintage chosen in Step 3

y

If available, $NCV_{i,y}$ and $EF_{CO2,i,y}$ from the fuel supplier of the power plants in invoices may be used; or, regional or national average default values may be used. In this PDD, $NCV_{i,y}$ of different fuels are obtained from China Energy Statistical Yearbook 2016. With regard to the fuel types where $NCV_{i,y}$ fluctuate in a certain range, the floor values of the fluctuation range are used for conservatism. $EF_{CO2,i,y}$ of fossil fuel comes from IPCC default values.

The Simple OM Emission Factor ($EF_{grid,OMsimple,y}$) of the project is calculated on the basis of the fuel consumption data for electricity generation of the NWPG, not including those of low-operating cost and must-run power plants, such as wind power, hydropower and nuclear etc. These data are obtained from the China Electric Power Yearbook (2016~2018, published annually) and China Energy Statistical Yearbook (2016~2018). Based on these data, the Simple OM Emission Factor ($EF_{grid,OMsimple,y}$) of the NWPG is calculated as 0.8922 tCO_2e/MWh.

Step 5. Calculate the build margin emission factor

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

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

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

The PD chooses **Option 1,** which requires the project participant to calculate the Build Margin Emission Factor $EF_{grid,BM,y}$, ex-ante based on the most recent information available on units already built for sample group m at the time of PD submission.

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

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

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

Otherwise:

(d) Exclude from SET_{sample} the power units which started to supply electricity to the grid more than10 years ago. Include in that set the power units registered as CDM project activity, starting with power units that started to supply electricity to the grid most recently, until the electricity generation of the new set comprises 20 per cent of the annual electricity generation of the project electricity system (if 20 per cent falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) to the extent is possible. Determine for the resulting set ($SET_{sample\text{-}CDM}$) the annual electricity generation ($AEG_{SET\text{-}sample\text{-}CDM}$, in MWh);

If the annual electricity generation of that set is comprising at least 20 per cent of the annual electricity generation of the project electricity system (i.e. $AEG_{SET\text{-}sample\text{-}CDM} \geq 0.2 \times AEG_{total}$), then use the sample group $SET_{sample\text{-}CDM}$ to calculate the build margin. Ignore steps (e) and (f).

(e) Include in the sample group $SET_{sample\text{-}CDM}$ the power units that started to supply electricity to the grid more than 10 years ago until the electricity generation of the new set comprises 20 per cent of the annual electricity generation of the project electricity system (if 20 per cent falls on part of the generation of a unit, the generation of that unit is fully included in the calculation);

(f) The sample group of power units m used to calculate the build margin is the resulting set ($SET_{sample\text{-}CDM\text{-}>10yrs}$).

However, in China, it is very difficult to obtain the data of the five existing power plants built most recently or the power plants capacity additions in the electricity system that comprise 20 per cent of the system generation (in MWh) and that were built most recently, since no data of plant specific generation and fossil fuel consumption is currently available in China. As none of the

above options can be selected, as approved by the CDM EB, the follows are adopted to calculate the BM[2]:

First, to calculate the newly added installed capacity and the contribution component of other various power generation technologies, then calculate of the weight of newly added installed capacity of each power generation technology, and finally, to calculate BM emission factor using the commercially optimal efficiency level of each power generation technology.

According to the "Tool to calculate the emission factor for an electricity system", the build margin emissions factor ($EF_{grid,BM,y}$) is calculated as the generation-weighted average emission factor (tCO_2e/MWh) of all power units m during the most recent year y for which power generation data is available. The calculation equation is as follows:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad \cdots\cdots \quad (3)$$

Where:

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

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

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

m = Power units included in the build margin

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

Since the generating capacity of coal-fired, oil-fired and gas-fired technologies can't be separated from the existing statistical data, the following measures are taken for the calculation:

First, based on the available data of the latest year, determine the ratio of CO_2 emissions from coal, oil, and gas consumption for power generation to the total CO_2 emission; Second, to calculate the emission factor of the thermal power based on the weight of CO_2 emission from coal, oil, and gas, and the emissions factors using commercial technologies with optimal efficiency. And finally, to multiply the thermal emission factor with the portion of the thermal power comprising 20 per cent of the newly added capacity.

Sub-step 5.1. Calculate the weights of CO_2 emission of solid, liquid and gaseous fossil fuels in total emissions for power generation

[2] http://cdm.unfccc.int/UserManagement/FileStorage/6POIAMGYOEDOTKW25TA20EHEKPR4DM

$$\lambda_{Coal} = \frac{\sum_{i \in COAL, j} F_{i,j,y} \times NCV_{i,y} \times EF_{co_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{co_2,i,j,y}} \quad \text{..... (4)}$$

$$\lambda_{Oil} = \frac{\sum_{i \in OIL, j} F_{i,j,y} \times NCV_{i,y} \times EF_{co_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{co_2,i,j,y}} \quad \text{..... (5)}$$

$$\lambda_{Gas} = \frac{\sum_{i \in GAS, j} F_{i,j,y} \times NCV_{i,y} \times EF_{co_2,i,j,y}}{\sum_{i,j} F_{i,j,y} \times NCV_{i,y} \times EF_{co_2,i,j,y}} \quad \text{..... (6)}$$

Where:

$FC_{i,j,y}$	=	Amount of fossil fuel type i consumed in province *j* in year *y* (mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ/t or GJ/m³)
$EF_{CO2,i,j,y}$	=	CO_2 emission factor of fossil fuel type i in year *y* (tCO_2e/GJ)

Sub-step 5.2. Calculation of Emission Factor of Relevant Thermal Power

$$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y} \text{..... (7)}$$

Where:

$EF_{Coal,Adv,y}$, $EF_{Oil,Adv,y}$ and $EF_{Gas,Adv,y}$ refers to the emission factors representing best technologies commercially available for coal, oil and gas fired power plants, respectively.

Sub-step 5.3. Calculate of BM of the grid

$$EF_{grid,BM,y} = \frac{CAP_{Thermal,y}}{CAP_{Total,y}} \times EF_{Thermal,y} \text{..... (8)}$$

Where:

$CAP_{Total,y}$	=	The total newly added electricity generation capacity (MW) in year y;
$CAP_{Thermal,y}$	=	The newly added electricity generation capacity of thermal power (MW) in year y

Key parameters used to calculate BM emission factor include the low calorific value of each fossil fuel, the oxidation rate, the potential emission factors, and the efficiency of various power generation technologies. The data of low calorific value of each fossil fuel and their oxidation rate comes from China Energy Statistical Yearbook 2018. The potential emission factors are sourced

from "2006 IPCC Guidelines for National Greenhouse Gas Inventories" Table 1.3 and Table 1.4 of Page 1.21-1.24 in Chapter one, Volume 2 Energy.

According to the latest and available data at the time of this PD submission, $EF_{grid,BM,y}$ is calculated to be 0.4407 tCO_2e/MWh.

Step 6. Calculate the combined margin emission factor

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

(a) Weighted average CM; or

(b) Simplified CM.

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

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

(a) The project activity is located in: (i) a Least Developed Country (LDC); or in (ii) a country with less than 10 registered CDM projects at the starting date of validation; or (iii) a Small Island Developing States (SIDS); and

(b) The data requirements for the application of step 5 above cannot be met.

The PD choose option A.

The combined margin emission factor is calculated as follows:

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

Where:

$EF_{grid,BM,y}$	=	Build margin CO_2 emission factor for the project electricity system in year *y* (tCO_2/MWh)
$EF_{grid,OM,y}$	=	Operating margin CO_2 emission factor for the project electricity system in year *y* (tCO_2/MWh)
ω_{OM}	=	Weighting of operating margin emissions factor (%)
ω_{BM}	=	Weighting of build margin emissions factor (%)

The combined margin emissions factor $EF_{grid,CM,y}$ should be calculated as the weighted average of the Operating Margin emission factor ($EF_{grid,OM,y}$) and the Build Margin emission factor ($EF_{grid,BM,y}$), where ω_{OM}= 0.75 and ω_{BM} = 0.25 for wind project (owing to their intermittent and non-dispatchable nature) for the first crediting period and for subsequent crediting periods. The ($EF_{grid,OM,y}$) and ($EF_{grid,BM,y}$) are calculated as described in Step 4 and 5.

$EF_{grid,CM,y}$ = 0.8922 tCO_2e/MWh *0.75+0.4407tCO_2e/MWh *0.25 = 0.7793 (tCO_2e/MWh)

4.2 Project Emissions

According to ACM0002 (version 20.0), the project is a wind farm, belongs to renewable energy activity, hence PE_y =0 tCO_2e/MWh.

4.3 Leakage

According to ACM0002 (version 20.0), no leakage is considered for this project.

4.4 Net GHG Emission Reductions and Removals

The annual emission reductions ER_y for the project activity are calculated as the baseline emissions minus the project emissions. Being the project of a greenhouse gas GHG zero-emission activity, the final GHG emission reductions are calculated as follows:

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

Where:

ER_y	Emission reductions in year y (tCO_2)
BE_y	Baseline Emissions in year y (tCO_2)
PE_y	Project emissions in year y (tCO_2)

And the baseline emissions (BE_y in tCO_2) are the product of the baseline emissions factor ($EF_{grid,CM,y}$ in tCO_2/MWh) times the electricity supplied by the project activity to the grid ($EG_{facility}$ in MWh). The calculation formula is as follows:

$$BE_y = EG_{facility} \times EG_{grid,CM,y} \quad \text{(11)}$$

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)
19/03/2021~18/03/2022	91,423	0	0	91,423
19/03/2022~18/03/2023	91,423	0	0	91,423
19/03/2023~18/03/2024	91,423	0	0	91,423
19/03/2024~18/03/2025	91,423	0	0	91,423
19/03/2025~18/03/2026	91,423	0	0	91,423
19/03/2026~18/03/2027	91,423	0	0	91,423

19/03/2027~18/03/2028	91,423	0	0	91,423
19/03/2028~18/03/2029	91,423	0	0	91,423
19/03/2029~18/03/2030	91,423	0	0	91,423
19/03/2030~18/03/2031	91,423	0	0	91,423
Total	914,230	0	0	914,230

5 MONITORING

5.1 Data and Parameters Available at Validation

The baseline gird emission factor is obtained directly from the official source 2019 Baseline Emission Factors for Regional Power Grids in China by China's DNA. Thus, the relevant basis parameters for calculation of are not described in detail here. With consideration of the fact of the Project, data and parameters that are available at validation are summarized in below tables.

Data/Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2e/MWh
Description	The baseline grid emission factor
Source of data	Tool to calculate the emission factor for an electricity system version 07.0
Value applied	0.7793
Justification of choice of data or description of measurement methods and procedures applied	As per the requirements in "Tool to calculate the emission factor for an electricity system version 07.0"
Purpose of Data	Calculation of baseline emissions
Comments	Calculated ex ante and fixed for the second crediting period.

Data/Parameter	$EF_{grid,OM,y}$
Data unit	tCO_2e/MWh
Description	Operating Margin Emission Factor for Northwest China Power Grid

Source of data	2019 Baseline Emission Factors for Regional Power Grids in China" published by China DNA
Value applied	0.8922
Justification of choice of data or description of measurement methods and procedures applied	Official public data from China DNA, calculated as per the requirements in "Tool to calculate the emission factor for an electricity system version 07.0"
Purpose of Data	Calculation of baseline emissions
Comments	Ex ante and fixed for the second crediting period.

Data/Parameter	$EF_{grid,BM,y}$
Data unit	tCO_2e/MWh
Description	Build Margin Emission Factor for Northwest China Power Grid
Source of data	2019 Baseline Emission Factors for Regional Power Grids in China" published by China DNA
Value applied	0.4407
Justification of choice of data or description of measurement methods and procedures applied	Official public data from China DNA, calculated as per the requirements in "Tool to calculate the emission factor for an electricity system version 07.0"
Purpose of Data	Calculation of baseline emissions
Comments	Ex ante and fixed for the second crediting period.

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

measurement methods and procedures applied	
Purpose of Data	Calculation of $EF_{grid,CM,y}$
Comments	/

Data/Parameter	ω_{BM}
Data unit	-
Description	Weighting of operating margin emissions factor
Source of data	"Tool to calculate the emission factor for an electricity system" (version 07.0)
Value applied	0.25
Justification of choice of data or description of measurement methods and procedures applied	Official public data from China DNA, calculated as per the requirements in "Tool to calculate the emission factor for an electricity system version 07.0"
Purpose of Data	Calculation of $EF_{grid,CM,y}$
Comments	/

5.2 Data and Parameters Monitored

Data/Parameter	$EG_{facility,y}$
Data unit	MWh/yr
Description	Quantity of net electricity generation supplied to the grid by the project to the Grid in year y.
Source of data	Electricity meter readings from the meters at the project site
Description of measurement methods and procedures to be applied	The readings of the electricity meter are continuously measured and monthly recorded. Monitoring equipments include two meters, the main meter (M1) and the backup meter (M2). All the meters are the multifunctional electricity meters (accuracy degree is 0.2s, bidirectional). M1 and M2 is used to monitor the electricity supplied to the grid by the proposed project and the electricity purchased from the Grid. Both meters are equipped at the high pressure site (110kV) of the 110kV on-site substation of the

	project and the project owner is responsible for conducting the meters monitoring. A backup power line will be used for supplied electricity in emergent case that the main power line fails to supply power. A meter (hereafter referred as meter M3) is installed to measure the electricity imported via this line. This meter is owned, maintained and monitored by the local grid company. The accuracy of the meter will be no less than 1.0.
Frequency of monitoring/recording	Continuous measurement and monthly recording
Value applied	117,315 MWh
Monitoring equipment	Please refer to Table 2 below.
QA/QC procedures to be applied	The net electricity supplied to the grid by the project can be monitored and recorded at the central control room. The project operator is responsible for recording such data. Receipts for electricity sales will be kept for further verification. The data will be archived for 2 years following the end of the last crediting period by means of electronic and paper backup. The meter would be calibrated once a year according to the rules of Relative Technical Administrative Code of Electric Energy Metering.
Purpose of data	Calculation of baseline emissions
Calculation method	The $EG_{facility,\ y}$ is calculated by $EG_{export,\ y}$, $EG_{import,,y}$ and $EG_{im\text{-}backup,\ y}$: $EG_{facility,\ y} = EG_{export,\ y} - EG_{import,,y} - EG_{im\text{-}backup,\ y}$
Comments	-

Data/Parameter	$EG_{export,y}$
Data unit	MWh
Description	Electricity supplied to the grid by the project in year y.
Source of data	Electricity meter reading (M1 as main meter, M2 as backup meter) at the on-site substation
Description of measurement methods and procedures to be applied	The readings of the electricity meter are continuously measured and monthly recorded. Monitoring equipments include two meters, the main meter (M1) and the backup meter (M2). All the meters are the multifunctional electricity meters (accuracy degree is 0.2s, bidirectional). M1 and M2 is used to monitor the electricity supplied to the grid by the proposed project and the electricity

	purchased from the Grid. Both meters are equipped at the high pressure site (110kV) of the 110kV on-site substation of the project and the project owner is responsible for conducting the meters monitoring.
Frequency of monitoring/recording	Continuously measured and monthly recorded
Value applied	-
Monitoring equipment	Please refer to Table 2 below.
QA/QC procedures to be applied	The electricity supplied to the grid by the project is monitored and recorded at the central control room. The project operator is responsible for recording such data. Receipts for electricity sales will be kept for further verification. The data will be archived for 2 years following the end of the last crediting period by means of electronic and paper backup. The meter would be calibrated once a year according to the rules of Relative Technical Administrative Code of Electric Energy Metering.
Purpose of data	Calculation of baseline emissions
Calculation method	Not applicable
Comments	The reading from the main meter (M1) is first choice. When the main meter is out of order, the reading from the backup meter (M2) is used.

Data/Parameter	$EG_{import,y}$
Data unit	MWh
Description	Electricity purchased from the grid by the project in year y.
Source of data	Electricity meter reading (M1 as main meter, M2 as backup meter) at the on-site substation.
Description of measurement methods and procedures to be applied	The readings of the electricity meter are continuously measured and monthly recorded. Monitoring equipments include two meters, the main meter (M1) and the backup meter (M2). All the meters are the multifunctional electricity meters (accuracy degree is 0.2s, bidirectional). M1 and M2 is used to monitor the electricity supplied to the grid by the proposed project and the electricity purchased from the Grid. Both meters are equipped at the high pressure site (110kV) of the 110kV on-site substation of the

	project and the project owner is responsible for conducting the meters monitoring.
Frequency of monitoring/recording	Continuously measured and monthly recorded
Value applied	-
Monitoring equipment	Please refer to Table 2 below.
QA/QC procedures to be applied	The electricity purchased from the grid by the project is monitored and recorded at the central control room. The project operator is responsible for recording such data. Receipts for electricity sales will be kept for further verification. The data will be archived for 2 years following the end of the last crediting period by means of electronic and paper backup. The meter would be calibrated once a year according to the rules of Relative Technical Administrative Code of Electric Energy Metering.
Purpose of data	Calculation of baseline emissions
Calculation method	Not applicable
Comments	-

Data/Parameter	$EG_{im\text{-}backup,\ y}$
Data unit	MWh
Description	Electricity imported from the grid by the project through the backup power line in the year y.
Source of data	Electricity meter reading (M3) at the project site.
Description of measurement methods and procedures to be applied	A backup power line will be used for supplied electricity in emergent case that the main power line fails to supply power. A meter (hereafter referred as meter M3) is installed to measure the electricity imported via this line. This meter is owned, maintained and monitored by the local grid company. The accuracy of the meter will be no less than 1.0.
Frequency of monitoring/recording	Continuously measured and monthly recorded
Value applied	-
Monitoring equipment	Please refer to Table 2 below.

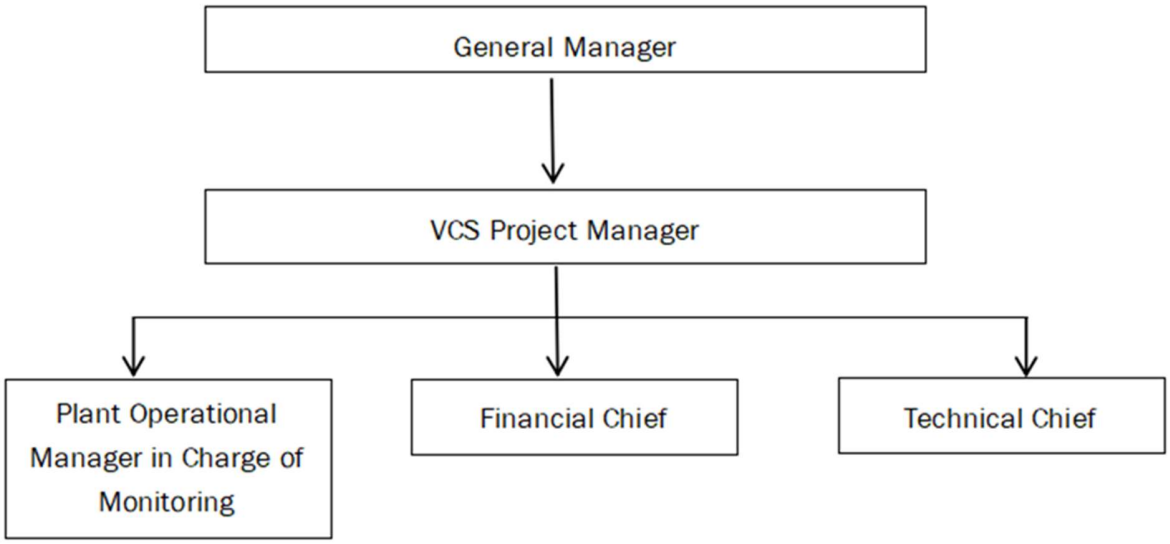
QA/QC procedures to be applied	The electricity imported from the grid through the backup line is monitored and recorded at the central control room. The project operator is responsible for recording such data. Receipts for electricity sales will be kept for further verification. The data will be archived for 2 years following the end of the last crediting period by means of electronic and paper backup. The meter would be calibrated once a year according to the rules of Relative Technical Administrative Code of Electric Energy Metering.
Purpose of data	Calculation of baseline emissions
Calculation method	Not applicable
Comments	-

Table 2 Detailed information of the meters

	M1	M2	M3
Type	DTSD718	DTSD718	DSZ188
Accuracy class	0.2S	0.2S	0.5S
Serial No.	800000287822	800000287824	01000002217676
Calibration frequency	annually	annually	annually

5.3 Monitoring Plan

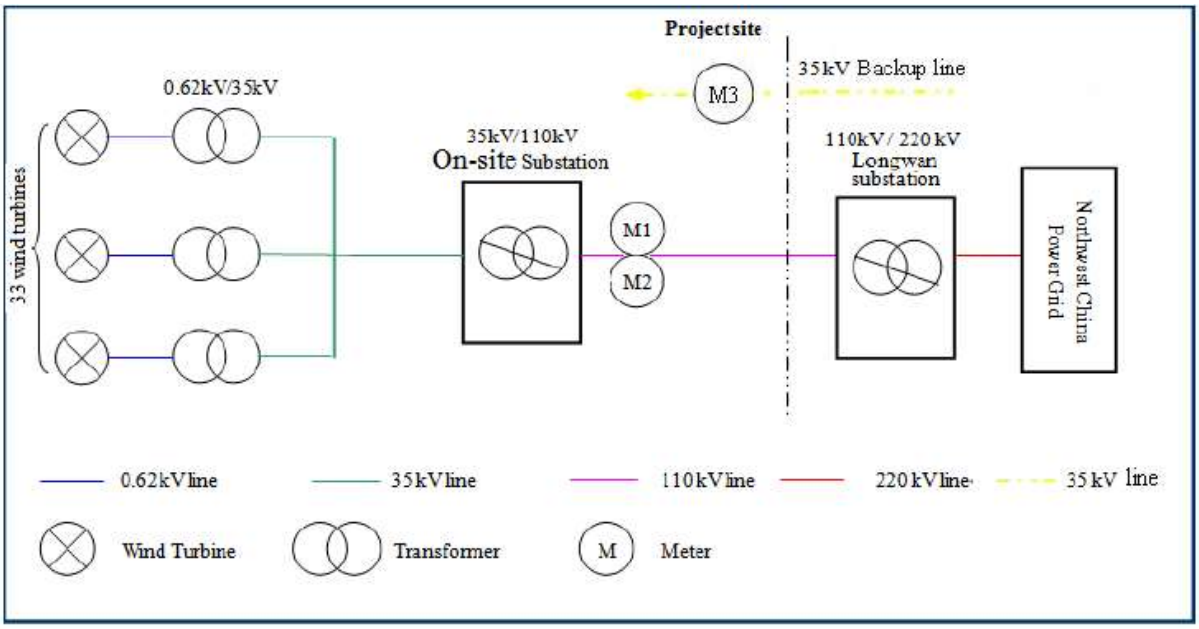
The General Manager of the project entity will appoint a VCS project manager or a chief officer. The operational and monitoring manager of the plant, the Financial Chief, and the Technical Chief are responsible for the collection of the data and information required in the monitoring plan. The collected information is documented and sent to the VCS manager or responsible staffs of the project entity monthly. The VCS manager 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.



1. Monitoring of the Electricity Delivered to the North China Power Grid by the Project

Grid-connected electricity generated by the project is monitored through metering equipment (a meter monitoring both electricity output generated from the project and electricity input provided by the grid) at the on-site substation.

Monitoring equipments include two meters, the main meter (M1) and the backup meter (M2). All the meters are the multifunctional electricity meters (accuracy degree is 0.2s, bidirectional). M1 as the main meter is used to monitor the electricity supplied to the grid by the project and the electricity purchased from the Grid. M2 will monitor the electricity supplied to the grid and imported from the grid by the project in case M1 is damaged. The main meter (M1) and backup meter (M2) are equipped at the high pressure site (110kV) of the 35kV/110kV on-site substation of the project and the project owner is responsible for conducting the meters monitoring. A backup power line is used for supplied electricity in emergent case that the main power line fails to supply power. A meter (hereafter referred as meter M3) is installed to measure the electricity imported via this line. This meter is owned, maintained and monitored by the local grid company. The accuracy of the meter will be no less than 1.0. The receipts of the electricity supplied to the power grid by the project and the electricity purchased from the grid will be issued based on the power purchase agreement (PPA) signed between the project owner and the grid company and the readings from the main meter (M1). The net electricity supplied by the project is calculated as electricity supplied to the grid by the project minus imports. A diagram shows how parameters are monitored and the location of meters is presented as follows.



Having been cross-checked by the project owner and the Grid Company every month, the metered values of electricity exported and imported will confirmed by the Grid Company and then the Grid Company will give the related sales invoices. Before the project is in operation, both the project owner and the grid company will check the equipments to ensure their work properly.

2. Quality Assurance and Quality Control

The quality assurance and quality control procedures for recording, maintaining and archiving data are developed as part of this project activity. This is an on-going process that is ensured through the activity in terms of the need for verification of the emissions on an annual basis according to this PD and the VCS manual.

Monthly data of electricity supply and import will be approved and signed by the Manager before it is accepted and stored. This audit will check compliance with monitoring procedures in this monitoring plan. This internal audit will also identify potential improvements to procedures to improve monitoring and reporting in future years. The monitoring staff will also attend a training session organized by the consultant. The purpose of training is to assure those staff are competent to conduct the monitoring plan, thus to make the monitored data accurate. Sales invoices will be used and kept for checking consistency of the recorded data.

The verification will use the main meter's data as long as the inaccuracy of the meter is within the

permissible tolerance. The main procedures are as follows:

I According to the requirements of power purchase/sales agreement, the project owner and the grid company should collect the two meters' data periodically, and check them at the same time.

II The project owner supplies the electricity to the grid company, and provides an electricity sales invoice to the Grid Company. A copy of the invoice is stored by the project owner, together with a record of the payment by the grid company.

III When the electricity generated by this project cannot meet the electricity self-use requirement of the power plant, the grid company supplies the electricity to the project owner. The Grid Company provides an electricity sales invoice to the project owner and the invoice is stored by the project owner.

IV The project owner records the power supplied to and purchased from the grid, and hence calculate the net electricity supplied to the grid;

V The records of the main meter's data readings will be provided by the Grid company to the project owner monthly and for verification by the VVB.

Emergency Procedure:

If the fault of the main meter exceeds the allowable tolerance or its malfunction occurs, the grid-connected electricity generated by the project will be resolved by following measures:

I Adopting the backup meter's data, unless a test by either party reveals it is inaccuracy;

II If the inaccuracy of the backup meter is not within the acceptable limits or it cannot work properly, the project owner and the grid company will discuss and calculate a conservative estimate of power supplied to the grid. A statement will be prepared indicating

☐ the background to the damage to metering equipment

☐ the assumptions used to estimate net electricity generation supplied to the grid for the days when no record was available

☐ the estimation of electricity supplied to the grid. The statement will be signed by representatives from the project owner and the grid company.

If any error is detected, the party owning the meter shall repair, re-calibrate or replace the meter and give the other party sufficient notice to allow a representative to attend during any corrective activity.

The project entity will furthermore document all efforts taken to restore normal monitoring procedures.

3. Calibration of Meters & Metering

The metering equipment will be properly calibrated and checked annually for accuracy. The project owner will prepare backup procedures to deal with any errors occurred to the meters. The calibration records carried out by the third party designated should be provided to the project owner and these records will be maintained.

Meters should be tested by a qualified organization co-agreed by the project owner and the grid company within 10 days after:

I The detection of the reading difference between the main meter and the backup meter that exceeds the allowable tolerance.

II The equipments malfunction caused by improper operation. All the calibration test records should be maintained safely for the verification.

4. Data Management System

To keep safely the record of the data collected during monitoring, this project will set up a complete data management system. The project will perfect the whole monitoring procedure by developing the CDM manual, tracking information from the primary source to the end-data calculations in paper document format. Physical documentation such as paper-based maps, diagrams and environmental assessment will be collated in a central place, together with this monitoring plan. All paper-based information will be stored by the project owner and kept at least one copy.

At the end of each month, the monitoring data will be filed in a spreadsheet and stored electronically, and the paper-based printout should be also archived. Furthermore, the project owner collects the sales invoices for the electricity supplied to the grid as a cross-check, and compiled the monitoring report including the monitoring data and relevant evidence at the end of each crediting year.

All the data will be kept for two years following the end of the last crediting period.