



SHANDONG YISHUI TANGWANGSHAN WIND FARM PROJECT

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

Project Title	<i>Shandong Yishui Tangwangshan Wind Farm Project</i>
Version	<i>04</i>
Report ID	<i>CGN-1187-202201</i>
Date of Issue	<i>28/10/2022</i>
Project ID	<i>PL1187</i>
Monitoring Period	<i>12/05/2020-31/12/2021</i>
Prepared By	<i>CGN Carbon Asset Management (Beijing) Co., Ltd.</i>
Contact	<i>Area 12 of Advanced Business Park, No. 188 west of South 4th Ring Road, No.2 Building, Beijing, The People's Republic of China</i> <i>Telephone: +86 10 63705765</i> <i>Email: cgnwind@163.com</i>

CONTENTS

1	PROJECT DETAILS.....	3
1.1	Summary Description of the Implementation Status of the Project.....	3
1.2	Sectoral Scope and Project Type.....	3
1.3	Project Proponent.....	4
1.4	Other Entities Involved in the Project.....	4
1.5	Project Start Date.....	4
1.6	Project Crediting Period.....	4
1.7	Project Location.....	4
1.8	Title and Reference of Methodology.....	6
1.9	Participation under other GHG Programs.....	6
1.10	Other Forms of Credit.....	6
1.11	Sustainable Development Contributions.....	7
2	SAFEGUARDS.....	10
2.1	No Net Harm.....	10
2.2	Local Stakeholder Consultation.....	11
2.3	AFOLU-Specific Safeguards.....	13
3	IMPLEMENTATION STATUS.....	13
3.1	Implementation Status of the Project Activity.....	13
3.2	Deviations.....	14
3.3	Grouped Projects.....	15
4	DATA AND PARAMETERS.....	15
4.1	Data and Parameters Available at Validation.....	15
4.2	Data and Parameters Monitored.....	15
4.3	Monitoring Plan.....	16
5	QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS.....	23
5.1	Baseline Emissions.....	23
5.2	Project Emissions.....	27
5.3	Leakage.....	27
5.4	Net GHG Emission Reductions and Removals.....	27

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Shandong Yishui Tangwangshan Wind Farm Project (hereinafter referred to as the proposed project) is to utilize wind resources for electricity generation through the construction of a wind farm with a total capacity of 20.4MW in Yishui County, Shandong Province, P. R. China. The electricity generated from the project will be sold to North China Power Grid (NCPG). The proposed project will achieve obvious greenhouse gas (GHG) emission reductions through the displacement of electricity delivered by NCPG which is a fossil-fuel dominated grid.

The proposed project is located in Yishui County, Linyi City, Shandong Province, P. R. China. The proposed project involves the installation of 24 wind turbines with capacity of 850 kW each, which amount to a total installed capacity of 20.4MW. The proposed project is constructed and operated by Yishui Tangwangshan Wind Power Co., Ltd. The estimated annual net electricity generation and average annual emission reductions of the proposed project are 38,068.7MWh and 31,996 tCO₂e, respectively.

The project started construction on 02/11/2009. The first batch of generating units started commercial operation on 12/05/2010 and all of the generating units had put into commercial operation on 01/11/2010. The expected operation period of the Project is 20 years as stated in the registered VCS PD Version 04.1 dated 05/11/2021. The first renewable crediting period of the project updated from 12/05/2010- 29/02/2012 to 12/05/2010-11/05/2020. And the second crediting period is from 12/05/2020 to 11/05/2030.

The project has been registered as VCS project with Ref. VCS1187 and VCUs of 51,277 tCO₂e have been issued for the monitoring period from 12/05/2010-29/02/2012, 127,933 tCO₂e have been issued for the monitoring period from 01/03/2012-31/12/2015 and 127,991 tCO₂e have been issued for the monitoring period from 01/01/2016-11/05/2020. The project also has been registered as CDM project with Ref. 5658.

The total emission reductions achieved in this monitoring period (12/05/2020-31/12/2021) were 40,887 tCO₂e.

1.2 Sectoral Scope and Project Type

Sectroal Scope 1: Energy Industry (renewable/non-renewable sources)

Project type: Energy industries (renewable/non-renewable sources)

The project is not a grouped project.

1.3 Project Proponent

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

1.4 Other Entities Involved in the Project

There are no other entities involved.

1.5 Project Start Date

The project started on 12/05/2010(commissioning start date).

1.6 Project Crediting Period

In the registered VCS PD, the crediting period is described as from 12/05/2010 to 29/02/2012. 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, it remains eligible to apply the crediting period requirements under VCS Version 3 which shall be a maximum of ten years and may be renewed at most twice, so the first renewable crediting period of the project should be updated from “12/05/2010 to 29/02/2012” to “12/05/2010 to 11/05/2020”. Moreover, as the project is also registered as a CDM project with a seven year twice renewable project crediting period starting from 01/03/2012 and furthermore, the project has the lifetime of 20 years; it is not eligible for VCU issuance beyond 11/05/2030. The second crediting period is from 12/05/2020 to 11/05/2030.

This monitoring period is from 12/05/2020-31/12/2021 within the second VCS crediting period and the monitoring period contains 599 days.

1.7 Project Location

The proposed project is located at Yishui County, Linyi City, Shandong Province, P. R. China. The geographical coordinates of the proposed project is from 118.216667 E to 119.05 E, from 35.6 N to 36.216667 N. The central geographical coordinate of the proposed project is

118.633334E, 35.808334N. Figures A1 and A2 show the geographical location of the proposed project.

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

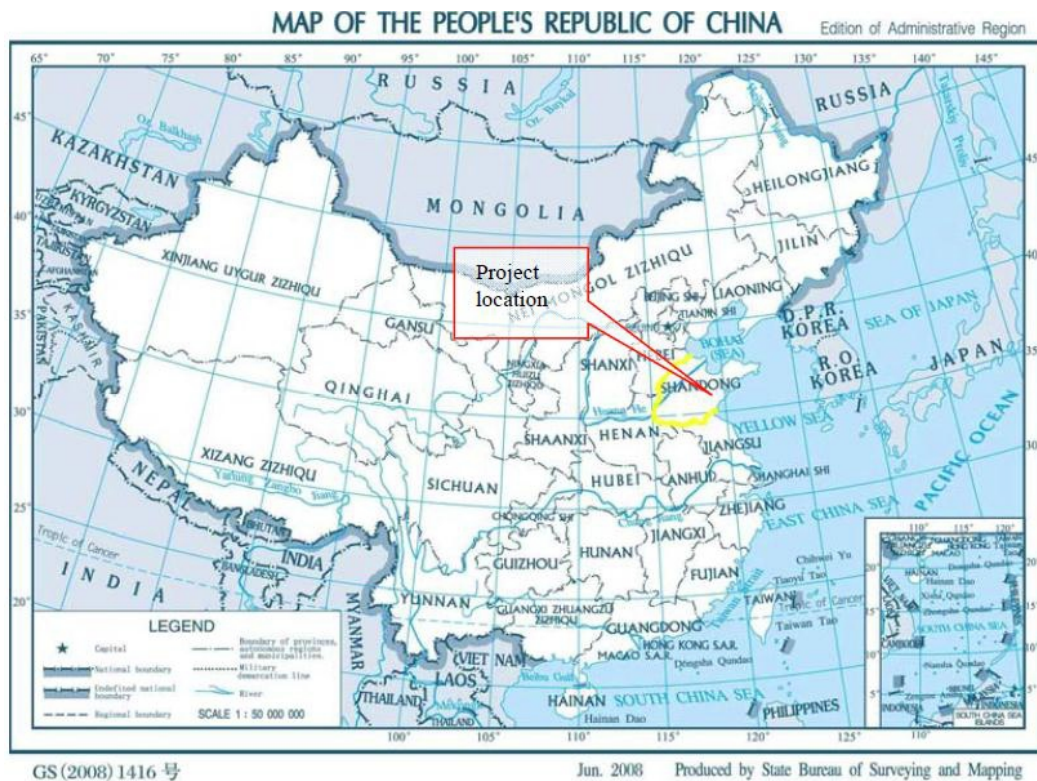


Figure A2. The proposed project on the map of Shandong Province and Yishui County



1.8 Title and Reference of Methodology

Methodology:

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

Reference:

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

The applied tools:

Tools: “Tool for assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period” (Version 03.0.1).

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>

1.9 Participation under other GHG Programs

The project has been registered as CDM project and the registration number is 5658, the first CDM crediting period is from 01/03/2012 to 28/02/2019, and the crediting period has been successfully renewed on 01/05/2019 with the 2nd CDM crediting period from 01/03/2019 to 28/02/2026. The project has been registered as VCS project with Ref. VCS1187. Please refer to the following link for details.

<https://cdm.unfccc.int/Projects/DB/SGS-UKL1326112903.91/view>

1.10 Other Forms of Credit

Emission Trading Programs and Other Binding Limits

The project has been registered as a CDM project on 26/01/2012 with Ref No.5658, for which a renewable crediting period of 3*7 years will be used under the CDM GHG Program.

Until now, no emission reductions were issued under CDM scheme. The project was registered as a VCS project under VCS standard (Version 3), emission reduction from 12/05/2010 to 29/02/2012, 01/03/2012 to 31/12/2015, and 01/01/2016 to 11/05/2020 has been issued under VCS scheme.

The project has not been counted or used under GS project or under any other voluntary carbon crediting scheme. And the project does not involved in ETS or other binding limits. All credits from 12/05/2020-31/12/2021 will be only claimed under VCS program as VCUs for the project

to avoid double counting, which will not be used for compliance with emission trading programs or to meet binding limits on GHG emissions.

Other Forms of Environmental Credit

The project hasn't sought or received another form of environmental credits.

1.11 Sustainable Development Contributions

The Project is located within Yishui County, Linyi City, Shandong Province, P. R. China. The purpose of the Project is to utilize wind resources for electricity generation through construction of a wind farm. The project employed standard wind power generation technology. It installed 24 wind turbines with an individual capacity of 850 kW, adding up to a total installed capacity of 20.4 MW. The electricity generated from the Project is delivered to Shandong Power Grid, an integral part of the North China Power Grid (NCPG).

The Project will not only supply renewable electricity to the grid, but also contribute to sustainable development of the local community, the host country and the world by means of:

1. reducing greenhouse gas emissions compared to a business-as-usual scenario;
2. diversifying power sources and mitigating the demand and supply contradiction;
3. helping to stimulate the growth of the local wind power industry and encourage and promote the technology progress and commercial proliferation of grid-connected renewable power generation projects;
4. reducing the emission of other pollutants resulting from the power generation industry in China, compared to a business-as-usual scenario;
5. creating employment opportunities for local community during the operation period of the Project and creating several employment opportunities for local community during the construction period of the Project.

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

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime				
3)	13.0	Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to increase	The project had achieved obvious GHG emission reductions by avoiding 40,887tCO ₂ emissions, as grid-connected fossil fuel-fired power dominates in the NCPG during this monitoring period.	The project had achieved obvious GHG emission reductions by avoiding 307,201tCO ₂ e that had been approved by the VCS program during the first crediting period from 12/05/2010-11/05/2020, and 40,887tCO ₂ e during this monitoring period from 12/05/2020-31/12/2021. The cumulative emission reductions until the end of this monitoring period from 12/05/2010 to 31/12/2021 is 348,088tCO ₂ e.				
					Period ¹		ER	GHG Program	Status
					From	To	tCO ₂ e		
					12/05/2010	29/02/2012	51,277	VCS	Approved
					01/03/2012	31/12/2015	127,933	VCS	Approved
					01/01/2016	11/05/2020	127,991	VCS	Approved

¹ This table includes sustainable development impacts from 12/05/2010 to 31/12/2021.

																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										</
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	----

2 SAFEGUARDS

2.1 No Net Harm

The environmental impact assessment for this project was carried out by Shandong Academy of Environmental Science in September 2008 and approved by Shandong Environmental Protection Bureau on 13/10/2008. 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 construction stage. 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 by sprinkling water frequently and timely clearing can reduce the dust pollution. When the project is in operational period, there will be no air pollutions. In conclusion, the proposed project will not pose 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. Noise Limits in Construction site (GB12523-90) and Emission standard for industrial enterprise noise at boundary (GB12348-2008) Level II noise standard would be fulfilled during the construction and operational period. Besides, some noise control measures on the noise source control and sensitive object protection would be taken to mitigate the noise at the maximum limit. Consequently, the noise of operation has little impact to the surrounding environment. Hence, the noise will not impact the work and daily life of local residents.

Electromagnetic impact

The operation of the wind farm will generate electromagnetic pollution, whereas the pollution is slight.

Some measures on the prevention and control of electromagnetic influence, for example, strengthen the training on the electromagnetic knowledge for the workers and organise and manage the work time, will be taken to reduce the electromagnetic impact during the operation phase. In addition, the wind turbines are very far from local residents and village. Therefore, the electronic magnetic pollution to the surrounding environment is insignificant.

Impact from Solid waste

Solid wastes generated from the proposed project activity are excavated earth material and municipal 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 municipal solid waste will be collected and treated together with the waste from local residents. As the report indicates, solid waste is handled properly.

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 discharging wastewater can reach the Water quality standard for urban miscellaneous water consumption (GB/T18920-2002). Therefore, the impact of wastewater is limited and mitigated.

No migrating birds have been found in the project field. Therefore, the project is not located on the passage of migrating birds, and the project construction will not influence the migration of birds.

2.2 Local Stakeholder Consultation

Local stakeholders Consultation during the project preparation stage:

Yishui Tangwangshan Wind Power Co. Ltd. put up a notice of Stakeholder Consultation Meeting Notification of Shandong Yishui Tangwangshan Wind Power Project to invite comments on the construction of the proposed project on 18/09/2009. Stakeholder Consultation Meeting of the project was held at Yishui County Government hostel on 28/09/2009 to guarantee the successful implementation of proposed project with the interest of stakeholder being taken into account. The project owner also distributed public participation questionnaires at the project location Quanli Town to collect advice and opinions on the proposed project from local stakeholders.

50 out of 50 copies of questionnaires were collected. Among the interviewees, there were 25 farmers, 6 workers, 4 government officials, 5 teachers and 10 with other occupation; 19 of them had junior high school education or below, 21 had high school level education, 9 had college level education and 1 with other education level. The questions in the questionnaire were mainly as follows:

- a) How do you think of the local environmental quality in general?
- b) Is there any electromagnetic radiation disturbance when you watch TV?
- c) Do you think the construction of the project will have any negative effect on you and your family?
- d) Will the project promote the local economy?
- e) How do you think the project will affect the acoustic environment (noise) quality?

f) What is your most concerned environmental issue during the construction and operation of the project?

g) Do you favour the construction of the project?

h) Do you have any advice about the selection of environmental protection measures?

i) Do you have any other suggestions to the proposed project?

The summary of survey is listed as the following:

- 76% of the interviewee think good of the general local environmental quality while 24% of them think it average.

- 90% of them think there is no electromagnetic radiation disturbance when they watch TV while 8% are not sure about it and 2% of them think there is;

- 90% of them think the construction of the project will have no negative effect on them and their family while 6% are not sure about it and 4% think it will.

- 88% of them think the project will promote the local economy while 12% are not sure;

- 72% of them think the project will not affect the acoustic environment (noise) quality while 8% think it will and 20% are not sure;

- 42% of them consider electromagnetic disturbance their most concerned environmental issue during the construction and operation of the project; 40% are most concerned about noise effect and 18% are most concerned about wastewater discharge;

- 90% of them support the construction of the project and 10% are not sure.

The vast majority of public opinions received were supportive. Local residents were most concerned about electromagnetic disturbance, noise impact and wastewater discharge. The EIA report of the proposed project has taken these issues into consideration and provided specific measures to control the environmental impact of the project. The proposed project selected antimagnetic and anti-radiation WTG design and material. The project owner will take measures to implement strict control and management on travelling time and route to avoid noise sensitive area and period. The WTG will be distributed far from residential area nearby, which satisfies the requirements of Standard of Urban Area Environmental Noise. The discharged wastewater will be treated periodically and transported out of the project location. The environmental impacts can be avoided, controlled or mitigated via thorough implementation of the mitigation measures. Therefore, the proposed project can be carried out as planned.

Local stakeholder Consultation during the project implementation stage:

The project owner has set out the mechanism for on-going communication with local stakeholders and the communications with local stakeholders are being carried out at periodic intervals.

Firstly, 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 timely response.

Secondly, 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 yearly.

During this monitoring period, the project carried out the communication with local stakeholders in line with the mechanism. Village committee's complaint book were quarterly checked by the contact person, and the contact person visited the villages in Aug 2021 to communicate with stakeholders. Meanwhile, the local authority has also conducted spot checks on the implementation of the project yearly. There are no negative comments received for the project during this monitoring period. In line with VCS requirements all the processed have been implemented to receive comments from local stakeholders as well as communicate with them.

2.3 AFOLU-Specific Safeguards

The project is not AFOLU project.

3 IMPLEMENTATION STATUS

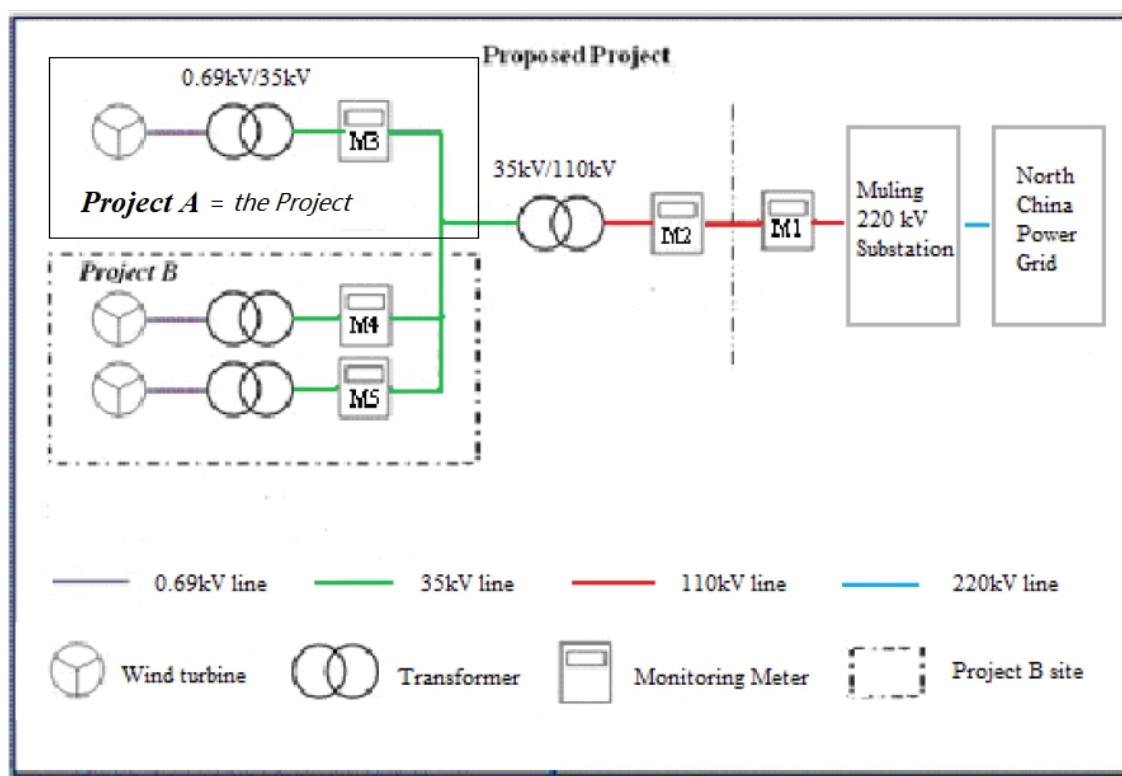
3.1 Implementation Status of the Project Activity

The project employed standard wind power generation technology. It installed 24 wind turbines with capacity of 850kW each, adding up to a total installed capacity of 20.4 MW. The main specifications of the turbine/generator are listed as below Table:

Item	Unit	Index
Type	-	G58-850kW
Rated capacity	kW	850
Number of blades		3
Rotor diameter	m	58
Cut-in speed	m/s	3.0

Rated wind speed	m/s	16
Cut-off speed	m/s	23
Height of hub	m	65
Rated voltage	V	690

The technology diagram of the Project is as follows:



The project started construction on 02/11/2009. The first batch of generating units started commercial operation on 12/05/2010. The expected operation period of the Project is 20 years as stated in the registered VCS PD Version 04.1 dated 05/11/2021.

The electricity generated from the Project is delivered to Shandong Power Grid, an integral part of the North China Power Grid (NCPG). During this monitoring period, there was no significant malfunction or any emergency occurred for the Project during this monitoring period. No events occurred during this monitoring period which may impact the applicability of the methodology.

3.2 Deviations

2.1.1 Methodology Deviations

There are no methodology deviations applied during this monitoring period.

2.1.2 Project Description Deviations

There are no project description deviations during this monitoring period.

3.3 Grouped Projects

The project is not a grouped project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO ₂ / MWh
Description	The baseline grid emission factor
Source of data	Registered VCS PD with Ref No.1187
Value applied	0.8405
Justification of choice of data or description of measurement methods and procedures applied	Refer to the registered VCS PD with Ref No.1187
Purpose of Data	Calculation of baseline emissions
Comments	The data is calculated ex-ante according to the applied tool.

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{facility,y}$
Data unit	MWh/yr
Description	Quantity of net electricity generation supplied by the project to the Grid in year y.
Source of data	Calculated according to $EG_{A,y}/(EG_{A,y} + EG_{B,y}) * EG_{export,y} - EG_{import,y}$
Description of measurement methods and procedures to be applied	The Quantity of net electricity generation supplied by the project plant/unit in year y will be calculated through $EG_{export,y}$, $EG_{import,y}$, $EG_{A,y}$ and $EG_{B,y}$. $EG_{facility,y} = EG_{A,y}/(EG_{A,y} + EG_{B,y}) * EG_{export,y} - EG_{import,y}$. $EG_{export,y}$ and $EG_{import,y}$ will be monitored by the main meter M1(S/N:1305712953). The reading from the main meter M1(S/N:1305712953) is first choice. When the main meter is out of order, the reading from the backup meter M2(S/N:9070125900004) will be used. The project operator is responsible for recording such data. Cross check the meter reading with sales receipts. Designated person records the readings of the main meter each month.

Frequency of monitoring/recording	Continuously measurement and monthly recording								
Value monitored	<table border="1"> <thead> <tr> <th>Period</th><th>MWh</th></tr> </thead> <tbody> <tr> <td>12/05/2020- 31/12/2020</td><td>17,414.03</td></tr> <tr> <td>01/01/2021- 31/12/2021</td><td>31,232.80</td></tr> <tr> <td>Total</td><td>48,646.83</td></tr> </tbody> </table>	Period	MWh	12/05/2020- 31/12/2020	17,414.03	01/01/2021- 31/12/2021	31,232.80	Total	48,646.83
Period	MWh								
12/05/2020- 31/12/2020	17,414.03								
01/01/2021- 31/12/2021	31,232.80								
Total	48,646.83								
Monitoring equipment	Electricity meters reading M1(S/N:1305712953), M2(S/N:9070125900004), M3(S/N:9090151400332), M4(S/N:9090151400334), M5(S/N:9090151400336). Please refer to the monitoring equipment information in the table of “Information of monitoring equipments” below.								
QA/QC procedures to be applied	The meter M3(S/N:9090151400332) at the project site and meters M1(S/N:1305712953), M2(S/N:9070125900004), M4(S/N:9090151400334) as well as M5(S/N:9090151400336) will be calibrated once a year according to the national rules. Meter readings from meters M1(S/N:1305712953) or M2(S/N:9070125900004) will be used for cross checking against sales receipts. Conservative values will be adopted for ERs calculation.								
Purpose of the data	Baseline Emission calculation								
Calculation method	-								
Comments	-								

Data / Parameter	$EG_{\text{export},y}$
Data unit	MWh
Description	Total electricity supplied to the grid by the proposed Project (Project A) and Project B during year y.
Source of data	Bidirectional electricity meter reading of Main meter M1(S/N:1305712953). The reading from the main meter M1(S/N:1305712953) is first choice. When the main meter is out of order, the reading from the backup meter M2(S/N:9070125900004) will be used.
Description of measurement methods and procedures to be applied	The readings of the electricity meter will be hourly measured and monthly recorded by the designated person. Data will be archived for 2 years following the end of the crediting period by means of electronic and paper backup. The accuracy of electricity meter is not lower than 0.5s. The calibration frequency is one time/year according to the national calibration standard.

Frequency of monitoring/recording	Continuously measurement and monthly recording								
Value monitored	<table border="1"> <thead> <tr> <th>Period</th><th>MWh</th></tr> </thead> <tbody> <tr> <td>12/05/2020- 31/12/2020</td><td>69,508.56</td></tr> <tr> <td>01/01/2021- 31/12/2021</td><td>123,837.12</td></tr> <tr> <td>Total</td><td>193,345.68</td></tr> </tbody> </table>	Period	MWh	12/05/2020- 31/12/2020	69,508.56	01/01/2021- 31/12/2021	123,837.12	Total	193,345.68
Period	MWh								
12/05/2020- 31/12/2020	69,508.56								
01/01/2021- 31/12/2021	123,837.12								
Total	193,345.68								
Monitoring equipment	Electricity meter reading M1(S/N:1305712953) and M2(S/N:9070125900004). Please refer to the monitoring equipment information in the table of "Information of monitoring equipments" below.								
QA/QC procedures to be applied	The main meter M1(S/N:1305712953) and backup meter M2(S/N:9070125900004) will be calibrated once a year according to the national standards. Electricity supplied to the grid will be double checked according to sales receipts.								
Purpose of the data	Baseline Emission calculation								
Calculation method	-								
Comments	-								

Data / Parameter	EG _{import,y}								
Data unit	MWh								
Description	Electricity imported from the grid by the Project (Project A) and Project B during year y.								
Source of data	Bidirectional electricity meter reading of M1(S/N:1305712953). The reading from the main meter M1(S/N:1305712953) is first choice. When the main meter is out of order, the reading from the backup meter M2(S/N:9070125900004) will be used.								
Description of measurement methods and procedures to be applied	The data will be continuously measured and monthly recorded by the designated person. Data will be archived for 2 years following the end of the crediting period.								
Frequency of monitoring/recording	Continuously measurement and monthly recording								
Value monitored	<table border="1"> <thead> <tr> <th>Period</th><th>MWh</th></tr> </thead> <tbody> <tr> <td>12/05/2020- 31/12/2020</td><td>362.56</td></tr> <tr> <td>01/01/2021- 31/12/2021</td><td>512.16</td></tr> <tr> <td>Total</td><td>874.72</td></tr> </tbody> </table>	Period	MWh	12/05/2020- 31/12/2020	362.56	01/01/2021- 31/12/2021	512.16	Total	874.72
Period	MWh								
12/05/2020- 31/12/2020	362.56								
01/01/2021- 31/12/2021	512.16								
Total	874.72								

Monitoring equipment	Electricity meter reading M1(S/N:1305712953) and M2(S/N:9070125900004). Please refer to the monitoring equipment information in the table of “Information of monitoring equipments” below.
QA/QC procedures to be applied	Meter readings from the meter M1(S/N:1305712953) and M2(S/N:9070125900004) will be directly applied for cross checking of electricity purchased from the grid by the proposed project. Electricity purchased from the grid will be double checked against electricity sales receipts. Conservative values will be adopted for ERs calculation.
Purpose of the data	Baseline Emission calculation
Calculation method	-
Comments	-

Data / Parameter	EG _{A,y}								
Data unit	MWh								
Description	Quantity of electricity supplied to the grid by Project A (the project) in year y.								
Source of data	The readings of the meter M3(S/N:9090151400332) installed at the low voltage side of 35kV/110kV substation on the project site.								
Description of measurement methods and procedures to be applied	The readings of the electricity meters are continuously measured and monthly recorded. Data will be archived for 2 years following the end of the last crediting period by means of electronic and paper backup. The calibration frequency is once a year.								
Frequency of monitoring/recording	Continuously measurement and monthly recording								
Value monitored	<table border="1"> <thead> <tr> <th>Period</th><th>MWh</th></tr> </thead> <tbody> <tr> <td>12/05/2020- 31/12/2020</td><td>17,910.48</td></tr> <tr> <td>01/01/2021- 31/12/2021</td><td>31,975.72</td></tr> <tr> <td>Total</td><td>49,886.20</td></tr> </tbody> </table>	Period	MWh	12/05/2020- 31/12/2020	17,910.48	01/01/2021- 31/12/2021	31,975.72	Total	49,886.20
Period	MWh								
12/05/2020- 31/12/2020	17,910.48								
01/01/2021- 31/12/2021	31,975.72								
Total	49,886.20								
Monitoring equipment	Electricity meter M3(S/N:9090151400332) installed at the low voltage side of 35kV/110kV substation on the project site. Please refer to the monitoring equipment information in the table of “Information of monitoring equipments” below.								
QA/QC procedures to be applied	The metering equipment at the substation are calibrated once a year according to the national standards.								
Purpose of the data	Baseline Emission calculation								

Calculation method	-
Comments	-

Data / Parameter	EG _{B,y}								
Data unit	MWh								
Description	Quantity of electricity supplied to the grid by Project B in year y.								
Source of data	Readings of electricity meters M4(S/N:9090151400334) and M5(S/N:9090151400336) installed at the site of project B.								
Description of measurement methods and procedures to be applied	The readings of the electricity meters are continuously measured and monthly recorded. Data will be archived for 2 years following the end of the last crediting period by means of electronic and paper backup. The calibration frequency is once a year.								
Frequency of monitoring/recording	Continuously measurement and monthly recording								
Value monitored	<table border="1"> <thead> <tr> <th>Period</th><th>MWh</th></tr> </thead> <tbody> <tr> <td>12/05/2020- 31/12/2020</td><td>52,124.52</td></tr> <tr> <td>01/01/2021- 31/12/2021</td><td>92,762.60</td></tr> <tr> <td>Total</td><td>144,887.12</td></tr> </tbody> </table>	Period	MWh	12/05/2020- 31/12/2020	52,124.52	01/01/2021- 31/12/2021	92,762.60	Total	144,887.12
Period	MWh								
12/05/2020- 31/12/2020	52,124.52								
01/01/2021- 31/12/2021	92,762.60								
Total	144,887.12								
Monitoring equipment	Electricity meter M4(S/N:9090151400334) and M5(S/N:9090151400336) installed at the Project B site. Please refer to the monitoring equipment information in the table of "Information of monitoring equipments" below..								
QA/QC procedures to be applied	The metering equipment at the substation is calibrated once a year according to the national standards.								
Purpose of the data	Baseline Emission calculation								
Calculation method	-								
Comments	-								

Information of monitoring equipments

Meters	Type	Serial No.	Accuracy	Calibration date	Calibration frequency	Validity
M1	DTSD3000	1305712953	0.5S	13/01/2020	Annually	Yes
M2	DL/T614	09070125900004	0.2S	13/01/2021	Annually	Yes

M3 ²	DL/T614	09090151400332	0.5S		Annually	Yes
M4 ³	DL/T614	09090151400334	0.5S		Annually	Yes
M5 ²	DL/T614	09090151400336	0.5S		Annually	Yes

4.3 Monitoring Plan

The 24 sets of wind turbines of the proposed project are connected with a 35kV transmission line and installed with a meter M3(S/N:9090151400332) at the low voltage side of 35kV/110kV substation on the project site. The meter M3(S/N:9090151400332) is used to monitor the electricity supplied to the grid by the proposed project, hereafter referred to Project A.

The project is sharing the meter M1(S/N:1305712953) installed at Muling 220kV substation measures the electricity exported to and imported from the grid by Project A and another project (Shandong Taipingshan Wind Farm Project, hereafter referred to Project B). The backup meter M2(S/N:9070125900004) was installed at the higher voltage side of 35kV/110kV substation. The reading from the main meter M1(S/N:1305712953) is first choice. When the main meter is out of order, the reading from the backup meter M2(S/N:9070125900004) will be used.

Electricity supplied to the grid by Project B is measured by meter M4(S/N:9090151400334) and M5(S/N:9090151400336) installed at the Project B site.

The accuracy of meter M1(S/N:1305712953), M2(S/N:9070125900004), M3(S/N:9090151400332), M4(S/N:9090151400334) and M5(S/N:9090151400336) is no lower than 0.5s, and the calibration accuracy is once a year in line with the national rules. Also, sales receipts for the proposed project activity will be used for double checking following the requirement in the applied methodology.

For calculating the net electricity generation supplied by the project plant/unit to the grid in year y, the following equation will be applied.

$$EG_{\text{facility},y} = EG_{A,y} / (EG_{A,y} + EG_{B,y}) * EG_{\text{export},y} - EG_{\text{import},y}$$

Where:

$EG_{\text{facility},y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y.

² This is the monitoring meter for the 35kV line of the Shandong Yishui Tangwangshan Wind Farm Project (Project A).

³ These two are the monitoring meters for the 35kV line of the Shandong Taipingshan Wind Farm Project (Project B).

$EG_{\text{export},y}$ = Total electricity supplied to the grid by the proposed Project (Project A) and Project B during year y .

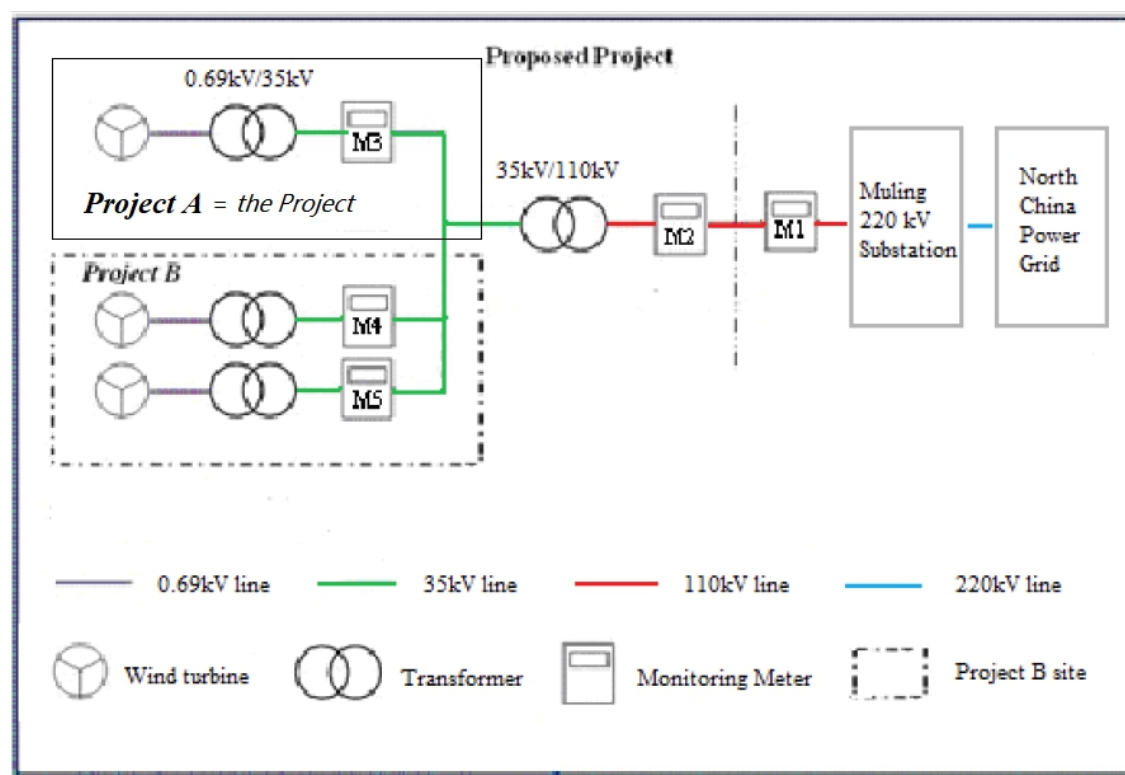
$EG_{\text{import},y}$ = Electricity imported from the grid by the Project (Project A) and Project B during year y .

$EG_{A,y}$ = Quantity of electricity supplied to the grid by the Project (Project A) in year y .

$EG_{B,y}$ = Quantity of electricity supplied to the grid by Project B in year y .

Meter readings from meter M1(S/N:1305712953) or M2(S/N:9070125900004) which measures the electricity imported by both Project A and project B. The total electricity purchased from the grid by the Project (Project A) and Project B is deemed as the total electricity purchased from the grid by the project when calculating emission reductions, which is conservative.

The simplified wiring diagram is shown as below:



Monitoring organizational structure, roles and responsibilities

The project owner will use this document as guideline in monitoring of the project emission reduction performance and will adhere to the guidelines set out in this monitoring plan to ensure that the monitoring is credible, transparent and conservative.

The responsibilities of the project staff are as follows:

General Manager: To be responsible for supervising the whole monitoring procedure.

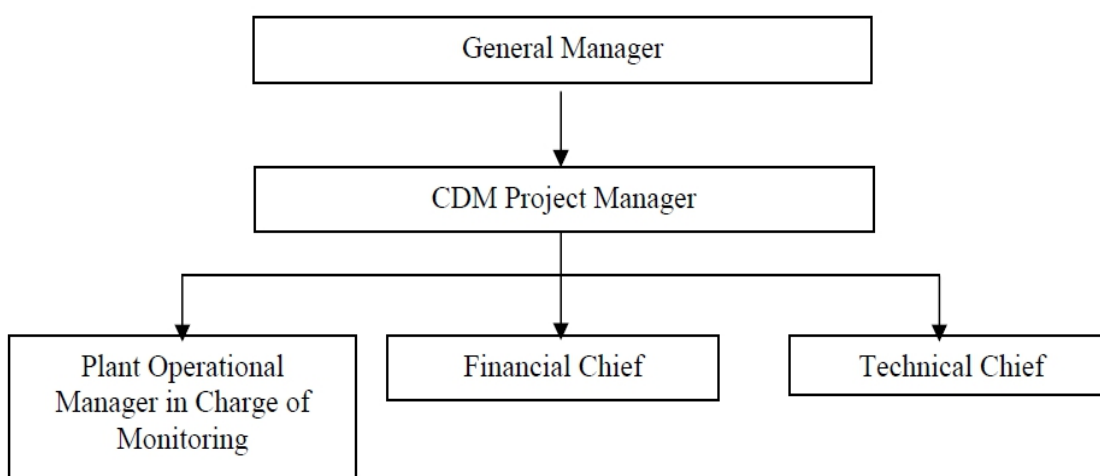
CDM Project Manager: To be responsible for data management and compiling monitoring report.

Operational and monitoring manager: To be responsible for collecting data and do internal audit.

Financial chief: To be responsible for collection of sales receipts.

Technical chief: To be responsible for preparing operational reports of the project activity, recording the daily operation of the wind farm, including operating periods, equipment defects, etc.

The organization of the monitoring implementers is illustrated in the table below:



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. It is the responsibility of the proposed project owner to provide additional necessary data and information for validation and verification requirements of respective DOE. 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 proposed project owner and kept at least one copy.

At the end of each month, the monitoring data will be filed in a spreadsheet, and the paper-based printout will be also archived as well. Furthermore, the project owner collects the sales receipts 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.

Quality Assurance and Quality Control

The workers are trained to be competent and the metering equipments are calibrated and sealed as per the industry practices at regular intervals, with the purpose to provide credible, accurate, transparent and conservative monitoring data and ensure the real, measurable, long-term GHG emission reduction from this project.

Monthly metering data of the supplied and purchased electricity by the proposed project will be approved and signed off 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 officers will also attend a training session organized by the CDM consultant. The purpose of training is to assure those staffs are competent to conduct the monitoring plan, thus to make the monitored data accurate.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

Baseline Emissions are calculated by multiplying the ex-ante Baseline Emission factor by annual power generation.

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

Where:

BE_y = Baseline emissions in year y (tCO₂/yr)

$EG_{\text{facility},y}$ = Quantity of net electricity generation supplied to the grid by the Project in year y. (MWh)

$EF_{\text{grid,CM},y}$ = Combined margin emission factor for grid connected power generation in year y (tCO₂/MWh).

$$EG_{\text{facility},y} = EG_{A,y} / (EG_{A,y} + EG_{B,y}) * EG_{\text{export},y} - EG_{\text{import},y}$$

Where:

$EG_{\text{facility},y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y.

$EG_{\text{export},y}$ = Total electricity supplied to the grid by the proposed Project (Project A) and Project B during year y.

$EG_{import,y}$ = Electricity imported from the grid by the Project (Project A) and Project B during year y.

$EG_{A,y}$ = Quantity of electricity supplied to the grid by the Project (Project A) in year y.

$EG_{B,y}$ = Quantity of electricity supplied to the grid by Project B in year y.

Table 1: The electricity exported and imported by the proposed project ($EG_{export,y}$ & $EG_{import,y}$)

Period	$EG_{export,y}$			$EG_{import,y}$		
	Readings	Sales receipts	Value	Readings	Sales receipts	Value
	A	B	C=Min(A,B)	D	E	F=Max(D,E)
12/05/2020-31/05/2020	10176.32	10176.32	10176.32	30.80	30.80	30.80
01/06/2020-30/06/2020	10252.88	10252.88	10252.88	49.28	49.28	49.28
01/07/2020-31/07/2020	8729.60	8729.60	8729.60	43.12	43.12	43.12
01/08/2020-31/08/2020	7171.12	7171.12	7171.12	33.44	33.44	33.44
01/09/2020-30/09/2020	4748.48	4748.48	4748.48	50.16	50.16	50.16
01/10/2020-31/10/2020	6432.80	6432.80	6432.80	58.96	58.96	58.96
01/11/2020-30/11/2020	10640.96	10640.96	10640.96	51.04	51.04	51.04
01/12/2020-31/12/2020	11356.40	11356.40	11356.40	45.76	45.76	45.76
Subtotal 2020			69508.56			362.56
01/01/2021-31/01/2021	11864.16	11864.16	11864.16	45.76	45.76	45.76
01/02/2021-28/02/2021	16103.12	16103.12	16103.12	28.16	28.16	28.16
01/03/2021-31/03/2021	12850.64	12850.64	12850.64	52.80	52.80	52.80
01/04/2021-30/04/2021	11878.24	11878.24	11878.24	26.40	26.40	26.40

01/05/2021-31/05/2021	13005.52	13005.52	13005.52	29.92	29.92	29.92
01/06/2021-30/06/2021	9962.48	9962.48	9962.48	31.68	31.68	31.68
01/07/2021-31/07/2021	9351.76	9351.76	9351.76	33.44	33.44	33.44
01/08/2021-31/08/2021	4810.08	4810.08	4810.08	70.40	70.40	70.40
01/09/2021-30/09/2021	6358.88	6358.88	6358.88	26.40	26.40	26.40
01/10/2021-31/10/2021	10767.68	10767.68	10767.68	44.00	44.00	44.00
01/11/2021-30/11/2021	8474.40	8474.40	8474.40	52.80	52.80	52.80
01/12/2021-31/12/2021	8410.16	8410.16	8410.16	70.40	70.40	70.40
Subtotal 2021			123837.12			512.16
Total			193345.68			874.72

Table 2: The electricity supply of the proposed project ($EG_{A,y}/(EG_{A,y} + EG_{B,y}) * EG_{export,y}$)

Period	Electricity supply of the proposed project and the other project by the meters					
	EG _{A,y} by the meter M3(S/N:9090151400332)	EG _{B,y} by the meter M4(S/N:9090151400334)	EG _{B,y} by the meter M5(S/N:9090151400336)	EG _{A,y} /(EG _{A,y} + EG _{B,y})* EG _{export,y}		
	G	H1	H2	I=G/(G+H1+H2)*C	Sales receipts (J)	Value (K=Min(I,J))
12/05/2020-31/05/2020	2786.84	3742.34	3737.86	2762.22	2762.22	2762.22
01/06/2020-30/06/2020	2257.92	4045.30	4048.80	2236.30	2236.30	2236.30
01/07/2020-31/07/2020	2050.16	3380.16	3376.38	2032.21	2032.21	2032.21
01/08/2020-31/08/2020	2047.36	2590.56	2589.44	2031.43	2031.43	2031.43

01/09/2020-30/09/2020	1207.36	1784.58	1782.06	1200.91	1200.91	1200.91
01/10/2020-31/10/2020	1711.36	2378.18	2380.14	1701.60	1701.60	1701.60
01/11/2020-30/11/2020	2695.00	4002.74	3997.14	2681.41	2681.41	2681.41
01/12/2020-31/12/2020	3154.48	4144.56	4144.28	3130.52	3130.52	3130.52
Subtotal 2020	17910.48	26068.42	26056.10			17776.59
01/01/2021-31/01/2021	2967.72	4495.40	4492.60	2944.99	2944.99	2944.99
01/02/2021-28/02/2021	4040.40	6078.94	6076.14	4017.36	4017.36	4017.36
01/03/2021-31/03/2021	3501.12	4722.20	4719.40	3476.21	3476.21	3476.21
01/04/2021-30/04/2021	3001.60	4485.32	4482.52	2978.73	2978.73	2978.73
01/05/2021-31/05/2021	3289.44	4905.18	4902.38	3266.46	3266.46	3266.46
01/06/2021-30/06/2021	2530.92	3758.30	3752.98	2510.83	2510.83	2510.83
01/07/2021-31/07/2021	2014.32	3712.94	3707.34	1996.63	1996.63	1996.63
01/08/2021-31/08/2021	1334.20	1761.90	1759.10	1321.80	1321.80	1321.80
01/09/2021-30/09/2021	1587.88	2409.40	2406.60	1576.72	1576.72	1576.72
01/10/2021-31/10/2021	3091.20	3889.76	3886.40	3062.85	3062.85	3062.85
01/11/2021-30/11/2021	2187.08	3167.78	3164.42	2175.56	2175.56	2175.56
01/12/2021-31/12/2021	2429.84	3014.48	3011.12	2416.83	2416.83	2416.83
Subtotal 2021	31975.72	46401.60	46361.00			31744.96

Total	49886.20	72470.02	72417.10			49521.54
-------	----------	----------	----------	--	--	----------

Table 3: Calculation of baseline emissions

Period	$EG_{A,y}/(EG_{A,y} + EG_{B,y}) * EG_{export,y}$	$EG_{import,y}$	$EG_{facility,y}$	$EF_{grid,CM,y}$	BE_y
	(MWh)	(MWh)	(MWh)	(tCO ₂ e/MWh)	(tCO ₂ e)
12/05/2020-31/12/2020	17,776.59	362.56	17,414.03	0.8405	14,636
01/01/2021-31/12/2021	31,744.96	512.16	31,232.80	0.8405	26,251
Total	49,521.55	874.72	48,646.83		40,887

5.2 Project Emissions

According to ACM0002 (Version 20.0), no project emissions were to be counted by the Project.

Hence, $PE_y = 0$ tCO₂e.

5.3 Leakage

According to the baseline methodology ACM0002 (version 20.0), the leakage of the Project is not considered.

5.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
12/05/2020-31/12/2020	14,636	0	0	14,636
01/01/2021-31/12/2021	26,251	0	0	26,251
Total	40,887	0	0	40,887

The annual average emission reductions estimated in the registered VCS-PD is 31,996 tCO₂, so the estimated amount of emission reductions for the corresponding 599 days (the duration of this monitoring period) are $599/365 \times 31,996 = 52,509$ tCO₂, which is higher than the actual value of 40,887 tCO₂.