



**Verified Carbon
Standard**

INNER MONGOLIA WULIJI WIND FARM PROJECT

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

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Report ID	CGNCAM-VCS543-202201
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Prepared By	CGN Carbon Asset Management (Beijing) Co., Ltd.
Contact	No.2 Building, Area 12 of Advanced Business Park, No. 188 west of South 4th Ring Road, Beijing, The People's Republic of China Telephone: +86 18566281342 Email:cgwind@163.com

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The Inner Mongolia Wuliji Wind Farm Project (hereinafter referred to as “the project”) is located in the Wulate Hou Qi, Bayannao’er City, Inner Mongolia Autonomous Region, China. The project is developed by CGN Wind Power Co.,Ltd. (hereafter referred to as the “Project proponent”). The objective of the project is to generate renewable electricity from wind and the generated power will be accessed to the North China Power Grid (NCPG). It involves the installation of 40 wind turbines, each of which has a rated output of 1,250 kW, providing a total installed capacity of 50 MW, with a predicted power supplied to the grid of 117,630 MWh annually.

The project activity was started construction on 02-September-2008. The first turbine was commissioned on 13-September-2009, and all the wind turbines have been put into operation gradually till 24-October-2009. The electricity generated from the project is supplied to the North China Power Grid, by replacing the electricity generated from fossil fuel-fired power plants dominated North China Power Grid (NCPG), the project activity achieves obvious greenhouse gas (GHG) emission reductions by avoiding CO₂ emissions.

During this VCS monitoring period from 13-September-2019 to 31-December-2021 (both days included), the total emission reduction achieved is 225,593 tCO₂e.

1.2 Sectoral Scope and Project Type

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

Project type: Grid connected wind power plant

The project is not a grouped project.

1.3 Project Proponent

Organization name	CGN Wind Power Co., Ltd.
Contact person	Shi Lei
Title	Manager
Address	No.2 Building, Area 12 of Advanced Business Park, No. 188 west of South 4th Ring Road, Beijing, The People's Republic of China
Telephone	+86 18566281342
Email	cgnwind@163.com

1.4 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	No.2 Building, Area 12 of Advanced Business Park, No. 188 west of South 4th Ring Road, Beijing, The People's Republic of China
Telephone	+86 15989548122
Email	brys_xing@outlook.com

1.5 Project Start Date

The project started on 13-September-2009 (the start date of electricity generation).

1.6 Project Crediting Period

The project was registered under VCS 2007.1 and complete validation before 19-March-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 (13-September-2009 to 14-March-2010) of the project should be updated to 13-September-2009 to 12-September-2019.

The lifetime of the project is about 20 years. As the project is also registered as a CDM project with a seven year twice renewable project crediting period, it is not eligible for VCU issuance beyond the end of those 21 years (14-March-2031).

The project first crediting period is from 13-September-2009 to 12-September-2019. The validation report of the renewal of crediting period has been issued after the end of the previous project crediting period and within two years after the end of the previous project crediting period, so the renewal of crediting period of this project has been completed successfully. This is the second crediting period from 13-September-2019 to 12-September-2029.

1.7 Project Location

The project activity lies in the Wulate Hou Qi, Bayannao'er City, Inner Mongolia Autonomous Region, China. The center of the project is defined using geographic coordinates obtained with a Global Positioning System (GPS) receiver: E 106°38'30" Longitude, N 41°30'20" Latitude.



Figure 1. The location of the project.

1.8 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: "Tool for 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).

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 a Clean Development Mechanism (CDM) project in UNFCCC (UNFCCC Ref. 2483) on 15-March-2010, with the first 7 years crediting period from 15-March-2010 to 14-March-2017 and the second 7 years crediting period from 15-March-2017 to 14-March-2024 has been renewed on 27-March-2019.

As shown in the following table, total GHG emission reductions of 813,840 tCO₂ from 15-March-2010 to 14-March-2017 (both days included) generated by the project has been issued as CER under CDM program.

Period	GHG Program	Issued GHG emission reductions (tCO ₂ e)
15-March-2010 to 31-Mar-2011	CDM	128,660
01-April-2011 to 31-January-2012	CDM	102,246
01-February-2012 to 20-January-2013	CDM	118,368
21-January-2013 to 14-March-2017	CDM	464,566
Total	-	813,840

Please refer to the following link for details:

<https://cdm.unfccc.int/Projects/DB/BVQI1239166632.16/view?cp=1>.

Except for the CDM, the project did not register any other GHG program.

1.10 Other Forms of Credit

Emissions Trading Programs and Other Binding Limits:

The GHG emission reductions generated from 13-September-2019 to 31-December-2021 (both days included) by the project would not be used for compliance with emission trading programs or to meet binding limits on GHG emissions.

Other Forms of Environmental Credit:

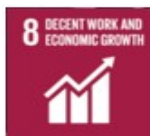
The project has not sought or received another form of GHG related environmental credit, including renewable energy certificates during this crediting period.

1.11 Sustainable Development Contributions

The project activity is a renewable wind power project located at Wulate Hou Qi, Bayannao'er City, Inner Mongolia Autonomous Region, China. In this monitoring period,



The project utilizes wind power energy resources to generate and supply 268,405.669 MWh renewable electricity to NCPG, which contributes to SDG 7.



The project provides 12 job opportunities for local people during both the construction and operational period, which has a positive effect on the local economy and contributes to SDG 8.



The project reduces 225,593 tCO₂e GHG emission and contributes to SDG 13.

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1)	7.2	Renewable energy supplied to the power grid	Implemented activities to increase	268,405.669 MWh of electricity from renewable sources has been supplied to the power grid during the reporting period	An accumulated 268,405.669 MWh of electricity from renewable sources has been supplied to the power grid during the monitoring period.
2)	8.5	Numbers of job opportunities provided by implementation of the project	Implemented activities to increase	The project provides 12 job opportunities for local people during both the construction and operational period	The project provides 12 job opportunities for local people during the monitoring period
3)	13.0	Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to increase	The project had achieve obvious GHG emission reductions by avoiding 225,593 tCO ₂ emissions, as grid-connected fossil fuel-fired power dominates in the NCPG during this monitoring period.	The annual average emission reductions estimated in the registered PD is 98,868 tCO ₂ e, and it will achieve obvious GHG emission reductions during all the lifetime. The project had achieve obvious GHG emission reductions by avoiding 225,593 tCO ₂ emissions, as grid-connected fossil fuel-fired power dominates in the NCPG during this monitoring period.

2 SAFEGUARDS

2.1 No Net Harm

The Environment Impact Assessment is prepared by Inner Mongolia Autonomous Region in November 2007 and approved by Environment Protection Bureau of Inner Mongolia Autonomous Region in May 2008.

According to the Environmental Impact Assessment (EIA), the environment impacts of the project are summarized below:

Waste water: a small quantity of waste water will be produced by the project management staff during operation. The waste water will be treated and will be used for sprinkling the vegetation.

Noise: the noise from the wind turbines is expected to be 53~33DB (A) at a distance of 50~150 meters, meeting the “ Industry Enterprise Factory Boundary Noise Standard ” . Therefore, the noise of the wind farm is not considered to have a negative impact on local residents during the operational period.

Solid waste: the main solid waste during the operational period is generated by the project management staff. All the waste produced will be collected and sent to landfill.

Therefore, the environmental impacts are not considered significant. The Environmental Protection Bureau of Inner Mongolia Autonomous Region approved the EIA

2.2 Local Stakeholder Consultation

Local stakeholder comments were invited and compiled on the basis of a questionnaire send out to stakeholders in February 2008. In total 40 questionnaires were distributed to stakeholders, and all the copies were returned.

The questions asked were as follows:

Do you think the project will influence the natural scenery?

Do you think the project will influence the ecosystem?

Do you think the project will influence the surrounding area?

Do you think the project will be helpful to the local economy?

Do you agree the construction of the project?

What about your opinion about the proposed project?

The survey shows that the project has strong local support among the local people. They all believe the project will promote the local economic development and will improve the life level of the local people. All the respondents agree the project construction. The villagers are all supportive of the project and to date there has been no need to modify the project design according to the comments received.

Communications with Local stakeholders were carried out at periodic intervals. Key implementation schedules or changes of the project will be communicated to the local authority, who will inform the neighborhood committee and the local residents, the comments and suggestions from residents will be collected by the local authority meanwhile. And the local government agencies and competent authorities will conduct spot checks on the implementation of the project from time to time, and give suggestions on the involved rectification problems. There are no negative comments received for the project. In line with VCS requirements all the processes have been implemented to receive comments from local stakeholders as well as communicate with them at periodic intervals.

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.

During this monitoring period from 13-September-2019 to 31-December-2021, the project owner carried out questionnaire survey for the local stakeholder to collect the relevant comments and suggestions and there are no negative comments received for the project.

2.3 AFOLU-Specific Safeguards

There is not applicable due to the project is non-AFOLU project.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The purpose of the Project is to use well established wind power generation technology for electricity generation and transmission to generate low emissions electricity for the Grid thereby displacing CO₂ emissions from electricity generation from the Grid. The baseline scenario is the same as the scenario existing prior to the start of the implementation of the project activity: electricity delivered to the Grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources. The Grid includes the Shandong, Beijing, Tianjin, Hebei, Shanxi and Inner Mongolia Provincial Power Grids.

The project involves the installation of 40 wind turbines, each of which has a rated output of 1,250 kW, providing a total installed capacity of 50 MW, with an expected power supplied to the grid of 117,630 MWh annually and the forecast load factor is 26.86%¹. The project is expected to be in operation for 20 years.

There was no significant malfunction or any emergency reported for the Project during this VCS monitoring period from 13-September-2019 to 31-December-2021.

The wind turbine is produced by Shanghai Electric Windpower Equipment Co., Ltd. The main technical specifications of the wind turbine are provided in the following table.

Table 2. Main Technical Parameters of wind turbines.

Item	Unit	Index
Type	-	SEC-1250
Quantity	Set	40
Rated power	kW	1,250
Hub height	m	65
Rotor diameter	m	64
Sweep-wind area	m ²	3,217
Cut-in speed	m/s	2.8
Cut-out speed	m/s	23
Rated wind speed	m/s	12.3
Rated voltage of generator	V	690
Load factor	-	26.86%

¹ 117630MWh/50MW/(24hours*365days)=26.86%

Lifetime	years	20
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3.2 Deviations

3.2.1 Methodology Deviations

There is a deviation on calculation of Build Margin when adopting the methodological tool – “Tool to calculate the emission factor for an electricity system” by the Chinese DNA in the “2017 Baseline Emission Factors for Regional Power Grids in China”. The deviation has been approved by the EB Board in a response letter entitled “Request for clarification on use of approved methodology AM0005 for several projects in China”, thus the same deviation method has been adopted in the previous crediting periods of the project by the Chinese DNA.

3.2.2 Project Description Deviations

There is a deviation for the crediting period. The project is registered under VCS 2007.1 and completed validation before 19/03/2020. Thus, it remains eligible to apply the crediting period requirements under VCS 3 which shall be a maximum of ten years and may be renewed at most twice, so the first crediting period of the project should be updated from 13-September-2009~14-March-2010 to 13-September-2009~12-September-2019.

However, as the project is also registered as a CDM project with a seven year twice renewable project crediting period, it is not eligible for VCU issuance beyond the end of those 21 years (14-March-2031).

The project first crediting period is from 13-September-2009 to 12-September-2019. The validation report of the renewal of crediting period has been issued after the end of the previous project crediting period and within two years after the end of the previous project crediting period, so the renewal of crediting period of this project has been completed successfully. This is the second crediting period from 13-September-2019 to 12-September-2029.

Besides, section 1.4 Other Entities Involved in the Project shows the consulting company for the project that is responsible for VCS reports and other related documents. The consultancy for renewal of the crediting period that prepared the approved VCS PD version 5.1 of the project is Climate Bridge (Shanghai) Ltd, while the consultancy for this monitoring period that prepared this MR is CGN Carbon Asset Management (Beijing) Co., Ltd.

The change of the consultancy entity is appropriate under VCS Standard v4.3 and would not have an impact on the applicability of the methodology, additionality, or the appropriateness of the baseline scenario of the project.

3.3 Grouped Projects

The project is not grouped project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

The baseline grid emission factor is obtained directly from the official source Notification on Determining Baseline Emission Factor of China's Grid 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 ₂ e/MWh
Description	The baseline grid emission factor
Source of data	Approved VCS PD with Ref No.543.
Value applied	0.8405
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	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
Description	The quantity of net electricity supplied to the grid by the project in period y
Source of data	Calculated
Description of measurement methods and procedures to be applied	The net electricity delivered from the project to the grid is calculated with the formula showed in section 5. The accuracy of the electricity meters involved will be described above in the monitored parameter $EG_{export,total,y}$, $EG_{import,total,y}$, $EG_{project,y}$ and $EG_{others,y}$

Frequency of monitoring/recording	Continuously measurement and monthly recording										
Value monitored	<table> <tr> <th>Period</th><th>Value</th></tr> <tr> <td>13-September-2019 to 31-December-2019</td><td>34,150.793</td></tr> <tr> <td>01-January-2020 to 31-December-2020</td><td>106,177.875</td></tr> <tr> <td>01-January-2021 to 31-December-2021</td><td>128,077.001</td></tr> <tr> <td>Total</td><td>268,405.669</td></tr> </table>	Period	Value	13-September-2019 to 31-December-2019	34,150.793	01-January-2020 to 31-December-2020	106,177.875	01-January-2021 to 31-December-2021	128,077.001	Total	268,405.669
Period	Value										
13-September-2019 to 31-December-2019	34,150.793										
01-January-2020 to 31-December-2020	106,177.875										
01-January-2021 to 31-December-2021	128,077.001										
Total	268,405.669										
Monitoring equipment	Electricity meters are installed at the onsite substation (the main meter) and the separate meters installed at the project site (M1, M2, M3, M4, M5, M6, M7, M8) to monitor the power output generated. Refer to the following table 3.										
QA/QC procedures to be applied	1. The net electricity supply to the grid is cross checked by receipt of sales. 2. The meters are calibrated once per year by a qualified organization according to the related national standards and regulations (Chinese electricity industry regulation DL/T448-2016). 3. A back-up meter is installed at the onsite substation to check the main meter. When the main meter fails to work normally, the readings of the back-up meter will be adopted. 4. Proportion of the monitored data is 100%. 5. The data will be kept during the crediting period and until two years after the end of the crediting period.										
Purpose of the data	Calculation of baseline emission										
Calculation method	Please refer to section 5.										
Comments	-										

Data / Parameter	EG _{export,total,y}
Data unit	MWh
Description	Quantity of annual electricity exported to the grid by the project and other wind farm project in period y
Source of data	Electricity meter: Main meter (or Backup meter)
Description of measurement methods and procedures to be	The quantity of annual electricity exported to the grid are monitored continuously through the main meter (or Backup meter) installed at onsite substation.

applied	The accuracy of the meters are 0.2S, meeting the national standard. A designated person from the grid company and the project company jointly record the readings of the meters at the onsite substation each month.																	
Frequency of monitoring/recording	Continuously measurement and monthly recording																	
Value monitored	<table><tr><th>Period</th><th>Value</th></tr><tr><td>13-September-2019 to 31-December-2019</td><td>68,986.476</td></tr><tr><td>01-January-2020 to 31-December-2020</td><td>212,733.216</td></tr><tr><td>01-January-2021 to 31-December-2021</td><td>256,607.637</td></tr><tr><td>Total</td><td>538,327.329</td></tr></table>			Period	Value	13-September-2019 to 31-December-2019	68,986.476	01-January-2020 to 31-December-2020	212,733.216	01-January-2021 to 31-December-2021	256,607.637	Total	538,327.329					
Period	Value																	
13-September-2019 to 31-December-2019	68,986.476																	
01-January-2020 to 31-December-2020	212,733.216																	
01-January-2021 to 31-December-2021	256,607.637																	
Total	538,327.329																	
Monitoring equipment	The quantity of annual electricity exported to the grid are monitored continuously through the main meter (or Backup meter) installed at onsite substation. The accuracy of the meters are 0.2S, meeting the national standard. <table><tr><td></td><td>Main meter</td><td>Backup meter</td></tr><tr><td>Type</td><td>ZMQ202C</td><td>ZMQ202C</td></tr><tr><td>Accuracy class</td><td>0.2S</td><td>0.2S</td></tr><tr><td>Serial No.</td><td>95691047</td><td>95691048</td></tr><tr><td>Calibration frequency</td><td>annually</td><td>annually</td></tr></table>				Main meter	Backup meter	Type	ZMQ202C	ZMQ202C	Accuracy class	0.2S	0.2S	Serial No.	95691047	95691048	Calibration frequency	annually	annually
	Main meter	Backup meter																
Type	ZMQ202C	ZMQ202C																
Accuracy class	0.2S	0.2S																
Serial No.	95691047	95691048																
Calibration frequency	annually	annually																
QA/QC procedures to be applied	1. The electricity exported to the grid would be double checked by the receipt of sales. 2. The metering instruments will be calibrated annually in accordance with the “Technical administrative code of electric energy metering (DL/T448-2016)”. 3. A backup meter is installed at the onsite substation to check the main meter. When the main meter fails to work normally, the readings of the backup meter would be adopted 4. The data will be kept during the recording period and until two years after the end of the crediting period.																	
Purpose of the data	Calculation of baseline emission																	

Calculation method	-
Comments	-

Data / Parameter	EG _{import,total,y}																
Data unit	MWh																
Description	Quantity of annual electricity imported from the grid by the project and other wind farm project in period y																
Source of data	Electricity meter: Main meter (or Backup meter)																
Description of measurement methods and procedures to be applied	The quantity of annual electricity imported from the grid are monitored continuously through the main meter (or Backup meter) installed at onsite substation. The accuracy of the meters are 0.2S, meeting the national standard. A designated person from the grid company and the project company jointly record the readings of the meters at the onsite substation each month.																
Frequency of monitoring/recording	Continuously measurement and monthly recording																
Value monitored	<table><tr><td>Period</td><td>Value</td></tr><tr><td>13-September-2019 to 31-December-2019</td><td>565.900</td></tr><tr><td>01-January-2020 to 31-December-2020</td><td>850.730</td></tr><tr><td>01-January-2021 to 31-December-2021</td><td>801.780</td></tr><tr><td>Total</td><td>2,218.410</td></tr></table>		Period	Value	13-September-2019 to 31-December-2019	565.900	01-January-2020 to 31-December-2020	850.730	01-January-2021 to 31-December-2021	801.780	Total	2,218.410					
Period	Value																
13-September-2019 to 31-December-2019	565.900																
01-January-2020 to 31-December-2020	850.730																
01-January-2021 to 31-December-2021	801.780																
Total	2,218.410																
Monitoring equipment	The quantity of annual electricity imported from the grid are monitored continuously through the main meter (or Backup meter) installed at onsite substation. The accuracy of the meters are 0.2S, meeting the national standard. <table><tr><td></td><td>Main meter</td><td>Backup meter</td></tr><tr><td>Type</td><td>ZMQ202C</td><td>ZMQ202C</td></tr><tr><td>Accuracy class</td><td>0.2S</td><td>0.2S</td></tr><tr><td>Serial No.</td><td>95691047</td><td>95691048</td></tr><tr><td>Calibration frequency</td><td>annually</td><td>annually</td></tr></table>			Main meter	Backup meter	Type	ZMQ202C	ZMQ202C	Accuracy class	0.2S	0.2S	Serial No.	95691047	95691048	Calibration frequency	annually	annually
	Main meter	Backup meter															
Type	ZMQ202C	ZMQ202C															
Accuracy class	0.2S	0.2S															
Serial No.	95691047	95691048															
Calibration frequency	annually	annually															

QA/QC procedures to be applied	1. The electricity imported from the grid would be double checked by the receipt of sales. 2. The metering instruments will be calibrated annually in accordance with the “Technical administrative code of electric energy metering (DL/T448-2016)”. 3. A backup meter is installed at the onsite substation to check the main meter. When the main meter fails to work normally, the readings of the backup meter would be adopted 4. The data will be kept during the recording period and until two years after the end of the crediting period.
Purpose of the data	Calculation of baseline emission
Calculation method	-
Comments	-

Data / Parameter	EG _{project,y}										
Data unit	MWh										
Description	The electricity generation from the project metered by separate meters in period y.										
Source of data	Measured										
Description of measurement methods and procedures to be applied	The quantity of annual electricity from the project are monitored continuously through the separate meters (M1, M2, M3, M4) installed at the project site The accuracy of the meters are 0.5S, meeting the national standard. A designated person from the grid company and the project company jointly record the readings of the meters at the onsite substation each month.										
Frequency of monitoring/recording	Continuously measurement and monthly recording										
Value monitored	<table border="1"> <thead> <tr> <th>Period</th><th>Value</th></tr> </thead> <tbody> <tr> <td>13-September-2019 to 31-December-2019</td><td>34,964.540</td></tr> <tr> <td>01-January-2020 to 31-December-2020</td><td>108,532.200</td></tr> <tr> <td>01-January-2021 to 31-December-2021</td><td>130,282.950</td></tr> <tr> <td>Total</td><td>273,779.690</td></tr> </tbody> </table>	Period	Value	13-September-2019 to 31-December-2019	34,964.540	01-January-2020 to 31-December-2020	108,532.200	01-January-2021 to 31-December-2021	130,282.950	Total	273,779.690
Period	Value										
13-September-2019 to 31-December-2019	34,964.540										
01-January-2020 to 31-December-2020	108,532.200										
01-January-2021 to 31-December-2021	130,282.950										
Total	273,779.690										
Monitoring equipment	Electricity meters:.										

	M1	M2	M3	M4
Type	DTSD341	DTSD341	DTSD341	DTSD341
Accuracy class	0.5S	0.5S	0.5S	0.5S
Serial No.	2007111 9020046	2007111 9020043	2007111 9020042	2007111 9020047
Calibration frequency	annually	annually	annually	annually
QA/QC procedures to be applied	1. The metering instruments will be calibrated annually in accordance with the “Technical administrative code of electric energy metering (DL/T448-2016)”. 2. The data will be kept during the recording period and until two years after the end of the crediting period.			
Purpose of the data	Calculation of baseline emission			
Calculation method	-			
Comments	-			

Data / Parameter	EG _{others,y}						
Data unit	MWh						
Description	The electricity generation from other project metered by separate meters in period y.						
Source of data	Measured						
Description of measurement methods and procedures to be applied	The quantity of annual electricity from other project are monitored continuously through the separate meters (M5, M6, M7, M8) installed at the project site The accuracy of the meters are 0.5S, meeting the national standard. A designated person from the grid company and the project company jointly record the readings of the meters at the onsite substation each month.						
Frequency of monitoring/recording	Continuously measurement and monthly recording						
Value monitored	<table> <tr> <th>Period</th><th>Value</th></tr> <tr> <td>13-September-2019 to 31-December-2019</td><td>35,088.130</td></tr> <tr> <td>01-January-2020 to 31-December-2020</td><td>108,050.040</td></tr> </table>	Period	Value	13-September-2019 to 31-December-2019	35,088.130	01-January-2020 to 31-December-2020	108,050.040
Period	Value						
13-September-2019 to 31-December-2019	35,088.130						
01-January-2020 to 31-December-2020	108,050.040						

	01-January-2021 to 31-December-2021		129,927.630		
	Total		273,065.800		
Monitoring equipment	Electricity meters:.				
		M5	M6	M7	M8
	Type	DTSD341	DTSD341	DTSD341	DTSD341
	Accuracy class	0.5S	0.5S	0.5S	0.5S
	Serial No.	2007111 9020056	0903002 7190095	0903002 7190096	0903002 7190087
	Calibration frequency	annually	annually	annually	annually
QA/QC procedures to be applied	1. The metering instruments will be calibrated annually in accordance with the “Technical administrative code of electric energy metering (DL/T448-2016)”.				
	2. The data will be kept during the recording period and until two years after the end of the crediting period.				
Purpose of the data	Calculation of baseline emission				
Calculation method	-				
Comments	-				

Table 3. Details of the metering instruments and calibration records.

Meters	Type	Accuracy class	Serial number	Calibration date	Validity date
Main meter	ZMQ202C	0.2S	95691047	25-June-2018	24-June-2019
				25-June-2019	24-June-2020
				25-June-2020	24-June-2021
				25-June-2021	24-June-2022
Backup meter	ZMQ202C	0.2S	95691048	25-June-2018	24-June-2019
				25-June-2019	24-June-2020
				25-June-2020	24-June-2021
				25-June-2021	24-June-2022

M1	DTSD341	0.5S	20071119020046	01-June-2018 01-June-2019 01-June-2020 01-June-2021	31-May-2019 31-May-2020 31-May-2021 31-May-2022
M2	DTSD341	0.5S	20071119020043	01-June-2018 01-June-2019 01-June-2020 01-June-2021	31-May-2019 31-May-2020 31-May-2021 31-May-2022
M3	DTSD341	0.5S	20071119020042	01-June-2018 01-June-2019 01-June-2020 01-June-2021	31-May-2019 31-May-2020 31-May-2021 31-May-2022
M4	DTSD341	0.5S	20071119020047	01-June-2018 01-June-2019 01-June-2020 01-June-2021	31-May-2019 31-May-2020 31-May-2021 31-May-2022
M5	DTSD341	0.5S	20071119020056	01-June-2018 01-June-2019 01-June-2020 01-June-2021	31-May-2019 31-May-2020 31-May-2021 31-May-2022
M6	DTSD341	0.5S	09030027190095	01-June-2018 01-June-2019 01-June-2020 01-June-2021	31-May-2019 31-May-2020 31-May-2021 31-May-2022
M7	DTSD341	0.5S	09030027190096	01-June-2018 01-June-2019	31-May-2019 31-May-2020

				01-June-2020	31-May-2021
				01-June-2021	31-May-2022
M8	DTSD341	0.5S	09030027190087	01-June-2018	31-May-2019
				01-June-2019	31-May-2020
				01-June-2020	31-May-2021
				01-June-2021	31-May-2022

4.3 Monitoring Plan

The aim of the monitoring plan is to make sure that the net electricity generation delivered to the grid is monitored completely, consistently, reliably and precisely. The details are summarized as follows.

1. Monitoring subject

The main data monitored is the net electricity generation delivered to the grid by the project.

2. Monitoring management structure

In order to obtain reliable monitoring data, the Project proponent will establish a monitoring management framework prior to the starting of the crediting period. Clear responsibilities will be assigned to all staff involved in the project. A monitoring director will be appointed who has the overall responsibilities for the monitoring of the project, other staff will be responsible for the data recording, data collecting, data archiving and emission reductions calculation. The detailed structure is shown in Figure 2.

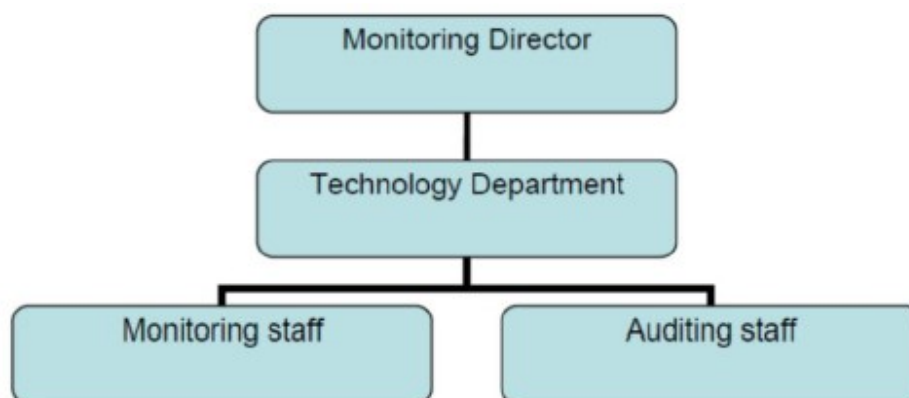


Figure 2. Structure of the monitoring management.

3. Monitoring apparatus and installation

The project shares the same transformer, substation or transmission line with some other wind farms in future, appropriate additional meters are installed at the project site so that the electricity generation can be monitored for each wind farm separately so as to calculate the share of this wind farm of the net supply to the grid.

The net electricity supplied by the project will be calculated as follows:

$$EG_{\text{facility}, y} = (EG_{\text{export}, \text{total}, y} - EG_{\text{import}, \text{total}, y}) * EG_{\text{project}, y} / (EG_{\text{project}, y} + EG_{\text{others}, y})$$

Where:

$EG_{\text{facility}, y}$	The net electricity supplied to the grid by the project in period y
$EG_{\text{export}, \text{total}, y}$	Total quantity of electricity exported to the grid by the project and other wind farm project based on the data metered by the main meter (or backup meter) installed at the on-site 220KV Substation in period y
$EG_{\text{import}, \text{total}, y}$	Total quantity of electricity imported from the grid by the project and other wind farm project based on the data metered by the main meter (or backup meter) installed at the on-site 220KV Substation in period y
$EG_{\text{project}, y}$	The electricity generation from the project metered by the separate meters (M1, M2, M3 and M4) installed at the project site in period y
$EG_{\text{others}, y}$	The electricity generation from the other wind farm project metered by the separate meters (M5, M6, M7 and M8) installed at the site of other project in period y

The separate meters M1~M8 are installed at the respective project site so that the electricity generation can be monitored for each wind farm separately so as to calculate the share of this wind farm of the total net electricity exported to the grid. M1~M4 are installed in Line1#~4# respectively to monitor the generation from the Project; M5~M8 are installed in Line5#~8# respectively to monitor the generation from other wind farm project. The location of the meters in relation to the grid, project, and other project transmission lines are displayed as following Figure 3.

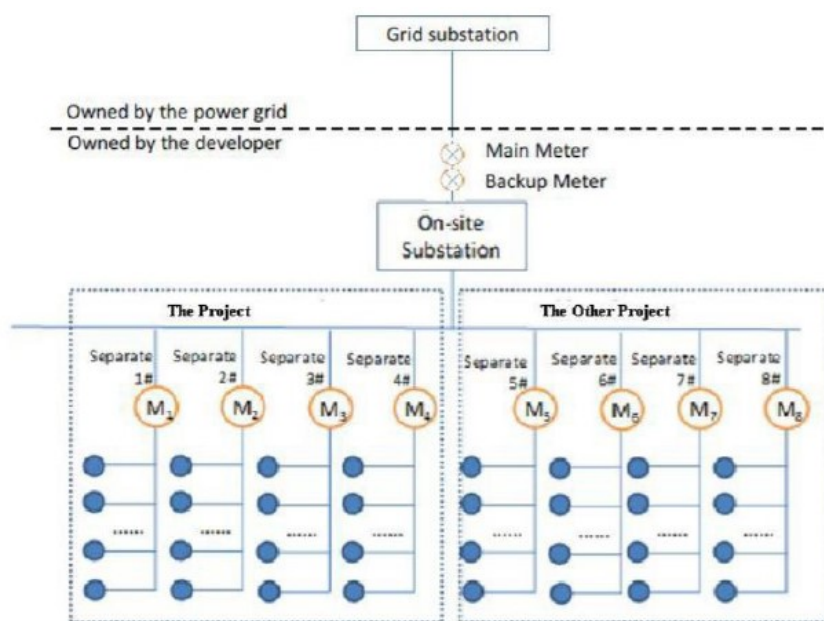


Figure 3. The location of meters.

4. Data monitoring and calculation

The readings of the main meter and separate meters are used for calculating the emission reductions when the main meter and separate meters are in normal operation state. The monitoring processes are as follows:

- (1) The meter readings from the main meter and separate meters are recorded daily;
- (2) The designated persons from the grid company and the project company jointly record the main meter readings of the power to/from the grid monthly;
- (3) The Project proponent provides the power grid company with a settling accounts sheet about the net electricity supplied to the grid monthly;
- (4) The Project proponent provides the power grid company with a sale receipt after the power grid company has confirmed the settling accounts sheet, and archives a copy of the sale receipt;
- (5) The Project proponent provides the VVB with the readings of the main meter at onsite substation and separate meters at project site and the copy of sale receipt.

5. Quality control

1) Calibration of meters

The calibration of meters is conducted by a qualified organization in compliance with the national standard and sectional regulations to ensure the accuracy. The main meter and back

up meter will be calibrated in line with the regulation and manufacturers requirements. The meters are sealed after calibration. The calibration records are archived together with other monitoring records. When the main meter or back-up meter have a breakdown, the party finding the breakdown should tell another party and inform the qualified calibration organization to check, calibrate, test and treat the meter so as to recover the normal monitoring state.

2) Emergency treatment

When the main meter or back-up meter have a breakdown, the electricity generation difference will be treated as follows:

- (1) When both meters are fine, the main meter will be used;
- (2) When one of the two meters has a breakdown, the readings of the other meter will be adopted;
- (3) If both the main meter and back-up meter have breakdowns, the net electricity supplied to the grid will be calculated from the readings of other meters and deducting the line losses.

6. Data management

All monitoring data and records will be archived in electronic format as well as on paper. The electronic documents will be backed up on compact disc or hard disc. The Project proponent will also keep copies of sale receipts and prepare a monitoring report at the end of each year, which includes the net electricity generation, the monitoring data summary, the calibration records, and the emission reductions calculation. And all data including calibration records is kept until 2 years after the end of the total crediting period of the VCS project.

7. Training program

The Project proponent will train all related staff before and during the crediting period. The training contains VCS knowledge, operational regulations, quality control (QC), data monitoring requirements and data management regulations, etc.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

In this monitoring period, the annual emission reductions ER_y for the project activity are calculated as follows:

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

Where:

BE_y = the baseline emissions (tCO₂e)

$EG_{facility,y}$ = the electricity supplied by the project activity to the grid (MWh)

$EF_{grid,CM,y}$ = baseline emissions factor (tCO₂e/MWh)

The quantity of net electricity supplied to the grid by the project in year y ($EG_{facility,y}$) in this monitoring period (13-September-2019 to 31-December-2021) as in the table below:

Period		$EG_{export,total,y}$ (MWh)	$EG_{import,total,y}$ (MWh)	$EG_{project,y}$ (MWh)	$EG_{others,y}$ (MWh)	$EG_{facility,y}$ (MWh)
		Conservative value	Conservative value	Measured by the meter	Measured by the meter	
13/09/2019	20/09/2019	2700.679	20.000	1217.790	1541.820	1,182.958
21/09/2019	20/10/2019	16903.812	117.500	8591.690	8506.960	8,434.747
21/10/2019	20/11/2019	24961.366	96.200	12693.450	12685.260	12,436.595
21/11/2019	20/12/2019	18482.456	102.300	9407.370	9321.690	9,232.120
21/12/2019	31/12/2019	5938.163	229.900	3054.240	3032.400	2,864.373
Subtotal		68,986.476	565.900	34,964.540	35,088.130	34,150.793
01/01/2020	20/01/2020	10796.660	105.800	5477.430	5559.330	5,305.763
21/01/2020	20/02/2020	14966.199	69.300	7613.130	7673.400	7,419.083
21/02/2020	20/03/2020	22761.955	68.300	11567.010	11475.870	11,391.707
21/03/2020	20/04/2020	14565.496	51.700	7458.570	7430.640	7,270.511
21/04/2020	20/05/2020	19015.055	16.600	9737.700	9608.970	9,562.434
21/05/2020	20/06/2020	17969.595	14.800	9125.130	9158.940	8,960.797
21/06/2020	20/07/2020	14242.235	39.000	7293.720	7213.080	7,141.094
21/07/2020	20/08/2020	16097.694	11.800	8235.780	8165.220	8,077.549
21/08/2020	20/09/2020	15437.106	70.500	7824.810	7899.150	7,646.978
21/09/2020	20/10/2020	17114.424	182.100	8762.250	8667.960	8,511.960
21/10/2020	20/11/2020	16637.442	107.900	8493.240	8431.290	8,295.023
21/11/2020	20/12/2020	18222.895	94.670	9330.510	9219.210	9,118.498
21/12/2020	31/12/2020	14906.460	18.260	7612.920	7546.980	7,476.479
Subtotal		212,733.216	850.730	108,532.200	108,050.040	106,177.875
01/01/2021	25/01/2021	27102.656	43.820	13656.930	13661.550	13,527.130
26/01/2021	22/02/2021	25324.157	74.910	12741.120	12823.020	12,584.178
23/02/2021	25/03/2021	19255.256	178.280	9757.650	9817.920	9,509.121
26/03/2021	24/04/2021	16521.662	93.940	8446.410	8355.480	8,258.314
25/04/2021	25/05/2021	27983.566	33.460	14167.650	14139.720	13,988.842
26/05/2021	24/06/2021	19227.796	50.590	9843.750	9715.230	9,651.609
25/06/2021	25/07/2021	15629.039	44.810	7955.010	7988.610	7,775.693
26/07/2021	25/08/2021	16024.046	47.650	8184.540	8104.320	8,027.539
26/08/2021	24/09/2021	12696.652	47.360	6535.410	6464.640	6,359.076
25/09/2021	25/10/2021	17591.172	76.580	8901.690	8976.030	8,720.881

26/10/2021	24/11/2021	29071.791	20.920	14740.740	14646.870	14,571.833
25/11/2021	25/12/2021	25868.481	67.680	13108.830	13046.880	12,930.955
26/12/2021	31/12/2021	4311.363	21.780	2243.220	2187.360	2,171.833
Subtotal		256,607.637	801.780	130,282.950	129,927.630	128,077.001
Total		538,327.329	2,218.410	273,779.690	273,065.800	268,405.669

Among which, $EF_{grid,CM,y}$ is 0.8405 tCO₂/MWh in the second crediting period, therefore, The baseline emission reductions during the monitoring period is:

Period	$EG_{facility,y}$	$EF_{grid,CM,y}$	BE_y
	MWh	tCO ₂ e/MWh	tCO ₂ e
13-September-2019 to 31-December-2019	34,150.793	0.8405	28,703
01-January-2020 to 31-December-2020	106,177.875	0.8405	89,242
01-January-2021 to 31-December-2021	128,077.001	0.8405	107,648
Total	268,405.669	-	225,593

5.2 Project Emissions

According to ACM0002 "Grid-connected electricity generation from renewable sources" (Version 20.0), no project emissions were to be counted by the Project. $PE_y = 0$ tCO₂e.

5.3 Leakage

According to the baseline methodology ACM0002 "Grid-connected electricity generation from renewable sources" (Version 20.0), the leakage of the Project is not considered.

5.4 Net GHG Emission Reductions and Removals

According to the Section 5.1, 5.2 and 5.3 above,

$$BE_y = 225,593 \text{ tCO}_2\text{e}$$

$$PE_y = 0 \text{ tCO}_2\text{e}$$

$$LE_y = 0 \text{ tCO}_2\text{e}$$

Therefore:

$$ER_y = BE_y - PE_y - LE_y = 225,593 \text{ tCO}_2\text{e}$$

This monitoring period started from 13-September-2019 to 31-December-2021, with totally 841 days. Based on the annual estimated emission reductions from the VCS approved PD, the amount of emission reductions for this monitoring period would be $98,868 / 365 * 841 = 227,802$ tCO₂e. The actual emission reductions in this monitoring period are 225,593 tCO₂e, which is 0.97% less than the estimation in the approved PD, which is considered to be conservative.

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)
13-September-2019 to 31-December-2019	28,703	0	0	28,703
01-January-2020 to 31-December-2020	89,242	0	0	89,242
01-January-2021 to 31-December-2021	107,648	0	0	107,648
Total	225,593	0	0	225,593

APPENDIX 1: <SUPPORTING EVIDENCE>

Evidence for SDG 7 and SDG 13: From project operation date onwards, the net electricity supplied to the grid and corresponding emission reduction in every monitoring period have been listed in below table. Please refer to following links for details.

<https://registry.verra.org/app/projectDetail/VCS/543>

Period		EG _y	ER
From	To	MWh	tCO ₂ e
13-September-2009	14-March-2010	60,171	63,467
15-March-2010	14-March-2017	771,560.97	813,840
15-March-2017	12-September-2019	251,476.934	265,256
13-September-2019	31-December-2021	268,405.669	225,593

Total GHG emission reductions of 813,840 tCO₂ from 15-March-2010 to 14-March-2017 (both days included) generated by the project has been issued as CER under CDM program. Please refer to the following link for details:

<https://cdm.unfccc.int/Projects/DB/BVQI1239166632.16/view?cp=1>.

Since the current project contributions with all impacts do not include in previously approved VCS monitoring reports or Sustainable Development Contribution Reports, all impacts during the previous monitoring period from 13-September-2009 to 12-September-2019 has not been calculated in the cumulative impact. Thus, the cumulative impacts in project lifetime are same as the one in this monitoring period.

Evidence for SDG 8: The staff payroll of the project has been submitted as a separate document to VVB due to confidentiality requirement of the project proponent.