INNER MONGOLIA XIMENG ZHELIGENTU WIND FARM PHASE I PROJECT

Document Prepared by Climate Bridge (Shanghai) Ltd.

Tel: +86 21 6246 2036; Fax: +86 21 2301 9950

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Prepared By	Melinda Hu
Contact	Block B, Level 24, Jiangong Mansion, 33 Fushan Road, Pudong New Area, Shanghai, P.R. of China Telephone: +86 21 6246 2036; Email: projects@climatebridge.com http://www.climatebridge.com

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 3
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 5
1.9 Participation under other GHG Programs 6
1.10 Other Forms of Credit 6
1.11 Sustainable Development 7
2 SAFEGUARDS 7
2.1 No Net Harm 7
2.2 Local Stakeholder Consultation 8
2.3 AFOLU-Specific Safeguards 9
3 IMPLEMENTATION STATUS 9
3.1 Implementation Status of the Project Activity 9
3.2 Deviations 10
3.3 Grouped Projects 10
4 DATA AND PARAMETERS 10
4.1 Data and Parameters Available at Validation 11
4.2 Data and Parameters Monitored 11
4.3 Monitoring Plan 18
5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS 22
5.1 Baseline Emissions 22
5.2 Project Emissions 31
5.3 Leakage 32
5.4 Net GHG Emission Reductions and Removals 32

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Inner Mongolia Ximeng Zheligentu Wind Farm Phase I Project (hereinafter referred to as the project) is to utilize wind resources for electricity generation through the construction of a wind farm with a total capacity of 48.75MW and a 220kV substation in Zhengxiangbai Qi, south Xilinguole League, Inner Mongolia Autonomous Region, P.R.China. The project is constructed and operated by Beijing International New Energy Co., Ltd. The electricity generated from the project was sold to West Inner Mongolia Power Grid, an integral part of the North China Power Grid (NCPG). The estimated annual net electricity output and average annual emission reductions of the project are 99.48GWh and 104,941 tCO_2e during the first crediting period from 01/05/2009 to 30/04/2019, 99.48GWh and 83,612 tCO_2e during the second period from 01/05/2019 to 30/04/2029.

The project started construction on 06/06/2008. The first wind turbine of the Project has been put into operation on 30/04/2009. And all the 39 wind turbines have been put into operation on 02/07/2009. The Project owner has implemented and operated the project as per the registered PD.

During this monitoring period, started from 21/07/2018 to 20/12/2020, the total emission reduction achieved is 173,215 tCO_2e.

1.2 Sectoral Scope and Project Type

Sectoral scope: 1. Energy industries (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	**Beijing International New Energy Co., Ltd.**
Contact person	Jiaman Xu
Title	Manager
Address	No.1, Nanbinhe Road, Guanganmenwai, Xuanwu District, 1003 Room, Gaoxin Building, Beijing City, China.
Telephone	021-23019950
Email	3542346576@qq.com

1.4 Other Entities Involved in the Project

Organization name	Climate Bridge (Shanghai) Ltd.
Role in the Project	VCU buyer
Contact person	Zhiwen Gao
Title	General Manager
Address	Block B, Level 24, Jiangong Mansion, 33 Fushan Road, Pudong New Area, Shanghai, China 200120
Telephone	+86-2162462036
Email	gao.zhiwen@climatebridge.com; projects@climatebridge.com

1.5 Project Start Date

The project started on 30/04/2009 (operation start date)

1.6 Project Crediting Period

The project crediting period is ten years, twice renewable for a total of 30 years. 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. The project first crediting period is from 01/05/2009 to 30/04/2019. And the second crediting period of the project is from 01/05/2019 to 30/04/2029.

1.7 Project Location

The project is located at Zhengxiangbai Qi, Xilinguole League, middle grassland of Inner Mongolia Autonomous Region, P. R. China. The project has geographical coordinates with east longitude of 115°29'34" and north latitude of 42°28'15". Figures A1 and A2 show the geographical location of the project.

Figure 1. Location of Inner Mongolia Autonomous Region in China

Figure 2. Location of the project

1.8 Title and Reference of Methodology

The methodology applied to the project is as follows:

Methodology:

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

ACM0002: "Consolidated methodology for grid-connected electricity generation from renewable sources" (version 07).

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

https://cdm.unfccc.int/methodologies/PAmethodologies/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG

The applied tools:

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

"Tool to calculate the emission factor for an electricity system" (version 01.1)

"Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" (Version 03.0).

Reference:

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

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

http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v3.0.pdf

1.9 Participation under other GHG Programs

The project has been registered as a Clean Development Mechanism (CDM) project in UNFCCC on 06/05/2010 (UNFCCC Ref. 2566), with the 7 years crediting period started from 06/05/2010. Please refer to the following link for details:

https://cdm.unfccc.int/Projects/DB/BVQI1241775223.11/view?cp=1

1.10 Other Forms of Credit

Emission Trading Programs and Other Binding Limits

The project does not reduce GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading.

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 monitoring period.

1.11 Sustainable Development

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

1. GHG emission reduction

The project activity achieves obvious greenhouse gas (GHG) emission reductions by avoiding CO_2 emissions, as grid-connected fossil fuel-fired power dominates in the North China Power Grid.

2. Pollutants emission reduction through replacing fossil fuel combustion

The project is to replace grid-connected fossil fuel-fired power plants in the North China Power Grid, and thus reduce fossil fuel consumption and avoid pollutants emission, such as sulfur dioxide and dust, brought by fossil fuel combustion. Therefore, the project has obvious environmental benefit.

3. Employment opportunities

The conducting of the project offered 16 job opportunities for local people.

4. Economy development

The region can achieve economic growth and booming of local tourism through the construction and operation of the project. Furthermore, the project contributes to local government with more tax revenues and poverty eradication.

2 SAFEGUARDS

2.1 No Net Harm

The project doesn't cause significant impact on the environment and socio-economic as to the conclusion of the EIA. The conclusions of EIA are documented below:

Ambient air

The impact on ambient air quality of the project is mainly from dust during the construction phase. The excavation work is the primary emission source; however, it is a ground source and the particle size are quite large so that dust deposit quickly on the ground. Immediately replant the areas where construction has completed, and sprinkling water on the road frequently should be conducted. Therefore, the project doesn't 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 was chosen to apply. Improvement on construction process and strengthening

of equipment maintenance is emphasized. Meanwhile, the project site is very far from the village or resident.

Consequently, the noise of operation has little impact to the surrounding environment. As a result, the noise doesn't impact the work and daily life of local residents.

Electromagnetic impact

The operation of the wind farm generates electromagnetic pollution, whereas the pollution is slight. In addition, the project is 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 project activity are excavated earth material and municipal solid waste. Part of the excavated earth material was backfilled, and the rest was used for land levelling and road construction near the project site. The municipal solid waste was 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 was applied for on-site primary treatment, and then the wastewater was treated together with the local wastewater. Small-scale septic tanks should be built on the site, through which the wastewater can meet the second-degree standard of discharge after treatment. Therefore, the impact of wastewater is limited and mitigate.

Impact on natural environment

In order to protect the landscape, vehicles are prohibited from driving on the landscape randomly and timely afforestation is required; hunting wild animals is strictly forbidden at the same time. The lands permanently taken by wind farms are normally mountain ridges, where most of the vegetation is grass and shrub, without rare plants. Hence, the project construction has little impact on the mountain's eco-environment.

No migrating birds have been found in the project field till now. Therefore, the project is not located on the passage of migrating birds, and the project construction doesn't influence the migration of birds.

2.2 Local Stakeholder Consultation

Local Stakeholder Consultation during the project preparation stage:

The project developer has sent out questionnaires to the stakeholders in the local County for the comments of the project construction in 06/03/2008. 50 copies of questionnaire were distributed, and 43 pieces of reply were received. The recovery ratio is 86%. Among the

interviewees, there were 1 farmer, 6 workers, 17 government officials and 19 others. 8 of them have educational level of middle school or below middle school, 13 of high school, 21 of college and 1 other.

The summary of survey is listed as the following:

- 72% of them consider their current living and/or working environment is quiet, another 28% is unsure and only one person thinks different.
- 72% of them currently do not experience electromagnetic interference when watching TV at home, while other 21% have the experience, and 7% don't know.
- 84% of them think there are not any negative impacts on their everyday life, and the remainder is unsure.
- 88% of them think the project help improve local economics, while the other of them is unsure.
- 70% of them think the construction of the project have no noise impact on the environment while other 28% is not sure, and only one person thinks the construction of the project have noise impact on the environment.
- Regarding the construction and operation of the propose project, 21% of them are most concerned with the noise level, 30% of them are most concerned with electromagnetic interference, and 49% of them are most concerned with wastewater from the project.
- 93% of them support the implementation of the project and the others are not sure.

Local Stakeholder Consultation during the project implementation stage:

Communications with Local stakeholders are being carried out at periodic intervals. In this monitoring period, the project owner carried out questionnaire survey for the local stakeholders to collect the relevant comments and suggestions in July 2018, June 2019 and May 2020. Meanwhile, the local authority has also conducted spot checks on the implementation of the project from time to time as per the request from the local governments' regulations. 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.

2.3 AFOLU-Specific Safeguards

NA

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project involves the installation of 39 wind turbines with each capacity of 1250kW each, which amount to a total installed capacity of 48.75MW. The annual net electricity output is 99.48GWh. The wind turbines are supplied by a domestic manufacturer–Shanghai Electric Wind Power Equipment Co., Ltd. and the selected model is SEC-1250. The main technical specifications of the wind turbine are provided in the following Table.1:

Table 1 Key Technical specifications of wind turbines

Item	Unit	Index
Type	SEC-1250	
Rated capacity	kW	1250
Number of blades	-	3
Rotor diameter	m	64
Swept area	m^2	3217
Cut-in speed	m/s	2.8
Rated wind speed	m/s	12.3
Safe wind speed	m/s	50.3
Cut-out speed	m/s	23
Height of hub	m	68
Rated voltage of generator	V	690
Rated capacity of generator	kW	1250
Lifetime	years	24

The project started construction on 06/06/2008. The first wind turbine of the Project has been put into operation on 30/04/2009. And all the 39 wind turbines have been put into operation on 02/07/2009. During this monitoring period, no events that may impact the GHG emission reductions or removals and monitoring occurred.

3.2 Deviations

3.2.1 Methodology Deviations

There is no deviation applied to this monitoring period.

3.2.2 Project Description Deviations

There is no deviation applied to the Project Description.

3.3 Grouped Projects

The Project is not a grouped project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

The baseline gird emission factor $EF_{grid,CM,y}$ 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 $EF_{grid,CM,y}$ are not described in detail here. With consideration of the fact of the Project, data and parameters that are available at validation are summarized in below tables.

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2e/MWh
Description	The baseline grid emission factor
Source of data	Registered PD
Value applied	1.0549 for the first crediting period （01/05/2009 - 30/04/2019） 0.8405 for the second crediting period（01/05/2019 - 30/04/2029）
Justification of choice of data or description of measurement methods and procedures applied	According to registered PD, the project chooses ex-ante for the calculation of the grid emission factor, therefore no need to monitor during the crediting period
Purpose of Data	Baseline emission calculations
Comments	The baselines emission factor was determined ex-ante and fixed during the first and second crediting period.

4.2 Data and Parameters Monitored

Data / Parameter	EG_y[1]
Data unit	MWh
Description	Net Electricity supplied to the grid by the project activity in year y
Source of data	Calculation by $EG_{export,y}$, $EG_{import,y}$, $EG_{A-i,y}$ and $EG_{B-i,y}$ according to

[1] For the second crediting period, $EG_{facility,y}$ instead of EG_y to describe the quantity of net electricity generation supplied by the project plant/unit in year y

<table>
<tr><td></td><td>the equation (1) in section 4.3.</td></tr>
<tr><td>Description of measurement methods and procedures to be applied</td><td>The net electricity supplied to the Grid by the project was calculated through $EG_{export,y}$, $EG_{import,y}$, $EG_{A-i,y}$ and $EG_{B-i,y}$ according to the equation (1) in section 4.3</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Continuously measured, and monthly recorded</td></tr>
<tr><td>Value monitored</td><td><table><tr><th>Year</th><th>Value</th></tr><tr><td>21/07/2018-31/12/2018</td><td>31,954.327</td></tr><tr><td>01/01/2019-31/12/2019</td><td>74,498.565</td></tr><tr><td>01/01/2020-20/12/2020</td><td>83,846.379</td></tr><tr><td>Total</td><td>190,299.271</td></tr></table></td></tr>
<tr><td>Monitoring equipment</td><td>Not applicable</td></tr>
<tr><td>QA/QC procedures to be applied</td><td>Power supplied to the grid was checked by internal verification procedure and electricity sales receipts</td></tr>
<tr><td>Purpose of the data</td><td>Baseline emission calculations</td></tr>
<tr><td>Calculation method</td><td>Not applicable</td></tr>
<tr><td>Comments</td><td>-</td></tr>
</table>

Data / Parameter	$EG_{export, y}$
Data unit	MWh
Description	Total electricity supplied to the grid by the proposed project and Project B during year y
Source of data	Bidirectional electricity meter reading of M1 installed at the project site.
Description of measurement methods and procedures to be applied	The readings of the electricity meter are hourly measured and monthly recorded. Data was archived for 2 years following the end of the crediting period by means of electronic and paper backup. The accuracy of electricity meter is 0.2S. The calibration frequency is one time/year according to the national calibration standard.
Frequency of monitoring/recording	Hourly measurement and monthly recording

<table>
<tr><td>Value monitored</td><td>
<table>
<tr><th>Year</th><th>Value</th></tr>
<tr><td>21/07/2018-31/12/2018</td><td>72,233.631</td></tr>
<tr><td>01/01/2019-31/12/2019</td><td>165,518.656</td></tr>
<tr><td>01/01/2020-20/12/2020</td><td>182,220.451</td></tr>
<tr><td>Total</td><td>419,972.738</td></tr>
</table>
</td></tr>
<tr><td>Monitoring equipment</td><td>The main meter and the backup meter were calibrated by Inner Mongolia Electricity Science Research Institute Electricity Measurement and Testing Center annually according to Chinese national calibration standards. Information of the meters is listed in the blow table:
<table>
<tr><td>Meter</td><td>Main meter M1</td><td>Backup meter M2</td></tr>
<tr><td>Serial No.</td><td>95232476</td><td>95232477</td></tr>
<tr><td>Type</td><td>ZMQ202C</td><td>ZMQ202C</td></tr>
<tr><td>Accuracy</td><td colspan="2">0.2S</td></tr>
<tr><td>Date of Calibration</td><td colspan="2">14/03/2018
28/08/2018
14/04/2019
17/09/2019
24/04/2020
03/11/2020</td></tr>
<tr><td>Validity</td><td colspan="2">From 14/03/2018 to 27/08/2018
From 28/08/2018 to 13/04/2019
From 14/04/2019 to 16/09/2019
From 17/09/2019 to 23/04/2020
From 24/04/2020 to 02/11/2020
From 03/11/2020 to 02/11/2021</td></tr>
</table>
</td></tr>
<tr><td>QA/QC procedures to be applied</td><td>The electricity supplied by the project activity to the grid is monitored and recorded at the central control room. The project operator is responsible for recording such data. Double check by receipt of sales.</td></tr>
<tr><td>Purpose of the data</td><td>Baseline emission calculations</td></tr>
<tr><td>Calculation method</td><td>-</td></tr>
</table>

Comments	The reading from the main meter is first choice. When the main meter is out of order, the reading from the backup meter will be used.

Data / Parameter	$EG_{import, y}$
Data unit	MWh
Description	Total electricity purchased from the grid by the proposed project and project B during year y
Source of data	Electricity meter reading of M1 installed at the project site
Description of measurement methods and procedures to be applied	The readings of the electricity meter are hourly measured and monthly recorded. Data was archived for 2 years following the end of the crediting period by means of electronic and paper backup. The accuracy of electricity meter is 0.2S. The calibration frequency is one time/year according to the national calibration standard.
Frequency of monitoring/recording	Continuously measured and monthly recorded
Value monitored	

Year	Value
21/07/2018-31/12/2018	301.885
01/01/2019-31/12/2019	897.551
01/01/2020-20/12/2020	921.634
Total	2,121.070

Monitoring equipment	The main meter and the backup meter were calibrated by Inner Mongolia Electricity Science Research Institute Electricity Measurement and Testing Center annually according to Chinese national calibration standards. Information of the meters is listed in the blow table*:*

Meter	Main meter M1	Backup meter M2
Serial No.	95232476	95232477
Type	ZMQ202C	ZMQ202C
Accuracy	0.2S	

	Date of Calibration	14/03/2018 28/08/2018 14/04/2019 17/09/2019 24/04/2020 03/11/2020
	Validity	From 14/03/2018 to 27/08/2018 From 28/08/2018 to 13/04/2019 From 14/04/2019 to 16/09/2019 From 17/09/2019 to 23/04/2020 From 24/04/2020 to 02/11/2020 From 03/11/2020 to 02/11/2021
QA/QC procedures to be applied	The electricity supplied by the project activity to the grid is monitored and recorded at the central control room. The project operator is responsible for recording such data Double check by receipt of sales.	
Purpose of the data	Baseline emission calculations	
Calculation method	-	
Comments	It is conservative for calculation of emission reductions by deduction of electricity purchased from the grid by both the project (Project A) and Project B	

Data / Parameter	$EG_{A\text{-}i,\,y}$
Data unit	MWh
Description	Quantity of electricity supplied to the grid by Group A-i (i=1,2,3) of the proposed project in year y.
Source of data	Readings of electricity meters (A-1, A-2, and A-3 described in section 4.3) installed at the 35kV transmission line of 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 is archived for 2 years following the end of the last crediting period by means of electronic and paper backup. The accuracy of electricity meters should be not lower than 0.5S. The calibration frequency is once a year.

<table>
<tr><td>Frequency of monitoring/recording</td><td>Continuously measured and monthly recorded</td></tr>
<tr><td>Value monitored</td><td>
<table>
<tr><th>Year</th><th>Value</th></tr>
<tr><td>21/07/2018-31/12/2018</td><td>33,301.467</td></tr>
<tr><td>01/01/2019-31/12/2019</td><td>76,259.090</td></tr>
<tr><td>01/01/2020-20/12/2020</td><td>86,117.872</td></tr>
<tr><td>Total</td><td>195,678.429</td></tr>
</table>
</td></tr>
<tr><td>Monitoring equipment</td><td>The meters were calibrated by Xilingol Electric Power Bureau Electricity Measurement and Testing Center annually according to Chinese national calibration standards. Information of the meters is listed in the blow table:
<table>
<tr><td>Meter</td><td>Meter A-1</td><td>Meter A-2</td><td>Meter A-3</td></tr>
<tr><td>Serial No.</td><td>9030094</td><td>9030093</td><td>9030096</td></tr>
<tr><td>Type</td><td>DSSD331</td><td>DSSD331</td><td>DSSD331</td></tr>
<tr><td>Accuracy</td><td colspan="3">0.5[2]</td></tr>
<tr><td>Date of Calibration</td><td colspan="3">12/09/2017
12/09/2018
12/09/2019
12/09/2020</td></tr>
<tr><td>Validity</td><td colspan="3">From 12/09/2017 to 11/09/2018
From 12/09/2018 to 11/09/2019
From 12/09/2019 to 11/09/2020
From 12/09/2020 to 11/09/2021</td></tr>
</table>
</td></tr>
<tr><td>QA/QC procedures to be applied</td><td>The metering equipments at the substation is calibrated once a year according to the management standard.</td></tr>
</table>

[2] The actual meter accuracy for meters A-1, A-2 and A-3 is 0.5, which is lower than the stipulated 0.5S in the registered PD, the situation has been considered in the calculation of emission reductions.

Purpose of the data	Baseline emission calculations
Calculation method	The sum of readings of electricity meters (A-1, A-2, and A-3 described in 4.3) installed at the 35kV transmission line of the Project site.
Comments	-

Data / Parameter	$EG_{B\text{-}i,\,y}$
Data unit	MWh
Description	Quantity of electricity supplied to the grid by Group B-i (i=1,2,3) of the Project B in year y.
Source of data	Readings of electricity meters (B-1, B-2, and B-3 described in section 4.3) installed at the 35kV transmission line of the Project B site.
Description of measurement methods and procedures to be applied	The readings of the electricity meters are continuously measured and monthly recorded. Data is archived for 2 years following the end of the last crediting period by means of electronic and paper backup. The accuracy of electricity meters should be no lower than 0.5S. The calibration frequency is once a year.
Frequency of monitoring/recording	Continuously measured and monthly recorded
Value monitored	

Year	Value
21/07/2018-31/12/2018	41,300.988
01/01/2019-31/12/2019	91,161.627
01/01/2020-20/12/2020	98,780.066
Total	231,242.681

Monitoring equipment	The meters were calibrated by Xilingol Electric Power Bureau Electricity Measurement and Testing Center annually according to Chinese national calibration standards. Information of the meters is listed in the blow table.

Meter	Meter B-1	Meter B-2	Meter B-3
Serial No.	9030087	0010037	0010038

	Type	DSSD331	DSSD331	DSSD331
	Accuracy	0.5[3]	0.5S	0.5S
	Date of Calibration	12/09/2017 12/09/2018 12/09/2019 12/09/2020		
	Validity	From 12/09/2017 to 11/09/2018 From 12/09/2018 to 11/09/2019 From 12/09/2019 to 11/09/2020 From 12/09/2020 to 11/09/2021		
QA/QC procedures to be applied	The metering equipments at the substation were calibrated once a year according to the management standard.			
Purpose of the data	Baseline emission calculations			
Calculation method	The sum of readings of electricity meters (B-1, B-2, and B-3 described in 4.3) installed at the 35kV transmission line of the Project B site.			
Comments	-			

4.3 Monitoring Plan

This Monitoring plan sets out a number of monitoring tasks in order to ensure the complete, consistent, clear and accurate monitoring and the accurate calculation of the emission reduction in the crediting period. This plan is mainly implemented by the project owner with the cooperation of the grid company.

1. Monitoring Object

The main objective data is the power supplied to and purchased from the grid which is calculated according to the generated electricity and the purchased electricity and supplied to the grid, thus to calculate the emission reduction of the project.

2. Monitoring Implementers

[3] The actual meter accuracy for meters B-1 is 0.5, which is lower than the stipulated 0.5S in the registered PD, the situation has been considered in the calculation of emission reductions.

The General Manager of the project entity appoint a VCS project manager or a chief officer. The operational and monitoring manager of the plant, the Financial Chief, and the Technical Chief are responsible for the collection of the data and information required in the monitoring plan. The collected information is documented and sent to the VCS manager or responsible staffs of the project entity monthly. The VCS manager in charge of the implementation of the Monitoring Plan and report to the General Manager of the company. The General Manager of the company makes the confirmations on monitoring, calculation data and reports.

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

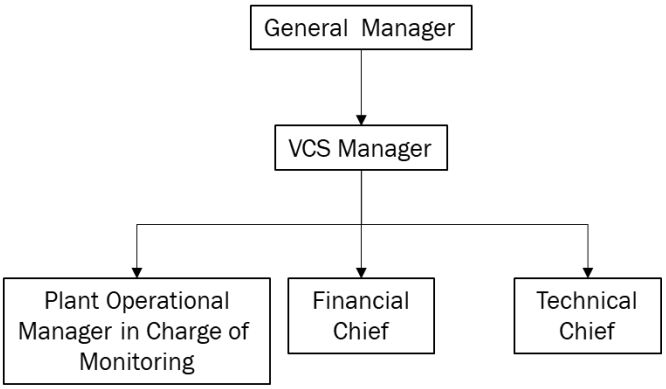

Figure 3 Operations and Monitoring Procedure of the Project

3. Monitoring Program and Equipments

The power connection and monitoring system is shown as below.

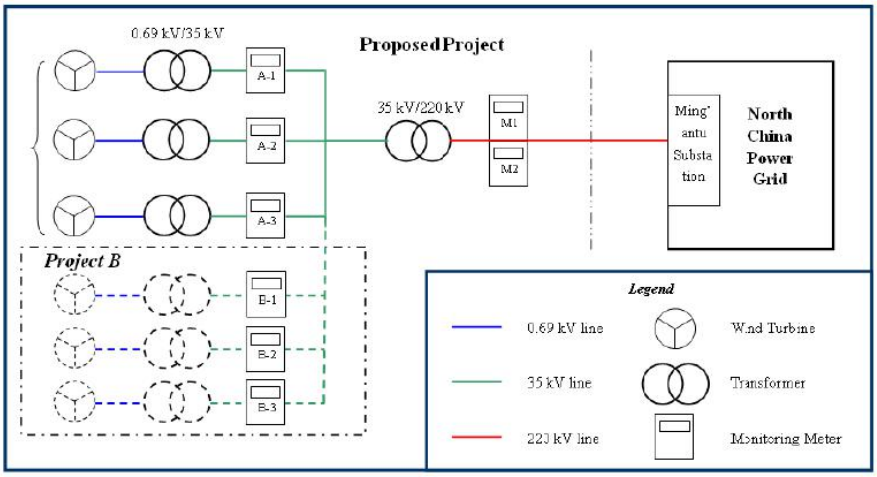

Figure 4: The location of meters

The project shares the transformer and gateway meters (the main meter M1 and backup meter M2) with another wind farm project (hereafter refer to Project B). Monitoring equipments include two bidirectional meters and six auxiliary meters. Both M1 (main meter) and M2 (backup meter) are equipped at the project site. The project owner and the Grid Company are

responsible for conducting the monitoring. The settlement time of M1 is at 24:00 on the 20th day of every month.

M1 was used to monitor the electricity exports to and imports from the grid by the project and project B as well as M2. The metering was hourly measured and daily recorded. The metering of M2 was used in case that M1 fails to work. Both meters have an accuracy of 0.2s. They were calibrated annually to ensure normal performance.

The 39 sets of wind turbines were divided into 3 groups, and each group is connected with a 35kV transmission line and installed with a meter at the low voltage side of 35kV/220kV transformer. These meters (A-1, A-2, A-3) are installed as auxiliary meters to calculate the electricity supplied to the grid by Group A-i (i=1,2,3) of the project activity. Similarly, three meters (B-1, B-2, B-3) are installed as auxiliary meters to calculate the electricity supplied to the grid by Group B-i (i=1,2,3) of the Project B. The precision of these six auxiliary meters should be no lower than 0.5S.

In order to deal with the jointly-reading problem, the project owner and the grid company set up the procedure and calculation method to determine the net electricity supplied to the grid by the project, which is calculated as follows:

$$EG_y = \frac{\sum_{i=1,2,3} EG_{A-i,y}}{\sum_{i=1,2,3} EG_{A-i,y} + \sum_{i=1,2,3} EG_{B-i,y}} \times EG_{export} - EG_{import} \quad \text{..... (2)}$$

Where:

EG_y = Net electricity supplied to the grid by the Project in the year y.

$EG_{export,y}$ = Total electricity supplied to the grid by the proposed project and Project B in the year y.

$EG_{import,y}$ = Total electricity purchased from the grid by the proposed project and Project B in the year y.

$EG_{A-i,y}$ = Electricity supplied to the grid by Group A-i (i=1,2,3) of the proposed project in year y.

$EG_{B-i,y}$ = Electricity supplied to the grid by Group B-i (i=1,2,3) of the Project B in year y.

4. Data Collection

The verification uses the main meter and six auxiliary meters' data as long as the inaccuracy of these meters is within the permissible tolerance. The main procedures are as follows:

I. According to the requirements of power purchase/sales agreement, the project owner and the grid company should collect the data of both the main meter (M1) and the backup meter (M2) periodically, and check them at the same time.

II. For the electricity supplied to the grid by the project activity, the project owner collects and records the data of auxiliary meters and calculates the electricity supplied to the grid by the project as per the procedure and calculation method jointly set up. The project owner provides sales receipts to the Grid Company. A copy of the sales receipts is stored for cross-check.

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

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

V. The project owner keeps and safe keeps the records of the main meter and the six auxiliary meters' data readings for verification by the DOE.

In any case that any of the six auxiliary meters exceeds the allowable tolerance or its malfunction occurs, the project owner will give up the emission reductions during the period when any of the six auxiliary meters are inaccurate. Otherwise, if the fault of the main meter M1 exceeds the allowable tolerance or its malfunction occurs, but the six auxiliary meters are within the allowable tolerance, the grid-connected electricity generated by the project will be resolved by following measures:

I. Adopting the backup meter M2 and the six auxiliary meters' data, unless a test by either party reveals it is inaccuracy;

II. If the inaccuracy of the backup meter M2 is not within the acceptable limits or it cannot work properly, the project owner will give up the emission reductions during the period when both the main meter and the backup meter are inaccurate;

5. Calibration of Meters & Metering

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

Meters were tested by a qualified metric organization co-authorized by the project owner and the grid company within 10 days after:

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

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

6. Data Management System

To keep safely the record of the data collected during monitoring, this project sets up a complete data management system. The project perfects the whole monitoring procedure by developing the VCS manual, tracking information from the primary source to the end-data calculations in paper document format. It is the responsibility of the 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 were collated in a central place, together with this monitoring plan. All paper-based information was stored by the project owner and kept at least one copy.

At the end of each month, the monitoring data was filed in a spreadsheet and stored on a hard disk and CD-ROM, and the paper-based printout should be also archived. 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 were kept for two years following the end of the last crediting period

7. Monitoring Report

After the VCS project manager collects and sorts the monitored data, the monitoring report is prepared by the project developer. The project developer has to make sure that the format and content of the monitoring report are consistent with the monitoring methodology in the registered PD.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

In accordance with the registered PD, baseline emissions are calculated according to the following formula:

$BE_y = EG_{PL,y} * EF_{grid,CM,y}$ (1)

$$EG_y = \frac{\sum_{i=1,2,3} EG_{A-i,y}}{\sum_{i=1,2,3} EG_{A-i,y} + \sum_{i=1,2,3} EG_{B-i,y}} \times EG_{export,\ y} - EG_{import,y} \quad (2)$$

Where:

BE_y = Baseline emission in year y (tCO_2/yr).

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr).

$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO2e/MWh).

EG_y = Net electricity supplied to the grid by the project in the year y.

$EG_{export,y}$ = Total electricity supplied to the grid by the project and Project B in the year y.

$EG_{import,y}$ = Total electricity purchased from the grid by the project and Project B in the year y.

$EG_{A\text{-}i,y}$ = Electricity supplied to the grid by Group A-i (i=1,2,3) of the project in year y.

$EG_{B\text{-}i,y}$ = Electricity supplied to the grid by Group B-i (i=1,2,3) of the Project B in year y.

The monitored data based on meter readings and sales receipts for the Project are as following:

Table 1 The $EG_{A-i,y}$ and $EG_{B-i,y}$ during the Monitoring Period

Period[4]	MA-1	MA-2	MA-3	Monitoring records $EG_{A-i,y}$ (Conservativeness)	MB-1	MB-1 (Conservativeness)	MB-2	MB-3	Monitoring records $EG_{B-i,y}$
	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh	MWh
	a	b	c	A=(a+b+c) *(1-0.5%)[5]	d	e=d*(1+0.5%)[6]	f	g	B=e+f+g
21/07/2018 - 20/08/2018	693.460	597.700	777.340	2,058.157	678.443	681.835	693.694	976.363	2,351.892
21/08/2018 - 20/09/2018	1,826.983	1,996.083	1,721.684	5,517.026	2,285.763	2,297.191	2,048.554	2,050.183	6,395.928
21/09/2018 - 20/10/2018	1,718.250	1,703.850	1,636.650	5,033.456	2,336.993	2,348.677	2,284.214	2,360.793	6,993.684
21/10/2018 - 20/11/2018	2,588.234	2,522.533	2,521.733	7,594.337	3,016.550	3,031.632	3,003.970	3,245.480	9,281.082
21/11/2018 -	3,176.600	3,281.700	3,139.700	9,550.010	3,883.423	3,902.840	4,054.133	3,644.944	11,601.917

[4] According to power purchase agreement, the time of meter reading for $EG_{export, y}$ and $EG_{import, y}$ with the power company is at 24:00 of 20th of every month. The electricity for the period from 21/12/2018 to 31/12/2018 and 21/12/2019 to 31/12/2019, is also from the sales(purchases) receipts confirmed by local grid company based on the monitoring daily data for the convenience of financial settlement at the end of year.

[5] Since the accuracy of the meters of MA-1~MA-3 is 0.5, which is lower than the registered PD requirement (0.5S), the accuracy difference has been considered and the electricity amount of $EG_{A-i, y}$ is conservatively calculated by deduction of 0.5%.

[6] Since the accuracy of the meter MB-1 is 0.5, which is lower than the registered PD requirement (0.5S), the accuracy difference has been considered and the electricity amount of MB-1 is conservatively calculated by addition of 0.5%, as the electricity of MB-1 is generated by the project B which shares the gateway meter with the proposed project.

20/12/2018									
21/12/2018 - 31/12/2018	1,208.084	1,212.314	1,145.915	3,548.481	1,607.108	1,615.143	1,543.967	1,517.375	4,676.485
Subtotal (2018)				**33,301.467**					**41,300.988**
01/01/2019 - 20/01/2019	1,973.099	1,913.869	1,852.469	5,710.739	2,444.597	2,456.819	2,455.232	2,501.471	7,413.522
21/01/2019 - 20/02/2019	2,320.750	2,316.750	2,473.250	7,075.196	2,693.067	2,706.532	2,792.016	2,773.167	8,271.715
21/02/2019 - 20/03/2019	1,756.783	1,793.184	1,925.783	5,448.371	2,178.943	2,189.837	2,266.734	2,166.323	6,622.894
21/03/2019 - 20/04/2019	3,014.850	2,974.450	2,878.450	8,823.411	3,311.216	3,327.772	3,303.647	3,347.637	9,979.056
21/04/2019 - 30/04/2019	1,098.717	1,081.250	1,083.450	3,247.099	1,408.689	1,415.732	1,209.576	1,162.902	3,788.210
01/05/2019 - 20/05/2019	2,197.433	2,162.500	2,166.900	6,494.199	2,817.377	2,831.464	2,419.152	2,325.804	7,576.420
21/05/2019 - 20/06/2019	2,382.534	2,372.635	2,269.831	6,989.875	2,970.340	2,985.191	2,750.660	2,893.750	8,629.601
21/06/2019 - 20/07/2019	1,266.583	1,218.985	1,266.682	3,733.488	1,649.383	1,657.629	1,454.931	1,452.186	4,564.746
21/07/2019 - 20/08/2019	1,930.966	1,859.166	1,976.368	5,737.667	2,199.735	2,210.733	2,142.629	2,156.386	6,509.748
21/08/2019 - 20/09/2019	1,672.754	1,641.688	1,639.808	4,929.478	1,862.586	1,871.898	1,894.153	1,879.011	5,645.062

21/09/2019 - 20/10/2019	1,300.329	1,278.581	1,330.840	3,890.201	1,606.599	1,614.631	1,609.275	1,528.626	4,752.532
21/10/2019 - 20/11/2019	2,917.151	2,932.976	2,902.373	8,708.737	3,344.117	3,360.837	3,287.698	3,416.435	10,064.970
21/11/2019 - 20/12/2019	1,276.635	1,250.301	1,259.814	3,767.816	1,652.511	1,660.773	1,619.410	1,611.329	4,891.512
21/12/2019 - 31/12/2019	562.308	569.697	579.365	1,702.813	843.037	847.252	723.954	880.433	2,451.639
Subtotal (2019)				**76,259.090**					**91,161.627**
01/01/2020 - 20/01/2020	1,032.255	1,027.574	978.801	3,023.436	1,261.775	1,268.083	1,227.619	1,578.432	4,074.134
21/01/2020 - 20/02/2020	4,394.767	4,337.409	4,386.324	13,052.907	5,443.154	5,470.369	5,376.937	5,276.659	16,123.965
21/02/2020 - 20/03/2020	3,068.811	3,079.016	2,987.173	9,089.325	3,432.159	3,449.319	3,362.914	3,473.177	10,285.410
21/03/2020 - 20/04/2020	2,878.100	2,826.626	2,939.524	8,601.028	3,498.725	3,516.218	3,567.315	3,451.210	10,534.743
21/04/2020 - 20/05/2020	3,420.171	3,499.526	3,373.053	10,241.286	3,712.172	3,730.732	3,694.420	3,529.158	10,954.310
21/05/2020 - 20/06/2020	2,695.353	2,692.450	2,789.447	8,136.363	2,856.539	2,870.821	2,838.161	2,811.550	8,520.532
21/06/2020 - 20/07/2020	1,092.050	1,106.188	1,129.262	3,310.862	1,220.394	1,226.495	1,186.929	1,207.927	3,621.351
21/07/2020 - 20/08/2020	1,571.388	1,567.548	1,621.564	4,736.697	1,283.269	1,289.685	1,303.337	1,306.894	3,899.916

21/08/2020 - 20/09/2020	1,579.399	1,543.840	1,534.261	4,634.212	1,906.111	1,915.641	1,890.164	1,943.475	5,749.280
21/09/2020 - 20/10/2020	2,027.066	1,984.379	2,047.555	6,028.705	2,042.923	2,053.137	2,026.163	2,015.914	6,095.214
21/10/2020 - 20/11/2020	3,195.153	3,229.403	3,121.444	9,498.270	3,565.898	3,583.727	3,547.334	3,453.518	10,584.579
21/11/2020 - 20/12/2020	1,924.052	1,922.128	1,947.570	5,764.781	2,776.560	2,790.442	2,804.542	2,741.648	8,336.632
Subtotal（2020）				**86,117.872**					**98,780.066**
Total (21/07/2018- 20/12/2020				**195,678.429**					**231,242.681**

Table 2 The $EG_{export,y}$ and $EG_{import,y}$,EG_y during the Monitoring Period

Period	Monitoring records	Sales Receipts	$EG_{export,y}$	Monitoring records	Sales Receipts	$EG_{import,y}$	EG_y
	MWh	MWh	MWh	MWh	MWh	MWh	MWh
	C	D	E=min(C,D)	F	G	H=max(F,G)	I=A/(B+A)*E-H
21/07/2018-20/08/2018	4,204.788	4,204.788	4,204.788	54.210	54.210	54.210	1,908.152
21/08/2018-20/09/2018	11,682.714	11,682.714	11,682.714	47.880	47.880	47.880	5,362.519
21/09/2018-20/10/2018	11,865.694	11,865.694	11,865.694	57.660	57.660	57.660	4,908.229
21/10/2018-20/11/2018	16,664.185	16,664.185	16,664.185	61.050	61.050	61.050	7,438.226

21/11/2018-20/12/2018	20,808.150	20,808.150	20,808.150	50.320	50.320	50.320	9,344.476
21/12/2018-31/12/2018	7,008.100	7,008.100	7,008.100	30.765	30.765	30.765	2,992.725
Subtotal (2018)	**72,233.631**	**72,233.631**	**72,233.631**	**301.885**	**301.885**	**301.885**	**31,954.327**
01/01/2019-20/01/2019	14,016.304	14,016.304	14,016.304	68.495	68.495	68.495	6,030.397
21/01/2019-20/02/2019	15,117.863	15,117.863	15,117.863	189.220	189.220	189.220	6,780.380
21/02/2019-20/03/2019	11,847.908	11,847.908	11,847.908	101.920	101.920	101.920	5,245.638
21/03/2019-20/04/2019	18,638.831	18,638.831	18,638.831	24.600	24.600	24.600	8,722.021
21/04/2019-30/04/2019	6,866.780	6,866.780	6,866.780	5.600	5.600	5.600	3,163.715
01/05/2019-20/05/2019	13,733.562	13,733.562	13,733.562	11.200	11.200	11.200	6,327.432
21/05/2019-20/06/2019	15,549.417	15,549.417	15,549.417	41.950	41.950	41.950	6,916.572
21/06/2019-20/07/2019	8,146.534	8,146.534	8,146.534	55.010	55.010	55.010	3,610.226
21/07/2019-20/08/2019	12,119.232	12,119.232	12,119.232	35.910	35.910	35.910	5,641.705
21/08/2019-20/09/2019	10,450.655	10,450.655	10,450.655	65.960	65.960	65.960	4,805.767
21/09/2019-20/10/2019	8,513.194	8,513.194	8,513.194	59.550	59.550	59.550	3,772.343
21/10/2019-20/11/2019	18,552.246	18,552.246	18,552.246	61.480	61.480	61.480	8,544.525
21/11/2019-20/12/2019	8,314.780	8,314.780	8,314.780	98.740	98.740	98.740	3,519.157
21/12/2019-31/12/2019	3,651.350	3,651.350	3,651.350	77.916	77.916	77.916	1,418.687

Subtotal (2019)	**165,518.656**	**165,518.656**	**165,518.656**	**897.551**	**897.551**	**897.551**	**74,498.565**
01/01/2020-20/01/2020	7,302.706	7,302.706	7,302.706	181.814	181.814	181.814	2,929.006
21/01/2020-20/02/2020	28,914.151	28,914.151	28,914.151	186.870	186.870	186.870	12,748.503
21/02/2020-20/03/2020	19,139.735	19,139.735	19,139.735	38.740	38.740	38.740	8,940.338
21/03/2020-20/04/2020	18,944.515	18,944.515	18,944.515	35.110	35.110	35.110	8,479.953
21/04/2020-20/05/2020	21,086.939	21,086.939	21,086.939	56.210	56.210	56.210	10,132.575
21/05/2020-20/06/2020	16,541.946	16,541.946	16,541.946	33.470	33.470	33.470	8,046.744
21/06/2020-20/07/2020	6,812.290	6,812.290	6,812.290	66.500	66.500	66.500	3,187.086
21/07/2020-20/08/2020	7,388.821	7,388.821	7,388.821	40.810	40.810	40.810	4,011.543
21/08/2020-20/09/2020	10,335.190	10,335.190	10,335.190	34.750	34.750	34.750	4,577.904
21/09/2020-20/10/2020	11,969.264	11,969.264	11,969.264	37.140	37.140	37.140	5,914.661
21/10/2020-20/11/2020	19,903.585	19,903.585	19,903.585	85.25	85.25	85.25	9,328.236
21/11/2020-20/12/2020	13,881.309	13,881.309	13,881.309	124.970	124.970	124.970	5,549.830
Subtotal (2020)	**182,220.451**	**182,220.451**	**182,220.451**	**921.634**	**921.634**	**921.634**	**83,846.379**
Total (21/07/2018-20/12/2020)	**419,972.738**	**419,972.738**	**419,972.738**	**2,121.070**	**2,121.070**	**2,121.070**	**190,299.271**

Among which, $EF_{grid,CM,y}$ is 1.0549 tCO_2/MWh in the first crediting period, and $EF_{grid,CM,y}$ is 0.8405 tCO_2/MWh in the second crediting period, therefore,

For 21/07/2018 to 31/12/2018:

$$EG_y = \frac{\sum_{i=1,2,3} EG_{A-i,y}}{\sum_{i=1,2,3} EG_{A-i,y}+\sum_{i=1,2,3} EG_{B-i,y}} \times EG_{export} - EG_{import} = 31{,}954.327 \text{ MWh}$$

$EF_{grid,CM,y}$ =1.0549 tCO_2e/MWh

For 01/01/2019 to 31/12/2019:

The first crediting period（For 01/01/2019 to 30/04/2019）

$$EG_y = \frac{\sum_{i=1,2,3} EG_{A-i,y}}{\sum_{i=1,2,3} EG_{A-i,y}+\sum_{i=1,2,3} EG_{B-i,y}} \times EG_{export} - EG_{import} = 29{,}942.151 \text{ MWh}$$

$EF_{grid,CM,y}$ =1.0549 tCO_2e/MWh

The second crediting period（For 01/05/2019 to 31/12/2019）

$$EG_{facility,y} = \frac{\sum_{i=1,2,3} EG_{A-i,y}}{\sum_{i=1,2,3} EG_{A-i,y}+\sum_{i=1,2,3} EG_{B-i,y}} \times EG_{export} - EG_{import} = 44{,}556.414 \text{ MWh}$$

$EF_{grid,CM,y}$ = 0.8405 tCO_2e/MWh

For 01/01/2020 to 31/12/2020:

$$EG_{facility,y} = \frac{\sum_{i=1,2,3} EG_{A-i,y}}{\sum_{i=1,2,3} EG_{A-i,y}+\sum_{i=1,2,3} EG_{B-i,y}} \times EG_{export} - EG_{import} = 83{,}846.379 \text{ MWh}$$

$EF_{grid,CM,y}$ = 0.8405 tCO_2e/MWh

Therefore, the baseline emissions $BE_y = EG_y \times EF_{grid,CM,y}$=31,954.327 MWh×1.0549 tCO_2e/MWh +29,942.151 MWh×1.0549 tCO_2e/MWh +44,556.414 MWh×0.8405 tCO_2e/MWh+83,846.379 MWh×0.8405 tCO_2e/MWh =173,215 tCO_2e

5.2 Project Emissions

According to registered PD, the project is a GHG zero-emission electricity generating activity; therefore, no project emissions from the project activity were identified PE_y = 0.

5.3 Leakage

According to registered PD, the project needn't consider leakages, i.e., LE_y=0.

5.4 Net GHG Emission Reductions and Removals

According to the Section 5.1, 5.2 and 5.3 above,

BE_y=173,215 tCO_2e;

PE_y=0. tCO_2e;

LE_y=0 tCO_2e;

Therefore, ER_y= BE_y - PE_y - LE_y =173,215 tCO_2e

This monitoring period started from 21/07/2018 to 20/12/2020, with totally 884 days. Among which, 284 days in first crediting period, and 600 days in second crediting period. Based on the annual estimated emission reductions from the registered VCS PD, the amount of emission reductions for this monitoring period would be 104,941tCO_2e/365d×284d + 83,612 tCO_2e/365d×600d =219,097 tCO_2e. The actual emission reductions in this monitoring period (884 days) are173,215 tCO_2e, which is 20.94% less than the estimation in the registered PD.

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
21/07/2018~31/12/2018	33,708	0	0	33,708
01/01/2019~31/12/2019	69,035	0	0	69,035
01/01/2020~20/12/2020	70,472	0	0	70,472
Total	**173,215**	**0**	**0**	**173,215**