



**Verified Carbon
Standard**

HEBEI SHIRENSHAN WIND POWER PROJECT

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

Project Title	Hebei Shirensan Wind Power Project
Version	1.1
Report ID	-
Date of Issue	06-Aug-2022
Project ID	277
Monitoring Period	01-May-2012 to 17-Feb-2018 (both days included)
Prepared By	Longyuan (Beijing) Carbon Asset Management Technology Co., Ltd.
Contact	Physical address: Building C, International Investment Building. 6-9 Fuchengmen North Street, Xicheng District, Beijing, China Telephone: +861063887032 Email: 20069189@ceic.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 Contributions.....	7
2 SAFEGUARDS.....	9
2.1 No Net Harm.....	9
2.2 Local Stakeholder Consultation.....	10
2.3 AFOLU-Specific Safeguards.....	11
3 IMPLEMENTATION STATUS.....	12
3.1 Implementation Status of the Project Activity.....	12
3.2 Deviations.....	12
3.3 Grouped Projects.....	13
4 DATA AND PARAMETERS.....	14
4.1 Data and Parameters Available at Validation.....	14
4.2 Data and Parameters Monitored.....	14
4.3 Monitoring Plan.....	16
5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS.....	21
5.1 Baseline Emissions.....	21
5.2 Project Emissions.....	30
5.3 Leakage.....	31
5.4 Net GHG Emission Reductions and Removals.....	31
APPENDIX: <SUPPORTING EVIDENCE>.....	32

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Hebei Shirensan Wind Power Project (hereafter referred as the project) is a grid connected renewable energy project. The objective of the project is to generate electricity from wind resources using advanced wind power generation technology and deliver to the North China Power Grid (NCPG).

The project is located in Taolizhuang village, Shangyi County, Zhangjiakou City, Hebei Province, North China. The project proposes to install 33 sets of 1500 KW wind turbines, for a total installed capacity of 49.5 MW. Shangyi County where the project is located has relative rich wind resources. It is estimated that the annual generation of the project will be 113.85GWh. As a result, 122,445 tonnes of CO₂ emission reduction will be generated.

The project began to construct on 09-Jul-2007. The first turbine has been operated on 18-Feb-2008. The whole wind turbines were put into operation on 18-Jun-2008.

During this monitoring period, the operation condition of all the wind turbines and the operation environment haven't been changed from the previous monitoring periods, which are also consistent with the description of the registered PDD.

During the second monitoring period (from 01-May-2012 to 17-Feb-2018) under VCS program, the project has generated the total net electricity supply of 571,493.016 MWh and achieved 614,637 tCO_{2e} emission reduction by replacing electricity generated by fossil fuel fired power plants connected into NCPG.

1.2 Sectoral Scope and Project Type

Sectoral scope: 1 energy industries (Renewable sources).

Project type: Grid-connected wind power project.

The project is not a grouped project.

1.3 Project Proponent

Organization name	Longyuan (Zhangjiakou) Wind Power Co., Ltd.
Contact person	Mr. Rui Liu
Title	General Manager
Address	Room 109, Wuhuan Machinery Co., LTD., Shangyi Economic

	Development Zone, Zhangjiakou city, Hebei Province, China
Telephone	+863142512123
Email	12050184@ceic.com

1.4 Other Entities Involved in the Project

Organization name	Longyuan (Beijing) Carbon Asset Management Technology Co., Ltd.
Role in the Project	Consultant
Contact person	YU Shanshan
Title	General Manager
Address	Building C, International Investment Building. 6-9 Fucheng North Street, Xicheng District, Beijing, China
Telephone	+861063887032
Email	20069189@ceic.com

1.5 Project Start Date

18-Feb-2008 (operation start date).

1.6 Project Crediting Period

There is a deviation for the crediting period. The project is registered under VCS Standard 2007.1 and completed validation before 19-Mar-2020, thus it remains eligible to apply the crediting period requirements under VCS Version 3 which shall be a maximum of ten years and may be renewed at most twice, so the first renewable crediting period of the project shall be updated from 18-Feb-2008~28-Dec-2008 to 18-Feb-2008~17-Feb-2018. This monitoring period belongs to the first crediting period from 18-Feb-2008 to 17-Feb-2018 (10 years).

1.7 Project Location

The project is located in Shangyi county, Zhangjiakou city, Hebei Province of China, its geographical coordinates are north latitude 40°58'38"-40°59'40" and east longitude 114°18'24"-114°23'29", and its altitude is from 1700m to 1880m. The detailed location of the project is shown in Figure 1.

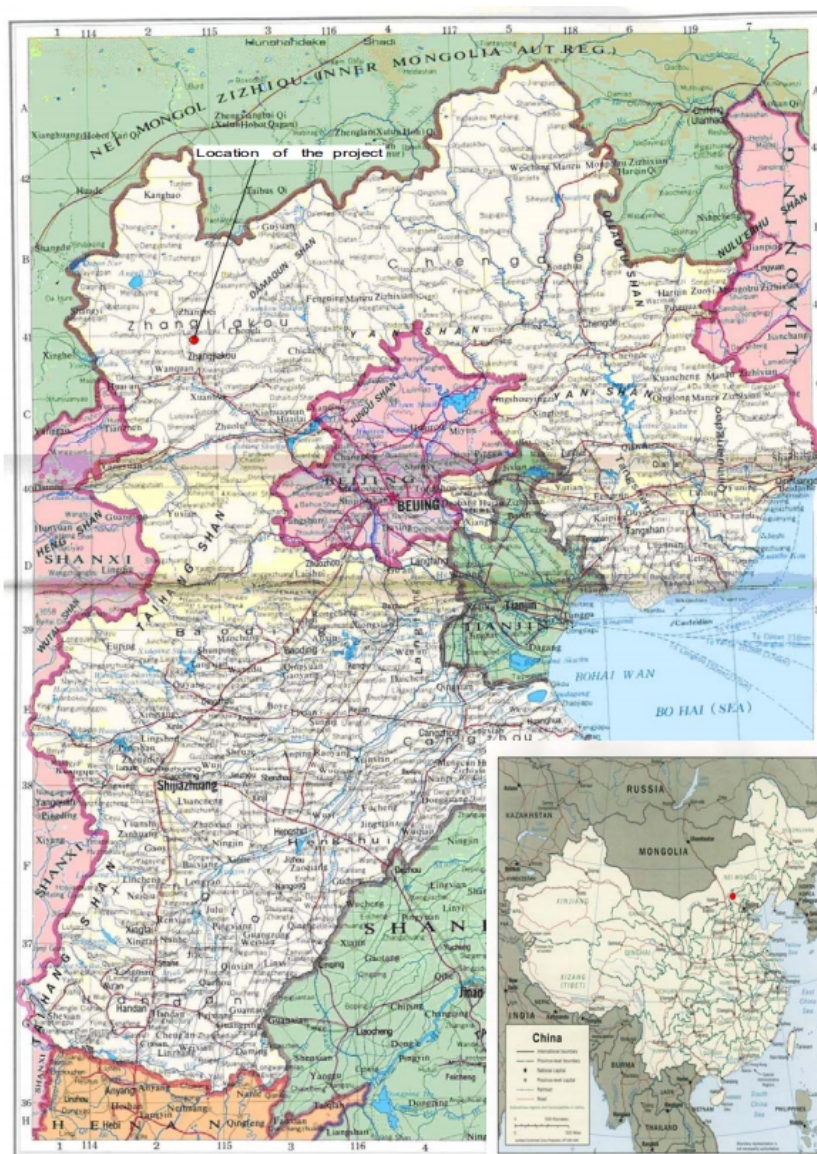


Figure 1: The location of the project

1.8 Title and Reference of Methodology

Baseline methodology:

ACM0002 (version 06): Consolidated methodology for grid-connected electricity generation from renewable sources.

The methodology draws upon Version 04 of the Tool for the demonstration and assessment of additionality.

Monitoring methodology:

Approved consolidated monitoring methodology ACM0002 (version 6): “ consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources” .

Reference: UNFCCC

website: <http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>.

1.9 Participation under other GHG Programs

The project is a registered CDM project with reference No.2067, the detailed information can be found at <https://cdm.unfccc.int/Projects/DB/TUEV-SUED1218467437.87/view>.

Start Date	End Date	GHG Emission Reduction (tCO ₂ e)	Credit	Program
18-Feb-2008	28-Dec-2008	79,435	VCU	VCS
29-Dec-2008	30-Jun-2009	87,442	CER	CDM
01-Jul-2009	30-Jun-2010	120,497	CER	CDM
01-Jul-2010	30-Jun-2011	124,613	CER	CDM
01-Jul-2011	30-Apr-2012	81,386	CER	CDM

This is the second monitoring period under VCS program from 01-May-2012 to 17-Feb-2018 for the project. All emission reductions during this monitoring period have not and will not seek CDM CER issuance. Emission reductions during this monitoring period will only seek issuance under VCS program.

1.10 Other Forms of Credit

Emission Trading Programs and Other Binding Limits

China has a national emissions trading scheme only cover the high-emission industries, such as thermal power generation, petrochemical, chemical, building materials, iron and steel, non-ferrous, paper, aviation and other key emission industries that emitted at least 26,000 tons of CO₂e/year, not including renewable project¹.

¹ http://www.mee.gov.cn/xxgk2018/xxgk/xxgk05/202103/t20210330_826728.html

Also, the project has not been registered as a CCER (Chinese Certified Emission Reductions) project in China, thus it is not eligible for emission reductions transaction under the China's ETS. Therefore, 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. The net GHG emission reductions generated during this monitoring period have not been used for compliance under such programs or mechanisms.

Furthermore, as a voluntary emission reduction project, the GHG emission reductions and removals generated by the project will not be enforced to be used for compliance in China. The credits in this monitoring period has not been counted and will not be counted under emission trading programs and other binding limits.

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 Contributions

The project activity is a renewable wind power project located in Shangyi county, Northeast China.



The project utilizes wind resources to generate and supply 571,493.016MWh renewable electricity to the power grid annually, which contributes to SDG 7.



The project provides 12-15 long-term job opportunities for local residents, which has a positive effect on the local economy and contributes to SDG 8.



The renewable electricity generated by the project replaces electricity generation by fossil-fuel power plants of the power grid, which reduces 614,637 tCO_{2e} GHG emission annually and contributes to SDG 13.

These contribute to achieve China's stated sustainable development priorities, included strengthening resistance capacity to climate risks, increasing labor force participation rate, increasing the share of clean energy consumption.

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime ²
1)	7.2	Renewable energy supplied to the power grid	Implemented activities to increase	571,493.016 MWh of electricity from renewable sources has been supplied to the power grid during the reporting period	571,493.016 MWh of electricity from renewable sources was supplied to the power grid over project lifetime. It is the first time that the project submits the SD contributions.
2)	8.5	Numbers of job opportunities provided by implementation of the project	Implemented activities to increase	12 people have been employed by the project in 2012. 13 people have been employed by the project in 2013 and 2015. 14 people have been employed by the project in 2016. 15 people have been employed by the project in 2014,2017 and 2018.	The project activity generates long-term working opportunities for some people during the construction period. 12 people have been employed by the project in 2012. 13 people have been employed by the project in 2013 and 2015. 14 people have been employed by the project in 2016. 15 people have been employed by the project in 2014,2017 and 2018.
3)	13.0	Tonnes of greenhouse gas emissions avoided	Implemented activities to increase	The project has achieved a total GHG emission reduction of 614,637 tCO _{2e} during the reporting period.	The project has achieved a total GHG emission reduction of 614,637 tCO _{2e} over project lifetime. It is the first time that the project submits the SD contributions.

²The contributions over the project lifetime column are intended for displaying the cumulative SD contributions that have been accounted for and approved by Verra in an SD contributions report or VCS monitoring report. Since this is the first time project 277 Hebei Shirensan Wind Power Project has claimed SD contributions, the contributions over the project lifetime should be the same as the current contributions for the period from 01-May-2012 to 17-Feb-2018. However, Appendix lists all previous contributions up to the end of the current monitoring period.

2 SAFEGUARDS

2.1 No Net Harm

Impacts on Air Environment

Wind Power plants are known to contribute to zero atmospheric pollution as no fuel combustion is involved during any stage of the operation. However, the sources of air pollution are mainly due to the construction activities including the transportation of construction material, road construction and improvement and cadre construction etc. The impacts on air environment are temporary that will be ended when the construction is completed. It is suggested that several measures shall be taken into account, such as prohibiting the construction under strong wind weather, reducing as much as possible the area of construction, spraying water during construction, and reducing the speed of vehicles in the field. Hence, the air quality of the project site is relatively well, which meets the Class II of China Ambient Air Quality Standard (GB 3095-1996)

Impacts on Noise Environment

The noise of the project in construction phase is from vehicles and machines on-site. During the construction period of the project, the noise level will be lower than 55dB at the distance to noise source of 250m, which will meet the class I of China Environmental Noise Standard in Urban Area (GB3096-93). The project is located in mountain area. Therefore, there will be no noise disturbance issue. Based on the formula of declining of sound emitted from a non-directional source, it is estimated that the maximum noise effective distance of the project is 50m in daytime and 300m at night. Moreover, the magnitude of the impacts during the construction period will only exist temporarily, and disappear with the completing of the construction period. Moreover, operational noise from the rotating blades is expected to be minimal due to the attenuation of noise beyond a distance of 300-500m from the wind turbines. The noise meets Class II of China Environmental Noise Standard in Urban Area (GB3096-1993). At the same time, the closest residential area to the site of the project is over 5km away. Therefore, the noise of the project will not have impact on nearby residents.

Impacts on Water and Solid Waste

The wind-farm does not consume any water, nor does it generate any wastewater in the operation phase. The possible negative impacts are the household wastewater and solid waste produced by builders and staff, and the waste earth from digging of the foundation in the construction phase. Under normal conditions with highly automated monitoring and control system, the household wastewater will be first treated in a septic tank, and then be disinfected to discharge for circumjacent virescence. Moreover, the amount of household solid waste will be very little, which will not have impact on the environment. Besides, the solid waste will be collected and moved to the landfill site of the nearest city. The waste earth from the digging should be firstly used for refilling. The rest of the waste earth should be placed in the low area of the site which should be replanted with grass. The quality of surface water meets the Class II

of China Quality Standard for Sea Water (GB/T 14848-93). Following the suggestion, the water and solid waste should have no significant impact on the environment.

Impacts on telecommunications and television transmissions

Since set of 110kV substation will be constructed in the project, the electromagnetism impact of the project should be evaluated. Based on the analogies of the built wind-farms, the result concludes that the operation of wind farm will not have electromagnetism impact on the nearby enterprises and residential areas that are 5 km away from the wind farms, and the electromagnetism impact is below the standard limit value specified in the Hygienic Standard on Power-frequency Electric Field Working Places (GB16203-1996). Therefore, the electromagnetism of this project in the operation phase doesn't impact the production and daily life of nearby enterprises and residents.

Impacts on Ecosystem Environment

A serious potential concern for wind farms is their impact on vegetation, animals and migrating birds. The minor quantity of soil erosion generated during the construction phase has no noticeable impact on soil use and the project proponent has made arrangements to dispose them in an environmentally acceptable manner. Moreover, there are no migratory birds / endangered species in the region of the project activity. After the completion of the construction, the surrounding area of permanent occupation of ground will be planted with vegetation; the temporary equipments will be taken away. The ground occupation will not have obvious impact on the local ecology impact. Therefore, the activities to be carried out will not generate any negative impact on the ecological environment.

Socio-Economic Impacts

The preliminary appraisal assumed a larger installed capacity and higher coal displacement in the project. The project is estimated to product GHG emission reduction through delivering electricity to the grid. So the project generates eco-friendly, GHG free power that contributes to sustainable development of the region. Moreover, the locals have benefited economically through land sales and revenues. The project activity not only helps the uplift of skilled and unskilled manpower in the region, but also improves employment rate and livelihood of local populace in the vicinity of the project.

Conclusion

The project activity does not have any major adverse impacts on environment during its construction and operational phase. The project is definitely a more environmentally friendly way of providing power than the other power plants.

2.2 Local Stakeholder Consultation

LSC prior to the project implementation

The stakeholder consultation meeting was announced well in advance, to ensure that all interested parties could participate in the meeting. Longyuan (Zhangjiakou) Wind Power Co., Ltd. published a bulletin on the bulletin board in the public place of the village around the wind

farm. Through the bulletin, all potential stakeholders could obtain the detailed information about the project and VCS. Meanwhile the project owner has established a mail box at the gate of their office building to accept comments from any stakeholders.

On 05-Jul-2007, under the support of local government, the project owner successfully held a stakeholder meeting in Shangyi County. The project owner and the consultant invited the participants in the meeting to express their comments and concerns about the project. At this stage, no critical comments were made; the overall finding was that the local residents and local government officials expected that the local people would benefit from the project. To further determine there are no negative impacts by the project, the consultant distributed 50 copies of questionnaire among the local residents after the meeting. The survey shows that the project receives strong support from local people, which is closely linked to the fact that the majority of local villagers have some understandings with wind power projects.

LSC during the operation period

Communications with Local stakeholders have been carried out at periodic intervals. Key implementation schedules and changes of the project have been communicated to the local authority, the neighbourhood committee, and local residents. The comments and suggestions from residents were collected by the local authority, if any.

The project owner carried out questionnaire survey for the local stakeholders to collect the relevant comments and suggestions every two years, e.g., in September 2013, November 2015 and October 2017 during this monitoring period. The local authority also conducts spot checks on the implementation of the project at periodic intervals as per relevant regulations. There have been no negative comments received for the project so far.

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

The project is a non-AFOLU project, this section is not required.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project adopted totally 33 sets of wind turbines (AW-77/1500-CII LT) made by a domestic joint venture corporation named Nantong CASC Wanyuan Acciona Wind Turbine Manufacture Co. Ltd. The capacity of the project is 49.5 MW. Each turbine was connected by a 12kV lines to the on-site 110kV substations which was constructed for the project, then link into Zhangbei 220kV substation through an 110kV line.

The power line supplying electric power to the grid can also deliver power from the grid to the wind farm. The quantity of power electricity supplied to NCPG can be accurately measured by the meters M1, M2 and M3. The electricity imported through main line can be measured by the meter M1. Meanwhile the electricity imported through the back-up line can be measured by the meter M4 installed on the back-up line.

During this monitoring period, the project was implemented in accordance with the registered PDD. The Project has operated without any accidental or emergency events that might impact the GHG emission reductions or removals and monitoring.

Table 2 Technical Parameters of wind turbines³

Parameters	Data
Rotor Diameter:	76.662m
Capacity:	1.5MW
Cut-in wind speed:	3m/s
Cut-out wind speed	25m/s
Rated wind speed	11m/s

3.2 Deviations

3.2.1 Methodology Deviations

There is no methodology deviation in this monitoring period.

3.2.2 Project Description Deviations

Another wind power project was put into operation on 10-Jul-2010 and shared the main meter M1 with the project. Thus, the monitoring plan was revised. The revised monitoring plan has been validated by DNV and approved by CDM EB on 13-Feb-2012.

³ Sourced from Wind Turbines Purchase Agreement

The electricity exported to the grid measured by meter M1 is the sum of the electricity exported by the project and the other project. The power supplied to the grid by the project can be measured by meter M2 located at the project site, while the power supplied to the grid by the other project can be measured by meter M3 located in the other project's site. The electricity imported both for the project and the other project through the backup line can be measured by meter M4. The whole revised monitoring plan please refer to section 4.3.

There is another deviation for the crediting period as well. The project is registered under VCS 2007.1 and completed validation before 19-Mar-2020, thus it remains eligible to apply the crediting period requirements under VCS Version 3 which shall be a maximum of ten years and may be renewed at most twice, so the first renewable crediting period of the project shall be updated from 18-Feb-2008~28-Dec-2008 to 18-Feb-2008~17-Feb-2018. This monitoring period belongs to the first crediting period from 18-Feb-2008 to 17-Feb-2018. The project did not complete the validation of the crediting period update within two years of the end of the first crediting period, therefore the VCS total crediting period ends on 17-Feb-2018, the end of the first crediting period.

Both the two deviations don't impact the applicability of the methodology, additionality and the appropriateness of the baseline scenario.

3.3 Grouped Projects

Not applicable.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

The baseline grid emission factor EF_y is calculated and fixed ex ante based on the relevant basis parameters in registered PDD. Refer to the registered PDD Annex 3 for detailed information of EF_y calculation.

Data / Parameter	EF_y
Data unit	tCO ₂ /MWh
Description	Combined margin CO ₂ emission factor for grid connected power generation in year y
Source of data	Registered PDD
Value applied	1.0755
Justification of choice of data or description of measurement methods and procedures applied	Ex-ante determined in the registered PDD and fixed during the 1 st crediting period.
Purpose of Data	Calculation of baseline emissions
Comments	Determined ex-ante and fixed for the 1st crediting period

4.2 Data and Parameters Monitored

Data / Parameter	EG_y										
Data unit	MWh										
Description	Net electricity supplied by the project to the grid in year y										
Source of data	On-site measurements at project activity site										
Description of measurement methods and procedures to be applied	Refer to Section 4.3 for details.										
Frequency of monitoring/recording	continuously measured and monthly recorded										
Value monitored	<table border="1"> <thead> <tr> <th>Period</th><th>Value</th></tr> </thead> <tbody> <tr> <td>01-May-2012~31-Dec-2012</td><td>66,931.551</td></tr> <tr> <td>01-Jan-2013~31-Dec-2013</td><td>119,137.254</td></tr> <tr> <td>01-Jan-2014~31-Dec-2014</td><td>113,516.081</td></tr> <tr> <td>01-Jan-2015~31-Dec-2015</td><td>71,456.705</td></tr> </tbody> </table>	Period	Value	01-May-2012~31-Dec-2012	66,931.551	01-Jan-2013~31-Dec-2013	119,137.254	01-Jan-2014~31-Dec-2014	113,516.081	01-Jan-2015~31-Dec-2015	71,456.705
Period	Value										
01-May-2012~31-Dec-2012	66,931.551										
01-Jan-2013~31-Dec-2013	119,137.254										
01-Jan-2014~31-Dec-2014	113,516.081										
01-Jan-2015~31-Dec-2015	71,456.705										

Monitoring equipment	01-Jan-2016~31-Dec-2016		93,876.577
	01-Jan-2017~31-Dec-2017		96,676.608
	01-Jan-2018~17-Feb 2018		9,898.240
	Total		571,493.016
	Monitoring equipment	M1 (Main meter)	M2
	Type	DTSD341	DTSD566
	Serial No.	20070743010001	0707960315
	Accuracy	0.2S	0.2S
	Calibration frequency	Annually	Annually
	Calibration date	07-Jul-2011 05-Jul-2012 03-Jul-2013 01-Jul-2014 29-Jun-2015 27-Jun-2016 25-Jun-2017	07-Jul-2011 05-Jul-2012 03-Jul-2013 01-Jul-2014 29-Jun-2015 27-Jun-2016 25-Jun-2017
	Validity date	06-Jul-2012 04-Jul-2013 02-Jul-2014 30-Jun-2015 28-Jun-2016 26-Jun-2017 24-Jun-2018	06-Jul-2012 04-Jul-2013 02-Jul-2014 30-Jun-2015 28-Jun-2016 26-Jun-2017 24-Jun-2018
	Monitoring equipment	M3	M4(back-up line)
	Type	DTSD341	DTSD341 DSZ331 ⁴
	Serial No.	20070743010002	812403003856 16300010000000124513980
	Accuracy	0.2S	0.5S 0.2S
	Calibration frequency	Annually	Annually Annually
	Calibration date	19-Jul-2011 05-Jul-2012 03-Jul-2013 01-Jul-2014 29-Jun-2015 27-Jun-2016	07-Jul-2011 05-Jul-2012 03-Jul-2013 01-Jul-2014 29-Jun-2015 27-Jun-2016 27-Jun-2016
			27-Jun-2016 25-Jun-2017

⁴ The meter installed on the back-up line of the project has been replaced on 01/07/2016. The S/N of the new meter is 16300010000000124513980. The accuracy of the new meter is 0.2S.

		25-Jun-2017		
	Validity date	18-Jul-2012 04-Jul-2013 02-Jul-2014 30-Jun-2015 28-Jun-2016 26-Jun-2017 24-Jun-2018	06-Jul-2012 04-Jul-2013 02-Jul-2014 30-Jun-2015 28-Jun-2016 26-Jun-2017	26-Jun-2017 24-Jun-2018
	QA/QC procedures to be applied	Electricity meters have been properly calibrated annually according to the requirement from Technical administrative code of electric energy metering (DL/T448). Accuracy degree of meters not less than 0.5s. Meter readings crosschecked with electricity purchase and sale receipts. Data will be archived for 2 years following the end of the crediting period by means of electronic and paper backup.		
	Purpose of the data	Calculation of baseline emissions		
	Calculation method	Net electricity supplied by the project to the grid is the difference between the electricity exported and the electricity imported.		
	Comments	-		

4.3 Monitoring Plan

Monitoring structure, roles and responsibilities

The Management Group of the project must maintain credible, transparent, and adequate data estimation, measurement, collection, and tracking systems to maintain the information required for an audit of an emission reduction project.

The Management Group consists of professional staff authorized by the owner of the project, Longyuan (Zhangjiakou) Wind Power Co., Ltd. The management structure is illustrated as follows:

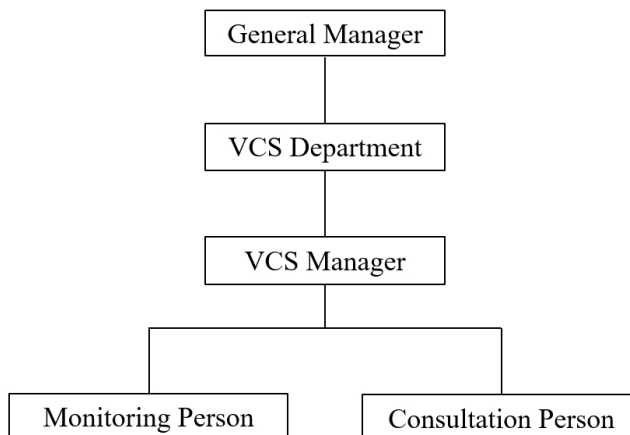


Figure 2 Management Structure

The Management Group is responsible for the VCS management of the project, providing support in the VCS validation and registration by a selected VVB, and providing support in the verification by a selected VVB.

The General Management is in general control and makes key decisions. The VCS Department is responsible for specific tasks in monitoring and execution of decisions. Specifically, the VCS Manager is responsible for the daily operation of the VCS Department, and contact with VVB and VERRA to support their work in validation, registration, verification, and certification. This person is also responsible for Monitoring Data adjustment and settlement of Data uncertainties, together with local electric power company, and/or VVB.

The Monitoring Person is responsible for reading and calibration of the meter, recording of the readings, and reporting of readings to local electric power company and/or VVB.

The Consultation Person is responsible for selecting a VCS consultant company and providing support to its work in developing PDD, selecting VCU buyer.

The Management Group has all received sufficient training in terms of monitoring and verification. They have received general training on wind power project operation organized by the project owner, including reading and calibration of the meter, recording of the readings, adjustment of readings, and reporting of readings.

Arrangement of Meters

The project is connected to the grid through an on-site transformer station that increases the voltage to 110kV. The project is then connected to Zhangbei 220kV transformer station which functions as a switching station to connect the project to the North China Power Grid.

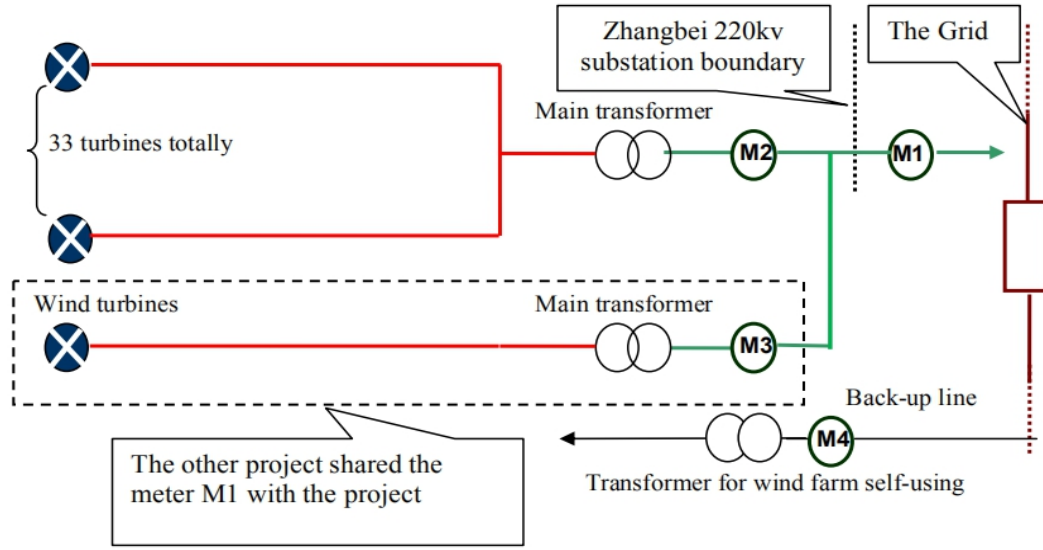


Figure 3 Location of the meters

As the figure 3 indicated, the line supplying electric power to the grid can also deliver power from the grid to the wind farm, and the metering equipments installed on the line run in two directions.

Monitoring of Electricity exported ($EG_{\text{exported},y}$):

The power supplied to the grid can be measured by the project entity at the point where meter M2 installed. Meter M3 is for the measurement of the electricity exchanged between the grid and the other project shared the meter M1 with the project. The electricity exported to the grid measured by meter M1 is the sum of the electricity exported by the project and the other project shared the meter M1 with the project. Then the transmission loss of the electricity exported can be calculated as the following formula indicated:

$$EG_{\text{loss},y} = (EG_{M2,\text{exported},y} + EG_{M3,\text{exported},y}) - EG_{M1,\text{exported},y} \quad (1)$$

where:

$EG_{\text{loss},y}$ is the total transmission loss of the electricity exported to the grid by the project and the shared project in year y.

$EG_{M1,\text{exported},y}$ is the electricity exported measured by meter M1 in year y.

$EG_{M2,\text{exported},y}$ is the electricity exported measured by meter M2 in year y.

$EG_{M3,\text{exported},y}$ is the electricity exported measured by meter M3 in year y.

In order to be conservative, the electricity exported by the project used for the emission reduction calculation is achieved as the formula 2 indicated:

$$EG_{\text{exported},y} = EG_{M2,\text{exported},y} - EG_{\text{loss},y} = EG_{M1,\text{exported},y} - EG_{M3,\text{exported},y} \quad (2)$$

Electricity imported through 110kv line ($EG_{\text{imported, main line},y}$):

As the figure above indicated, the electricity imported from the grid measured by meter M1 is the sum of the electricity imported by the project and the other project shared the meter M1 with the project.

Electricity imported through back-up line ($EG_{\text{imported, back-up line},y}$):

Meanwhile the electricity imported through the back-up line can be measured by the meter M4 installed on the back-up line.

Net electricity used for emission reduction calculation:

The net electricity (EG_y) used for the calculation of the emission reduction is obtained through the exported generation subtract the imported generation.

$$EG_y = EG_{\text{exported},y} - EG_{\text{imported,mainline},y} - EG_{\text{imported,back-upline},y} \quad (3)$$

The record of the electricity transaction between the project and the grid has been obtained to ensure the consistency. Data record will be archived for a period of 2 years after the crediting period to which the records pertain.

data aggregation, recording, calculating and reporting

The steps required to meet the requirements for emissions reduction monitoring including:

- 1) The project owner read and record the meters M2, M3 and M4 daily, and then report the readings to the grid company monthly.
- 2) Zhangjiakou Electric Power Company reads the meters M1, crosschecks the readings of meter M2, M3 and meter M4, then reports the result to the project owner monthly.
- 3) After confirmed electricity exchanged between each other, Zhangjiakou Electric Power Company and the project owner will pay each other for the generation purchased.
- 4) The project owner carries out an internal audit on the readings and calculations, and reports the emission reduction to the VVB for verification.

The net electricity used for the calculation of the emission reduction is obtained through the exported generation subtract the imported generation. The record of the electricity transaction between the project and the grid has been obtained to ensure the consistency.

The meter reading records are readily accessible for VVB. Calibration test records were maintained for verification.

Monitoring Practice and Handling of Emergency

The electric meters have been calibrated annually according to relevant national electric industry standards or regulations. After verification, the meters have been sealed.

There are no errors detected during this monitoring period. The accuracy of the meter readings is acceptable.

However, according to the register PDD, if any errors are detected, the party owning the meter shall repair, recalibrate or replace the meter and give the other party sufficient notice to allow a representative to attend during any corrective activity.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

As per the registered PDD, the baseline emission of the project is calculated as below:

$$BE_y = EG_y \times EF_y \quad (4)$$

Where,

BE_y Baseline emissions in year y (t CO₂e);

EG_y Net electricity delivered to the grid by the project in year y (MWh);

EF_y Combined margin CO₂ emission factor for grid connected power generation in year y (tCO₂e/MWh);

As per the revised monitoring plan, the Net electricity delivered to the grid by the project (EG_y) is calculated as below:

$$EG_y = EG_{exported,y} - EG_{imported,mainline,y} - EG_{imported,back_upline,y} \quad (5)$$

Where,

$EG_{exported,y}$ Electricity exported to the grid in year y (MWh);

$EG_{imported,mainline,y}$ Electricity imported from the grid by the main line in year y (MWh);

$EG_{imported,back_upline,y}$ Electricity imported from the grid by the back-up line in year y (MWh);

The Electricity exported to the grid ($EG_{exported,y}$) is calculated as below:

$$EG_{exported,y} = EG_{M1,exported,y} - EG_{M3,exported,y} \quad (6)$$

Where,

$EG_{exported,y}$ Electricity exported to the grid in year y (MWh);

$EG_{M1,exported,y}$ Electricity exported measured by meter M1 in year y (MWh);

$EG_{M3,exported,y}$ Electricity exported measured by meter M3 in year y (MWh).

The monitored EG_y is reported in the table below.

Table 3 Calculation of the electricity exported to grid by the project ($EG_{\text{exported},y}$) (MWh)

Period		Meter reading records (M1) $EG_{M1,\text{exported},y}$	Meter reading records (M3) $EG_{M3,\text{exported},y}$	The electricity exported to grid $EG_{\text{exported},y}$	ETN	Conservative value applied
From	To	A	B	C=A-B	D	E=MIN(C,D)
01-May-2012	31-May-2012	17,535.936	7,051.824	10,484.112	10,484.112	10,484.112
01-Jun-2012	30-Jun-2012	14,267.880	5,384.575	8,883.305	8,883.305	8,883.305
01-Jul-2012	31-Jul-2012	10,749.816	3,916.422	6,833.394	6,833.394	6,833.394
01-Aug-2012	31-Aug-2012	8,029.824	3,207.805	4,822.019	4,822.019	4,822.019
01-Sep-2012	30-Sep-2012	9,444.996	3,815.463	5,629.533	5,629.533	5,629.533
01-Oct-2012	31-Oct-2012	11,144.892	4,270.009	6,874.883	6,874.883	6,874.883
01-Nov-2012	30-Nov-2012	10,873.632	4,486.290	6,387.342	6,387.342	6,387.342
01-Dec-2012	31-Dec-2012	27,690.643	10,427.500	17,263.143	17,263.143	17,263.143
Subtotal-2012		109,737.619	42,559.888	67,177.731	67,177.731	67,177.731
01-Jan-2013	31-Jan-2013	7,413.968	3,265.131	4,148.837	4,148.837	4,148.837
01-Feb-2013	28-Feb-2013	15,508.574	4,287.371	11,221.203	11,221.203	11,221.203
01-Mar-2013	31-Mar-2013	15,726.586	4,026.885	11,699.701	11,699.701	11,699.701
01-Apr-2013	30-Apr-2013	20,474.652	5,372.872	15,101.780	15,101.780	15,101.780
01-May-2013	31-May-2013	16,107.036	4,778.553	11,328.483	11,328.483	11,328.483
01-Jun-2013	30-Jun-2013	16,413.672	4,068.604	12,345.068	12,345.068	12,345.068
01-Jul-2013	31-Jul-2013	9,658.176	2,549.625	7,108.551	7,108.551	7,108.551
01-Aug-2013	31-Aug-2013	8,738.532	2,812.295	5,926.237	5,926.237	5,926.237
01-Sep-2013	30-Sep-2013	10,207.164	3,298.727	6,908.437	6,908.437	6,908.437
01-Oct-2013	31-Oct-2013	13,931.544	4,278.482	9,653.062	9,653.062	9,653.062
01-Nov-2013	30-Nov-2013	18,506.268	5,339.044	13,167.224	13,167.224	13,167.224
01-Dec-2013	31-Dec-2013	17,197.488	6,322.317	10,875.171	10,875.171	10,875.171

Period		Meter reading records (M1) EG _{M1,exported,y}	Meter reading records (M3) EG _{M3,exported,y}	The electricity exported to grid EG _{exported,y}	ETN	Conservative value applied
Subtotal-2013		169,883.660	50,399.906	119,483.754	119,483.754	119,483.754
01-Jan-2014	31-Jan-2014	19,641.072	5,747.407	13,893.665	13,893.665	13,893.665
01-Feb-2014	28-Feb-2014	5,398.040	2,411.001	2,987.039	2,987.039	2,987.039
01-Mar-2014	31-Mar-2014	18,557.721	5,272.995	13,284.726	13,284.726	13,284.726
01-Apr-2014	30-Apr-2014	12,030.744	3,838.366	8,192.378	8,192.378	8,192.378
01-May-2014	31-May-2014	18,486.864	6,198.387	12,288.477	12,288.477	12,288.477
01-Jun-2014	30-Jun-2014	10,854.624	3,547.839	7,306.785	7,306.785	7,306.785
01-Jul-2014	31-Jul-2014	8,757.804	2,876.713	5,881.091	5,881.091	5,881.091
01-Aug-2014	31-Aug-2014	8,879.508	2,837.903	6,041.605	6,041.605	6,041.605
01-Sep-2014	30-Sep-2014	9,121.068	3,004.657	6,116.411	6,116.411	6,116.411
01-Oct-2014	31-Oct-2014	12,512.676	4,140.549	8,372.127	8,372.127	8,372.127
01-Nov-2014	30-Nov-2014	18,834.526	4,373.901	14,460.625	14,460.625	14,460.625
01-Dec-2014	31-Dec-2014	21,596.652	6,234.762	15,361.890	15,361.890	15,361.890
Subtotal-2014		164,671.299	50,484.480	114,186.819	114,186.819	114,186.819
01-Jan-2015	31-Jan-2015	12,047.270	4,667.932	7,379.338	7,379.338	7,379.338
01-Feb-2015	28-Feb-2015	11,029.656	3,486.468	7,543.188	7,543.188	7,543.188
01-Mar-2015	31-Mar-2015	16,041.960	4,751.558	11,290.402	11,290.402	11,290.402
01-Apr-2015	30-Apr-2015	13,301.244	3,688.062	9,613.182	9,613.182	9,613.182
01-May-2015	31-May-2015	12,284.052	3,759.708	8,524.344	8,524.344	8,524.344
01-Jun-2015	30-Jun-2015	8,406.024	2,847.356	5,558.668	5,558.668	5,558.668
01-Jul-2015	31-Jul-2015	4,057.944	941.839	3,116.105	3,116.105	3,116.105
01-Aug-2015	31-Aug-2015	5,090.712	1,470.995	3,619.717	3,619.717	3,619.717
01-Sep-2015	30-Sep-2015	8,059.260	3,041.959	5,017.301	5,017.301	5,017.301

Period		Meter reading records (M1) EG _{M1,exported,y}	Meter reading records (M3) EG _{M3,exported,y}	The electricity exported to grid EG _{exported,y}	ETN	Conservative value applied
01-Oct-2015	31-Oct-2015	10,725.792	4,200.784	6,525.008	6,525.008	6,525.008
01-Nov-2015	30-Nov-2015	5,801.928	2,042.155	3,759.773	3,759.773	3,759.773
01-Dec-2015	31-Dec-2015	4,435.807	816.906	3,618.901	3,618.901	3,618.901
Subtotal-2015		111,281.649	35,715.722	75,565.927	75,565.927	75,565.927
01-Jan-2016	31-Jan-2016	11,390.597	3,785.491	7,605.106	7,605.106	7,605.106
01-Feb-2016	29-Feb-2016	8,045.664	2,579.138	5,466.526	5,466.526	5,466.526
01-Mar-2016	31-Mar-2016	12,965.212	4,025.101	8,940.111	8,940.111	8,940.111
01-Apr-2016	30-Apr-2016	14,582.436	4,297.406	10,285.030	10,285.030	10,285.030
01-May-2016	31-May-2016	14,311.176	4,648.915	9,662.261	9,662.261	9,662.261
01-Jun-2016	30-Jun-2016	9,156.344	3,013.227	6,143.117	6,143.117	6,143.117
01-Jul-2016	31-Jul-2016	9,117.326	2,930.239	6,187.087	6,187.087	6,187.087
01-Aug-2016	31-Aug-2016	7,708.140	2,504.473	5,203.667	5,203.667	5,203.667
01-Sep-2016	30-Sep-2016	7,588.548	2,587.435	5,001.113	5,001.113	5,001.113
01-Oct-2016	31-Oct-2016	12,654.444	4,451.042	8,203.402	8,203.402	8,203.402
01-Nov-2016	30-Nov-2016	18,139.572	6,058.054	12,081.518	12,081.518	12,081.518
01-Dec-2016	31-Dec-2016	15,179.472	5,126.293	10,053.179	10,053.179	10,053.179
Subtotal-2016		140,838.931	46,006.814	94,832.117	94,832.117	94,832.117
01-Jan-2017	31-Jan-2017	15,965.558	5,538.020	10,427.538	10,427.538	10,427.538
01-Feb-2017	28-Feb-2017	15,074.400	5,081.594	9,992.806	9,992.806	9,992.806
01-Mar-2017	31-Mar-2017	13,222.704	5,046.235	8,176.469	8,176.469	8,176.469
01-Apr-2017	30-Apr-2017	17,679.156	7,106.396	10,572.760	10,572.760	10,572.760
01-May-2017	31-May-2017	13,642.411	4,214.643	9,427.768	9,427.768	9,427.768
01-Jun-2017	30-Jun-2017	8,004.480	2,586.320	5,418.160	5,418.160	5,418.160

Period		Meter reading records (M1) EG _{M1,exported,y}	Meter reading records (M3) EG _{M3,exported,y}	The electricity exported to grid EG _{exported,y}	ETN	Conservative value applied
01-Jul-2017	31-Jul-2017	7,360.320	2,323.200	5,037.120	5,037.120	5,037.120
01-Aug-2017	31-Aug-2017	9,630.720	3,143.360	6,487.360	6,487.360	6,487.360
01-Sep-2017	30-Sep-2017	8,551.840	2,875.840	5,676.000	5,676.000	5,676.000
01-Oct-2017	31-Oct-2017	9,065.804	3,400.320	5,665.484	5,665.484	5,665.484
01-Nov-2017	30-Nov-2017	18,094.560	6,912.400	11,182.160	11,182.160	11,182.160
01-Dec-2017	31-Dec-2017	14,935.404	5,798.320	9,137.084	9,137.084	9,137.084
Subtotal-2017		151,227.357	54,026.648	97,200.709	97,200.709	97,200.709
01-Jan-2018	31-Jan-2018	16,177.920	6,200.480	9,977.440	9,977.440	9,977.440
01-Feb-2018	17-Feb-2018	0.000	0.000	0.000	0.000	0.000
Subtotal-2018		16,177.920	6,200.480	9,977.440	9,977.440	9,977.440
Total		863,818.435	285,393.938	578,424.497	578,424.497	578,424.497

Table 4 Calculation of the electricity imported from the grid (EG_{imported,mainline,y} and EG_{imported,back_upline,y}) (MWh)

Period		Electricity Imported from the grid by the project					
		EG _{imported, main line, y}			EG _{imported, back-up line, y}		
From	To	Meter reading records (M1)	ETN	Conservative values applied	Meter reading records (M4)	ETN	Conservative values applied
		<i>F</i>	<i>G</i>	<i>H=max (F, G)</i>	<i>I</i>	<i>J</i>	<i>K=max (I, J)</i>
01-May-2012	31-May-2012	17.160	17.160	17.160	0	0	0
01-Jun-2012	30-Jun-2012	17.556	17.556	17.556	0	0	0
01-Jul-2012	31-Jul-2012	31.548	31.548	31.548	0	0	0
01-Aug-2012	31-Aug-2012	0.000	0.000	0.000	34.980	34.980	34.980
01-Sep-2012	30-Sep-2012	52.800	52.800	52.800	0	0	0
01-Oct-2012	31-Oct-2012	54.648	54.648	54.648	0	0	0
01-Nov-2012	30-Nov-2012	37.488	37.488	37.488	0	0	0
01-Dec-2012	31-Dec-2012	0.000	0.000	0.000	0	0	0
Subtotal-2012		211.200	211.200	211.200	34.980	34.980	34.980
01-Jan-2013	31-Jan-2013	10.956	10.956	10.956	0	0	0
01-Feb-2013	28-Feb-2013	25.212	25.212	25.212	0	0	0
01-Mar-2013	31-Mar-2013	42.768	42.768	42.768	0	0	0
01-Apr-2013	30-Apr-2013	19.800	19.800	19.800	0	0	0
01-May-2013	31-May-2013	31.944	31.944	31.944	0	0	0
01-Jun-2013	30-Jun-2013	34.980	34.980	34.980	0	0	0
01-Jul-2013	31-Jul-2013	0.000	0.000	0.000	40.788	40.788	40.788
01-Aug-2013	31-Aug-2013	36.960	36.960	36.960	0	0	0

01-Sep-2013	30-Sep-2013	42.768	42.768	42.768	0	0	0
01-Oct-2013	31-Oct-2013	48.180	48.180	48.180	0	0	0
01-Nov-2013	30-Nov-2013	12.144	12.144	12.144	0	0	0
01-Dec-2013	31-Dec-2013	0.000	0.000	0.000	0	0	0
Subtotal-2013		305.712	305.712	305.712	40.788	40.788	40.788
01-Jan-2014	31-Jan-2014	11.088	11.088	11.088	0	0	0
01-Feb-2014	28-Feb-2014	242.530	242.530	242.530	0	0	0
01-Mar-2014	31-Mar-2014	18.348	18.348	18.348	0	0	0
01-Apr-2014	30-Apr-2014	66.792	66.792	66.792	0	0	0
01-May-2014	31-May-2014	14.520	14.520	14.520	0	0	0
01-Jun-2014	30-Jun-2014	78.144	78.144	78.144	0	0	0
01-Jul-2014	31-Jul-2014	42.504	42.504	42.504	0	0	0
01-Aug-2014	31-Aug-2014	0.000	0.000	0.000	50.028	50.028	50.028
01-Sep-2014	30-Sep-2014	50.028	50.028	50.028	0	0	0
01-Oct-2014	31-Oct-2014	0.000	0.000	0.000	0	0	0
01-Nov-2014	30-Nov-2014	69.828	69.828	69.828	0	0	0
01-Dec-2014	31-Dec-2014	26.928	26.928	26.928	0	0	0
Subtotal-2014		620.710	620.710	620.710	50.028	50.028	50.028
01-Jan-2015	31-Jan-2015	46.521	46.521	46.521	0	0	0
01-Feb-2015	28-Feb-2015	0.000	0.000	0.000	0	0	0
01-Mar-2015	31-Mar-2015	131.116	131.116	131.116	0	0	0
01-Apr-2015	30-Apr-2015	79.261	79.261	79.261	0	0	0
01-May-2015	31-May-2015	26.400	26.400	26.400	0	0	0
01-Jun-2015	30-Jun-2015	2,735.801	2,735.801	2,735.801	0	0	0
01-Jul-2015	31-Jul-2015	0.000	0.000	0.000	81.703	81.703	81.703
01-Aug-2015	31-Aug-2015	599.970	599.970	599.970	0	0	0

01-Sep-2015	30-Sep-2015	69.558	69.558	69.558	0	0	0
01-Oct-2015	31-Oct-2015	33.000	33.000	33.000	0	0	0
01-Nov-2015	30-Nov-2015	257.092	257.092	257.092	0	0	0
01-Dec-2015	31-Dec-2015	48.800	48.800	48.800	0	0	0
Subtotal-2015		4,027.519	4,027.519	4,027.519	81.703	81.703	81.703
01-Jan-2016	31-Jan-2016	186.013	186.013	186.013	0	0	0
01-Feb-2016	29-Feb-2016	304.434	304.434	304.434	0	0	0
01-Mar-2016	31-Mar-2016	29.958	29.958	29.958	0	0	0
01-Apr-2016	30-Apr-2016	61.013	61.013	61.013	0	0	0
01-May-2016	31-May-2016	17.160	17.160	17.160	0	0	0
01-Jun-2016	30-Jun-2016	40.314	40.314	40.314	0	0	0
01-Jul-2016	31-Jul-2016	0.000	0.000	0.000	52.566	52.566	52.566
01-Aug-2016	31-Aug-2016	59.417	59.417	59.417	0	0	0
01-Sep-2016	30-Sep-2016	67.322	67.322	67.322	0	0	0
01-Oct-2016	31-Oct-2016	43.608	43.608	43.608	0	0	0
01-Nov-2016	30-Nov-2016	14.755	14.755	14.755	0	0	0
01-Dec-2016	31-Dec-2016	78.980	78.980	78.980	0	0	0
Subtotal-2016		902.974	902.974	902.974	52.566	52.566	52.566
01-Jan-2017	31-Jan-2017	64.687	64.687	64.687	0	0	0
01-Feb-2017	28-Feb-2017	34.254	34.254	34.254	0	0	0
01-Mar-2017	31-Mar-2017	72.460	72.460	72.460	0	0	0
01-Apr-2017	30-Apr-2017	18.444	18.444	18.444	0	0	0
01-May-2017	31-May-2017	27.666	27.666	27.666	0	0	0
01-Jun-2017	30-Jun-2017	54.015	54.015	54.015	0	0	0
01-Jul-2017	31-Jul-2017	63.305	63.305	63.305	0	0	0
01-Aug-2017	31-Aug-2017	38.112	38.112	38.112	0	0	0

01-Sep-2017	30-Sep-2017	0.000	0.000	0.000	40.050	40.050	40.050
01-Oct-2017	31-Oct-2017	85.269	85.269	85.269	0	0	0
01-Nov-2017	30-Nov-2017	6.460	6.460	6.460	0	0	0
01-Dec-2017	31-Dec-2017	19.379	19.379	19.379	0	0	0
Subtotal-2017		484.051	484.051	484.051	40.050	40.050	40.050
01-Jan-2018	31-Jan-2018	64.680	64.680	64.680	0	0	0
01-Feb-2018	17-Feb-2018	14.520	14.520	14.520	0	0	0
Subtotal-2018		79.200	79.200	79.200	0	0	0
Total		6,631.366	6,631.366	6,631.366	300.115	300.115	300.115

Note: Since there is no grid certification documents, the conservative values of electricity exported to the grid by the project is 0 from 01-Feb-2018 to 17-Feb-2018. Meanwhile, the conservative values of electricity imported from the grid by the project from 01-Feb-2018 to 17-Feb-2018 is the whole month's electricity imported from the grid.

Table 5 EG_y calculation (MWh)

Year	EG _{exported,y}	EG _{imported,mainline,y}	EG _{imported,back_upline,y}	EG _y
	E	H	K	L=E-H-K
01-May-2012~31-Dec-2012	67,177.731	211.200	34.980	66,931.551
01-Jan-2013~31-Dec-2013	119,483.754	305.712	40.788	119,137.254
01-Jan-2014~31-Dec-2014	114,186.819	620.710	50.028	113,516.081
01-Jan-2015~31-Dec-2015	75,565.927	4,027.519	81.703	71,456.705
01-Jan-2016~31-Dec-2016	94,832.117	902.974	52.566	93,876.577
01-Jan-2017~31-Dec-2017	97,200.709	484.051	40.050	96,676.608
01-Jan-2018~17-Feb-2018	9,977.440	79.200	0	9,898.240
Total	578,424.497	6,631.366	300.115	571,493.016

The baseline emissions of the project are calculated as follows:

Table 6 Calculation of Baseline emissions

Year	EG _y (MWh)	EF _{grid,CM,y} (tCO ₂ /MWh)	BE _y (tCO ₂)
	L	M	N=L*M
01-May-2012~31-Dec-2012	66,931.551	1.0755	71,984
01-Jan-2013~31-Dec-2013	119,137.254	1.0755	128,132
01-Jan-2014~31-Dec-2014	113,516.081	1.0755	122,086
01-Jan-2015~31-Dec-2015	71,456.705	1.0755	76,851
01-Jan-2016~31-Dec-2016	93,876.577	1.0755	100,964
01-Jan-2017~31-Dec-2017	96,676.608	1.0755	103,975
01-Jan-2018~17-Feb-2018	9898.240	1.0755	10,645
Total	571,493.016		614,637

In summary, the baseline emissions BE_y during this monitoring period is 614,637 tCO₂e.

5.2 Project Emissions

According to the ACM0002, the emission of wind power project activity is zero, i.e. $PE_y=0$.

5.3 Leakage

According to ACM0002, the leakage of wind power project is not needed to be considered.

5.4 Net GHG Emission Reductions and Removals

This monitoring period started from 01-May-2012 to 17-Feb-2018, with totally 2,119 days. Based on the annual estimated emission reductions from the registered PDD, the amount of emission reductions for this monitoring period would be $122,445 \text{ tCO}_2\text{e}/365 \text{ d} \times 2,119 \text{ d} = 710,852 \text{ tCO}_2\text{e}$. The actual emission reductions in this monitoring period (2,119 days) are 614,637 tCO₂e, which are 13.54% lower than the estimation in the registered PDD. It is because wind fluctuations and the limitation of the grid absorption capacity. So, it is reasonable that during this monitoring period, the actual emission reduction is less than the estimated value.

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)
01-May-2012~31-Dec-2012	71,984	0	0	71,984
01-Jan-2013~31-Dec-2013	128,132	0	0	128,132
01-Jan-2014~31-Dec-2014	122,086	0	0	122,086
01-Jan-2015~31-Dec-2015	76,851	0	0	76,851
01-Jan-2016~31-Dec-2016	100,964	0	0	100,964
01-Jan-2017~31-Dec-2017	103,975	0	0	103,975
01-Jan-2018~17-Feb-2018	10,645	0	0	10,645
Total	614,637	0	0	614,637

APPENDIX: <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://cdm.unfccc.int/Projects/DB/TUEV-SUED1218467437.87/view>

<https://registry.verra.org/app/projectDetail/VCS/277>

Period		EG _y	ER
From	To	MWh	tCO ₂ e
18-Feb-2008	28-Dec-2008	73,858.996	79,435
29-Dec-2008	30-Jun-2009	81,303.35	87,442
01-Jul-2009	30-Jun-2010	112,039	120,497
01-Jul-2010	30-Jun-2011	115,865	124,613
01-Jul-2011	30-Apr-2012	75,673	81,386
01-May-2012	17-Feb-2018	571,493.016	614,637
Total		1,030,232.362	1,108,010

Evidence for SDG 8: The Statement on the annual income of employees of the project has been submitted as a separate document to VVB due to confidentiality requirement of the project proponent.