NINGXIA XIANGSHAN WIND FARM PROJECT

Document Prepared by Beijing Cronus Technology Counsultancy Centre

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Ningxia Xiangshan Wind farm Project (hereafter referred to as the Project) is located in Zhongwei City, Ningxia Hui Autonomous Region, People's Republic of China. It is operated by Ningxia Zhongwei Aluminum New Energy Co., Ltd.

The project has a total installed capacity of 397.5MW consisting of 265 wind turbines with unit capacity of 1,500kW. The expected annual power delivered to the grid is 948,633.8 MWh. The power generated will be delivered to the Northwest Power Grid (NWPG) via Ningxia Power Grid to replace equivalent amount of electricity that would have otherwise been generated by other fossil fuel power plants. Therefore, this project could avoid GHG emissions. The estimated annual average emission reduction are 727,982 tCO_2e.

This monitoring period is from 01/03/2020-31/12/2020 (306days). The total net electricity supplied to the grid by the project in this monitoring period are 813433.256 MWh and the emission reductions in this monitoring period are 624,588tCO_2.

The project started construction on 01/11/2016 and starts commercial operation on 15/04/2017 and fully operation on 20/07/2017.

1.2 Sectoral Scope and Project Type

This category would fall within sectoral scope 1: energy industries (Renewable sources).

Project type: wind power project.

This project is not grouped project.

1.3 Project Proponent

Organization name	Ningxia Zhongwei Aluminum New Energy Co., Ltd
Contact person	Sun Ping
Title	Manager
Address	No 218, Xinchang West Road, Yinchuan City
Telephone	+86-951-6733432

Email	cdmcarbon@126.com

1.4 Other Entities Involved in the Project

Organization name	Beijing Cronus Technology Counsultancy Centre
Role in the Project	Project participant
Contact person	Li Qiang
Title	Manager
Address	814-004, No.15, information road, Haidian, Beijing, 100083, China
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1.5 Project Start Date

15/04/2017(started commissioning, which means the date that started to generate GHG emission reductions)

1.6 Project Crediting Period

The first VCS crediting period of the Project is from 15/04/2017 to 14/04/2027 (10 years, renewable). The total crediting period is from 15/04/2017 to 14/04/2047(totally 30 years).

1.7 Project Location

The project is located southwest of Zhongwei City, Ningxia Hui Autonomous Region, People's Republic of China. The coordinates of the proposed project location are 106°41′32″ to 108°23′65″ east longitude and 37°14′05″ to 39°05′23″ north latitude. The site is 1,700-1,350m above sea level. Fig. 1 shows the location of the project.

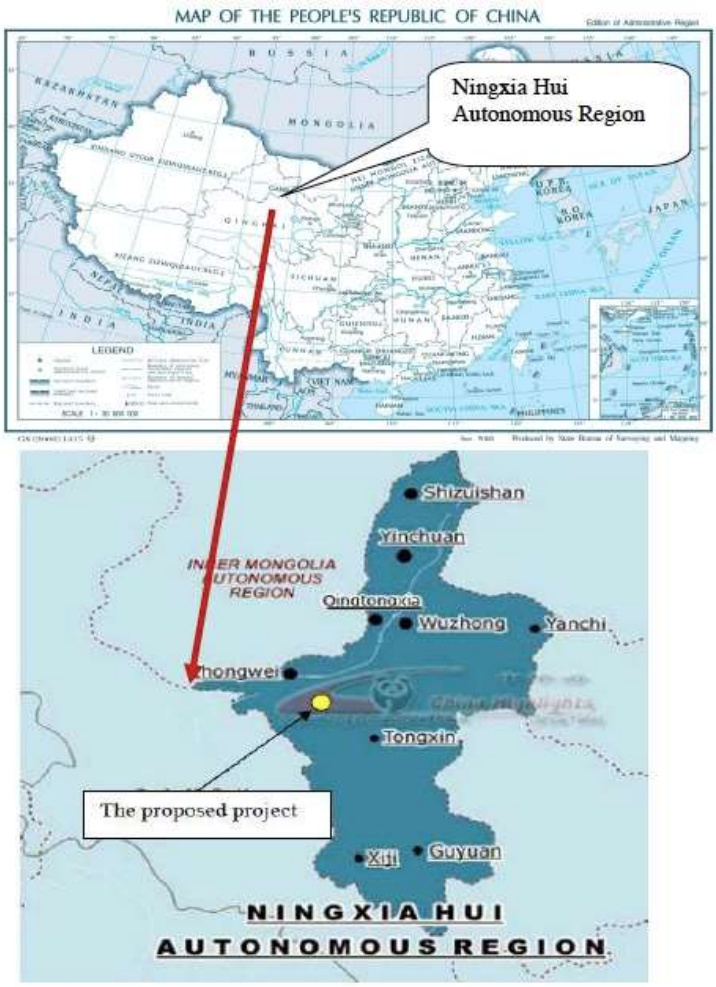

Figure 1. The location of the project.

1.8 Title and Reference of Methodology

The project applies the Approved consolidated baseline and monitoring methodology ACM0002 "Consolidated methodology for grid-connected electricity generation from renewable sources" (Version 19.0).

The methodology also refers to the following tools:
Tool to calculate the emission factor for an electricity system (Version 07.0);
Tool for the demonstration and assessment of additionality (Version 07.0).

1.9 Participation under other GHG Programs

The Project has not been applied for CDM or other GHG programs. The emission reductions from 15/04/2017 to 28/02/2019 and from 01/03/2019 to 29/02/2020 have been applied for VCS credits. They have not and will not be claimed for other kind of GHG credits.

1.10 Other Forms of Credit

The Project has not been claimed for any other forms of credit.

1.11 Sustainable Development

The project will contribute to sustainable development mainly by:

• Reducing the emission of CO_2 and other pollutants compared with fuel-fired power plant;

• Creating local employment opportunities during the construction (more than 200 people) and operation (65 people) of the proposed project and improving the living standard of local people;

• With the help of the road, which was constructed due to the proposed project, agriculture and other products could be transported from the mountains of Xiangshan to city by Local farmers. It can reduce poverty, which is very important to Ningxia, a poverty-stricken region energy resources of Northwest Power Grid;

• The implementation of the proposed project will help to change the energy structure, and thereby, contribute to the development of local economy;

• To construct such a large-scale wind power plant, the project owner spends a lot to purchase wind turbines and other auxiliary equipment such as transformers and distributed control system etc. The huge investment provides an opportunity for the expansion of related industrial branches and factories, hence stimulates the growth of wind power industry and development of wind power technology in China.

2 SAFEGUARDS

2.1 No Net Harm

The Environmental Impact Assessment (EIA) Report for the proposed project was compiled by Ningxia Dingxing Consulting company in Ningxia Hui Autonomous Region. The EIA Report for the proposed project has been approved by the Environmental Protection Bureau of Ningxia Hui Autonomous Region on 05/07/2015, with approval No. Ninghuanbiao [2015] No.58. According to the approval comments of the EIA Report by the Environmental Protection Bureau of Ningxia Autonomous Region, the environmental impacts likely to be caused by the project are analyzed.

Construction Phase:

Ecological Impact

Because the impeller of the wind turbine of the proposed project is 121m, the flight height of the bird migration is usually lower 1000m, and to the small birds the flight height is less than 300m based on the information. Therefore, the proposed project has little impact on the birds' migration.

Atmosphere Impact

The main air pollution sources during the construction period include off-gases from the operation of many kinds of machines. And the pollutant source is scattered with little emission. Thus, the construction will not cause much negative impact on the local air environment.

Wastewater Impact

The waste water from construction is mainly wastewater from the construction activity and the sewage from construction staff. The constriction waste water was mainly sediment waste water, with some measures to reduce the impact, including collecting, depositing etc., and then recycled to clean the construction sites. And the sewage from construction staff is mainly used to green and fall dust. So, the wastewater will not have the impact on the local water environment.

Noise impact

During the construction period, the noise of the construction is between 84dB and 105dB, mainly including piling machine, loading shovel and other transport vehicles. Because of the proposed project site is located in the hill and there is few residents. Furthermore, the sensitive region is at a distance of 400m away from the wind farm. According to relative standards, some steps are to be taken to reduce the noise impact. So the noise impact has little impact on the project site.

Solid Waste Impact

The solid wastes in the construction period including the construction wastes and household garbage will be collected. The construction wastes will be treated on site and the household garbage will be moved to a designated site to be disposed properly. So the solid wastes will not have the impact on the environment.

Transportation Impact

There is not heavy transportation load to the project site. Therefore, the transportation impact has little impact on the nearby residents.

Operation Phase:

Ecological Impact

Due to the low noise of the wind turbines, the proposed project has no effect to the birds during the operation period. Because there are no residents and other radio communication facilities within the assessment range, the electromagnetic radiation of the proposed project has little impact on the surrounding environment.

Atmosphere Impact

During the operation period, the emission resources are mainly from the restaurant in the project site. Using the clean fuel and discharge after purification, there is no impact on the local atmosphere impact.

Wastewater Impact

The proposed project has the 1.0 m3/d wastewater, which has been biochemical treatment, used to fall dust with surrounding areas. Hence, the waste water will not have the impact on the local water environment.

Noise impact

There is the noise of the wind turbines operation during the operation time. The nearest resident regions are 400m away from the wind farm, so the noise does not influence the residential districts nearest to the site.

Solid Waste Impact

After the project completed, the solid waste is mainly household garbage with the output 2.4t/a, which should be airtight and stored in the control centre, then moved to the garbage collected site. And the waste oil of wind turbine is about 99kg/a, which is the hazardous waste and should be recycled and disposed by the manufacturer when they have maintained the wind turbine based on the relative hazardous waste disposal regulation. So, the solid wastes will not have the impact on the environment.

Conclusion

After the above measures are performed, the negative impacts on environment will be minimized below the requirements of laws and regulations during the construction and operational period. Therefore, the project will do no net harm to environment and social development.

2.2 Local Stakeholder Consultation

To let the public realize the objective of the proposed project, support and cooperate with construction of the project, and heighten the environmental benefits and social benefits of the project, the project proponent developed a stakeholders' survey of the project in Nov 2017, to collect comments and requirement of public in the related region.

The first stage

The public participation was organized in Nov 2016 for collecting stakeholder's views and opinions mainly focused on the environmental impacts through releasing questionnaire and public announcement, partly by interview one by one.

Medium bulletin: make medium bulletin in the local residential area near the location site and release bulletin survey of stakeholders in the residential area near the project construction site. The bulletin contents include general description of the proposed project, public participation load table and contact method.

Questionnaire survey: The survey objects include local government and related departments of Xiangshan County, the local villagers living nearby Xiangshan Wind power project. During the survey of stakeholders, 150 questionnaires were released, and 145 questionnaires were got back, the return ratio is 96.7%. In addition, 40 people is interviewed and consulted.

The second stage

To know the public's suggestions and advices mainly on the issues of VCS application of the project, the project owner did the stakeholders' survey in Nov 2017. The survey was conducted in Xiangshan County. 46 questionnaires were released, and all were got back.

The survey shows the stakeholders believe that the VER project activity will have positive impacts on the local ecology and employment. Some stakeholders expressed concerns about potential increased soil

erosion in the area due to the project activity. All stakeholders expressed their support to the proposed project.

To keep on-going communications with local stakeholders, the project owner public its telephone through bulletin and oral notice to local people. Anyone who have comments on the project could phone the project owner directly. Besides, the project owner also put a grievance book in the office of wind plant and some villages. People can leave their grievance or suggestions on the book.

No comments were received in this monitoring period.

2.3 AFOLU-Specific Safeguards

This project is not an AFOLU project. Therefore, this section is not applicable.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The proposed project is to utilize wind resources for electricity generation in Zhongwei city, Ningxia Autonomous Region, P. R. China.

The project involves the installation of 265 sets of 1,500 kW wind turbines. The total installed capacity of the project is 397.5MW. Estimated annual power generation is 948,633.8MWh. The estimated annual operation hours are 2,386.5h and the estimated plant load factor is 27.2%.

Technical parameters of the wind turbines employed by the Project are illustrated in Table 1.

Table 1. Main technical parameters of key equipment in the Project

Wind turbine	
Rated capacity	1,500kW
Impeller diameter	82~89m
Wheel hub height	70m
Cut-in wind speed	3.0m/s
Rated wind speed	10.5m/s
Cut-out wind speed	25m/s
Max design wind speed	52.5m/s
Rated voltage	690kV
Manufacturer	Dongfang Electric Corporation Dongfang Turbine Co., Ltd
Lifetime	20 years

The technologies employed in the project activity are domestic technologies, and no technology transfer activity involved. The project started construction on 01/11/2016 and starts commercial operation on 15/04/2017.

This monitoring period covers from 01/03/2020 to 31/12/2020. During this monitoring period, the Project was implemented in line with the monitoring plan. And in this monitoring period, the wind farm runs well, no equipment is overhauled or replaced. No events or emergency which may impact the emission reductions and monitoring occurred during this monitoring period.

3.2 Deviations

2.3.1 Methodology Deviations

There is no methodology deviation in this monitoring period.

2.3.2 Project Description Deviations

There are no project description deviations in this monitoring period.

3.3 Grouped Projects

Not applicable as this is not a grouped project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,BM,y}$
Data unit	tCO_2/GJ
Description	Build margin CO_2 emission factor in year y
Source of data	National public data
Value applied	0.3232, the calculation process is shown in section 3.1 of registered PD
Justification of choice of data or description of measurement methods and procedures applied	The data source is from public data of China DNA.
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	$EF_{grid,OM,y}$

Data unit	tCO_2/GJ
Description	Operating margin CO_2 emission factor in year y
Source of data	National public data
Value applied	0.9155, the calculation process is shown in section 3.1 of registered PD.
Justification of choice of data or description of measurement methods and procedures applied	The data source is from public data of China DNA.
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2/GJ
Description	Combined margin CO_2 emission factor in year y
Source of data	National public data
Value applied	0.7674, the calculation process is shown in section 3.1 of registered PD.
Justification of choice of data or description of measurement methods and procedures applied	The data source is from public data of China DNA
Purpose of Data	Calculation of baseline emissions
Comments	/

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{facility,y}$
Data unit	MWh
Description	Quantity of net electricity generation supplied by the Project to the grid in year y

<table>
<tr><td>Source of data</td><td>Meter Recordings</td></tr>
<tr><td>Description of measurement methods and procedures to be applied</td><td>Grid-connected electricity generated by the project is monitored through electricity meters installed at the transform substation and recorded monthly. The project owner is responsible for the monitoring activities. The accuracy of the meters are 0.2s.</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Measured continuously and recorded monthly</td></tr>
<tr><td>Value monitored</td><td>813910.300</td></tr>
<tr><td>Monitoring equipment</td><td>The information of the electricity meters are shown in the following table. The main information of the meters is shown below:
<table>
<tr><th>Meter No.</th><th>Type</th><th>Serial No.</th><th>Accuracy</th><th>Calibration Date</th><th>Valid date</th></tr>
<tr><td rowspan="2">M522 (main meter)</td><td rowspan="2">DSSD8848</td><td rowspan="2">080002009870</td><td rowspan="2">0.2S</td><td>29/03/2019</td><td>28/03/2020</td></tr>
<tr><td>23/03/2020</td><td>22/03/2021</td></tr>
<tr><td rowspan="2">M533 (main meter)</td><td rowspan="2">DSSD8848</td><td rowspan="2">080002009822</td><td rowspan="2">0.2S</td><td>29/03/2019</td><td>28/03/2020</td></tr>
<tr><td>23/03/2020</td><td>22/03/2021</td></tr>
<tr><td rowspan="2">M523 (backup meter)</td><td rowspan="2">DSSD8848</td><td rowspan="2">080002009875</td><td rowspan="2">0.2S</td><td>29/03/2019</td><td>28/03/2020</td></tr>
<tr><td>23/03/2020</td><td>22/03/2021</td></tr>
<tr><td rowspan="2">M534 (backup meter)</td><td rowspan="2">DSSD8848</td><td rowspan="2">080002009872</td><td rowspan="2">0.2S</td><td>29/03/2019</td><td>28/03/2020</td></tr>
<tr><td>23/03/2020</td><td>22/03/2021</td></tr>
</table></td></tr>
<tr><td>QA/QC procedures to be applied</td><td>The electricity meters are calibrated annually by qualified entity according to national standards so that the metering equipments shall have sufficient accuracy. The electricity records are crosschecked with Electricity Transaction Note (ETN).</td></tr>
<tr><td>Purpose of the data</td><td>Calculation of baseline emissions</td></tr>
<tr><td>Calculation method</td><td>Measured directly by electricity meters. The exact data were the electricity delivered to the power grid minus the electricity supplied by the power grid. The data were measured continuously and recorded monthly.</td></tr>
<tr><td>Comments</td><td>/</td></tr>
</table>

4.3 Monitoring Plan

1. Monitoring objective

The objective of this monitoring plan is to ensure the complete, consistent, clear, and accurate monitoring and calculation of the project emission reductions during the entire crediting period. The project owner is responsible for the implementation of the monitoring plan, and the grid company cooperates with the project owner.

2. Monitoring System Organization Chart

The Project owner will set up an Emission Reduction monitoring team and the team manager of which will be assigned accordingly. The team is charge of collecting, monitoring and verifying the data. The operational and management structure is as follows:

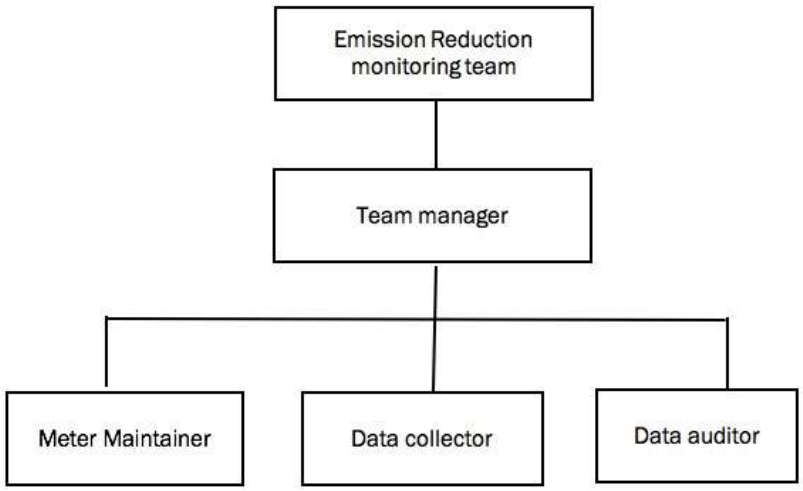

Figure 2. Monitoring structure

3. The monitoring method and equipments installation

Power generated by the project are fed into the Ningxia Power Grid through transmission line. Four bi-directional electricity meters (two main meters and two backup meters) are installed on the transform substation to directly and continuously measure the exported and imported electricity by the project activity. To be conservative, the net power supplied to grid by the project is calculated as "$EG_{facility,y}$= $EG_{export,y}$ - $EG_{import,y}$" during the monitoring period. $EG_{export,y}$ is electricity exported to the grid by the project (MWh) and $EG_{import,y}$ is electricity imported to the project activity by the grid.

The monthly readings of electricity meters are recorded at 24:00 of the last day of each month. The ETN is prepared by the grid company according to the meters and confirmed by the project owner. The meter records are cross checked by the ETN. The conservative data between the meter readings and ETN are used to calculate ERs during this monitoring period.

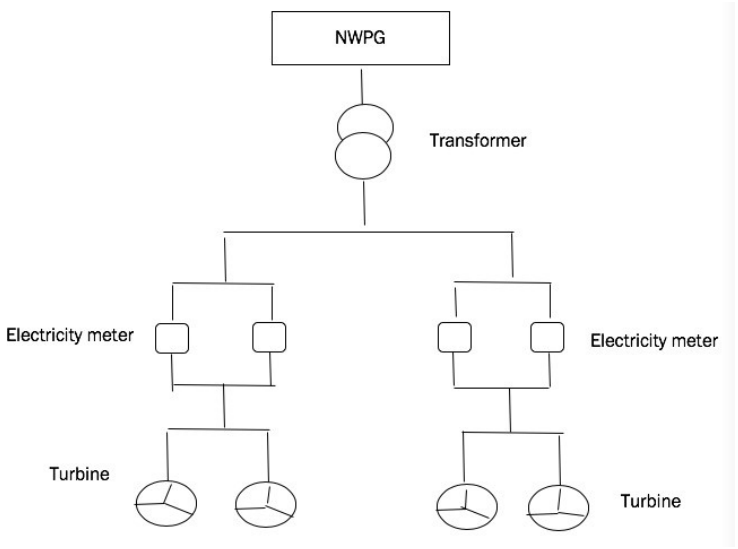

Figure 3. Line Diagram

4. Quality Assurance and Quality Control (QA/QC)

1) Calibration

The electricity meters will be calibrated annually. The electric meters will be calibrated by an accredited calibration agency. Calibration certificates of the accredited calibration agency and the relevant calibration documents will be collected by the QA/QC department and transferred to technical department for archiving. The accuracy of electricity meter(s) is 0.2s.

2) Corrective actions

If problems which can affect the quality of data occur, the QA/QC department will initiate and supervise the implementation of corrective actions.

3) Internal audit

Internal audit is independent. Internal audit procedure will be initiated under any of the following circumstances:

· modification of the monitoring system

· prior to verification

The monitoring system will be checked on whether the monitoring system runs properly and whether the monitored results are correct. Secondly, spot check of daily/monthly data report will be undertaken.

5. Data management

All the data are continuously monitored, recorded by the data collector monthly and aggregated yearly for emission reduction calculations. These data are reviewed by the data auditor and checked by team manager. The file documents are copied and kept in specific place. All digital files are copied by hard disk. These documents will be provided to DOE for verification and kept until 2 years after the end of the crediting period.

6. Procedure of emergency handling

In case the main meter is out of order, it shall be inspected, repaired, or replaced immediately by the professional staff and quantity of net electricity generation supplied by the Project to the grid shall be jointly determined by the Project Owner and the power grid company. A conservative and reasonable estimate of the readings shall be determined and conservative values shall be used to estimate emission reductions.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired

power plants that are displaced due to the project activity. The baseline emissions are to be calculated as follows:

$BEy = EG_{PJ,y} \times EF_{grid,CM,y}$

Where:

BE_y	= baseline emissions in year y (tCO_2e)
$EG_{PJ,y}$	=Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the VCS 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. It is calculated using the latest version of the Tool to calculate the emission factor for an electricity system. And the result is fixed in the crediting period(tCO_2e/MWh). According to the registered PD, $EF_{grid, CM,y}$=0.7674 tCO_2e/MWh.

Calculation of $EG_{PJ,y}$

The calculation of $EG_{PJ,y}$ is different for (a) greenfield plants, (b) retrofits and replacements, and (c) capacity additions. The project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, then

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

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

$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)

The yearly electricity volume and baseline emissions are listed in following table 2.

Table 2. Baseline emissions

Period	Electricity exported to the grid by the project ($EG_{export,y}$) (MWh)	Electricity imported from the grid ($EG_{import,y}$) (MWh)	Net electricity supplied to the grid ($EG_{facility,y}$) (MWh)	$EF_{grid,CM,y}$ (tCO_2/MWh)	Baseline emission (BE_y) (tCO_2e)
01/03/2020-31/03/2020	93596.412	248.052	93348.360	0.7674	71,635
01/04/2020-30/04/2020	93668.078	255.710	93412.368	0.7674	71,684
01/05/2020-31/05/2020	89227.264	355.824	88871.440	0.7674	68,199
01/06/2020-30/06/2020	92752.926	349.174	92403.752	0.7674	70,910
01/07/2020-31/07/2020	79237.732	293.734	78943.998	0.7674	60,581
01/08/2020-31/08/2020	64931.034	356.426	64574.608	0.7674	49,554
01/09/2020-30/09/2020	72281.762	348.432	71933.330	0.7674	55,201
01/10/2020-31/10/2020	70734.818	327.152	70407.666	0.7674	54,030
01/11/2020-30/11/2020	78332.870	412.874	77919.996	0.7674	59,795
01/12/2020-31/12/2020	82474.028	379.246	82094.782	0.7674	62,999
Total in this monitoring period	**817236.924**	**3326.624**	**813910.300**	/	**624,588**

5.2 Project Emissions

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

In according with the registered PD, $ER_y = BE_y - PE_y$

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)
01/03/2020-31/12/2020	624,588	0	0	624,588
Total	624,588	0	0	624,588

The annual emission reductions estimated in the PDD are 727,982 tCO_2e. This monitoring period is from 01/03/2020 to 31/12/2020 (306days). The ex-ante emission reductions estimation for this monitoring period are 727,982/365*306=610,308tCO_2. The actual emission reductions in this monitoring period are 624,588CO_2e, which is 2.3% more than the estimation for this monitoring period. This will not impact the additionally of the project activity as the sensitivity analysis of the project activity shows that the IRR will not exceeds benchmark until an 8.2% increase in Grid-connected electricity. The main reason for the electricity generation increase is that the wind flow in this monitoring period are larger than the designing value in the FSR and the management skills improves gradually.