



Verified Carbon Standard

GUAZHOU BEIDAQIAO NO.1 WIND FARM PROJECT IN GANSU PROVINCE, CHINA

Document Prepared by Beijing MD Energy Technology Co., Ltd.

Project Title	Guazhou Beidaqiao No.1 Wind Farm Project in Gansu Province, China
Version	02
Report ID	NA
Date of Issue	30/03/2022
Project ID	1037
Monitoring Period	29/06/2012 to 31/12/2017
Prepared By	Will Yang
Contact	Room 11-F, Beijing City Plaza, No.4 Office Building, Chaoyang District, Beijing , China Email: will.yang@mdenergy.cn www.mdenergy.cn

CONTENT

1	Project Details.....	3
1.1	Summary Description of the Implementation Status of the Project.....	3
1.2	Sectoral Scope and Project Type.....	3
1.3	Project Proponent.....	4
1.4	Other Entities Involved in the Project.....	4
1.5	Project Start Date.....	4
1.6	Project Crediting Period.....	4
1.7	Project Location.....	4
1.8	Title and Reference of Methodology.....	5
1.9	Participation under other GHG Programs.....	5
1.10	Other Forms of Credit.....	5
1.11	Sustainable Development.....	6
2	Safeguards.....	6
2.1	No Net Harm.....	6
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.....	11
4	Data and Parameters.....	11
4.1	Data and Parameters Available at Validation.....	11
4.2	Data and Parameters Monitored.....	11
4.3	Monitoring Plan.....	14
5	Quantification of GHG Emission Reductions and Removals.....	18
5.1	Baseline Emissions.....	18
5.2	Project Emissions.....	22
5.3	Leakage.....	22
5.4	Net GHG Emission Reductions and Removals.....	22

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The Guazhou Beidaqiao No.1 Wind Farm Project in Gansu Province, China (hereafter refers to “the project”), a wind power project, is located in Guazhou County, Jiuquan City, Gansu Province, China. The total installed capacity of the project activity is 201MW (67 sets of SL1500 wind turbine units and 67 sets of GW1500 wind turbine units). Dependent on the reliability of the local wind resource, the project is expected to supply 461,464 MWh of electricity annually. The electricity generated by the project activity is supplied to Northwest China Power Grid (“NWPG”) through Gansu Grid, displacing part of electricity generated by NWPG which is dominated by thermal power plants, and thus greenhouse gas (GHG) emission reductions could be achieved.

As a renewable energy project, the project activity produces positive environmental and economic benefits and contributes to the local sustainable development. The implementation of the project achieves CO₂ emission reduction by replacing electricity generated by fossil fuel fired power plants. The estimated annual GHG emission reductions are 428,829 tCO_{2e}. The implementation of the project activity was:

Date	Key Events
29/09/2011	Registered as a CDM project
03/01/2011	The operation starting date
03/01/2011 to 28/09/2011	1 st VCS monitoring period
29/09/2011 to 28/06/2012	1 st CDM monitoring period
29/06/2012 to 31/12/2017	2 nd VCS monitoring period (this monitoring period)

During this monitoring period, the Net electricity supplied to NWPG by the proposed project in year y by the project is 1,473,082.930 MWh, and the emission reduction achieved is 1,368,760 tCO₂.

1.2 Sectoral Scope and Project Type

Sectoral Scope 1: Energy industries (renewable - / nonrenewable sources);

Project type: wind power generation project;

The project is not a grouped project.

1.3 Project Proponent

Organization name	Hydrochina Guazhou Wind Power Co., Ltd.
Contact person	Kong Weidou
Title	Project Manager
Address	7th Floor, Building A, NORTH STAR CENTURY CENTER, Beichen West Road 8#, Chaoyang District, Beijing
Telephone	+86 010-86301832
Email	kongweidou@hydrochina.com.cn

1.4 Other Entities Involved in the Project

Organization name	Beijing MD Energy Technology Co., Ltd.
Role in the Project	Consultancy
Contact person	Will Yang
Title	Project Manager
Address	Room 11-F, Beijing City Plaza, No.4 Office Building, Chaoyang District, Beijing , China
Telephone	+86--15311472896
Email	will.yang@mdenergy.cn

1.5 Project Start Date

The project started on 03/01/2011 (operation start date).

1.6 Project Crediting Period

The project is registered under VCS version 3 and completed validation before 19/03/2020. Thus, it remains eligible to apply the crediting period requirements under VCS version 3 which shall be a maximum of ten years and may be renewed at most twice, so the first renewable VCS crediting period of the project should be updated from 03/01/2011 - 28/09/2011 to 03/01/2011 - 02/01/2021.

1.7 Project Location

The project is located in Guazhou County, Jiuquan City, Gansu Province, China, about 18km northwest away from Guazhou County. The geographical coordinates of the project is the North Latitude of +40.6025° and the East Longitude of +95.8037° .

1.8 Title and Reference of Methodology

Methodology:

ACM0002 “Grid-connected electricity generation from renewable sources” (version 12.1.0)

Reference:

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

Tools:

Tool to calculate the emission factor for an electricity system

Reference:

<https://cdm.unfccc.int/Reference/tools/index.html>

1.9 Participation under other GHG Programs

The project was registered as a Clean Development Mechanism (CDM) project (reference number: 4254) in UNFCCC with 3*7 years renewable crediting period started from 29/09/2011. Please refer to the following link for details:

<https://cdm.unfccc.int/Projects/DB/ERM-CVS1292512044.7/view>

1.10 Other Forms of Credit

The project is a registered CDM project with reference No. 4254. GHG emission reductions from 29/09/2011 to 28/06/2012 by the project has been issued as CERs under CDM program, the detailed information can be found at <https://cdm.unfccc.int/Projects/DB/ERM-CVS1292512044.7/view>.

All emission reductions during 29/06/2012 to 31/12/2017 have not and will not seek CDM CER issuance. Emission reductions during this monitoring period will only seek issuance under VCS program. The GHG emission reductions of 309,444 tCO₂e generated from 03/01/2011 to 28/09/2011 by the project has been issued as VCU under VCS program.

The project proponent is not part of any emission trading program. The net GHG emission reductions from the project will not be used for compliance with emission trading programs or to meet binding limits on GHG emissions. The project activity has not participated in any other GHG programs.

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/year¹. And the project activity is not included the mandatory emission control scheme and there is no emission cap enforced for the project owner according to the enforced company list² in public information. Hence, it is confirmed that the emission reductions will not be double counted.

1.11 Sustainable Development

The contributions of this project to the sustainable development of the host country and project site are summarized as follows:

Because the wind power plants of the project will generate electricity without GHG emission, the project can help the local areas reduce GHG emissions by replacing some part of the electricity from coal-fired power plants. And the project also helps decrease the local environmental pollution caused by coal burning, which has remarkable environmental benefits. The project has achieved a GHG emission reduction of 1,368,760 tCO₂e during this monitoring period. Thus, the project achieved SDG 13 Climate Action³.

During this monitoring period, 1,473,082.930 MWh of electricity from renewable sources has been exported to the power grid. And the project makes good use of the local water resource to solve the difficulties of lack of power and unstable voltage, which help improve local life quality. Thus, the project achieved SDG 7 Affordable and Clean Energy⁴.

During the construction, operation, and maintenance of this project, the project, directly and indirectly, generates more job opportunities, which helps improve local employment and reduce local poverty. Thus, the project achieved SDG 8 Decent Work and Economic Growth⁵.

2 SAFEGUARDS

2.1 No Net Harm

The Environmental Impact Assessment (EIA) of the project was completed by Resource and Environment & Quality Evaluation Research Center of Lanzhou University and approved by Gansu Environmental Protection Administration. The summary of this evaluation is as following:

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

² <http://mee.gov.cn/xxgk2018/xxgk/xxgk03/202012/W020201230736907682380.pdf>

³ <https://sdgs.un.org/goals/goal13>

⁴ <https://sdgs.un.org/goals/goal7>

⁵ <https://sdgs.un.org/goals/goal8>

1. Noise

The noises will be produced by the constructing equipments and transporting vehicle during construction period. The construction will be arranged by daylight mostly, and there is no residential area and industrial and mining enterprises a few kilometres around the project site, so the constructing noise will not interrupt the residents and the noise will disappear when the project finishes construction. The measurements as arranging the transport time reasonably, limited the speed and no tooting of the vehicles in some environmental sensitive area will be carried out to reduce the noise impact of the transporting vehicle. The low-noise wind turbines will be employed to reduce the noise impact during operation period.

2. Air Pollution

The Powder and dust produced in the constructing process are the main factor for the air pollution during construction period. Sprinkling, covering the raw material and so on will be carried out to reduce the impact to lowest. The tail gas of transporting vehicles and constructing equipments will impact on part environment, but the impact will be over when the project finishes construction.

3. Wastewater

The wastewater during construction period involves equipment washing wastewater and domestic sewage. The evaporation tank will be built to treat the wastewater. When the project finishes construction, the evaporation tank will be buried. In the operation period, the domestic sewage will be drained into the water storage pit after treatment. Then it will be used for factory virescence. Therefore, there is no impact on the water environment.

4. Solid waste

The solid wastes include living garbage and construction garbage during construction period. The solid waste will be transported to the Guazhou County landfill. The smeary solid wastes will be set on fire or collected to treat. When the project finishes construction, the solid waste will be cleaned in time. The oilskin will be collected and sent to the hazardous waste treatment and disposal company during the operation period, so it will not impact on the environment.

5. Ecological environment

The impact on the ecological environment is mainly happened during construction period. The excavation, transport and the storage of equipments and materials will lead to the destruction of vegetation and changes of earth's surface structure. The construction area will be strictly arranged and will carry out the environment protecting and recovery measurements.

The project site is in the Gobi desert which is not the birds migrating channel, so there is no harm for the birds.

6. Conclusion

After the above measurements performed, the negative impacts on environment will be minimized below the requirements of laws and regulations during the construction and operation periods. Furthermore, as renewable power project, the project can reduce the consumption of fossil fuel sources and GHG emission. Besides, the project will become the special scenery in the Gobi desert and will improve the development of the local tourism.

According to EIA, no significant environmental impacts are discovered by the project participants or the host party. Gansu Environmental Protection Administration has approved the EIA in 06/08/2008.

2.2 Local Stakeholder Consultation

Local Stakeholder Consultation during the project preparation stage:

To ensure the sustainability of the project which is one of the key requirements of CDM project, the project owner has carried out a stakeholder investigation around the project site in April 2009. The stakeholder investigating summary is shown as below:

In 28/04/2009, a public stakeholder consultation was held by the developer. the project and the CDM procedures were introduced in detail to the publics on the meeting, and 45 questionnaires were distributed and 43 of the distributed questionnaires had been returned. The meeting participants includes: residents in the neighbouring area, governmental officials, staff from the project owner company, and other related persons.

The questions in the questionnaires including:

- What do you think is there any air pollution/water pollution /noise/electromagnetic interference? If any, what's the extent?
- What do you think the influence on the conditions of the local ecosystem?
- What do you think the influence on your life and income?
- What do you think the influence on local employment?
- What do you think the influence on local power distribution?
- What do you think the influence on the local economic development?
- From the perspective of environmental protection and residents' interest, do you have any suggestions about the project construction and operation?

50 questionnaires had been delivered and 50 of them had been collected, 90% support the construction of the project; other 5% shows that they are indifferent to the construction of the

project. Over 95% think the positive influences will be brought to the local economic/social/cultural development.

The residents and local government are all very supportive to the project. No negative comments have been received on the project. The result of the stakeholder investigation with answers to the mainly cared issues was put up in the neighbouring area lasted for one month, and no objection or any more comments have been received.

Local Stakeholder Consultation during the project implementation stage:

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.

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 installed and operated four sets 134 wind turbine-generators, each with a capacity of 1,500 kW, forming a total capacity of 201 MW. The 67 sets of wind turbines model SL1500/77 are manufactured by Sinovel Wind Technology Co., Ltd, and the other 67 sets of wind turbines model GW77/1500 are manufactured by Xinjiang Goldwind Technology Co., Ltd. The technology is introduced from Germany and produced under license. Therefore, the establishment and operation of the project activity will promote technology transfer and utilization in China. The technology is considered good practice in China.

The details of the equipment can be referred to Table 1 below.

Table 1. Summary of key equipment in the project

Parameter of Turbines	Unit	Value
-----------------------	------	-------

Type	/	SL1500/77	GW77/1500
Quantity of Turbine	/	67	67
Rated Power	kW	1500	1500
Cut-in Wind Speed	m/s	3.0	3.0
Cut-out Wind Speed	m/s	20.0	22.0
Rated Wind Speed	m/s	11.0	11.5
Rated Voltage	V	690	690

The project adopts turbine-transformer units to boost voltage from 690V to 35 kV. All the turbine-transformers are linked with the 35 kV suspension lines and are connected to West Beidaqiao Substation, which boosts the voltage from 35kV to 330 kV. The electricity will then be boosted to 750kV through Anxi Substation and be transmitted to NWPG through the 750kV transmission line. In this monitoring period, the project was running orderly without any overhauling and downtimes of equipment. No special events occurred during the monitoring period which may impact the applicability of the methodology.

3.2 Deviations

3.2.1 Methodology Deviations

There is no methodology deviation applied to this monitoring period.

3.2.2 Project Description Deviations

The project is registered under VCS version 3 and completed validation before 19/03/2020, thus it remains eligible to apply the crediting period requirements under VCS version 3, the first crediting period of the project should be updated from 03/01/2011 - 28/09/2011 to 03/01/2011 - 02/01/2021 (3*10 years). The deviation for the crediting period is applicable to this monitoring period (29/06/2012 to 31/12/2017) and it has no impacts on the applicability, additionality or baseline of the project.

Furthermore, as per revised CDM PDD, the accuracy of the meter M_{21} is changed from 0.5 to 1.0, which has been approved by CDM EB on 15/01/2013. The net electricity will be determined by the following formula:

$$EG_{\text{facility},y} = EG_{\text{export},y} - EG_{\text{import1},y} - EG_{\text{import2},y} \times (1+0.5\%)$$

Except these, there are no other project description deviations occurred in this monitoring period or a previous monitoring period.

3.3 Grouped Projects

NA.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO ₂ e/MWh
Description	Combined margin CO ₂ emission factor for grid connected power generation in year y
Source of data	registered CDM PDD
Value applied	0.92928
Justification of choice of data or description of measurement methods and procedures applied	The $EF_{grid,CM,y}$ is ex-ante decided in the registered CDM PDD
Purpose of Data	Calculation of baseline emissions
Comments	Calculated ex ante and fixed for the first crediting period.

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{Facility,y}$
Data unit	MWh
Description	Net electricity supplied to NWPG by the proposed project in year y
Source of data	Calculated
Description of measurement methods and procedures to be applied	Calculated based on parameters $EG_{export,y}$ and $EG_{import,y}$
Frequency of monitoring/recording	Measured continuously and recorded monthly
Value monitored	1,473,082.930

Monitoring equipment	/
QA/QC procedures to be applied	/
Purpose of the data	Calculation of baseline emissions
Calculation method	$EG_{\text{facility},y} = EG_{\text{export},y} - EG_{\text{import},y}$ $EG_{\text{import},y} = EG_{\text{import}1,y} + EG_{\text{import}2,y} * (1+0.5\%)$ <p>$EG_{\text{export},y}$ is Electricity supplied by the project activity to the grid in year y;</p> <p>$EG_{\text{import},y}$ is Electricity imported from the grid by the project in year y;</p>
Comments	NA

Data / Parameter	$EG_{\text{export},y}$														
Data unit	MWh														
Description	Electricity supplied by the project activity to the grid in year y														
Source of data	Monthly Meter Records and electricity sales receipts														
Description of measurement methods and procedures to be applied	<p>This parameter is monitored through bi-directional meters M_{11} and M_{12}. M_{11} is main meter while M_{12} is back up meter. Both meters are installed at the 330kV West Beidaqiao Substation. Back up meter M_{12} is used when main meter M_{11} is out of order. In this monitoring period, main meter M_{11} is working well. The cut off time was 24:00 of the last day of each month since July 2012. At the cut off time, staff from the project owner and the grid company will read the main meter M_{11} together.</p>														
Frequency of monitoring/recording	Measured continuously and recorded monthly														
Value monitored	1,481,762.820														
Monitoring equipment	<p>The information of the electricity meters are shown in the following table. The main information of the meters is shown below:</p> <table border="1"> <thead> <tr> <th>Meter No.</th> <th>Type</th> <th>Serial No.</th> <th>Accuracy</th> <th>Calibration Date</th> <th>Valid Date</th> </tr> </thead> <tbody> <tr> <td rowspan="2">M₁₁ (main meter)</td> <td rowspan="2">SL7000</td> <td rowspan="2">57036843</td> <td rowspan="2">0.2S</td> <td>29/03/2012</td> <td>28/03/2013</td> </tr> <tr> <td>27/03/2013</td> <td>26/03/2014</td> </tr> </tbody> </table>	Meter No.	Type	Serial No.	Accuracy	Calibration Date	Valid Date	M ₁₁ (main meter)	SL7000	57036843	0.2S	29/03/2012	28/03/2013	27/03/2013	26/03/2014
Meter No.	Type	Serial No.	Accuracy	Calibration Date	Valid Date										
M ₁₁ (main meter)	SL7000	57036843	0.2S	29/03/2012	28/03/2013										
				27/03/2013	26/03/2014										

				23/03/2014	22/03/2015	
				23/03/2015	22/03/2016	
				23/03/2016	22/03/2017	
				23/03/2017	22/03/2018	
	M ₁₂ (backup meter)	SL7000	57036839	0.2S	29/03/2012	28/03/2013
					27/03/2013	26/03/2014
					23/03/2014	22/03/2015
					23/03/2015	22/03/2016
					23/03/2016	22/03/2017
					23/03/2017	22/03/2018
Calibration entity: Electric Energy measurement Center Gansu Electric Power Corporation						
QA/QC procedures to be applied	Data measured by meter will be crosschecked by electricity receipt.					
Purpose of the data	Calculation of baseline emissions					
Calculation method	Measured directly by electricity meters.					
Comments	NA					

Data / Parameter	EG _{import1,y}
Data unit	MWh
Description	Electricity imported from the grid through the main meter to the project
Source of data	Monthly Meter Records and electricity purchase receipts
Description of measurement methods and procedures to be applied	This parameter is monitored through bi-directional meters M ₁₁ and M ₁₂ . M ₁₁ is main meter while M ₁₂ is back up meter. Both meters are installed at the 330kV West Beidaqiao Substation. Back up meter M ₁₂ is used when main meter M ₁₁ is out of order. In this monitoring period, main meter M ₁₁ is working well. The cut off time was 24:00 of the last day of each month since July 2012. At the cut off time, staff from the project owner and the grid company will read the main meter M ₁₁ together.
Frequency of monitoring/recording	Measured continuously and recorded monthly
Value monitored	8,679.890
Monitoring equipment	The information of the electricity meters are shown in the following table. The main information of the meters is shown below:

	Meter No.	Type	Serial No.	Accuracy	Calibration Date	Valid Date
	M ₁₁ (main meter)	SL7000	57036843	0.2S	29/03/2012	28/03/2013
					27/03/2013	26/03/2014
					23/03/2014	22/03/2015
					23/03/2015	22/03/2016
					23/03/2016	22/03/2017
					23/03/2017	22/03/2018
	M ₁₂ (backup meter)	SL7000	57036839	0.2S	29/03/2012	28/03/2013
					27/03/2013	26/03/2014
					23/03/2014	22/03/2015
					23/03/2015	22/03/2016
					23/03/2016	22/03/2017
					23/03/2017	22/03/2018
Calibration entity: Electric Energy measurement Center Gansu Electric Power Corporation						
QA/QC procedures to be applied	Data measured by meter will be crosschecked by electricity receipt.					
Purpose of the data	Calculation of baseline emissions					
Calculation method	Measured directly by electricity meters.					
Comments	NA					

Data / Parameter	EG _{import2,y}
Data unit	MWh
Description	Electricity imported from the grid through the backup line to the project
Source of data	Monthly Meter Records
Description of measurement methods and procedures to be applied	This parameter is monitored through meter M ₂₁ . The meter is installed at the project site. The cut off time was 24:00 of the last day of each month since July 2012. At the cut off time, staff from the project owner and the grid company will read the meter M ₂₁ together. During this monitoring period, no electricity was imported by the project via the backup line
Frequency of monitoring/recording	Measured continuously and recorded monthly
Value monitored	0

Monitoring equipment	The information of the electricity meter is shown in the following table. The main information of the meter is shown below:				
	Meter No.	Serial No.	Accuracy	Calibration Date	Valid Date
	M ₂₁	1000759046	1.0	17/02/2012	16/02/2013
				12/02/2013	11/02/2014
				08/02/2014	07/02/2015
				08/02/2015	07/02/2016
				08/02/2016	07/02/2017
08/02/2017				07/02/2018	
Calibration entity: Electric Energy measurement Center Gansu Electric Power Corporation					
QA/QC procedures to be applied	Data measured by meter will be crosschecked by electricity receipt.				
Purpose of the data	Calculation of baseline emissions				
Calculation method	Measured directly by electricity meters.				
Comments	NA				

4.3 Monitoring Plan

Monitoring organization

The project developer had set up a VCS project team for monitoring of the project activity. Clear roles and responsibilities are assigned to all staffs involved in the VCS project and the prospect of nominating a VCS Manager has been considered. The VCS project manager authorized by the project developer is in charge of all the management works and the fulfilment of the Monitoring Plan. The operation and management structure is show as in Figure 2 below:

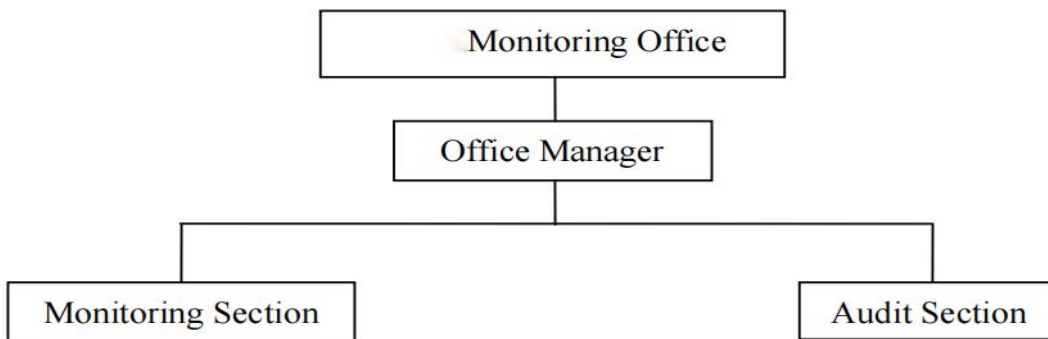


Figure 2: Monitoring and management Structure

Metering system

The net electricity supplied to the grid is monitored through the main meter M_{11} installed at the 330kV West Beidaqiao Substation and the meter M_{21} installed at the project site. The main meter M_{11} is bidirectional and has two-way metering, recording both exports to the grid $EG_{export,y}$ and imports from the grid $EG_{import1,y}$.

The back-up meter M_{12} is also installed at the 330kV West Beidaqiao Substation and used in case of the main meter is out of order.

The meter M_{21} is to record the electricity imports from the grid ($EG_{import2,y}$) through the backup line. The electricity imported from the grid $EG_{import,y} = EG_{import1,y} + EG_{import2,y} * (1+0.5\%)$. The net electricity supplied to the grid $EG_{facility,y} = EG_{export,y} - EG_{import,y}$.

Both the main meter M_{11} and the back-up meter M_{12} are in accuracy of 0.2S, the main meter M_{21} is in accuracy of 1.0. The electricity exported to the grid and imported from the grid will be cross-checked with sales receipts.

As per revised CDM PDD, the accuracy of the meter M_{21} is changed from 0.5 to 1.0, which has been approved by CDM EB on 15/01/2013. The difference of the accuracy is 0.5%. According to the revised CDM PDD approved by CDM EB, in order to approach conservation, the value is adjusted as follows: adjusted value = measured value - measured value * adjusted factor. Adjusting factor for electricity exported is (1-0.5%), adjusting factor for electricity imported is (1+0.5%), which in fact inhibits differences between the electric meters accuracy. The percentage is multiplied by the electricity generation in order to calculate the deduction of the measured value. In this project, there is only changed of the back-up meter which monitoring the imported electricity ($EG_{import2,y}$). Therefore, the imported electricity ($EG_{import2,y}$) should be multiplied the adjusting factor(1+0.5%).

The detail metering system please sees the figure 3 below:

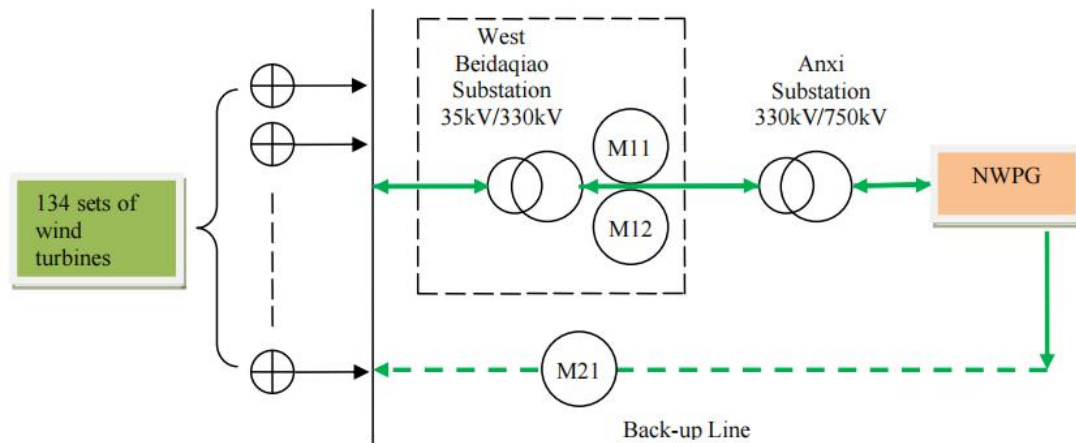


Figure 3: Monitoring System and Monitoring Meters

The electricity meters are properly calibrated following relevant provision in applicable national standard. Calibration is carried out by Electric Energy Measurement Center, Gansu Electric Power Corporation. The meter is calibrated no less than once a year.

All the meters have been jointly inspected and sealed on behalf of the parties concerned and shall not be interfered with by either party except in the presence of the other party or its accredited representatives.

Data collection procedures

- a. The main meter M_{11} and meter M_{21} is read and reported to Northwest Power Grid Company monthly.
- b. The backup meter M_{12} is read and reported monthly.
- c. The project owner reports the readings, grid data and calculations to the VVB for verification.

QA & QC

The calibration of meters conducted by qualified organization must comply with national standard and sector regulations regularly to ensure the accuracy. The meters are calibrated no less than once a year and must be pasted with seal after calibration. The calibration records must be archived together with other monitoring records.

If any errors are detected the party owning the meters shall repair, recalibrate or replace the meter giving the other party sufficient notice to allow a representative to attend during any corrective activity. If the readings of the main meter are beyond allowable error, the backup meter will be used; if the readings of both the main meter and the backup meter are beyond allowable error, the project owner and Power Grid Company shall jointly prepare a reasonable and conservative estimate of the correct reading. In any case there is any problem for the meters, the relevant third party is responsible to correct the meters.

After handling of the emergency, the project owner must prepare a report regarding the emergency to explain to DOE that the handling method is reasonable.

Data management

The project owners keep the copies of sales receipts and prepare a monitoring report when necessary, which includes the net electricity generation, the calibration records and meters' corrective action records. The monitoring data are verified by the Office Manager once every quarter. If there is anything wrong for the data, the Office Manager will correct the data according to other meters and historical data and write the corrective action records for it.

All the electronic and paper documents are archived during the crediting period and two years after the end of the crediting period or the last issuance of CERs, whichever occurs later.

Training program

The project owner entrust the professional engineers and experts to train all the relative staffs before operation of generators. The training contains CDM knowledge, operational regulations, quality control (QC) standard flow, data monitoring requirements and data management regulations etc.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The emission reduction by the project is calculated according to approved consolidated methodology ACM0002 (version 12.1.0). The equation is showed below:

$$ER_y = BE_y - PE_y$$

Where:

ER_y is the emission reductions in year y (tCO₂e/yr)

BE_y is baseline emissions in year y (tCO₂e/yr)

PE_y is project emissions in year y (tCO₂e/yr)

To calculate BE_y :

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

Where:

$EG_{\text{facility},y}$ = Net electricity supplied to NWPG by the proposed project in year y (MWh/yr).

$EF_{\text{grid,CM},y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y (tCO₂e/MWh).

The emission factor $EF_{\text{grid,CM},y}$, with the value of 0.92928 tCO₂e/MWh, is calculated ex-ante and is fixed during the crediting period. The details of the Net electricity supplied to NWPG by the proposed project in year y in this monitoring period (29/06/2012 ~ 31/12/2017) is shown in Table 2.

Table 2. The summarization of emission reductions from 29/06/2012 ~ 31/12/2017⁶.

Monitoring period		EG _{export,y} (MWh)			EG _{import,y} (MWh)				EG _{facility,y} (MWh)	Emission reductions (ERy)
					EG _{import1,y} (MWh)			EG _{import2,y} (MWh)		
from	to	meter (main meter) reading records	electricity sales receipts	Data used for ER calculation	Meter (main meter) reading records	electricity sales receipts	Data used for ER calculation	Data used for ER calculation	(MWh)	(tCO ₂ e)
29/06/2012	30/06/2012	2272.160	2272.160	2272.160	0.000	0.000	0.000	0.000	2272.160	2111
01/07/2012	31/07/2012	25927.440	25927.440	25927.440	110.880	110.880	110.880	0.000	25816.560	23990
01/08/2012	31/08/2012	21735.120	21735.120	21735.120	129.360	129.360	129.360	0.000	21605.760	20077
01/09/2012	30/09/2012	31978.320	31978.320	31978.320	97.680	97.680	97.680	0.000	31880.640	29626
01/10/2012	31/10/2012	22532.400	22532.400	22532.400	168.960	168.960	168.960	0.000	22363.440	20781
01/11/2012	30/11/2012	19631.040	19631.040	19631.040	221.760	221.760	221.760	0.000	19409.280	18036
01/12/2012	31/12/2012	17212.800	17212.800	17212.800	300.960	300.960	300.960	0.000	16911.840	15715
Sub Total		141289.280	141289.280	141289.280	1029.600	1029.600	1029.600	0.000	140259.680	130336
01/01/2013	31/01/2013	17806.800	17806.800	17806.800	398.640	398.640	398.640	0.000	17408.160	16177
01/02/2013	28/02/2013	25980.240	25980.240	25980.240	150.480	150.480	150.480	0.000	25829.760	24003
01/03/2013	31/03/2013	27640.800	27640.800	27640.800	147.840	147.840	147.840	0.000	27492.960	25548
01/04/2013	30/04/2013	18403.440	18403.440	18403.440	75.560	75.560	75.560	0.000	18327.880	17031
01/05/2013	31/05/2013	40257.360	40257.360	40257.360	73.920	73.920	73.920	0.000	40183.440	37341
01/06/2013	30/06/2013	37279.440	37279.440	37279.440	81.840	81.840	81.840	0.000	37197.600	34566
01/07/2013	31/07/2013	29322.480	29322.480	29322.480	110.880	110.880	110.880	0.000	29211.600	27145
01/08/2013	31/08/2013	49874.880	49874.880	49874.880	81.840	81.840	81.840	0.000	49793.040	46271
01/09/2013	30/09/2013	34919.280	34919.280	34919.280	76.560	76.560	76.560	0.000	34842.720	32378
01/10/2013	31/10/2013	37781.040	37781.040	37781.040	168.960	168.960	168.960	0.000	37612.080	34952
01/11/2013	30/11/2013	24008.160	24008.160	24008.160	274.560	274.560	274.560	0.000	23733.600	22055

⁶ The amount of electricity exports and imports from the period of 29/06/2012 to 30/06/2012 have been confirmed by the grid company.

01/12/2013	31/12/2013	16407.600	16407.600	16407.600	216.480	216.480	216.480	0.000	16191.120	15046
Sub Total		359681.520	359681.520	359681.520	1857.560	1857.560	1857.560	0.000	357823.960	332513
01/01/2014	31/01/2014	11766.480	11766.480	11766.480	295.680	295.680	295.680	0.000	11470.800	10659
01/02/2014	28/02/2014	32714.880	32714.880	32714.880	155.760	155.760	155.760	0.000	32559.120	30256
01/03/2014	31/03/2014	32450.880	32450.880	32450.880	142.560	142.560	142.560	0.000	32308.320	30023
01/04/2014	30/04/2014	33285.120	33285.120	33285.120	87.120	87.120	87.120	0.000	33198.000	30850
01/05/2014	31/05/2014	33530.640	33530.640	33530.640	92.400	92.400	92.400	0.000	33438.240	31073
01/06/2014	30/06/2014	34531.200	34531.200	34531.200	68.640	68.640	68.640	0.000	34462.560	32025
01/07/2014	31/07/2014	30629.280	30629.280	30629.280	66.000	66.000	66.000	0.000	30563.280	28401
01/08/2014	31/08/2014	45027.840	45027.840	45027.840	44.880	44.880	44.880	0.000	44982.960	41801
01/09/2014	30/09/2014	19522.800	19522.800	19522.800	105.600	105.600	105.600	0.000	19417.200	18044
01/10/2014	31/10/2014	12957.120	12957.120	12957.120	124.080	124.080	124.080	0.000	12833.040	11925
01/11/2014	30/11/2014	7579.440	7579.440	7579.440	182.160	182.160	182.160	0.000	7397.280	6874
01/12/2014	31/12/2014	11156.640	11156.640	11156.640	216.480	216.480	216.480	0.000	10940.160	10166
Sub Total		305152.320	305152.320	305152.320	1581.360	1581.360	1581.360	0.000	303570.960	282097
01/01/2015	31/01/2015	16201.680	16201.680	16201.680	216.480	216.480	216.480	0.000	15985.200	14854
01/02/2015	28/02/2015	18949.920	18949.920	18949.920	124.080	124.080	124.080	0.000	18825.840	17494
01/03/2015	31/03/2015	20486.400	20486.400	20486.400	84.480	84.480	84.480	0.000	20401.920	18959
01/04/2015	30/04/2015	25304.400	25304.400	25304.400	55.440	55.440	55.440	0.000	25248.960	23463
01/05/2015	31/05/2015	21056.640	21056.640	21056.640	71.280	71.280	71.280	0.000	20985.360	19501
01/06/2015	30/06/2015	25307.040	25307.040	25307.040	50.160	50.160	50.160	0.000	25256.880	23470
01/07/2015	31/07/2015	14688.960	14688.960	14688.960	58.080	58.080	58.080	0.000	14630.880	13596
01/08/2015	31/08/2015	29338.320	29338.320	29338.320	39.600	39.600	39.600	0.000	29298.720	27226
01/09/2015	30/09/2015	15016.320	15016.320	15016.320	87.120	87.120	87.120	0.000	14929.200	13873
01/10/2015	31/10/2015	15003.499	15003.499	15003.499	95.040	95.040	95.040	0.000	14908.459	13854
01/11/2015	30/11/2015	11816.640	11816.640	11816.640	182.160	182.160	182.160	0.000	11634.480	10811
01/12/2015	31/12/2015	7518.720	7518.720	7518.720	311.460	311.460	311.460	0.000	7207.260	6697
Sub Total		220688.539	220688.539	220688.539	1375.380	1375.380	1375.380	0.000	219313.159	203798
01/01/2016	31/01/2016	19401.360	19401.360	19401.360	211.200	211.200	211.200	0.000	19190.160	17833

01/02/2016	29/02/2016	14741.760	14741.760	14741.760	166.320	166.320	166.320	0.000	14575.440	13544
01/03/2016	31/03/2016	14942.400	14942.400	14942.400	100.320	100.320	100.320	0.000	14842.080	13792
01/04/2016	30/04/2016	22569.360	22569.360	22569.360	60.720	60.720	60.720	0.000	22508.640	20916
01/05/2016	31/05/2016	19887.120	19887.120	19887.120	100.320	100.320	100.320	0.000	19786.800	18387
01/06/2016	30/06/2016	20177.520	20177.520	20177.520	71.280	71.280	71.280	0.000	20106.240	18684
01/07/2016	31/07/2016	17484.720	17484.720	17484.720	71.280	71.280	71.280	0.000	17413.440	16181
01/08/2016	31/08/2016	26545.200	26545.200	26545.200	55.440	55.440	55.440	0.000	26489.760	24616
01/09/2016	30/09/2016	16302.000	16302.000	16302.000	95.040	95.040	95.040	0.000	16206.960	15060
01/10/2016	31/10/2016	14691.600	14691.600	14691.600	116.160	116.160	116.160	0.000	14575.440	13544
01/11/2016	30/11/2016	4535.520	4535.520	4535.520	195.360	195.360	195.360	0.000	4340.160	4033
01/12/2016	31/12/2016	4094.601	4094.601	4094.601	259.350	259.350	259.350	0.000	3835.251	3564
Sub Total		195373.161	195373.161	195373.161	1502.790	1502.790	1502.790	0.000	193870.371	180154
01/01/2017	31/01/2017	7978.344	7978.344	7978.344	316.800	316.800	316.800	0.000	7661.544	7119
01/02/2017	28/02/2017	14379.816	14379.816	14379.816	155.760	155.760	155.760	0.000	14224.056	13218
01/03/2017	31/03/2017	32073.360	32073.360	32073.360	55.440	55.440	55.440	0.000	32017.920	29753
01/04/2017	30/04/2017	20549.760	20549.760	20549.760	66.000	66.000	66.000	0.000	20483.760	19035
01/05/2017	31/05/2017	30877.440	30877.440	30877.440	36.960	36.960	36.960	0.000	30840.480	28659
01/06/2017	30/06/2017	14472.480	14472.480	14472.480	44.880	44.880	44.880	0.000	14427.600	13407
01/07/2017	31/07/2017	20708.160	20708.160	20708.160	66.000	66.000	66.000	0.000	20642.160	19182
01/08/2017	31/08/2017	25935.360	25935.360	25935.360	87.120	87.120	87.120	0.000	25848.240	24020
01/09/2017	30/09/2017	27968.424	27968.424	27968.424	105.600	105.600	105.600	0.000	27862.824	25892
01/10/2017	31/10/2017	26985.816	26985.816	26985.816	116.160	116.160	116.160	0.000	26869.656	24969
01/11/2017	30/11/2017	12595.440	12595.440	12595.440	229.680	229.680	229.680	0.000	12365.760	11491
01/12/2017	31/12/2017	25053.600	25053.600	25053.600	176.880	176.880	176.880	0.000	24876.720	23117
Sub Total		259578.000	259578.000	259578.000	1457.280	1457.280	1457.280	0.000	258120.720	239862
total		1481762.820	1481762.820	1481762.820	8803.970	8803.970	8803.970	0.000	1472958.850	1368760

Thus, the baseline emission during this monitoring period is 1,368,760 tCO₂e.

5.2 Project Emissions

As per the revised CDM PDD and the ACM0002 (version 12.1.0), for wind power plant, the project emission is 0.

5.3 Leakage

According to methodology ACM0002 (version 12.1.0), No leakage emissions should be considered.

5.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2012/06/29-2012/12/31	130,336	0	0	130,336
2013/01/01-2013/12/31	332,513	0	0	332,513
2014/01/01-2014/12/31	282,097	0	0	282,097
2015/01/01-2015/12/31	203,798	0	0	203,798
2016/01/01-2016/12/31	180,154	0	0	180,154
2017/01/01-2017/12/31	239,862	0	0	239,862
Total	1,368,760	0	0	1,368,760

According to the revised CDM PDD, the estimated value of emission reduction during this monitoring period is 428,829 tCO₂e per year. The total estimated value of the emission reduction of this monitoring period is calculated as:

$$\text{Total Estimated ER}_y = \frac{428,829 \text{ tCO}_2\text{e} \times \text{number of monitored days}}{365}$$

In the monitoring period from 29/06/2012 to 31/12/2017 (2012 days, both days included), the estimated emission reduction is 2,363,846 tCO₂e while the actual emission reduction is 1,368,760 tCO₂e.

Table 3. The comparison of emission reductions between the estimated and actual value

Estimated ER _y during Monitoring Period (tCO ₂ e)	Actual ER _y during Monitoring Period (tCO ₂ e)	Difference Percentage (%)
2,363,846	1,368,760	-42.09

The actual emission reduction is 42.09% lower than the estimated emission reduction, which will not caused the over estimation of emission reductions. As per statistic data⁷ which is public available, the difference is because of high wind abandonment rate caused by insufficient electricity demand or insufficient grid receiving capacity in local area.

⁷ http://www.nea.gov.cn/2015-07/27/c_134451678.htm

https://www.sohu.com/a/125584518_472920

http://www.gov.cn/xinwen/2018-02/02/content_5263096.htm