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MONITORING REPORT OF CECIC GANSU YUMEN CHANGMA NO.3 WIND FARM PROJECT

Document Prepared By Goldchina Consultancy International Co., Ltd

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CONTENTS

1 Project Details.....	5
1.1 Summary Description of the Implementation Status of the Project	5
1.2 Sectoral Scope and Project Type	5
1.3 Project Proponent	5
1.4 Other Entities Involved in the Project	6
1.5 Project Start Date	6
1.6 Project Crediting Period	6
1.7 Project Location	6
1.8 Title and Reference of Methodology	6
1.9 Participation under other GHG Programs.....	7
1.10 Other Forms of Credit	7
1.11 Sustainable Development.....	7
2 Safeguards.....	8
2.1 No Net Harm	8
2.2 Local Stakeholder Consultation	9
3 Implementation Status.....	14
3.1 Implementation Status of the Project Activity	14
3.2 Grouped Projects	16
4 Data and Parameters	16
4.1 Data and Parameters Available at Validation	16
4.2 Data and Parameters Monitored.....	17
4.3 Monitoring Plan.....	17

4.4 Baseline Emissions	23
4.5 Project Emissions	27
4.6 Leakage	27
4.7 Net GHG Emission Reductions and Removals.....	27

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

CECIC Gansu Yumen Changma No.3 Wind Farm Project (hereinafter referred as "the Project") is located in Yumen Town, Yumen City, Gansu Province, the People's Republic of China. The purpose of the Project is to generate electricity using wind power resources in the project region and to deliver to the Northwest China Power Grid (NWPG) which is predominated by connected fossil fuel fired power plants, especially coal fired plants. So the Project can reduce GHG emissions by replacing the electricity generated by fossil fuel fired power plants in NWPG. The project has been registered as a CDM project on 28/04/2011.

The Project involves the installation of 134 wind turbines with 1.5MW capacity per unit, with a total installed capacity of 201 MW. Totally 463,714 MWh of clean electricity generated by the Project are expected to be delivered to the NWPG annually.

The Project started construction on 19/09/2009. The first wind turbine of the Project commissioning started on 28/01/2011. The Project started fully commissioning on 23/10/2012.

During the monitoring period (from 01/07/2018 to 31/12/2019), the monitoring activities were conducted strictly in accordance with the monitoring plan in the registered PDD. The project has operated without any accidental or emergency events that might impact the accuracy and/or implementation of monitoring activities. The net feed-in electricity during this period is 576,120.810MWh, and the emission reduction achieved by the project in this monitoring period is 528,878tCO₂e. The emission reductions in the monitoring period will be verified and issued under VCS rules.

1.2 Sectoral Scope and Project Type

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

1.3 Project Proponent

Organization name	CECIC Wind-power (Gansu) Co., Ltd.
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Title	CDM office manager
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1.4 Other Entities Involved in the Project

Organization name	Goldchina Consultancy International Co., Ltd.
Role in the Project	The buyer
Contact person	Dr, Zheng Zhaoning
Title	Technical director
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1.5 Project Start Date

28/01/2011. (It is the date when the first turbine was commissioned.).

1.6 Project Crediting Period

The Project crediting period is from 28/01/2011 to 27/01/2021.

1.7 Project Location

The Project site is located 18-31 km southwest of Yumen Town, Yumen City, Gansu Province in the People's Republic of China. It is located at Latitude from N 40°05'39" to N 40°09'52" and Longitude from E 96°46'22" to E 96°51'57". The altitude of the Project site ranges from between 1690 m to 1825 m above the sea level.

1.8 Title and Reference of Methodology

Title: Approved consolidated baseline and monitoring methodology ACM0002: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 12.1.0) is applied by the Project, and

The methodology also refers to the latest approved versions of the following tools:

Tool for the demonstration and assessment of additionality (version 05.2),
Tool to calculate the emission factor for an electricity system (version 02.1).

1.9 Participation under other GHG Programs

The Project has been registered as a CDM project with registration number 4734.

The project has been registered as a VCS project with registration number 728

1.10 Other Forms of Credit

Emission Trading Programs and Other Binding Limits:

The project proponent confirmed that, once emission reductions generate from 01/01/2016 to 30/06/2018 will be claimed as VCUs under VCS rules And issued VCUs will be sold only once to one particular buyer.

Once the project proponent are included in an emissions trading program or any other mechanism that includes GHG allowance trading, the VCU issuance under VCS rules will be stop immediately since the date of included in an emissions trading program or any other mechanism that includes GHG allowance trading.

Other Forms of Environmental Credit:

The Project is a renewable energy generation project, no GHG emission generated during operation period. Thus, the project doesn't fall into categories that creating GHG emissions primarily for the purpose of its subsequent removal or destruction.

The Project has not created another form of environmental credit, which will be verified by DOE. And The Project will not create other environmental credit in the future.

1.11 Sustainable Development

The Project is expected to produce various benefits to society as well as the environment. Therefore, the Project will significantly contribute to national as well as local sustainable development, including;

Job creation: Implementation of the Project will generate employment opportunities for local contractors and suppliers, while operation and maintenance of the plant will create additional long-term employment opportunities for skilled professionals. For the Project operation PP is planning to employ a number of skilled workers, while more additional jobs were created by sub-contractors for construction of the Project.

Reduction in GHG emissions: Currently, most of the electricity in the region is generated through conventional fossil fuel based thermal power plants, according to the China Electricity Power Yearbook 2009. Through combustion of fossil fuels, they emit a large volume of Greenhouse gasses (GHG) into the atmosphere, which has a negative effect on global society. Generation of GHG emission free electricity, such as wind, will displace electricity generated by these fossil fuel based thermal plants, therefore reducing GHG emissions.

Reduction of fossil fuel use: The Project Activity will reduce reliance on imported fossil fuels, which will contribute to increasing China's energy security, and will also improve local air quality as it reduces the emissions of SO₂ and NO_x associated with fossil fuel use.

Increase of power supply: Due to rapid economic growth in recent years, China is experiencing a serious shortage of electricity, causing blackouts and brownouts throughout the country¹. Such power outage reduces economical activity, and has a negative effect on daily life. With the new wind farm, the grid is expected to improve its supply while contributing to steady and reliable economical growth in the region. .

2 SAFEGUARDS

2.1 No Net Harm

In line with the requirements of local government, an Environmental Impact Assessment (EIA) for the proposed wind farm project was carried out. The EIA was completed by Lanzhou University and has been approved by the Environmental Protection Bureau of Gansu Province, indicating that the Project meets all national environmental protection regulations. The analysis and measures to be taken to mitigate the impacts are demonstrated in the following:

Impact on Air Quality

The air pollution during construction mainly comes from flying dust produced by excavating land as well as some exhaust discharge from transportation vehicles and construction machinery. To minimize effects from such activities, PP will take appropriate measures, such as watering the site regularly. In addition, since the project site is far away from the nearest local residential area (over 5Km), there is no impact on local residents from dust and air pollution. The main impact is on the construction staff and appropriate measures such as watering and converting will be taken to reduce any negative impact and ensure staff safety.

Noise Pollution

The noise mainly comes from the drilling machines and cement mixers during the construction period, and aerodynamic interaction between the wind and turbine blades during operation. Although the operating level of these turbines is around 100dB, at a range of 150 meters from the turbines the noise weakens to 33dB, which is below the national standard of 45dB. However, as the Project is far away from any residential area (5km), effects on the surrounding environment of noise pollution are not significant.

Impact of Solid Waste:

Solid waste mainly comes from construction and living waste. During the construction period, construction waste will be properly disposed to avoid water and soil erosion problems. The Project will generate living wastes of 150 kg per day during construction. This waste will be properly collected and delivered to the local county for disposal.

Impact on Waste Water:

The waste water generated during the construction includes washing water from machines and wastewater from the project office. Since the project site is located in the Gobi desert area, the waste water will be reused on the construction site or as fertilizer. During operation, the waste water and sewage will be treated by using a septic tank and all-in-one biochemical process equipment to recycle and reuse water on the project site. The treated waste water will be used for on-site greening and road spreading. The treated waste water quality will meet the requirement of the Fields Irrigation Water Standard (GB 5084-1992), therefore, it has no negative impact on the surrounding environment.

Impact on Ecosystem:

The Project is located in the Gobi desert area with sparse vegetation. Through minimizing the construction area, backfilling the gravel, properly disposing of solid waste during construction, and growing drought-resistant, sand-fixing, and fast growing plants after construction, the impact on the ecological environment will be reduced.

2.2 Local Stakeholder Consultation

1. Brief description how comments by local stakeholders have been invited and compiled:

The local stakeholder's meeting was held in Yumen City on 18/06/2008. 45 participants attended the meeting including local residents, builders and members of the local authorities. The project owner introduced the Project, and then a survey was arranged through a one-page questionnaire, which was designed to be easily filled in. The opinions expressed by the stakeholders were recorded and are available on request. The survey includes the following sections:

(i) Project introduction;

(ii) Respondents' basic information and education level;

(iii) Questions;

Do you consider your current living, studying and working environment to be quiet?

Do you think that the project will have an impact on the environment, such as air quality, noise, water, etc.?

Will the project construction have a negative impact on the living, studying and working environment of you and your family?

Do you think the project implementation will have some positive impact on your life?

During the project construction which of the following problems concerns you most: noise, air pollution, equipment safety, wastewater discharge, electromagnetic interference, landscape destruction?

Do you agree with the development and construction of the project?

Do you have any suggestion regarding the kind of measures which should be applied during the project construction and operation in order to protect the environment?

Do you have any suggestions/advice for the developer of the Project?

(iv) Space for the date of stakeholder meeting.

2. Summary of the comments received:

Stakeholder Meeting

Every stakeholder expressed their comments in favour of the Project. To date, no negative comments have been received. The summary of stakeholder meeting's comments is as following:

- Promote the local economic development

The local government strongly supports the development and construction of the proposed Project. It will increase local financial income and promote technological progress of local building materials, tower tube manufacturing, and other related industries. This project will provide clean energy ("green energy") to the Northwest grid, and promote the sustainable development of the local economy.

- Local environment protection

According to the project EIA report, the noise level of the installed turbines is within below the national standard. The proposed Project site is located in the Gobi desert, the underdeveloped region. Moreover, there are no residents or industrial firms near the project site. Furthermore, there are no issues related to noise and communications signal interference, or to bird migration. The project will play an exemplary role on energy saving, pollution reduction and the environment protection.

- Improve the living condition of local residents

The project site is located in Gobi desert and there are no residents around the project site, so the local residents will not be impacted by the noise from the construction and operation of the project. The proposed project will create new employment opportunities through the project construction and operation. For the construction, the PP is planning to employ a number of skilled workers for the operation, while creating more jobs by sub-contractors for construction work. The project will also purchase the raw materials for construction and other supplies from the local market. Therefore, the local people will benefit from the Project.

Questionnaire Survey

The survey had a 100% response rate with all questionnaires returned. The key findings of the survey and the summary of the consultation are as following:

- 86.67% of respondents agree with the development and construction of the project.
- 86.67% of the respondents believe that the Project will have no negative impact on their living, studying and working environments.
- 71.11% of the respondents believe that the project implementation will have a positive impact on their lives.

The stakeholder meeting and the survey showed that the Project receives strong support from the local community. The result and comments received in the survey is shown below. They all believe the Project will promote local economic development and agree with the project development and construction.

Table E.2-1: Survey result

Questions	Answer	Number	Ratio
1. Is your current living, working and study environment quiet?	Quiet	38	84.44%
	Not Quiet	2	4.44%
	Not sure	4	8.89%
	No answer	1	2.22%
2. Do you think the project will affect the surrounding environment (air, noise and water)?	Yes	8	17.78%
	No	31	68.89%
	Not sure	5	11.11%
	No answer	1	2.22%
3. Will the project construction have a negative impact on the living, studying and working environment of you and your family?	Yes	2	4.44%
	No	39	86.67%
	Not sure	2	4.44%
	No answer	2	4.44%
4. Do you think the project implementation will have some positive impact on your life?	Yes	32	71.11%
	No	6	13.33%
	Not sure	6	13.33%
	No answer	1	2.22%
5. What do you concern the most during the project construction and operation?*	Noise	10	17.86%
	Air pollution	10	17.86%
	Equipment safety	16	28.57%
	Wastewater discharge	9	16.07%
	Electromagnetic	9	16.07%
	Landscape destruction	2	3.57%
6. Do you agree with development of this project?	Agree	39	86.67%
	Not agree	0	0.00%
	No sure	1	2.22%
	No answer	5	11.11%

(*For the question 5, multiple answers per survey was allowed)

3. Report on how due account was taken of any comments received:

Although there was no negative comment directly opposing the Project implementation, there were several concerns and suggestions raised by stakeholders, especially on possible effects on the environment. However, for these concerns, PP has already taken necessary measures to minimize such effects, as shown in the below table.

Issues	Preventative actions taken by CECIC
Equipment safety	Wind turbine and hub are the key equipment used for the Project. The Project will install efficient and highly reliable turbines manufactured by Dongfang Steam Turbine Manufacture.
Electromagnetic	Radiation of electromagnetism arising from generators, transformer substations and transmission lines is considered insignificant in terms of intensity, and is unlikely to have a negative impact on residents' health because of the long distance between the project site and the nearest residential area. The project has 134 units of 35kv medium-pressure transformer substation which are each covered in a metal cabinet and electromagnetic radiation is kept low.
Air pollution	Air pollution during construction mainly comes from flying dust produced by excavating land as well as some exhaust discharge from transportation vehicles and construction machinery. To minimize effects from such activities, the PP will take appropriate measures, such as watering the site regularly. In addition, since the project site is far away from the nearest local residential area (over 5Km), there is no impact on local residents from dust and air pollution. The main impact is on the construction staff and appropriate measures such as watering and covering will be taken to reduce any negative impact and ensure staff safety.
Noise	The noise mainly comes from the drilling machines and cement mixers during the construction period, and aerodynamic interaction between the wind and turbine blades during operation. Although the operating level of these turbines is around 100dB, at a range of 150 meters from the turbines the noise weakens to 33dB, which is below the national standard of 45dB. However, as the Project is far away from any residential area (5km), effects on the surrounding environment of noise pollution are not significant.

Waste water	The waste water generated during the construction includes washing water from machines and wastewater from the project office. Since the project site is located in the Gobi desert area, the waste water will be reused on the construction site or as fertilizer. During operation, the waste water and sewage will be treated by using a septic tank and all-in-one biochemical process equipment to recycle and reuse water on the project site. The treated waste water will be used for on-site greening and road spreading. The treated waste water quality will meet the requirement of the Fields Irrigation Water Standard (GB 5084-1992), therefore it has no negative impact on the surrounding environment.
Solid Waste	Solid waste mainly comes from construction and living waste. During the construction period, construction waste will be disposed of properly to avoid water and soil erosion problems. The Project will generate living waste of 150 kg per day during construction. This waste will be properly collected and delivered to the local county for disposal.
Landscape destruction	The Project is located in the Gobi desert area with sparse vegetation. The Project construction could exacerbate the soil erosion and blown sand hazards. Through minimizing the construction area, backfilling the gravel, properly disposing of solid waste during construction, and growing drought-resistant, sand-fixing, and fast growing plants after construction, the impact on the ecological environment will be reduced. Furthermore, there is no farmland or residential area near the Project site, therefore, damage to such farmland or residential areas are considered minimum.
Protection from heavy vehicles on Gobi desert, road, city and residential area	Since the Project is located in the Gobi desert, damage caused by heavy vehicles at the Project site is considered minimum. In addition, CECIC will plant fast-growing plants upon completion of the Project, which will restore any damage caused by the Project. In addition, heavy vehicles used for construction would not cause excess wear and tears to the road, and will avoid driving in the city or close to residential areas to minimize any impact.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The Project started construction on 19/09/2009. The first wind turbine of the Project started commissioning on 28/01/2011. The electricity generated by the Project is delivered to NWPG,

according to the signed power purchase agreement (PPA) with Gansu Electric Power Grid Co.

During this monitoring period, the Project is operated and implemented smoothly. There is no emergencies happened to the monitoring system in this monitoring period, or events or situations occurred during the monitoring period, which may impact the applicability of the methodology.

Total 134 sets of wind power turbine and generators with 1.5MW unit capacity each, are installed in the Project, forming 201MW of total capacity. These wind turbines are manufactured by China's Dongfang Steam Turbine Co., Ltd and the model type of these wind turbines is FD82A-1500/11. The main technology parameter of this type of wind power turbine can be found at Table1, which is in line with the specification made in the PDD.

Major technical parameters of the key equipments employed by the project are illustrated in the following table 1.

Item	FD82A/1500
1. Data for Unit	
Rated capacity (kW)	1500
Number of unit	134
Capacity control method	Adjusting the pitch of blade and wind wheel speed control
Turbine diameter (m)	82
Hub height (m)	70
Cut in wind speed (m/s)	3.0
Rated wind speed (m/s)	11
Cut out wind speed (m/s)	20.0
Wind speed limit (m/s)	52.5
Operating temperature (°C)	-20~+40
The wind direction	Upwind
Technical lifetime (y)	20
2. Blade	
Number of blades	3
Material of blade	GRP
End profiles of blades speed (m/s)	74.3
3. Generator	
Type of generator	Double-fed slip ring asynchronous generator
Rated capacity (kW)	1500
Output Voltage (V)	690
Rated speed (rpm)	1000~1800 ±10%
4. Machinery space & Tower	
Machinery space (t) (exclude blade)	61
blade	3×6.2
Type of tower	Conical steel tube
High of tower (m)	70
Weight of tower (t)	127.66

- The electricity generated by the Project is exported to the local Yumen town grid via a newly built 35kV/330kV transformer station, which is then exported to the NWPG.

.Deviations

2.2.1 Methodology Deviations

There is no deviation applied to this monitoring period

2.2.2 Project Description Deviations

There is no deviation applied to this monitoring period.

3.2 Grouped Projects

The Project is not a grouped project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

The specific parameter information is shown in B.6.2. Data and parameters that are available at validation of the registered PDD, These parameters are used to calculate $EF_{grid,CM,y}$.

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO ₂ e/MWh
Description	Baseline emission factor: the combined emission factor of the project grid system.
Source of data	The registered PDD
Value applied	0.9180
Justification of choice of data or description of measurement methods and procedures applied	<i>Fixed before registration</i>
Purpose of Data	Calculation of baseline emissions
Comments	The emission factor of the Project was ex-ante determined and is fixed during the first crediting period. All data and parameters had been determined at registration.

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{facility,y}$
Data unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Source of data	Meter reading and ETNs
Description of measurement methods and procedures to be applied	Measured
Frequency of monitoring/recording	Measuring continuously/Reading monthly/Recording monthly
Value monitored	576,120.810
Monitoring equipment	Meter (Meter information and calibration see page 19)
QA/QC procedures to be applied	Monthly power exported and imported to the NWPG are cross-checked against the sales receipts. Based on the standard of DL/T448-2016, the calibrations are done by a qualified organization at least once per year for the monitoring meters.
Purpose of the data	Calculation of baseline emissions
Calculation method	N/A
Comments	-

4.3 Monitoring Plan

The implementation of monitoring system and Management organization for the Project are fully consistent with the description in the revised Monitoring Plan which was approved by EB on 23/10/2012.

1. Data collection and management

The electricity generated by the Project feeds to the Changma west 35kV/330kV substation through ten 35kV transmission lines, then to NWPG after 35kV/330kV transformer. The Quantity of net electricity generation supplied by the project plant/unit to the grid ($EG_{facility,y}$) is continuous monitored through ten bi-directional meters installed at the 35kV side of 35kV/330kV transformer. All of the meters can record the electricity exported to the grid by the Project and the electricity imported from the grid by the Project. The electricity exported to the grid by the Project is the sum of values measured by the ten meters for exported electricity. Meanwhile, electricity imported from the grid by the Project is the sum of values measured by the ten meters for imported electricity. The electricity output and input of other

current and any future projects which share the same Gateway Meter with the Project, can be measured directly by their own meters. The Gateway Meter can obtain the total electricity output and input by these projects. The cut off time is the 00:00 of the penultimate day of each month. Designated personnel of the grid company read and record the readings monthly, then inform the reading to the project company for confirmation. Meanwhile, the staff of the Project company reads and records the meters readings through telecommunication system, too.

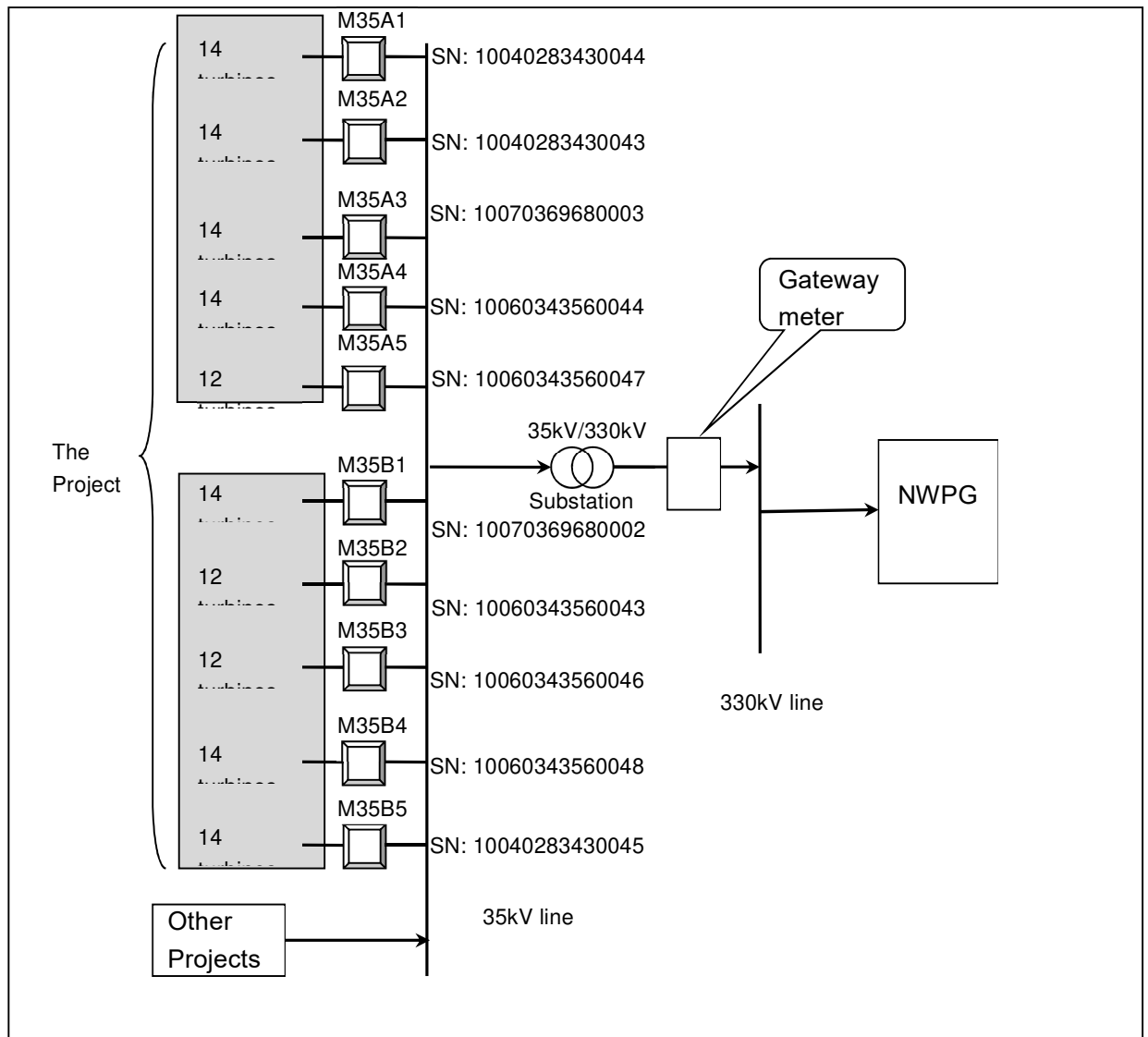
Based on the readings of the meters at the 35kV side of the 35kV/330kV transformer, the gateway meter at the 330kV side of the 35kV/330kV transformer, consider of the transmission and line loss, the electricity exported to the grid by the Project and the electricity imported from the grid by the Project are calculated by the grid company according to the approach defined in the PPA. After both sides confirming, the Electricity Transaction Notes (ETNs), which serves as sales receipts, for the electricity exported to the grid by the Project and the electricity imported from the grid by the Project are issued separately by the grid company in the end of each month. The CDM manager of the Project wind farm counter-checked the reported data against with ETNs before archived. The most conservative values have been selected for the ERs calculation. The electricity imported from the grid by the Project has been deducted from the electricity exported to the grid by the Project to get the quantity of the net electricity supplied to the grid by the Project.

All data collected as part of monitoring is archived electronically and is kept until 2 years after the end of the total crediting period of the Project.

2. Meters Distribution

More details for the distribution of metering equipments installation and monitoring points can be found at following figure1.

Figure1. The distribution of meters installation



3. Meters Calibrations

The metering equipments are calibrated and checked at least annually in accordance with related regulations and rules. Calibration is carried out by authorized and qualified calibration entity. The calibration record of the electricity measure-related meters can be found at Table2.

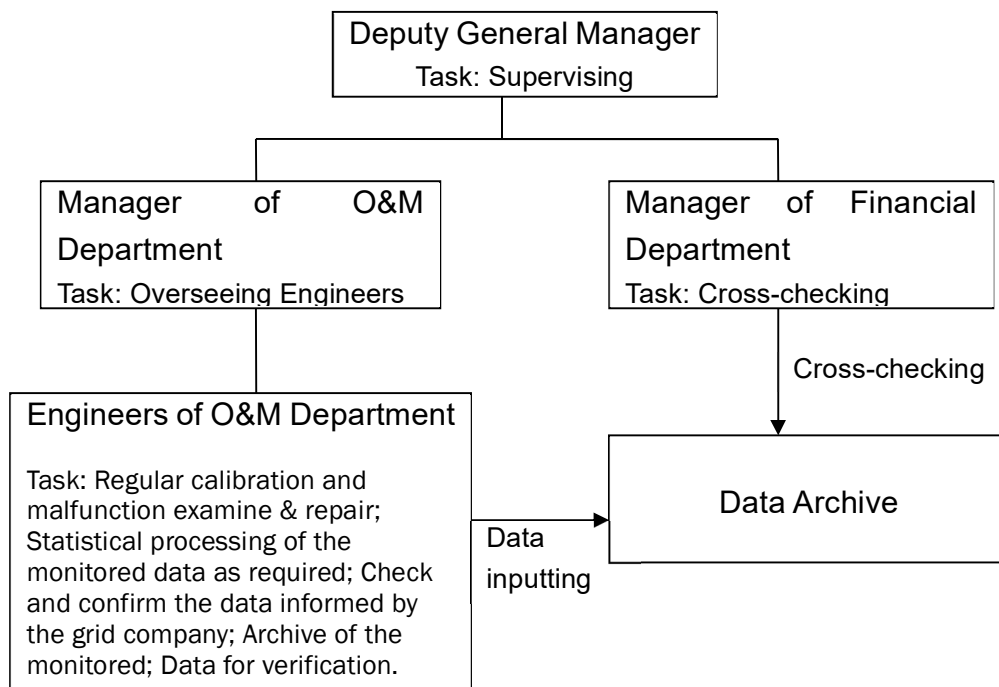
Table2. Calibration record of the meters

No.	Type	SN	Accuracy class	Required Calibration frequency	Calibration date	Calibration due on	Calibrated by
M35A1	Electric meter	1004028343004 4	0.5s	Annually	20/02/2018 15/02/2019	19/02/2019 14/02/2020	Metrological Centre of Jiayuguan Power Supply Corporation
M35A2	Electric meter	1004028343004 3	0.5s	Annually	20/02/2018 15/02/2019	19/02/2019 14/02/2020	Metrological Centre of Jiayuguan Power Supply Corporation
M35A3	Electric meter	1007036968000 3	0.5s	Annually	20/02/2018 15/02/2019	19/02/2019 14/02/2020	Metrological Centre of Jiayuguan Power Supply Corporation
M35A4	Electric meter	1006034356004 4	0.5s	Annually	20/02/2018 15/02/2019	19/02/2019 14/02/2020	Metrological Centre of Jiayuguan Power Supply Corporation
M35A5	Electric meter	1006034356004 7	0.5s	Annually	20/02/2018 15/02/2019	19/02/2019 14/02/2020	Metrological Centre of Jiayuguan Power Supply Corporation
M35B1	Electric meter	1007036968000 2	0.5s	Annually	20/02/2018 15/02/2019	19/02/2019 14/02/2020	Metrological Centre of Jiayuguan Power Supply Corporation
M35B2	Electric meter	1006034356004 3	0.5s	Annually	20/02/2018 15/02/2019	19/02/2019 14/02/2020	Metrological Centre of Jiayuguan Power Supply Corporation
M35B3	Electric meter	1006034356004 6	0.5s	Annually	20/02/2018 15/02/2019	19/02/2019 14/02/2020	Metrological Centre of Jiayuguan Power Supply Corporation
M35B4	Electric meter	1006034356004 8	0.5s	Annually	20/02/2018 15/02/2019	19/02/2019 14/02/2020	Metrological Centre of Jiayuguan Power Supply Corporation

M35B5	Electric meter	1004028343004 5	0.5s	Annually	20/02/2018 15/02/2019	19/02/2019 14/02/2020	Metrological Centre of Jiayuguan Power Supply Corporation
Gateway meter (Main meter)	Electric meter	57033315	0.2s	Annually	28/09/2017 25/09/2018 22/09/2019	27/09/2018 24/09/2019 21/09/2020	Electric Energy Measurement Centre of Gansu Electric Power Corporation
Gateway meter (Backup meter)	Electric meter	57033312	0.2s	Annually	28/09/2017 25/09/2018 22/09/2019	27/09/2018 24/09/2019 21/09/2020	Electric Energy Measurement Centre of Gansu Electric Power Corporation

4. Organizational structure and responsibilities

The Project owner (CECIC Wind-power (Gansu) Co., Ltd.) established a CDM Project Management Office (PMO). The organization structure of PMO is illustrated as follows:



5. Emergency Procedures

When reading error of any meter exceeds the allowable range or any inconsistency occurs, the meter should be repaired and followed by calibration by a third party in accordance with the standard, within 10 days. The grid company shall inform the project company before the calibration and all the record should be kept by the project company.

When any meter detects the error beyond the allowable range or inconsistency, the grid company shall repair the meter, recalibrate, or replace, while giving the project company sufficient notice to allow their representative to attend during any corrective activities. When it happens, the electricity will be calculated and estimated by the project company and the grid company using a reasonable and conservative method, based on the reading of gateway meter and other projects meters, and historical generation data. Also, the project owner should provide the evidence to testify whether the method is reasonable and conservative.

The Project is operated and implemented smoothly during this monitoring period. There have been no emergencies happened to the monitoring system, also no events or situations occurred during the monitoring period.

4.4 Baseline Emissions

According to ACM0002 and the registered PDD of the Project, the baseline emission BE_y during the monitoring period results from:

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

The Project is the installation of a new grid-connected renewable power plant at a site where no renewable power plant was operated prior to the implementation of the Project. So:

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

Accordingly,

$$\begin{aligned} BE_y &= EG_{PJ,y} \times EF_{grid,CM,y} \\ &= EG_{facility,y} \times EF_{grid,CM,y} \end{aligned}$$

Where:

BE_y is the baseline emissions in year y (tCO_2/yr);

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

$EF_{grid,CM,y}$ is the combined margin baseline emission factor of the NWPG;

$EG_{facility,y}$ is the quantity of net electricity generation supplied by the Project plant/unit to the grid in year y (MWh/yr)..

The monthly electricity data is listed in following table3:

Period	Electricity exported to the grid by the Project			Electricity imported from the grid by the Project			EG _{facility,y}
	data from meter readings	data from the sales receipts	data used to calculate the ER	data from meter readings	data from the sales receipts	data used to calculate the ER	
	A	B*	C=MIN(A,B)	D	E**	F=MAX(D,E)	G=C-F
01/07/2018-31/07/2018	32,875.500	28,773.540	28,773.540	60.900	60.000	60.900	28,712.640
01/08/2018-31/08/2018	39,039.000	41,907.180	39,039.000	54.600	52.800	54.600	38,984.400
01/09/2018-30/09/2018	29,710.800	27,996.690	27,996.690	58.800	26.400	58.800	27,937.890
01/10/2018-31/10/2018	34,458.900	35,600.535	34,458.900	42.000	26.400	42.000	34,416.900
01/11/2018-30/11/2018	29,685.600	27,663.630	27,663.630	71.400	52.800	71.400	27,592.230
01/12/2018-31/12/2018	40,252.800	42,170.745	40,252.800	81.900	79.200	81.900	40,170.900
2018 total	206,022.600	204,112.320	198,184.560	413.700	297.600	413.700	197,770.860
01/01/2019-31/01/2019	23,807.700	20,556.240	20,556.240	161.700	79.200	161.700	20,394.540
01/02/2019-29/02/2019	30,639.000	31,174.380	30,639.000	79.800	132.000	132.000	30,507.000

01/03/2019-31/03/2019	36,201.900	34,550.430	34,550.430	52.500	52.800	52.800	34,497.630
01/04/2019-30/04/2019	35,326.200	35,513.160	35,326.200	35.700	26.400	35.700	35,290.500
01/05/2019-31/05/2019	40,962.600	40,949.100	40,949.100	54.600	26.400	54.600	40,894.500
01/06/2019-30/06/2019	32,249.700	34,276.320	32,249.700	58.800	26.400	58.800	32,190.900
01/07/2019-31/07/2019	30,622.200	29,114.910	29,114.910	48.300	26.400	48.300	29,066.610
01/08/2019-31/08/2019	32,592.000	34,022.310	32,592.000	50.400	26.400	50.400	32,541.600
01/09/2019-30/09/2019	20,727.000	19,473.690	19,473.690	46.200	26.400	46.200	19,427.490
01/10/2019-31/10/2019	40,534.200	41,111.280	40,534.200	42.000	26.400	42.000	40,492.200
01/11/2019-30/11/2019	27,680.100	26,873.070	26,873.070	84.000	52.800	84.000	26,789.070
01/12/2019-31/12/2019	36,714.300	36,373.410	36,373.410	73.500	26.400	73.500	36,299.910
2019 total	388,056.900	383,988.300	379,231.950	829.500	528.000	882.000	378,349.950
Total	594,079.500	588,100.620	577,416.510	1,243.200	825.600	1,295.700	576,120.810

The baseline emission during this monitoring period calculated as following:

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

Table4. Baseline emissions

Period	EG _{facility,y} (MWh)	EF _{grid,CM,y} (tCO ₂ e/MWh)	BE _y (tCO ₂ e)
01/07/2018-31/12/2018	197770.860	0.9180	181,553
01/01/2019-31/12/2019	378349.950	0.9180	347,325
01/01/2016-31/12/2019	576,120.810	0.9180	528,878

4.5 Project Emissions

Project emission (PE_y) is 0 tCO₂e as per the approved revised PDD.

4.6 Leakage

Leakage is 0 tCO₂e as per the registered PDD.

4.7 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)
01/07/2018-31/12/2018	181,553	0	0	181,553
01/01/2019-31/12/2019	347,325	0	0	347,325
Total	528,878	0	0	528,878

The estimated annual emission reductions are 425,689tCO₂e as per registered PDD. The monitoring period covers 549days, 425,689*549/365=640,283tCO₂e, and the emission reduction achieved by the project in this monitoring period is 528,878tCO₂e, so the emission reductions during current monitoring period are lower than estimate in the registered PDD.