



**Verified Carbon
Standard**

CECIC HKC GANSU CHANGMA WIND POWER PROJECT

Document Prepared by Demeter Venture UK Limited

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CONTENTS

1	PROJECT DETAILS.....	3
1.1	Summary Description of the Implementation Status of the Project	3
1.2	Sectoral Scope and Project Type	3
1.3	Project Proponent	3
1.4	Other Entities Involved in the Project	4
1.5	Project Start Date	4
1.6	Project Crediting Period	4
1.7	Project Location	5
1.8	Title and Reference of Methodology	6
1.9	Participation under other GHG Programs.....	6
1.10	Other Forms of Credit.....	6
1.11	Sustainable Development.....	6
2	SAFEGUARDS	7
2.1	No Net Harm	7
2.2	Local Stakeholder Consultation	9
2.3	AFOLU-Specific Safeguards	17
3	IMPLEMENTATION STATUS	17
3.1	Implementation Status of the Project Activity	17
3.2	Deviations	19
3.3	Grouped Projects	19
4	DATA AND PARAMETERS.....	20
4.1	Data and Parameters Available at Validation	20
4.2	Data and Parameters Monitored.....	22
4.3	Monitoring Plan.....	23
5	QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS	26
5.1	Baseline Emissions	26
5.2	Project Emissions	27
5.3	Leakage.....	27
5.4	Net GHG Emission Reductions and Removals.....	27
	APPENDIX I: < MONTHLY AND YEARLY ELECTRICITY>	29

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

CECIC HKC Gansu Changma Wind Power project (hereinafter referred as “the Project”) is located in Yumen Town, Yumen City, Gansu Province, 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 involves the installation of 134 wind turbines with 1.5MW capacity per unit, with a total installed capacity of 201MW, and is expected to generate 431,949 MWh of clean electricity, annually. This generated electricity will partially displace electricity currently generated from grid connected conventional fossil fuel based thermal power plants, while reducing emissions of 430,588 tCO₂ annually.

The Project has been registered as a VCS project (No. 717).

The Project started construction on 16/06/2008. The first wind turbine of the Project started commissioning on 21/11/2009. The Project was put into full operation on 15/02/2011. This monitoring period is from 29/09/2019 to 31/12/2020, which is included in two crediting periods. The first crediting period is from 21/11/2009 to 20/11/2019, and the second crediting period is from 21/11/2019 to 20/11/2029. Therefore, this monitoring period is divided into two parts. Part 1 of this monitoring period (hereinafter referred as “the P1”) is from 29/09/2019 to 20/11/2019, and Part 2 of this monitoring period (hereinafter referred as “the P2”) is from 21/11/2019 to 31/12/2020. The emission reductions in P1 is 68,278 tCO₂, the emission reductions in P2 is 410,459 tCO₂. Hence, the emission reductions in this monitoring period is 478,737 tCO₂.

1.2 Sectoral Scope and Project Type

This category would fall within sectoral scope 1: energy industries (renewable - / non- renewable sources).

Project type: wind power project.

This project is not a grouped project.

1.3 Project Proponent

Organization name	CECIC HKC Gansu Wind Power Co., LTD.
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Title	Project manager
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1.4 Other Entities Involved in the Project

Organization name	Demeter Venture UK Limited
Role in the Project	Project participant
Contact person	Susan Lu
Title	Manager
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1.5 Project Start Date

21/11/2009. (It is the date when the first turbine was commissioned, which is also the first date that generates GHG emission reductions.)

1.6 Project Crediting Period

The first crediting period under VCS is from 21/11/2009 to 20/11/2019 (10years, renewable). Therefore, the total crediting period under VCS would have been from 21/11/2009 to 20/11/2039 (30 years). However, the project was registered under CDM on 24/09/2011. And the total crediting period under CDM is from 24/09/2011 to 23/09/2032 (21years).

According to VCS standard, the total crediting period under VCS is from 21/11/2009 to 23/09/2032.

1.7 Project Location

The Project is located 7-10 km southwest of Yumen Town, Yumen City, Gansu Province in the People's Republic of China. It is located at Latitude between 40.1417°N and 40.2572°N , Longitude between 96.8583°E and 96.9575°E . The location of the project is provided in Fig. 1.

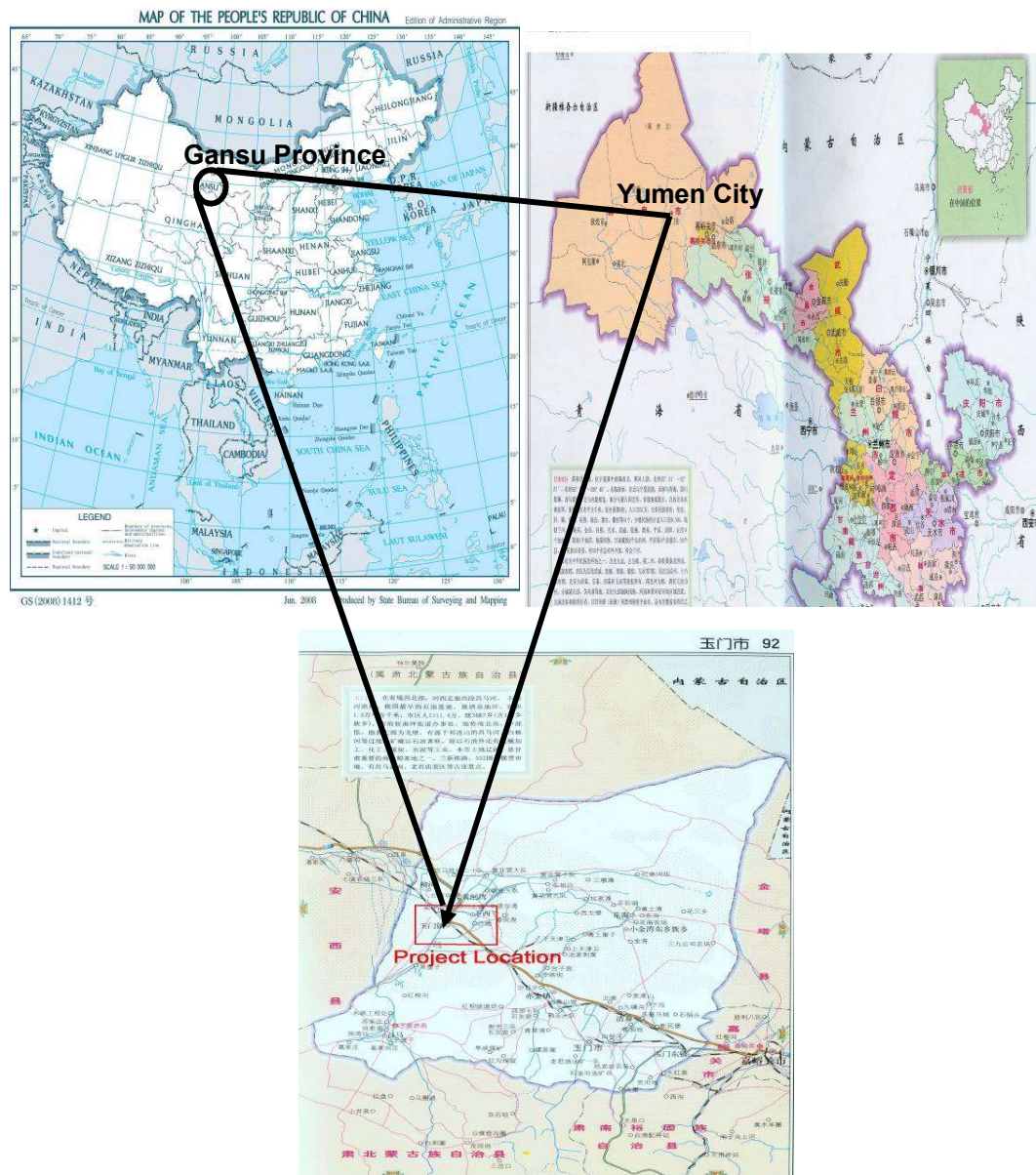


Figure 1. The location of the Project

1.8 Title and Reference of Methodology

For P1, the Project applies the approved consolidated baseline and monitoring methodology ACM0002 “Consolidated methodology for grid-connected electricity generation from renewable sources.” (Version 10).

The methodology also refers to the following tools:

Tool to calculate the emission factor for an electricity system (Version 02);

Tool for the demonstration and assessment of additionality (Version 5.2).

For P2, the Project applies the approved consolidated baseline and monitoring methodology ACM0002 “Grid-connected electricity generation from renewable sources.” (Version 20.0).

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 07.0.0).

1.9 Participation under other GHG Programs

The Project has been registered as a CDM project on 24/09/2011 with registration number of 3670. It has been issued five times under CDM mechanism, covering monitoring period from 24/09/2011 to 31/12/2015.

The credits in this monitoring period (29/09/2019- 31/12/2020) has not been counted and will not be counted under other kind of GHG programs.

1.10 Other Forms of Credit

The Project has been registered as a CDM project on 24/09/2011 with registration number of 3670. It has been issued five times under CDM mechanism, covering monitoring period from 24/09/2011 to 31/12/2015.

The Project has not created another form of environmental credit, and the Project will not create other environmental credit in the future.

1.11 Sustainable Development

The Project will 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 generated employment opportunities for local contractors and suppliers, while operation and maintenance of the plant creates additional long term employment opportunities for skilled professionals within CECIC. For the Project,

CECIC directly hired 27 new employees, while 300 more new employment opportunities were created for local people through construction companies for the Project.

Reduction in GHG emissions: Currently, most of the electricity in the region is generated through conventional fossil fuel based thermal power plants. 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, displaces electricity generated by these fossil fuel based thermal plants, therefore reducing GHG emissions.

Reduction of fossil fuel use: the Project activity reduces reliance on imported fossil fuels, contributes to increasing China's energy security, and also improves 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 country. Such power outage reduces economical activity, and has a negative effect on daily life. With the new wind farm, the grid improves its supply while contributing to steady and reliable economical growth in the region.

In addition, the Project helps the Chinese government to achieve the goal it set itself under the Renewable Energy Law. The Law states that the country is committed to increase the share of renewable energy use in the country's energy mix to 10% by 2010 and 30% by 2030, in order to realize the sustainable development of the economy and society. It is also consistent with the government's National Renewable Energy Development Strategy and Plan (NREDSP) which sets the goal of increasing the share of renewable energy in primary energy consumption to 10%.

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 Gansu Province Environment and Science Design Institute and has been approved by the Environmental Protection Bureau of Gansu Province, indicating that the proposed 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. 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. As the proposed project is far away from any residential area, 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 87 kg per day during construction, which will be reduced to 15 kg per day during operation. 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 waste water 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. 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.

- Impact on Radiation of Electromagnetism:

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 project site and the nearest residential area. Meanwhile, the radiation intensity of high voltage transformer

equipments is lower than 3.5kV/m, which is much lower than the requirement of national standards (GB16203-1996).

In conclusion, the Project does not bring negative environmental and socio-economic impacts.

2.2 Local Stakeholder Consultation

The local stakeholder's meeting was held in Yumen County on 06/03/2008. 44 participants attended the meeting including local residents, builders and members of the local authorities. the project CECIC introduced the proposed 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 a negative 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 installation, waste water 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 proposed project?

(iv) Space for the respondents' signature and date.

Summary of the comments received

(i) Stakeholder Meeting

Every stakeholder expressed their comments for the proposed 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.

- Local environment protection

According to the project EIA report, the noise level of the installed turbines is below the national standard. The proposed Project site is located in the Gobi desert area. 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.

- Improve the living condition of local residents

the project will create new employment opportunities through the project construction and operation. 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.

(ii) 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:

- 100% of respondents agree with the development and construction of the project.
- 100% of the respondents believe that the proposed project will have no negative impact on their living, studying and working environments.
- 100% 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. They all believe the proposed project will promote local economic development and agree with the project development and construction.

All the concerns and suggestions were summarized below. The number provided after each comments corresponds to CECIC's response given in table 2¹ below.

Table 1. SUMMARY OF SURVEY (part of stakeholder's meeting)

	Gender	Age	Occupation	Do you think the project will affect the surrounding environment (air, noise and water)?	What do you concern the most during the project construction and operation?	Do you agree with development of this project?	Any environmental protection measurements should be considered?	Suggestions to project developer
1	M	28	Employee	Yes	• Noise: 4 • Electromagnetic: 2	agree	• Protect vegetation: 10 • Greening the project area after construction: 10 • Reduce dust: 3	strengthening the support to local government: 11
2	F	37	Employee	Yes	• Noise: 4 • Air pollution: 3	agree	Suggest building special roads for big trucks to avoid the heavy vehicles damage the Gobi plants: 8	• Construction waste should be dealt properly: 6 • The damage made to the Gobi plants by heavy vehicles should be restored as soon as the construction finished; build special construction-use-only roads: 8
3	M	32	Employee	Yes	• Air pollution: 3 • Electromagnetic: 2	agree	• Disturb the ground surface as less as possible to reduce fugitive dust: 3 & 7 • Equipment maintenance should be carried out as planned: 1 • Use surface water instead of groundwater: 12	• Reduce road occupation, restore the land that temporarily occupied: 7 • Give financial support to local environmental protection, use the profit made from emission reduction: 11

¹ Table 2 is in Page 17 on this monitoring report.

4	F	31	Employee	Not sure	•Air pollution: 3 •Equipment safety: 1 •Electromagnetic: 2	agree	Hardening the road surface to avoid pollution: 7, 8 & 10	Suggest developer to register local company, pay local tax and employ local labor. Participate and support local public welfare: 9, 11
5	M	35	Employee	Yes	•Wastewater discharge: 5	agree	•Improve wastewater treatment: 5 •Vehicles carrying heavy equipments should keep distance from residential area and town centre: 8	Protect the road and bridge during construction and pay the repair fee if there is any damage incurred: 8
6	F	22	Other	Yes	•Noise: 4 •Equipment safety: 1	agree	•Use environment friendly material: 13 •Take measures to reduce noise: 4 •Conduct environmental effect assessment beforehand: 14	Improve the economic development and employment in Yumen: 9
7	M	53	Employee	No	•Air pollution: 3	agree		
8	M	29	Employee	Yes	•Equipment safety: 1	agree		
9	F	35	Worker	Yes	•Air pollution: 3	agree		
10	M	46	Employee	No	•Equipment safety: 1 •Wastewater discharge: 5	agree		
11	M	29	Employee	No	•Equipment safety: 1 •Electromagnetic: 2	agree		
12	M	40	Employee	No	•Equipment safety: 1	agree		
13	M	23	Employee	Yes	•Noise: 4 •Equipment safety: 1	agree	•Soil-water protection: 7 & 5 •Vegetation protection: 10	
14	M	48	Other	No	•Equipment safety: 1 •Electromagnetic : 2	agree	Centralized construction and avoid farm land: 7	Develop the project as Yumen is your second home: Not relevant
15	F	21	Worker	No	•Noise: 4 •Air pollution: 3	agree		
16	M	36	Employee	No	•Equipment safety: 1 •Electromagnetic: 2	agree		

17	F	28	Employee	No	•Noise: 4 •Air pollution: 3 •Wastewater discharge: 5	agree		
18	M	45	Employee	No	•Equipment safety: 1	agree		
19	M	56	Employee	No	•Air pollution: 3	agree	Ground surface greening should be included in construction plan: 10	Ground environmental reform should be done properly: 7 & 10
20	F	25	Employee	No	•Electromagnetic: 2	agree		
21	M	36	Employee	No	•Noise: 4	agree		
22	M	41	Farmer	No	•Equipment safety: 1	agree		
23	F	39	Farmer	No	•Electromagnetic: 2	agree		
24	M	46	Employee	No	•Equipment safety: 1	agree		
25	M	36	Farmer	No	•Electromagnetic: 2	agree	Waste in construction site should be treated properly: 6	
26	M	41	Employee	No	•Landscape destruction: 7	agree	Build construction-use-only road to protect environment: 8	
27	F	29	Farmer	Not sure	•Electromagnetic: 2	agree		
28	M	39	Farmer	Yes	•Equipment safety: 1	agree		
29	M	36	Farmer	No	•Noise: 4	agree		
30	M	32	Farmer	No	•Air pollution: 3 •Landscape destruction: 7	agree		
31	M	32	Farmer	Yes	•Noise: 4 •Wastewater discharge: 5 •Electromagnetic: 2	agree		
32	M	38	Farmer	No	•Air pollution: 3 •Landscape destruction: 7	agree		
33	M	48	Farmer	No	•Landscape destruction: 7	agree		
34	M	45	Farmer	No	•Equipment safety: 1	agree		
35	M	40	Farmer	No	•Equipment safety: 1 •Wastewater discharge: 5	agree		

36	F	35	Employee	No	• Air pollution: 3	agree		
37	M	51	Woker	No	• Noise: 4 • Air pollution: 3 • Wastewater discharge: 5	agree		
38	M	28	Farmer	No	• Noise: 4 • Air pollution: 3 • Wastewater discharge: 5	agree		
39	M	29	Farmer	No	• Electromagnetic: 2	agree		
40	M	32	Employee	Yes	• Air pollution: 3 • Wastewater discharge: 5 • Electromagnetic: 2	agree	Reduce electromagnetic interference and wastewater discharge, and strengthening greening: 2, 5 & 10	Construction should be carried out as planned: Not relevant
41	F	34	Other	Yes	• Noise: 4 • Wastewater discharge: 5 • Landscape destruction: 7	agree		
42	M	43	Farmer	No	• Equipment safety: 1 • Electromagnetic: 2 • Landscape destruction: 7	agree		
43	M	49	Farmer	No	• Equipment safety: 1 • Electromagnetic: 2	agree		
44	M	36	Farmer	No	• Noise: 4 • Equipment safety: 1 • Electromagnetic: 2	agree		

Consideration of comments received

Table 2 indicates the issues raised by the stakeholders, and the response or action from CECIC on each issue.

Table 2. Responses to comments received by Stakeholders

Issues	Actions taken by CECIC
1. Equipment safety and maintenance	Wind turbine and hub are the key equipment used for the project. the project will install efficient and reliable turbines manufactured by Dongfang Steam Turbine Manufacture. In addition, the control system will be imported from EU, which makes the project very safe. CECIC will conduct regular maintenance in accordance with manufacture's specification.
2. 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 project site and the nearest residential area. Meanwhile, the radiation intensity of high voltage transformer equipments is lower than 3.5kV/m, which is much lower than the requirement of national standards (GB16203-1996).
3. Air pollution and dust	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. 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.
4. 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. As the proposed project is far away from any residential area, effects of noise pollution on the surrounding environment are not significant.
5. Waste water	The waste water generated during the construction includes washing water from machines and waste water 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.
6. 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 87 kg per day during construction, which will be reduced to 15 kg per day during operation. This waste will be properly collected and delivered to the local county for disposal.
7. 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, back filling 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.

8. Impact of heavy vehicles	All the vehicles used for the project meet all the regulations and standards required by the law. Therefore, the project would not cause excess wear and tears to the road. Since the project is located in the Gobi desert, damage caused by such heavy vehicles at the project site is considered minimum, while these vehicles will avoid driving in city or close to residential area to minimize the impact of surrounding communities. In addition, CECIC will plant fast growing plants upon completion of the plant, which will restore any damages caused by the project.
9. Local development	the project has created new employment opportunities as stated in the Section A.2. Doing the construction, the construction companies hire over 300 local employees specifically for the project. In addition, generated electricity will reduce grid's power shortage and supporting regional economical activities. Finally, through the project, CECIC will be paying VAT to local government, which will benefit local government while enhancing economic activity of the surrounding communities.
10. Protection of vegetation and Greening	the project is located in the Gobi desert area with sparse vegetation and impact to vegetation is considered minimum. In addition, CECIC will plant fast growing plants upon completion of the plant, which will result in a better vegetation condition than before the project.
11. Support to the local government, welfare, and environmental protection	CECIC will pay all the required _VAT in accordance with the tax law. However, it is not role of CECIC to support local government, welfare, and environmental protection agency beyond its obligation under the law. Nonetheless, the CECIC will support the local community by creating new employment opportunities.
12. Use of water resource	The project will not consume large volume of waste, therefore, impact on water resource is not relevant.
13. Construction material	All the material used for the project meets all the regulations and standards required.
14. Environmental Impact Assessment	As shown in the section D above, CECIC has conducted EIA and Gansu Environment Protection Bureau approved the project, based on the EIA.

As shown in the table 1, most of concerns were related to environmental impact. The Project has received EIA approval and has taken necessary measures to minimize these impacts.



Image 1. Stakeholder's Meeting



Image 2. Stakeholder's Meeting

In order for on-going communicate with local stakeholders, the project owner put a grievance notebook in the company office. Anyone can put their comments on the book. Since this project has been operated for several years, all local stakeholders know the telephone of the office. When people has comments on the project, he or she can call the project owner directly and leave message.

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 project installed 134 sets of wind turbine, each of which has a rated installed capacity of 1,500kW, providing a total installed capacity of 201MW. The estimated electricity delivered to NWPG by the project is 431,949MWh per year and the average annual operating hours is 2,149h with a power load factor of 24.53%.

The project employs turbines manufactured by China's Dongfang Steam Turbine Manufacture. Key technical parameters of main equipments in the project are shown in the following table 3.

Table 3. Key technical parameters of main equipments in the project

Item	FD77A/1500
1. Data for Unit	
Rated capacity (kW)	1500
Number of unit	134
Capacity control method	Pitch-controlled
Turbine diameter (m)	77
Hub height (m)	70
Cut in wind speed (m/s)	3.0
Rated wind speed (m/s)	12.5
Cut out wind speed (m/s)	20
Wind speed limit (m/s)	53.3
Technical lifetime (y)	20
Material of blade	GRP
Blade tip speed (m/s)	69.6
2. Generator	
Type of generator	Double-fed induction generator
Rated capacity (kW)	1500
Output Voltage (V)	690
Rated speed (rpm)	1000-1800 (+10.0%)

The electricity generated by the project is exported to the NWPG, via a 35kV/110kV transformer substation located within the project site. The technical process in the project can be shown as following diagram:

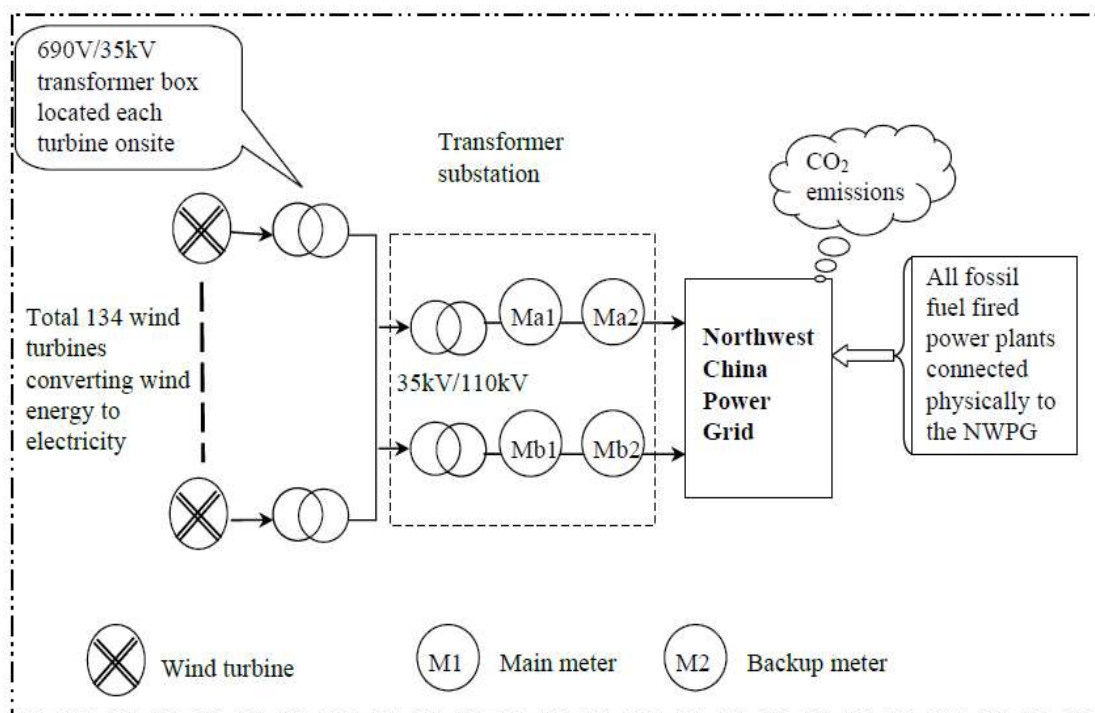


Figure 2. The technology flow diagram of the Project

The Project began to construct on 16/06/2008. The first wind turbine of the Project started commissioning on 21/11/2009. The Project was put into full operation on 15/02/2011. During this monitoring period (29/09/2019-31/12/2020), the Project monitoring activities were implemented in line with the monitoring plan.

The wind farm operated normally. No equipment is overhauled or replaced in this monitoring period. No emergencies which may impact the methodology application 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,OM,y}
Data unit	tCO ₂ /MWh
Description	Simple operating margin CO ₂ emission factor in year y
Source of data	For P1, “2008 Baseline Emission Factors for Regional Power Grids in China” issued by China DNA ² For P2, “2019 Baseline Emission Factors for Regional Power Grids in China” issued by China DNA ³
Value applied	1.1225 for P1 0.8922 for P2
Justification of choice of data or description of measurement methods and procedures applied	Official public data from MEE
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	EF _{grid,BM,y}
Data unit	tCO ₂ /MWh
Description	Build margin CO ₂ emission factor in year y
Source of data	For P1, “2008 Baseline Emission Factors for Regional Power Grids in China” issued by China DNA ⁴ For P2, “2019 Baseline Emission Factors for Regional Power Grids in China” issued by China DNA ⁵
Value applied	0.6199 for P1 0.4407 for P2
eJustification of choice of data or description of	Official public data from MEE

² <http://www.mee.gov.cn/ywgz/ydqhbh/wsqtzk/201812/W020181220585204502948.pdf>

³ <http://www.mee.gov.cn/ywgz/ydqhbh/wsqtzk/202012/W020201229610353816665.pdf>

⁴ <http://www.mee.gov.cn/ywgz/ydqhbh/wsqtzk/201812/W020181220585204502948.pdf>

⁵ <http://www.mee.gov.cn/ywgz/ydqhbh/wsqtzk/202012/W020201229610354442145.pdf>

measurement methods and procedures applied	
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	WOM
Data unit	%
Description	Weighting of operating margin emissions factor
Source of data	"Tool to calculate the emission factor for an electricity system" (Version 07.0)
Value applied	75
Justification of choice of data or description of measurement methods and procedures applied	Based on the requirements of "Tool to calculate the emission factor for an electricity system" (Version 07.0)
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	WBM
Data unit	%
Description	Weighting of build margin emissions factor
Source of data	"Tool to calculate the emission factor for an electricity system" (Version 07.0)
Value applied	25
Justification of choice of data or description of measurement methods and procedures applied	Based on the requirements of "Tool to calculate the emission factor for an electricity system" (Version 07.0)
Purpose of Data	Calculation of baseline emissions
Comments	/

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. EF _{grid,CM,y} was not directly available at validation but calculated based on other parameters in the PD available at validation, therefore in the MR, only EF _{grid,CM,y} is included and the rest of the parameters are either used to calculate EF _{grid,CM,y} or not used in the MR.
Source of data	Registered PD for P1, and renewed PD for P2.
Value applied	0.99685 for P1, 0.7793 for P2.
Justification of choice of data or description of measurement methods and procedures applied	For P1, Notification on 2008 baseline emission factors for regional power grids in China, issued by China DNA and the registered PD. http://www.mee.gov.cn/ywgz/ydqbhb/wsqtz/201812/W020181220585204502948.pdf For P2, Notification on 2019 baseline emission factors for regional power grids in China, issued by China DNA and the renewed PD. http://www.mee.gov.cn/ywgz/ydqbhb/wsqtz/202012/t20201229815386.shtml
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	Direct measurement
Description of measurement methods and procedures to be applied	Both the main meter(s) and backup meter(s) have been installed at high voltage side of 35kV/110kV substation, located within the site. The main meter(s) will be used to monitor electricity exchanged between the Project and the grid continuously and reported monthly. The data from the electricity meters can be cross-checked with the sales receipts for the electricity.
Frequency of monitoring/recording	Measured continuously and recorded monthly.
Value monitored	For P1, EG _{facility,y} is 68,494.720MWh. EG _{export,y} is 68,754.400 MWh, and EG _{import,y} is 259.680MWh.

	For P2, EG _{facility} is 526,711.253MWh. EG _{export,y} is 527,629.235 MWh, and EG _{import,y} is 917.982MWh. EG _{export,y} : Quantity of electricity exported to the grid by the project. EG _{import,y} : Quantity of electricity imported from the grid by the project.				
Monitoring equipment	Serial No.	Accuracy	Calibration date	Validity of the Calibration	Calibration frequency
	51000040 Main meter a	0.2s	11/09/2019	10/09/2020	Annually
			02/07/2020	01/07/2021	
	51000042 Backup meter a	0.2s	11/09/2019	10/09/2020	Annually
			02/07/2020	01/07/2021	
	51000044 Main meter b	0.2s	11/09/2019	10/09/2020	Annually
			02/07/2020	01/07/2021	
	51000043 Backup meter b	0.2s	11/09/2019	10/09/2020	Annually
02/07/2020			01/07/2021		
QA/QC procedures to be applied	Monitoring data are counter-checked against the sales receipts. The main meters and backup meters are calibrated by certified third party according to national standard annually.				
Purpose of the data	Calculation of baseline emissions				
Calculation method	EG _{facility,y} =EG _{export,y} —EG _{import,y} EG _{export,y} : Quantity of electricity exported to the grid by the Project. EG _{import,y} : Quantity of electricity imported from the grid by the Project.				
Comments	/				

4.3 Monitoring Plan

The implementation of monitoring system and Management organization for the Project are fully in consistent with the description in the PD Monitoring Plan.

Purpose

The monitoring methodology clearly describes how to identify and collect the necessary data. The following is a summary list of the main items to be monitored:

The operational and management structure to be adopted by CECIC in implementing the monitoring plan for the project activity is outlined in the Figure 3 below.

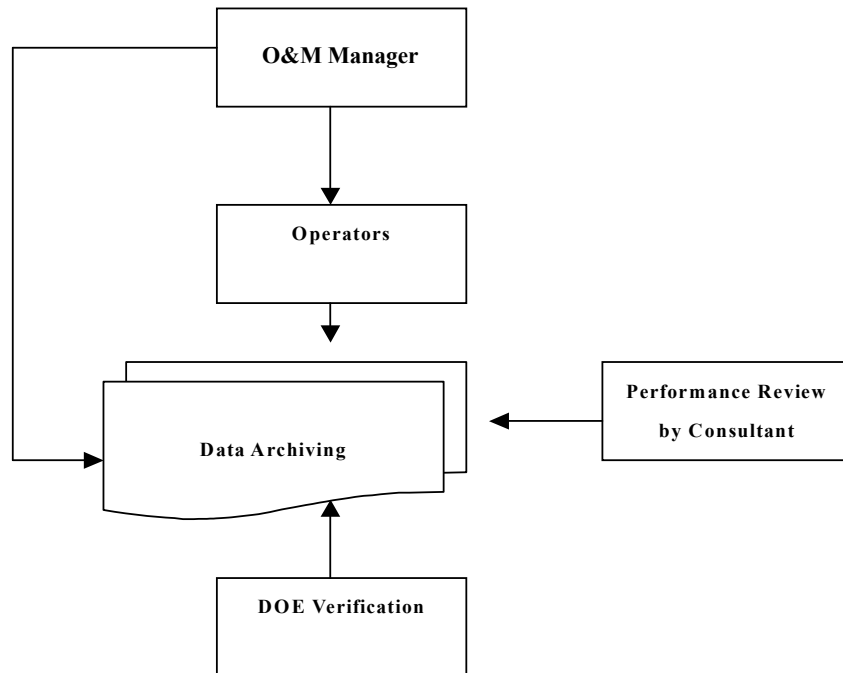


Figure 3. Operational and management structure for monitoring the project activity

The performance of the Project will be reviewed and analyzed by the consultant on a regular basis.

Metering

The power generated by the project and supplied to the grid will be monitored at the following points using electricity meters:

Both the main meter(s) and backup meter(s) have been installed at high voltage side of 35kV/110kV substation, located within the site. The main meter(s) will be used to monitor electricity exchanged between the project and the grid continuously and reported monthly.

The data from the electricity meters can be cross-checked with the Electricity Transaction notes or sales receipts for the electricity.

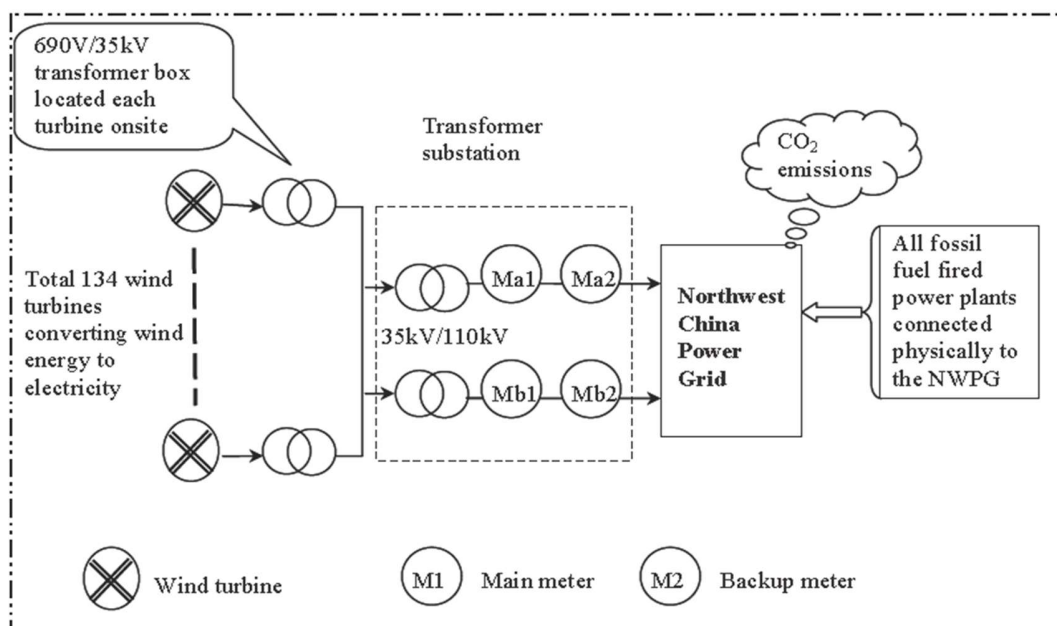


Figure 4. Flow diagram of the metering

Calibration

The metering equipment will be calibrated and checked at least once a year by a qualified third party according to an appropriate industry standard or the manufacturer's specifications. The calibration records will be maintained and made available for review by the DOE.

Accuracy

The metering equipment will be calibrated and checked for accuracy according to local industry standards to make sure that any error resulting from such equipment will not exceed 0.5% of full-scale rating. Both meters shall be jointly inspected and sealed on behalf of the parties concerned and shall be only checked in the presence of the other party or its accredited representatives. It will also comply with the national standards Technical Administrative Code of Electric Energy Metering (DL/T 448-2016) and Alternating Current Static Watt-hour Meters for Active Energy, with accuracy of no less than 0.5S (GB/T 17883-1999).

Procedure

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

When the main meter detects the error beyond the allowable range or inconsistency, the backup meter, located within the site, will be used. In case that both meters detect errors, CECIC shall repair the meter, recalibrate, or replace, while giving the grid company sufficient notice to allow their representative to attend during any corrective activities. When this happen, the net power

generated is calculated by read the backup meter. In case where both meters fail, CECIC and the grid company should formulate reasonable and conservative estimation based on historical or the nearest month power generation data. Also, CECIC should provide the evidence to testify the method is reasonable and conservative.

Data

All data collected as part of monitoring should be archived electronically and be kept for at least 2 years after the end of the last crediting period. 100% of data is to be monitored.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

According to ACM0002, the baseline emission during this verification period is calculated as

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

$$EG_{\text{facility},y} = EG_{\text{export},y} - EG_{\text{import},y}$$

Where:

BE_y is the baseline emissions in year y (tCO₂/yr);

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

$EF_{\text{grid},\text{CM},y}$ is the combined margin CO₂ emission factor for grid connected power generation in year y (tCO₂e/MWh);

$EG_{\text{export},y}$ is the quantity of electricity exported to the grid by the Project;

$EG_{\text{import},y}$ is the quantity of electricity imported from the grid by the Project.

The electricity volume and baseline emissions are listed in following table 4.

Table 4. Baseline emissions

Period	$EG_{\text{export},y}$ (MWh)	$EG_{\text{import},y}$ (MWh)	$EG_{\text{facility},y}$ (MWh)	$EF_{\text{grid},\text{CM},y}$ (tCO ₂ /MWh)	BE_y (tCO ₂ e)
29/09/2019- 20/11/2019	68,754.400	259.680	68,494.720	0.99685	68,278
21/11/2019- 31/12/2020	527,629.235	917.982	526,711.253	0.7793	410,459

Total in this monitoring period	596,383.635	1,177.662	595,205.973		478,737
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The monthly data are shown in appendix 1.

5.2 Project Emissions

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

5.3 Leakage

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

5.4 Net GHG Emission Reductions and Removals

In according with the registered PD

$$ER_y = BE_y - PE_y$$

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)
29/09/2019-31/12/2019	112,034	0	0	112,034
01/01/2020-31/12/2020	366,703	0	0	366,703
Total	478,737	0	0	478,737

Crediting Period	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)
P1: 29/09/2019-20/11/2019	68,278	0	0	68,278
P2:	410,459	0	0	410,459

21/11/2019-31/12/2020				
Total	478,737	0	0	478,737

For P1, the estimated annual emission reductions are 430,588 tCO₂e as per registered PD. P1 covers 53 days. The estimated emission reductions during P1 are $430,588/365 \times 53 = 62,523$ tCO₂e. The actual emission reductions during P1 are 68,278 tCO₂e, which are 9.20% more than the estimated value within the normal variation range.

P1 includes October and November, which are the start of winter. And winter is the high-wind-speed-season in Gansu Province. So it is normal for the emission reductions of the two months to be more than the average level.

For P2, the estimated annual emission reductions are 336,628 tCO₂e as per renewed PD. P2 covers 407 days. The estimated emission reductions during P2 are $336,628/365 \times 407 = 375,363$ tCO₂e. The actual emission reductions during P2 are 410,459 tCO₂e, which are 9.35% more than the estimated value within the normal variation range.

According to public available data⁶, in Gansu Province, the availability of renewable resource increases year by year. The availability of renewable resource in 2020 is 95.28%, which reaches the highest level and is 1.63% higher than that in 2019. Meanwhile, with the development of technology of renewable resource, the annual operating hour for wind turbine increases. The longest annual operating hour in Yumen City is 3600 hours⁷. The annual operating hour in 2020 of the Project is 2345hours which is in a reasonable range.

Furthermore, according to the sensitivity analysis in the registered PD, when the power generation increases 21.35%, the IRR reaches the benchmark 8%. For P1 and P2, the emission reductions, which are influenced by power generation, have not increased over 10%. Therefore, the IRR is much lower than 8%, and consequently, the additionality stays still.

⁶ <http://news.bjx.com.cn/html/20210127/1132685.shtml>

⁷ <https://wind.in-en.com/html/wind-2396232.shtml>

APPENDIX I: < MONTHLY AND YEARLY ELECTRICITY>

Vintage	Electricity exported to Grid (EG _{export,y}) (MWh)					Electricity imported from Grid (EG _{import,y}) (MWh)					Net electricity generation supplied by the project plant/unit to the grid (EG _{facility,y}) (MWh)	EF _{grid,CM,y} (tCO ₂ e/MWh)	Baseline Emissions (BE _y) (tCO ₂ e)
	Data from meter a readings (MWh)	Data from meter b readings (MWh)	Total electricity exported (MWh)	Data on sale receipts (MWh)	Data for ER calculation (MWh)	Data from meter a readings (MWh)	Data from meter b readings (MWh)	Total electricity imported (MWh)	Data on purchase invoices (MWh)	Data for ER calculation (MWh)			
	A	B	C=A+B	D	E=Min(C,D)	F	G	H=F+G	I	J=Max(H,I)			
29/09/2019-30/09/2019	834.173	874.982	1,709.155	1,709.155	1,709.155	55.440	44.880	100.320	100.320	100.320	1,608.835	0.99685	1,603
01/10/2019-31/10/2019	14,982.114	14,832.502	29,814.616	29,814.616	29,814.616	44.880	29.040	73.920	73.920	73.920	29,740.696	0.99685	29,647
01/11/2019-20/11/2019	18,838.190	18,392.439	37,230.629	37,230.629	37,230.629	44.320	41.120	85.440	85.440	85.440	37,145.189	0.99685	37,028
P1	34,654.477	34,099.923	68,754.400	68,754.400	68,754.400	144.640	115.040	259.680	259.680	259.680	68,494.720		68,278
21/11/2019-30/11/2019	4,093.492	4,382.572	8,476.064	8,476.064	8,476.064	22.392	23.034	45.426	45.426	45.426	8,430.638	0.7793	6,569
01/12/2019-31/12/2019	23,943.019	23,843.201	47,786.220	47,786.220	47,786.220	29.385	38.339	67.724	67.724	67.724	47,718.496	0.7793	37,187
01/01/2020-31/01/2020	22,849.375	22,947.302	45,796.677	45,796.677	45,796.677	29.284	30.284	59.568	59.568	59.568	45,737.109	0.7793	35,642
01/02/2020-29/02/2020	21,738.544	22,043.058	43,781.602	43,781.602	43,781.602	30.283	30.002	60.285	60.285	60.285	43,721.317	0.7793	34,072
01/03/2020-31/03/2020	20,039.285	20,137.743	40,177.028	40,177.028	40,177.028	20.144	29.284	49.428	49.428	49.428	40,127.600	0.7793	31,271
01/04/2020-30/04/2020	20,305.284	20,406.294	40,711.578	40,711.578	40,711.578	30.294	29.722	60.016	60.016	60.016	40,651.562	0.7793	31,679
01/05/2020-31/05/2020	19,399.304	19,038.294	38,437.598	38,437.598	38,437.598	33.593	34.995	68.588	68.588	68.588	38,369.010	0.7793	29,900
01/06/2020-30/06/2020	18,395.285	18,399.203	36,794.488	36,794.488	36,794.488	49.003	48.229	97.232	97.232	97.232	36,697.256	0.7793	28,598
01/07/2020-31/07/2020	19,038.528	19,938.294	38,976.822	38,976.822	38,976.822	44.395	43.662	88.057	88.057	88.057	38,888.765	0.7793	30,306

01/08/2020-31/08/2020	18,205.294	18,305.730	36,511.024	36,511.024	36,511.024	44.834	40.375	85.209	85.209	85.209	36,425.815	0.7793	28,386
01/09/2020-30/09/2020	18,483.395	18,993.440	37,476.835	37,476.835	37,476.835	36.663	38.501	75.164	75.164	75.164	37,401.671	0.7793	29,147
01/10/2020-31/10/2020	15,042.593	15,058.772	30,101.366	30,101.366	30,101.366	30.384	30.275	60.659	60.659	60.659	30,040.707	0.7793	23,410
01/11/2020-30/11/2020	18,930.364	18,920.979	37,851.343	37,851.343	37,851.343	29.374	28.485	57.859	57.859	57.859	37,793.484	0.7793	29,452
01/12/2020-31/12/2020	22,375.305	22,375.285	44,750.590	44,750.590	44,750.590	20.493	22.274	42.767	42.767	42.767	44,707.823	0.7793	34,840
P2	262,839.067	264,790.168	527,629.235	527,629.235	527,629.235	450.521	467.461	917.982	917.982	917.982	526,711.253		410,459
Total	297,493.544	298,890.091	596,383.635	596,383.635	596,383.635	595.161	582.501	1,177.662	1,177.662	1,177.662	595,205.973		478,737

Year	Electricity exported to Grid ($EG_{export,y}$) (MWh)					Electricity imported from Grid ($EG_{import,y}$) (MWh)					Net electricity generation supplied by the project plant/unit to the grid ($EG_{facility,y}$) (MWh)
	Data from meter a readings (MWh)	Data from meter b readings (MWh)	Total electricity exported (MWh)	Data on sale receipts (MWh)	Data for ER calculation (MWh)	Data from meter a readings (MWh)	Data from meter b readings (MWh)	Total electricity imported (MWh)	Data on purchase invoices (MWh)	Data for ER calculation (MWh)	
	A	B	C=A+B	D	E=Min(C,D)	F	G	H=F+G	I	J=Max(H,I)	
29/09/2019-31/12/2019	62,690.988	62,325.696	125,016.684	125,016.684	125,016.684	196.417	176.413	372.830	372.830	372.830	124,643.854
01/10/2020-31/10/2020	234,802.556	236,564.395	471,366.951	471,366.951	471,366.951	398.744	406.088	804.832	804.832	804.832	470,562.119
Total	297,493.544	298,890.091	596,383.635	596,383.635	596,383.635	595.161	582.501	1,177.662	1,177.662	1,177.662	595,205.973