



JINGYUAN COUNTY 100MW SOLAR POWER GENERATION PROJECT

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Project ID	VCS 1406
Monitoring Period	01-Nov-2020 to 31-Dec-2021
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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Jingyuan County 100MW Solar Power Generation Project (hereafter simplified as “the project”) is a newly built grid-connected photovoltaic power plant with installed capacity of 100MWp, which is located in Zhongyuan Village, Ruoli Township, Jingyuan County, Baiyin City, Gansu Province of China. The project is developed and operated by Gansu Deyou Energy Technology Co., Ltd. (hereafter simplified as “the project owner”).

The existing scenario prior to the implementation of the project is the electricity being generated by Northwest Power Grid (NWPG), and the baseline scenario of the project is the same as the existing scenario. Purpose of the project is to generate electricity by using the renewable solar energy, and the electricity generated by the project will be delivered into NWPG to replace the equivalent electricity generated by fossil-fuel dominated NWPG, therefore the GHG emission reductions will be achieved.

The expected annual grid-in electricity of the project in 25 years is 141,403.5 MWh, at 1,414 operational hours with a PLF of 16.14%; and the annual grid-in electricity in the first 10 years is 150,081.5 MWh, at 1,501 operational hours with a PLF of 17.13%. During the first crediting period from 29-Dec-2014 to 28-Dec-2024, the annual average GHG emission reductions are estimated to be 128,589 tCO_{2e}, while the total GHG emission reductions during the first 10-year crediting period are estimated to be 1,285,890 tCO_{2e}.

The start date of commercial operation is dated on 29-Dec-2014. All project equipment and facilities as described in the registered VCS PD have been correctly installed. Please refer to section 3.1 for details.

This monitoring period covers the period from 01-Nov-2020 to 31-Dec-2021(both days included). The project operated in accordance with the registered VCS PD. Total GHG emission reduction achieved in this monitoring period is 147,771 tCO_{2e}.

1.2 Sectoral Scope and Project Type

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

Project Type: Grid-connected renewable power generation

The project is not a grouped project.

1.3 Project Proponent

Organization name	Gansu Deyou Energy Technology Co., Ltd
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Contact person	Li Guoliang
Title	Director
Address	The crossing of East Youth Street, Ganzhou District, Zhangye City, Gansu Province
Telephone	+86 936 8226684
Email	projects@climatebridge.com

1.4 Other Entities Involved in the Project

Organization name	Gansu Heihe Electric Power Sales Co., Ltd.
Role in the Project	Consultant
Contact person	Liu Mengde
Title	Project Manager
Address	6th floor of Heihe Hydropower Complex Building, 116 Changshou Road, Ganzhou District, Zhangye City, Gansu Province, China 734000
Telephone	+86 0936-8251641
Email	projects@climatebridge.com , hhsdyinlongxing@vip.163.com

Organization name	Climate Bridge (Shanghai) Ltd.
Role in the Project	VCU buyer
Contact person	Gao Zhiwen
Title	General Manager
Address	Block B, Level 24, Jiangong Mansion, 33 Fushan Road, Pudong New Area, Shanghai, China 200120
Telephone	+86-2162462036
Email	gao.zhiwen@climatebridge.com

1.5 Project Start Date

29-Dec-2014 (commissioning start date).

1.6 Project Crediting Period

The project is registered under previous VCS Standard and completed validation before 19-Mar-2020. As per Appendix 3 of VCS Standard version 4.3, registered projects and projects that complete validation on or before 19-Mar-2020 remain eligible to apply the crediting period requirements under VCS Version 3. Thus, it remains eligible to apply the crediting period requirements under VCS Standard Version 3 which shall be a maximum of ten years and may be renewed at most twice. Considering the lifetime of the project is 25 years, it is reasonable that the total VCS crediting period was determined from 29-Dec-2014 to 28-Dec-2039, of which the first VCS crediting period is from 29-Dec-2014 to 28-Dec-2024. This monitoring period belongs to the first period from 29-Dec-2014 to 28-Dec-2024.

1.7 Project Location

The Project is located in Zhongyuan Village, Ruoli Township, Jingyuan County, Baiyin City, Gansu Province of China. The coordinates of the project are:

Latitude: 36° 59'0.15"N - 36° 59'42.46"N

Longitude: 105° 7'45.21"E - 105° 9'35.54"E

The location of the Project is shown in the map of **Figure 1**.

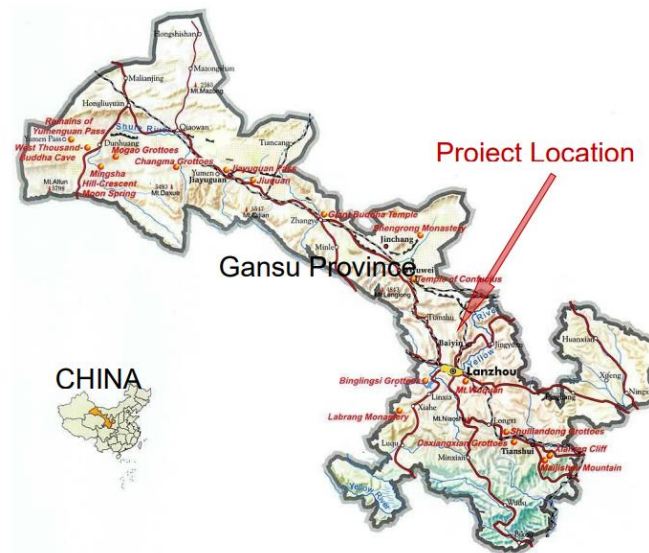


Figure 1 The location of the project

1.8 Title and Reference of Methodology

ACM0002: “Grid-connected electricity generation from renewable sources” (Version 16.0);

The methodology also refers to:

“Tool to calculate the emission factor for an electricity system” (Version 04.0);

More information concerning the above methodology and tools can be referred to:
<http://cdm.unfccc.int/methodologies/PAMethodologies/approved.html>

1.9 Participation under other GHG Programs

The project only has been registered as a VCS project with registration number 1406. The project does not reduce GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading.

1.10 Other Forms of Credit

Emission Trading Programs and Other Binding Limits

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

Also, the project has not been registered as a CCER (Chinese Certified Emission Reductions) project in China, thus it is not eligible for emission reductions transaction under the China’s ETS. Therefore, the project does not reduce GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading. The net GHG emission reductions generated during this monitoring period have not been used for compliance under such programs or mechanisms.

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

Other Forms of Environmental Credit

The project has not sought or received another form of GHG-related environmental credit, including renewable energy certificates, during this monitoring period.

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

1.11 Sustainable Development Contributions

The project is a grid-connected photovoltaic power plant in Jingyuan County, Northwest China. In this monitoring period,



The project utilizes solar energy to generate electricity and supply 172,468.810 MWh renewable electricity to NWPG, which contributes to SDG 7.



The project provides 13 long-term job opportunities for local, which has a positive effect on the local economy and contributes to SDG 8.



The project reduces 147,771 tCO₂e GHG emission and contributes to SDG 13.

These contribute to achieve China's stated sustainable development priorities, included strengthening resistance capacity to climate risks, increasing labor force participation rate, increasing the share of clean energy consumption. Supporting evidence is provided in the appendix 1.

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1)	7.2	Renewable energy supplied to the power grid	Implemented activities to increase	172,468.810 MWh of electricity from renewable sources has been supplied to the power grid during the reporting period	An accumulated 956,436.240 MWh of electricity from renewable sources has been supplied to the power grid by end of the reporting period
2)	8.5	Numbers of job opportunities provided by implementation of the project	Implemented activities to increase	13 people have been employed by the project as long-term employee	13 people have been employed by the project as long-term employee by end of the reporting period
3)	13.0	Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to increase	The project has achieved a total GHG emission reduction of 147,771 tCO ₂ e during the reporting period	An accumulated 819,471 tCO ₂ e of GHG emission reduction have been achieved by the project by end of the reporting period

2 SAFEGUARDS

2.1 No Net Harm

Environmental Impact

The Environmental Impact Assessment (EIA) of this project has been examined and approved by Gansu Environmental Protection Bureau (Ganhuanshenbiaofa [2013] No.63) on 22-Aug-2013. This project will not cause significant impact on the environment as to the conclusion of the EIA.

Socio-economic impact

Furthermore, the project is renewable project and achieves the SDG 7 and SDG 13. Also, the project provides 13 long-term job opportunities for local, which has a positive effect on the local economy and contributes to SDG 8. Please refer to section 1.11 of this report for details.

In conclusion, no net harm on local environment and social community has been detected for the project.

2.2 Local Stakeholder Consultation

Local Stakeholder Consultation during the project preparation stage:

To let the public realize the objective of the proposed project, support and cooperate with construction of the project, and heighten the environmental benefits and social benefits of the proposed project, the project owner carried out the stakeholders meeting in September 2014, to collect comments and requirement of public in the related region, with the results of the survey indicating support for the project. Please refer to section 6 of the registered PD (version 2.0 dated 02-02-2015) of the project for detailed information. Most of the stakeholders interviewed expressed the project will benefit the local environment, economy, and social development, some of them thought there is no significant impact on those, and no negative impact were raised by stakeholders.

Local Stakeholder Consultation during the project implementation stage:

In March 2021, the project owner carried out a survey of the local villagers and residents in the area using a questionnaire, with the results of the survey indicating support for the project. The following people are considered as the stakeholders of this project:

- Residents of the nearby village;
- Staff of the project station;
- Relevant administrative staff of the local government.

The one page questionnaire was designed with the following sections:

- 1) Brief introduction of the project
- 2) Basic information of respondent
- 3) Major question issues

Whether the project will cause water pollution?

- Whether the project will cause air pollution?
- Whether the project will cause noise pollution?
- Whether the project will impact on soil environment?
- Whether the project will impact on the surrounding animals and plants?
- Impact on the local residents' employment opportunities and income.
- Impact on the local economic development.
- Impact on the local power grid and NWPG.
- Attitude on developing the project.

30 questionnaires have been handed in total and all of them have been received successfully from the stakeholder representatives, respectively from the local government, and surrounding villages. The representatives covered different ages, different occupations and different education levels. Comments of the respondents are shown in Table 2 as below:

Table 2 The result of stakeholders' comments

Item	Options	Results	Percentage
Whether the project will cause water pollution?	Yes	0	0.00%
	No	28	93.33%
	Don't know	2	6.67%
Whether the project will cause air pollution?	Yes	0	0.00%
	No	28	93.33%
	Don't know	2	6.67%
Whether the project will cause noise pollution?	Yes	0	0.00%
	No	28	93.33%
	Don't know	2	6.67%
Whether the project will impact on soil environment?	Yes	0	0.00%
	No	25	83.33%
	Don't know	5	16.67%
Whether the project will impact on the surrounding animals and plants?	Yes	0	0.00%
	No	21	70.00%
	Don't know	9	30.00%
Impact on the local residents' employment opportunities and income.	Advantageous	26	86.67%
	No impact	4	13.33%
	Disadvantageous	0	0.00%
Impact on the local economic development.	Advantageous	26	86.67%
	No impact	4	13.33%

	Disadvantageous	0	0.00%
Impact on the local power grid and NWPg.	Advantageous	22	73.33%
	No impact	8	26.67%
	Disadvantageous	0	0.00%
Attitude on developing the project.	Support	30	100.00%
	Oppose	0	0.00%
	Don't know	0	0.00%

As described above, most of the stakeholders interviewed expressed the project will benefit the local environment, economy and social development, some of them thought there is no significant impact on those, and no negative impact were raised by stakeholders.

Communications with Local stakeholders are being carried out at periodic intervals. Key implementation schedules or changes of the project will be communicated to the local authority, who will inform the neighborhood committee and the local residents, the comments and suggestions from residents will be collected by the local authority meanwhile. And the local government agencies and competent authorities will conduct spot checks on the implementation of the project from time to time, and give suggestions on the involved rectification problems. In line with VCS requirements all the processes have been implemented to receive comments from local stakeholders as well as communicate with them at periodic intervals.

2.3 AFOLU-Specific Safeguards

The project is a non-AFOLU project.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The installed capacity of the Project is about 100 MWp which form 48 sets of power generation units (sub-systems), 45 of them is about 2 MW and each one is equipped with 4 inverters, the rest 3 sub-systems is about 1 MW and each one is equipped with 2 inverters. The project was put into full operation on 29-Dec-2014.

The electricity generated by the project was transformed to 110kV by two main transformers (1# and 2#) before connected to the Beitán 110kV Substation through the 110kV transmission line. Finally, the electricity generated by the Project is delivered to NWPg. And two bi-directional meters M1 and M1' were installed in the Beitán substation to measure the electricity delivered to the grid by the project ($E_{Gout,y}$) and the electricity consumed by the project which is imported from the grid ($E_{Gin,y}$). please refer to the Figure 3 of section 4.3 for details.

The technical parameters of the main equipment for the project are shown in **Table 3**.

Table 3 Parameters of the equipment used in the project

Photovoltaic Modules(Polysilicon)							
Manufacturer	Trina Solar Co., Ltd.		Hareon Solar Co., Ltd.		JA Solar Co., Ltd.		
Type	TSM-255PC05A	TSM-265PC05A	HR-255P-18/Bb	HR-260P-18/Bb	JAP6-60-255/3BB	JAP6-60-260/3BB	JAP6-60-265/3BB
Quantity	36,608	16,500	220,892	64,522	31,988	35,420	8,580
Rated maximum power (Pmax)	255 W	265 W	255 W	260 W	255 W	260 W	265W
Maximum power voltage (V _{mp})	30.5 V	31.0 V	30.25 V	30.51 V	30.29 V	30.63 V	30.96 V
Maximum power current (I _{mp})	8.37 A	8.55 A	8.43 A	8.52 A	8.42 A	8.49 A	8.56 A
Open circuit voltage (V _{oc})	38.1 V	38.4 V	37.54 V	37.65 V	37.82 V	37.98 V	38.14 V
Short circuit current (I _{sc})	8.88 A	9.10 A	8.94 A	9.09 A	8.98 A	9.04 A	9.10 A
Lifetime	25 years	25 years	25 years	25 years	25 years	25 years	25 years
Inverter							
Manufacturer	Power-One Italy S.p.a						
Type	PVI-500.0-TL-CN			PVI-500.0-TL-CN			
Quantity	140			46			
Max input Voltage (V _{dc max})	1000 V			900 V			
Max total input current (I _{dc max})	1100 A			1100 A			
Max Continuous Output power (P _{acr})	470-560 kW			500 kW			
Rated output voltage (V _{acr})	300-360 V			320 V			
Max output current for each phase (I _{ac max})	900 A			900 A (rms)			
Lifetime	25 years			25 years			
Box transformer							
Manufacturer	Jiangsu Huapeng Transformer Co., Ltd.						
Type	ZGSF11-Z.G-1100/35		ZGSF11-Z.G-2250/35		ZGSF11-Z.G-2500/35		
Quantity	3		16		29		
Rated power	1100/550-550 kVA		2250/1125-1125 kVA		2500/1250-1250 kVA		
Rated voltage	38.5±2×2.5%/0.34-0.34 kV		38.5±2×2.5%/0.34-0.34 kV		38.5±2×2.5%/0.34-0.34 kV		
Rated current	16.5/933.9-933.9 A		33.7/1910.3-1910.3 A		37.5/2122.6-2122.6 A		
Rated frequency	50 Hz		50 Hz		50 Hz		
Lifetime	25 years		25 years		25 years		

During this monitoring period, the project is operated and implemented in accordance with the registered VCS PD version 2.0 dated 02-Feb-2015. Neither emergencies (including of overhaul times, downtimes of equipment, exchange of equipment, etc.) happened to the monitoring system in this monitoring period, nor did events or situations occur during the monitoring period which may impact the applicability of the methodology.

3.2 Deviations

3.2.1 Methodology Deviations

There is no deviation applied to this monitoring period.

3.2.2 Project Description Deviations

There is no project description deviation applied to this monitoring period.

3.3 Grouped Projects

The Project is not a grouped project.

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	Calculated based on “Tool to calculate the emission factor for an electricity system”.
Value applied	0.8568
Justification of choice of data or description of measurement methods and procedures applied	Official and authoritative statistic data
Purpose of Data	Calculation of baseline emissions
Comments	

4.2 Data and Parameters Monitored

Data / Parameter	EG_{facility,y}
Data unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Source of data	Calculated

Description of measurement methods and procedures to be applied	Calculated based on the electricity delivered to the grid by the project ($EG_{out,y}$) and the electricity consumed by the project which is imported from the grid ($EG_{in,y}$).	
Frequency of monitoring/recording	Measured continuously and recorded monthly	
Value monitored	Period	Value
	01-Nov-2020~31-Dec-2020	21,006.243
	01-Jan-2021~31-Dec-2021	151,462.567
	Total	172,468.810
Monitoring equipment	-	
QA/QC procedures to be applied	-	
Purpose of the data	Calculation of baseline emissions	
Calculation method	$EG_{facility,y} = EG_{out,y} - EG_{in,y}$	
Comments	-	

Data / Parameter	$EG_{out,y}$	
Data unit	MWh	
Description	Quantity of the electricity delivered to the grid by the project in year y	
Source of data	On-site measurement	
Description of measurement methods and procedures to be applied	Use calibrated electric meters. The accuracy of the meter(s) is 0.2s. Monitoring: Electricity meter will be measured continuously by monitoring staff. Data type: Measured Archiving procedure: Paper and Electronic Responsibility: The operator was responsible for monitoring and checks for regular calibration of electricity meter and Shift in-charge was responsible for calibration of the electricity meters Calibration Frequency: Once in one year	
Frequency of monitoring/recording	Measured continuously and recorded monthly	
Value monitored	Period	Value
	01-Nov-2020~31-Dec-2020	21,377.163
	01-Jan-2021~31-Dec-2021	152,970.007

	Total	174,347.170																					
Monitoring equipment	Electric meters <table> <tr> <th></th><th>Main meter M1</th><th>Backup meter M1'</th></tr> <tr> <td>Type</td><td>MK6E</td><td>MK6E</td></tr> <tr> <td>Serial No.</td><td>213211533</td><td>213211534</td></tr> <tr> <td>Accuracy</td><td>0.2S</td><td>0.2S</td></tr> <tr> <td>Calibration frequency</td><td>Annually</td><td>Annually</td></tr> <tr> <td>Date of calibration</td><td>29-Nov-2019; 26-Nov-2020; 20-Nov-2021</td><td>29-Nov-2019; 26-Nov-2020; 20-Nov-2021</td></tr> <tr> <td>Validity</td><td>28-Nov-2020; 25-Nov-2021; 19-Nov-2022</td><td>28-Nov-2020; 25-Nov-2021; 19-Nov-2022</td></tr> </table>			Main meter M1	Backup meter M1'	Type	MK6E	MK6E	Serial No.	213211533	213211534	Accuracy	0.2S	0.2S	Calibration frequency	Annually	Annually	Date of calibration	29-Nov-2019; 26-Nov-2020; 20-Nov-2021	29-Nov-2019; 26-Nov-2020; 20-Nov-2021	Validity	28-Nov-2020; 25-Nov-2021; 19-Nov-2022	28-Nov-2020; 25-Nov-2021; 19-Nov-2022
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QA/QC procedures to be applied	The measurement results should be cross-checked with sale receipt. During this monitoring period, the measurement results were cross-checked with the sale receipt, and the cross-checked results were consistent, The precision degree pf the meter was 0.2S according to the national standard Technical Administrative Code of Electric Energy Metering (DL/T 448-2016).																						
Purpose of the data	Calculation of baseline emissions																						
Calculation method	-																						
Comments	-																						

Data / Parameter	$EG_{in,y}$
Data unit	MWh
Description	Quantity of the electricity consumed by the project which is imported from the grid in year y
Source of data	On-site measurement
Description of measurement methods and procedures to be applied	Use calibrated electric meters. The accuracy of the meter(s) is 0.2s. Monitoring: Electricity meter will be measured continuously by monitoring staff. Data type: Measured Archiving procedure: Paper and Electronic

	Responsibility: The operator was responsible for monitoring and checks for regular calibration of electricity meter and Shift in-charge was responsible for calibration of the electricity meters																						
	Calibration Frequency: Once in one year																						
Frequency of monitoring/recording	Measured continuously and recorded monthly																						
Value monitored	<table><tr><td>Period</td><td>Value</td></tr><tr><td>01-Nov-2020~31-Dec-2020</td><td>370,920</td></tr><tr><td>01-Jan-2021~31-Dec-2021</td><td>1,507.440</td></tr><tr><td>Total</td><td>1,878.360</td></tr></table>		Period	Value	01-Nov-2020~31-Dec-2020	370,920	01-Jan-2021~31-Dec-2021	1,507.440	Total	1,878.360													
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Validity	28-Nov-2020; 25-Nov-2021; 19-Nov-2022	28-Nov-2020; 25-Nov-2021; 19-Nov-2022																					
QA/QC procedures to be applied	The measurement results should be cross-checked with purchase receipt. During this monitoring period, the measurement results were cross-checked with the purchase receipt, and the cross-checked results were consistent, The precision degree pf the meter was 0.2S according to the national standard Technical Administrative Code of Electric Energy Metering (DL/T 448-2016).																						
Purpose of the data	Calculation of baseline emissions																						
Calculation method	-																						
Comments	-																						

4.3 Monitoring Plan

1) Operation and management structure

Overall responsibility for daily monitoring and reporting lies with the project owner. A monitoring group will be established within the project company to carry out the monitoring work. The structure of the monitoring group is as follows:

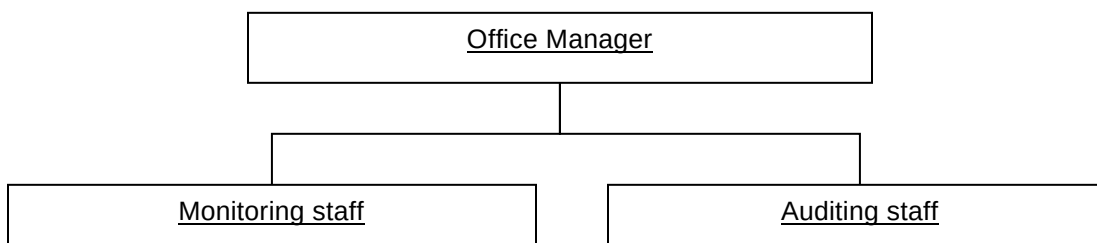


Figure 2 Organization structure of the monitoring team

The responsibilities of each role in the team structure are:

- Office manager has the overall management responsibility, especially supervising the implementation of the monitoring plan
- Monitoring staff measures the electricity imported to and exported from the project
- Auditing staff performs internal verification of the measurement, collects relevant receipts and calculates emission reductions

Finally, the monitoring reports will be reviewed by the General Manager.

2) Monitoring equipment and installation

The electricity generated by the project was transformed to 110kV by two main transformers (1# and 2#) before connected to the Beitan 110kV Substation through the 110kV transmission line. And two bi-directional meters M1 and M1' were installed in the Beitan substation to measure the electricity delivered to the grid by the project ($EG_{out,y}$) and the electricity consumed by the project which is imported from the grid ($EG_{in,y}$). The readings from main meter M1 shall be used for ER calculation, and when M1 is out of order, the readings from the back-up meter M1' shall be used for reference. The main meter and back-up meter is owned, operated and maintained by the grid company. The total electricity delivered to the grid by the project: $EG_{facility,y} = EG_{out,y} - EG_{in,y}$

The meters were configured to meet the technology requirements of "Management Regulations for Power Metered Device Technology" (DL/T448-2016) and the subsequent industrial standards. These meters installed for power measurement should reach 0.5 or above in accuracy degree. And before the electric energy metering equipment was put into operation, the project owner and power grid company have checked and accepted the equipment according to the regulation.

According to power purchase agreement of the project, the time of meter reading for $EG_{out,y}$ and $EG_{in,y}$ with the power company is at 24:00 of the last day every month from 01-Nov-2020 to 31-Dec-2021.

The power line diagram of the project is shown as follows:

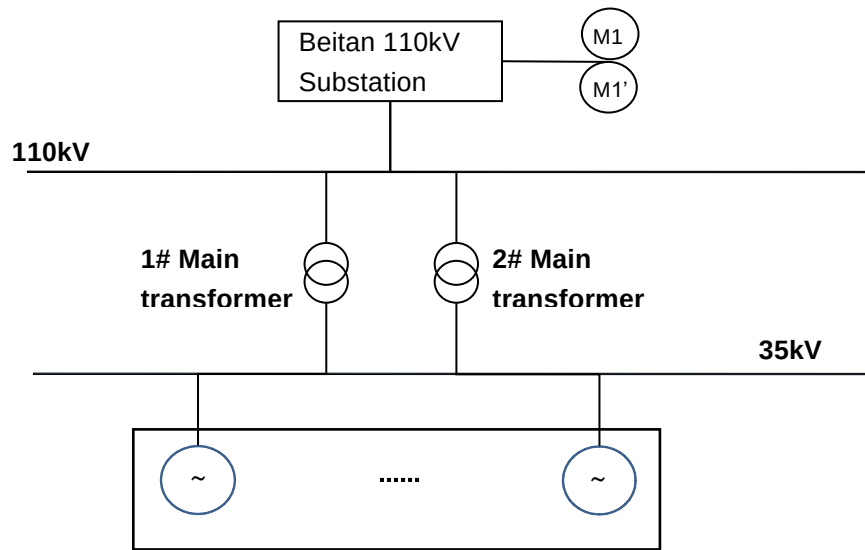


Figure 3 Power line diagram of the monitoring system

3) Data collection system

The procedures of data recording and collecting are listed below:

- The project owner reads the main meter (M1) every month and then submits the reading results of exported and imported electricity to the grid company. Upon agreement on the electricity reading from both parties, the power grid pays the project owner for exported electricity and the project owner provides the grid company with a sale receipt. The project owner pays the power grid for imported electricity and the power grid provides the project owner with a sale receipt.
- The project owner files the meter readings in the monthly report, a data collection form designed for monitoring. The data on this monthly report which can be cross-checked with the electricity sale and purchase receipt are used to calculate emission reductions.
- The project owner collects and keeps on file maintenance records, meter calibration documents.

4) Quality assurance and quality control (QA/QC)

QA/QC practice involves:

- The metering equipment was calibrated and checked annually for accuracy;
- Calibration was carried out by qualified parties with the records being supplied to the project owner, and the calibration shall ensure sufficient accuracy so that any error resulting from such equipment shall not exceed the allowable error of full-scale rating.

- When M1 is out of work, M1' will be used for measurement, and no emission reduction will be claimed when both M1 and M1' are out of work.
- All data collected as part of monitoring is archived electronically. All information should be stored by the technology department of the project owner and all the material has a physical copy for backup. In order to facilitate auditors' reference of relevant literature relating to the project, the project material and monitoring results are indexed. And all data including calibration records is kept until 2 years after the end of the crediting period, or the last issuance of VCUs, whichever is later.

No emergency occurred during this monitoring period.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

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

$$BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y} \quad (1)$$

And for greenfield power plant,

$$EG_{PJ,y} = EG_{facility,y} = EG_{out,y} - EG_{in,y} \quad (2)$$

Where

BE_y	=	Baseline emission in year y (tCO ₂ e)
$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in year y (MWh)
$EG_{facility,y}$	=	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)
$EG_{out,y}$	=	Quantity of the electricity delivered to the grid by the project in year y (MWh/yr)
$EG_{in,y}$	=	Quantity of the electricity consumed by the project which is imported from the grid in year y (MWh/yr)
$EF_{grid,CM,y}$	=	Combined margin CO ₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO ₂ e/MWh)

The monthly electricity data and baseline emission are listed in the table 4 and table 5.

Table 4 The monthly electricity data for $EG_{out,y}$ and $EG_{in,y}$

Monitoring period	$EG_{out,y}$ (MWh)			$EG_{int,y}$ (MWh)			$EG_{facility,y}$ (MWh)
	Electricity Exported ($EG_{out,y}$)	Electricity Exported ($EG_{out,y}$)	Data for Calculation	Electricity Imported ($EG_{in,y}$)	Electricity Imported ($EG_{in,y}$)	Data for Calculation	
	A (data in the monthly report)	B (data in the sale receipt)	C=min(A,B)	D (data in the monthly report)	E(data in the purchase receipt)	F=max(D,E)	G=C-F
01-11-2020~30-11-2020	10,147.487	10,147.487	10,147.487	207.240	207.240	207.240	9,940.247
01-12-2020~31-12-2020	11,229.676	11,229.676	11,229.676	163.680	163.680	163.680	11,065.996
01-01-2021~31-01-2021	13,268.891	13,268.891	13,268.891	175.560	175.560	175.560	13,093.331
01-02-2021~28-02-2021	11,304.440	11,304.440	11,304.440	155.760	155.760	155.760	11,148.680
01-03-2021~31-03-2021	13,813.945	13,813.945	13,813.945	141.240	141.240	141.240	13,672.705
01-04-2021~30-04-2021	9,995.383	9,995.383	9,995.383	106.920	106.920	106.920	9,888.463
01-05-2021~31-05-2021	14,592.349	14,592.349	14,592.349	122.760	122.760	122.760	14,469.589
01-06-2021~30-06-2021	13,612.566	13,612.566	13,612.566	102.960	102.960	102.960	13,509.606
01-07-2021~31-07-2021	14,713.736	14,713.736	14,713.736	108.240	108.240	108.240	14,605,496
01-08-2021~31-08-2021	13,374.755	13,374.755	13,374.755	112.200	112.200	112.200	13,262.555
01-09-2021~30-09-2021	12,661.770	12,661.770	12,661.770	108.240	108.240	108.240	12,553.530
01-10-2021~31-10-2021	10,398.379	10,398.379	10,398.379	116.160	116.160	116.160	10,282.219
01-11-2021~30-11-2021	13,425.522	13,425.522	13,425.522	124.080	124.080	124.080	13,301.442

01-12-2021~31-12-2021	11,808.271	11,808.271	11,808.271	133.320	133.320	133.320	11,674.951
Total	174,347.170	174,347.170	174,347.170	1,878.360	1,878.360	1,878.360	172,468.810

Table 5 Calculation of the baseline emission

Monitoring period	$EG_{\text{facility},y}$ (MWh)	$EF_{\text{grid},CM,y}$ (tCO ₂ e/MWh)	BE _y (tCO ₂ e)
01-11-2020~31-12-2020	21,006.243	0.8568	17,998
01-01-2021~31-12-2021	151,462.567	0.8568	129,773
Total	172,468.810	0.8568	147,771

5.2 Project Emissions

As per the registered VCS PD, the Project emission (PE_y) is 0 tCO₂ e.

5.3 Leakage

No leakage emissions are considered as per the applied methodology ACM0002 and the registered VCS PD.

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)
01-Nov-2020~31-Dec-2020	17,998	0	0	17,998
01-Jan-2021~31-Dec-2021	129,773	0	0	129,773
Total	147,771	0	0	147,771

Comparison of actual emission reductions with estimates during validation:

The emission reductions achieved in the 3rd monitoring period are about 1.54%² less than the estimated value 150,079 tCO₂e³ which is calculated in line with the registered VCS PD, which is in the normal fluctuation range.

² $(147,771 \text{ tCO}_2\text{e} - 150,079 \text{ tCO}_2\text{e}) / 150,079 \text{ tCO}_2\text{e} = -1.54\%$

³ As per the registered VCS PD, the annual emission reduction is 150,079 tCO₂e, thus the estimated emission reduction in the monitoring period (covering 426 days) is 150,079 tCO₂e, i.e., $150,079 \text{ tCO}_2\text{e} = 128,589 \text{ tCO}_2\text{e} \times 426 \text{ days} / 365 \text{ days}$.

APPENDIX 1: <SUPPORTING EVIDENCE>

Evidence for SDG 7 and SDG 13: From project operation date onwards, the net electricity supplied to the grid and corresponding emission reduction in every monitoring period have been listed in below table. Please refer to following links for details.

<https://registry.verra.org/app/projectDetail/VCS/1406>

Period		EG _{facility,y}	ER
From	To	MWh	CO ₂ e
01-Nov-2020	31-Dec-2020	21,006.243	17,998
01-Jan-2021	31-Dec-2021	151,462.567	129,773
Total		172,468.810	147,771

Evidence for SDG 8: The partial labor contracts and monthly wage statement which have been submitted to VVB for verification are not included as appendices to this report due to confidentiality requirement of the project proponent.