



**Verified Carbon
Standard**

JINGYUAN COUNTY 100MW SOLAR POWER GENERATION PROJECT



ClimateBridge

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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 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, the annual average GHG emission reductions are estimated to be 128,589 tCO₂e, while the total GHG emission reductions during the first 10-year crediting period are estimated to be 1,285,890 tCO₂e.

The start date of commercial operation is dated on 29-December-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 29-December-2014 to 28-October-2019. The project operated in accordance with the registered VCS PD. Total GHG emission reduction achieved in this monitoring period is 549,989 tCO₂e

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.

Contribution to sustainable development

The project promotes local sustainable development through the following aspects:

- The project activity will displace the power generation of fossil fuel power plants, reducing CO₂, SO_x and NO_x emissions significantly, thus mitigating the air pollution and its adverse impacts on human health.
- Improvement of the fossil fuel dominated fuel mix of the electricity generation in the power grid by providing clean and renewable energy source, and help to energy supply security.

- Promote application and diffusion of the innovative/creative solar PV technology in China through the demonstrative practice of the project activity.

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
Contact person	Li Guoliang
Title	Director
Address	The crossing of East Youth Street, Ganzhou District, Zhangye City, Gansu Province
Telephone	+86 936 8226684
Email	hhsdyinlongxing@vip.163.com

1.4 Other Entities Involved in the Project

Organization name	Climate Bridge Ltd.
Role in the Project	VCU buyer
Contact person	Gao Zhiwen
Title	General Manager
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1.5 Project Start Date

29-December-2014 (commissioning start date).

1.6 Project Crediting Period

This project adopts renewable crediting periods of 25 years (from 29-December-2014 to 28-December-2039), and the first 10-year crediting period is from 29-December-2014 to 28-December-2024 (both days included).

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 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

The project has been registered as a VCS project with registration number 1406. The project hasn't participated in any other form of emission trading programs.

1.11 Sustainable Development

The project will help reduce GHG emissions versus the high-growth, coal dominated business-as-usual scenario. The proposed project promotes local sustainable development through the following aspects:

- The project activity will displace the power generation of fossil fuel power plants, reducing CO₂, SO_x and NO_x emissions significantly, thus mitigating the air pollution and its adverse impacts on human health.
- Improvement of the fossil fuel dominated fuel mix of the electricity generation in the power grid by providing clean and renewable energy source, and help to energy supply security.
- Promote application and diffusion of the innovative/creative solar PV technology in China through the demonstrative practice of the project activity.

2 SAFEGUARDS

2.1 No Net Harm

The Environmental Impact Assessment (EIA) of this project has been approved by Gansu Environmental Protection Bureau (Ganhuanshenbiaofa [2013] No.63) on 22-08-2013. According

to the approval comments of the EIA Report by the Environmental Protection Bureau of Gansu Province, the environmental impacts likely to be caused by the project are analyzed.

This project will not cause significant impact on the environment as to the conclusion of the EIA. The conclusions of EIA are documented below:

1) Ecological environment

The area influenced by the project construction is about 281.63 hm², all owned by government. The construction activity will destroy the nature vegetation. According to the prediction of water and soil erosion, the increased soil erosion during construction and commissioning period (totally 1 year) may be 29,705 t. Working area should be strictly defined and water-and-soil conservation measures should be implemented to minimize the water loss and soil erosion.

2) Acoustic environment

The noise during construction period is mainly from the operation of the construction equipment such as excavator and concrete mixer, the sound source is from 86 to 105 dB. Therefore, the mechanical equipment should be well maintained during the construction period to keep the lubrication and decrease noise. The temporary acoustical insulation measures should be applied for the equipment which would cause high noise and also reduce their working hours to minimize the influence to acoustic environment around the project.

The noise during operation period is mainly from main transformer whose sound source is 84 dB (A). After acoustical insulation and range attenuation, the noise inside the project boundary can meet the standard II of GB12348-2008.

3) Air environment

During the construction period, the activities of construction for buildings and roads will cause some ground excavation and massive earthwork transport, which will generate raise dust in the windy days and bring negative impact to local air environment in short time; the transport vehicle will aggravate the raise dust and the TSP concentration will exceed the limit. But due to the range attenuation of TSP, as long as there are effective prevention and treatment, the impact will be minimized to least.

4) Water environment

The highest amount of domestic sewage generated during construction period is about 4.8m³/d which is mainly inside the living area. The temporary toilet built for compost treatment will prevent the pollution of water environment. The waste water from construction will be collected in sedimentation tank without discharge and then used for reducing road dust after treatment.

The amount of domestic sewage generated during operation period is about 0.8m³/d (292.0m³/a). EIA suggests that the water after treatment should reach the Water Quality Standard for Farmland Irrigation (GB5084-2005) and can be used for greenbelt around the plant area. In addition, a tank of 100m³ will be built for temporary storage of waste water during winter season when no irrigation needed.

5) Solid waste environment

No waste earth and stone during construction period will be stockpiled, and the domestic garbage generated during construction and operation period will be gathered into the garbage bags and then transported to collection site in Wuhe County for disposal.

After 15 years of operation, the polysilicon batteries will be replaced step by step. Totally 390,364 used batteries will be recycled by manufacture.

All dangerous waste will be gathered and transported to Gansu Hazardous Waste Disposal Centre.

6) Light and shadow impact

According to on-site field investigation, there are all waste land around the project site and no main traffic line passing through the project area, so there should be no disturbed condition of moving vehicles influenced by light pollution after implementation of the project.

Thus, being a solar power generation project, there are no negative environmental and/or socio-economic impacts due to the project.

2.2 Local Stakeholder Consultation

Local Stakeholder Consultation during the project preparation stage:

In September 2014, 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 1** as below:

Table 1 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%
	Advantageous	26	86.67%
	No impact	4	13.33%

Impact on the local residents' employment opportunities and income.	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.

Local Stakeholder Consultation during the project implementation stage:

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. There are no negative comments received for the project. In line with VCS requirements all the processes have been implemented to receive comments from local stakeholders as well as communicate with them at periodic intervals.

2.3 AFOLU-Specific Safeguards

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--December-2014. The electricity generated by the Project is delivered to NWPg.

The technical parameters of the main equipment for the project are shown in **Table 2**.

Table 2 Parameters of the equipment used in the proposed project

Photovoltaic Modules (Polysilicon)							
Manufacturer	Trina Solar Co., Ltd.		Hareon Solar Co., Ltd.		JA Solar Co., Ltd.		
Type	TSM-255PC05 A	TSM-265PC05 A	HR-255P-18/Bb	HR-260P-18/Bb	JAP6-60-255/3BB	JAP6-60-260/3B B	JAP6-60-265/3B B
Quantity	36,608	16,500	220,892	64,522	31,988	35,420	8,580
Rated maximum power (P _{max})	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-February-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	China DNA
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	641,913.148
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 no less than 0.5. The calibration will be conducted annually subject to national standards. Data monitored continuously and aggregated monthly.		
Frequency of monitoring/recording	Measured continuously and recorded monthly		
Value monitored	646,847.256		
Monitoring equipment	Electric meters		
		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-November-2014; 29-November-2015; 29-November-2016; 29-November-2017; 29-November-2018;	29-November-2014; 29-November-2015; 29-November-2016; 29-November-2017; 29-November-2018;
	Validity	28-November-2015; 28-November-2016; 28-November-2017; 28-November-2018; 28-November-2019	28-November-2015; 28-November-2016; 28-November-2017; 28-November-2018; 28-November-2019
QA/QC procedures to be applied	Cross check measurement results with records for sold electricity		
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 no less than 0.5. The calibration will be conducted annually subject to national standards. Data monitored continuously and aggregated monthly.		
Frequency of monitoring/recording	Measured continuously and recorded monthly		
Value monitored	4,934.108		
Monitoring equipment	Electric meters		
		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-November-2014; 29-November-2015; 29-November-2016; 29-November-2017; 29-November-2018;	29-November-2014; 29-November-2015; 29-November-2016; 29-November-2017; 29-November-2018;
	Validity	28-November-2015; 28-November-2016; 28-November-2017; 28-November-2018; 28-November-2019	28-November-2015; 28-November-2016; 28-November-2017; 28-November-2018; 28-November-2019
QA/QC procedures to be applied	Cross check measurement results with records for purchased electricity		
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:

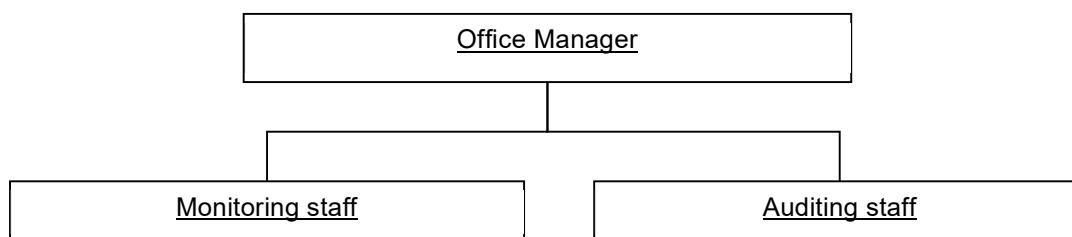


Figure 2 Organization structure of the monitoring team

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/T448-2000) 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.

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

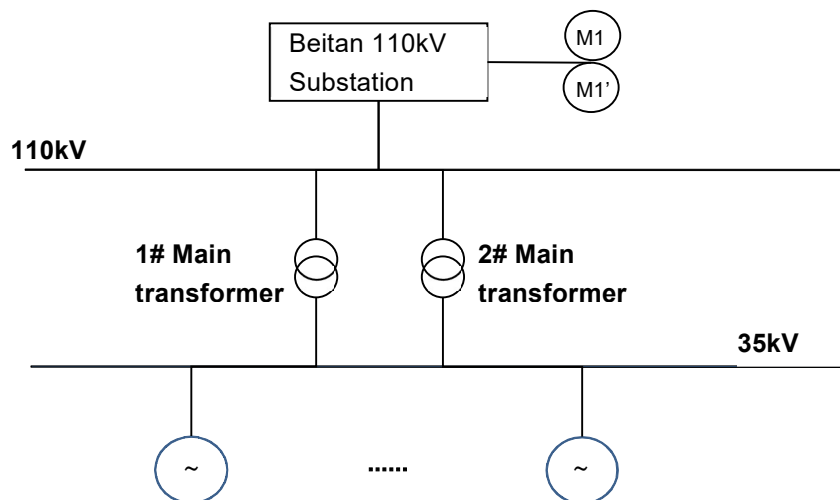


Figure 3 Power line diagram of the monitoring system

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 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 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 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 will be calibrated and checked annually for accuracy;
- Calibration will be 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 VCU, whichever is later.

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 “ <i>Tool to calculate the emission factor for an electricity system</i> ” (tCO ₂ e/MWh)

The monthly electricity data and baseline emission are listed in the table 3 and table 4.

Table 3 The monthly electricity data for $EG_{out,y}$ and $EG_{in,y}$

Monitoring period	$EG_{out,y}$ (MWh)			$EG_{in,y}$ (MWh)			$EG_{facility,y}$ (MWh)
	Monthly reports	ETN Data	Data for Calculation	Monthly reports	ETN Data	Data for Calculation	
	A	B	$C=\min(A,B)$	D	E	$F=\max(D,E)$	
29-12-2014~31-12-2014	50.424	50.424	50.424	0	0	0	50.424
Subtotal	50.424	50.424	50.424	0	0	0	50.424
01-01-2015~28-01-2015	6,252.576	6,252.576	6,252.576	69.960	69.960	69.960	6,182.616
29-01-2015~26-02-2015	8,060.052	8,060.052	8,060.052	99.000	99.000	99.000	7,961.052
27-02-2015~28-03-2015	11,234.520	11,234.520	11,234.520	81.840	81.840	81.840	11,152.680
29-03-2015~28-04-2015	12,955.668	12,955.668	12,955.668	87.120	87.120	87.120	12,868.548
29-04-2015~28-05-2015	14,144.064	14,144.064	14,144.064	73.920	73.920	73.920	14,070.144
29-05-2015~28-06-2015	10,479.744	10,479.744	10,479.744	71.280	71.280	71.280	10,408.464
29-06-2015~28-07-2015	9,139.020	9,139.020	9,139.020	69.960	69.960	69.960	9,069.060
29-07-2015~28-08-2015	9,373.320	9,373.320	9,373.320	67.320	67.320	67.320	9,306.000
29-08-2015~28-09-2015	9,378.336	9,378.336	9,378.336	81.840	81.840	81.840	9,296.496
29-09-2015~28-10-2015	8,526.276	8,526.276	8,526.276	89.760	89.760	89.760	8,436.516
29-10-2015~28-11-2015	7,060.680	7,060.680	7,060.680	104.280	104.280	104.280	6,956.400
29-11-2015~28-12-2015	9,124.236	9,124.236	9,124.236	106.920	106.920	106.920	9,017.316

Subtotal	115,728.492	115,728.492	115,728.492	1,003.200	1,003.200	1,003.200	114,725.292
29-12-2015~28-01-2016	8,492.088	8,492.088	8,492.088	113.520	113.520	113.520	8,378.568
29-01-2016~26-02-2016	7,873.272	7,873.272	7,873.272	106.920	106.920	106.920	7,766.352
27-02-2016~28-03-2016	8,589.636	8,589.636	8,589.636	69.960	69.960	69.960	8,519.676
29-03-2016~28-04-2016	10,719.456	10,719.456	10,719.456	85.800	85.800	85.800	10,633.656
29-04-2016~28-05-2016	10,398.036	10,398.036	10,398.036	73.920	73.920	73.920	10,324.116
29-05-2016~28-06-2016	10,487.400	10,487.400	10,487.400	71.280	71.280	71.280	10,416.120
29-06-2016~28-07-2016	7,812.288	7,812.288	7,812.288	69.960	69.960	69.960	7,742.328
29-07-2016~28-08-2016	11,878.416	11,878.416	11,878.416	76.560	76.560	76.560	11,801.856
29-08-2016~28-09-2016	12,791.196	12,791.196	12,791.196	85.800	85.800	85.800	12,705.396
29-09-2016~28-10-2016	9,944.880	9,944.880	9,944.880	79.200	79.200	79.200	9,865.680
29-10-2016~28-11-2016	12,368.532	12,368.532	12,368.532	102.960	102.960	102.960	12,265.572
29-11-2016~28-12-2016	7,851.888	7,851.888	7,851.888	106.920	106.920	106.920	7,744.968
Subtotal	119,207.088	119,207.088	119,207.088	1,042.800	1,042.800	1,042.800	118,164.288
29-12-2016~28-01-2017	10,624.152	10,624.152	10,624.152	112.200	112.200	112.200	10,511.952
29-01-2017~26-02-2017	7,241.256	7,241.256	7,241.256	104.280	104.280	104.280	7,136.976
27-02-2017~28-03-2017	11,600.688	11,600.688	11,600.688	80.520	80.520	80.520	11,520.168
29-03-2017~28-04-2017	12,119.448	12,119.448	12,119.448	81.840	81.840	81.840	12,037.608
29-04-2017~28-05-2017	13,846.140	13,846.140	13,846.140	71.280	71.280	71.280	13,774.860
29-05-2017~28-06-2017	14,189.736	14,189.736	14,189.736	69.960	69.960	69.960	14,119.776

29-06-2017~28-07-2017	14,532.408	14,532.408	14,532.408	69.960	69.960	69.960	14,462.448
29-07-2017~28-08-2017	11,982.432	11,982.432	11,982.432	75.240	75.240	75.240	11,907.192
29-08-2017~28-09-2017	10,444.764	10,444.764	10,444.764	81.840	81.840	81.840	10,362.924
29-09-2017~28-10-2017	8,661.444	8,661.444	8,661.444	81.840	81.840	81.840	8,579.604
29-10-2017~28-11-2017	13,145.748	13,145.748	13,145.748	97.680	97.680	97.680	13,048.068
29-11-2017~28-12-2017	10,083.348	10,083.348	10,083.348	102.960	102.960	102.960	9,980.388
Subtotal	138,471.564	138,471.564	138,471.564	1,029.600	1,029.600	1,029.600	137,441.964
29-12-2017~28-01-2018	9,873.600	9,873.600	9,873.600	109.560	109.560	109.560	9,764.040
29-01-2018~26-02-2018	12,496.176	12,496.176	12,496.176	102.960	102.960	102.960	12,393.216
27-02-2018~28-03-2018	16,457.892	16,457.892	16,457.892	83.160	83.160	83.160	16,374.732
29-03-2018~28-04-2018	14,805.384	14,805.384	14,805.384	81.840	81.840	81.840	14,723.544
29-04-2018~28-05-2018	15,023.976	15,023.976	15,023.976	69.960	69.960	69.960	14,954.016
29-05-2018~28-06-2018	14,117.004	14,117.004	14,117.004	69.960	69.960	69.960	14,047.044
29-06-2018~28-07-2018	12,336.192	12,336.192	12,336.192	66.000	66.000	66.000	12,270.192
29-07-2018~28-08-2018	11,717.904	11,717.904	11,717.904	71.228	71.228	71.228	11,646.676
29-08-2018~28-09-2018	8,649.696	8,649.696	8,649.696	81.840	81.840	81.840	8,567.856
29-09-2018~28-10-2018	12,542.218	12,542.218	12,542.218	91.080	91.080	91.080	12,451.138
29-10-2018~28-11-2018	11,294.870	11,294.870	11,294.870	97.680	97.680	97.680	11,197.190
29-11-2018~28-12-2018	10,638.936	10,638.936	10,638.936	101.640	101.640	101.640	10,537.296
Subtotal	149,953.848	149,953.848	149,953.848	1,026.908	1,026.908	1,026.908	148,926.940

29-12-2018~28-01-2019	11,356.594	11,356.594	11,356.594	110.880	110.880	110.880	11,245.714
29-01-2019~26-02-2019	10,241.246	10,241.246	10,241.246	104.280	104.280	104.280	10,136.966
27-02-2019~28-03-2019	15,208.142	15,208.142	15,208.142	83.160	83.160	83.160	15,124.982
29-03-2019~28-04-2019	14,656.224	14,656.224	14,656.224	83.160	83.160	83.160	14,573.064
29-04-2019~28-05-2019	10,578.058	10,578.058	10,578.058	73.920	73.920	73.920	10,504.138
29-05-2019~28-06-2019	9,907.128	9,907.128	9,907.128	76.560	76.560	76.560	9,830.568
29-06-2019~28-07-2019	15,118.752	15,118.752	15,118.752	66.000	66.000	66.000	15,052.752
29-07-2019~28-08-2019	13,354.334	13,354.334	13,354.334	71.280	71.280	71.280	13,283.054
29-08-2019~28-09-2019	11,644.512	11,644.512	11,644.512	83.160	83.160	83.160	11,561.352
29-09-2019~28-10-2019	11,370.850	11,370.850	11,370.850	79.200	79.200	79.200	11,291.650
Subtotal	123,435.840	123,435.840	123,435.840	831.600	831.600	831.600	122,604.240
Total	646,847.256	646,847.256	646,847.256	4,934.108	4,934.108	4,934.108	641,913.148

Table 4 Calculation of the baseline emission

Monitoring period	EG _{facility,y} (MWh)	EF _{grid,CM,y}	BE _y (tCO ₂)
29-12-2014~31-12-2014	50.424	0.8568	43
01-01-2015~28-12-2015	114,725.292	0.8568	98,296
29-12-2015~28-12-2016	118,164.288	0.8568	101,243
29-12-2016~28-12-2017	137,441.964	0.8568	117,760
29-12-2017~28-12-2018	148,926.940	0.8568	127,600
29-12-2018~28-10-2019	122,604.240	0.8568	105,047
Total	641,913.148		549,989

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)
29-12-2014~31-12-2014	43	0	0	43
01-01-2015~28-12-2015	98,296	0	0	98,296
29-12-2015~28-12-2016	101,243	0	0	101,243
29-12-2016~28-12-2017	117,760	0	0	117,760
29-12-2017~28-12-2018	127,600	0	0	127,600
29-12-2018~28-10-2019	105,047	0	0	105,047
Total	549,989	0	0	549,989

Comparison of actual emission reductions with estimates during validation:

The emission reductions achieved in the 1st monitoring period are about 11.55%¹ less than the estimated value 621,807tCO₂e² which is calculated in line with the registered PD. It is mainly because of the unstable performance due to the initial operation of the project.

¹ $(549,989 - 621,807) / 621,807 = -11.55\%$

² As per the registered PD, the annual emission reduction is 128,589 tCO₂e, thus the estimated emission reduction in the monitoring period (covering 1,765 days) is 621,807tCO₂e, ie. $621,807 = 128,589 * 1,765 / 365$.