

Gold standard for the global goals
Monitoring report



June 2017, version 1

Title of the project	40 MW Orange Charanka Solar Power Project in Gujarat, India
Gold Standard project id	GS5866
Version number of the monitoring report	02
Completion date of the monitoring report	15/06/2020
Date of project design certification	19/04/2018
Start date of crediting period	04/08/2017
Duration of this monitoring period	01/08/2018 to 29/02/2020 (Both days included)
Duration of previous monitoring period	04/08/2017 to 31/07/2018 (Both days included)
Project representative(s)	Orange Charanka Solar Energy Private Limited
Host Country	India
Certification pathway (activity certification/impact certification)	Activity Certification
SDG Contributions targeted (as per approved PDD)	1 - SDG 7 Affordable and Clean Energy 2 - SDG 8 Decent Work and Economic Growth 3 - SDG 13 Climate Action
Gold Standard statement/product certification sought (GSVER/ADALYs/RECs etc.)	GS VERs
Selected methodology(ies)	ACM0002 "Grid-connected electricity generation from renewable sources" Version 17.0
Estimated amount of annual average certified SDG impact (as per approved PDD)	SDG 7: 86,347MWh 136735 MWh for this monitoring period SDG 8: The income to all the workers are made in line with the minimum wage specified by the government time to time. Minimum 1 training to be carried out annually SDG 13: 84,421 tCO ₂ /year 133,686 tCo ₂ for this Monitoring Period
Total amount of certified SDG impact (as per approved methodology) achieved in this monitoring period	SDG 7: 135,325 MWh SDG 8: 04 Trainings INR: 8,935,512 34 Staff SDG 13: 132,305 tCO ₂

SECTION A. Description of project

A.1. Purpose and general description of project

>> The project activity is a 40 MW solar power project, promoted by Orange Charanka Solar Power Private Limited (OCSPPPL). The purpose of the project activity is to generate clean electricity with utilization of solar energy. The project activity aims to harness solar energy through installation of PV with total installed capacity of 40MWac (corresponding to 53.4MWp).

The electricity generated by the project is exported to the Indian electricity grid. The project activity therefore displaces an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid and thereby reduces the associated CO2 emissions.

Placements of the Purchase Orders i.e. start date of the project activity 19th December 2016. Commissioning Date of the project activity is 4th August 2017. The project is in continuous operation since the implementation. No unforced error or breakdown details were identified for the present monitoring period.

The Emission Reductions as per the vintage break-up (2018, 2019 and 2020) in the monitoring in the following format:

01/08/2018 to 31/12/2018: **32,776 tCO2e**

01/01/2019 to 31/12/2019: **84,137 tCO2e**

01/01/2020 to 29/02/2020: **15,392 tCO2e**

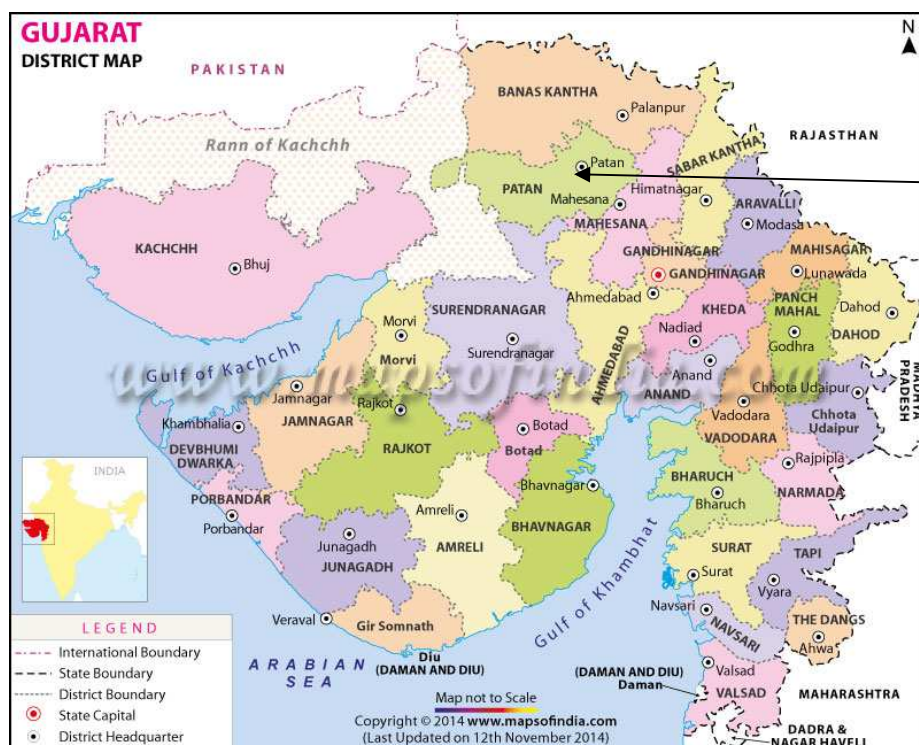
A.2. Location of project

>> OCSPPPL has installed solar PV panels at Charanka, Santalpur, District Patan in the State of Gujarat, India.

Geographical coordinates is given below:

Project Investors' Name	Latitude	Longitude	Commissioning Status
Orange Charanka Solar Energy Private Limited	23° 54' 26.45" N	71° 12' 4.79" E	04/08/2017

The geographical location of the project site is as shown below:



Project Site

A.3. Reference of applied methodology

- >> **Title:** Consolidated baseline and monitoring methodology for “Grid-connected electricity generation from renewable sources”
References: Approved consolidated baseline methodology ACM0002 “Grid-connected electricity generation from renewable sources” (Version 17.0, EB 89¹)

A.4. Crediting period of project

- >> Type of Crediting Period : Renewable
 Start date of the crediting period : 04/08/2017
 Length of the current crediting period : 7 years

SECTION B. Implementation of project

B.1. Description of implemented project

- >> The project activity aims to harness solar energy through installation of PV with total installed capacity of 40MW_{ac} (corresponding to 53.4MWp). The solar PV power plant will have solar PV modules, inverters, transformers and other protection system and supporting components as under:

Solar PV modules

Make	JA Solar	JA Solar
Technology	60-cell multi Crystalline	60-cell multi Crystalline
Model	JAP 6(K) 60 265 4BB	JAP 6(K) 60 270 4BB
Capacity	265 Wp	270 Wp
No. of Modules	80784	118656
Capacity, MW (DC)	21.408 MWp	32.037 MWp
Total Capacity, MW (DC)	53.445 MWp	
Total Capacity, MW (AC)	40 MW	

¹ <http://cdm.unfccc.int/methodologies/DB/EY2CL7RTEHRC9V6YQHAR6MJ6VEU83>

Inverters

Make	ABB	Huawei
Model	PVS800-57	SUN2000-43KTL-IN-C1
Rated Capacity	1000 kVA	43 kVA
No. of Inverters	36	94
Rated Input Voltage	1000 V DC	1000 V DC

Transformers

Make	Raychem RPG	Raychem RPG	Crompton Greaves	Recons Power Equipments
Model No.	ADA1419025	ADA1419026	MT 7984	
Capacity	4000 kVA	4000 kVA	20/25 MVA	100 kVA
No. of Transformers	09	01	02	01
Voltage Ratio	4 x 380 V/ 11 kV	2 x 500 V/ 11 kV	11 / 66 kV	415 V / 11 kV

The solar PV modules have a useful life of 25 years

B.2. Post-registration changes

B.2.1. Temporary deviations from Certified Key Project Information, Project Design Document, Monitoring & Reporting Plan, applied methodology or applied standardized baseline

>> There are no deviations/delays regarding the implementation status from registered PDD, Monitoring & Reporting Plan, applied methodology or applied standardized baseline.

B.2.2. Corrections

>> Not Applicable

B.2.3. Changes to start date of crediting period

>> Not Applicable

B.2.4. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

>> Not Applicable

B.2.5. Changes to project design of approved project

>> Not Applicable

SECTION C. Description of monitoring system applied by the project

>> The export and import energy is measured continuously using Main and Check meters. Export & Import readings of Main meters is taken on monthly basis by authorized officer of Gujrat Urja Vikas Nigam Limited (GUVNL) in the presence of PP or representative of PP. Based on the readings, invoices are raised by the Project Participant. These invoices can be used for cross checking the meter readings taken for the project activity.

Month	Export (MWh)	Import (MWh)	Net (MWh)
01-08-18 to 31-08-18	4656	32	4624
Sep-18	6478	33	6445
Oct-18	7827	35	7791
Nov-18	7342	35	7307
Dec-18	7395	39	7357
Jan-19	7755	38	7716
Feb-19	7654	33	7621
Mar-19	8888	34	8854
Apr-19	8597	31	8567
May-19	8588	30	8558
Jun-19	6728	29	6699
Jul-19	6482	29	6453
Aug-19	5632	32	5600
Sep-19	5625	32	5593
Oct-19	7404	34	7370
Nov-19	6041	35	6006
Dec-19	7058	37	7020
Jan-20	7731	40	7692
01/02/2020 to 29/02/2020	8087	35	8051
Total	135,966	642	135,325

Data collection and archiving

Export & Import readings from main and check meters will be collected under the supervision of the authorized representatives of PP. The net electricity supplied to grid would be calculated based on export & import readings. The period of storage of the monitored data will be 2 years after the end of crediting period or until the last issuance of CERs for the project activity whichever occurs later.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Relevant SDG Indicator	SDG13.2.1: Climate Action
Data/parameter:	EF _{grid,OM,y}
Unit	tCO ₂ /MWh
Description	Operating Margin CO ₂ emission factor in year y

Source of data	Calculated from CEA database, Version 11, April 2016 http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver11.pdf
Value(s) applied)	0.9941
Choice of data or measurement methods and procedures	Calculated as per “Tool to calculate the emission factor for an electricity system, version 06.0.0” as 3-year generation weighted average using data for the years 2012-2013, 2013-2014 & 2014-15. The data are obtained from “CO2 Baseline Database for Indian Power Sector” version 11.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	For the calculation of the Baseline Emission
Additional comments	This parameter is fixed ex-ante for the entire crediting period.

Relevant SDG Indicator	SDG13.2.1: Climate Action
Data/parameter:	$EF_{grid,BM,y}$
Unit	tCO ₂ /MWh
Description	Build Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 11, April 2016 http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver11.pdf
Value(s) applied)	0.9285
Choice of data or measurement methods and procedures	Calculated as per “Tool to calculate the emission factor for an electricity system, version 06.0.0”. The data are obtained from “CO ₂ Baseline Database for Indian Power Sector” version 11.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	For the calculation of the Baseline Emission
Additional comments	This parameter is fixed ex-ante for the entire crediting period.

Relevant SDG Indicator	SDG13.2.1: Climate Action
Data/parameter:	$EF_{grid,CM,y}$
Unit	tCO ₂ /MWh
Description	Combined Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 11, April 2016 http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver11.pdf
Value(s) applied)	0.9777
Choice of data or measurement methods and procedures	Calculated as per “Tool to calculate the emission factor for an electricity system, version 06”. The data is obtained from “CO ₂ Baseline Database for Indian Power Sector” version 11.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	For the calculation of the Baseline Emission
Additional comments	This parameter is fixed ex-ante for the entire crediting period.

D.2. Data and parameters monitored

Relevant SDG Indicator	SDG 7.2.1: Affordable and Clean Energy																										
Data/parameter:	EG _{facility,y}																										
Unit	MWh																										
Description	Quantity of net electricity supplied by the project plant to the grid																										
Measured/calculated/default	Calculated (based on the measured values of electricity exported and imported)																										
Source of data	Monthly Meter Reading Reports																										
Value(s) of monitored parameter	135,325 MWh																										
Monitoring equipment	The electricity exported & imported are measured by Energy meter installed at substations. The reading is recorded and the difference from last month reading gives the number of units imported/exported. Two sets of energy meters (main & check) installed. The details are the meters are given below: Meters of Charanka Solar Park Substation site <table><tr><th>Details</th><th>Main meter</th><th>Check meter</th></tr><tr><td>Meter Number</td><td>GJ3845A</td><td>GJ3846A</td></tr><tr><td>Make</td><td>Secure</td><td>Secure</td></tr><tr><td>Accuracy class</td><td>0.2S</td><td>0.2S</td></tr><tr><td>Location</td><td>Substation</td><td>Substation</td></tr><tr><td>Meters Commissioned</td><td>12/06/2017</td><td>12/06/2017</td></tr><tr><td>Meters synchronization date</td><td>28/07/2017</td><td>28/07/2017</td></tr><tr><td>Last calibration</td><td>30/08/2017 (valid up to 29/08/2022)</td><td>06/10/2017 (valid up to 05/10/2022)</td></tr></table> *All the meters are of “Secure Make: with 0.2s Accuracy class. Calibration frequency: Once in 5 years as per CEA guidelines			Details	Main meter	Check meter	Meter Number	GJ3845A	GJ3846A	Make	Secure	Secure	Accuracy class	0.2S	0.2S	Location	Substation	Substation	Meters Commissioned	12/06/2017	12/06/2017	Meters synchronization date	28/07/2017	28/07/2017	Last calibration	30/08/2017 (valid up to 29/08/2022)	06/10/2017 (valid up to 05/10/2022)
Details	Main meter	Check meter																									
Meter Number	GJ3845A	GJ3846A																									
Make	Secure	Secure																									
Accuracy class	0.2S	0.2S																									
Location	Substation	Substation																									
Meters Commissioned	12/06/2017	12/06/2017																									
Meters synchronization date	28/07/2017	28/07/2017																									
Last calibration	30/08/2017 (valid up to 29/08/2022)	06/10/2017 (valid up to 05/10/2022)																									
Measuring/reading/recording frequency:	Measuring Frequency: Continuous Frequency of Recording: Monthly																										
Calculation method (if applicable):	<u>Method:</u> The Net electricity supplied to the grid by the project activity will be calculated as a difference of electricity exported to the grid, electricity imported from the grid obtained from Monthly Meter reading reports provided by SEB as per below equation: $EG_{\text{facility},y} = EG_{\text{Export}} - EG_{\text{Import}}$																										
QA/QC procedures:	Quantity of net electricity supplied to the grid will be cross checked from the Invoices/ Monthly Bill raised by the Project Participant to SECI.																										
Purpose of data:	To monitor the contribution to SDG 7 (Ensure access to affordable, reliable, sustainable and modern energy for all)																										
Additional comments:	-																										

Relevant SDG Indicator	SDG 13.2.1: Climate Action
Data/parameter:	Emissions Reductions in tCO ₂
Unit	tCO ₂

Description	CO2 emission reduction
Measured/calculated/default	Calculated
Source of data	Central Electricity Authority: "CO2 Emission Database CEA CO2 Baseline database Version 11" published by Central Electricity Authority (CEA), Ministry of Power, Government of India. http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver11.pdf
Value(s) of monitored parameter	132,305 tCO2 emission reductions achieved during the reported monitoring period. The applied OM & BM for the project are as following: Operating Margin: 0.9941 tCO2/MWh Build Margin: 0.9285 tCO2/MWh The applied Combined margin for the project activity is 0.9777 tCO2/MWh. This high emission factor signifies the fact that the electricity being fed in the Indian grid (earlier NEWNE) is highly carbon intensive. Every MWh of electricity generated by the project activity prevents further emissions.
Monitoring equipment	-
Measuring/reading/recording frequency:	Once every monitoring period
Calculation method (if applicable):	The parameter is calculated below: In the baseline, there were no Social Development activities taking place; whereas baseline Emissions for electricity supplied by project activity, BE _y is calculated as: $BE_y = EG_{PJ,y} * EF_{grid,CM,y}$ Where, BE _y = Baseline emissions in year y (tCO2/yr) EG _{PJ,y} = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr). EF _{grid,CM,y} = Combined margin CO2 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" (tCO2/MWh)
QA/QC procedures:	-
Purpose of data:	To monitor the contribution to SDG 13 (Take urgent action to combat climate change and its impacts)
Additional comments:	-

Relevant SDG Indicator	SDG 8.5.1: Decent Work and Economic Growth
Data/parameter:	Quality of employment
Unit	Number of Trainings provided to project employees
Description	Trainings provided to employees
Measured/calculated/default	Measured
Source of data	Training Records

Value(s) of monitored parameter	04 trainings were conducted to the employees during the monitoring period:			
	S. No.	Name of Trainings	No. of attendees	Date of Training
	1	Tilting of Module Mounting Structure (MMS) Training	11	29/10/2018
	2.	Pre-Monsoon Training	12	04/07/2019
	3.	Training on waste management	07	04/09/2019
	4.	On-Load Tap-Changer (OLTC) and N2 Fire Protection	09	25/12/2019
Monitoring equipment	The Project personnel observes and take records in Training Records once in a year; there is no equipment to monitor it.			
Measuring/reading/recording frequency:	Annually			
Calculation method (if applicable):	Manually by PP representative			
QA/QC procedures:	Transparent data collection, analysis and reporting is done to identify and record the no. of trainings provided to the employees as well as employment generated due to project activity.			
Purpose of data :	Continuation of regular trainings/workshops for employees & O&M staffs. Further, HSE trainings have also been conducted during the monitoring period which impacts positively to the Safeguarding principle 3.3 'Community Health, Safety and Working Conditions'			
Additional comments:	The records of training & workshops have been submitted to the assessment team. The training programmes help in making the workforce efficient and skilled at their job. This not only helps the company but also adds to growth of individual employees. Thus, the project has a positive impact on the parameter.			

Relevant SDG Indicator	SDG 8.5.1: Decent Work and Economic Growth
Data/parameter:	Quantitative employment and income generation
Unit	Number of staffs involved in the project
Description	Number of people employed directly due to the project activity
Measured/calculated/default	Measured
Source of data	Declaration letter from the PP
Value(s) of monitored parameter	During the current monitoring period there are a Total of 34 employees. Income provided to the employees for the monitoring period: :8,935,512 INR
Monitoring equipment	The Project personnel keep the records in the employees register and records once in a year; there is no equipment to monitor it.
Measuring/reading/recording frequency:	Annually
Calculation method (if applicable):	Manually by PP representative
QA/QC procedures:	The number of persons employed would be mentioned in the plant register, which can be crossed checked with daily attendance register.

Purpose of data	To monitor the contribution to SDG 8
Additional comments:	The declaration with the Number of employees involved in the project, the income generated due to project and the salary certificates have been submitted to the assessment team.

Break-Up	Number of Employees
Skilled	10
Non-Skilled	24
Local	26
Non-Local	08

D.3. Implementation of sampling plan

No sampling process is involved, hence not applicable. The details of sampling any of carried out during the course of verification will be included.

SECTION E. Calculation of SDG outcomes

E.1. Calculation of baseline value or estimation of baseline situation of each SDG outcome

In the baseline, there were no Social Development activities taking place; whereas baseline Emissions for electricity supplied by project activity, BE_y is calculated as:

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

Where,

BE_y = Baseline emissions in year y (tCO₂/yr)

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

$EF_{grid,CM,y}$ = Combined margin CO₂ 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" (tCO₂/MWh)

Thus, the estimated baseline situation of each SDG outcome is summarised as follows:

Item	Baseline estimate
SDG 7: Affordable and Clean Energy	No Activities in the baseline
SDG 8: Decent Work and Economic Growth	No Activities in the baseline
SDG 13: Climate Action	Emission of 132,305 tCO₂

E.2. Calculation of project value or estimation of project situation of each SDG outcome

>> The company conducts regular surveys during construction as well as O&M phases in the villages near project locations to check the requirement of facilities by the villages and the SDGs impacted in this monitoring period.

SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all	<u>Method:</u> The Net electricity supplied to the grid by the project activity will be calculated as a difference of electricity exported to the grid, electricity imported from the grid obtained from Monthly Meter reading reports provided by SEB as per below equation: $EG_{\text{facility},y} = EG_{\text{Export}} - EG_{\text{Import}}$ <u>Frequency:</u> Monthly <u>QA/QC procedures:</u> Quantity of net electricity supplied to the grid will be cross checked from the Invoices/ Monthly Bill raised by the Project Participant to Solar Energy Corporation of India Ltd. (SECI) <u>Purpose:</u> To measure the electricity produced and supplied to the grid Quantity of net electricity supplied to the grid Project Value for this monitoring period: 135,325 MWh for this Monitoring Period
SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	<u>Method:</u> Ongoing data collection and storage under HSE records & HR Records. <u>Frequency:</u> Annual <u>QA/QC procedures:</u> Transparent data collection, analysis and reporting. <u>Purpose:</u> To identify and record the no. of trainings provided to the employees as well as employment generated due to project activity Quantitative employment, income generation and trainings provided to employees & O&M staff for this monitoring period: : 4 trainings : 34 employees : 8,935,512 INR
SDG 13: Take urgent action to combat climate change and its impacts	<u>Method:</u> Using processes and equations provided under “Tool to calculate the emission factor for an electricity system”, v6 and referencing data from CEA database v11. <u>Frequency:</u> Every monitoring period <u>QA/QC procedures:</u> Transparent data collection, analysis, calculation and reporting. <u>Purpose:</u> To calculate emissions avoided due to the project activity CO2 emission reduction and reduction in dust generation for this monitoring period: 132,305 tCO2 for this Monitoring Period.

E.3. Calculation of net benefits as difference of baseline and project values or direct calculation for each SDG outcome

Item	Baseline Value	Project Value	Net benefit
SDG 7: Affordable and Clean Energy	0 MWh	135,325 MWh	135,325 MWh
SDG 8: Decent Work and Economic Growth	-	4 Training INR: 8,935,512 34 Staff	4 Training INR: 8,935,512 34 Staff
SDG 13: Climate Action	132,305tCO2	0	132,305tCO2

E.4. Summary of ex-post values of each SDG outcome for the current monitoring period

Item	Baseline estimate	Project estimate	Net benefit
SDG 7: Affordable and Clean Energy	0 MWh	86,347 MWh/year 1,36,736 MWh for the Monitoring Period (578 days)	135,325 MWh
SDG 8: Decent Work and Economic Growth	-	4 Training INR: 8,935,512 34 Staff	2 Training INR: 8,935,512 34 Staff
SDG 13: Climate Action	132,305tCO2	0	132,305 tCO2

E.5. Comparison of actual value of outcomes with estimates in approved PDD

Item	Values estimated in ex ante calculation of approved PDD	Actual values achieved during this monitoring period
SDG 7: Affordable and Clean Energy	86,347 MWh/Year (365 days) 1,36,736 MWh for the Monitoring Period (578 days)	135,325 MWh
SDG 8: Decent Work and Economic Growth	1 Training - -	2 Training INR: 8,935,512 34 Staff
SDG 13: Climate Action	84,421 tCO2 /Year 1,33,686 tCO2 for the monitoring period (578 days)	132,305 tCO2

E.6. Remarks on difference from estimated value in approved PDD

Item	Values estimated in ex ante calculation of approved PDD	Actual values achieved during this monitoring period
SDG 7: Affordable and Clean Energy	86,347 MWh/Year 136,736 MWh for the Monitoring Period (578 days)	135,325 MWh
SDG 8: Decent Work and Economic Growth	1 Training - -	04 Training INR: 8,935,512 34 Staff
SDG 13: Climate Action	84,421 tCO2 133,686 tCO2 for the monitoring period (578 days)	132,305 tCO2

The actual achieved emission reduction for this monitoring period is 1.03% less than estimated value in the PDD as the generation depends on the solar conditions. Also, it does not have a material impact on the additionality.

SECTION F. Stakeholder inputs and legal disputes

F.1. List all inputs/grievances which have been received for the project during the monitoring period together with their respective answers/actions

No grievances received for the project during the monitoring period together with their respective answers/actions.

F.2. List all inputs/grievances from previous monitoring period where follow up action is to be verified in this monitoring period

There is no input/grievance from previous monitoring period thus no action needs to follow up in this monitoring period.

F.3. Provide details of any legal contest or dispute that has arisen with the project during the monitoring period

No legal contest or dispute that has arisen with the project during the monitoring period.