Gold standard for the global goals
Monitoring report

June 2017, version 1

Title of the project	70 MW Bhadla Solar power plant by Fortum Finnsurya Energy Pvt Ltd (EKIESL-CDM-APRIL-16-01)
Gold Standard project id	GS 5519
Version number of the monitoring report	02
Completion date of the monitoring report	18/09/2019
Date of project design certification	03/01/2018
Start date of crediting period	06/11/2017
Duration of this monitoring period	06/11/17 to 01/04/2019 (Inclusive of both days)
Duration of previous monitoring period	(NA)
Project representative(s)	EKI Energy Services Limited
Host Country	INDIA
Certification pathway (activity certification/impact certification)	Impact Certification
SDG Contributions targeted (as per approved PDD)	**1 – SDG 7:** 122,640 MWh/Year **2– SDG 8**: More than 10 people employed and more than 1 training will be conducted **3– SDG 13:** 119,384 tCO_2e GS CERs for annual average
Gold Standard statement/product certification sought (GSVER/ADALYs/RECs etc.)	GSCER
Selected methodology(ies)	ACM0002 Version 17. Grid-connected electricity generation from renewable sources
Estimated amount of annual average certified SDG impact (as per approved PDD)	**1 – SDG 7:** 171,284 MWh **2– SDG 8**: More than 10 people employed and more than 2 training will be conducted **3– SDG 13:** 167,465 tCO_2e GS CERs for annual average
Total amount of certified SDG impact (as per approved methodology) achieved in this monitoring period	**1 – SDG 7:** 205901.33MWh **2– SDG 8**: More than 13 people employed and more than 31 training will be conducted **3– SDG 13:** 201,309 tCO_2e GS CERs for annual average

SECTION A. Description of project

A.1. Purpose and general description of project

The main purpose of this project activity is to generate clean form of electricity through renewable solar energy source. Fortum FinnSurya Energy Pvt. Ltd. is the promoter of the proposed project activity. The project activity involves installation of 70 MW (AC) (88.2 MWp) solar power project at Bhadla, Jodhpur, Rajasthan. The annual average of estimated electricity generation and estimated emission reduction over 7 years of crediting period will be 122,640 MWh/year and 119,905 tCO2e per year.

The project will replace anthropogenic emissions of greenhouse gases (GHG's) by displacing equivalent amount of electricity from the generation-mix of power plants connected to the Indian grid, which is mainly dominated by thermal/fossil fuel based power plant.

Location of project:
Latitude : 27° 28' 7.00" North
Longitude : 71° 58' 17.00" East
District : Jodhpur
Village : Bhadla
State : Rajasthan
Country : India

A.2. Reference of applied methodology

As per the applicable methodology, a Greenfield power plant is defined as "a new renewable energy power plant that is constructed and operated at a site where no renewable energy power plant was operated prior to the implementation of the project activity".

As the project activity falls under the definition of a Greenfield power plant, the baseline scenario as per applied methodology is the following:

Title : "Grid-connected electricity generation from renewable sources",
Reference : ACM0002 Version 17.0"[1]
Project Type: (i): Renewable energy projects

A.3. Crediting period of project

Renewable Crediting period of 07 year renewable twice starts from 06/11/2017 to 05/11/2024 (end date of first CDM crediting period)

SECTION B. Implementation of project

B.1. Description of implemented project

The project activity involves installation of 70 MW (AC) (88.2 MWp) solar power project at Bhadla, Jodhpur, Rajasthan. The annual average of estimated electricity generation and estimated emission reduction over 7 years of crediting period will be 122,108 MWh/year and 119,384 tCO_2e per year.

Purpose of the project activity and the measures taken for GHG emission reductions or net GHG removals by sinks:-

The scenario existing prior to the implementation of the project activity, is electricity delivered to the grid by the project activity that would have otherwise been generated by the operation of grid connected power

[1] http://cdm.unfccc.int/methodologies/DB/8W400U6E7LFHHYH2C4JR1RJWWO4PVN

plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system

Brief description of the installed technology and equipment;

Technical detail of the equipment[3]	Remark
Technology	Solar PV Module
Solar photovoltaic module	First solar series 4™ PV Module
No of Modules	112.5Wp:- 88800, 115Wp:-587000, 117.5Wp:- 85200
Make	First Solar
Capacity	112.5Wp, 115Wp,117.5Wp
No of inverters	70
Make	ABB
Capacity	1000KVA
No. of transformers	18 (ITD) + 2 (PT)
Technical & Operational Lifetime	25 years

Relevant dates for the project activity;
31/03/2017 is the date of commissioning of the project activity.

No events or situations happened during the reported monitoring period which can alter the applicability of the applied methodology.

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

The is no temporary deviation from certified key project information, Project design document, monitoring & reporting plan, applied methodology or applied standardized baseline.

B.2.2. Corrections

There have not been any correction to project information or parameters fixed at validation during the current monitoring period.

B.2.3. Changes to start date of crediting period

There has not been any changes to start date of crediting period.

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

There has not been any permanent change from registered monitoring plan, applied methodology or applied standardized baseline.

B.2.5. Changes to project design of approved project

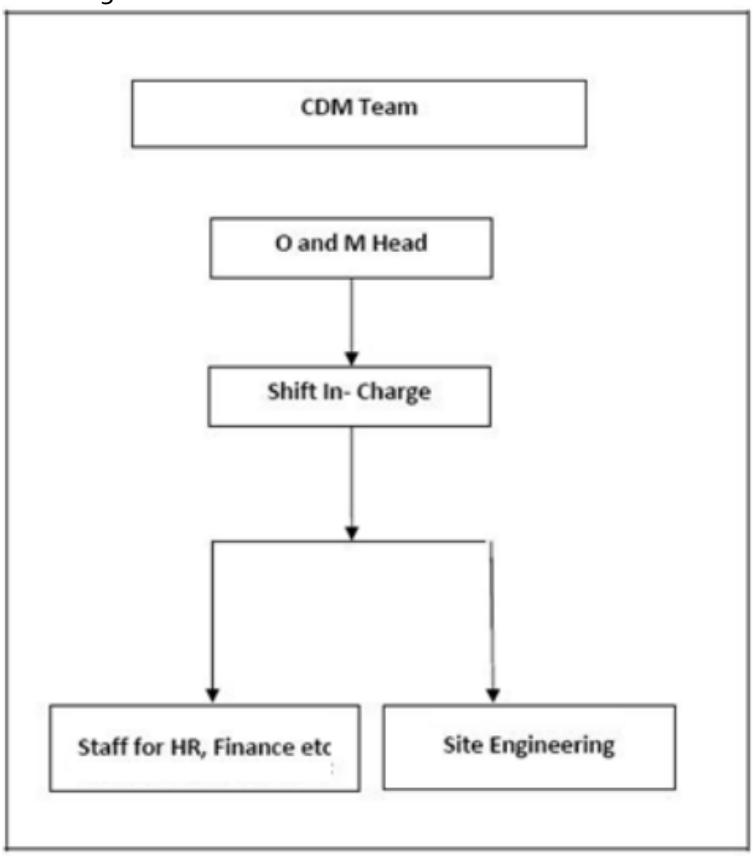
There has not been any change in the PDD during the current monitoring period.

SECTION C. Description of monitoring system applied by the project

The monitoring plan is developed and followed in accordance with the modalities and procedures for CDM project activities and is for grid-connected solar power project activity in Rajasthan, India. The monitoring

plan which has been implemented by the project participant describes about the monitoring organisation, parameters to be monitored, monitoring practices, quality assurance, quality control procedures, data storage and archiving.

The authority and responsibility for registration, monitoring, measurement, reporting and reviewing of the data rests with the project participant. PP follows the below mentioned structure for data monitoring, collection, data archiving and calibration of equipment for this project activity. The team comprises of the following members:



Responsibility
• Reviewing the monthly and annual generation statistics. • Evaluating the GHG performance of the project activity. • Identifying the opportunities for future improvement • Addressing grievance related to project activity.
• Implementation of corrective appropriate measures in case any discrepancies are identified in the reported parameters. • Review of monthly report. • Ensuring calibration of monitoring equipment as and when required.
• Monitoring and reporting the GHG performance related parameters following the guidance provided in the project design document • Preparation of monthly and annual generation statistics. • Reporting of any discrepancies identified in the reporting parameters. • Ensuring calibration of the monitoring equipments as and when required.

Data Measurement

The export and import energy is measured continuously using above mentioned Main and Check meters located at the substation. Readings of meters are taken on monthly basis by authorized officer of SEB in the presence of PP or representative of PP. Based on the Meter Reading Statement to Fortum FinnSurya Energy Pvt. Ltd, invoices are raised. These invoices are used for cross checking the meter readings taken for the respective project activity.

In case of billing cycle and monitoring period cycle does not match, then daily generation data is used to determine net electricity export for particular period.

Data collection and archiving

Readings from meters is collected in the presence of the plant in-charge. Export and Import data is recorded and stored in logs as well as in electronic form on a daily basis. The records are checked periodically by the Plant Manager and discussed thoroughly with the plant supervisor. The period of storage of the monitored data will be 2 years after the end of crediting period or till the last issuance of CERs for the project activity whichever occurs later.

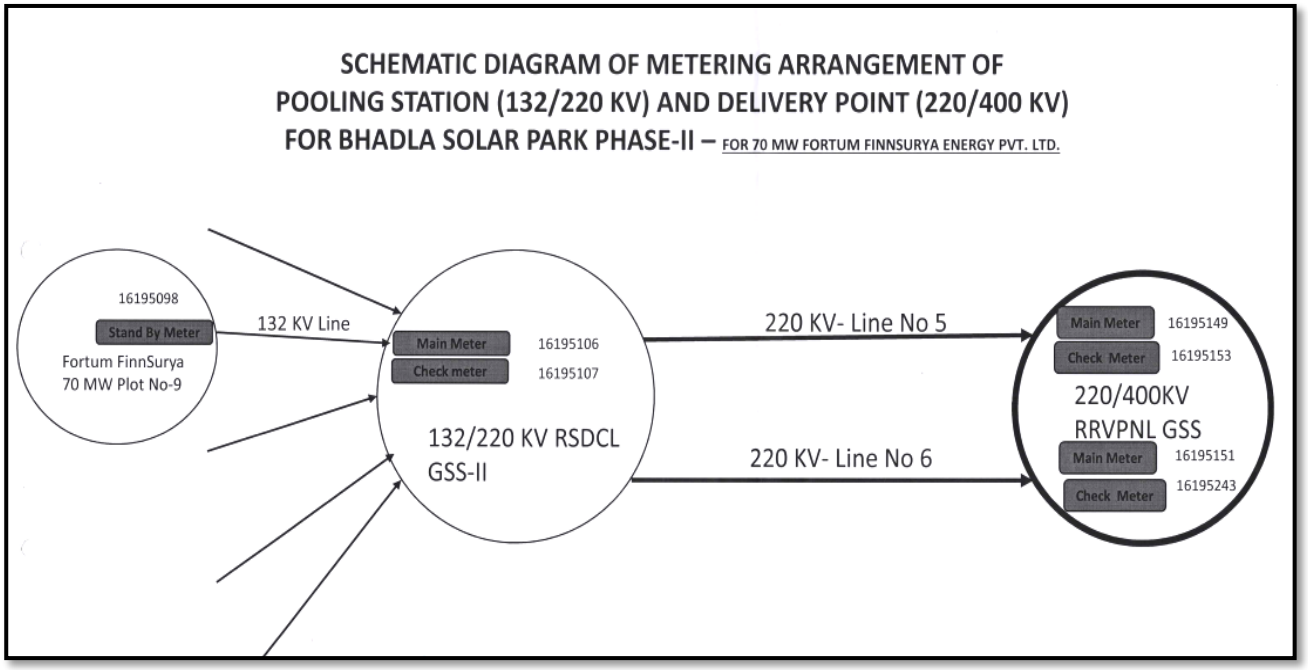
Emergency preparedness

The project activity will not result in any unidentified activity that can result in substantial emissions from the project activity. No need for emergency preparedness in data monitoring is visualized.

Personnel training

In order to ensure a proper functioning of the project activity and a properly monitoring of emission reductions, the staff (CDM team) has been trained. The plant helpers have been trained in equipment operation, data recording, reports writing, operation and maintenance and emergency procedures in compliance with the monitoring plan.

The Schematic Diagram of Metering arrangement of pooling station (132/220 KV) and delivery point (220/400 KV) for Bhadla Solar Phase II for 70 MW Fortum Finnsuryia Energy Pvt. Ltd.



Calibration details for 132/220 KV RSDCL GSS II:

Meter Details (Main Meter)	
Sr. No.	16195106
Make	L&T
Accuracy Class	0.2s
Initial Meter Calibration Date	12/01/2017
Calibration Date	13/03/2018
Due date of Calibration Date	13/03/2023

Meter Details (Check Meter)	
Sr. No.	16195107
Make	L&T
Accuracy Class	0.2s
Initial Meter Calibration Date	12/01/2017
Calibration Date	13/03/2018
Due date of Calibration Date	13/03/2023

Calibration details for 220/400 KV RRVPNL GSS:

Meter Details (Bay 5)		
Sr. No.	16195149 (Main Meter)	16195153 (Check Meter)
Make	L&T	L&T
Accuracy Class	0.2S	0.2S
Calibration Date	23/10/2017	23/10/2017
Due date of Calibration Date	22/10/2022	22/10/2022

Meter Details (Bay 6)		
Sr. No.	16195151 (Main Meter)	16195243 (Check Meter)
Make	L&T	L&T
Accuracy Class	0.2S	0.2S
Calibration Date	23/10/2017	23/10/2017
Due date of Calibration Date	22/10/2022	22/10/2022

SECTION D. Data and parameters

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

Relevant SDG Indicator	**SDG 13: Climate Action**
Data/parameter:	**$EF_{grid,OM,y}$**
Unit	tCO_2/MWh
Description	Operating Margin emission factor for NEWNE grid
Source of data	Calculated from CEA database, Version 11, April 2016[2]
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 05" as 3-year generation weighted average using data for the years 2012-13, 2013-14, & 2014-15. The data are obtained from "CO2 Baseline Database for Indian Power Sector" version 11, 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	**SDG 13: Climate Action**
Data/parameter:	**$EF_{grid,BM,y}$**
Unit	tCO_2/MWh
Description	Build Margin CO2 emission factor in year y
Source of data	Calculated from CEA database, Version 11, April 2016[2]
Value(s) applied)	0.9285 tCO_2/MWh
Choice of data or measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 05" as 3-year generation weighted average using data for the years 2012-13, 2013-14, & 2014-15. The data are obtained from "CO2 Baseline Database for Indian Power Sector" version 11, 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

[2] http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver11.pdf

Relevant SDG Indicator	SDG 13: Climate Action
Data/parameter:	**$EF_{grid,CM,y}$**
Unit	tCO_2/MWh
Description	Combined Margin CO_2 emission factor for NEWNE grid
Source of data	Calculated from CEA database, Version 11, April 2016[2]
Value(s) applied)	0.9777
Choice of data or measurement methods and procedures	The combined margin emissions factor is calculated as follows: $EF_{grid,CM,y} = EF_{grid,OM,y} * WOM + EF_{grid,BM,y} * WBM$ Where: $EF_{grid,BM,y}$= Build margin CO_2 emission factor in year y (tCO_2/MWh) $EF_{grid,OM,y}$= Operating margin CO_2 emission factor in year y (tCO_2/MWh) W_{OM} = Weighting of operating margin emissions factor (%) = 75% W_{BM}= Weighting of build margin emissions factor (%) = 25%
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 : Affordable and Clean Energy
Data/parameter:	**$EG_{PJ,y}$**
Unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh
Measured/calculated/default	Measured
Source of data	Monthly joint meter reading reports (70MW)
Value(s) of monitored parameter	**Monitoring duration** / **Values** 06/11/2017 to 31/12/2017 — 19788.41 01/01/2018 to 31/12/2018 — 150427.80 01/01/2019 to 01/04/2019 — 35685.12 **Total** — 205901.33
Monitoring equipment	The bidirectional electronic energy meters with accuracy class 0.2 s.
Measuring/reading/recording frequency:	Plant end dedicated metering: The electricity exported / supplied by the plant is first metered by plant end dedicated meter. This can be considered as stand by meter. Common metering at the substation: All the plants (including the project activity solar plant and other investors solar plant) are further connected to a common metering point at Pooling substation 132/220 KV GSS II and further electricity is transferred to 220/400 KV RRVPNL substation. The common metering point consists of both main & check meters (ABT Meters) having accuracy class of 0.2s. The export/import losses between these two substations are apportioned based on pooling substation readings. The difference of final apportioned value of export and import is used for monthly values of net electricity supplied to the grid by the project activity and same value will be considered for ER calculations
Calculation method (if applicable):	Continuous measurement & monthly recording

QA/QC procedures:	The meters is approved, tested & sealed by the State Utility. The meters are in the custody of State Utility. The frequency of calibration is once in 5 years.[3] The monthly electricity supplied/exported by the project activity in the JMR report is cross checked with the monthly invoices of sale. In the absence or delay in the meter calibration appropriate Guidelines will be applied appropriately to confirm the conservativeness of metering. The metering arrangement, accuracy class of meters, calibration frequency and apportioning approach is under control of state electricity board and PP do not have any control on it. PP is getting value of net electricity supplied to grid and the same is considered the monitoring parameter
Purpose of data:	Calculation of baseline emissions
Additional comments:	Data will be archived in paper & electronic form for two years after the end of crediting period or of the last issuance of CERs for this project activity, whichever occurs later.

Relevant SDG Indicator	**SDG 8 : Decent Work and Economic Growth**
Data/parameter:	**Quantitative employment and income generation**
Unit	Number
Description	Number of people employed directly due to the project activity. Number of men and number of women employed by the project activity. Type of job like temporary/permanent or skilled/unskilled, etc also monitored and it is ensued that peoples will get equal payment for equal work.
Measured/calculated/default	-
Source of data	Plant records / Letter from O&M contractor for employment generation/ DOE interview with employees, local stakeholders etc
Value(s) of monitored parameter	<table><tr><td>**Monitoring Duration**</td><td>06/11/2017 to 31/12/2017</td><td>01/01/2018 to 31/12/2018</td><td>01/01/2019 to 01/04/2019</td><td>Total</td></tr><tr><td>Skilled</td><td>02</td><td>07</td><td>00</td><td>09</td></tr><tr><td>Un-Skilled</td><td>01</td><td>02</td><td>01</td><td>04</td></tr></table>Above number of jobs are permanent and full time in nature. Additional short-term services create temporary jobs.
Monitoring equipment	-
Measuring/reading/recording frequency:	Monthly monitoring and annual compilation
Calculation method (if applicable):	The total number of persons working in the plant would be calculated based on the daily log available at site. This parameter also monitor number of men/women employed by the project activity. The project activity ensures that "equal pay for work of equal value" for both men and women and there is no any discrimination against women. "The employment covers number of men and number of women employed by the project activity. The job is of type temporary/permanent or skilled/unskilled, etc. Also it is ensued that peoples will get equal payment for equal work. The payment will be based on work and no any gender inequality for payment for work of equal value. The employment generated refers to overall jobs created during project implementation and during project Operation and Maintenance. This is primary and direct effect on employment generated due to project activity. The effect of employment generation is not be 'one off' or an effect generated in design, construction, distribution or start-up or decommissioning of the Project.

[3] http://www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_2006.pdf

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 SDG 8 Indicator
Additional comments:	-

Relevant SDG Indicator	**SDG 8 : Decent Work and Economic Growth**
Data/parameter:	**Quality of employment**
Unit	-
Description	Training of staff
Measured/calculated/default	-
Source of data	The training records for all the employees/Letter from O&M contractor for employment generation/ DOE interview with employees, local stakeholders etc
Value(s) of monitored parameter	**Monitoring duration** / **Values** 06/11/2017 to 31/12/2017 — 00 01/01/2018 to 31/12/2018 — 19 01/01/2019 to 01/04/2019 — 12 **Total** — **31** Please refer Appendix 1 for details.
Monitoring equipment	Together with the technology supplier the Project organise training for the staff on the technology and the monitoring of the plant operation, and the emergency and safety procedures.
Measuring/reading/recording frequency:	Annually
Calculation method (if applicable):	NA
QA/QC procedures:	The training records for all the employees
Purpose of data:	To monitor the SDG 8 Indicator
Additional comments:	-

Relevant SDG Indicator	**SDG13: Climate Action**
Data/parameter:	**ER_y**
Unit	tCO_2
Description	Emission reduction achieved during monitoring period
Measured/calculated/default	Calculated as per registered PDD and as per methodology
Source of data	Calculated as per the registered PDD and as per methodology
Value(s) of monitored parameter	201,309 **Monitoring duration** / **Values** 06/11/2017 to 31/12/2017 — 19347 01/01/2018 to 31/12/2018 — 147073 01/01/2019 to 01/04/2019 — 34889 **Total** — 201,309
Monitoring equipment	Calculated as per registered PDD
Measuring/reading/recording frequency:	As per monitoring period

Calculation method (if applicable):	The baseline emissions are the product of electrical energy baseline $EG_{PJ,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by an emission factor.
QA/QC procedures:	Not applicable
Purpose of data:	Calculation of emission reductions
Additional comments:	Data would be stored in paper & electronic form for two years after the end of crediting period or of the last issuance of the CERs for this project activity, whichever occurs later.

D.3. Implementation of sampling plan

Not applicable

SECTION E. Calculation of SDG outcomes

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

SDG 07: Affordable and Clean Energy

The value for affordable and clean energy is the summation of monthly net electricity supplied to the grid. The values are sourced from Monthly Joint Meter Reading records. The summation for current monitoring period is 205901.33 MWh.

SDG 08: Decent work and economic growth

The values for Decent work and economic growth is sourced from HR records/ Letter from O&M contractor and training records. 31 training conducted and 13 people are employed during the current monitoring period.

Further, the project participant ensures the proper health & safety trainings, environment policy to be followed during operation. The training documents are submitted to the DOE.

SDG 13: Climate Action

Calculation of baseline emission is as follows;

$BE_y = EG_{BL,y} \times EF_{CO2,grid,y}$

Where,

$EG_{BL,y}$ = 205901.33 MWh

$EF_{CO2,grid,y} = EF_{grid,CM,y,y} = 0.9777\ tCO_2e/MWh$

Hence,

BE_y = 205901.33 MWh * 0.9777 tCO2e/MWh

= 201309 tCO_2e

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

No Project Emissions from SDG 07, SDG 08 and SDG 13.

Therefore, $PE_y = 0$

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

No Leakage emission from SDG 07, SDG 08 and SDG 13.

Therefore LEy=0

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	205901.33 MWh	-	205901.33 MWh
SDG 8 (Quantitative employment and income generation)	13 People employed directly from the project activity	-	13 People employed directly on regular basis
SDG 8 (Quality of employment)	31 employee training Conducted during the current monitoring period	-	31 employee training Conducted during the current monitoring period
SDG 13	201,309 tCO_2e	-	201,309 tCO_2e

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	171284.32 MWh	205901.33 MWh
SDG 8 (Quantitative employment and income generation)	10	13 people employed directly
SDG 8 (Quality of employment)	02	31 employee training conducted during the current monitoring period
SDG 13	167,465 tCO_2e	201,309 tCO_2e

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

Actual Emission reduction is 20.21% higher than the estimated value, due to more number of sunshine hours during the current monitoring period.

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

As a part of continuous feedback from stakeholders, the grievances register is being placed at site and is being continuously monitored and addressed through the grievances cell on regular basis and maintained in a register at site office.
During the monitoring period no grievances have been received, the comments received are satisfactory and appreciating in nature. The scan copies has been provided to the DOE.

S. No.	Date of Complaint	Topic	Date of resolution	Remark from PP
-	-	-	-	-

Further, the project is implemented on a barren land not in a high conservation value area therefore it does not Involve any human resettlement. This can be demonstrated from the list of High Conservation Reserves of India that the project is not located in any of the areas[4]. Also, the project land is owned by the Project Participant and mutually decided fair price is paid to the prior owner considering regional market value and precedent agreement copy is provided to DOE.

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

Not Applicable

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

Not Applicable

[4] http://natureconservation.in/state-wise-list-of-conservation-reserves-of-india-updated/

Appendix 1. Training Calendar

Sl. No.	Training Topic	Year
1.	General Safety Awareness	2018- February 2018, April 2018, August 2018, September 2018, October 2018 and December 2018 2019- January 2019, February 2019 and March 2019
2.	First Aid	December 2018 and January 2019
3.	Fire Fighting	April 2018, May 2018, November 2018, December 2018 and February 2019
4.	Use of personal protective equipment	April 2018, August 2018, October 2018, December 2018 and March 2019
5.	EHS training	September 2018 and February 2019
6.	Communication Skill	March 2019
7.	Safety training for Contractors	May 2018, September 2018 and March 2019
8.	Fortum's Safety Ground rule	July 2018 and January 2019
9.	Tool Box Training	January 2019
10.	Electric Shock handling	February 2019