



**Monitoring report form for CDM project activity**  
**(Version 07.0)**

**MONITORING REPORT**

<b>Title of the project activity</b>	Solar Power Project by Fortum FinnSurya (EKIESL-CDM.February-15-01)	
<b>UNFCCC reference number of the project activity</b>	10288 <sup>1</sup>	
<b>Version number of the PDD applicable to this monitoring report</b>	02	
<b>Version number of this monitoring report</b>	01	
<b>Completion date of this monitoring report</b>	25/08/2020	
<b>Monitoring period number</b>	03	
<b>Duration of this monitoring period</b>	02/04/2019 to 31/07/2020 (inclusive of both days)	
<b>Monitoring report number for this monitoring period</b>	01	
<b>Project participants</b>	Fortum FinnSurya Energy Pvt. Ltd. EKI Energy Services Limited	
<b>Host Party</b>	India	
<b>Applied methodologies and standardized baselines</b>	AMS-I.D "Grid connected renewable electricity generation" (EB 81, Version 18) Standardized baseline not applicable	
<b>Sectoral scopes</b>	Energy Industries (renewable - /non-renewable sources)	
<b>Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period</b>	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	NA	25,729 tCO <sub>2</sub> e
<b>Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD</b>	25,850 tCO <sub>2</sub> e	

<sup>1</sup><http://cdm.unfccc.int/Projects/DB/Appendix1460660777.8/view>

## SECTION A. Description of project activity

### A.1. General description of project activity

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 12 MWp (10 MW AC) solar power project at Ujjain, Madhya Pradesh. As per registered PDD, the project replaces anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 19,374 tCO<sub>2</sub>e per year, thereon displacing 19,831 MWh/year amount of electricity from the generation-mix of power plants connected to the NEWNE regional grid, which is mainly dominated by thermal/fossil fuel based power plant.

The electricity exported by the present project activity would displace an equivalent amount of electricity generated by the power plants already operational and proposed to be added in the North-East-West-North East (NEWNE) Grid which relies predominantly on fossil fuels. Thus, it contributes towards reduction in the demand-supply gap during periods of electricity shortage and increase in the share of renewable energy in the grid mix.

Technical Details of Equipment	Remarks
Technology	Thin Film-CdTe modules on Fixed Tilt at 20 degrees
Solar photovoltaic module	95 Wp Modules of make - First Solar- FS395
No. of modules	126360
Total Number of Invertors	15 Units
Transformer	10 Numbers (2 Nos of 125KVA- for Auxiliary- 33kV/415 V, 1 Nos 700 kVA- 380 V/33kV and 7 Nos. 1400 kVA- 380 V/33 kV)
Central inverters of nominal AC power output	680 kVA-CONEXT CORE XC 680, Schneider Make), three phase, 50 Hz.
Technical & Operational Lifetime	25 years

The already operational Solar PV project uses crystalline silicon based solar PV modules. Since the project activity is a Greenfield installation there was no electricity generation at the project site prior to its implementation. The whole installation will have a 25 years design life.

Power evacuation infrastructure has been set up as per the guidelines of Madhya Pradesh Electricity Regulatory Commissions (MPERC), Central Electricity Regulatory Commission (CERC) and the respective Distribution Company (DISCOM). The present project is being connected to the nearby 11/33 kV grid substation. The grid connection unit continuously synchronize the incoming solar power with the available grid for safe and efficient operation. The metering of net electricity generated is undertaken at the grid interconnection point. The technology for the project is environmentally safe and sound. Further, there is no technology transfer associated with the project activity.

The estimation of GHG emission reductions by the present project activity is limited to carbon dioxide (CO<sub>2</sub>) only and its primary source is the fossil fuels consumed in the NEWNE grid. The project undergoes continued operation during current monitoring period.

During the current monitoring period the net GHG emission reductions by the project activity are 25,729 tCO<sub>2</sub>e. During this monitoring period no major breakdown has taken place and the plant was operational throughout the current monitoring period.

The investors of the project are as follows:

Sl. No.	Project Investor	Capacity (MWp)	Date of Commissioning	Purpose
1	Fortum FinnSurya Energy Pvt. Ltd.	12	31/12/2014	Sale to EB

## A.2. Location of project activity

The present 12 MWp solar PV power project is installed in state Madhya Pradesh, India.

Sl. No.	Project Investor	Capacity (MWp)	Village	Tehsil	District	State
1	Fortum FinnSurya Energy Pvt. Ltd.	12	Kapeli	Tarana	Ujjain	Madhya Pradesh

The nearest Airport is Devi Ahilyabai Holkar Airport situated at Indore approximately 188 km away, and well connectivity by Madhya Pradesh State Highway (MP SH 27) by road. It would take approximately 3 hrs 30 minutes to reach the site by road.

Project Investor	Capacity (MWp)	Latitude (N)			Longitude (E)		
		Deg°	Min"	Sec'	Deg°	Min"	Sec'
Fortum FinnSurya Energy Pvt. Ltd.	12	23	07	23.0	76	07	14.0

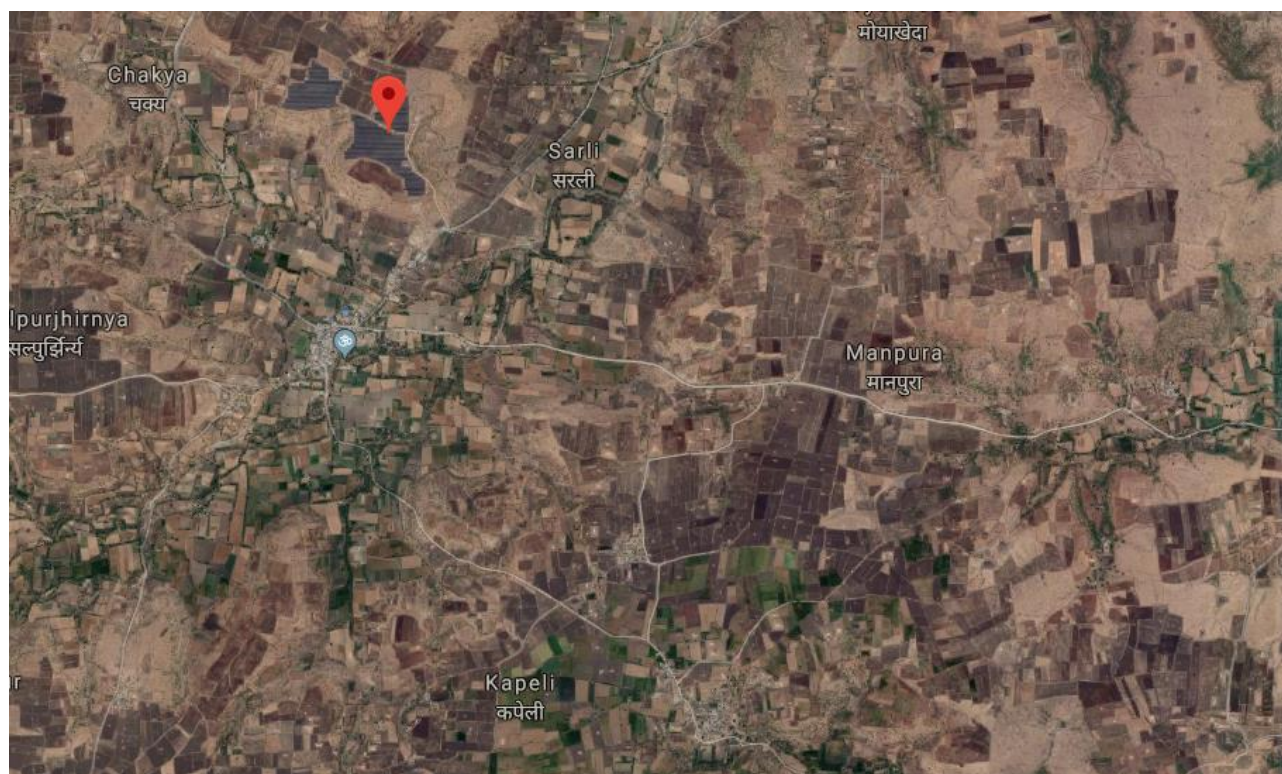
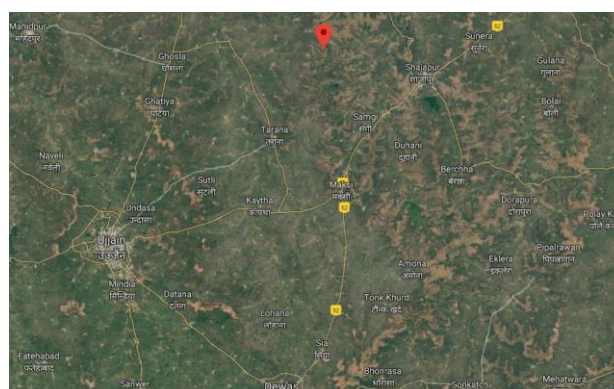


Figure 1. Satellite View of the Project site

**A.3. Parties and project participants**

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host)	Fortum FinnSurya Energy Pvt. Ltd.(Private entity)	No
Australia	EKI Energy Services Limited (Private entity)	No

**A.4. References to applied methodologies and standardized baselines**

**Title:** Grid Connected Renewable Electricity Generation

**Reference:** AMS I.D. (Version 18, EB 81)

The project also refers to the “Tool to calculate the emission factor for an electricity system” Version 05.0.0<sup>2</sup>

**A.5. Crediting period type and duration**

Crediting period (07 years 00 Months)

Type of crediting period	Renewable
Crediting period from	02/05/2016 to 01/05/2023
Length of the Crediting Period	7 Years
Monitoring period from	02/04/2019 to 31/07/2020 (both days included)
Length of the Monitoring Period	487 Days

**SECTION B. Implementation of project activity****B.1. Description of implemented project activity**

The technology employed by the already operational Project Activity includes the usage of polycrystalline based solar PV modules with an aggregate of 12 MWp generation capacity to supply the generated electricity to the Grid. The generation and consumption of the Project Activity is monitored continuously through the energy meters. The data is used for the calculation of exports to the grid and imports from the grid.

The Solar power system has been designed with number of sub main plants, solar PV arrays and inverters of suitable capacity. The detailed description for the technology used has already been mentioned in section A.1. The commissioning and implementation schedule of each plant has been mentioned in section A.1.

The electricity exported by the present project activity would displace an equivalent amount of electricity generated by the power plants already operational and proposed to be added in the North-East-West-North East (NEWNE) Grid which relies predominantly on fossil fuels. Thus, it contributes towards reduction in the demand-supply gap during periods of electricity shortage and increase in the share of renewable energy in the grid mix.

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

<sup>2</sup> <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v5.0.pdf>

**B.2. Post-registration changes****B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents**

There is no request for deviation applied during this monitoring period.

**B.2.2. Corrections**

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

**B.2.3. Changes to the start date of the crediting period**

Not Applicable.

**B.2.4. Inclusion of monitoring plan**

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

**B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents**

Not Applicable.

**B.2.6. Changes to project design**

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

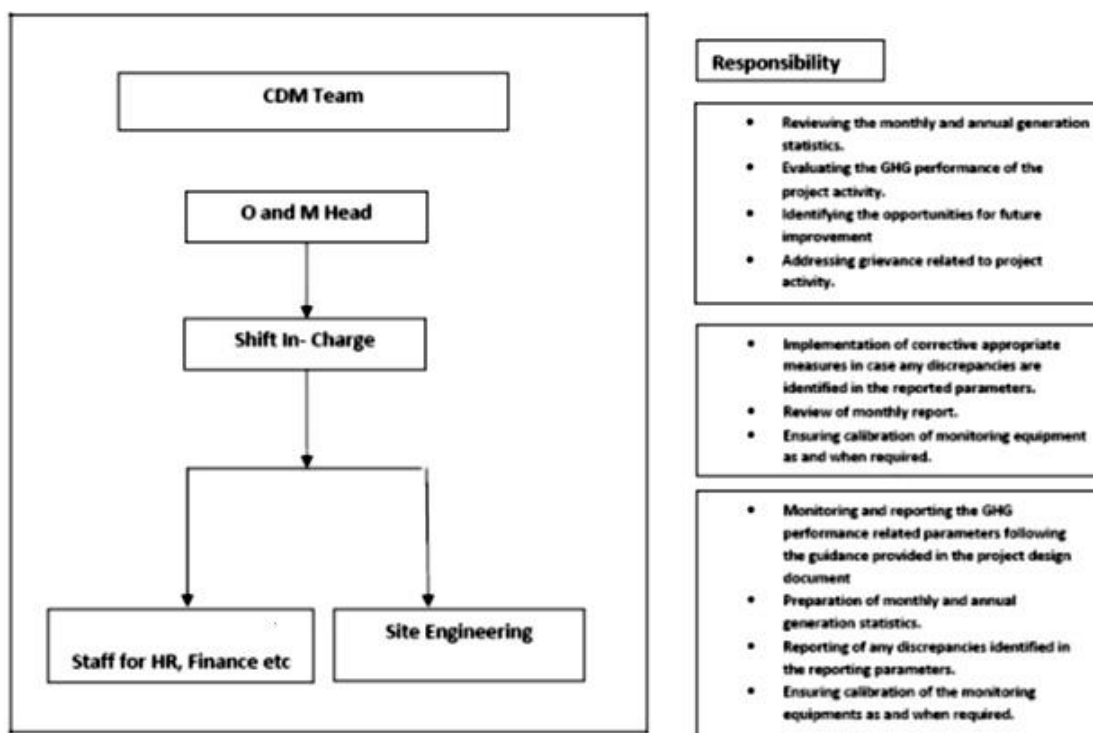
**B.2.7. Changes specific to afforestation or reforestation project activity**

This is not a afforestation or reforestation project activity.

**SECTION C. Description of monitoring system**

The monitoring plan is developed in accordance with the modalities and procedures for CDM project activities and is proposed for grid-connected solar power project being implemented in Madhya Pradesh, India. The monitoring plan, which is 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 proposed the following structure for data monitoring, collection, data archiving and calibration of equipment's for this project activity. The team comprises of the following members:





## Data Measurement

The export and import energy are measured continuously using Main and Check meters located at the substation. The main meter is used for billing purpose and in case of any issues with main meter, check meter will be used. No such event occurred during current monitoring period. Readings of meters shall be taken on monthly basis by authorized officer of Madhya Pradesh Paschim Kshetra Vidyut Vitaran (MPPKVVCL) in the presence of PP or representative of PP. MPPKVVCL then issues the Meter Reading Statement to Fortum FinnSurya Energy Pvt. Ltd. which then issues invoice based on this Meter Reading Statement.

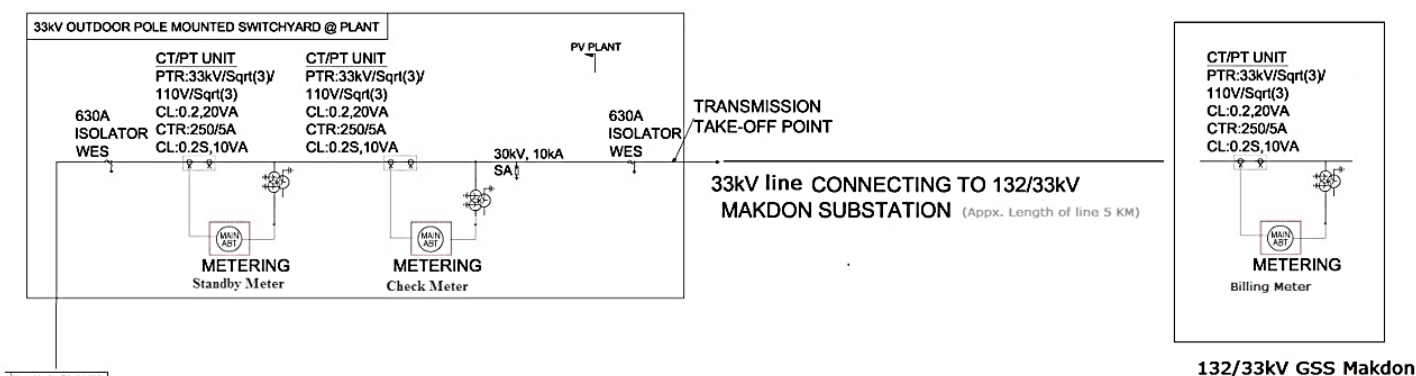
## Data collection and archiving

Readings from meters are collected in the presence of the plant in-charge. Export and Import data are 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) is trained. The plant helpers are trained in equipment operation, data recording, reports writing, operation and maintenance and emergency procedures in compliance with the monitoring plan.

The schematic line diagram of the project site along with all metering location has been illustrated below:



### Calibration Details:

The calibration details of meters involved in the project activity is as below:

Type	Meter Serial Number	Make	Accuracy Class	Calibration date	Calibration date	Validity
Main Meter	XB581186	Secure Apx 100	0.2s	28-10-16	21-01-19	20-01-24
Check Meter	XB570697	Secure Apx 100	0.2s	28-10-16	21-01-19	20-01-24

For current monitoring period, only main meter data is used for monitoring of electricity and invoicing purpose. There is no delay in calibration observed for all main meters. The check meter is just as a backup meter and not used for invoicing purpose.

The Solar plant is located at Kapeli village of Ujjain district and the solar plant is connected to Delchi (Makdon) substation as a single feeder, the information is clearly depicted in respective month JMRs.

## SECTION D. Data and parameters

### D.1. Data and parameters fixed ex ante

Data/Parameter	EF <sub>grid, OM, y</sub>
Unit	tCO <sub>2</sub> /MWh
Description	Operating Margin CO <sub>2</sub> emission factor in year y
Source of data	Calculated from CEA database, Version 10, December 2014 <sup>3</sup>
Value(s) applied	0.9862
Choice of data or measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 05.0.0" as 3-year generation weighted average using data for the years 2011-2012, 2012-2013 & 2013-2014. The data are obtained from "CO <sub>2</sub> Baseline Database for Indian Power Sector" version 10.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data/parameter	For the calculation of the Baseline Emission
Additional comments	This parameter is fixed ex-ante for the entire crediting period.

<sup>3</sup>[http://www.cea.nic.in/reports/planning/cdm\\_co2/user\\_guide\\_ver10.pdf](http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver10.pdf)

<b>Data/Parameter</b>	EF <sub>grid, BM, y</sub>
Unit	tCO <sub>2</sub> /MWh
Description	Build Margin CO <sub>2</sub> emission factor in year y
Source of data	Calculated from CEA database, Version 10, December 2014 <sup>4</sup>
Value(s) applied	0.9495
Choice of data or measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 05.0.0" for the year 2013-2014. The data are obtained from "CO <sub>2</sub> Baseline Database for Indian Power Sector" version 10.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data/parameter	For the calculation of the Baseline Emission
Additional comments	This parameter is fixed ex-ante for the entire crediting period.

<b>Data/Parameter</b>	EF <sub>grid, y</sub>
Unit	tCO <sub>2</sub> /MWh
Description	Combined Margin CO <sub>2</sub> emission factor in year y
Source of data	Calculated from CEA database, Version 10, December 2014 <sup>5</sup>
Value(s) applied	0.9770
Choice of data or measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 05.0.0". The data are obtained from "CO <sub>2</sub> Baseline Database for Indian Power Sector" version 10.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data/parameter	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

<b>Data/parameter:</b>	EG <sub>PJ, y</sub>
Unit	MWh
Description	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in a year y (MWh).
Measured/calculated/default	Calculated
Source of data	Meter Reading Statement issued by MPPKV/VCL which provide input values (EG <sub>export, y</sub> , EG <sub>import, y</sub> ), used for calculation of EG <sub>PJ, y</sub> .
Value(s) of monitored parameter	26334.818
Monitoring equipment	Energy Meters of accuracy class 0.2 are used for monitoring <b>Calibration Frequency:</b> once in 5 years <b>Accuracy class of the meters:</b> 0.2s The detailed description of all the meters and calibration schedule used in the current monitoring period has been mentioned in section C of MR.
Measuring/reading/recording frequency:	Measuring Frequency: Continuous Recording Frequency: Monthly

<sup>4</sup>[http://www.cea.nic.in/reports/planning/cdm\\_co2/user\\_guide\\_ver10.pdf](http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver10.pdf)

<sup>5</sup>[http://www.cea.nic.in/reports/planning/cdm\\_co2/user\\_guide\\_ver10.pdf](http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver10.pdf)



Calculation method (if applicable):	<p>Electricity exported/imported to the grid is in kWh. However, for the calculation purpose electricity exported is converted in MWh. The value electrical units supplied by the project activity to grid and electrical units consumed by the project activity is provided in Meter Reading Statement that is issued monthly by MPPKVVCL. The quantity of net electricity supplied to the grid can be obtained, by following calculations:</p> $EG_{pj,y} = EG_{export,y} - EG_{import,y}$ <p>Where,  <math>EG_{export,y}</math>: Electricity exported to the grid by the project activity,  <math>EG_{import,y}</math>: Electricity imported from the grid by the project activity</p> <p>The calculation is done by MPPKVVCL and the PP has no say in the calculation.</p> <p>The electricity supplied to the grid by the project activity connected to the substation is measured by electronic meters of accuracy class 0.2s. The net electricity supplied is measured continuously using Main and Check meters at the substation. Readings of Main and Check meters shall be taken on monthly basis by authorized officer(s) of MPPKVVCL in the presence of PP or representative of PP.</p> <p>Data Type: Measured Monitoring equipment: Bi-directional Energy Meters are used for monitoring Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually</p>
QA/QC procedures:	Calibration of all the meters will be undertaken once in 5 years and faulty meters will be duly replaced immediately. For current monitoring period, the calibration frequency is followed within calibration interval. The meters are of accuracy class 0.2.
Purpose of data:	The Data/Parameter is required to calculate baseline emission.
Additional comments:	Data will be archived electronically for a period of 2 years beyond the end of crediting period.

### D.3. Implementation of sampling plan

Sampling is not required for the given project activity

## SECTION E. Calculation of emission reductions or net anthropogenic removals

### E.1. Calculation of baseline emissions or baseline net removals

As the project activity is the installation of a Greenfield power plant, the baseline scenario is the following as per applied methodology: The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid.

The emission factor has been calculated by using option (a) as per the paragraph 12 of AMS.I.D (Version18) i.e. as combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the "Tool to calculate the emission factor for an electricity system" Version 5.0.0.

The baseline emission calculation for the project activity is attributable to the CO<sub>2</sub> Emission that could have been produced by the fossil fuel based power plants in absence of the proposed project activity. Therefore the amount electricity supplied to the NEWNE grid will be multiplied by the grid emission factor to calculate the baseline emissions reduced by the proposed project activity.

$$BE_y = EG_{PJ,Y} \times EF_{grid}$$

Where,  $BE_y$  = Baseline emissions in year y (t CO<sub>2</sub>)

$EG_{PJ,Y}$  = 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).

$EF_{grid}$  = Combined margin CO<sub>2</sub> 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" (t CO<sub>2</sub>/MWh).

Same calculation of Baseline Emissions  $BE_y$  (As per Equation (1) of AMS.I.D, Version 18) for the current monitoring period has been depicted below:

$$BE_y = EG_{PJ,y} \times EF_{CO_2, grid, y}$$

Where,

$$EG_{PJ,y} = 26334.818 \text{ MWh}$$

$$EF_{CO_2, grid, y} = 0.9770 \text{ tCO}_2\text{e/MWh}$$

Hence,

$$BE_y = 26334.818 \text{ MWh} \times 0.9770 \text{ tCO}_2\text{e/MWh} = 25,729 \text{ tCO}_2\text{e}$$

$$PE_y = 0 \text{ (as explained under section E.2)}$$

$$LE_y = 0 \text{ (as explained under section E.3)}$$

Therefore, Emission reduction

$$ER_y = BE_y - PE_y - LE_y$$

$$= 25,729 - 0 - 0 \text{ tCO}_2\text{e}$$

$$= 25,729 \text{ tCO}_2\text{e}$$

## E.2. Calculation of project emissions or actual net removals

Since the project activity is a renewable energy project that generates electricity using solar power, therefore there are no resulting project emissions.

## E.3. Calculation of leakage emissions

As per approved methodology AMS-I.D., no leakage is considered from the project activity.

## E.4. Calculation of emission reductions or net anthropogenic removals

	Baseline GHG emissions or baseline net GHG removals (t CO <sub>2</sub> e)	Project GHG emissions or actual net GHG removals (t CO <sub>2</sub> e)	Leakage GHG emissions (t CO <sub>2</sub> e)	GHG emission reductions or net anthropogenic GHG removals (t CO <sub>2</sub> e)		
				Before 01/01/2013	From 01/01/2013	Total amount
<b>Total</b>	25,729	0	0	0	25,729	25,729

## E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

Amount achieved during this monitoring period (t CO <sub>2</sub> e)	Amount estimated ex ante for this monitoring period in the PDD (t CO <sub>2</sub> e)
25,729	25,850

**E.5.1. Explanation of calculation of “amount estimated ex ante for this monitoring period in the PDD”**

A total of 2.20% lower emission reduction achieved with respect to estimated values due to less sun shine hours.

As per CDM registered PDD, 19374 tCO<sub>2</sub>e is the amount of CERs generated annually. Therefore, following unitary method, the amount of estimated ex ante for this monitoring period is identified. The total number of days in this monitoring period is 487.

$$= (19374/365) * 487$$

$$= 25,850 \text{ tCO}_2\text{e}$$

**E.6. Remarks on increase in achieved emission reductions**

Actual emission reduction is less as compared to the estimated emission reduction.

**E.7. Remarks on scale of small-scale project activity**

The size of the project is still the same as registered in CDM PDD and there is no any design changes.

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**Document information**

<i>Version</i>	<i>Date</i>	<i>Description</i>
07.0	31 May 2019	Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with version 02.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN);</li> <li>• Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period;</li> <li>• Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes;</li> <li>• Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods;</li> <li>• Make editorial improvements.</li> </ul>
06.0	7 June 2017	Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN);</li> <li>• Make editorial improvements.</li> </ul>
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: <ul style="list-style-type: none"> <li>• Include provisions related to delayed submission of a monitoring plan;</li> <li>• Provisions related to the Host Party;</li> <li>• Remove reference to programme of activities;</li> <li>• Overall editorial improvement.</li> </ul>

<i>Version</i>	<i>Date</i>	<i>Description</i>
04.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> <li>• Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0));</li> <li>• Include provisions related to standardized baselines;</li> <li>• Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1;</li> <li>• Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>;</li> <li>• Editorial improvement.</li> </ul>
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: monitoring report		