



Verified Carbon Standard

RENEWABLE SOLAR POWER PROJECT BY SHAPOORJI PALLONJI



Document Prepared by

Emergent Ventures India Private Limited

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Contents

1	PROJECT DETAILS.....	4
1.1	Summary Description of the Implementation Status of the Project	4
1.2	Sectoral Scope and Project Type	5
1.3	Project Proponent	5
1.4	Other Entities Involved in the Project	6
1.5	Project Start Date	6
1.6	Project Crediting Period	6
1.7	Project Location	6
1.8	Title and Reference of Methodology	9
1.9	Participation under other GHG Programs.....	9
1.10	Other Forms of Credit and Supply Chain (Scope 3) Emissions	9
1.11	Sustainable Development Contributions	9
2	SAFEGUARDS.....	13
2.1	No Net Harm	13
2.2	Local Stakeholder Consultation	13
2.3	AFOLU-Specific Safeguards	13
3	IMPLEMENTATION STATUS.....	13
3.1	Implementation Status of the Project Activity	13
3.2	Deviations	15
3.3	Grouped Projects	16
4	DATA AND PARAMETERS.....	16
4.1	Data and Parameters Available at Validation	16
4.2	Data and Parameters Monitored.....	18
4.3	Monitoring Plan.....	21
5	QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS	24
5.1	Baseline Emissions	24
5.2	Project Emissions	24
5.3	Leakage.....	25
5.4	Net GHG Emission Reductions and Removals	25
	APPENDIX 1: CALIBRATION DETAILS	27

APPENDIX 2: OUTAGE DETAILS (HOURS) 29

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project activity generates electricity through renewable solar energy source. The project is bundled involving 220 MW solar projects in three states of India (Maharashtra, Tamilnadu & Karnataka). Over the 10 years of first crediting period, the project will replace anthropogenic emissions of greenhouse gases from the generation-mix of power plants connected to the Indian grid, which is mainly dominated by thermal/fossil fuel based power plant.

The details of the projects are mentioned in the table below:

Name of SPV	Capacity (MW)	COD	District	State	Usage
Solar Edge Power and Energy Private Limited	50	26-April-2018	Jalgaon	Maharashtra	Sale to SECI
	50	08-April-2018	Beed		
	30	22-April-2018	Beed		
Terralight Rajapalayam Solar Private Limited	50	26-September-2018	Virudhunagar	Tamil Nadu	Sale to Grid
Suryoday One Energy Private Limited	40	30-March-2018	Belgavi (Gokak)	Karnataka	Sale to Grid

During the current monitoring period from 01-October-2021 to 31-December-2022, the project activity supplied 481,729 MWh of energy. This resulted in emission reductions of 451,284 tCO₂e.

Audit Type	Period	Program	WB Name	Number of years
Validation	23-August-2020	VCS	Earthood Services Private Limited	NA
1 st Verification	(08-April-2018 – 25-June-2019)	VCS	Applus+ Certification	1.21
2 nd Verification	(26-June-2019 – 31-December-2020)	VCS	Earthood Services Private Limited	1.52
3 rd Verification	(01-Januray-2021 – 30-Septmeber-2021)	VCS	Applus+ Certification	0.75

4 th Verification	(01-October-2021 – 31-December-2022)	VCS	4KES Pvt. Ltd.	1.25
Total	(08-April-2018 - 31-December-2022)	VCS		4.73

1.2 Sectoral Scope and Project Type

Sectoral Scope: 01 - Energy industries (renewable/ non-renewable sources)

Project Type: I - Renewable Energy Projects

This is not a grouped project.

1.3 Project Proponent

Organization name	Solar Edge Power and Energy Private Limited
Contact person	Atul Raaizada
Title	COO - Solar
Address	10th Floor, Parinee Crescenzo, C-30, G Block, Bandra Kurla Complex, Bandra East, Mumbai 400 051
Telephone	+91-98105 69922
Email	Atul.raaizada@indigrid.com

Organization name	Terralight Rajapalayam Solar Private Limited ¹
Contact person	Atul Raaizada
Title	COO - Solar
Address	10th Floor, Parinee Crescenzo, C-30, G Block, Bandra Kurla Complex, Bandra East, Mumbai 400 051
Telephone	+91-98105 69922

¹ Previously known as Shapoorji Pallonji Infrastructure Capital Company Private Limited and Shapoorji Pallonji Suryaprakash Private Limited

Email	Atul.raaizada@indigrid.com
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Organization name	Suryoday One Energy Private Limited
Contact person	Sunil Kulkarni
Title	Director
Address	41/44, Minoo Desai Marg, Colaba, Mumbai- 400005, India
Telephone	+9188793446297
Email	sunil.kulkarni@shapoorji.com

1.4 Other Entities Involved in the Project

Organization name	Emergent Ventures India Private Limited
Role in the Project	Project Consultant
Contact person	Atul Sanghal
Title	Director
Address	1002, Magnum Tower-1, Sector -58, Gurgaon – 122018 (India)
Telephone	-
Email	atul.sanghal@emergent-ventures.com

1.5 Project Start Date

30-March-2018. The earliest commissioning date for Suryodaya One (Karnataka),

1.6 Project Crediting Period

Start date: 30-March-2018

End date: 29-March-2028

Renewable crediting period of 10 years period, twice renewable

1.7 Project Location

Name of SPV	Capacity (MW)	Village	Taluka	District	State
Solar Edge Powerand	50	Wadhve, Hartale &	Muktainagar	Jalgaon	Maharashtra

Energy Private Limited		Manpur			
	50	Parli	-	Beed	
	30	Parli	-	Beed	
Terralight Rajapalayam Solar Private Limited	50	Thenkarai	Vembakottai	Virudhunagar	Tamil Nadu
Suryoday One Energy Private Limited	40	Gokak Falls	Gokak	Belgavi	Karnataka

Name of SPV	Capacity (MW)	Latitude	Longitude
Solar Edge Power and Energy Private Limited	50	21° 01' 36.01"	75° 59' 6.82"
	50	18° 55' 21.06"	76° 21' 29.28"
	30	18° 55' 21.06"	76° 21' 29.28"
Terralight Rajapalayam Solar Private Limited	50	9° 33' 14.52"	77° 53' 03.25"
Suryoday One Energy Private Limited	40	16° 10' 40.92"	74° 47' 22.56"

The project locations have been highlighted in the maps shown below:





1.8 Title and Reference of Methodology

Methodology: ACM0002: Grid-connected electricity generation from renewable sources; Version 19²

Tools referred with above methodology and applicable for project activity are:

- Tool to calculate the emission factor for an electricity system; Version 07.0³
- Methodological Tool- Tool for the demonstration and assessment of additionality; Version 07.0.0⁴

1.9 Participation under other GHG Programs

The project does not participate in any other GHG mechanism which includes GHG allowance trading. It does not generate any other form of GHG-related environmental credit apart from GHG emission reductions or removals claimed under the VCS Program.

1.10 Other Forms of Credit and Supply Chain (Scope 3) Emissions

The project does not generate any other form of GHG-related environmental credit apart from GHG emission reductions or removals claimed under the VCS Program.

1.11 Sustainable Development Contributions

The various contributions by the Project Proponent (PP) towards the SDGs have been given below:

1. **SDG 7 Affordable and Clean Energy:** Since the project activity is a solar power project, it generates clean energy. The Project activity is a new facility (Greenfield) and the electricity generated by the project is exported to the Indian electricity grid. The project therefore displaces an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid.
2. **SDG 8 Economic Growth:** The Project Proponent aims to provide employment to local men and women with decent compensation. PP has targeted to employ 20 persons by the year 2025 and minimum 1 person per annum after 2025.
3. **SDG 13 Climate Action:** The main purpose of this project activity is to generate a clean form of electricity through renewable solar energy sources. The project activity involves total capacity of 220 MW solar power project which is installed in the state of Maharashtra, Karnataka and Tamil Nadu of India. The solar project has been developed by the SPVs of Shapoorji Pallonji group, one of the green energy giants of India.

² <https://cdm.unfccc.int/UserManagement/FileStorage/58IAGB7SZUDEO2VN6LYM30K41HFPRQ>

³ <https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v7.0.pdf>

⁴ <https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-01-v7.0.0.pdf>

The project supplies clean electricity from the solar power plants to the Indian Grid, hence displacing the electricity generated from grid connected fossil fuel power plants and thereby avoiding the equivalent Carbon dioxide which is a greenhouse gas.

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1)	7.2	7.2.1: Renewable energy share in the total final energy consumption	Implemented activities to increase	481,729 MWh	First Monitoring Period: 08-April-2018 to 25-June-2019 (Inclusive of both the dates) 377,913 MWh Second Monitoring Period: 26-June-2019 to 31-December-2020 (Inclusive of both the dates) 588,695 MWh Third Monitoring Period: 01-January-2021 to 30-September-2021 (Inclusive of both the dates) 291,016 MWh Current Monitoring Period: 01-October-2021 to 31-December-2022 (Inclusive of both the dates) 481,729 MWh Total - 1,739,354 MWh
2)	8.0	Employment of local men and women	Implemented activities to increase	Minimum 1 person employed	First Monitoring Period: 08-April-2018 to 25-June-2019 (Inclusive of both the dates) Minimum 1 person employed Second Monitoring Period: 26-June-2019 to 31-December-2020 (Inclusive of both the dates) Minimum 1 person employed

3)	13.0	Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to decrease	451,284 tCO ₂	Third Monitoring Period: 01-January-2021 to 30-September-2021 (Inclusive of both the dates) Minimum 1 person employed Current Monitoring Period: 01-October-2021 to 31-December-2022 (Inclusive of both the dates) Overall - Minimum 1 person employed First Monitoring Period: 08-April-2018 to 25-June-2019 (Inclusive of both the dates) 354,005 tCO₂ Second Monitoring Period: 26-June-2019 to 31-December-2020 (Inclusive of both the dates) 551,445 tCO₂ Third Monitoring Period: 01-January-2021 to 30-September-2021 (Inclusive of both the dates) 272,606 tCO₂ Current Monitoring Period: 01-October-2021 to 30-December-2022 (Inclusive of both the dates) 451,284 tCO₂ Total - 1,629,340 tCO₂
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2 SAFEGUARDS

2.1 No Net Harm

The project being a solar power project has not negative impact on environment as well as socio-economic conditions.. Solar power projects are not included in the Schedule I of the EIA notification S.O.1533 (E) dated 14-September-2006 and thus an EIA is not required. Ministry of Environment & forests vide their OM J-11013/41/2006 - IA II (I) dated 13-May-2011, has re-affirmed this and exempted wind / solar power plants from EIA and Environmental Consent requirement.

2.2 Local Stakeholder Consultation

Detailed local stakeholders' consultation was conducted during the registration of the project – by identification of stakeholders, identification of local stakeholders, invitation of them, held meeting where project activity was explained in details and the PP also took due care of comments/suggestions of the local stakeholders.

The process of local stakeholder consultation is continuous. During the current monitoring period, the project proponent has kept grievance register in plant site office and sought comments/grievances/suggestions from local stakeholders including local community, government agencies and NGOs. Besides, the PP has also kept provision for submitting comments/grievances/suggestions from local stakeholders through direct mail. However, no major comments/grievances/suggestions have been received from the aforementioned stakeholders during the current monitoring period and all such minor suggestions have been take care by the PP.

2.3 AFOLU-Specific Safeguards

Not applicable.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project activity involves electricity generation from 220 MW Solar PV Plant located in three different states of India i.e. Maharashtra, Tamilnadu & Karnataka. The electricity generated from the project activity is being exported to the Indian electricity grid.

The technical details are described in the tables below.

40 MW solar project by Suryoday One Energy Private Limited, Gokak, Karnataka				
SN	Technical details of the equipment	Description		
1	Technology	Solar PV technology (Poly-Crystalline)		
2	Modules	Make	Capacity	Number
		Canadian	345 Wp 350 Wp 355 Wp	23,622 101,928 34,348
3	Inverters	SMA	2500 kW	16
4	Transformers	CG	20 MVA	2

50 MW solar projects by Terralight Rajapalayam Solar Private Limited, Virudhunagar, Tamilnadu				
SN	Technical details of the equipment	Description		
1	Technology	Solar PV technology (Poly-Crystalline)		
2	Modules	Make	Capacity	Number
		JA Solar	325 Wp 330 Wp	83,040 81,900
3	Inverters	SINENG	1250 kW	40
4	Transformers	EMCO	24 MVA	2

50 MW solar projects by Solar Edge Power and Energy Private Limited, Muktainagar, Jalgaon, Maharashtra				
SN	Technical details of the equipment	Description		
1	Technology	Solar PV technology (Poly-Crystalline)		
2	Modules	Make	Capacity	Number
		Canadian Solar	320 Wp 325 Wp 330 Wp	7,998 16,120 31,682
		JA Solar	325 Wp 330 Wp	15,934 7,998
		Astronergy	320 Wp	121,892
3	Inverters	ABB	2000kW	25
4	Transformers	CGL	25 MVA	2

30 MW solar project by Solar Edge Power and Energy Private Limited, Beed, Maharashtra		
SN	Technical details of the equipment	Description
1	Technology	Solar PV technology (Poly-Crystalline)

2	Modules	Make	Capacity	Number
		JA Solar	325 Wp 330 Wp	70,680 48,484
3	Inverters	ABB	2000 kW	15
4	Transformer	PROLEC	50 MVA	1

50 MW solar project by Solar Edge Power and Energy Private Limited, Beed, Maharashtra				
SN	Technical details of the equipment	Description		
1	Technology	Solar PV technology (Poly-Crystalline)		
2	Modules	Make	Capacity	Number
		Canadian Solar	320 Wp 325 Wp 330 Wp	37,944 79,174 3,472
		Chint Solar	325 Wp	79,980
3	Invertors	ABB	2000kW	25
4	Transformer	PROLEC	50 MVA	1

Feeder Connectivity details of the solar plant have been mentioned below

SN	Name of SPVs	Feeder Connectivity
1	Solar Edge Power and Energy Private Limited	132 kV Muktainagar
		132 kV GSS Pangri, Beed
2	Terralight Rajapalayam Solar Private Limited	110 kV, Nallamanaickenpatti
3	Suryoday One Energy Private Limited	110 kV Gokak Shindikur Substation connected to 220 kV R/S Ghataprabha.

There are no events in the current monitoring period that have any adverse impact on emission reduction. Project related outage data at the sites is added to Appendix 2.

3.2 Deviations

3.2.1 Methodology Deviations

There is no deviation from the applied methodology during the current monitoring period.

3.2.2 Project Description Deviations

Following deviations were approved in last verification(s):-

- There was a change in ownership of the SPVs located in Tamil Nadu and Maharashtra of the project activity. The details of the new owner are mentioned in Section 1.3 of previous Monitoring Report (version 03 dated 27-January-2022). The deviation was accepted and approved by VVB during last verification.

- b) In addition to that, the earliest Commissioning date of 40 MW installation Suryoday One Energy Private Limited at Karnataka is 30-March-2018. However, as per the approved VCS-PD, PP has taken 08-April-2018, which is the Commissioning date of installations at Maharashtra as the start date of the project activity. As earliest commissioning date is 30-March-2018, same is considered as project start date. The deviation was accepted and approved by VVB during last verification.
- c) At Karnataka Site (Suryoday One Energy Private Limited, 40 MW), PP has considered transmission losses at substation end as mentioned in JMR as a conservative approach for emission reduction calculation. Emission reduction calculation is done considering transmission losses as a conservative approach.

Current verification:

During the current verification, it was noted that the technical specifications provided in the registered PD were not correct. The details are now correctly provided in section 3.1 above. The supporting documents are provided to VVB to establish that the technical details now provided were the ones available at the time of commissioning of the project. The correction does not affect the scale, baseline or the additionality of the project.

3.3 Grouped Projects

Not applicable as this is not a grouped project or part of any grouped project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	EF _{grid,OM,y}
Data unit	tCO ₂ /MWh
Description	Operating Margin CO2 emission factor in year y
Source of data	Calculated from CEA database, Version 14, Dec 2018
Value applied	0.9610
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per "Tool to calculate the emission factor for an electricity system, version 07" as 3-year generation weighted average using data for the years 2015-16, 2016-17 & 2017-18. The data are obtained from "CO2 Baseline Database for Indian Power Sector" version 14, published by the Central Electricity Authority, Ministry of Power, and Government of India.
Purpose of Data	For the calculation of the Baseline Emission.

Comments	This parameter is fixed ex-ante for the entire crediting period.
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Data / Parameter	$EF_{grid,BM,y}$
Data unit	tCO ₂ /MWh
Description	Build Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 14, Dec 2018
Value applied	0.8644
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per “Tool to calculate the emission factor for an electricity system, version 07” as per the latest data available for the most recent year 2017-18. The data is obtained from “CO ₂ Baseline Database for Indian Power Sector” version 14, published by the Central Electricity Authority, Ministry of Power, and Government of India.
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO ₂ /MWh
Description	Combined Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 14, Dec 2018
Value applied	0.9368
Justification of choice of data or description of measurement methods and procedures applied	The combined margin emissions factor is calculated as follows: $EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$ Where: $EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (tCO₂/MWh) $EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (tCO₂/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.
Comments	This parameter is fixed ex-ante for the entire crediting period.

4.2 Data and Parameters Monitored

For Karnataka Site

Data / Parameter	EG _{PJ, y}
Data unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh
Source of data	Monthly B-Forms
Description of measurement methods and procedures to be applied	The difference of final value of export and 115% import is used for monthly values of net electricity supplied to the grid by the project activity and same value has been considered for ER calculations.
Frequency of monitoring/recording	Continuous measurement & monthly recording
Value monitored	83,281.75
Monitoring equipment	The electricity exported/supplied by the plant to pooling substation and further to substation. This meter also measures electricity imported by the plant from the grid.
QA/QC procedures to be applied	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 ⁵ . 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 have been applied appropriately to confirm the conservativeness of metering. The metering arrangement, accuracy class of meters, calibration frequency is under control of state electricity board and PP does not have any control on it. PP is getting value of net electricity supplied to grid and the same is considered the monitoring parameter. The billing is raised based on substation meters.
Purpose of the data	Calculation of baseline emissions
Calculation method	Net electricity supplied to the grid by the project plant in a given month = Export, kWh – 115% Import, kWh-transmission losses at substation end
Comments	Data are being archived in paper & electronic form for two years after the end of crediting period or of the last issuance

⁵ [meter_reg.pdf\(cea.nic.in\)](http://meter_reg.pdf(cea.nic.in))

	of VERs for this project activity, whichever occurs later.
For Maharashtra Site	
Data / Parameter	EG _{PJ, y}
Data unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh
Source of data	Joint Meter Reading Reports
Description of measurement methods and procedures to be applied	The difference of final value of export and import is used for monthly values of net electricity supplied to the grid by the project activity and same value has been considered for ER calculations.
Frequency of monitoring/recording	Continuous measurement & monthly recording
Value monitored	298,910.55
Monitoring equipment	The electricity exported/supplied by the plant to pooling substation and further to substation. This meter also measures electricity imported by the plant from the grid.
QA/QC procedures to be applied	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 ⁶ . 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 is under control of state electricity board and PP does not have any control on it. PP is getting value of net electricity supplied to grid and the same is considered the monitoring parameter. The billing is raised based on substation meters.
Purpose of the data	Calculation of baseline emissions
Calculation method	Net electricity supplied to the grid by the project plant in a given month = Export, kWh – Import, kWh
Comments	Data are being archived in paper & electronic form for two years after the end of crediting period or of the last issuance

⁶ [meter_reg.pdf\(cea.nic.in\)](http://meter_reg.pdf(cea.nic.in))

of VERs for this project activity, whichever occurs later

For Tamil Nadu Site

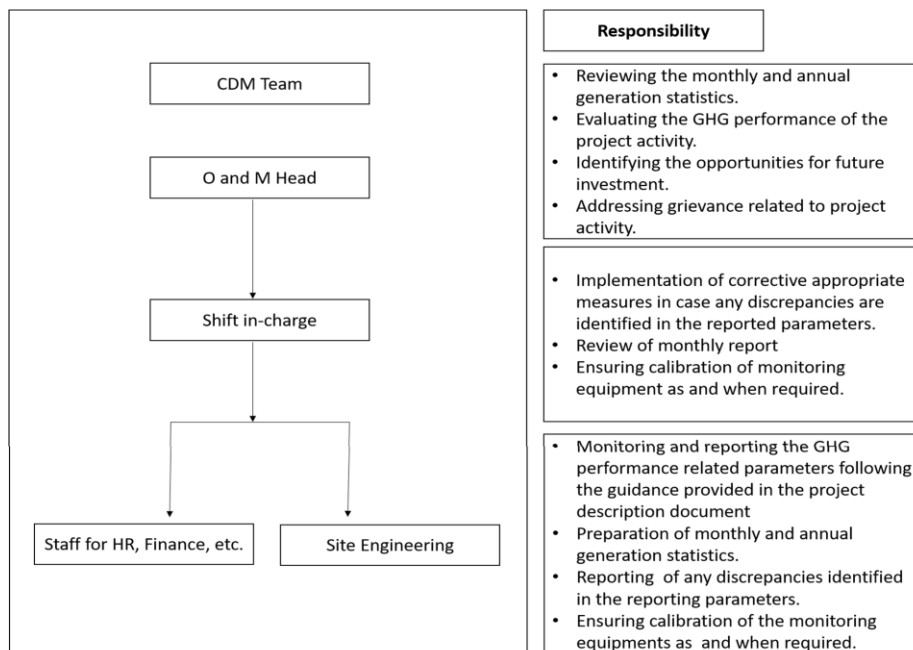
Data / Parameter	EG _{PJ, y}
Data unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh
Source of data	Joint Meter Reading Reports
Description of measurement methods and procedures to be applied	The difference of final value of export and import is used for monthly values of net electricity supplied to the grid by the project activity and same value has been considered for ER calculations.
Frequency of monitoring/recording	Continuous measurement & monthly recording
Value monitored	99,537.00
Monitoring equipment	The electricity exported / supplied by the plant to pooling substation and further to substation. This meter also measures electricity imported by the plant from the grid.
QA/QC procedures to be applied	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 ⁷ . 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 has been applied appropriately to confirm the conservativeness of metering. The metering arrangement, accuracy class of meters, calibration frequency is under control of state electricity board and PP does not have any control on it. PP is getting value of net electricity supplied to grid and the same is considered the monitoring parameter. The billing is raised based on substation meters.
Purpose of the data	Calculation of baseline emissions
Calculation method	Net electricity supplied to the grid by the project plant in a

⁷ [meter_reg.pdf\(cea.nic.in\)](http://meter_reg.pdf(cea.nic.in))

	given month = Export, kWh – Import, kWh
Comments	Data are being archived in paper & electronic form for two years after the end of crediting period or of the last issuance of VERs for this project activity, whichever occurs later.

4.3 Monitoring Plan

The monitoring plan is developed in accordance with the modalities and procedures for grid-connected solar power project being implemented. 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 has the following structure for data monitoring, collection, data archiving and calibration of equipment for this project activity. The team comprises of the following members:



Data Measurement

The export and import energy has been measured continuously using above mentioned Main and Check meters located at the substations. Readings of meters shall be 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 PP, invoices has been raised. These invoices can be used for cross checking the meter readings taken for the respective project activity.

Data collection and archiving:

Readings from meters has been collected in the presence of the plant in-charge. Export and Import data would be 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 VERs for the project activity whichever occurs later.

Emergency preparedness

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

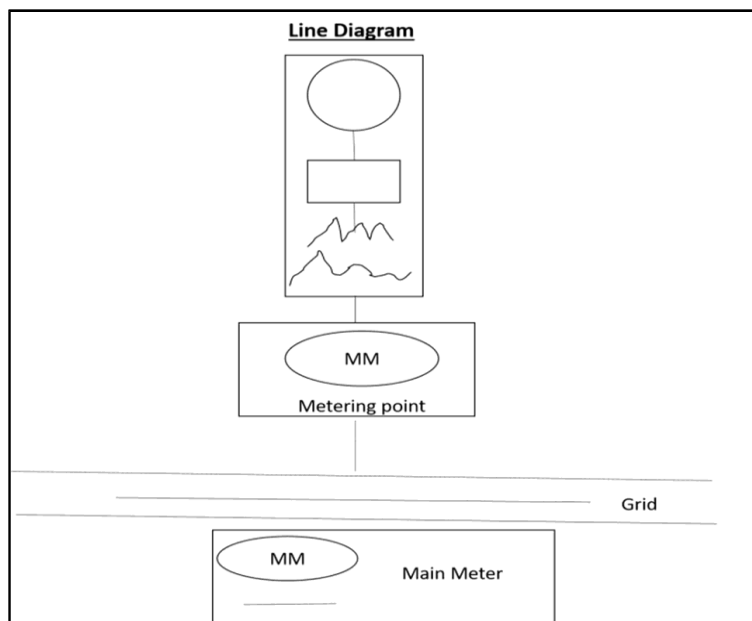
In the event that the main meter, which is used to record the net electricity exported by the project, is found to be faulty it will be repaired or replaced and the data from the check meter will be used in its place. In the unlikely event that the check meter fails it will also be repaired or replaced.

Personnel training

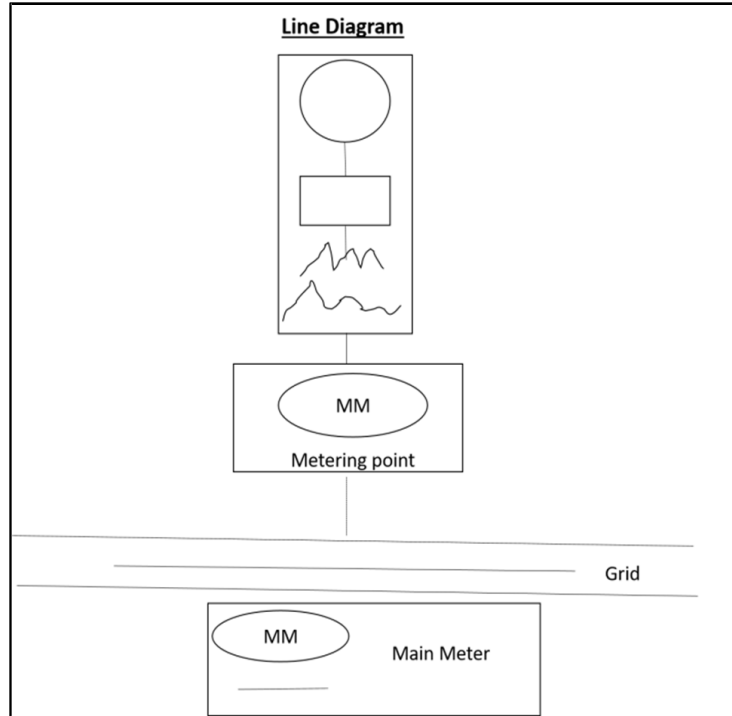
In order to ensure a proper functioning of the project activity and a properly monitoring of emission reductions, the staff has been trained. The plant helpers have been trained in equipment operation, data recording, reports writing, operation and maintenance and emergency procedures in compliance with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

Metering Arrangement Line diagram with metering arrangement for the solar project activity is shown below:

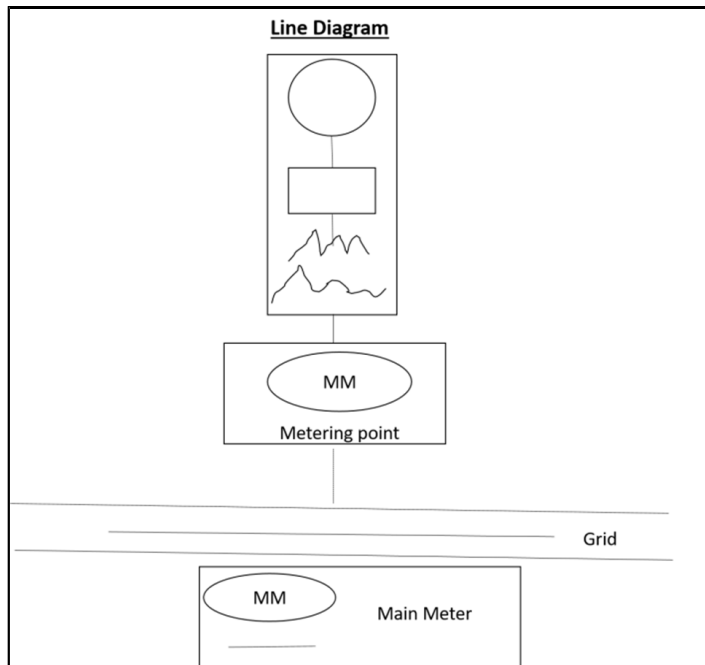
For Karnataka Site:



For Maharashtra Site:



For Tamil Nadu Site:



QA/QC procedures

The energy meters at the feeders are maintained and owned by state electricity board. Neither the project proponent nor the site personnel have any control over it. The records have been crosschecked with the records of sold electricity to state electricity board. The meters are calibrated by state electricity board at-least once in five years.

Apportioning

In case the dates of a particular monitoring period do not match with the dates of the billing cycle, the net electricity exported to the grid will be calculated from:

Apportioning the net electricity exported to grid, as recorded in the consolidated Share Certificate / JMR Report / Credit Notes certified by the respective state DISCOM, based on the number of days in the monitoring period and the number of days for which Share Certificate / JMR Report / Credit Notes was prepared.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

Baseline Emissions: Baseline emissions due to the project activity are calculated as follow:

Baseline Emissions (BE_y) = Combined Margin CO_2 emission factor of the regional grid (Indian Grid) (EF_y) X Net electricity exported to the grid (EG_y)

Hence, $BE_y = 0.9368 * 481,729 \text{ MWh}$

$= 451,284 \text{ tCO}_2\text{e}$ (Rounded down value).

5.2 Project Emissions

As per the approved consolidated Methodology ACM0002 (Version 19.0) para 34: "For most renewable energy power generation project activities, $PE_y = 0$. However, some project activities may involve project emissions that can be significant. These emissions shall accounted for as project emissions by using the following equation:

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$$

Where:

PE_y = Project emissions in year y (t $CO_2\text{e}/\text{yr}$)

$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (t $CO_2\text{e}/\text{yr}$)

$PE_{GP,y}$ = Project emissions from the operation of dry, flash, steam or binary geothermal power plants in year y (t CO₂e/yr)

$PE_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year y (t CO₂e/yr)

As the project activity is the installation of new grid connected Solar PV power plant and does not involve any project emissions from fossil fuel, operation of dry, flash steam or binary geothermal power plants and from water reservoirs of hydro power plants. Therefore, $PE_{FF,y}$, $PE_{GP,y}$, $PE_{HP,y}$ are equal to zero and thus $PE_y = 0$

5.3 Leakage

No other leakage emissions are considered. The emissions potentially arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport etc.) are neglected.

5.4 Net GHG Emission Reductions and Removals

Emission Reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:

ER_y = Emission reductions in year y (t CO₂e)

BE_y = Baseline emissions in year y (t CO₂e)

PE_y = Project emissions in year y (t CO₂e)

Hence, $ER_y = 451,284 - 0$

Net GHG Emission Reductions and Removals = 451,284 tCO₂e

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
01-October-2021 to 31-December-2021	85,965	0	0	85,965
01-January-2022 to 31-December-2022	365,319	0	0	365,319

Total	451,284	0	0	451,284
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As per registered PD, 432,770 tCO₂e is the amount of emission reductions achieved 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 457.

$$= (432,770/365) * 457$$

$$= 541,852 \text{ tCO}_2\text{e}$$

The actual emission reductions are 16.71% lower than the ex-ante estimated for this monitoring period.

<u>Ex-ante emissions reductions/removals (tCO₂e)</u>	<u>Achieved emissions reductions/removals (tCO₂e)</u>	<u>Percent difference</u>	<u>Justification for the difference</u>
541,852	451,284	-16.71%	The decrease in actual emission reduction is mainly because of low PLF (unfavourable sun) which is a natural phenomenon and beyond the control of the Project Proponent.

APPENDIX 1: CALIBRATION DETAILS

Solar Edge Power, Muktainagar (Maharashtra) - 50 MW		
Type of meter	Main	Check
Meter Number	02840872	02840873
Meter Make	elster	elster
Accuracy	0.2S	0.2S
Meter location	Muktainagar GSS ⁸	Muktainagar GSS
Calibration	24-March-2018	24-March-2018
Validity	23-March-2023	23-March-2023

Solar Edge Power, Beed (Maharashtra) - 80 MW		
Type of meter	Main	Check
Meter Number	XC475851	XC475852
Meter Make	SECURE	SECURE
Accuracy	0.2S	0.2S
Meter location	Pangri GSS	Pangri GSS
Calibration	01-March-2018	01-March-2018
Validity	28-February-2023	28-February-2023

Terralight Rajapalayam Solar, Virudhunagar (Tamil Nadu) - 50 MW		
Type of meter	Main	Check
Meter Number	17076769	17076792
Meter Make	L&T	L&T
Accuracy	0.2S	0.2S
Meter location	GSS	GSS
Calibration	29-June-2018	29-June-2018
Validity	28-June-2023	29-June-2023

Suryoday One Energy, Gokak (Karnataka) - 40 MW				
	Bay 1		Bay 2	
Type of meter	Main	Check	Main	Check
Meter Number	18037240	18037249	18037252	18015450
Meter Make	L&T	L&T	L&T	L&T
Accuracy	0.2s	0.2s	0.2s	0.2s

⁸ GSS is Grid Substation

Meter location	110kV Switchyard	110kV Switchyard	110kV Switchyard	110kV Switchyard
Calibration I	10-June-2020	10-June-2020	10-June-2019	10-June-2019
Validity	09-June-2025	09-June-2025	09-June-2024	09-June-2024
Calibration II	19-November- 2021	19-November- 2021	19-November- 2021	19-November- 2021
Validity	18-November- 2026	18-November- 2026	18-November- 2026	18-November- 2026

APPENDIX 2: OUTAGE DETAILS (HOURS)

Month-Year	50 MW solar projects by Solar Edge Power and Energy Private Limited, Jalgaon, Maharashtra	80 MW solar project by Solar Edge Power and Energy Private Limited, Beed, Maharashtra	40 MW solar project by Suryoday One Energy Private Limited, Gokak, Karnataka	50 MW solar projects by Terralight Rajapalayam Solar Private Limited, Virudhunaga, Tamilnadu
Oct-21	04:30	00:00	10:28	04:23
Nov-21	00:00	16:51	00:21	05:38
Dec-21	01:36	03:10	02:02	03:44
Jan-22	00:00	00:00	12:29	11:35
Feb-22	00:00	29:11:00	17:30	09:30
Mar-22	00:00	38:31:00	13:45	15:22
Apr-22	00:00	34:25:00	02:39	00:04
May-22	00:00	27:36:00	03:07	03:34
Jun-22	00:00	30:05:00	00:24	19:43
Jul-22	00:00	13:58:00	08:42	00:00
Aug-22	00:00	00:00	14:05	11:55
Sep-22	00:00	60:00:00	06:46	05:14
Oct-22	00:00	25:32:00	01:55	08:39
Nov-22	00:00	00:00	02:08	04:22
Dec-22	00:00	00:00	10:28	00:00