



BUNDLED SOLAR POWER PROJECT BY D.J. MALPANI AND GIRIRAJ ENTERPRISES



Document Prepared by EKI Energy Services Limited

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The purpose of the bundled project activity is to generate power using renewable energy source (solar energy) and sell the power generated to the state grid. The project activity generates electricity using solar energy. The generated electricity is exported to the regional grid system which is a part of the unified INDIAN grid of India.

This is a greenfield project activity i. e. there was no renewable energy-based electricity generation facility in each site of this bundled project and equivalent amount of electricity would have been supplied by fossil-fuel dominated grid – which is pre-project scenario as well as baseline scenario for this project activity and it reduces GHG emissions by displacing fossil-fuel based electricity with solar (clean energy) energy based electricity.

The total installed capacity of the current project activity is 56.25 MW; which involves operation of solar power plants in the states of Tamil Nadu and Telangana in India. The project is promoted by following project investors which are as follows:

Project Investors	Project	Project Capacity in AC	Date of commissioning	Project location	State
M/s. D. J. Malpani	Solar	16.25 MW	31-March-2015	Village- Hoti Tehsil- Zaheerabad Mandal, District- Medak	Telangana
Giriraj Enterprises	Solar	40 MW	23-September-2015	Village- Sengottai, Tehsil- Virudhunagar, District- Virudhunagar	Tamil Nadu

The solar power plant during the monitoring period of 01-July-2021 to 31-March-2022 was operational for 3562 hours for Telangana site and 3091.75 hours for Tamil Nadu site.

The net electricity generated by the bundled project activity that was evacuated to the grid during the current monitoring period (7th monitoring period) of 01-July-2021 to 31-March-2022 (inclusive of both the dates) is 72,893 MWh and it has led total net GHG emission reductions of 71,267 tCO₂e.

1.2 Sectoral Scope and Project Type

The project activity falls under the following Sectoral scope and Project Type:

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

Project Type: I - Renewable Energy Projects

The project is not a grouped project activity.

1.3 Project Proponent

Organization name	M/s. D.J. Malpani
Contact person	Mr. Prafulla Khinvasara
Title	CEO- Renewable Power Projects
Address	Malpani House, New Nagar Road, Tal- Sangamner, Dist – Ahmednagar, Maharashtra, India
Telephone	+91-2425-433010
Email	kpraful@malpani.com

Organization name	Giriraj Enterprises
Contact person	Mr. Prafulla Khinvasara
Title	CEO- Renewable Power Projects
Address	Malpani House, New Nagar Road, Tal- Sangamner, Dist – Ahmednagar, Maharashtra, India
Telephone	+91-2425-433010
Email	kpraful@malpani.com

1.4 Other Entities Involved in the Project

Organization name	EKI Energy Services Limited
Role in the Project	Project Consultancy

Contact person	Vanya Chauhan
Title	Executive Operations – Climate Change
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1.5 Project Start Date

The first project activity of the bundled project under consideration was commissioned and electricity generation started on 31-March-2015 at Hoti, Zaheerabad Mandal in District Medak, in the state of Telangana in India. Hence the project start date is defined as follows:

Start date of this bundled project activity is 31-March-2015

This date corresponds to the commissioning date of first phase of this bundled project activity (i.e. commissioning date of 16.25 MW solar PV power project by M/s. D. J. Malpani in Medak district in the state of Telangana, India).

1.6 Project Crediting Period

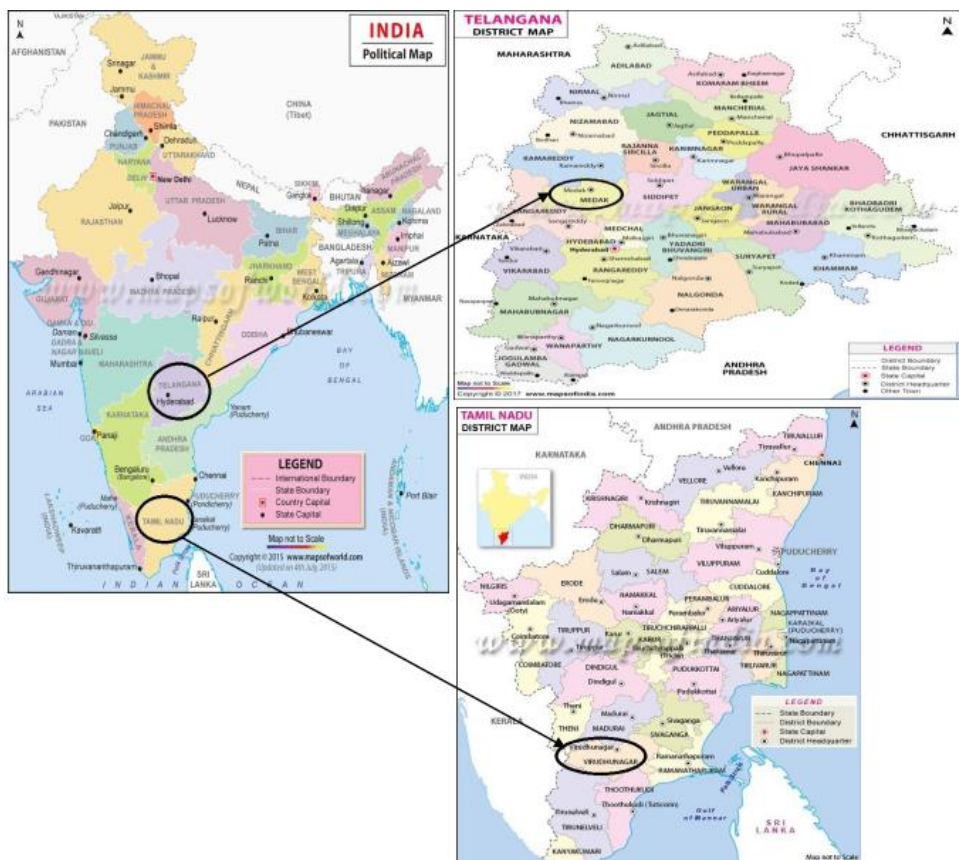
Crediting Period Start date: 31-March-2015 (1st crediting period)

Crediting Period End date: 30-March-2025 (1st crediting period)

The project activity adopts a renewable crediting period of 10 years which can be renewed twice.

1.7 Project Location

The project location has been highlighted in the geographical map shown below:



The Geo Coordinates of the project location has been mentioned in the table below:

Project owner	Village	Taluka	District	State	Latitude	Longitude
M/s. D. J. Malpani	Hoti	Zaheerabad Mandal	Medak	Telanagana	17°39'21.08" N	77°33'24.55" E
Giriraj Enterprises	Sengottai	Virudhunagar	Virudhunagar	Tamil Nadu	9°38'8.03" N	77°51'16.17" E

1.8 Title and Reference of Methodology

Methodology: ACM0002: Grid-connected electricity generation from renewable sources - Version 17.0¹

Sectoral Scope: 01

¹ <https://cdm.unfccc.int/methodologies/DB/8W400U6E7LFHHYH2C4JR1RJWWO4PVN>

Type I: Energy industries (renewable / non-renewable sources)

Category: Approved Consolidated Methodology (ACM0002)

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

- Tool to calculate the emission factor for an electricity system- Version 05.0 (EB 87, Annex 09)²
- Methodological Tool- Tool for the demonstration and assessment of additionality- Version 07.0.0 (EB 70, Annex 08)³

1.9 Participation under other GHG Programs

The project has neither been registered nor seeking registration under any other GHG programs. The project is registered only in the GHG program under VERRA. PP has also provided undertaking that it will not claim GHG credits in any other GHG programme other than that under VERRA in this monitoring period.

1.10 Other Forms of Credit

Emission Trading Programs and Other Binding Limits:

Net GHG emission reductions or removals generated by the Project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions in any Emission Trading program or other binding limits.

Other Forms of Environmental Credit:

Not applicable, as the project is not registered in any other GHG mechanism other than VCS. Also, the project activity is not availing any REC benefits and the same can be confirmed from publicly available link of REC generators⁴.

1.11 Sustainable Development Contributions

Contribution to sustainable development:

Ministry of Environment and Forests, has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development. The project contributes to sustainable development using the following ways.

Social well-being: The project would help in generating employment opportunities during the construction and operation phases. The project activity will lead to development in

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

³ <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-01-v7.0.0.pdf>

⁴ https://www.recregistryindia.nic.in/index.php/publics/registered_regens

infrastructure in the region like development of roads and also may promote business with improved power generation.

Economic well-being: The project is a clean technology investment in the region, which would not have been taken place in the absence of the VCS benefits the project activity will also help to reduce the demand supply gap in the state.

Technological well-being: The successful operation of project activity would lead to promotion of solar based power generation and would encourage other entrepreneurs to participate in similar projects.

Environmental well-being: Solar being a renewable source of energy, it reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion. Due to its zero emission the project activity also helps in avoiding significant amount of GHG emissions and specific pollutants like SO_x, NO_x, and SPM associated with the conventional thermal power generation facilities.

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	72,893 MWh, of renewable electricity has been supplied to Indian grid during the reported period that helps to increase the renewable energy share in the energy mix.	$(148,710 + 112,098 + 103,014.76 + 91,474.27 + 79,678 + 49,916 + 72,893) = 657,784.03^5$ MWh renewable electricity has been supplied to Indian grid that helps to increase the renewable energy share in the energy mix.
2)	13.0	Take urgent action to combat climate change and its impacts	Implemented activities to decrease	By supplying 72,893 MWh clean electricity to Indian grid, the project avoided release of 71,267 tCO ₂ in to the atmosphere during the reporting period	Prevented the release of $(145,393 + 109,597 + 100,718 + 89,423 + 77,900 + 48,803 + 71,267) = 643,101^6$ tCO ₂ into the atmosphere.

⁵ The previous electricity generation values have been updated from the corresponding monitoring reports present in: <https://registry.verra.org/app/projectDetail/VCS/1670>

⁶ The previous electricity generation values have been updated from the corresponding monitoring reports present in: <https://registry.verra.org/app/projectDetail/VCS/1670>

2 SAFEGUARDS

2.1 No Net Harm

Solar power projects are not included in the Schedule I of the EIA notification S.O.1533 (E) dated 14th September 2006 and thus an EIA is not required. Ministry of Environment & forests vide their OM No. J-11013/41/2006 - IA II (I) dated 13th May 2011, has re-affirmed this and exempted solar power plants from EIA and Environmental Consent requirement.

The project activity has no significant negative environmental or socio-economic impacts, all potential negative impacts have been listed below:

During construction

Impact on air

Movement of construction material during construction will have some impact on the air. As the transportation is quite less for the project activity, the impacts will be negligible.

Impact on water

Not much water discharge takes place during construction. However, proper sanitary arrangements are provided by project proponents.

Impact on Land use

The land on which the project activity takes place is largely unproductive. Prior to the project activity, most of the land had no beneficial use. The project proponents had bought the land for a worthwhile application and obtained necessary approvals for installation of solar PVs. No dislocation of people is involved in the course of the project activity. The magnitude of the impacts during the construction phase is negligible and exists for a temporary period of time till the end of construction phase. Therefore, it would not affect the environment considerably. The impacts on the environment due to construction activities of solar PVs are negligible.

Operation and Maintenance Phase

SWSL/Enrich maintains highest level of safety standards. Systematic and scientific maintenance of all equipment has been undertaken to ensure the best safety standards.

Impact on air

Solar energy plants are known to contribute to zero atmospheric pollution as no fuel combustion is involved during any stage of the operation.

Impact on water

There is absolutely no effluent discharge during operation of solar plant.

Impact on ecology.

No harm on the ecological environment is envisaged by the project activity.

Socio-Economic Impacts

There is no inconvenience to the local community due to the transmission lines. The project activity helps in upliftment of skilled and unskilled manpower in the region. The project has been providing employment opportunities not only during the construction phase, but also during its operational lifetime. The project activity improves employment rate and livelihood of local populace in the vicinity of the project. Moreover, the project generates eco-friendly, GHG free power which contributes to sustainable development of the region.

Conclusion

The net impact under environmental pollution category are positive as all necessary abatement measures are being adopted and periodically monitored. The project activity does not have any major adverse impacts on environment during its construction or operational phase.

The human interest parameters show positive socio-economic impacts due to increased job opportunities at the facility as well as other ancillary units coming up.

2.2 Local Stakeholder Consultation

The local stakeholder meeting was carried out for the project activity and the details of the same can be referred from the registered VCS PD.

As a part of continuous feedback from stakeholders, the PP has also placed a grievance register in plant site office where-in, the stakeholders including local community, government agencies and NGOs can put down their complaint and the same if found genuine are addressed as soon as possible. However, during the current monitoring period no such comments/grievances/suggestions have been received from the stakeholders.

2.3 AFOLU-Specific Safeguards

Not Applicable, as this is not an AFOLU project.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project activity involves bundled Solar Power Projects in different states of India i.e. Tamil Nadu and Telengana. The total installed capacity of the project is 56.25 MW.

The project has already been commissioned and the commissioning details of the project activity have been mentioned below. The project started operation on 31-March-2015 which is the earliest date of commissioning and has been in operation till now since commissioning except scheduled maintenance and shutdowns.

Project Investors	Project	Project Capacity in AC	Date of commissioning	Project location	State
M/s. D. J. Malpani	Solar	16.25 MW	31-March-2015	Village- Hoti Tehsil- Zaheerabad Mandal, District- Medak	Telangana
Giriraj Enterprises	Solar	40 MW	23-September-2015	Village- Sengottai, Tehsil- Virudhunagar, District- Virudhunagar	Tamil Nadu

Solar Power Project Technology Details –

The bundled project activity harness solar energy through installation of PV with installed capacity of 56.25 MW. Solar energy is a pollution-free, infinitely sustainable form of energy. It does not use fossil fuel. It does not produce greenhouse gases, and it does not produce toxic or radioactive waste. Therefore, the technology used for the project activity, is environmentally safe and sound.

The bundled project activity generates power using solar energy, which is a renewable source of energy. The solar PV system mainly consists of PV modules, module mounting structures, junction boxes, Inverters, regulators, monitoring devices etc. The solar PV cells convert solar radiation into DC current. The solar panels are installed in arrays. The modules in the each array are connected in parallel and/or series in order to get the preferred current & voltage which match with the rated input parameters of the inverter. The Inverter connected in each array converts the DC current to AC current. The electricity collected from all the inverters is stepped up to 33 kV through a 380V/33kV transformer at Telangana site. For Tamil Nadu site the inverter output is stepped up to 33kV through a 405V/33KV transformer. For Tamil Nadu site this this 33 kV electricity is further stepped up to 110kV and then supplied to Indian grid. The energy meters are installed at each site, for Tamil Nadu site the meters

are installed at Solar Plant End Switch Yard while for the Telangana site meters are at the substation maintained by the state utility for the measurement of electricity generated. The operational life time of the project activity (PV module) is 25 years.

The technical Specifications for 16.25 MW project activity is as below:

CSUN 255-60P- Polycrystalline Solar PV modules
Capacity DC – 17.92854 MW (70308 No of Modules, 255 Watt capacity)
Inverter – ABB make, PVS800-57-1000KW-C
No. of Inverters - 16
AC output capacity – 16.25 MW

The technical Specifications for 40 MW project activity is as below:

Canadian Solar PV Modules, 315 Wp (CS6X-315P),
Capacity DC – 49.565280 MW (Total Modules (87024 + 72864 = 159,888) of 315 Watt capacity)
No. of Inverters - 40
AC output capacity – 40 MW

Feeder connectivity details of the solar plant is given in the table below:

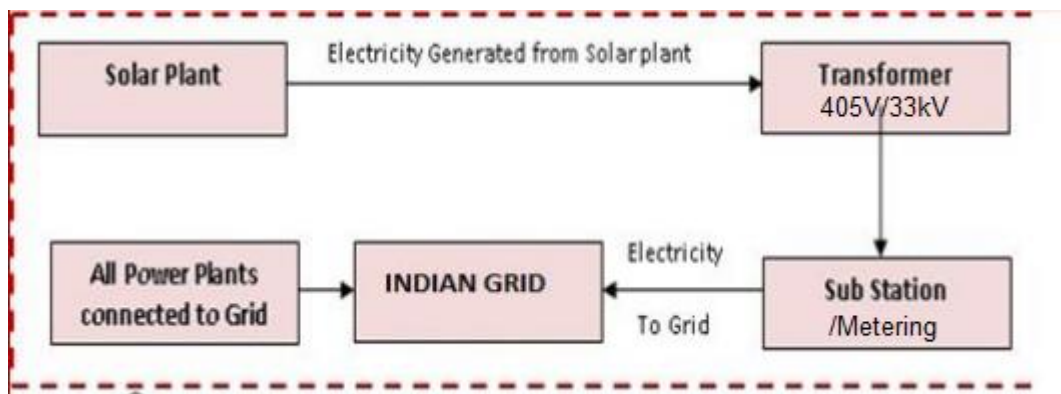
Site	State	Capacity	Feeder Location Details
Virudhunagar Site	Tamil Nadu	40 MW	Virudhunagar Feeder
Zaheerabad Site	Telangana	16.25 MW	Zaheerabad Feeder

During the current monitoring period, all the solar power plants were operational and the project activity has supplied 72,893 MWh of electricity, and thus contributing to 71,267 tCO₂e GHG reductions.

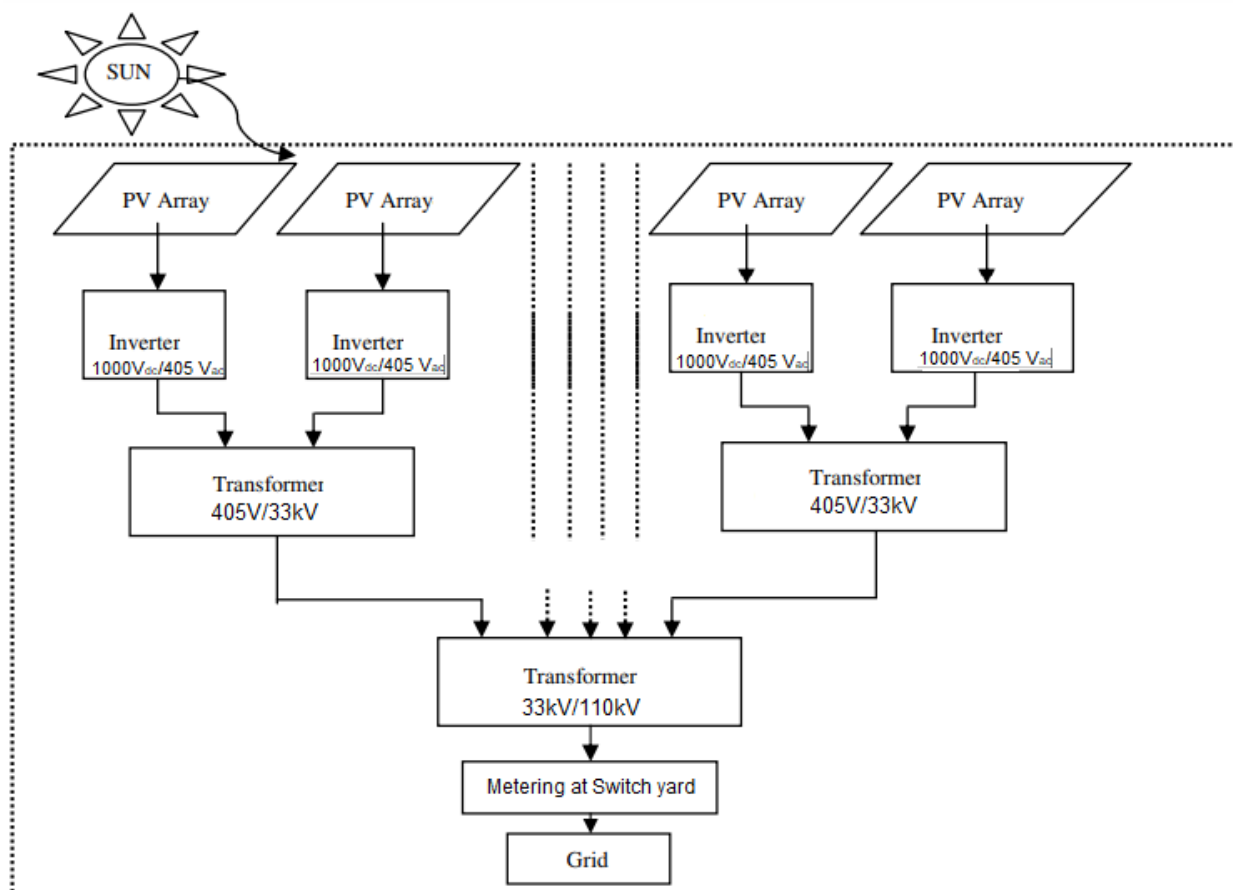
Plant Breakdown has occurred during the current monitoring period, total breakdown duration is calculated as 76 hours 25 minutes for Tamil Nadu site and 7 hours 20 minutes for Telangana site this can be checked from Appendix 1 of the monitoring report wherein the breakdown details have been mentioned. No significant impacts have occurred due to plant breakdown on the GHG emission reduction from the project activity and monitoring process of the project activity.

Line Diagram showing the metering location for both Tamil Nadu and Telangana Sites:

Telangana Site:



Tamil Nadu Site:



3.2 Deviations

3.2.1 Methodology Deviations

Not Applicable, as there are no methodological deviations.

3.2.2 Project Description Deviations

Not Applicable, as there are no project deviations.

3.3 Grouped Projects

Not Applicable, as this is not a grouped project activity.

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 CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 11, April 2016 ⁷
Value applied	0.9941
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 05.0.0” as 3-year generation weighted average using data for the years 2012-2013, 2013-2014 & 2014- 2015. 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
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	EF _{grid,BM,y}
Data unit	tCO ₂ /MWh
Description	Build Margin CO ₂ emission factor in year y

⁷ https://cea.nic.in/wp-content/uploads/baseline/2020/07/user_guide_ver11.pdf

Source of data	Calculated from CEA database, Version 11, April 2016 ⁸
Value applied	0.9285
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 05.0.0” BM is calculated ex-ante based on the most recent information available at the time of submission of PDD and is fixed for the entire crediting period. 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
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 11, April 2016 ⁹
Value applied	0.9777
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

Data / Parameter	EG _{PJ, y}
Data unit	MWh

⁸https://cea.nic.in/wp-content/uploads/baseline/2020/07/user_guide_ver11.pdf

⁹https://cea.nic.in/wp-content/uploads/baseline/2020/07/user_guide_ver11.pdf

Description	Quantity of net electricity generation supplied by the project (Solar) plant/unit to the grid in year y
Source of data	Joint meter readings
Description of measurement methods and procedures to be applied	The value of net electricity generation supplied to the grid as per Joint Meter Reading Report forms the basis for calculation of the emission reductions; which can be cross checked from the invoice raised to DISCOM i.e. SPDCTL in case of Telangana site and TANGEDCO in case of Tamil Nadu site. Net electricity supplied to grid is calculated as the difference of the measured values of “export” and “import” of electricity through the dedicated SEB energy meter installed at the delivery point (i.e. the connected substation). Net electricity generated and supplied by the project (Solar) plant/unit to the grid = Electricity Export to the grid – Electricity Import from the grid. Monthly meter readings are taken from the main and check meter installed at the substation and certified by the representatives of SEB Officials and the representatives of the project proponent.
Frequency of monitoring/recording	Continuous monitoring, hourly measurement and at least monthly recording
Value monitored	72,893
Monitoring equipment	Monitoring: Tri vector meter are used Data type: Measured Type of meter: Static type meter (Main & Check). Both are Bidirectional meters. Class of meter: 0.2s The Calibration details of the Energy Meter has been mentioned in Appendix-1 of the Monitoring Report.
QA/QC procedures to be applied	- The energy meter reading are taken on monthly basis - Energy meters are calibrated once in five years¹⁰¹¹ and faulty meters are duly replaced immediately (if found). - All the energy meters are under the control of state utility and calibration of energy meters is also under the jurisdiction of state utility. - The Net electricity exported to the grid can be cross checked against the invoice raised by the PP towards the DISCOM i.e. SPDCTL in case of Telangana site and TANGEDCO in case of Tamil Nadu site.

¹⁰ As per CEA regulation

¹¹ https://cea.nic.in/wp-content/uploads/2020/02/CEA_metering_regulation_amendment_2019.pdf

Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	The data would be archived electronically and maintained for the entire crediting period plus two years.

4.3 Monitoring Plan

Aim of monitoring

The monitoring methodology specified in the methodology requires that the project-monitoring plan to consist of monitoring of quantity of net electricity supplied to the grid in the year y. In order to monitor the mitigation of GHG due to the project activity, the total energy exported needs to be measured. The net energy supplied to the unified INDIAN grid by the project activity multiplied by emission factor for the grid, would form the baseline for the project activity.

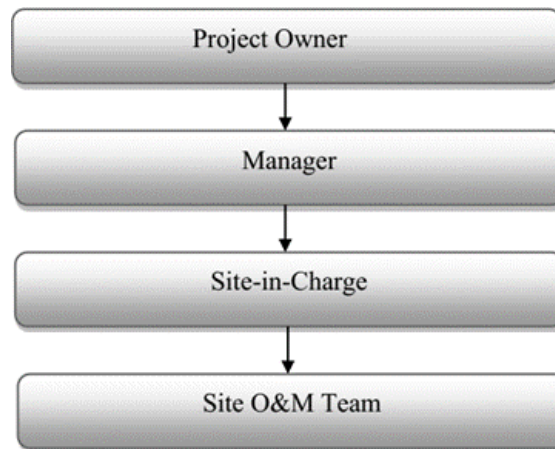
Since the baseline emission factor is based on an ex-ante determination, monitoring of this parameter is not required. The sole parameter for monitoring is the net electricity exported to the grid.

Monitoring roles and responsibilities

The operational and management structure implemented for data monitoring is as follows:

The monitoring plan is developed in accordance with the modalities and procedures for CDM/VCS project activities and is proposed for grid-connected solar power project being implemented in respective states in India. The monitoring plan, which is implemented by the project proponent 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 proponent. PP proposed the following structure for data monitoring, collection, data archiving and calibration of equipments for this project activity. The team comprises of the following members:



PP has assigned the responsibility of operation and maintenance of solar plants to respective EPC contractor for each sites.

Responsibilities of Head (O & M – Solar Power Project): Overall functioning and maintenance of the project activity.

Responsibilities of Plant In-charge: Responsibility to maintain the data records, ensures completeness of data, and reliability of data (calibration of equipments). Responsibilities of Shift In-charge: Responsibility for day to day data collection and maintains day to day log book for monitored data.

Apportioning

In case of common metering arrangement, the apportioning will be done by state electricity board and PP is getting break up sheet where the energy supplied by project activity to grid is mentioned.

The same break up sheet will be used for invoice purpose. This apportioning process is under control of state electricity board and PP do not have any control on it.

QA/QC procedures

The energy meters at the feeders are maintained and owned by DISCOM. Neither the project proponent nor the site personnel have any control over it. The records are cross-checked with the records of sold electricity to DISCOM/third party. The meters are calibrated by DISCOM at-least once in five years.

Data Measurement

The export and import energy will be measured continuously using above mentioned Main & Check meters. Export & Import readings of Main & Check meters shall be taken on monthly basis by authorized officer of state electricity board in the presence of PP or representative of PP. The meter reading will be taken jointly and signed by the representatives of the state electricity board and project investors. Based on the readings, invoices will be raised by project investors. These invoices can be used for cross checking the meter readings taken for the project activity. It is to be noted though PP or PP representative is available during meter reading, the calculations of net electricity supplied to grid is completely under purview

of state electricity board officer and PP do not have any control on it. Also accuracy class of meters and calibration frequency is under purview of state electricity board officer and PP do not have any control on it. PP got the monthly credit report from where net electricity supplied to grid is obtained and used for emission reduction calculations.

Data Archiving

Monthly data shall be archived electronically and in paper form and stored for the entire crediting period and two years thereafter.

Emergency preparedness

In the event that the main meter, which is used to record the net electricity exported by the project, is found to be faulty or calibration throws up error beyond acceptable limits, 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 also fails or calibration throws up error beyond acceptable limits, it will also be repaired or replaced. In this case the readings from the plant are not available and therefore the emission reductions are not accounted for.

Training and maintenance requirements:

Each and every site personnel is provided with proper training to meet the requirements of the Operations and maintenance. This ultimately leads to creativity in problem solving.

Personnel training

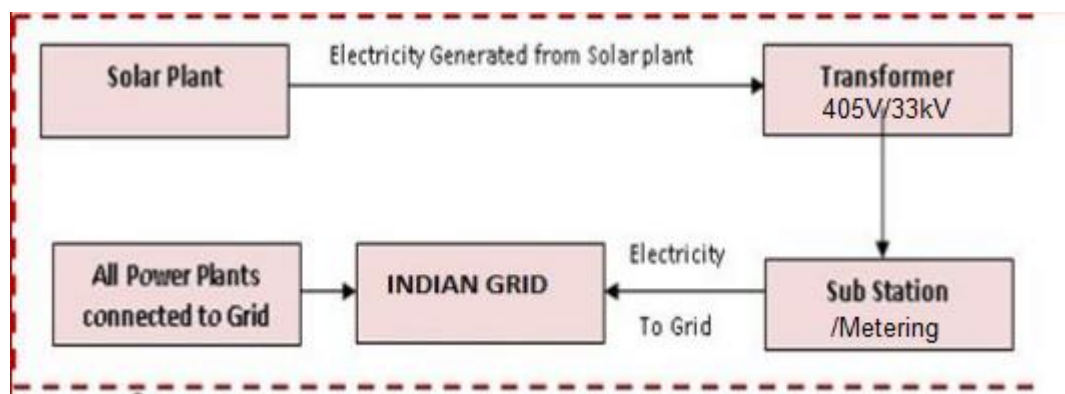
In order to ensure a proper functioning of the project activity and a properly monitoring of emission reductions, the staff (CDM/VCS team) will be trained. The plant helpers will be trained in equipment operation, data recording, reports writing, operation and maintenance and emergency procedures in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

Apportioning

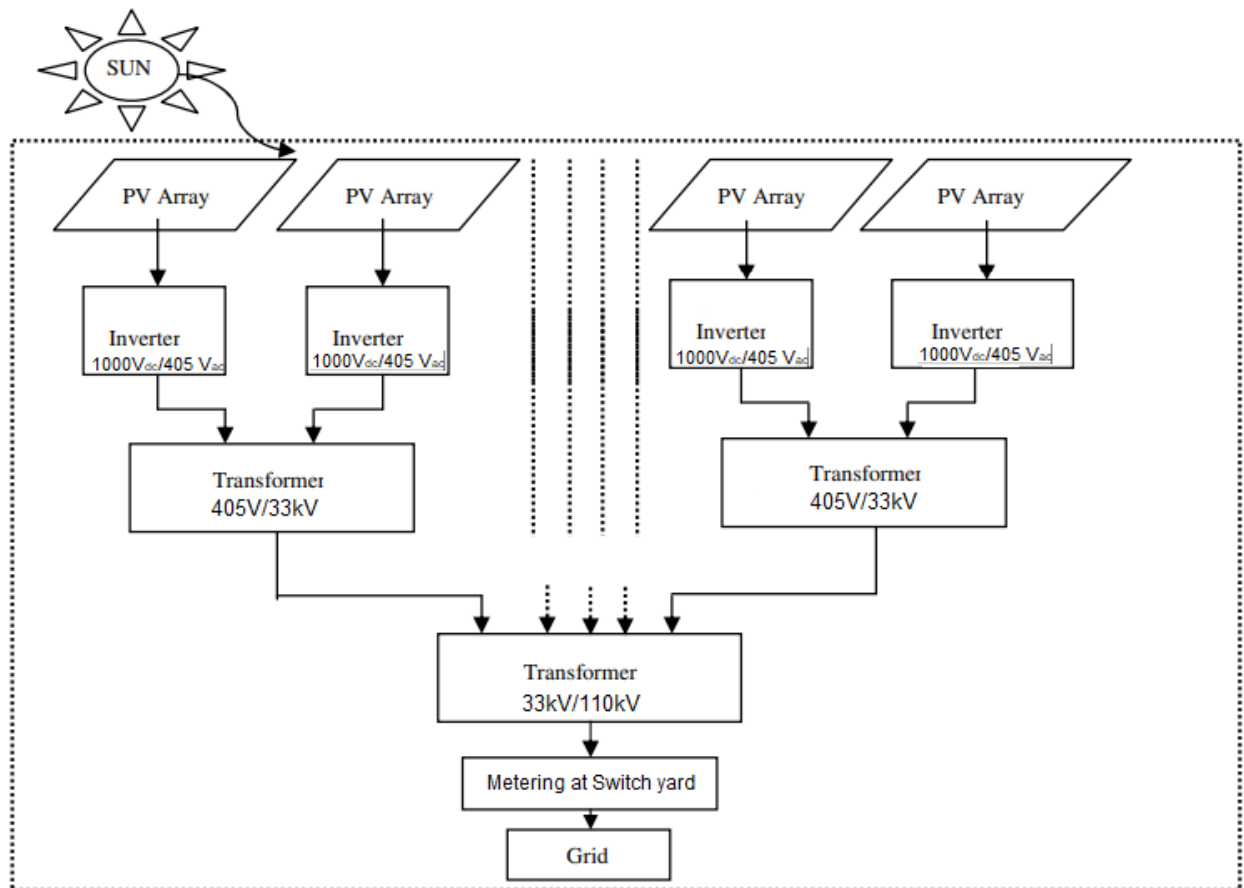
In case of mismatch of date between the start date of the billing cycle and the start date of monitoring period the data will be apportioned in line to the daily generation values for the said mismatch period.

Line Diagram showing the metering location for both Tamil Nadu and Telangana Sites:

Telangana Site:



Tamil Nadu Site:



5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

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

Where:

BE_y : Baseline emissions in year y (tCO₂e/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 VCS 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” (tCO₂e/MWh)

Parameter	Unit	Value
$EG_{PJ,y}$	MWh	72,893.00
$EF_{grid,CM,y}$	tCO ₂ e	0.9777
BE_y	=	$72,893.00 * 0.9777$
	=	71,267.00 (Round down value)

Year	Baseline emissions or removals (tCO ₂ e)
01-July-2021 to 31-December-2021	45,215
01-January-2022 to 31-March-2022	26,052

5.2 Project Emissions

$PE_{FF,y} = 0$, As per para 37 of ACM0002 version 17, “For all renewable energy power generation project activities, emissions due to the use of fossil fuels for the backup generator can be neglected”. Hence, $PE_{FF,y} = 0$.

5.3 Leakage

As per para 60 of ACM0002 version 17, No leakage emissions need to be considered for the project activity. Hence, $LE_y = 0$.

5.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
01-July-2021 to 31-December-2021	45,215	0	0	45,215

01-January-2022 to 31-March-2022	26,052	0	0	26,052
Total	71,267	0	0	71,267

The estimated emission reduction to be achieved from the project activity for the current monitoring period is 69,830 tCO₂e, whereas actual emission reductions achieved are 71,267 tCO₂e. The actual emission reductions achieved are 2% higher than the estimated emission reductions. This is mainly due to the higher PLF or higher generation of electricity. The generation of electricity depends upon the number of annual days of sunshine availability and many other climatic conditions, which are not within the control of the project participant. The higher generation during the current verification period is hence due to certain natural conditions and hence acceptable.

Moreover, higher generation of 2% from the estimated value in registered VCS PD for this monitoring period does not impact the additionality of the project as sensitivity analysis in PD already demonstrated the impact of +/-10% generation on additionality and higher generation amount in the current monitoring period is less than the same.

The breakdown that occurred during the current monitoring period is for a total duration of 76 hour 25 minutes for Tamil Nadu site and 7 hours 20 minutes for Telangana site this can be checked from Appendix 2 of the monitoring report. No significant impacts have occurred due to plant breakdown on the GHG emission reduction from the project activity and monitoring process of the project activity.

APPENDIX 1: CALIBRATION DETAILS

Meter and Calibration details for current monitoring period:

40 MW Project Activity by Giriraj Enterprises

Meter Type	Meter Serial Number	Make	Accuracy Class	Calibration Date	Validity
Main Meter	17074037	L & T	0.2s	10-October-2018	09-October-2023
Check Meter	17074077	L & T	0.2s	10- October-2018	09-October-2023

As the calibration frequency of the meter is once in five years, the calibration reports are valid during the current monitoring period. Hence, error factor has not been applied.

16.25 MW Project Activity by D J Malpani

Meter Type	Meter Serial Number at plant site	Make	Accuracy Class	Calibration Date	Validity
Main Meter	16351134	Elster	0.2s	11-June-2020	10-June-2025
Check Meter	16538757	Elster	0.2s	11-June-2020	10-June-2025
Standby Meter	02811297	Elster	0.2s	10-September-2020	09-September-2025

As the calibration frequency of the meter is once in five years, the calibration reports are valid during the current monitoring period. Hence, error factor has not been applied.

APPENDIX 2: BREAKDOWN DETAILS

Tamil Nadu site:

Month	Date	Plant	Total Breakdown Hrs. (hh:mm)	Breakdown Details
July	01-Jul-21	40MW Giriraj Enterprises	00:55	PV I-V Curve Test
July	01-Jul-21	40MW Giriraj Enterprises	00:10	PV I-V Curve Test
July	01-Jul-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
July	01-Jul-21	40MW Giriraj Enterprises	00:15	PV I-V Curve Test
July	01-Jul-21	40MW Giriraj Enterprises	00:25	PV I-V Curve Test
July	02-Jul-21	40MW Giriraj Enterprises	00:17	GFD Trip
July	02-Jul-21	40MW Giriraj Enterprises	01:35	GFD Trip
July	07-Jul-21	40MW Giriraj Enterprises	00:13	GFD Trip
July	07-Jul-21	40MW Giriraj Enterprises	00:56	GFD Trip
July	07-Jul-21	40MW Giriraj Enterprises	00:35	String Cable Failure
July	07-Jul-21	40MW Giriraj Enterprises	00:30	String Cable Failure
July	12-Jul-21	40MW Giriraj Enterprises	00:35	VCB Healthyness checking
July	12-Jul-21	40MW Giriraj Enterprises	00:05	VCB Healthyness checking

July	13-Jul-21	40MW Giriraj Enterprises	00:05	Inverter Healthyness checking
July	14-Jul-21	40MW Giriraj Enterprises	06:04	String Cable theft
July	20-Jul-21	40MW Giriraj Enterprises	00:35	String Cable Failure
July	30-Jul-21	40MW Giriraj Enterprises	00:27	String Cable Failure
July	30-Jul-21	40MW Giriraj Enterprises	00:31	String Cable Failure
July	31-Jul-21	40MW Giriraj Enterprises	00:09	Inverter communication disturbed
July	31-Jul-21	40MW Giriraj Enterprises	00:14	Inverter communication disturbed
July	31-Jul-21	40MW Giriraj Enterprises	00:07	Inverter communication disturbed
July	31-Jul-21	40MW Giriraj Enterprises	00:16	Inverter communication disturbed
July	31-Jul-21	40MW Giriraj Enterprises	00:13	Inverter communication disturbed
August	05-Aug-21	40MW Giriraj Enterprises	00:11	Inverter communication disturbed
August	05-Aug-21	40MW Giriraj Enterprises	00:20	String Cable Failure
August	12-Aug-21	40MW Giriraj Enterprises	00:14	String Cable Failure
August	17-Aug-21	40MW Giriraj Enterprises	00:20	String Cable Failure
August	23-Aug-21	40MW Giriraj Enterprises	00:19	String Cable Failure
August	30-Aug-21	40MW Giriraj Enterprises	00:15	Inverter communication disturbed

September	03-Sep-21	40MW Giriraj Enterprises	00:19	String Cable Failure
September	08-Sep-21	40MW Giriraj Enterprises	00:20	String Cable Failure
September	08-Sep-21	40MW Giriraj Enterprises	00:20	String Cable Failure
September	17-Sep-21	40MW Giriraj Enterprises	00:15	PV I-V Curve Test
September	17-Sep-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
September	17-Sep-21	40MW Giriraj Enterprises	00:25	PV I-V Curve Test
September	17-Sep-21	40MW Giriraj Enterprises	00:30	PV I-V Curve Test
September	17-Sep-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
September	18-Sep-21	40MW Giriraj Enterprises	00:45	PV I-V Curve Test
September	18-Sep-21	40MW Giriraj Enterprises	00:30	PV I-V Curve Test
September	18-Sep-21	40MW Giriraj Enterprises	00:15	PV I-V Curve Test
September	18-Sep-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
September	19-Sep-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
September	19-Sep-21	40MW Giriraj Enterprises	00:15	PV I-V Curve Test
September	19-Sep-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
September	19-Sep-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
September	19-Sep-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
September	19-Sep-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
September	19-Sep-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
September	20-Sep-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test

September	20-Sep-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
September	20-Sep-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
September	20-Sep-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
September	21-Sep-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
September	21-Sep-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
September	22-Sep-21	40MW Giriraj Enterprises	00:41	String Cable Failure
September	23-Sep-21	40MW Giriraj Enterprises	00:58	String Cable Failure
September	24-Sep-21	40MW Giriraj Enterprises	00:17	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:07	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:08	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:30	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:31	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:19	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:08	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:09	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:08	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:33	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:25	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:32	GFD Trip

September	24-Sep-21	40MW Giriraj Enterprises	00:17	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:15	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:08	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:10	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:07	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:27	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:29	GFD Trip
September	24-Sep-21	40MW Giriraj Enterprises	00:27	GFD Trip
September	25-Sep-21	40MW Giriraj Enterprises	00:19	Inverter communication disturbed
September	25-Sep-21	40MW Giriraj Enterprises	01:17	GFD Trip
September	30-Sep-21	40MW Giriraj Enterprises	00:18	PV I-V Curve Test
September	30-Sep-21	40MW Giriraj Enterprises	00:19	PV I-V Curve Test
September	30-Sep-21	40MW Giriraj Enterprises	00:15	PV I-V Curve Test
September	30-Sep-21	40MW Giriraj Enterprises	00:19	PV I-V Curve Test
September	30-Sep-21	40MW Giriraj Enterprises	00:19	PV I-V Curve Test
October	01-Oct-21	40MW Giriraj Enterprises	00:23	String Cable Failure
October	01-Oct-21	40MW Giriraj Enterprises	00:22	String Cable Failure
October	03-Oct-21	40MW Giriraj Enterprises	00:29	String Cable Failure
October	07-Oct-21	40MW Giriraj Enterprises	00:14	GFD Trip

October	07-Oct-21	40MW Giriraj Enterprises	00:07	GFD Trip
October	07-Oct-21	40MW Giriraj Enterprises	00:42	GFD Trip
October	13-Oct-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
October	13-Oct-21	40MW Giriraj Enterprises	00:15	PV I-V Curve Test
October	13-Oct-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
October	13-Oct-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
October	13-Oct-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
October	13-Oct-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
October	13-Oct-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
October	13-Oct-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
October	14-Oct-21	40MW Giriraj Enterprises	00:10	PV I-V Curve Test
October	14-Oct-21	40MW Giriraj Enterprises	00:10	PV I-V Curve Test
October	15-Oct-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
October	15-Oct-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
October	15-Oct-21	40MW Giriraj Enterprises	00:20	PV I-V Curve Test
October	15-Oct-21	40MW Giriraj Enterprises	00:15	PV I-V Curve Test
October	24-Oct-21	40MW Giriraj Enterprises	00:22	String Cable Failure
November	01-Nov-21	40MW Giriraj Enterprises	00:15	String Cable Failure
November	01-Nov-21	40MW Giriraj Enterprises	00:15	String Cable Failure

November	06-Nov-21	40MW Giriraj Enterprises	00:15	String Cable Failure
November	07-Nov-21	40MW Giriraj Enterprises	00:15	String Cable Failure
November	07-Nov-21	40MW Giriraj Enterprises	00:15	String Cable Failure
November	07-Nov-21	40MW Giriraj Enterprises	00:54	String Cable Failure
November	21-Nov-21	40MW Giriraj Enterprises	00:28	String Cable Failure
November	21-Nov-21	40MW Giriraj Enterprises	00:24	String Cable Failure
November	21-Nov-21	40MW Giriraj Enterprises	00:25	String Cable Failure
November	21-Nov-21	40MW Giriraj Enterprises	00:30	String Cable Failure
November	21-Nov-21	40MW Giriraj Enterprises	00:25	String Cable Failure
November	23-Nov-21	40MW Giriraj Enterprises	03:03	Over temperature power unit error- 6502
November	26-Nov-21	40MW Giriraj Enterprises	00:30	String Cable Failure
November	26-Nov-21	40MW Giriraj Enterprises	00:26	String Cable Failure
November	26-Nov-21	40MW Giriraj Enterprises	00:28	String Cable Failure
November	26-Nov-21	40MW Giriraj Enterprises	00:26	String Cable Failure

November	30-Nov-21	40MW Giriraj Enterprises	00:11	GFD Trip
November	30-Nov-21	40MW Giriraj Enterprises	00:08	GFD Trip
November	30-Nov-21	40MW Giriraj Enterprises	00:51	GFD Trip
November	30-Nov-21	40MW Giriraj Enterprises	00:13	Force Majeure
November	30-Nov-21	40MW Giriraj Enterprises	02:12	Force Majeure
December	01-Dec-21	40MW Giriraj Enterprises	00:20	String Cable Failure
December	01-Dec-21	40MW Giriraj Enterprises	00:15	String Cable Failure
December	01-Dec-21	40MW Giriraj Enterprises	00:20	String Cable Failure
December	07-Dec-21	40MW Giriraj Enterprises	02:18	Power Transformer 1 Tripped
December	07-Dec-21	40MW Giriraj Enterprises	02:43	Power Transformer 1 Tripped
December	08-Dec-21	40MW Giriraj Enterprises	00:32	String Cable Failure
December	08-Dec-21	40MW Giriraj Enterprises	00:45	String Cable Failure
December	14-Dec-21	40MW Giriraj Enterprises	00:29	String Cable Failure
December	14-Dec-21	40MW Giriraj Enterprises	00:31	String Cable Failure

December	15-Dec-21	40MW Giriraj Enterprises	00:29	String Cable Failure
December	21-Dec-21	40MW Giriraj Enterprises	00:32	String Cable Failure
December	21-Dec-21	40MW Giriraj Enterprises	00:28	String Cable Failure
January	04-Jan-22	40MW Giriraj Enterprises	00:25	String Cable Failure
January	05-Jan-22	40MW Giriraj Enterprises	00:05	GFD Trip
January	04-Jan-22	40MW Giriraj Enterprises	00:33	String Cable Failure
January	04-Jan-22	40MW Giriraj Enterprises	01:07	String Cable Failure
January	09-Jan-22	40MW Giriraj Enterprises	00:25	String Cable Failure
January	17-Jan-22	40MW Giriraj Enterprises	00:20	String Cable Failure
February	04-Feb-22	40MW Giriraj Enterprises	00:31	String Cable Failure
February	22-Feb-22	40MW Giriraj Enterprises	05:38	String cable theft
February	23-Feb-22	40MW Giriraj Enterprises	00:26	String Cable Failure
March	13-Mar-22	40MW Giriraj Enterprises	00:33	String Cable Failure
March	21-Mar-22	40MW Giriraj Enterprises	00:25	String Cable Failure
Total Duration			76:25	

Telangana Site:

Month	Date	Plant	Breakdown	Description
October	3-Oct-21	16.25 MW D.J. Malpani	0:45	132KV "R" Phase Bus PT failure
October	17-Oct-21	16.25 MW D.J. Malpani	0:40	Z01 location tripped due to Power swing
November	3-Nov-21	16.25 MW D.J. Malpani	0:45	132 KV shut down taken due to over voltage issue
November	14-Nov-21	16.25 MW D.J. Malpani	0:10	Z01 location tripped due to Power swing
November	14-Nov-21	16.25 MW D.J. Malpani	0:10	Z01 location tripped due to Power swing
November	17-Nov-21	16.25 MW D.J. Malpani	0:40	132 KV incomer line tripped after generation
November	24-Nov-21	16.25 MW D.J. Malpani	0:10	common meter VCB tripped on over current fault
November	24-Nov-21	16.25 MW D.J. Malpani	0:10	common meter VCB tripped on over current fault
December	23-Dec-21	16.25 MW D.J. Malpani	0:25	Inverter tripped on SC fault and ISU fault .IGBT FRC cable
January	11-Jan-22	16.25 MW D.J. Malpani	0:20	Location tripped due to power swing
January	18-Jan-22	16.25 MW D.J. Malpani	0:15	VCB tripped due malfunction in relay
January	28-Jan-22	16.25 MW D.J. Malpani	0:15	breakdown due to E/F
February	7-Feb-22	16.25 MW D.J. Malpani	0:10	location tripped due to Power swing
February	26-Feb-22	16.25 MW D.J. Malpani	0:20	132 KV shut down taken due to over voltage issue
February	27-Feb-22	16.25 MW D.J. Malpani	2:05	breakdown due to E/F
Total Duration			7:20	