



Verified Carbon Standard

BUNDLED SOLAR POWER PROJECT BY VECTOR GREEN ENERGY PRIVATE LIMITED



Document Prepared by EKI Energy Services Limited

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Version	06
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Project ID	1770
Monitoring Period	02-April-2021 to 31-October-2022 (both dates are included)
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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The main purpose of this project activity is to generate clean form of electricity through renewable solar energy source. The project is a bundled project activity which involves installation of 105 MW (AC) solar project in different states of India through SPVs.

Over the 10 years of first crediting period, the project replaces anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 163,888 tCO_{2e} per year, thereon displacing 169,781 MWh/year amount of electricity from the generation-mix of power plants connected to the Indian grid, which is mainly dominated by fossil fuel-based power plant.

The details of the SPVs for the project and their location of installation are mentioned in the table below: -

Name of SPVs	Capacity in MW	COD	Connection with Grid	State	Usage
Winsol Solar Fields (Polepally) Pvt. Ltd.	15 MW, AC (19.5 DC)	01-July- 2016	Indian Grid	Telangana	Sale to State Discom
	50 MW, AC (62.5 DC)	31-December- 2016	Indian Grid	Telangana	Sale to State Discom
Hindupur Solar Park Pvt. Ltd.	40 MW, AC (54.5 DC)	28-June- 2016	Indian Grid	Andhra Pradesh	Sale to State Discom

Total emission reductions achieved in this monitoring period:

During the Current Monitoring Period from 02-April-2021 to 31-October-2022 (First and last date are included), the project activity has supplied 300,631 MWh of electricity, and thus contributing to the GHG reductions 290,199 tCO_{2e}.

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
 Project Category : Grid-connected electricity generation from renewable sources
 ACM0002- Version 18.1¹

¹<http://cdm.unfccc.int/methodologies/DB/5725LCHYPYM4I1V8OD9SFYVAMFFWNP>

The commissioned project is a solar power project and not an AFOLU project

The project is not a grouped project activity.

1.3 Project Proponent

Organization name	Winsol Solar Fields (Polepally) Pvt. Ltd.
Contact person	Mr Ajay Sunkari
Title	GM-Business Acquisition
Address	Office No. 504/2, 5th Floor, White House Block I, 6-3-1192/1/1, Kundanbagh, Begumpet, Hyderabad Telangana- 500016 India
Telephone	+91-9820848924
Email	ajay.sunkari@vectorgreen.com

Organization name	Hindupur Solar Park Pvt. Ltd.
Contact person	Mr Ajay Sunkari
Title	GM-Business Acquisition
Address	Office No. 504/2, 5th Floor, White House Block I, 6-3-1192/1/1, Kundanbagh, Begumpet, Hyderabad Telangana- 500016 India
Telephone	+91-9820848924
Email	ajay.sunkari@vectorgreen.com

1.4 Other Entities Involved in the Project

Organization name	EKI Energy Services Limited
Role in the Project	Project Consultant
Contact person	Rahul Kulkarni
Title	Manager – Operations
Address	Office No. 201, EnKing Embassy, Plot No. 48, Scheme No. 78, Part II, Vijay Nagar INDORE – 452010, India.

Telephone	+91-9432014162
Email	rahul.kulkarni@enkingint.org registry@enkingint.org

1.5 Project Start Date

Start date of the project activity is the earliest date of interconnection with the grid i.e., 28-June-2016. This is the date of commissioning of 40 MW solar PV project activity by Hindupur Solar Park Pvt. Ltd.

1.6 Project Crediting Period

Crediting Period Start date: 28-June-2016

Crediting Period End date: 27-June-2026

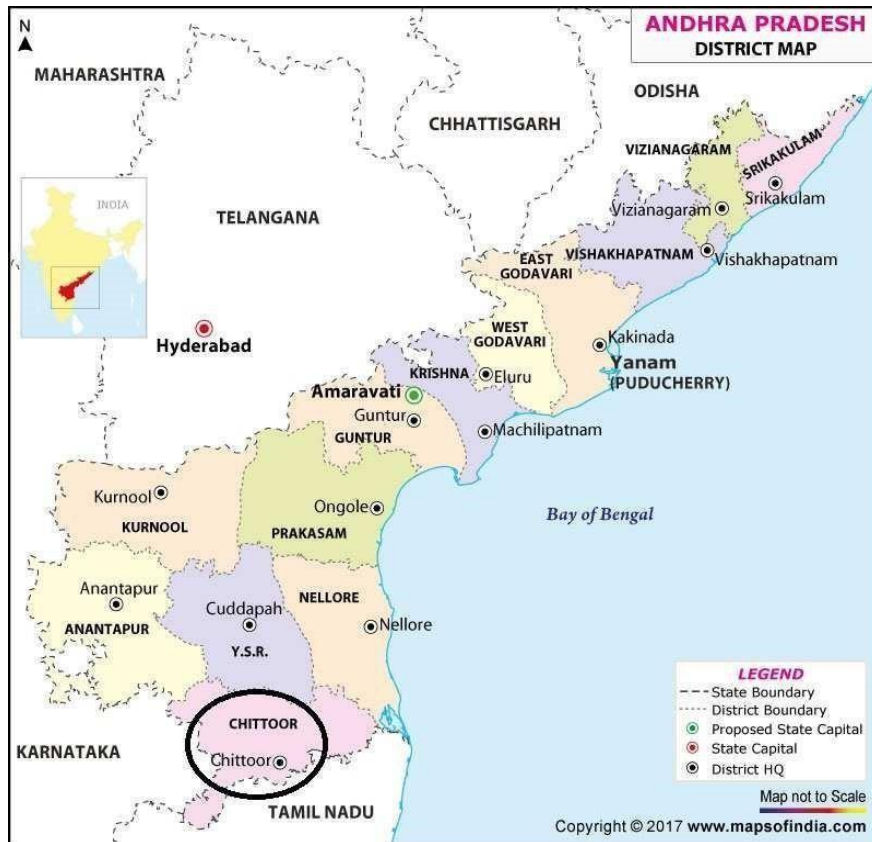
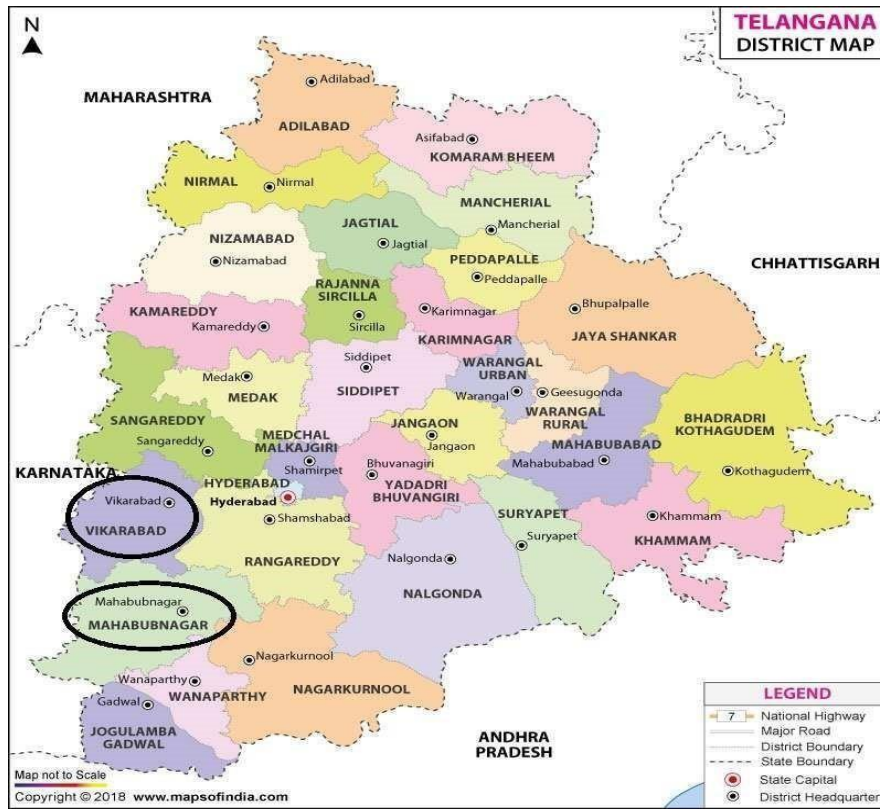
The project activity adopts renewable crediting period of 10 years period which can be renewed for maximum 2 times.

1.7 Project Location

The details of the project locations are mentioned in the table below

Name of SPVs	Capacity (MW)	State	Village	Mandal	District	Latitude (N)	Longitude (E)
Winsol Solar Fields (Polepally) Pvt.Ltd.	15MW, AC (19.5 DC)	Telangana	Karoor	Nawabpet	Mahabubnagar	16° 51' 49.9"	78° 05' 33.6"
	50 MW. AC (62.5 DC)	Telangana	Indur	Peddumal	Vikarabad	17° 20' 41.4"	77° 36' 56.6"
Hindupur Solar Park Pvt.Ltd.	40MW AC (54.5 DC)	Andhra Pradesh	Nelapalle	Peddapanjani	Chittoor	13° 19' 31.90" "	78° 40' 10.75" "

The project locations have been shown in the map below:



1.8 Title and Reference of Methodology

Title: Grid-connected electricity generation from renewable sources

Reference: The project activity meets the eligibility criteria of large-scale project as it is more than 15MW.

Methodology: ACM0002, Grid-connected electricity generation from renewable sources-Version18.1²

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 system³ - Version 06.0 (EB 97, Annex 07)
- Methodological Tool- Tool for the demonstration and assessment of additionality⁴- Version 07.0.0 (EB 70, Annex 08)

1.9 Participation under other GHG Programs

Not Applicable, as the project activity not registered with any of the program.

The undertaking from PP has been submitted for no double accounting for current monitoring period and project activity is not participated any other GHG program other than VCS.

1.10 Other Forms of Credit

Include the following information, as applicable:

- Emission Trading Programs and Other Binding Limits: The PP has not applied this project in any Emission Trading Programs and other Binding Limits.
- Other Forms of Environmental Credit: The PP has not applied this project in any other form of environmental credits.

1.11 Sustainable Development Contributions

²<https://cdm.unfccc.int/methodologies/DB/5725LCHYPYM4I1V8OD9SFYVAMFFWNP>

³<https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v6.pdf>

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

Contribution to sustainable development:

The main purpose of this project activity is to generate clean form of electricity through renewable solar energy source. The project is a bundled project activity which involves installation of 105 MW solar project in different states of India through SPVs.

Over the 10 years of first crediting period, the project replaces anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 163,888 tCO₂e per year, thereon displacing 169,781 MWh/year amount of electricity from the generation-mix of power plants connected to the Indian grid, which is mainly dominated by thermal/fossil fuel-based power plant.

In a nutshell, the various contributions by the Project Proponent (PP) towards the SDGs has been given below: -

1. SDG 7 Affordable and Clean Energy⁵ : 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.

During current monitoring Period: 02-April-2021 to 31-October-2022 (Inclusive of both the dates) 300,631 MWh electricity has supplied to Indian grid.

2. SDG 13 Climate Action⁶: The main purpose of this project activity is to generate a clean form of electricity through renewable solar energy sources. The project activity involves installation of 15 MW solar project by Winsol Solar Fields (Polepally) Pvt.Ltd.at Mahabubnagar district, Telangana, India, 50 MW solar project by Winsol Solar Fields (Polepally) Pvt.Ltd.at Vikarabad district, Telangana, India and 40 MW solar power project by Hindupur Solar Park Pvt.Ltd.at Chittoor district, Andhra Pradesh, India.

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.

By supplying 300,631 MWh clean electricity to Indian grid, the project avoided release of 290,199 tCO₂e into the atmosphere during current monitoring Period: 02-April-2021 to 31-October-2022 (Inclusive of both the dates).

⁵<https://sdgs.un.org/goals/goal7>

⁶<https://sdgs.un.org/goals/goal13>

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 renewable energy share in the total final energy consumption.	About 300,631MWh renewable electricity has supplied to Indian grid during the current monitoring period that helps to increase the renewable energy share in the energy mix	First Monitoring Period: 28-June-2016 to 22-May-2018 (Inclusive of both the dates) 321,387 MWh ⁷ Second Monitoring Period: 23-May-2018 to 22-December-2019 (Inclusive of both the dates) 301,162 MWh ⁸ Third Monitoring Period: 23-December-2019 to 01-April-2021 (Inclusive of both the dates) 234,844 MWh ⁹ Current Monitoring Period: 02-April-2021 to 31-October-2022 (Inclusive of both the dates) 300,631 MWh Total: 1,158,024 MWh

⁷<https://registry.verra.org/app/projectDetail/VCS/1770>

⁸<https://registry.verra.org/app/projectDetail/VCS/1770>

⁹<https://registry.verra.org/app/projectDetail/VCS/1770>

2)	13.0	Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to decrease tonnes of greenhouse gas emission.	By supplying 300,631 MWh clean electricity to Indian grid, the project avoided release of 290,199 tCO _{2e} into the atmosphere during the reporting period.	<p>First Monitoring Period: 28-June-2016 to 22-May-2018(Inclusive of both the dates) 310,233 tCO_{2e}¹⁰</p> <p>Second Monitoring Period: 23-May-2018 to 22-December-2019(Inclusive of both the dates) 290,710 tCO_{2e}¹¹</p> <p>Third Monitoring Period: 23-December-2019 to 01-April-2021(Inclusive of both the dates) 226,692 tCO_{2e}¹²</p> <p>Current Monitoring Period: 02-April-2021 to 31-October-2022 (Inclusive of both the dates) 290,199 tCO_{2e}</p> <p>Total: 1,117,834 tCO_{2e}</p>
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¹⁰<https://registry.verra.org/app/projectDetail/VCS/1770>

¹¹<https://registry.verra.org/app/projectDetail/VCS/1770>

¹²<https://registry.verra.org/app/projectDetail/VCS/1770>

2 SAFEGUARDS

2.1 No Net Harm

The project activity does not involve any major construction activity. It primarily requires the installation of the solar PV panels, interfacing the generators with the State Electricity Board by setting up HT transmission lines and installation of other accessories.

The report on “Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects” prepared by MNRE dated September 2013¹³. This report clearly mentioned that solar PV project activity operations do not result in direct air pollution, noise pollution. Please refer below web link for the same¹⁴.

Thus, there are no any significant impacts due to implementation of project activity on air, water, soil quality and ambience are envisaged due to the project activity.

The project activity has no significant impact on the environment. Solar power projects are not included in the Schedule I of the EIA notification S.O.1533 (E) dated 14th September 2006¹⁵ and thus an EIA is not required. Ministry of Environment & forests vide their OM 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.

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 details of stakeholder meetings are as follows –

For 15 MW Solar Project at Telangana by Winsol Solar Fields (Polepally) Pvt Ltd.

- Date of invitation – 05-January-2016
- Date of Meeting – 12-January-2016
- Location of Meeting - Project site, Telangana

For 50 MW Solar Project at Telangana by Winsol Solar Fields (Polepally) Pvt Ltd

¹³<http://164.100.94.214/sites/default/files/uploads/report-on-developmental-impacts-of-RE.pdf>

¹⁴<http://164.100.94.214/sites/default/files/uploads/report-on-developmental-impacts-of-RE.pdf>

¹⁵ <http://www.environmentwb.gov.in/pdf/EIA%20Notification,%202006.pdf>

- Date of invitation – 06-January-2016
- Date of Meeting – 13-January-2016
- Location of Meeting - Project site, Telangana

3. For 40 MW Solar Project at Andhra Pradesh by Hindupur Solar Park Pvt Ltd

- Date of invitation – 07-January-2016
- Date of Meeting – 14-January-2016
- Location of Meeting - Project site, Andhra Pradesh

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. Details are as follows –

- Winsol (15 MW – Mahabubnagar) – kesava.reddy@vector-green.com
- Winsol (50 MW – Vikarabad) – krishna.balaji@vector-green.com
- Hindupur (40 MW – Chittoor) – Bharath.kumar@vector-green.com

However, no major comments/grievances/suggestions have been received from the aforementioned stakeholders during the current monitoring period. PP has maintained this ongoing communication with local stakeholder consultation mechanism at site all the time

2.3 AFOLU-Specific Safeguards

This section is not applicable because the project activity is not AFOLU project activity.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project activity involves the installation of Solar PV project. The total installed capacity of the project is 105 MW of Solar PV plant located at different states in India. The project is promoted by Vector Green Energy Private Limited.

The Project activity is a new facility (Greenfield) and the electricity generated by the project is being 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. The Project Proponent plans to avail the VCS benefits for the project.

In the Pre- project scenario the entire 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.

During the Current Monitoring Period from 02-April-2021 to 31-October- 2022 (First and last date included) the project activity has supplied 300,631 MWh of net electricity and thus contributing to GHG reductions of 290,199 tCO_{2e}.

The technical details of Solar PV Project are described in below table¹⁶ –

The project activity aims to harness solar energy through installation of Solar PV project with total installed capacity of 105 MW. The technical specification of each SPV mentioned during validation of project activity.

The technical specification of 40 (4 X 10 MW) plant interconnection with grid on 28-June-2016 by Hindupur Solar Park Pvt Ltd are as follows:

Sl. No.	Technical details of the equipment	Description
1	Make of modules installed	First solar series4V2
2	No. of the modules installed	Wp capacity – 110 & 112.5 Wp Total No. of modules - 432300 Nos.
3	Tilt angle	11 degrees
4	Make & Model of Invertor	Make – ABB Model – PVS -800-57-1000kW-C
5	Number of Inverters	40 Nos.
6	Make & Number of Transformers& Capacity	Voltamp Transformer Ltd.- 2000 kVA – 20 Nos,

The technical specification of 15 MW plant interconnection with grid on 01-July-2016 by Winsol Solar Fields (Polepally) Pvt Ltd are as follows:

Sl. No.	Technical details of the equipment	Description
1	Make of modules installed	First solar series4V2
2	No. of the modules installed	Wp Capacity – 100, 102.5,105, 107.5 Wp. Total No. of modules –172788 Nos.
3	Tilt angle	13 degrees
4	Make & Model of Invertor	Make – ABB Model – PVS-800-57-1000kW-C
5	Number of Inverters	15 Nos.
6	Make & Number of Transformers& Capacity	Voltamp – 2000 kVA – 7 Nos. Voltamp – 1000 kVA – 1 No. Schneider – 25/30 MVA – 1 No.

¹⁶ Technical specification are mentioned as per Joint VCS PD & MR (Version 02 dated 16-July-2018)

The technical specification of 50 MW plant interconnection with grid on 31-December-2016 by Winsol Solar Fields (Polepally) Pvt Ltd are as follows:

Sl. No.	Technical details of the equipment	Description
1	Make of modules installed	First solar series4V2
2	No. of the modules installed	Wp Capacity - 100, 112.5 Wp Total No. of modules - 551840 Nos.
3	Tilt angle	13 degrees
4	Make & Model of Invertor	SMA - SC 2500-EV - 19 Nos. ABB - PVS -980-58-2000 kVA-K - 2 Nos. ABB - PVS-980-58-2091 kVA -L - 1 No.
5	Number of Inverters	22
6	Make & Number of Transformers& Capacity	Voltamp - 2250 kVA - 9 Nos. Scilchar - 2250 kVA - 10 Nos. Scilchar -2000 kVA - 2 Nos. Scilchar - 2700 kVA - 1 No Bharat Bijlee - 35/40 MVA - 2 Nos.

During this monitoring period, all sites under the project are operating normally, and no events happened, which may impact the GHG emission reductions or removals and monitoring.

Plant wise major breakdown details for current monitoring period mentioned in Appendix II of this monitoring report.

During this monitoring period, no project proponents changed.

3.2 Deviations

2.1.1 Methodology Deviations

The project activity has been implemented as described in the VCS joint PD & MR and there was no methodological deviation applied during the validation and current & previous monitoring period.

2.1.2 Project Description Deviations

Project description taken during this monitoring period -

Deviation request 1 - The Geo-coordinate of 40 MW Hindupur Solar Park Pvt. Ltd., Chittoor, Andhra Pradesh are revised to exact site location, there was some minor correction in minutes & Seconds of values in this monitoring report. Requesting project description deviation during the current monitoring period.

Deviation request 2 - 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. The nature of deviation is permanent

3.3 Grouped Projects

The specified project is not a part of a 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 CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 12, May 2017 ¹⁷ (as per Joint VCS PD & MR, Version 02 dated 16-July-2018)
Value applied	0.9843
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” as 3-year generation weighted average using data for the years 2013-14, 2014-15 & 2015-16. The data are obtained from “CO ₂ Baseline Database for Indian Power Sector” version 12, 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
Source of data	Calculated from CEA database, Version 12, May 2017 ¹⁸ (as per Joint VCS PD & MR, Version 02 dated 16-July-2018)
Value applied	0.9083
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” as 3-year generation weighted average using data for the years 2013-14, 2014-15 & 2015-16. The data are obtained from “CO ₂ Baseline Database for Indian Power Sector” version 12, published by the Central Electricity Authority, Ministry of Power, Government of India.

¹⁷https://cea.nic.in/wp-content/uploads/baseline/2020/07/user_guide_ver12.pdf

¹⁸https://cea.nic.in/wp-content/uploads/baseline/2020/07/user_guide_ver12.pdf

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 12, May 2017 ¹⁹ (as per Joint VCS PD & MR, Version 02 dated 16-July-2018)
Value applied	0.9653
Justification of choice of data or description of measurement methods and procedures applied	<p>The combined margin emissions factor is calculated as follows: $EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$</p> <p>Where:</p> <p>$EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (tCO₂/MWh)</p> <p>$EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (tCO₂/MWh)</p> <p>W_{OM} = Weighting of operating margin emissions factor (%) = 75%</p> <p>W_{BM} = Weighting of build margin emissions factor (%) = 25%</p>
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/y
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh (This value is the sum of the net electricity generated from all 3 sites).
Source of data	Monthly 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	300,631 MWh

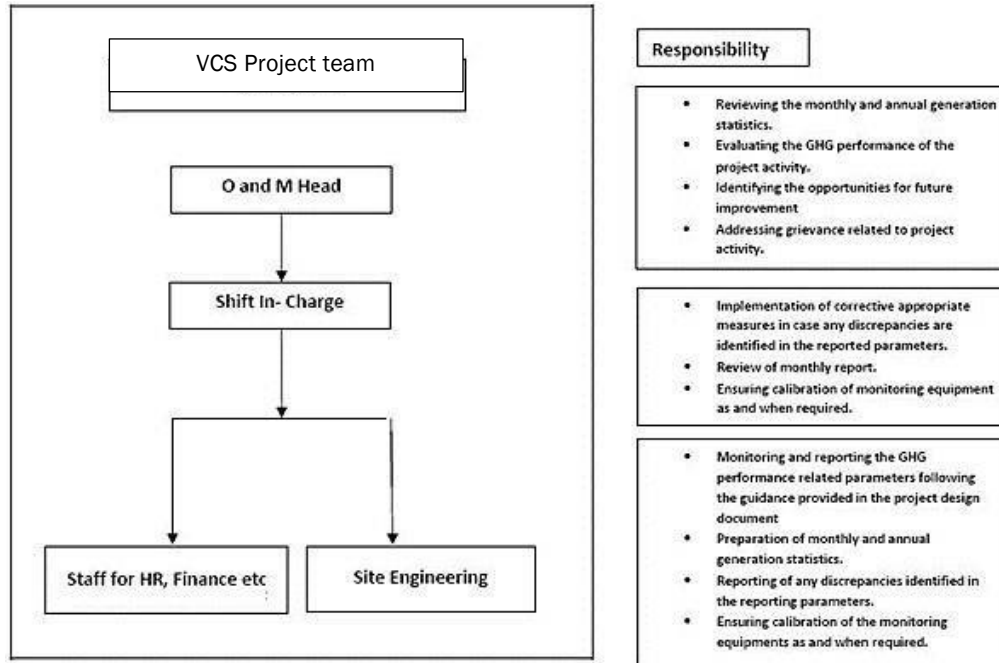
¹⁹https://cea.nic.in/wp-content/uploads/baseline/2020/07/user_guide_ver12.pdf

Monitoring equipment	<p>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.</p> <p>The billing meter used for project activity having following specification Monitoring: ABT cum Tri vector meter are used</p> <p>Data type: Measured</p> <p>Type of meter: Static type meter (Main, Check & Standby meter). Accuracy Class of meters: 0.2s</p> <p>The meter details are being mentioned over APPENDIX1: Meter Calibration Details</p>
QA/QC procedures to be applied	<p>The meters are 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. 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 are applied appropriately to confirm the conservativeness of metering.</p> <p>The metering arrangement, accuracy class of meters, calibration frequency is under control of state electricity board and PP do not have any control on it. PP is getting value of net electricity supplied to grid and the same is considered the monitoring parameter.</p> <p>The billing is raised based on substation meters</p>
Purpose of the data	Calculation of baseline emissions
Calculation method	Thus, Net electricity supplied to the grid by the project plant in a given month = Export, kWh – Import, kWh
Comments	Data is archived in paper & electronic form for two years after the end of crediting period or of the last issuance of VCUs for this project activity, whichever occurs later

4.3 Monitoring Plan

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. The monitoring plan, which is implemented by the project participant describes about the monitoring organization, 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 for this project activity. The team comprises of the following members:



Data Measurement

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

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 is 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 does 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.

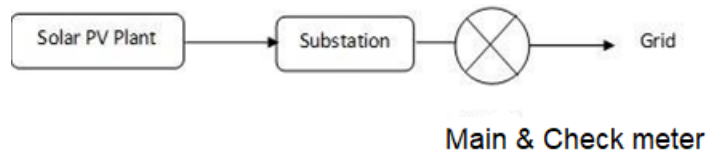
In the event that the main meter, which is used to record the net electricity exported by the project, is found to be faulty it will be repaired or replaced and the data from the check meter will be used in its place. In the unlikely event that the check meter fails it will also be repaired or replaced.

Personnel training

In order to ensure a proper functioning of the project activity and a properly monitoring of emission reductions, the staff are 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.

Metering Arrangement

Line diagram with metering arrangement for the project activity is shown below.



The metering arrangement for all the three sites are the same. Each solar plant has their own dedicated metering arrangement at the substation end. The metering arrangement is under control of state electricity board and may change in future.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The baseline is the MWh produced by the renewable generating unit multiplied by an emission coefficient (measured in tCO₂e/MWh) calculated in a transparent and conservative manner as:

$$BE_y = EF_y \times EG_y$$

Where,

BE_y: Baseline emissions due to displacement of electricity during year y in tons of tCO₂e

EG_{Pj,y}: Quantity of net electricity generation supplied by the project plant/unit to the grid in year y, (MWh)

EF_{grid,CM,y}: Combined Margin CO₂ emission factor in year y in tons CO₂/MWh

Hence, Baseline Emission (BE_y)= CO₂ Emission Factor (EF_y) * Electricity supplied to the grid by the project activity during monitoring period (EG_y):

$$= 0.9653 * 300,631$$

$$= 290,199 \text{ (Round Down)}$$

Grid Emission Factor,

The GEF is fixed ex-ante in the Joint VCS PD & MR (Version 02 dated 16-July-2018) which is given below:

Parameter	Value
OM	0.9843
BM	0.9083
CM	0.9653

5.2 Project Emissions

As per the approved consolidated Methodology ACM0002 (Version 18.1), para 34, for most renewable energy power generation project activities, $PE_y = 0$.

5.3 Leakage

As per the approved consolidated Methodology ACM0002 (Version 18.1) section 5.6, 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. Hence, $LE_y = 0$.

5.4 Net GHG Emission Reductions and Removals

$$ER_y = BE_y - PE_y$$

BE_y = Baseline Emissions

PE_y = Project emissions Therefore, Net GHG Emission Reductions and Removals are calculated as follows:

$$ER_y = 290,199 - 0$$

$$= 290,199 \text{ tCO}_2\text{e}$$

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)
2021	132,513	0	0	132,513
2022	157,686	0	0	157,686
Total	290,199	0	0	290,199

It is to be noted here that as per the estimated emission reduction to be achieved from the project activity for the current monitoring period is 259,526 tCO_{2e}, whereas actual emission reductions achieved are 290,199 tCO_{2e}, which is approximately 11.82 % higher than the estimated emission reductions. The generation of electricity depends upon many other climatic conditions, which are not within the control of the project participant.

The higher generation during the current verification period is due to certain natural conditions (i.e more no. of sunny days) and strict follow up of maintenance schedule (Solar panel cleaning) at site. It is to be noted that due to the higher generation during the current monitoring period, there is no impact on the additionality as generation variation is well below the breaching value 19.90% (Average of breaching value (in %) for PLF of three sites of bundle project activity i.e., 19.90% as per VCS Joint PD & MR (Version 02, dated 16-July-2018). Hence, it is acceptable.

The details of generation variation trend observed during previous monitoring period mentioned in below table:

Sr. No.	Monitoring Period	Generation variation	Remark
1.	28-June-2016 to 22-May-2018	Higher by 12%	Generation variation is well below breaching value 19.90% (Average of breaching value (in %) for PLF of three sites of bundle project activity i.e., 19.90% as per VCS Joint PD & MR (Version 02, dated 16-July-2018), hence acceptable
2	23-May-2018 to 22-December-2019	Higher by 12%	Generation variation is well below breaching value 19.90% (Average of breaching value (in %) for PLF of three sites of bundle project activity i.e., 19.90% as per VCS Joint PD & MR (Version 02, dated 16-July-2018), hence acceptable
3.	23-December-2019 to 01-April-2021	Higher by 8.3 %	Generation variation is well below breaching value 19.90% (Average of breaching value (in %) for PLF of three sites of bundle project activity i.e., 19.90% as per VCS Joint PD & MR (Version 02, dated 16-July-2018), hence acceptable

APPENDIX I: CALIBRATION DETAILS

For Winsol Solar-15 MW			
Meter Details	Main Meter	Check Meter	Standby Meter
Meter Serial No	APX00924	APX00925	APX00926
Make	Secure Meters	Secure Meters	Secure Meters
Accuracy Class	0.2 s	0.2 s	0.2 s
Calibration Frequency	Once in 5 years	Once in 5 years	Once in 5 years
Date of Calibration	30-August-2019	30-August-2019	30-August-2019
Due date of Calibration	29-August-2024	29-August-2024	29-August-2024
For Winsol Solar-50 MW			
Meter Details	Main Meter	Check Meter	Standby Meter
Meter Serial No	APW00111	AP925645	APX00645
Make	Secure	Secure	Secure
Accuracy Class	0.2 s	0.2 s	0.2 s
Calibration Frequency	Once in 5 years	Once in 5 years	Once in 5 years
Date of Calibration	25-October-2018	25-October-2018	25-October-2018
Due date of Calibration	24-October-2023	24-October-2023	24-October-2023
For Hindupur Solar-40 MW			
Hindupur Solar Park Pvt Ltd- I			
Meter Details	Main Meter	Check Meter	Standby Meter
Meter Serial No	APX00864	APX00865	APX00866
Make	Secure	Secure	Secure
Accuracy Class	0.2 s	0.2 s	0.2 s
Calibration Frequency	Once in 5 years	Once in 5 years	Once in 5 years
Date of Calibration	18-January-2020	18-January-2020	18-January-2020
Due date of Calibration	17-January-2025	17-January-2025	17-January-2025
Hindupur Solar Park Pvt Ltd- II			
Meter Details	Main Meter	Check Meter	Standby Meter
Meter SI. No	APX00858	APX00859	APX00860
Make	Secure	Secure	Secure
Accuracy Class	0.2 s	0.2 s	0.2 s
Calibration Frequency	Once in 5 years	Once in 5 years	Once in 5 years
Date of Calibration	18-January-2020	18-January-2020	18-January-2020
Due Date of Calibration	17-January-2025	17-January-2025	17-January-2025
Hindupur Solar Park Pvt Ltd- III			
Meter Details	Main Meter	Check Meter	Standby Meter
Meter SI. No	APX00861	APX00862	APX00863

Make	Secure	Secure	Secure
Accuracy Class	0.2 s	0.2 s	0.2 s
Calibration Frequency	Once in 5 years	Once in 5 years	Once in 5 years
Date of Calibration	22-February-2021	22-February-2021	22-February-2021
Due Date of Calibration	21-February-2026	21-February-2026	21-February-2026
Hindupur Solar Park Pvt Ltd- IV			
Meter Details	Main Meter	Check Meter	Standby Meter
Meter SI. No	APX00867	APX00868	APX00869
Make	Secure	Secure	Secure
Accuracy Class	0.2 s	0.2 s	0.2 s
Calibration Frequency	Once in 5 years	Once in 5 years	Once in 5 years
Date of Calibration	22-February-2021	22-February-2021	22-February-2021
Due Date of Calibration	21-February-2026	21-February-2026	21-February-2026

Note:

There is no change in metering arrangement for 40 MW Hindupur site since its commissioning date – 40 (4X10) MW solar power project which is connected to 132/33 KV Punganur SS set up by M/s. Hindupur Solar Park Pvt. Ltd. Located at Nelapalle village, Peddapanjani mandal, Chittoor district, Andhra Pradesh. (CoD–28-June-2016, Ref Commissioning Certificate No. CGM/P&MM and IPC /TPT/GM/IPC/F.HSPPL/D.No.660/16 Dtd. 04-Nov.-2016 with reference to VCS PD & MR. (Submitting herewith commissioning certificate for verification)

There are another similar capacity (40 MW) connected to the 132/33 KV Hindupur SS set up by M/s. Hindupur Solar Park Pvt. Ltd. Located at Beechiganipalli village, Parigi mandal of Hindupur division in Ananthapuram district, Andhra Pradesh . (CoD – 31-March-2016, Ref Commissioning Certificate No. SE/O/ATP/Com-I/F.No.HSPPL/D.No.391/16 Dtd. 06-May-2016, (Submitting herewith commissioning certificate for verification) and meters were changed in this project location. However, as the capacity is same and setup by M/s. Hindupur Solar Park Pvt. Ltd. therefore project proponent was considered the same location calibration meter details in the project activity mistakenly and accordingly all details mentioned in the previous MR & FVR.

This has further been investigated by the Project proponent and found that no meter has been changed in the project activity and it can further be confirmed through attached Single Line Diagram (SLD) and submitted JMR for current monitoring period 02-April-2021 to 31-October-2022.

Also, submitting herewith calibration certificate dated 18-January-2020 (valid till 17-January-2025) applicable to this monitoring period. (Meter sr. no. are matching with submitted JMRs)

Hence, it can be confirmed that there is no change in metering arrangement at Hindupur (40 MW) site during this monitoring period.

APPENDIX II: MAJOR BREAKDOWN DETAILS

For Winsol -15 MW

S No	Date	Duration	Remarks
1	16-April-2022	0.20	Supply failed from GSS end
2	15-June-2022	0.37	Inverter tripped due to ground fault
3	13-July-2022	0.28	Incoming to GSS Bothpur and shadnagar feeder trip
4	18-July-2022	6.72	Negative string cable failure due to ground fault
5	25-July-2022	0.13	FO Cable Communication
6	19-August-2022	0.42	Inverter settings changed for reactive power
7	24-August-2022	0.02	Inverter tripped on IO Fault
8	06-September-2022	1.42	33kv 4 -Pole DP Yard B- phase jumper Failure
9	16-October-2022	3.00	Average breakdown for Module scanning

For Winsol -50 MW

S No	Date	Duration	Remarks
1	06-April-2022	4.73	String no. 16, table no. 03, substring no. 01 found 01 nos MC4 is melted.
2	09-April-2022	0.30	Manual shutdown taken for replacing the IGBT of M2 section
3	24-May-2022	2.22	Inverter Clipping loss due to inverter high temperature
4	25-May-2022	1.22	Line tripped GSS end.
5	15-June-2022	0.10	Insulation failure
6	01-July-2022	4.72	LCL Filter Issue

S No	Date	Duration	Remarks
7	06-July-2022	11.50	M2 section AC fuses failed due to M2 section internal issue
8	14-August-2022	2.82	Manual shutdown taken for M2 section LCL Filter installation
9	09-September-2022	5.07	String-10 floating voltage abnormality
10	09-Septmber-2022	0.80	Inverter under shutdown due to bus melted (IDT to Inverter)
11	07-October-2022	1.00	String-12 floating voltage abnormality
12	24-October-2022	2.85	Load curtailment

For Hindupur -40 MW

S No	Date	Duration	Remarks
1	05-April-2021	0.10	Feeder 4 tripped on E/L fault due to bird flash, trail charge taken T/M line withstanding and feeder charged.
2	06-May-2021	0.17	Inverter 8 tripped on Short ckt fault, checked related ckt and restarted the inverter, after generation hours IGBT section filters cleaning work done.
3	19-May-2021	0.80	Inverter 12 tripped on Run Disable fault, checked related ckt and restarted the inverter.
4	25-July-2021	0.08	Feeder 3 tripped on E/L fault, after discussing with GSS team trail charge taken T/M line withstanding and feeder charged.
5	09-August-2021	4.12	Feeder 2 tripped on Y phase E/L fault, line patrolling done and found pole no.173 Y phase pin insulator failure, replaced the insulator and feeder charged.
6	04-November-2021	2.33	Feeder 1 tripped on E/L fault, T/M line patrolling work done, found CP-3 B-ph insulator failure, replaced as same and feeder charged.

S No	Date	Duration	Remarks
7	08-July-2022	0.32	Inverter 8 tripped on short circuit fault checked related connections, and restart the inverter
8	28-August-2022	0.57	Due to T/L line fluctuations Trafo 8 tripped on MasterI trip fault checked related connections, charged transformer.
9	16-October-2022	0.08	Feeder 1 tripped on E/L & O/L, fault. Trail charge taken; feeder withstand.