40MW BUNDLED SOLAR PROJECT IN TELANGANA, INDIA

Document Prepared by Infinite Environmental Solutions LLP

Project Title	40 MW Bundled Solar Project in Telangana, India
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Project ID	1990
Monitoring Period	01-January -2021 to 31–December-2022 (Inclusive of both days)
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CONTENTS

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 for sale of electricity to the grid. The project is a bundle project activity with three individual project promoters detailed below:

Project Investors' Name	Capacity in MW_{AC}	Location
Achintya Solar Power Limited I	10 MW	Village: Mandamarri; District: Mancherial; State: Telangana
Achintya Solar Power Limited-II	10 MW	
Suvarchas Solar Power Limited	10 MW	
Grinibhrit Solar Power Limited	10 MW	

The project activity involves installation of 04 projects of 10 MW_{AC} each, totaling to 40 MW_{AC} (corresponding to 54.525 MW_p) solar power project under National Solar Mission, Phase-II, Batch-II, Tranche – I, State Specific Bundling Scheme. All the 4 projects are installed in the common project boundary at Village: Mandamarri, District: Mancherial, State: Telangana. The electricity generated from project activity is sold under the Power Purchase Agreement (PPA), signed with NTPC Ltd. NTPC has been identified by the Government of India (GoI) as the Implementation Agency for setting up of Grid-connected Solar PV Power Projects under State Specific Bundling Scheme under the National Solar Mission of Government of India (GoI). And NTPC Vidyut Vyapar Nigam Limited (NVVN) on behalf of NTPC is purchase Solar Power from Solar Power Developer, and sell it to Discom (TSTRANSCO). The electricity generated from the project activity is evacuated through 220/132 kV sub-station located at Mandamarri for consumption in the Indian Electricity Grid. The Project comprises of total 40 MW, out of which 32 MW has been commissioned dated 22-December-2017 and the rest 8 MW has been commissioned dated 17-January-2018. The project has replaced anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately average 77,456 tCO_2e per annum, thereon displacing average 82,683 MWh/year amount of electricity from the generation-mix of power plants connected to the Indian electricity grid, which is mainly dominated by thermal/fossil fuel-based power plant. The monitoring period is from 01- January -2021 to 31-December-2022 (Inclusive of both days). The total GHG emission reductions or removals generated in this monitoring period are 154,169 tCO_2e thereon displacing 164,571.40 MWh amount of electricity generation.

Audit Type	Period	Program	VVB Name	Number of years
Validation+ Verification	22-December-2017 to 28-September-2019 (Inclusive of both days)	VCS	LGAI Technological Center S.A. (Applus + Certification)	01 Year 09 months 07 days
Verification	29-September-2019 to 31- December-2020 (Inclusive of both days)	VCS	TÜV SÜD South Asia Pvt Ltd.	01 Year 03 months 03 days
Verification	01-January -2021 to 31–December-2022 (Inclusive of both days)	VCS	VKU CERTIFICATION PVT. LTD.	02 Year 00 months 00 days
Total				05 Year 00 months 10 days

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 19.0[1].

The project is neither a grouped project nor an AFOLU project activity.

1.3 Project Proponent

Organization name	Achintya Solar Power Limited- I and II
Contact person	Murali Krishnam Raju M
Title	Senior Manager - Commercial

[1] CDM: Grid-connected electricity generation from renewable sources --- Version 19.0 (unfccc.int)

Address	PLOT NO. #1131/A, ROAD NO. 36, JUBILEE HILLS, HYDERABAD – 500033, TELANGANA, INDIA.
Telephone	+91 40 40300100
Email	muraliraju.m@greenkogroup.com

Organization name	Suvarchas Solar Power Limited
Contact person	Murali Krishnam Raju M
Title	Senior Manager - Commercial
Address	PLOT NO. #1131/A, ROAD NO. 36, JUBILEE HILLS, HYDERABAD – 500033, TELANGANA, INDIA.
Telephone	+91 40 40300100
Email	muraliraju.m@greenkogroup.com

Organization name	Grinibhrit Solar Power Limited
Contact person	Murali Krishnam Raju M
Title	Senior Manager - Commercial
Address	PLOT NO. #1131/A, ROAD NO. 36, JUBILEE HILLS, HYDERABAD – 500033, TELANGANA, INDIA.
Telephone	+91 40 40300100
Email	muraliraju.m@greenkogroup.com

1.4 Other Entities Involved in the Project

Organization name	Infinite Solutions
Role in the Project	Project Consultant
Contact person	Mr. Jimmy Sah
Title	Head – Sustainability
Address	214-215 Milinda Manor, Opp. Next Treasure Island, 2 RNT Marg, Indore – 452001, India
Telephone	+91-9644130430

Email	jimmy@infisolutions.org

1.5 Project Start Date

Project Start Date: 22-December-2017. The project start date is the earliest commissioning date amongst projects, which are part of this Project. The Project comprises of total 40 MW, out of which 32 MW has been commissioned dated 22-December-2017 and the rest 8 MW was commissioned on 17-January-2018.

1.6 Project Crediting Period

Crediting Period Start date : 22-December-2017

Crediting Period End date : 21-December-2027 (Inclusive of both days)

The project activity adopts renewable crediting period of 10 years period, which can be renewed for maximum 2 times. The current monitoring period is 3rd verification under 1st crediting period.

1.7 Project Location

The project is located at Village: Mandamarri, District: Mancherial, State: Telangana, Country: India. The geological coordinates are:

Name of Investor	Latitude (N)	Longitude (E)
Achintya Solar Power Limited - I	18°58'30" N	79° 25' 33.6"E
Achintya Solar Power Limited - II	18°58'30" N	79° 25' 33.6"E
Grinibhrit Solar Power Limited	18°58'30" N	79° 25' 33.6"E
Suvarchas Solar Power Limited	18°58'30" N	79° 25' 33.6"E

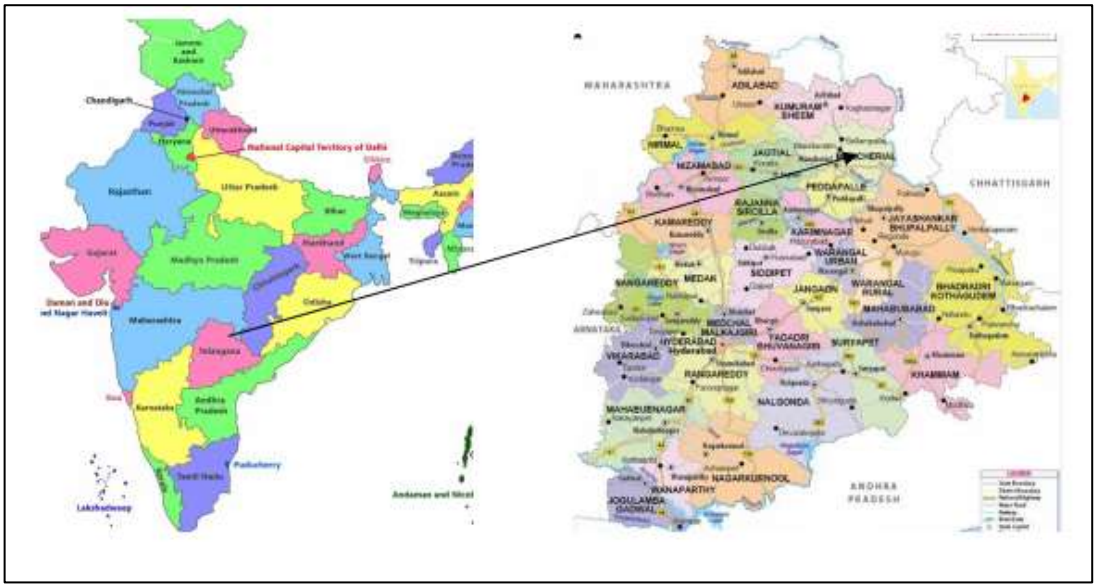


Figure 1 Project Location

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 15 MW.

Type I : Energy industries (renewable / non-renewable sources) Category: Approved Consolidated Methodology (ACM0002)

Methodology: ACM0002: Grid-connected electricity generation from renewable sources --- Version 19.0.

https://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD

The project activity also takes reference from following Tools from the tools prescribed by applied methodology:

Tool 01: Tool for the demonstration and assessment of additionality --- Version 07.0.0.

https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

Tool 07: Tool to calculate the emission factor for an electricity system --- Version 07.0.

https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf

1.9 Participation under other GHG Programs

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

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

Emission Trading Programs and Other Binding Limits: The project is not a part of any emission trading program as confirmed by the project proponent through the declaration of no double counting certificate.

Other Forms of Environmental Credit: The project activity has not availed any other form of environmental credit as confirmed by the project proponent through the declaration of no double counting. Furthermore, the project activity is not availing any benefits from any carbon mechanism apart from VCS. The project activity is not availing any benefits CDM/GS/GCC/UCR/RECs mechanism which can be confirmed from the link below:

- https://www.recregistryindia.nic.in/index.php/publics/accredited_regens
- CDM: CDM-Home (unfccc.int)
- https://www.goldstandard.org/

- https://projects.globalcarboncouncil.com/
- https://www.ucarbonregistry.io/
- Registries | I-REC Standard (irecstandard.org)
- Social Carbon registry (https://wilder.earth/social_carbon)
- Cercarbono registry (https://www.ecoregistry.io/)

The project Activity is a solar power project and does not involve any supply chain in the project such as manufacturers, wholesalers, distributers and retailers. So, no indirect upstream and downstream GHG emissions are involved in the project activity. Thus, the Scope 3 emissions are not applicable in this project activity.

1.11 Sustainable Development Contributions

40 MW_{AC} bundled solar project in Telangana, India is located at Mancherial, State: Telangana, Country: India.

The project is contributing in sustainable development[2] by generating electricity and reduction of CO_2 emissions due to implementation of project activity and generates employment to the local stakeholders. Through Project activity economic development has been achieved in the project location by creating opportunities of employment during the project lifetime.

Project proponent monitors the carbon emission with help of the record of electricity generated.

[2] https://unstats.un.org/sdgs/indicators/Global%20Indicator%20Framework%20after%202023%20refinement_Eng.pdf

Table 1: Sustainable Development Contributions

The project is solar power project, it has generated 164,571.40 MWh electricity and avoided 154,169 tCO_2e in the atmosphere during the current monitoring period. So, the project has contributed to the sustainable development and it is fulfilling SDG 07 and SDG 13.

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	About 164,571.40 MWh, renewable electricity has supplied to Indian Grid during the reported period that helps to increase the renewable energy share in the energy mix	Since Commissioning, about 403,619.4 MWh (135,697+103,351+164,571.40)[3] renewable electricity has supplied to Indian Grid to helps to increase the renewable energy share in the energy mix.
2)	13.0	13.0 Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to increase	By supplying 164,571.40 MWh clean electricity (generated through Solar Power) to the Indian electricity grid, the project has prevented the release of 154,169 tCO_2e into the atmosphere during the monitoring period	Overall Prevented the release of 378,107 tCO_2e (127,119+96,819+ 154,169) into the atmosphere[4].

[3] https://registry.verra.org/app/projectDetail/VCS/1990

[4] https://registry.verra.org/app/projectDetail/VCS/1990

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 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 2013. This report clearly mentioned that solar power project activity operations do not result in direct air pollution, noise pollution[5].

There are no negative environmental and/or socio-economic impacts due to the project.

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.

2.2 Local Stakeholder Consultation

The project has already been registered under VCS mechanism. The Local Stakeholder consultation process was conducted during the validation stage.

The stakeholders of the project activity were invited to attend the stakeholder meeting conducted on 28-April-2016. Personal invitations were also sent to the prominent members of the regions in the vicinity along with public display of invitation letters.

The meeting was attended by local villagers, panchayat members, shopkeepers, suppliers, vendors and representatives of PPs. The stakeholders were explained about the project activity and the various benefits arising out of the project activity. A discussion was held in which the views of the local stakeholders were addressed.

Ongoing Stakeholder Consultation: During the current monitoring period, the PP has kept a grievance/ suggestion register at the project site for the comments from local community at any point of time during the project crediting period. For ongoing Stakeholder communication, the PP has also placed a grievance register onsite where in the stakeholder can put down his/her complain and the same if found genuine is being addressed immediately. During the current monitoring period got some of comments related to CSR activity like road work, bridge work and school development work. There is no grievance related to project activity.

[5] http://164.100.94.214/sites/default/files/uploads/report-on-developmental-impacts-of-RE.pdf

Outcome: Discussions with Local stakeholders are being carried out at periodic intervals. There are no negative comments received for the project. In line with VCS requirements the following process has been implemented to receive comments from local stakeholders as well as communicate with them at periodic intervals.

Methods	Details	Reason for Selection
Communication Book or Register	Communication Register is maintained at Admin office at project site office. Any comments/inputs/grievance received was processed in line with the procedure.	The administrative office is located at the site office. Thus, it is appropriate publicly accessible location at which local stakeholders can provide their feedback on the project.
Process Book	Any comments/inputs/grievance received was processed inline with the procedure	The local stakeholders are informed about the Communication Register. Further, a public notice has been posted at the site informing the stakeholders about the communication procedure.
Telephone access	+91 9959556707	Phone number of the contact person is circulated and discussed in the stakeholder meeting
Internet/email access	muraliraju.m@greenkogroup.com	Email ID of the contact person is circulated and discussed in the stakeholder meeting.

2.3 AFOLU-Specific Safeguards

Not applicable to this as this is not an AFOLU project activity.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The main purpose of this project activity is to generate clean form of electricity through renewable solar energy source for sale of electricity to the grid. The project activity involves installation of 04 projects of 10 MW_{AC} each, totaling to 40 MW_{AC} (corresponding to 54.525 MW_p) solar power project under National Solar Mission, Phase-II, Batch-II, Tranche – I, State Specific Bundling Scheme. All the projects are installed in the common project boundary at Village: Mandamarri, District: Mancherial, State: Telangana. The solar PV power plant have solar PV modules, inverters, transformers and other protection system and supporting components as under

Solar PV modules:

Module Supplier (Make)	**Module Model**	**Capacity (p)**	**Number**	**Total Capacity (MW_p)**
Renesola	Poly-crystalline	315	72,702	22.901
	Poly-crystalline	320	98,826	31.624
	Total Capacity			**54.525**

S. No.	**Mounting Structure Type**	**Fixed tilt**
1	Tilt	13° South direction
2	Pitch(m)	6
3	Number of modules per string	21
Mounting Structure		
4	Typical mounting unit (rows x columns)	2 x 21
5	Orientation of modules (East-West)	Portrait
Inverters		
6	Make	SMA
7	Model	Sunny Central 1000CP XT
8	Rated Capacity	900 kW_p
9	No. of Inverters	11
10	Rated Input Voltage	405 V
AUXILIARY TRANSFORMER		
11	Make	VMC
12	Rating	160KVA,33KV/415V
13	S.No	ODUZT-12/VMCL/C/3123
POWER TRANSFORMER		
14	Make	PRIME MEIDEN

15	Rating	50/60MVA,132/33KV, ONAN/ONAF,WITH OLTC
16	S.No	WOI-102170129-01/12/17/00177

The Project activity is a new facility (Greenfield) and the electricity generated by the Project is exporting to the Indian Grid. The Project is therefore displacing 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 equivalent amount of electricity, either fetched (under captive cases) or delivered to the grid by the project activity, would have otherwise been generated by the operation of grid connected fossil fuel-based power plants and by the addition of new generation sources. The project is replacing anthropogenic emissions of greenhouse gases (GHG's) with estimated emissions of 77,456 tCO_2e per year, thereon displacing 82,683 MWh/year amount of electricity from the gird.

The Solar plants are under operation including scheduled shutdowns during the current monitoring period. The breakdown occurred is for a total of 82:18 hours of all solar panels and is beyond the control of PP. Therefore, due to this minor variations of breakdown identified in the current monitoring period it has no impact in the GHG emissions reductions.

Further, there are no changes to the project participant for the project activity during the monitoring period.

3.2 Deviations

3.2.1 Methodology Deviations

No methodology deviation is applied during the monitoring period.

3.2.2 Project Description Deviations

No deviation has taken place in project description during the monitoring period.

3.3 Grouped Projects

The project is not a grouped project thus this is not applicable.

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 for the project electricity system in year y
Source of data	Calculated from CEA database, Version 14 December 2018[6]
Value applied	0.9610 (Indian Grid)
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 "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	$EF_{grid, BM, y}$
Data unit	tCO_2/MWh
Description	Build margin CO_2 emission factor for the project electricity system in year y
Source of data	Central Electricity Authority (CEA) of India Database Version 14.
Value applied	0.8644 (Indian Grid)
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 07.0" 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	Calculation of baseline emissions
Comments	The above value is fixed and it is same for the entire crediting period

[6] CDM - CO2 Baseline Database - Central Electricity Authority (cea.nic.in)

Data / Parameter	$EF_{grid, CM, y}$
Data unit	tCO_2/MWh
Description	Combined margin CO_2 emission factor for the project electricity system in year y
Source of data	Calculated from CEA database, Version 14, Dec 2018.
Value applied	0.9368 (Indian Grid)
Justification of choice of data or description of measurement methods and procedures applied	The combined margin emissions factor is calculated as follows: $EF_{grid,CM,y} = EF_{grid,OM,y} * WOM + EF_{grid, BM,y} * WB_M$ Where: $EF_{grid,BM,y}$= Build margin CO_2 emission factor in year y (tCO_2/MWh) $EF_{grid,OM,y}$= Operating margin CO_2 emission factor in year y (tCO_2/MWh) W_{OM} = Weighting of operating margin emissions factor (%) = 75% W_{BM}= Weighting of build margin emissions factor (%) = 25%
Purpose of Data	Calculation of baseline emissions
Comments	The above value is fixed and it is same for the entire crediting period

4.2 Data and Parameters Monitored

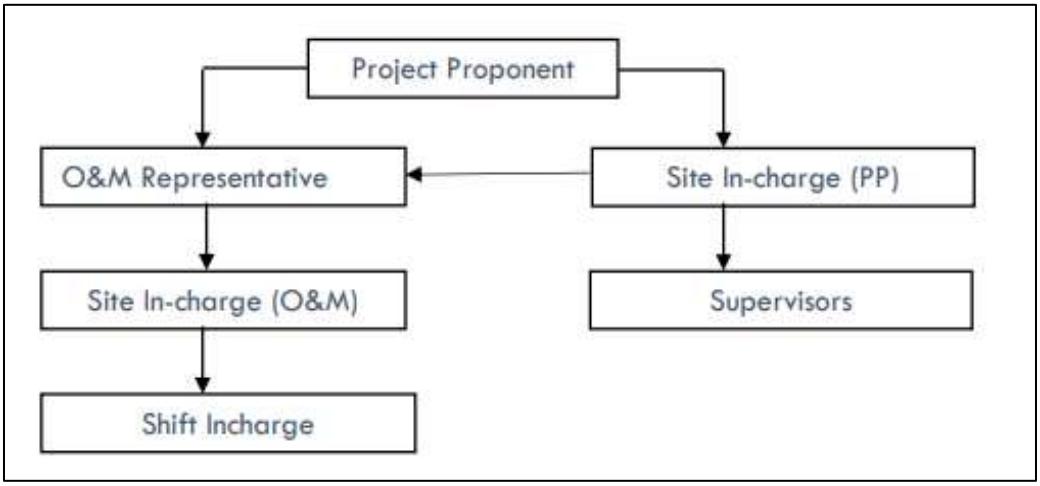
Data / Parameter	$EG_{PJ, y}$
Data unit	MWh/y
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh)
Source of data	Joint Meter Reading statement provided by TSSPDCL every month.
Description of measurement methods and procedures to be applied	Electricity exported and imported to the grid is in kWh. However, for the calculation purpose electricity exported and imported is converted in MWh. The Net electricity supplied to the grid by the project activity is calculated as a difference of electricity exported to the grid and electricity imported from the grid obtained from Monthly Meter reading reports provided by TSTRANSCO /TSNPDCL as per below equation: $EG_{PJ,y} = EG_{Export} - EG_{Import}$
Frequency of monitoring/recording	Continuous measurement & monthly recording
Value monitored	164,571.40 MWh

Monitoring equipment	Electricity Meters of 0.2s Class
QA/QC procedures to be applied	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[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 is 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	Thus, Net electricity supplied to the grid by the project plant in a given month = Export, kWh – Import, kWh. The Net electricity, kWh is then converted to MWh units to obtain the $EG_{PJ,y}$ value.
Comments	Data will be 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 CDM project activities and is proposed for grid-connected solar power project/ unit being implemented in Telangana, India. The monitoring plan, which is implemented by the project participant describes about the monitoring organisation, parameters to be monitored, monitoring practices, quality assurance, quality control procedures, data storage and archiving.

[7] https://www.cbip.org/cearegulations/CEA%20DATA/MeteringRegulations/Jan2020/CEA%20Metering%20Regulations_Summarydocx.pdf



Responsibilities of Site In charge (PP): Overall functioning and maintenance of the project activity, the Site in-charge shall coordinate with the O&M operator as well as the site supervisors.

Responsibilities of O & M Representative: Co-ordination between Site in-charge of the O&M operator as well as the project participant and further report to PP head office.

Responsibilities of Site In-charge (O & M) Operator): Responsibilities for maintaining the data records, ensures completeness of data, and reliability of data (calibration of equipment) as well as data recording for all the parameters.

Responsibilities of Shift In-charge: Responsibilities for day-to-day data collection and maintains day to day monitored data.

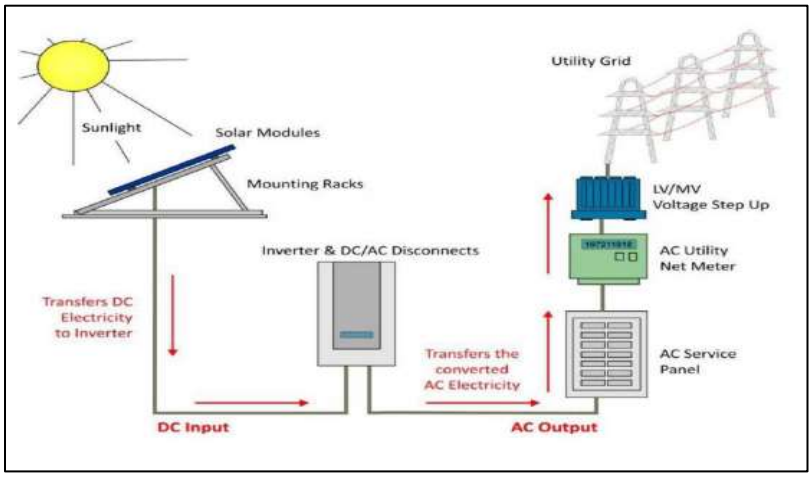
QA/QC Procedure: The energy meters at the feeders are maintained and owned by Telangana State Northern Power Distribution Company Limited (TSNPDCL). Neither the project proponent nor the site personnel have any control over it. The records are cross-checked with the records of sold electricity TSNPDCL. The meters are calibrated by TSNPDCL at-least once in five years[8].

Data Measurement

The export and import energy is measured continuously using Main & Check meters. Authorized officer of TSNPDCL in the presence of PP or representative of PP is take Export & Import readings of Main & Check meters installed at the substation on monthly basis. The meter reading is taken jointly and signed by the representatives of the TSNPDCL and project investors. Based on the readings, invoices are raised by project investors. These invoices can be used for cross checking

[8] https://www.cbip.org/cearegulations/CEA%20DATA/MeteringRegulations/Jan2020/CEA%20Metering%20Regulations_Summarydocx.pdf

the meter readings taken for the project activity. It is to be noted though PP or PP representative is available during meter reading, the electricity exported and imported by the Solar Project is completely under purview of TSNPDCL officer and PP do not have any control on it. In addition, accuracy class of meters and calibration frequency is under purview of TSNPDCL officer and PP do not have any control on it. PP get the monthly JMR report from where electricity export and import values are obtained to calculate net electricity supplied to grid and used for emission reduction calculations.



Data collection and archiving

Export & Import readings from the meters is collected under the supervision of the authorized representatives of PP. The net electricity supplied to grid would be calculated based on export & import readings. Export and Import data would be recorded and stored in electronic &/or Paper format. The records are checked periodically by the Head (Operations) and discussed thoroughly with the O&M Team. The period of storage of the monitored data will be 2 years after the end of crediting period.

Mismatch in Monitoring Period and the Billing Period

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

$D = (A/B) \times C$

Were,

A= Difference of number of days which are not matching of billing period and monitoring period.

B=Number of days of the billing period/month which was not matched with the monitoring period.

C= Net electricity supplied to the grid for that given billing period/month

The calculated value after apportioning would be used for calculation of emission reductions during that period.

Emergency preparedness

The project activity will not result in any unidentified activity that can result in substantial emissions from the project activity. No need for emergency preparedness in data monitoring is visualized. In the unlikely event of failure of all Main, Check as well as Standby meter installed at Substation, where all the faulty meters are required to be repaired or replaced simultaneously, the export & import readings from Main, Check & Standby Meters installed at the inter-connection point at the project site will be used for monitoring of net electricity exported to the grid. In the current monitoring period, there is no delay in calibration and in case of the absence or delay in the meter calibration appropriate Guidelines will be applied appropriately to confirm the conservativeness of metering.

Personnel training

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

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

As per the approved consolidated Methodology ACM0002 (Version 19.0) para 42:

Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid- connected power plants and the addition of new grid- connected power plants. The baseline emissions are to be calculated as follows:

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

Where:

BE_y = Baseline emissions in year y (tCO_2/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 CDM project activity in year y (MWh/yr)

$EF_{grid, CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" ($t CO_2/MWh$)

Grid Emission Factor:

The GEF is fixed ex-ante in the PD as given below:

Parameter	Value
OM	0.9610 tCO_2/MWh
BM	0.8644 tCO_2/MWh
CM	0.9368 tCO_2/MWh

Therefore,

BEy = 164,571.40 x 0.9368

= 154,169 tCO_2e (Round down values)

5.2 Project Emissions

Not Applicable, since emissions from the project activity is zero as per ACM0002 methodology. Hence, $PE_y = 0$.

5.3 Leakage

Not Applicable, since leakage emissions from the project activity is zero as per ACM0002 methodology. Hence, $LE_y = 0$.

5.4 Net GHG Emission Reductions and Removals

The Formula used to calculate the net emission reduction for the project activity

$$ER_Y = BE_y - PE_y$$

Where,

ER_y = Emission Reduction in $tCO_2/year$
BE_y = Baseline emission in $tCO_2/year$
PE_y = Project emissions in $tCO_2/year$
LE_y = Leakage Emissions in $tCO_2/year$

For the project activity during the current monitoring period, as per section 5.1

BE_y = 154,169 tCO_2e
PE_y = 0 tCO_2e
LE_y = 0 tCO_2e

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
01-January - 2021 to 31– December- 2021	75,115	0	0	75,115
01–January- 2022 to 31 – December- 2022	79,054	0	0	79,054
Total	154,169	0	0	154,169

It is to be noted here that as per the estimated emission reduction estimated from the project activity for the current monitoring period is 154,912 tCO_2e, whereas actual emission reductions achieved are 154,169 tCO_2e, which is approximately 0.48 % lower than the estimated emission reductions.

Ex-ante emissions reductions /removals	Achieved emissions reductions /removals	Percent difference	Justification for the difference
154,912 tCO2e	154,169 tCO_2e	- 0.48 %	It is to be noted here that as per the estimated emission reduction estimated from the project activity for the current monitoring period is 154,912 tCO_2e, whereas actual emission reductions achieved are 154,169 tCO_2e, which is approximately 0.48 % lower than the estimated emission reductions.

APPENDIX I: METER CALIBRATION DETAILS

Project	Meter	Meter number	Accuracy class	Latest Calibration Date	Calibration Validity
Achintya Solar Power Limited I	Main Meter	0017250984	0.2s	23-December-2019	22-December-2024
	Check Meter	0017250985	0.2s	23-December-2019	22-December-2024
	Standby	0017250986	0.2s	23-December-2019	22-December-2024
Achintya Solar Power Limited-II	Main Meter	0017250981	0.2s	23-December-2019	22-December-2024
	Check Meter	0017250982	0.2s	23-December-2019	22-December-2024
	Standby	0017250983	0.2s	23-December-2019	22-December-2024
Suvarchas Solar Power Limited	Main Meter	0017250990	0.2s	23-December-2019	22-December-2024
	Check Meter	0017250991	0.2s	23-December-2019	22-December-2024
	Standby	0017250992	0.2s	23-December-2019	22-December-2024
Grinibhrit Solar Power Limited	Main Meter	0017250987	0.2s	23-December-2019	22-December-2024
	Check Meter	0017250988	0.2s	23-December-2019	22-December-2024
	Standby	0017250989	0.2s	23-December-2019	22-December-2024

APPENDIX II: BREAKDOWNS DETAILS

Site	Date	Fault Description	Shut down time [HH:MM]
Achintya-I	17-February-2021	Grid Failure in Bay Extension	0:56
Achintya-II	17-February-2021	Grid Failure in Bay Extension	0:56
Grinibhrit	17-February-2021	Grid Failure in Bay Extension	0:56
Suvarchas	17-February-2021	Grid Failure in Bay Extension	0:56
Achintya-I	21-March-2021	Manual shutdown For Energy Meter Calibration	1:32
Achintya-II	21-March-2021	Manual shutdown For Energy Meter Calibration	1:32
Grinibhrit	21-March-2021	Manual shutdown For Energy Meter Calibration	1:32
Suvarchas	21-March-2021	Manual shutdown For Energy Meter Calibration	1:32
Achintya-I	29-April-2021	Manual Shutdown Taken for New CT, PT Testing & Erection Work at Bay Extension	11:00
Achintya-II	29-April-2021		11:00
Grinibhrit	29-April-2021		11:00
Suvarchas	29-April-2021		11:00
Achintya-I	20-February-2022	LC taken for Mandamarri bay extension maintenance by Govt. officials	3:20
Achintya-II	20-February-2022	LC taken for Mandamarri bay extension maintenance by Govt. officials	3:20
Grinibhrit	20-February-2022	LC taken for Mandamarri bay extension maintenance by Govt. officials	3:20
Suvarchas	20-February-2022	LC taken for Mandamarri bay extension maintenance by Govt. officials	3:20
Achintya-I	23-March-2022	Grid Failure in Bay Extension	0:45
Achintya-II	23-March-2022	Grid Failure in Bay Extension	0:45
Grinibhrit	23-March-2022	Grid Failure in Bay Extension	0:45
Suvarchas	23-March-2022	Grid Failure in Bay Extension	0:45
Achintya-I	29-March-2022	LC taken for Mandamarri bay extension maintenance by Govt. officials	1:15
Achintya-II	29-March-2022	LC taken for Mandamarri bay extension maintenance by Govt. officials	1:15

Grinibhrit	29-March-2022	LC taken for Mandamarri bay extension maintenance by Govt. officials	1:15
Suvarchas	29-March-2022	LC taken for Mandamarri bay extension maintenance by Govt. officials	1:15
Achintya-I	25-September-2022	LC taken for Mandamarri bay extension maintenance by Govt. officials	2:22
Achintya-II	25-September-2022	LC taken for Mandamarri bay extension maintenance by Govt. officials	2:22
Grinibhrit	25-September-2022	LC taken for Mandamarri bay extension maintenance by Govt. officials	2:22
Suvarchas	25-September-2022	LC taken for Mandamarri bay extension maintenance by Govt. officials	2:22
Total			**84:40**

APPENDIX III: SDG CONTRIBUTION

Months	Total Net Generation (MWh)	Emission Reductions(tCO_2)
	SGD 7	SGD 13
01-January-2021 to 28-January-2021	6215.91	5823.06
29-January-2021 to 28-February-2021	8006.60	7500.58
29-February-2021 to 28-March2021	7207.70	6752.17
29-March-2021 to 28-April-2021	7857.30	7360.72
29-April-2021 to 28-May-2021	5404.65	5063.07
29-May-2021 to 28-June-2021	6686.60	6264.01
29-June-2021 to 28-July-2021	5659.60	5301.91
29-July-2021 to 28-August-2021	5701.40	5341.07
29-August-2021 to 28-September-2021	5822.60	5454.61
29-September-2021 to 28-October-2021	7380.80	6914.33
29-October-2021 to 28-November-2021	6635.60	6216.23
29-November-2021 to 28-December-2021	6955.60	6516.01
29-December-2021 to 31-December-2021	648.88	607.87
01-January-2022 to 28-January-2022	6056.22	5673.47
29-January-2022 to 28-February-2022	8499.70	7962.52
29-February-2022 to 28-March-2022	7141.70	6690.34
29-March-2022 to 28-April-2022	7991.70	7486.62
29-April-2022 to 28-May-2022	7963.30	7460.02
29-May-2022 to 28-June-2022	6901.80	6465.61
29-June-2022 to 28-July-2022	4296.50	4024.96
29-July-2022 to 28-August-2022	6154.10	5765.16
29-August-2022 to 28-September-2022	6306.20	5907.65
29-September-2022 to 28-October-2022	7226.90	6770.16
29-October-2022 to 28-November-2022	8026.60	7519.32
29-November-2022 to 28-December-2022	7121.10	6671.04
29-December-2022 to 31-December-2022	702.35	657.96
Total	**164,571.40**	**154,169 (Round down)**