



SOLAR PHOTOVOLTAIC PROJECT BY GIRIRAJ RENEWABLES PRIVATE LIMITED

Document Prepared by

Emergent Ventures India Pvt. Ltd

Project Title	Solar Photovoltaic Project by Giriraj Renewables Private Limited
Version	01.1
Report ID	VCS1768-III
Date of Issue	01-July-2021
Project ID	1786
Monitoring Period	01-October-2020 to 31-December-2020
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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 153 MW solar projects in different states of India through SPVs.

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

Name of SPV	Capacity Commissioned	COD	Connection with Grid	State
Avaada Sustainable Energy Pvt. Ltd	30 MW	02/03/2018	Indian Grid	Karnataka
Avaada Clean Energy Power Limited	5 MW	14/09/2018	Indian Grid	Uttar Pradesh
Giriraj Renewables Pvt. Ltd	28 MW	16/04/2018	Indian Grid	Maharashtra
Solarsys Non-Conventional Energy Pvt. Ltd	30 MW	30/03/2018	Indian Grid	Karnataka
	60 MW	31/03/2018	Indian Grid	Karnataka

Total emission reductions achieved in this monitoring period:

During the Current Monitoring Period from **01/10/2020 to 31/12/2020** (First and last date included) the project activity has supplied **72,151 MWh** of electricity, and thus contributing to the GHG reductions **67,591 tCO₂e**.

1.2 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

The project is not a grouped project activity.

1.3 Project Proponent

Organization name	Giriraj Renewables Private Limited
Contact person	Praveen Golash

Title	Senior General Manager
Address	304, Shoppers Plaza, Opp. Municipal Market, CG Road, Navrangpura. Ahmedabad-380009
Telephone	-
Email	-

1.4 Other Entities Involved in the Project

Organization name	Emergent Ventures India Pvt. Ltd.
Role in the Project	Project Consultant
Contact person	Atul Sanghal
Title	Business Head
Address	Magnum Tower 1, 8 th Floor, Sector 58, Gurgaon
Telephone	+91-97173 96309
Email	contact@emergent-ventures.com

1.5 Project Start Date

02-March-2018

1.6 Project Crediting Period

Crediting Period Start date: 02-March-2018

Crediting Period End date: 01-March-2028

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

1.7 Project Location

Name of SPVs	Capacity	Village	Taluka	District	State	Latitude (N)	Longitude (E)
Avaada Sustainable Energy Pvt Ltd	30 MW	Donet emen ahalli	Molakalmuru	Chitradurga	Karnataka	14° 40' 38.2728"	76° 40' 34.0644"
Avaada Clean Energy Power Limited	5 MW	Ordnance Factory		Kanpur	Uttar Pradesh	26° 28' 34.7124"	80° 16' 10.4340"

Giriraj Renewables Pvt Ltd	28 MW	Varkute and Malavadi	Man	Satara	Maharashtra	17° 33' 28.8"	74° 48' 36.7"
Solarsys Non-Conventional Energy Pvt Ltd	30 MW	Banavikalu	Kudligi	Ballary	Karnataka	14.76759 2°	76.51993 3°
	60 MW	Balakundi	Ilkal	Balkot	Karnataka	15° 55' 41.63"	76° 5' 2.89"

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

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

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 07.0 (EB 100, Annex 04)
- Tool for the demonstration and assessment of additionality -Version 07.0.0 (EB 70, Annex 08)

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 VCS program. The Project is not rejected by other GHG programs.

1.10 Other Forms of Credit

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.

The Project has no intend to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program.

However it can be crosschecked that PP is not claiming REC benefits, the same can be verified with the REC accreditation body of India.

1.11 Sustainable Development

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 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.

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 2013. 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 same¹

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 stakeholders can anytime provide their inputs or concerns over the project, and for this, PP has placed a grievance register onsite, where in they can put down their complaint

¹ <https://smartnet.niua.org/sites/default/files/resources/report-on-developmental-impacts-of-RE.pdf>

and the same if found genuine will be addressed immediately. The site manager is responsible for addressing the grievances received from stakeholders.

No complaints were received during the monitoring period.

2.3 AFOLU-Specific Safeguards

Not Applicable, as this project is a non-AFOLU project.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

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

Name of SPVs	Capacity Commissioned	COD	Connection with Grid	State
Avaada Sustainable Energy Pvt Ltd	30 MW	02/03/2018	Indian Grid	Karnataka
Avaada Clean Energy Power Limited	5 MW	14/09/2018	Indian Grid	Uttar Pradesh
Giriraj Renewables Pvt Ltd	28 MW	16/04/2018	Indian Grid	Maharashtra
Solarsys Non-Conventional Energy Pvt Ltd	30 MW	30/03/2018	Indian Grid	Karnataka
	60 MW	31/03/2018	Indian Grid	Karnataka

There are no events that took place in the current monitoring period that might impact GHG emissions reductions. The project remained operational through the period.

3.2 Deviations

3.2.1 Methodology Deviations

There is no methodology deviation.

3.2.2 Project Description Deviations

Of the originally planned 100MW capacity by Giriraj Renewables Pvt. Ltd. (as per the registered Joint PD-MR Version 03 dated 15-May-2020), 28MW was installed on 16-April-2018. The remaining 72MW however has also been installed but under a separate SPV M/s Avaada Satara MH Pvt. Ltd. on 09-November-2020. A commissioning certificate issued

by MSEDCL for the same is submitted to VVB. Project proponent is not claiming GHG emission reductions on account of this 72MW capacity.

3.3 Grouped Projects

The project 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 ² , Version 14, December 2018
Value applied	0.9610
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per “Tool to calculate the emission factor for an electricity system, version 07” as 3-year generation weighted average using data for the years 2015-16, 2016-17 & 2017-18. The data are obtained from “CO ₂ Baseline Database for Indian Power Sector” version 14, 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 ³ , Version 14, December 2018
Value applied	0.8644
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per “Tool to calculate the emission factor for an electricity system, version 07” as per the latest data available for the most recent year 2017-18. The data is obtained from “CO ₂ Baseline Database for Indian Power Sector” version 14,

² http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf

³ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf

	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 ⁴ , Version 14, December 2018
Value applied	0.9368
Justification of choice of data or description of measurement methods and procedures applied	The combined margin emissions factor is calculated as follows: $EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$ Where: $EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (tCO₂/MWh) $EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (tCO₂/MWh) W_{OM} = Weighting of operating margin emissions factor (%) = 75% W_{BM} = Weighting of build margin emissions factor (%) = 25%
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

4.2 Data and Parameters Monitored

For Karnataka Site

Data / Parameter	$EG_{PJ,y}$
Data unit	MWh/y
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh
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 is considered for ER calculations.

⁴ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf

Frequency of monitoring/recording	Continuous measurement & monthly recording
Value monitored	58,344 MWh
Monitoring equipment	The electricity exported / supplied by the plant to pooling substation and further to substation. This meter also measures electricity imported by the plant from the grid.
QA/QC procedures to be applied	The meters is approved, tested & sealed by the State Utility. The meters are in the custody of State Utility. The frequency of calibration is once in 5 years. 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
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.

For Kanpur (Uttar Pradesh) Site

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
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 is considered for ER calculations.
Frequency of monitoring/recording	Continuous measurement & monthly recording

Value monitored	2,287 MWh
Monitoring equipment	The electricity exported / supplied by the plant to pooling substation and further to substation. This meter also measures electricity imported by the plant from the grid.
QA/QC procedures to be applied	The meters is approved, tested & sealed by the State Utility. The meters are in the custody of State Utility. The frequency of calibration is once in 5 years. 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
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.

For Maharashtra Site

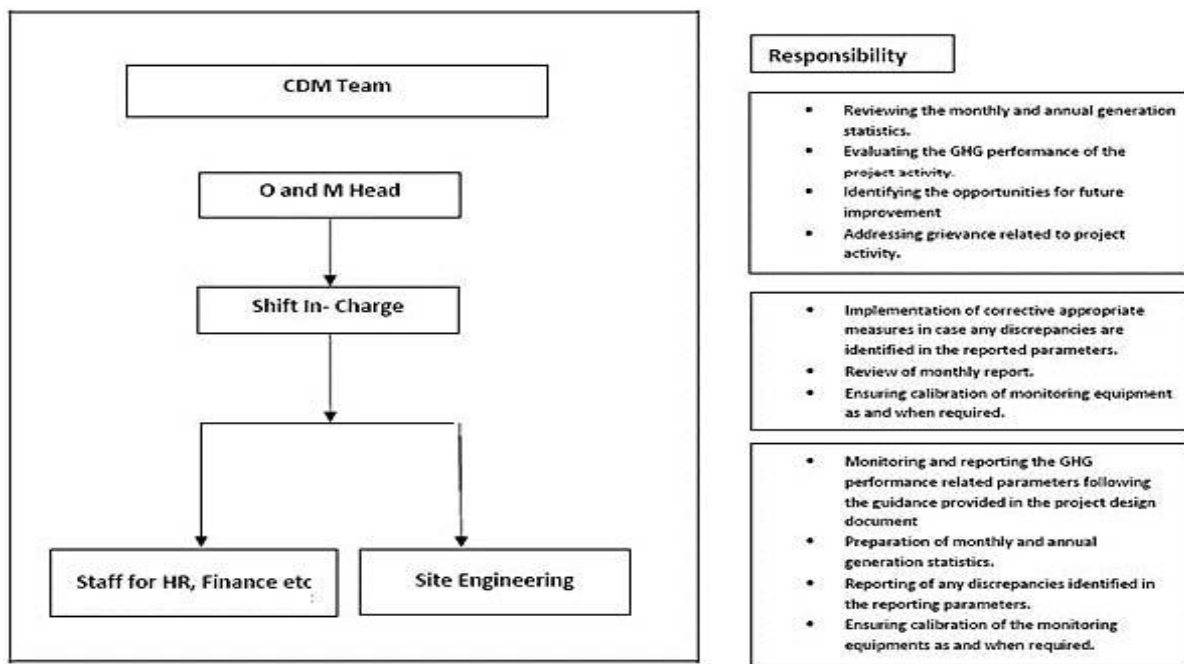
Data / Parameter	$EG_{PJ,y}$
Data unit	MWh/y
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh
Source of data	Monthly joint meter reading reports
Description of measurement methods and procedures to be applied	The difference of final value of export and import is used for monthly values of net electricity supplied to the grid by the project activity and same value is considered for ER calculations.
Frequency of monitoring/recording	Continuous measurement & monthly recording

Value monitored	11,519 MWh
Monitoring equipment	The electricity exported / supplied by the plant to pooling substation and further to substation. This meter also measures electricity imported by the plant from the grid.
QA/QC procedures to be applied	The meters is approved, tested & sealed by the State Utility. The meters are in the custody of State Utility. The frequency of calibration is once in 5 years. 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
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 being implemented. The monitoring plan, which is implemented by the project participant describes about the monitoring organisation, parameters to be monitored, monitoring practices, quality assurance, quality control procedures, data storage and archiving.

The authority and responsibility for registration, monitoring, measurement, reporting and reviewing of the data rests with the project participant. PP proposed the following structure for data monitoring, collection, data archiving and calibration of equipment for this project activity. The team comprises of the following members:



Data Measurement

The export and import energy is measured continuously using above mentioned Main and Check meters located at the substations. Readings of meters shall be taken on monthly basis by authorized officer of SEB in the presence of PP or representative of PP. Based on the Meter Reading Statement to PP, invoices are raised. These invoices can be used for cross checking the meter readings taken for the respective project activity.

There are standby meters provided at the sites of Avaada Clean Energy Power Limited (5 MW) and Giriraj Renewable Private Limited (28 MW) which are used in case there are discrepancies in main meter readings.

For the period Oct 2020-Dec 2020, Main meter was found to be having CT/PT issues and hence readings of Standby meters are used for Avaada Clean Energy Power Limited (5 MW).

Data collection and archiving

Readings from meters are collected in the presence of the plant in-charge. Export and Import data would be recorded and stored in logs as well as in electronic form on a daily basis. The records are checked periodically by the Plant Manager and discussed thoroughly with the plant supervisor. The period of storage of the monitored data will be 2 years after the end of crediting period or till the last issuance of VERs for the project activity whichever occurs later.

Emergency preparedness

The project activity 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.

Personnel training

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

QA/QC procedures

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

Apportioning

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

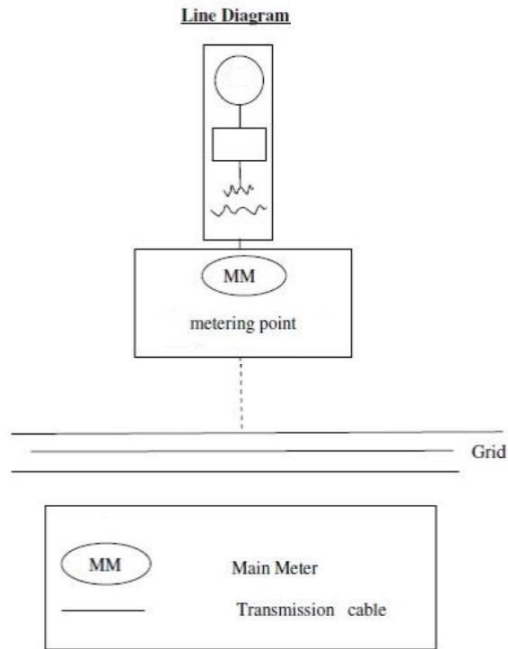
- Apportioning the net electricity exported to grid, as recorded in the consolidated Share Certificate / JMR Report / Credit Notes certified by the respective state discom, based on the number of days in the monitoring period and the number of days for which Share Certificate / JMR Report / Credit Notes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

During the current monitoring period, apportioning has not been done.

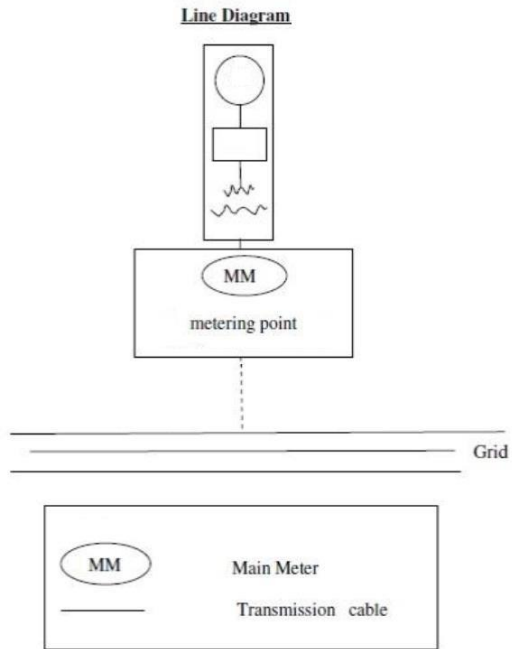
Metering Arrangement

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

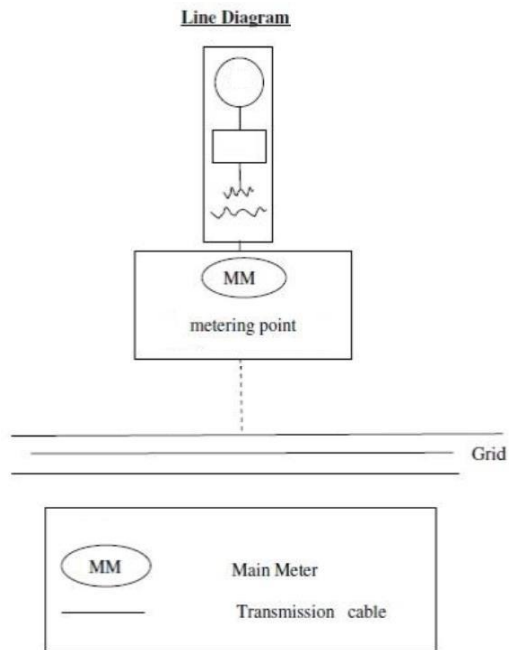
For Karnataka Site



For Kanpur (Uttar Pradesh) Site



For Maharashtra Site



5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

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

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 CO₂emission 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	72,151.055
$EF_{grid,CM,y}$	tCO ₂ e	0.9368
BE_y	=	72,151.055 * 0.9368
	=	67,591

5.2 Project Emissions

Not Applicable, since leakage emissions are zero as per ACM0002 methodology

5.3 Leakage

Not Applicable, since emissions from the project activity is zero as per ACM0002 methodology

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)
2020	67,591	0	0	67,591
Total	67,591	0	0	67,591

APPENDIX 1: METER AND CALIBRATION DETAILS

Avaada Sustainable Energy Private Limited (30 MW)

Meter Details	Main Meter	Check Meter
Meter Serial No	18015390	18015388
Meter Make	L&T	L&T
Accuracy Class	0.2s	0.2s
Date of Calibration	28/02/2018	28/02/2018
Due date of next calibration	27/02/2023	27/02/2023

Avaada Clean Energy Power Limited (5 MW)

Meter Details	Main Meter	Check Meter	Standby Meter
Meter Serial No	UPP67363	UPP67364	UPP67365
Meter Make	Secure	Secure	Secure
Accuracy Class	0.2s	0.2s	0.2s
Date of Calibration	21/07/2018	21/07/2018	21/07/2018
Due date of next calibration	20/07/2023	20/07/2023	20/07/2023

Giriraj Renewable Private Limited (28 MW)

Meter Details	Main Meter	Check Meter	Standby Meter
Meter Serial No	XC477938	XC477939	XC477940
Meter Make	Secure	Secure	Secure
Accuracy Class	0.2s	0.2s	0.2s
Date of Calibration	20/03/2018	20/03/2018	20/03/2018
Due date of next calibration	19/03/2023	19/03/2023	19/03/2023

The above meters were replaced with the below ones in Feb 2020.

Meter Details	Main Meter	Check Meter	Standby Meter
Meter Serial No	028689319	02874835	028689315
Meter Make	Elster A1800	Elster A1800	Elster A1800
Accuracy Class	0.2s	0.2s	0.2s

Date of Calibration	28/11/2019	28/11/2019	28/11/2019
Due date of next calibration	27/11/2024	27/11/2024	27/11/2024

Solarys Non-Conventional Energy Private Limited (30 MW)

Meter Details	Main Meter	Check Meter
Meter Serial No	18015356	18015439
Meter Make	L&T	L&T
Accuracy Class	0.2s	0.2s
Date of Calibration	14/11/2018	14/11/2018
Due date of next calibration	13/11/2023	13/11/2023

Solarys Non-Conventional Energy Private Limited (60 MW)

Meter Details	Main Meter	Check Meter
Meter Serial No	18015391	18015392
Meter Make	L&T	L&T
Accuracy Class	0.2s	0.2s
Date of Calibration	28/03/2019	28/03/2019
Due date of next calibration	27/03/2024	27/03/2024