



**Verified Carbon
Standard**

RENEWABLE SOLAR POWER PROJECT BY ADANI



Document Prepared by EKI Energy Services Limited

Project Title	Renewable Solar Power Project by Adani
Version	04
Report ID	VCS 2043
Date of Issue	08-July-2022
Project ID	VCS 2043
Monitoring Period	01-January-2021 to 30-November-2021 (both first and last date included)
Prepared By	Ms. Ishani S Manager Operations, Climate Change EKI Energy Services Limited
Contact	EnKing Embassy, Office no. 201, Plot 48, Scheme 78 Part 2, Vijay Nagar Near Brilliant Convention Centre, Indore – 452010, Madhya Pradesh, India Website: www.enkingint.org Email ID: ishani@enkingint.org T: +91 731 42 89 086, M: +91 261333556

CONTENTS

1	PROJECT DETAILS.....	4
1.1	Summary Description of the Implementation Status of the Project	4
1.2	Sectoral Scope and Project Type	5
1.3	Project Proponent	5
1.4	Other Entities Involved in the Project	5
1.5	Project Start Date	6
1.6	Project Crediting Period	6
1.7	Project Location	6
1.8	Title and Reference of Methodology	7
1.9	Participation under other GHG Programs.....	8
1.10	Other Forms of Credit.....	8
1.11	Sustainable Development Contributions	8
2	SAFEGUARDS	13
2.1	No Net Harm	13
2.2	Local Stakeholder Consultation	13
2.3	AFOLU-Specific Safeguards	13
3	IMPLEMENTATION STATUS	13
3.1	Implementation Status of the Project Activity	14
3.2	Deviations.....	14
3.3	Grouped Projects	17
4	DATA AND PARAMETERS.....	17
4.1	Data and Parameters Available at Validation	17
4.2	Data and Parameters Monitored.....	19
4.3	Monitoring Plan.....	20
5	QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS	24
5.1	Baseline Emissions	24
5.2	Project Emissions	25
5.3	Leakage.....	25
5.4	Net GHG Emission Reductions and Removals	25
	APPENDIX 1: METER CALIBRATION DETAILS.....	26

APPENDIX 2: MAJOR BREAKDOWN DETAILS 28

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project activity involves the installation of Solar PV project. The total installed capacity of the project is 200 MW of Solar PV plant located in the state of Rajasthan of India.

The main purpose of this project activity is to generate clean form of electricity through renewable solar energy source.

The Project activity is a new facility (Greenfield) and the electricity generated by the project will be exported to the Indian electricity grid. The project will therefore displace 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.

The technical specification of 200 MW solar project by Adani Renewable Energy (RJ) Limited

Sl. No.	Technical details of the equipment	Description
1	Technology Used	Solar PV technology (Poly-Crystalline)
2	Module Make, Number of modules and their capacity	Module Make ¹ - MSPVL, Jinergy, Chint No. of Modules- 851424 Capacity- 325Wp, 330 Wp, 335 Wp
3	Inverter Make, Number of Inverters & Capacity	Inverter Make- Huawei Technologies No. of Inverters- 2,223 Inverter capacity- 90 KW

The relevant implementation dates

The details of the project is mentioned in the table below

Name of the SPVs	Capacity (MW)	COD	Connection with the Grid	State	Usage
Adani Renewable Energy (RJ) Limited	100	02-August-2019	Indian Grid	Rajasthan	Sale to Grid
	100	21-August-2019			

The total GHG emission reductions or removals generated in this monitoring period.

¹ As per the Commissioning Certificate issued by the state utility

The total emission reductions achieved in this monitoring period i.e. from 01-January-2021 to 30-November-2021 (first and last days included) is 445,217 tCO₂e.

1.2 Sectoral Scope and Project Type

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

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

Project Type : I - Renewable Energy Projects

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	Adani Green Energy Limited
Contact person	Alpesh Gedia
Title	Associate Manager- Business Development
Address	Adani House, Nr Mithakhali Six Roads, Navrangpura, Ahmedabad380009, Gujarat, India
Telephone	+919907534900
Email	alpeshk.gedia@adani.com

1.4 Other Entities Involved in the Project

Organization name	EKI Energy Services Limited
Role in the Project	Project Consultant
Contact person	Manish Dabkara
Title	CEO & MD
Address	EnKing Embassy, Office No 201, Plot 48, Scheme 78, Part 2, VijayNagar, Indore- 452010, Madhya Pradesh, India.
Telephone	+91-731-4289086
Email	manish@enkingint.org

1.5 Project Start Date

The start date of the project activity is the earliest date of interconnection with the grid i.e. 02-August-2019. This is the date of commissioning of 100 MW solar PV project activity.

1.6 Project Crediting Period

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

Crediting Period Start date: 02-August -2019

Crediting Period End date: 01-August -2029

1.7 Project Location

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

Name of the SPVs	Capacity (MW)	Village	Taluka	District	State
Adani Renewable Energy (RJ) Limited	100	Rawra, Bhiv Ji ka Gaon & Hanuwant Nagar	Bap	Jodhpur	Rajasthan
	100				

The Geo-coordinate of the project activity is given below

Name of the SPVs	Capacity (MW)	District	State	Latitude (N)	Longitude (E)
Adani Renewable Energy (RJ) Limited	200	Jodhpur	Rajasthan	27° 23" 51.20"	72° 13" 47.59"

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



1.8 Title and Reference of Methodology

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

Title: Grid-connected electricity generation from renewable sources

Methodology : ACM0002: Grid-connected electricity generation from renewable sources –
Version 19.0²

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,

²<http://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD>

Annex 04)³

- Methodological Tool- Tool for the demonstration and assessment of additionality - Version 07.0.0 (EB 70, Annex 08)⁴

1.9 Participation under other GHG Programs

The project has neither been registered, nor seeking registration under any other GHG programs. The project is seeking registration only in VCS program.

1.10 Other Forms of Credit

Emission Trading Programs and Other Binding Limits:

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

Other Forms of Environmental Credit:

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

1.11 Sustainable Development Contributions

Contribution to sustainable development:

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

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

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

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

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 Sox, Nox, and SPM associated with the conventional thermal power generation facilities.

The main purpose of this project activity is to generate clean form of electricity through renewable solar energy source. The project involves installation of 200 MW solar project in the state of Rajasthan, India.

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 displace 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.

The project shall result in replacing anthropogenic emissions of greenhouse gases (GHG"s) estimated to be approximately 437,825 tCO₂e per year, thereon displacing 467,362 MWh/year amount of electricity from the grid over the 10 years crediting period.

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

3. SDG 8 Economic Growth⁶: The Project Proponent aims to provide employment to local men and women with decent compensation. PP has targeted to employ 20 persons by the year 2025 and minimum 1 person per annum after 2025.

2. SDG 13 Climate Action⁷: The main purpose of this project activity is to generate a clean form of electricity through renewable solar energy sources. The project activity involves total capacity of 200 MW solar power project which is installed in the state of Rajasthan of India.

⁵ <https://sdgs.un.org/goals/goal7>

⁶ <https://sdgs.un.org/goals/goal8>

⁷ <https://sdgs.un.org/goals/goal13>

The solar projects has been developed by the SPV namely Adani Renewable Energy (RJ) Limited of Adani Green Energy Limited, one of the green energy giants of 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 green house gas.

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1)	7.2	7.2.1: Renewable energy share in the total final energy consumption	Implemented activities to increase	About 475,253.15 MWh renewable electricity was supplied to the Indian grid during the current monitoring period that helps to increase the renewable energy share in the energy mix.	Previous Monitoring Period 02-August-2019 to 30-November-2019 (Inclusive of both the dates) 123,867.01 MWh Previous Monitoring Period 01-December-2019 to 31-December-2020 (Inclusive of both the dates) 529,161.67 MWh Current Monitoring Period: 01-January-2021 to 30-November-2021 (Inclusive of both the dates) 475,253.15 MWh Total: 1,128,281.83 MWh
2)	8.0	Employment of local men and women	Implemented activities to increase	The Project Proponent has targeted to employ 20 persons by the year 2025 and minimum 1 person per annum after 2025.	0

3)	13.0	Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to decrease	By supplying 475,253.15 MWh clean electricity to Indian grid, the project avoided release of 445,217tCO ₂ in to the atmosphere during the reporting period.	Previous Monitoring Period 02-August-2019 to 30-November-2019 (Inclusive of both the dates) 116,037 tCO₂e Previous Monitoring Period 01-December-2019 to 31-December-2020 (Inclusive of both the dates) 495,718 tCO₂e Current Monitoring Period: 01-January-2021 to 30-November-2021 (Inclusive of both the dates) 445,217 tCO₂e Total: 1,056,972tCO₂e
----	------	---	------------------------------------	--	--

2 SAFEGUARDS

2.1 No Net Harm

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 2006 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 wind / solar power plants from EIA and Environmental Consent requirement.

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.

Thus, there is no any significant impact 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

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

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

2.3 AFOLU-Specific Safeguards

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

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project has been commissioned on 02-August-2019.

Solar plant are running satisfactorily during the reported monitoring period. There are no special events occur during the reported monitoring period. Hence, no impact occurs on the GHG reduction from the project activity. There has been no change to the Project Proponent's organization during the reported monitoring period.

3.2 Deviations

3.2.1 Methodology Deviations

There is no methodology deviation applied during this monitoring period.

3.2.2 Project Description Deviations

1. Deviation has been requested as the connectivity details given in the Commissioning Certificate issued by the state utility, Maharashtra State Electricity Distribution Company Limited (MSEDCL):-

Metering Equipment installed at Sending end at the 33 kV Grid Substation)

125 MW Main Meter:	RE-0001-A
125 MW Check Meter:	RE-0002-A
125 MW Standby Meter:	RE-0003-A
75 MW Main Meter:	RE-0004-A
75 MW Check Meter:	RE-0005-A
75 MW Standby Meter:	RE-0006-A

The above Metering Equipment installed at Sending end at the 33 kV Grid Substation are used for data collection and scheduling readings. Also in reference to the Power Purchase Agreement signed by PP with the State Utility, for the purpose of energy accounting the power producer shall install ABT compliant meter at the metering point which have been mentioned above.

It is to be noted that initially, at the time of validation of project activity, the following meters were taken as part of the Monitoring plan. These are installed at the interconnecting point which is Bhadla Substation owned by the Power Grid Corporation of India Limited (PGCIL).

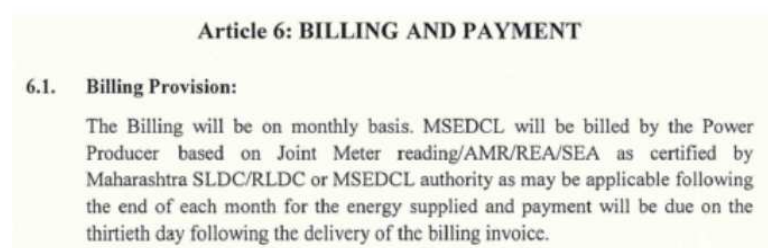
S. No. of Main Meter:	4517-A
S. No. of Check Meter:	4512-A
S. No. of Standby Meter:	3649-A

Now the reason for seeking this deviation for change in meters in monitoring plan being the aforesaid meters at the PGCIL substation are beyond the control of Project Proponent because they are owned and operated by PGCIL and PP does not have any role in their calibration and operation. Also, it does not play any role in the current billing and monitoring process detailed below:-

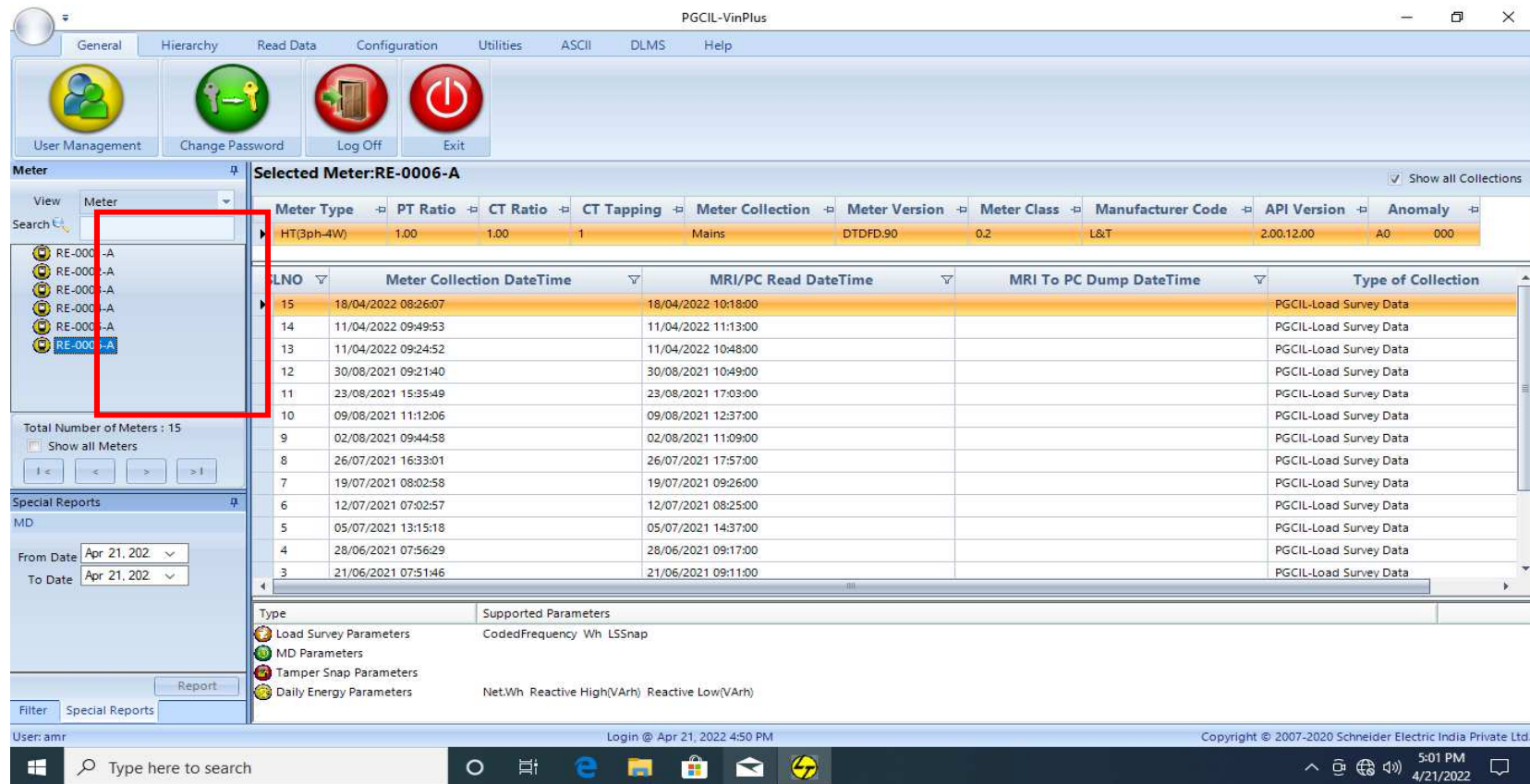
The current Billing procedure is as below:-

- In case of Inter-State grid connected RE projects, billing/invoicing is done based on REA basis which is issued by Regional Power Committee. In this process, there is no joint metering done by govt. officials and project representative, entire process is automated. As this project is located in Rajasthan and delivering electricity to Maharashtra (PPA signed with MSEDCL), thus, this project is also categorized as Inter-State project.
- In the grid inter-connection point i.e. at grid sub-station, ABT meters mentioned below are located and capturing the actual export and import of electricity from the project.

125 MW Main Meter:	RE-0001-A
125 MW Check Meter:	RE-0002-A
125 MW Standby Meter:	RE-0003-A
75 MW Main Meter:	RE-0004-A
75 MW Check Meter:	RE-0005-A
75 MW Standby Meter:	RE-0006-A
- After specific interval (presently, once in a week, however, can also be changed as per DISCOM's decision), project representative electronically download the generation report from the ABT meter and upload the same on Northern Regional Load Dispatch Centre's dedicated web-interface.
- Based on the encrypted generation report, Northern Regional Power Committee issue the REA which mentioned actual net electricity injected by the project for that specific month. Post issuance of REA, project proponent is issuing the monthly invoice for billing purpose.
- Below is snapshot of PPA signed by the PP with the utility:-



In addition to that reference may please be made to the snapshot below of the SCADA page shows the 6 no. of meters which are the source of data for all Energy Accounting of the project activity. These have been installed at project end and the PP has access to them for collection of data and calibration as well.



PGCIL-VinPlus

General Hierarchy Read Data Configuration Utilities ASCII DLMS Help

User Management Change Password Log Off Exit

Meter Selected Meter: RE-006-A Show all Collections

View Meter Search

Meter Type	PT Ratio	CT Ratio	CT Tapping	Meter Collection	Meter Version	Meter Class	Manufacturer Code	API Version	Anomaly
HT(3ph-4W)	1.00	1.00	1	Mains	DTDFD.90	0.2	L&T	2.00.12.00	A0 000

LNO	Meter Collection DateTime	MRI/PC Read DateTime	MRI To PC Dump DateTime	Type of Collection
15	18/04/2022 08:26:07	18/04/2022 10:18:00		PGCIL-Load Survey Data
14	11/04/2022 09:49:53	11/04/2022 11:13:00		PGCIL-Load Survey Data
13	11/04/2022 09:24:52	11/04/2022 10:48:00		PGCIL-Load Survey Data
12	30/08/2021 09:21:40	30/08/2021 10:49:00		PGCIL-Load Survey Data
11	23/08/2021 15:35:49	23/08/2021 17:03:00		PGCIL-Load Survey Data
10	09/08/2021 11:12:06	09/08/2021 12:37:00		PGCIL-Load Survey Data
9	02/08/2021 09:44:58	02/08/2021 11:09:00		PGCIL-Load Survey Data
8	26/07/2021 16:33:01	26/07/2021 17:57:00		PGCIL-Load Survey Data
7	19/07/2021 08:02:58	19/07/2021 09:26:00		PGCIL-Load Survey Data
6	12/07/2021 07:02:57	12/07/2021 08:25:00		PGCIL-Load Survey Data
5	05/07/2021 13:15:18	05/07/2021 14:37:00		PGCIL-Load Survey Data
4	28/06/2021 07:56:29	28/06/2021 09:17:00		PGCIL-Load Survey Data
3	21/06/2021 07:51:46	21/06/2021 09:11:00		PGCIL-Load Survey Data

Total Number of Meters : 15 Show all Meters

Special Reports MD

From Date Apr 21, 2022 To Date Apr 21, 2022

Report

Filter Special Reports

User: amr Login @ Apr 21, 2022 4:50 PM Copyright © 2007-2020 Schneider Electric India Private Ltd.

Type Supported Parameters

- Load Survey Parameters CodedFrequency Wh LSSnap
- MD Parameters
- Tamper Snap Parameters
- Daily Energy Parameters Net.Wh Reactive High(VArh) Reactive Low(VArh)

2. The Make and Capacity of the Modules installed at site have been updated as per the Commissioning Certificate issued by the State Utility:

Module Make- MSPVL, Jinergy, Chint

Capacity- 325Wp, 330 Wp, 335 Wp

3. Deviation requested as per the current site practice, the Monthly REA statements are issued by Northern Regional Power Committee instead of Western Regional Power Committee.

4. Deviation requested as per current site practice that there are no auxiliary meters and only the meters mentioned in Deviation #1 above located at the plant site.

5. Deviation requested for change in cross check mechanism given in the registered PDD. As per current site practice, the power sale invoices are used for cross checking the Quantity of net electricity generation supplied by the project plant/unit to the grid instead with the Monthly Generation Report. The monthly sales invoices being more reliable source for cross check as the same is raised by PP to the utility every month.

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 in year y
Source of data	Calculated from CEA database, Version 14, Dec- 2018 ⁸
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

⁸ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf

	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 in year y
Source of data	Calculated from CEA database, Version 14, Dec 2018 ⁹
Value applied	0.8644
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per “Tool to calculate the emission factor for an electricity system, version 07” as per the latest data available for the most recent year 2017-18. The data is obtained from “CO ₂ Baseline Database for Indian Power Sector” version 14, published by the Central Electricity Authority, Ministry of Power, Government of India
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO ₂ /MWh
Description	Combined Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 14, Dec 2018 ¹⁰
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%

⁹ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf

¹⁰ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf

	W_{BM} = Weighting of build margin emissions factor (%) = 25%
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{P,J, y}$
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	Regional Energy Account statement issued by Northern Regional Power Committee (NRPC)
Description of measurement methods and procedures to be applied	Data Type: Measured Monitoring equipment: Energy Meters are used for monitoring. Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually Archiving Policy: Paper & Electronic Class of meter: 0.2s. Calibration frequency: One in five years Electricity exported by the project to the grid at project site switch yard is the actual generation recorded and monitored by the metering system installed at the project site switch yard. The energy meters are special energy meters which are installed and sealed by the Power Grid Corporation of India Limited in the presence of the representatives of the power producer. The check meter shall be used during the period the main metering system is not in service..
Frequency of monitoring/recording	Continuous measurement & monthly recording
Value monitored	475,253.15
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..

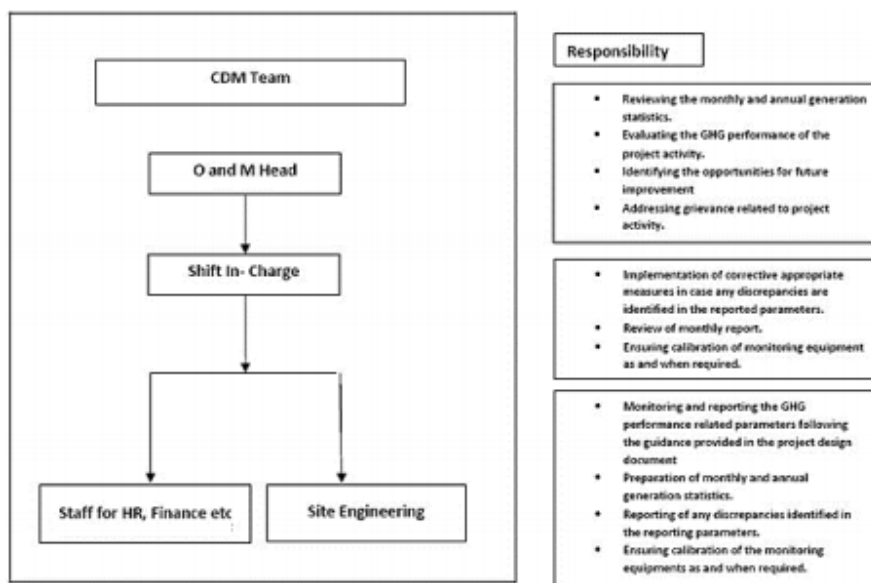
QA/QC procedures to be applied	Energy meters will be calibrated once in a five year and faulty meters will be duly replaced immediately. This data may be cross checked with the Monthly Power Sale Invoices.
Purpose of the data	Calculation of baseline emissions
Calculation method	Not Applicable ¹¹
Comments	Data will be 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 VCS project activities and is proposed for grid-connected solar power project being implemented. The monitoring plan, which will be 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's for this project activity.

The team comprises of the following members:

¹¹ A Monthly Regional Energy Accounting statement (REA) is issued by the Northern Regional Power Committee (NRPC) provides the details of inter-regional bilateral exchange of electricity. It is based on the scheduled electricity given by the Northern Load Despatch Center for the month and processed schedule/meter data. The same value of electricity given in the REA statement is taken by the PP as Sale of power generated by the project activity for the month.



Data Measurement

The electricity supplied or transmitted is sourced from the “Regional Energy Account” and the same can be cross checked from the Invoices raised by the PP. The “Regional Energy Account” is a publically available document which is issued by the Northern Regional Power Committee. The “Regional Energy Account” statement are available on monthly basis and based upon this, the invoices are raised by the PP.

The current Billing procedure is as below:-

- In case of Inter-State grid connected RE projects, billing/invoicing is done based on REA basis which is issued by Regional Power Committee. In this process, there is no joint metering done by govt. officials and project representative, entire process is automated. As this project is located in Rajasthan and delivering electricity to Maharashtra (PPA signed with MSEDCL), thus, this project is also categorized as Inter-State project.
- In the grid inter-connection point i.e. at grid sub-station, ABT meters mentioned below are located and capturing the actual export and import of electricity from the project.

125 MW Main Meter:	RE-0001-A
125 MW Check Meter:	RE-0002-A
125 MW Standby Meter:	RE-0003-A
75 MW Main Meter:	RE-0004-A
75 MW Check Meter:	RE-0005-A
75 MW Standby Meter:	RE-0006-A
- After specific interval (presently, once in a week, however, can also be changed as per DISCOM’s decision), project representative electronically download the

generation report from the ABT meter and upload the same on Northern Regional Load Dispatch Centre's dedicated web-interface.

- Based on the encrypted generation report, Northern Regional Power Committee issue the REA which mentioned actual net electricity injected by the project for that specific month. Post issuance of REA, project proponent is issuing the monthly invoice for billing purpose.

Data collection and archiving

The records are checked periodically by the Plant Manager and discussed thoroughly with the plant supervisor. The period of storage of the monitored data will be 2 years after the end of crediting period or till the last issuance of VERs for the project activity whichever occurs later.

Emergency preparedness

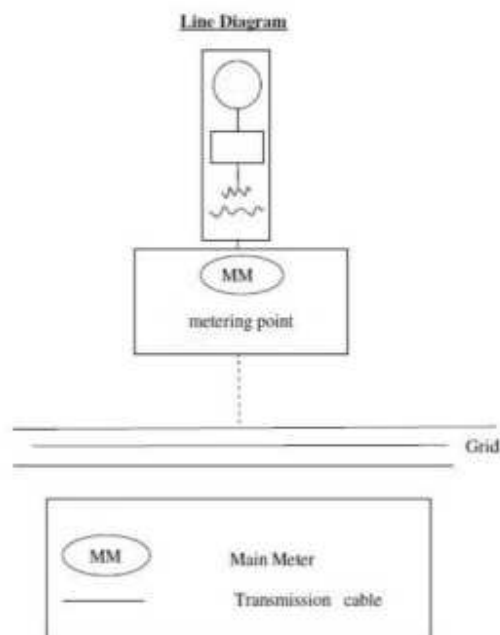
The project activity will not result in any unidentified activity that can result in substantial emissions from the project activity. No need for emergency preparedness in data monitoring is visualized. In the event that the main meter, which is used to record the net electricity exported by the project, 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 will be trained. The plant helpers will be trained in equipment operation, data recording, reports writing, operation and maintenance and emergency procedures in compliance with the monitoring plan.

Metering Arrangement

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



As per the connectivity details given in the Commissioning Certificate issued by the state utility, Maharashtra State Electricity Distribution Company Limited (MSEDCL):-

Metering Equipment installed at Sending end at the 33 kV Grid Substation)

125 MW Main Meter:	RE-0001-A
125 MW Check Meter:	RE-0002-A
125 MW Standby Meter:	RE-0003-A
75 MW Main Meter:	RE-0004-A
75 MW Check Meter:	RE-0005-A
75 MW Standby Meter:	RE-0006-A

The above Metering Equipment installed at Sending end at the 33 kV Grid Substation are used for data collection and scheduling. Also in reference to the Power Purchase Agreement signed by PP with the State Utility, for the purpose of energy accounting the power producer shall install ABT compliant meter at the metering point which have been mentioned above.

The monthly reading of energy exported from the project activity are provided to the State Utility/Load Dispatch Centers for scheduling and Billing purposes.

Cross Check Mechanism

A Monthly Regional Energy Accounting statement (REA) is issued by the Northern Regional Power Committee (NRPC) provides the details of inter-regional bilateral exchange of electricity. It is based on the scheduled electricity given by the Northern Load Dispatch Center for the month and processed schedule/meter data.

The same value of electricity given in the REA statement is taken by the PP as Sale of power generated by the project activity for the month.

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 will be 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 is calculated from:

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

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The Baseline emissions are calculated as follows

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

Where:

BE_y = Baseline emissions in year y (t CO₂/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 CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (t CO₂/MWh)

$$BE_y = 475,253.15 \text{ MWh} \times 0.9368 \text{ tCO}_2\text{e}$$

$$BE_y = 445,217 \text{ tCO}_2\text{e (rounded down figure)}$$

5.2 Project Emissions

Not Applicable, since project emissions are zero as per ACM0002 methodology.

5.3 Leakage

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

5.4 Net GHG Emission Reductions and Removals

In reference to section 5.1 of this MR, the Baseline emission has been calculated using the formula given below: -

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

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 CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” (tCO₂e/MWh)

Hence,

$$\begin{aligned} BE_y &= 475,253.15 \text{ MWh} \times 0.9368 \text{ tCO}_2\text{e} \\ &= 445,217 \text{ tCO}_2\text{e} \text{ (Round down value)} \end{aligned}$$

As per Section 5.7 of ACM0002 methodology (version 19), Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:

ER_y = Emission reductions in year y (t CO₂e/yr)

BE_y = Baseline emissions in year y (t CO₂/yr)

PE_y = Project emissions in year y (t CO₂e/yr)

$$\begin{aligned} \text{Hence, } ER_y &= 445,217 - 0 \\ &= 445,217 \text{ tCO}_2\text{e} \text{ (Rounded Down Figure)} \end{aligned}$$

The breakdown of GHG emission reductions and removals by vintages has been summarized in the table below: -

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
01-01-2021 to 30-11-2021	445,217	0	0	445,217
Total	445,217	0	0	445,217

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 437,825 tCO₂e, whereas actual emission reductions achieved are 445,217 tCO₂e, which is approximately 11.13% more 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 favorable sun.

As per the registered PDD, the Equity IRR without CDM for the project activity is 8.89 % and the Benchmark Equity IRR is 14.18%. The PLF considered at the time of validation is 27.29% as per the DPR of the project activity. The average actual PLF for the current monitoring period from 01-January-2021 to 30-November-2021 is 29.59%. Upon using this PLF for the IRR calculations, the Equity IRR comes out to be 10.3% which is well below the benchmark and hence does not impacts additionality and is acceptable.

APPENDIX 1: METER CALIBRATION DETAILS

As per the connectivity details given in the Commissioning Certificate issued by the state utility, Maharashtra State Electricity Distribution Company Limited (MSEDCL):-

Metering Equipment installed at Sending end at the 33 kV Grid Substation)

125 MW Main Meter:	RE-0001-A
125 MW Check Meter:	RE-0002-A
125 MW Standby Meter:	RE-0003-A
75 MW Main Meter:	RE-0004-A
75 MW Check Meter:	RE-0005-A
75 MW Standby Meter:	RE-0006-A

The above Metering Equipment installed at Sending end at the 33 kV Grid Substation are used for data collection and scheduling. Also in reference to the Power Purchase Agreement signed by PP with the State Utility, for the purpose of energy accounting the power producer shall install ABT compliant meter at the metering point which have been mentioned above.

The Calibration details of above meters is as below:-

SR NO	Meter detail	Meter make	Accuracy Class	Meter Serial no	Date of Calibration	Validity
1	MAIN	L&T	0.2s	RE-0001-A	03-June-2019	02-June-2024
2	CHECK	L&T	0.2s	RE-0002-A	03-June-2019	02-June-2024
3	STANDBY	L&T	0.2s	RE-0003-A	03-June-2019	02-June-2024
4	MAIN	L&T	0.2s	RE-0004-A	03-June-2019	02-June-2024
5	CHECK	L&T	0.2s	RE-0005-A	03-June-2019	02-June-2024
6	STANDBY	L&T	0.2s	RE-0006-A	03-June-2019	02-June-2024

APPENDIX 2: MAJOR BREAKDOWN DETAILS

DATE	TOTALTIME(Hrs)	FaultDescription	Actiontaken
01-Apr-21	03:08:00	IDT tripped in Earth fault	Check found cable puncher between Outdoor HT Panel to IDT, After generation hour cable replace with spare cable and IDT charged.
02-Apr-21	12:00:00	IDT tripped in Earth fault	Check found End joint kit Failure and bushing crack B phase in IDT end done and IDT Charged
18-Apr-21	01:11:00	Incomer feeder-5(Block-6,7,4,3) tripped in O/C E/F due to end termination kit failure at Block-07 LBS-A in mid-night 12:46AM	Faulty cable remove & feeder charged on single run in morning 6:00AM and then after new end termination done again shutdown taken at 9:14 for cable connect and feeder charged on both cable run at 10:25.
26-Apr-21	02:20:00	IDT DGA report found abnormal, shutdown taken for internal inspection by OEM	Open topcover and visual inspection of core & winding found ok, then flushing core & winding by oil also additional paper insulation apply between core and channel.
02-May-21	02:05:00	Shtdown taken by PGCIL for sectionized connection work.	All system charged normally after work completion by PGCIL.
24-Jul-21	05:52:00	Block-5 INV-26,27,28,29,45,46,47,49,52,53 all string DC cable theft from table to inverter	New string cable installed with MC4 and MH4 connector from table to inverter and then inverter start
24-Jul-21	06:14:00	Block-5 INV-25,48,51 6 nos & INV 50 8 Nos of string DC cable theft from table to inverter	New string cable installed with MC4 and MH4 connector from table to inverter and then inverter start
24-Jul-21	13:02:00	Block-5 INV-44 all string DC cable theft from table to inverter	New string cable installed with MC4 and MH4 connector from table to inverter and then inverter start
24-Jul-21	11:37:00	Block-6 INV-09, 8 Nos of string DC cable theft from table to inverter	New string cable installed with MC4 and MH4 connector from table to inverter and then inverter start
24-Jul-21	11:27:00	Block-6 INV-4,5,6,7,8 all string DC cable theft from table to inverter	New string cable installed with MC4 and MH4 connector from table to inverter and then inverter start

DATE	TOTALTIME(Hrs)	FaultDescription	Actiontaken
30-Jul-21	02:37:00	Cable theft at night.	New string cable installed with MC4 and MH4 connector from table to inverter and then inverter start
30-Jul-21	02:30:00	Cable theft at night.	New string cable installed with MC4 and MH4 connector from table to inverter and then inverter start
30-Jul-21	01:43:00	Cable theft at night.	New string cable installed with MC4 and MH4 connector from table to inverter and then inverter start
30-Jul-21	02:39:00	Cable theft at night.	New string cable installed with MC4 and MH4 connector from table to inverter and then inverter start
26-Aug-21	00:04:00	During the time grid voltage high 231.79/35.53 KV, Approx 100 MW capacity was down	Inverters restart
13-Nov-21	08:19:00	LV Bushing Crack	LV2 B-Phase Bushing Damaged, Change Bushing and Top-up Oil in Transformer
15-Nov-21	00:49:00	Grid Trip	Grid Trip from PGCIL End due to Jumper Open at PGCIL of Other SPD
28-Nov-21	10:42:00	GIS Y-phase female contact problem at PGCIL(765/400/220KV GSS) end. taken shutdown for corrective maintenance	GIS maintenance work in progress.