



**Verified Carbon
Standard**

RENEWABLE SOLAR POWER PROJECT BY ADANI



Document Prepared by EKI Energy Services Limited

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The 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- JA Solar Co. Ltd & Jolywood (Taizohou) Solar Technology Co. No. of Modules- 851424 Model capacity- 330 Wp, 350 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	02/08/2019	Indian Grid	Rajasthan	Sale to Grid
	100	21/08/2019			

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

The total emission reductions achieved in this monitoring period i.e. from 01/12/2019 to 31/12/2020 (first and last days included) is 495,718 tCO₂ e.

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. 02/08/2019. 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

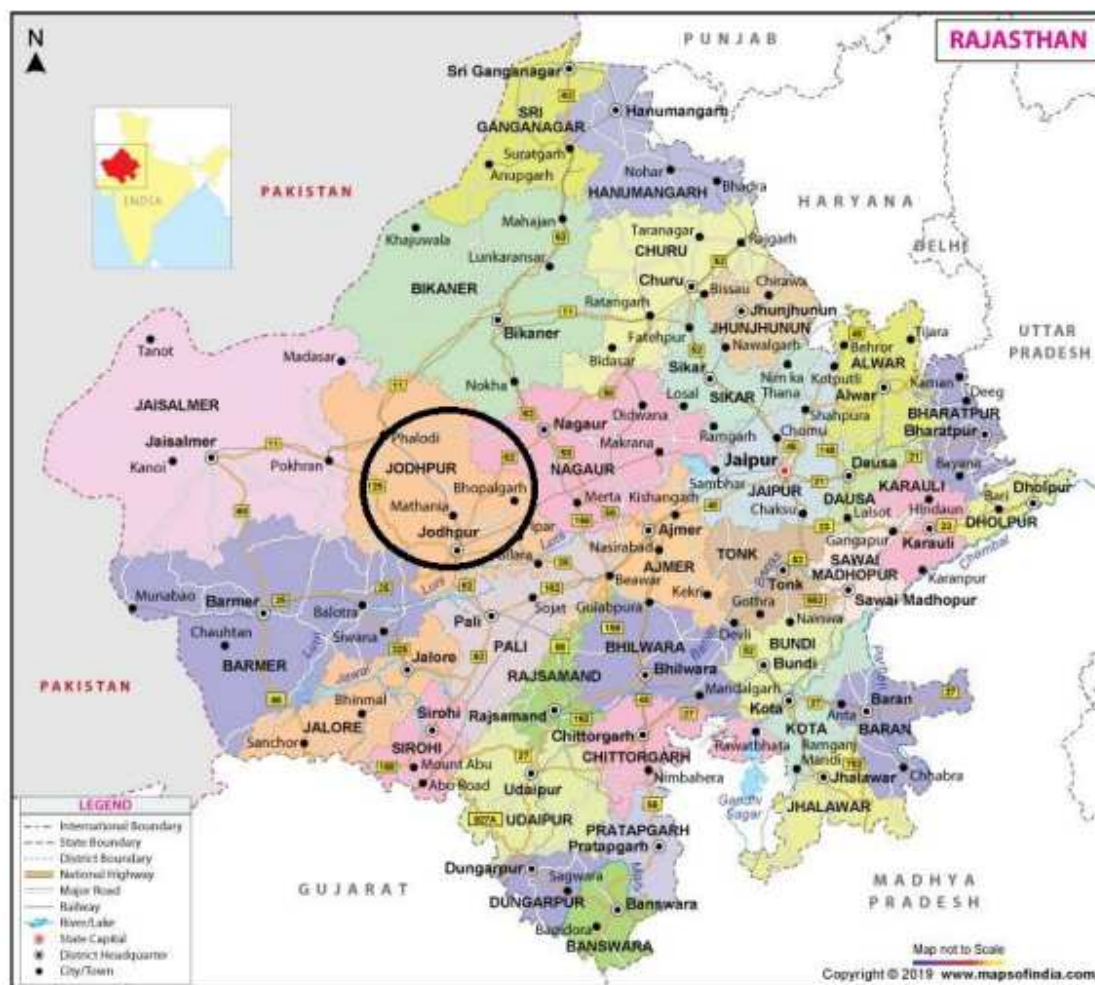
The details of the project locations are mentioned in the table below

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 19.0¹

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

¹<http://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD>

- Tool to calculate the emission factor for an electricity system - Version 07.0 (EB 100, Annex 04)²
- Methodological Tool- Tool for the demonstration and assessment of additionality - Version 07.0.0 (EB 70, Annex 08)³

1.9 Participation under other GHG Programs

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

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.

² https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf/history_view

³ https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf/history_view

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 Sox, Nox, 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 same¹⁵.

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

In the introductory speech, the representative of Project Investor, welcomed the gathering and given a brief about the climate mitigation project activity. Subsequent to the introductory speech, stakeholders were explained about the electricity generation from solar project is an environmental friendly power generation technology contributing to reduction in GHG emissions. They were also explained about the benefits of the solar power projects like, increasing energy availability and improving quality of power and its assistance to the local population by providing employment opportunities to both skilled & unskilled labours.

The Minutes of meeting with commenting sheet from LSH, invitation letter receipt copy are submitted to the DOE.

Meeting started with opening speech by representative of project participant. He introduced all guests on dais. The representative of project participant explained Technical aspects of

project to stakeholders. He also explained about social, environmental & economic benefits of the project.

Name of Investor	Capacity	Project Location			Date of Invitation	Date of Meeting
		Village	District	State		
Adani Renewable Energy (RJ) Limited	200 MW	Jodhpur	Jodhpur	Rajasthan	29/05/2019	06/06/2019

He also elaborated about carbon mechanism & its requirement for the current project. After the detailed discussions, the session was open for questions from stakeholders.

Most of the questions were related to employment opportunities, economic development, benefits from project to villagers and other development activities. The question raised by the villagers are summarized below:

Q: Will there be free supply of power to the local people?

A: The generated power will be fed in the grid. Project promoter can't supply directly power to the local people. They have to get authorized connection from Govt. body. But due to the project activity the supply of power in the area will increase

. Q: Will there be employment generation due to the project activity for youth from the adjoining areas?

A: Responding about the increased possibilities for employment of local youth due to the project activity, it was pointed out that preference would be given for locals in the employment opportunities.

Q: Will the project release any pollutants or hazardous, toxic or noxious substances to air?

A: No, not from what we know, there is no project emissions associated to the project & does not have any negative impacts.

As a part of continuous feedback from stakeholders, there were no other major comments or protest raised by the stakeholders and they were totally in support for setting up of these kinds of projects in the region. The PP also placed a grievance register onsite in where the stakeholder can put down his/her complain and the same if found genuine will be addressed immediately.

During the current monitoring period, positive feedback are received regarding site operation. No any grievances received during the current monitoring period, therefore, no any mitigation measures are required. In case of grievances, the nature of probable resolution is discussed with the plant head office and implemented by the site incharge

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 02-08-2019.

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.

3.2 Deviations

2.3.1 Methodology Deviations

There is no methodology deviation.

2.3.2 Project Description Deviations

No project description deviation is applicable during this monitoring period and there is no previous project description deviation for this project activity.

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 ⁴
Value applied	0.9610

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

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 in year y
Source of data	Calculated from CEA database, Version 14, Dec 2018 ⁵
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 ⁶
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: $EF_{grid,CM,y} = EF_{grid,OM,y} \cdot WOM + EF_{grid,BM,y} \cdot WBM$ Where: $EF_{grid,BM,y} = \text{Build margin CO}_2 \text{ emission factor in year y (tCO}_2\text{/MWh)}$

⁵ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf

⁶ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver14.pdf

	EF_{grid,OM,y}= Operating margin CO₂ emission factor in year y (tCO₂/MWh) W_{OM} = Weighting of operating margin emissions factor (%) = 75% W_{BM}= Weighting of build margin emissions factor (%) = 25%
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

4.2 Data and Parameters Monitored

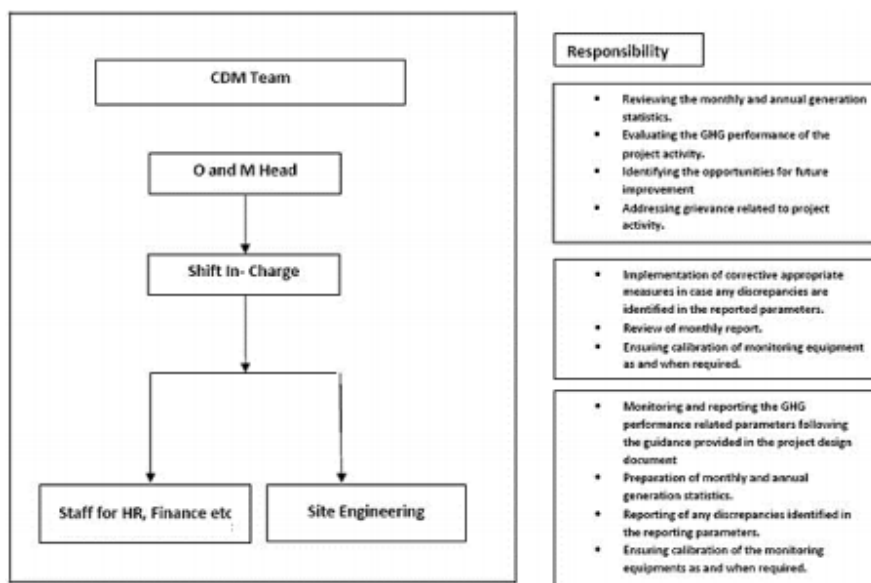
Data / Parameter	EG _{P,J, y}
Data unit	MWh/y
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh
Source of data	Regional Energy Account statement issued by WRPC
Description of measurement methods and procedures to be applied	Data Type: Measured 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. Further in case of failure of both main meter and check meter, sum of the net electricity generation recorded by three individual special energy meters (SEMs) and
Frequency of monitoring/recording	Continuous measurement & monthly recording
Value monitored	529,161.67

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 Generation Reports.
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 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:



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 „Western Regional Power Committee. The “Regional Energy Account” statement are available on monthly basis and based upon this, the invoices are raised by the PP.

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.

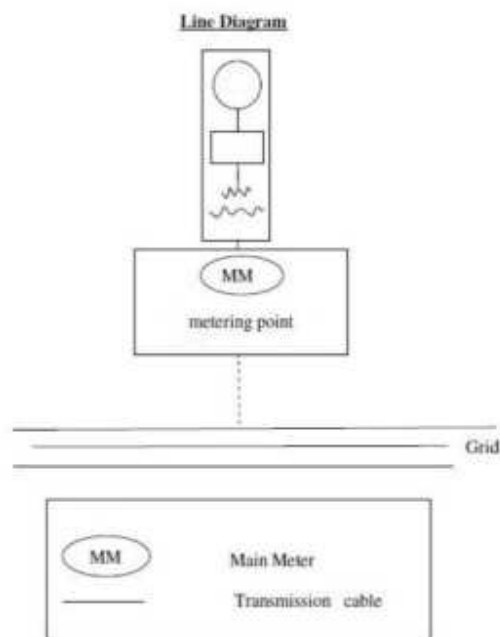
Personnel training

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



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 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.

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)

$$BE_y = 529161.67 \text{ MWh} \times 0.9368 \text{ tCO}_2\text{e}$$

$$BE_y = 495,718 \text{ tCO}_2\text{e (rounded down figure)}$$

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

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)
2019	34,199	0	0	34,199
2020	461,519	0	0	461,519
Total	495,718	0	0	495,718

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 495,718tCO₂e, which is approximately 4.1% 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. Hence, it is acceptable.

APPENDIX 1: METER CALIBRATION DETAILS

Meter Details	Main Meter	Check Meter
Meter Serial No	05297957	05297966
Meter Make	Elster	Elster
Accuracy Class	0.2 s	0.2 s
Date of Calibration	27/07/2019 ⁷	27/07/2019
Due date of next calibration	26/07/2024	26/07/2024

⁷ The Meters were calibrated on 27/07/2019. Since the calibration frequency of the meters are once in five year, the calibration is valid during the current monitoring period. Hence, no error factor has been applied due to delay

APPENDIX 2: MAJOR BREAKDOWN DETAILS

DATE	FAULT DESCRIPTION	Hrs
10-04-2020	MCCB-12 flashover due to internal burning	06:50:00
16-04-2020	Differential Protection pickup in CRP	00:38:00
26-06-2020	MCCB 9 burn	04:48:00
25-07-2020	Generation Schedule not approved by KSMPL.It arppoved schedule from 11:45:00.	05:43:00
02-08-2020	Block-3 LT-2 MCCB 1FA Burn	06:17:00
04-08-2020	Block-2 LT-2 MCCB 1FD Trip	00:11:00
12-08-2020	Block-5 LT-2 2FB MCCB Trip	00:11:00
14-08-2020	Block-8 LT-1 3FA MCCB Trip	00:13:00
15-08-2020	Block-8 LT-1 3FA MCCB Trip	00:13:00
21-08-2020	Block-3 Inv.-3,4 LT-2 1FB MCCB 1FB Trip	00:13:00
15-09-2020	DC Earth fault	00:11:00
28-09-2020	MCCB faulty due to Inverter 35 burn & water ingress in ASB	00:11:00
19-11-2020	EXT DI4 fault	00:33:00
17-12-2020	DC earth fault	08:40:00
30-12-2020	DC earth fault	10:29:00