



**Verified Carbon
Standard**

SOLAR GROUPED PROJECT BY ACME GROUP (EKIESL-VCS-AUG-16-01)



Leading Through Innovation



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 grouped project activity is a step towards supporting the implementation and installation of grid connected renewable energy power plants in India. The implementation of grouped project activity ensures energy security, diversification of the grid generation mix and sustainable growth of the electricity generation sector in India.

The grouped project activity is a voluntary action and each SPV is the Project Proponent for their project activity Instance. ACME Group as a parent company formed different SPV (Special Purpose Vehicles) for solar projects and projects are developed by name of SPVs. There are no mandatory laws or regulations existing in India requiring PP or any other party to develop a programme for renewable generation plants. All 11 project activity instances are commissioned and the commission dates are tabulated below. The project activity instance is running very smoothly with scheduled maintenance activity since commissioning. No situation found during the current monitoring period that could alter the applicability of methodology.

The commissioning/commercial operation details of 11 project activity instances involved in current monitoring period are as below:

Project Activity Instance	PP (SPV) Name	Commercial Operation Date	MW
1	Mihit Solar Power Private Ltd. 25 MW	21-March-2016	74
	Mihit Solar Power Private Ltd. 25 MW	21-March-2016	
	Mihit Solar Power Private Ltd. 24 MW	28-February-2016 (for 11.5 MW) 30-March-2016 (for 12.5 MW)	
2	ACME Jaisalmer Solar Power Pvt. Ltd.	12-May-2016	20
3	Aarohi Solar Pvt. Ltd.	29-March-2016	50
4	Dayanidhi Solar Power Pvt. Ltd.	01-April-2016	40
5	Niranjana Solar Energy Pvt. Ltd.	31-March-2016	20
6	Vishwatma Solar Energy Pvt Ltd.	02-April-2016 (for 10 MW) 30-April-2016 (for 20 MW)	30
7	Acme Raipur Solar Power Pvt. Ltd.	09-January-2016 (for 23 MW) 15-March-2016 (for 7 MW)	30
8	Dayakara Solar Power Pvt Ltd	21-June-2016	30
9	Grahati Solar Energy Pvt Ltd	20-July-2016 (for 20 MW) 03-August-2016 (for 30 MW)	50
10	Acme Odisha Solar Power Pvt Ltd	22-June-2015	25
11	Eminent Solar Power Pvt Ltd.	09-February-2017	12.5
Total Capacity			381.5

The total GHG Emission reductions generated in current monitoring period of 01-January-2021

to 31-August-2021 are 457,545 tCO₂e. No More project activity instance is included in the grouped project activity during current monitoring period.

1.2 Sectoral Scope and Project Type

The project activity falls under consideration of the grouped project activity. The project activity instances as part of the grouped project will have the following parameters

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

Project Type : I - Renewable Energy Projects

Project Category: For each project activity instances will apply only solar technology. However each project activity instances will be either small scale or large scale and not the combination of two.

For large scale project activities, below large scale methodology is applied

Methodology : ACM0002: Grid-connected electricity generation from renewable sources - Version 17.0¹

For small scale project activities, below small scale methodology is applied

AMS-I.D." Grid Connected renewable electricity generation – Version 18.0²

The project activity under consideration is a grouped project activity.

1.3 Project Proponent

Organization name	Eminent Solar Power Pvt Ltd
Contact person	Gursharan Jassal
Title	Director
Address	Plot No.152, Sector – 44, Gurgaon -122 002, Haryana, India
Telephone	+91-124-7117001
Email	info@acme.in

Organization name	Mihit Solar Power Private Ltd.
Contact person	Gursharan Jassal
Title	Director

¹ <https://cdm.unfccc.int/UserManagement/FileStorage/D5YFS9I3VKBT18MQNGX0LPZ6U7AWCO>

² <http://cdm.unfccc.int/UserManagement/FileStorage/2P7FS6ZQAR84LG3NMKYUH50WI9ODBC>

Address	Plot No.152, Sector – 44, Gurgaon -122 002, Haryana, India
Telephone	+91-124-7117001
Email	info@acme.in

Organization name	ACME Jaisalmer Solar Power Pvt. Ltd.
Contact person	Gursharan Jassal
Title	Director
Address	Plot No.152, Sector – 44, Gurgaon -122 002, Haryana, India
Telephone	+91-124-7117001
Email	info@acme.in

Organization name	Aarohi Solar Pvt. Ltd
Contact person	Jyoti Arora
Title	Director
Address	Plot No.152, Sector – 44, Gurgaon -122 002, Haryana, India
Telephone	+91-124-7117001
Email	info@acme.in

Organization name	Dayanidhi Solar Power Pvt. Ltd.
Contact person	Manish Karna
Title	Director
Address	Plot No.152, Sector – 44, Gurgaon -122 002, Haryana, India
Telephone	+91-124-7117001
Email	info@acme.in

Organization name	Niranjana Solar Energy Pvt. Ltd.
Contact person	Yudhvir Singh Gulia
Title	Director
Address	Plot No.152, Sector – 44, Gurgaon -122 002, Haryana, India
Telephone	+91-124-7117001

Email	info@acme.in
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Organization name	Vishwatma Solar Energy Pvt Ltd.
Contact person	Ashish K. Saxena
Title	Director
Address	Plot No.152, Sector – 44, Gurgaon -122 002, Haryana, India
Telephone	+91-124-7117001
Email	info@acme.in

Organization name	Acme Raipur Solar Power Pvt. Ltd.
Contact person	Rajesh Sodhi
Title	Director
Address	Plot No.152, Sector – 44, Gurgaon -122 002, Haryana, India
Telephone	+91-124-7117001
Email	info@acme.in

Organization name	Dayakara Solar Power Pvt Ltd
Contact person	Rajesh Sodhi
Title	Director
Address	Plot No.152, Sector – 44, Gurgaon -122 002, Haryana, India
Telephone	+91-124-7117001
Email	info@acme.in

Organization name	Grahati Solar Energy Pvt Ltd
Contact person	Jyoti Arora
Title	Director
Address	Plot No.152, Sector – 44, Gurgaon -122 002, Haryana, India
Telephone	+91-124-7117001
Email	info@acme.in

Organization name	Acme Odisha Solar Power Pvt Ltd
Contact person	Gursharan Jassal
Title	Director
Address	Plot No.152, Sector – 44, Gurgaon -122 002, Haryana, India
Telephone	+91-124-7117001
Email	info@acme.in

ACME Cleantech Solutions Private Limited as a parent company of all project activity instances formed as different SPV (Special Purpose Vehicles) for solar projects and projects are developed by name of SPVs.

1.4 Other Entities Involved in the Project

Organization name	EKI Energy Services Limited
Role in the Project	Project Consultant
Contact person	Mr. Prakash Sahu
Title	Project Manager
Address	Office No 201, Plot No 48, Scheme 78, Vijay Nagar Part- II, Indore 452010, India
Telephone	+91-9589899649
Email	prakash@enkingint.org

1.5 Project Start Date

The first project activity instance of the grouped project under consideration was commissioned and power generation started on 22-June-2015. This project activity instance is SPV- Acme Odisha Solar Power Pvt Ltd under ACME group having installed capacity of 25 MW. Hence the project start date is defined as follows:

Project start date: 22-June-2015

1.6 Project Crediting Period

Project crediting period for grouped project activity is taken as 10 years renewable twice. Accordingly, the start date of the first crediting period is 22-June-2015 and end date will be 21-June-2025.

First crediting period is from 22-June-2015 to 21-June-2025.

1.7 Project Location

All the project activity instances in the grouped project activity would be located within geographical boundaries of Republic of India. Thus geographical area of grouped project is India.

The geographical boundary is delineated in the form of extreme geographic coordinates as follows³:

Latitude - 8° 4' to 37° 6' N

Longitude - 68° 7' to 97° 25' E

The map of India is as indicated in the following figure:



The location details of each instances of the project activity is mentioned in the table below

SPV Name	MW	State	Project Location /Sub Station	Village	Tehsil	District
Mihit Solar Power Private Ltd.	25	Punjab	Kherakhurd	Khaira Khurd	Sardulgarh	Mansa

³ Precise latitude and longitude details of each project instances are provided in section 3.1 of this monitoring report. Please refer below web link for the range of co-ordinates https://en.wikipedia.org/wiki/Geography_of_India

Mihit Solar Power Private Ltd.	25	Punjab	Mankhera	Mankhera	Sardulgarh	Mansa
Mihit Solar Power Private Ltd.	24	Punjab	Jandekalan	Jhande Kalan	Sardulgarh	Mansa
ACME Jaisalmer Solar Power Pvt. Ltd.	20	Andhra Pradesh	Rayachoti	Pothukurupalli	Ramapura m Mandal	Kadapa
Aarohi Solar Pvt. Ltd.	50	Andhra Pradesh	Hindupur	Kalipi	Roddam Mandal	Anathapur
Dayanidhi Solar Power Pvt. Ltd.	40	Andhra Pradesh	Shanthipuram	Gunjarlapalle & Morasanapalle	Shanthipuram Mandal	Chittoor
Niranjana Solar Energy Pvt. Ltd.	20	Andhra Pradesh	Pathikonda	Puchakayalam	Pathikonda Mandal	Kurnool
Vishwatma Solar Energy Pvt Ltd.	30	Andhra Pradesh	Yemmiganur	Kadivella	Yemmiganur	Kurnool
Acme Raipur Solar Power Pvt. Ltd.	30	Chattishgarh	Bagbera	Bhikapali	Bagbahara	Mahasamund
Dayakara Solar Power Pvt Ltd	30	Telangana	Maddur	Damkanpur	Maddur	Mehbubnagar
Grahati Solar Energy Pvt Ltd	50	Telangana	Balanagar	Narellapalli	Balanagar	Mehbubnagar
Acme Odisha Solar Power Pvt Ltd	25	Odisha	Balongir	Mursing & Sikuan	Deogaon	Bolangir
Eminent Solar Power Pvt Ltd.	12.5	Uttarakhand	Udham Singh Nagar	Ratanpur Bazpur	Bajpur	Udham Singh Nagar
Total (MW)	381.5					

1.8 Title and Reference of Methodology

The methodology for the project activity is approved methodology for large-scale CDM project activities. The details of the methodology are as follows:

Methodology: ACM0002

Project Type : Type-I: Renewable Energy Projects

Title : Grid-connected electricity generation from renewable sources

Version No. : Version 17.0;

Reference : CDM Methodology⁴

The methodology refers to following CDM Tools:

- Tool for the demonstration and assessment of additionality⁵ (Version 07.0.0, EB 70, Annex 8)
- Tool to calculate emission factor for an electricity system⁶ (Version 05.0)

⁴ <https://cdm.unfccc.int/methodologies/DB/8W400U6E7LFHHYH2C4JR1RJWWO4PVN>

⁵ <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-01-v7.0.0.pdf>

The methodology for small scale project activity instances will be the approved methodology for small-scale CDM project activities. The details of the methodology are as follows:

Methodology : AMS I.D
Project Type : Type-I: Renewable Energy Projects
Title : Grid connected renewable electricity generation
Version No. : Version 18;
Reference : CDM Methodology⁷

The methodology refers to following CDM Tools:

- Tool to calculate emission factor for an electricity system⁸ (Version 05.0)

1.9 Participation under other GHG Programs

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

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

1.10 Other Forms of Credit

The project activity is not availing any REC/IREC benefits and the same can be confirmed from publically available link of REC generators.

Web-link: https://www.recregistryindia.nic.in/index.php/general/publics/registered_regens and <https://evident.services/device-register> PP has also submitted undertaking for not availing other forms of environmental credit for the same crediting period under consideration.

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 contributes in employment generation during the construction and operation phases. The project activity lead to development in infrastructure in the region like development of roads and also promote business with improved power generation.

⁶ <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v5.0.pdf>

⁷ <https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTFQQOFQQH4SBK>

⁸ <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v5.0.pdf>

- **Economic well-being:** The project is a clean technology investment in the region, the project activity also help to reduce the demand supply gap of electricity in the state.

The project activity generates power using zero emissions solar energy based power generation which helps to reduce GHG emissions and specific pollutants like SO_x, NO_x, and SPM associated with the conventional thermal power generation facilities.

- **Technological well-being:** The successful operation of project activity leads to promotion of solar 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.

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. As per section 3.4.3 *ENVIRONMENTAL IMPACTS FROM SOLAR FARMS*, the 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 same⁹.

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

As a part of continual improvement process, feedback from the associated stakeholders is vital, therefore a dedicated Visitor register cum grievance register has been placed at the project site (Security office at the main gate & plant office) which is accessible to stakeholders anytime to provide their feedback on the project. It is appropriate publicly accessible location at which local stakeholders can provide their feedback on the project. This location is also conducive to

⁹ <https://smartnet.niua.org/sites/default/files/resources/report-on-developmental-impacts-of-RE.pdf>

continuous and regular checks for stakeholder comments. For the global stakeholders, the suggestion and the grievance can be submitted to info@acme.in

Stakeholder meetings were organized at the time of registration of project activity in order to identify the major challenges around the area, stakeholders were invited well in advance through printed invitation, calls, meeting and a notice is placed around the local common areas. Various CSR activities around site are carried out. The stakeholder are also request to share their experiences and grievances on continuous basis. Registers is used to records the grievances and feedback.

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 in charge. The grievance copies have been submitted to VCS VVB.

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 activity involves the installation of Solar Power Projects. The total capacity of the project is 381.5 MW. The project is promoted by ACME Cleantech Solution Private Limited with its different group SPVs. The project activity is using solar energy to generate direct current (DC) using photovoltaic modules that converts into alternating current by inverters. The project activity instances under grouped project activity is grid connected and will install a new power plant (i.e. solar PV) at a site where no renewable power plant was operating prior to the implementation of the project activity (green-field plant). The generated electricity is being supplied to grid or uses grid network for captive or third party sale.

The project activity instances are small scale project activities (with power generation capacity less than 15 MW) and large scale project activities (with power generation capacity more than 15 MW). The Project activity follows AMS I.D. Version 18 or ACM0002 Version 17.0 based on scale of project activity instances.

The solar power generated from the Project is displacing the electricity generated from thermal power stations feeding into Indian grid and replacing the usage of diesel generators for meeting the power demand during shortage periods. Since, the solar power is Green House Gas (GHG) emissions free, the power generated prevent the anthropogenic GHG emissions generated by

the fossil fuel based thermal power stations comprising coal, diesel, furnace oil and gas. The estimation of GHG reductions by this project is limited to carbon dioxide (CO₂) only.

All project activity instances are photovoltaic (PV) plant/unit, the project activity instances would use solar energy to generate direct current from photo voltaic modules that will be converted into alternating current by inverters. The technical specifications of the plants are tabulated below:

The geo co-ordinates and the commissioning information of each instances of the project activity are mentioned in the table below

PP Name	MW	State	Project Location	Latitude (N)	Longitude (E)
Mihit Solar Power Private Ltd.	25	Punjab	Kherakhurd	29.66	75.26
Mihit Solar Power Private Ltd.	25	Punjab	Mankhera	29.59	75.24
Mihit Solar Power Private Ltd.	24	Punjab	Jandekalan	29.62	75.20
ACME Jaisalmer Solar Power Pvt. Ltd.	20	Andhra Pradesh	Raichotti	14.11	78.78
Aarohi Solar Pvt. Ltd.	50	Andhra Pradesh	Hindupur	13.98	77.48
Dayanidhi Solar Power Pvt. Ltd.	40	Andhra Pradesh	Shantipuram	12.88	78.38
Niranjana Solar Energy Pvt. Ltd.	20	Andhra Pradesh	Patthikonda	15.36	77.49
Vishwatma Solar Energy Pvt Ltd.	30	Andhra Pradesh	Yemmiganur	15.67	77.47
Acme Raipur Solar Power Pvt. Ltd.	30	Chattishgarh	Bagbera	21.12	82.48
Dayakara Solar Power Pvt Ltd	30	Telangana	Maddur	16.88	77.58
Grahati Solar Energy Pvt Ltd	50	Telangana	Balanagar	16.93	78.13
Acme Odisha Solar Power Pvt Ltd	25	Odisha	Balongir,	20.54	83.38
Eminent Solar Power Pvt Ltd.	12.5	Uttarakhand	Uddham Singh Nagar	29.2	79.1

Technical Specifications of the 11 project activity instances

1. Mihit Solar Power Private Ltd.

a) Mihit Solar Power Private Ltd kherakhurd 25 MW

Technical detail of the equipment	Remark
Technology	Photovoltaic cell Seasonal tilt 5&25
Solar photovoltaic module	250,255,260Wp Modules of make - BYD/TELESON
No. of modules	102792
Total Number of Invertors	29 Units
Transformer numbers and KVA ratings	11 T/F & 5 T/F-5KVA&5 T/F -4008KVA&1T/F-22500 KVA
Central inverters of nominal AC power, output KVA rating , make etc	SCHNIDER-680 KVA
Technical & Operational Lifetime	25 years

b) Mihit Solar Power Private Ltd. Mankhera 25 MW

Technical detail of the equipment	Remark
Technology	Polycrystalline modules, seasonal tilt (Oct to March- 25°, April to Sep- 5°)
Solar photovoltaic module	Talesun-255Wp Talesun-260 Wp BYD-250 Wp BYD-255Wp BYD-260 Wp
No. of modules	102912
Total Number of Invertors	29
Transformer numbers and KVA ratings	Power transformer: 22.5/25 MVA (1 Nos), Aux. Trafo: 100 KVA(1 Nos), Inv. Trafo.: 4080 KVA (5 Nos) Aux Trafo. ICR: 5 KVA (5 Nos)
Central inverters of nominal AC power, output KVA rating , make etc	680 KVA Conext Core XC series Make:- Schneider
Technical & Operational Lifetime	25 years

c) Mihit Solar Power Private Ltd. Jhandekalan 24 MW

Technical detail of the equipment	Remark
Technology	Polycrystalline modules on Seasonal Tilt 25 degree & 5 degree.
Solar photovoltaic module	Waree China - 250wp (37915 Nos.) Waree China - 255wp (1826 Nos.) Waree China - 260wp (4563 Nos.) Waree China - 265wp (182 Nos.) Waree India - 250wp (12750 Nos.) Waree India - 255wp (24492 Nos.) Waree India - 260wp (14400 Nos.) TELSUN - 260wp (3136 Nos.)

No. of modules	99264
Total Number of Invertors	19 Units
Transformer numbers and KVA ratings	Power transformer: 25000 KVA(1 Nos)-Make: Schneider Aux. Trafo: 100 KVA(1 Nos)-Make: GTB(Ludhiana) Inv. Trafo: 4000 KVA(5 Nos)-Make: Sudhir Aux. Trafo ICR: 5KVA(5 Nos)-Make: Shivalic
Central inverters of nominal AC power, output KVA rating , make etc	1000 KW, ABB - Total 12 Nos. 1000 KW, TBEA - Total 7 Nos.
Technical & Operational Lifetime	25 years

2. ACME Jaisalmer Solar Power Pvt. Ltd., Rayachoti (20 MW)

Technical detail of the equipment	Remark
Technology	Polycrystal modules on Seasonal Tilt at 3 degrees and 15 degrees
Solar photovoltaic module	250Wp Modules of make - BYD, 255Wp Modules of make -BYD, 260Wp Modules of make -BYD, 260Wp Modules of make - Talesun
No. of modules	99096
Total Number of Invertors	20 Units
Transformer numbers and KVA ratings	4 Nos - 4MVA, 2 Nos - 2MVA, 1Nos-100KVA
Central inverters of nominal AC power, output KVA rating , make etc	1MVA-ABB - 16Nos, 1MVA - TBEA - 4 Nos.
Technical & Operational Lifetime	25 years

3. Aarohi Solar Pvt. Ltd., Hindupur (50 MW)

Technical detail of the equipment	Remark
Technology	1)Thin film - CIS technology, 2)Crystalline.
Solar photovoltaic module	Thin film-165 Wp,170 Wp Modules of make - Solar Frontier. Crystalline - 265 Wp,270 Wp TALESON.
No. of modules	334752 No's
Total Number of Invertors	50 Units
Transformer numbers and KVA ratings	12-4MVA,1-2MVA,2-25MVA Power Trafo.
Central inverters of nominal AC power, output KVA rating , make etc	each 1 MVA ABB make inverters.
Technical & Operational Lifetime	25 years

4. Dayanidhi Solar Power Pvt. Ltd., Shanthipuram (40 MW)

Technical detail of the equipment	Remark
Technology	Poly Crystalline 3 Deg & 15 Deg (Seasonal Tilt)
Solar photovoltaic module	BYD,TALESUN(250W,255W,260W)
No. of modules	188232
Total Number of Invertors	38 No's (In operation), No's (Not in Operation) using As spare
Transformer numbers and KVA ratings	20MVA(2Power Trafo's),4 MVA (9 Trafo's) & 2 MVA (1

	Trafo),100KVA (2 Trafo's) Spare:- 2MVA(1 Trafo),100KVA(1Trafo)
Central inverters of nominal AC power, output KVA rating , make etc	ABB:-14 No's PVS 800-57-1000KW-C TBEA:-24NO's TBEA1000KH-M
Technical & Operational Lifetime	25 years

5. Niranjana Solar Energy Pvt. Ltd., Pathikonda (20 MW)

Technical detail of the equipment	Remark
Technology	Poly Crystalline modules on Seasonal Tilt at 3 & 15 degrees
Solar photovoltaic module	250,255&260 Wp Modules of make - BYD&Talesun
No. of modules	97872
Total Number of Invertors	20
Transformer numbers and KVA ratings	BO-15-455-1 ->2000KVA, BO-15-455-2 ->2000KVA, BO-15-454-1->4000KVA, BO-15-454-2 ->4000KVA, BO-15-454-3->4000KVA, BO-15-454-4 ->4000KVA,
Central inverters of nominal AC power, output KVA rating , make etc	Inverters -1000KW ,Make -ABB
Technical & Operational Lifetime	25 years

6. Vishwatma Solar Energy Pvt Ltd., Yemmiganur (30 MW)

Technical detail of the equipment	Remark
Technology	Polycrystalline modules silicon technology with seasonal Tilt at 3 and 15 degrees
Solar photovoltaic module	250,255 and 260 Wp Modules of make - BYD and TELESUN
No. of modules	143376
Total Number of Invertors	30 Units
Transformer numbers and KVA ratings	1 in no 30MVA,7 in no 4MVA,1 in no 2MVA and 1 in no 100KVA
Central inverters of nominal AC power, output KVA rating , make etc	1100KVA, 26 in no TBEA make and 4 in no ABB make
Technical & Operational Lifetime	25 years

7. Acme Raipur Solar Power Pvt. Ltd., Bagbera (30 MW)

Technical detail of the equipment	Remark
Technology	Thin Film-CdTe modules on variable Tilt at 5 Sep _ Apr and 21 Apr to Sep
Solar photovoltaic module	Talesun & BYD - 250,255 &260
No. of modules	118776
Total Number of Invertors	28
Transformer numbers and KVA ratings	Main Power transformer 1 Make ABB 25/30 MVA

Central inverters of nominal AC power, output KVA rating , make etc	24 ABB 1000KW & 6 SUNGRO 630KW Inverter Transformer Raychem RPG 6 nos. – 4MVA & 1 no. -2.5MVA
Technical & Operational Lifetime	25 years

8. Dayakara Solar Power Pvt Ltd., Maddur (30 MW)

Technical detail of the equipment	Remark
Technology	Poly Crystalline modules - Silicon technology on seasonol Tilt at 3 & 23 degrees
Solar photovoltaic module	250W, 255W` Wp Modules of make - BYD 255W, 260W, 265` Wp Modules of make - RISEN 260W, 265W` Wp Modules of make - SUNTECH 255W, 260W, 265W` Wp Modules of make TALESUN
No. of modules	1,49,256
Total Number of Invertors	30 Units
Transformer numbers and KVA ratings	30MVA - 1 No's, 4MVA- 7 No's, 2MVA- 1 No's, 100KVA - 1 No's
Central inverters of nominal AC power, output KVA rating , make etc	TMeiC - 1MW - 22 No's ABB Make - 1MW - 8 No's
Technical & Operational Lifetime	25 years

9. Grahati Solar Energy Pvt Ltd., Balanagar (50 MW)

Technical detail of the equipment	Remark
Technology	Solar Photo voltaic module modules on seasonal tilting
Solar photovoltaic module	250,255,260,265 Wp Modules of make - BYD,RISEN SUNTECH TALESUN
No. of modules	249648
Total Number of Invertors	50
Transformer numbers and KVA ratings	25MVA-2,4MVA-8,2MVA-8,1MVA-2,50KVA-2
Central inverters of nominal AC power, output KVA rating , make etc	380V 1000KW
Technical & Operational Lifetime	25 years

10. Acme Odisha Solar Power Pvt Ltd, Balongir, Odisha (25 MW)

Technical detail of the equipment	Remark
Technology	POLY CRYSTALLINE MODULE WITH SEASONAL TILTING (5,21 DEGREES)
Solar photovoltaic module	250,255 & 260 Wp module of trina solar

No. of modules	118992
Total Number of Invertors	37
Transformer numbers and KVA ratings	Inverter transformer: 9 nos (2720 KVA,380V/11kv) + 1 nos (700 KVA, 340V/11kv) Power transformer: 1 nos (25/30 MVA, 11kv/132kv)
Central inverters of nominal AC power, output KVA rating , make etc	33 nos of schneider (680kw, output: 380V)+ 4 nos of TBEA (630 kw,output:340V)
Technical & Operational Lifetime	25 years

11. Eminent Solar Power Pvt Ltd., Udham Singh Nagar District, Uttarakhand (12.5 MW)

Technical detail of the equipment	Remark
Technology	photovoltaic modules on Fixed Tilt at 15 degrees and 3 degrees
Solar photovoltaic module	260 Wp & 265 Wp Modules of make - Telsun
No. of modules	59256
Total Number of Invertors	12 Units
Transformer numbers and KVA ratings	2 x 4 MVA & 1 x 4.5 MVA
Central inverters of nominal AC power, output KVA rating , make etc	(380V AC,1.1 MWp,Inverter make:-TBEA)
Technical & Operational Lifetime	25 years

The respective project is running smoothly, there were no any instances occurred that would alter the GHG reductions, methodology applicability and monitoring procedure. The plant went for the schedule maintenance at regular intervals. There were zero breakdown subsequently no impact in emission reduction. There are also no changes to the project proponent.

3.2 Deviations

3.2.1 Methodology Deviations

No methodology deviation is applied during the monitoring period.

3.2.2 Project Description Deviations

No project descriptive deviation is applied during the monitoring period and during previous monitoring period.

3.3 Grouped Projects

The project activity is grouped project activity. However, no new project activity instances have been added in this grouped project during the current monitoring period. Thus original 11 project activity instances are part of current monitoring period.

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 11, April 2016
Value applied	0.9941
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per “Tool to calculate the emission factor for an electricity system, version 05.0.0” as 3-year generation weighted average using data for the years 2012-2013, 2013-2014 & 2014- 2015. The data are obtained from “CO ₂ Baseline Database for Indian Power Sector” version 11.0, published by the Central Electricity Authority, Ministry of Power, Government of India
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	EF _{grid,BM,y}
Data unit	tCO ₂ /MWh
Description	Build Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 11, April 2016
Value applied	0.9285
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per “Tool to calculate the emission factor for an electricity system, version 05.0.0” as 3-year generation weighted average using data for the years 2012-2013, 2013-2014 & 2014- 2015. The data are obtained from “CO ₂ Baseline Database for Indian Power Sector” version 11.0, 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 11, April 2016
Value applied	0.9777
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% Calculated as per “Tool to calculate the emission factor for an electricity system, version 05.0.0”. The data is obtained from “CO₂ Baseline Database for Indian Power Sector” Version 11, April 2016, 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.

4.2 Data and Parameters Monitored

Data / Parameter	EG _{facility,y}
Data unit	MWh
Description	Quantity of net electricity supplied (MWh) to the grid as a result of the implementation of the project activity instances in year y
Source of data	Credit note/ JMR/Form B reports/ monthly generation report from respective state electricity board/DISCOM
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 Calibration frequency: One in five years

	Electricity exported/imported to the grid is in kWh. However for the calculation purpose electricity exported 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, electricity imported from the grid obtained from joint meter reading certificates/credit notes issued by state electricity board as per below equation: $EG_{\text{facility},y} = EG_{\text{Export}} - EG_{\text{Import}}$ The joint reading at metering point is carried out once in a month in presence of O&M officials and state electricity board personnel. The calculations/measurement of net electricity supplied to grid is under purview of state electricity board and the PP/Project activity Instance owner has no role on it. PP/Project activity Instance owner gets value of net electricity supplied to grid and hence this parameter is mentioned as a part of monitoring plan. Cross Checking: Quantity of net electricity supplied to the grid can be cross checked from the invoices raised by the PP to the State Electricity Board or invoices with third party.
Frequency of monitoring/recording	Continuous monitoring and monthly recording
Value monitored	467,988.08
Monitoring equipment	Monitoring equipment are energy meters installed at each of the project activity instance site. Readings can be cross checked with back up meter. The accuracy class of meters, calibration frequency of meters is totally under purview of state electricity board and PP do not have any control on it. The meter details, make, calibration date, due date and respective accuracy class are mentioned in the APPENDIX 1: Calibration Records
QA/QC procedures to be applied	The calibration of all the meters are undertaken once in five years ¹⁰ and faulty meters are duly replaced immediately. The calibration details is being provided in APPENDIX 1: Calibration Records. The meters are of accuracy class 0.5s or higher. The

¹⁰ http://www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_2006.pdf

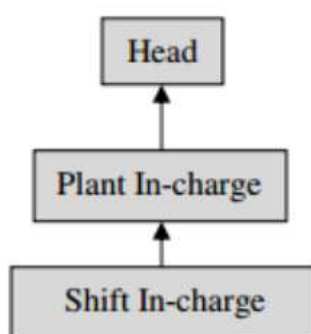
	meter accuracy class and calibration interval is under purview of state electricity board and PP/Project Activity Instances owner do not have any control on it. It is also noted that apportioning procedure (if applicable for project activity instances) is under control of state electricity board and PP do not have any control on it. The available parameter to PP/project activity instance owner is the net electricity supplied to grid and same parameter is mentioned as monitoring parameter.
Purpose of the data	The Data/Parameter is required to calculate the baseline emission.
Calculation method	The parameter is measured and if any calculation is required, the calculation is based on measured parameters.
Comments	Data is archived electronically for a period of 2 years beyond the end of crediting period

4.3 Monitoring Plan

The monitoring plan, which is implemented by the PP 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 results with the PP. PP follows the mentioned structure for data monitoring, collection, data archiving and calibration of equipments for this project activity instances. The team comprises of the following members:

Organisational Structure for Monitoring



PP has assigned the responsibility of operation and maintenance of project activity instances with relevant and authorized O&M contractors. The Plant In-charge and Shift In-Charge have been deployed by O&M contractors.

Responsibilities of Head: Overall functioning and maintenance of the data.

Responsibilities of Plant In-charge: Responsibility for Maintains the data records, ensures completeness of data, and reliability of data (calibration of equipments).

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

In the event when the individual verification period dates and billing cycle dates of the project activity do not coincide, then the electricity export will be apportioned based on number of days.

The ratio of number of days under monitoring period and total number of days under billing cycle will multiplied to total electricity export to billing cycle. No such event is applicable for current monitoring period.

For project activity instances which involves solar projects with common metering, apportioning is followed to determine net electricity export to grid. The apportioning procedure is not under control of PP, thus value of net electricity supplied to grid is available to PP and same is mentioned as monitoring parameter. The value of net electricity supplied to grid is used for ER calculations.

It is to be noted that the metering arrangement, accuracy class of meters, feeder arrangements, calibration frequency of meters are under control of state electricity board and PP do not have any control on it. Thus any deviation at actual site or during verification is accepted.

QA & QC Procedures to be followed

Necessary check meters as required have been installed, to operate in standby mode or when the main meters are not working. All meters are calibrated at least once in five year as per CEA notification. Records of calibration certificates are maintained for verification. Hence, high quality is ensured with the above parameters. The calibration of meters is under purview of state electricity board and CME/ project activity instances owner do not have any control on it.

Data Recording and Storage

For measuring the net energy supplied to grid by the project activity instances at the interconnection point, one set of Main meter and Check Meter is provided. Representatives of both project activity instances Owner and State Utility are present to record the monthly meter readings. The state utility prepares the credit report for the net energy supplied to the grid and same is used as a basic document for monitoring and verification of the net energy supplied to the grid. Based on the monthly credit report, the project activity instances Owner raise an invoice to the utility. Utility pays to the project activity instances Owner based on this document.

The above documents are kept at safe storage for verification of emission reductions generated from the project activity. The period of data storage will be 2 years beyond crediting period.

Emergency preparedness

The project activity does not result in any unidentified activity that can result in substantial emissions from the project activity. However, in case monitoring equipment get failed or is found faulty, they are replaced with calibrated meters as quickly as possible. In case main meter get failed or is found faulty, the reading of check meter will be considered.

Personnel training

In order to ensure a proper functioning of the project activity instances and a properly monitoring of emission reductions, the staff are trained. The Shift In-charge and Plant In-charge are trained in equipment operation, data recording, operation and maintenance and emergency procedures in compliance with the monitoring plant.

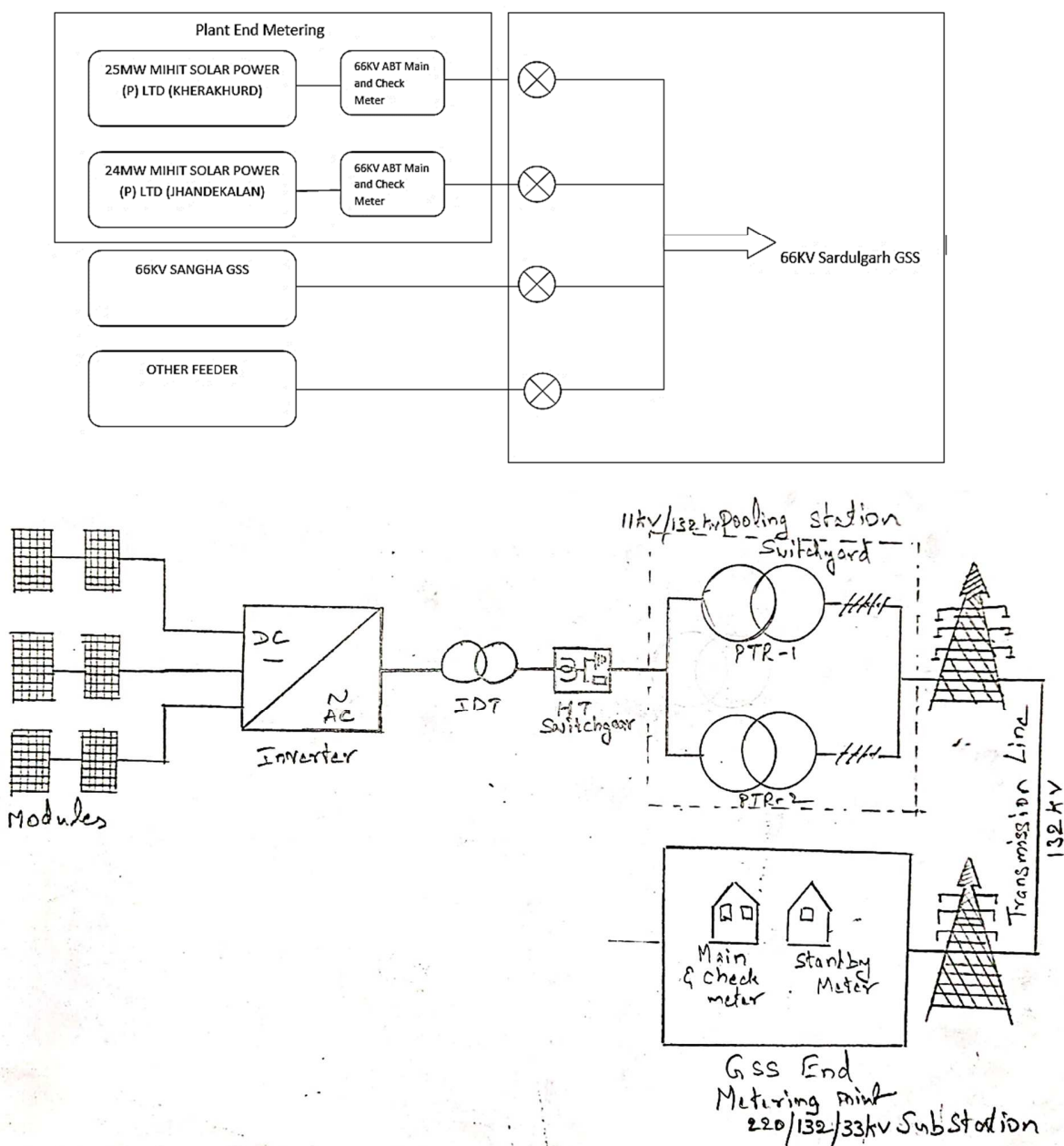


Figure 1. Metering block layout of the instances

For Punjab state projects (74 MW), the project activity meters are connected to 66 kV supply line (CT/PT connected to 66 kV/110 V) and for rest sites the solar plants are connected at 132 kV/33 kV substation.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The baseline emission calculation for the project activity instances is attributable to the CO₂ Emission that could have been produced by the fossil fuel based power plants in absence of the project activity. Therefore the amount electricity supplied to the Indian grid will be multiplied by the grid emission factor of Indian grid to calculate the baseline emissions reduced by the project activity.

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

Where,

BE_y	=	Baseline Emissions in year y; tCO ₂ e
$EG_{\text{facility},y}$	=	Quantity of net electricity supplied (MWh) to the grid as a result of the implementation of the project activity instances in year y (MWh)
$EF_{\text{grid},CM,y}$	=	CO ₂ emission factor of the grid in year y; tCO ₂ e/MWh

Thus,

$$\begin{aligned} BE_y &= 467,988.08 \times 0.9777 \\ &= 457,545 \text{ tCO}_2\text{e (round down values)} \end{aligned}$$

Note that above value of emissions is summation of rounded down for each SPV, thus overall value is less than simply multiplication of $467,988.08 \times 0.9777$.

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 is

$$ER_y = BE_y - PE_y - LE_y$$

Where,

ER_y = Emission Reduction in tCO₂/year

BE_y = Baseline emission in tCO₂/year

PE_y = Project emissions in tCO₂/year

LE_y = Leakage Emissions in tCO₂/year

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

$$BE_y = 457,545 \text{ tCO}_2\text{e}$$

$$PE_y = 0 \text{ tCO}_2\text{e}$$

$$LE_y = 0 \text{ tCO}_2\text{e}$$

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
01-January-2021 to 31-August-2021	457,545	0	0	457,545
Total	457,545	0	0	457,545

The actual emission reductions achieved is 457,545 tCO₂ which is 5.44% lower than estimated. The lower emission reduction achieved is justified due to lower generation in the current monitoring period.

SPV wise emission reduction are tabulated below:

SPVs	State	Capacity (MW)	Emission Reduction (tCO ₂ e)
Mihit Solar Power Private Ltd. 25 MW	Punjab	25	24323
Mihit Solar Power Private Ltd. 25 MW	Punjab	25	25000
Mihit Solar Power Private Ltd. 24 MW	Punjab	24	26241
ACME Jaisalmer Solar Power Pvt. Ltd.	Andhra Pradesh	20	25948
Aarohi Solar Pvt. Ltd.	Andhra Pradesh	50	62203
Dayanidhi Solar Power Pvt. Ltd.	Andhra Pradesh	40	50433
Niranjana Solar Energy Pvt. Ltd.	Andhra Pradesh	20	24363
Vishwatma Solar Energy Pvt Ltd.	Andhra	30	38318

	Pradesh		
Acme Raipur Solar Power Pvt. Ltd.	Chattishgarh	30	30841
Dayakara Solar Power Pvt Ltd	Telangana	30	39403
Grahati Solar Energy Pvt Ltd	Telangana	50	65783
Acme Odisha Solar Power Pvt Ltd	Odisha	25	30432
Eminent Solar Power Pvt Ltd.	Uttarakhand	12.5	14257
Total		381.5	457,545

APPENDIX 1: CALIBRATION RECORDS

The meter serial number (0.2 s Accuracy class) and their calibration dates project activity instances are as below.

PP Name	MW	State	Project Location	Main Meter serial number	Check Meter Serial Number	Stand By Meter if available	Calibration Date
Mihit Solar Power Private Ltd.	25	Punjab	Kherakhurd	PBB48607	PBB48608	NA	06-December-2016
							05-April-2019
Mihit Solar Power Private Ltd.	25	Punjab	Mankhera	PBB48603	PBB48604	NA	06-December-2016
							09-August-2018
							02-September-2019
Mihit Solar Power Private Ltd.	24	Punjab	Jandekalan	PBB48610	PBB48609	PBB48611	10-December-2015
							10-August-2020
ACME Jaisalmer Solar Power Pvt. Ltd.	20	Andhra Pradesh	Raichotti	APX00910 & APX00913	APX00911 & APX00914	APX00912 & APX00915	18-December-2019
Aarohi Solar Pvt. Ltd.	50	Andhra Pradesh	Hindupur	APX00584	APX00585	APX00586	29-December-2015
							19-September-2020
Dayanidhi Solar Power Pvt. Ltd.	40	Andhra Pradesh	Shantipuram	APX00604	APX00605	APX00600	28-March-2016
							16-September-2019
Niranjana Solar Energy Pvt. Ltd.	20	Andhra Pradesh	Patthikonda	15196518 & 15196512	15196519 & 15196521	15196516 & 15197462	19-March-2016
							26-February-2020
							15-June-2021
Vishwatma Solar Energy Pvt Ltd.	30	Andhra Pradesh	Yemmiganur	15197463	15197470	15196511	19-March-2016
							27-February-2020
							16-June-2021
Acme Raipur Solar Power Pvt. Ltd.	30	Chhattisgarh	Bagbera	Old Meter MSP54469	NA	NA	07-December-2015
				CSE52062	NA	NA	28-December-2019
Dayakara Solar Power Pvt Ltd	30	Telangana	Maddur	APX00907	APX00908	APX00909	31-May-2016
							05-February-2020
							02-September-2021
Grahati Solar Energy Pvt Ltd	50	Telangana	Balanagar	APX00971	APX00972	APX00973	19-July-2016
							05-September-2020
Acme Odisha Solar Power Pvt Ltd	25	Odisha	Balongir	OPT01170	OPT01399	NA	24-June-2016
							16-October-2019
Eminent Solar Power Pvt Ltd.	12.5	Uttarakhand	Uddham Singh Nagar	UKD02407	UKD02412	NA	09-February-2017
							01-November-2019

The calibration frequency of the energy meters are once in five year. Hence, these calibrations are still valid during the current monitoring period. As a result, error factor is not applicable to the generation data.

For Punjab state projects (74 MW), the project activity meters are connected to 66 kV supply line (CT/PT connected to 66 kV/110 V) and for rest sites the solar plants are connected at 132 kV/33 kV substation.