



**Verified Carbon
Standard**

VCS GROUPED PROJECT FOR RENEWABLE POWER GENERATION BY ESSEL MINING AND INDUSTRIES LIMITED



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

Essel Mining & Industries Limited (EMIL) and their group companies (hereafter referred as “project proponent”) have installed Renewable Energy Power Plants based on solar photovoltaic (PV) technology (hereafter referred as “proposed project activity”) at various locations across India as a grouped project activity. EMIL is looking forward to earn carbon credits under VCS mechanism for these solar PV based power plants.

The objective of the grouped project activity is to develop a platform for reducing VCS Registration timelines and process costs for registration of individual projects under VCS.

The grouped project activity supports development of renewable energy generation plants based on Solar PV technology in India and delivering electricity to the grid. Each instance of project activity under this grouped project consists of one or more renewable power generation plant using solar PV technology. The proposed grouped project is a voluntary action being undertaken by EMIL. All the project activity instances being included in the proposed grouped project are owned by EMIL (or their group companies) who is also acting as Coordinating and Managing entity for the Grouped Project activity.

The renewable energy generation plants under the grouped project activity generates Solar PV based electricity, which otherwise in absence of project activity would have been generated from fossil fuel fired grid connected power plants. The grouped project activity thus leads to reduction in Greenhouse Gas (GHG) emissions.

All the project instances i.e. renewable energy generation plants to be included in this grouped project are from within India only. Hence the location and geographical boundary of the grouped project can be defined as India. The estimated annual emission reductions over a 10 year period from initial five project activity instances and additional six project activity instances are 247,123 tCO₂e/year.

Following five project activity instances are being included in the grouped project at the time of registration:

Project activity instances	Project Owner	Title of the project activity	Location	Date of Commissioning	Estimated Annual Average ERs over a 10 year

					period
Instance – 1	Essel Mining and Industries Limited	VCS Project for Solar Power Plant at Bhadla, Rajasthan	Bhadla Solar Park, Village – Bhadla, Tehsil – Bap, District – Jodhpur, Rajasthan India	12-March-2014	29,270
Instance – 2		VCS Project for Solar Power plant at Achampet, Telagana	5 MW Solar Power Plant, Achampet Village and Mandal, Dist. Mehaboobnagar,	07-July-2014	7,171
Instance – 3		VCS Project for Solar Power Plant at Kalwakurthy, Dist. Mehabubnagar, Telangana	Ternikal Village, KalwakurthyMandal, Dist. Mehaboobnagar, Telangana, India.	30-June-2014	14,524
Instance – 4		VCS Project for Solar Power Plant at Salakpur, Telangana	Village: Salakpur District: Warangal State:	17-September-2014	14,240

		Telangana, India		
Instance – 5	VCS Project for Solar Power Plant at Alladurg, Telangana	Village: Bhiaramdhibba District: Medak State: Telangana, India	28-July-2014	14,679

Since the project activity is grouped project activity, more project activity instances can be included in grouped project activity in future. During first verification period, following project instances are being added. These new instances will also be grid connected solar power plants generating renewable power (for ACM0002 and AMS I.D) or Project displaces grid electricity consumption (e.g. grid import) and/or captive fossil fuel electricity generation at the user end (excess electricity may be supplied to a grid) (for AMS I.F) and will contribute to GHG emission reductions. The new project activity instances eligibility criteria have been discussed in below section.

The details of new project activity instances are as below:

Project activity instances	Project Owner	Title of the project activity	Location	Date of Commissioning	Estimated Annual Average ERs over a 10 year period
Instance – 6	Aditya Birla Solar Limited	VCS Project for Solar Power Plant at Karnataka	Village: Bellatti, Shirahatti District: Gadag State: Karnataka, India	11-May-2017	36,410
	Aditya Birla		Village: Chandargi	12-May-2017	36,513

	Solar Limited		, Kaktol, Ramadurg Taluk District: Belagavi, State: Karnataka, India		
	Aditya Birla Solar Limited		Village: Mulbangal, District: Kolar State: Karnataka, India	13-October-2017	36,599
	Aditya Birla Renewables limited		Village: Devar Nimbargi, District: Vijayapura State: Karnataka, India	26-March-2018	26,460
Instance – 7	Aditya Birla Renewables SPV 1 Limited	VCS Project for Solar Power Plant at Vijaypur	Village: DevarNimbargi, District: Vijayapura State: Karnataka, India	26-Mar-2018	10,525
Instance – 8	Aditya Birla Renewables SPV 1 Limited	VCS Project for Solar Power Plant at Hotgi, Maharashtra	Village: Hotgi, Tal South Solapur District:	20-June-2018	1,432

			Solapur State: Maharashtra, India		
Instance – 9		VCS Project for Solar Power Plant at Gotan, Rajasthan, India	Village: KhariaKhanagar, Tehsil: Bhopalgarh District: Jodhpur State: Rajasthan, India	01-Feb-2018	8,956
Instance – 10	Aditya Birla Renewables SPV 1 Limited	VCS Project for Solar Power Plant at Sevagram, Gujarat	Village: Sevagram, Tal- Abdasa District: Kutch State: Gujarat, India	14-Aug-2018	8,956
Instance – 11	Aditya Birla Renewables SPV 1 Limited	VCS Project for Solar Power Plant at Pune, Maharashtra	Village: Peth, Tal Havelim Dist Pune, Maharashtra, India	01-Feb-2018	1,388

Start date is 12-March-2014 (commissioning date of first project instance)

Details of the project activity instances are as follows;

Project activity instances	Title of the project activity	Location	Project Capacity	Commissioning Date
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Instance – 1 Bhadla	VCS Project for Solar Power Plant at Bhadla, Rajasthan	Bhadla Solar Park, Village – Bhadla, Tehsil – Bap, District – Jodhpur, Rajasthan India	20 MW	12-March-2014
Instance – 2 Achampet	VCS Project for Solar Power plant at Achampet, Telangana	5 MW Solar Power Plant, Achampet Village and Mandal, Dist. Mehaboobnagar, Telangana, India.	5 MW	07-July-2014
Instance – 3 Kalwakurthy	VCS Project for Solar Power Plant at Kalwakurthy, Dist. Mehabubnagar, Telangana	Ternikal Village, KalwakurthyMandal, Dist. Mehaboobnagar, Telangana, India.	10 MW	30-June-2014
Instance – 4 Salakpur	VCS Project for Solar Power Plant at Salakpur, Telangana	Village: Salakpur District: Warangal State: Telangana, India	10 MW	17-September-2014
Instance – 5 Alladurg	VCS Project for Solar Power Plant at Alladurg, Telangana	Village: Bhiaramdhibba District: Medak State: Telangana, India	10 MW	28-July-2014
Instance – 6 Karnataka	VCS Project for Solar Power Plant at Karnataka	Village: Bellatti, Shirahatti District: Gadag State: Karnataka, India	20 MW	11-May-2017
		Village: Chandargi, Kaktol, Ramadurg Taluk District: Belagavi	20 MW	12-May-2017

		State: Karnataka, India		
		Village: Mulbangal, District: Kolar State: Karnataka, India	20 MW	13-October-2017
		Village: DevarNimbargi, District: Vijayapura State: Karnataka, India	17 MW	26-March-2018
Instance – 7 Bijapur	VCS Project for Solar Power Plant at Vijaypur	Village: DevarNimbargi, District: Vijayapura State: Karnataka, India	6.8 MW	26-March-2018
Instance – 8 Hotgi	VCS Project for Solar Power Plant at Hotgi, Maharashtra	Village: Hotgi, Tal South Solapur District: Solapur State: Maharashtra, India	0.8 MW	20-June-2018
Instance – 9 Gotan	VCS Project for Solar Power Plant at Gotan, Rajasthan, India	Village: KhariaKhargar, Tehsil: Bhopalgarh District: Jodhpur State: Rajasthan, India	5 MW	01-February-2018
Instance – 10 Gujarat	VCS Project for Solar Power Plant at Sevagram, Gujrat	Village: Sevagram, Tal- Abdasa District: Kutch State: Gujarat, India	5 MW	14-August-2018
Instance – 11 Pune	VCS Project for Solar Power Plant at Pune, Maharashtra	Village: Peth District: Pune State: Maharashtra, India	0.8 MW	01-February-2018

The respective project promoter signed operation and maintenance agreements with the O & M contractor of the solar power projects. The performance of the PV plant, safety in operation and scheduled / breakdown maintenances is the responsibility of O & M contractor

and are organized and monitored by them, hence the authority and responsibility of project management on site lies with the O & M contractor maintains all the data / records for the project monitoring.

Pre project scenario

There was no power generation activity at the project site prior to implementation of the project activity instances. Therefore, in the absence of the proposed project activity instances, the equivalent amount of electricity would have been generated from the connected/new power plants in the grid, while project activity instances in the proposed grouped project are green field projects. Therein, the main emission source in the pre-project scenario is the power plants connected to the grid and the primary GHG involved is CO₂.

The amount of actual emission reductions generated in this monitoring period are 272,745 tCO₂e

1.2 Sectoral Scope and Project Type

The project activity under consideration is a grouped project activity. The project activity instances as part of the grouped project will have following sectoral scope, project type and methodologies:

Sectoral Scope Applicable to project: 01 – Energy Industries (renewable/non-renewable Sources)

Project Type: I – Renewable Energy Projects

For Large Scale Project activity instances as per CDM terminology i.e. project activity instances with capacity more than 15 MW: (ACM0002) Grid-connected electricity generation from renewable sources (Version 16.0) (EB 81, Annex 9)

Web-link:

<http://cdm.unfccc.int/methodologies/DB/EY2CL7RTEHRC9V6YQHLAR6MJ6VEU83>

For small scale project activity instances as per CDM terminology i.e. project activity instances with capacity less than 15 MW: (AMS-I.D) Grid connected renewable electricity generation (Version 18.0) (EB 81, Annex 24).

Web-link:

<http://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK>

For small scale project activity instances as per CDM terminology i.e. project activity instances with capacity less than 15 MW: AMS-I.F.: Renewable electricity generation for captive use and mini-grid --- Version 3.0

Web link:

<http://cdm.unfccc.int/methodologies/DB/9KJWQ1G0WEG6LKHX21MLPS8BQR7242>

1.3 Project Proponent

Organization name	Essel Mining and Industries Limited¹
Contact person	Surajit Chanda
Title	Authorized Signatory
Address	4C, Aditya Birla Centre, SK Ahire Marg, Mumbai – 400 030 (Maharashtra) INDIA
Telephone	+91-9873722454
Email	Surajit.chanda@adityabirla.com

1.4 Other Entities Involved in the Project

Organization name	Aditya Birla Solar Limited
Contact person	Surajit Chanda
Title	Authorized Signatory
Address	4C, Aditya Birla Centre, SK Ahire Marg, Mumbai – 400 030 (Maharashtra) INDIA
Telephone	+91-9873722454
Email	Surajit.chanda@adityabirla.com

Organization name	Aditya Birla Renewables Limited
Contact person	Surajit Chanda
Title	Authorized Signatory
Address	4C, Aditya Birla Centre, SK Ahire Marg, Mumbai – 400 030 (Maharashtra) INDIA
Telephone	+91-9873722454
Email	Surajit.chanda@adityabirla.com

Organization name	Aditya Birla Renewables SPV 1 Limited
Contact person	Surajit Chanda

¹This organization is acting as PP for all project activity instances. However the owner of each project activity instances is mentioned in the PD. Along with Essel Mining & Industries Limited, the other owners are Aditya Birla Solar Limited, Aditya Birla Renewables Limited and Aditya Birla Renewables SPV 1 Limited.

Title	Authorized Signatory
Address	4C, Aditya Birla Centre, SK Ahire Marg, Mumbai – 400 030 (Maharashtra) INDIA
Telephone	+91-9873722454
Email	Surajit.chanda@adityabirla.com

Organization name	EKI Energy Services Limited
Role in the Project	Project Consultant
Contact person	Pankaj Rajpoot
Title	Project Manager
Address	EnKing Embassy, Office No 201, Plot 48, Scheme 78, Part 2, Vijay Nagar, Indore- 452010, Madhya Pradesh, India.
Telephone	+91-7828347589
Email	pankaj@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 12-March-2014 at Bhadla in District Jodhpur (project instance 1) in the state of Rajasthan in India. Hence the project start date is defined as follows:

Project start date: **12-March-2014**.

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 crediting period is 12-March-2014 and end date will be 11-March-2024.

1.7 Project Location

All the project activity instances in the proposed 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 follows:

North: 33.24902°N 76.82704°E

South: 6.74678°N 93.84260°E

East: 27.12622°N 97.16712°E

West: 23.71307°N 68.03215°E

The map is as indicated in the following figure.



The geographic boundaries, geo-coordinates for project activity instance included in the grouped project activity are as follows:

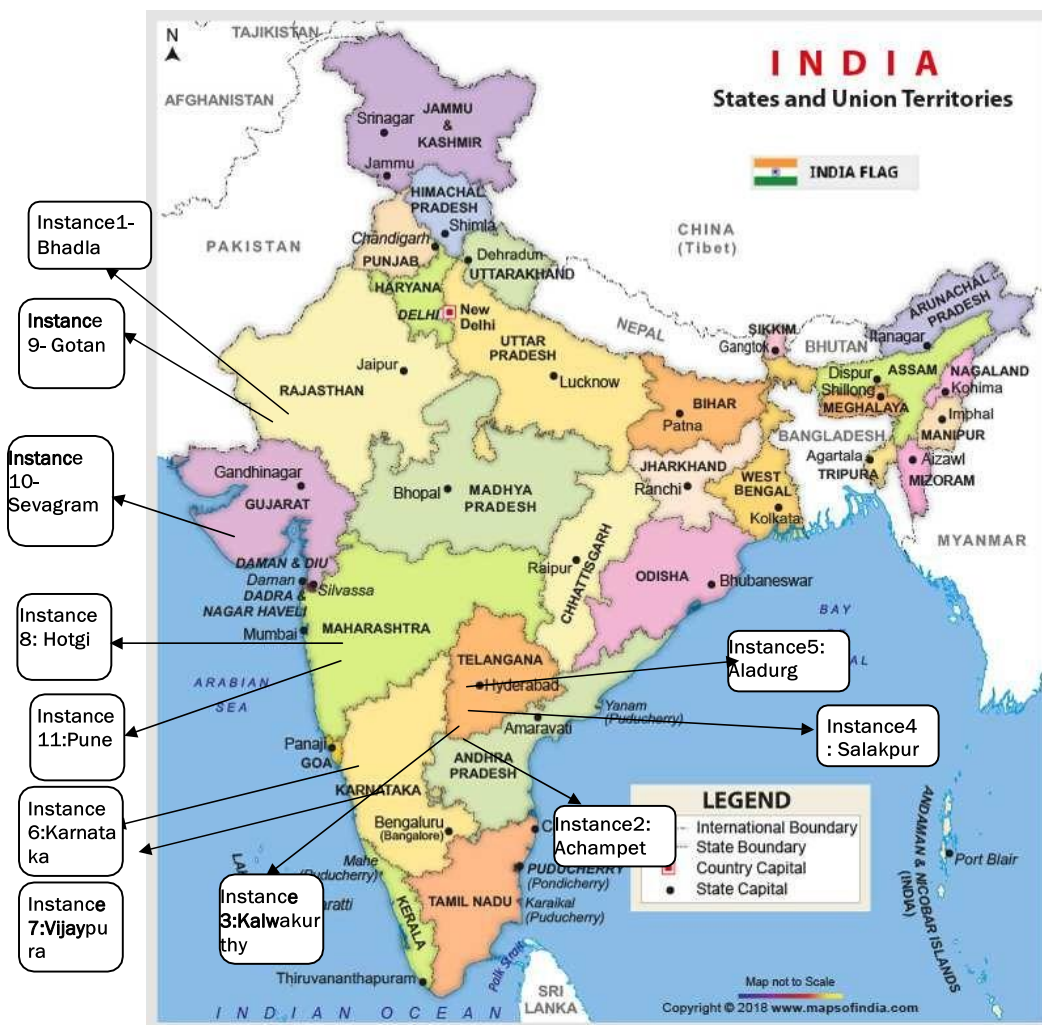
Project activity instances	Title of the project activity	Location	Project Owner	Geo Coordinates
Instance – 1 Bhadla	VCS Project for Solar Power Plant at	Bhadla Solar Park, Village –Bhadla, Tehsil – Bap, District – Jodhpur,		Latitude: 27.561° N Longitude: 71.929° E

	Bhadla, Rajasthan	Rajasthan India		
Instance – 2 Achampet	VCS Project for Solar Power plant at Achampet, Telagana	5 MW Solar Power Plant, Achampet Village and Mandal, Dist. Mehaboobnagar, Telangana, India.		Latitude: 16.4 ⁰ N Longitude: 78.6 ⁰ E
Instance – 3 Kalwakurthy	VCS Project for Solar Power Plant at Kalwakurthy, Dist. Mehabubnagar, Telangana	Ternikal Village, KalwakurthyManda l, Dist. Mehaboobnagar, Telangana, India.	Essel Mining and Industries Ltd.	Latitude: 16.7 ⁰ N Longitude: 78.5 ⁰ E
Instance – 4 Salakpur	VCS Project for Solar Power Plant at Salakpur, Telangana	Village: Salakpur District: Warangal State: Telangana, India		Latitude: 17.89 ⁰ N Longitude: 79.05 ⁰ E
Instance – 5 Alladurg	VCS Project for Solar Power Plant at Alladurg, Telangana	Village: Bhiaramdhibba District: Medak State: Telangana, India		Latitude: 17.94 ⁰ N Longitude: 77.92 ⁰ E
Instance – 6 Karnataka	VCS Project for Solar Power Plant at Karnataka	Village: Bellatti, Shirahatti District: Gadag State: Karnataka, India	Aditya Birla Solar Limited	Latitude 15.09 ⁰ N , Longitude: 75.623 ⁰ E
		Village: Chandargi, Kaktol, Ramadurg Taluk District: BelagaviState: Karnataka, India		Latitude: 16.021 ⁰ N, Longitude: 75.127 ⁰ E

		Village: Mulbangal, District: Kolar State: Karnataka, India	Aditya Birla Solar Limited	Latitude:13°05'04.4" N, Longitude:78°17'28 .8" E
		Village: DevarNimbargi, District: Vijayapura State: Karnataka, India	Aditya Birla Renewable s Limited	Latitude:17.250426 °N , Longitude:75.660746° E
Instance – 7 Bijapur	VCS Project for Solar Power Plant at Vijaypur	Village: DevarNimbargi, District: Vijayapura State:Karnataka , India	Aditya Birla Renewable s SPV 1 Limited	Latitude:17.250426 °N Longitude: 75.660746°E
Instance – 8 Hotgi	VCS Project for Solar Power Plant at Hotgi, Maharashtra	Village: Hotgi, Tal South Solapur District: Solapur State: Maharashtra, India		Latitude:17.55953712° N Longitude:76.0021 4484°E
Instance – 9 Gotan	VCS Project for Solar Power Plant at Gotan, Rajasthan, India	Village: KhariaKhangar, Tehsil: Bhopalgarh District: Jodhpur State: Rajasthan, India		Latitude:26° 36' 25" N, Longitude:73° 41' 33"E
Instance – 10 Sevagram	VCS Project for Solar Power Plant at Sevagram, Gujrat	Village: Sevagram, Tal- AbdasaDistric t: Kutch State:Gujarat, India	Aditya Birla Renewable	Latitude:23° 25' 44.55" N, Longitude:68° 42' 13.17"
Instance – 11	VCS Project for Solar Power Plant at	Village: Peth, Tal Haveli, Dist Pune, Maharashtra,		Latitude: 18.494475°N , Longitude:74.0970 218°E

Pune	Pune, Maharashtra	India	s SPV 1 Limited	
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These project activity instances can be represented on the map as follows:



1.8 Title and Reference of Methodology

The project activity instances as part of the proposed grouped project activity will be either small scale project activity instances with power generation capacity less than 15 MW or large scale project activity instances with power generation capacity more than 15 MW as per CDM terminology. Accordingly one of the following methodologies will be used for each of the project activity instance based on its capacity.

For Small Scale Project Activity Instances (including instance – 2 to 5 and instance 7):

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; EB 81

Reference: CDM Methodologies:

<http://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK>

For Small Scale Project Activity Instances (including instance – 8 to 11):

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.F

Project Type: Type-I: Renewable Energy Projects

Title: Renewable electricity generation for captive use and mini-grid

Version No.: Version 3; EB 81

Reference: CDM Methodologies:

<http://cdm.unfccc.int/methodologies/DB/9KJWQ1G0WEG6LKHX21MLPS8BQR7242>

The methodology refers to following CDM Tools:

- Tool to calculate emission factor for an electricity system (Version 05.0) (<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v5.0.pdf>)
- Tool to calculate project or leakage CO2 emissions from fossil fuel combustion (Version 02) (<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf>)
- Tool to determine the remaining lifetime of equipment (Version 01) (<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-10-v1.pdf>)
- Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period (Version 03.0.1) (<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf>)

For Large Scale Project Activity Instances (including instance – 1 and 6):

The methodology for large scale project activity instances will be the 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 16; EB 81

Reference: CDM Methodology:

<http://cdm.unfccc.int/methodologies/DB/EY2CL7RTEHRC9V6YQHLAR6MJ6VEU83>

The methodology refers to following CDM Tools:

- Tool for the demonstration and assessment of additionality (Version 07.0.0) (<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>)
- Combined tool to identify the baseline scenario and demonstrate additionality (Version 06.0) (<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-02-v6.0.pdf>)
- Tool to calculate project or leakage CO2 emissions from fossil fuel combustion (Version 02) (<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf>)
- Tool to calculate emission factor for an electricity system (Version 05.0) (<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v5.0.pdf>)
- Tool to determine the remaining lifetime of equipment (Version 01) (<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-10-v1.pdf>)
- Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period (Version 03.0.1) (<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf>)

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

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

However it can be crosschecked that PP is not claiming REC benefits, the same can be verified with the REC accreditation body of India²

1.11 Sustainable Development

The grouped project activity as a whole would contribute towards sustainable development of the host country India. The key sustainable development benefits because of the grouped project are outlined as follows:

Social Well-being: Installation of the project generates direct and indirect employment opportunities in the nearby areas of the project sites. Generation of employment opportunities helps in poverty alleviation, improvement in standard of living etc. of nearby communities hence contributing towards social well-being of local communities.

Environmental Well-being: Each of the individual plants under the project activity generates renewable electricity through solar PV based power generation system. Use of solar PV technology for electricity generation does not emit any GHG emissions. In the absence of project activity the equivalent amount of electricity would be generated through grid connected fossil fuel fired power plants, thereby leading to increase in GHG and other SO_x, NO_x emissions. As such it is implied that the proposed grouped project would not generate any negative environmental footprint hence leading to environmental well-being.

Economic well-being: Installation and operation of project activity instances as part of the grouped project creates employment and business opportunities hence contributing towards economic well-being of the local communities.

Technological well-being: Power generation through solar PV technology is environmentally safe and sound technology. Also there are no harmful emissions while operation of the plant. Hence this technology is amongst the cleanest sources of power generation among the other power generation technologies available in the country. The project activity helps in diffusion of the cleaner technology in the country for power generation. This will lead to technological wellbeing in power generation sector in India.

2 SAFEGUARDS

²https://www.recregistryindia.nic.in/index.php/publics/accredited_regens

2.1 No Net Harm

The project activity does not cause any harm to the local ecology. It primarily requires the installation of the Solar PV project, interfacing the generators with the State Electricity Board by setting up HT transmission lines and installation of other accessories.

Also as per the Central Pollution Control Board of India notification⁵ Solar PV project falls under White Category and are practically non-polluting.

However, there are no negative impacts on air, water, soil quality and ambience are envisaged due to the project activity.

2.2 Local Stakeholder Consultation

As a part of ongoing communication, a grievance register on the project sites have been placed so that the local stake-holder can put their concerns and suggestions

The Grievances received during the current Monitoring Period has been mentioned below:

S.No	Instance Number	Comment/Grievance Received	Date	Action Taken	Date	Result
1	Instance – 5 Alladurg	Improper water management at site leads to shortage of drinking water	20-March-2020	Designated RO were installed only for sole water in drinking purpose	22-March-2020	Issue resolved
2	Instance-8 Hotgi	Improper garden management at the site	28-April-2020	A gardener was hired to take care of the garden Proper	30-April-2020	Issue resolved
3	Instance-9 Gotan	Shortage of additional help	21-August-2020	Additional helper boy was hired to ensure the proper help given	25-August-2020	Issue resolved

				to the employees		
4	Instance – 10 Sevagram	No proper street lighting facility on the way to the site	10-January -2021	street lighting were constructed on the side ways of the road	18-January -2021	Issue resolved
5	Instance – 11 Pune	Roads to the Site are illegitimate	23-March-2021	Proper roads were made to the site	28-March-2021	Issue resolved

2.3 AFOLU-Specific Safeguards

Not Applicable

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project activity is a grouped project activity in which various project instances are the part of this grouped project activity. These project activity instances involves installation of renewable electricity generation projects based on Solar PV technology. The project activity instances will be either small scale project activities (with power generation capacity less than 15 MW) or large scale project activities (with power generation capacity more than 15 MW). All the project activity instances would be connected to the grid and power generated would be dispatched to the grid.

Under the proposed grouped project activity installation of solar PV based power plant and generation of renewable electricity will replace the equivalent amount of electricity generated through other grid connected fossil fuel fired power plants. The project activity thus will lead to reduction in an equivalent amount of GHG emissions.

For the captive projects, the project participant establish the project activity because of associated environment benefits. The project proponent would be using the electricity directly from the grid if not for the installation of solar PV based power plant for the captive usage. Hence through utilization of renewable power, the project activity would be displacing equivalent quantum of grid electricity which would otherwise be generated from fossil fuel dominated grid.

As per the guidelines provide by MNRE2; the capacity of a solar PV power plant is defined as “Maximum Power Output (AC) from the Solar Power Plant which can be scheduled at the point of Injection to the GRID during any time block of the day”. There is no technology transfer involved in the proposed grouped project activity.

Technical specifications of above project activity instances are as follows:

Project activity instances	Capacity	PV Modules	Inverters
Instance – 1 Bhadla	20 MW	36,288 nos. (245 Wp each) 52,488 nos. (250 Wp each) Manufactured by CSun	30 nos.(680 kVA each) Manufactured by Schneider
Instance – 2 Achampet	5 MW	18,340 nos. (300 Wp each) Manufactured by CSun	7 nos, (860 kVA each) Manufactured by Schneider Electric
Instance – 3 Kalwakurthy	10 MW	37,940 nos. (290 Wp each) Manufactured by CSun	14 nos, (680 kVA each) Manufactured by Schneider Electric
Instance – 4 Salakpur	10 MW	36,680 nos. (300 Wp each) Manufactured by YINGLI	14 nos, Manufactured by Schneider Electric of capacity 680 kVA each
Instance – 5 Alladurg	10 MW	36,680 nos. (300 Wp each) Manufactured by CSUN	14 nos, (680 KVA) Manufactured by Schneider Electric
Instance – 6 Karnataka	20 MW	69,800 nos. (320/315 Wp each) Make Seraphim	30 nos. Schnidler make (680KVA)
	20 MW	69,760 nos. (320/315 Wp each) Make Seraphim	30 nos. Schnidler make (680VA)
	20 MW	70,040 nos. (320/315 Wp each) Make Seraphim	30 nos. Schnidler make (680KVA)
	17 MW	87,120 nos. (78,360- 320 Wp)	20 nos. Schnidler make (680KVA)

Instance – 7 Vijaypur	6.8 MW	8,760-315 Wp each, Make Znshine Solar	10 nos. Schnidler make (680KVA)
Instance – 8 Hotgi	0.8 MW	3,000 nos. (320 Wp each) Make Canadian solar	10 invertors, Deltaww
Instance – 9 Gotan	5 MW	Total 18,340, 8090- 325 Wp/ 10250- 330 Wp), Make- Canadian Solar	5 Invertors (Make- ABB Ltd) 1 MW each
Instance – 10 Sevagram	5 MW	15,520 nos. (320 Wp each) Make Emmvee	4 Invertors, TMEIC make
Instance – 11 Pune	0.8 MW	3,000 nos. (320 Wp each) Make Canadian solar	10 invertors, Deltaww

As per the page number 28 of registered Instance -1 – Bhadla is the large scale project activity instance being included in the grouped project activity. Accordingly, the percentage share of total installed capacity of solar PV technology in India is 1.44% which is less than two percent, hence this project activity instance is also automatically additional.

As per CDM Tool for demonstration of additionality for small scale project activities, solar PV projects with capacity upto 15 MW fall in positive list of technologies termed as automatically additional.

Hence four project instances:

Instance – 2: Achampet,

Instance – 3: Kalwakurthy,

Instance – 4: Salakpur

Instance – 5: Alladurg

Instance – 7: Vijaypur are automatically additional

For instance 6 (Vijaypura 17MW), the PLF achieved at the time of registration was 18.1% but during the current monitoring period, the PLF achieved is 20%. The achieved PLF of 20% does not breach the benchmark and hence the higher emission reduction achieved is considerable.

During the current monitoring period, there has been no negative events impacted the GHG emission reductions.

There has been no changes to project participant or the monitoring plan in the current monitoring period.

3.2 Deviations

2.3.1 Methodology Deviations

There is no methodology deviation

2.3.2 Project Description Deviations

There is no Project Description deviation

3.3 Grouped Projects

No new instances have been added for this grouped project activity during the current verification period.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	EF_{CO2,grid,y}
Data unit	tCO ₂ /MWh
Description	Combined margin emission factor for National Grid in year y for the proposed grouped project activity
Source of data	The combined margin emission factor is calculated using following formula: $EF_{Grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$
Value applied	0.9770 for NEWNE grid and 0.9817 for Southern grid
Justification of choice of data or description of measurement methods and procedures applied	This is in accordance with applicable methodologies – AMS.I.D (version 18.0), ACM0002 (version 16.0) and AMS I.F (Version 03) along with Tool to calculate the emission factor for an electricity system (version 05.0).
Purpose of Data	For the calculation of the Baseline Emission
Comments	The combined margin emission factor for respective projects are applied depending on which grid they operate in.

4.2 Data and Parameters Monitored

Data / Parameter	EG_{PJ,facility,y}
Data unit	MWh
Description	Net electricity supplied to the grid by the project activity instance during the year y (for AMS I.D and ACM002 component)
Source of data	The quantity of net electricity supplied by the project activity to the grid (i.e. Net export in kWh) is taken from monthly “Joint Meter Reading” report which contains monthly energy meter reading
Description of measurement methods and procedures to be applied	Net electricity supplied to the Grid is calculated based on the measured values of “export” and “import” on the meter at the delivery point, where monthly joint meter reading is taken.
Frequency of monitoring/recording	Continuous measurement & monthly recording
Value monitored	Estimated values of net electricity supplied to grid will be monitored for each of the project activity instance separately. Following are values for all project activity instances: 1. Project Activity Instance- 1 – 41,013 2. Project Activity Instance- 2 – 9,105 3. Project Activity Instance- 3 –18,794 4. Project Activity Instance- 4 – 17,089 5. Project Activity Instance- 5 – 16,582 6. Project Activity Instance- 6 – 142,237 7. Project Activity Instance- 7 –12,786 8. Project Activity Instance- 8 – 1,315 9. Project Activity Instance- 9 – 8,958 10. Project Activity Instance- 10 – 8,795 11. Project Activity Instance- 11 – 1,548
Monitoring equipment	Monitoring equipment will be energy meter installed at each of the project activity instance site. Readings will be cross checked with Invoices.
QA/QC procedures to be applied	The measurement of the electricity generated will be jointly recorded by respective power distribution company and project participants. This value is treated as the accurate and final measurement of the energy supplied to Grid by the power

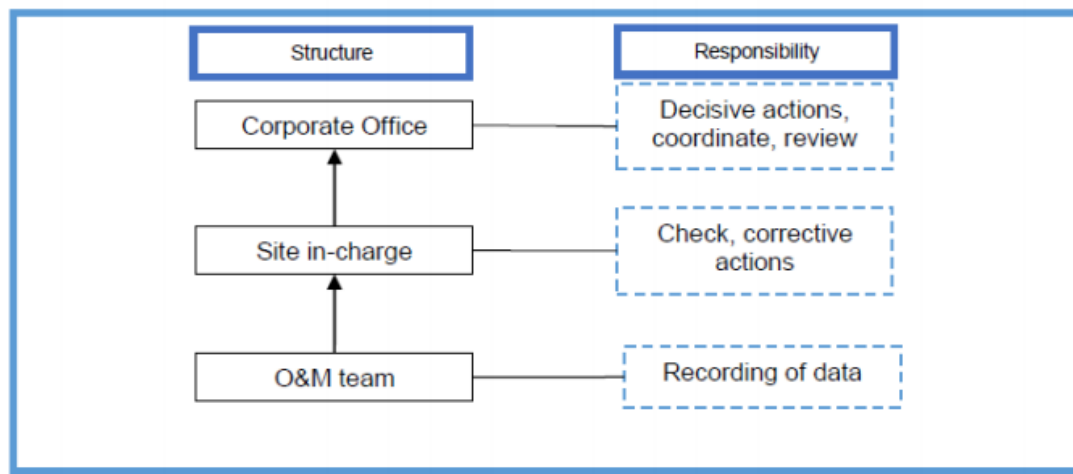
	producer. The meters are installed at the delivery point to grid. All meters shall be calibrated as described in the Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006. These regulations describe of calibration of meters to be done at least once in five years.
.Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	The monitored data will be archived electronically by the project proponent for the period that covers crediting period + 2 years.

4.3 Monitoring Plan

The monitoring plan for the grouped project activity has been developed in accordance with procedures described in methodologies – AMS.I.D (version 18.0), AMS I.F (version 3.0) and ACM0002 (version 16.0). Two of these methodologies require monitoring of the quantity of net electricity supplied from the project activity power plant to the grid. For AMS I.F methodology, the monitoring of net quantity of electricity displaced by project is required. The monitoring plan is described as follows:

Roles and Responsibility:

Essel Mining and Industries Limited (EMIL) and their other group companies are acting as the coordinating and managing entity for the grouped project activity. The management structure implemented for the purpose of monitoring of proposed project activity is explained as follows:



Corporate Office:

Officers in corporate office of project proponent are responsible for overall co-ordination towards the project activity instances development under VCS, including communication with VCS Consultants and Validation/Verification agencies etc. They also ensure that the relevant monitoring and data up-keep is carried out for the project activity properly and regularly. Thus, corporate office of Project Proponent/ project activity instance owner are solely responsible for timely execution of all the related activities in VCS project development as well as operation of the proposed grouped project activity and take decisive actions in this regard.

Site In-charge:

Site In-charge for each of the project activity instance are the project activity instance owner staff who is responsible for trouble free day to day operation of Solar PV project in support with O&M Team at respective sites. The site in-charge ensures that the monitoring plan is adhered and operations are carried out as per standard procedures. He/she collects all the relevant monitored data from O&M Team, and submit them to the corporate office for perusal. For the VCS aspects, he/she co-ordinates for the site visits under validation/verification process of the project activity.

O&M Team:

The monitoring data related to the project activity are collected, reported, maintained and archived by O&M team at the respective project sites. The corrective actions (if required) would be taken by O&M Team to maintain the quality of data. The team further submits the monitoring data to site in-charge for perusal.

Monitoring Procedures:

For each of the project activity instance to be included in the grouped project activity, the meters are installed which monitors the net electricity supplied to grid or net electricity displaced by project activity.

Net electricity supplied to grid will be calculated as the difference of the measured values of “export” and “import” at the metering point. The energy import and export readings are recorded on monthly basis in the form of Joint Meter Readings (JMR). The readings are taken in presence of representative from project proponent, representative from PP and representative from State Electricity Board. The JMR document is signed by all these representatives.

This net electricity supplied is utilized for the purpose of GHG emission reductions by the proposed project activity. Same monitoring plan is followed at each project activity instance.

QA/QC Procedures:

All main and back up meters installed at each of the project activity instance sites shall be calibrated as described in Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006. Currently the regulations describe of calibration of meters to be done at least once in five years.

Further, the net electricity exported to the grid can be cross verified with sales invoices raised in the name of power purchaser.

Completeness:**Data Management and Data Archiving (Central GHG information system):**

Copies of, monitored data sheet and monthly energy meter reading reports will be maintained for the entire crediting period plus two years by the project proponent. Central GHG information system and controls will be maintained by owner. Data for all the project activity instances will be maintained. This data will be maintained in electronic format for entire crediting period plus two years.

Procedures for Data Adjustments/Uncertainties:**Reading and Corrections of Meters:**

1. Project proponent, representative from GSS and representative from the power purchaser shall jointly read the metering system on every month at the delivery point.
2. In the event that the main metering system is not in service as a result of maintenance, repairs or testing, then the back-up metering system shall be used during the period the main metering system is not in service.
3. Meter reading taken jointly at the appointed date and time will be signed by the representative of project proponent, representative from GSS and representative from the power purchaser. If representative from project proponent is not present, then the power purchaser shall provide the project participant with a signed copy of the meter reading of the Main Metering System or Backup metering system as the case may be. Such meter readings shall be treated as the accurate and final measurement of the energy supplied to grid by the power producer.

Sealing and Maintenance of Meters:

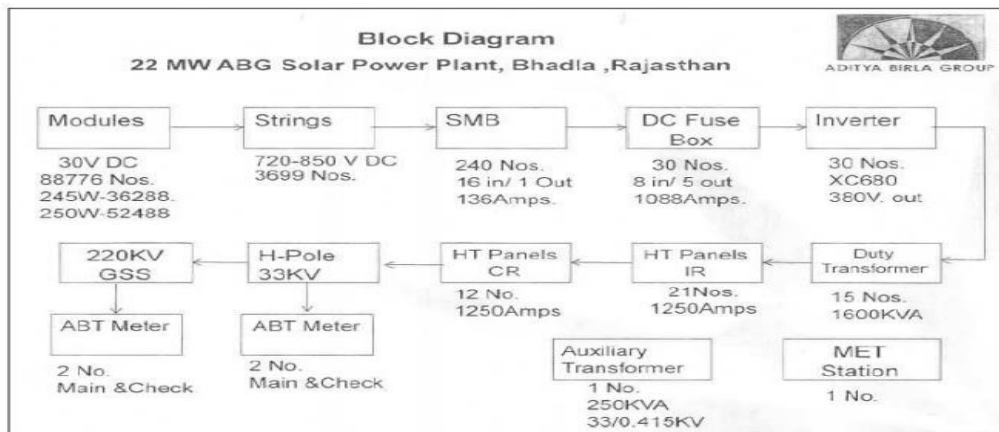
1. The main metering system and back-up metering system shall be sealed in the presence of representative of project proponent, representative from GSS and representative from the power purchaser.
2. When the main metering system and/or back-up metering system and/or any component thereof is found to be outside the acceptable limits of accuracy or

otherwise not functioning properly, it shall be repaired, re-calibrated or replaced as soon as possible

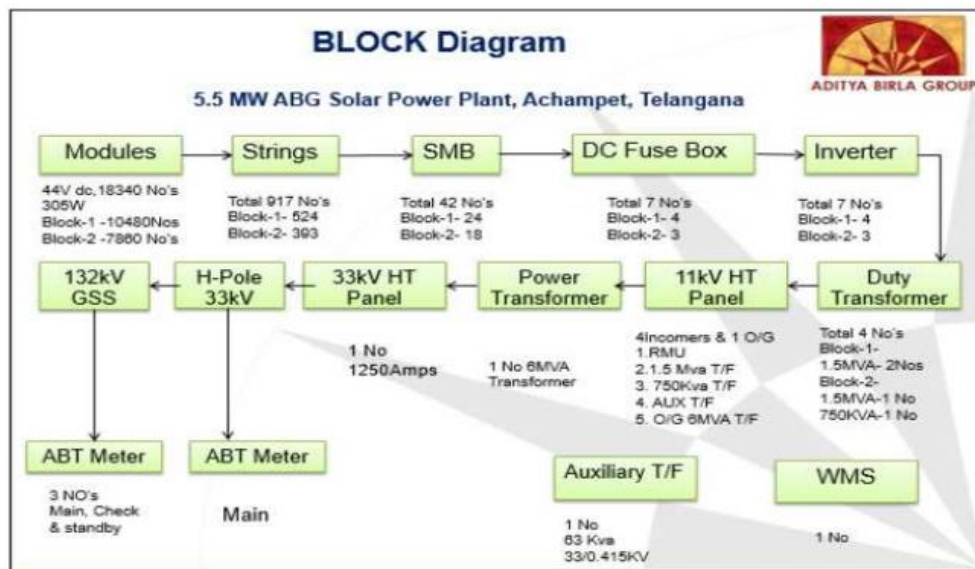
3. Any meter seal(s) shall be broken only by the GSS representative in the presence of project proponent and representative from the power purchaser whenever the main metering system or the back-up metering system is to be inspected, tested, adjusted, repaired or replaced.

Line diagram of individual project instances are as follows:

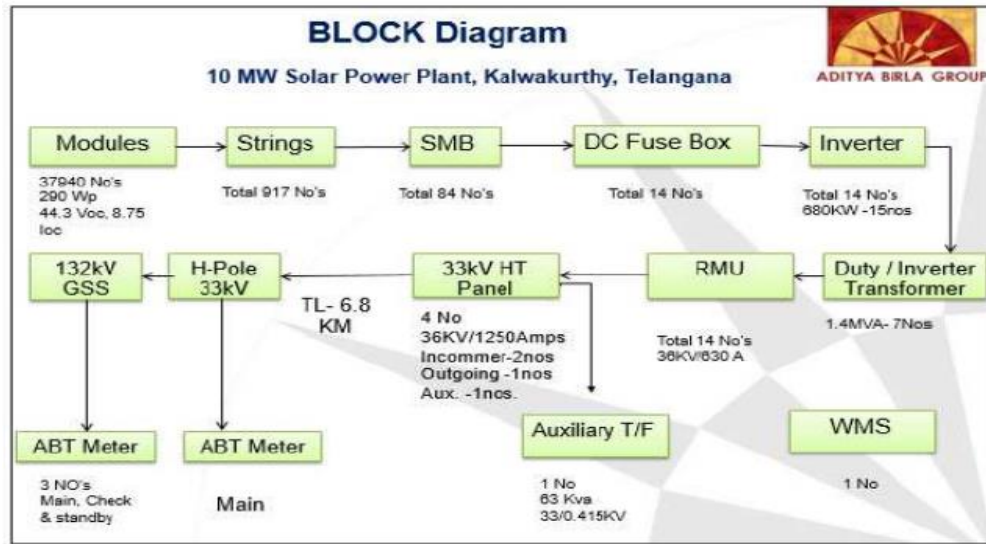
Instance 1:



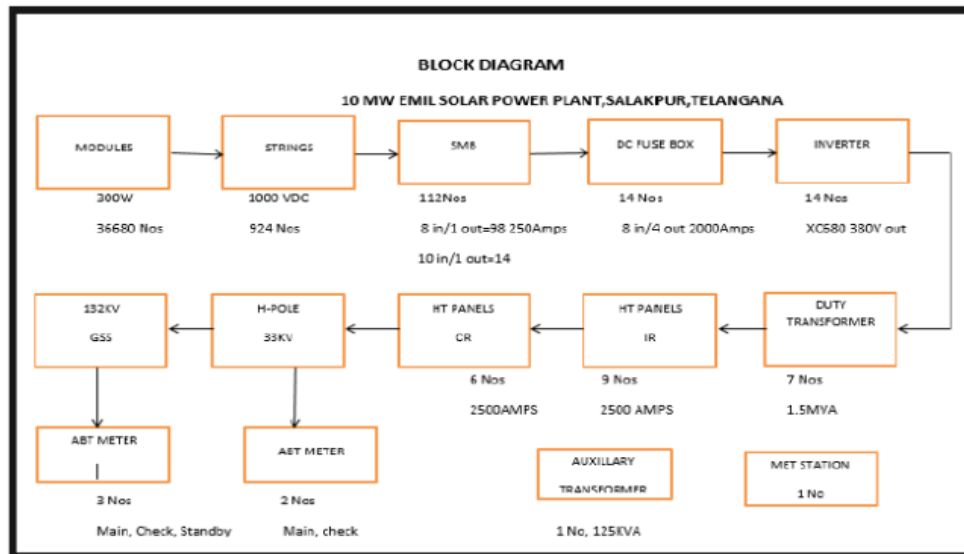
Instance 2



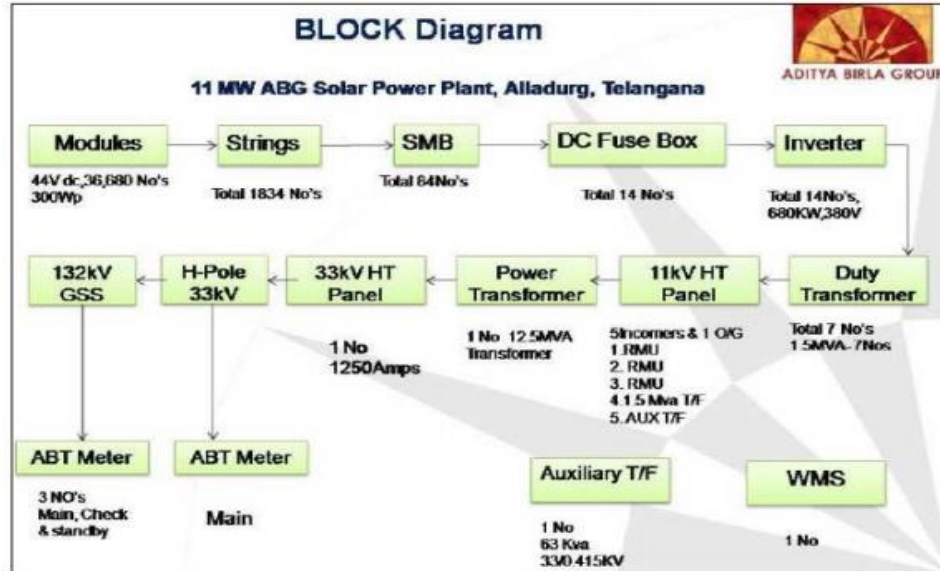
Instance 3



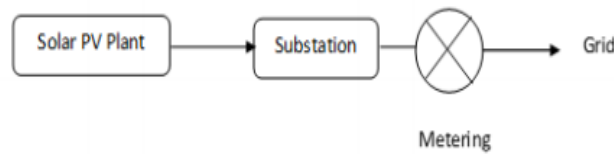
Instance 4



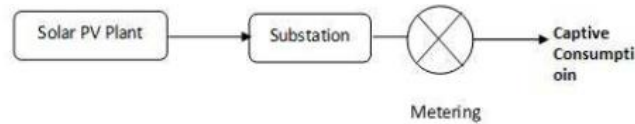
Instance 5



Line Diagram for the Instance 6 and 7



Line Diagram for the Instance 8 to 11



5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

Baseline emissions are calculated by multiplying the Net electricity exported to the grid with net baseline emission factor, as given in the VCS PD.

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

Where,

$EG_{PJ,y}$ = Quantity of net electricity generation that is generated and fed into the grid or grid electricity displaced as a result of the implementation of the CDM project activity in year y (MWh)

$EF_{grid,y}$ = Combined margin CO_2 emission factor for grid connected power generation
Also as per the applied methodology AMS I.D , ACM0002 and AMS I.F. baseline emissions are being calculated as follows:

Instance	$EG_{PJ,y}$	$EF_{grid,y}$	$BE_y = EG_{PJ,y} * EF_{grid,y}$
Instance - 1	41,013	0.9770	40,063
Instance – 2	9,105	0.9817	8,933
Instance – 3	18,794	0.9817	18,443
Instance – 4	17,089	0.9817	16,766
Instance – 5	16,582	0.9817	16,273
Instance – 6	142,237	0.9817	139,606
Instance – 7	12,786	0.9817	12,546
Instance – 8	1,315	0.9770	1,278
Instance – 9	8,958	0.9770	8,746
Instance – 10	8,795	0.9770	8,586
Instance - 11	1,548	0.9770	1,505

$BE_y = 272,745 \text{ tCO}_2\text{e}$ (Round down Value)

5.2 Project Emissions

Since the project activity instances to be included into the grouped project activity are renewable energy projects based on solar PV technology, there will be no project emissions involved as per paragraph 39 of the small scale methodology AMS.I.D (version 18.0), para 24 of AMS I.F Version 03 and paragraph 35 of the large scale methodology ACM0002 (version 16.0). Hence,

$$PE_y = 0$$

5.3 Leakage Emissions

Since the project activity instances to be included into the grouped project activity are renewable energy projects based on solar PV technology, no leakage emissions are considered - in line with paragraph 42 of the small scale methodology AMS.I.D (version 18.0), para 27 of AMS I.F Version 03 and paragraph 60 of the large scale methodology ACM0002 (version 16.0).

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)
Year 2020	212,780	0	0	212,780
Year 2021	59,965	0	0	59,965
Total	272,745	0	0	272,745

Appendix - 1: Calibration Details

Project activity instances	Project site	Main Meter	Check Meter	Calibration Date	Validity
Instance – 1: Bhadla	Bhadla, Rajasthan	13194946	13194947	01/10/2018	30/09/2023
Instance – 2: Achampet	Achampet Telangana	02781573	02781574	28/01/2017	27/01/2022
Instance – 3: Kalwakurthy	Kalwakurthy, Telangana	02781577	02781578	28/01/2017	27/01/2022
Instance – 4: Salakpur	Mutsyal, Telangana	13194257	13194258	18-01-2017	17-01-2022
Instance – 5: Alladurg	Aladurg, Telangana	02781621	02781631	07/03/2018	06/03/2023
Instance – 6: Karnataka	Shirahatti, Karnataka	16102125	16102130	16/08/2017	15/08/2022
	Ramadurg Karnataka	16102135	16102133	28/01/2017	27/01/2022
	Mulbangal Karnataka	14194780	14194782	05/02/2017	04/02/2022
	Vijaypur, Karnataka	X048842 2	X048842 3	06/04/2018	05/04/2023
Instance – 7: Vijaypur	Vijaypur, Karnataka	X048841 9	X048842 1	06/04/2018	05/04/2023
Instance – 8: Hotgi	Hotgi, Maharastra	05288830	05288838	28/01/2017	27/01/2022
Instance – 9: Gotan	Gotan, Jodhpur	RJB 90318	RJB 90317	17/01/2018	16/01/2023
Instance – 10: Sevagram	Sevagram Gujarat	HT 01180175	HT 01180176	30/07/2018	29/07/2023
Instance – 11: Pune	Pune, Maharastra	Y 0355612	Y 0355568	06/02/2018	05/02/2023

Appendix - 2: Percentage Variation between actual Emission Reduction and estimated Emission Reduction.

Comparison between actual and estimated Emission Reductions						
Project activity instances	Title of the project activity	Operational days in current MP	Annual Estimation for 365 days	ER estimation for actual days	Actual ER	% Variation between Actual ER and estimated ER
Instance – 1 Bhadla	VCS Project for Solar Power Plant at Bhadla, Rajasthan	405	29271	32478	40063	23.35%
Instance – 2 Achampet	VCS Project for Solar Power plant at Achampet, Telagana	405	7171	7956	8933	12.28%
Instance – 3 Kalwakurthy	VCS Project for Solar Power Plant at Kalwakurthy, Dist. Mehabubnagar, Telangana	405	14524	16115	18443	14.45%
Instance – 4 Salakpur	VCS Project for Solar Power Plant at Salakpur, Telangana	405	14240	15800	16766	6.11%
Instance – 5 Alladurg	VCS Project for Solar Power Plant at Alladurg, Telangana	405	14679	16287	16273	-0.09%
Instance 6 Karnataka	VCS Project for Solar Power Plant at Karnataka	405	36410	40400	35909	-11.12%
		405	36513	40514	33579	-17.12%
		405	36599	40609	36293	-10.63%
		405	26460	29359	33825	15.21%

Instance – 7 Bijapur	VCS Project for Solar Power Plant at Vijaypur	405	10525	11678	12546	7.43%
Instance – 8 Hotgi	VCS Project for Solar Power Plant at Hotgi, Maharastra	405	1432	1588	1278	-19.52%
Instance – 9 Gotan	VCS Project for Solar Power Plant at Gotan, Rajasthan, India	405	8956	9937	8746	-11.99%
Instance – 10 Gujarat	VCS Project for Solar Power Plant at Sevagram, Gujrat	405	8956	9937	8586	-13.60%
Instance – 11 Pune	VCS Project for Solar Power Plant at Pune, Maharastra	405	1388	1540	1505	-2.27%
			Overall	274198	272745	-0.53%