

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



Document Prepared By EKI Energy Services Limited

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Prepared By	Mr. Bhaskar Dutta
Contact	Manager Operations – GHG Services EKI Energy Services Limited Email ID : bhaskar@enkingint.org T +91 731 42 89 086, M +91 9109916710 Address: Office no. 201, Plot 48, Scheme 78 part 2, Vijay Nagar Indore - 452010 (M.P, India) Website www.enkingint.org

TABLE OF CONTENTS

1	Project Details.....	3
1.1	Summary Description of the Project.....	3
1.2	Sectoral Scope and Project Type	7
1.3	Project Proponent	8
1.4	Other Entities Involved in the Project.....	8
1.5	Project Start Date.....	8
1.6	Project Crediting Period.....	9
1.7	Project Scale and Estimated GHG Emission Reductions or Removals	9
1.8	Description of the Project Activity	10
1.9	Project Location	11
1.10	Conditions Prior to Project Initiation	15
1.11	Compliance with Laws, Statutes and Other Regulatory Frameworks.....	16
1.12	Ownership and Other Programs	16
1.12.1	Project Ownership	16
1.12.2	Emissions Trading Programs and Other Binding Limits	16
1.12.3	Other Forms of Environmental Credit.....	16
1.12.4	Participation under Other GHG Programs	16
1.12.5	Projects Rejected by Other GHG Programs	16
1.13	Additional Information Relevant to the Project	16
2	Application of Methodology	21
2.1	Title and Reference of Methodology	21
2.2	Applicability of Methodology	22
2.3	Project Boundary.....	30
2.4	Baseline Scenario	31
2.5	Additionality.....	32
2.6	Methodology Deviations	35
3	Quantification of GHG Emission Reductions and Removals.....	35
3.1	Baseline Emissions	35
3.2	Project Emissions.....	37
3.3	Leakage.....	37
3.4	Net GHG Emission Reductions and Removals	37
4	Monitoring.....	39
4.1	Data and Parameters Available at Validation	39
4.2	Data and Parameters Monitored.....	39
4.3	Monitoring Plan	41
5	Safeguards	47
5.1	No Net Harm.....	47
5.2	Environmental Impact.....	47
5.3	Local Stakeholder Consultation	47
5.4	Public Comments	49

1 PROJECT DETAILS

1.1 Summary Description 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 proposed 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 would generate 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 will be 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	12th March 2014	29,270
Instance – 2		VCS Project for Solar Power plant at Achampet, Telangana	5 MW Solar Power Plant, Achampet Village and Mandal, Dist. Mehaboobnagar,	07th July 2014	7,171

Project activity instances	Project Owner	Title of the project activity	Location	Date of Commissioning	Estimated Annual Average ERs over a 10 year period
			Telangana, India.		
Instance – 3		VCS Project for Solar Power Plant at Kalwakurthy, Dist. Mehabubnagar, Telangana	Ternikal Village, Kalwakurthy Mandal, Dist. Mehabubnagar, Telangana, India.	30th June 2014	14,524
Instance – 4		VCS Project for Solar Power Plant at Salakpur, Telangana	Village: Salakpur District: Warangal State: Telangana, India	17th September 2014	14,240
Instance – 5		VCS Project for Solar Power Plant at Alladurg, Telangana	Village: Bharamdhibba District: Medak State: Telangana, India	28th 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 ACM002 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	Title of the project activity	Location	Project Owner	Date of Commissioning	Estimated Annual Average ERs over a 10 year period
Instance – 6	VCS Project for Solar Power Plant at Karnataka	Village: Bellatti, Shirahatti District: Gadag State: Karnataka, India	Aditya Birla Solar Limited	11th May 2017	36,410
		Village: Chandargi, Kaktol, Ramadurg Taluk District: Belagavi		12th May 2017	36,513

Project activity instances	Title of the project activity	Location	Project Owner	Date of Commissioning	Estimated Annual Average ERs over a 10 year period
		State: Karnataka, India		13th Oct 2017	36,599
		Village: Mulbangal, District: Kolar State: Karnataka, India			
		Village: Devar Nimbargi, District: Vijayapura State: Karnataka, India	Aditya Birla Renewables Limited	26th Mar 2018	26,460
Instance – 7	VCS Project for Solar Power Plant at Vijaypur	Village: Devar Nimbargi, District: Vijayapura State: Karnataka, India	Aditya Birla Renewables SPV 1 Limited	26th Mar 2018	10,525
Instance – 8	VCS Project for Solar Power Plant at Hotgi, Maharashtra	Village: Hotgi, Tal South Solapur District: Solapur State: Maharashtra, India		20th June 2018	1,432
Instance – 9	VCS Project for Solar Power Plant at Gotan, Rajasthan, India	Village: Kharia Khangar, Tehsil: Bhopalgarh District: Jodhpur State: Rajasthan, India		1 st Feb 2018	8,956
Instance – 10	VCS Project for Solar Power Plant at Sevagram, Gujrat	Village: Sevagram, Tal- Abdasa District: Kutch State: Gujarat, India		14 th Aug 2018	8,956
Instance – 11	VCS Project for Solar Power Plant at Pune, Maharashtra	Village: Peth, Tal Havelim Dist Pune, Maharashtra, India		1 st Feb 2018	1,388

Start date is 12/03/2014 (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
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	12/03/2014
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	07/07/2014
Instance – 3 Kalwakurthy	VCS Project for Solar Power Plant at Kalwakurthy, Dist. Mehabubnagar, Telangana	Ternikal Village, Kalwakurthy Mandal, Dist. Mehaboobnagar, Telangana, India.	10 MW	30/06/2014
Instance – 4 Salakpur	VCS Project for Solar Power Plant at Salakpur, Telangana	Village: Salakpur District: Warangal State: Telangana, India	10 MW	17/09/2014
Instance – 5 Alladurg	VCS Project for Solar Power Plant at Alladurg, Telangana	Village: Bharamdhibba District: Medak State: Telangana, India	10 MW	28/07/2014
Instance – 6 Karnataka	VCS Project for Solar Power Plant at Karnataka	Village: Bellatti, Shirahatti District: Gadag State: Karnataka, India	20 MW	11/05/2017
		Village: Chandargi, Kaktol, Ramadurg Taluk District: Belagavi State: Karnataka, India	20 MW	12/05/2017
		Village: Mulbangal, District: Kolar State: Karnataka, India	20 MW	13/10/2017
		Village: Devar Nimbargi, District: Vijayapura State: Karnataka, India	17 MW	26/03/2018
Instance – 7	VCS Project for Solar Power Plant	Village: Devar Nimbargi,	6.8 MW	26/03/2018

Project activity instances	Title of the project activity	Location	Project Capacity	Commissioning Date
Bijapur	at Vijaypur	District: Vijayapura State: Karnataka, India		
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	20/06/2018
Instance – 9 Gotan	VCS Project for Solar Power Plant at Gotan, Rajasthan, India	Village: Kharia Khangar, Tehsil: Bhopalgarh District: Jodhpur State: Rajasthan, India	5 MW	01/02/2018
Instance – 10 Gujarat	VCS Project for Solar Power Plant at Sevagram, Gujarat	Village: Sevagram, Tal- Abdasa District: Kutch State: Gujarat, India	5 MW	14/08/2018
Instance – 11 Pune	VCS Project for Solar Power Plant at Pune, Maharashtra	Village: Peth District: Pune State: Maharashtra, India	0.8 MW	01/02/2018

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 will 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.

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 Limited ¹
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	EKI Energy Services Limited
Role in the project	Project Consultant
Contact person	Bhaskar Dutta
Title	Manager- Operations
Address	Office No 201, Plot No 48, Scheme 78, Vijay Nagar Part- II, Indore- 452010, India
Telephone	+91-8750286710
Email	bhaskar@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 March 12, 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:

¹ This 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.

Project start date: **12th day of 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 12th March 2014 and end date will be 11th March 2024.

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

As per section 3.9.1 of VCS standard, the projects are classified as follows:

- 1) Projects: Less than or equal to 300,000 tonnes of CO₂e per year
- 2) Large projects: Greater than 300,000 tonnes of CO₂e per year

The grouped project activity instances being included currently have less than 300,000 tCO₂e emission reduction, hence these project activity instances are classified as “Projects”

Similarly, the estimated GHG Emission Reductions will depend upon the power generation capacity of individual project activity instances. The estimated Emission Reduction for the 11 project activity instances being included in the grouped project activity are as follows:

Project Activity Instance	Investor Name/Location	Capacity (MW)	COD	PLF	Net Generation	Emission reductions
					(MWh/year)	(t CO ₂ e)
1	Bhadla	20	12-Mar-14	17.10%	29,959	29270
2	Achampet	5	07-Jul-14	16.68%	7,305	7171
3	Kalwakurthy	10	30-Jun-14	16.89%	14,795	14524
4	Salakpur	10	17-Sep-14	16.56%	14,506	14240
5	Alladurg	10	28-Jul-14	17.07%	14,953	14679
6	Shirahatti	20	11-May-17	21.17%	37,089	36410
	Ramadurg	20	12-May-17	21.23%	37,194	36513
	Mulbanga	20	13-Oct-17	21.28%	37,282	36599
	ABRL-Bijapur	17	26-Mar-18	18.10%	26,954	26460
7	Bijapur	6.8	26-Mar-18	18.00%	10,722	10525
8	Hotgi	0.8	20-Jun-18	20.93%	1,466	1432
9	Gotan	5	01-Feb-18	20.93%	9,167	8956
10	Sevagram	5	14-Aug-18	20.93%	9,167	8956
11	Pune	0.8	01-Feb-18	20.28%	1,421	1388
Total		150.4			251,980	247,123
Total in 10 Years					2519802	2471230

Each project activity instance estimated Emission reductions are less than 300,000 tCO₂e, hence categorised as “projects”

Project Scale

Project	√
Large project	

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
Year 1	247,123
Year 2	247,123
Year 3	247,123
Year 4	247,123
Year 5	247,123
Year 6	247,123
Year 7	247,123
Year 8	247,123
Year 9	247,123
Year 10	247,123
Total estimated ERs	2,471,230
Total number of crediting years	10
Average annual ERs	247,123

1.8 Description of the Project Activity

The project activity is a grouped project activity in which various project instances would be added from time to time. These project activity instances will involve 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.

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

² The document is available on <http://www.nvvn.co.in/Elaboration%20of%20Provisions%201.pdf>

Project activity instances	Capacity	PV Modules	Inverters
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

The operational lifetime of each project activity instances will be 25 years from the date of commissioning.

1.9 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.



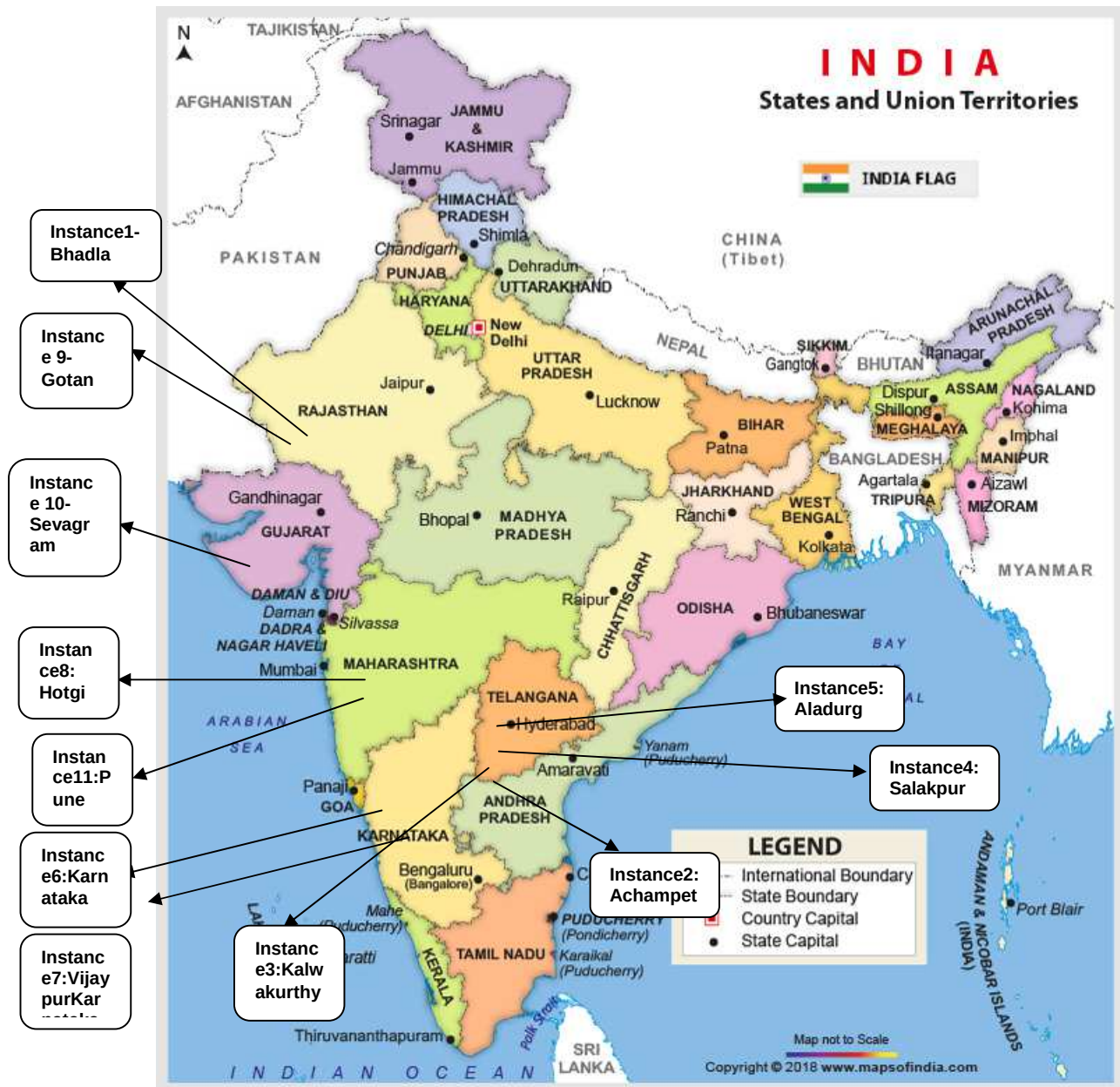
The geographic boundaries, geo-coordinates for project activity instance included in the grouped project activity are as follows:

Project activity instances	Title of the project activity	Location	Project Owner	Geo Coordinates
Instance – 1	VCS Project for	Bhadla Solar Park,	Essel	Latitude: 27.561° N

Project activity instances	Title of the project activity	Location	Project Owner	Geo Coordinates
Bhadla	Solar Power Plant at Bhadla, Rajasthan	Village – Bhadla, Tehsil – Bap, District – Jodhpur, Rajasthan India	Mining and Industries Ltd.	Longitude: 71.929 ⁰ E
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.		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, Kalwakurthy Mandal, Dist. Mehaboobnagar, Telangana, India.		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: Bhiamramdhibba 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: Belagavi State: Karnataka, India		Latitude: 16.021 ⁰ N, Longitude: 75.127 ⁰ E
		Village: Mulbangal, District: Kolar State: Karnataka, India		Latitude: 13°05'04.4" N, Longitude: 78°17'28.8" E
		Village: Devar Nimbargi, District: Vijayapura State: Karnataka, India	Aditya Birla Renewables Limited	Latitude: 17.250426 ⁰ N, Longitude: 75.660746 ⁰ E
Instance – 7 Bijapur	VCS Project for Solar Power Plant at Vijaypur	Village: Devar Nimbargi, District: Vijayapura State: Karnataka, India	Aditya Birla Renewables SPV 1 Limited	Latitude: 17.250426 ⁰ N Longitude: 75.660746 ⁰ E
Instance – 8	VCS Project for	Village: Hotgi, Tal		Latitude: 17.559537

Project activity instances	Title of the project activity	Location	Project Owner	Geo Coordinates
Hotgi	Solar Power Plant at Hotgi, Maharashtra	South Solapur District: Solapur State: Maharashtra, India		12 ⁰ N Longitude:76.0021 4484 ⁰ E
Instance – 9 Gotan	VCS Project for Solar Power Plant at Gotan, Rajasthan, India	Village: Kharia Khangar, 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- Abdasa District: Kutch State: Gujarat, India		Latitude:23° 25' 44.55" N, Longitude:68° 42' 13.17"
Instance – 11 Pune	VCS Project for Solar Power Plant at Pune, Maharashtra	Village: Peth, Tal Haveli, Dist Pune, Maharashtra, India		Latitude: 18.494475 ⁰ N , Longitude:74.0970 218 ⁰ E

These project activity instances can be represented on the map as follows:



1.10 Conditions Prior to Project Initiation

The project activity instances as part of the proposed grouped project activity are Greenfield renewable power generation projects. These will be installed at locations where there was no power generation activity at the site. In the absence of the project activity instances as part of the proposed grouped project activity, the equivalent amount of electricity would have been generated from the existing/new power plants connected to the grid. Therein, the main emission source in the pre-project scenario is the grid connected power plants and the primary GHG involved is CO₂. Further the project is a voluntary initiative by the respective project owner and not being implemented to generate GHG emission for the purpose of their subsequent reduction removal or destruction.

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

Compliance related to following aspects will be provided for each of the project activity instance to be included in the grouped project activity:

- Consent to establish under section 25/26 of water 1974 is provided by State Pollution Control Board
- Consent to operate provided by State Pollution Control Board
- Power evacuation clearance obtained from relevant authorities.

1.12 Ownership and Other Programs

1.12.1 Project Ownership

The solar PV equipment & infrastructure installed at site of each of the project activity instances as part of the proposed grouped project activity are under ownership of the respective SPV. This is evident by equipment supply contracts, power purchase agreement for individual project activity instances.

1.12.2 Emissions Trading Programs and Other Binding Limits

The grouped project activity under consideration is not participating in any other Emission trading programme and other binding limits.

1.12.3 Other Forms of Environmental Credit

The proposed grouped project activity neither has nor intends to generate any other form of GHG related environmental credit for GHG emission reductions or removals claimed under the VCS Program.

1.12.4 Participation under Other GHG Programs

The proposed grouped project activity has not been registered and is not seeking registration under any other GHG programs.

1.12.5 Projects Rejected by Other GHG Programs

The proposed grouped project activity is not participating in other Environmental credits, other GHG programs and has not been rejected by other GHG programs

1.13 Additional Information Relevant to the Project

Eligibility Criteria

The project is a grouped project and following are the eligibility criteria for inclusion of new project activity instances into the grouped project activity:

1) Applicability Conditions: The project activity instances shall meet applicability conditions for applicable methodology as defined in section 2.2.

2) Geographical Area: The project activity instances to be included in the grouped project activity will be activities involving grid connected renewable electricity generation using solar technology located within India.

3) Baseline scenario: All Project Activity Instances shall meet the baseline definition as defined in respective methodology and as explained in section 2.4.

4) Technology type: The project activity instances to be included in the grouped project activity will be Greenfield activities involving grid connected renewable electricity generation using solar PV technology.

5) Additionality: The project activity instances to be added as part of the grouped project will meet additionality criteria as set out in respective methodologies - for Small Scale Project instances the methodology applicable will be AMS-ID and for Large Scale Project instances methodology applicable will be ACM0002. For small scale projects as per CDM terminology, Tool for demonstration of additionality for small scale project activities will be used. Further for inclusion of Large Scale project activity instances with solar photovoltaic technology in to the grouped project, following condition will be fulfilled at the time of inclusion of project activity instance into the grouped project for the project to be considered automatically additional as per positive list of technologies as per para 30 of ACM 0002 ver 16:

The percentage share of total installed capacity of the specific technology (solar PV) in the total installed grid connected power generation capacity in the host country is equal to or less than two per cent.

During registration of project activity, project activity instance 1 was fulfilling this criteria and this project activity instance 1 is auto additional.

As on 31/12/2018, total installed capacity is 349288.22 MW, out of which 25212.26 MW is from solar and it is around 7% of total installed capacity, thus 2% criteria is not applicable for future instances. Please refer below web link for % contribution of solar out of total installed capacity. http://www.cea.nic.in/reports/monthly/installedcapacity/2018/installed_capacity-12.pdf

Currently the percentage share of total installed capacity of the specific technology (solar PV) in the total installed grid connected power generation capacity in the host country is greater than 2%, hence para 30 of ACM0002 ver 16 is not applicable and para 33 of ACM0002 ver 16 has been followed by future new project activity instance. The additionality of the new large scale project activity instance is demonstrated using the latest version of the "Tool for the demonstration and assessment of additionality"

The additionality demonstration of large scale projects will be demonstrated through investment analysis.

6) Start Date: The start date of each project activity instance under the grouped project should not be prior to the start date of the grouped project. The start date of each project activity instance will be determined through documentary evidence.

7) Conditions that avoid double counting of emission reductions like unique identifications of project and claiming emission reduction only under one GHG program.

8) The Grouped Project specific requirements stipulated by the Entity responsible for coordinating and managing grouped project for conducting local stakeholder consultations and environmental impact assessment (EIA), as applicable.

9) The project activity using solar PV project will supply electricity to grid or user.

Sr No.	Eligibility Criteria	Project Activity instances eligibility
1	Applicability Conditions: The project activity instances shall meet applicability conditions for applicable methodology	Details of applicability conditions for all project activity instances according to respective methodologies are provided in subsequent sections of this document. All project activity instances meet respective applicability conditions of methodology, hence this eligibility criteria is fulfilled. Please refer section 2.2 of PD for applicability criteria and its justification for all project activity instances.
2	Geographical Area: The project activity instances to be included in the grouped project activity will be activities involving grid connected renewable electricity generation using solar technology located within India	The project activity instances are located within geographic boundaries of India. Hence this condition is fulfilled. Please refer section 1.9 of PD for location of each project activity instances.
3	Baseline scenario: All Project Activity Instances shall meet the baseline definition as defined in respective methodology	All project activity instances Instance have same baseline scenario as per methodology as detailed in subsequent sections, hence this eligibility criteria is fulfilled. Please refer section 2.4 of PD for applicability baseline scenario for all new project activity instances.
4	Technology type: The project activity instances to be included in the grouped project activity will be Greenfield activities involving grid connected renewable electricity generation using solar PV technology	All project activity instances Instance are solar PV power plants supplying electricity to grid. All are Green field projects. Hence this condition is fulfilled.
5	Additionality: The project activity instances to be added as part of the grouped project will meet additionality criteria as set out in respective methodologies - for Small Scale Project instances the methodology applicable will be AMS-ID and for Large Scale Project instances methodology applicable will be	The additionality for the all project activity instances included in the grouped project has been demonstrated in section 2.5 of PD. As per CDM Tool for demonstration of additionality for small scale project activities, solar PV projects with capacity up to 15 MW fall in positive list of technologies termed as automatically additional. Hence project activity

Sr No.	Eligibility Criteria	Project Activity instances eligibility
	ACM0002. For small scale projects as per CDM terminology, Tool for demonstration of additionality for small scale project activities will be used Further for inclusion of Large Scale project activity instances with solar photovoltaic technology in to the grouped project, following condition will be fulfilled at the time of inclusion of project activity instance into the grouped project for the project to be considered automatically additional as per positive list of technologies as per para 30 of ACM 0002 ver 16: The percentage share of total installed capacity of the specific technology (solar PV) in the total installed grid connected power generation capacity in the host country is equal to or less than two per cent. The percentage share of total installed capacity of the specific technology (solar PV) in the total installed grid connected power generation capacity in the host country is greater than 2%, hence para 30 of ACM0002 ver 16 is not applicable and para 33 of ACM0002 ver 16 has been followed by new project activity instance. The additionality of the new large scale project activity instance is demonstrated using the latest version of the “Tool for the demonstration and assessment of additionality” The additionality demonstration of large scale projects will be demonstrated through Investment Analysis.	instances 2 to 5 and 7 to 11 are small scale projects and are automatically additional. Project activity instance 1 is auto additional as per para 30 of methodology. Currently project activity Instance 6 is the large scale project activity instance being included in the grouped project activity. The percentage share of total installed capacity of the specific technology (solar PV) in the total installed grid connected power generation capacity in the host country is greater than 2%, hence para 30 of ACM0002 ver 16 is not applicable and para 33 of ACM0002 ver 16 has been followed by new project activity instance. The additionality of the new large scale project activity instance is demonstrated using the latest version of the “Tool for the demonstration and assessment of additionality” The additionality demonstration of large scale project activity instance 6 is done at Appendix 1 of MR. Accordingly, this condition is fulfilled.
6	Start Date: The start date of each project activity instance under the grouped project should not be prior to the start date of the grouped project. The start date of each project activity	The start date of grouped project is considered as 12 March 2014 which is commissioning date of project activity instance at Bhadla and start date of all other project activity instances including new project activity instances is after

Sr No.	Eligibility Criteria	Project Activity instances eligibility
	instance will be determined through documentary evidence.	this date. Hence this condition is fulfilled. Please refer commissioning details for start date of each project activity instance.
7	Conditions that avoid double counting of emission reductions like unique identifications of project and claiming emission reduction only under one GHG program	The existing and new project activity instances are identified by latitude and longitude and location of the plant. Declaration has been provided and these project activity instances are not participating in any other GHG program. Hence this condition is fulfilled.
8	The Grouped Project specific requirements stipulated by the Entity responsible for coordinating and managing grouped project for conducting local stakeholder consultations and environmental impact assessment (EIA), as applicable.	Local stakeholder consultation has been conducted at the project site for initial project activity instances 1 to 5 and also new project activity instances 6 to 11. Details are mentioned in subsequent section of this PD. There is no requirement for carrying out EIA for these projects in India, hence this condition is fulfilled.
9	The project activity using solar PV project will supply electricity to grid or user	The existing and new project activity instances are solar PV power plants supplying electricity to grid or user. Hence this condition is fulfilled.

Leakage Management

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) and paragraph 60 of the large scale methodology ACM0002 (version 16.0) and para 27 of methodology AMS I.F.

Commercially Sensitive Information

Not applicable. There is no commercially sensitive information.

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 would generate direct and indirect employment opportunities in the nearby areas of the project sites. Generation of employment opportunities will help 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 will be generate 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 would generate 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 would help in diffusion of the cleaner technology in the country for power generation. This will lead to technological well-being in power generation sector in India.

Further Information

Not Applicable

2 APPLICATION OF METHODOLOGY

2.1 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: ACM002

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>)

The demonstration and justification of how the project activity(s) meets each of the applicability conditions of the chosen methodology, and tools will be described as follows:

2.2 Applicability of Methodology

For project activity instance -1 and 6 which is included in the grouped project are as follows – Applicability Conditions of ACM0002 (Version 16; EB 81) are explained as follows:

Methodology Criteria	Applicability
This methodology is applicable to grid-connected renewable energy power generation project activities that a) install a Greenfield power plant;	The proposed grouped project activity including instance 1 and 6 involves installation of greenfield grid connected solar power plant.

Methodology Criteria	Applicability
b) involve a capacity addition to (an) existing plant(s); c) involve a retrofit of (an) existing plant(s)/unit(s); d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or e) Involve a replacement of (an) existing plant(s)/unit(s).	Hence the applicability condition is fulfilled.
The methodology is applicable under the following conditions: a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	a) The grouped project activity including instance 1 and 6 is a renewable energy power plants based on solar PV technology. Hence this condition is fulfilled. b) The grouped project activity including instance 1 and 6 do not involve capacity additions, retrofits, rehabilitations or replacements, hence this condition is not applicable.
In case of hydro power plants, one of the following conditions shall apply: a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density calculated using equation (3), is greater than 4 W/m²; or c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m²; or d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m², all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m²; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower	Not applicable The proposed grouped project activity including instance 1 and 6 do not include any hydro power project. Hence, this clause is not applicable.

Methodology Criteria	Applicability
than or equal to 4 W/m ² shall be: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project.	
In the case of integrated hydro power projects, project proponent shall: 1. Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or 2. Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.	Not applicable The proposed grouped project activity including instance 1 and 6 do not include any hydro power project. Hence, this clause is not applicable.
The methodology is not applicable to the following: a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; b) Biomass fired power plants/units.	Not applicable .The grouped project activity including instance 1 and 6 involves green field solar PV power plants and do not involve switching from fossil fuels to renewable energy sources at the sites of the projects. Biomass fired power plants/units are also not involved in the project.
In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".	Not applicable. No capacity additions, retrofits, rehabilitations and replacements are involved in the grouped project activity including instance 1 and 6 as part of the proposed grouped project.

The applicability conditions of tools included in the tools as referred in the methodology ACM0002 (Version 16) are explained as follows:

Tool to calculate the emission factor of an electricity system (Version 05.0): The project activity instances to be included in the proposed grouped project activity replace fossil fuel dominated grid electricity by renewable electricity. Accordingly, this tool has been used to determine the grid emission factor which is used to estimate the amount of baseline emissions. The Central Electricity Authority compiled CO₂ baseline database for the Indian Power Sector. CO₂ baseline database Version 10.0 has been used as reference for the emission factor. This

CO₂ database has been compiled in conjunction with the “Tool to calculate the emission factor for an electricity system”.

- **Tool for the demonstration and assessment of additionality (version 07.0.0): For project activity instance 1,** The additionality of the large scale project activity instances is being demonstrated in accordance with paragraph 29 of the methodology ACM0002 (Version 16) – Simplified Procedure to Demonstrate Additionality. Hence application of “Tool for the demonstration and assessment of additionality” (version 07.0.0) is not required. However Currently the percentage share of total installed capacity of the specific technology (solar PV) in the total installed grid connected power generation capacity in the host country is greater than 2%, hence para 30 of ACM0002 ver 16 is not applicable and para 33 of ACM0002 ver 16 has been followed by future new project activity instance. The additionality of the new future large scale project activity instance is demonstrated using the latest version of the “Tool for the demonstration and assessment of additionality”
- **Combined tool to identify the baseline scenario and demonstrate additionality (version 05.0.0):** The large scale project activity instances to be included in the proposed grouped project will be greenfield power plants. The baseline scenario of the project activity is as defined in paragraph 23 of the methodology ACM0002 (version 16). **Hence application of “Combined tool to identify the baseline scenario and demonstrate additionality” is not required for the proposed project activity.**
- **Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion (version 02):** In accordance with applicable approved methodology ACM0002 (version 16), the project activity instances to be included in the proposed grouped project activity does not involve the project emissions. Further the net metering approach will be used to calculate amount of electricity generated from the power plant, thus **the said tool has not been used for the project activity under consideration.**
- **Tool to determine the remaining lifetime of equipment (Version 01):** The tool provides guidance to determine the remaining lifetime of baseline or project equipment. Since this is first crediting period hence the said tool will not be applicable and will be taken care of during the renewal of crediting period. **Hence application of the said tool is not required for present crediting period of the grouped project activity under consideration.**
- **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):** This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at **the renewal of a crediting period.** However, this grouped project activity involves first crediting period, hence **the said tool is not applicable.**

For project activity instance- 2 to 5 and 7 (and small scale project activity instances to be included in the grouped project in future) – the applicability conditions of AMS.I.D (Version 18) are explained as follows:

Methodology Criteria	Applicability
This methodology comprises Renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: a) Supplying electricity to a national or a regional grid; or b) Supplying electricity to an identified	The grouped project activity including project activity instances 2 to 5 and 7 included in the proposed grouped project activity are renewable electricity generation unit based on solar photovoltaic technology and each of the said project activity instances will supply electricity to the national grid or supply

Methodology Criteria	Applicability
consumer facility via national/regional grid through a contractual arrangement such as wheeling	electricity to an identified consumer facility via national/regional grid or being utilized for captive consumption. Hence scope of methodology is fulfilled.
Illustration of respective situations under which each of the methodology (i.e. “AMS-I.D.: Grid connected renewable electricity generation”, “AMS-I.F.: Renewable electricity generation for captive use and mini-grid” and “AMS-I.A.: Electricity generation by the user) applies is included in the appendix	Table 1 of appendix of AMS-I.D, (Version 18.0) further substantiates that the project which generates and supplies electricity to a national grid falls under AMS-I.D. The grouped project activity including project activity instances 2 to 5 and 7 supply electricity to grid, hence this condition is applicable
This methodology is applicable to project activities that: a) Install a Greenfield plant; b) Involve a capacity addition in (an) existing plant(s); c) Involve a retrofit of (an) existing plant(s); d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or e) Involve a replacement of (an) existing plant(s).	The grouped project activity including instances 2 to 5 and 7 included in the proposed grouped project activity are the installation of a new solar photovoltaic (PV) power plant at the project site where there was no renewable energy power plant operating prior to the implementation of respective project activity instance. Thus the project activity instances to be included into the grouped project activity under consideration will be Greenfield plants. Hence the applicability condition is fulfilled.
Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: a) The project activity is implemented in an existing reservoir with no change in the volume of reservoir; b) The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the project emissions section, is greater than 4 W/m ² ; c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m ² .	Not applicable. The grouped project activity including instances 2 to 5 and 7 to be included in the grouped project activity under consideration are not hydro power projects. Hence, this clause is not applicable.
If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	There will be no non-renewable components in the grouped project activity including instances 2 to 5 and 7 under consideration. Also each project activity instances will not exceed eligibility limit of 15 MW for small scale project activity as per CDM terminology. There is no co-firing of fossil fuel.
Combined heat and power (co-generation) systems are not eligible under this category.	The grouped project activity including instances 2 to 5 and 7 included in the grouped project activity under consideration does not involve combined heat and power (co-generation) systems. Hence this condition is fulfilled.
In the case of project activities that involve the capacity addition of renewable energy	Not applicable The grouped project activity including instance

Methodology Criteria	Applicability
generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	2 to 5 and 7 included in the grouped project activity under consideration are greenfield power plants. Hence this condition is not applicable.
In the case of retrofit, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted, rehabilitated or replacement power plant/unit shall not exceed the limit of 15 MW.	Not applicable The grouped project activity including Instance 2 to 5 and 7 included in the grouped project activity under consideration will be greenfield power plants that do not involve any retrofit, replacement or capacity addition. Hence this clause is not applicable.
In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as "AMS-I.C.: Thermal energy production with or without electricity" shall be explored.	Not applicable The grouped project activity including instances 2 to 5 and 7 to be included in the grouped project activity under consideration are greenfield power plants based on solar PV technology and will not involve landfill gas, waste gas, wastewater treatment and agro-industries projects. Hence this clause is not applicable.
In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply.	Not applicable The grouped project activity including instances 2 to 5 and 7 included in the grouped project activity under consideration is greenfield power plants based on solar PV technology and will not involve use of biomass. Hence this clause is not applicable.

For project activity instance- 8, 9, 10 and 11 (and small scale project activity instances to be included in the grouped project in future) the power generated from the project activity 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) and thus Methodology AMS I.F is being applied and applicability conditions of AMS.I.F (Version 3) are explained as follows:

Applicability Criterion	Project Case
1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to user(s). The project activity will displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit i.e. in the absence of the project activity, the users would have been supplied electricity from one or more sources listed below: (a) A national or a regional grid (grid hereafter);	The Instance under grouped project (instance 8 to 11) will be a Renewable Energy Project (i.e. solar PV) which supplies electricity to user. The instance will displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit i.e. in the absence of the project activity, the users would have been supplied electricity from one or more sources listed below: (a) A national or a regional grid (grid

(b) Fossil fuel fired captive power plant; (c) A carbon intensive mini-grid	hereafter); (b) Fossil fuel fired captive power plant; (c) A carbon intensive mini-grid. Hence the instance under grouped project meets the given applicability criterion. Option “a” is applicable for instances 8 to 11.
2. Illustration of respective situations under which each of the methodology (i.e. AMS-I.D, AMS-I.F and AMS-I.A) applies is included in Table	The 2nd option of Table 3 of AMS I.F. Version 3, is applicable when instance under grouped 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) and/or 4th option is applicable when instance under grouped project supplies electricity to a mini grid system where in the baseline all generators use exclusively fuel oil and/or diesel fuel. Option 2nd is applicable for instances 8 to 11.
3. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: • The project activity is implemented in an existing reservoir with no change in the volume of reservoir; • The project activity is implemented in an existing reservoir³, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m²; • The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m².	This criteria is applicable for instances which involves hydro power plant and this project involves solar PV, hence this condition is not applicable.
4. This methodology is applicable to project activities that (a) install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).	Instance under grouped project will be an installation of new renewable energy (solar PV) based electricity generation plants (not addition to existing system). Option a) is applicable for instance.
5. In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing	The instance under grouped project will be Greenfield project and there is no existing power generation facility at the site. Hence the criterion is not applicable to the project.

³ A reservoir is to be considered as an “existing reservoir” if it has been in operation for at least three years before the implementation of the project activity.

units.	
6. In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	Not applicable, the renewable energy project (solar PV) is a Green field project activity and this instance is not the enhancement or up gradation project. Hence the criterion is not applicable to the project.
7. If the unit added has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	Instance will have capacity within eligibility limit of 15 MW and will involve only renewable component (solar PV). Unit does not co-fire fossil fuels. Hence the criterion is not applicable to the project.
8. Combined heat and power (co-generation) systems are not eligible under this category.	The instances are renewable energy projects (solar PV) and are not a combined heat and power system. Hence the criterion is not applicable to the project.
9. If electricity and/or steam/heat produced by the project activity is delivered to a third party, i.e. another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered that ensures that there is no double counting of emission reductions.	If instance delivering the generated electricity to third party, then contract between supplier and consumer will be entered. This is applicable for instances 8 to 11 and they have mutual contract.
10. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply.	The instance is a renewable energy power project which involves solar PV and is not a biomass project. Hence the criterion is not applicable to the project.

Applicability conditions of tools referred in the methodology AMD I.D Version 18 and AMS.I.F (version 3) are explained as follows:

- Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion (version 02):** In accordance with applicable approved methodology, the individual small scale project activity instances to be included in the grouped project activity under consideration does not involve the project emissions. Also, net metering approach will be used for calculating amount of electricity generated from the plant. Hence application of the said tool is not relevant to the grouped project activity under consideration.
- Tool to calculate the emission factor of an electricity system (Version 05.0):** The individual small scale project activity instances to be included in the grouped project activity under consideration replace fossil fuel dominated grid electricity by renewable electricity. Accordingly, this tool has been used to determine the grid emission factor which is used to estimate the amount of baseline emissions. The Central Electricity Authority compiled CO₂ baseline database for the Indian Power Sector. CO₂ baseline database Version 10.0 has been used as reference for the emission factor. This CO₂ database has been compiled in conjunction with the "Tool to calculate the emission factor for an electricity system".

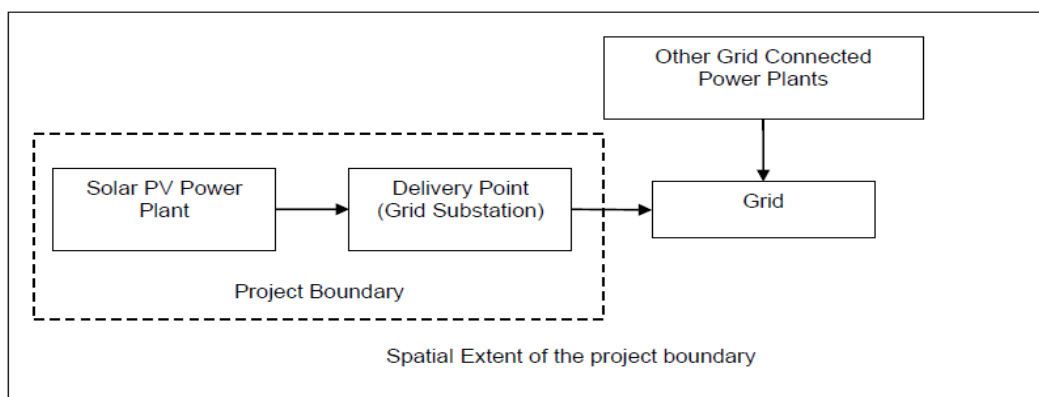
- **Tool to determine the remaining lifetime of equipment (Version 01):** The tool provides guidance to determine the remaining lifetime of baseline or project equipment. However, since this is first crediting period of the project activity hence the said tool will be applicable at the time of renewal of crediting period. Hence application of the said tool is not relevant to the grouped project activity under consideration for the present crediting period.
- **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):** This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at **the renewal of a crediting period**. However, the proposed grouped project activity is requesting registration; hence the said tool is not applicable. This is first crediting period, thus this tool will be used at the time of renewal of crediting period.

2.3 Project Boundary

Referring to the paragraph 18 of the methodology AMS.I.D (Version 18), and paragraph 21 of the methodology ACM0002 (Version 16), the project boundary includes the project power plant and all power plants connected physically to the electricity system that the project activity power plant is connected to. Thus, the project boundary for each of the project activity instance as part of the proposed grouped project activity will consist of PV installation, connected substations, metering equipment and the grid.

Accordingly, the project boundary for project activity instances being included in the grouped project activity will respective PV installation, connected substation, metering equipment and grid including all power plants connected physically to the electricity system.

The project boundary and the spatial extent of the project boundary for each of the project instances as part of the proposed grouped project activity is diagrammatically represented as follows:



Project boundary has been ascertained using para 17 of AMS I.F (Version 3.0) – “The spatial extent of the project boundary includes industrial, commercial facilities consuming energy generated by the system. In the case of electricity generated and supplied to distributed users (e.g. residential users) via mini/isolated grid(s) the project boundary may be confined to physical, geographical site of renewable generating units.

The boundary also extends to the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to”.

According to the methodology AMS ID (version 18.0), AMS I.F (Version 3.0) and ACM0002 (version 16.0) the following gases are to be considered for the boundary:

Source		Gas	Included?	Justification/Explanation
Baseline	Grid connected electricity generation.	CO ₂	Yes	Main emission source
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source
		Other	No	Project activity does not emit other forms of GHG emissions
Project	Greenfield Solar PV Power Project Activity.	CO ₂	No	No CO ₂ emissions are emitted from the project
		CH ₄	No	Project activity does not emit CH ₄
		N ₂ O	No	Project activity does not emit N ₂ O
		Other	No	Project activity does not emit other forms of GHG emissions

2.4 Baseline Scenario

The grouped project activity will include small scale (**i.e. project activity instances with capacity less than 15 MW**) as well as large scale (**i.e. project activity instances with capacity more than 15 MW**) project activity instances as per CDM terminology. Accordingly the baseline scenario is defined as follows:

- **For small scale project activity instances** as per CDM terminology (**i.e. project activity instances with capacity less than 15 MW**):

The baseline for small scale project activity instances to be included in the grouped project under consideration is determined in accordance with the methodology AMS I.D (version 18) and AMS I.F of Appendix B to the Simplified modalities and procedures for small scale CDM project activities.

The paragraph 19 of AMS.I.D (version 18) defines baseline scenario for Greenfield power plants as – *“The baseline scenario is that the electricity delivered to the grid by the project activity would have **otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid**”.*

Similarly as per AMS I.F Version 03, project activity only applies to displace electricity from an electricity distribution system that is or would have been supplied by at least national or regional grid, fossil fuel fired captive power plant or carbon intensive mini grid.

As per AMS I.F methodology, Baseline emissions for other systems are the product of amount electricity displaced with the electricity produced by the renewable generating unit and an emission factor.

- **For large scale project activity instances** as per CDM terminology (**i.e. project activity instances with capacity more than 15 MW**):

The baseline for large scale project activity instances to be included in the grouped project under consideration is determined in accordance with approved CDM methodology ACM0002 (version 16). The paragraph 23 of ACM0002 (version 16) defines baseline scenario as – *“If the project*

*activity is the installation of a Greenfield power plant, the baseline scenario is electricity delivered to the grid by the project activity would have **otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources**, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.*

Accordingly, the baseline scenario for new project activity instances being included in the grouped project activity are as follows:

- **For project activity instance – 1 and 6:**

The baseline for project activity instance – 1 and 6 are determined in accordance with approved CDM methodology ACM0002 (version 16). The paragraph 23 of ACM0002 (version 16) defines baseline scenario as – *“If the project activity is the installation of a Greenfield power plant, the baseline scenario is electricity delivered to the grid by the project activity would have **otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources**, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.*

- **For project activity instances 2 to 5 and 7:**

The baseline for small scale project activity Instance – 2 to 5 and 7: Vijayapura, is determined in accordance with the methodology AMS I.D (version 18) of Appendix B to the Simplified modalities and procedures for small scale CDM project activities. The paragraph 19 of AMS.I.D (version 18) defines baseline scenario for greenfield power plants as – *“The baseline scenario is that the electricity delivered to the grid by the project activity would have **otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid**”.*

- **For project activity instances 8 to 11:**

The baseline for small scale project activity Instance - Instance – 8: Hotgi, Instance – 9: Gotan, Instance 10: Sevagram and Instance – 11: Pune is determined in accordance with the methodology AMS I.F (version 3) of Appendix B to the Simplified modalities and procedures for small scale CDM project activities. The paragraph 19 of AMS.I.D (version 18) defines baseline scenario for greenfield power plants as – *“Baseline emissions for other systems are the product of amount electricity displaced with the electricity produced by the renewable generating unit and an emission factor”.*

As mentioned above, for Greenfield projects, same baseline is prescribed by CDM methodologies AMS-I.D ver 18 and ACM 0002 ver 16. As all the new project activity instances in grouped project are Greenfield projects, same baseline is defined for entire geographical area i.e. India.

2.5 Additionality

As described in earlier sections of this document, the grouped project activity under consideration will consist of small scale project activity instances as well as large scale project activity instances. Accordingly the additionality for respective types of project activity instances is demonstrated as follows:

For small scale project activity instances (i.e. project activity instances with capacity less than 15 MW as per CDM terminology): Additionality for the small scale project activity instances to be included in the proposed grouped project activity is defined as follows:

Methodological tool – Demonstration of additionality for small scale project activities⁷ (paragraph 10) refers to demonstrate that the project activity would not have occurred anyway due to at least one of the following barriers:

a) **Investment barrier:** a financially more viable alternative to the project activity would have led to higher emissions;

b) **Technological barrier:** a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions

c) **Barrier due to prevailing practice:** prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;

d) **Other barriers:** Without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

Further, paragraph 11 of the said methodological tool refers that, documentation of barriers is not required for the positive list of technologies and project activity types that are defined as automatically additional for project sizes up to and including the small-scale CDM thresholds (e.g. installed capacity up to 15 MW). The positive list comprises of:

- a) Solar technologies (photovoltaic and solar thermal electricity generation);
- b) Off-shore wind technologies;
- c) Marine technologies (wave, tidal).
- d) Building-integrated wind turbines or household rooftop wind turbines of a size up to 100 kW;

The small scale project activity instances to be included in the proposed grouped project activity are grid connected solar photovoltaic electricity generation projects having capacity less than 15 MW and hence, will fall under the positive list of technologies as mentioned above. This demonstrates the additionality for small scale project activity instances to be included in the proposed grouped project activity is demonstrated.

The project activity instances 2 to 5 are small scale project activity instances and are auto additional.

Presently, there are new Solar PV project activity instances 7 to 11 with capacity less than 15MW are included under the grouped project. The new project activity instances 7 to 11 with capacity less than 15 MW are 6.8 MW Solar Project at Vijaypur in Telangana, 0.8 MW Solar Project at Hotgi in Maharashtra, 5 MW Solar Project at Gotan in Rajasthan, 5 MW Solar Project at Sevagram in Gujarat and 0.8 MW Solar PV Project at Pune in Maharashtra. Thus, these will fall under the positive list of technologies that are automatically additional as mentioned above.

For large scale project activity instances (i.e. project activity instances with capacity more than 15 MW as per CDM terminology): Additionality for the large scale project activity instances (capacity more than 15 MW) to be included in the grouped project activity under consideration is defined as follows:

For demonstration of additionality of large scale project activity instances, Simplified procedure to demonstrate additionality is used in line with paragraph 29 of methodology ACM0002 (version 16.0). Section “**5.3.1. Simplified procedure to demonstrate additionality**” of ACM0002 (version 16) states following:

The simplified procedure to demonstrate additionality is applicable to the following grid connected electricity generation technologies (positive list):

- (a) Solar photovoltaic technologies;*
- (b) Solar thermal electricity generation including concentrating Solar Power (CSP);*
- (c) Off-shore wind technologies;*
- (d) Marine wave technologies;*
- (e) Marine tidal technologies.*

The large scale project activity instances to be included into the grouped project activity will use Solar Photovoltaic Technology for power generation. Hence in line with requirements specified above, the Simplified procedure to demonstrate additionality can be used for demonstrating additionality of the project activity instances.

Further, paragraph 30 of the methodology ACM0002 (version 16.0) states as follows:

A specific technology in the positive list is defined as automatically additional if at the time of PDD submission any of the following conditions is met:

- (a) The percentage share of total installed capacity of the specific technology in the total installed grid connected power generation capacity in the host country is equal to or less than two per cent; or*
- (b) The total installed capacity of the technology in the host country is less than or equal to 50 MW.*

Hence in accordance with paragraph 29 and 30 of methodology ACM0002 (version 16.0) the additionality has been demonstrated for existing large scale project activity instance 1. During registration of project activity, project activity instance 1 was fulfilling this criteria and this project activity instance 1 is auto additional.

As on 31/12/2018, total installed capacity is 349288.22 MW, out of which 25212.26 MW is from solar and it is around 7% of total installed capacity, thus 2% criteria is not applicable for future instances. Please refer below web link for % contribution of solar out of total installed capacity. http://www.cea.nic.in/reports/monthly/installedcapacity/2018/installed_capacity-12.pdf

Currently the percentage share of total installed capacity of the specific technology (solar PV) in the total installed grid connected power generation capacity in the host country is greater than 2%, hence para 30 of ACM0002 ver 16 is not applicable and para 33 of ACM0002 ver 16 has been followed by future new project activity instance. The additionality of the new large scale project activity instance is demonstrated using the latest version of the "Tool for the demonstration and assessment of additionality"

The additionality demonstration of large scale projects will be demonstrated through investment analysis.

For the new project activity instance 6 and future large scale project activity instances, demonstration of additionality has been done as per para 33 of ACM0002 using the methodological tool "Tool for the demonstration and assessment of additionality" and the same has been demonstrated in VCS MR during verification of project activity.

2.6 Methodology Deviations

Not applicable.

3 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

Baseline emissions include only CO₂ emissions from electricity generation in grid connected power plants that would have generated equivalent amount of electricity in the absence of the project activity. The baseline scenario assumes that all project electricity generation would have been generated by existing/new grid-connected power plants. The baseline emissions for the project activity instances to be included in the grouped project activity under consideration are estimated as follows:

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

Where:

BE_y = Baseline emissions in year y (t CO₂)

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

$EF_{grid,y}$ = 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).

Also as per the applied methodology AMS I.F. baseline emissions are being calculated as follows:

$$BE_y = EG_{BL,y} * EF_{CO2,CM,y}$$

Where $EG_{BL,y}$ = Quantity of net electricity displaced in year y

$EF_{CO2,CM,y}$ = Combined margin CO₂ emission factor for grid connected power generation

Determination of combined margin CO₂ emission factor for grid:

The combined margin emission factor is calculated using the methodological tool – Tool to calculate the emission factor for an electricity system (version 05.0).

The Central Electricity Authority, Ministry of Power, Government of India publishes CO₂ baseline database for Indian Power Sector. The latest database – version 10⁴ was published in December 2014. This latest version has been prepared in line with requirements as specified in CDM methodological tool – Tool to calculate the emission factor for an electricity system (version 05.0).

⁴ Available at: http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/database_10.zip

Simple operating margin emission factor as per the said database is as represented in the table below:

Simple Operating Margin (tCO₂/MWh) (excl. Imports) (1)					
	2009-10	2010-11	2011-12	2012-13	2013-14
NEWNE	0.99	0.98	0.98	1.00	1.00
South	0.94	0.93	0.95	0.99	1.02
India	0.98	0.97	0.97	1.00	1.01

Build margin emission factor as per the said database is as represented in the table below:

Build Margin (tCO₂/MWh) (excl. Imports)					
	2009-10	2010-11	2011-12	2012-13	2013-14
NEWNE	0.82	0.87	0.93	0.98	0.95
South	0.80	0.83	0.87	0.95	0.96
India	0.82	0.86	0.92	0.97	0.95

Paragraph 80 of the tool to calculate emission factor for an electricity system (version 05.0) specifies calculation of weighted average combined margin emission factor as follows:

$$EF_{\text{grid,CM,y}} = EF_{\text{grid,OM,y}} * W_{\text{OM}} + EF_{\text{grid,BM,y}} * W_{\text{BM}}$$

Where:

$EF_{\text{grid,BM,y}}$ = Build margin CO₂ emission factor in year y (t CO₂/MWh).

$EF_{\text{grid,OM,y}}$ = Operating margin CO₂ emission factor in year y (t CO₂/MWh)

W_{OM} = Weighting of operating margin emissions factor (per cent)

W_{BM} = Weighting of build margin emissions factor (per cent)

Paragraph 81 of the said tool provides default values to be used for w_{OM} and w_{BM} :

- a) Wind and solar power generation project activities: $W_{\text{OM}} = 0.75$ and $W_{\text{BM}} = 0.25$ (owing to their intermittent and non-dispatchable nature) for the first crediting period and for subsequent crediting periods;
- b) All other projects: $W_{\text{OM}} = 0.5$ and $W_{\text{BM}} = 0.5$ for the first crediting period, and $w_{\text{OM}} = 0.25$ and $w = 0.75$ for the second and third crediting period, unless otherwise specified in the approved methodology which refers to this tool.

Since the grouped project activity under consideration involve project activity instances of solar power generation activities, hence $W_{\text{OM}} = 0.75$ and $W_{\text{BM}} = 0.25$ will be used for the first crediting period and for subsequent crediting periods for all the project activity instances to be included in the grouped project activity under consideration.

Accordingly, the emission factor for NEWNE grid is calculated as follows:

$$\begin{aligned} EF_{\text{grid,CM,y}} &= EF_{\text{grid,OM,y}} * W_{\text{OM}} + EF_{\text{grid,BM,y}} * W_{\text{BM}} \\ &= 0.9862 * 0.75 + 0.9495 * 0.25 \\ &= 0.9770 \text{ t CO}_2/\text{MWh} \end{aligned}$$

Accordingly, the emission factor for Southern grid is calculated as follows:

$$\begin{aligned} EF_{\text{grid,CM,y}} &= EF_{\text{grid,OM,y}} * W_{\text{OM}} + EF_{\text{grid,BM,y}} * W_{\text{BM}} \\ &= 0.9887 * 0.75 + 0.9609 * 0.25 \\ &= 0.9817 \text{ t CO}_2/\text{MWh} \end{aligned}$$

The emission factor for NEWNE grid is applicable for project activity instances connected to NEWNE grid and emission factor for Southern grid is applicable for project activity instances connected to southern grid.

3.2 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 3) and paragraph 35 of the large scale methodology ACM0002 (version 16.0). Hence,

$$PE_y = 0$$

3.3 Leakage

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 3) and paragraph 60 of the large scale methodology ACM0002 (version 16.0).

3.4 Net GHG Emission Reductions and Removals

Based on paragraph 43 of methodology AMS.I.D (version 18.0) and paragraph 61 of methodology ACM0002 (version 16.0) and AMS.I.F (Version 03), net GHG emission reductions are calculated as follows:

$$\begin{aligned} ER_y &= BE_y - PE_y - LE_y \\ ER_y &= \text{Emission reductions in year } y \text{ (tCO}_2\text{e/yr)} \\ BE_y &= \text{Baseline emissions in year } y \text{ (tCO}_2\text{e/yr)} \\ PE_y &= \text{Project emissions in year } y \text{ (tCO}_2\text{e/yr).} \\ LE_y &= \text{Leakage emissions in year } y \text{ (tCO}_2\text{e/yr)} \end{aligned}$$

Since $PE_y = LE_y = 0$, Hence $ER_y = BE_y$

Estimated emission reductions are being depicted below:

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
Year 1	247,123	0	0	247,123
Year 2	247,123	0	0	247,123
Year 3	247,123	0	0	247,123
Year 4	247,123	0	0	247,123
Year 5	247,123	0	0	247,123
Year 6	247,123	0	0	247,123
Year 7	247,123	0	0	247,123
Year 8	247,123	0	0	247,123
Year 9	247,123	0	0	247,123
Year 10	247,123	0	0	247,123
Total	2,471,230	0	0	2,471,230

Estimated emission reduction of the individual project activity instances are being demonstrated below:

Project Activity Instance	Investor Name/Location	Capacity (MW)	COD	PLF	Net Generation	Emission reductions
					(MWh/year)	(t CO ₂ e)
1	Bhadla	20	12-Mar-14	17.10%	29,959	29270
2	Achampet	5	07-Jul-14	16.68%	7,305	7171
3	Kalwakurthy	10	30-Jun-14	16.89%	14,795	14524
4	Salakpur	10	17-Sep-14	16.56%	14,506	14240
5	Alladurg	10	28-Jul-14	17.07%	14,953	14679
6	Shirahatti	20	11-May-17	21.17%	37,089	36410
	Ramadurg	20	12-May-17	21.23%	37,194	36513
	Mulbangal	20	13-Oct-17	21.28%	37,282	36599
	ABRL-Bijapur	17	26-Mar-18	18.10%	26,954	26460
7	Bijapur	6.8	26-Mar-18	18.00%	10,722	10525
8	Hotgi	0.8	20-Jun-18	20.93%	1,466	1432
9	Gotan	5	01-Feb-18	20.93%	9,167	8956
10	Sevagram	5	14-Aug-18	20.93%	9,167	8956
11	Pune	0.8	01-Feb-18	20.28%	1,421	1388
Total		150.4			251,980	247,123
Total in 10 Years					2519802	2471230

4 MONITORING

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{Grid,CM,y}$
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) and ACM0002 (version 16.0) and Tool to calculate the emission factor for an electricity system (version 05.0).
Purpose of the data	Calculation of baseline emissions
Comments	The combined margin emission factor for respective projects are applied depending on which grid they operate in.

The parameter Combined margin emission factor for National Grid in year y for the proposed grouped project activity only used for emission reductions and additionality is demonstrated as per “Tool for the demonstration and assessment of additionality”, hence the below parameters mentioned in initial registered VCS PD are not mentioned in VCS PD.

The percentage share of total installed capacity of the specific technology, Weight of operating margin emission factor for calculating the emission factor, Weight of Build margin emission factor for calculating the emission factor, Build margin emission factor for respective Grid in year y, Operating margin emission factor for respective Grid in year.

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	Continuous monitoring and monthly recording

monitoring/recording	
Value applied	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 –29,270 2. Project Activity Instance- 2 –7,171 3. Project Activity Instance- 3 –14,524 4. Project Activity Instance- 4 –14,240 5. Project Activity Instance- 5 –14,679 6. Project Activity Instance- 6 –135,982 7. Project Activity Instance- 7 –10,525
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 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.

Data / Parameter	$EG_{BL,y}$
Data unit	MWh
Description	Net electricity displaced by the project activity instance during the year y (for AMS I.F component)
Source of data	The quantity of net electricity displaced by the project activity is taken from monthly "Joint Meter Reading" report or Monthly report which contains monthly energy meter reading
Description of measurement methods and procedures to be applied	Net electricity displaced is calculated based on the measured values of "export" on the meter at the delivery point, where monthly joint meter reading is taken.
Frequency of	Continuous monitoring and monthly recording

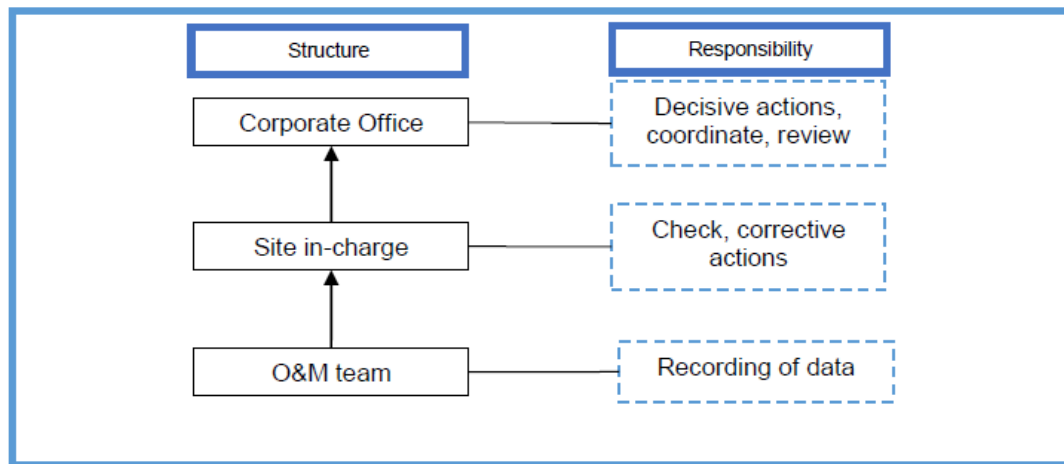
monitoring/recording	
Value applied	Estimated values of net electricity displaced by project will be monitored for each of the project activity instance separately. Following are values for all project activity instances: 1. Project Activity Instance- 8 –1,432 2. Project Activity Instance- 9 –8,956 3. Project Activity Instance- 10 – 8,956 4. Project Activity Instance- 11 –1,388
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 displaced by meters installed at site. 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 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:**

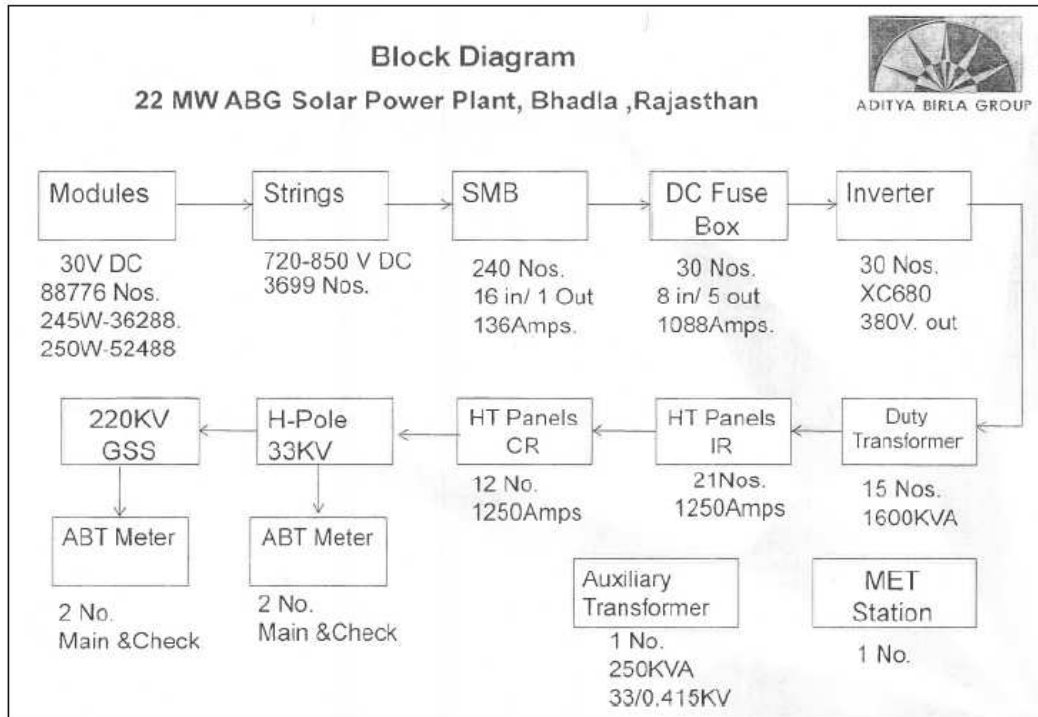
1. Project proponent, representative from GSS and representative from the power purchaser shall jointly read the metering system on every month at the delivery point.
2. In the event that the main metering system is not in service as a result of maintenance, repairs or testing, then the back-up metering 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 Back-up 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:

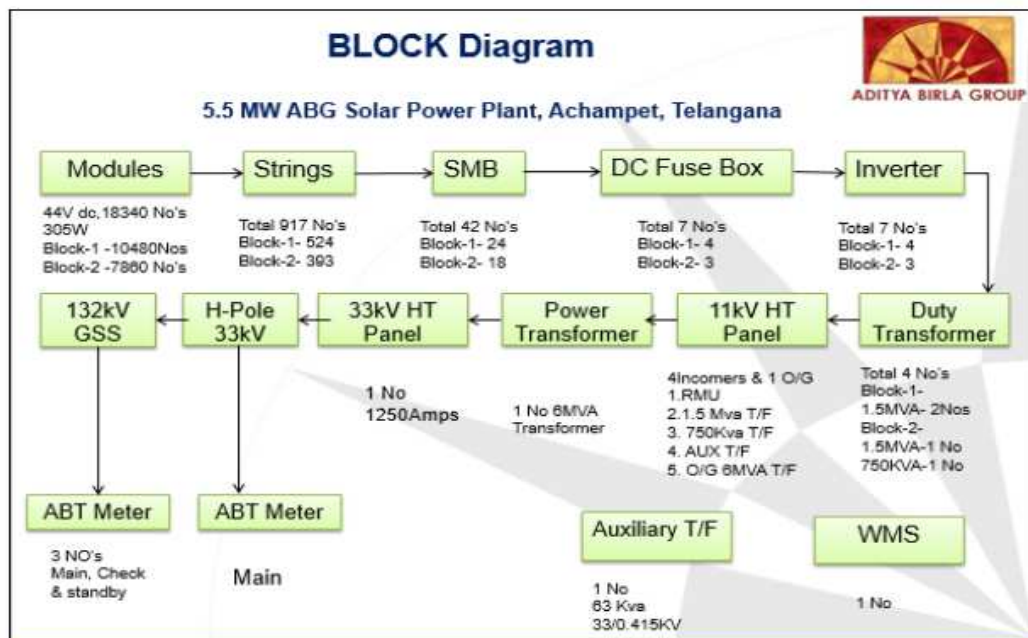
1. The main metering system and back-up metering system shall be sealed in the presence of representative of project proponent, representative from GSS and representative from the power purchaser.
2. When the main metering system and/or back-up metering system and/or any component thereof is found to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

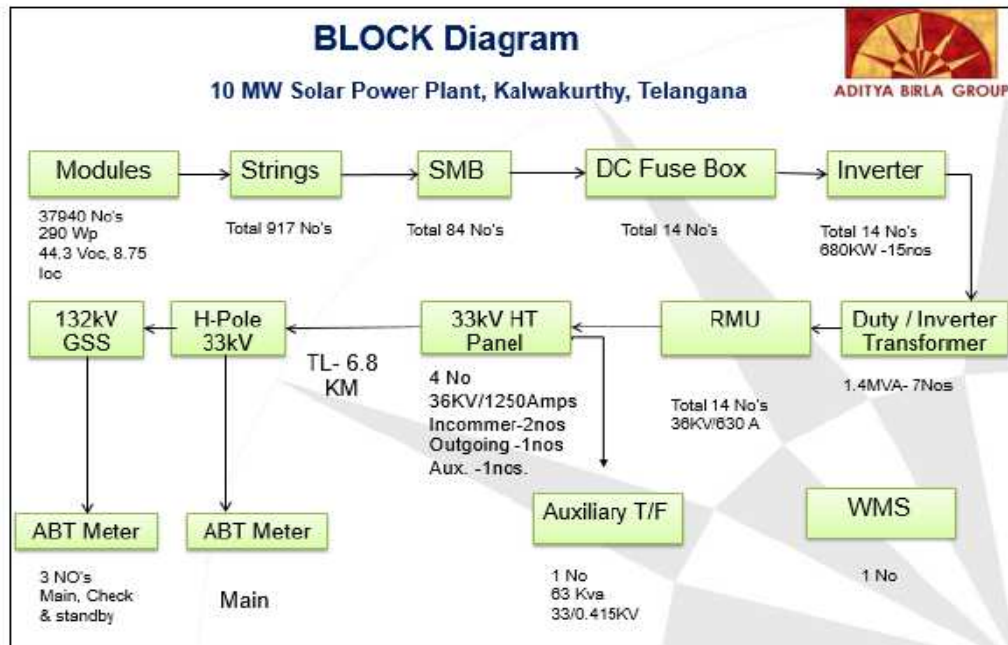
Instance 1



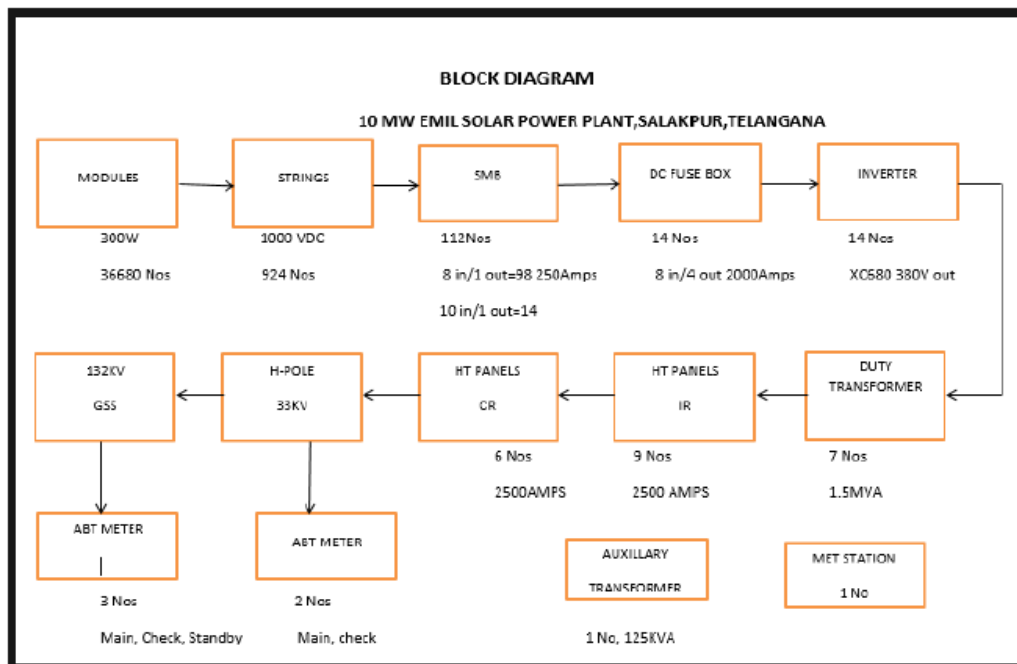
Instance 2



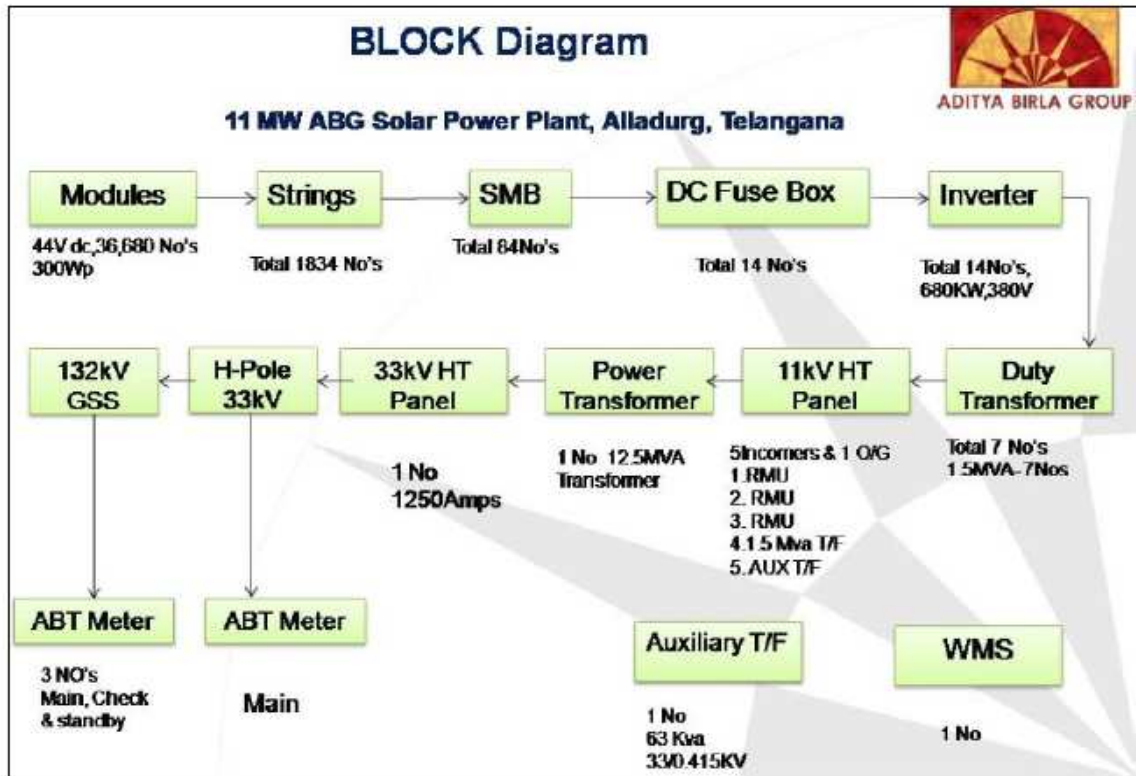
Instance 3



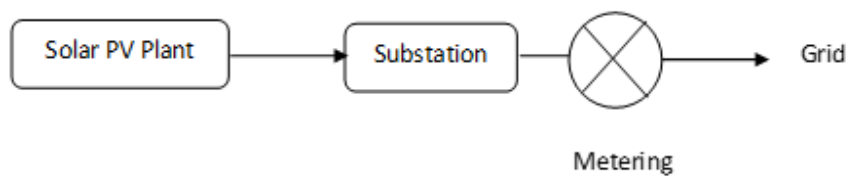
Instance 4



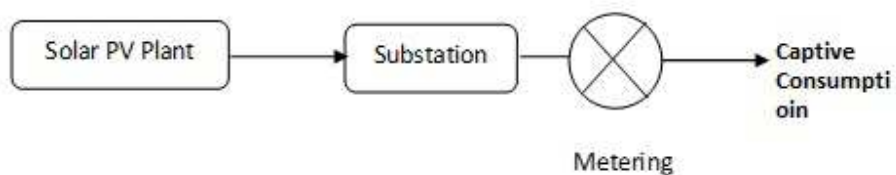
Instance 5



Line Diagram for the Instance 6 and 7



Line Diagram for the Instance 8 to 11



5 SAFEGUARDS

5.1 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.

5.2 Environmental Impact

Solar PV is one of the cleanest sources of renewable energy, with no associated emissions and waste products. In India, Environmental Impact Assessment (EIA) of solar power project is not an essential regulatory requirement. The Schedule-1 of Environment Impact Assessment (EIA) Notification 1994 and 2006 have covered 30 and 8 sectors respectively which are required to conduct EIA. However solar PV projects are not covered under the Schedule 1. Moreover, the project activity affects the environment in favourable manner by generating a clean energy. Therefore EIA is not required for the project activity under consideration.

5.3 Local Stakeholder Consultation

The project proponents organized stakeholders meeting in order to take into account the concerns of the nearby villagers regarding the project implementation. 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. For the VCS grouped project activity under consideration, stakeholder consultation was held at each of the project activity instance site. Relevant outcomes from respective stakeholder consultations for each of the eleven project activity instance are provided as follows:

Instance – 1: Bhadla: The stakeholder meeting for the VCS project activity instance -1 at Bhadla was held at the plant site on September 12, 2015. Stakeholders were invited for the meeting by sending invitations in the form of notification in newspapers (public notice was published in Dainik Bhaskar on 28th August 2015) and by personalized invitations to key stakeholders such as government officials, panchayat representatives and other relevant organizations. Newspaper notification was published in local newspaper in local language and in English . Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

⁵ http://envfor.nic.in/sites/default/files/Latest_118_Final_Directions.pdf

There were no negative comments received during the meeting and stakeholders appreciated proactive efforts taken by project proponent towards reducing emissions.

Instance – 2: Achampet: The stakeholder meeting for the VCS project activity instance 2 at Achampet was held at the plant site on September 14, 2015. Stakeholders were invited for the meeting by sending invitations in the form of notification in newspapers and by personalized invitations to key stakeholders such as government officials, panchayat representatives and other relevant organizations. Newspaper notification was published in newspaper – The Hindu on 26th August 2015 in local language and in English. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

There were no negative comments received during the meeting and stakeholders appreciated proactive efforts taken by project proponent towards reducing emissions.

Instance – 3: Kalwakurthy: The stakeholder meeting for the VCS project activity instance -3 at Kalwakurthy was held at the plant site on September 14, 2015. Stakeholders were invited for the meeting by sending invitations in the form of notification in newspapers and by personalized invitations to key stakeholders such as government officials, panchayat representatives and other relevant organizations. Newspaper notification was published in newspaper – The Hindu on 26th August 2015 in local language and in English. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

There were no negative comments received during the meeting and stakeholders appreciated proactive efforts taken by project proponent towards reducing emissions.

Instance – 4: Salakpur: The stakeholder meeting for the VCS project activity instance -4 at Salakpur was held at the plant site on September 15, 2015. Stakeholders were invited for the meeting by sending invitations in the form of notification in newspapers and by personalized invitations to key stakeholders such as government officials, panchayat representatives and other relevant organizations. Newspaper notification was published in newspaper - – The Hindu on 26th August 2015 in local language and in English. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

There were no negative comments received during the meeting and stakeholders appreciated proactive efforts taken by project proponent towards reducing emissions.

Instance – 5: Alladurg: The stakeholder meeting for the VCS project activity instance -5 at Alladurg was held at the plant site on September 16, 2015. Stakeholders were invited for the meeting by sending invitations in the form of notification in newspapers and by personalized invitations to key stakeholders such as government officials, panchayat representatives and other relevant organizations. Newspaper notification was published in newspaper – The Hindu on 26th August 2015 in local language and in English. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

Instance – 6: Karnataka: The stakeholder meeting for the VCS project activity instance -6 at Karnataka site was held at the plant site on September 22, 2016. Stakeholders were invited for the meeting by means of public notice and sending personal invitations on 15th September 2016) to key stakeholders such as government officials, panchayat representatives and other relevant organizations. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

There were no negative comments received during the meeting and stakeholders appreciated proactive efforts taken by project proponent towards reducing emissions.

Instance – 7: Vijaypur: The stakeholder meeting for the VCS project activity instance -6 at Vijaypur site was held at the plant site on September 23, 2016. Stakeholders were invited for the meeting by means of public notice and sending personal invitations on 15th September 2016) to key stakeholders such as government officials, panchayat representatives and other relevant organizations. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

Instance – 8: Hotgi: The stakeholder meeting for the VCS project activity instance -8 at Hotgi site was held at the plant site on Jan 13, 2017. Stakeholders were invited for the meeting by means of public notice and sending personal invitations on 5th January 2017) to key stakeholders such as government officials, panchayat representatives and other relevant organizations. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

There were no negative comments received during the meeting and stakeholders appreciated proactive efforts taken by project proponent towards reducing emissions.

Instance – 9: Gotan: The stakeholder meeting for the VCS project activity instance -9 at Gotan site was held at the plant site on Nov 10, 2016. Stakeholders were invited for the meeting by means of public notice and sending personal invitations on 5th Nov 2016) to key stakeholders such as government officials, panchayat representatives and other relevant organizations. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

There were no negative comments received during the meeting and stakeholders appreciated proactive efforts taken by project proponent towards reducing emissions.

Instance – 10: Sevagram: The stakeholder meeting for the VCS project activity instance -10 at Sevagram, Gujrat site was held at the plant site on Mar 20, 2018. Stakeholders were invited for the meeting by means of public notice and sending personal invitations on 12th March 2018) to key stakeholders such as government officials, panchayat representatives and local villagers. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

Instance – 11: Pune: The stakeholder meeting for the VCS project activity instance -11 at Pune site was held at the plant site on April 30, 2018. Stakeholders were invited for the meeting by means of public notice and sending personal invitations on 25th April 2018) to key stakeholders such as government officials, panchayat representatives and local villagers. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

There were no negative comments received during the meeting and stakeholders appreciated proactive efforts taken by project proponent towards reducing emissions.

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.

5.4 Public Comments

The project activity is already registered hence this section is not applicable.