



**Verified Carbon  
Standard**

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



Document Prepared by EKI Energy Services Limited

|                          |                                                                                                                                                                                                                                                                                                                                                |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Project Title</b>     | VCS Grouped Project for Renewable Power Generation by Essel Mining and Industries Limited                                                                                                                                                                                                                                                      |
| <b>Version</b>           | 03                                                                                                                                                                                                                                                                                                                                             |
| <b>Report ID</b>         | VCS 1497                                                                                                                                                                                                                                                                                                                                       |
| <b>Date of Issue</b>     | 23-May-2020                                                                                                                                                                                                                                                                                                                                    |
| <b>Project ID</b>        | VCS 1497                                                                                                                                                                                                                                                                                                                                       |
| <b>Monitoring Period</b> | 21-October-2018 to 20-February-2020 (Inclusive of both the dates)                                                                                                                                                                                                                                                                              |
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# CONTENTS

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|          |                                                                                 |           |
|----------|---------------------------------------------------------------------------------|-----------|
| <b>1</b> | <b>PROJECT DETAILS.....</b>                                                     | <b>3</b>  |
| 1.1      | Summary Description of the Implementation Status of the Project .....           | 3         |
| 1.2      | Sectoral Scope and Project Type .....                                           | 10        |
| 1.3      | Project Proponent .....                                                         | 11        |
| 1.4      | Other Entities Involved in the Project .....                                    | 11        |
| 1.5      | Project Start Date .....                                                        | 12        |
| 1.6      | Project Crediting Period .....                                                  | 12        |
| 1.7      | Project Location .....                                                          | 12        |
| 1.8      | Title and Reference of Methodology .....                                        | 16        |
| 1.9      | Participation under other GHG Programs.....                                     | 18        |
| 1.10     | Other Forms of Credit.....                                                      | 18        |
| 1.11     | Sustainable Development.....                                                    | 19        |
| <b>2</b> | <b>SAFEGUARDS .....</b>                                                         | <b>19</b> |
| 2.3      | AFOLU-Specific Safeguards .....                                                 | 24        |
| <b>3</b> | <b>IMPLEMENTATION STATUS .....</b>                                              | <b>24</b> |
| 3.1      | Implementation Status of the Project Activity .....                             | 24        |
| 3.2      | Deviations .....                                                                | 25        |
| 3.3      | Grouped Projects .....                                                          | 26        |
| <b>4</b> | <b>DATA AND PARAMETERS.....</b>                                                 | <b>26</b> |
| 4.1      | Data and Parameters Available at Validation .....                               | 26        |
| 4.2      | Data and Parameters Monitored.....                                              | 26        |
| 4.3      | Monitoring Plan.....                                                            | 29        |
| <b>5</b> | <b>QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS .....</b>             | <b>34</b> |
| 5.1      | Baseline Emissions .....                                                        | 34        |
| 5.2      | Project Emissions .....                                                         | 36        |
| 5.3      | Leakage.....                                                                    | 36        |
| 5.4      | Net GHG Emission Reductions and Removals.....                                   | 36        |
|          | Appendix - 1: Calibration Details.....                                          | 37        |
|          | Appendix – 2: Comparison between actual and estimated Emission Reductions ..... | 38        |

# 1 PROJECT DETAILS

## 1.1 Summary Description of the Implementation Status of the Project

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

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

The 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 tCO<sub>2</sub>e/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 |
|----------------------------|---------------|-------------------------------|----------|-----------------------|-----------------------------------|
|----------------------------|---------------|-------------------------------|----------|-----------------------|-----------------------------------|

|              |                                     |                                                                                 |                                                                                        |                                 | <b>a 10 year period</b> |
|--------------|-------------------------------------|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|---------------------------------|-------------------------|
| Instance – 1 | Essel Mining and Industries Limited | VCS Project for Solar Power Plant at Bhadla, Rajasthan                          | Bhadla Solar Park, Village – Bhadla, Tehsil – Bap, District – Jodhpur, Rajasthan India | 12 <sup>th</sup> March 2014     | 29,270                  |
| Instance – 2 |                                     | VCS Project for Solar Power plant at Achampet, Telagana                         | 5 MW Solar Power Plant, Achampe t Village and Mandal, Dist. Mehaboo bnagar,            | 07 <sup>th</sup> July 2014      | 7,171                   |
| Instance – 3 |                                     | VCS Project for Solar Power Plant at Kalwakurthy, Dist. Mehabubnagar, Telangana | Ternikal Village, KalwakurthyMandal , Dist. Mehaboo bnagar, Telangan a, India.         | 30 <sup>th</sup> June 2014      | 14,524                  |
| Instance – 4 |                                     | VCS Project for Solar Power Plant at Salakpur, Telangana                        | Village: Salakpur District: Warangal State:                                            | 17 <sup>th</sup> September 2014 | 14,240                  |

|              |                                                          |                                                                      |                            |        |
|--------------|----------------------------------------------------------|----------------------------------------------------------------------|----------------------------|--------|
|              |                                                          | Telangana, India                                                     |                            |        |
| Instance – 5 | VCS Project for Solar Power Plant at Alladurg, Telangana | Village: Bhiaramdhibba<br>District: Medak<br>State: Telangana, India | 28 <sup>th</sup> July 2014 | 14,679 |

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

The details of new project activity instances are as below:

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

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

|               |                                       |                                                              |                                                                                       |                           |       |
|---------------|---------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------|-------|
|               |                                       |                                                              | Solapur State:<br>Maharashtra, India                                                  |                           |       |
| Instance – 9  |                                       | VCS Project for Solar Power Plant at Gotan, Rajasthan, India | Village: KhariaKhanagar, Tehsil: Bhopalgarh District: Jodhpur State: Rajasthan, India | 1 <sup>st</sup> Feb 2018  | 8,956 |
| Instance – 10 | Aditya Birla Renewables SPV 1 Limited | VCS Project for Solar Power Plant at Sevagram, Gujarat       | Village: Sevagram, Tal- Abdasa District: Kutch State: Gujarat, India                  | 14 <sup>th</sup> Aug 2018 | 8,956 |
| Instance – 11 | Aditya Birla Renewables SPV 1 Limited | VCS Project for Solar Power Plant at Pune, Maharashtra       | Village: Peth, Tal Havelim Dist Pune, Maharashtra, India                              | 1 <sup>st</sup> 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<br>Bhadla     | VCS Project for Solar Power   | Bhadla Solar Park, Village – Bhadla, | 20 MW            | 12/03/2014         |

|                             |                                                                                                   |                                                                                                            |       |            |
|-----------------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-------|------------|
|                             | Plant at<br>Bhadla,<br>Rajasthan                                                                  | Tehsil – Bap,<br>District<br>– Jodhpur,<br>Rajasthan India                                                 |       |            |
| Instance – 2<br>Achampet    | VCS Project for<br>Solar Power<br>plant at<br>Achampet,<br>Telangana                              | 5 MW Solar Power<br>Plant, Achampet<br>Village and Mandal,<br>Dist.<br>Mehaboobnagar,<br>Telangana, India. | 5 MW  | 07/07/2014 |
| Instance – 3<br>Kalwakurthy | VCS Project for<br>Solar Power<br>Plant at<br>Kalwakurthy,<br>Dist.<br>Mehabubnagar,<br>Telangana | Ternikal Village,<br>KalwakurthyMandal,<br>Dist.<br>Mehaboobnagar,<br>Telangana, India.                    | 10 MW | 30/06/2014 |
| Instance – 4<br>Salakpur    | VCS Project for<br>Solar Power<br>Plant at<br>Salakpur,<br>Telangana                              | Village: Salakpur<br>District: Warangal<br>State: Telangana,<br>India                                      | 10 MW | 17/09/2014 |
| Instance – 5<br>Alladurg    | VCS Project for<br>Solar Power<br>Plant at<br>Alladurg,<br>Telangana                              | Village:<br>Bhiaramdhibba<br>District: Medak<br>State: Telangana,<br>India                                 | 10 MW | 28/07/2014 |
| Instance – 6<br>Karnataka   | VCS Project for<br>Solar Power<br>Plant at<br>Karnataka                                           | Village: Bellatti,<br>Shirahatti District:<br>Gadag State:<br>Karnataka,<br>India                          | 20 MW | 11/05/2017 |
|                             |                                                                                                   | Village: Chandargi,<br>Kaktol, Ramadurg<br>Taluk<br>District: Belagavi<br>State: Karnataka,<br>India       | 20 MW | 12/05/2017 |
|                             |                                                                                                   | Village: Mulbangal,                                                                                        | 20 MW | 13/10/2017 |

|                          |                                                              |                                                                                               |        |            |
|--------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------|------------|
|                          |                                                              | District: Kolar State: Karnataka, India                                                       |        |            |
|                          |                                                              | Village: DevarNimbargi,<br>District: Vijayapura<br>State: Karnataka, India                    | 17 MW  | 26/03/2018 |
| Instance – 7<br>Bijapur  | VCS Project for Solar Power Plant at Vijaypur                | Village: DevarNimbargi,<br>District: Vijayapura<br>State: Karnataka, India                    | 6.8 MW | 26/03/2018 |
| Instance – 8<br>Hotgi    | VCS Project for Solar Power Plant at Hotgi, Maharashtra      | Village: Hotgi,<br>Tal South<br>Solapur District:<br>Solapur<br>State: Maharashtra, India     | 0.8 MW | 20/06/2018 |
| Instance – 9<br>Gotan    | VCS Project for Solar Power Plant at Gotan, Rajasthan, India | Village: KhariaKhangar,<br>Tehsil: Bhopalgarh<br>District: Jodhpur<br>State: Rajasthan, India | 5 MW   | 01/02/2018 |
| Instance – 10<br>Gujarat | VCS Project for Solar Power Plant at Sevagram, Gujrat        | Village: Sevagram,<br>Tal- Abdasa District:<br>Kutch<br>State: Gujarat, India                 | 5 MW   | 14/08/2018 |
| Instance – 11<br>Pune    | VCS Project for Solar Power Plant at Pune, Maharashtra       | Village: Peth<br>District: Pune<br>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 CO<sub>2</sub>.

## 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/W3TINZ7KKWCK7L8WTFQOQFQQH4SBK>

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 | <b>Essel Mining and Industries Limited</b>                                                      |
| Contact person    | Surjo Sinha                                                                                     |
| Title             | Authorized Signatory                                                                            |
| Address           | A-4, Aditya Birla Center, Sk Ahire Marg, Worli Mumbai, Mumbai City, Maharashtra, 400030, India. |
| Telephone         | +91-7039040554                                                                                  |
| Email             | <a href="mailto:surjo.sinha@adityabirla.com">surjo.sinha@adityabirla.com</a>                    |

|                   |                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------------------|
| Organization name | <b>Aditya Birla Solar Limited</b>                                                               |
| Contact person    | Surjo Sinha                                                                                     |
| Title             | Authorized Signatory                                                                            |
| Address           | A-4, Aditya Birla Center, Sk Ahire Marg, Worli Mumbai, Mumbai City, Maharashtra, 400030, India. |
| Telephone         | +91-7039040554                                                                                  |
| Email             | <a href="mailto:surjo.sinha@adityabirla.com">surjo.sinha@adityabirla.com</a>                    |

|                   |                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------------------|
| Organization name | <b>Aditya Birla Renewables Limited</b>                                                          |
| Contact person    | Surjo Sinha                                                                                     |
| Title             | Authorized Signatory                                                                            |
| Address           | A-4, Aditya Birla Center, Sk Ahire Marg, Worli Mumbai, Mumbai City, Maharashtra, 400030, India. |
| Telephone         | +91-7039040554                                                                                  |
| Email             | <a href="mailto:surjo.sinha@adityabirla.com">surjo.sinha@adityabirla.com</a>                    |

|                   |                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------------------|
| Organization name | <b>Aditya Birla Renewables SPV1 Limited</b>                                                     |
| Contact person    | Surjo Sinha                                                                                     |
| Title             | Authorized Signatory                                                                            |
| Address           | A-4, Aditya Birla Center, Sk Ahire Marg, Worli Mumbai, Mumbai City, Maharashtra, 400030, India. |
| Telephone         | +91-7039040554                                                                                  |
| Email             | <a href="mailto:surjo.sinha@adityabirla.com">surjo.sinha@adityabirla.com</a>                    |

## 1.4 Other Entities Involved in the Project

|                     |                                                                                                                |
|---------------------|----------------------------------------------------------------------------------------------------------------|
| Organization name   | <b>EKI Energy Services Limited</b>                                                                             |
| Role in the Project | Project Consultant                                                                                             |
| Contact person      | Pankaj Rajpoot                                                                                                 |
| Title               | Project Manager                                                                                                |
| Address             | EnKing Embassy, Office No 201, Plot 48, Scheme 78, Part 2, Vijay Nagar, Indore- 452010, Madhya Pradesh, India. |
| Telephone           | +91-7828347589                                                                                                 |
| Email               | <a href="mailto:pankaj@enkingint.org">pankaj@enkingint.org</a>                                                 |

## 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:

Project start date: **12<sup>th</sup> 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 12<sup>th</sup> March 2014 and end date will be 11<sup>th</sup> March 2024.

## 1.7 Project Location

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

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

North: 33.24902°N 76.82704°E

South: 6.74678°N 93.84260°E

East: 27.12622°N 97.16712°E

West: 23.71307°N 68.03215°E

The map is as indicated in the following figure.



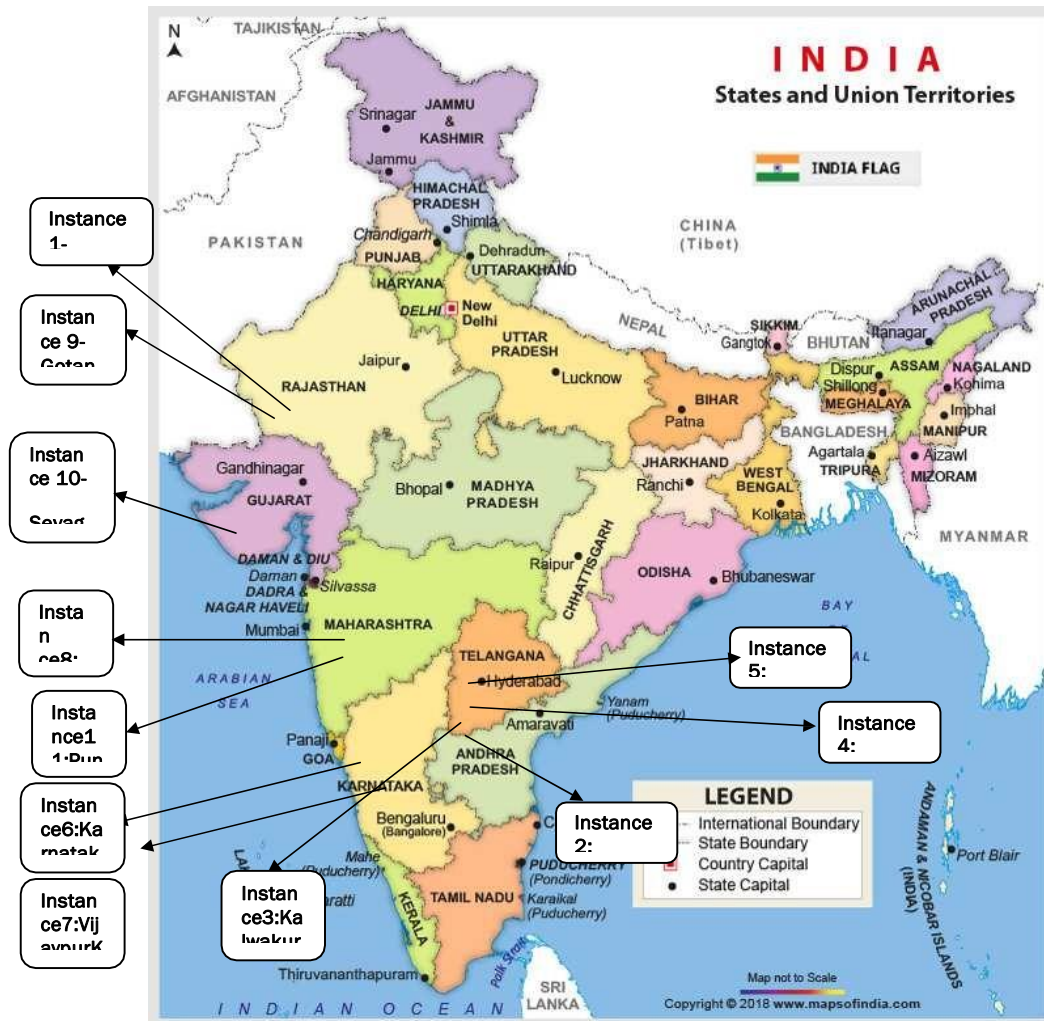
The geographic boundaries, geo-coordinates for project activity instance included in the grouped project activity are as follows:

| Project activity instances | Title of the project activity                          | Location                                                                              | Project Owner | Geo Coordinates                             |
|----------------------------|--------------------------------------------------------|---------------------------------------------------------------------------------------|---------------|---------------------------------------------|
| Instance – 1<br>Bhadla     | VCS Project for Solar Power Plant at Bhadla, Rajasthan | Bhadla Solar Park, Village –Bhadla, Tehsil – Bap, District – Jodhpur, Rajasthan India |               | Latitude: 27.561° N<br>Longitude: 71.929° E |
| Instance – 2<br>Achampet   | VCS Project for Solar Power plant at                   | 5 MW Solar Power Plant, Achampet Village and                                          |               | Latitude: 16.4° N<br>Longitude: 78.6° E     |

|                                |                                                                                                       |                                                                                                     |                                           |                                                                            |
|--------------------------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------|
|                                | Achampet,<br>Telagana                                                                                 | Mandal, Dist.<br>Mehaboobnagar,<br>Telangana, India.                                                | Essel<br>Mining and<br>Industries<br>Ltd. |                                                                            |
| Instance –<br>3<br>Kalwakurthy | VCS Project<br>for Solar<br>Power Plant at<br>Kalwakurthy,<br>Dist.<br>Mehabubnagar<br>,<br>Telangana | Ternikal Village,<br>KalwakurthyMandal<br>, Dist.<br>Mehaboobnagar,<br>Telangana, India.            |                                           | Latitude: 16.7 <sup>0</sup> N<br>Longitude: 78.5 <sup>0</sup> E            |
| Instance –<br>4 Salakpur       | VCS Project<br>for Solar<br>Power Plant at<br>Salakpur,<br>Telangana                                  | Village: Salakpur<br>District: Warangal<br>State: Telangana,<br>India                               |                                           | Latitude: 17.89 <sup>0</sup> N<br>Longitude: 79.05 <sup>0</sup> E          |
| Instance –<br>5 Alladurg       | VCS Project<br>for Solar<br>Power Plant at<br>Alladurg,<br>Telangana                                  | Village:<br>Bhiaramdhibba<br>District: Medak<br>State: Telangana,<br>India                          |                                           | Latitude: 17.94 <sup>0</sup> N<br>Longitude: 77.92 <sup>0</sup> E          |
| Instance –<br>6<br>Karnataka   | VCS Project<br>for Solar<br>Power Plant at<br>Karnataka                                               | Village: Bellatti,<br>Shirahatti District:<br>Gadag State:<br>Karnataka,<br>India                   | Aditya Birla<br>Solar<br>Limited          | Latitude 15.09 <sup>0</sup> N ,<br>Longitude: 75.623 <sup>0</sup> E        |
|                                |                                                                                                       | Village: Chandargi,<br>Kaktol, Ramadurg<br>Taluk District:<br>BelagaviState:<br>Karnataka,<br>India | Aditya Birla<br>Solar<br>Limited          | Latitude: 16.021 <sup>0</sup> N,<br>Longitude: 75.127 <sup>0</sup> E       |
|                                |                                                                                                       | Village: Mulbantal,<br>District: Kolar<br>State: Karnataka,<br>India                                |                                           | Latitude:13°05'04.4" N,<br>Longitude:78°17'28<br>.8" E                     |
|                                |                                                                                                       | Village:<br>DevarNimbargi,<br>District: Vijayapura                                                  | Aditya Birla<br>Renewable<br>s Limited    | Latitude:17.250426<br><sup>0</sup> N ,<br>Longitude:75.660746 <sup>0</sup> |

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

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



## 1.8 Title and Reference of Methodology

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

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

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

**Methodology:** AMS.I.D

**Project Type: Type-I: Renewable Energy Projects**

**Title:** Grid connected renewable electricity generation

**Version No.:** Version 18; EB 81

**Reference:** CDM Methodologies:

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

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

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

**Methodology:** AMS.I.F

**Project Type:** Type-I: Renewable Energy Projects

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

**Version No.:** Version 3; EB 81

**Reference:** CDM Methodologies:

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

**The methodology refers to following CDM Tools:**

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

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

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

**Methodology:** ACM0002

**Project Type:** Type-I: Renewable Energy Projects

**Title:** Grid-connected electricity generation from renewable sources

**Version No.:** Version 16; EB 81

**Reference:** CDM Methodology:

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

**The methodology refers to following CDM Tools:**

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

## 1.9 Participation under other GHG Programs

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

## 1.10 Other Forms of Credit

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

However it can be crosschecked that PP is not claiming REC benefits, the same can be verified with the REC accreditation body of India<sup>1</sup>

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<sup>1</sup>[https://recregistryindia.nic.in/index.php/general/publics/accredited\\_regens\\_pdf](https://recregistryindia.nic.in/index.php/general/publics/accredited_regens_pdf)

## 1.11 Sustainable Development

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

**Social Well-being:** Installation of the project 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<sub>x</sub>, NO<sub>x</sub> 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 wellbeing in power generation sector in India.

# 2 SAFEGUARDS

## 2.1 No Net Harm

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

Also as per the Central Pollution Control Board of India notification<sup>5</sup> Solar PV project falls under White Category and are practically non-polluting.

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

## 2.2 Local Stakeholder Consultation

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 DainikBhaskar on 28<sup>th</sup> 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.

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 26<sup>th</sup> 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 26<sup>th</sup> 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 26<sup>th</sup> 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 26<sup>th</sup> 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 15<sup>th</sup> 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 Hotgisite 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 Gotansite 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.

| S.No. | Instance Number             | Comment/Grievance Received                                            | Date       | Action Taken                                                                      | Date       | Result         |
|-------|-----------------------------|-----------------------------------------------------------------------|------------|-----------------------------------------------------------------------------------|------------|----------------|
| 1     | Instance – 3<br>Kalwakurthy | Roads to the Site are illegitimate                                    | 20-12-2018 | Proper roads were made to the site                                                | 22-01-2019 | Issue resolved |
| 2     | Instance- 7<br>Vijaypur     | No proper street lighting facility on the way to the site             | 03-03-2019 | Proper street lighting were constructed on the side ways of the road              | 10-04-2019 | Issue resolved |
| 3     | Instance- 7<br>Vijaypur     | Improper water management at site leads to shortage of drinking water | 05-05-2019 | Designated RO were installed only for sole water in drinking purpose              | 20-05-2019 | Issue resolved |
| 4     | Instance – 9<br>Gotan       | Improper garden management at the site                                | 08-10-2019 | A gardener was hired to take care of the garden                                   | 12-10-2019 | Issue resolved |
| 5     | Instance – 10<br>Sevagram   | Shortage of additional help                                           | 01-12-2019 | Additional helper boy was hired to ensure the proper help given to the employees. | 05-12-2019 | Issue resolved |

## 2.3 AFOLU-Specific Safeguards

Not Applicable

# 3 IMPLEMENTATION STATUS

## 3.1 Implementation Status of the Project Activity

The project activity is a grouped project activity in which various project instances 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.

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

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

**Technical specifications of above project activity instances are as follows:**

| Project activity instances | Capacity | PV Modules                                                                     | Inverters                                             |
|----------------------------|----------|--------------------------------------------------------------------------------|-------------------------------------------------------|
| Instance – 1<br>Bhadla     | 20 MW    | 36,288 nos. (245 Wp each)<br>52,488 nos. (250 Wp each)<br>Manufactured by CSun | 30 nos.(680 kVA each)<br>Manufactured by<br>Schneider |

|                             |        |                                                                           |                                                                           |
|-----------------------------|--------|---------------------------------------------------------------------------|---------------------------------------------------------------------------|
| Instance – 2<br>Achampet    | 5 MW   | 18,340 nos. (300 Wp each)<br>Manufactured by CSun                         | 7 nos, (860 kVA each)<br>Manufactured by<br>Schneider Electric            |
| Instance – 3<br>Kalwakurthy | 10 MW  | 37,940 nos. (290 Wp each)<br>Manufactured by CSun                         | 14 nos, (680 kVA each)<br>Manufactured by<br>Schneider Electric           |
| Instance – 4<br>Salakpur    | 10 MW  | 36,680 nos. (300 Wp each)<br>Manufactured by YINGLI                       | 14 nos, Manufactured<br>by Schneider Electric of<br>capacity 680 kVA each |
| Instance – 5<br>Alladurg    | 10 MW  | 36,680 nos. (300 Wp each)<br>Manufactured by CSUN                         | 14 nos, (680 KVA)<br>Manufactured by<br>Schneider Electric                |
| Instance – 6<br>Karnataka   | 20 MW  | 69,800 nos. (320/315 Wp<br>each) Make Seraphim                            | 30 nos. Schnidler make<br>(680KVA)                                        |
|                             | 20 MW  | 69,760 nos. (320/315 Wp<br>each) Make Seraphim                            | 30 nos. Schnidler make<br>(680VA)                                         |
|                             | 20 MW  | 70,040 nos. (320/315 Wp<br>each) Make Seraphim                            | 30 nos. Schnidler make<br>(680KVA)                                        |
|                             | 17 MW  | 87,120 nos. (78,360- 320<br>Wp )                                          | 20 nos. Schnidler make<br>(680KVA)                                        |
| Instance – 7<br>Vijaypur    | 6.8 MW | 8,760-315 Wp each, Make<br>Znshine Solar                                  | 10 nos. Schnidler make<br>(680KVA)                                        |
| Instance – 8<br>Hotgi       | 0.8 MW | 3,000 nos. (320 Wp each)<br>Make Canadian solar                           | 10 invertors, Deltaww                                                     |
| Instance – 9<br>Gotan       | 5 MW   | Total 18,340, 8090- 325<br>Wp/ 10250- 330 Wp),<br>Make-<br>Canadian Solar | 5 Invertors (Make- ABB<br>Ltd) 1 MW each                                  |
| Instance – 10<br>Sevagram   | 5 MW   | 15,520 nos. (320 Wp each)<br>Make Emmvee                                  | 4 Invertors, TMEIC<br>make                                                |
| Instance – 11<br>Pune       | 0.8 MW | 3,000 nos. (320 Wp each)<br>Make Canadian solar                           | 10 invertors, Deltaww                                                     |

## 3.2 Deviations

### 2.3.1 Methodology Deviations

There is no methodology deviation

### 2.3.2 Project Description Deviations

There is no Project Description deviation

### 3.3 Grouped Projects

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

## 4 DATA AND PARAMETERS

### 4.1 Data and Parameters Available at Validation

|                                                                                              |                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                                             | <b>EF<sub>Grid,CM,y</sub></b>                                                                                                                                                                                            |
| Data unit                                                                                    | tCO <sub>2</sub> /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:<br>$EF_{Grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$                                                                       |
| Value applied                                                                                | 0.9770 for NEWNE grid and 0.9817 for Southern grid                                                                                                                                                                       |
| Justification of choice of data or description of measurement methods and procedures applied | This is in accordance with applicable methodologies – AMS.I.D (version 18.0), ACM0002 (version 16.0) and AMS I.F (Version 03) along with Tool to calculate the emission factor for an electricity system (version 05.0). |
| Purpose of Data                                                                              | For the calculation of the Baseline Emission                                                                                                                                                                             |
| Comments                                                                                     | The combined margin emission factor for respective projects are applied depending on which grid they operate in.                                                                                                         |

### 4.2 Data and Parameters Monitored

|                  |                                                                                                                            |
|------------------|----------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter | <b>EG<sub>PJ,facility,y</sub></b>                                                                                          |
| Data unit        | MWh                                                                                                                        |
| Description      | Net electricity supplied to the grid by the project activity instance during the year y (for AMS I.D and ACM002 component) |

|                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Source of data                                                  | The quantity of net electricity supplied by the project activity to the grid (i.e. Net export in kWh) is taken from monthly “Joint Meter Reading” report which contains monthly energy meter reading                                                                                                                                                                                                                                                                                                                                                                                                               |
| Description of measurement methods and procedures to be applied | Net electricity supplied to the Grid is calculated based on the measured values of “export” and “import” on the meter at the delivery point, where monthly joint meter reading is taken.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Frequency of monitoring/recording                               | Continuous measurement & monthly recording                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Value monitored                                                 | <p>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:</p> <ol style="list-style-type: none"> <li>1. Project Activity Instance- 1 –48,584.22</li> <li>2. Project Activity Instance- 2 –10,996.34</li> <li>3. Project Activity Instance- 3 –22,731.73</li> <li>4. Project Activity Instance- 4 –21,736.92</li> <li>5. Project Activity Instance- 5 –21,018.01</li> <li>6. Project Activity Instance- 6 –179,363.53</li> <li>7. Project Activity Instance- 7 –16,681.75</li> </ol> |
| 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                                  | <p>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.</p> <p>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.</p>                                            |
| .Purpose of the data                                            | Calculation of baseline emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Calculation method                                              | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Comments                                                        | The monitored data will be archived electronically by the                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

|  |                                                                          |
|--|--------------------------------------------------------------------------|
|  | project proponent for the period that covers crediting period + 2 years. |
|--|--------------------------------------------------------------------------|

|                                                                 |                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data / Parameter                                                | <b>EG<sub>BL,y</sub></b>                                                                                                                                                                                                                                                                                                                                                          |
| 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 istaken 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 monitoring/recording                               | Continuous measurement & monthly recording                                                                                                                                                                                                                                                                                                                                        |
| Value monitored                                                 | 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:<br>1. Project Activity Instance- 8 –1,840.35<br>2. Project Activity Instance- 9 –11,562.59<br>3. Project Activity Instance- 10 –11,295.06<br>4. Project Activity Instance- 11 –1,973.37 |
| 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.<br>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.<br>The billing is raised based on substation meters.          |
| Purpose of the data                                             | Calculation of baseline emissions                                                                                                                                                                                                                                                                                                                                                 |
| Calculation method                                              | -                                                                                                                                                                                                                                                                                                                                                                                 |
| Comments                                                        | The monitored data will be archived electronically by the project                                                                                                                                                                                                                                                                                                                 |

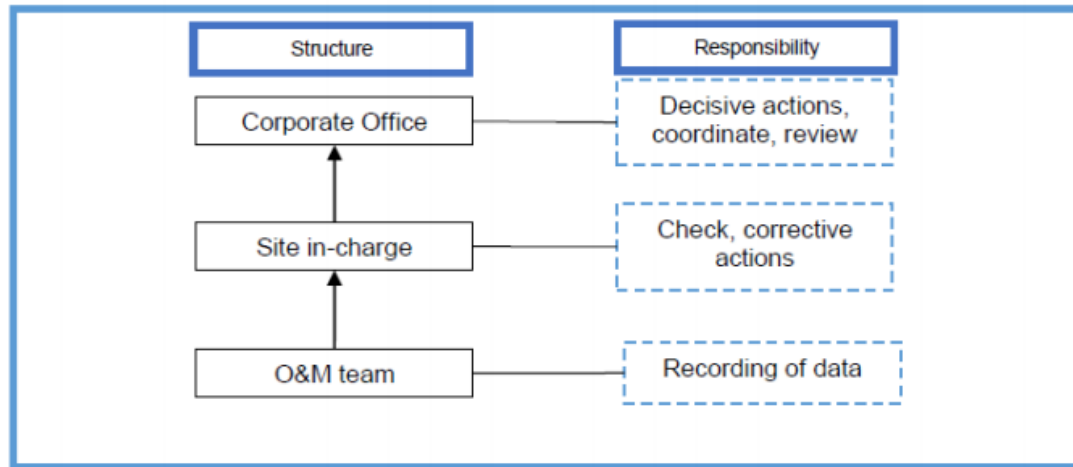
proponent for the period that covers crediting period + 2 years.

### 4.3 Monitoring Plan

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

#### Roles and Responsibility:

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



#### Corporate Office:

Officers in corporate office of project proponent are responsible for overall co-ordination towards the project activity instances development under VCS, including communication with VCS Consultants and Validation/Verification agencies etc. They also ensure that the relevant monitoring and data up-keep is carried out for the project activity properly and regularly. Thus, corporate office of Project Proponent/ project activity instance owner are solely

responsible for timely execution of all the related activities in VCS project development as well as operation of the proposed grouped project activity and take decisive actions in this regard.

**Site In-charge:**

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

**O&M Team:**

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

**Monitoring Procedures:**

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

Net electricity supplied to grid will be calculated as the difference of the measured values of

“export” and “import” at the metering point. The energy import and export readings are recorded on monthly basis in the form of Joint Meter Readings (JMR). The readings are taken in presence of representative from project proponent, representative from PP and representative from State Electricity Board. The JMR document is signed by all these representatives.

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

**QA/QC Procedures:**

All main and back up meters installed at each of the project activity instance sites shall be calibrated as described in Central Electricity Authority (Installation and Operation of

Meters) Regulations, 2006. Currently the regulations describe of calibration of meters to be done at least once in five years.

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

**Completeness:**

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

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

**Procedures for Data Adjustments/Uncertainties:**

**Reading and Corrections of Meters:**

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

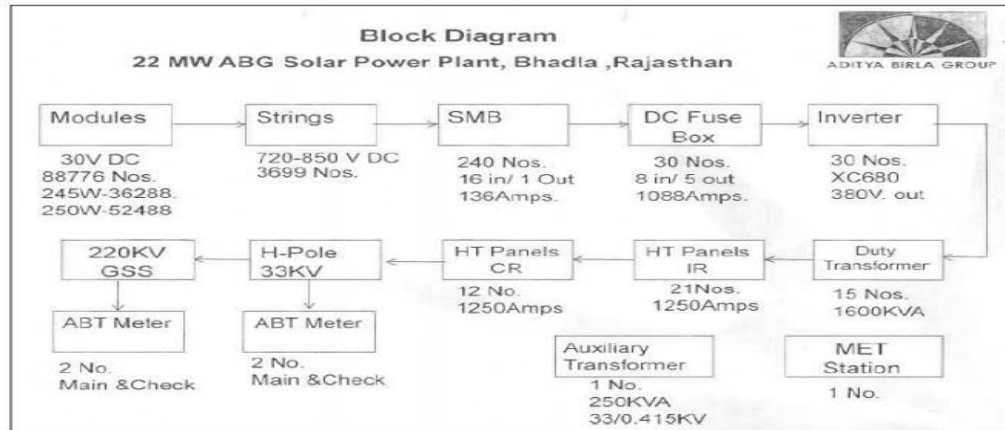
**Sealing and Maintenance of Meters:**

1. The main metering system and back-up metering system shall be sealed in the presence of representative of project proponent, representative from GSS and representative from the power purchaser.
2. When the main metering system and/or back-up metering system and/or any component thereof is found to be outside the acceptable limits of accuracy or otherwise not functioning properly, it shall be repaired, re-calibrated or replaced as soon as possible
3. Any meter seal(s) shall be broken only by the GSS representative in the presence of project proponent and representative from the power purchaser whenever the

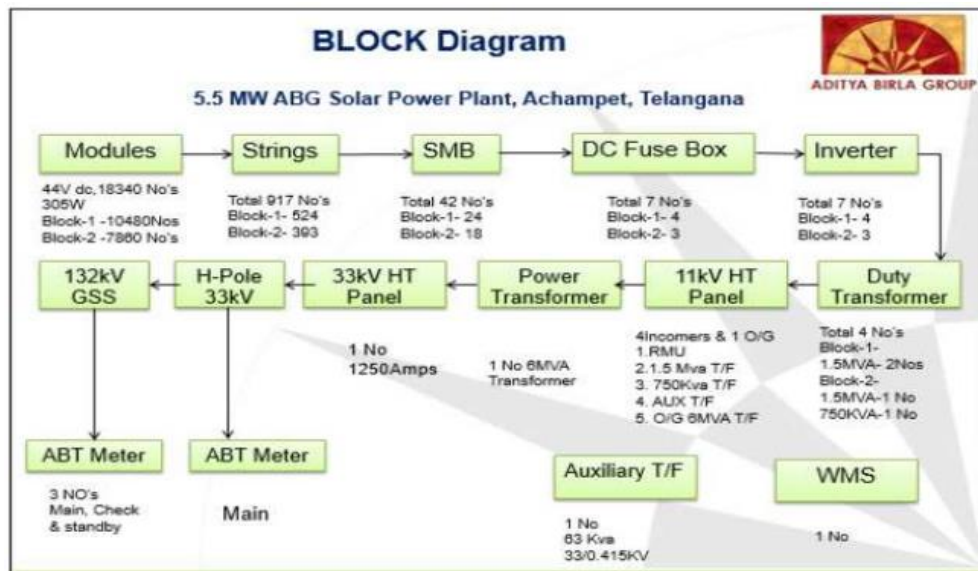
main metering system or the back-up metering system is to be inspected, tested, adjusted, repaired or replaced.

Line diagram of individual project instances are as follows:

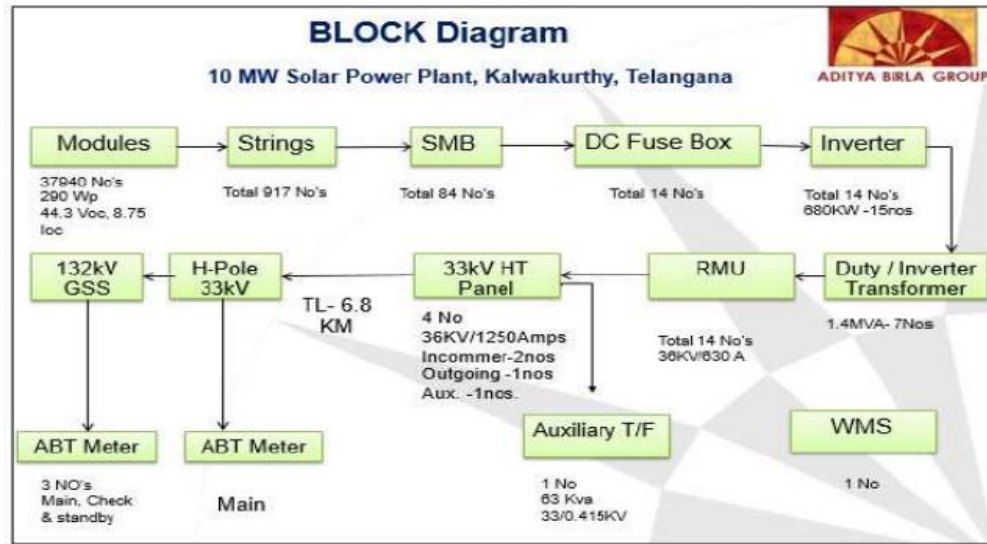
#### Instance 1:



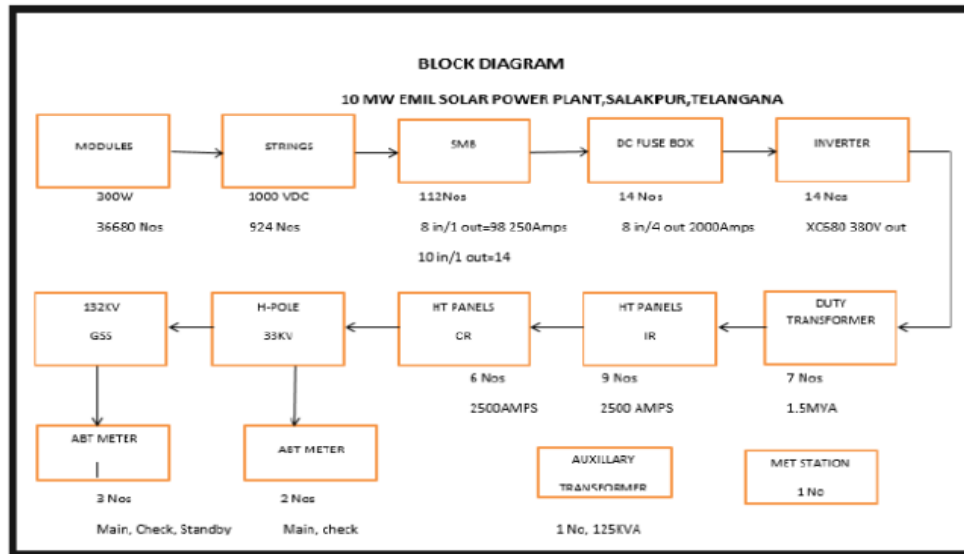
#### Instance 2



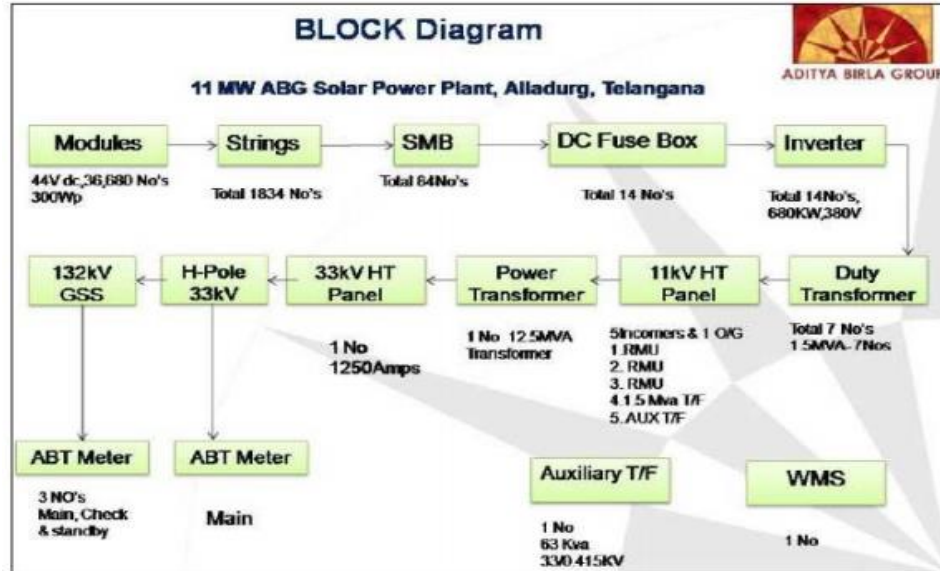
#### Instance 3



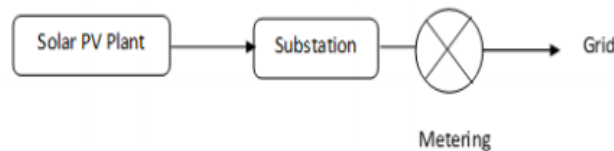
Instance 4



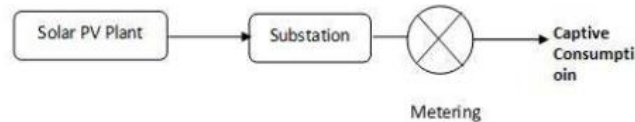
Instance 5



Line Diagram for the Instance 6 and 7



Line Diagram for the Instance 8 to 11



## 5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

### 5.1 Baseline Emissions

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

As per AMS I.D & ACM002:

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

Where,

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

$EF_{Grid, CM, y}$  = Combined margin CO<sub>2</sub> emission factor for grid connected power generation

As per AMS I.F:

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

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

$EF_{Grid, CM, y}$  = Combined margin CO<sub>2</sub> emission factor for grid connected power generation

Also as per the applied methodology AMS I.D, ACM0002 and AMS I.F. baseline emissions are being calculated as follows:

| Instance      | $EG_{PJ, facility, y} / EG_{BL, y}$ | $EF_{Grid, CM, y}$ | $EG_{BL, y} * EF_{Grid, CM, y} = BE_y$ |
|---------------|-------------------------------------|--------------------|----------------------------------------|
| Instance - 1  | 48,584.22                           | 0.9770             | 47,458                                 |
| Instance – 2  | 10,996.34                           | 0.9817             | 10,786                                 |
| Instance – 3  | 22,731.73                           | 0.9817             | 22,307                                 |
| Instance – 4  | 21,736.92                           | 0.9817             | 21,330                                 |
| Instance – 5  | 21,018.01                           | 0.9817             | 20,625                                 |
| Instance – 6  | 179,363.53                          | 0.9817             | 176,047                                |
| Instance – 7  | 16,681.755                          | 0.9817             | 16,368                                 |
| Instance – 8  | 1,840.35                            | 0.9770             | 1,788                                  |
| Instance – 9  | 11,562.59                           | 0.9770             | 11,287                                 |
| Instance – 10 | 11,295.06                           | 0.9770             | 11,027                                 |
| Instance - 11 | 1,973.37                            | 0.9770             | 1,919                                  |

$$BE_y = 340,942 \text{ tCO}_2\text{e (Round down Value)}$$

## 5.2 Project Emissions

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

$$PE_y = 0$$

## 5.3 Leakage

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

## 5.4 Net GHG Emission Reductions and Removals

| Year         | Baseline emissions or removals (tCO <sub>2</sub> e) | Project emissions or removals (tCO <sub>2</sub> e) | Leakage emissions (tCO <sub>2</sub> e) | Net GHG emission reductions or removals (tCO <sub>2</sub> e) |
|--------------|-----------------------------------------------------|----------------------------------------------------|----------------------------------------|--------------------------------------------------------------|
| Year 2018    | 49,032                                              | 0                                                  | 0                                      | 49,032                                                       |
| Year 2019    | 252,996                                             | 0                                                  | 0                                      | 252,996                                                      |
| Year 2020    | 38,914                                              | 0                                                  | 0                                      | 38,914                                                       |
| <b>Total</b> | 340,942                                             | 0                                                  | 0                                      | 340,942                                                      |

### Appendix - 1: Calibration Details

| Project activity instances   | Project site              | Main Meter | Check Meter | Calibration Date | Validity   |
|------------------------------|---------------------------|------------|-------------|------------------|------------|
| Instance – 1:<br>Bhadla      | Bhadla,<br>Rajasthan      | 13194946   | 13194947    | 01/10/2018       | 30/09/2023 |
| Instance – 2:<br>Achampet    | Achampet<br>Telangana     | 02781573   | 02781574    | 28/01/2017       | 27/01/2022 |
| Instance – 3:<br>Kalwakurthy | Kalwakurthy,<br>Telangana | 02781577   | 02781578    | 28/01/2017       | 27/01/2022 |
| Instance – 4:<br>Salakpur    | Mutsyal,<br>Telangana     | 13194257   | 13194258    | 18-01-2017       | 17-01-2022 |
| Instance – 5:<br>Alladurg    | Aladurg,<br>Telangana     | 02781621   | 02781631    | 07/03/2018       | 06/03/2022 |
| Instance – 6:<br>Karnataka   | Shirahatti,<br>Karnataka  | 16102125   | 16102130    | 16/08/2017       | 15/08/2022 |
|                              | Ramadurg                  | 16102135   | 16102133    | 28/01/2017       | 27/01/2022 |

|                            |                        |                |                |            |            |
|----------------------------|------------------------|----------------|----------------|------------|------------|
|                            | Karnataka              |                |                |            |            |
|                            | Mulbangal<br>Karnataka | 14194780       | 14194782       | 31/03/2016 | 30/03/2021 |
|                            | Vijaypur,<br>Karnataka | X048842<br>2   | X048842<br>3   | 06/04/2018 | 05/04/2023 |
| Instance – 7:<br>Vijaypur  | Vijaypur,<br>Karnataka | X048841<br>9   | X048842<br>1   | 06/04/2018 | 05/04/2023 |
| Instance – 8:<br>Hotgi     | Hotgi,<br>Maharastra   | 05288830       | 05288838       | 28/01/2017 | 27/01/2022 |
| Instance – 9:<br>Gotan     | Gotan,<br>Jodhpur      | RJB<br>90318   | RJB<br>90317   | 17/01/2018 | 16/01/2023 |
| Instance – 10:<br>Sevagram | Sevagram<br>Gujarat    | HT<br>01180175 | HT<br>01180176 | 30/07/2018 | 29/07/2023 |
| Instance – 11:<br>Pune     | Pune,<br>Maharastra    | Y<br>0355612   | Y<br>0355568   | 06/02/2018 | 05/02/2023 |

## Appendix – 2: Comparison between actual and estimated Emission Reductions

| Project activity instances | Title of the project activity                          | Opertaional days in current MP | Annual Estimatio n for 365 days | ER estimation for actual days | Actual ER | % Variation between Actual ER and estimate d ER |
|----------------------------|--------------------------------------------------------|--------------------------------|---------------------------------|-------------------------------|-----------|-------------------------------------------------|
| Instance – 1 Bhadla        | VCS Project for Solar Power Plant at Bhadla, Rajasthan | 488                            | 29270                           | 39133                         | 47458     | 21.27%                                          |

|                             |                                                                                  |     |       |       |       |         |
|-----------------------------|----------------------------------------------------------------------------------|-----|-------|-------|-------|---------|
| Instance – 2<br>Achampet    | VCS Project for Solar Power plant at Achampet, Telagana                          | 488 | 7171  | 9587  | 10786 | 12.51%  |
| Instance – 3<br>Kalwakurthy | VCS Project for Solar Power Plant at Kalwakurthy, Dist. Mehabubnagar , Telangana | 488 | 14524 | 19418 | 22307 | 14.88%  |
| Instance – 4<br>Salakpur    | VCS Project for Solar Power Plant at Salakpur, Telangana                         | 488 | 14240 | 19038 | 21330 | 12.04%  |
| Instance – 5<br>Alladurg    | VCS Project for Solar Power Plant at Alladurg, Telangana                         | 488 | 14679 | 19625 | 20625 | 5.10%   |
| Instance 6<br>Karnataka     | VCS Project for Solar Power Plant at Karnataka                                   | 488 | 36410 | 48679 | 45221 | -7.10%  |
|                             |                                                                                  | 488 | 36513 | 48817 | 46125 | -5.51%  |
|                             |                                                                                  | 488 | 36599 | 48932 | 43542 | -11.02% |
|                             |                                                                                  | 488 | 26460 | 35376 | 41159 | 16.35%  |
| Instance – 7<br>Bijapur     | VCS Project for Solar Power Plant at Vijaypur                                    | 488 | 10525 | 14071 | 16368 | 16.32%  |

|                          |                                                                          |     |                |               |               |              |
|--------------------------|--------------------------------------------------------------------------|-----|----------------|---------------|---------------|--------------|
| Instance –<br>8 Hotgi    | VCS Project for<br>Solar Power<br>Plant at Hotgi,<br>Maharastra          | 488 | 1432           | 1914          | 1788          | -6.58%       |
| Instance –<br>9 Gotan    | VCS Project for<br>Solar Power<br>Plant at Gotan,<br>Rajasthan,<br>India | 488 | 8956           | 11974         | 11287         | -5.74%       |
| Instance –<br>10 Gujarat | VCS Project for<br>Solar Power<br>Plant at<br>Sevagram,<br>Gujrat        | 488 | 8956           | 11974         | 11027         | -7.91%       |
| Instance –<br>11 Pune    | VCS Project for<br>Solar Power<br>Plant at Pune,<br>Maharastra           | 488 | 1388           | 1855          | 1919          | 3.45%        |
|                          |                                                                          |     | <b>Overall</b> | <b>330393</b> | <b>340942</b> | <b>3.19%</b> |